HAMTECH-2008

International Expo & Conference

Discussions, Demos, Lectures, Exhibits, Dxpedition and Tourism - A multi dimensional approach to promote amateur radio

18-20th October 2008
Hyderabad

Overview:

The National Institute of Amateur Radio (NIAR), Hyderabad organized a 3 day HAMTECH-2008, International Expo & Conference during October 18-20, 2008 at Swami Vivekananda Hall, NIAR Campus, Raj Bhavan Road, Hyderabad.

This event was co-sponsored by Department of Information Technology, Ministry of Communications and IT, Govt. of India and coincides with the Silver Jubilee celebrations of NIAR.

The Ministry of Home Affairs, Ministry of Defence & Department of Telecommunications, Govt. of India have supported by issuing necessary permissions to foreign and Indian Radio amateurs (HAMs) to operate their amateur radio stations from Andaman and Lakshadweep Islands with special callsigns VU4RG-VU4MY-VU7SJ and VU7NRO that followed this event during October 14-November 3, 2008.

HAMTECH-2008, International Expo & Conference was inaugurated by Mr. K. Rosaiah, Hon'ble Minister for Finance, Govt of AP and presided by Mr. V.Hanumntha Rao, Hon'ble Member of Parliament (RS). The dignitaries attending the event include Mr. K.S.Rao, Hon'ble Member of Parliament (LS), Mr. Vedavyas, Hon'ble MLA, Mr. Kamalakar Rao, Hon'ble MLC, Smt.Usha Chandrasekhar, Post Master General, Hyderabad Region and Mr. B.M.Baveja, Sr.Director, DIT, Govt. of India.

This event was well-attended with representatives from various government departments, senior & experienced ham experts from India and abroad, representatives from several schools and colleges, Bharat Scouts and Guides and other Non-Government Organisations, witnessed the impressive developments in promotion of amateur radio and latest amateur radio communication technologies by NIAR over the last 25 years. The members of electronic and print media attending this event gave wide publicity to the event.

The Amateur Radio Service has a long and rich history of technical innovation. The benefits derived from the effective utilization of radio spectrum resource by amateur radio operators and their study on propagation conditions for terrestrial communication around the globe is a reference to make better-informed decisions about the management of this important resource. The success of continuous technical experimentation on contemporary techniques of wireless transmission and reception has transformed the way we communicate speech and image signals.

HAMTECH-2008 was a very successful & unique event conducted in Hyderabad which showcased the developments in amateur radio wireless communications tools and technologies practiced by amateur radio operators in pursuit of gaining knowledge and upgrading their skills for societal development.

NIAR has received a very positive feedback from National and International Ham delegates attending the conference. All the dignitaries attending the event lauded the invaluable services rendered by Hams and NIAR over Two and Half decades by providing much needed communication support during various kinds of emergencies and also carrying forward vision of late Mr. Rajiv Gandhi, VU2RG with its activities and programs to further increase Ham Population in the country. The electronic and print media extensively covered the proceedings of the event.

Many delegates including the senior officers of Government of India were all praise of NIAR activities and the leadership role it is playing in this region. NIAR is promoting many facets of amateur radio including skill empowerment, self employment, technical exchanges, R&D, improving security environment etc besides disaster mitigation which we all know for several years.

The discussions at this convention addressed various topical issues like Promotional Aspects of Amateur Radio, Discussion on Roadmap for creating 1,00,000 Hams, taking forward Global Amateur Radio Emergency Communication Conference (GAREC) decisions, in India and other countries with the support of governments in the region. The event also focused on amateur radio modes like Voice, Morse Code, Visual, internet related and digital & satellite communication technologies, and also focused on latest technology developments in Antennas & propagation, Dxpeditions, HF&VHF Communications. There was an open forum to discuss on disaster management particularly the experiences, lessons learnt in the recent natural calamities shared by experts.

There is a need for greater awareness on amateur radio activities and encourage hams to discuss, display and demonstrate the latest amateur radio communication technologies used by hams internationally.

Hamtech 2008 featured forums for technical discussions on latest trends amateur radio communication technologies used by Hams around the world in combination with amateur radio operations. The outcome of this event has provided a strong basis of International support to future programs for development of amateur radio activity in this

region. The highlight of this event has been the professional make up of teams for amateur radio operation and their dedication to compete among themselves and prove to the world that their skills in the art of two-way wireless communication are second to none under not so favorable HF propagation conditions during this period.

Venue & Expo:

The Hamtech-2008, International Expo & Conference was held during October 18-20, 2008 at National Institute of Amateur Radio Campus, Hyderabad. The Expo included an impressive display of wide range of HF/VHF/UHF amateur radio wireless communication equipment and accessories from popular manufacturers like YAESU, ICOM, KENWOOD etc. and antenna systems of StepIR, Hi-gain, Create, Force-12 etc. The accessories included power supplies, antenna tuners, antenna rotators, towers. Several Hams from India have also exhibited their home devices and accessories including HF transceivers, antennas, baluns etc. The members from student community participating the event were particularly attracted to Direction finding devices which is used for hunting hidden transmitter in the game of 'Fox Hunt'.

Participants:

The 3-day event was attended by over 400 delegates from India and abroad. The participants of this event include radio amateurs from representatives from educational institutions as well as State and Central Government agencies from various parts of the country. People from all walks of life including students, Lecturers, Doctors, Businessmen as well as from government service participated in the interactive meeting.

A Report on Inaugural Session:

The Inaugural function of Hamtech-2008 was held at "Swami Vivekananda Conference Hall" at NIAR Campus, Hyderabad on October 18, 2008 at 5.30 PM. Hamtech-2008, International Expo & Conference was formally inaugurated by Mr. K. Rosaiah Garu, Hon'ble Minister for Finance, Govt of AP and other distinguished guests. The inaugural function was attended by delegates from India and abroad including several local citizens.

Welcome Address:

Mr. S.Suri Convener, Organising Committee HAMTECH-2008 while presenting the welcome address explained the objectives of the event and informed that this event was co-sponsored by Department of Information Technology, GoI. He also gave a detailed account on the genesis of amateur radio development programs undertaken by NIAR with continuous support of Department of Information Technology, Govt. of India since 1983 and explained the tangile results achieved in terms of upgrading skills of Indian Hams, International cooperation, Ham tourism and expanding the knowledge base by increasing Ham population in the country, to this date. He specially mentioned the support and encouragement received from Ministry of Home Affairs, Defence, External Affairs and Department of Telecommunications for various programs undertaken by NIAR in the last few years. Mr. Suri informed that foreign and Indian participants would display, demonstrate their skills as well as interact with other delegates to share knowledge on technical developments achieved in their countries. International Ham Tourism to India was also one of the objectives of this event.

Mr.S.Ram Mohan, VU2MYH gave a report on activities of NIAR conducted over last 25 years which include Awareness, Training, establishing Ham Clubs, contributions to policy making and others. He also gave detailed account of promotional activities by way of Demonstrations conducted at various institutions, Lectures programs, Seminars, as well as innovative and interactive programs like painting competitions, fox hunt conducted by NIAR with involvement of students and colleges to bring youth closer to the activity. He also explained the achievements of NIAR though technical study on Propagation Conditions in amateur radio communications for Coastal areas in the state of Tamil Nadu with support of Department of Information Technology, Government of India and evolving a concept paper for increasing Ham population to 1,00,000 in the next two years.

Mr. V Hanumantha Rao, Hon'ble Member of Parliament & Chairman HAMTECH 2008 Organising Committee said that NIAR is serving the nation since its inception in 1983 and fulfilling the vision of Mr.. Rajiv Gandhi by taking communication technology tools to the masses and making them partners in the national development. The voluntary service rendered by the members of NIAR in all major calamities/ disasters throughout the country is well appreciated by all governments. The outcome of this event is expected to encourage many young radio amateurs in the country with hands on experience in several technologies demonstrated by participating Hams and improve their technical skills in the art of two-way wireless communication. He also suggested the agencies of government like Telecom, Disaster Management to collaborate with NIAR and to use its services for further benefit of society.

Mr.. K. S. Rao, Hon'ble Member of Parliament while addressing the gathering said that HAMTECH-2008 is a very Innovative and informative technical Exhibition which has several models of amateur radio communication ranging from low cost home made devices to modern state of the art technology devices, the variety of Antennas and accessories. Amateur Radio can become a medium for connecting people, bridging gaps in the medium of information exchange between urban and rural/remote areas as well as in case of calamities. He also requested the Govt. of AP to support NIAR by giving grants-in-aid regularly.

Mr.. B. Vedavyas, Hon'ble MLA and Mr.. B. Kamalakar Rao, Hon'ble MLC appreciated the role of NIAR and its members for their excellent service since many years to further promote and popularize amateur radio in the country. They also requested the Chief Guest to consider the registration of the allotted land in the name of NIAR.

Mr. B.M. Baveja, Sr. Director, DIT explained the support providing by the Dept. of Information Technology, Ministry of Communications & IT to NIAR over 25 years and also conducting various projects including R & D Projects like "Propagation Conditions in Amateur Radio for Coastal Areas, Digital Connectivity in Rural/ Urban and Remote areas as well as for organizing international seminars and Dxpeditions in A& N Islands and Lakshadweep Islands including the HAMFEST-2006, HAMFEST-2007 and also the HAMTECH-2008. He also suggested the state government should support NIAR for implementing various projects in Andhra Pradesh and in the country.

Smt. Usha Chandrasekhar, Post Master General, Hyderabad Region presented the special postal cover & cancellation commemorating successful completion of 25 years of service to society by NIAR. The special cover & cancellation was released through the Hands of the Chief Guest Mr. K. Rosaiah, Hon'ble Minister of Finance, Govt of Andhra Pradesh.

Chief Guest Address:

Mr. K. Rosaiah Garu, Hon'ble Minister for Finance, Govt of AP in his inaugural address as the Chief Guest on the occasion while appreciating the voluntary service by hams through their radio contacts add great value for service to society by passing information during the critical hours when communications are essentially required. He said it was a unique and historic occasion as such a large gathering of National & International hams was organized in Hyderabad in the country. He also released a souvenir brought out by NIAR to mark the occasion.

Earlier, Mr. K.Rosaiah inaugurated the International Expo consisting of various kinds of amateur radio wireless communication equipment and accessories. He was particularly impressed by the display of various working models of communication equipment and technologies related to Automatic Position Reporting System (APRS), Direction finding, other HF/VHF/UHF transceivers, Antennas and accessories raging from low cost devices to high-end models.

Mr. Rosiah speaking on the occasion said that the number of Hams needs to be increased keeping in view of invaluable services during the disasters, specialized training programs needs to be imparted to un-employed youth for skill development and prepare them to respond for emergency communication needs of our country.

He also expressed the need to implement advanced concepts in communication technologies that assist in faster dissemination of information in the times of disaster. He also assured to take up the issues related to promotion of amateur radio with the respective government departments as well as provide financial resources to the activity.

He also gave away HF transceiver award to Mr. Naman Batra, Student from Delhi Public School, R.K.Puram New Delhi and also felicitated the foreign Ham experts attending the event.

Presentation of Awards & Certificates:

Mr. Naman Batra, Student of Delhi Public School, RK Puram, New Delhi receiving HF Transceiver award through the hands of Chief Guest Mr. K. Rosaiah, Hon'ble Minister for Finance, Govt. of AP.

HF Contest: NIAR had earlier released an announcement inviting foreign and Indian Hams to participate in Silver Jubilee HF contest on 7 & 14 Mhz band in various categories organsied during 16th - 17th August 2008.

The Silver Jubilee HF Contest committee headed by Mr. Franz Bernt, DL9GFB gave away the awards and certificates to the winners in various categories as follows:

Category A.1. Dr.Rajasekhar, VU2HMY

Category B:1. Ms. Nisha M.Mohan, VU2NIS
2. Nr.Jayan U., VU2JYU
3. Mr.L.M.Rajeev, VU2OCY

Category C. 1. Mr.Charles Harpole, HS0ZCW

SWL 1. Mr.Alokesh Gupta
2. Mr.Manu M.Pillai
3.Mr.Edara Venkateswara Rao

Mr. Franz Berndt Dl9GFB, presenting a trophy to Dr. Rajashekar, VU2HMY on winning NIAR Silver jubilee HF Contest under Home Brew category in first place.

All others who have sent contest entries will receive participation certificate

Certificates to Painting Competition: As part of NIAR's Silver Jubilee Celebrations to encourage and to create awareness among the students, a painting competition in Kendriya Vidyalaya No.2 School on the theme "Amateur Radio in Disaster Management" with over 50 students have participated. The certificates were distributed to the winners and participants.

The program concluded with the vote of thanks.

Cultural events:

The cultural program included young artists giving a scintillating dance performance in an ancient dance form called 'Andhra Natyam' which is derived from soup of south Indian dance forms like Kuchipudi and Bharatnatyam. This art is the spiritual expression of the Telugu people and another unique dance form of this state. The artists enthralled the audience performing the Andhra Natyam item, Dasavataram, *Sivakaivaram, Tripura Samharam* with different *mudras* and *abhinayam*, facial expressions amply reflected the soul of the lyric and precise footwork that impressed the foreign and Indian participants, a treat to watch enticing the audience at the end of an eventful day.

Program - Day 1: 18th October 2008
Pre Inaugural Discussions

Session-I : 10:00 AM ~ 11:30 AM

Chairman : Dr. Armugam , Vice-Chairman, Kumaraguru College of Engineering and Technology, Coimbatore. In his address to the gathering, he emphasized the need for getting youth particularly in technical education to undertake activities such as amateur radio explaining its benefits. The inspiration from the leaders in this field like Mr.Suri would go along way in the shaping the scientific temper among the young minds. He said all the technical institutes in the country need to encourage their students to participate in amateur radio related activities which provide immense personal benefit as well as benefits transferred to society in times of need.

Speakers:

Mr. S. Suri VU2MY, Founder & Chairman, NIAR welcomed the delegates and guests, he explained the vision and mission that inspired to carry forward the message of service to the society as an NGO through amateur radio activities raising from humble beginnings at the time inception of NIAR and its journey over last 25 years with the help of Govt. of India, Govt. of AP and other institutions. He emphasized that establishing partnerships with like-minded institutions, channelizing efforts of increasing ham population, need for organizational framework to carryout objectives, initiating policies that integrate with the nation-building process and scientific development. He also explained that our has country has a large geographical area and diverse needs, amateur radio has a role to play in igniting young minds to inculcate scientific temper, provide alternate communication channels in disaster management, disseminating knowledge and information on latest developments, empowering people even in rural and remote areas to access information at negligible cost, above all ensuring security and overall development. He also extended an invitation to all Hams and Ham Clubs in India and abroad to join in the efforts to create 1,00,000 Hams in the country.

Mr. Martin Leybold, DL2NED, Germany speaking on the occasion said that the International Community of Hams is supporting this event with the demonstration of technical excellence in amateur radio communications from several countries. Ham Radio has always been an inspiration to many radio amateurs to become leaders in various fields of wireless communication art like the Voice, Digital, Morse Code and internet related communications technologies using special designs of antennas, transmitters, receivers, interface devices are used to enhance the wider coverage of signal to reach every nook and corner of the world. The knowledge sharing and experimentation has in many ways brought superior standards in the technology they use.

Mr. Hans Elhers, DF5UG explained that in a contrary to the wide spread telephone/mobile communication systems, amateur radio gives an individual the necessary technical and operation skill as well as understanding of communication technologies used by people for making a two-way radio contact. He appreciated the role and the service of NIAR and its members.

Mr. Lakshmikanth, VU2LKP, an NRI entrepreneur based in USA, shared his experiences from the past being one of the most active student members participating in various calamities as a volunteer. He also explained how amateur radio encouraged him to improve his skills in personality development, leadership qualities and technical advancement. He also explained that in present day's context of globalization, our country needs to study and learn from progressive policies in amateur radio adopted by developed countries like USA and in Europe, which give us many progressive examples. He also added by saying that only progressive policies backed up with committed implementation program can only bring desirable results for our country.

Dr. Vijaya Ragavan gave an impressive lecture and paper presentation on "**Creative Mindset Building in Radio Usage".** In a though provoking lecture he explained the methods that can be followed for Social and Personality development as a result of interactions with the people. The practical examples involving the participants particularly youth and children to self motivation and success attracted the audience.

At the end of the session, Dr. Armugam, Chairman of proceedings for the session honored the speakers for sharing their experiences. Mr. S. Suri, VU2MY, Chairman of NIAR has honored Dr. Armugam for his cooperation and support for the event.

SESSION-II

11:45 ~ 13:15 Promotional Aspects of Amateur Radio: Discussion on Roadmap for creating 1,00,000 Hams

Chairman of Proceedings: Mr. Gulab Chand, Asst. Wireless Advisor to GoI

Speakers: Ms. Bharathi Pradas, VU2RBI
Mr.Satyapal, VU2FI
Mr. K.G.Nadarajan, VU2KGN
Mr. D.N.R.Rao, VU2DNR
Mr. Chaitanya Kumar, VU3MCK
Mr. Marcus, VU2VTM

Mr.. Gulab Chand explained the initiatives taken by Wireless Planning and Coordination (WPC) wing, Department of Telecommunications, Government of India for issuing special permissions to foreign and Indian hams to operate their amateur radio stations from Lakshadweep Islands as well from Andaman Islands during various occasions in the past and also during this year. The special callsigns VU7SJ, VU7NRO, VU4MY and VU4RG was issued for radio amateurs to operate from Kadmat, Agatti of Lakshadweep Islands as well as Port Blair with a view to encourage more hams to participate in these activities. He said that their department would welcome and keen to support any progressive proposals for development of amateur radio activity in the country.

Speakers:

Ms. Bharathi VU2RBI explained that over the years the need for use of amateur radio in emergency communications have increased and new challenges have been thrown up with more frequent occurrences of major disasters. It requires elaborate planning, preparedness and a motivated group of young enthusiasts to meet these challenges. It is essential to tap the vast human resource in our country and hence the idea to create 1,00,000 hams is envisaged to meet the needs of our future. It is essential to have the concrete program that can become part of a development process of the country, supported by strong economic models that can be replicated for its sustenance and enhanced growth. It is essential to motivate all sections of society to build confidence, bring communities closer by using affordable technologies as well as benefit from such programs. The dx-peditions provide a forum for hams to work as teams, exhibit their technical expertise and channel their resources to be prepared for any eventuality.

Mr.Satyapal, VU2FI, Director Indian Institute of Hams, Bangalore appreciated the services of the regulatory agencies particularly the Department of Telecommunications and Department of Information Technology for their continuous support to amateur radio activity and said the issue of new licenses and renewals has been expedited in the recent years as compared to the past. He also said that even after 110 years of invention of radio, most educational institutions are unaware of the activities of amateur radio and their usefulness to the society, the fault is not with the people but lack of organizational framework to reach out population in a massive way to cover geography and population of India. We need to conduct massive awareness programs in a befitting way through our clubs or individuals. He suggested that each ham may identify atleast 5 schools in their localities and organise awareness programs, it is not difficulty to make 1,00,000 hams. We need to become active and bring a directory of active people.

Mr. K.G.Nadarajan, VU2KGN, President QARL supporting the program to create 1 lakh hams in the country said that Kerala State has been among the forefront in encouraging amateur radio activity and explained that necessary steps are needed to be taken to ensure atleast 1 ham operator in every village. He also said that state governments should adopt suitable policies to expedite this objective and provide resources to meet the targets, the returns of which are ensured through Disaster Management activities. The prolific use of computer & Internet based technologies like Echo-link provide needed stimulus with practical application of this activity. He also said that computer based training and examination would simplify conduct of ASOC examination and achieve desired results. He also said QARL has been achieving 60-80 % success in ASOC examinations conducted each year and would like to continue to train more students as well as associate with other clubs to get some more support.

Mr. D. N.R Rao, VU2DNR while appreciating the services of NIAR over 25 years said political will is essentially required to carry the message of amateur radio to the people, Mr. Rajiv Gandhi, VU2RG being an active Ham himself and as a politician promoted this hobby in our country. It is most appropriate that we do remember his support and NIAR has become synonymous for amateur radio activity in our country. He suggested that the syllabus of ASOC examination needs to reviewed and modified to make suitable changes to accommodate latest developments in technology as well as having question bank with objective type of questionnaire in examination will go a longway in simplifying procedure for conducting these examinations. The modern equipment is easy to import from abroad as manufactures like BEL in India serve the needs of defence organizations, Duties levied on the these equipment and accessories may be scraped. Not many young people are getting

involved in making their own equipment, it requires to create a talent pool in India that would encourage young minds into assemble their ouwn kits. The Morse code for ASOC is not serving the objective as there are many new practical ways that experimentation is conducted using computer softwares. It is highly recommended and that of entire ham community that Morse code is no longer needed to be part of ASOC examination.

Mr. Chaitanya Kumar, VU3MCK observed that while the country is progressing well in various fields, we are still waiting for suitable favorable polices to be initiated for promotion of amateur radio, it is essential for institutions like NIAR to work more aggressively with the policy makers to achieve desirable results. He explained that while student community is most targeted sections for amateur radio resource emphasis should be given to technical institutions, NGOs and Disaster Management agencies. He said motivation for an individual to pursue this hobby can only be sustained by expediting conduct of ASOC examinations, issue of results, issue of Licenses and other administrative aspects as long as they adhere to a specific time frame. He also explained the benefits of amateur radio is not limited to individuals self attainment of knowledge and skill development but also work for community development, awareness should about the hobby needs to start from ones family and his neighborhood.

Mr. Marcus, VU2VTM speaking on the occasion said that amateur radio activity is not an expensive hobby as many perceive it, awareness is most important task, it was suggested to have National Amateur Radio awareness day celebrated by bringing all Hams and Ham Clubs together. The syllabus and conduct of ASOC examination must ensure that a person at the age of 12 years is able to qualify for the same. It is also necessary to update the policies for upgrading the license grades for amateur radio licenses as the syllabus and examination is same for various grades. It is certainly possible to achieve the target of 1,00,000 hams in the country when is a concerted effort from Amateur Radio organizations, Hams and regulatory agencies of Govt. of India.

At the end of the session, Mr. Gulab Chand, Chairman of proceedings for the session presented mementoes to the speakers and thanked them for sharing their valuable experiences. Mr. S. Suri, VU2MY, Chairman of NIAR has honored Mr. Gulab Chand, Asst. Wireless Advisor to Govt of India and thanked all the officers of Wireless Planning and Coordination (WPC) wing, Department of Telecommunications, Govt. of India for their cooperation and support to this event.

SESSION-III

14:00 ~ 15:45 **Amateur Radio Satellites:**

Chairman : Mr. Franz Berndt, DL9GFB

Speaker: Mr. B.A. Subrahmani, VU2WMY
Secretary Upagraha Radio Club, ISRO, Bangalore

Mr. Franz Berndt, DL9GFB addressed the gathering on behalf of the team of amateur radio operators visiting Agatti Islands appreciated the Government of India for issuing necessary permissions for International Hams to make suitable preparations to showcase their technology tools and skills on amateur radio operations. He also appreciated the initiatives and effort of NIAR to foreign hams since many years to operate the amateur radio stations from A& N Islands as well as Lakshadweep Islands. He also presented a memoir - photo album on VU7RG expedition at Lakshadweep Islands during January 2007 in which he was also a participant. He also presented the "Sea of Peace" award to NIAR for its Silver Jubilee special callsign "AT25MY" operated during 26 July 2008 to 22 October 2008. While appreciating the developments of NIAR, he also readout the message from the Mr. Franz Langner, President of German DX Foundation on the silver jubilee occasion.

Mr. Franz, DL9GFB also presented a "Sea of Peace" award to Ms. Nisha M Mohan, VU2NIS for contacting amateur radio stations around the black sea during the contest period in July 2008.

Mr. Franz, DL9GFB also presented a "Sea of Peace" award to Mr. Jose Jacob, VU2JOS for contacting amateur radio stations around the black sea for the year 2007 .

Speaker:

Mr. B. A. Subramani, VU2WMY, Secretary, Upagraha Radio Club, ISRO, Bangalore gave an excellent and informative power point presentation on Satellite Communications. He also explained that the ten satellites placed in orbit in one launch and seven out of them are amateur radio related satellites.

He explained the lineage of Space communications with the launch of World's first Artificial Satellite –Sputnik 1 which marked the beginning of the space age and importance of use of satellite technologies for remote sensing, weather forecasts, groundwater conservation, relief and rescue. He explained the need of satellite for amateur radio communications using VHF/UHF communication which gives us an opportunity to understanding space technologies as Hams always try to learn many new concepts. Through satellites hams can learn more about digital communications, space science, operating skills improvement, skill of tracking and communicating to various orbiting satellites etc., this gives techniques and exposure to hams.

The most fascinating thing is contacting International space station and talking to Astronauts. All space mission shuttles carry amateur payloads: Shuttle Amateur Radio Experiment'. Ham astronaut's on-board space station thrills many schools and hams on earth with a call from space.

An other experiment: Amateur Radio experiment on International Space shuttle. ISS is having permanent ham setup and callsign NE1SS. Most of the astronauts are hams and ISS can itself communicate with hams on earth with digital modes and functions as a cross band repeater.

Amateur Radio still remains Astronauts and Cosmonauts electronic connection to life on earth and a constant home life companion. Most of the Architects are designed, developed and launched by hams from USA, Germany, Canada, Russia, France, Italy, Australia etc., in some countries which are not having their own satellites systems but launched amateur satellites which shows the interest of hams.

Though India joined late, it launched its first satellite "HAMSAT" called Vu Sat or VO-52 on 05.05.2005 which is in the orbit now. It's a linear transponder working with 60 khz bandwidth. HAMSAT is termed as a 'Good Will ambassador' on the air. A world class satellites by ISRO/India …CQ CQ CQ CQ Ham sat CQ Hamsat CQ Hamsat. The skies reverberated by carrying these messages, the moment when the Indian pay load transponder of Hamsat was switched on 6th May 2005 after the Hamsat soared into space abroad PSLV on that magical day 05-05-2005.

He said India has vast potential with the student community among various universities that needs to be galvanized to conduct experiments in amateur satellites.

At the end of the session, Mr. Franz, Chairman of the session honored the speaker for his informative presentation. Mr. S. Satyapal, VU2FI, Governing Council member of NIAR have honored Mr. Franz for his excellent presentations.

SESSION-IV
15:45 ~ 17:00 Expeditions / Contesting

Chairman : Mr. B.M.Baveja, Sr. Director, DIT
Speakers: Mr. Norbert Meyer, DJ7JC, Germany
Ms. Jeanie Parker, WA6UVF, USA
Ms. Kyoko Miyoshi, JR3MVF, Japan

Mr. B.M. Baveja, Sr. Director, DIT which speaking on the occasion said dxpeditions are unique by which amateur radio operators excel in a team event, working for a common objective and also strike a social chord among participants. He reminded the fruitful interactions during Hamfests organized during 2006 and 2007 which involved participation of foreign and Indian hams, exhibiting tremendous physical and technical ability, professionalism on par with the best in the field which are unique qualities of radio amateurs. He congratulated all the team members of VU7SJ,VU7NRO, VU4RG, VU4MY dxpedition and appreciated the role of international ham community for the supporting amateur radio activity in India.

Speakers

Mr. Norbert Meyer, DJ7JC, Germany shared his expedition's experiences to the participants. Personal Development in making own Crystal radio, Short Wave radio and intrinsic motivation of individual for expanding knowledge, participate in social causes for working in disaster. The dx-peditions provide an opportunity to develop deep friendship with other like-minded people around the world. He also gave insights in to planning, preparations team roles and responsibilities, raising resources to organize a good dxpedition with an interesting power point presentation on TI9KK expedition on "Isla Del Coco", Costa Rica in 2008.

Ms. Jeanie Parker, WA6UVF, representing Young Ladies Radio League USA congratulated NIAR and its team for celebrating Silver Jubilee. Ms. Ellen J Parker from USA thanked the Government of India for encouragement given to foreign Hams to operate their amateur radio stations earlier and recently from Lakshadweep islands as well as A& N islands and providing an opportunity to exchange their views on promotional aspects of amateur radio. She also explained that participation of women is important in the technically challenging activities as its builds their self-confidence and motivates them to exhibit their professionalism on par with men in the field. She also suggested having exclusive activities with women ham members in the country that will go a long way in promoting the cause of amateur radio.

Ms. Kyoko Mioyoshi, JR3MVF, President Japan Ladies Radio league Japan

The success of the earlier Hamfest 2006 in Port Blair, A&N Islands and Hamfest 2007, Lakshadweep Islands has encouraged hams to take active role in co-ordinating this major event. The International Ham community is proud to be associated with the NIAR. She lauded the support given by the Ministry of Communications and IT for all the major events of NIAR for promotion of amateur radio in India. She suggested that young generation needs to be motivated by encouraging them to participate in group events, technical debates, constructing of electronic kits.

Ms. D. Bharathi Prasad, VU2RBI and Ms. S. Yamini, VU2YAM of NIAR honored Ms. Jeanie Parker, UA3UVF for her continuous support to amateur radio activities in India for over three years.

Program- DAY-2, 19 October, 2008

SESSION-V

10:00~11:30 Emergency Communications: Prepare for Social Response

Chairman : Mr. Denzil B Atkinson, Ex-MP

Speakers : Mr.S.Suri, VU2MY
Dr. Vijayaraghavan
Mr. Hans Elhers, DF5UG
Lion Ajoy, VU2JHM

Mr. Denzil B Atkinson, Ex-MP said that understanding of amateur radio concepts has not reached the sections of policy makers who are unaware of the potential use of this activity for community development. He shared his experiences and difficulties inherent in the bureaucracy that failed to understand his proposal to establish amateur radio stations in over 25 institutions across the state was not favorably considered. However, his continuous effort to achieve this objective has given the opportunity for 4 schools to encourage their students to take part in amateur radio activities. He said people of the country needs to be educated that ham radio is a communication tool and more useful than any other communication system. After seeing the growth of ham and importance, it is my duty to write to C.M, MP'S and others about this hobby. Even under present circumstances of prolific use of Internet and mobile phones, all the officials like Collectors etc., are not able to send messages to other officials during calamities. My suggestion is to improve ham population by way of making atleast 1 million hams and setting of stations in each district head quarters. And that should go down to panchayath level and lower levels. Latest developments in amateur radio using GPS may be used for helping society in disasters. Students must be made aware of this useful hobby through their curriculum at school and all the institutions who can afford to setup ham radio should encourage the same for their children.

Speakers

Mr.Suri VU2MY explained the steps taken by NIAR to improve emergency communication skills of Indian hams by joining the international amateur radio community Hams with greater emphasis on training at Austria, Interaction with the experts in Dayton and participation in GAREC conferences during the recent years. He stressed that Indian hams should learn to use latest technologies that can be implemented for providing better services to the administration in times of need. He encouraged participation in Disaster management exercises, interaction with other NGOs and Disaster Management agencies for better inter-agency coordination. He also informed that a database of interested ham volunteers is being maintained and equipment resources are being upgraded to meet the future challenges.

He also stressed that Hams and Ham Clubs in India should work with a single objective of service through society as well as develop human resource of hams in different parts of the country for efficient emergency communications response.

Dr. Vijayaraghavan explained about the methods of creative mindset to achieve success to most complex challenges for Ham community and society in general and to look forward for solutions from a non-ham perspective which could achieve desired results. He said while the experience gained by the individual in the field helps in evolving a thought process but to overcome these challenges sections of society other than hams can also provide suitable professional advise that evolve strategies and tasks that assist ham organizations in improving their skills for emergency communications, team work, organizing abilities and creative environment. He also distributed prizes to the participants who actively participated in various memory improvement tests etc.

Mr. Hans Elhars, DF5UG explained that individuals need to understand about the importance of amateur radio service and should develop a commitment to pursue a hobby with intent of service. He said that several International agencies including the United Nations have realized the potential of amateur radio service and encouraged the same. He said that it essential to prepare a directory of committed radio amateurs, understanding technical skills as a hobbyist and commitment for service to society.

Lion Ajay, VU2JHM explained that amateur radio emergency communications for social response as a coordinated effort by way of networking of resources of various organizations and agencies that are depended on communications for providing efficient Disaster Management. As there are more agencies Lions, Rotary Clubs and others that get involved in Disaster Management activities, amateur radio operators are also expected to exhibit their professionalism in their skills to match their support. It is required to have continuous training, mock drills and be prepared. He also extended invitation to all participants to join again in Bangalore to celebrate 50 years of BARC.

The speakers of the session were later felicitated by the Chairman of the session Mr. Denzil B Atkinson, Ex-MP.

SESSION-VI
11:45 ~ 13:45 **Home Brew Techniques**

Speakers
Mr. S.B. Ram, VU2LIC
Ms. S. Yamini, VU2YAM
Dr. Rajashekar, VU2HMY
Mr. K.C. Pandey

Dr. Rajeswara Rao, former DDG (Telecom) said radio spectrum is a natural resource that needs to be exploited for benefit of the people. Amateur Radio operators utilize this abundant natural resource for two-way communication, disaster management technical experimentation and scientific advancement. The people of the country must be made aware on the benefits of this communication technology and organizations like NIAR with their experience of 25 years in this field must work for bringing suitable policies with the government seeking support from all sections of society. The leadership of the organization should work closely with Indian administration and also encourage people to people understanding, International relationships with neighboring countries and South East Asia. The spectrum of Ham Radio is a major resource available for developing countries that can be used to improve scientific advancement and suggested case studies on the above subjects may be placed on internet for wider understanding of the people.

Dr. Rajashekhar, VU2HMY gave a detailed technical presentation on the low cost home made 'HMY2K8' HF transceiver designed and developed by him having a double conversion receiver and achieving a power out put of 40-50 Watt. The power source of 12 V - 1 Amp can either be a batter or a low cost rectifier input. He explained the circuit operation with complete schematic diagram and detailed construction. A detailed report is also published in the HAMTECH 2008 Souvenir. He also said that further developments are underway for improving the quality of the equipment for multi-band operation soon.

Ms. S. Yamini VU2YAM shared her experience of "TI9KK" International Expedition to Cocos Islands, Costa Rica, Central America being the First Indian and only woman participant of a 12 member team comprising of Hams from Europe, USA and Asia hams to work on SSB,CW, RTTY, EME and Pactor operation. She explained the challenges met by the team to succeed in their goal which has won the members of the team several prestigious awards nationally and internationally.

Mr. K.S. Pandey While congratulating NIAR for successful completion of 25 years in service explained that amateur radio is a unique resource by which the developing countries can network even remote regions with an excellent communication network among the people. He said that our country has vast geographical area where technical difficulties arising of wire line connectivity at many places cannot be addressed considering the scale and scope of disasters. Hence, people must be encouraged to build a network of amateur radio communications along the communities particularly the coast-line and remote regions.

Mr.Balaji Kumar shared his experience on how amateur radio assisted to gain self-confidence in life through participation in several activities like Asiad'82 games and other disaster management programs even being a physically challenged person.

Mr. S.B.Ram VU2LIC gave detailed account of his experience since 1982, his association with the amateur radio activity and the inspiration of NIAR founder Mr.Suri about the Vision and Mission for which NIAR was established. He said several members of NIAR have shown utmost commitment to achieve the objectives of the organization. He explained that administrations and policy makers need to be made aware on the benefits of amateur radio and its technologies on regular basis. He suggested that stake holders of amateur radio activity in the country must work as a united force to achieve desirable policies from Govt. of India.

Mr. S. Suri, VU2MY presenting a memento to Dr. Rajeswara Rao, former DDG (Telecom), GoI for his support to promote amateur radio.

SESSION –VII- Presentation of Awards:

HF Transceiver Award presented at HAMTECH 2008

G-QRP CLUB and QRP-ARCI Jointly sponsored 20 MFJ 9420 HF SSB Transceivers to encourage Amateur Radio activity among young Indian hams, who are interested and willing to promote the activity.

National Institute of Amateur Radio had earlier made an announcement requesting nominations for the HF Transceiver Award. Several nominations were received from across the country for the above said award. A committee chaired by Ms. D. Bharathi Prasad, VU2RBI finalized the list of award winners and the awards were presented at the HAMTECH 2008 organised by NIAR during October 18-20, 2008.

As per the criteria, the awards were presented to Hams those are most deserving and shown keen interest to operate and promote amateur radio activity in the region. Preference was given to the school children, Ham Clubs in schools and colleges and active amateur radio volunteers and amateur radio clubs so as to encourage them to further promote the activity.

Several of these stations are already on the air and have sent encouraging reports of not only contacting stations within India but also with hams from other countries.

We are thankful to the sponsors of this award - G QRP Club and QRP ARCI and their encouraging support to strengthen amateur radio activity in the country.

Name	: Mr. Naman Batra
Callsign	: VU3NBA
Designation	: Student, Delhi Public School
Address	: C 317, DDA Flats, Saket
City / State	: New Delhi
Pin	: 110017
Email	: vu3nba@gmail.com
About him	: A School boy from Delhi Public School, R.K. Puram, Sec 12, New Delhi.

Name	: Ms. M. N. Machamma
Callsign	: VU3HVC
Designation	: Asst. Director, Northern Region, NCTC, Bharat Scouts & Guides
Address	: B-263, New Ashok Nagar
City / State	: New Delhi
Pin	: 110096
About her	: She deals with activities for both adult and youth by organizing Disaster Preparedness Course, Adventure / Trekking Programs etc. Hosts Jamboree on the Air/ Jamboree on the Internet for Scouts & Guides.

(Mr.K.Mathur, VU2CDW receiving the award on behalf of Ms. Mathur)

Name : Ms. Vineeta Mathur
Callsign : VU3DXX
Designation : Teacher
Address : 404, Gulmohar, D. S. K. Ranwara, NDA-Bawdhan Road,
City : Pune
State : Maharashtra
Pin : 411021
Email : vineetamathur@rediffmail.com
About her : Ham not having any equipment.

Promotes Amateur Radio in among school Children her area.

Name : Ms. Vineeta Mathur
Callsign : VU3DXX
Designation : Teacher
Address : 404, Gulmohar, D. S. K. Ranwara, NDA-Bawdhan Road,
City : Pune
State : Maharashtra
Pin : 411021
Email : vineetamathur@rediffmail.com

Operating with the new MFJ HF Transceiver

(Ms. Lissy,VU3LMS receiving the set)

Name : Amateur Radio Club
Callsign : VU2VLF
Address : Kendriya Vidyalaya No. 2, Uppal
City : Hyderabad
State : Andhra Pradesh
Pin : 500039
Email : vu2vlf@gmail.com
About Club : The club is conducting demonstrations and JOTA for students and regular Amateur Radio training classes.

Name : Mr. R. Hiremath
Callsign : VU3IGP
Designation : Administrator, The Presidency Public School
Address : Gurukula, Amarapura Road, Sira
City : Tumkur Dist
State : Karnataka
Pin : 572137
Email : administrator@sirapresidency.org
About him : Participated in providing communication during many car rallies. He is interested in popularizing HAM Radio activities in Presidency group of institutions, where he is working.

	Name : Mr. Deepak M. Chauhan Callsign : VU2DMC Designation : Holy Cross Matriculation Higher Secondary School Address : K. N. Colony City : Salem State : Tamilnadu Pin : 636014 Email : salemholycross@hotmail.com About him : He is promoting amateur radio in the school. He is conducting annual trekking 10 km. Bro. Gerard memorial mini Marathon race.
	Name : Mr. S. Vijayan and Ms. Rajeswari Mariappan Callsign : VU2WDP Designation : Prof. & Head, Dept. of ECE, KCT Ham Club Address : Kumaraguru College of Technology, Box 2034 City : Coimbatore State : Tamilnadu Pin : 641006 Email : rajeswarim@gmail.com About club : Promotes Amateur Radio in the college.
	Name : Mr. K. R. Kasi Viswanathan Callsign : VU2FFM Address : 18, Agraharam, Karatholuvu City : Udumalpet Tk, State : Tamilnadu Pin : 642203 Email : vu2ffm@rediffmail.com About him : He is Radio Dxer providing communication during rallies, voluntary communication support provided to police dept. Helps forest department during the annual census of wild animals.
	Name : Dr. Sanjeev Attri Designation : Lecturer, Life Science, GGSSS Address : c/o R.D.Gautam, 254/1, Ram Kundi City : Nahan State : Himachal Pradesh Pin : 173001 Email : sandeepbatra_nhn@yahoo.co.in About him : He is interested in promoting HAM Radio to the school children of Nahan.

Name : Dr. R. Rajasekhar
Callsign : VU2HMY
Designation : Doctorate in Zoology.
Address : 201, Krishi Nilayam, 10th Cross, Magunta Layout
City : Nellore
State : Andhra Pradesh
Pin : 524003
Email : vu2hmy@yahoo.co.in
About him : He is promoting HAM Radio by giving demonstrations in schools & colleges. He designed and developed multi band HF transceiver (HMY2K8).

Name : Mr. K. Leela Krishna
Callsign : VU3LGX
Address : 1-63, Ramalayam Street, Ramavarappadu
City : Vijayawada
State : Andhra Pradesh
Pin : 521108
Email : niar007@gmail.com
About him : He is very active NIAR volunteer and participated in Demonstrations / Dxpeditions.

Name : Mr. Mukesh Kumar Gola
Callsign : VU2MCW
Address : T-743 A, Faiz Road, Karol Bagh
City / State : New Delhi
Pin : 110005
Email : vu2mcw@yahoo.com
About him : He has lot of interest in HAM Radio. Done many activities in Himachal Pradesh & Bharat Scouts & Guides and helping in amateur radio promotion activities in North India.

Name : Mr. K. G. Nadarajan
Callsign : VU2KGN
Designation : President, Quilon Amateur Radio League
Address : MC 249, Beach Road
City : Kollam
State : Kerala
Pin : 691001
Email : vu2kgn@yahoo.com
About club : Quilon Amateur Radio League, VU2QAR, a very active club in Kerala received excellent active club award promoting HAM Radio. Conducts Fox hunt & Ham Fair every year during the World Amateur Day.

Name : Mr. Sampath Kumar
Callsign : VU2YZ
Designation : President, Bangalore Amateur Radio Club
Address : Box 5053, GPO
City : Bangalore
State : Karnataka
Pin : 560001
Email : sampathmrs@yahoo.com
About him : He is almost a professional in founding amateur radio clubs. Founder member of Repeater Society of Bangalore. Promoting amateur radio activities in Karnataka state.

Name : Mr. Rajesh T.C.
Callsign : VU2TRH
Designation : Space Rays Amateur Radio Club
Address : Anthikad
City : Thrissur Dist
State : Kerala
Pin : 680641
Email : spacerays@yahoo.com
About him : Space Rays Amateur Radio Club provides vital communication support to the local authorities and public during the time of emergencies. Conduct awareness programs / seminar/ demos / Training / conducting ASOC examination etc.

Name : Mr. Alex Kuncheria
Callsign : VU2AJL
Address : Pushpalyam, Nalugody
City : Changanacherry
State : Kerala
Pin : 686548
Email : alexkuncheria@gmail.com
About him : Active handicapped ham

Name : Mr. Tapas Chakraborthy
Callsign : VU2TKC
Designation : President, Indian Wave of Amateur Radio
Address : FL 501, 60 New G. T. Road, Uttarpara
City : Hooghly
State : West Bengal
Pin : 712258
Email : vu2iwa@gmail.com
About him : He is promoting Ham Radio activities in Kolkata.

Name : Mr. Joy Chakraborthy
Callsign : VU3JCH
Designation : Journalist
Address : 23 Kali Kumar Majumdar Road, Santoshpur, Battala, 2nd Floor
City : Kolkata
State : West Bengal
Pin : 700075
Email : vu3jch@gmail.com
About him : Interested in Promoting Amateur Radio in his area..

Name : Mr. Debasish Ghosh
Callsign : VU2DGH
Designation : Electronics Engineer
Address : Shaikh Lane, Village Shantinagar, Danesh
City : Howrah
State : West Bengal
Pin : 711109
Email : vu2dgh@india.com
About him : Home Brewer, Active Ham.

Mr. Satyapal VU2FI while congratulating the award winners said that the activity is likely to receive major thrust with the equipment support provided to amateur radio operators and clubs. He said the award winners need to re-assure with their active presence on the amateur radio band in operation on a regular basis. He lauded the efforts made by NIAR for distributing 25 radio sets during the silver jubilee year to the most deserving radio amateurs in the country. He also suggested having a suitable HF contest which encourages participation of the radio amateurs including the award winners.

Mr.S.Suri, VU2MY while congratulating the award winners said that the sponsors of the award and the manufacturer have constructed the model for simple and easy to use operation. The equipment was shipped to India and being provided on as is condition. He thanked the QRP-ARCI, G-QRP Club UK, the manufacturer MFJ electronics, USA and also Ms. Bharathi VU2RBI for her dedicated, tireless efforts to implement the awards program for the benefit of amateur radio community in India.

Mr. J.Suryanarayana, VU2JJS congratulated all the award winners and said it was a unique occasion in the country to see many of the most deserving young amateurs and active clubs receive such a quality equipment which will benefit the activity in coming years.

Mr.A Satyanarayana, VU2SAX congratulated the award winners and suggested them to take active participation on radio bands and called for renewing their commitment by participating in Disaster Management activity whenever needed. He said the spirit of volunteerism should inspire many young radio amateurs from across the country to the wonderful scientific activity.

Mr.S.B.Ram VU2LIC congratulated the radio clubs and other hams who received the HF transceiver award and recollected the informal discussions with late Mr. Rajiv Gandhi's vision for increasing the Ham population in the country and also providing each ham a radio set. He said with consistent efforts and support from Govt of India, Govt of AP and International organizations, NIAR has made considerable progress over the 25 years. We have made first steps to achieve the goal of having one ham in every village of the country and wish NIAR will continue this kind of service so that in future more and more hams can go on air.

Mr. Gulab Chand, Asst. Wireless Advisor congratulated award winners and NIAR for the excellent program. He appreciated the enthusiasm and spirit of amateur radio operators coming together on this memorable occasion to share their experiences. The programs have been very informative giving insights in various technologies used by Hams. It also gives an opportunity to understand said the participation and active interaction with many amateurs This is a very good program organized by NIAR. We are all well looked after. I was most comfortable. I congratulate Mr. Suri and I hope similar functions would be done in future. We can see great future in this hobby. We all will give our best efforts for promotion o this hobby.

Mr. Gulab Chand honored Ms. Kyoko Miyoshi, JR3MVF for the support to NIAR activities during many years.

SESSION-VIII: Digital Amateur Radio Communications-

Automatic Link Establishment (ALE) for Amateur Radio-Mr. Sarath Babu, VU3RSB

ALE is - A radio system for calling up HF stations for SSB or digital modes, QSOs and Nets, a transceiver feature, that scans HF frequencies for calls and messages, a way of using your computer and ham rig for HF email, HF phone texting, and HF-to-HF message relay and the *international standard* for initiating and sustaining HF communications.

What Does ALE Do for Ham Radio Emcomm? Maintains *Hot Standby Nets* 24 - 7 - 365 on demand. Interoperates via SSB voice or Text between various organizations and agencies on HF. HF email with just your HF radio and computer, Tracks GPS positions by HF.

How ALE Works: Each ham radio ALE station uses the operator's callsign as a digital *address*. When not actively in a QSO with another station, each ALE transceiver constantly scans through common frequencies on all bands, listening for its own callsign. Each ALE transceiver also listens for other callsigns and memorizes the frequency, signal quality, and time each callsign is heard.

ALE Hardware and Software: Most ALE ham operators use PCALE software ALE program with an HF amateur radio SSB transceiver. MULTIPSK software has recently added the basic functions of ALE for calling and messaging. MARS members use MARS-ALE. Hams also use commercial HF radios with ALE built-in... a computer is not needed with these radios. Other ham software programs are now in the process of adding ALE. External ALE controllers are also available (for more details, please refer NIAR HAMTECH-2008 Souvenir).

Mr.Sanildeep, VU3SIO gave a talk on BCDX - Broadcasting Distance Station. BCDXer will be sitting in the home, listening the signal from unknown place and doing this hobby. He also explained the concepts of Short ware Radio listening and challenge to listen international stations from our own shacks with simple antennas. He explained that a dedicated group of individuals and hams have come forward to encourage youngsters to enjoy this fascinating hobby and also sharing information on listening to international stations you will be able to listen to their local songs, local language, listen their local news. It only requires using a simple radio with buildup antenna inside, by monitoring all bands we can listen to some stations broadcasting on some particular frequencies. He said there are books written by good radio listeners that provide exciting insights into the radio dxing.

Mr. Sanildeep, VU3SIO receiving a memento from Mrs.S.Yamini, VU2YAM

Program- DAY-3, 20 October, 2008

SESSION-1X

10:00~11:30 Open forum– Sum up / Recommendations
Chairman : Mr. G.L.Rao, VU2GL

Mr. Ramprabhu, VU2DEV

Mr. Ramesh Babu, VU2RDM

An Open forum with a sum up and also recommendations were taken up at the final and concluding session on day 3 of the Hamtech 2008. The session was chaired by Mr.G.L.Rao, VU2GL former President IEI and Vice-Chairman NIAR. Several representatives of amateur radio clubs were present and shared their views on discussions and deliberations that transpired in the three-day event.

Mr. Ramprabhu VU2DEV gave details on recently made a simple, low cost digital VFO covering 5MHz and shared the information on the technical parameters, circuit design and construction for homebrew transceiver. He said that trials were being made on the stability and further developments will be made based on the performance of the transceiver model.

Mr.Ramesh Babu VU2RDM explained the importance of home brewing in amateur radio as the important aspect for sustenance of amateur radio activity for enthusing young minds in experimentation on electronics and communication. He also explained the design and construction of RM96 transceiver being among the most popular low cost transceiver in India.

The following resolutions / recommendations were made:-

1) The conference registers its regards and thanks to the Dept of Information Technology, Ministry of Communication and IT, GOI and Ministries of Home Affairs, Defense, External Affairs for sponsoring and supporting the HAMTECH 2008.

2) A “Research Cell” is to be established at NIAR for taking up need based; time demanding research in Amateur Radio and a Document cell is to be set up for compiling the rear experience of Amateur Radio clubs in the country. This would serve as a food data-base for convincing the policy makers of the contributions and scope of Amateur Radio.

3) A suitable Awards program may be launched to recognize noteworthy contributions made by Individuals/Institutions/Non-Government Organisations for furthering amateur radio communication concepts in India.

4) To achieve a target of 1 Lakh Hams in the county, intensive educational campaign is to be triggered on war forting to create a basic awareness among general public on the potential and importance of Amateur Radio Communications. All Amateur clubs in the country may organize a special activity and take a pledge to reactivate the sick clubs and enroll new clubs as well as organize joint programs with NCC, NSS, Scouts & Guides, Lions, Rotary clubs and other service organizations.

5) During the National Science day celebration on Feb 28 every year, the students should be encouraged to make small equipments of Amateur radio and be rewarded suitably by local clubs(as said by Gulab Chandji) and the schools as a policy are to be encouraged to go for Amateur radio clubs.

6) The conference request the GOI

   I. To recycle the surplus or condemned wireless equipments in operational condition from various labs, defense and police departments for further use by Amateur after due modifications.

   II. To abolish customs and excise duty on import of amateur radio transceivers and accessories including antennas and radio modems etc.

   III. To provide substantial financial support to encourage projects and programs for amateur radio promotion in the country.

7) The conference recommends administrative and policy modifications on regulatory issues particularly simplifying the procedures for issue, renewal of amateur station operators licence and conduct of ASOC examination, Syllabus, license categories based on the current developments in the amateur radio wireless communication technologies.

8) The conference feds it as a necessity to bring out a national policy in colleges/technical institutions/UGC to encourage the involvement of youth at a very young age in Amateur radio activity.

9) NIAR has been a force for consistent technical advancement, individual skill training and the improvement of emergency communication capabilities not only within India but around the world. Due to these concerted accomplishments, the delegates of the conference unanimously recommend Government of India and its agencies to support up gradation of NIAR as centre for excellence in “Emergency Management & Communications Institute” (as that of ICRISAT & other organizations).

Report on Amateur Radio operations:

The Department of Telecommunications, Government of India issued a special permission to foreign and Indian hams to operate their amateur radio stations from Kadmat, Agatti of Lakshadweep Islands with special callsigns VU7SJ, VU7NRO as well as Port Blair, A & N islands with the calls VU4MY, VU4RG. The amateur radio operations were permitted from these islands during 24 Oct-03 Nov 2008.

VU7SJ, VU7NRO, VU4RG and VU4MY Teams
International Dxpedition team members - Mr. Franz DL9GFB, Mr. Norbert DJ7JC, Ms.Yamini VU2YAM, Ms.Bhanumathy VU2BL, Ms. Nisha VU2NIS, Mr.Madhu Mohanan VU2UWZ, Mr.Jorgen DF7TT, Mr.Jose VU2JOS

This event is unique as 2 Islands of Lakshadweep and A & N islands got simultaneously activated by International and national Hams. This was certainly an excellent display of technical and operating skills by hams, even when propagation conditions were predicted to be unfavorable, the world community of Hams proved that successful two-way radio contacts can be made with other amateur radio stations around the world using SSB, CW, RTTY, PSK31, SSTV modes of operation.

Over 43,750 contacts around the world, proves that in any kind of Disaster Management, Ham radio can establish reliable communication to and from any remote region of the world.

The concept of organsing an International Dxpedition started as a multi dimensional approach that explain the planning, preparedness, installation and operation of amateur radio stations from remote corners of the world.

The activity also promotes youth to empower themselves with the knowledge and skills on economical models of alternate channels of communication. The humanitarian assistance provided by hams using of amateur radio technologies in times of disaster, explain the social relevance of this technical activity. The information exchange on local culture, people and places encourages tourism through amateur radio.

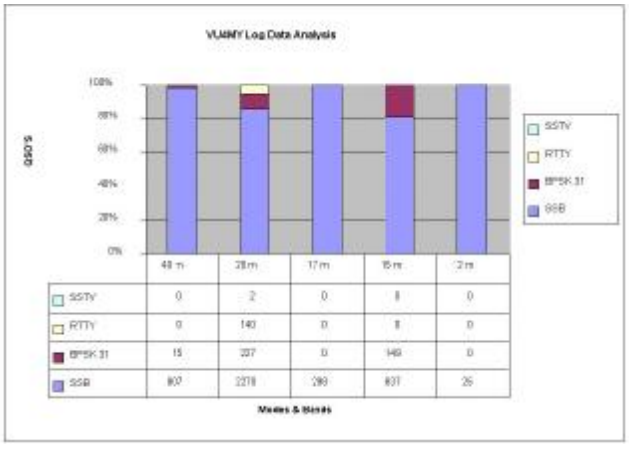
Summary of International Amateur Radio Dxpedition to Andaman Islands and Lakshadweep Islands during 24th October – 3rd November 2008.

SITE-1: VU4MY Dxpedition Port Blair, A & N Islands

Operators: YL S.Yamini-VU2YAM, Ram Mohan-VU2MYH, YL M.Bhanumathy-VU2BL

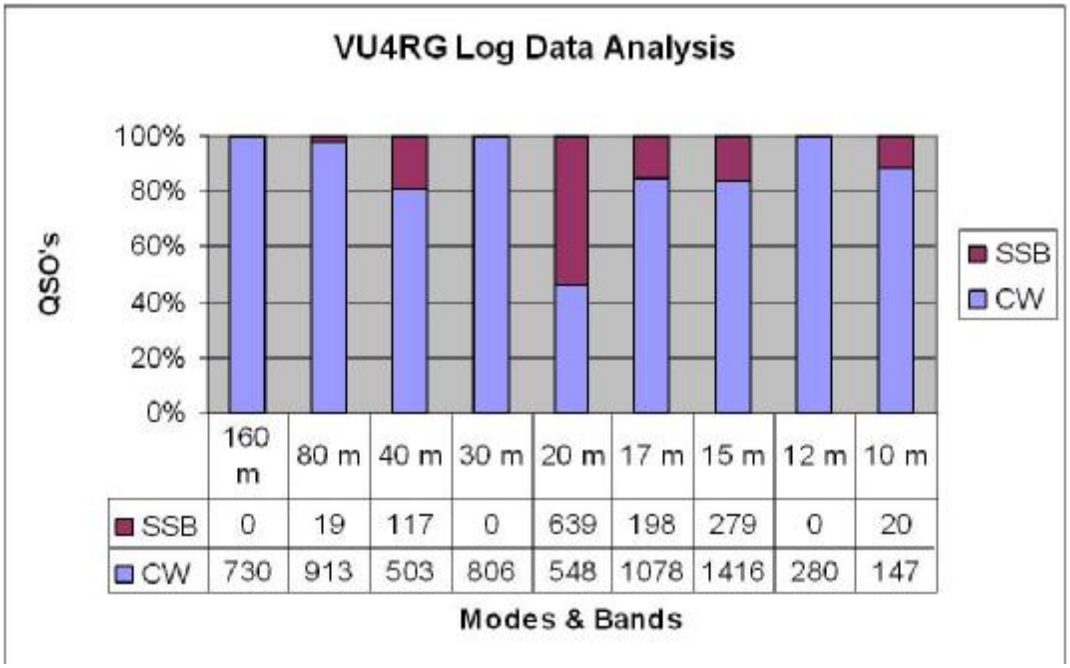
Equipment	:	IC 7000, MFJ digital interface, NIMM logging software
Antennas	:	Spider beam, 20 / 40 m inverted V, All band Buddi pole
Bands	:	40 m, 20m,17m, 15m, 12m
Modes	:	SSB, BPSK, RTTY, SSTV

SSTV QSO



SITE-2 :VU4RG

Operators:
Norbert Meyer, DJ7JC (VU3NLF)
Helmut, DL5DSM (VU3NLG)



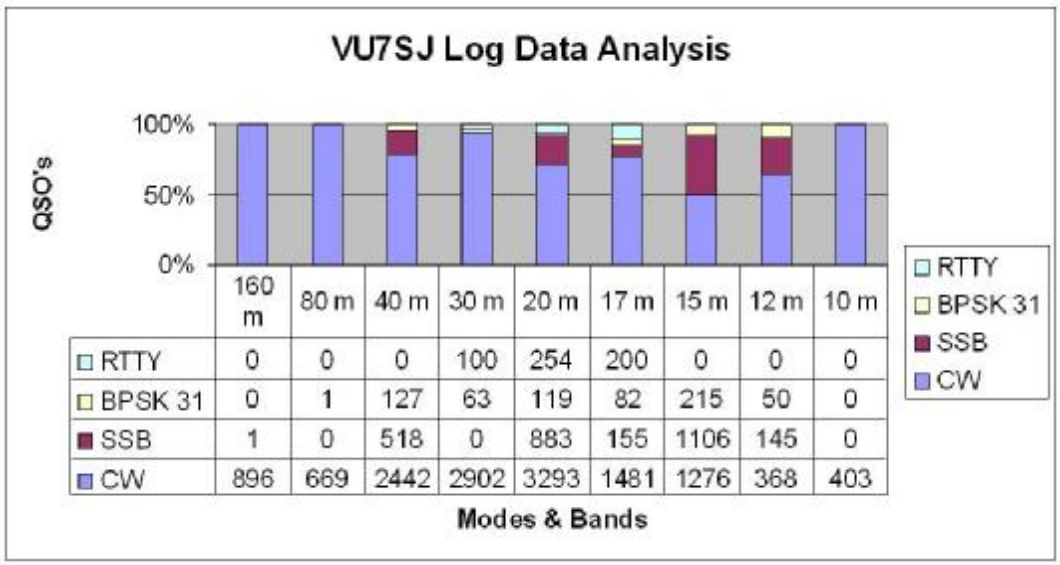
	160 m	80 m	40 m	30 m	20 m	17 m	15 m	12 m	10 m
SSB	0	19	117	0	639	198	279	0	20
CW	730	913	503	806	548	1078	1416	280	147

Equipment:	FT857; Elecraft K3, N1MM, MiXW, HRD
Antennas:	160m L-Antenna; Vertical for 80 m CW, 40m Phased Array (2GP's); 30m GP; 20-10m 5-Band-Spiderbeam
Modes:	CW, SSB, BPSK, RTTY
QTH:	Port Blair, A & N Islands

SITE-3: VU7SJ

Operators:

DL9GFB OM Franz (VU3RYE) (SSB, CW)
DF7TT OM Juergen (VU3NKW) (CW, Digital)
VU2JOS OM Jos (CW, SSB)
VU3HEM OM Hemant (SSB)

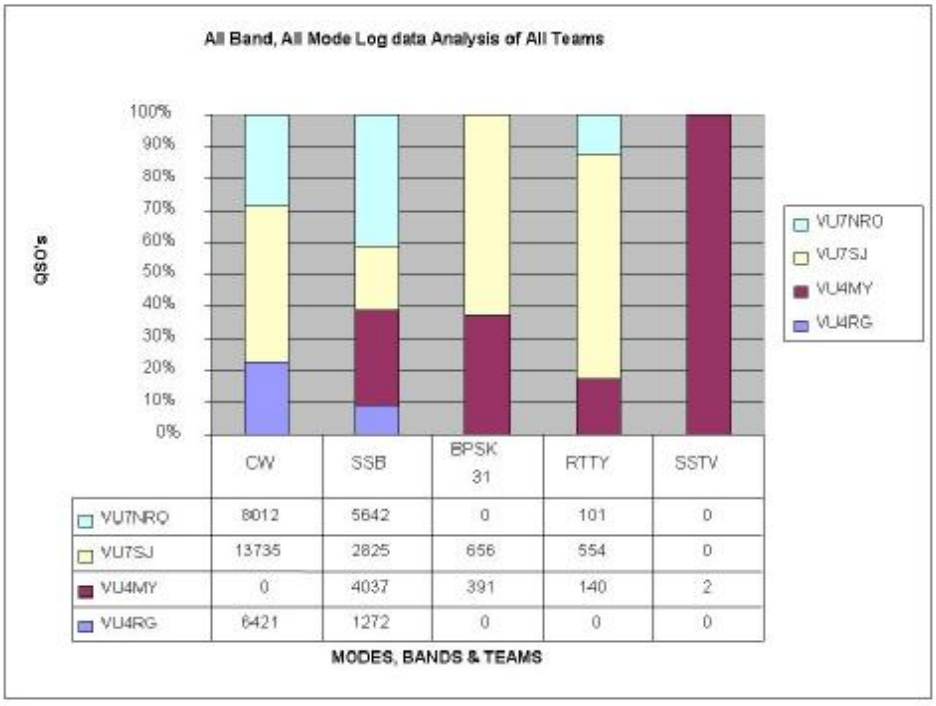


EQUIPMENT : Icom IC 7400, Icom IC 746, Yaesu FT 747 GX, Yaesu FL 7000
ANTENNAS : Spider Beam, HF9V, 30 M Vertical, 160 M Vertical, 17 M Vertical, Inverted V for 80 M, 20 M/40 M.
Bands : 160 m, 80 m, 40, 30m, 20m, 17 m, 15 m, 12 m and 10 m
Location : Agatti Beach Resort, Agatti, Lakshadweep Islands

Site-4: VU7NRO : Kadmat Beach Resort, Kadmat, Lakshadweep Islands

Operators:
VU2UWZ OM Madhu (Phone & Digital)
VU2NIS XYL Nisha (CW)

Equipments : Yeasu FT 840, Yeasu FT 757GX, Yeasu FL 7000, 6 Ele Tri Band, Hustler 6BT, Acer TravelMate 4061 Laptop,
Bands : 160 m, 80 m, 40, 30m, 20m, 17 m, 15 m, 12 m and 10 m
Antennas : Hygain Vertical AV14AVQ-1, Icom AH 710 folded dipole, Off centre dipole 80/40/20, Inverted "V" 20/40, 30 Mtr,15 Mtr



Media - Publicity

హ్యామ్ రేడియోకు విస్తృత ప్రచారం

వచ్చే ఏడాది నుంచి ప్రత్యేక నిధులు : రోశయ్య

అమెచ్యూర్ రేడియోకు ఆర్థికచేయూత

సదస్సులో మంత్రి రోశయ్య

The Lakshadweep Times

Hams in Kadmat Island

Kadmat, Nov. 4 : In connection with the Silver Jubilee Celebrations of National Institute of Amateur Radio (NIAR), Hyderabad, two Hams reached Kadmat Island on 21st October, 2008 Ministry of Communication & IT Dept. has given permission to operate Ham Radio from the Lakshadeep Islands after a long time. The team leader for the operation was Mr. Madhu Mohan S. from NIAR. His wife Nisha M. Mohan PGT (Physics), Kendriya Vidyalaya , No. 2, Uppal, Hyderabad also accompanied him . They erected the antenna on the beach near the boat jetty and started their activities from 23rd of October. They contacted more than 13700 Hams from 135 countries all over the world before they closed their station on 3rd November. During the same period three hams, Jose Jacob, NIAR, Franz and Jurgen, both from Germany stayed in Agatti Islands for the same purpose.

Ham radio awareness programme was conducted in Govt High School, Kadmat on 4th November . Nisha M. Mohan talked about the role of Ham Radio in disaster management. They distributed magazines and pamphlets to students. They also demonstrated Ham Radio to local people also during their stay in the island. The team left the island on 5th November, 2008.

'Last mile' radio connectivity can save lives

Amateur radio institute holding talks with National Disaster Management Authority

Staff Reporter

- Vision to connect 1,000 villages along coast prone to cyclones
- NIAR setting up Emergency Management Institute to train ham use

HYDERABAD: National Institute of Amateur Radio (NIAR), Hyderabad is holding a series of talks with National Disaster Management Authority (NDMA) to chalk out modalities to use ham radios for 'last mile' connectivity, the final act of passing on vital information to public during disasters and in the process save lives.

This was disclosed by NIAR officials during 'HAM-TECH 2008- International Expo and Conference', which began on Saturday, coinciding with NIAR's silver jubilee celebrations.

The vision is to connect nearly 1,000 villages along the coastal belt, which are prone to cyclones, to help public evacuate to safety before the disaster hits.

The three-day conference, attended by ham operators from India, US and Europe, will discuss on the ways to achieve the target of one lakh ham radios in the country. "Presently, our estimates suggest that nearly 13,000 hams are operating in India. We want to increase this number to one lakh in the next two years," says NIAR Chairman S. Suri.

Awareness levels

To effectively implement last mile connectivity project, NIAR officials said that Government agencies like NDMA should empower science-based organizations like NIAR, schools, colleges and other NGOs for using hams. While there are foolproof plans on paper, catching concrete has materialised, they said.

"Spreading awareness, training locals and equipping them with hams and above all getting permissions from various government agencies to import ham technology is a challenge. This requires political will if one is interested in using ham radios during disasters," Mr. Suri said.

On its part, NIAR is setting up Emergency Management Institute (EMI), to train public on using hams during natural disasters.

Media – Publicity

WorldRadio

Vol 38, Issue 2 www.wrtvc.com August 2008 • $2.00

The Rare "VUs" to Hit the Air in October

It was recently announced that the National Institute of Amateur Radio (NIAR) will be celebrating its "Silver Jubilee" in Hyderabad, India, between 18-20 October. To help celebrate this event, look for some special Amateur Radio activities to take place between 24 October and 03 November from many Indian locations which will include operations from the Andaman & Nicobar Islands (VU4) and Lakshadweep Islands (VU7). NIAR will be assisting foreign amateurs in regard to reciprocal licenses or operation permits for the VU4 and VU7 activations. To receive details about license requirements, fill out the registration form at: *http://www.niar.org/sj/form.html*. More information is available at: *http://www.niar.org/sj/index.htm*.

VU4 and VU7 — ANDAMAN, NICOBAR and LAKSHADWEEP ISLANDS

India's National Institute of Amateur Radio's (NIAR), *Ham News* has some details of the prospective VU4/VU7 operations for October 24 to November 3. To register to participate, go to **www.niar.org/sj/form.html**. But first, the silver jubilee celebration is October 18-20 in Hyderabad. It appears attending this part on the mainland may be a helpful prerequisite. The 119,000 QSOs made in connection with "Hamfest 2007" and the VU7RG/VU7MY operations of January 2007, were cited as contributing to increasing awareness of "ham tourism" in India.

THOMAS ROSCOE, K8CX

National Institute of Amateur Radio (NIAR) members Mohan Suri, VU2MYH, and Sadineni Yamini, VU2YAM, were present at the Dayton Hamvention in May. In late October and early November NIAR is sponsoring an Amateur Radio activity in VU4 and VU7.

88 August 2008 QST

VU4 AND VU7 — ANDAMAN, NICOBAR AND LAKSHADWEEP ISLANDS

As of press time there are not a lot of details I can give out on the much anticipated VU4 — Andaman and Nicobar Islands as well as the VU7 — Lakshadweep Islands DXpeditions. Members of the National Institute of Amateur Radio (NIAR) will be holding their Silver Jubilee Celebrations in Hyderabad October 18-20. Afterward, some attendees, mostly from Germany and India, will be operating from VU4 and VU7 in the October 24 to November 3 time frame. Watch the NIAR Web site at **www.niar.org** and the DX rags for the latest news on these two rare ones. QST

QST November 2008 89

Having a Dream- by Mr. Norbert Meyer, DJ7JC, Germany

Having a Dream
HAM RADIO
Life
and DXing

Norbert
DJ7JC/VU3NLF/VU4RG

First of all I want to express that I'm very grateful to be here and to be able to take part at the DXpedition to the Andaman Island – VU4RG/VU4MY – next week.

Frame of a DXpedition:

- Looking for a rare DX-Country or Island (IOTA)
- Creating and forming an international team with different competencies, like
  - Technical aspects for a common Logging-Software
  - Team members for different modes, like CW-, SSB- and RTTY-Operators
  - Specific antenna arrangements from low-bands up to 6 m and maybe EME
- Applying for the license
- Applying for Country- or Island-Visa/Permission

Motivation

- **Technical Aspects and at least the combination of Software, Internet and HAM RADIO**
- **Be a member of a Regional, National and Worldwide Network**
- **Social Aspects and social relationships in the**
- **Local area and**
- **Worldwide**

Team Building

- **To be a part of a whole team when strange situations occurred like natural disasters, as we'd in the Hamburg Flood Disaster 1961, or the flooding of the River Elbe in East Germany 1998.**

Contesting and DXing

- To take part in DXpeditions is a fulfilling dream of the young boy Norbert with the aspects:
- To discover other countries, continents and cultures
- To learn about the basic elements of life like,:
  - to communicate with empathy,
  - with respect to human beings as they are,
  - to learn in a group from the others,
    solving problems in a team,
    to achieve a common goal,
    to develop friendship around the globe
  - to be competitive in contesting

DXpeditions and other international HAM Radio activities: TI9KK, TI7/DJ7JC, DJ7JC/mm, CT9L, VK2AIW, ZL/DJ7JC, F/DJ7JC, CT3/DJ7JC, W8/DJ7JC, EA8/DJ7JC, PA/DJ7JC, OE/DJ7JC, HB9/DJ7JC

Financial and Technical Aspects

- Applying for financial support from DXfoundations
- Booking of the location, of the flights,
- Looking for a good place for the operation
- Technical aspects: Equipment, Antennas, Masts, Power Supply, Software Networks between the different stations, Internet Access if available.

Having a Dream- by Mr. Norbert Meyer, DJ7JC, Germany

Making Friends

- Helping people, making friends, one example: One of most important friendship with Y26GN (DM2FGN, DM5XBN) and now DL6YGN since 13th of August (the memorial day of the Berlin Wall) 1968 during the time between 1968 and 9th of November 1989 – the day the old GDR collapsed and starting a Training Centre in Karl-Marx-Stadt /now Chemnitz for unemployed and disabled people.

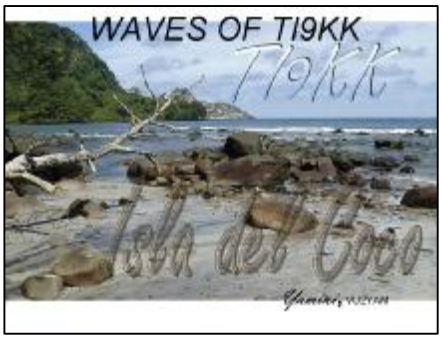
Becoming a HAM with 14 years

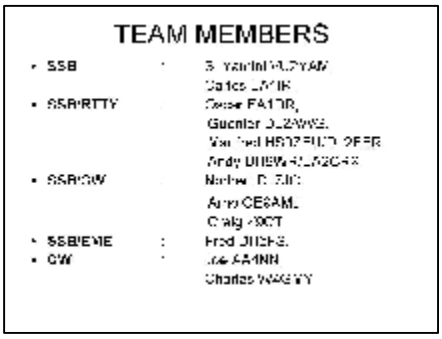
- Initial trigger point to become a HAM in the age of 14 years
- Intrinsic Motivation which keeps on the whole life
- Communication without any borders
- Natural phenomena of the Ionosphere

Thank YOU NIAR

- Thank you for such huge support from the team of Mr. S.Suri, VU2MY, NIAR and specifically to my friends Mohan, VU2MYH, and Yamini, VU2YAM

Waves of "TI9KK" by Ms. S. YAMINI, VU2YAM





Waves of "TI9KK" by Ms. S. YAMINI, VU2YAM

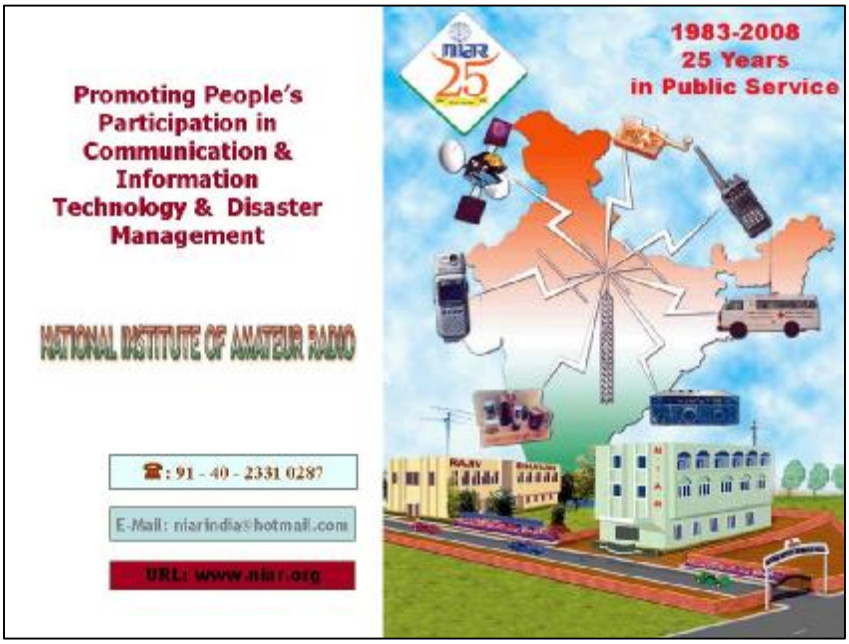
Waves of "TI9KK" by Ms. S. YAMINI, VU2YAM

Waves of "TI9KK" by Ms. S. YAMINI, VU2YAM

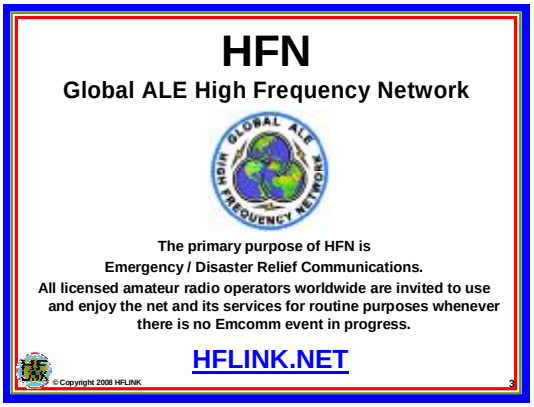
Equipment that worked:

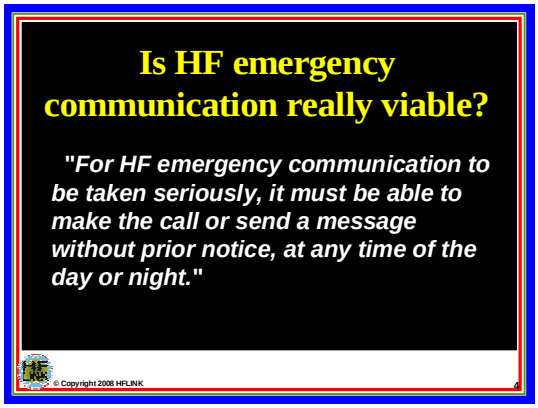
- Radios: Icom IC7000, K2, FT897, IC706 with linear Amplifiers
- Antennas: HyGain AV640 Vertical 40m - 6m 2X40m Dipole with symmetric 450 Ohm feed line 18 m High for 160 - 80 m Tuner AV640 Step R Vertical, 40m 4 Square, 20m 30 m 4 Square, HFGV
- Software MiXW 2.18

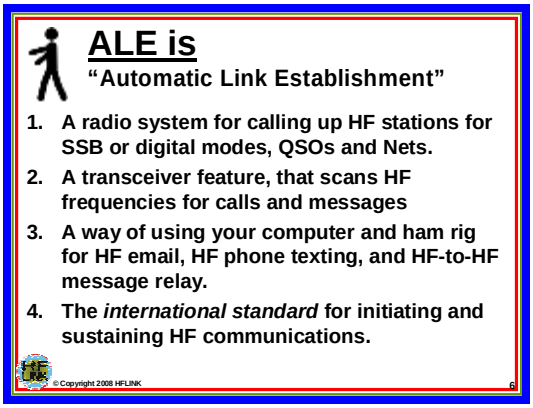
Waves of "TI9KK" by Ms. S. YAMINI, VU2YAM

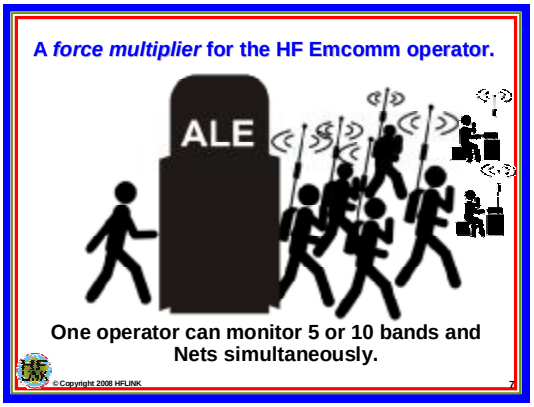


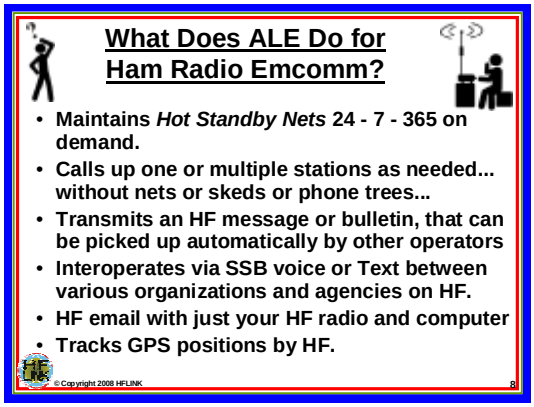
ALE for Amateur Radio-by Mr. R. Sarath Babu, VU3RSB











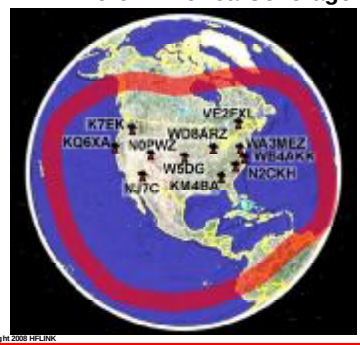
ALE for Amateur Radio-by Mr. R. Sarath Babu, VU3RSB

Global ALE HF Network (HFN)

- 24-7-365 Network of ALE base stations with HF internet
- Provides HF to SMS phone texting and HF to text email
- Scanning all major HF bands 3.5MHz - 28MHz every 10 seconds
- Phase 1 : Covers North America with a 10 station constellation
- Phase 2 : Expanding worldwide and adding more features

 9

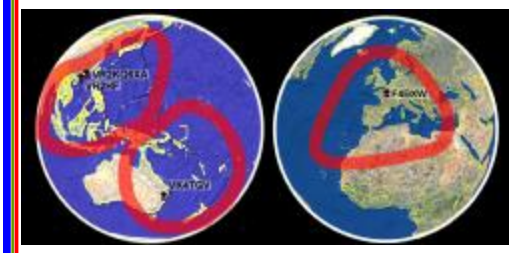
ALE HFN North America Coverage Map



* PHASE 1
JUNE 2008

 10

ALE HFN Global Coverage Map, Phase 1



 11

ALE HF Network Frequencies in North America

Frequency kHz USB
3596.0
7102.0
10145.5
14109.0
18106.0
21096.0
24926.0
28146.0

Note: *Primary Frequencies are Coordinated with FCC Rules Automatic Data Sub-Bands

 12

 13

How ALE Works

- Each ham radio ALE station uses the operator's callsign as a digital *address*.
- When not actively in a QSO with another station, each ALE transceiver constantly scans through common frequencies on all bands, listening for its own callsign.
- Each ALE transceiver also listens for other callsigns... and memorizes the frequency, signal quality, and time each callsign is heard.

 14

HF propagation is like a wild animal. With ALE, you can ride it.

 15

ALE Hardware and Software

- Most ALE ham operators use PCALE software ALE program with an HF amateur radio SSB transceiver.
- MULTIPSK software has recently added the basic functions of ALE for calling and messaging.
- MARS members use MARS-ALE.
- Hams also use commercial HF radios with ALE built-in... a computer is not needed with these radios.
- Other ham software programs are now in the process of adding ALE.
- External ALE controllers are also available.

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ALE for Amateur Radio-by Mr. R. Sarath Babu, VU3RSB

PCALE by
Charles Brain G4GUO

- Complete ALE software for amateur radio HF rigs.
- Advanced methods of scanning that enable Ham-Friendly ALE.
- High-speed HF soundcard ARQ built-in.
- Interoperable with ALE Hardware MIL-STD radios.
- Free download for hams at HFLINK.COM

MARS-ALE by
Steve Hajducek N2CKH

• Advanced CAT interface control for ham and commercial HF rigs
• Silent relay scanning for PCALE
• Enables ALE HF Network internet with BBSlink by Alan Barrow KM4BA

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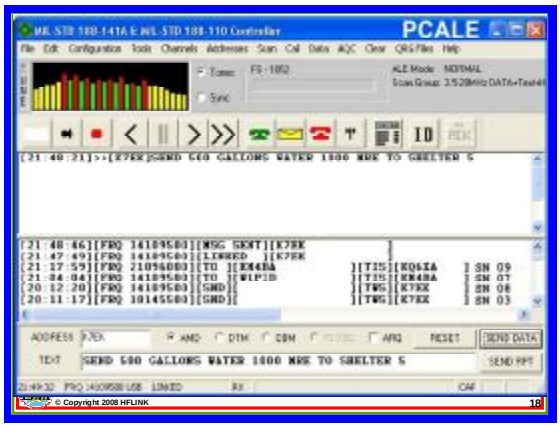

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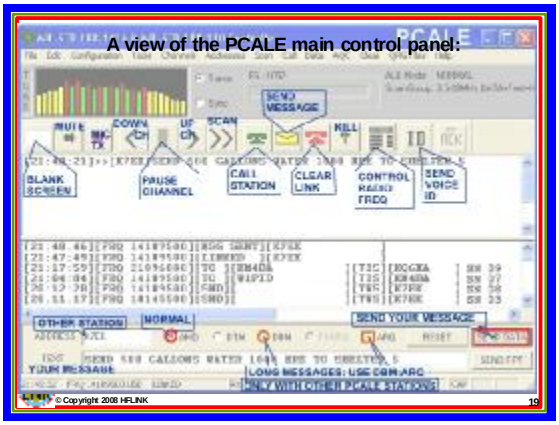

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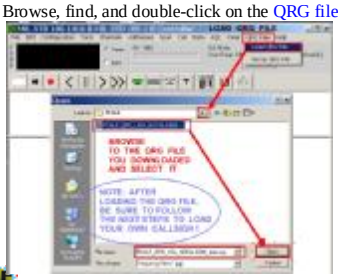
Load the QRG file (see diagram below).
QRG Files>Load QRG File
Browse, find, and double-click on the QRG file you downloaded.



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Load your callsign (see diagram below).
PCALE>Addresses>Modify>Own>Select Address>Modify Own Address
Follow these steps VERY CAREFULLY to enter your Own Callsign (Own Address).

1. PCALE, at the top: ADDRESSES>MODIFY>OWN>Select Address>NOCALSIGN>OK
2. Double-click on NOCAL SIGN.
3. NOCALSIGN should now be highlighted.
4. Type in your own callsign. Press OK.

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Check Your Callsign (see diagram below)
PCALE>Addresses>List>Own

1. View the list, it should have your callsign in the OO line.
2. If this fails, repeat procedure starting at Step #1 of Load Your Callsign.
3. If this succeeds, you are ready for channel scan group selection.

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Select your Active Channel Scan Group. (see diagram below) .
Set the channel groups to the frequencies you wish to scan and transmit on.
These channel groups have pre-programmed frequencies in the QRG file for your geographic area, region, or country.
Select an active channel scan group for testing (see diagram below):
Put your transceiver VFO on 14109.0kHz USB in the 20 meter ham band, and connect a 14MHz antenna or dummy load to it. Check the SWR before going any further!
Select the Active Channel Scan Group to operate:
Channels>Select Active Group>14MHzVOICE+DATA>OK
This will select your system to scan and transmit only on the 14MHz ALE channels.
Other channel scan groups may be selected in a similar way, but for intitial testing, use the 14MHz scan group .

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Set the MIL-STD 188-141 Options (see diagram below).
PCALE>Configuration>MIL-STD 188-141
Set your parameters as in the diagram below. Set your Radio Type.
In the lower right part of the control panel, select the computer ports that your computer uses for CAT and PTT. Connect your radio to your computer via CAT serial interface port.

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ALE for Amateur Radio-by Mr. R. Sarath Babu, VU3RSB

Configure your Radio Type for CAT and PTT control (see diagram below).

Enabling CAT Control Inside Your Transceiver's menu:
After configuration of PCALE radio type, then check your transceiver's menu settings to sure CAT control is enabled, has the manufacturer's default bus (hex) address, and suggested baud rate. Connect the CAT serial data cable and any other interface devices needed for your radio.

 25

Audible Alarms, Scanning, and Calling set up:
PCALE>CONFIGURATION>PROPERTIES (see diagram below)
Set your Alarms.
PC Speaker will beep when you receive an ALE call or message.
Set your Scanning Section. This limits the duration of your calling transmissions. Use minimum 6 and maximum 10.
Set your Calling number of attempts. Use 4 attempts on best channel. Use 1 Attempt on all channels.

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Mobat Micom ALE Transceivers

 27

Icom IC-F7000 ALE mobile

Fly-Away 125 Watt Portable ALE HF Station Package in Waterproof Case

POWER SUPPLY
CONTROL HEAD
TRANSCEIVER
PELICAN FLIP TOP CASE 1430

 29

Harris ALE Transceivers

LCD display shows messages and calls

Use keypad to send text similar to cell mobile phone

 28

Starting an ALE QSO

1. The radio operator enters the desired callsign into the ALE controller, just like dialing a phone number.
2. The ALE controller starts calling on the bands the desired station was heard previously with good quality.
3. The ALE controller transmits a short *selective calling* burst containing the callsigns.
4. When the desired station responds, a Link is thus Established and the QSO can begin using any mode, such as SSB Voice or Text Messaging.

 30

Receiving an ALE Call

1. When your scanning transceiver's ALE controller detects the first few characters of its callsign, it stops scanning and stays on that frequency.
2. If it decodes your callsign, it responds to the caller with a *handshake* to confirm the link is established.
3. Your transceiver, muted up until now, turns on its speaker, or the controller beeps to alert you.
4. Your ALE controller display indicates the callsign of the station calling you.
5. You may start a regular QSO in any mode you like.
6. At the conclusion of the QSO, you clear the link, and each operator returns their transceiver to scanning.

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ALE for Amateur Radio-by Mr. R. Sarath Babu, VU3RSB

About the ALE Frequencies

- ALE frequencies coordinated with IARU Region bandplans, and comply with rules for the various countries of operation.
- At least one ALE voice SSB frequency on each HF band is available in every IARU Region throughout the world.
- An ALE data frequency on each HF band is used for *Sounding* Station Identification transmissions and HF Network text/data.
- The HF spectrum is a shared resource, so there is no guarantee of a clear frequency... if one ALE frequency is busy, an alternate QSY frequency is selected by ALE.
- Ham-Friendly ALE techniques for sounding and scanning were specially developed by hams to avoid interference, and make ALE compatible with ham radio, using automatic frequency occupancy detection.

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ALE Signal

Based on standard	FED-1045 or MIL-STD 188-141
Occupied Bandwidth	2kHz
Emission Type	8FSK - single tone shifted between 8 frequencies
Audio Shift Frequencies	750Hz to 2500Hz at 250Hz spacing
Symbol Rate (baud)	125 Symbols Per Second
Speed (raw bit rate)	Basic 375 Bits Per Second. (Up to 4800 BPS with the 8PSK fast ARQ data formats associated with ALE)
Decode sensitivity	- 4dB SNR
Compatible with	Amateur SSB Transceivers with no special ALC requirements

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International Amateur Radio Emergency / Disaster Relief

ALE Frequencies

1845.0 Global	**14346.0** Global
3791.0 Global	**18117.5** Global
5403.5 Regional	**21437.5** Global
7065.0 Regional	**24932.0** Global
7185.5 Global	**28312.5** Global
10145.5 Global	kHz USB

All ALE Frequencies are Upper Sideband standard.

Frequencies are coordinated with all IARU Regions (R1, R2, R3) for Global use.

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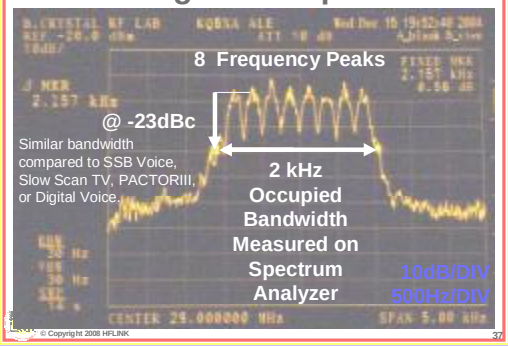
ALE Signal RF Spectrum



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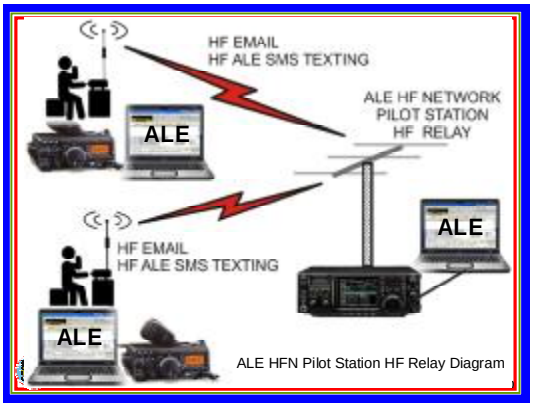
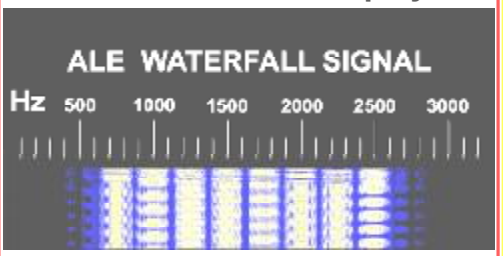


Example of an Icom 756pro ham transceiver with PCALE

Quiet Relay Scanning and Sounding

ALE Signal on a Computer Waterfall Audio Display



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ALE for Amateur Radio-by Mr. R. Sarath Babu, VU3RSB

ALE - SMS

What is ALE - SMS?

A short phone-text or email message sent through a Global ALE HF Network Station.

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ALE - SMS TEXT MESSAGE

- Message is received via internet or cell phone system by any Mobile Cell Phone, Blackberry or PDA

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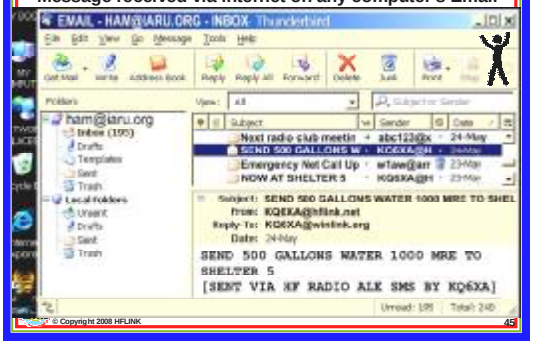
SENDING AN SMS MESSAGE BY FRONT PANEL KEYPAD OF AN ALE HF TRANSCEIVER

ALE - SMS TEXT MESSAGE

- Message received via internet on any computer's Email



 45

ALE in the Katrina disaster relief

- Mobile tracking
- Station status
- In route messaging

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International Amateur Radio ALE is an Open Net

- All organizations and individual operators are invited to use the ALE network and ALE frequencies at any time.
- Use it as an interoperative, common ***Net of Nets***.
- Share the ALE common frequencies for calling each other, or calling up your own net with your net's unique ALE *netcall*.
- Make your contact on frequency as needed, or QSY to your normal net frequency.

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Example ALE Net Calls

ALE netcalls are 3 Letters

```
HAM = Ham radio emergency stations
RED = Red Cross
SAT = SATERN
ARR = ARRL
ARE = ARES
RAY = Raynet
RAC = Radio Amateurs of Canada
IAR = IARU
RCS = RACES
SBD = SBDR
SAL = Salvation Army
 Other examples:
CAA = California ARES
ALA = Alabama ARES
MCA = Monroe County ARES
```

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Questions Answers

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ALE for Amateur Radio-by Mr. R. Sarath Babu, VU3RSB

ALE for International Amateur Radio Emergency / Disaster Relief Communications

Originally presented at the IARU Global Amateur Radio Emergency Communications Conference by

Bonnie Crystal KQ6XA and Alan Barrow KM4BA

More information:

HFLINK.NET

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This presentation is available for Amateur Radio Clubs and Organizations on the web at:

- http://hflink.net/presentation

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Sarath

Thank you

De Sarath, VU3RSB

HYDERABAD

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The Roadmap for ICT Development through Amateur Radio

Strategic Plan

Vivid Vision to guide for

Reaping Reach…

Rewarding Response…

Resonating Results…

by

S.Suri, VU2MY
Founder & Chairman

and

S.Ram Mohan, VU2MYH
Director

NATIONAL INSTITUTE OF AMATEUR RADIO
RAJ BHAVAN ROAD, HYDERABAD – 500 082
Tel: 91-40-2331 0287
Email: niarindia@hotmail.com
Website: www.niar.org

Roadmap to Amateur Radio Communication

Achievement ⊔ Accomplishment ⊔ Advancement

The Roadmap to achieve 1,00,000 hams in the country is prepared after a series of deliberations/discussions /brainstorming sessions with senior Hams and other Amateur Radio Clubs in the country, is submitted for kind consideration and favorable action.

Overview

ITU defines Amateur Service as, "*A radio communication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest*" also included Amateur Satellite service and related IT developments. The Indian Wireless Telegraph (Amateur Service) Rules issued by Government of India. Wireless Planning and coordination wing of the department of Telecommunications is the regulatory agency in our country in this regard.

It can be emphasized to strengthening measure for technology development in the country and can be achieved with a national policy with the support of Department of Information Technology to promote Amateur Radio in the country.

"To develop the scientific temper, humanism and the spirit of inquiry and reform" is enshrined in the Constitution of India, Article text no. 51a (h) on the Fundamental Duties of every citizen of India.

The views already expressed by, the National Human Rights Commission, Central Vigilance Commissioner, Planning Commission of India, various state governments and other non government agencies who have accentuated the need for developing and improving the Amateur Radio activity in the country particularly through schools and colleges be noted seriously to implement various schemes/programs in Amateur Radio.

PROMOTING PEOPLE'S PARTICIPATION

IN COMMUNICATION AND INFORMATION TECHNOLOGY
AND DISASTER MANAGEMENT THROUGH AMATEUR RADIO

The Government of India has initiated many pilot projects between 1980 – 1993 such as encouraging participation of Amateur Radio in 2nd Antarctic Mission, Rajiv Gandhi's own initiative in awareness programmes/demonstrations/exhibitions, Janvignan Jathas, participation in CHOGM, ASIAD'82, Freedom Fighters Conference and many more. A group of Ministers has assigned and deputed the Founder of NIAR for a two-month world tour to study and research developments in Amateur Radio movement across the globe and submit a detailed study report to Department of Electronics now known as Department of Information Technology in 1983.

NIAR, advocating Amateur Radio movement among Society

The Origin

The National Institute of Amateur Radio (NIAR), Hyderabad was established in 1983, with the support received from Department of Information Technology (formerly D.O.E) and has been working over the last 25 years to promote people's participation in communication and Information Technology and disaster management through development of amateur radio in the country.

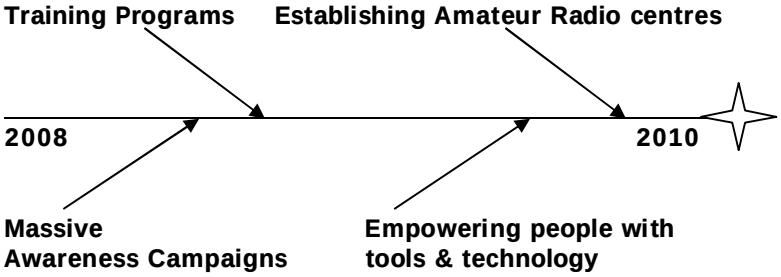
Initiative to Improve

The Department of Information Technology has taken up the initiative to establish Amateur Radio centers at various locations in the country to develop skills and empower people with latest amateur radio communication techniques. This initiative has been considered to be the major step towards increasing Ham population in the country. The first review by the PRSG appreciating progress in the current project desired that a country with a population of over one billion needed a vivid vision and mission for massive increase of Ham population to atleast 1,00,000.

Amateur Radio for Development

The development of amateur radio is seen as a nation building activity to achieve faster growth in the field of communication and Information Technology.

Road Map of the programme



Our Initiatives

NIAR has initiated the following to meet the targets:

- **Increasing number of Awareness Programs in each location**
- **Increasing number of Training Programs in each location**
- **Brainstorming sessions with Ham Experts in India and Abroad**
- **Increasing interaction among foreign and Indian Hams**

Roadmap to achieve 1,00,000 HAMs by 2010

2008	2009	2010
Ham Population in India is estimated to be around 12,000	10 fold raise in conducting Awareness activities / Training activities at targeted location in Sate/District Headquarters would increase Ham population by 100000 Hams	Amateur Radio Centers as part of Knowledge kiosks / Emergency Communication Command centres / R&D institutions / Schools/ Colleges / NGOs

Making strategy to realize OBJECTIVES and accomplishing RESULTS

Phases to achieve the objectives
We adopt the accomplishment plan in three phases to achieve the above targets:

I Phase

- **2 years program continuous program.**
- **Bringing in the basic awareness to major institutions such as Disaster Management / NGOs / Educational Institutions / Armed Forces / Police.**
- **Bringing in changes to administrative procedures to simply ASOC Examination / Time bound issue of Amateur Radio licenses.**
- **Establishing Amateur Radio centers to impart the latest developments including amateur radio digital communication techniques.**

Three Phases to realize objectives:

- **I Phase: to bring in procedural and organization amendments for better Amateur Radio growth**
- **II Phase: to create mass-scale awareness, simplify examination and licensing and advocate media participation**
- **III Phase: to promote amateur clubs, interaction and mutual network for effective growth of Amateur Radio movement in India.**

Actions were initiated to achieve all the above by way of meeting concerned / making proposals / submitting necessary documents and so on. There is good progress expected on matters related to procedural changes for ASOC Examination and Licensing.

II Phase

- **Creating mass-media awareness programs among students in professional colleges, graduates and undergraduate courses.**
- **Conducting nation-wide awareness seminars, training sessions, symposiums, exhibitions, demonstrations and so on.**
- **Modifying and making standard and simple practices to undertake ASOC examination.**
- **Monitoring developments by various volunteers on producing indigenous low-cost amateur radio communication equipments.**
- **Providing a monitory package for supporting Hams to procure equipment with indigenous technology.**
- **Advocating Media Policy Change in Education through campaigns and consultations.**

III Phase

- **Promoting aggressive/active Amateur Radio Club culture.**
- **Enabling interaction among inter-disciplinary groups.**
- **Encouraging active participation in new and emerging techniques.**
- **Creating a massive network of amateur radio centres in the country.**
- **Coordinating a cohesive and proactive participation from Government, NGOs and Educational Institutes.**

It may be noted that Planning Commission, Government of India has in the past had conducted serious exercise and recommended on the above. If the above phases are taken the proposed targets can be achieved at the earliest possible schedule and India can become a leader in Communication and Information Technology among developing and developed countries, even surpassing Japan's Ham population.

Using Amateur Radio, a means of SOCIAL CHANGE

Prospects for Socio-Economic Development

It may be understood that, the higher the HAM population, the higher the GDP, the higher the revenue to Government, the higher the growth of personal income even in Rural remote areas, the higher the Social development. It is a proven theory in countries like Japan, USA, Europe. Thus, the growth in Ham population has effective impact on Socio-Economic Development.

Generating new avenues of revenues

It may be noted that an investment of Rs. 10 crores by Government of India over a period of time is bound to generate revenues to Government more than invested within the same period by way of ASOC Fee / Excise / Sales tax on goods and equipment. Services utilized by 1,00,000 hams, this is explained in the topic on economic development through amateur radio. However, major thrust initially must be on publicity, demonstrations, exhibitions, seminars on wide scale.

Making globe a village with manifold development

The developments in the field of wireless communication and Information Technology reach multi-fold when these Radio Amateurs start experimenting with newer ideas and concepts in finding new technologies. Amateur Radio is the forerunner of our electronic age. In an enthralling, hands-on manner, it has managed to keep its enthusiasts interested and abreast of current communications technologies, lured first by the *novelty of talking across town, the across the nation, across the world, and ultimately with hams orbiting the earth in spacecraft.*

Promising Future

In 21st century, India will have the ability to meet the challenges in the field of Information Technology and Wireless Communications with the opportunities to learn, develop skills amongst the people and create a valued human resource base in the country. The development in the field of Amateur Radio will enhance the standards of quality, productivity, workmanship and initiative amongst the people that will lay a foundation for faster economic growth in the country.

Diversity of Amateur Radio

Radio Amateurs have pioneered wireless communication techniques and protocols, built antennas, learned to operate all kinds of communication equipments, and communicated with each other seamless manner through Morse Code, Voice, radioteletype, television, moonbounce, packet radio (Computer-to-Computer Communication) and Satellite Communications. It has the ability to lead many of its participants into careers undreamed of and providing a way for those with physical challenges to reach the world.

Amateur Radio for Societal Development

Society at large will be widely benefit from the Scientific Culture developed through Amateur Radio which enables individuals to achieve their full potential and efficient functioning by encouraging Self-learning, Intercommunication and conducting technical investigations. In short, we will achieve standards for high quality of life in the new millennium.

Amazing Potentiality of Amateur Radio

- **Enables socio-economic development**
- **Generates alternative and additional revenues for Government**
- **Makes the World a Global Village and enhances the communications**
- **Promises the better future through quality, productivity and economic growth**
- **Offers diversified communication and interaction techniques**
- **Enables social research and learning**

I. Introduction

Aiming to scale new heights of comprehensive COMMUNICATION

Foraying into fruitful economic affluence

India is forging ahead and preparing itself to catch-up with the developed world in various fields with developing economy. Over the last five decades, India has been striving hard to ensure equal opportunities to all and all-round efforts for a self-reliant and prosperous national economy. India has been trying hard to develop in the areas of agriculture, education, science and technology and other areas of development. Still, the nation is confronted with serious problems related to poverty, unemployment, social and economic imbalances and so on.

Amateur Radio reviving economies

To become truly world-class, we need to zero in upon the key value drivers like Amateur Radio that can fuel our nation's growth to newer heights. This can act as catalyst for growth of Science and Technology in the country. These sectors have played a very crucial role in reviving the economies across the globe. Amateur Radio continues to receive the same amount of patronage in the developed world that it had in the early days of its existence. Thus, the Amateur Radio movement is assisting the countries to maintain the lead in all aspects of Science and Technology.

Linkages with technology development

Amateur Radio is a multi-sectored activity, which has linkages with several branches of Science and Technology. In order to gauge the true impact of Amateur Radio, it is imperative to extend the statistics to include contributions by several Radio Amateurs to the field of wireless communication, science & technology and society at large.

So far, in the field of Science and Technology, the development policies were largely concentrated on establishing major institutions like research laboratories, corporations and so on. The Amateur Radio aspects in these specialized sectors were neglected. Thus, over the 50 years, we lost considerable amount of Human Resource that could have been utilized to support or complement the professional/primary institutions. We need a significant change in the policies adopted by the government with an open view to encourage these Amateur Radio communications and technologies as major thrust areas to usher in a new era of development to become a prosperous nation in the 21st century.

Untapped potential of Amateur Radio

India has not yet exploited or experienced the significant impact of Amateur Radio development as we can see in the developed world. This may be due to lack of initial investment in developmental stages either by Public or Private sector. It is here that the government needs to visualize the triggering mechanism of Amateur Radio in raising scientific temper among the people and to the development of Science and Technology in the areas of Electronics, Computers, Satellites, Space, Information Technology, Broadcasting and so on. A major awareness campaign highlighting potential goods of Amateur Radio to the society needs to be initiated to involve more peoples' participation, specially the youth throughout the country.

Roadmap that drives and guides on the road to SUCCESS

Experience envisages the excellence in SERVICE DELIVERY

NIAR – 25 years of rich expertise

To achieve such targets, a National Policy needs to be framed with a time-bound action plan with a programme atleast for a period of 5 years. This may also require some regulatory changes and constant interaction with the authorities to disseminate information. NIAR is as pioneering organization with good infrastructure and other facilities and a specialist in this field. NIAR has received several awards and appreciations from various governments, non-government agencies in India and abroad for its activities on promotion of Amateur Radio. NIAR's services can be utilized for to the maximum extent and will also serve as an excellent launching pad for implementing such programmes in the country.

The proposed national policy to promote Amateur Radio in the country will ensure people's participation, involving people from all walks of life including all types of institutions, organizations and the communities. The challenge is to chalk out the best possible action-plan in present global scenario keeping our national priorities in sharp focus. Thus, this document with detailed proposals after having discussed with several Senior Radio Amateurs in India submitted.

The Need of Expansion for better Societal Development

Radio communications during calamities

In the National policy for disaster management a view needs to be taken for promoting such non-conventional communication activity as a second line of communication which is very cost-effective and dependable in the need of the hour when compared to the capital intensive conventional telecommunications which are invariably susceptible for disruptions at the time of calamities. This area would also provide scope for alternative employment generation, technology development and connectivity of people in remote areas and thus leading to the comprehensive rural development.

NIAR in rescue and relief

The proposal is based on earlier approval of World Bank US $ 1.2 million to NIAR through Andhra Pradesh Cyclone Emergency Re-construction Project (APCERP) and Department of Information Technology, GoI supported programs. In fact implementation of these projects as well as others resulted in NIAR coming to the rescue and relief during many calamities, though on a limited scale, during Indian Ocean Tsunami-2004, Gujarat Earthquake-2001, Orissa Super Cyclone-1999 and many others. As such, we do not think there will be any difficulty with funding Agency like World Bank or Government id India or others as it is a similar one.

Empowering people with communications

It is necessary for the government to support, encourage and nourish activities like Amateur Radio in its initial stages as a welfare measure for the people of the country. The technologies like Amateur Radio in return will reap the benefits for the government in the future by creating multifold development in Science and Technology, education and empowering people with knowledge and information base.

Amateur for self-reliance

Several developed countries are supporting their Amateur Radio organizations in their early stages, which become self-reliant later with large number of amateur population. A large-scale development of Amateur Radio will create numerous employment opportunities in the manufacturing and maintenance sector throughout the country.

Promotion to strengthen the-communication-in-the-need-of-hour
Taking the maximum benefit from many facets of Amateur Radio

Opportunities galore

People will be able to look forward to exciting opportunities in the field electronics, Communications, Computers, Broadcasting, Space, Satellites and Information Technology. If they live in rural areas, they will have the ability to interact with people from other locations and provide alternate and cost-effective channels of communication. The interaction amongst the inter-disciplinary groups will provide involvement of wide sections of society to work for common objectives. The transfer of information, knowledge and skills to rural and remote areas will become more affordable and initiate scientific outlook among masses.

The Objectives of Amateur Radio Promotion in the country:

1. **Human Resource Development**
   To exploit easily available National Human Resources and material resources including frequency spectrum allotted by the ITU to Radio Amateurs to produce cost-effective solutions for faster economic developments of far reaching proportions.
2. **Better Coordination**
   To plan an alternative National network on communications and Information Technology utilities for proper and coordinated use of skilled resource development.
3. **Employment Generation**
   Employment generation through products and services related to Amateur Radio and greater role in most under developed nation through exchange programmes like Grammeen Bank in Bangladesh.
4. **Technology Development**
   Amateur Radio is a Trigger Mechanism for Science and Technology developments in areas of Electronics, Computers, Communications, Information Technology, Satellites, Space and Broadcasting.
5. **Catalyst for Innovations**
   It is a Major catalyst on all Information Technology related aspects and consequent economic development can also be ensured in all the above mentioned areas. A serious and detailed scientific study in developed countries would reveal that Amateur Radio is the single major factor leading to several innovations in Information Technology and Communications as seen today.
6. **Disaster mitigation and Health Management**
   There is no parallel to Amateur radio in providing cost effective solutions either during Natural Calamities or Preventive acts or Health Disasters.
7. **Education and Research**
   Amateur Radio provides better and scientific learning of skills and comprehensive research in cost-effective manner in hi-tech areas including Space, Communications and Information Technology. It makes the development faster, authentic and effective and enables many alternative sources.
8. **Increased National Security**
   Amateur Radio can support the national government with knowledge and working of the latest tools and techniques in communication. It can provide cost-effective solutions for maintenance of technologies and alternate channels of communication that strengthens the activities of National Security organizations.

Benefits to bring in bountiful progress to Communities… Society… Nation…

II. The Strategy

Strategy to chalk out guidelines for successful initiatives

For realizing the objectives envisaged in the plan document, the convergence of programs, activities and efforts is essential. Following areas can be concentrated:

1. **Awareness**
   Creating a basic awareness amongst the general public on the potential and importance of Amateur Radio communications

2. **Campaigns**
   Conducting massive campaigns, seminars, exhibitions, guest lectures, yatras, demonstrations on Amateur Radio technologies

3. **Joint-ventures**
   Organizing joint programs with NCC, NSS, Scouts and Guides, Paramilitary services, ex-servicemen associations, IETE, IEI and so on

4. **National Policy**
   Bringing out a national policy for Engineering Colleges, Polytechnic Colleges, ITI Colleges to encourage the involvement of youth at a very young age in Amateur Radio activity

5. **Alternative Network of Communication**
   Creating an alternate network of Amateur Radio communications throughout the country to work effectively during emergencies and calamities

6. **Employment**
   Creating a large-scale employment opportunities in various sectors of science and technology

7. **Economic Development**
   Enhancing greater progress in economy by empowering people with knowledge and Information base and raising them to higher standards for more quality of life

Transforming initiatives into successful interventions

III. Economic development through Amateur Radio

Projections illustrate prospective growth

Despite immense potential to nation's economy, it is disheartening to note that Amateur Radio technologies were neglected over the years. Authorized by Government of Andhra Pradesh, a Chinese delegation visited NIAR in April 1995 to study the role of Amateur Radio. Today, Ham population in China is estimated around 10,000. A silent revolution is taking place in that country to surpass Ham population as that of Japan.

Taking into account the geographical area and population of the country, available skilled manpower and the very low cost of the project on amateur radio on a national scale, we should plan for a target of generating atleast one lakh Amateur Radio operators in the country over a period of 2 years (say 2010) and One million by 2020. It is possible with political determination and extensive awareness programmes using diverse media.

An estimated Amateur Radio population of 1,00,000.

The amount of revenue generated by way of:

a	Taxes (direct and Indirect) collected by Government from sale of equipment and other related services. (Minimum value of Amateur Radio equipment as Rs.10,000/- and taxes at 10% of its value)	50,000 X Rs.1000 =Rs. 5,00,00,000
b	Amount collected as ASOC examination fees	1,00,000 X Rs.20 = Rs. 20,00,000
c	Amount collected as ASOL license fee	1,00,000 X Rs.100 =Rs. 1,00,00,000
d	Amount generated through Amateur Radio related services and self employment	1,00,000 X Rs.1000=Rs.10,00,00,000

Self Employment for 1.2 million people can be generated considering 2 Amateur Radio operators per village on an average throughout India in 6,00,000 villages.

An estimated employment for another 50,000 people will be additionally required to service and maintain the Amateur Radio equipment.

Amateur Communication enabling alternative means of employment

IV. The World of Amateur Radio

Global scenario in amateur communications

Amateur Radio commonly called "*Ham Radio*", is a hobby enjoyed by many people throughout the world, as of 2004 about 3 million worldwide. A holder of an Amateur Radio license has studied and passed required tests in his or her country and been issued a *call sign* by its government. This call sign is unique to the operator and is often a source of period. The holder of a call sign uses it on the air to legally identify all voice and data communications.

The Wireless Planning and Coordination wing of Department of Telecommunications, Ministry of Communication and Information Technology regulates radio and telecommunications. In India, Amateur Radio serves the following purposes:

- **Promotion and enhancement of the Amateur Radio Service as a voluntary and non-commercial public communications service**
- **Continual advancement of the art of radio communications**
- **Expansion of the reservoir of trained radio operators and electronic experts**
- **Enhancement of international goodwill at the grass roots level**

HAMs Population

There are about 3 million amateur radio stations in the world. This figure only represents the number of stations, which are actually in operation. It is no exaggeration to say that there is an amateur radio station in virtually every part of the world, the only exception being uninhabited regions.

Japan	13,00,000	USA	7,00,000	Germany	75,254
England	62,093	Spain	59,325	Canada	57,000
Russia	5,000	Italy	30,000	Brazil	32,053
Argentina	35,776	India	13,000		

Source: <<www.iaru.org >>

The number of amateur radio stations in Japan is almost half of the total. It is truly amazing how amateur radio communications gained such mammoth popularity in Japan and also these Amateurs build their nation into an economic super power.

Governance and Amateur Radio Societies

The International Telecommunication Union (ITU) governs the allocation of amateur radio communication frequencies world-wide, with participation by each nation by representation from their communication regulations authority. IARU member nations may choose to further limit specific frequency allocations within IARU guidelines.

Many countries have their own national Amateur Radio Society that coordinates with the communications regulation authority for the benefit of all Amateurs. The oldest of these societies is the Wireless Institute of Australia (WIA), formed in 1910; other notable early societies are the Radio Society of Great Britain founded in 1913 and the American Radio Relay League instituted in 1914. National societies also cooperate through the International Amateur Radio Union (IARU).

Enunciating empowerment of Amateur Communication for Effective Service

Band Plans and Frequency Allocations

Through ITU agreement and standards bandwidth has been set aside for amateur transmissions. Amateurs use a variety of transmission modes, including Morse Code, Radio Teletype, Data, and Voice. Specific frequency allocations are a matter of record and vary from country to country and region to region, but the most widely used frequency allocations in India include:

Medium Frequency (MF) (300 KHz to 3 MHz)

- **160 metres (1.820 – 1.860 MHz)**

High Frequency (HF) (3 to 30 MHz)

- **80 metres (3.5 – 3.7 MHz)**
- **80 metres (3.89 – 3.9 MHz)**
- **40 metres (7.0 – 7.1 MHz)**
- **30 metres (10.1 – 10.15 MHz)**
- **20 metres (14.0 – 14.35 MHz)**
- **17 metres (18.068 – 18.168 MHz)**
- **15 metres (21.000 – 21.450 MHz)**
- **12 metres (24.890 – 24.990 MHz)**
- **10 metres (28.0 – 29.7 MHz)**

Very High Frequency (UHF) (30 to 300 MHz)

- **6 metres (50.35 – 50.55 MHz)**
- **2 metres (144 – 146 MHz)**

Ultra High Frequency (UHF) (300 MHz to 3 GHz)

- **70 centimetres (434 – 438 MHz)**
- **23 centimetres (1260 – 1300 MHz)**
- **9 centimetres (3300 – 3410 MHz)**
- **6 centimetres (5725 – 5800 MHz)**

Use and Available Activities

Amateur to abundant exploration

Licensed Amateur Radio operators enjoy personal two-way communications with friends, family members, and complete strangers, all of whom must also be licensed. They support the lager public community with emergency and disaster communications. Increasing a person's knowledge of electronics and radio theory as well as radio contesting are also popular aspects of this radio service. A good way to get started In Ham Radio is to find a club in your area to answer your questions and provide information on getting licensed and then getting on the air!

Simplex Communication

Ham Radio offers the licensed operators a variety of radio modes that help to ensure reliable communications during and after disasters. Many of these rely on the "simplex" mode which is direct, radio-to-radio communications. It avoids the problems associated with networks that might fail. In Ham Radio simplex communications, it allows a skilled radio operator to talk across town on VHF or UHF frequencies or across the world on the HF (shortwave) bands of frequencies. Hams also have other powerful tools available, *Repeaters*. Repeaters are radio relay devices usually located on the top of a mountain or skyscraper building. A repeater allows the licensed Ham to have radio coverage for hundreds of miles from just a small handheld or mobile two-way radio.

Within amateur radio, one can pursue interests such as:

- **Powering communications for a community emergency response team**
- **Antenna theory**
- **Satellite communication (AMSAT / OSCAR series satellites)**
- **Traditional SSB/CW communications**
- **Packet radio/RTTY/PSK31/SSTV/ATV/APRS (using data transmission protocols similar to that used on the Internet, but via radio links)**
- **DX communication over thousands of miles using the ionosphere to refract radio waves**
- **Internet Radio Linking Project (IRLP)/Echolink which is a composite network of radio signals and the Internet**
- **Radio contests and super low-power or QRP operation**

QSL Cards and Contesting

Dx-peditions - to Explore and Experience

One of the many exciting activities of Ham Radio is the DX-pedition. Radio amateurs collect QSL cards from other stations, indicating the continents and regions which they have contacted. Certain zones of the world have very few radio amateurs. As a result, when a station with rare ID comes on the air, radio amateurs flock to communicate with it. To take advantage of this phenomenon, a group of hams transport radio equipment into a remote country or islands (such as normally uninhabited Bouvet Islands, which has the rare *callsign* prefix *3Y*). These expeditions can help Hams quickly achieve a communications award such as a DXCC. To obtain the DXCC award a Ham needs confirming QSL cards from Hams in 100 countries across the globe.

Contesting to Compete

Contesting is another activity which has garnered interest in the Ham community. During a period of time (normally 24 to 48 hours) a ham tries to successfully communicate with as many other hams as possible. In the US, one such event is Field Day, held in the last full weekend in June. The contesting amateur may concentrate on just DX stations, or only on stations powered by emergency generation equipments or running on batteries, which is meant to simulate hurricane or other limitations in allowable modes of transmission.

Weak Signal and Low Power Activities

Frequency signals for better communications

Some Hams use VHF or UHF frequencies to bounce their signals off the moon. The return signal is heard by many other Hams who also do EME (Earth – Moon – Earth). The antenna arrays are massive so a lot of real estate is needed. Other Hams transmit with very low power. Signals on the order of 5 watts or less are heard all over the world by these QRP (low power) operators.

Past, Present and Future

Despite all these exciting specialties, many Hams enjoy the informal contacts, long discussions or "rag-chews", or round table "nets", whether by voice transmission (SSB, AM, or FM), CW (Morse telegraphy), or one of the digital modes (RTTY, PSK31, and others).

Amateur Radio in building better societal communications
Advent of Technology in Amateur Radio Communication for effective results

Prominence of Amateur Radio in the Internet Era

Even with the advent of the Internet (offering emails, music, broadcast audio, video, Voice over Internet Protocol (VoIP) Ham radio is not diminishing in countries with advanced communications infrastructure. Amateur radio remains strong even today, as figures from the American Radio Relay League will prove. This may be party because Hams enjoy communicating using the most minimalist simple hardware possible as well as finding the most technically advanced way, advancing the art of radio communication at both ends, frequency beyond what professionals are willing to try and risk.

VoIP in Amateur Radio Communication

Voice over IP (VoIP) is also finding its way into Amateur Radio. Programs like *Echolink* (http://www.eacholink.org/) connect Hams with Computers into Ham Radio Repeaters across the globe. The Internet Radio Linking Project (IRLP) (http://www.irpl.net/) utilizes VoIP to connect repeaters together directly by user command. This nascent use is finding applications in emergency services and as an alternative to expensive (and something fallible) trunking systems.

Amateur Radio in the hour of need

In times of crisis and natural disasters Ham radio is the only surviving means of communication. If has found all too often that both wire and cellular telephone systems either fail or are overloaded in times of crisis and radios dedicated to emergency services fare litter better. In the United States two organizations of amateur radio operators exist nationally for disaster communications. They are the Amateur Radio Emergency Service (ARES) and Radio Amateur Civil Emergency Service (RACES). Typically a local radio club will have information on joining either or both. In areas where known disaster problems exist, the amateur radio communication has become the main mode of communication support for local emergency services.

In the year 1895, Sir J.C Bose, was known to have demonstrated the first wireless communication experiment in India. More recently as 2007, Ham radio has been used for flood relief operations in Mumbai.

Amateur Radio, a tool of true support

Throughout its history, amateur radio had made significant contributions to science and technology and societal development. The economic and social benefit derived from amateur radio research has founded new industries, built economies, empowered nations, and saved lives.

Igniting the insights of Research and Development

Amateur radio represents a unique research and development (R&D) environment that cannot be duplicated in the laboratories or research parks of either industry or the government. Existing at the intersection of the economic, cultural and scientific development; amateur radio leverages this position to invent and innovate from a unique perspective. Many now-commonplace communication technologies have their genesis in amateur radio.

However, the amateur radio service or more specifically, the portion of the electromagnetic spectrum allocated to the activity is under extreme pressure from the telecommunication industry. Recent exponential growth in commercial wireless communication systems has taxed existing commercial spectrum allocations, and industry is eager for expansion. Amateur radio spectrum is threatened. Ironically, many

of the communication technologies used by these firms were initially developed within the field of amateur radio.

To justify their quest for additional spectrum, industry lobbyists portray amateur radios as an anachronism, and characterize amateur bands, particularly in the UHF and microwave region, as underutilized. On the contrary, innovative communications research within the hobby is alive and well, and many of these new amateur projects utilize the higher- frequency bands sought after by industry. There is commercial interest in some of the new technologies currently under development within amateur radio, and amateur radio continues to the state of the radio art.

Therefore, amateur radio must be supported by government and the telecommunications industry it helped create, so that it may continue to innovate and serve as a source of creativity for both technological and social change as we forward into the twenty-first century.

Instilling integrated development in information and communication processes

How to become an Amateur Radio Operator

NIAR adopts processes that lead for proactive service

Any individual above the age of 12 is eligible to appear for Amateur Station Operator License Examination conducted by Ministry of Communications. One should qualify a simple test conducted in three subjects such:

- **I) Morse Code (Transmission and Reception)**
- **II) Communication Procedure**
- **III) Basic Electronics**

Wireless Planning and Coordination wing of the Ministry of Communications issues licenses to qualified candidates. There are four categories of licenses:

1. **Advance Grade**
2. **Grade – I**
3. **Grade – II**
4. **Restricted Grade – II**

How to get your Ham Radio License

The following is the procedure for persons interested in obtaining an Amateur Radio license:

1. **Selection of License Type**
   Choose the type of license you wish to have. The most popular introductory Amateur Radio license is the "no code" Restricted Grade-II or Grade-II class license. Another alternative is the Grade-I class license. The "no code" Restricted Grade-II and Grade-II license enables you to use popular "FM" two-way radios and repeaters on the VHF and UHF bands. You can also send computer data, television signals or use Amateur Radio orbiting spacecraft with this license. Decide which license you wish to pursue

Note: Grade-II licensee needs to appear for Morse Code test with the speed of 5 words per minute
Grade-I licensee needs to appear for Morse Code test with the speed of 12 words per minute

2. **Studying For the Exam**
   There are several ways to prepare for the Amateur Radio exams that include:

- **Take a class**
  If you know an amateur radio operator in your area, you might ask if he or she knows of local license classes. Many radio clubs provide training classes. In some areas, community colleges and other schools may provide license study classes. Knowing a local Ham radio operator may also prove helpful when you are setting up your first Amateur Station and you need advice and assistance regarding antennas, radio equipment, RF and electrical safety considerations, including local rules on the installation of antennas.

- **Self-Study**
  You can study on your own using available study guides and/or video-taped instruction. Audio cassette tapes and computer aided learning (CAL) programs are available to help you learn the Morse Code if you choose to do so for your first license. There are two approaches to preparing for the tests:
  i. **learn the material**
  ii. **try to memorize all the test questions and answers**

People with academic background in electronics already know most of the theories and technologies. With two to four hours of review and an understanding of the rules and regulations that apply to Amateur Radio, they can successfully pass their written exam on their first attempt.

3. **Optional - Learning the Morse Code**
   You do not need to learn the Morse code to earn the "no code" Restricted Grade-II class license. The "no code" Restricted Grade-II license is the most popular license class for new licensees. If you wish to learn the Morse Code, you should start with the 5 word per minute (WPM) tests. Many people can learn 5 WPM Morse Code by studying for 15 minutes, once each night over a 2 to 3 week period. You only need to pass the 5 WPM speed for the Grade-II license. By passing this exam you will have access to Voice Communications on the Amateur 10 meter band, which provides you with access to worldwide communications. Higher-class licenses have exams at 12 WPM.

4. **Where To Take Your Exam**
   Once you are prepared to take the examination(s), you need to find out where to take the test. Tests are administered by Monitoring stations of Ministry of Communications throughout the country. A nominal fee is charged to cover the costs of the testing. There are several ways to locate a test session. If you know a local Ham, ask him or her about local testing opportunities.

Where to take Ham Radio License Examinations?
The place and schedule will be decided by the respective Monitoring Stations (details published in WPC website Http://www.wpc.dot.gov.in)

Amateur Radio enabling communication for better development and service

V. Amateur Radio for Education and Skill Development in Rural Areas

Amateur Radio for Education empowerment and Skill Enhancement

Amateur Radio for Poverty Alleviation

To enrich income levels and expand employment opportunities of the weaker sections of the society particularly those living below the poverty line and women in rural areas, National Institute of Amateur Radio (NIAR) proposes to establish amateur radio clubs in the rural/remote areas over a period of time. These clubs also organize regular services through the use of amateur radio as part of rural infrastructure. This will also help in disaster mitigation activities and run service centres for electric/electronics gadgets.

Kiosks for Value Added Services

The Information Technology Kiosks proposed to be developed in rural areas and others will have to be run by people with certain skills and alternate means of communication support to be really cost effective. Without amateur radio background it is likely that similar to VPT (Village Public Telephone) system the IT Kiosks also become less effective.

Enabling Self-employment

The emphasis is given to rural development by Government of India and the State Governments through many tailored schemes and in several ways specially to bring up people below the poverty line and women. All these schemes attempt at getting tangible results and immediate benefits that can accrue to the beneficiary directly. Some may end up with mere awareness and training programmes without sufficiently making it possible for rural youth to self-employment.

Catalysts in Rural Development

The kind of rural infrastructure we have today despite latest technological trends in communication and other areas that can benefit large sections of people are not percolating down to the rural areas. This is due to the Government emphasis and spending is not taking sufficient care of "catalysts" like amateur facets of education, culture and science. These can be easily developed at rural areas instead of looking at solutions only through organized formal or well established institutions for rural development.

Linkage of Communities

Even in the developed countries like USA, Europe, Japan and so on, even today the amateur aspects are given due importance as they are not only considered as "*catalysts*" but also as a linkage in bringing together rich and poor, able and disabled, urban and rural professionals and providing a comprehensive interactive participation among them. Thus, they save lot of money from unnecessary spending on technologies. It is by their interaction of Amateur Radio community in all aspects and in all walks of life at all ages bring in coordinated effort in Education, Industry and improve goods and services.

Technical Support

A good technical backup is essential to see that equipment and funds are not wasted in such scheme. With the rapid technological improvements taking place all over, the rural areas cannot be neglected. Even the rural schools/colleges will have to catch up with these technical trends particularly in communication area, if the gap between rich and poor and rural urban is to be bridged, it is this kind of rural infrastructure and activities around it only can help.

Amateur Radio to accentuate development among rural communities

NIAR to play pivotal role to bring holistic development

NGO Participation

The skill development is achieved either due to professional or self-effort. Self-effort is also essential need for employment generation and to improve the social environment that can provide opportunities to build and develop skills. It is here the emphasis in developing scientific outlook and humanism as enshrined in our constitution needs to be understood and steps have to be taken to strengthen through meaningful ways to educate masses using institutions like NIAR and other NGOs besides using extensive electronic and press media. It is NGOs that are devoted to social, cultural, scientific development and use education and dissemination of information through various methods take active part in this regard.

There has to be one Apex organization that can look after all the areas.

NIAR, a pioneer in Amateur Radio movement

NIAR is a well-established national organization with proper infrastructure already developed, which can take up activity in rural areas to establish Amateur Radio Clubs. The Government of India in 1983 helped establish this National Institute of Amateur Radio as an apex organization in NGO sector after a detailed study of amateur radio institution all over the world.

The NIAR's Effort

- **NIAR intends to involve participants in the planning, implementation and activities envisaged right from the beginning.**

  Through the proposed amateur radio centres to be established in the rural and remote areas, it is the educated persons, women of the area who plan for their safety standards for survival in the event of calamities, also for implementing projects and activities with the help of Hams interaction.

- **NIAR ensures to provide proper infrastructure and planning to develop methodologies capable of replication and support technical services.**

  It is possible to link rural and remote groups to the nodal points where their activities are originated, controlled or supervised. Further, the link can be established to levels higher from the nodal centre upto district, state, central Head Quarters. All these amateur forums although are not working on commercial or official lines, it is the way to empower rural people including women in communication trends of modern and scientific age. These clubs can be established in any part of the country.

The proposal is to develop amateur radio centres initially in all State headquarters.

NIAR proven track record

It is here, only NIAR as an NGO at national level with rich infrastructure, domain expertise and technical acumen is ideally suited to take up the programme all over India. NIAR has proven track record for more than two decades.

Pioneering many path-breaking initiatives
Promoting amateur communication among masses for all-round development

Advocating the awareness amongst stakeholders of society

Promotion of Amateur Radio clubs in India is being proposed by NIAR under the programme of funding on a national scale with the following objectives:

A) To create an awareness among the rural masses on the potential use of available communication media including Amateur Radio.

B) To develop a forum in the rural areas where different skilled people are made to interact not only among themselves but also with others in urban areas and with talented and influential in the field through amateur radio clubs located nearer to them.

C) To establish an amateur radio club in villages to help in disaster mitigation efforts during natural calamities besides helping the villages on medical emergencies and others dire needs as permitted within the rules of Indian Wireless Telegraphy (Amateur Service) Rules.

D) To provide opportunities to less fortunate, but educated upto 8th standard, including woman to develop skills in use of modern tools of communication and commonly used in electrical and electronic gadgets.

E) To empower the village assistants, rural organizers, social workers and so on with amateur radio skills.

Advocating Quality of Life

In today's world of technological revolution, in the emerged and emerging areas of Electronics, Communications, Computers, Space and Information Sciences, it is organization like NIAR that can involve in improving quality of life of people living in rural areas specially woman with Amateur Radio activities making them active participants in community development.

It is possible to conduct programmes by NIAR to the rural poor but educated to a level atleast 8th standard and above.

Objective to achieve target

The objective of this project is to establish professional quality services which would lead to make amateur radio as a movement that should surpass Japanese amateur radio population of *1.2 million over a decade.* This is a target to be achieved. Economic returns on the investment are measurable and will have not only to recover the investments made on this project by Government of India, but prove that the project is a money spinner for the Government along with social action on Information Technology and Disaster management.

Communication during calamities

In times of natural calamities these clubs come very handy to save life and property. Each club is expected to provide employment for two to three persons either directly or indirectly. The Member Parliament Local Area Development Scheme (MPLADS) also allows the MPs to setup amateur radio clubs and use Citizens Band Radios. The MPs can use their funds for amateur radio/citizen band radios only when sufficient number of trained and qualified men and women are available in these fields.

Emphasizing on empowerment amateur communication for effective results

Encouraging people's participation in amateur communication

Participants

Under the guidance of highly skilled professionals with local vernacular language as a medium of communication, it is the small marginal farmers, rural women, landless agricultural laborers, village artisans, fisherfolk, forest dwellers and many more who will be made participants, however among them qualified upto 8th standard and above will be only considered.

They will be the future trainers in this movement with rural background.

Employment opportunities

The proposed scheme envisages employment of *1000 motivators* also as trainers and 50 highly qualified persons in all branches of amateur radio. During the period of Implementation of the Project, an awareness programme, training, field activities, establishment of amateur radio centres in State Head Quarters and District Head Quarters. It is expected that some of the participants find gainfully employed.

Awareness Programmes and Survey

It is necessary to conduct an awareness programme including survey at first instance to the rural areas by way of demonstration and exhibition of *Amateur Radio* equipment and its uses to the people for their appreciation and for their training programmes in the rural areas. This includes:

- **Poster Campaigns**
- **Pamphlets**
- **Seminars / Workshops**
- **Radio / Television**
- **Press Advertisements**
- **Contacts with rural leaders/social animators**
- **Coordination with Village Assistants / rural organizers/social animators**

Conducting 3-day intensive programme for 30 or more candidates chosen in each centre can do this.

This campaign has to be similar to health sector campaigns on AIDS, Polio Vaccination and many more.

Under training programme the components are:

A. Basic training

Basic Training upto 15 Days to One month depending on the qualifications of the persons to be trained in elementary knowledge of electronics, communication procedure, Morse Code to enable a candidate to appear for an Amateur Station Operator's License (ASOL) exam conducted by the Dept. of Telecom (WPC Wing) under Ministry of Communications & IT, Govt. of India.

For around 30 or more candidates
Full time training programme
With 6 to 8 hours time schedule
Boarding and lodging facilities to participants

B. Technical Training

The second phase of technical training is for another two months for those qualified in A.S.O.L only. The training includes servicing of electric/ electronic gadgets for six months, besides exposure to amateurs radio communications and mock exercises to work during disasters like natural calamities.
Includes boarding/lodging facilities to participants
Full-time programme with 8 hours a day time schedule

C. Amateur Radio Club Setup

Establishment of a Amateur Radio Club by those qualified in ASOL and underwent second phase of training successfully will have to be provided with equipment support under the scheme and for running a service centre of electronic / electric goods and computer servicing for a minimum period of one or two year.

D. Government Authorization

It is economical to conduct a programme for a group 30 or more candidates at a time in such programmes. The examiners from Government of India are authorized to conduct at the location of the training be it rural/remote area, if 30 or more candidates appear for exam. While every one gets benefited by qualifying in ASOL and will be able to operate the HF/VHF sets, some get into regular employment with the training and skills gained.

Equipment Support

Every club is expected to have atleast ONE HF and TWO VHF, TWO computers and TWO MODEM sets to be effective and useful in times of emergencies. Frequency allocation is already made by Government of India for radio amateurs.

NIAR has already developed equipments in its Research and Development and is good enough for duplication. The prototypes are already field tested and successfully operated. It is economical and feasible, if 100 or more sets are produced at NIAR laboratory/workshop at a time. Imports are also permitted by Government of India, but it is possible for NIAR to provide low-cost indigenous equipments.

There are Amateurs, making their own HF or VHF two-way communication devices as low as Rs. 2000/-.

Establishing Radio club/service centre along with IT Kiosks / STD booths

Installation of Kiosks

In any rural home ideally suited or in a public place the equipment can be installed and can be used by all the trained and qualified (possessing amateur station operator's license issued by Government of India) can utilize this community based equipment. Only requirement is power supply source. If electric supply is not available, these sets can run on batteries.

The trained men in the rural areas may not only spend their leisure time enjoying amateur radio/citizens band contacts, but also learn lot through such contacts.

Service Centre

The service centre in the club station is intended to help the people of that area in servicing electric / electronic gadgets. The clubs as part of disaster mitigation will coordinate with others and network with Village / Mandal / District level authorities.

Initiating many path-breaking promotion activities for amateur communications

Promoting Amateur Radio clubs in rural areas for effective results

VI.Disaster Management through Amateur Radio

Amateur Radio, the communication in need

Present Scenario

With the veins of telephone network penetrating deep into the rural sectors, telephones are now available in some of the Indian remote villages too! But "History Repeats" and as with any natural calamities around the globe, Gujarat earthquake or Super cyclone in Orissa or other disasters, the man made disaster like the 9/11 in USA, wire telecommunication is the first to fail.

The professional wireless telecommunication is then relied upon heavily and has always proved to be far below the datum to sustain the pressures of the moment. Along with the regular tasks of law and order enforcement and additional field work during times of natural calamities, the wireless channels would always be overloaded with extended internal traffic. An antenna blown off or a snap in power supply sometimes adds to the gravity of the situation. Even with latest state-of-the-art Cell Phone, the battery charge and replace the dark patch that has always reminded uncovered was an efficient communication between the civil administrative authorities deployed at the site and those decision makers at the control points to initiate the necessary rescue/relief operations.

Neither can heavy police force be deployed only for communication purposes nor can the Hotline telephones through Microwave/Satellite communication be provided though for a short period from each such affected village to the various control points governing it. By exploiting the carrier Microwave links through repeaters and through satellite, the system was not only prohibitively expensive, but also was restricted to a limited number of stations.

Furthermore, manipulation of such a system to suit the stations requirement is beyond ones control. Some of such systems mounted on vehicles with dish/parabolic antennas and adequately protected with self generation power sources could be sent to a limited Taluka / District Headquarters on the cyclone map. But these moving masses weighing not less than 8 – 10 tones on an average had portability restricted till the disaster strikes and were then necessarily grounded. At such times, even a small snag in effective communication can lead to the loss of precious human life and property. These vehicle mounted systems, Satellite or ground based cell phones and so on were so sophisticated and hi-tech that it would call for an expert to attend to any breakdown in the system and would simply be beyond the reach of an operator handling the station/equipment.

Using HAM Radio

A time-tested solution to such a grave situation is Ham Radio. Furthermore, as decades old disasters speak, it was Hams to the rescue of the nation first and best, even in some of the manmade major disasters in even the technically perfect nations of the advanced communication era of the world such as USA(Alaska earthquake) and Russia (Armenia earthquake), Japan (Kobe earthquake). Ham Radio has always played a vital role even in advanced countries during such natural calamities and its necessity/impact would be felt more in a country like ours India, where developments/perfection in the field of disaster management is substantially less.

In fact a prominent magazine in USA called *World Radio* publishes month after month how in these advanced countries Amateurs are playing a significant role.

Instilling scientific outlook among rural communities
Amateur Radio, an effective communication in the hour need

HAM Radio Role in the 2001 Gujarat Earthquake

The Calamity

On 26th January 2001, nature's fury in the form of massive earthquake shook the entire subcontinent with its epicenter near Bhuj in the State of Gujarat. Earthquake that recorded nearly 6.9 on the Richter scale was sensed as far as Bangalore, Delhi and other neighboring states and even neighboring countries in the region. The earthquake has not only cracked soil, buildings but also cracked lives of over one million people in Gujarat.

The Amateur Team

The first team met at the NIAR Head Quarter for a brief meeting on the task ahead. A team of five persons under the leadership of Mr. S.B. Ram, VU2LIC immediately rushed to Gujarat by air. The Control Station at Gandhinagar secretariat was established. A Team of two amateur radio operators were airlifted to Bhuj and were operational from 27th January morning and passed on messages extent of damage and flashed the news for need of more stations to be activated in other effected areas.

The Support

Amateur Radio operators from various parts of the country responded to the call, more than 100 amateurs have come forward and amateur radio stations were deployed in some of the most effected areas like Bhuj, Anjar, Bachau, Patan, Gandhi ham, Morvi, and Rapar to assist in relief and rescue operations.

HAM Radio Role in the 1999 Orissa Super Cyclone

The Disaster

During the super cyclone in 1999, National Institute of Amateur Radio (NIAR) with its limited resources could provide HF Communication link to the Special Relief Commissioner with all District Headquarters affected by Cyclone and the State capital. We could also mobilize temporary resources upto an additional 20 amateur radio stations with about 30 licensed Radio Amateur Operators working in shifts round-the-clock. Unfortunately, a large number of places yet remained cut-off from communication, covered neither by the Ham net nor by the police net or any one else.

From the worst hit coastal districts Jagatsinghpur and Kendrapara, Hams provided the only two-way link for all weather report traffic, upto the minute position reports, property losses (Government and Private), life loss reports after the event of Super Cyclone on 29th and 30th October, 1999.

Racing ahead to support with RACES

It was done using the dedicated staff and volunteers network of NIAR (funded over years by Government of Andhra Pradesh, Government of India, World Bank) who were trained for months prior to the crisis period under its RACES (Radio Amateur Civil Emergency Services) Wing. Each such person was trained to handle emergency situations by fast moving into disaster prone areas with radio equipments, independent power sources, antennas and accessories. The nucleus staff member at Hyderabad headquarters assembles and organizes the volunteers and transports them to the needed places much before the cyclone touches the coast. It could thus render the vital service during the floods in U.P., Gujarat, Orissa, Tamilnadu and cyclones in Andhra Pradesh and Gujarat and earthquake in Bihar, U.P. RACES also organized several links during other calamities like Air/Naval/Rail accidents and attended to emergencies of mountaineering and so on.

Initiating many successful services for societal development

VII. Issues that holdup promotion of Amateur Radio in India

1. **Undue delays caused in Issue of Amateur Station Operator Licenses.**
2. **Provision for agencies other than Government involved in Disaster Relief to utilize Amateur Radio services.**
3. **Permission for operating in Andaman and Nicobar Islands, Lakshadweep Islands, Jammu and Kashmir, and in other border areas.**
4. **Opening up more frequency bands for amateurs as being done in USA and other countries.**
5. **Checking infringement by commercial and other operators with harmonics disturbing Amateur Radio bands.**
6. **To encourage a constant dialogue with Amateurs to make further amendments to Indian Wireless (Amateur Service) rules with frequent changes in Technology, when ever necessary.**
7. **Simplify procedures for easy import of Amateur Radio equipment.**
8. **The customs duty needs to completely waived-off on import of Amateur Radio equipment to all easy transfer of technology from other countries.**

Amateur Radio promotion with proactive outlook
Advocating people-friendly amateur communications

VII. Missing Linkages

Amateur Communication to integrate diverse social agencies for development

It appears outwardly that every major area of activity i.e. Government, Industry, Education and Services has been considered and taken care. We the Radio Amateurs feel that the inherent basic culture needed to be developed for Information Technology promotion is not taken care.

The subject "Amateur Radio" itself is neglected whose potential to Information Technology growth has not been properly understood. Not a single amateur radio promoter in India is considered good enough to be in the organizing, execution and monitoring committees so far.

A new kind of *Haves* and *Have-nots* as a consequence of present growth of Information Technology is also building up in India with knowledge base improving and rural and urban divide taking place. Social tensions of different kind are already emerging.

This is 21st century challenge that Amateur Radio activities have to promote Information Technology as a people's movement. This movement will bring down the disparities of knowledge *Haves* and *Have-nots* to a great extent. If the Governments are serious, there has to be concern equally for amateur facets and their growth.

Promotion of Amateur Communication for sustainable development

VIII. Role of Financial and Other Institutions

Amateur Communication for Socio-economic development

Banks and Financial institutions can play a key role in promoting Amateur Radio in the country by way of giving soft loans for purchase of Amateur Radio equipment and accessories by license holders at Interest free or nominal / low interest rates.

Financial Funding agencies can play a proactive role in provision of productive infrastructure, training and capacity building, small tools and exposure tours and so on.

Amateur Radio equipment is a tool for gathering knowledge and information and helps the society in times of disasters. Hence, all desirable support needs to be extended.

Budgetary support or program for investment promotion in Amateur Radio and its technologies may be allowed after sufficient allocation of funds.

Playing key role in initiating many developments through communications

NIAR – *challenging limitations, crafting communication solutions*

The Advanced Countries Advantage on Information Technology

All those countries that are today considered to be very well advanced in Science and Technology and their economy including USA, Europe, Far East have an holistic approach to Information Technology i.e. professional and amateur go together, interact very freely, develop and design together products and services of IT.

The common platform for meeting both professional and amateur is the Amateur Radio Club seen in every major town and village. They meet almost every week, with hundreds and thousands of people from all walks of life i.e. from a top Politician, Scientist, Administrator, Engineer, Student, Housewife and a Common Man sharing developments on IT.

In these countries, these amateur radio clubs also have some specialized branches like Amateur Radio Satellite Corporations, Amateur Radio Data Services with their "*Free Interaction*" providing innovate technologies in IT, thus their national Industry, Governments and other services take advantage of these developments taking place at least cost and further develop the areas of specialist nature i.e. *Interaction* among professionals and amateurs by spreading this culture through Governments taking initiatives or through their cultural and scientific exchange programmes between nations.

Challenges met on IT by USA and Japan

When contemporary technologies in space science that includes IT were not proving the competence of USA compared with USSR and noticing certain lack of progress President Kennedy in 60s said that it is his mission to launch the Man on the Moon by the turn of the decade. It is the people of USA that made this mission achievement possible but not alone the scientists and clerks of NASA laboratory that made this mission possible. On the ground there were over 4,00,000 radio amateurs to support them. While Professionals/ Commercial / Defense satellites go up in Space even radio amateurs in USA are launching their own state-of-the-art satellite frequently since 1962.

Japan in 60s was not a nation to be considered that important in economic sense; also it was beginning to be seen making some efforts. It is Japanese leadership and people who noticed with enthusiasm the statements of Kennedy and the like, they also made a resolve. At that time it had to be a silent revolution for strategic or other economic reasons.

All Japanese children were told that they must have two compulsory hobbies i.e. amateur radio and Photography and targets set so licensed radio amateurs shall surpass the American numbers by the turn of the decade (60s) and that other areas the numbers will be even twice and thrice that of US citizens.

Till 80s Japanese Amateur Radio Relay League received tremendous Government support, thereafter by Industry and now by people themselves i.e. 15,50,000 licensed radio amateurs which is more than half the population of the entire world radio amateurs. Not only these radio amateurs had ensured emergence of new and innovative technologies in electronics, communications and computers but are able to push up in the areas of space and Information Technologies. Japanese Amateurs also launched their own satellite programmes.

Such is the power of amateurs as doers. Both USA and Japan claim amateur is a personal and non-commercial, non-official, and yet ensure their people do not suffer in any way as the Government policy towards amateurs is favorable, yet outwardly restrictive. This is also a convenient policy as they ensure others in developing and under developed countries do not catch up by getting involved in basics to developments.

IX. Regulatory Issues

Accentuating for societal-friendly policy decisions

Agencies in regulation

Indian Wireless (Amateur Service) Rules based on Indian Telegraphy Act, 1885 govern the procedures for obtaining a license, operation and maintenance and inspection and so on. The concerned authority is Wireless Adviser to Government of India under Department of Telecommunications, Ministry of Communications & IT.

Telecom Policy

The 1994 and 1999 National Telecom Policy did not speak anything about Amateur Radio or the role Hams expected to play in Telecom developments or in Disaster Management. This is due to lack of awareness within the communication ministry. Visionary personalities like Mr.N. Vital, Central Vigilance Commissioner stated that "*Today there no is conscious policy on Amateur Radio*" and sent his recommendations to various Secretaries to the Government of India including Department of Telecommunications (DoT).

Examination

The Regulatory Agency (WPC Wing) under Department of Telecommunications which has network of Wireless Monitoring Stations in the country conducts examinations for Amateur Station operator license candidates whose age is 12 years or above. The examination and subsequent process of declaring the result and the issue of license is a cumbersome bureaucratic process. The present arrangements did not help develop this activity in India, as it should be.

Volunteer Contribution

This needs to be rationalized and revolutionized keeping certain targets to be achieved in every state of our country on raising amateur radio clubs and licensed radio amateurs. Today there is no need to hold the exam by WPC wing of Government of India and any *Grade – I Amateur License* should be able to be a volunteer examiner like in USA /Canada. National Institute of Amateur Radio (NIAR) can be made the nodal/apex agency for setting up standards, examination paper and streamlining examination process. The WPC wing of Department of Telecommunications however will give the formal license.

Process Streamlining

Age-old tradition of checking antecedents through process involving various agencies right from the Home Ministry down the line upto Police Thana in the village can be dispensed. Amateur license which is a part of education in school going age should be allowed on the basis of a conduct/character certificate provided by the Principal/Head Master of a school and no objection certificate from local Police station from where the student is studying. The issue of license should not take more than two weeks. Even the passports can be issued on 'Tatkal'.

Where not a student of 12 years seeking a Hobby License issued in 2 weeks?

Streamlining the process for better results and effective service

X. Tasks ahead – Promotional Issues

Marching ahead for prospective future for amateur communications

Government Agencies

Indian Government departments are concerned with cultural promotion, sports and so on have budgets and special promotional programmes to improve culture and sports in the country. Similarly various departments dealing with education and Culture Communication, Computers, Electronics, Space, Information and Broadcasting Sciences and Rural Development must make provision in their budgets for promoting amateur radio aspects. All these departments need to involve and conduct a serious review to identify schemes to promote amateur radio keeping certain targets on numbers, qualitative change in content of school curriculum etc.

Budgetary Constraints

The Department of Telecommunications (DoT) and others who spend budgets in providing communication means either telephone or wireless should at least spend 2% of their budget towards peoples involvement through amateur radio services especially in rural and remote areas. To self-support Amateur Radio Clubs in villages the DOT can utilize services of Hams in repair and maintenance services on paying remuneration.

NIAR's Support

The Department of Programme Implementation has issued guidelines to MPs in which HAM Radio in schools and Citizen Band Radio are authorized under their MPLAD Schemes. Since these schemes are not easy to implement without a license and an organization support, the NIAR needs to be identified as Nodal Agency for implementing the schemes to be approved. For all the five electronic projects under MPLAD scheme NIAR can also be made the implementing agency. A proposal is enclosed here with.

Equipment Recycling

Indian government can recycle the surplus or condemned wireless equipment in operational condition from various laboratories, Defense and Police departments for further use by Amateurs after modifications. This can also be used as low cost alternative for Amateur Wireless equipment. Today this useful equipment is either disposed of in question of shop or going into some unlicensed persons including anti-social elements. Also in the name of security the wireless equipment is destroyed. Instead with simple suitable modification before disposal by Defense and Police Agencies they can be given to their own employees, schools and NGOs for productive use. NIAR can assist in these agencies in this regard.

Proper Utilization of Manpower

Talented technical manpower who have retired and also working in pubic and private sectors and Armed Forces and those who have become surplus can be deputed into useful social action for limited period. This is a national asset. A retired Director or Curator of Museum becomes a guide to visitors in USA/Europe. A space scientist is an active Ham promoter and encourages youngsters to self build satellites. Similar situation has to be developed in India.

NIAR, provider of comprehensive Amateur Radio services and consultancy

XI. Recommendations for Amendment to MPLADS

Requesting the policy makers to make use abundant potential of amateur radio

NIAR is a unique organization and well developed infrastructure and funded from Government of India and Department of Electronics. NIAR is ideally suited for implementing projects under MPLADS.

We at NIAR, feel that it is not enough to approach Honorable Members of Parliament and Collectors and convince them to implement these projects in the larger national interest.

Hence, it is also recommended to advise Department of Programme Implementation to be amended the following clauses in their guidelines under Member of Parliament Local Area Development Scheme issued by Department of Programme Implementation as under:

- **Appendix-I, Illustrative list of works that can be taken up under MPLADS.**
  Existing Clause: Para 23

  Procurement of hospital equipment like X-ray machines, ambulances for Government Hospitals and setting up of mobile dispensaries in rural areas by Government Panchayat Institutions. (Ambulances can be provided to reputed service organizations like Red Cross, Ramakrishna Mission etc.)

  The above clause may be amended as below:

  Procurement of hospital equipment like X-ray machines, ambulances for Government Hospitals and setting up of mobile dispensaries, Disaster Relief Vehicles (DRV) with First aid and Communication facilities in rural areas by Government Panchayat Institutions. (Ambulances can be provided to reputed service organizations like Red Cross, Ramakrishna Mission, National Institute of Amateur Radio etc.)

- **Existing Clause: Para 24**
  Electronic Projects: (par 2.2 may also be referred to)

  i) Computer in education project : Computer in every High school
  ii) Information footpath
  iii) Ham Clubs in high schools
  iv) Citizen band radio
  v) Bibliographic data-base projects

  The above clause may be amended as below:
  Electronic Projects: (par 2.2 may also be referred to)

  i) Computer in education project : Computer in every High school
  ii) Information footpath
  iii) Ham Clubs in high schools
  iv) Citizen band radio
  v) Bibliographic data-base projects
  vi) Disaster Relief Vehicle with Amateur Radio (HAM) / CB / Computer Communication facilities

- **Please include the following note as part of the guidelines.**

  Note: All the above projects can be procured and implemented by National Institute of Amateur Radio in any school / college / institution / University / recognized Amateur Radio Clubs / Amateur Radio Society recommended by Honorable Member of Parliament besides other agencies who are already approved under the guidelines.

Appealing for amendments for amateur radio friendly policies

XII. Conclusion

NIAR envisaging to bring in exponential growth in amateur communications

Awareness Programs
A massive awareness campaign needs to launched in the country involving schools, colleges, NGOs, R&D institutions etc. building partnerships among people in urban and rural areas to become partners in technology development.

Empowering People
By empowering people with tools of amateur radio communication technology, they become partners in community development, help themselves in distress, access to information and technology.

Propagation Research
Regular propagation studies on HF/VHF/UHF amateur radio frequencies to understand communication patterns needs to be conducted covering complete geographical area of our country. The nationwide databank on usable frequencies and locations is to be maintained and updated from time to time. This will enable us to understand performance of antennas and wireless systems to identify desirable locations for emergency management.

Amateur Radio Clubs in Rural areas
It is the above Project Proposal and the kind of rural infrastructure that is suggested through Amateur Radio Clubs in rural areas alone can stop migration of educated youth to cities that are getting overcrowded.

Development of Science and Technology
Further, work culture and social-economic development as a factor will certainly improve between rural and urban divide. The current technological trends like extensive use of computers, communication can provide several millions of jobs in rural areas in the coming years, particularly with the spread of internet and other facets of Science and Technology provided the rural youth are able to adapt to the new trends and are ready for a take off.

Economies of Scale
The Government of India needs to undertake large-scale nation-wide projects and programs, so as the costs will automatically come down depending on the number of centres in a year to be established.

Financial Assistance
An initial investment of Rs.10 crores is expected. Anything less is an half hearted measure on implementation. This projection is based on earlier experience where investment of about Six Crores of Rupees from all sources on NIAR projects.

Projected Targets
The impact could reach multifold if only a conscious effort is made now to achieve a target of 1,00,000 Hams in the country and spread the use of amateur radio to rural and remote areas in the country.

NIAR to provide comprehensive solution for radio communications

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NO MORSE – MORE HAMS

By D.Bharathi Prasad, VU2RBI
and S.Ram Mohan, VU2MYH

I. BACKGROUND

The Indian Wireless Telegraph (Amateur Service) Rules define the amateur service as a radiocommunication service for the purpose of self-training, intercommunication, and technical investigations by amateur radio operators. This definition reflects the principles that express the fundamental purpose of the amateur service in the India. An amateur radio operator is a person named as an amateur operator license station granted by WPC, DOT, Govt. of India. who is interested in radio technique solely with a personal aim and without pecuniary interest, and who may engage in voluntary, noncommercial communications with other amateur radio operators located in India and abroad. Millions of amateur radio operators throughout the world communicate directly with each other by exchanging voice, teleprinting, telegraphy, digital packet, facsimile, and television messages. Amateur radio operators on a voluntary basis also may provide communications to meet essential needs and facilitate relief actions when normal communications systems are overloaded, damaged, or disrupted.

The Radio Regulations require that operators of amateur service stations be licensed. The Radio Regulations generally required that any person seeking a license to operate the apparatus of an amateur station prove that he or she is able to correctly send and receive texts in Morse code, but countries were allowed to waive this requirement for persons operating amateur stations using only frequencies above 30 MHz. Thus, countries could issue "no code" amateur service operator licenses, i.e., amateur service operator licenses (Restricted Grade-II) did not require the licensee to pass a telegraphy test, for stations using only amateur service frequencies above 30 MHz, while requiring demonstration of Morse code proficiency by persons holding an amateur operator license that authorized transmitting privileges on frequencies below 30 MHz.

The International Telecommunication Union (ITU), under the auspices of the United Nations, convened the WRC-03 from June 9 to July 4, 2003, in Geneva, Switzerland. The actions taken at the WRC-03 were published as the WRC-03 Final Acts, and are codified in the ITU Radio Regulations. At the WRC-03, the international regulations applicable to the amateur service were revised in a comprehensive manner, resulting in more streamlined, updated regulations that reflect modern amateur radio communication techniques and technologies. Among other things, the WRC-03 Final Acts amended Article 25 of the Radio Regulations to allow a country to determine whether it would require a person seeking an amateur radio operator license to demonstrate the ability to send and receive texts in Morse code signals. The effect of this revision to Article 25 was to eliminate the international requirement that a person demonstrate Morse code proficiency in order to qualify for an amateur radio operator license with transmitting privileges on frequencies below 30 MHz.

The Indian Wireless Telegraph (Amateur Service) Rules, currently require an examinee to pass a Morse code telegraphy test for certain Categories of amateur radio operator licenses. NIAR representing, on behalf of individual amateur radio operators and their organizations request and appeal to revise amateur service rules and license structure to reflect the Radio Regulation revisions adopted at WRC-03 and issue of the appropriate requirements for an individual to obtain an amateur radio operator license.

II. AMATEUR RADIO OPERATOR LICENSING REQUIREMENTS

Indian Wireless Telegraphs (Amateur Service) Rules, 1978 under para 5 (1) (i) (c) explicitly explain the eligibility for license to those who qualifies the Amateur Station Operators' Examination for the award of licence.

Eligibility for licence :

(1) A licence may be granted subject to such conditions contained in Annexure I to these rules -

(i) to a person,-

a. who is a citizen of India;

b. who is not less than 18 years of age;

c. who qualifies the Amateur Station Operators' Examination for the award of licence or holds either of the following certificate of proficiency, namely:

Radio-communication Operators' General Certificates;

First or Second Class Radio-telegraph Operators' Certificate;

Provided that the holder of a Special Radio Telegraph Operator's Certificate may also be considered eligible for the award of Amateur Wireless Telegraph Station Licence Grade II.

(iii) to a bonafide amateur radio society, club or a school, college, or an institution or a university in India, which has the aim of investigations in the field of radio or the training of persons in radio communication techniques.

Provided that the licence shall be issued in the name of an authorized official of the society, club, school, college, institute or a University in India holding a category of licence appropriate to the transmissions to be conducted by the station including amateur radio beacon transmission.

(2) Notwithstanding anything contained in sub-clause (b) of clause (i) of sub-rule (1), the Central Government may grant, to bonafide experimenters between the ages of 14 and 18 years, Amateur Wireless Telegraph Station Licence, Grade I and to those between the ages of 12 and 18 years, Amateur Wireless Telegraph Station Licence, Grade II or Restricted Amateur Wireless Telegraph Station Licence or Short Wave Listeners' Amateur Wireless Telegraph Station Licence :

(3) Notwithstanding anything contained in sub-clause (c) of clause (i) of sub-rule (1), the Central Government may recognize, subject to any conditions it may prescribe from time to time, such other radiotelegraph operators' certificates or Amateur Station Operators' Certificates as are issued by a competent authority in any other country as equivalent to qualifications referred to in aforesaid sub-rule for the purpose of grant of licence under these rules.

III. SYLLABUS AND THE DETAILS OF EXAMINATIONS FOR THE AWARD OF AMATEUR STATION OPERATOR'S LICENCE

1. The examination shall consist of the following two parts :

PART I - Written Test

It shall comprise of one paper containing two sections as under :

Section A : Radio Theory and Practice

Section B: National and International Regulations applicable to the operation of amateur station and those relating to the working of station generally.

PART II - Morse

(i) Receiving, and (ii) Sending.

2. Detailed syllabus :

2.1 Amateur Station Operator's Grade II Examination

Part II - Morse

(a) Section 1 : Morse Receiving : (Speed : 5 words per minute)

The test piece will consist of a plain language passage of 125 letters, five letters counting as one word. Candidates are required to receive for five consecutive minutes at the speed of 5 words per minute from a double head-gear headphone receiver, international morse signals from an audio oscillator keyed either manually or automatically. A short practice piece may be sent at the prescribed speed before the start of the actual test. Candidates will not be allowed more than one attempt in each test. The test may be written in ink or pencil but must be legible. Bad handwriting and over-writing will render a candidate liable to disqualification. More than 5 errors will disqualify a candidate.

(b) Secton 2 : Morse Sending (Speed : 5 words per minute)

The test piece will consist of a plain language passage of 125 letters, 5 letters counting as one word. Candidates are required to send on an ordinary key for five consecutive minutes at the minimum speed of five words per minute. A short practice piece may be allowed before the actual test. Candidates will not be allowed more than one attempt in the test. Efforts should be made to correct all errors. However, more than 5 uncorrected errors will disqualify a candidate. The accuracy of signaling, correct formation of characters and the correctness of spacing shall be taken into account.

Note- A candidate is required to pass both in Part I and Part II. In the case of candidates qualifying in Part I only, the licence shall be restricted to radiophone operations only.

2.2. Amateur Station Operators' Grade I Examination

Part II – Morse

(a) Section 1 : Morse Receiving (Speed 12 words per minute)

The test piece will consist of a plain language passage of 300 characters which may comprise of letters, figures and punctuations (Punctuations are indicated below). The average words shall contain five characters and each figure and punctuation will be counted as two characters. Candidates are required to receive for five consecutive minutes at a speed of 12 words per minute. Other conditions are the same as applicable to Amateur Station Operator's Grade II examination.

Note- Test piece may contain only the following punctuations :

Full stop; Comma; Semi-colon; Break Sign; Hypen and question mark.

(b)Section 2 : Morse Sending (Speed 12 words per minute)

The test piece will be similar to Morse Receiving test. Candidates are required to send for five consecutive minutes at a speed not less than 12 words per minute. Other conditions are the same as applicable to Amateur Station Operators' Grade II examination.

Note- A candidate is required to pass both in Part I and Part II simultaneously.

IV. NO-CODE FOR AMATEUR RADIO

i. NIAR and several amateur radio clubs and societies are recommending abolition of the Morse code testing requirement as a prerequisite for any class of Amateur Radio license. NIAR or radio amateurs are not opposed to manual Morse code operation. But Morse code is just another mode and should not be

afforded any special priority over others. It is available to those who wish to use it. Morse proficiency should not be required for those who do not wish to use the mode.

ii. Manual radiotelegraphy communications has been superseded by more modern, reliable, accurate, faster and efficient means of communication.

iii. Requiring manual telegraphy proficiency is not compatible with the radio amateur's mandated objective of contributing to the advancement of the radio art.

iv. No evidence exists that Morse proficiency is an indicator of a desirable, motivated or better qualified operator.

v. The Morse code requirement serves as an advancement barrier to many otherwise qualified individuals.

vi. The value of Morse code communications in the Amateur Service is primarily recreational in nature and manual telegraphy proficiency should no longer be a compulsory licensing requirement for any class of Amateur Radio license.

V. RESTRUCTURING ASOC EXAMINATION RULES:

We request WPC, DOT, MCIT restructuring of our amateur service operator licensing and examination system rules. The current structure of operator license categories, and the requirements for obtaining these licenses, should be simplified. The license structure for amateur radio service may be aligned to higher category, while maintaining additional frequency privileges as an incentive for amateur radio operators to advance their communication and technical skills.

Presently, individuals may qualify for any of the Five Categories listed below, As a licensee advances or "upgrades" to a higher class operator license, the licensee earns more frequency privileges.

Categories of licence :
There shall be five categories of licences, namely :
(i) Advanced Amateur Wireless Telegraph Station Licence;
To qualify for ASOC Advance Grade examination an applicant must pass an Part-I written examination concerning the privileges of ASOC Grade and Part-II (Sending and Receiving) a Twelve words-per-minute (wpm) telegraphy examination. The holders of Amateur Station Operators' Grade I Licence shall however be exempted from Part II of the examination.

(ii) Amateur Wireless Telegraph Station Licence, Grade-I;
To qualify for ASOC Grade-I examination an applicant must pass an Part-I written examination concerning the privileges of ASOC Grade-I and Part-II (Sending and Receiving) a Twelve words-per-minute (wpm) telegraphy examination. The test is of 2 hours duration. The maximum number of marks is 100 and candidates must secure at least 50% in each section and 55% in aggregate for a pass.

(iii) Amateur Wireless Telegraph Station Licence, Grade-II;
To qualify for ASOC Grade-II examination an applicant must pass an Part-I written examination concerning the privileges of ASOC Grade-II and Part-II (Sending and Receiving) a five words-per-minute (wpm) telegraphy examination. The above written test is of one hour duration. the maximum number of marks is 100 and candidate must secure at least 40 % in each section and 50% in aggregate for a pass.

(iv) Restricted Amateur Wireless Telegraph Station Licence;

To qualify for ASOC Grade-II (R)examination an applicant must pass an Part-I written examination concerning the privileges of ASOC Grade-II. The above written test is of one hour duration. the maximum number of marks is 100 and candidate must secure at least 40 % in each section and 50% in aggregate for a pass.

(v) Short Wave Listeners' Amateur Wireless Telegraph Station Licence; No Examination

VI. RECOMMENDATIONS:

a. **NIAR requests and recommends to eliminate all telegraphy proficiency testing requirements from the Indian Wireless Telegraphs (Amateur Service) Rules for amateur radio operator license examination rules. The requirement no longer serves any valid regulatory purpose, in light of the WRC-03 changes to the Radio Regulations.**

b. **Amateur service community had discussed on this issue over the last 4 years in various forums and made several resolutions. There is no clear rationale for using Morse code proficiency as a requirement it is only one of many modes amateur radio operators use to communicate, communication by Morse telegraphy is a recreational activity that reflects operator choice and preference, rather than necessity. Removing the telegraphy examination requirement would further enhance the value of the amateur service to the public as a voluntary non-commercial service, and result in expanding the existing reservoir of trained operators, technicians, and electronic experts within the amateur radio service, while doing nothing to prevent use of telegraphy on the air or otherwise prevent those interested in pursuing telegraphy proficiency from doing so.**

c. **The requirement of Morse Code Proficiency test is out-of-date. The Morse code has become obsolete in practically all other contemporary communications systems due to the emergence of satellite and digital communication technologies. Morse code testing is an unnecessary burden on applicants because most applicants who pass the code examination never use code for communications on the airwaves. These examinations require extensive preparation and trained professional to administer the examination properly.**

d. **The Morse code testing should be ended because the amateur radio operator examination process does not require a practical demonstration in the ability to use any other mode of communication.**

e. **The Morse code proficiency requirement was reasonable fifty years ago, continuing the Morse code examination requirement serves no useful purpose in the twenty-first century, and that the Morse code examination requirement limits the number of people, especially those who are handicapped, who can take advantage of amateur radio as a hobby.**

f. **The individual's ability to demonstrate increased Morse code proficiency is not necessarily indicative of his or her ability to contribute to the advancement of the radio art.**

g. **We believe that because the international requirement for telegraphy proficiency has been eliminated, we should treat Morse code telegraphy as a communications technique with the same standing as one of the modulation techniques in amateur service. Moreover, given that there is no requirement that a licensee who has passed a telegraphy examination actually use telegraphy for communications or otherwise maintain proficiency, successful completion of a one-time telegraphy examination offers no guarantee of future proficiency.**

h. The amateur radio emergency communication service today is performed using voice, data, or video modes, and that most amateur radio operators who choose to provide emergency communication do so using voice or digital modes of communication, because information can be exchanged much faster using modes of communication other than telegraphy. Additionally, we note that although many amateur radio operators choose to use their communications ability to assist the public by providing communications during an emergency, and we continue to encourage such activity, there is no requirement that they do so.

i. In India, it was observed that morse code proficiency test has not been very consistent as per exam requirements. Nowadays, computer based morse code program is also being used in some examination centres instead of a trained professional for conducting morse code receiving text.

j. Recommendations made my amateur service community in India at various forums are also enclosed.

VII. CONCLUSION :

The ITU Radio Regulations contain certain requirements that a country's administration must satisfy before granting an applicant an amateur radio license. Specifically, Article 25.6 requires that administrations verify the operational and technical qualifications of any person wishing to operate an amateur station. We believe that Article 25.6 is satisfied by requiring applicants for an amateur radio operator license to pass written examinations covering relevant subject matter. Because the Radio Regulations no longer mandate a telegraphy requirement, each country's administration must decide whether to require telegraphy proficiency for an amateur radio license.

Hence, it requested that the Regulatory Agency for wireless communication in India, The Wireless Planning and Coordination wing, Department of Telecommunications, Ministry of Communications and IT, Government of India, restructure, the Indian Wireless Telegraph (Amateur Service) Rules in the public interest that would serve best by eliminating the telegraphy examination requirement for an amateur radio operator license to accommodate the amateur radio operator's proven ability to contribute to the advancement of the radio art.

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Amateur Satellites: Developing Trends

By

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Synopsis

In the present "Space Age", artificial Satellites have become an in-separable part of our lives. Satellite applications find a place in almost all areas of modern living, touching almost every aspect of common man.

Though satellites are designed, developed, launched and tracked largely by Government and Space agencies, this talk attempts in introducing a platform of low cost, direct and easy access to satellites by Radio Amateurs for the purposes of communication and experiments.

Till date, more than 80 satellites for Amateur Radio purposes were launched by Hams from various Countries. Though little late, "Hamsat" is the testimony for the capabilities and potentials of India, ISRO and Indian Hams.

This talk is an attempt to further harness these potentials and capabilities, and to explore all possibilities to have an "Indian Amateur Satellite System" on a sustainable basis for the global Amateur community with the help of "World Class" Space agency "ISRO".

HMY2K8 - A MULTI BAND HF TRANSCEIVER

By Dr. R. RAJASEKHAR, VU2HMY

TECHNICAL SPECIFICATIONS:

Frequency coverage: Ham Bands

3.500 - 3.600 M.Hz (80 M)
7.000 - 7.100M.Hz (40 M)
14.000 – 14.350 M.Hz (20 M)
21.000 - 21.350 M.Hz (15 M)
28.000 – 28.350 M.Hz (10 M)

Frequency control:

Ver. 1: Direct Digital Synthesizer (DDS) with 1 Hz step continuously variable vfo with 20 memory channels. 2 line LCD display. Dual VFO, Split , RIT, Key pad / rotary encoder for frequency entry.

Ver. 2: 5 Band Heterodyne VFO with PIC frequency counter to reduce cost of the project.

Receiver:

Single conversion receiver with 10.000 M.Hz Cohn filter.

Low noise figure, 2.2 K.Hz SSB band width, 1.5 W audio O/P.

Transmitter:

RF O/P - SSB - 90 W (DC PWR I/P)

CW - 60 W (DC PWR I/P)

Built in CW side tone, CW delay, pwr meter, MOS FET Push Pull PA.

Dimensions: 8.5 X 7 X 4.5 inches

Genesis:

Being a home brewer I was hesitated to buy a commercial HF transceiver soon after getting my ticket in1988. Even my guru, late T.K.Seshandam VU2WC was not allowed me to do so. But he was kind enough to give me a set of pcb's of VWN QRP TX . I was successful to come on air with VWN QRP effectively along with L board RX on 40M. Those days are really good for HF communication. With low band noise, excellent propagation conditions we could work hours together daily on 40 M with 7 W AM signals. After that I have homebrewed RM96 and ATS1 and came on air effectively with SSB signals on 40 M. Even though there is a feeling of missing a lot of activity on other HF bands Viz 20 M, because all the above rigs are mono banders. If I want come on other band I have to construct another rig of same circuit! Then I could get a used ICOM - IC720 commercial TRX. It worked well for about 6 months and gone QRT. I just sent it to few service centers and was not able to get it repaired due to the non availability of spares for PLL & Logic boards. Then I secured one BEL524 in dead condition and able to repair it and came on air on all HAM bands with an home made out board DDS VFO. But servicing such surplus equipment is not that much easy due to their concealed and modular construction. Then I was thinking of home brewing a multi-band SSB/CW TRX using indigenous components freely available in VU land . I searched for the circuit schematics even on the internet. But ….in vain! Then I could download and made simple 40 M band SSB TRX circuits using bilateral switching technique using switching IC 74HS4053 by KD1JV using NE602 and PY2OHH using TA7358. Both performed well and gave me good results on air. But the cost of NE602/SA612 is around Rs.300/- ++ and its rare availability in VU land, whereas the cost of TA7358 is Rs.15/- and freely available.

Finally, I was decided to design a multi band SSB/CW TRX using Toshiba IC TA7358 with band switching using diode switching arrangement which can give 90 W DC PWR input from 80 to 10 Mtr bands. I have incorporated CW delay and side tone for easy CW operation. I have designed pcb (measures 7 X 3.5 inches) lay out using EXP PCB design soft ware and printed the board which accommodates all stages Viz Bal. Modulator/ demodulator, RX/TX mixer, 5 band band pass filter, 6 pole cohn filter, Tone circuit for

CW, CW side tone, mike amp, audio amplifier, transmitter driver and TRX change over. I have used home made DDS VFO using up-conversion to cover 80 – 10 M bands. In other version a pre mixed heterodyne VFO has used to minimize the cost of the rig. I hope this tiny rig shall meet all the demands of an average VU ham with all its sophistication at reasonable cost.

The circuit:

The circuit is simple and strait forward. IC1 TA7358 is used as RX/TX mixer, IC2 TA7358 is used as Product detector / Bal. modulator and IC3 as a bi-lateral switch to switch both the ICs, IC1 and IC2 to particular inputs / outputs in transceive operation by applying DC voltage in Key down / press of PTT condition.

Receiving chain:

The incoming rf signal is amplified in broad band RF amplifier and fed to the band pass filter by applying appropriate switching voltage from the band switch from front panel. The strong local signals can be attenuated by VR1 from front panel. Here the signal is filtered in the band pass filter and fed to IC1 TA7358, RX mixer through the switching IC, (IC3 sec A). Here the incoming signal is mixed with local oscillator signal (VFO) and converted to 10 M.Hz IF frequency and fed to the SSB filter (6 pole 10 M.Hz cohn filter) through switching IC (IC3 sec B) and fed to IC2 Product detector through switching IC (IC3 sec C). In the product detector the signal is beat with Carrier oscillator signal to get resultant audio signal which is further amplified by transistors Q2 and Q3 and sent to audio amplifier IC4 LM380 to deliver sufficient audio from speaker. The AF gain can be adjusted by the potentiometer VR3 (VOL) from front panel.

Transmitting chain:

Voice received by the condenser microphone is amplified by transistor Q4 and sent to IC2 Bal. modulator. Here carrier frequency is modulated and 10 M.Hz DSB signal is produced and further amplified by Q2 and fed to the SSB filter through switching IC (IC3sec C) to eliminate unwanted side band. The mike gain can be set by the preset VR2 and appropriate side band X-Tal is selected by the mode switch SW 2 from the front panel. The 10 M.Hz SSB signal from filter is fed to the TX mixer IC1 through switching IC (IC3 sec B) and mixed with Local oscillator signal (VFO) to get required transmitted frequency. The signal is further amplified by 2 stage broad band RF amplifier and sent to band pass filter through switching IC (IC3 sec A).

Appropriate band pass filter is selected by applying +12V to the switching diodes from the 5 way band switch SW3 from front panel or from logic out put from DDS VFO in case of using DDS VFO. Few milli volts of RF of TX signal from band pass filter is further amplified by 3stage broad band HF driver amplifier for about 1 – 1.5 W. The driver amplifier is having good linearity through 80 – 10 mts and the gain of the amplifier can be adjusted by changing the value of damping resistors R53, R54, and R57 to get adequate drive level to the final amplifier. Initially one can come on air with this 1W power and can work few stations to get reports and to align the transceiver.

VFO:

I have used DDS VFO using AD9851 along with PIC16F628 in up conversion mode to cover 80 to 10 Mtrs bands in one set and in another set a pre mixed heterodyne VFO is used to reduce the cost of the transceiver. If one wish to operate on single band, can use simple colpits oscillator such as RM96 VFO which is very stable in operation. I don't want to describe more about VFO, because one can choose his VFO according to his taste and requirement. There are variety of VFO circuits available in hand books or on the internet.

CW operation:

Sine wave tone around 900 K.C from an oscillator consisting of Q13 and Q14 is fed to mike amplifier through SW1, SSB/CW switch in key down condition. At the same time the side tone is amplified by IC 6 LM386 and heard in speaker LS 2. CW delay circuit provides sufficient delay for proper CW operation. The delay time can be adjusted by the preset VR7 in the base circuit of Q 12.

SSB filter:

Six x-tal cohn filter is used for selective band width of around 2.5 K.C. Select all the six x-tals with in 100 Hz tolerance to each other to achieve proper band width and audio quality. Select carrier oscillator x-tals with + and - 1.5K.C of filter frequency for LSB and USB operation.

Final MOS FET push pull broad band amplifier:

Circuit of popular IRF 510 push pull amplifier is used for final RF amplifier which is capable of delivering of 90 W DC power input over the frequencies between 3.5 to 30 M.Hz with 1 – 1.5 W of drive. Double side glass epoxy PCB has to be used for proper operation and to achieve stability especially at higher frequencies. A large heat sink (6 X 3. 5 inches) with fins should be used. The amplifier draws 3 – 3.5 A for the maximum voice peak with 25V of operation. The O/P of the PA is connected to the SO239 antenna socket through change over relay contacts with a peace of 50 ohms thin coax. The O/P of the PA is sampled and the PWR level is indicated by VU meter mounted on front panel.

Construction:

Soon after finishing soldering all the components, check for shorts and solder bridges between the tracks. I have selected a cabinet of FLD (front loaded) tape deck available from electronic shops which measures 8.5 X 7 X 4.5 inches (Almost the size of commercial TRX). On front panel volume controller, Tuning knob, Attenuator controller, mode switch, band switch, key pad, on/off switch, jack sockets for PTT/MIC, Phones, Key and VU meter are fixed. The main board is fixed on the chassis and on the back panel the PA, SO239 antenna socket, relay and two fuse holders are fixed. Inter connections are done with multi strand hookup wire. 25 V line to PA has to be wired with thick wire used for car wiring capable of carrying 5A. All audio connections should be made with 1+2 shield cable and the RF interconnections are done with thin coax cables RG174 and RG58C/U. Shields with thin ms sheet should be provided for SSB filter, VFO and to the PA. PTT switch and microphone are housed in a small plastic box such as cell phone charger case. Condenser microphone is wrapped with few layers of soft cloth or sponge to avoid unwanted low frequencies entering into mike such as breath. 1 + 2 thick shield cable which is used for public address system should be used for microphone.

Alignment:

To align the receiver, the RF signal from signal generator or the incoming signal from antenna should be used. Both the coils for each band in the band pass filter are peaked by teflon alignment tool for maximum signal strength. Then adjust the carrier frequencies of LSB and USB X-Tals for exact beat note. This completes the receiver alignment. To align transmitter, connect a 6 V low current bulb to the O/P of driver amplifier and apply power to TX line by pressing PTT or in key down condition. As you shout into the microphone or depressing the key, you will observe glow in the bulb. By observing brilliance of the bulb set the mike gain preset VR2 to adequate level. If necessary alter the values of damping resistors R53 , R54 , and R57 in driver amplifier to get adequate drive. Keep this level 20 % low in CW mode to protect the finals from thermal run away by adjusting CW level preset VR8 . Now disconnect the bulb and connect the driver amplifier O/P to relay, with this one can work (QRPP) few stations and get reports initially.

Connect a milli ammeter in series with PA and apply 25 V than adjust idling current of MOSFETS to draw 40 mA (20 mA each) by adjusting potentiometers VR4 and VR5 . Then disconnect milli ammeter and connect 5A FSD ammeter and connect the driver amplifier O/P to the I/P of the PA. Now connect a 50 ohms / 100W dummy load or an external antenna to the rig. By shouting into the microphone, check the current drawn by the PA. It should be 3 – 3.5 A at 25V of drain supply. If not, re-adjust the mike gain preset VR2. Too much mike gain leads distortion of transmitted signal and shift in operating frequency.

Things to remember:

1. All the resistors should be of 1 % tolerance and capacitor C6, C8, C11, C13, C16, C18, C21, C23, C26, C28, C56, C57 are styroflex to obtain stability and to avoid drift in

operation. Use only 74HC4053 high speed switching IC to achieve good results especially in higher bands.

2. SSB filter should be shielded with a metal case and grounded.

3. Use 1 + 2 shield wire for audio and RG174 & RG58C/U for RF inter connections.

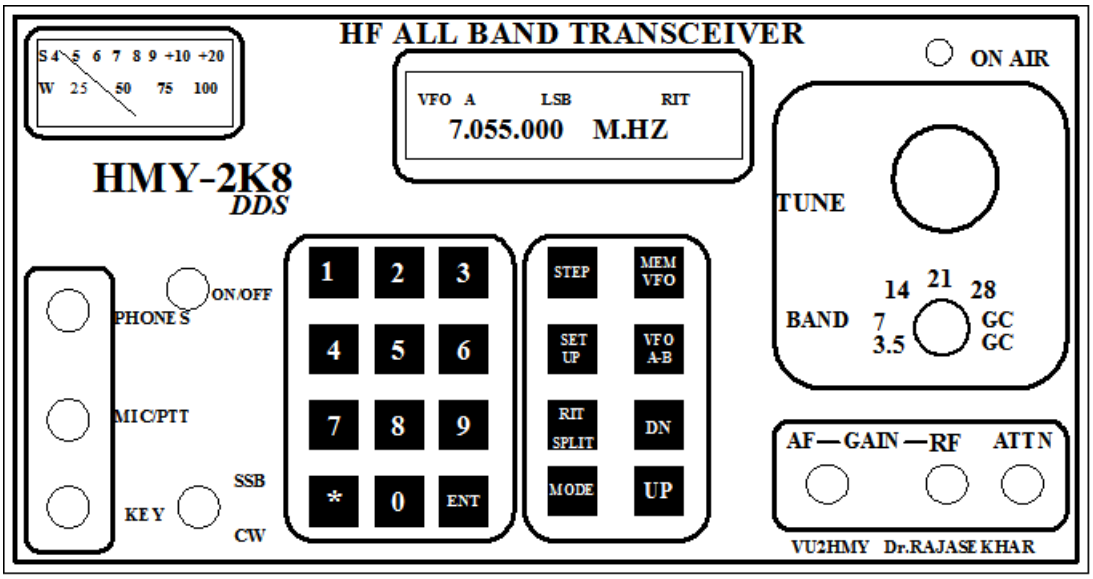
4. Good quality heat sinks should be used for Q8 , Q9 , IC5 and a large (6 X 3.5 inches) heat sink for FETs. use heat sink compound applied both the sides of mica washers.

5. Shield VFO and the PA with small boxes made with soft ms sheet.

6. Beware of static damage while handling FETs, microcontrollers etc. Ground your soldering equipment and unplug from mains while soldering such devices.

7. Use 50 ohms/100W dummy load and carry your initial testing of your rig. Don't shout haaaalo--- haaaalo---- halo on air and create QRM to others. Identify your self on band to get critical reports and certainly these reports shall help you to improve the performance of the rig.

Fig1:



The front panel layout used for the multi band transceiver (8.5 X 4.5 inches).

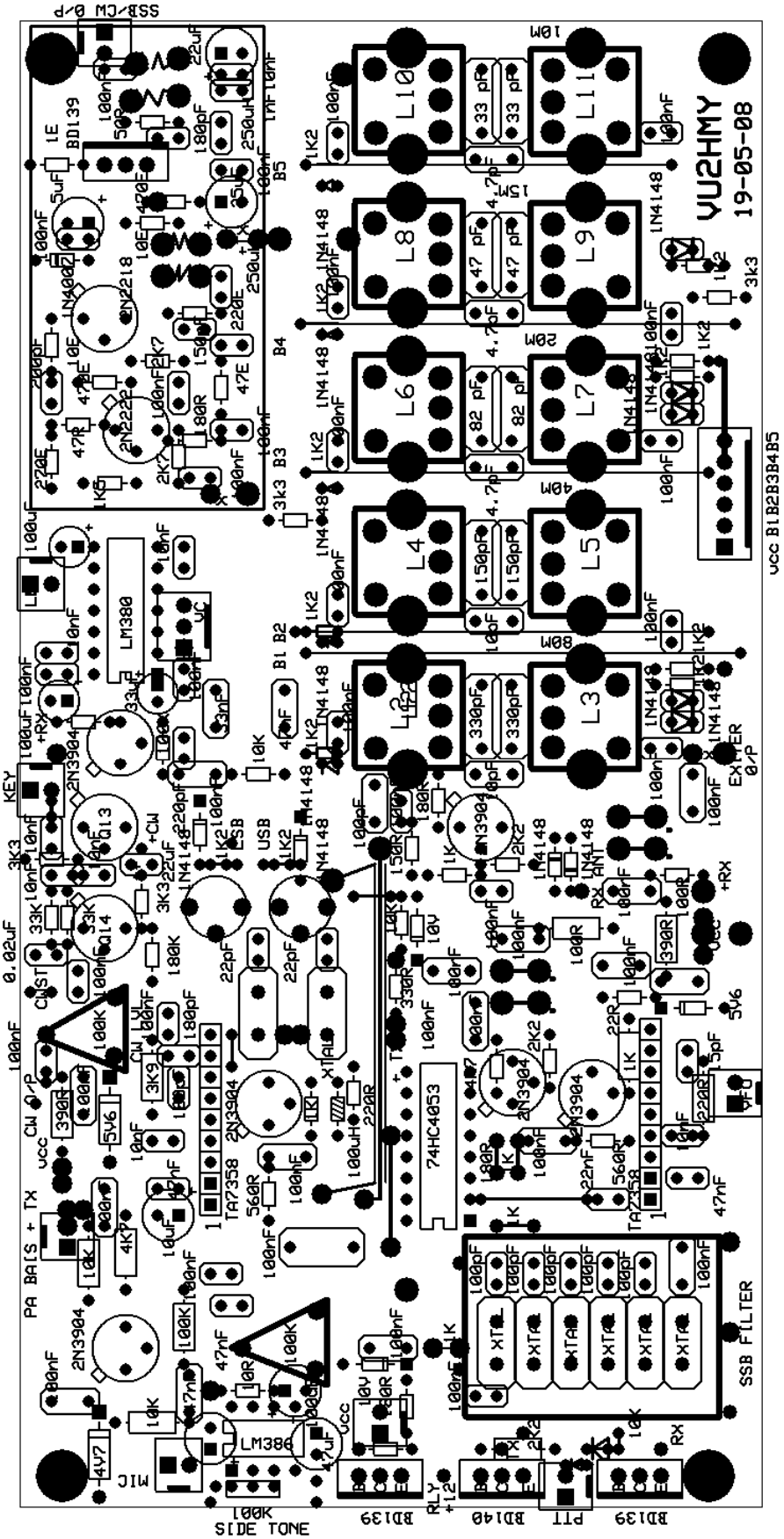


Fig 2: The schematic circuit diagram of multi band HF transceiver HMY2K8

Fig 3: Component layout of HMY2K8 multi band transceiver (7 X 3.5 inches).

List of components:

Resistors:

R1, R38	2K2	R52	10R
R2, R22, R23, R35, R39, R61	1K	R53	220R* Adj
R3, R40, R43	180 R	R54	10R* Adj
R4	150 R	R55	470R
R5, R42, R70	100 R	R56	10R ½ W
R6 – R15, R26, R27, R46	1K5	R57	220R* Adj
R16, R17, R65, R69	3 K3	R58, R59	33R
R18, R21, R30	10K	R60	47K
R19, R31	100K	R62, R63	1K5
R20, R28, R32, R64	4K7	R66	180K
R24	3K9	R67, R68	33K
R25, R34	390R	R72	15K
R29	220R	VR1	1K Lin Pot
R33	220R * Adj	VR2, VR6 – VR9	100K Preset
R36	22R	VR3	100K Log Pot
R37	560R	VR4, VR5	4K7 Preset
R41	4R7	Note: All are ¼ W Unless otherwise	
R44	330R	specified	
R45, R50	2K7		
R47, R49	47R		
R48	270R		
R51	470R		

Capacitors:

C1 – C5, C9, C10, C14, C15, C19,		C32, C54, C60	0.047uF
C20, C24, C25, C29, C35 – C41,	C34	10pF	
C47 – C52, C58, C59, C62, C64,	C42 – C46	82pF	
C66, C71, C73 – C75, C77,	C53	10uF	
C82 – C88, C100, C104	0.1 uF	C56, C57	- 180PF Styroflex
C7, C12, C17, C22, C27, C92	10Pf	C61	0.033uF
C6,C8	330pF styroflex	C63, C72	220pF
C11, C13	150pF Styroflex	C76	4.7uF
C16, C18	82pF Styroflex	C78, C81, C94, C95	22uF
C21, C23	47 pF Styroflex	C79	0.001uF
C26, C28	33pF Styroflex	C89	100 uF/63 V
C30	100Pf	C9	0.01uF /63V
C31	22nF	C91, C101	1uF/63V
C33, C55, C65, C93, C96 – C98	0.01uF	C99	0.02 uF
C67, C80	0.01uF/63V	C102, C103	47 uF
C68	100 uF/25V	VC1, VC2	22 pF Philps
C69	33 uF /25V	Trimmers	
C70	100 uF		

Diodes:

D1 – D12, D16, D17, D22, D23	1N4148

D20, D21, D24, D25	1N4001		
D13, D14	6.1 V / ½ W Zenar		
D18, D19	9.1 V / ½ WZenar		

Transistors:

Q1	BF494	Q9	2SC1162 (or) BD139
Q2, Q5, Q6	2N3904	Q10, Q11	IRF510
Q3, Q4, Q13, Q14	BC549	Q12	BD140
Q7	2N2222A	Q15	BD139
Q8	2N3866		

IC'S:

IC1, IC2	TA7358	IC5	7805 Regulator
IC2	74HC 4053	IC6	LM386
IC4	LM380		

X-TALS:

X1 – X6	10.0000 M.Hz	* See text
X8	10.0015 M.Hz	* See text
X9	9.99850 M.Hz	* See text

Switches:

S1 - DPDT, S2 - SPDT, S3 - 1 Pole 5 Way, S4 - SPST

Relay1 - 12V DPDT, Relay2 - 12V SPDT Mini (If DDS VFO is used)

Condenser mike – 1, LED's Green – 1, Red - 2, Speaker - 8 Ohms/ 2W - 1 Mini speaker / Piegeo element - 1, Fuse holders – 2, Fuse 1A -1, Fuse 4A – 1

6 pin RNC connector – 1, 5 mm Stereo Sockets – 2, 5mm mono Socket -1

VU meter – 1, Heat sinks for BD139, 2N3866, 7812 and 6 X 3.5 X 1 inches for PA.

Coil winding data:

L1, L13 – Bifilar, 10 turns on 10 mm torroid with 36 SWG

L12 – 50 turns on ferrite dumbbell with 45 SWG

L14 – Pri- 30 turns and Sec – 4 turns with 36 SWG on 10 mm torroid.

L15 - Pri – 6 and Sec 4 with 36 SWG.

L16, L17 – 25 turns on 10 mm torroid with 36 SWG.

L18 – Bifilar 10 turns on 12 mm torroid with 28 SWG

L19, L20 – 9 turns 6 mm dia

L21 – Bifilar 10 turns on 25mm torroid with 20 SWG

L22 – Pri – 2 turns and Sec – 3 turns on HF BALUN core formed by six 10 mm Torroid cores with 20 SWG teflon hook up wire (used in submersible motors)

Coil winding details for Band pass filter:

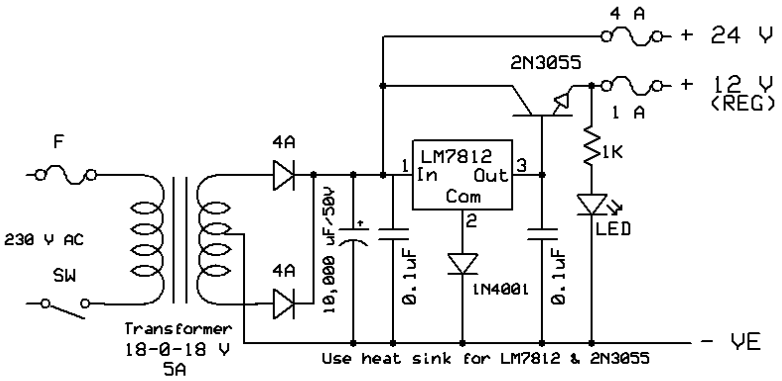
Slug tuned 10 mm former (Preferably with slots for split winding). 36 SWG or thinner enamel copper wire.

Turns

BAND	COIL	PRI	SEC	COIL	PRI	SEC
80 M	L2	3+2	8+9+9+8	L3	8+9+9+8	3+2
40M	L4	3+2	5+6+6+5	L5	5+6+6+5	3+2
20M	L6	3+2	3+5+5+3	L7	3+5+5+3	3+2
15M	L8	1+1	2+4+4+2	L9	2+4+4+2	1+1
10M	L10	1+1	2+3+3+2	L11	2+3+3+2	1+1

Power supply:

The exciter requires 12 V / 1 A depends upon the type of VFO / Display and PA needs 24 V / 4 Amp to get maximum RF O/P. I have got 35 W DC PWR I/P even with 12V car battery and had several contacts. The following circuit diagram can be used for PSU. Use rated fuses and good heat sinks for LM7812 and 2N3055.



Power supply unit for HMY2K8 - Multi band transceiver

Fig 4:

Acknowledgements:

I am thank full to VU2RVK and VU2WMJ for their great support especially monitoring my signal and giving reports. I thank VU2RM and VU2SV for their critical suggestions to improve the final performance of the rig especially on improving CW oscillator.

I also thank our UV hams VU2NR, VU2VWN, VU2RM,VU2ATN, VU2IF, VU2EM, for their great contribution of designing and publishing successful homebrew rigs and kept many hams on air.

I thank VU2PAL, VU3ITI, VU2RJN, VU2AF and all net controllers who are controlling nets for year together and keeping hams active in spite of their busy schedules.

Guardian angle of my happy HAM home, my XYL Dr. Ashalatha and my harmonics Hannu and Minnu were more keen on my academic and research activities rather than domestic chores and kept me scintillating with vigour always and never allowed any situation that would dampen my enthusiasm for ham radio.

73, Happy home brewing DE VU2HMY, Sehkar.

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Policies that matter

by Ms. Yamini, VU2YAM

Amateur radio in India is yet to attract the attention of educated masses. It is necessary to implement and evolve policies which take the country to the path of development.

Amateur radio communication technologies have proved time and again that self-learning, intercommunication and technical investigations improve individual skills that bring about holistic development. The benefit that these technologies bring to communities in need has been effective for many generations.

Hence suitable policies are needed with changes in time and technology.

Here are a few Recommendations:

In view of the WRC 2003 recommendations, the existing "Restricted Grade II " licenses may be automatically changed to "Grade II" license with full access to HF bands. The Restricted Grade II licenses may be abandoned and there may be only two types of transmitting licenses viz. Grade II, Grade I.

Grade 1 or Advanced Grade License may be issued to those holding First or Second Class Radio Telegraph Operators Certificate or Special Radio Telegraph Operators Certificate. Now they are eligible for only Grade II. All Armed Forces personal and police personal who underwent training in Morse code and Radio Theory may be also exempted from the ASOL test.

Club licenses may be issued to any licensed ham above 18 years. (Now it is issued only to Grade I or Advanced Grade licenses).

Conduct ASOL exams in all parts of India including Andaman's, Lakshadweep, Jammu & Kashmir, NE India etc. (Now ASOL exams are not conducted in some areas) National Institute of Amateur Radio (NIAR) may be permitted to conduct ASOL exams. (In USA, ARRL is conducting the Amateur exams)

Local Monitoring stations may be authorized to issue Amateur licenses.

The period of validity of license may be 10 years also. (Now it is for 2 or 5 years only)

For renewal, remove the need for declaring about making 40 contacts per year.

Permit Walkie-talkies to be used as portable. (Present rule does not permit it to be used outside ones own shack) Now we should send original license for change of address. This clause may be removed as it is found that many a time the licenses are being lost due to which Radio Amateurs is put to inconvenience.

Amateur Radio Clubs with call signs may be permitted to conduct demonstrations on all authorized bands within their own states/ Union Territory without prior permission from WPC. The local monitoring station may be intimated in advance about the demonstration by the officials of the club station.

For Maritime Mobile stations the present rule say to use "MS" suffix along with the callsign. This may be changed to "MM" which is the suffix used internationally.

Now, for operation of club stations by its members, prior permission from Central Government in writing is needed. This clause may be deleted. Any person holding valid Indian Amateur Radio License may be permitted to operate the club station. As per present rules the licensee must keep personal surveillance over the operation of club station. This clause may be deleted.

Reciprocal license should be given at shortest time after getting applications from foreign Radio Amateurs as per the appropriate class of license in their respective home country.

Remove Morse code requirement for HF operations as suggested recently by WRC 2003. (It is already implemented by 32 Administrations world wide).

The present rules say to note in the logbook "a summery of communications exchanged". This clause may be deleted, as it is not practical.

Simplify ASOL application forms deleting unwanted questions like type of equipment to be used etc.

The power permitted for various grades may be increased. For Grade II maximum power on HF may be increased to 100 watts (Now it is 50 watts) For Grade 1 maximum power on HF may be increased to 500 watts (Now it is 150 watts)

Make permission for the following bands permanent: 3790 to 3800 KHz, 10100 to 10150 KHz, 50.35 & 50.55 MHz. Now permission is issued based on request from time to time. Instead of spot frequencies on 50 MHz band, a full band from 50 to 52 MHz may be allotted like done in other countries.

For Grade II licenses delete the clause about getting voice licenses delete the clause about getting voice. endorsement for HF after 100 CW contacts. It may be modified as Grade II licenses can operate on Voice on HF also immediately after getting the license.

Instead of accepting only Demand Drafts from State Bank of India, it may be accepted from any nationalized bank.

Speed up results of ASOL exams and issue of licences.

Separate callsign prefixes may be issued for different categories of licence. E.g. VU1 for Grade 1, VU2 for Grade II, VU5 for Club stations, VU6 for Repeaters, VU0 for Advanced Grade etc.). Now it is difficult to identify the category of licence. (Now stations with VU2 prefix can be either be Grade 1 or Advanced Grade, and those with VU3 prefix may be Grade II or Restricted Grade.)

WPC is putting details of Commercial licences under process in their Website. Similar information may be made available of Amateur Radio applications also.

Lot of interference is noted from Long-Range Cordless Telephones on the Amateur VHF band (144 to 146 MHz) and by other non-Amateur Indian stations on some HF bands especially 40 meters (7.000 to 7.100 Mhz). Suitable measures may be taken to stop that interference.

Amateur radio clubs in India may consider making a uniform appeal to Government of India on policy matters for favorable consideration from time to time, as they benefit amateur radio community at large.

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HAM COMMUNICATIONS DURING AND AFTER DISASTERS

By S.SATHYAPAL, VU2FI, Director, Indian Institute of Hams, Bangalore

Disaster: A disaster is an event triggered by natural or man-made causes that lead to sudden disruption of normalcy within society.

Kinds of disasters: Natural and man-made.

Types of natural disasters:

I. Water and climate related disasters:

II. Geological related disasters;

III. Chemical, Industrial and Nuclear related disasters.

IV. Accident related disasters;

V. Biologically related disasters;

Since disasters may come up due to unexpected sources/conditions, First 24 to 48 hours may be very crucial to get all the necessary help and there are many agencies are involved, from the highest Governmental to NGO's, International and National voluntary organizations. But the main requirement is communications both at the site of disasters and also to disseminate the same to wider areas to mobilize help. So we shall limit our topic only for emergency communications.

If there is a big fire, we see the smoke blowing , or in case of floods, we experience heavy rains and winds, with disasters to property and lives. In most of the disasters, there will be power failure, and if it is night darkness of the environment will results first requirement will be light by any means, by naked flame to the torch lights. But if the atmosphere is charged with gases which can be source of explosion one should take precaution, before lighting a naked flame.

When a crowd gathers there will be verbal communications, and unless it is coordinated with one agency being the disaster mitigation group, there will be confusion. We will not go into such details, since as volunteers of mobile radio communicators, we shall limit our discussion only those volunteers. Radio Amateurs use battery operated equipment and so it forms THE ESSENTIAL method of communication. We can only relay important messages of the other teams like fire services, para medical team and others. Even cell telephone network and land telephone systems may fail and so radio amateurs, with VHF/UHF hand equipment may fill the gap of communications. For long distance communications, Amateurs or HAMS can use the High Frequency transmitting/Receiving equipment called Transceivers, operated on Battery supply. In the case of emergency coordinated network communication is essential, so that important messages are relayed properly to the persons concerned.

Let us take VHF: Even American armed forces form a group of 4 or 5 persons, with assigned responsibility for each . Similarly 4 or 5 hams should form a group and spread out at the site and establish their location, and report the situation around them to a base station if established so that they could co-ordinate with other agencies. They in turn may direct the traffic or information and messages to the persons concerned, as appropriate.

The very essential requirements:

- **Establish your location and identity**
- **The message should be precise and brief.**
- **One should wait for the other person to finish, or break-in in the case of emergency with causing confusion.**
- **Usually limit the transmit time to receive as 1:3 mins.**
- **Always keep your coordinator informed about the latest situation.**

In the radio Amateur parlance there is what is called a Q codes. If all the volunteers are familiar they could save lot of time in communication. Also the important messages should be repeated, if necessary with phonetics, or local language, if necessary for easy understanding. This is a rather difficult in our country with various languages being used.

Hints for Hams and Ham Clubs in providing effective Ham communication during disasters:

1, Ham clubs are the Team-Managers, clubs will identify Hams locally who are interested in volunteering for disasters.

2. Participate in Inter-Ham Club meet conducted by NIAR or any other organisation.

3. Clubs should conduct orientation programme, emergency mock drills, workshops to setup antennas and Ham station in a shortest time.

4. Check-in to the nets on HF, VHF or be on Echolink either from your home or office.

5. Clubs should equip with sophisticated Ham equipments, mobile and portable antennas, solar panels to charge the batteries

6. Keep in touch with Collectors / DCs / Top Police Brass / Lions, Rotary Club, NGOs, Local MPs, MLAs and invite them for club meetings or functions for better co-ordination during emergencies.

7. Encourage Repeater Clubs and try to link the repeaters for better connectivity and large Ham net work.

8. Have uniform dress – jackets for emergency field operations.

9. Have blood donors list and try to update regularly.

10 Conduct lecturers/ demonstrations / training program regularly so that there is an entry of new comers and involve SWLs for all the activities and keep the list of dedicated SWLs volunteers who can assist Hams during emergency communication network.

11. Release press note for all your planned activities to create awareness on Ham.

12. Identify the Hams who are retired from services and can assist in relaying messages from their respective Licensed QTH during emergencies and involve them actively.

13. Keep the list of callsigns, with email id, cell and landline nos as well as their blood group.

14. Associate with NIAR, the only well established recognized amateur radio institution(University) in India.

"I am ready with HF / VHF / Cross Band Repeater / Antennas connected accessories for any emergency call with a dedicated ham group". There is a need for such dedicated team or radio officials.

If we have one dozen dedicate team / group, then we can exercise in a way it is needed without confusion and in orderly manner has required by the agencies concerned for effective communication network which can serve the nation.

Agencies are well aware that Ham Radio can play an important role specially during disasters when all other means of communication fail. H A M - Help All Kind.

"ALWAYS WE SUCCEED ONLY WHEN WE HAVE GOOD TEAM WORK"

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Birth and Death of Morse code.

by Mr. S. Soma, VU2RO

1844: Samuel Morse invents the telegraphy

Before Morse invention, signaling systems were first primitive but there were not really efficient except in whisling or using wind or percussion instruments. Then the signaling systems became visual. At the end of the XVIIIth century, the French Claude Chappe invented the semaphore or "optical telegraph" to transmit messages over long distance. The characters constituting the messages were defined by the position of arms. Placed on top of towers or on distant hills, the operators used flags or lights to send coded messages from one station to another. But the system was limited. It was quasi inefficient at night or when there was fog or heavy showers.

In the 1800s the young American republic offered a prize of $30,000 to the inventor offering a more efficient system able to cover the entire Atlantic coast. Samuel Finley Breese Morse accepted the challenge. Morse didn't at all begin his professional life in the field of electricity or any other related area.

Born in 1791 - yes, in the 1800s! - he was a painter and sculptor graduated from Yale College, and had opened an art studio in 1823. The legend tells that he had the idea of using electricity to communicate over distance during a conversation aboard the ship Sully when he was returning from Europe in autumn 1832, at 41 years old. The ship's passengers were discussing about the Michael Faraday's recently invented electromagnet, when Morse came to understand how it worked, and began speculating that it might be possible to send a coded message over a wire.

Between 1835 and 1836 Morse invented a first code made of numbers associated to a dictionary to use with a key to fasten communications. The message was recorded on a long moving strip of paper. To the operator's skills to decode and interpret the code in real time, and to transcribe it into numbers and letters as he heard it. But this is not the Morse code yet but rather a telegraph code that requested a dictionary to code words. By December 1837, Morse had enough confidence in his new system to apply for the federal government's appropriation, and during the next year he conducted demonstrations of his telegraph both in New York and Washington. However, after the economic disaster of 1837 that caused a true panic followed with a long depression, nobody was interested in his invention and Morse was forced to wait for better times. In the meantime he visited Europe again and met in England Charles Wheatstone, the inventor of a competitor electric telegraph system. After the meeting, Morse realized that his system was far simpler, more efficient, and easier to use.

In January 1838, thanks to the help of Alfred Vail, Morse gave up his telegraphic dictionary where words were represented by number codes to use a simpler solution, coding each character with one or more dots and dashes. This method eliminated the need to encode and decode each word to be transmitted. On January 6, using an electric conductor 5 km long, for the first time he transmitted successfully the letters of the alphabet using his new code. The Morse code was born (unfortunatelly will say the gossip !).

The Morse and Q codes

Recall that the Morse code invented in 1835 is a system of representing letters, numbers and punctuation marks by means of a coded signal sent intermittently like the two samples displayed below demonstrates. These pure tones travel much easier than a modulated voice across QRM. Even weak signals emitted at 5 W pass through interference or fading, hence the power of this mode of communication. The characters sent were associated to abbreviations representing words or full sentenses to fasten communications in limiting the risk of error But as we seen previously, as soon as 1854 the hundreds telegraph companies existing across the USA were charged based on the length of the message sent, and by 1866 Western Union that merged with the American Telegraph Company as well as all European telegraph companies participated also in the expansion of Morse family Fortune. To reduce costs elaborate commercial codes were developed that encoded complete phrases in five-letter groups that were sent as single words. Example : "AYYLU" meant "Not clearly coded, repeat more clearly". Very soon standard abbreviations were used by all operators. Used in their formal "question/answer" sense, their meaning varied depending on whether they were sent as a question or an answer. So, the abbreviation "RST ?" requests to the contact to transmit his "RST" or Readability-Signal Strength-Tone report. Tens of abbreviations were edited and listed in this file some of the most commonly used of them. A few years later, in 1912 the abbreviations were modified and replaced by a standardized and international code name the "Q code" as all abbreviations began with a Q.

The Q code

The Q code was developed and instituted in order to facilitate communication between maritime wireless operators of different nationalities. Example, all amateurs know, whatever their language that "QRZ ?" means "Who is calling me ?". In the forth coming years the Q code was incorporated in ITU-R recommendation M.1172.

The Q code was used to transmit a large amount of information from the adjustment of frequency to distress information or related to safety, urgency, identification, name, route, transit, strength of signal, quality of signal, keying, meteorology, and more. The code was defined as follows:

- The Q code groups range from QOA to QUZ.-

The QOA to QQZ series are reserved for the maritime service

- Certains Q code abbreviations may be given an affirmative or negative sense by sending, immediately following the abbreviation, the letter C or the letters NO (in radiotelephony spoken as: CHARLIE or NO).

- The meanings assigned to Q code abbreviations may be amplified or completed by the addition of other appropriate groups, call signs, place names, figures, numbers, etc.

- Q code abbreviations are given the form of a question when followed by a question mark in radiotelegraphy and RQ (ROMEO QUEBEC) in radio telephony.

- Q code abbreviations with numbered alternative significations shall be followed by the appropriate figure to indicate the exact meaning intended. This figure shall be sent immediately following the abbreviation CW at 5 wpm CW at 20 wpm

- All times shall be given in Coordinated Universal Time (UTC) unless otherwise indicated in the question or reply. Soon hundred years after its released, the Q code is always used without the slightest change by maritime, military, civilian and amateur radio operators. This is probably one of the very scarce thing that doesn't change since Marconi's discoveries... even the ham spirit is today somewhat debased !

More confident than ever, owning an efficient transmission code, in 1843 Morse submitted his invention to the Congress asking for the $30,000 that would allow him to build a telegraph line from Washington to Baltimore, 60 km (40 miles) away. The House of Representatives agreed and the Senate approved the bill in his last session. President Tyler signed the document on March 3, and Morse received the cash to build his first telegraph line. Engineer Ezra Cornell had the intention to place the electric wires inside a pipe when Morse discovered that Congressman F. O. J. Smith, had purchased wire with defective insulation. As the deadline approached, to fasten the project Cornell suggested that the fastest and cheapest way of connecting Washington and Baltimore was to string wires overhead on trees and poles. Morse agreed and the line were hanged on poles. And this is this way that on May 24, 1844 the wired telegraphy was born in a dramatic way. Morse sent the telegraph message "What hath God wrought ?" between the Supreme Court chamber of the Capitol building in Washington to the Railroad Depot station in Baltimore. The message was received on a roll of paper and is always kept at the US Library of Congress archives.

Soon, a wired mesh connected cities all together from New Jersey to Florida using the new Morse code. Telegraph lines soon extended westward. In 1850, about 20 different telegraph companies installed an estimated 19,000 km (12,000 miles) of telegraph lines across the United States In 1854, the U.S. Supreme Court upholds Morse's patent claims for the telegraph. All U.S. companies that use his system began to pay Morse royalties. Morse won the jackpot of the century! By 1855, the British and French built their first telegraph lines for the Crimean War. For the first time governments were able to communicate directly with commanders in the field, and newspaper correspondents "cabled" their first reports right from the front.

This is during the Civil War of 1861 that the US Army understood the essential role of telegraphy in his strategy, and it constituted one of his major tactical tool.

1861, extension of telegraphy in Europe.

At the same time, on the other side of the Atlantic, to develop the economy associated to the fishing industry, in 1861 the Norwegian parliament (Stortinget) granted funds to extend the telegraph line from Sørvågen, to Røst, Værøy and the Lofoten headland, creating the first fisheries telegraphservice in Norway According to the Norsk Telecom Museum at Sørvågen, the stations were only open four months, during the fishing season. In1868, the Lofoten Line was linked up to the main Norwegian network, and from 1873, Sørvågen Telegraph Station was open all year round.This activity increased the yield of the Lofoten fishery for both the fishermen, the merchants and the state, creating in the vicinity many new jobs in these fishing villages. The telegraph reinforced the security of fishermen, e.g. in sending them weather forecast bulletins, and improved their job in given them information about the location of fishes. It is in 1906 that this network linked all the rest of the country, giving birth to the first northern Europe wireless telegraph service. In the meantime, in 1866, the first Atlantic cable is at last successfully laid between Europe and the U.S.A. The broken cable of 1865 is raised and repaired, and soon two cables are operational. By 1880, an estimated 160,000 km (100,000 miles) of undersea telegraph cable have been laid ! Samuel Morse died on April 2, 1872 in New York City at 81 years old. He is buried in Greenwood Cemetery, Brooklyn. We can say that he was the father of all Silent Keys, in both senses of the word.

Q code

Question or Information is implied depending on the suffix of a question mark QRA What is the name of your station ? The name of my station is...

QRB How far approximately are you from my station ?

The approximate distance between our stations is.....nautical miles (or.... kilometers)

QRG Will you tell me my exact frequency(or that of....) ?

Your exact frequency (or that of...) is ...Khz (orMhz)

QRH Does my frequency vary ? Your frequency varies.

QRI How is the tone of my transmission ?

The tone of your transmission is .. 1 = good. 2 =variable. 3 = bad

QRK What is the readability of my signals ?The readability of your signals is..... 1 = bad. 2 =poor. 3 = fair. 4 = good. 5 = excellent.

QRL Are you busy ? I am busy

QRM Are you being interfered ?I am being interfered with: 1 = nil. 2 = slightly. 3 =moderately. 4 = severely. 5 = extremely.

QRN Are you troubled by static ?

I am troubled by static 1 = nil. 2 = slightly. 3 = moderately. 4 = severely. 5 = extremely.

QRO Shall I increase transmitter power ? Increase transmitter power.

QRP Shall I decrease transmitter power ? Decrease transmitter power.

QRQ Shall I send faster ? Send faster (or ... words per minute).

QRS Shall I send more slowly ? Send more slowly (or ... words per minute).

QRT Shall I stop sending ? Stop sending.

QRU Have you anything for me ? I have nothing for you.

QRV Are you ready ? I am ready.

QRW Shall I inform...that you are callinghim on...khz (or...Mhz)?.

Please inform...that I am calling him on...khz (or...Mhz)

QRX When will you call me again ?I will call you again at...hours (on ...khz(or ..Mhz)).

QRY What is my turn ?Your turn is number....(or according to any other indication).

QRZ Who is calling me ? You are being called by...(on ...khz (or ...Mhz)).

QSA What is the strength of my signals ?

The strength of your signals (or those of ..) is... 1 = scarcely perceptible. 2 = weak. 3 = fairly good. 4 = good. 5 = very good.

QSB Are my signals fading? Your signals are fading.

QSD Is my keying defective? Your keying is defective.

QSK Can you hear me between your signals and if so can I break in on your transmission?

I can hear you between my signals; break in on my transmission

QSL Can you acknowledge receipt ? I am acknowledging receipt.

QSO Can you communicate with...?I can communicate with...direct (or by relay through...).

QSP Will you relay to...? I will relay to...

QST Is there any message for radio hams?

Here follows a message for radio-hams

QSU Shall I send or reply on this frequency(or on ...khz (or ...Mhz))?

Send or reply on this frequency ? (on ...khz(or ...Mhz)).

QSV Shall I send a series of V's on thisfrequency (or on ..khz (or ...Mhz))?

Send a series of V's on this frequency (or on ...khz(or ..Mhz)).

QSW Will you send on this frequency (oron ..khz (or ...Mhz))?

I am going to send on this frequency (or on ...khz(or ..Mhz)).

QSX Will you listen to...? I am listening to ...(call signs) on ...khz (or Mhz).

QSY Shall I transmit on an other frequency ?Transmit on an other frequency.(or on .khz (or ..Mhz)).

QTC How many messages have you for me ?I have...messages for you.

QTH What is your position ? My position is...

QTR What is the correct time (in UTC) ? The correct time is...(in UTC).

How it worked identifying operators by their 'fingerprints' Morse: the end of an era?

Tony Smith, consultant Editor of Morsum Magnificat, an international magazine devoted to Morse telegraphy By the end of the 19thcentury, Morse telegraphy was in widespread use.

This Morse receiver dating from 1889 is displayed in the telecommunications museum at Pleumeur-Bodou, in France. A Hungarian plate printed at A world information highway built as a result of the 19th-

century century communications revolution came to the end of the road at the beginning of this year. Or did it? From midnight, January 31, 1999, international regulations no longer require ships at sea to be equipped to call for help in an emergency using Morse code and the well-known SOS signal. On February 1, the Global Maritime Distress and Safety System (GMDSS), using satellite and other high-tech communication techniques, replaced a system which since the early part of this century has saved countless ships and thousands of lives. GMDSS has been developed and progressively implemented since 1979. As more and more ships adopted the new system, coastal radio stations around the world have been closing down their wireless telegraphy (W/T) services as demand has decreased As midnight approached on January 31, many of the remaining stations sent their final Morse signals in a profusion of emotional messages, typical of which was this from a group of Danish stations: "Concluding an era of more than 90 years of W/T service from Danish coast stations, starting in 1909. . . This is the last transmission for ever. "Thus signed off with dots and dashes the era of Morse telegraphy, a medium which in the 19th century had created a revolution in world communications, serving virtually every aspect of human activity: government, diplomacy, business, industry, railways, newspapers, military, and more, plus the needs of ordinary people who wished to send telegrams. 'What Hath God Wrought!'

The most famous early use of Morse at sea was when the Titanic struck an iceberg and sank on the night of April 14, 1912. Her two Radio Officers, Jack Phillips and Harold Bride, stayed by their radio until the last moment, sending out CQD SOS messages in Morse code calling other ships to their rescue. "CQD" was a recognized maritime distress signal, and "SOS" was anew international signal due to replace it shortly Their calls were heard 58 miles (93 km) away by the Carpathia, which arrived on the scene an hour and twenty minutes after the Titanic sank and rescued some 700 survivors. Over 1,500 people died in the tragedy, including Jack Phillips. Bride survived and although unable to walk or stand, spent much of thetime over the next four days heroically helping the radio officer of the Carpathia send a continuous stream of messages from the surviving passengers to their next of kin.

Military use

Morse telegraphy was used by military forces in the Crimean War, and in the American Civil War. In the First World War, it was widely employed in trench warfare with buzzers replacing sounders. At the same time early wireless telegraphy sets were coming into use.

By the time of the Second World War, although wired telegraphy was still used, wireless had become the preferred form of military communication. It was also an essential part of clandestine/ intelligence operations, particularly in occupied Europe where Allied agents risked detection, and their lives, every time they transmitted a message to London. Morse by radio also served as a vital communications link for the greatly increased use of aircraft in wartime operations. In most armed forces today Morse is no longer taught as a standard form of communication, although some operators still learn it as a special skill. In a recent unusual application, Sudan People's Liberation Armyrebels fighting the government of Sudan have been heard on shortwave radio, without Morse keys, vocalizing the code as "dits" and "dahs" into microphones. Not quite the end The invention of radio signalled the beginning of the end for landline Morse, but it took a long time to happen. While long-distance radio services challenged the cable companies, the advent of the teleprinter took a more immediate effect. Britain's Post operator, it becomes quite easy to recognize the style or"fist" of the other.In the Second World War, the differences in the sending styles of secret agents were noted by their home stations so that if they were captured false messages emanating from the enemy could easily be detected. The styles of operators on enemy submarines, ships or military units were also identified to help track their movements on a day-to-day basis. Military office officially abandoned Morse in 1932, although its use continued in the United States and Australia until the 1960s.

The same process took place in other countries although from time to time unconfirmed reports indicate that landline Morse still survives in Mexico and India.

Morse at sea has officially ceased, but it has not yet disappeared. Some stations and ships are still actively carrying Morse traffic, mostly in the developing world, but some European stations can also be heard. The high cost of installing new equipment in the ships is the main reason for the delay in changing to GMDSS, but also training facilities have not been able to keep up with demand.

There is still one major user of Morse code. Radio amateurs worldwide use it to communicate with each other because of two advantages. It has an internationally understood system of abbreviations which aids communication between people who are unfamiliar with each other's language; and Morse radio transmission is a particularly effective means of getting signals to distant places compared with other radio modes—the same advantages that made it so valuable for maritime use. Landline Morse is also kept alive by hobbyists. That resulted in the motto for Radio Hams as ONE WORLD ONE LANGUAGE. In America, Canada and Australia, enthusiasts mount historical displays and communicate with each other using original keys and sounders via the public telephone system, dial-up units, and modems• The Internet contains a vast amount of information about Morse telegraphy. That is the storey of Morse Code.

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Amateur Radio Emergency Communications Network

by Ms. Bhanumathy, VU2BL

Amateur Radio Emergency Service (ARES)

The Amateur Radio Emergency Service (ARES) consists of licensed amateurs who have voluntarily registered their qualifications and equipment for communications duty in the public service when disaster strikes. Every licensed amateur is eligible for membership in the ARES. The only qualification, other than possession of an Amateur Radio license, is a sincere desire to serve. Because ARES is an amateur service, only amateurs are eligible for membership.

ARES Organization

There are four levels of ARES organization--national, section, district and local.

Section Level

At the section level, the Section Emergency Coordinator is appointed by the Section Manager and works under his/her supervision.

Local Level

It is at the local level where most of the real emergency organizing gets accomplished, because this is the level at which most emergencies occur and the level at which ARES leaders make direct contact with the ARES member-volunteers and with officials of the agencies to be served.

District Level

In the large sections, the local groups could proliferate to the point where simply keeping track of them would be more than a full-time chore, not to mention the idea of trying to coordinate them in an actual emergency.

ARES Operation During Emergencies and Disasters

Operation in an emergency net is little different from operation in any other net, requires preparation and training. This includes training in handling of written messages--that is, what is generally known as "traffic handling."

An effective communication service depend on the nature of the information which must be communicated. Pre-disaster plans and arrangements for disaster communications include:

Identification of clients who will need Amateur Radio communication services.

Discussion with these clients to learn the nature of the information which they will need to communicate, and the people they will need to communicate with.

Specification, development and testing of pertinent services.

Amateurs are often trained and skilled communicators. The emergency management community recognizes these two key words when talking about the Amateur Radio Service. Amateurs must use their skills to help the agencies provide the information that needs to be passed, while at the same time showing their talents as trained communicators who know how to pass information quickly and efficiently. We are expected to pass the information accurately, even if we do not understand the terminology

RACES

The Radio Amateur Civil Emergency Service (RACES) that provides a reserve communications group in times of extraordinary need. During periods of activation, RACES personnel are called upon to perform many tasks for the government agencies they serve. Traditional RACES operations involve emergency message handling on Amateur Radio Service frequencies. These operations typically involve messages between critical locations such as Mandal offices, hospitals, Cyclone/Flood shelters, and any other locations where communication is needed to the District or State headquarters. NIAR is having a very active RACES Wing.

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HAM TECH 2008

CREATIVE MINDSET BUILDING IN RADIO USAGE

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Managing Communications has become as critical as managing men, materials and money. A radio is a mini-library for enthusiastic users.

As far as I am concerned, Moving from the "Known" to "Unknown" is Creativity.

Creativity is not the product but the process. Creativity doesn't create something out of nothing but rather, recombines ideas that already separately exist.

Everyone has creative ideas but some people either have so many or such good ones that they get a reputation of being "Creative Thinkers" (Extraordinary Creativity).

Food for thought for us :
Does creativity require freedom of choice ?
Does creativity imply being new and different ?
Does creativity imply avoiding societal norms ?
Is doing something different as an individual creative ?
Is producing something creative ?
Can a person's creativity be quantified ?
Can creativity be logical ?
Does group work enhance creativity ?
Are children more creative than adults /
Does education enhance creativity ?
Does experience enhance creativity ?
Can everyone be creative ?
Can creativity be developed ?
Are artists more creative than engineers ?

Fluency creativity is having lots of ideas, but the ideas are not necessarily unusual (Task : Uses of Radio). Flexibility Creativity has new ideas of imagination.

Brainstorming encourages all of us to have creative ideas- both fluency and flexibility. The domain for this Conference is Radio. Our task is visualizing unconventional or new on radio.

Imagination is greater than knowledge (Einstein) and mastery of a domain is (in this case Radio) probably required so that correct associations can be made. (Knowledge first, intuition second). Creative insights from outside the domain of knowledge is also important (Out of box thinking).

Out-of-Box
In-the-Box
New-Box
Other-Box
No-Box Thinking

For years supporters and detractors of creative thinking in the workplace have talked about Out-of-the-Box Thinking. The supporters, often consultants and researchers, have stressed the easiest way for people to be creative was to think out-of-the-box, to break their paradigms or mindsets, their ways of thinking.

The detractors have pointed out often the damage such thinking can produce and stressed the counteractive effects upon the total organization and its more global goals and mission. Within

organizations particular departments have been labeled out-of-the-box: R&D, Marketing, Human Resource Department and Creative Services and resisted by the finance, purchasing, administration, shipping, and other departments who prefer to stay in their carefully constructed boxes or the boxes provided for them.
As a consultant, speaker and college professor I have promoted the development of out-of-the-box thinking in all people, all departments for about 20 years, normally to a thundering thud of silence.

Occasionally creative type departments will entertain the idea of learning how to leave boxes but generally they already know how. Their problems center on the debris, anger, and frustration they leave in their wake when they do tear done or damage boxes.

Recently in an email message, Chris Barlow, Ph.D., professor at IITs Management Department and long-time fellow CPSI faculty member and colleague challenged me on an apparent emphasis on out-of-the-box thinking as the primary source of creative thinking. Stressing mainly or even only out-of-the-box thinking excludes a wealth of other sources of creativity:

Immediately jumping out of a box or tearing it down eliminates many possibilities of ideas and solutions that can come from staying in-the-box. If we stay in our box we can examine what has worked?, what hasn't worked?, what might work if we only….?, how can we capitalize on what is working while still changing or improving it?
By forcing ourselves to leave our box we cut ourselves off from the not-yet-understood or not-thoroughly communicated or experienced existing knowledge within our existing box. Or as Sid Shore has tried to teach us for many years, what's good about It (our box)? By using new box thinking instead of out-of-the-box thinking we provide ourselves with controllable and measurable limits or useful restraints.

New Box Thinking is a controlled form of out-of-the-box thinking. The best analogy is one that Edward de Bono has used often to describe the difference between vertical thinking (box) and lateral thinking (out-of-the-box, actually new box). He has written that vertical thinking is comparable to digging the same hole deeper to find the treasure and horizontal or lateral thinking is digging new holes in many locations (new boxes).

Out-of-the-box thinking would go beyond simply digging new holes it might involve looking in the air, under the sea or using other tools or methods beyond simply a shovel As Abraham Maslow has told us, If you see your only tool as a hammer (shovel), then you will see all your problems as nails (holes to be dug).

Other-Box Thinking involves leaving yours and entering someone else's once again with the's Good about It? Philosophy. An example might be for the creative department to send people to work in the finance, purchasing, shipping, manufacturing departments to learn what the grass on the other side of the fence is really like in the other boxes. Benefits might be:
1) Greater understandings of the benefits of the other boxes,
2) A sharing of commonalties within boxes,
3) Ways to integrate and interlock boxes.

Another example often used in today's business and industry is for employees from a manufacturing company to visit and work with people in their various supplier or vendor companies to understand their boxes and to share about their own with them. No-Box Thinking might mean complete open thinking with no limits or Virtual/Transparent-Box Thinking. No-Box thinking challenges the greatest majority of people because of the tremendously potential risks involved. Anything can wrong at any time. There is no box to provide any protection. No fortress or castle walls. Yet if people are encouraged to use out-of-the-box thinking as part of their job, a small percentage at first expanding as they are ready.

3M is reported to encourage their research people to spend up to 15% of their time on exploratory projects, thinking out- of-the-box, while still accomplishing the 100% of their work they have contracted to complete within the other 85% of their time. Post-It notes are but one example of this approach.

It's interesting that in elementary schools and some middle schools across the country teachers have been using this reward approach to provide students with time during their school day for out-of-the-box thinking time and projects of their own choosing, if and only if they complete their required work early.

Virtual/Imaginary Box thinking may provide the best of both in and out thinking. The box is there in the form of policies and principles yet the employees are allowed to look out of their box or even venture out knowing that they can always return to the security and safety of their box.

Next time you consider breaking out of your box consider these other options.
1. Re-look at the box you think you are in. It may actually not have permanent, impregnable walls as you current believe or think.
2. Look within to solutions you have never considered or can reconsider from the past. Work within the box.
3. Visit other boxes, within or without your organization. Much can be learned and shared with the inhabitants.
4. Experiment at least part of the time with having no boxes. Perhaps keep a tether attached back to your box just in case. Even the most experienced mountain climbers rarely climb unattached.
5. Encourage the use of virtual or transparent wall material for your box.
6. Gradually teach others the benefits of out-of-the-box thinking, while you learn the benefits you have never considered that lie within the boxes where you already are.

Remember our boxes are in our minds most of the time. Doing something will help. Doing something new will help more. Doing something new that changes perceptions is the real goal of creative thinking.

ATTRIBUTES OF A CREATIVE MIND

Most of us have formed definite neural pathways of thought. We use habitual methods of thinking to approach life's challenges. In this way we have created deep ruts in our brain. We have truly hard-wired our mechanism for thought, the brain. If we accept the concept that mind is created by consciousness acting upon the brain, we can see that we need to create flexibility in the brain to have flexibility of mind. Not only is doing puzzles daily an excellent way of keeping the mind sharp, but different puzzles exercise different portions of the brain. Some puzzles stimulate the left brain, some the right brain. There are also different types of thinking; logical, analogical, and lateral are a few examples. These different modes of thinking apply to solving different kinds of problems. Most of us were educated in the public school system and our logical left brain habits were specifically targeted. Reading, writing and most forms of arithmetic use structured sequential thought. Reasoning is also an attribute of left bran thinking. Developing our ability to reason is an art that results in wisdom. Learning to access and stimulate the right brain is done with art, sports, music or other forms of holistic, spatial and audio forms of training. You can also stimulate the right brain by using your mind to solve spatial orientation, pattern recognition and analogical puzzles. The right brain is thought to be the seat of insight. Opening pathways in the right brain allows us the ability to facilitate insight. Insight is that sudden knowing of the answer. By nurturing and exercising our capacity for insight we have opened up the potential for genius to emerge. We are offering a variety of puzzles here, presented daily that will stimulate the left brain, the right brain, and also generate a whole brain entrainment. Whole brain thinking is akin to intuitive thought, and contrary to common knowledge, it can be taught and exercised, thereby strengthened. Developing our ability to reason with clarity and listen to our insights will further unify the brain and allow for creative genius to be common in our lives.

Why some of us are not Creative ?
They are too anxious to get the"right" answer.
They are too willing to reject "Bad" ideas.
They do not seek alternate solutions.
They may not have the positive attitude that a solution exists.
They may have stopped asking discovery questions – What if , Why not , How
They have developed habits in their actions and thinking.
They find it hard to suspend logic to look for unlikely solutions.

In the session, three creative tasks on radio will be demonstrated so as sensitize the need for being creative in our domain- HAM RADIO.

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HAMs and their stations

by Jose Jacob, VU2JOS

Amateur radio station

An amateur radio station is a facility equipped for radio communications in the amateur radio service. Any station on the air must identify itself with a call sign issued by the authorized regulatory authority of the country in which the station is located. Radio amateurs build and operate several types of amateur radio station, including fixed ground stations (located in a building), mobile stations (in a vehicle), space stations (aboard orbiting satellites), and temporary field stations. A slang term for the location of radio equipment is the "shack," named after the small enclosures added to the upperworks of ships to hold the first radio equipment and their batteries.

Stations and call signs

In the early history of amateur radio, a call sign w20

as issued to a station, and not the operator or owner of the equipment. A licensee was granted an operator license and a station license separately. The station license specified the address at which a station could be built with that call sign. If an amateur radio operator moved to a new address, or wished to build a station in more than one location, a new call sign was needed for each location. When radio amateurs began installing transceivers in automobiles, the use of call signs to designate potentially more than one collection of equipment suitable for radio communications became common. The trend continued with the operation of portable stations, popularized by Field Day events.

Today, most regulatory agencies worldwide issue call signs to the operator licensee, and not to the station. An amateur radio station may be operated under the call sign of the owner of the station or the call sign of the operator of the station. In some countries, special call signs might be made available for clubs, and are frequently used at a club station established for use of the club's members. Depending on the country, the call sign of the club may be specified exclusively for use at that particular station, or may be available for use in any club activity.

Fixed stations

An amateur radio station established in a permanent structure with equipment that is not intended for portable operation is referred to as a fixed station. This is the most common form of amateur radio station, and can be found in homes, schools, and some public buildings. A typical fixed station is equipped with a transceiver and one or more antennas. For voice communications, the station will be equipped with a microphone; for communications using the Morse code, a telegraph key is common; and for communications over digital modes such as RTTY and PSK31, a station will be equipped with a specialized interface to connect the transceiver to a computer sound card. While not a requirement for radiocommunications, most fixed amateur radio stations are equipped with one or more computers, which serve tasks ranging from logging of contacts with other stations to various levels of station hardware control. Fixed stations might also be equipped with amplifiers, antenna rotators, SWR meters, and other station accessories.

Fixed stations are generally powered from the AC mains electrical supply available in the building. Some equipment in fixed stations may run off low voltage DC instead of AC, and require a separate power supply. Some fixed stations are equipped with auxiliary sources of power, such as electrical generators or batteries for use in emergencies.

Mobile stations

An amateur radio station installed in a vehicle is referred to as a mobile station. A typical mobile station is equipped with a transceiver, one or more antennas, and a microphone. The transceiver may be specially designed for installation in vehicles. It may be much smaller than transceivers designed for fixed station use, to facilitate installation under a seat or in a trunk, and it may feature a detachable control head that can be mounted in a separate location from the rest of the radio. Antennas designed for mobile stations must accommodate the unique physical constraints of the vehicle and

travel lanes which it occupies, allowing for clearance under overpasses and bridges, and safe passage by vehicles in adjacent lanes. Most antennas used in mobile stations are omnidirectional. Few mobile stations are equipped to communicate with Morse code or digital modes. Most mobile stations are designed to be operated by the vehicle operator while driving. Most transceivers installed in vehicles are designed to run on 12-16 VDC, and are generally powered by the starting battery in the vehicle. Because of the power demands placed on the vehicle battery, most mobile stations either do not include external amplifiers or include amplifiers with power outputs that are more modest than those commonly found in fixed stations.

Maritime mobile stations are mobile stations installed in a watercraft, usually an ocean-going vessel. When in international waters, these stations are operated under the regulatory authority of the flag under which the vessel is registered. In addition to the regulatory requirements of amateur radio, operation of maritime mobile stations also requires the permission of the captain of the vessel. Maritime mobile stations append a /MM to end of their call sign (pronounced as "slash maritime mobile").

Aeronautical mobile stations are mobile stations installed in an aircraft. In addition to the regulatory requirements of amateur radio, operation of aeronautical mobile stations also requires the permission of the pilot of the aircraft. Aeronautical mobile stations append a /AM to end of their call sign (pronounced as "slash aeronautical mobile").

Portable stations

An amateur radio station set up in a temporary location is referred to as a portable station. A portable station might be established to provide emergency communications in a disaster area, to provide public service communications during a large organized event such as a charity bicycle ride, to provide communications during an expedition, or for the recreational enjoyment of operating outdoors. Portable stations include the same basic equipment as fixed and mobile stations, although transportation of the transceiver, antennas, power supplies or batteries and necessary accessories often influences the particular selection. Equipment that does not weigh very much, or that can be broken down for shipment or transportation in luggage is especially popular with amateur radio operators travelling on DX-peditions. Most portable stations rely upon generator or battery power. Because this form of power might be of limited supply, portable stations often operate at lower transmitter power output to conserve energy.

Some portable stations append a /P to end of their call sign (pronounced as "slash portable") to indicate their status as a portable operation. In some countries, this is a regulatory requirement, whereas in others it is done at the option of the operator.

Space stations

An amateur radio station that is located in a satellite, the Space Shuttle, or on the International Space Station is referred to as a space station. Some countries, including the United States, have additional or different regulations regarding the operation of space stations than other amateur radio stations. Most space stations are located on satellites that orbit the earth. These stations are frequently either transponders or repeaters that operate under automatic control and can be used by ground stations (any station that is not a space station) to relay their signal to other ground stations.

Handheld stations

Handheld radios contain all the necessary equipment for radio communications with another station. A typical radio used as a handheld station integrates a transceiver with an antenna and a battery in one handheld package. Most handheld transceivers used in amateur radio are designed for operation on the VHF or UHF amateur radio bands and most often are capable of only FM voice communications transmissions. To conserve battery power, they have limited transmitter power, often below 1W, to cover a local range of typically a few km or miles.

Repeater stations

An amateur radio repeater is a specialty amateur radio station that extends the range of communications for other stations. A repeater uses a receiver tuned to one radio frequency and a transmitter tuned to another radio frequency. Other stations using a repeater station transmit on one frequency but listen for signals on the other frequency. If a repeater station is in a favorable location, such as on a tall tower, the top of a tall

building, or on a mountaintop, stations that otherwise would not be able to communicate with each other can each use the repeater and establish two-way communications.

Repeater stations generally operate under automatic control. The control equipment is responsible for transmitting the repeater station's call sign at regular intervals. This identification is often done in Morse code. Some US repeater stations append a /R to end of their call sign or not (used to be required in the 80s and early 90s but no longer). Some may still have a vanity "WR#xxx" repeater license where #=0 thru 9 and xxx is any 3 letter combo but these callsigns are going away when they expire.

Repeaters

The range of communication is normally a few kilometers using standard walkie-talkie. To increase the range we need a repeater.

The repeaters are of two types simplex & duplex

Simplexes Repeaters:

Simplex Repeater consists of a radio on a simplex frequency and a digital voice recorder. When a signal is received, the recorder stores the message (usually up to 60 seconds worth max.). When the received signal ends, the digital voice recorder retransmits the message on the same frequency. A commonly used term to describe this activity is "store and forward" which is what a packet radio digipeater does.

Simplex repeaters are ideal for emergency or temporary situations where you need to communicate farther than a handheld radio would be able. Simplex repeaters can be installed in vehicles and parked on a hilltop to increase the transmission range.

Simplex repeaters are also handy for radio checks. When you send a signal to a simplex repeater you'll hear exactly what you sound like retransmitted back to you.

Some simplex repeaters simply attach to the external speaker jack and the microphone jack of the radio. When a signal is received via the speaker jack, the unit records the transmission and then retransmits it thru the microphone jack on the radio. This is known as VOX (voice activated).

Duplexers Repeaters

A duplex repeater receives a transmission on one frequency and simultaneously retransmits it on another. The result is that the re-transmission is heard at the same time that the original transmission was made.

Difference between a "simplex repeater" and a "duplex repeater"

Both types of repeaters pick up a signal and re-transmit it to improve its range. The difference is in the timing.

A duplex repeater (a conventional repeater) receives on one frequency and transmits on another simultaneously. Anything received on one frequency is immediately re-transmitted on the other. Of course, this setup requires a separate transmitter and receiver, and some type of RF isolation to prevent the transmitter from interfering with the receiver.

A simplex repeater stores the transmission and waits until it has finished before retransmitting it on the same frequency. It picks up a signal on the receiver, begins recording it, and after the signal finishes, it turns on the transmitter and plays it back. This can be accomplished using an ordinary transceiver and a single antenna. However, it is generally only usable for short transmissions, because there are long periods of silence between each one. This type of repeater is usually used for portable or emergency set-ups. Apart from these repeaters, software based repeater called EchoStation is also used.

EchoStation – A software implementation

EchoStation is a repeater-control program for Windows which makes it easy to set up a complete, fully-functional repeater or "announcement machine" using a personal computer. EchoStation is perfect for portable and emergency use, or for clubs wishing to use a PC instead of specialized hardware to control a repeater. It also makes an excellent "store and forward" simplex repeater when connected to a single transceiver.

The software even lets you set up an "announcement machine" which plays scheduled voice announcements over your club's existing repeater, using a radio at another location, such as a home station. Setup is as easy as installing the software, and connecting a transmitter and receiver to the PC's sound card. The transmitter can be controlled by VOX, or connected to the COM port with an interface such as the RIGblaster from West Mountain Radio. EchoStation has been fully tested with each of the three models of RIGblaster. All standard repeater functions are supported, such as COR, CW ID, courtesy tone, forward and reverse autopatch, and control link.

Communication in various modes & Experiments

Amateurs like to communicate in various modes like Voice, Morse, Television, satellites, Chatting (RTTY), Facsimile etc.

Emergency communication

Although emergency communication is not a part of HAM Radio activities but ham are helping voluntary in relief communication and helping human-being.

Friendship Radiosport Games

The Friendship Radiosport Games (FRG) is an international multi-sport event that includes competitions in the various sports collectively referred to as radiosport. The Friendship Radiosport Games began in 1989 as a result of a sister city agreement between Khabarovsk, Russia and Portland, Oregon, USA. Since then, participation has been extended to other sister cities in the Pacific Rim. The Friendship Radiosport Games are generally held in the month of August.

The first Friendship Radiosport Games were held in 1989 in Khabarovsk, Russia, which was then still a part of the Soviet Union. The games were organized as a result of the signing of a sister city agreement between the Siberian city of Khabarovsk and the city of Portland, Oregon, on the west coast of the United States.

The origination of the idea for a friendly radiosport competition between the two cities can be credited to Yevgeny Stavitsky UAØCA, an active amateur radio operator in Khabarovsk.

The second Friendship Radiosport Games were held in Portland, hosted by the Friendship Amateur Radio Society, and participants from Khabarovsk traveled to Oregon to attend the event. This would start a tradition of holding the event in August of every odd-numbered year.

Extending the event to additional sister cities, the host for the 1993 Friendship Radiosport Games was Victoria, British Columbia, Canada. In addition to competitors from Canada, Russia, and the United States, competitors from the sister city of Niigata, Japan also came to the event in 1993. The 1995 Friendship Radiosport Games were held in Khabarovsk, Russia for the second time, and representatives from all four cities were in attendance. Tokyo, Japan became the fourth host city for the Friendship Radiosport Games when the event has held there in 1997.

The 1999 games returned to Portland, Oregon, USA, where the ARDF event was also designated the IARU Region II Championships, the first such IARU sanctioned championships in the Americas. The event returned to Victoria, British Columbia, Canada in 2001, where for the first time competitors from Melbourne, Victoria, Australia were also in attendance. Breaking with the established pattern, the Friendship Radiosport Games were not held in 2003, but were instead held in 2004, again in Khabarovsk, Russia. The invitation to participation was further extended to radio clubs in the Pacific Rim sister cities of Harbin, China, and Buchon, Korea.

Competition

The Friendship Radiosport Games have traditionally included events from all of the three activities collectively known as radiosport. This includes:

- **HF contesting**
- **Amateur Radio Direction Finding**
- **and High Speed Telegraphy.**

Some competitors participate in only one of these activities, while others have been competitive in multiple events.

Ham Radio Direction Finding (Fox Hunting).

Radio direction finding is used to find sources of interference to any form of wireless electronic communications, including broadcast and two-way radio, television, and telephones. It is also used to track missing or stolen cars and other property. Search and rescue workers use it to find persons in distress. Emergency Locator Transmitters in downed aircraft are tracked with RDF techniques.

Much of the information at this site pertains to RDF equipment and techniques for Amateur Radio (ham) operators. Hams use RDF to track jamming stations and stolen equipment, but more often, they use it just for fun. Hidden transmitter hunting has been done by hams for about fifty years and it is a growing activity. T-hunting refers specifically to hunts involving hams driving in RDF-equipped vehicles. A mobile T-hunt is best described as hide-and-seek for all ages with radio gear. When you set out on a Thunt, you never know where you'll end up, and you have no idea what you're going to find. No form of ham radio contesting is more fun! Mobile T-hunting is done in cities and towns all over the USA, and elsewhere.

Mobile T-hunting is called foxhunting in some parts of the USA, but everywhere else in the world, the terms "foxhunting" and ARDF refer to another kind of RDF contest, done completely on foot in large woods and parks. It's a map-and-compass sport similar to orienteering, with about a half-dozen "fox" transmitters to find in a period of two hours or so. Someday this sport, which is also called foxtailing, fox-teering and radio-orienteering, may become an Olympic event. Meanwhile, it's a fun-filled activity for your hamfests and Scout Jamborees.

Shortwave Listening

Shortwave listening (abbreviated SWLing) is tuning for stations located on shortwave frequencies, usually thought of as those from 1700 kHz (the upper limit of the AM broadcasting band) to 30 MHz (the lower limit of the tuning range of most scanner radio). In between those two frequencies, a simple, low cost shortwave radio is capable of letting you hear news, music, commentaries, and other feature programs in English from stations located round the world.

Most of the larger nations of the world broadcast programs in English and transmit them on times and frequencies for best reception. But why bother listening to shortwave in this era of communications satellites and cable television news channels? Perhaps the biggest reason why is that SWLing can give you a unique perspective on events that you simply cannot get from American media. If you watch coverage of an event in Moscow from CCN or CBS News, you get the American perspective on what is happening from an American journalist. If you listen to the Voice of Russia, you get the Russian perspective from a Russian journalist. As you might expect, the two interpretations of the same news event can be quite different.

Shortwave also lets you get foreign reactions to and interpretations of American news events.

Even European democracies like Britain and Germany seemed bewildered by his candidacy and popularity; they could not understand how someone could declare himself a presidential candidate and achieve such popularity outside of a political party system. Moments like that help you appreciate the profound cultural and intellectual differences that exist between ostensibly closely-linked nations. While no one knows the exact number of shortwave listeners (SWLs) in the United States, most estimates place the number in the millions. SWLs range from teenagers to retired persons to David Letterman, who has mentioned on several occasions how much he enjoys listening to shortwave, particularly broadcasts by the British Broadcasting Corporation (BBC). Of course, not all shortwave stations broadcast in English. If you're studying a foreign language—or want to maintain your proficiency in one—shortwave radio will offer you an unlimited supply of contemporary practice material. If you enjoy music, shortwave will let you hear sounds you probably can't find in the even the most specialized record and CD shops. Ever heard a lagu melayu song? It sounds like a cross between Indian-style instrumentals and an Arabic vocal style, and it's very popular in Indonesia. You can hear such songs over the various shortwave outlets of Radio Republic Indonesia. The so-called "world beat" popular with young people had its origins in the "high life" music broadcast by shortwave stations in Africa. Other SWLs arise before dawn to catch the

haunting huayno melodies coming from stations in Bolivia and Peru. Some SWL music fans have compiled tape-recorded libraries of folk and indigenous music from shortwave broadcasts that many college and university music departments would envy!

Most stations operating on shortwave frequencies are not broadcasters, however. HAM Radio operators have certain frequency bands set aside for their use, and you can hear them "talking" (by voice, Morse code, radioteletype, etc.) with friends around the world. Aircraft flying international routes, ships at sea, and military forces are also big users of shortwave. In fact, some SWLs ignore broadcasters altogether and specialize in trying to hear such "utility" stations. Another specialty within SWLing is "DXing," in which the goal is to receive faint, distant, and otherwise hard-to-hear stations. DXing on shortwave is like panning for gold; DXers patiently work through noise, interference, and fading to hear a low powered station deep in the Amazonian basin of Brazil or somewhere in the Indonesian archipelago. DXing is a manifestation of shortwave's biggest weakness—the fact that shortwave reception is highly variable compared to the AM and FM broadcasting bands. Reception of a shortwave station on a given frequency will usually vary greatly with the time of day and season of the year.

Shortwave reception is heavily influenced by solar activity as indicated by the number of sunspots visible on the Sun. Solar flares and storms can disrupt shortwave reception for hours and even days. Fading is also common on the shortwave bands. While shortwave can offer you listening you cannot find on your local AM and FM stations, it unfortunately cannot offer you the same reliable reception or audio quality. Many shortwave stations welcome correspondence from listeners, especially reports on how well the station is being received and comments on their programming. Stations often respond to such letters by sending out colorful souvenir cards, known as QSL cards, for correct reports of reception. Some station reply with QSL letters instead of cards, and a few send other items, like pennants with the station's name or call letters, to lucky SWLs.

JOTA & Sports

Scouts movements: Millions of scouts and guides enjoying HAM Radio world wide to interact with them globally via HAM Radio.

Dxpedition:

A DX-pedition is an expedition to what is considered an exotic place by amateur radio operators, perhaps because of its remoteness or because there are very few radio amateurs active from that place. This could be an island, a country, or even a particular spot on a geographical grid. DX-peditions are planned and organized to help operators who need to contact that area to obtain an amateur radio award. There are several awards sponsored by various organizations based on contacting many different countries. An "entity" for radio award purposes is any location that is both politically and physically remote from other jurisdictions/locations.

In addition to licensing and survival issues, DX-pedition participants devote much attention with the radio equipment they use. In an extremely rare location for a popular awards program like DXCC, many thousands of stations may be calling the DX-pedition at any one time. Therefore, DX-peditioners will aim to use high power and gain antennas on as many bands as practical, in order to achieve a loud signal worldwide and keep control of the inevitable pileups that occur. The operator may also receive and transmit on different frequencies, called split operation, in order to be heard by distant stations without interference from the pileup.

For smaller operations to remote locations, smaller radios which run off of 12V DC and antenna systems which are more easily transported are favored over larger and more difficult to transport equipment. However, generators are usually used because of the power requirements for amplifiers and the ease of refueling versus recharging a battery.

HAM NET:

A ham net is an amateur radio activity, where amateur radio operators "check into" are regularly conducted across world.

Types of Net

Open Net: stations call each other directly to pass traffic

Direct Net: Stations call only net control directly; go direct only with net control permission

Net Control…

- ◊ **must have a commanding signal**
- ◊ **is in charge of the net**
- ◊ **activates and assigns resources**
- ◊ **must keep track of resources**
- ◊ **assigns tactical calls**
- ◊ **keeps a good log**
- ◊ **has a clear speaking voice**
- ◊ **controls his or her tone of voice**
- ◊ **has good command of the English language**
- ◊ **can handle physical and mental stress for long periods**
- ◊ **can listen and respond in a noisy/chaotic environment**
- ◊ **has good hearing**
- ◊ **writes legibly**
- ◊ **enforces net discipline**
- ◊ **uses tactical calls**
- ◊ **uses plain English - no "10" codes or "Q" signals**
- ◊ **uses standard phonetics**
- ◊ **thinks before keying**
- ◊ **is as concise as possible**
- ◊ **knows how to operate the radio**
- ◊ **frequently identifies name and reason for the net**
- ◊ **transmits only facts, not conjecture**
- ◊ **when transmitting, key up, take a breath, then talk**

Car rally - Field day

Car rally is also a part of amateur radio activities in which amateur radio operators provide the communication, assistance and position alert in rally route.

Amateur Radio Operator normally positioned at all of the Safety on Stage points situated every 5kms along the rally track.

Some of the organizations organized yearly this event.

The Caloundra's Falken Rally Queensland organised by the Brisbane Sporting Car Club organized car rally yearly.

The popular car rally organized yearly in Cochin organized by kerala auto sports club.

Recently in Himachal Pradesh also organized car rally.

Special Call signs for special events

When transmitting in conjunction with an event of special significance, an amateur station ("special event station") may transmit the identification announcement using a special event call sign in accord with the procedures detailed below. Substituting a special event call sign for its assigned call sign may help a special event station call attention "on-air" to its participation in the special event and to the unique opportunity for the amateur service community to exchange greetings with the station. Use of these provisions, however, must not detract from the station making the source of its transmissions known to those receiving them. The special event station must also transmit its assigned call sign at least once per hour during such operation.

Example AT60MY was in the memory of 60 years of Indian independence and AT25MY is running in memory of silver jubilee of NIAR. Previously VU7MY was organized by NIAR's team in Minicoy Island in year 2007.

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ALE for Amateur Radio

Emergency / Disaster Relief Communications

HFLINK
is an international resource for:

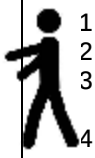
- Coordination of ALE in the Amateur Radio Service
- Interoperative HF Comms between organizations
- Emergency / Disaster Relief HF Communications
- Sponsoring the Global ALE High Frequency Network

HFN
Global ALE High Frequency Network
The primary purpose of HFN is
Emergency / Disaster Relief Communications.
All licensed amateur radio operators worldwide are invited to use and enjoy the net and its services for routine purposes whenever there is no Emcomm event in progress.

Is HF emergency communication really viable?
"For HF emergency communication to be taken seriously, it must be able to make the call or send a message without prior notice, at any time of the day or night."

What is ALE?

ALE is
"Automatic Link Establishment"



1. A radio system for calling up HF stations for SSB or digital modes, QSOs and Nets.
2. A transceiver feature, that scans HF frequencies for calls and messages
3. A way of using your computer and ham rig for HF email, HF phone texting, and HF-to-HF message relay.
4. The ***international standard*** for initiating and sustaining HF communications.

A ***force multiplier*** for the HF Emcomm operator.

One operator can monitor 5 or 10 bands and Nets simultaneously

What Does ALE Do for Ham Radio Emcomm?

- Maintains ***Hot Standby Nets*** 24 - 7 - 365 on demand.
- Calls up one or multiple stations as needed... without nets or skeds or phone trees...
- Transmits an HF message or bulletin, that can be picked up automatically by other operators
- Interoperates via SSB voice or Text between various organizations and agencies on HF.
- HF email with just your HF radio and computer
- Tracks GPS positions by HF.

ALE Net Diagram

How ALE Works

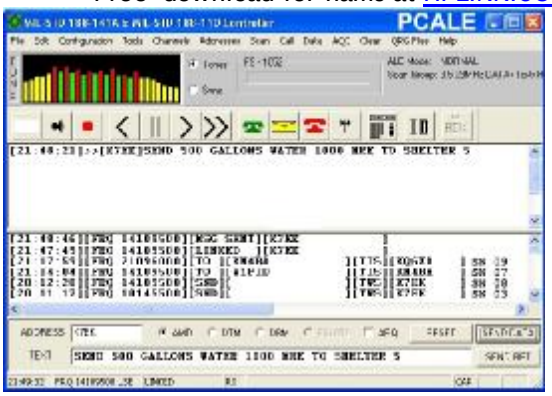
- Each ham radio ALE station uses the operator's callsign as a digital ***address***.
- When not actively in a QSO with another station, each ALE transceiver constantly scans through common frequencies on all bands, listening for its own callsign.
- Each ALE transceiver also listens for other callsigns... and memorizes the frequency, signal quality, and time each callsign is heard.

ALE Hardware and Software

- Most ALE ham operators use PCALE software ALE program with an HF amateur radio SSB transceiver.
- MULTIPSK software has recently added the basic functions of ALE for calling and messaging.
- MARS members use MARS-ALE.
- Hams also use commercial HF radios with ALE built-in... a computer is not needed with these radios.
- Other ham software programs are now in the process of adding ALE.
- External ALE controllers are also available.

PCALE by Charles Brain G4GUO

- Complete ALE software for amateur radio HF rigs.
- Advanced methods of scanning that enable Ham-Friendly ALE.
- High-speed HF soundcard ARQ built-in.
- Interoperable with ALE Hardware MIL-STD radios.
- Free download for hams at HFLINK.COM



Starting an ALE QSO

1. The radio operator enters the desired callsign into the ALE controller, just like dialing a phone number.
2. The ALE controller starts calling on the bands the desired station was heard previously with good quality.
3. The ALE controller transmits a short ***selective calling*** burst containing the callsigns.
4. When the desired station responds, a Link is thus Established and the QSO can begin using any mode, such as SSB Voice or Text Messaging.

Receiving an ALE Call

1. When your scanning transceiver's ALE controller detects the first few characters of its callsign, it stops scanning and stays on that frequency.
2. If it decodes your callsign, it responds to the caller with a ***handshake*** to confirm the link is established.
3. Your transceiver, muted up until now, turns on its speaker, or the controller beeps to alert you.
4. Your ALE controller display indicates the callsign of the station calling you.
5. You may start a regular QSO in any mode you like.
6. At the conclusion of the QSO, you clear the link, and each operator returns their transceiver to scanning.

ALE - SMS

What is ALE - SMS?

A short phone-text or email message sent through a Global ALE HF Network Station

This presentation is available for Amateur Radio Clubs and Organizations on the web at: http://hflink.net/presentation

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20th Anniversary of BCDX Net

-Jose Jacob, VU2JOS

The weekly BC DX NET operating on the 40 Meter Amateur Band in South India is celebrating it 20th anniversary this year. This Net was started on Sunday November 27, 1988 by a small group of Amateurs viz. Shanmughasundaram, VU2FOT, Victor Goonetilleke, 4S7VK, Jose Jacob, VU2JOS and some SWLs.

The whole concept of this Net started when these Hams used to meet regularly on the band and exchanged DX news at various times. This later transformed into a regular Net which benefited many people. This net is conducted on Sunday mornings for the advantage of those who are keenly interested in Broadcast Band Dxing.

The unique thing about this Net is that it has helped Hams to become SWL Dxers and SWLs to become Hams!

On a typical Sunday morning, the Net control starts the Net by calling in for regular check-ins. After about 10 minutes he gives the latest DX tips that he has gathered and later other stations also takes turn in exchanging their DX information. It has all the ingredients of a live two way DX program and continues for about 30 minutes depending on the traffic. For some time it was known as SWL DX Net.

The Net grew up with VU2KAK Anil, VU3SIO Sanil, VU2ISR Harsha, VU3ITI Varadhan, VU3DJQ Raman, VU2NGB Binu, VU2BNP Prahalad, VU3BGK Neel, VU2ICI Mohan etc. joining in.

In 1989 a monthly newsletter was published on behalf of the Net by VU2FOT which was unfortunately discontinued after some issues. In May 1991 a BC DX Net Convention was held at Kozhikode which was a big successes attended by over 85 people including Victor Goonetilleke, 4S7VK from Sri Lanka. A Ham station with the special call sign VU2F was also operational at the

Convention venue. A DX contest sponsored by Radio Netherlands was organised on 29 & 30 January 1994 in collaboration with Union of Asian DXers, Sri Lanka. Special QSL cards were issued by Radio Netherlands for the occasion. In 1995 a special QSL card was also issued to mark the 7th anniversary of the Net by VU2BNP. In 1998 AWR Wavescan broadcast a special program on the occasion of the 10th anniversary of the BCDX Net. Articles on BCDX Net has also appeared in "NIAR Ham News" July 1998 issue, "Hamfest India" 1998 souvenir and other DX publications and was also mentioned in various DX programs several times.

The BCDX Net has been very regular all these long 20 years, thanks to the dedicated Net Controllers. Now a days it is conducted on Sunday mornings at 8.30 am Indian Standard Time (0300 UTC) on 7085 kHz on the 40 meter Amateur Band which covers South India and Sri Lanka. Occasionally it was also conducted on the 20 Meter Band 14150 kHz at 2130 IST (1600 UTC).Currently, the regular net controller is Sanil Deep VU3SIO and assisted from time to time by VU3BGK, VU2JOS etc.

As part of the 20th anniversary of the BC DX Net, a special segment is scheduled to be broadcast by Wavesacan program of Adventist World Radio by its stations worldwide in November 2008. Special QSL cards are also offered. The postal address of BC DX Net is Box 211, Kozhikode 673001, Kerala, India.

Congratulations to BCDX Net on its important anniversary!

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Amateur Radio for Awards and Rewards

by Sushil Kumar Dhingra, VU2LFA

History of contesting

The origin of contesting can be traced to the Trans-Atlantic Tests of the early 1920s, when amateur radio operators first attempted to establish long distance radio communications across the Atlantic Ocean on the short wave amateur radio frequencies. A wide variety of amateur radio contests are sponsored every year. Contest sponsors have crafted competitive events that serve to promote a variety of interests and appeal to diverse audiences. Radio contests typically take place on weekends or local weeknight evenings, and can last from a few hours to forty-eight hours in duration.

An important innovation in early contesting was the development of Field Day operating events. Field day events were promoted as an opportunity for radio amateurs to operate from portable locations, in environments that simulate what might be encountered during emergency or disaster relief situations. Field day events have traditionally carried the same general operating and scoring structures as other contests, but the emphasis on emergency readiness and capability has historically outweighed the competitive nature of these events.

Modern contests draw upon the heritage of DX communications, traffic handling, and communications readiness. By the turn of the century, contesting had become an established world wide sport, with tens of thousands of active competitors, connected not just through their on air activities, but with specialist web sites, journals, and conventions.

Without a single world wide organizing body or authority for the sport, there has never been a world ranking system by which contesters could compare themselves. The vast differences contesters face in the locations from which they operate contests, and the effect that location has on both radio propagation and the proximity to major populations of amateur radio operators also conspired to make comparisons of the top performers in the sport difficult. The first World Radiosport Team Championship event was held in July, 1990 in Seattle, Washington, USA, and was an effort to overcome some of these issues by inviting the top contesters from around the world to operate a single contest from similar stations in one compact geographic area.

Contesting (also known as radiosport) is a competitive activity pursued by amateur radio operators. In a contest an amateur radio station, which may be operated by an individual or a team, seeks to contact as many other amateur radio stations as possible in a given period of time and exchange information. Rules for each competition define the amateur radio bands, the mode of communication that may be used, and the kind of information that must be exchanged. The contacts made during the contest contribute to a score by which stations are ranked. Contest sponsors publish the results in magazines and on web sites.

Contesting basics

Radio contests are principally sponsored by amateur radio societies, radio clubs, or radio enthusiast magazines. These organizations publish the rules for the event, collect the operational logs from all stations that operate in the event, cross-check the logs to generate a score for each station, and then publish the results in a magazine, in a society journal, or on a web site. Because the competitions are between stations licensed in the Amateur Radio Service (with the exception of certain contests which sponsor awards for shortwave listeners), which prohibits the use of radio frequencies for pecuniary interests, there are no professional radio contests or professional contesters, and any awards granted by the contest sponsors are typically limited to paper certificates, plaques, or trophies.

During a radio contest, each station attempts to establish two-way contact with other licensed amateur radio stations and exchange information specific to that contest. The information exchanged could include a signal report, a name, the country in which the station is located, the geographic zone in which the station is located, the Maidenhead grid locator in which the station is located, the age of the operator, or an incrementing serial number. For each contact, the radio operator must correctly receive the call sign of the other station, as well as the information in the "exchange", and record this data,

along with the time of the contact and the band or frequency that was used to make the contact, in a log.

A contest score is computed based on a formula defined for that contest. A typical formula assigns some number of points for each contact, and a "multiplier" based on some aspect of the exchanged information. Many HF contests reward stations with a new multiplier for contacts with stations in each country -often based on the "entities" listed on the DXCC country list maintained by the American Radio Relay League ("ARRL"). Depending on the rules for a particular contest, each multiplier may count once on each radio band or only once during the contest, regardless of the radio band on which the multiplier was first earned. The points earned for each contact can be a fixed amount per contact, or can vary based on a geographical relationship.

After they are received by the contest sponsor, logs are checked for accuracy. Points can be deducted or credit or multipliers lost if there are errors in the log data for a given contact. Depending on the scoring formula used, the resulting scores of any particular contest can be either a small number of points or in the millions of points. Most contests offer multiple entry categories, and declare winners in each category. Some contests also declare regional winners for specific geographic subdivisions, such as continents, countries.

The most common entry category is the single operator category and variations thereof, in which only one individual operates a radio station for the entire duration of the contest. Subdivisions of the single operator category are often made based on the highest power output levels used during the contest, such as a QRP category for single operator stations using no more than five watts output power, or a High Power category that allows stations to transmit with as much output power as their license permits. Multi-operator categories allow for teams of individuals to operate from a single station, and may either allow for a single radio transmitter or several to be in use simultaneously on different amateur radio bands. Many contests also offer team or club competitions in which the scores of multiple radio stations are combined and ranked.

Types of contests

A wide variety of amateur radio contests are sponsored every year. Contest sponsors have crafted competitive events that serve to promote a variety of interests and appeal to diverse audiences. Radio contests typically take place on weekends or local weeknight evenings, and can last from a few hours to forty-eight hours in duration. The rules of each contest will specify which stations are eligible for participation, the radio frequency bands on which they may operate, the communications modes they may employ, and the specific time period during which they may make contacts for the contest.

The rules of a contest will indicate which stations are eligible to participate in the competition, and which other amateur radio stations they may contact. Some contests restrict participation to stations in a particular geographic area, such as a continent or country. There are contests in which any amateur radio station worldwide may participate and make contact with any other stations for contest credit. The CQ World Wide DX Contest permits stations to contact other stations anywhere else on the planet, and attracts tens of thousands of participating stations each year. In large contests the number of people taking part is a significant percentage of radio amateurs active on the HF bands, although they in themselves are a small percentage of the total amateurs in the world.

There are regional contests that invite all stations around the world to participate, but restrict which stations each competitor may contact. There are also contests that limit participation to just the stations located in a particular continent or country, even though those stations may work any other station for points.

All contests use one or more amateur radio bands on which competing stations may make two-way contacts. HF contests use one or more of the 160 meter, 80 Meter, 40 Meter, 20 Meter, 15 Meter, and 10 Meter bands. VHF contests use all the amateur radio bands above 50 MHz. Some contests permit activity on all HF or all VHF bands, and may offer points for contacts and multipliers on each band. Other contests may permit activity on all bands but restrict stations to making only one contact with each other station, regardless of band, or may limit multipliers to once per contest instead of once per band. Contests exist for enthusiasts of all modes. Some contests are restricted to

just CW emissions using the Morse code for communications, some are restricted to telephony modes and spoken communications, and some employ digital emissions modes such as RTTY or PSK31. Many popular contests are offered on two separate weekends, one for CW and one for telephony, with all the same rules. Some contests, especially those restricted to a single radio frequency band, allow the competing stations to use several different emissions modes. VHF contests typically permit any mode of emission, including some specialty digital modes designed specifically for use on those bands. As with the other variations in contest rules and participation structure, some contest stations and operators choose to specialize in contests on certain modes and may not participate seriously in contests on other modes. Large, worldwide contests on the HF bands can be scheduled for up to forty-eight hours in duration. Typically, these large worldwide contests run from 0000 UTC on Saturday morning until the end of 2359 UTC Sunday evening. Regional and smaller contests often are scheduled for a shorter duration, with twenty-four hours, twelve hours, and four hours being common variations.

The wide variety of contests attracts a large variety of contesters and contest stations. The rules and structure of a particular contest can determine the strategies used by competitors to maximize the number of contacts made and multipliers earned. Some stations and operators specialize in certain contests, and either rarely operate in others, or compete in them with less seriousness. As with other sports, contest rules evolve over time, and rule changes are one of the primary sources of controversy in the sport.

Results and awards:

Most contests are sponsored by organizations that either publish a membership journal, or sell a radio enthusiast magazine as their business. The results of radio contest events are printed in these publications, and often include an article describing the event and highlighting the victors. Contest results articles might also include photographs of radio stations and operators in the contest, and a detailed listing of the scores of every participating station. In addition to publication in magazines and journals, many contest sponsors also publish results on web sites, often in a format similar to that found in print.

Because radio contests take place using amateur radio, competitors are forbidden by regulation from being compensated financially for their activity. In addition to the recognition of their peers, winners in radio contests do, however, often receive paper certificates, wooden plaques, trophies, engraved gavels, or medals in recognition of their achievements. Some contests provide trophies of nominal economic value that highlight their local agricultural or cultural heritage, such as smoked salmon or a bottle of wine.

Logs and log checking

Most serious competitive stations log their contest contacts using contest logging software, although some continue to use paper and pencil. There are many different software logging programs written specifically for radio contesting. Computer logging programs can handle many additional duties besides simply recording the log data; they can keep a running score based upon the formula of the contest, track which available multipliers have been "worked" and which have not, and provide the operator with visual clues about how many contacts are being made on which bands. Some contest software even provide a means to control the station equipment via computer, retrieve data from the radio and send pre-recorded Morse code, voice or digital messages. After the conclusion of a contest, each station must submit its operational log to the contest sponsor. Many sponsors accept logs by e-mail, by upload on web sites, or even by postal mail.

Once a contest sponsor receives all the logs from the competitors, the logs undergo a process known as "cross-checking." In cross-checking, the contest sponsor will match up the contacts recorded in the logs and look for errors or omissions. Most contests enforce stiff points penalties for inaccuracies in the log, which means that the need for speed in operation must be balanced against the requirement for accuracy. It is not uncommon for a station to lead in points at the end of the contest, but slip behind a more accurate competitor after the cross-checking process has assessed penalties. Some contest sponsors provide custom log checking reports to participating stations that offer details about the errors in their log and how they were penalized.

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Modulations used by Radio Amateurs

By Ramesh Babu

Analog modes

Amplitude Modulation (AM)

Single Sideband (SSB)

Frequency Modulation (FM)

Phase Modulation (PM)

Continuous Wave (CW)

Image Modes

Amateur Television, also known as Fast Scan television (ATV)

Slow Scan Television (SSTV)

Digital Modes

Most amateur digital modes are transmitted by inserting audio into the microphone input of a radio and using an analog scheme such as amplitude modulation (AM), frequency modulation (FM), or single side band modulation (SSB).

Some examples of digital modes are:

- ☐ **Amateur Teleprinting Over Radio (AMTOR)**
- ☐ **D-Star**
- ☐ **Echolink**
- ☐ **Multiple Frequency-Shift Keying (MFSK)**
- ☐ **Packet Radio**
- ☐ **Automatic Position Reporting System (APRS)**
- ☐ **PACTOR**
- ☐ **Phase Shift Keying (31 baud) (PSK31)**
- ☐ **Radio Teletype (RTTY)**

Modes by Activity

The following 'modes' use no one specific modulation scheme but rather are classified by the activity of the communication.

Earth-Moon-Earth (EME)

Internet Radio Linking Project (IRLP)

Low Transmitter Power (QRP)

Satellite (OSCAR)

Continuous Wave (CW)

CW is the simplest form of modulation. The output of the transmitter is switched on and off, typically to form the characters of the Morse code. CW signal doesn't occupy much frequency space (usually less than 500 Hz)

Amplitude Modulation (AM)

In amplitude modulation, the strength (amplitude) of the carrier from a transmitter is varied according to how a modulating signal varies. Amplitude modulation results in three separate frequencies being transmitted: the original carrier frequency, a lower sideband (LSB) below the carrier frequency, andan upper sideband (USB) above the carrier frequency. AM has the advantages of being easy to produce in a transmitter and AM receivers are simple in design.

Its main disadvantage is its inefficiency. AM is simple to tune on ordinary receivers, and that is why it is used for almost all shortwave broadcasting.

Single Sideband (SSB)

Since so much power is wasted in AM, radio engineers devised a method to transmit just one sideband and put all of the transmitter's power into sending useful intelligence. This method is known as single sideband (SSB). In SSB transmitters, the carrier and one sideband are removed before the signal is amplified. Either the upper sideband (USB) or lower sideband (LSB) of the original AM signal can be transmitted. SSB is a much more efficient mode than AM since all of the transmitter's power goes into transmitting useful intelligence. SSB is used mainly by ham radio operators, military services, maritime and aeronautical radio services.

Frequency Modulation (FM)

In CW, AM, and SSB, the carrier of the signal will not change in a normally operating transmitter. However, it is possible to modulate a signal by changing its frequency in accordance with a modulating signal. This is the idea behind frequency modulation (FM). FM is mainly used on

frequency above 30 MHz, where adequate frequency space is available. This is why most scanner radios can only receive FM signals, since most signals found above 30 MHz are FM. The big advantage of FM is its audio quality and immunity to noise.

Phase Modulation:

Phase modulation (PM) is a form of modulation that represents information as variations in the instantaneous phase of a carrier wave. Unlike its more popular counterpart, frequency modulation (FM), PM is not very widely used. This is because it tends to require more complex receiving hardware and there can be ambiguity problems in determining whether, for example, the signal has changed phase by +180° or -180°.

Frequency-Shift Keying (FSK)

FSK was originally developed to send text via radioteleprinter devices. The shifting of the carrier between the mark and space was used to generate characters in the Baudot code, which can be thought of as a more elaborate version of the Morse code. As technology improved, FSK was used to transmit messages in the ASCII code used by computers. FSK is the fastest way to send text by radio, and the error-correcting modes offer high accuracy and reliability.

TOR is an acronym for Teleprinting over Radio. It is traditionally used to describe the three popular "error free" operating modes, AMTOR, PACTOR and G-TOR.

AMTOR is an FSK mode that has been fading into history. While a robust mode, it only has 5 bits (as did its predecessor RTTY) and can not transfer extended ASCII or any binary data.

G-TOR (Golay -TOR) is an FSK mode that offers a fast transfer rate compared to Pactor. It incorporates a data inter-leaving system that assists in minimizing the effects of atmospheric noise and has the ability to fix garbled data.

PACTOR is an FSK mode and is a standard on modern TNCs. It is designed with a combination of packet and Amtor Techniques.

PACTOR-2 is a robust and powerful PSK mode which operates well under varying conditions. It uses strong logic, automatic frequency tracking; it is DSP based and as much as 8 times faster then Pactor.

RTTY or "Radio Teletype" is an FSK mode that has been in use longer than any other digital mode (except for morse code). RTTY is a very simple technique which uses a five-bit code to represent all the letters of the alphabet, the numbers, some punctuation and some control characters. RTTY is a popular with die-hard operators.

PSK31 was developed by English amateur radio operator Peter Martinez (G3PLX) and introduced to the wider amateur radio community in December 1998. Martinez initially called his creation "varicode", because it uses variable length encodings (Huffman codes) to represent characters. PSK31 is the first new digital mode to find popularity on HF bands in many years. PSK31 enjoys great popularity on the HF bands today and is presently the standard for live keyboard communications. PSK31 was enthusiastically received, and has since quickly spread into worldwide use. Due to the efficiency of the mode, it has become especially popular with operators whose circumstances do not permit the erection of large antenna systems and/or the use of high power. Very little equipment, in addition to a standard radio transceiver, is required—normally an old PC and a few cables will suffice; the software is both free to download and runs on older, slower computers.

Multiple frequency-shift keying (MFSK) is a variation of frequency-shift keying (FSK) that uses more than two frequencies. MFSK is a form of M-ary orthogonal modulation, where each symbol consists of one element from an alphabet of orthogonal waveforms. M, the size of the alphabet, is usually a power of two so that each symbol represents log2M bits.

M is usually between 2 and 64

Error Correction is generally also used

MFSK16 is advancement to the THROB mode and encodes 16 tones. MFSK8 and MFSK16 were developed by Murray Greenman, ZL1BPU for amateur radio communications on HF.

EchoLink is a computer program that runs under Microsoft Windows to allow radio amateurs to communicate with one another using Voice over IP (VoIP) technology on the internet for at least part of the path between them. It was designed by Jonathan Taylor, a radio amateur with callsign K1RFD. The program allows reliable worldwide connections to be made between radio amateurs, greatly enhancing Amateur Radio's communications capabilities.

D-Star:

D-STAR (Digital Smart Technologies for Amateur Radio) is a digital voice and data protocol specification developed as the result of research by the Japan Amateur Radio League to investigate digital technologies for amateur radio. While there are other digital on-air technologies being used by amateurs that have come from other services, D-Star is one of the first on-air standards to be widely deployed and sold by a major radio manufacturer that is designed specifically for amateur service use.

D-Star compatible radios are available on VHF and UHF and microwave amateur radio bands. In addition to the over-the-air protocol, D-Star also provides specifications for network connectivity, enabling D-Star radios to be connected to the Internet or other networks and provisions for routing data streams of voice or packet data via amateur radio callsigns.

APRS (Automatic Position Reporting System)

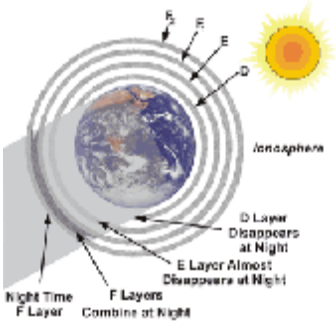
APRS is a real-time tactical digital communications protocol for exchanging information between a large numbers of stations covering a large (local) area. As a multi-user data network, it is quite different from conventional packet radio. APRS is different from regular packet in four ways. First by the integration of maps and other data displays to organize and display data, second, by using a one-to-many protocol to update everyone in real time, third, by using generic digipeating so that prior knowledge of the network is not required, and fourth , since 1997, a worldwide transparent internet backbone, linking everyone worldwide.

EME (Earth-moon-Earth)

EME also known as "Moonbounce" is a type of communication that occurs between two stations point their antennas at the Moon and attempt to reflect their signal off the moon to try to make a contact. The Moon is used as a reflector much like ionosphere is used to reflect radio waves.

Ionosphere:

At heights of 80 km (50 miles), the gas is so thin that free electrons can exist for short periods of time before they are captured by a nearby positive ion. The existence of charged particles at this altitude and above indicates the beginning of the ionosphere a region having the properties of a gas and of plasma. The ionosphere is indicated by the in the figure to the below.



The ionosphere is composed of three main parts: the D, E, and F regions.

F-region: 150-1000km contains a range of ion from NO+ and O+ at the bottom to H+ b and He+ ions at the top. Electron density is highest in this layer.

E-region: 95-150km, contains mostly 02+ ions

D-region: 75-95 kilometers up, relatively weak ionization due to its position at the bottom.

Mechanism of Refraction in Ionosphere:

When a radio wave reaches the ionosphere, the electric field in the wave forces the electrons in the ionosphere into oscillation at the same frequency as the radio wave. Some of the radio-frequency energy is given up to this resonant oscillation. The oscillating electrons will then either be lost to recombination or will re-radiate the original wave energy. Total refraction can occur when the collision frequency of the ionosphere is less than the radio frequency, and if the electron density in the ionosphere is great enough.

The critical frequency is the limiting frequency at or below which a radio wave is refracted by an ionospheric layer at vertical incidence. If the transmitted frequency is higher than the plasma frequency of the ionosphere, then the electrons cannot respond fast enough, and they are not able to re-radiate the signal. The Maximum Usable Frequency (MUF) is defined as the upper frequency limit that can be used for transmission between two points at a specified time.

Revolution in Voice modulation

In amplitude modulation, the strength (amplitude) of the carrier from a transmitter is varied according to how a modulating signal varies.

When you speak into the microphone of an AM transmitter, the microphone converts your voice into a varying voltage. This voltage is amplified and then used to vary the strength of the transmitter's output. Amplitude modulation adds power to the carrier, with the amount added depending on the strength of the modulating voltage. Amplitude modulation results in three separate frequencies being transmitted: the original carrier frequency, a lower sideband (LSB) below the carrier frequency, and an upper sideband (USB) above the carrier frequency. The sidebands are "mirror images" of each other and contain the same intelligence. When an AM signal is received, these frequencies are combined to produce the sounds you hear.

Since so much power is wasted in AM, radio engineers devised a method to transmit just one sideband and put all of the transmitter's power into sending useful intelligence. This method is known as single sideband (SSB). In SSB transmitters, the carrier and one sideband are removed before the signal is amplified. Either the upper sideband (USB) or lower sideband (LSB) of the original AM signal can be transmitted. A SSB signal also occupies only about half the frequency space of a comparable AM signal.

But to successfully demodulate a SSB signal, you need a substitute carrier which is supplied by Beat Frequency Oscillator (BFO). For best performance, a SSB receiver needs more precise tuning and stability than an AM receiver, and it must be tuned more carefully than an AM receiver.

SSB is used mainly by ham radio operators, military services, maritime and aeronautical radio services, and other situations where skilled operators and quality receiving equipment are common.

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FREQUENCY ALLOCATION

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The electromagnetic spectrum is an aspect of the physical world, like land, water, and air. It is a resource, limited by its usability. Use of radio frequency bands of the electromagnetic spectrum is regulated by governments in most countries, in a process known as frequency allocation or spectrum allocation. Like weather and internationally traded goods, radio propagation and RF technology do not stop at national boundaries. Giving technical and economic reasons, governments have sought to harmonise spectrum allocation standards.

A number of forums and standards bodies work on standards for frequency allocation, including:, ITU , CEPT, ETSI, International Special Committee on Radio Interference. High-demand sections of the electromagnetic spectrum may sometimes be allocated through auctions.

The range of "radio frequencies" is a matter of international convention. At the international radio conference at Atlantic City in 1947, Hertzian (radio) waves were defined as electromagnetic waves of frequencies between 10 Kc/s and 3000000 Mc/s. The lower limit was dropped in subsequent international radio regulations. More recently there have been proposals to raise the upper limit.

As a matter of physics, many objects and actions generate low-level, wide-band radiation. The frequency allocation process traditionally has not been concerned with many types of radiation.

Frequency Allocations:

153 to 279 kHz: This is the European Long wave Broadcast band. The channel separation is 9 kHz.

279 to 530 kHz: Most stations heard in this range are aeronautical and marine navigation beacons that continuously repeat their call signs in Morse code. These stations can be found locally, with some DX heard at night. Some RTTY signals are found in the upper end of this band. Marine weather and safety broadcasts, known as NAVTEX, are transmitted on 518 kHz. Your best reception here will be at night, especially during the fall and winter months. The old international distress frequency of 500 kHz is in this band, but it is no longer officially used.

530 to 1600 kHz: This is the Medium wave Broadcast band (also known as the "AM" broadcasting band). The channel separation is 9 kHz in Europe, Africa and Asia, and 10 kHz in the Americas. Many powerful stations in South America use a non-standard frequency step in this band.

1600 to 1710 kHz: In USA the Medium wave Broadcast band now ends at 1700 kHz, with 1610 to 1700 kHz being the new "X" or "extended" band. New stations began appearing here in late 1997, and this new "X band" is providing excellent DX listening opportunities.

1710 to 1800 kHz: This is a "grab bag" of miscellaneous radio communications, mainly beacons and navigation aids. You may hear several transmitters that sound like chirping crickets; these are floating beacons used to mark fishing and offshore oil exploration locations. In Europe you can hear Coastal Radio stations in this band. Best time to listen would be during the nighttime hours. Most two-way communications in this band is USB.

1800 to 2000 kHz: This is the 160-meter ham radio band. Most voice communications will be in LSB and AM with best reception at night during the fall and winter months.

2000 to 2300 kHz: This range is used maritime communications, with 2182 kHz reserved for distress messages and calling (DCS calling: 2187.5 kHz). There are also several regularly scheduled maritime weather broadcasts by Coastal Radio stations. Most activity will be in USB, and best reception is at night. The frequency of 2670 kHz is used by the Coast Guard for informational broadcasts.

2300 to 2495 kHz: This is the 120-meter broadcasting band, mainly used by stations located in the tropics. In North America, this band is also used by government stations. You may also hear illegal marine stations in this band, in USB mode.

2498 to 2850 kHz: More maritime stations are found here, as well as standard time and frequency stations WWV and WWVH on 2500 kHz.

2850 to 3155 kHz: Mainly aeronautical stations in USB use this band. Several stations broadcasts aeronautical weather bulletins, and you can also hear traffic between airports and airplanes aloft.

3150 to 3200 kHz: This range is allocated to fixed stations, with most communications in RTTY.

3200 to 3400 kHz: This is a very interesting segment. This is the 90-meter broadcasting band, used mainly by stations in the tropics. Canadian standard time and frequency station CHU can be heard on 3330 kHz. Best reception will be at night.

3400 to 3500 kHz: This range is used for civil aeronautical communications in USB. Some military stations use this band also, but activity is light. Pirate stations in North America use this band also, the calling frequency being 3475 kHz.

3500 to 3800 kHz: This is the 80-meter ham radio band. The 3500 to 3750 kHz range is used for CW and RTTY communications, and the rest of the band is used for LSB voice.

3800 to 3950 kHz: This range is used for civil aeronautical communications in USB. In North America this is a radio amateur band. Best reception is at night. An interesting frequency on this band is 3950

kHz; it is an active ham radio frequency, the hurricane net during the summer (see also 14325 kHz) but is also used by many European military and government stations.

3950 to 4000 kHz: This is the 75-meter broadcasting band in Europe and Africa. In North America this is a radio amateur band (see the listing for 3800 to 3950 kHz, above). Best reception is at night.

4000 to 4063 kHz: This is a fixed station band, mainly used by military forces for SSB traffic. Many marine operations are also in this band, with simplex operations in USB mode.

4063 to 4438 kHz: This is a large band used for maritime communications in USB, with 4125 kHz being used as a calling/distress frequency.

4438 to 4650 kHz: This range is mainly used for fixed and mobile stations in USB. Many military and government agencies use this band for nighttime command-and-control nets.

4650 to 4750 kHz: This range is used for aeronautical communications in USB. Both military and civilian aircraft use this band, with military traffic centered around 4724 kHz.

4750 to 5060 kHz: This is the 60-meter broadcasting band, used mainly by stations in the tropics. Best reception is in the evening and night hours during the fall and winter. In winter, stations to the east of you begin to fade in an hour or two before your local sunset, and stations to the west of you don't start to fade out until an hour or so after your local sunrise. The frequency 5000 kHz is allocated internationally to standard time and frequency stations.

5060 to 5450 kHz: This range is a real jumble! Several broadcasting stations are found in the lower part of the segment, and fixed and mobile stations in SSB, RTTY, and CW are found throughout this band. Best reception is during the evening and night hours. The new 60-meter ham radio band uses the following frequencies: 5332, 5348, 5368, 5373 and 5405 kHz, with the only allowed mode being USB.

5450 to 5730 kHz: This range is used for aeronautical communications in USB

5730 to 5950 kHz: Another jumble of different stations! For years, this band has been used by fixed stations of the U.S. government for communications in USB and RTTY. However, several broadcasters are also showing up here, many from Central and South America.

5950 to 6295 kHz: This is the 49-meter broadcasting band, and is loaded with signals from late afternoon to a couple of hours after your local sunrise. Some marine stations also use this band.

6295 to 6525 kHz: This is a very busy band for maritime communication in USB and various FSK modes like AMTOR and FEC.

6525 to 6765 kHz: This is another busy band, this time for aeronautical communications in USB. Best reception is during the evening and night hours.

6765 to 7000 kHz: This segment is allocated to fixed stations, with signals in SSB, CW, FAX modes, and miscellaneous digital modes.

7000 to 7100 kHz: The 7000 to 7100 kHz range is allocated exclusively to ham radio worldwide, although an occasional broadcaster will show up here. Hams use CW and RTTY from 7000 to 7040 kHz, and mainly LSB from 7040 to 7100 kHz. Best reception is from the late afternoon to early morning, although some hams can usually be heard here around the clock.

7100 to 7350 kHz: The 7100 to 7300 kHz range is allocated exclusively to ham radio in North and South America, but is the 41-meter broadcasting band in the rest of the world. Best reception is from the late afternoon to early morning, although some stations can usually be heard here around the clock.

7350 to 8195 kHz: Fixed stations mainly use this segment, although several broadcasters can be found in the lower reaches. Various FSK and digital modes are used. Pirate stations, similar to those found in the 6900 to 7000 kHz range, also use this segment, with activity centered around 7415 and 7475 kHz.

8195 to 8815 kHz: This is a busy maritime band from the late afternoon until early morning, with most traffic in USB and FSK modes. Distress calls and beacons from lifeboats are found at 8364 kHz.

8815 to 9040 kHz: This is another aeronautical communications band, with traffic in USB. Several stations broadcast aeronautical weather reports. Military "SKYKING" broadcasts can also be heard in this band, with most of the stations around 8992 kHz.

9040 to 9400 kHz: This range is used mainly by fixed station in various FSK and digital modes, but several international broadcasters also use it.

9400 to 9900 kHz: This is the 31-meter international broadcasting band, and is packed with stations from around the world. Best reception is usually from mid-afternoon to around mid-morning, although some stations can be heard here throughout the day, especially in winter.

9900 to 9995 kHz: Several international broadcasters use this range along with fixed stations using FSK modes.

9995 to 10005 kHz: This is set aside for standard time and frequency stations, like WWV and WWVH on 10000 kHz.

10005 to 10100 kHz: This range is used for civil aeronautical communications.

10100 to 10150 kHz: This is the 30-meter ham radio band. Because it is so narrow, operation here is restricted to CW and RTTY, with lower power outputs. Fixed stations also use this band from time to time, using many different FSK modes.

10150 to 11170 kHz: Fixed stations use this segment. In addition to various FSK and digital modes, you may hear several international broadcast stations being relayed in SSB. These "feeder" stations are used to send programming to relay sites not served by satellite downlinks.

11170 to 11400 kHz: This range is used for aeronautical communications in USB. The most popular HF monitoring target, the USAF global-high frequency network common frequency of 11175, is used day and night.

11400 to 11650 kHz: Fixed stations in FSK and digital modes mainly use this segment, but some international broadcasters also operate here.

11600 to 12100 kHz: This is the 25-meter international broadcasting band. You can usually hear several stations here no matter what time of day you listen.

12100 to 12330 kHz: Fixed stations in FSK and digital modes primarily use this band, although several international broadcasters are found in the lower area.

12330 to 13200 kHz: This is a busy maritime communications band during the day and evening hours, with traffic in USB and various FSK modes. Military EAM broadcasts are on 13155 kHz. (Supplementary to the USAF common frequency of 11175 kHz).

13200 to 13360 kHz: Aeronautical communications in USB are heard here during the day and evening.

13360 to 13570 kHz: Fixed stations, mainly in FSK and digital modes use this range.

13570 to 13870 kHz: This is the 22-meter international broadcasting band, with best reception generally during the daytime and early evening.

13870 to 14000 kHz: Fixed stations use this range, with most communications in FSK modes.

14000 to 14350 kHz: This is the 20-meter ham radio band. The lowest 100 kHz is reserved for CW and RTTY use, with USB popular in the rest of the band. Best reception is during the daytime and early evening. This is the most popular HF ham radio band, with stations day and night. Frequencies around 14175 to 14275 kHz are the highly active "DX" frequencies.

14350 to 14490 kHz: Fixed stations, primarily in FSK and digital modes use this segment.

14990 to 15010 kHz: This is reserved for standard time and frequency stations; with the best-heard being WWV and WWVH on 15000 kHz.

15010 to 15100 kHz: This range is for military aeronautical communications in USB, although a few international broadcasters do show up here.

15100 to 15800 kHz: This is the 19-meter international broadcasting band, and it is usually packed with signals during the daytime and early evening.

15800 to 16460 kHz: Fixed stations in USB, FSK modes, and digital modes use this band. Because this is such a large band and activity is pretty light, many military and government stations from all around the world can be found in this band, using anything from voice in USB to advanced digital modes.

16460 to 17360 kHz: This range is shared between maritime and fixed stations using USB, FSK modes, and digital modes. Best reception here is generally during the daytime.

17360 to 17480 kHz: Aeronautical and fixed stations using USB, FSK modes, and digital modes share the range.

17480 to 17900 kHz: This is the 16-meter international broadcasting band, and best reception is usually during the daylight hours.

17900 to 18030 kHz: This band is used for aeronautical communications in USB.

18030 to 18068 kHz: Fixed stations, mainly in FSK and digital modes use this range.

18068 to 18168 kHz: This is the 17-meter ham radio band, where CW, RTTY, and USB are used.

18168 to 18900 kHz: Fixed stations, with a few maritime stations also found here use this large band. Most traffic is in FSK and digital modes. Reception in this range will usually be limited to daylight hours. Many marine stations also use USB in this section.

18900 to 19020 kHz: This is the 19-meter international broadcasting band.

19020 to 19990 kHz: Fixed stations, with a few maritime stations also found here use this large band. Most traffic is in FSK and digital modes.

19990 to 20010 kHz: This segment is reserved for standard time and frequency stations like WWV on 20000 kHz. Reception here is usually possible only in daytime.

20010 to 21000 kHz: Fixed stations and a few aeronautical stations mainly use this range. Most traffic is in FSK and digital modes as well as USB.

21000 to 21450 kHz: This is the 15-meter amateur band. CW and RTTY is mainly found in the first 200 kHz, and USB is used in the rest of the band. Best reception here is in the daytime hours.

21450 to 21850 kHz: This is the 13-meter international broadcasting band, with best reception during the daytime.

21850 to 21870 kHz: Fixed service in FSK and digital modes as well as USB use this band...

21870 to 22000 kHz: This band is used for civil aeronautical communications in USB.

22000 to 22855 kHz: This range is reserved for maritime communications in USB and FSK modes. Best reception is in daytime during years of high sunspot activity.

22855 to 23200 kHz: Fixed stations, mainly in FSK and digital modes use this band.

23200 to 23350 kHz: This band is used for civil aeronautical communications in USB.

23350 to 24890 kHz: Fixed stations in FSK and digital modes use this segment.

24890 to 24990 kHz: This is the 12-meter ham radio band, used for CW, FSK, and USB work. Reception is usually limited to the daytime during years of high sunspot activity.

24990 to 25010 kHz: This range is for standard time and frequency stations, although none are currently operating here.

25010 to 25550 kHz: This band is also allocated for maritime stations in USB, but it is only active during the summer days in periods of high sunspot activity.

25550 to 25670 kHz: This region is reserved for radio astronomy and is usually free of stations, with a few pirate CB stations showing up from time to time in AM and SSB mode.

25670 to 26100 kHz: This is the 11-meter international broadcasting band. Reception is usually possible only in daytime during years of high sunspot activity.

26100 to 26965 kHz: This band is allocated to low-powered beacon and remote broadcast pickup stations operating in FM mode, as well as military and government users. This band is filled with pirate stations operating illegally modified CB equipment, with activity found near 26715, 26885 and 26915 kHz. Mode is usually AM, but some SSB is also heard.

26965 to 27405 kHz: This is the legal citizens band; the channel separation is 10 kHz, with few channels skipped for telemetry and remote control. AM and SSB are used in North America, while FM is authorized in Europe and most of the rest of the world. Channel 9, or 27065 kHz, is for emergency communications only, but it is however, usually being jammed. The CB band is incredibly congested, so many stations around the 27 MHz band use illegal amplifiers to get larger range, but therefore they jam the channel for miles.

27405 to 28000 kHz: This band is allocated to military and government users, but there are many pirate two-way stations that can also be found in this area, with the most active frequencies being 27495 and 27555 kHz. USB and AM are mainly used, but FM can also be heard. Listen for activity from early morning to late-afternoon during the summer months. In years of high sunspot activity, stations from around the world can be heard on this band day and night.

28000 to 29700 kHz: This is the 10-meter ham radio band. Most activity is in USB from 28300 to 28600 kHz, with FM used in the range 29510 - 29700 kHz (the FM calling frequency is 29600 kHz). It is possible to receive amateur radio satellites between 29300 and 29510 kHz. Best reception is during daytime in years of high sunspot activity or during a sporadic-E propagation opening. There is also a significant amount of AM being used in this band also. This band is used for local ham communications all year round, with some FM repeaters above 29605 kHz in major metro areas.

29700 to 30000 kHz: In North America, this band is allocated to low powered fixed and mobile stations, operating in AM or FM mode. Civilian land mobile radio stations can be found at 29710, 29730, 29750 and 29770 kHz, using FM mode. In times of high sunspot activity, stations from around the world can be heard in this band (many using SSB). Because this range is so close to the VHF-low band, it is used for pretty much everything and you can hear everything when the sunspots are high.

30 to 50 MHz: This is known as the "VHF low" band. Most transmissions will be in narrow band FM with channels spaced at 20 kHz intervals. A wide variety of stations can be heard on this range, including businesses, federal, state, and local governments, law enforcement agencies, and various industrial radio services.

50 to 54 MHz: This is the 6 - meter ham radio band. The first megahertz is mainly used for USB, AM, CW, FSK modes, digital modes. The remainder of the band is used for narrow band FM, both simplex and through repeaters. 52.525 MHz is widely used as a simplex and calling frequency.

54 to 72 MHz: Television channels 2, 3, and 4 are located in this range. The video portions will sound like distorted noise on a scanner. The audio portions are in FM, but will sound "clipped" and "tinny" unless your scanner can tune this range in wide band.

72 to 76 MHz: This range is used for remote control signals for model airplanes and garage door openers, wireless microphones (including those used by law enforcement agencies), and two-way communications inside factories, warehouses, and other industrial facilities. Most channels are spaced at 20 kHz intervals.

76 to 88 MHz: This range is used for television channels 5 and 6.

88 to 108 MHz: This is where the FM broadcasting band is located.

108 to 136 MHz: This band is used for civilian aeronautical communications and all transmissions are in AM. Aeronautical beacons occupy 108 to 118 MHz; these continuously transmit a station identification and are used for navigation. The rest of the band is used for traffic between aircraft and air traffic control towers on channels spaced at 25 kHz intervals.

136 to 138 MHz: This segment is mainly used by weather satellites to transmit photographic images.

138 to 144 MHz: The various military services are the biggest users of this segment in the United States, with most transmissions in narrow band FM and spaced at 5 kHz intervals. You can also hear ham radio operators who are members of the military affiliate radio service (MARS).

144 to 148 MHz: This is the 2 - meter ham radio band. This is the most heavily used ham radio band. USB and various FSK modes are mainly used in the first 500 kHz, and the rest of the band is FM. Most activity is through repeaters, although simplex activity is found on frequencies like 146.52 MHz.

148 to 150.8 MHz: The usage here is similar to the 138 to 144 MHz range.

150.8 to 174 MHz: This is known as the "VHF high" band, and it is used by the same wide spectrum of users as the 30 to 50 MHz band.

174 to 216 MHz: This range is used for television channels 7 through 13.

216 to 220 MHz: In the United States, this band is used by the automated maritime telecommunication system (AMTS) used on major inland waterways such as the Great Lakes and the Mississippi river. Communications are in FM on channels spaced at 12.5 kHz intervals. However, the 219 to 220 MHz range is shared with ham radio. On this range, ham stations can be used to relay digital messages to other hams, subject to a maximum power of 50 watts. Hams must first register to use their shared allocation, and cannot use it within range of maritime users.

220 to 222 MHz: This range was reallocated a few years ago from ham radio to land mobile radio. Frequency usage and modulation have not yet been finalized, although new narrow bandwidth modes are expected to be used.

222 to 225 MHz: This is the 1.25-meter ham radio band. It is mainly used for FM communication through repeaters, although it is much less heavily used than the two - meter band.

225 to 400 MHz: This very wide band is used for military aviation communications in AM. Most channels are 100 kHz apart.

400 to 406 MHz: This range is used primarily by government and military stations in FM.

406 to 420 MHz: In the United States, this band is used exclusively by the federal government. All transmissions are in FM, with most channels spaced at 25 kHz intervals.

420 to 450 MHz: This is the 70-centimeter ham radio band, second in popularity to the two-meter band on VHF/UHF. The 420 to 444 MHz range is used for USB, digital modes, ham television, and ham communications satellites. The 444 to 450 MHz range is used for FM, mainly in conjunction with repeaters.

450 to 470 MHz: This is the "UHF" band on most scanners, used for many of the same purposes as the 30 to 50 and 150.8 to 174 MHz bands.

470 to 512 MHz: This is known as the "UHF-T" band, and covers the same frequency range as television channels 14 to 20. This band is used for many of the same purposes as the "UHF" band in areas of the country without television stations on those channels.

512 to 825 MHz: This range is where television channels 21 through 72 are located.

825 to 849 MHz: This range is used for cellular telephone service, with cellular units transmitting here. Listening in this range is prohibited.

849 to 851 MHz: This band is used to provide telephone service from aircraft in flight. SSB is generally used here. Listening in this range is prohibited.

851 to 866 MHz: This is used by many of the same users as the 450 to 470 MHz band, with channels spaced at 25 kHz intervals.

866 to 869 MHz: This allocation is used by public safety and law enforcement agencies.

869 to 894 MHz: This range is used for cellular telephone service, with cells transmitting here. Listening in this range is prohibited.

894 MHz and above: These higher frequencies are where new communications technologies, such as wireless local area networks, spread spectrum telephony, and direct satellite broadcasting are being implemented.

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WHO INVENTED (?

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A standard dictionary defines the telephone as "an apparatus for reproducing sound, especially that of the voice, at a great distance, by means of electricity; consisting of transmitting and receiving instruments connected by a line or wire which conveys the electric current." Electricity operates the telephone and it carries your voice.

Telephone history begins at the start of human history. Man has always wanted to communicate from afar. People have used smoke signals, mirrors, jungle drums, carrier pigeons and semaphores to get a message from one point to another. But a phone was something new. Some say Francis Bacon predicted the telephone in 1627, however, his book New Utopia only described a long speaking tube. A real telephone could not be invented until the electrical age began. And even then it didn't seem desirable. The electrical principles needed to build a telephone were known in 1831 but it wasn't until 1854 that Bourseul suggested transmitting speech electrically. And it wasn't until 22 years later in 1876 that the idea became a reality. But before then, a telephone might have been impossible to form in one's consciousness.

Telephone comes from the Greek word tele, meaning from afar, and phones, meaning voice or voiced sound. Generally, a telephone is any device which conveys sound over a distance.

While Da Vinci predicted flight and Jules Verne envisioned space travel, people did not lie awake through the centuries dreaming of making a call. How could they? With little knowledge of electricity, let alone the idea that it could carry a conversation, how could people dream of a telephonic future? Who in the fifteenth century might have imagined a pay phone on the street corner or a fax machine on their desk? You didn't have then, an easily visualized goal among people like powered flight, resulting in one inventor after another working through the years to realize a common goal. Telephone development instead was a series of often-disconnected events, mostly electrical, some accidental, that made the telephone possible.

Alexander Graham Bell was born in 1847 in Edinburgh, Scotland. He moved to Ontario, and then to the United States, settling in Boston, before beginning his career as an inventor. Throughout his life, Bell had been interested in the education of deaf people.

On March 10, 1876, in Boston, Massachusetts, Alexander Graham Bell invented the telephone. Thomas Watson fashioned the device itself; a crude thing made of a wooden stand, a funnel, a cup of acid, and some copper wire. But these simple parts and the equally simple first telephone call -- "Mr. Watson, come here, I want you!" -- belie a complicated past. Bell filed his application just hours before his competitor, Elisha Gray, filed notice to soon patent a telephone himself. What's more, though neither man had actually built a working telephone, Bell made his telephone operate three weeks later using ideas outlined in Gray's Notice of Invention, methods Bell did not propose in his own patent. News of his invention quickly spread throughout the country, even throughout Europe. By 1878

Bell had set up the first telephone exchange in New Haven, Connecticut. By 1884, long distance connections were made between Boston, Massachusetts and New York City

In 1729 English chemist Stephen Gray transmitted electricity over a wire. He sent charges nearly 300 feet over brass wire and moistened thread. An electrostatic generator powered his experiments, one charge at a time. A few years later, Dutchman Pieter van Musschenbroek and German Ewald Georg von Kleist in 1746 independently developed the Leyden jar, a sort of battery or condenser for storing static electricity. Named for its Holland City of invention, the jar was a glass bottle lined inside and out with tin or lead. The glass sandwiched between the metal sheets stored electricity; a strong charge could be kept for a few days and transported. Over the years these jars were used in countless experiments, lectures, and demonstrations.

In 1753 an anonymous writer, possibly physician Charles Morrison, suggested in The Scot's Magazine that electricity might transmit messages. He thought up a scheme using separate wires to represent each letter. An electrostatic generator, he posited, could electrify each line in turn, attracting a bit of paper by static charge on the other end. By

noting which paper letters were attracted one might spell out a message. Needing wires by the dozen, signals got transmitted a mile or two. People labored with telegraphs like this for many decades. Experiments continued slowly until 1800. Many inventors worked alone, misunderstood earlier discoveries, or spent time producing results already achieved. Poor equipment didn't help either.

In 1800 Alessandro Volta produced the first battery. A major development, Volta's battery provided sustained low powered electric current at high cost. Chemically based, as all batteries are, the battery improved quickly and became the electrical source for further experimenting. But while batteries got more reliable, they still couldn't produce the power needed to work machinery, light cities, or provide heat. And although batteries would work telegraph and telephone systems, and still do, transmitting speech required understanding two related elements, namely, electricity and magnetism.

In 1820 Danish physicist Christian Oersted discovered electromagnetism, the critical idea needed to develop electrical power and to communicate. In a famous experiment at his University of Copenhagen classroom, Oersted pushed a compass under a live electric wire. This caused its needle to turn from pointing north, as if acted on by a larger magnet. Oersted discovered that an electric current creates a magnetic field. But could a magnetic field create electricity? If so, a new source of power beckoned. And the principle of electromagnetism, if fully understood and applied, promised a new era of communication

In 1821 Michael Faraday reversed Oersted's experiment and in so doing discovered induction. He got a weak current to flow in a wire revolving around a permanent magnet. In other words, a magnetic field caused or induced an electric current to flow in a nearby wire. In so doing, Faraday had built the world's first electric generator. Mechanical energy could now be converted to electrical energy.

Elisha Gray, "American inventor, who contested the invention of the telephone with Alexander Graham Bell. He was born in Barnesville, Ohio, on Aug. 2, 1835, and was brought up on a farm. He had to leave school early because of the death of his father, but later completed preparatory school and two years at Oberlin College while supporting himself as a carpenter. At college he became fascinated by electricity, and in 1867 he received a patent for an improved telegraph relay. During the rest of his life he was granted patents on about 70 other inventions, including the telautograph (1888), an electrical device for reproducing writing at a distance.

On Feb. 14, 1876, Gray filed with the U.S. Patent Office a caveat (an announcement of an invention he expected soon to patent) describing apparatus 'for transmitting vocal sounds telegraphically.' Unknown to Gray, Bell had only two hours earlier applied for an actual patent on an apparatus to accomplish the same end.

It was later discovered, however, that the apparatus described in Gray's caveat would have worked, while that in Bell's patent would not have. After years of litigation, Bell was legally named the inventor of the telephone, although to many the question of who should be credited with the invention remained debatable.

In 1872, Gray founded the Western Electric Manufacturing Company, parent firm of the present Western Electric Company. Two years later he retired to continue independent research and invention and to teach at Oberlin College. He died in Newtonville, Mass., on Jan. 21, 1901."

Antonio musi born in 1808, was a technician. In 1830 he found that electricity can flow in copper wires. While he was in Cuba island, used few copper wires and metal cans to communicate with his paralyzed wife in next room. He named this invention as 'teletetraphone', and same is exhibited in 1860 in New York. He could not patent rights for his invention due to poverty. Graham Bell worked with Antonio Musi and declared that he has done research and invented telephone by him, and managed to get patented. Antonio Musi filed a case against Bell, before his case came to hearing Antonio Musi dead in 1889.

Mahesh Kulkarni – VU3EDA ; maheshnet@ yahoo.com

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Museum of Amateur Radio and Archive.

de Manohar "Arasu" VU2UR

We have in India, many amateur radio clubs, in the various cities. They serve a limited number of amateurs of their region, in various activities like, publication of periodical, organising field days, contests, fox-hunting etc., But, almost none have their immovable assets, as they do not have funds.

The National Society, that is Amateur Radio Society of India, is the recognised society by the International Amateur Radio Union- Region 3. Even this National Society, is not having its own building, a regular club station, space reserved for trainings, conference halls etc.,. Thus, it has to arrange programmes in hired premises. There are no activities possible for maintaining a library, a workshop, a museum or an archive etc.,

Though the number of licenced amateur radio operators in India, is in the five figures, the number of VU hams, who have achieved distinction in the International Arena, for their designing capabilities, achievements and contesting, can be counted on the finger tips of one hand. The ratio of the number of amateur licences to the total population is itself, negligible. Then, the ratio of active amateurs to those who are totally licenced, is a dismal figure. Finally among the active amateurs, those who have achieved world class, may be two or three only. This is a very scaring data.

There is now, an awareness about amateur radio and its great help in the field of disaster communications etc.,.But, the peaceful uses of amateur radio, at other times, is mostly spent by many operators in signing their presence in various "nets" and soliciting QSOs with their fast friends only. You may hardly find an amateur going after something of a serious pursuit, like Honour Roll in each of DXCC, IOTA, RDA, JCC, JCG, etc.,.

Many clubs and individuals are taking pride in telling they have taught amateur radio to hundreds, and made many of them come on the air. Please take a look at all those statements. How many amateurs who got their tickets during their college days, are active today, after they became professionals?

Again, a dismal figure. What is lacking in motivating those who have tickets to be active? This is a tough question to answer. Is the saying "Lives of great men all remind us, we can make our lives sublime..." etc, leads us anywhere? It may, only if there is a museum or archive to inspire the new comers and those inactive amateurs as well.

As NIAR, is the leading organisation in India, with its own vast building complex, it can think of opening a museum or archive of rare QSLs, Prizes, Awards, Certificates etc., which can be preserved, kept for exhibition etc., This is a yeoman service to amateur radio. Famous VU amateurs of world class, have already become "silent keys". As an example, Late Dady Major VU2MD, was a pure CW enthusiast.

He had worked most of the rare countries with his G5RV antenna. He became a silent key, falling short of a few confirmations to DXCC Honour Roll.

He was an award hunter too. what happened to all the QSLs and awards he had.? The QSL Collection of Late Leslie King VU2AK, is worth a place in a museum. The various, achievement awards and contest certificates of Late B.S.Dutt VU2AJ, who earned his last JARL AA Contest certificate, at the ripe age of 88, are great examples for the posterity. Late VU2STZ of Nadiad, had the only ARRL award of appreciation in his amateur services during the Morvi dam disaster in Gujarat. Is it not a great piece of paper for exhibiting ???

Most of the above amateurs did not have, a child equally interested in amateur radio. The result is that all those rare achievement awards and certificates, might have gone to some "raddiwaala". I am extremely pained, if it has happened that way.

The only award that has a cumulative effect of the good amateur radio working, is the "A-1 Operator" certificate of ARRL. VU2AJ was one of them. There are a couple of living A-1 operators of whom, we should be proud of, like OM Rao VU2RM, OM Suhas VU2SMN etc.,. There are a few present day amateurs, who have earned "the ham of the year" type award, like YL Bharathi VU2RBI for her work from Andaman, during the earthquake and Tsunami, etc.,.are to be housed in the museum.

I request the NIAR Suriji, to take this writeup seriously, and make some space reserved in their building complex, in this "silver jubilee year of NIAR", for a "museum and archive of amateur radio" to house early transmitters, receivers built, awards won, certificates earned and many more.

NIAR should contact the families of the above amateurs, who are no more, and investigate the possibility of obtaining all these papers and other materials, for the museum. Like-wise, among the living greats, I request them to bequeath/present all their amateur radio regalia, to the museum after they become silent key, through a "will" or instructions to their family members. I hope many of my senior citizen amateurs join me in support.

73, all the very best to NIAR in the "Silver Jubilee Celebrations"

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INDIAN INSTITUTE OF HAMS, VU2IIH
WELL ESTABLISHED INSTITUTION IN STATE OF KARNATAKA

Indian Institute of Hams, VU2IIH is registered Trust located at Sree Kanteerava Outdoor Stadium, Bangalore with full fledged radio station and training center which is functioning under the Chairmanship of Commissioner for Youth Services and Sports, Government of Karnataka under the affiliation to National Institute of Amateur Radio Hyderabad. Place for IIH is honoured by Department of Youth Services and Sports, Government of Karnataka.

Institute started in 1992 actively promoting amateur radio especially in the State of Karnataka. IIH conducted number of training programs for interested aspirants and brought more than 1600 ham licenses to Karnataka, especially Bangalore. IIH conducted no. workshops, field days, fox hunts, Quiz on Air for High schools, conventions, exhibitions, painting competition, essay writing and such other connected programmes. IIH meets all the Hams and SWLs on last Sunday of every month at 10 am to discuss the developmental and promotional activities. Large no of Hams and SWLs participate and interact.

IIH has brought out two Call books (Directory of Amateur Radio Operators in India) during 2000 and 2005. IIH has attended many

National seminars and conventions. International Convention at Germany, Friedrichshafen was represent by Sri S.Sathyapal, VU2FI during 2005 sponsored by NIAR.

IIH got two National Rajiv Gandhi Awards during 1995 and 1996 for the best promotion of Amateur Radio activities and during 1997 Rajiv Gandhi Award was awarded to VU2IU for bring out indigenous VHF repeater (145.200 +shift) which is established and functioning at Bangalore. Institute is well recognized and popular amongst the educational institutions and NGOs in Karnataka.

IIH has dedicated team of volunteers who can swung into action for any Natural Calamities, we have extended communication support during Orissa Super Cyclone, Gujarat Earthquake and Tsunami. We are now equipped with equipments at least to adopt one district for providing any emergency communication.

IIH is extending communication support to Sporting events specially motor Sports involving new budding hams.

IIH wishes Shri S.Surigaru, VU2MY for completing 25 years of milestone in useful movement for popularizing and bringing world class institution for Hams "National Institute of Amateur Radio, Hyderabad". We extend all our support in further movement of popularizing and promoting this wonderful scientific hobby and stand as a voluntary communication force during National Disaster for our Nation.

73,

S. Sathyapal, VU2FI
Director,
www.indianhams.com

Antennas & Propagation

By, G Akshay Raj

Before I explain about Antennas and its Propagation, let me briefly explain you about three main concepts used in the antenna.

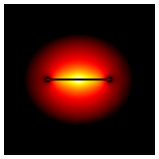
Well it goes like this; the main things are as follows:

I. Radio Energy
II. Frequency
III. Directionality

I. Radio Energy:

☐ A magnetic field forms around a magnet. An electrostatic field might form around your body when you shuffle your feet across a rug in the winter.

☐ When a magnetic field cuts across a wire, it generates a bit of electricity. An electrostatic field can also generate a bit of current in a wire. Radio waves are composed of alternating magnetic and electrostatic fields. When AC voltage, such as that in your house wiring, is fed into a sufficiently long wire, alternating current and voltage in the wire turns into alternating magnetic and electrostatic fields --- radio waves! Likewise, any wire intercepting the radio wave will generate a bit of electricity at the same frequency as the original alternating current and voltage.



II. Frequency:

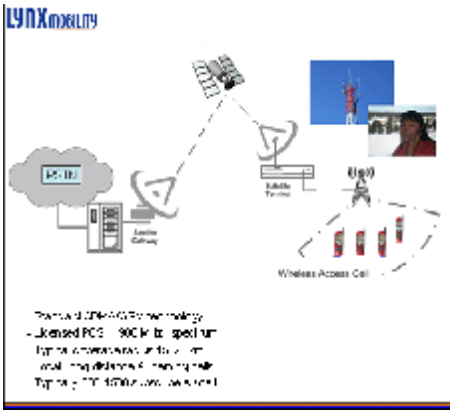
The frequencies in the radio transmissions are done in HERTZ to GIGA-HERTZ, the different types are pre adjusted in a particular device, these frequencies are known as Channels. The frequency of an antenna is rated by its length; The following are the different types of pre-set channels.

Channel #	Frequency	Ant Length Inch	Length CM
Channel 2	(54-60 MHz)	102'	259
Channel 3	(60-66)	92'	234
Channel 4	(66-72)	83'	211
Channel 6	(82-88)	72'	183
FM	(88-108)	57'	145
Channel 7	(174-180)	32'	81
Channel 8	(180-186)	31'	79
Channel 9	(186-192)	30'	76
Channel 10	(192-198)	29'	74
Channel 11	(198-204)	28'	71
Channel 12	(204-210)	27'	69
Channel 13	(210-216)	26'	66
Channel 14	(470 Mhz+ 6 MHz each add'l ch.)	12'	30
Channel 69	(794)	7'	18

Frequency Chart

III. Directionality:

The direction of transmission or receiving an signal depends up on the type of the antenna. For example if you take an Dish antenna or a satellite antenna the direction of it should always directing towards the position of the satellite. The diagrambelow will show to the detail picture of the example.



What is an antenna?

An antenna is a transducer designed to transmit or receive electromagnetic waves. In other words, antennas convert electromagnetic waves into electrical currents and vice versa. Antennas are used in systems such as radio and television broadcasting, point-to-point radio communication, wireless LAN, radar, and space exploration. Antennas usually work in air or outer space, but can also be operated under water or even through soil and rock at certain frequencies for short distances.

Physically, an antenna is an arrangement of conductors that generate a radiating electromagnetic field in response to an applied alternating voltage and the associated alternating electric current, or can be placed in an electromagnetic field so that the field will induce an alternating current in the antenna and a voltage between its terminals. Some antenna devices (parabolic antenna, Horn Antenna) just adapt the free space to another type of antenna.

Terminology:

The words *antenna* (plural: *antennas*[1]) and "aerial" are used interchangeably; but usually a rigid metallic structure is termed an antenna and a wire format is called an aerial. In the United Kingdom and other British English speaking areas the term aerial is more common, even for rigid types. The noun *aerial* is occasionally written with a diaresis mark — *aërial* — in recognition of the original spelling of the adjective *aërial* from which the noun is derived.

The origin of the word *antenna* relative to wireless apparatus is attributed to Guglielmo Marconi. In 1895, while testing early radio apparatus in the Swiss Alps at Salvan, Switzerland in the Mont Blanc region, Marconi experimented with early wireless equipment. A 2.5 meter long pole, along which was carried a wire, was used as a radiating and receiving aerial element. In Italian a tent pole is known as *l'antenna centrale,* and the pole with a wire alongside it used as an aerial was simply called *l'antenna.* Until then wireless radiating transmitting and receiving elements were known simply as aerials or terminals. Marconi's use of the word *antenna* (Italian for *pole*) would become a popular term for what today is uniformly known as the *antenna*.

A Hertzian antenna is a set of terminals that does not require the presence of a ground for its operation (versus a Tesla antenna which is grounded.) A loaded antenna is an active antenna having an elongated portion of appreciable electrical length and having additional inductance or capacitance directly in series or shunt with the elongated portion so as to modify the standing wave pattern existing along the portion or to change the effective electrical length of the portion. An antenna grounding structure is a structure for establishing a reference potential level for operating the active antenna. It can be any structure closely associated with (or acting as) the ground which is connected to the terminal of the signal receiver or source opposing the active antenna terminal, (i.e., the signal receiver or source is interposed between the active antenna and this structure

Overview:

Antennas have practical uses for the transmission and reception of radio frequency signals (radio, TV, etc.). In air, those signals travel close to the speed of light in vacuum and with a very low transmission loss. The signals are absorbed when propagating through more conducting materials, such as concrete walls, rock, etc. When encountering an interface, the waves are partially reflected and partially transmitted through.

The vast majority of antennas are simple vertical rods a quarter of a wavelength long. Such antennas are simple in construction, usually inexpensive, and both radiate in and receive from all horizontal directions (omnidirectional). One limitation of this antenna is that it does not radiate or receive in the direction in which the rod points. This region is called the antenna blind cone or null.

There are two fundamental types of antennas, which, with reference to a specific three dimensional (usually horizontal or vertical) plane are either:

1. **Omni-directional (radiates equally in all directions), such as a vertical rod or**
2. **Directional (radiates more in one direction than in the other).**

In colloquial usage omni-directional usually refers to all horizontal directions with reception above and below the antenna being reduced in favor of better reception (and thus range) in other directions. Also directional antennas are usually meant to refer to one targeting a single specific direction such as a telescope, satellite dish, or possibly a 120° horizontal reception and transmission area.

All antennas radiate some energy in all directions in free space but careful construction results in substantial transmission of energy in a preferred direction and negligible energy radiated in other directions.

By adding additional conducting rods or coils (called *elements*) and varying their length, spacing, and orientation (or changing the direction of the antenna beam), an antenna with specific desired properties can be created, such as a Yagi-Uda Antenna (often abbreviated to "Yagi").

An antenna array is two or more antennas coupled to a common source or load to produce a specific directional radiation pattern. The spatial relationship between individual antennas contributes to the directivity of the antenna.

The term active element is intended to describe an element whose energy output is modified due to the presence of a source of energy in the element (other than the mere signal energy which passes through the circuit) or an element in which the energy output from a source of energy is controlled by the signal input.

An antenna lead-in is the medium, for example, a transmission line or feed line for conveying the signal energy between the signal source or receiver and the antenna. The antenna feed refers to the components between the antenna and an amplifier.

An antenna counterpoise is a structure of conductive material most closely associated with ground that may be insulated from or capacitively coupled to the natural ground. It aids in the function of the natural ground, particularly where variations (or limitations) of the characteristics of the natural ground interfere with its proper function. Such structures are usually connected to the terminal of a receiver or source opposite to the antenna terminal.

An antenna component is a portion of the antenna performing a distinct function and limited for use in an antenna, as for example, a reflector, director, or active antenna.

Parasitic elements are usually metallic conductive structures which reradiate into free space impinging electromagnetic radiation coming from or going to the active antenna.

An electromagnetic wave refractor is a structure which is shaped or positioned to delay or accelerate transmitted electromagnetic waves, passing through such structure, an amount which varies over the wave front. The refractor alters the direction of propagation of the waves emitted from the structure with respect to the waves impinging on the structure. It can alternatively bring the wave to a focus or alter the wave front in other ways, such as to convert a spherical wave front to a planar wave front (or vice versa). The velocities of the waves radiated have a component which is in

the same direction (director) or in the opposite direction (reflector) as that of the velocity of the impinging wave.

A director is usually a metallic conductive structure which reradiates into free space impinging electromagnetic radiation coming from or going to the active antenna, the velocity of the reradiated wave having a component in the direction of the velocity of the impinging wave. The director modifies the radiation pattern of the active antenna and there is no significant potential relationship between the active antenna and this conductive structure.

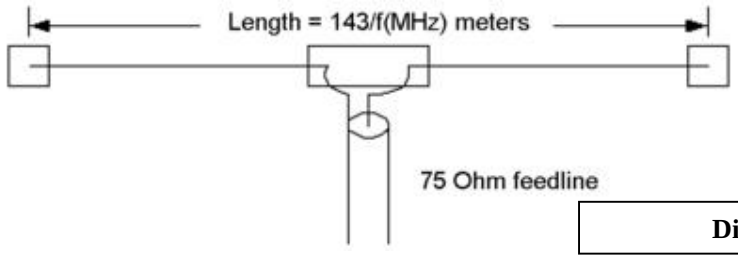
A reflector is usually a metallic conductive structure (e.g., screen, rod or plate) which reradiates back into free space impinging electromagnetic radiation coming from or going to the active antenna. The velocity of the returned wave having a component in a direction opposite to the direction of the velocity of the impinging wave. The reflector modifies the radiation of the active antenna. There is no significant potential relationship between the active antenna and this conductive structure.

An antenna coupling network is a passive network (which may be any combination of a resistive, inductive or capacitive circuit(s)) for transmitting the signal energy between the active antenna and a source (or receiver) of such signal energy.

Typically, antennas are designed to operate in a relatively narrow frequency range. The design criteria for receiving and transmitting antennas differ slightly, but generally an antenna can receive and transmit equally well. This property is called reciprocity.

Basic types of Antennas:

- **The isotropic radiator is a purely theoretical antenna that radiates equally in all directions. It is considered to be a point in space with no dimensions and no mass. This antenna cannot physically exist, but is useful as a theoretical model for comparison with all other antennas. Most antennas' gains are measured with reference to an isotropic radiator, and are rated in dBi (decibels with respect to an isotropic radiator).**
- **The dipole antenna is simply two wires pointed in opposite directions arranged either horizontally or vertically, with one end of each wire connected to the radio and the other end hanging free in space. Since this is the simplest practical antenna, it is also used as reference model for other antennas; gain with respect to a dipole is labeled as dBd. Generally, the dipole is considered to be omnidirectional in the plane perpendicular to the axis of the antenna, but it has deep nulls in the directions of the axis. Variations of the dipole include the folded dipole, the half wave antenna, the ground plane antenna, the whip, and the J-pole.**

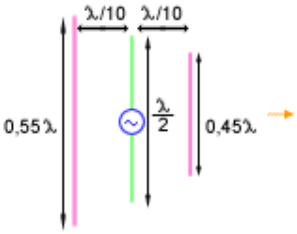


Dipole Antenna

J-Pole antenna (Zepp)

The Whip antenna usually
Seen in an hand-held radios

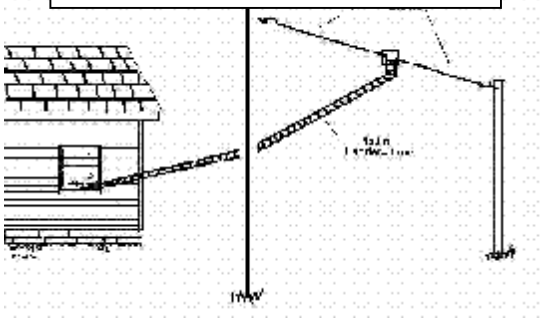
◊ **The Yagi-Uda antenna is a directional variation of the dipole with parasitic elements added with functionality similar to adding a reflector and lenses (directors) to focus a filament light bulb.**

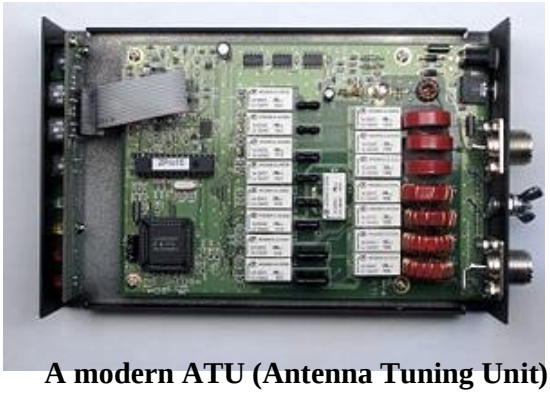


Yagi-Uda Antenna

◊ **The random wire antenna is simply a very long (greater than one wavelength) wire with one end connected to the radio and the other in free space, arranged in any way most convenient for the space available. Folding will reduce effectiveness and make theoretical analysis extremely difficult. (The added length helps more than the folding typically hurts.) Typically, a random wire antenna will also require an antenna tuner, as it might have a random impedance that varies nonlinearly with frequency.**

Random wire antenna





A modern ATU (Antenna Tuning Unit)
for ham operators

◊ **The Horn is used where high gain is needed, the wavelength is short (microwave) and space is not an issue. Horns can be narrow band or wide band, depending on their shape. A horn can be built for any frequency, but horns for lower frequencies are typically impractical.**

Broad-Band Horn Antenna

◊ **Dish antenna (Parabolic antenna)**

The parabolic antenna is a high-gain reflector antenna used for radio, television and data communications, and also for radiolocation (RADAR), on the UHF (Ultra-High Frequency) and SHF (Super High Frequency) parts of the electromagnetic spectrum.

The relatively short wavelength of electromagnetic (radio) energy at these frequencies allows reasonably sized reflectors to exhibit the very desirable highly directional response for both receiving and transmitting.

A typical parabolic antenna consists of a parabolic reflector illuminated by a small feed antenna.

The reflector is a metallic surface formed into a paraboloid of revolution and (usually) truncated in a circular rim that forms the diameter of the antenna. This paraboloid possesses a distinct focal point by virtue of having the reflective property of parabolas in that a point light source at this focus produces a parallel light beam aligned with the axis of revolution.

A steel amateur radio antenna mast

The feed antenna is placed at the reflector focus. This antenna is typically a low-gain type such as a half-wave dipole or a small waveguide horn. In more complex designs, such as the Cassegrain antenna, a sub-reflector is used to direct the energy into the parabolic reflector from a feed antenna located away from the primary focal point. The feed antenna is connected to the associated radio-frequency (RF) transmitting or receiving equipment by means of a coaxial cable transmission line or hollow waveguide.

<u>Amateur-Radio</u>:

Amateur radio, often called ham radio, is both a hobby and a service in which participants, called "hams," use various types of radio communications equipment to communicate with other radio amateurs for public service, recreation and self-training.

The term "amateur" is not a reflection on the skills of the participants, which are often quite advanced; rather, "amateur" indicates that amateur radio communications are not allowed to be made for commercial or money-making purposes.

<u>History</u>:

Though its origins can be traced to at least the late 1800s, amateur radio, as practiced today, did not begin until the early 1900s. The first listing of amateur radio stations is contained in the *First Annual Official Wireless Blue Book of the Wireless Association of America* in 1909.This first radio call book lists wireless telegraph stations in Canada and the United States, including eighty-nine amateur radio stations. As with radio in general, the birth of amateur radio was strongly associated with various amateur experimenters and hobbyists. Throughout its history, amateur radio enthusiasts have made significant contributions to science, engineering, industry, and social services. Research by amateur radio operators has founded new industries, built economies, empowered nations, and saved lives in times of emergency.

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NALGONDA AMATEUR RADIO CLUB WISHING A VERY HAPPY SILVER JUBILEE YEAR TO N.I.A.R. HYDERABAD

WHAT IS LIFE

HAM life is a challenge	**...**	**Meet it.**
Ham life is a Gift	**...**	**Accept it.**
Ham life is a Adventure	**...**	**Dare it.**
Ham life is a Sorrow	**...**	**Overcome it.**
Ham life is a Tragedy	**...**	**Face it.**
Ham life is a Duty	**...**	**Perform it.**
Ham life is a Game	**...**	**Play it.**
Ham life is a Mystery	**...**	**Unfold it.**
Ham life is a Journey	**...**	**Complete it.**
Ham life is a Puzzle	**...**	**Solve it.**
Ham life is a Love	**...**	**Enjoy it.**
Ham life is a Beauty	**...**	**Praise it.**
Ham life is a Goal	**...**	**Achieve it.**

HAM'S WATCH

Dear HAMs watch your thoughts	**-**	**they become words**
Dear HAMs watch your words	**-**	**they become action**
Dear HAMs watch your actions	**-**	**they become habits**
Dear HAMs watch your habits	**-**	**they become charters**
Dear HAMs watch your charters	**-**	**they become destiny**

Success full ham = Trail+Conficence+Belief+Discovery

EACH HAM MAKE A HAM

73's De. Venugopal Rao Naidu, VU3BAO

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With best complements from
Mr. S. B. Ram
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Mr. Nadendla Bhaskara Rao

Former Chief Minister, Andhra Pradesh

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