CHAIRMAN OF THE JOINT CHIEFS OF STAFF INSTRUCTION

Directive current as of 20 December 2007

J-6 CJCSI 6232.01D
DISTRIBUTION: A, B, C, J, S 15 December 2006

LINK-16 SPECTRUM DECONFLICTION

1. Purpose. This instruction implements policy to ensure that use of Link-16 systems, including the Joint Tactical Information Distribution System (JTIDS) and Multifunctional Information Distribution System (MIDS), operates in accordance with the National Telecommunications and Information Administration (NTIA) and US Military Communications-Electronics Board (MCEB) spectrum certification guidance. In particular, that the operation of these systems does not exceed the spectrum certification limits for pulse density identified in Enclosure C. This instruction applies to all units operating JTIDS/MIDS in the proximity of the United States and its Possessions (US&P). This instruction provides the policy, definition, procedures, and organizational responsibilities to manage JTIDS/MIDS use through the control, monitoring, supervision, and management of pulse densities, referred to as pulse deconfliction.

2. Cancellation. CJCSI 6232.01C, 30 June 2004, "Link-16 Spectrum Deconfliction," is canceled.

3. Applicability. This instruction applies to the Military Services, Joint Staff, combatant commands and those activities and agencies reporting to the Chairman of the Joint Chiefs of Staff operating JTIDS/MIDS equipped systems within 200 nautical miles of the coastal US&P. This instruction also applies to US link managers and Deconfliction Authorities (DAs) in their management of Link-16 operations with foreign and/or coalition units within 200 nautical miles of the coastal US&P. Pulse Density limits and deconfliction policies contained in this instruction do not apply during armed conflict or the exercise of self-defense to the extent necessary for US forces and participating foreign and/or coalition forces.

4. Policy

a. JTIDS/MIDS must not cause harmful interference to navigational aids operating in the same frequency band (including Identification Friend or Foe [IFF], Tactical Air Navigation [TACAN] and Distance Measuring Equipment [DME]). JTIDS/MIDS operations must comply with specific frequency assignments granted for specific geographic and/or operational areas. All units operating JTIDS/MIDS are required to comply with the operational and terminal restrictions and requirements contained in Enclosure C. JTIDS/MIDS operations shall be deconflicted:

(1) Within geographic and operational areas, to ensure local pulse densities do not exceed assignment restrictions.

(2) With concurrent operations in adjacent or overlapping geographic areas, to ensure composite pulse density restrictions are not exceeded.

b. Individual units will deconflict operations to ensure compliance with frequency assignment restrictions. If local units are unable to deconflict, the first common commander will perform this function. In cases where no common commander exists or where such coordination is not possible, the Joint Staff/J-6 will serve as the final JTIDS/MIDS DA and will ensure operations comply with the restrictions cited in this instruction.

c. Outside the US&P

(1) JTIDS/MIDS operations within foreign territories shall be coordinated with host nation (HN) forces in accordance with respective combatant command directives and HN frequency spectrum restrictions.

(2) General guidance regarding international frequency clearances may be found in either the JTIDS/MIDS Spectrum Users Guide (https://totn.acc.af.mil), JTIDS/MIDS Multinational Notebook (http://www.jcs.mil/j6/cceb/) or, for the European area, the European JTIDS/MIDS Cross-Boarder Coordination Standard Operating Procedures (no Web site address). These documents can serve as a starting point for understanding international Link 16 frequency clearance restrictions, to include specific country pulse deconfliction requirements, and requesting appropriate clearances to conduct Link-16 operations worldwide.

5. Summary of Changes. This revision clarifies organizational roles, responsibilities, and procedures for conducting deconfliction within the US&P, the entities involved in the process, and the ultimate authorities for making deconfliction decisions. It also reflects the most current restrictions and requirements on JTIDS/MIDS operations based on NTIA/MCEB guidance.

6. Responsibilities. See Enclosure A.

7. Procedures. See Enclosure B.

8. Restrictions & Requirements. See Enclosure C.

9. Definitions. See Glossary.

10. Releasability. This instruction is approved for public release; distribution is unlimited. DOD components (to include the combatant commands), other federal agencies, and the public may obtain copies of this instruction through the Internet from the CJCS Directives Home Page--http://www.dtic.mil/cjcs_directives/index.htm. Copies are also available through the Government Printing Office on the Joint Electronic Library CD-ROM.

11. Effective Date. This instruction is effective upon receipt.

WALTER L. SHARP
Lieutenant General, USA
Director, Joint Staff

Enclosures:
A -- Organizational Responsibilities
B -- Procedures
C -- Restrictions & Requirements
GL -- Glossary

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ENCLOSURE A

ORGANIZATIONAL RESPONSIBILITIES

1. The Joint Staff. The Director for Command, Control, Communications and Computer Systems, Joint Staff/J-6, is assigned primary responsibility for ensuring compliance with pulse deconfliction restrictions. The Joint Staff/J-6 shall:

a. When necessary, specify the JTIDS/MIDS DA for joint or combined JTIDS/MIDS operations.

b. Serve as final DA when deconfliction cannot be achieved at a lower level.

c. Monitor execution of policy to ensure pulse deconfliction restrictions are met by JTIDS/MIDS equipped units.

2. Combatant Commands, Services, and Defense Agencies (C/S/A) shall:

a. Ensure subordinate commands using JTIDS/MIDS terminals have adequate guidance and resources to deconflict operations at the lowest level possible. This includes assignment of user privileges on the JTIDS/MIDS Deconfliction Server (JDS) for use during pre-mission planning (see Enclosure B).

b. Provide policy, guidance, and procedures to coordinate operations with foreign services and/or HN governments whenever those HN governments develop and implement JTIDS/MIDS frequency assignment procedures.

c. Assign Deconfliction Coordinators (DCs) as required. Coordinator assignments should be made to maximize efficiency in deconflicting training events and to eliminate the possibility of uncoordinated operations occurring. Deconfliction coordinators may be assigned geographically by command authority or by individual unit.

d. Serve as DA when deconfliction cannot be achieved at a lower level.

e. Assign JDS privileges. If a JTIDS/MIDS user lacks access or user privileges, the deconfliction scheduling responsibility will be assigned to a DC with the necessary access and privileges. All commands using JTIDS/MIDS terminals will have JDS viewing privileges.

f. Ensure acquisition programs that provide Link-16 capability (e.g., Joint Tactical Radio System) and its platform integration are designed to enable users to comply with this instruction (e.g., Terminal Electromagnetic Compatibility [EMC] Features).

g. Ensure that operational units comply with NTIA terminal periodic verification and terminal EMC feature event monitoring and data storage requirements. Stored data shall be provided to the NTIA and FAA upon request via the service frequency management authorities and Navy & Marine Corps Spectrum Center (NMSC).

h. Ensure units operating outside of the US&P comply with local national frequency clearances to include documentation and national/coalition (e.g., NATO) reporting requirements.

3. JTIDS/MIDS DA. The JTIDS/MIDS DA is the first operational commander or Combatant Commander common to both units. In the US, if there is no common Combatant Commander (e.g., arbitration is required between USSOUTHCOM and USNORTHCOM or an operational unit and a test and evaluation unit), the Joint Staff/J-6 will serve as the DA. Combatant Commanders will provide guidance for DAs within their AORs as appropriate, based upon the requirements contained in the individual HN's frequency clearance. The Joint Interoperability Division (JID) can provide technical advice and recommendations to any JTIDS/MIDS DA when requested.

4. JTIDS/MIDS DCs. DCs schedule JTIDS/MIDS operations in the JDS. DCs shall:

a. Coordinate with the JID to ensure that JTIDS/MIDS Operating Areas (JOAs) are defined in the JDS, as necessary, to support the scheduling of operations. JOAs must be as small as possible but still contain the expected area of operations.

b. Make entries in the JDS that specify time, JOA, and anticipated Time Slot Duty Factor (TSDF) for all planned JTIDS/MIDS unit(s) operations for which the DC has responsibility. Times and TSDF must reflect, to the maximum extent possible, the planned use.

c. Using the JDS, DCs will deconflict with other same-area or adjacent JOA users to ensure TSDF and contention use restrictions are met. Promulgate, as necessary, operating/utilization instructions to represented units to comply with restrictions. All JTIDS/MIDS use must be less than what is entered into the JDS.

d. When required, conduct coordination with other DCs to prioritize use. When coordination does not resolve prioritization issues, use the appropriate DA.

5. Unit/Staff Planners. Unit/staff planners responsible for planning JTIDS/MIDS operations, exercises, tests, or evaluations will:

a. Contact the Joint Frequency Management Office (JFMO) or Service Frequency Management Office (SFMO) for specific requirements, and to ensure an adequate frequency assignment for the desired area of operations has been approved.

b. In cases where no assignment exists, or if the existing assignment is insufficient for the scope of operations, submit a temporary frequency assignment request in accordance with frequency management directives. The approved frequency assignment must be in place prior to commencement of operations. Although frequency assignment requests are similar to airspace coordination requests in format and routing, approval of one does not imply approval of the other.

c. Comply with frequency assignment restrictions. DA coordination and JDS entry is required even when complying with an existing permanent frequency assignment. This ensures unused margin is available for other units within the same geographic area (further explanation may be found in Enclosure B, paragraph 2, "Coordination Procedures").

d. Ensure participating JTIDS/MIDS units are included in the coordination process and are briefed regarding specific frequency assignment restrictions.

6. Joint Interoperability Division (JID). The JID shall:

a. Operate, maintain, and administer the JDS and assist users in its operation.

b. Assist Joint Staff in developing deconfliction policies and monitoring execution to ensure compliance for JTIDS/MIDS operations, exercises, and tests.

c. Provide technical advice to the Joint Staff/J-6 in the accomplishment of pulse deconfliction responsibilities as outlined in this instruction.

d. Ensure appropriate courses taught by the Joint Multi-Tactical Data Link School incorporate JTIDS/MIDS deconfliction training for frequency managers, operators, and technicians.

e. Serve as the joint lead and combatant commander advocate in JTIDS/MIDS Network Design Library (JNDL) support activities.

f. The JID shall serve as a point of contact for C/S/A and joint task force commanders providing assistance with JTIDS/MIDS network selection and

deconfliction issues utilizing the data available through the JNDL as needed to support this effort.

7. JTIDS/MIDS Network Design Library. The JNDL is a virtual, net-centric collection of web sites to assist in pulse deconfliction and all aspects of JTIDS/MIDS network distribution and operations. The JNDL consists of the data on the USFORSCOM JID and the four services (USN, USAF, USA, and USMC), Network Design Facility (NDF) web sites. All of the web sites have links to each other.

Service NDFs shall receive, catalog, store, and maintain all C/S/A approved JTIDS/MIDS networks and serve as a point of contact for assistance with JTIDS/MIDS network selection and generation. They shall have service platform load files readily available to assist with spectrum deconfliction and will assist with appropriate network selection.

8. Deconfliction Organization Relationship. See Figure 1 for block diagram of the descriptions contained within this enclosure.

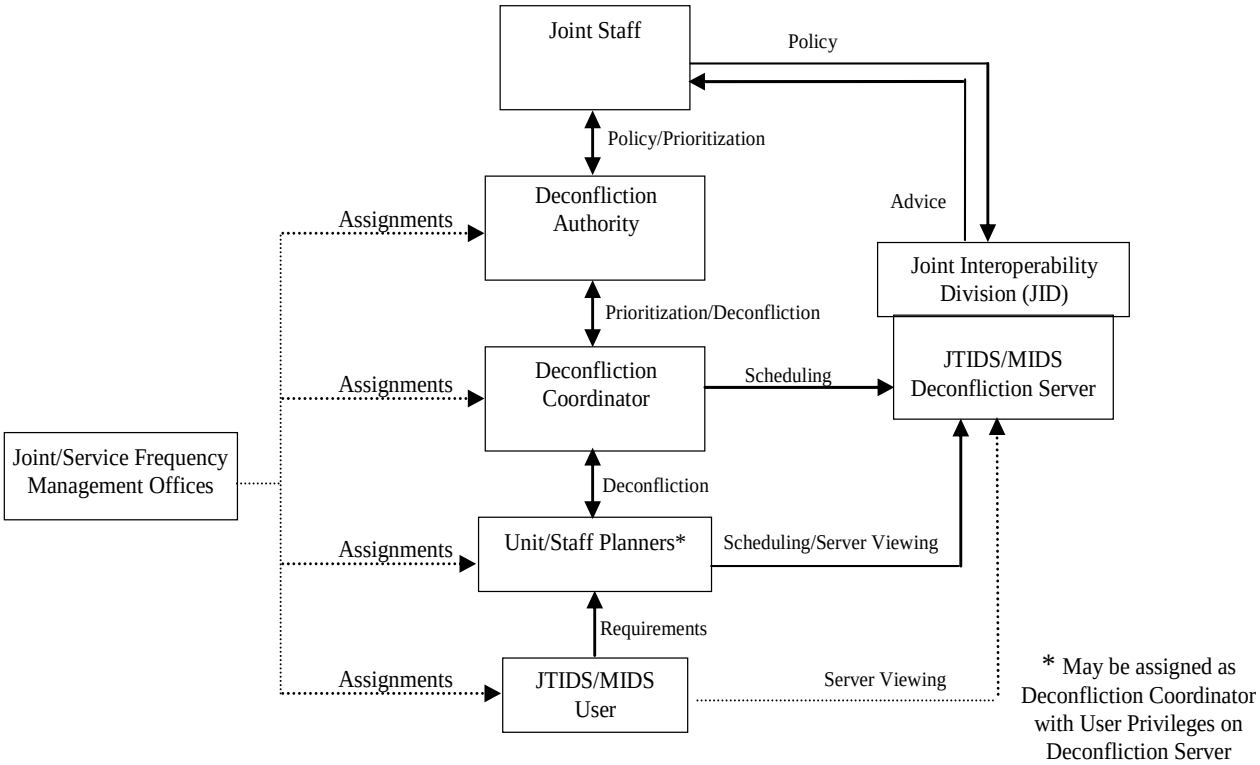

Figure A-1. Organizational Relationships

9. Operational Units. These units shall comply with the restrictions contained at Enclosure C and the NTIA terminal periodic verification requirements and terminal EMC features related event monitoring and data storage requirements by accomplishing the following:

a. For terminals that operate continuously, either perform manually initiated built-in test (BIT) or place the terminal in a powered down state in order to run start-up BIT (through either a STANDBY mode or an OFF mode) at least once every 30 days.

b. Establish and perform provisions for downloading from terminal non-volatile memory where applicable or manually where applicable and maintaining the storage of terminal EMC features related event data within maintenance records for a period of one year. Provide the maintenance records to the NTIA and FAA upon their request via the service frequency management authorities. This event data includes: the dates and beginning and end times of occasions where there are transmit inhibits (along with the identity of the failure that caused the inhibit for terminals that store this information); occasions when the terminal is switched from a full EMC Protection Mode to Exercise or Combat Mode; and instances when the terminal is placed in the high power mode (power mode greater than 200 watts).

10. Navy Marine Corps Spectrum Center. The NMSC shall act as the DOD single point of contact with the NTIA and FAA for JTIDS/MIDS spectrum matters. NMSC will:

a. Coordinate all user requirements that exceed the peacetime spectrum certification geographic area pulse limits with the FAA to obtain temporary authorization to utilize JTIDS/MIDS at the increased levels.

b. Provide operational unit terminal maintenance records upon NTIA/FAA request. NMSC shall coordinate with the service frequency management authorities to request this data from the user community.

11. Program Executive Officer for Command, Control, Communications, Computers, Intelligence (PEO C4I). PEO C4I shall act as configuration and control manager for the deconfliction server hardware and software and will ensure that modifications and upgrades meet NTIA spectrum certification and user interface requirements.

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ENCLOSURE B

PROCEDURES

1. The JTIDS/MIDS Deconfliction Server. JTIDS/MIDS pulse deconfliction is most effectively accomplished by keeping coordination at the lowest level possible. Future increases in the number of JTIDS/MIDS equipped units will result in an increase in geographic overlap for terminal operations and a corresponding increase in the requirements for coordination. The JDS is an automated Internet-based system to support the coordination process within the US&P. Units located outside of the US&P will work through the appropriate local HN/coalition (e.g., NATO) organization(s) to ensure operations are properly deconflicted and documented as required by local HN and coalition procedures.

a. All JTIDS/MIDS activity will be coordinated through the JDS. The appropriate DC (or unit/staff planner when authorized) will make entries into the JDS prior to any JTIDS/MIDS operation.

b. The JDS is accessible at various levels. Services will determine which user or viewer level will be assigned to their units.

c. For routine operations, coordination and scheduling are handled by inputs from each unit's planned activity into a JDS. As training opportunities are identified, users may coordinate directly with each other to establish networks that adhere to the pulse density limitations for the intended operational areas.

d. For complex exercises, tests, demonstrations, and special operations, the appropriate DC (or unit/staff planner when authorized) will ensure adherence to pulse deconfliction restrictions and procedures and make appropriate JDS entries.

(1) DCs (or unit/staff planner when authorized) will ensure JTIDS/MIDS operations are coordinated with their appropriate C/S/A counterparts and entered into the JDS. Entries will be completed as part of the normal planning process and should be accomplished at least as far in advance as airspace coordination. Unit/Staff planners must incorporate appropriate frequency assignment restrictions into planned JTIDS/MIDS operations.

(2) If mission requirements exceed the restrictions of the existing frequency assignment, temporary assignments may be granted on a case-by-case basis. Unit/staff planners should request temporary JTIDS/MIDS frequency assignments through the appropriate frequency management office.

e. In the case of conflicting operations, DCs will deconflict operations to ensure compliance with local frequency assignments. Conflicts between DCs not resolved locally will be elevated to the DA.

2. Coordination Procedures

a. Documentation accompanying existing or new network designs will include a Network Description Document with TSDF information, including individual platform TSDF, for use in scheduling operations on the JDS. TSDF can be calculated using the TSDF calculator available on the JDS, JID, or Service NDF web sites. Newer network description document data will include a JJL file, and will provide an automated capability to calculate TSDF when used with the TSDF Calculator. These documents/files provide the necessary information for JICOs and DCs to verify unit participation, calculate expected TSDF, and determine appropriate operational measures to ensure compliance. Assistance can be obtained by contacting the JID or Service NDFs.

b. Unit/staff planners must accurately define operational requirements to ensure complete TSDF calculations can be made for a given network and specific participants. TSDF values listed for an operation on the JDS should be sufficient to satisfy operational requirements without overstating them. Doing so will ensure maximum use of available TSDF by all requesting users within the same geographic area.

c. Unit/staff planners will review existing frequency assignments (available from the JFMO and SFMO) to determine if they are adequate for the proposed operation or training event. The JDS and JID can assist in determining pulse deconfliction requirements.

(1) If an existing frequency assignment is adequate, the event will be scheduled through the JDS.

(2) If a frequency assignment does not exist for the area of operations, or existing assignments do not meet the operational requirements, the unit/staff planner will submit a frequency assignment request (see Enclosure C for typical frequency assignment restrictions).

d. The DC (or unit/staff planner when authorized) will make appropriate entries to the JDS for the planned event.

(1) Multiple operations within a single geographic area may be scheduled as a single event, or each DC (or unit/staff planner when authorized) may make individual JDS entries. The JDS will alert the DC if the submitted TSDF exceeds limits specified in the frequency assignment or conflicts exist with other JTIDS/MIDS activity in overlapping or adjacent areas.

(2) Options are available in cases where mission requirements exceed pulse density restrictions. The JID or the appropriate Service NDF can provide technical advice to reduce the overall TSDF. Other possible solutions include:

(a) Provide different operating times to units within a single geographic area.

(b) Establish an operational procedure to limit network capacity by individual units or reduce the number of participants, ensuring total pulse density in any given area complies with restrictions.

(c) Change the geographical disposition of forces to reduce the pulse density in an area where JTIDS/MIDS use is particularly heavy.

e. The DA, combatant commander, or Joint Staff/J-6 will not normally be involved in the deconfliction process. When deconfliction cannot be achieved at a subordinate level, these authorities will establish priorities and direct deconfliction as necessary.

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ENCLOSURE C

RESTRICTIONS & REQUIREMENTS

1. JTIDS/MIDS Restrictions & Requirements. The restrictions and requirements listed in this Enclosure are derived from the spectrum Certification (Interdepartmental Radio Advisory Committee Document 35883) issued by the NTIA for peacetime operations. NMSC shall coordinate with the FAA any time operational requirements exceed the peacetime conditions identified in this enclosure. Users should verify, through their respective frequency management chain of command, the actual restrictions for their respective operating areas as some locations may be more or less restrictive than others. It should be noted that FAA-imposed restrictions contained in a particular frequency assignment always take precedence over the restrictions in a previously approved area assignment. Operational requirements above the restrictions are handled on a case-by-case basis and ultimately through NMSC to the FAA. Requesters should allow additional lead-time and include detailed justification in their waiver requests.

2. Geographic Area TSDF Limitation

a. No more than 100 percent TSDF is permitted within a 100 nautical mile (nm) radius circle drawn around each JTIDS/MIDS terminal.

(1) 100 percent TSDF is defined as 396,288 pulses per 12-second interval, regardless of the number of pulses per time slot that are actually being used (not necessarily 100 percent of time slots).

(2) TSDF is always based on assigned time slots for participating platforms, whether or not transmission occurs.

b. In addition, the total TSDF within a circle of radius 370 kilometers (200 nms) constructed around any Point A shall not exceed 400 percent. At this time, Point A is defined as the position of any time division multiple access (TDMA) terminal. By the time of the GPS Civil Downlink (GPS L5) Initial Operational Capability, or no later than 1 January 2008, Point A becomes any point in space.

3. TSDF Limitations for Individual Terminals. Any TDMA terminal, or closely spaced group of ground or stationary/slow moving TDMA airborne terminals, within a 3 nm radius about each TDMA terminal, shall be limited to a combined total 50 percent TSDF. The 50 percent TSDF limitation when combined with the 100 percent and 400 percent TSDF limitations for the geographic area in the paragraph above is called the 100/50 (300) TSDF limitation.

4. Voice Operations. JTIDS/MIDS voice operations are allowed on up to two channels (time slot pools), subject to an overall geographic area TSDF calculation that is based on the number of voice nets in use, multiplied by the voice pool TSDF, multiplied by a Usage Factor which is dependent on the number of users assigned to a particular voice net. The Usage Factor shall be 1 when the number of users equals 1 to 12, 2 when the number of users equals 13 to 20, and 3 when the number of users is greater than 20. In determining platform compliance with the TSDF restrictions of this document, platforms will include each TDMA voice transmission.

5. Multinet Operations. Multinet operations are permitted.

6. Time Slot Message Structures. Terminal transmissions containing up to and including 444 pulses per time slot are permitted.

7. Adjacent Time Slots. Transmission in adjacent time slots is permitted.

8. Contention Transmissions

a. Contention transmissions including Repromulgation Relay (RR), Time Slot Reallocation (TSR), and Machine Controlled Contention shall be permitted.

b. Machine Controlled Contention, also known as Random Access[1], includes Round Trip Timing Broadcast (RTT-B) mode, Precise Participant Location and Identification (PPLI), Initial Net Entry (INE), Fighter-to-Fighter, and Conditional Paired Slot Relay (CPSR). Total contention transmission TSDF, which is the sum of RR, TSR, and Machine Controlled Contention in paragraph (1) below, shall not exceed 25 percent. If, however, all Machine Controlled Contention other than RTT-B, PPLI, and INE is limited to use by fast-moving aircraft, then contention transmission TSDF can be increased to the limit of 33 percent. With respect to counting toward the 100 percent TSDF geographic area limits, the platform TSDFs and the TSR geographic area TSDF shall be summed. The TSDF for contention, participating platforms, and the geographic area shall be counted as follows:

(1) Contention Transmission TSDF

(a) The RR contribution to contention TSDF count is equal to the total TSDF in which relaying can occur times one third, i.e., using the originator time slot TSDF times one third. The granularity of the RR jitter step size is no less than 10 microseconds.

[1] This is the contention (random) transmit access mode time slot assignments; see MIL-STD-6016, *"Tactical Data Link (TDL) 16 Message Standard."*

(b) The TSDF from centralized TSR is not to be counted toward the contention TSDF. For decentralized TSR, the contention TSDF count shall be equal to the total TSDF in which TSR can occur multiplied by a factor X. If the number of TSR participants does not exceed the capacity of the reallocation message, X=1/4; otherwise, X=1/3.

(c) The Machine Controlled Contention contribution to the contention is equal to the TSDF of the contention pool multiplied by one-half.

(2) Platform TSDF

(a) The platform TSDF from RR is equal to the TSDF of the time slots in which the platform could originate or relay, i.e., one half of the time slots assigned to the originator plus one half of the sum of all the time slots assigned to other originators in which the terminal could be instructed to relay.

(b) The platform TSDF from TSR transmissions is equal to the TSDF of the TSR time slots in which the platform could transmit, i.e., 22 percent or 60 percent of the TSR pool size depending on the specific platform initialization.

(c) The platform TSDF from Machine Controlled Contention is equal to the platform contention access rate over a 12-second frame for that platform.

(3) Geographic Area TSDF

(a) The geographic area TSDF contribution due to RR is equal to the sum of all platform RR TSDFs.

(b) The geographic area TSDF contribution from centralized TSR transmissions is equal to the total TSDF of all the centralized TSR pools. The geographic area TSDF contribution from decentralized TSR transmissions is equal to the total TSDF of all the decentralized TSR pools multiplied by a factor X. If the number of TSR participants does not exceed the capacity of the reallocation message, X=1.25; otherwise, X=1.33.

(c) The geographic area TSDF contribution due to Machine Controlled Contention is equal to the sum of the platform Machine Controlled Contention TSDFs.

9. Restrictions Near TACAN and DME Beacons

a. Surface-based JTIDS/MIDS terminals will be located such that TACAN, conventional DME (DME/N) and precision DME (DME/P) beacons will be protected from TDMA signals that exceed a peak power level of minus 33

decibels relative to one milliwatt (dBm) with up to 50 percent TSDF at the beacon receiver input. In the event that this signal condition cannot be complied with, 20 percent TSDF at up to minus 24 dBm is allowed. However, this latter condition must be coordinated with NMSC and subsequently identified to NTIA. Installations where these required conditions need to be exceeded will be addressed on a case-by-case basis.

b. Table C-1, "JTIDS/MIDS Distance Separation Requirements," contains theoretical worst-case location scenarios for JTIDS/MIDS transmitters to protect the signal level to weaker than minus 33 dBm at TACAN/DME equipment receiver input points. Since closer distances coordinated[2] prior to use are possible with a specific site analysis for each instance in support of the minus 24 dBm standoff, these are also listed in Table C-1.

10. Restrictions Near Air Traffic Control Radar Beacon System (ATCRBS) and Mode Select (Mode S) Equipment. Surface-based JTIDS/MIDS terminals will be located such that ATCRBS Interrogators and Mode S sensors will be protected from TDMA signals that exceed a peak power level of minus 20 dBm at the ATCRBS interrogator or Mode S sensor receiver input.

a. Table C-1 also contains theoretical worst-case location scenarios for JTIDS/MIDS transmitters to protect the signal level to weaker than minus 20 dBm at ATC equipment receiver input points.

b. There are no similar restrictions on airborne JTIDS/MIDS terminals.

11. Output Power. JTIDS/MIDS terminals are limited to a maximum of 200 watts + 1 decibel (dB) at the terminal transmitter antenna output port.

12. Terminal EMC Features. Terminal EMC features must be operational. The Combat Mode is prohibited. The Exercise Mode shall not be used unless coordinated with NMSC or it is specifically allowed for the applicable platform within a frequency assignment. In order to comply with NTIA requirements for terminal EMC features, the terminal components must be periodically verified and terminal EMC features-related events must be monitored and stored in terminal memory.

a. To meet the periodic verification requirement, the terminal performs BIT on the EMC features monitor components. These BIT checks shall be performed at least once every 30 days for terminals that are operating continuously.

[2] Coordinated operations are coordinated with FAA. Uncoordinated operations need to be coordinated within NMSC/DOD

b. Individual units shall adhere to methods for downloading and storing EMC features-related data from the Link 16 terminal and platform as applicable (see Enclosure A, paragraph 9) for a period of one year. If the terminal does not have the capability to store this data, then this applicable information shall be kept manually for a period of one year and be available to the NMSC and NTIA upon request.

13. Required Separation Distance From ATC Equipment. Table C-1 shows the worst-case standoff distances from ATC equipment, which is required for various JTIDS/MIDS platforms. First, determine if it is possible to maintain the standoff distance indicated in Table C-1. If so, then the distance indicated is used as the minimum required separation distance from the ATC equipment. Second, if the separation distance indicated in Table C-1 cannot be maintained and meet the operational requirements, then a request for restriction easing might be obtained. During this process, NMSC performs a site analysis for the requested operation specifics. A significant reduction in the separation distance may be possible, but this is on a case-by-case basis so the received signal level into the ATC equipment does not exceed signal level limitations. The distances indicated in Table C-1 are worst-case theoretical JTIDS/MIDS-to-ATC equipment antennas main beam-to-main beam gain conversion. The following subparagraphs contain general considerations to use when planning where to place JTIDS/MIDS platforms. Note that with respect to the restrictions mentioned above, the term “surface” refers to both ground-based and maritime platforms.

a. Ground. Ground-based platforms can be the most difficult to maintain sufficient separation from ground-based ATC equipment. Caution should be observed with respect to the height of the antenna and the range and bearing from the ATC equipment. See Table C-1.

b. Maritime. The required JTIDS/MIDS separation distances from civilian ATC equipment are essentially the same for maritime operations as those of the ground platforms. Since maritime units are mobile, they must consider all ATC equipment that may come within radio line-of-sight. See Table C-1.

c. Airborne. The distance separation guidelines presented in Table C-1 for aircraft equipped with JTIDS/MIDS terminals are applicable when these aircraft are operating on the ground (e.g., ramps, runways, and taxiways).

d. Altitude Considerations. Distance separations from ATC equipment should be considered both horizontally and vertically.

e. Authorized Terminals. JTIDS/MIDS terminals are approved for operation on an uncoordinated basis (i.e., geographic area frequency assignment support has previously been granted) for any mobile, stationary

platform or site that is identified within the approved DD Form 1494 (J/F 12 4413/4).

Table C–1. JTIDS/MIDS Distance Separation Requirements (in nautical miles)

Individual Platform (Note 6)	TACAN/ DME Beacons ((Note 5)	TACAN/ DME Beacons	En Route ATCRBS	Terminal ATCRBS	En Route Mode S	Terminal Mode S
ATC Unit Receive Level Threshold (dBm)	- 24	- 33	- 20	- 20	- 20	- 20
A-10 Lower	0.27	0.75	0.77	0.79	1.46	1.58
ABCCC III Capsule	0.19	0.53	0.55	0.56	1.03	1.12
ABMOC	0.24	0.69	0.71	0.73	1.34	1.46
ADA	0.21	0.59	0.61	0.63	1.16	1.26
Aerostat	0.13	0.37	0.39	0.40	0.73	0.79
AMDPCS	0.19	0.53	0.55	0.56	1.04	1.13
AOC	0.27	0.77	0.80	0.82	1.51	1.64
ATC Unit Receive Level Threshold (dBm)	-24	-33	-20	-20	-20	-20
B-1B Lower	0.19	0.54	0.56	0.57	1.05	1.14
B-2 Lower	0.07	0.19	0.20	0.20	0.38	0.41
B-52	0.19	0.54	0.56	0.57	1.06	1.14
B-707 Paul Revere	0.27	0.75	0.77	0.79	1.46	1.58
B-737 AFL Top or Bottom	0.23	0.64	0.67	0.68	1.26	1.36
B-737 Smart Tanker Lower	0.11	0.32	0.34	0.34	0.63	0.68
B-747 YAL-1 ABL Upper	0.25	0.71	0.73	0.75	1.38	1.50
B-767 AST	0.17	0.47	0.49	0.50	0.92	1.00
Boeing EPIC RV	0.19	0.54	0.56	0.57	1.06	1.15
Boeing King Air Lower	0.19	0.55	0.57	0.58	1.07	1.16
Boeing NCO RV	0.11	0.30	0.31	0.32	0.59	0.64
C-12J	0.20	0.56	0.58	0.59	1.09	1.18
C-130 Top	0.17	0.49	0.51	0.52	0.95	1.03
C-9 (DC-9)	0.16	0.46	0.48	0.49	0.90	0.97
CAC2S	0.28	0.79	0.82	0.84	1.54	1.67
D-1A/D-1B	0.32	0.89	0.92	0.94	1.73	1.88
DC-10 WASP Bottom	0.18	0.50	0.52	0.53	0.97	1.06
E-2C Bottom	0.21	0.59	0.61	0.62	1.14	1.24
E-3 Aft	0.23	0.64	0.67	0.68	1.26	1.36
E-767	0.14	0.39	0.41	0.42	0.76	0.83
E-8 JSTARS Bottom	0.24	0.67	0.69	0.71	1.30	1.41
EA-6B Upper	0.23	0.66	0.68	0.70	1.28	1.39
EC-130 Upper	0.17	0.47	0.49	0.50	0.92	1.00
EC-135	0.14	0.40	0.41	0.42	0.77	0.84

Table C–1. JTIDS/MIDS Distance Separation Requirements (in nautical miles)						
Individual Platform (Note 6)	TACAN/ DME Beacons ((Note 5)	TACAN/ DME Beacons	En Route ATCRBS	Terminal ATCRBS	En Route Mode S	Terminal Mode S
ATC Unit Receive Level Threshold (dBm)	- 24	- 33	- 20	- 20	- 20	- 20
EP-3 Upper	0.12	0.34	0.35	0.36	0.67	0.72
F/A-18 MIDS Top	0.18	0.50	0.52	0.53	0.97	1.05
F-14 Top	0.24	0.68	0.71	0.72	1.33	1.44
F-15 Class 2 Bottom	0.21	0.60	0.62	0.64	1.17	1.27
F-15 MIDS FDL Bottom	0.13	0.38	0.39	0.40	0.74	0.80
F-16 MIDS Top	0.25	0.70	0.72	0.74	1.36	1.47
FAADC2I	0.24	0.69	0.71	0.73	1.34	1.46
G-1 Top	0.19	0.55	0.57	0.58	1.07	1.16
GMG Raider	0.31	0.88	0.91	0.94	1.72	1.87
JLENS	0.24	0.69	0.71	0.73	1.34	1.46
JTAGS	0.19	0.53	0.55	0.56	1.04	1.13
JTW	0.32	0.89	0.92	0.94	1.73	1.88
JVAN (RELNAV VAN)	0.50	1.41	1.46	1.49	2.75	2.98
KC-135 ROBE (Top)	0.12	0.35	0.36	0.37	0.67	0.73
Lear Jet (Upper)	0.18	0.49	0.51	0.52	0.96	1.04
MCE/JM/JRE/CRC	0.21	0.60	0.63	0.64	1.18	1.28
MEADS	0.24	0.69	0.71	0.73	1.34	1.46
Mini-rack Lemoore CA	0.34	0.96	1.00	1.02	1.88	2.04
Mini-rack Point Mugu CA	0.32	0.91	0.94	0.96	1.77	1.92
MJGRS J-CABIN	0.35	0.97	1.01	1.03	1.90	2.06
MSTIC PAX River	0.09	0.26	0.27	0.28	0.51	0.55
OPFAC/JTD	0.32	0.89	0.92	0.94	1.73	1.88
P-3 Orion Bottom	0.17	0.48	0.49	0.51	0.93	1.01
PATRIOT	0.29	0.82	0.85	0.87	1.61	1.74
Pocket J	0.17	0.48	0.50	0.51	0.94	1.02
RC-135 RJ Top	0.15	0.44	0.45	0.46	0.85	0.92
RMP	0.47	1.31	1.36	1.39	2.56	2.78
ROSETTA	0.21	0.59	0.61	0.63	1.15	1.25
S-3B Upper	0.16	0.45	0.46	0.47	0.87	0.95
SESEF	0.21	0.60	0.62	0.64	1.17	1.27
SH-60/UH-60A Helicopter Lower	0.10	0.29	0.30	0.30	0.56	0.61
SHIPS	0.15	0.44	0.45	0.46	0.85	0.92
SHORAD	0.19	0.53	0.55	0.56	1.04	1.13
SJS	0.27	0.77	0.80	0.82	1.51	1.64
SUBMARINE	0.07	0.19	0.19	0.20	0.37	0.40
T-33 (Bottom)	0.15	0.43	0.44	0.45	0.83	0.90
TALON GATEWAY Air	0.13	0.35	0.37	0.37	0.69	0.75

Table C–1. JTIDS/MIDS Distance Separation Requirements (in nautical miles)						
Individual Platform (Note 6)	TACAN/ DME Beacons ((Note 5)	TACAN/ DME Beacons	En Route ATCRBS	Terminal ATCRBS	En Route Mode S	Terminal Mode S
ATC Unit Receive Level Threshold (dBm)	- 24	- 33	- 20	- 20	- 20	- 20
TALON GATEWAY Ground	0.06	0.18	0.18	0.19	0.35	0.37
TAOM/AOC (Ground Mounted)	0.21	0.59	0.61	0.63	1.15	1.25
TAOM/AOC (Shelter Mounted)	0.32	0.89	0.93	0.95	1.74	1.89
TAOM/TACC TSC-131 (Ground)	0.26	0.72	0.75	0.76	1.41	1.53
TAOM/TACC TSC-131 (Shelter)	0.39	1.10	1.14	1.17	2.15	2.33
TAOM/TYQ-82 Camp Pendleton	0.04	0.12	0.12	0.13	0.23	0.25
THAAD	0.25	0.69	0.72	0.73	1.35	1.46
TYQ-101A CDLS	0.38	1.08	1.12	1.14	2.11	2.28
TYQ-82, ADCP	0.53	1.49	1.54	1.58	2.91	3.15
U-2	0.11	0.31	0.51	0.52	0.61	1.04
UAV Top	0.15	0.42	0.44	0.45	0.82	0.89
UCAV	0.14	0.41	0.37	0.43	0.79	0.86
UK C-130 Bottom	0.14	0.39	0.40	0.41	0.76	0.82
UK C-130 Top	0.14	0.40	0.42	0.43	0.78	0.85
USG-48 (Capsule)	0.30	0.84	0.87	0.89	1.64	1.77

See Part I of Glossary for Acronym Definition

Note 1: Distances are worst-case theoretical JTIDS/MIDS-to-ATC equipment antennas main beam-to-main beam gain conversions. Distances are measured in nautical miles.

Note 2: Signal level with respect to the JTIDS/MIDS peak signal.

Note 3: For the aircraft listed, these separation distances only apply to ground operations such as ramps, runways, and taxiways.

Note 4: TACAN/DME distances for a –24 dBm standoff are for coordinated cases where the TSDF is less than 20 percent only.

Note 5: Names of platforms evolve over time; however, the characteristics of the platform may remain the same. Any discrepancy with platform name or potential characteristics should be noted and provided to NMSC for official modification to the DD Form 1494.

GLOSSARY

PART I -- ABBREVIATIONS AND ACRONYMS

AOR	Area of Responsibility
ATC	Air Traffic Control
ATCRBS	Air Traffic Control Radar Beacon System
BIT	Built In Test
C/S/A	Combatant Commands, Services and Defense Agencies
DA	Deconfliction Authority
dBm	Milliwatt
DME	Distance Measuring Equipment
DME/N	Conventional Distance Measuring Equipment
DME/P	Distance Measuring Equipment-Precision
EMC	Electromagnetic Compatibility
FDL	Fighter Data Link (MIDS Low Volume Terminal (LVT)-3)
FAA	Federal Aviation Administration
FMO	Frequency Management Office
HN	Host Nation
IFF	Identification, Friend or Foe
INE	Initial Net Entry
JFMO	Joint Frequency Management Office
JMTS	Joint Multi-Tactical Data Link School
JID	Joint Interoperability Division
JNDL	JTIDS/MIDS Network Design Library

JTIDS	Joint Tactical Information Distribution System
MCEB	Military Communications-Electronics Board
MIDS	Multi-Functional Information Distribution System
NDF	Network Design Facility
Nm	Nautical Mile
NMSC	Navy Marine Corps Spectrum Center
NTIA	National Telecommunications and Information Administration
PPLI	Precise Participant Location and Identification
RR	Repromulgation Relay
RTT-B	Round Trip Timing Broadcast
TACAN	Tactical Air Navigation
TDMA	Time Division Multiple Access
TSDF	Time Slot Duty Factor
TSR	Time Slot Reallocation
US&P	United States and Possessions

PART II -- DEFINITIONS

frequency assignment. Authorization given by an administration, or other authority, for a radio station or other emitter to use a specific frequency under specific conditions.

frequency clearance. Authorization for use of frequencies by a Radio Frequency (RF) system to operate and provide a specified class of service, (e.g., jamming, voice communications, or radio navigation).

geographic area. A circular area with a radius, defined in the Interdepartmental Radio Advisory Committee (IRAC) Spectrum Certification, around each JTIDS/MIDS terminal within which the TSDF is counted. Currently, there are two areas defined: a specified base area defined by a circle with a radius of 100 nm: and an area surrounding the base area defined by a circle with a radius of 200 nm (higher TSDF may be authorized on a case-by-case basis).

Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS). High capacity, anti-jam, secure, digital information transfer systems operating in the UHF band on 51 discrete frequencies between 969 MHz and 1206 MHz. MIDS is a technology insertion program to reduce component size and weight while maintaining all JTIDS functionality. The United States, France, Italy, Germany, and Spain are the five countries participating in the development of the MIDS terminals.

JTIDS/MIDS spectrum. JTIDS/MIDS operates on 51 frequencies within three sub-bands: 969 - 1008 MHz, 1053 - 1065 MHz, and 1113 - 1206 MHz at 3 MHz intervals using TDMA. JTIDS/MIDS terminals are designed to exclude JTIDS/MIDS transmissions between 1008 MHz and 1053 MHz and between 1065 MHz and 1113 MHz. Since in aircraft installations the JTIDS/MIDS terminal may also provide TACAN (non-TDMA) data, those terminals are capable of using the entire 962 - 1213 MHz range for TACAN functions, but restrict JTIDS/MIDS transmissions to the three sub-bands described above. The 960-1215 MHz band is use by civil and military aeronautical radio navigational systems. The ATCRBS, Mode S, and IFF systems use 1030 MHz for interrogations and 1090 MHz for replies. Civil aviation DME and Military TACAN systems operate on frequencies from 962 MHz to 1213 MHz in 1 MHz increments. Each DME/TACAN channel uses two frequencies, one for interrogations from the aircraft for information and one for beacon replies.

JTIDS/MIDS network management. The process in which Link 16 network design, planning, initiation, and operations is accomplished. During this process planning of information exchange requirements for JTIDS/MIDS operations are designed and coordinated and platform loads are developed and

disseminated to all of the platforms participating in that Link 16 network. The process also includes initiation of operations where real-time management of Link 16 network performance is accomplished.

pulse density. The total effective TSDF resulting from the transmissions of all the JTIDS/MIDS terminals within a geographic area.

Time Slot Duty Factor (TSDF). TSDF is a percentage figure relative to a base value of 396,288 pulses transmitted within a 12-second frame.

a. Link 16 pulse density is measured in terms of its TSDF. The TSDF contribution is from individual participants and networks of participants within a specified geographic area. This area is defined by circles with radii of 100 and 200 nm around individual terminals.[1] When used to quantify pulse density within a geographic area, two numbers, (e.g., 100/50), are usually provided. A third number written in parentheses, [e.g., as in 100/50 (300)], can also be provided to define the additional TSDF contribution that begins at the radius edge of original 100nm geo area and extends out an additional 100 nm (i.e., 200 nm from the terminal). This area can be referred to as the "doughnut."

b. The first number [e.g., 100 in 100/50 (300)], is the maximum percentage of pulses that may be transmitted by all the platforms combined within a specified 100 nm geographic area. The second number [e.g., 50 in 100/50 (300)] represents the maximum percentage of pulses transmitted by a single user (i.e., the single highest platforms TSDF). The third figure [e.g., (300) in 100/50 (300)] represents the additional TSDF contribution of any adjacent operations and their respective pulses originating outside the primary 100 nm geographic area.

c. Time slots may contain 144 (72 I and 72 R)[2], 258 or 444 pulses, depending on the use for the slot and the packing limit assigned. To calculate TSDF for a particular platform or network, multiply the number of assigned time slots by the maximum number of pulses in each time slot, divide the total pulses for all assigned time slots by the base value of 396,288 pulses, and multiply the result by 100 (see formula on page GL-5).

[1] However recall that by the time of the Global Positioning System Civil Downlink (GPS L5) Initial Operational Capability (IOC), or no later than January 1, 2008, Point A becomes any point in space.

[2] "I" refers to "interrogate" and "R" refers to "reply" of the RTT message.

$$\text{TSDF (\%)} = \frac{\text{Total pulses in assigned TS}}{} = \frac{(A \times 258) + (B \times 144) + (C \times 444)}{396{,}288} \times 100$$

A = Number of time slots with a limit of 258 pulses (Standard Packing and Packed 2 Single Pulse)
B = Number of time slots with a limit of 144 pulses (Round Trip Timing)
C = Number of time slots with a limit of 444 pulses (Packed 2 Double Pulse and Packed 4 Single Pulse)

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