

International Charter Space & Major Disasters



Executive Secretariat

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1 Introduction

1.1 Overview of the International Charter Space and Major Disasters

The Charter is an international collaboration among space agencies – the Charter members. Initiated by the European Space Agency (ESA), the French Space Agency (CNES) and the Canadian Space Agency (CSA) in 2000, it was joined by 11 other space agencies between 2000 and 2012, namely (in chronological order):

- US National Oceanic and Atmospheric Administration, NOAA
- Comision Nacional de Activida des Espaciales, Argentina, CONAE
- Indian Space Research Organization, ISRO
- Japanese Aerospace Exploration Agency, JAXA
- United States Geological Survey, USGS
- UK Space Agency, UKSA/ Disaster Monitoring Constellation (DMC), DMC
- China National Space Administration, CNSA
- German Aerospace Center, DLR
- Korea Aerospace Research Institute, KARI
- Instituto Nacional de PesquisasEspaciais, Brazil, INPE
- European Organisation for the Exploitation of Meteorological Satellites, EUMETSAT, Europe

Final integration of the Russian Federal Space Agency (ROSCOSMOS) is expected to occur in 2013.

The founding agreement of the Charter is intentionally limited in scope and thus, not intended to serve the entire disaster management cycle (mitigation, preparedness, response, and recovery). The Charter provides a mechanism for rapid tasking of satellites for immediate response rather than long-term monitoring of severe environmental hazards such as droughts and non-environment-related humanitarian emergencies (e.g. acts of war, refugee crises etc.). Free satellite-based information is provided to national disaster management authorities and humanitarian organizations for supporting immediate response to major natural or man-made disasters.

The Charter has been activated for 364 disasters (as at the end of 2012) in over 108 countries and six overseas territories since its inception in 2000. In 2012 alone, the Charter was activated 40 times for disasters in 27 countries. These accomplishments can be attributed to its narrowly defined scope.

The Charter gives access to a constellation of satellites equipped with radar and optical sensors. In 2012, the live satellites were the following:

- Radar (high resolution and very high resolution sensors): ENVISAT (decommissioned in April), Risat-1, RADARSAT-1 & 2, TerraSAR-X and TanDEM-X.
- Optical (high resolution and very high resolution sensors): SPOT4, SPOT5, PLEIADES, Landsat 5 &7, PROBA 1, UK-DMC 2, KOMPSAT-2, IRS-P5, Resourcesat-2, Oceansat-2, Cartosat-2, IMS-1, RapidEye.
- Optical (medium and low resolution sensors): POES, GOES, SAC-C.

Operations of ENVISAT ceased on 9 May 2012 after 10 years of activities. Archived data from ENVISAT and others (ALOS, ERS, CBERS, IRS-1C, SPOT 2, UK-DMC, and NigeriaSat) remain available for Charter activations. Archived data can be compared with newly acquired data to prepare damage assessment products.

The data of the first French Pléiades satellite was made available to the Charter in mid-2012. The second satellite of the Pléiades Earth-observation system developed by CNES was put into orbit on 2 December from French Guiana. Pléiades-1B joins its twin Pléiades-1A, placed in the same 694-km orbit just one year ago. The two satellites will be phased opposite one another to enable daily revisits to any point on the globe.

Landsat 5 and SPOT 4 will be decommissioned during 2013.

Specific agreements with other entities allow the Charter to access additional products (high and very high resolution) from satellite such as, Formosat, GeoEye, IKONOS, QuickBird, WorldView.

1.2 Purpose and scope of this document

This document describes the 2012 activities of the International Charter “Space & Major Disasters”. During this period, the Lead agencies on a six monthly rotational basis have been: the Canadian Space Agency (October 2011 - April 2012), the Japanese Space Agency (May 2012 – September 2012) and the French Space Agency (October 2012 – April 2013).

The report is based on the following:

- Working documents, notes and actions of the Executive Secretariat and Board
- Input from the Communication Group
- Input from each Charter member concerning EO resources
- Project Managers’ reports for each activation, and
- Statistical data from EM-DAT.

The report follows the same structure as the work plan of the Executive Secretariat.

Chapter 1 is the present introduction.

Chapter 2 explains integration of new members, external relationships, Cooperating Bodies.

Chapter 3 describes the development of Charter new initiatives concerning the user base, e.g. the Universal Access decision, and technical innovation to improve Charter operations.

Chapter 4 depicts internal business, particularly the operations, anomalies, resource consumption, and technical updates.

Chapter 5 reports on communication activities.

Chapter 6 provides an assessment of the system performance, products and services, user appraisal and communication assessment.

Chapter 7 provides the conclusions.

1.3 *Applicable documents*

[AD1] Text of the Charter "Space and Major Disasters" - <http://www.disasterscharter.org>

[AD2] Charter Implementation Plan, RSCSA-PL0098

[AD3] Project Manager Procedure, RSCSA-PR0419

[AD4] Emergency On-Call Officer Procedure, RSCSA-PR0418

1.4 *Reference documents*

[RD1] EM-DAT: The OFDA/CRED International Disaster Database - Université Catholique de Louvain - Brussels – Belgium.
www.em-dat.net

1.5 List of acronyms

AOI	Area of Interest
ADRC	Asian Disaster Reduction Center
AIT	Asian Institute of Technology
APRSAF	Asia-Pacific Regional Space Agency Forum
ASEAN	Association of South-East Asian Nations
AU	Authorised User (of the Charter)
BNGRC	Bureau National de Gestion des Risques et des Catastrophes
CATHALAC	Centro del Agua del Trópico Húmedo para América Latina y El Caribe
CEOS	Committee on Earth Observation Satellites
Charter	The International Charter Space & Major Disasters
CMA	China Meteorological Administration
CNES	Centre National d'Etudes Spatiales
CNSA	China National Space Administration
COGIC	Centre Opérationnel de Gestion Interministérielle des Crises (France)
CONAE	Comision Nacional de Actividades Espaciales (Argentina)
CONIDA	Comision Nacional de Investigacion y Desarrollo Aeroespacial (Peru)
CONRED	Coordinadora Nacional para la Reducción de Desastres (Guatemala)
CRED	Centre for Research on the Epidemiology of Disasters
CRESDA	China Center for Resources Satellite Data and Application
CSA	Canadian Space Agency
CSDP	European Union Common Security and Defence Policy
DDSC	Direction de la Défense et de la Sécurité Civiles
DLR	Deutsches Zentrum für Luft und Raumfahrt (German Aerospace Center)
DMA	Disaster Management Authority
DMC	Disaster Management Constellation
DMCii	Disaster Management Constellation International Imaging
ECO	Emergency On-Call Officer (of the Charter)
EM-DAT	Emergency Events Database
EO	Earth Observation
EOR	Emergency Observation Request
ERS	Emergency Response Service
ESA	European Space Agency
ESRIN	ESA Centre for Earth Observation
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
EUR-OPA	European Open Partial Agreement
EUSC	European Union Satellite Centre
FASP	European Union Foreign and Security Policy
FTP	File Transfer Protocol
GDACS	Global Disaster Alert and Coordination System
GEO	Group on Earth Observations
GEONETCast	global network of satellite-based data dissemination systems
GEOSS	Global Earth Observation System of Systems, GEO
GIO	GMES Initial Operations
GISTDA	Geo-Informatics and Space Development Agency of Thailand
GMES	Global Monitoring for Environment and Security
HDSS	(USGS) Hazards Data Distribution System
HR	High Resolution
ICD	Interface Control Document
ICIMOD	International Center for Integrated Mountain Development
IFRC	International Federation of Red Cross / Red Crescent societies
INGEOMINAS	Instituto Colombiano de Geología y Minería
INPE	National Institute for Space Research (Brazil)
ISRO	Indian Space Research Organization
JAXA	Japanese Aerospace Exploration Agency
JPTM	Sentinel Asia Joint Project Team Meeting
KARI	Korea Aerospace Research Institute
KML	Keyhole Markup Language
MCDM	Ministry of Civil Defence and Emergency Management (New Zealand)

MR	Medium Resolution
NASRDA	Nigerian Space Agency
NatCatSERVICE	Natural catastrophe know-how for risk management and research
NCDR	National Center for Disaster Reduction
NEMA	National Emergency Management Agency (Nigeria)
NFP	National Focal Point
NOAA	National Oceanic and Atmospheric Administration
NRSC	National Remote Sensing Centre (India)
NSMC	National Satellite Meteorological Center
NSPO	National Space Organization(Taipei)
ODO	On-Duty Operator
ONEMI	Oficina Nacional de Emergencia del Ministerio del Interior (Chile)
PA	Partner Agency
PM	Project Manager (of the Charter)
RCMRD	Regional Center for Mapping of Resources for Development (Kenya)
RESTEC	Remote Sensing Technology Center (Japan)
ROSCOSMOS	Russian Federal Space Agency
SA	Sentinel Asia
SAFER	Services and Applications for Emergency Response
SARE	Semi Annual Refresher Exercises
SASOT	Sentinel Asia System Operation Training
SEGEMAR	Servicio Geológico Minero Argentino
SERTIT	Service Régional de Traitement d'Image et de Télédétection (France)
SIFEM	Sistema federal de Emergencias (Argentina)
SOPAC	Pacific Islands Applied Geosciences Commission
UA	Universal Access
UKSA	United Kingdom Space Agency
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNICEF	United Nations Children's Fund
UNITAR/UNOSAT	United Nations Institute for Training and Research/ United Nations Operational Satellite Applications Programme
UNHCR	United Nations High Commissary for Refugees
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNOPS	United Nations Office for Project Services
UN OOSA	United Nations Office for Outer Space Affairs
UN-SPIDER	United Nations Platform for Space-based Information for Disaster Management and Emergency Response
URF	User Request Form
USAID/OFDA	United States Agency for International Development's Office of Foreign Disaster Assistance
USGS	United States Geological Survey
VAR	Value Added Reseller
VAP	Value-Added Provider
VHR	Very High Resolution
VHRO	Very High Resolution Optical
WFP	World Food Programme
WWF	World Wide Fund For Nature

2 External relations

2.1 New members accession

The training of the National Institute for Space Research (INPE) was held in March 2012 with the participation of ESA, CSA and DMCii. The follow on qualification test included participation from INPE, ESA, DMCII, CONAE, CSA, CNES, ISRO, USGS, NOAA and JAXA.

After EUMETSAT's membership application was accepted in October 2011, EUMETSAT formally signed the International Charter on Space and Major Disasters on 5 July 2012. EUMETSAT is the fourteenth Charter member. Qualification and training of EUMETSAT is planned in mid-2013.

The integration of the Russian Federal Space Agency (ROSCOSMOS) as a full Charter member was still pending waiting clarification from Russian counterparts in regards to their respective roles at an institutional level. However, the Russian AU was defined and accepted in October 2012.

Ukraine sent a request to become a Charter member and was invited to present its potential contribution to the Charter in October 2012. Two Ukrainian organizations were present at the meeting: the State Space Agency of Ukraine (SSAU) presented its membership request and Dniprocosmos State Company presented Ukrainian resources that would be included in the Charter. The Board asked for the nomination of an appropriate Authorized User and for an appropriate implementation plan (including a data policy) to be provided before accepting the Ukrainian membership.

The increasing membership continues to demonstrate the interest of space agencies in the Charter initiative, which is a unique worldwide service for disaster response. Each new membership request, which brings an effective resource in terms of satellite sensors and human contribution, is carefully examined by the Charter Board.

2.2 Cooperating Bodies & Charter User Intermediaries

2.2.1 Collaboration with UNOOSA and UNITAR/UNOSAT

Cooperation with the UN has continued based on the arrangements with both UNOOSA and UNITAR/UNOSAT.

27.5% of Charter activation requests this year (11 of 40 activations) were through UNOOSA (4 activations) and UNITAR/UNOSAT (7 activations). UNOCHA was the main requestor with 7 calls; the others were UNDP, UNICEF, WFP and UNITAR Nigeria. UNOOSA also activated the Charter for a national requestor as an exception since no UN agency was present in the country (Iran).

UNITAR/UNOSAT remarked that the modest number of activations by UN cooperating bodies might partly be due to the fact that events are now triggered by national or regional organizations which in the past would have been triggered more likely by the UN.

UNITAR/UNOSAT had staff members nominated as Project Managers for 4 activations (Algeria fire, Senegal flood, Chad flood and Fiji ocean storm). UNITAR/UNOSAT supported the Charter

for 4 additional activations by providing value-adding service (Pakistan flood, South Sudan flood, Nigeria floods, and Samoa Island tropical cyclone).

UNOOSA and UNITAR/UNOSAT activities were separately reviewed via teleconferences held on 12 of October 2012 during the Board meeting in Paris. Discussions were centred on their activities during 2012 and additional support that UN partners could provide to Universal Access implementation, in supporting awareness and increasing the number and the capacity of the PMs and value adders within their network.

UNOOSA welcomed the adoption of the Universal Access principle and informed the Charter that they were very happy to promote Universal Access. Both UNOOSA and UNITAR/UNOSAT posted the Universal Access announcement on their websites at the beginning of September 2012. UNOOSA invited CNES as Charter Lead to present Universal Access on the occasion of the COPUOS-STSC Plenary in February 2013.

During 2012, UNITAR/UNOSAT actively promoted the International Charter in international conferences (Permanent Delegation of the European Union to the UN in Geneva with support from Government of Poland; GIS4UN conference in Geneva in collaboration with ESRI); by presentations to UN agencies in Kenya and Chad and to the Uganda Government. The International Charter standard material is part of the standard UNITAR/UNOSAT presentation (50 presentations in 2012) and of the UNOSAT training module (Master of Disaster Management - University of Copenhagen; GIS4DRR regional training in Bangkok with ADPC; Government of Vietnam and national organizations and Government of Costa Rica).

UNOOSA staff, specifically UN-SPIDER, raised awareness of the opportunities offered by the Charter in the framework of: Technical Advisory Missions and Technical Assessment Mission workshops organized for local stakeholders in Sri Lanka, Myanmar, Bangladesh, Cape Verde, Solomon Islands, and Mozambique; training workshops and stakeholders meetings in Cameroon, involving a number of countries in the Central African region, and in Sri Lanka. In addition, all Charter activations and product references were published in the monthly UN-SPIDER Updates, an electronic publication also posted on the Knowledge Portal (www.un-spider.org) that is distributed to nearly 20,000 experts worldwide via e-mail.

Twitter is also a media used by both entities to communicate Charter activations and publicize the Charter.

2.2.2 Cooperation with Sentinel Asia

Since March 2010, the Asian Disaster Reduction Center (ADRC) has had the status of a Charter Cooperating Body and can trigger the Charter to support requests from national members of Sentinel Asia (SA) and ADRC. Sentinel Asia is comprised of 72 organizations from 25 countries and regions and 14 international organizations.

ADRC provided the Charter with monthly activation status reports and two bi-annual reports (May and September) which included a review of Sentinel Asia emergency response activities and promotional / awareness activities.

In 2012, twenty four (24) activations of SA were requested; 5 Emergency Observation Requests (EOR) were rejected. The escalation mechanism to the Charter was used in response to two (2) events in Philippines: flood (August) and cyclone (December).

SA was triggered for 14 floods, 1 cyclone, 1 tropical storm, 1 earthquake, 1 wildfire and 1 landslide. In 2012 the number of activations (19 activations) was lower than 2010 (31

activations) and 2011 (29 activations). The number of escalations to the Charter remains low (2 in 2010, 4 in 2011 and 2 in 2012).

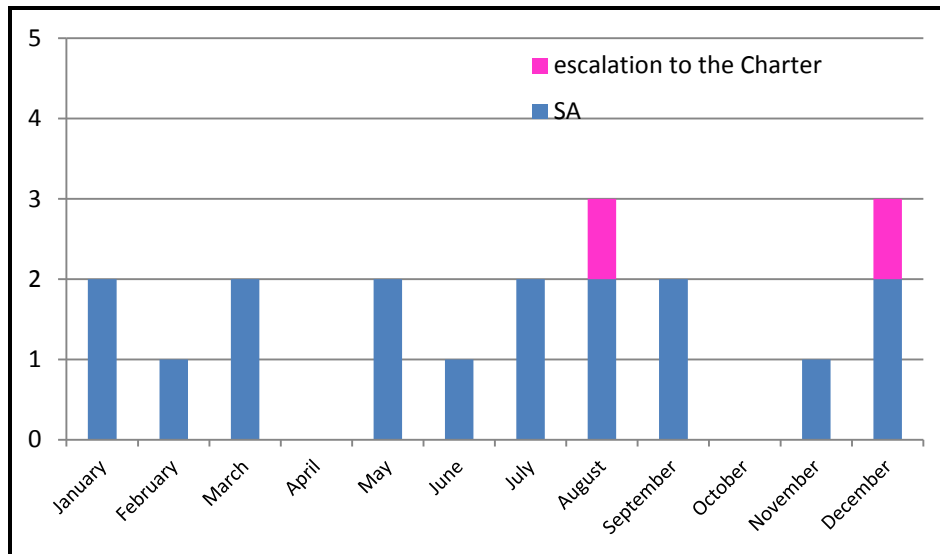


Figure 2-1. Sentinel Asia: 2012 monthly activations
In pink - the two activations with escalation to the Charter

SA was not operated in parallel to the Charter in 2012 thanks to the JAXA and ADRC awareness campaign to enhance knowledge at national level and to limit redundancies in order to optimize the use of the satellite resources.

SA – with the involvement of Charter members (JAXA, KARI) – continued in 2012 to promote the Charter and explained the escalation mechanism to activate the Charter in several trainings and conferences: e.g. Sentinel Asia System Operation Training (SASOT) in February (Thailand); Sentinel Asia Joint Project Team Meeting (JPTM) in November.

2.2.3 Collaboration with EUSC

Collaboration with EUSC, nominated as a Cooperating Body for two years in 2010, was re-examined during the Paris Board meeting. It was decided to extend its status for two more years. EUSC may activate the Charter for natural and man-made disasters and may also provide project managers.

2.3 Cooperation with other programmes and initiatives

During 2012, the Charter continued its collaboration with the intergovernmental Group on Earth Observations (GEO) to improve Charter access worldwide.

Arrangements between the European members of the Charter (CNES, DLR, ESA, UKSA) and the GMES SAFER project was concluded in March 2012. Terms of collaboration with Copernicus (formerly GMES) Emergency Management Service (EMS) are in discussion.

2.3.1 Collaboration with GEO

As a follow on to the request from the GEO Secretariat to improve Charter access world-wide, the activities concerning national users and access modes have progressed in the Asia Pacific region and Africa. For users from the Asia Pacific region, the collaboration with Sentinel Asia

continues to be significant for achieving effective results (§2.2.2). For users from Africa, formal user consultations were organized in 2012 in Botswana, Malawi and Zimbabwe. The process has facilitated a better understanding of the institutional and operational framework of these countries, and also the choice of appropriate activation mechanisms best suited for each country's Disaster Management Authority. For instance, thanks to the agreement between the Disaster Management Authority (DMA) of Madagascar and the French Civil Protection, the Charter was activated twice in 2012 for cyclone events in Madagascar using the "Sponsor AU" mechanism.

GEO has associated the Charter with its initiative to reinforce GEOSS in Africa. AfriGEOSS is dedicated to linking current GEO activities with existing capacities and initiatives in Africa. ESA has participated to the AfriGEOSS Side Event held at the 9th International Conference of the African Association of Remote Sensing of the Environment (AARSE) in September 2012.

The GEO Secretariat welcomed the Universal Access decision taken by the Charter and re-affirmed its willingness to support the Charter in disseminating information about the Charter and this particular initiative. As a first action, GEO published the UA announcement on its website in September 2012. In addition, the Charter and UA were presented by the CNES Board member at the GEO Plenary meeting in Brazil in November 2012.

2.3.2 Collaboration between European members of the Charter and the GMES programme

The arrangement with the European Union initiative, Global Monitoring for Environment and Security (GMES) started in January 2009 and ended in March 2012 with the closure of the GMES SAFER project – the pre-operational project of the GMES Emergency Management Service (EMS). The arrangement was still used twice for Charter activations outside Europe: flood in Algeria in February and, an ocean storm and flood in Madagascar in March. The activation in Algeria was requested by the Algerian Authorized User (AU) and the one in Madagascar was made by the French Civil protection (COGIC) on behalf of the National Office of Disaster Management of Madagascar (BNGRC). SAFER provided rapid mapping service and delivered value-added products to the Charter.

Contacts occurred with the Copernicus (formerly GMES) bureau to discuss possible arrangements to continue the collaboration in the framework of the GIO-Emergency Management Service project, in particular the rush mode component. A meeting was scheduled in 2013 to finalize the arrangement and operational rules. However, GIO-EMS project has already provided support to the Charter once in 2012 for a large flood in Cameroon in September. JRC has been nominated Project Manager and the GIO-EMS has provided value-added maps.

2.4 Training

A team from USGS provided training to the Russian National Emergency Management Center (EMERCOM), the Russian Federal Space Agency (ROSCOSMOS) and Russian Space Systems (RSS) at the end of September, with a general overview of the Charter for management staff, as well as Project Manager (PM) training for technical staff.

The training was delivered to introduce the Charter and to develop PMs to support Russian Charter activations. A general overview provided high level information on the Charter policies and workflows, and the benefits it can bring to the emergency response community. The technical staff received the necessary information to act as PM for any activations requested by the Russian government. The training introduced them to the Charter, its member agencies, its

operations, its assets, and the reporting functions that must be fulfilled by the PM at the completion of an activation. The two Russian Charter activations from this year were reviewed and a mock activation exercise was completed by the participating staff.

The European Space Agency (ESA) hosted a training course on the International Charter 'Space and Major Disasters' at the European Space Research Institute (ESRIN) on 22-25 October 2012. A total of nine Chinese delegates attended the training course with participants from the China National Space Administration (CNSA), the National Space Science Center, the China Centre for Resources Satellite Data & Application (CRESDA), the Chinese Society of Astronautics, the Beijing Institute of Control Engineering, the China Meteorological Administration and the National Satellite Meteorological Center.

The Charter training course was comprised of various presentations on Earth Observation capabilities for crisis mapping as well as practical exercise sessions focusing on flood mapping, oil spill mapping, fire detection and burnt area mapping. Participants also took part in Charter tutorials on the history of the Charter and its management structure, as well as an overview of operational roles and procedures.

3 Charter Evolution

The Charter Members, conscious of the importance of developing a long-term plan for the evolution of its product and services, started in 2010 to re-examine the Charter's scope, policies, and external partnerships within which it operates, so as to remain an effective resource for emergency response.

2012 was mainly focused on:

- 1) Charter Universal Access (UA) implementation.
- 2) Operation system and data distribution system.

In addition, the training subgroup began developing training materials to support the implementation of the Universal Access.

3.1 Universal Access

The resolution on Universal Access (UA) was adopted at the London Board meeting in May 2011: any national disaster management authority will be able to submit requests to the Charter for emergency response. Proper procedures will have to be followed, but the affected country will not have to be a Charter member.

In January 2012, the Board established a high-level agreement among Charter members that defined the admission process for countries and outreach programmes to be used by the Charter members. Criteria have been identified as a prerequisite for assessing the qualifications of an applicant, to ensure that the Charter's resources are efficiently utilized:

- The entity must be a national disaster management authority or its delegated agency in that country
- The entity must have the capacity to download and utilize maps
- The entity must be able to submit and pursue its activation requests in English

A communication plan was developed and discussed at the Board meeting in Tokyo and a one-year implementation plan was defined and approved at the Board teleconference in September.

In the meanwhile, the Universal Access brochure was issued (Figure 3-1) providing an overview of the Charter, of its members, of its products and explaining the different steps (registration, candidate assessment, training) a candidate should pass through to become a Charter Authorized User. A candidate would be recognized as Authorized User only completing the prescribed training.

The training group drafted the Authorized User (AU) training manual to explain the Charter functions, roles and the procedures an AU must follow to trigger the Charter after a major disaster. After approval by the Board, the material will be made available as a brochure and e-learning material on Moodle.

Universal Access was announced officially in September 2012 through communications on the Charter website and on the websites of GEO, UNITAR/UNOSAT and UNOOSA, which agreed to support the Charter in disseminating this information via their network. The Universal Access brochure and Registration Form were provided together with the announcement message.

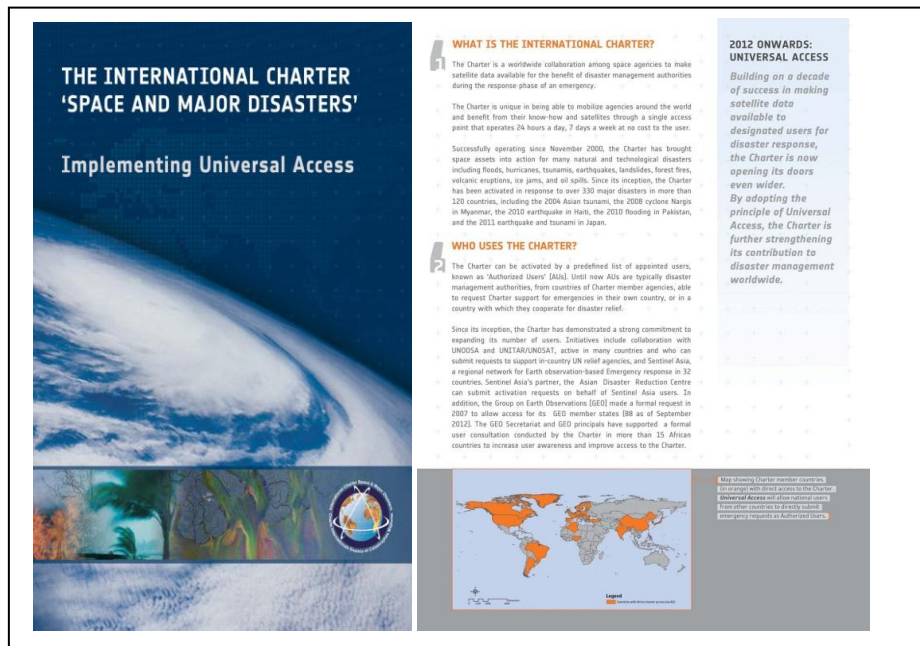


Figure 3.1. Universal access brochure

In addition, Charter members have promoted Universal Access and the Charter as a whole through participation in different international events: EUMETSAT, at the Coordination Group on Meteorological Satellites Plenary Session, JAXA and KARI at the JPTM2012, CNES at the GEO Plenary meeting and UKSA at the European Space Solution.

Two applications were received by the end of 2012.

3.2 New Charter Operations system

The Board agreed that the Charter will adopt a new data workflow management system, the Charter Operations System (COS-2).

COS-2 is under development by ESA and was presented at the Board meeting held in Paris in October 2012.

It is an integrated system that is being implemented to support workflow management in Charter operations. It allows for the provision of a digital User Request Forms (URF); the creation dossier (acquisition and archive plan for the Emergency on-Call Officer, ECO); submission of the Project Manager nomination; and methods to optimise the planning of new acquisitions with the multi-mission orbit propagator SaVoir. It will also used to generate part of the PM dossier and some of the Charter statistics. COS-2 will also be integrated with the Charter Geographic Tool (CGT), a meta data library developed by CNES (§4.6).

3.3 Data Distribution System

To improve Charter operations, the Board agreed that the Charter should utilize the COS-2/CGT and HDDS systems for data distribution.

When the Charter was created, it focused on implementing a unified system for gathering user requests (based on the User Request Form, URF) and, for tasking EO missions during

emergencies (based on the Emergency on-Call Officers and the Emergency Request Form, ERF). These tools have been proven as effective operational solutions form the solid foundations of the Charter today. Following the “Charter evolution ” process, Charter agencies have realised that to improve the responsiveness and the ease of use of the Charter, a unified system to distribute data acquired during a Charter activation would be highly desirable.

Achieving unified EO data access requires reducing the number of systems used by the Project Manager to get data from the different Charter members. It was proposed at the Board meeting of Paris in October 2012 to utilize: a system based on USGS’ Hazards Data Distribution System (HDDS) and the new Charter Operational System COS-2/ Charter Geographic Tool (CGT) which will allow access to all Charter data, including those data whose providers wish to retain distribution at the source.

4 Operations

4.1 Charter activations

In 2012, the number of activations was 40; a number very close to the average of the years 2007 to 2011 (Figure 4-1). In total the Charter was triggered for 364 disasters in 108 countries since 2000.

Since 2007, the annual number of activations has oscillated between 30 and 50. The Charter has effectively managed those 40/50 activations a year thanks to its distributed operational capacities and human resources (satellites constellation, ES, ECOs and, PMs).

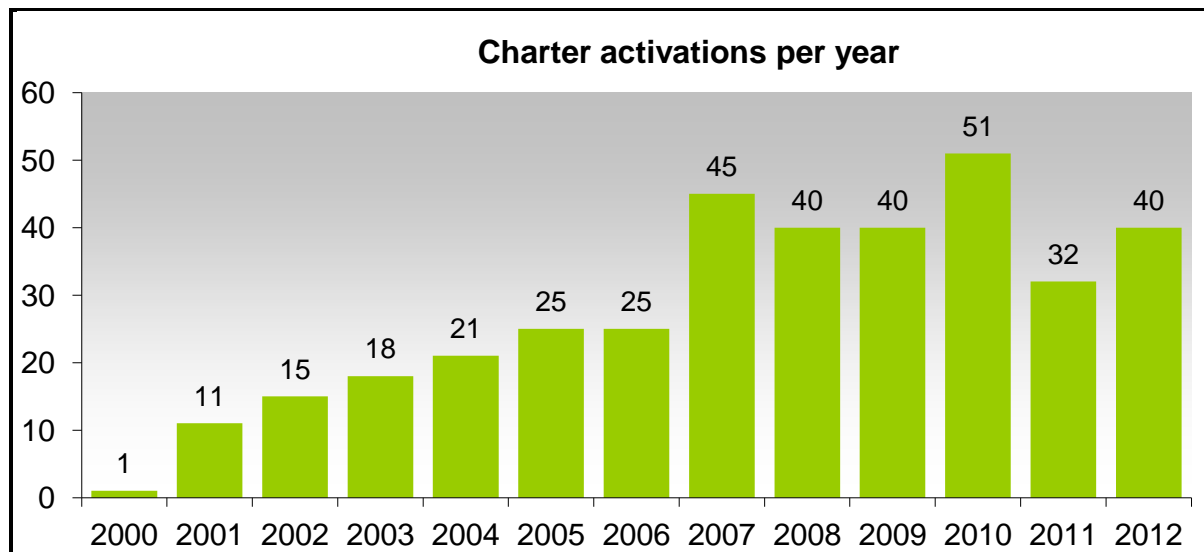


Figure 4-1. Number of Charter activations per year (2000- 2012)

The 2012 activations are listed in Table 4-1. The Call-ID is the unique number assigned by the On-Duty Operator (ODO) to any User Request Form received. The number of the activation ('Activation number') differs from the Call-ID as some Calls are not processed (rejection mechanism) and others are merged. In total, 44 requests were received in 2012.

- Two calls were denied:
 - o Call 390, for a flood and landslide in Ecuador. It was denied because it was requested by a national user (Secretaría Nacional de Gestión de Riesgos - SNGR) without the status of Authorized User (error of procedure). Call 391 for the same event was requested by the authorized user of Argentina (SIFEM) on behalf of the SNGR and accepted as activation 330.
 - o Call 393, for a locust infestation in Libya and Algeria. The request was made by UNOOSA on behalf of the FAO but was not accepted because the type of event does not meet the Charter's criteria for emergency satellite data acquisition planning in response to a sudden and unforeseen event.
- One activation (Act.342) for flooding in Senegal was the result of two calls subsequently merged:
 - o Call 404 was requested by UNITAR/UNOSAT on behalf of UNOCHA-ROWCA.

- Call 406 was requested by the French Civil Protection (COGIC) on behalf of Minister of Interior/Fire Division of Senegal (Groupement National des Sapeurs Pompiers - GNSE).

Activation ID	Hazard type	Country name	Activation Date
325	flood	Brazil	07/01/2012
326	ocean storm (cyclone)	Madagascar	14/02/2012
327	flood	Peru	21/02/2012
328	flood	Algeria	26/02/2012
329	ocean storm & flood	Madagascar	01/03/2012
330	flood & landslide	Ecuador	10/03/2012
331	flood	Fiji	31/03/2012
332	flood	Paraguay	30/04/2012
333	flood	China P Rep	12/05/2012
334	Volcano	Guatemala	21/05/2012
335	flood	Canada	24/06/2012
336	flood	India	29/06/2012
337	flood	Russia	10/07/2012
338	flood	Philippines	08/08/2012
339	earthquake	Iran	15/08/2012
340	wildfire	Algeria	16/08/2012
341	flood	Russia	22/08/2012
342	flood	Senegal	27/08/2012
343	flood	Niger	28/08/2012
344	flood	Nigeria	29/08/2012
345	ocean storm & flood	USA	30/08/2012
346	flood	Cameroon	06/09/2012
347	earthquake	China P Republic	07/09/2012
348	flood & landslide	India	15/09/2012
349	wildfire	Ecuador	16/09/2012
350	flood	Pakistan	18/09/2012
351	flood	South Sudan	24/09/2012
352	flood	Nigeria	25/09/2012
353	flood	Nigeria	10/10/2012
354	flood	Chad	11/10/2012
355	ocean storm	Haiti	29/10/2012
356	ocean storm	USA	01/11/2012
357	earthquake	Guatemala	08/11/2012
358	flood	England	27/11/2012
359	ocean storm	Palau	03/12/2012
360	ocean storm	Philippines	05/12/2012
361	ocean storm	Samoa islands	15/12/2012
362	ocean storm	Wallis and Futuna Islands (France)	16/12/2012
363	ocean storm	Fiji	18/12/2012
364	flood	England	21/12/2012

Table 4-1. List of 2012 Activations

4.1.1 Monthly activations

During 2012 the monthly average of calls was 3.7 and the monthly average of activations was 3.3, which are comparable to 2007 and 2008.

Year	Average # of calls per month	Average # of activations per month
2001	1	0.9
2002	1.4	1.3
2003	1.6	1.5
2004	1.9	1.8
2005	2.5	2.1
2006	2.3	2.1
2007	4.1	3.8
2008	3.9	3.3
2009	3.8	3.3
2010	5.3	4.3
2011	3	2.7
2012	3.7	3.3

Figure 4-2 shows the monthly distribution of activations in 2012. The highest number of activations happened in August and September which corresponded to 37.5 % of the total. Another peak in December is linked to a series of ocean storms, which hit Oceania and Southern Asia countries. The other months varied from 1 to 3 activations.

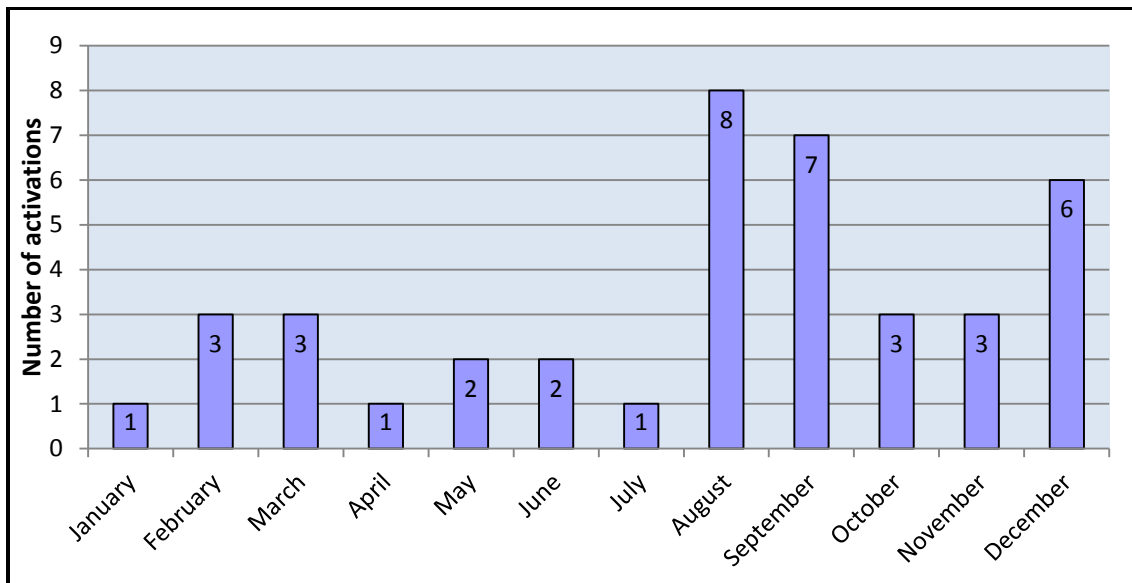


Figure 4-2. Distribution of Charter activations by months in 2012

Such peaks at the end of summer and in autumn have regularly occurred since 2009 (Figures 4-3 and 4-4). Figure 4-5 illustrates the trend observed in September by continents/sub-continents in the time frame 2008-2012, in particular the increase of requests from African and Asian end users. Disasters that occurred in that time of year were mainly caused by intense rains in Western Africa or Asia and/or ocean storms in the Caribbean and North America. Increase of requests by African entities can also be explained in part by their having better knowledge of the Charter and

available access mechanisms, thanks to awareness campaigns carried out by Charter members during the past several years.

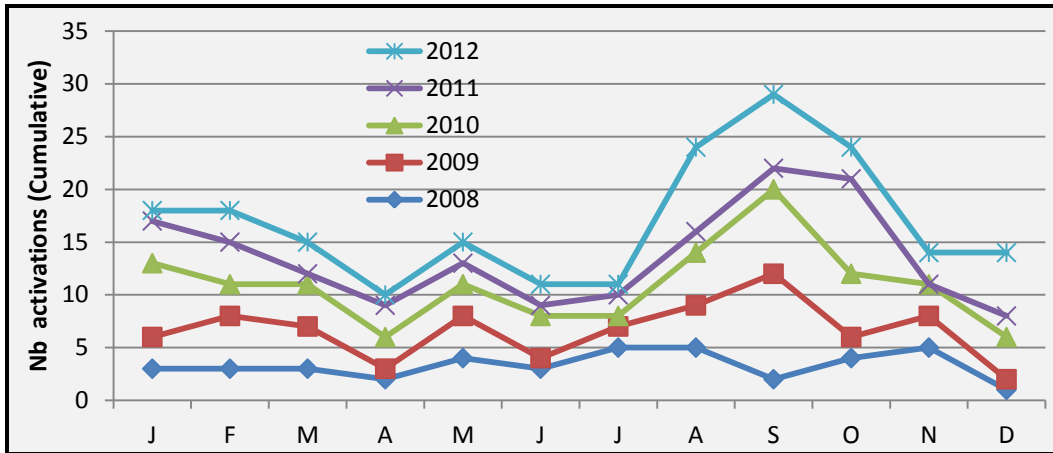


Figure 4-3. Charter activations by months from 2008 to 2012

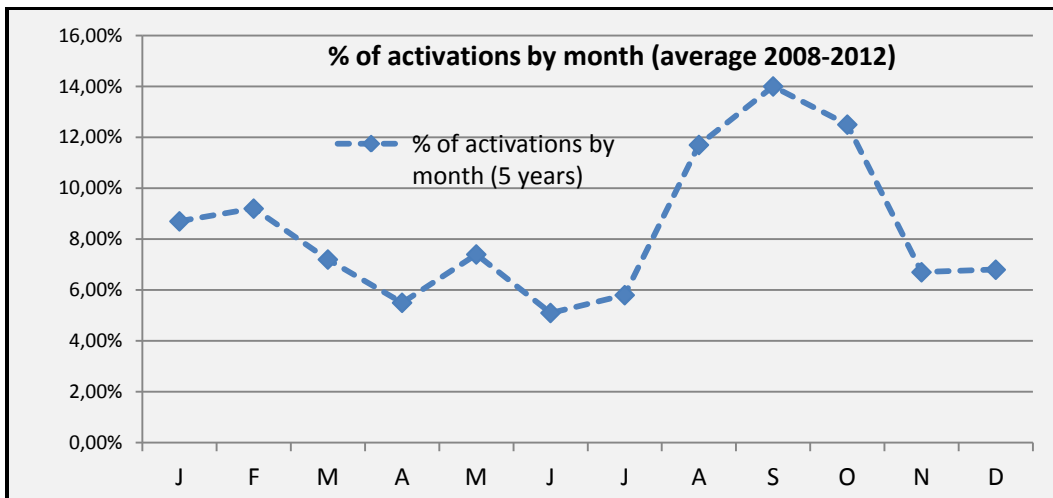


Figure 4-4. Monthly average (in %) of Charter activations (2008 to 2012)

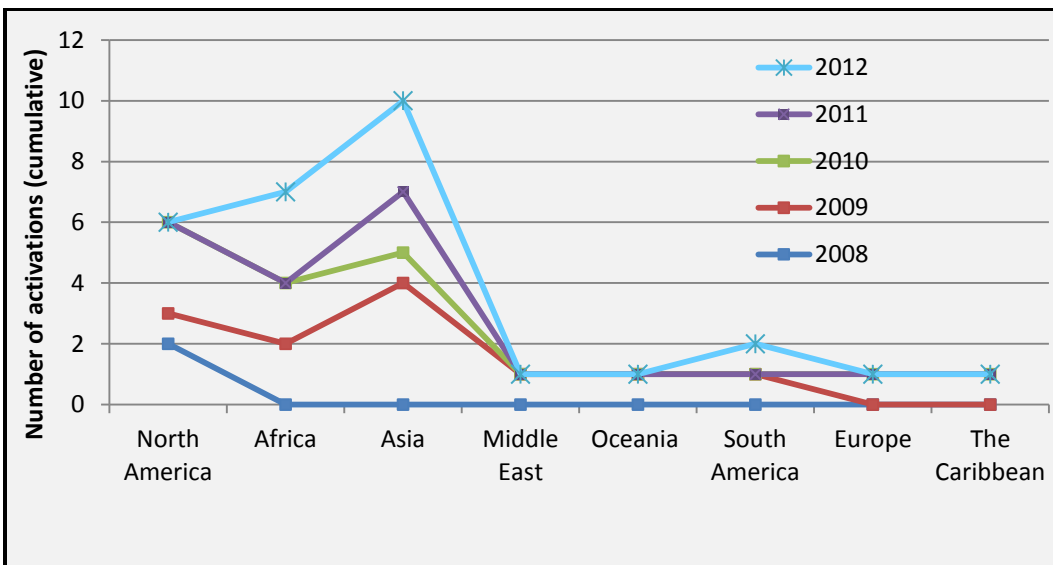


Figure 4-5. Breakdown of activations by continents in September 2008-2012

4.1.2 Geographical distribution

In 2012, 12 activations occurred in Africa, 9 in Asia, 8 in South & Central America, 4 in Europe, 4 in Oceania, and 3 in North America (Figure 4-6 & 4-7) with the most frequent hazard type being flooding (63%) and ocean storms (23%) (Figure 4-8).

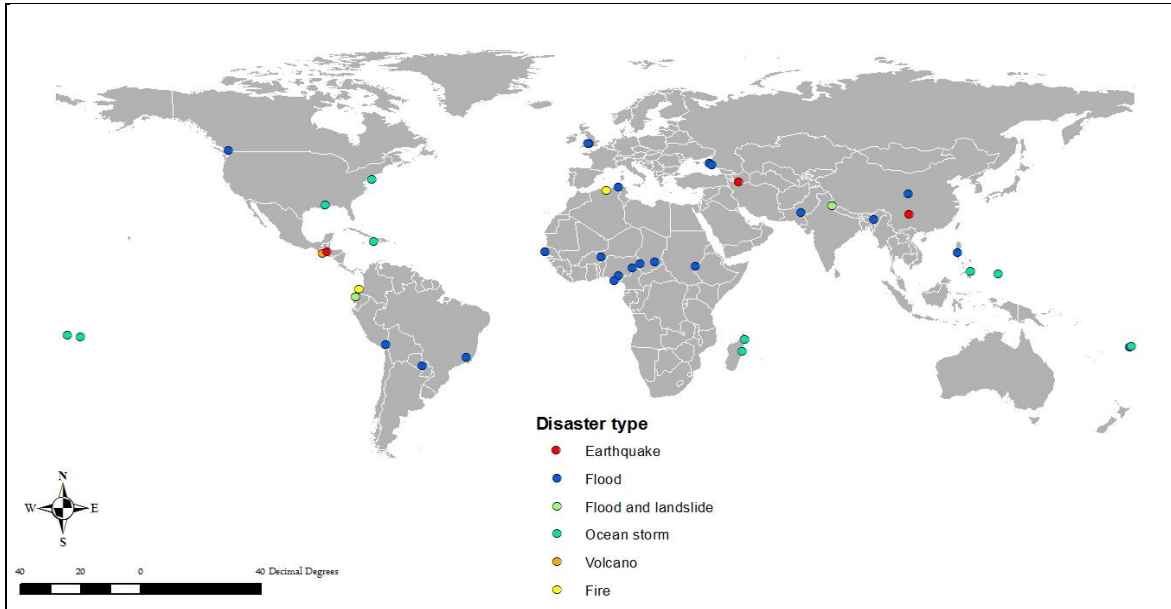


Figure 4-6. Location of the 2012 activations (by hazard type)

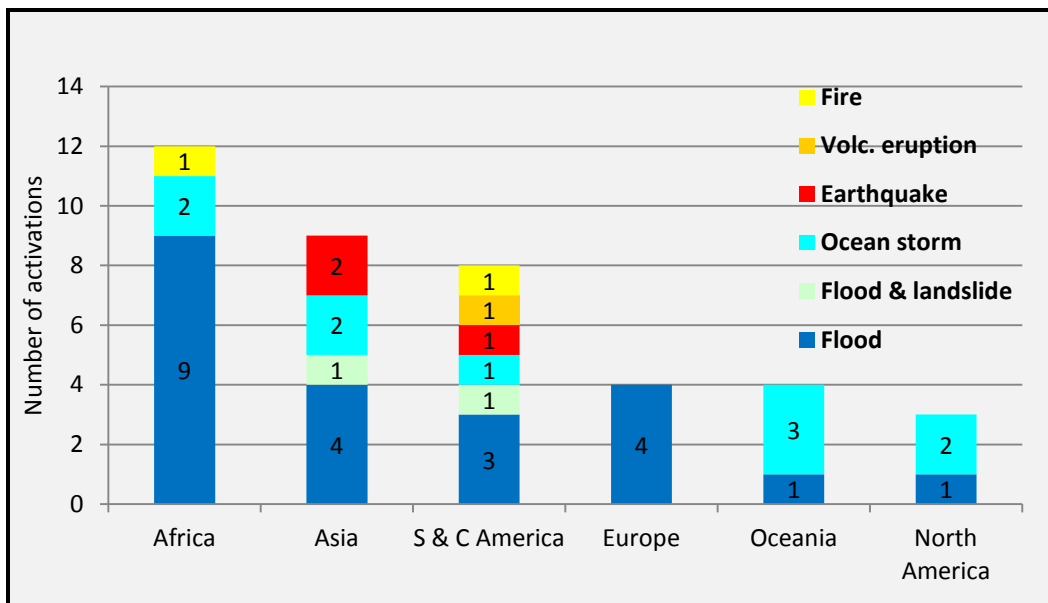


Figure 4-7. Number of activations by continent/subcontinent and hazard type.

In 2012, weather related hazards represent 90% of the total calls while solid Earth-related hazards represented only 10% (Figure 4-8). However, it should be noted that it is not always easy to classify Charter activations by disaster types as there are often combinations of events, such as earthquakes causing landslides and tropical storms resulting in floods and landslides.

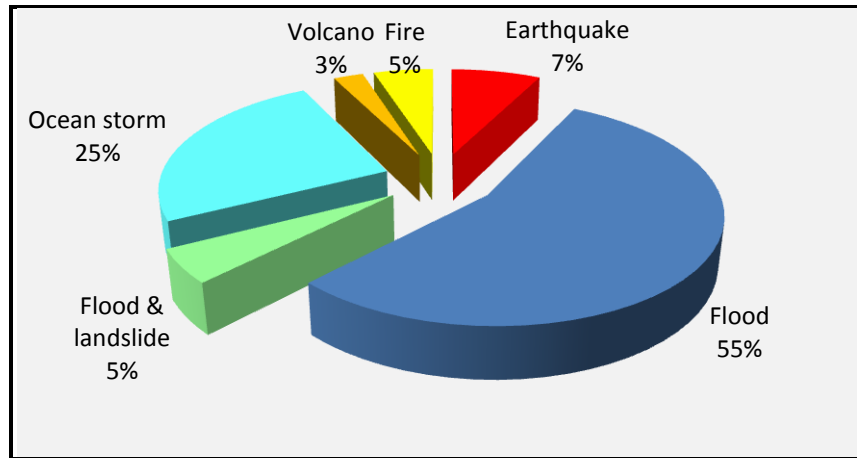


Figure 4-8. 2012 Number of activations by hazard type

As shown in the figure below (Figure 4.9), since 2004, most disasters covered by the Charter are caused by flooding. The other two principal hazards are storm/hurricanes and earthquakes. Activations for ice/snow hazards, oil spills, landslides and volcanic eruptions were relatively rare (around 6%).

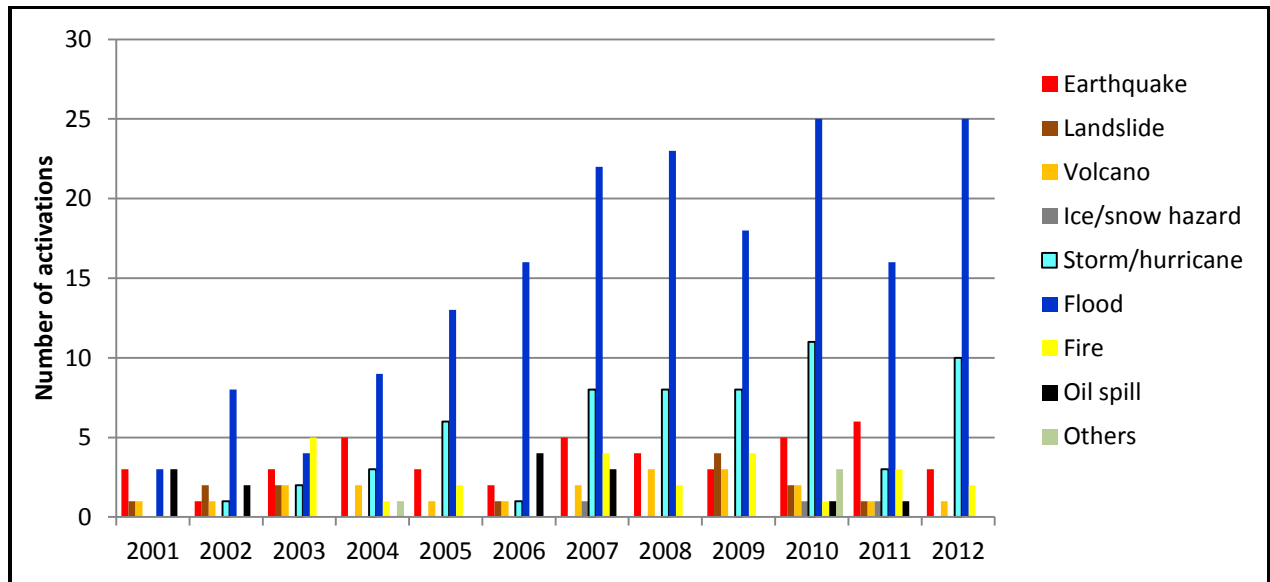


Figure 4-9. 2001-2012 Distribution of activations by hazard type

Figure 4-10 shows the geographic distribution of activations by access mode. Since 2010, there are 4 access modes that have been used.

- Mode 1: direct activation by an Authorized User for a disaster occurring in his country.
- Mode 2: activation by an Authorized User on behalf of a user from another country without AU ('Sponsor AU').
- Mode 3: activation by UN OOSA or UNITAR/UNOSAT for UN users.
- In 2010, the Mode 4 was created; it is the activation for national users from the Asia Pacific region via Sentinel Asia's partner, the Asian Disaster Reduction Center.

In 2012, Mode 1 was used for disasters in Asia, the Americas and Africa; Mode 2 was used for disasters in Africa and, Central and South America. Mode 3 was used mainly for disasters in Africa, Asia and Oceania. By definition, Mode 4 was used in Asia (Figure 4-10 & 4-11). In 2012, activations by an AU (mode 1 & 2) were the main access modes (70% in total) to the Charter while UN activations remained stable at 27% of the total.

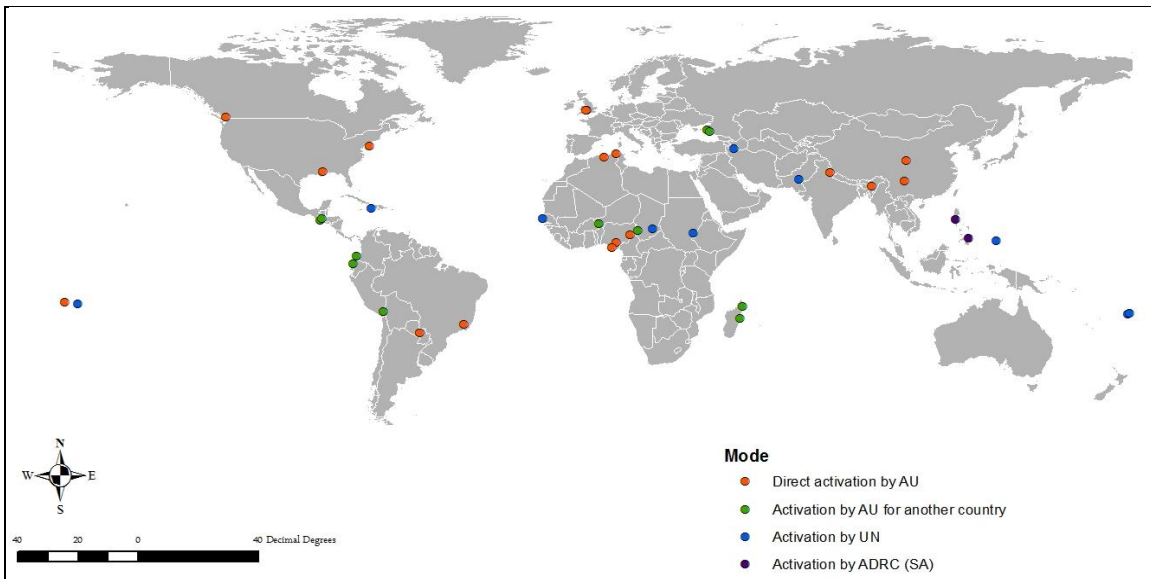


Figure 4-10. Location of the 2012 activations (per mode)

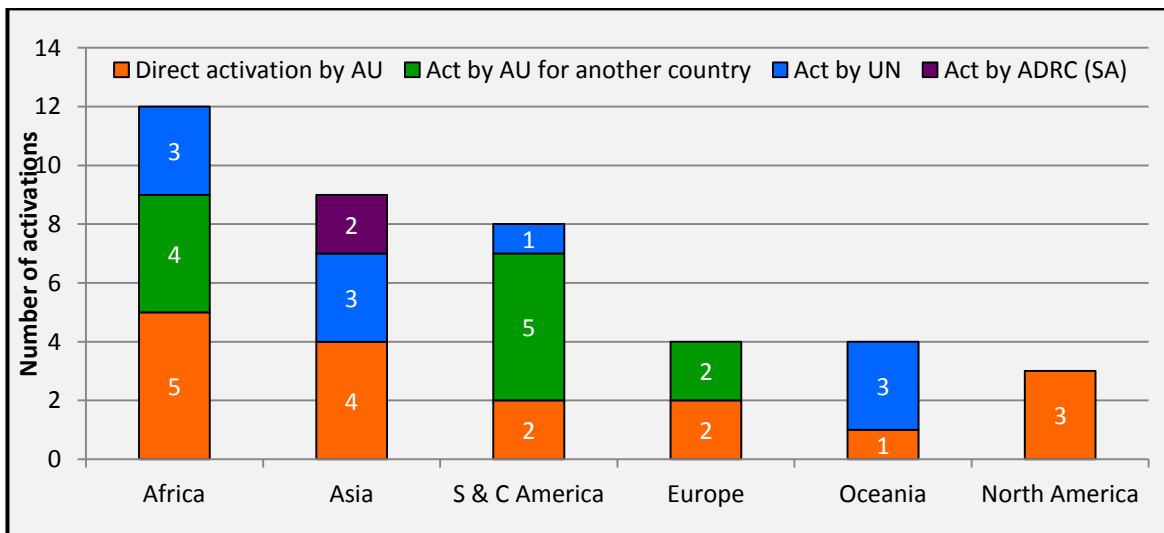


Figure 4-11. 2012 Number of Charter activations per continent/sub-continent & per mode

The following diagram (Figure 4-12) compares the relative weight of the different access mechanisms from 2001 through 2012. The Charter continues to address more users and is not only a service supporting users from countries with an Authorized User (AU) but a service supporting users worldwide, including countries without direct access by an AU (through activations by AU for other countries, by UN bodies for UN in-country agencies and through Sentinel Asia). Indeed, since its inception, 80 countries without AUs have benefited from the Charter. During 2007-2012 approximately 60% of the activations were not direct requests but requests on behalf of a user in a country without an Authorized User.

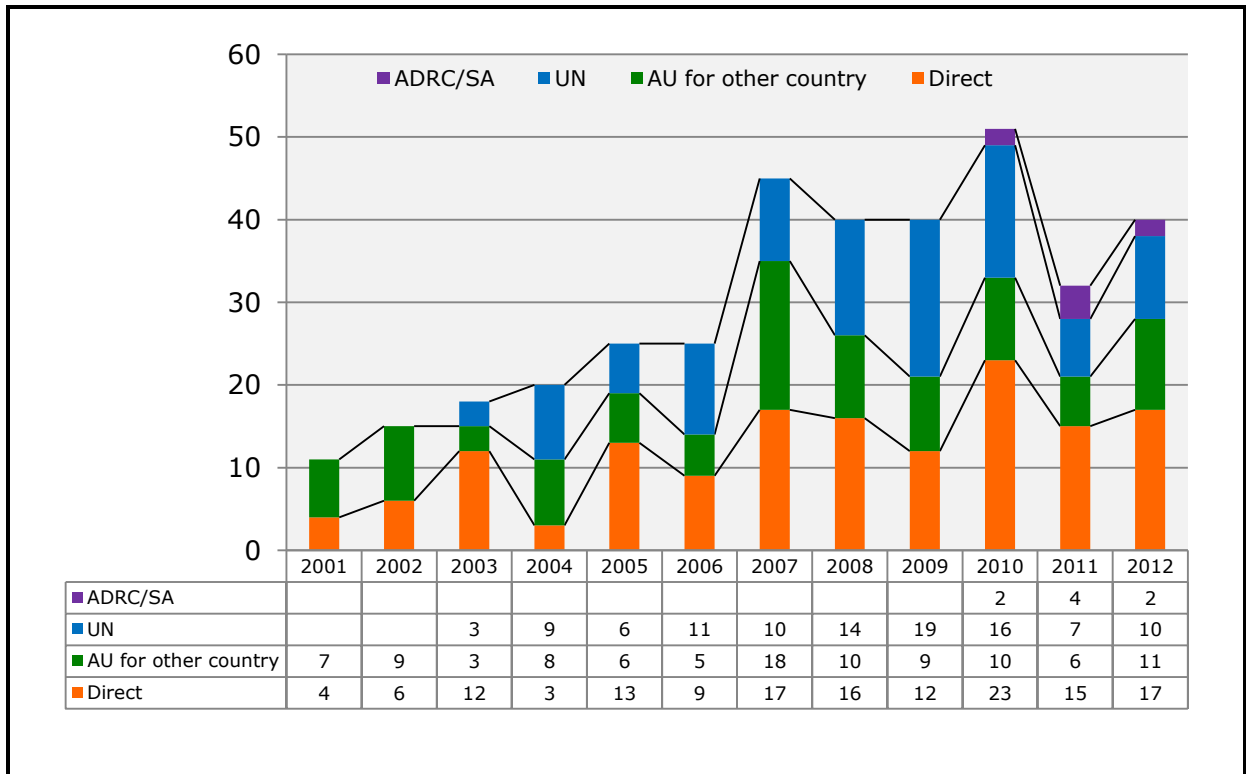


Figure 4-12. 2001-2012 number of Charter activations per mode.

4.2 Anomaly reports

In case where operational procedures are not properly followed during an activation, the Charter opens an anomaly report to keep track of such errors and to analyse their causes, in order to try and avoid repetition of similar situations.

Two anomaly reports were opened during this period:

- Call 385 (Activation 325), flood in Brazil: the On-Duty Operator (ODO) ticked the box ‘Other’ on the User Request Form (URF) for this Call despite the fact that it was from an AU. It appears the ODO referred to an old AU list. Such errors could lead delay in processing the Charter activation and in providing needed support to emergency teams.
- Calls 404 to 408 (Activations 342 to 345): floods in Senegal, Niger, and Nigeria, and an ocean storm in USA. ISRO order desk was unreachable during these calls. Necessary action to ensure a proper response for Charter data requests was performed by ISRO mission planners, in particular updating the ISRO Emergency Request Form (ERF) with

Emergency on-Call Officers phone numbers and providing an additional number for leaving urgent messages.

4.3 *FTP site*

The FTP site is a facility reserved for Charter members; it is mainly used as the primary archive of Charter reports, procedures and minutes of meetings, and occasionally is utilized as a temporary repository for the exchange of raw data amongst space agencies and Project Managers. CSA conducts regular monitoring of the FTP site to ensure that it is used and maintained effectively and appropriately.

4.4 Resource report

4.4.1 EO data consumption in 2012

In 2012, in order to support 40 activations in 27 countries, a total of 980 images were supplied by the Charter members: 693 HR and VHR optical data (Figure 4-13, 4-14, table 4-2) and a total of 287 radar data including 114 VHR SAR products (TerraSAR-X/TanDEM-X) (Figure 4-13, 4-15, table 4-3). In addition, 1,826 images of commercial US VHR optical satellites (GeoEye, IKONOS, QuickBird, WorldView) were supplied.

Supply of Pléiades images started in June 2012; ENVISAT was decommissioned in April 2012.

Figure 4-13 shows the total number of Charter EO data provided in 2012.

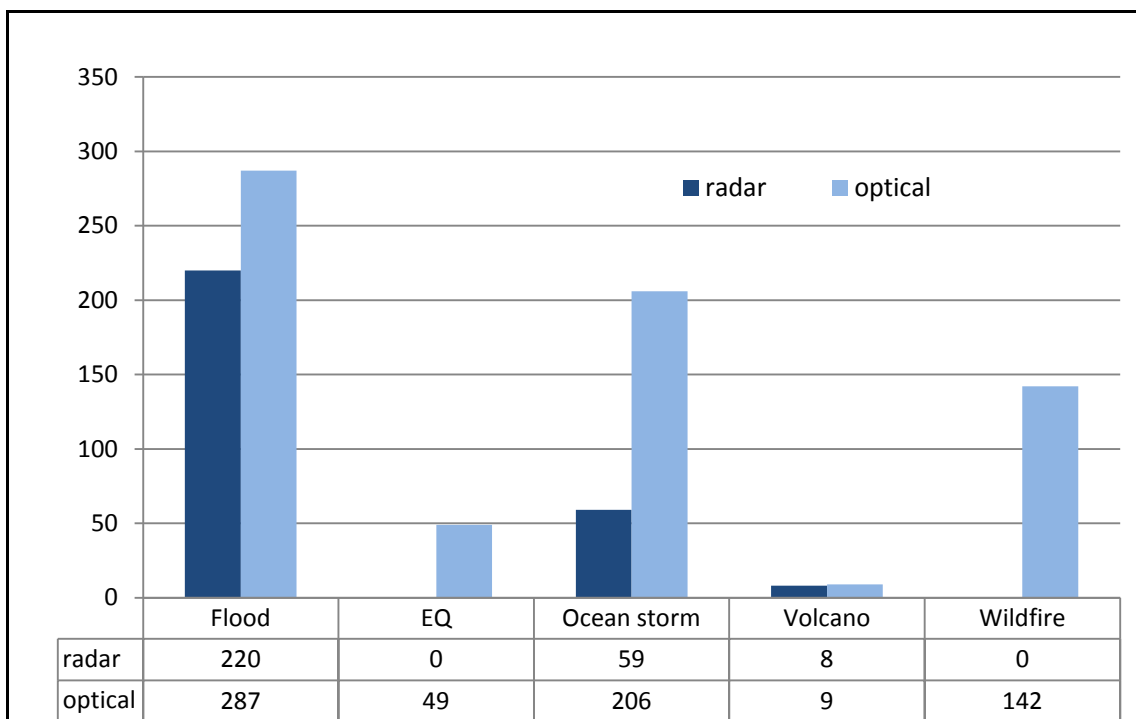


Figure 4-13. 2012 number of radar and optical images grouped by hazard type

In 2011, 1105 images were supplied to support 32 activations in 23 countries.

	Flood	Earthquake	Ocean storm	Oil spill	landslide	Snow fall	Volcano	Wildfire
Radar data	227	55	53	10	1	4	18	0
Optical data	425	88	84	7	0	10	26	97

The higher consumption of data in 2011 was due in part to the delivery of large quantity of data to support long and big activations as the earthquake and tsunami in Japan, an ocean storm in US and a flood in Thailand.

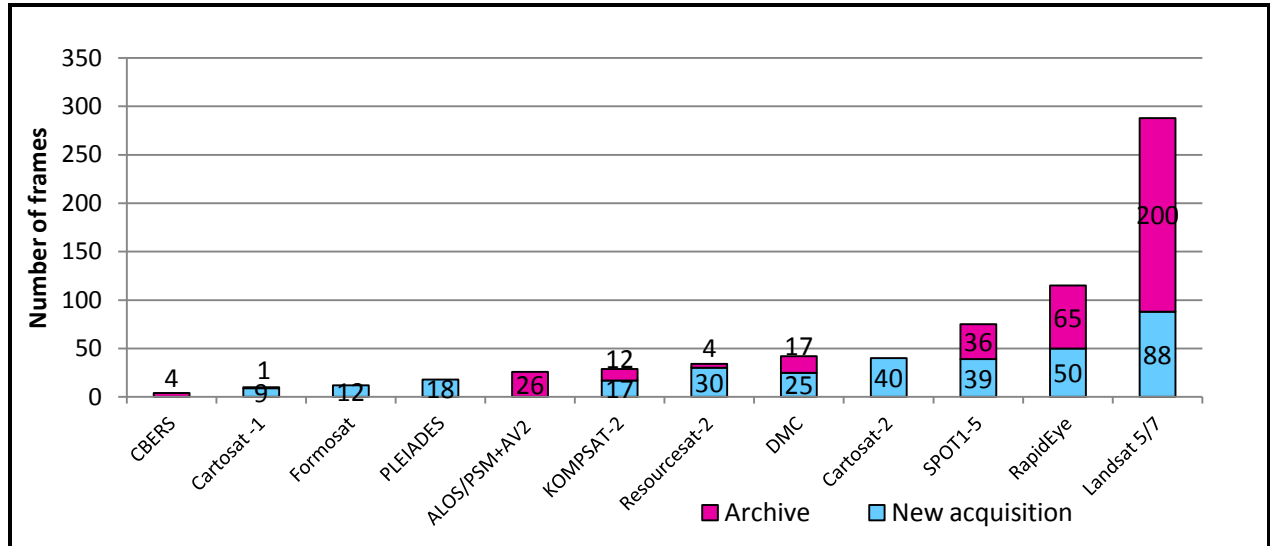


Figure 4-14. 2012 Data Consumption- Optical sensors

Resource	CBERS	FORMOSAT	PLEIADES	ALOS/PSM+AV2	KOMPSAT2	Resourcesat-	DMC	Cartosat-1/2	SPOT 1-5	RapidEye	LANDSAT 5/7
Total number of Data Products delivered	4	12	18	26	29	34	42	50	75	115	288
archive	4	-	-	26	12	4	17	1	36	65	200
New Acquisition	-	12	18	-	17	30	25	49	39	50	88
Max # images per Activation	4	4	5	7	8	7	4	6	7	77	48
Average # images. per activation		0.3	0.45	0.65	.73	0.85	1.05	1.2	1.87	2.87	7.2

Table 4-2. Statistics by Optical sensors

Landsat data represents the main optical resource with a total of 288 images (200 archive images and 88 new acquisitions), but was notably fewer in quantity than in 2011 (511 image) and 2010 (600).

RapidEye data was contributed on a case-by-case basis for a few activations, such as the fire events in Ecuador and in Algeria. The high numbers being reported above are due to the delivery format of the data as relatively small RapidEye image tiles.

Distribution of Pléiades data started only after June 2012 and was contributed to respond to earthquakes and hurricane events.

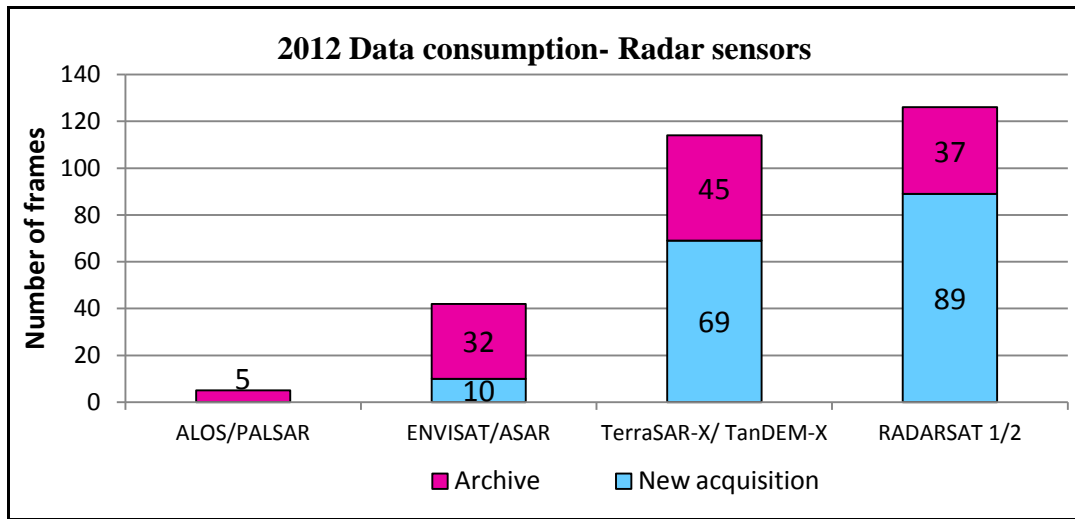


Figure 4-15. 2012 Data Consumption - Radar sensors

Resource	ALOS/ PALSAR	ENVISAT/ ASAR	TERRASAR-X/ TanDEM-X	RADARSAT
Total number of Data delivered	5	42	114	126
Archive	5	32	45	37
New Acquisition		10	69	89
Max # per Activation	4	4	7	10
Average # images. per activation		1.	2.85	3.15

Table 4-3.Statistics by Radar sensors

Due to decommissioning of ALOS in 2011 and of ENVISAT in April 2012, radar data were provided mainly by TerraSAR-X and Tandem-X and RADARSAT 1 and 2. The total numbers of TerraSAR-X/Tandem-X and RADARSAT 1 and 2 scenes were higher than in 2011 (90 RADARSAT and 101 TerraSAR/Tandem-X data in 2011).

1,826 images of commercial US satellites (GeoEye, IKONOS, QuickBird, WorldView) were supplied. US VHR imagery is delivered to the Charter through USGS (Figure 4.16, table 4-4). The number of US VHR data delivered is lower than in 2011 (4,095 images).

The majority of the data was provided to monitor the impact of the Hurricane Sandy that hit the northeast of US in November (activation 356) with 15 programmed QuickBird and 331 programmed WorldView 1 and 2 data.

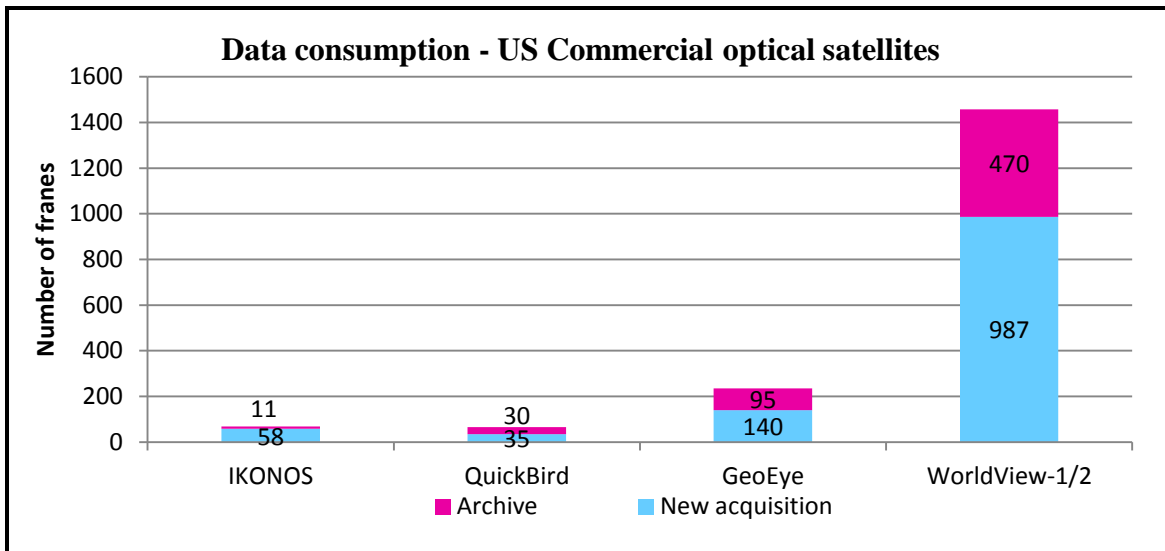


Figure 4-16. 2012 Data Consumption –US Commercial optical satellites

Resource	IKONOS	QUICKBIRD	GEOEYE	WORLDVIEW 1/2
Total number of Data Products delivered	60	65	235	1457
Archive	11	30	95	470
New acquisition	58	35	140	987
Max images per Activation	18	15	32	331
Average images per activation	1.5	1.6	5.8	36.4

Table 4-4. Statistics concerning US commercial optical satellites

Overview of charter data consumption by activations:

Figures 4-17 and 4-18 depict the number of Charter programmed and archive images by activation, and 4.19 shows the number of US VHR data by activation.

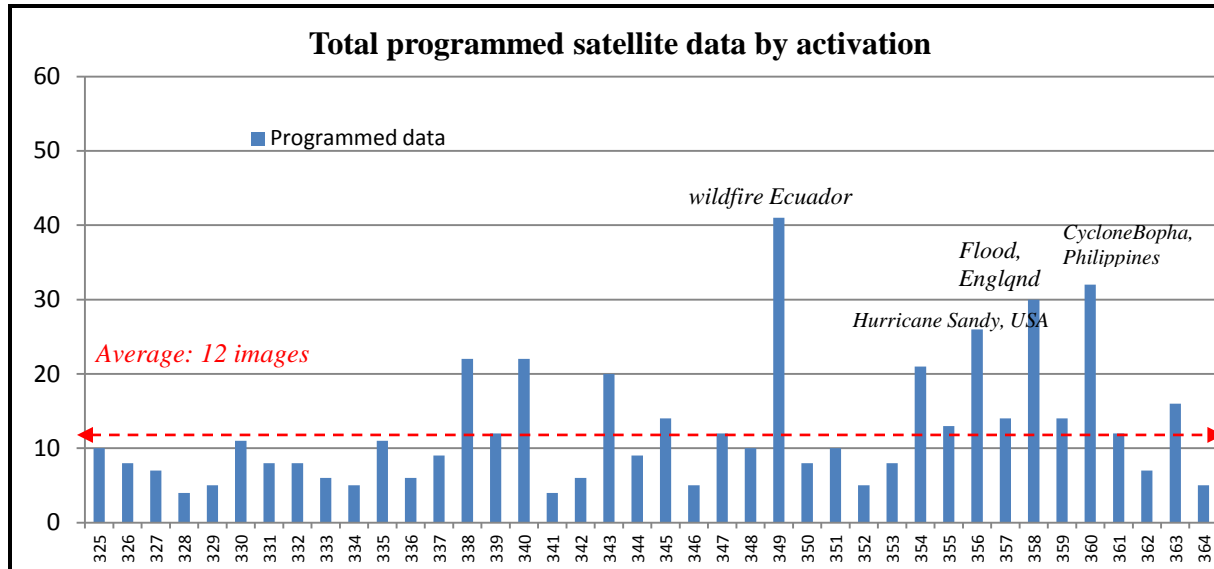


Figure 4-17. Number of programmed images provided by activation (all Charter EO sensors)

This year the number of programmed images by activation is in general fewer and less variable from one activation to another if compared with 2011. On average the quantity of images is less than last year (12 images in 2012 against 22 images in 2011). There are four activations with a higher number (greater than 20) of programmed data (Charter optical & radar sensors), these are: Act 349, wildfire in Ecuador, 40 images; Act 360, Cyclone Bopha in the Philippines, 31 images; Act 358, flood in England, 30 images; Act 356, Hurricane Sandy in USA, 24 images.

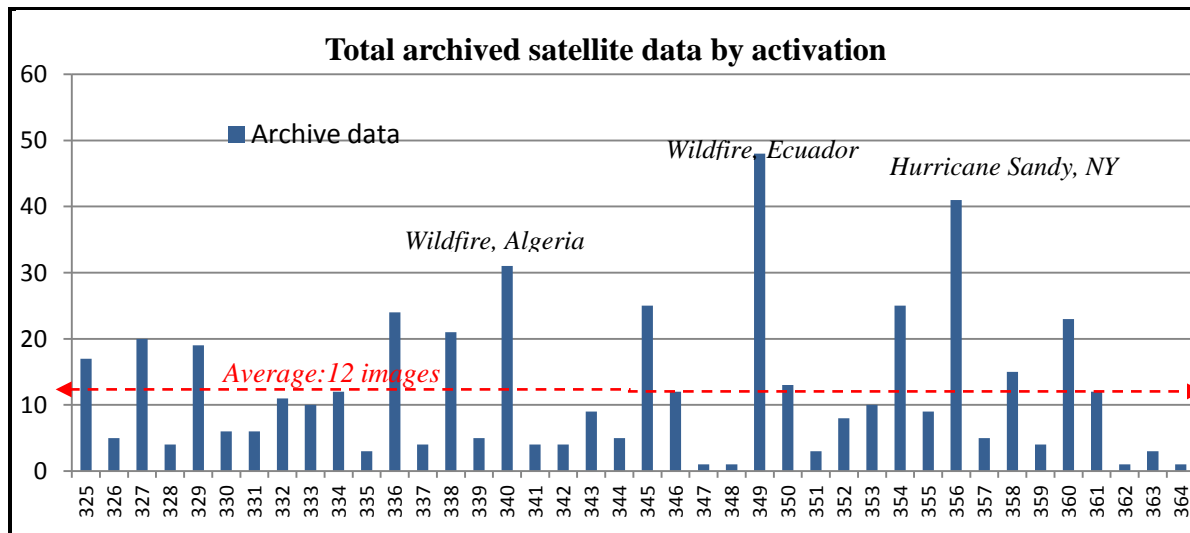


Figure 4-18. Number of archived images provided by activation (all Charter EO sensors).

Number of archived data used is on average equal to that of programmed data. There are three activations with a number of archive data more than 30 images /frames: Act 340, wildfire in Algeria; Act 349, wildfire in Ecuador; Act 356, hurricane Sandy in USA. RapidEye was the primary data source for two wildfires events and Landsat was the primary data source for hurricane Sandy event.

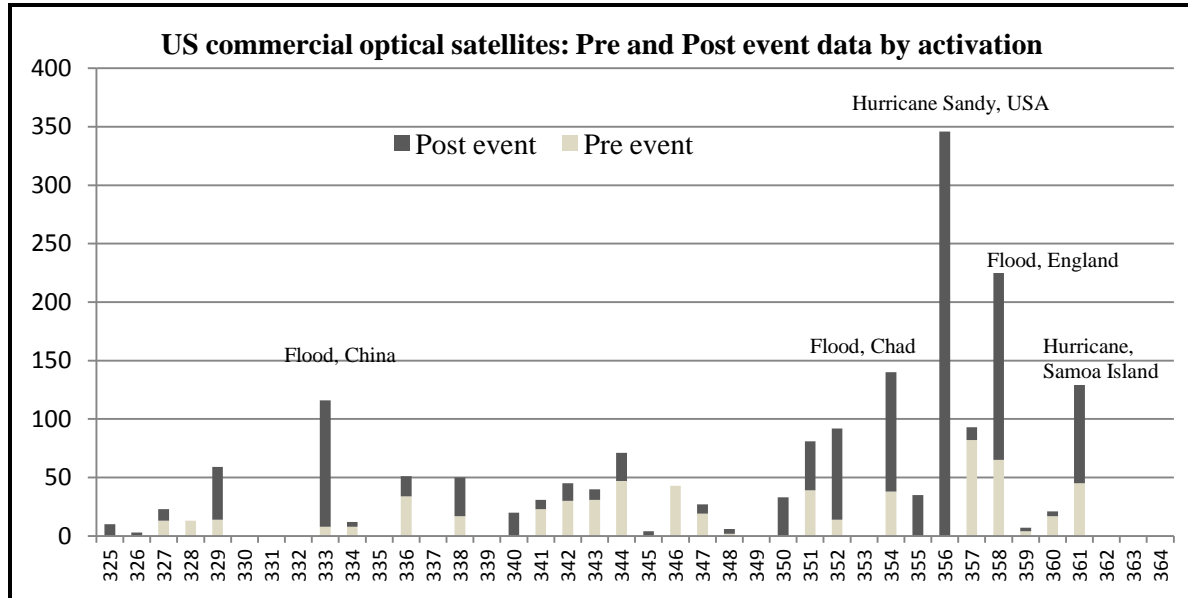


Figure 4-19. Number of images provided by activation (US optical commercial satellites).

The five activations with the highest number of US VHR data (greater than 100) provided are: Act 333, flood in China; act 354, flood in Chad; Act. 356, Hurricane Sandy in USA; Act 358: flood in England and Act 361: Hurricane in Samoa Island. 29 activations of 40 have benefited from these additional inputs.

In 2012, the Charter covered 8 of the 10 most severe disasters by fatalities (table 6-1), in particular the cyclone (Typhoon) Bopha in Southern Philippines at the beginning of December. The Charter provided 32 newly acquired radar and optical data and 23 archived data to analyse the damages caused by the cyclone. Radar data was used to identify the extension of flooded areas, and SPOT, Pléiades and GeoEye data were utilized to provide detailed analysis of the damages to the buildings and the vegetation.

A large amount of data was also delivered to monitor the impact of Hurricane Sandy in the USA (activation 361) in November 2012: 67 radar and optical images from the Charter members satellites and 346 images from US optical commercial satellites. Hurricane Sandy, which hit north-eastern USA on 29 October 2012, was reported as the most destructive encountered in this part of USA since the great storm of 1938.

The data resource analysis shows that the capacity of the Charter virtual constellation with the support of additional satellites can adequately support national authorities for estimating damages caused by different types of natural hazards in urban and non-urban areas.

4.4.2 Human resource contribution (ECO and PM) in 2012

- *ECO resources in 2012*

The Emergency On-Call Officer (ECO) services were provided on a weekly rotational basis by 10 Charter members agencies: CNES, CNSA, CONAE, CSA, DLR, DMCii, ESA, ISRO, JAXA, and KARI. The random nature of calls resulted in a rather skewed workload for the members, with CNES handling nearly one fifth of the calls. There were 8 calls processed by CNES, 6 calls by DMCii, 5 calls by CONAE, CSA and JAXA, 4 calls by CNSA and ESA; 3 calls by KARI and DLR and 1 call by ISRO.

Some ECOs had to handle 2-3 calls during their week on duty, particularly in September, when the maximum number of calls occurred.

- *Distribution of Charter members responsible for the PM services delivered in 2012*

CNES, USGS, DMCii, CONAE, JAXA, and DLR nominated Project Managers for 20% (8), 17.5% (7), 15% (6), 12.5% (5) of the Charter activations, respectively. JAXA and DLR nominated PMs for 7.5% (3) each. CNSA, INPE, and ISRO nominated PM for 5% (2) each; CSA and ESA for 2.5% (1) of activations each (Figure 4-20).

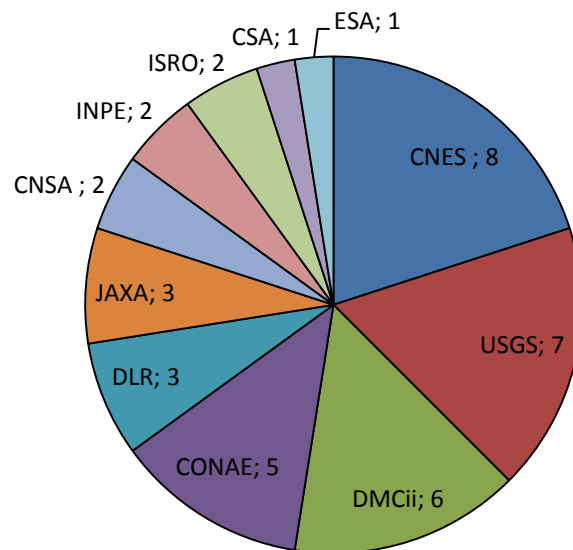


Figure 4-20. Distribution of Charter Parties responsible for the PM services in 2012

- *Distribution of organizations providing PM resources in 2012:*

The PMs may come from a Charter Party or a Third Party. Figure (4-21) shows the breakdown of the Project Managers' organizations involved in the processing and interpretation of the satellite imagery. This year, 24 different organizations offered their PM services.

Difference between figures 4-20 & 4-21: Any organization – Charter member or Third Party - can perform the PM service. In the case of third Party organizations it is required that a Charter member designates them and takes the responsibility for the service they provide. Figure 4-20

represents the breakdown of Charter members who designated PMs in 2012 while Figure 4-21 represents the breakdown of organizations performing the PM work for 2012 activations.

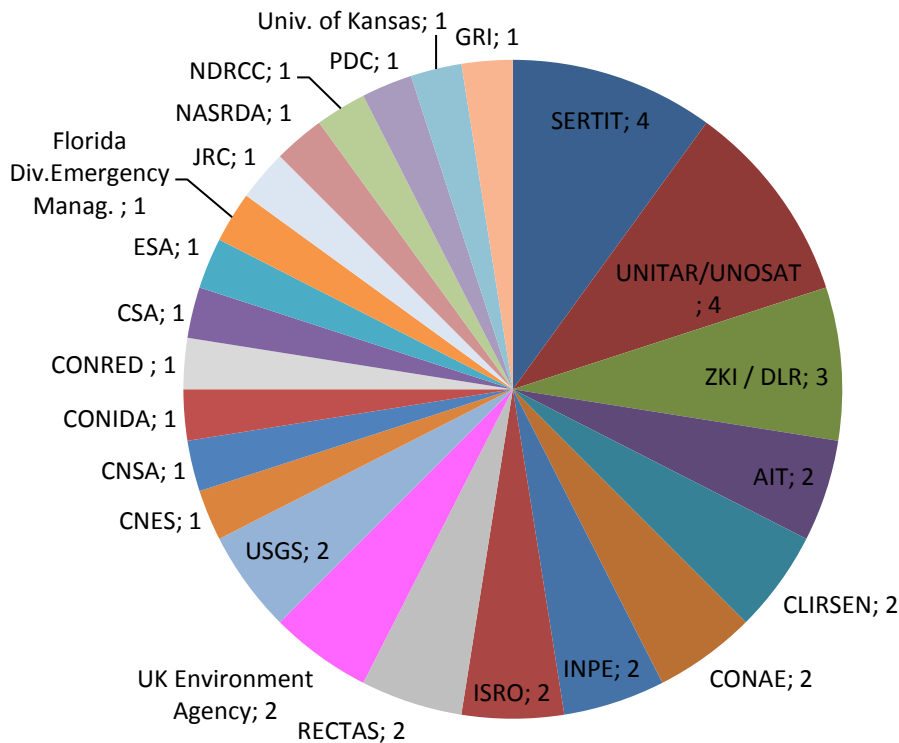


Figure 4-21. Distribution of organizations providing PM resources in 2012

Detailed comments:

- CNES provided 20% of the total Project Manager services with one internal staff covering the activation in Niger and other organizations, SERTIT (10%) and UNITAR/UNOSAT (1 event), covering activations in Madagascar and Wallis & Futuna (French overseas territory).
- USGS provided 17.5% of the total Project Manager Services comprising USGS (5%) with additional PMs from other organizations: Pacific Disaster Center (PDC) and Florida Division Emergency Management to cover activations in USA, EC-JRC to cover an activation in Cameroon (Africa), University of Kansas for an activation in Algeria, and CLIRSEN for a disaster in Ecuador.
- DMCii provided 15% of the total Project Manager services with PMs from the UK Environmental Agency to cover activations in England, Nigerian organizations (NARSDA and RECTAS) to manage the activations in Nigeria (Africa) and UNITAR/UNOSAT for a fire in Algeria.
- CONAE provided 12.5% of the total Project Manager services comprising CONAE (5%) with additional PMs from organizations such as CONIDA, CLIRSEN and CONRED to cover disasters in Peru, Ecuador and Guatemala.

- JAXA provided 7.5% of the total Project Management services from PMs provided by AIT to cover 2 events in Asia and by UNITAR/UNOSAT to cover one event in Senegal (Africa).
- DLR provided 7.5% of the total Project Management services from DLR-ZKI to cover UN requests for disasters in Fiji islands, in Iran and in Southern Sudan.
- INPE provided 5% of the total Project Management services from internal PMs to cover one event in Brazil and one in Pakistan.
- CNSA, ISRO and CSA provided internal PMs to cover activations in their countries.
- ESA provided 3% of the total Project Manager services to cover one event in Samoa Island, with one Project Manager provided internally,

Note that UNITAR/UNOSAT is an external organization engaged as PM by member agencies, in particular for UN activations. UNOSAT contributed to 10 % of the totality of activations over 2012.

- *Distribution of Charter members responsible for the PM services in 2010, 2011 and 2012*

The following graph represents the % of PM nominated by each Charter member in 2010 (51 activations), 2011 (32 activations) and 2012 (40 activations).

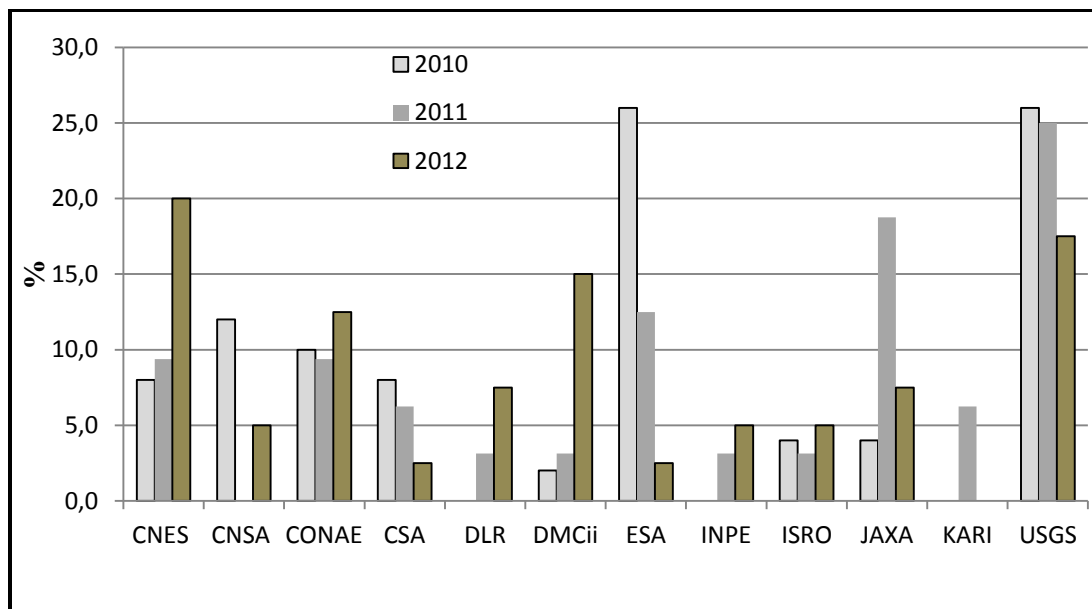


Figure 4-22. Distribution of Charter Parties responsible for the PM services in 2010, 2011 & 2012.

There is a large variability by agency and by year. This breakdown is explained by:

- Annual number of disasters
- Number of requests by Authorized Users for disasters occurring in their countries. The PM is nominated by the relevant Charter member.
- Number of requests by Authorized Users for another country without AU (e.g. SIFEM requests for Ecuador or Columbia, French Civil Protection requests for Madagascar, Senegal, New Zealand, USGS requests for Cameroon, Ecuador, Mexico, etc). The PM is nominated by the relevant Charter member.

- Number of requests by UN bodies. In that case, the current Charter Lead Agency has to nominate the PM.
- Number of requests by ADRC. In that case, the PM is nominated by JAXA.
- Number of requests by Algeria, Nigeria and Turkey. In that case, the PM is nominated by DMCii.
- Number of PMs managed by each agency and their availability.

During the last three years, USGS is the member which has nominated/provided the highest number of PMs followed by ESA (mostly in 2010), CNES (mostly in 2012), CONAE, and JAXA (mostly in 2011).

4.5 SARE – Semi Annual Refresher Exercises

Following the Charter procedures two Semi Annual Refresher Exercises were performed in 2012:

- SARE-09: Earthquake and flooding, Missouri/Tennessee Border, USA (from 04/06/2012 to 18/06/2012). This exercise was lead by USGS and CSA as the Training Team. 35 ECOs from 10 agencies participated. The report was prepared by CSA.
- SARE-10: Volcanic eruption, Italy (from 26/11/2012). This exercise was lead by ESA and USGS as the Training Team. 35 ECOs from 9 agencies participated. Report was prepared by USGS.

A set of common recommendations were issued to improve the Charter's Emergency on-Call Officer (ECO) operations and data management:

- update of the ECO procedures and scenarios;
- SaVoir is considered an extremely useful tool but it has to be regularly updated with the latest Charter missions and relevant sensors to be used properly;
- modification of the Generic ERF to accelerate the process;
- standardize parties' ERFs in order to make the process easier and faster for ECOs when they are called into action
- preparing SARE using complex scenarios (e.g. earthquake with a consequent flooding) is both challenging and useful.

All participants recognised that SARE is a good exercise for improving and upholding the knowledge of ECOs. The need for regular participation of ECO staff from the agencies providing ECO service to maintain effectiveness was highlighted. These comments are consistent from SARE to SARE.

4.6 Charter Geographic Tool

The "Charter Geographic Tool" (formerly Charter metadata catalogue) was developed by CNES in order to establish a comprehensive record of all images acquired by the Charter members in response to Charter activations.

Since 2000, images have been acquired by around 20 different Earth Observation satellites. Of these, over 4000 metadata files have been ingested into the catalogue by the Charter agencies.

The Charter Geographic Tool consists of three main components:

- An image metadata catalogue

- A FTP site which manages the harvesting of the metadata files uploaded by the Charter agencies
- A web interface based on the mapshup framework. This user-friendly interface allows searching and browsing of the metadata catalogue by activation, date and hazard type (Figures 4-23 and 4-24).

The tool is accessible through the Charter website or directly at the following address: <http://engine.mapshup.info/charternrg/>.

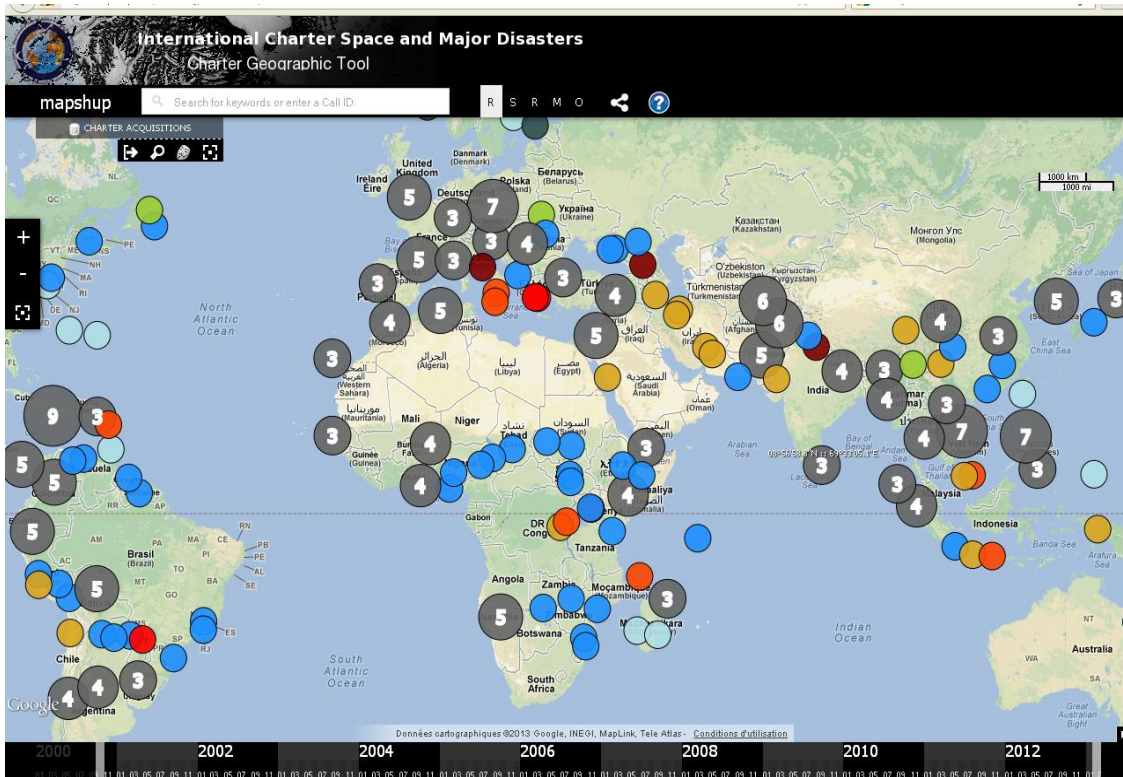
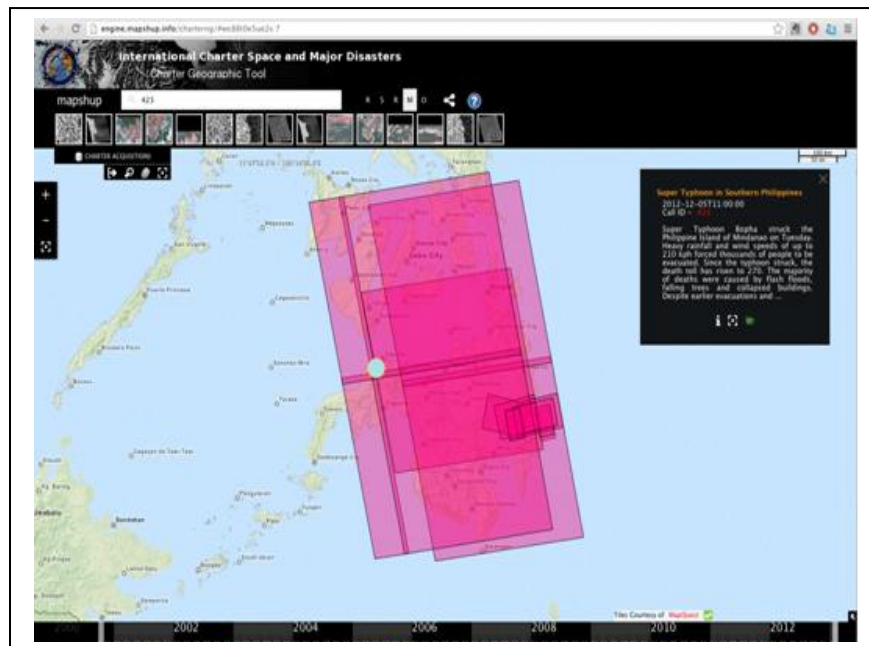


Figure 4-23. CGT home page showing all Charter activations locations and hazards (2000-2012)

Figure 4-24. Selection of one call, depicting all image footprints and relevant quick looks.



5 Communication

5.1 Web site

The website is part of the standard communication activities and currently available in five languages (English, Chinese, French, Japanese and Spanish).

Summary					
Reported period	Year 2012				
First visit	01 Jan 2012 - 00:00				
Last visit	31 Dec 2012 - 23:59				
	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Viewed traffic *	<= 99782 Exact value not available in 'Year' view	388693 (3.89 visits/visitor)	2770396 (7.12 Pages/Visit)	5339131 (13.73 Hits/Visit)	610.52 GB (1646.99 KB/Visit)
Not viewed traffic *			1584737	1841593	63.99 GB

* Not viewed traffic includes traffic generated by robots, worms, or replies with special HTTP status codes.

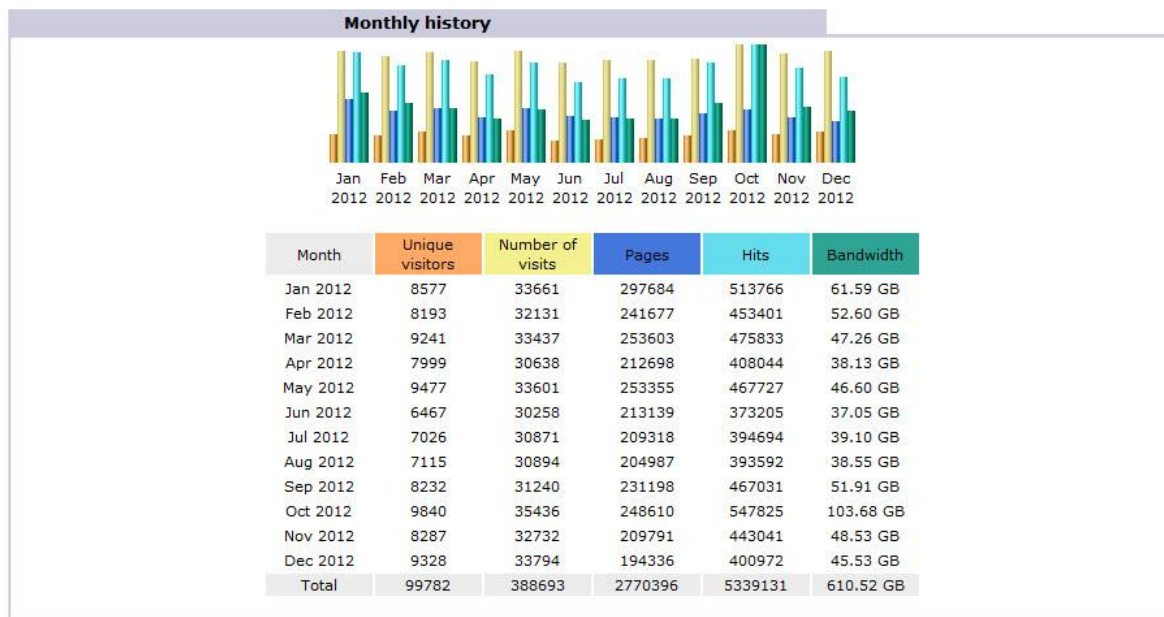


Table 5-1. Charter web monthly usage January – December 2012

The 6 columns respectively represent: month, number of different visitors, and number of visits, number of pages and hits, and bandwidth.

From 1 January to 31 December 2012, the total number of visits was close to 400,000 (ca. 100,000 different visitors). Monthly activity is less than 10,000 unique visitors. The 2012 number of total visits decreased in comparison with 2011, when the Japanese earthquake and tsunami caused an extraordinary “peak”, but is comparable to the years 2010 and 2009 (around 300,000-350,000 visits).

Charter visibility is also ensured through other media, such as Twitter, which counted around 300 followers by the end of 2012.

5.2 Charter Newsletters

Charter newsletters were issued in April, September and December 2012. The newsletter represents an additional communication means for regularly informing the users and stakeholders on recent Charter activations, news, events and related activity.



Figure 5-1. Charter newsletter, issue4

The second issue (April 2012) was focused on 2011 Charter Activations at a glance, the 10 years of Envisat, 40 years of Hazard Monitoring by Landsat, and the Pléiades launching.

The third issue (September 2012) presented articles on the entry of EUMETSAT as full member of the Charter, the anniversaries of the TerraSAR-X (5 years) and SPOT (10 years) satellites and the Charter's Universal Access initiative.

The fourth issue (December 2012) was devoted to CNES Chairmanship of the Charter from October 2012, promotion of the Universal Access initiative in different forums, Charter activations for covering the impacts of the hurricane Sandy in Haiti and of the super typhoon Bopha in the Philippines.

The newsletter is produced on a quarterly basis. Dissemination of the newsletter is through the Charter website or by e-mail. Each agency deals with its own distribution list.

5.3 Charter brochure

The brochure was updated with agency sheets for DLR, KARI and INPE (see below). Preparation of a EUMETSAT sheet and a general update of the brochure are scheduled (2013).



Figure 5-2. DLR, KARI & INPE brochure sheets

5.4 Conferences and presentations

The following table provides a list of 2012 events or conferences where the Charter was presented.

Event	Venue	Date	Speakers
Sentinel Asia System Operation Training (SASOT)	Thailand	February	JAXA
UN TAM	Myanmar	March	USGS
National Hurricane Conference	USA	March	USGS
IPLER Workshop - Rochester Institute of Technology	USA	May	USGS
Formal national user consultation meeting in Africa	Botswana	May	ESA/ARGANS
Louisiana Data Mining Workshop	USA	June	USGS
Small Sat Conference	USA	August	USGS
Formal national user consultation meeting in Africa	Zimbabwe, Malawi	August	ESA/ARGANS
NCEO/CEOI Joint Science Conference	Nottingham, UK	September	UKSA/DMCii
NorthCom SME Exchange	USA	October	USGS
ASPRS Specialty Conference	USA	October	USGS
International Astronautical Congress , IAC	Naples, Italy	October	ESA
Coordination Group on Meteorological Satellites Plenary Session	Lugano, Switzerland	November	EUMETSAT
5th Joint Project Team Meeting for Sentinel Asia STEP2 (JPTM2012)	Daejeon, South Korea	November	KARI
GEO Plenary conference	Iguazu, Brazil	November	CNES
European Space Solutions Conference	London, UK	December	UKSA/DMCii

Table 5-2. List of conferences/workshops with Charter presence.

In four conferences, the Universal access initiative was explained and promoted by:

- EUMETSAT, 5 November, at the Coordination Group on Meteorological Satellites Plenary Session, in Lugano, Switzerland.
- JAXA and KARI, 14 November, at the JPTM2012 in Daejeon, South Korea
- CNES, 22 November, at the GEO Plenary meeting, Iguazu, Brazil
- UKSA, 3 December, at the European Space Solution, London, UK.

UNOOSA and UNITAR/UNOSAT also contributed towards increasing Charter awareness through newsletters and presentations to a wide public audience, ranging from Ministers and Heads of Agencies to operational entities within the UN system and beyond.

5.5 Press releases, articles

Table 5-3 summarises the main press releases, web and paper articles issued by the member agencies or others during this period.

Date	Issuing agency	Title
7 October	UKSA	Saving lives from space. Audio slideshow on the BBC as part of World Space Week http://www.bbc.co.uk/news/science-environment-19826963
9 October	CNES	http://www.cnes.fr/web/CNES-fr/10541-ouverture-de-la-charte-sous-la-presidence-francaise.php
16 October	CNES	Générosité Universelle. http://www.la-croix.com/Archives/2012-10-16/Generosite-universelle-_NP_-2012-10-16-865313
October	CNES	CNESMAG n° 55 http://www.cnes.fr/web/CNES-fr/4523-charte-espace-et-catastrophes-majeures.php
7 November	CNES	http://www.cnes.fr/web/CNES-fr/10586-gp-la-charte-espace-et-catastrophes-majeures-sous-presidence-francaise.php
3 December	CNES	Le dispositif de partage d'images spatiales est renforcé pour secourir les pays sinistrés. http://www.lemonde.fr/planete/article/2012/12/03/partage-d-images-spatiales-renforce-pour-secourir-les-pays-sinistres_1799138_3244.html?xtmc=charte_internationale_espace_et_catastrophes_majeures&xtcr=1

Table 5-3. Press releases and publications

In addition, an announcement of the Universal Access initiative at the end of September was carried out through several channels: Charter website, UNOOSA, UNITAR/UNOSAT and GEO websites.

6 Assessment

This section provides a synopsis of the lessons learned and recommendations to consider for improving Charter operations.

Statistics on 2012 activations were combined with EM-DAT data to evaluate the overall impact of the Charter as a service that supports disaster response. EM-DAT data was downloaded from the EM-DAT website (EM-DAT-CRED: the International Disaster Database - Centre for Research on the Epidemiology of Disasters [RD1]).

The reports issued by the Project Managers (PM) remain one of the main sources of information for assessing the performance and quality of service provided by the Charter during 2012.

6.1 Overall impact

In 2012, the Centre for Research on the Epidemiology of Disasters (CRED) reported 310 natural disasters (including droughts, extreme temperature, earthquakes and tsunamis, floods, landslides, storms, volcanic eruptions and, wildfires). The disasters claimed 9,930 lives, affected over 106 million others and caused economic damages of USD 138 billion (*CredCrunch, issue 31, March 2013*).

- The worst disaster of 2012 in terms of mortality was typhoon Bopha in the Philippines that resulted in 1,901 deaths. It was the strongest tropical cyclone on record to hit the southern Philippine island of Mindanao and affected over 6 million persons.
- The worst disaster of 2012 in terms of financial loss was hurricane Sandy, which hit northeastern USA on 29 October 2012, and has been reported by EM-DAT and insurance groups, such as Munich Reinsurance (NatCatSERVICE) and Swiss Re Group (CatNet), as the most destructive encountered in the northeastern USA since the great storm of 1938. The hurricane caused an estimated total of USD 70 billion in economic losses, making it the second most damaging hurricane on record after hurricane Katrina in 2005. (*Natural catastrophes 2012, Analyses, assessments, positions, 2013 issue, Munich Re Topics Geo 2012; SIGMA, Natural catastrophes and man-made disasters in 2012: A year of extreme weather events in the US; issue 2/2013, Published by: Swiss Re Ltd*).

The Charter is represented in around 13% of the total number of natural disasters registered by EM-DAT in 2012 (13% in 2010; 10% in 2011). For comparison, generally accepted figures concerning the occurrence of natural hazards (not only major disasters) are around 800-1000 per year: the Munich Re NatCatSERVICE reported 905 natural events in 2012 exceeding the 820 registered in 2011 and the ten-year average of 800. (*Natural catastrophes 2012, Analyses, assessments, positions, 2013 issue, Munich Re Topics Geo 2012*).

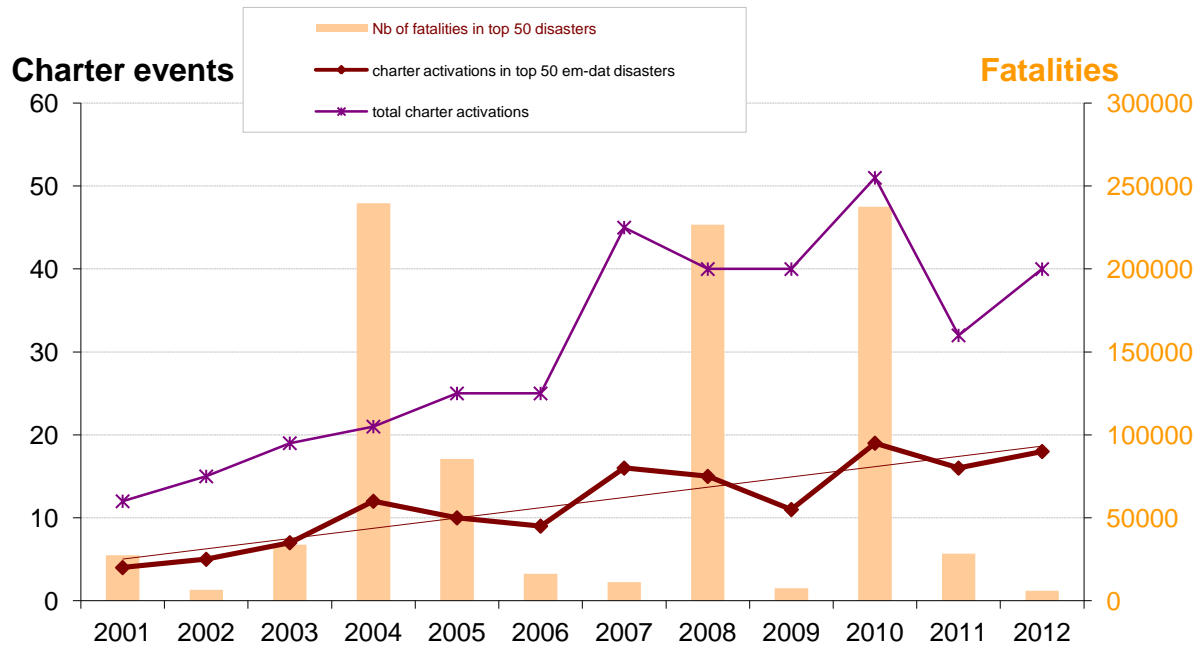


Figure 6-1. Number of Charter events over 2001-2012

Represented in red are the number of Charter events per year that are included within the 50 most severe disasters recorded in EM-DAT each year. The total number of fatalities counted for the 50 main disasters was much lower in 2012 (6000) compared to 2004, 2008 and 2010 but comparable to 2002 and 2009 numbers. 1/3 of fatalities 2012 were due to typhoon Bopha in the Philippines in December 2012.

Looking at Figure 6-1 there had been a gradual linear increase in the number of Charter events per year between 2001 and 2006 while since 2007 the number of Charter events has fluctuated between 30 and 50 a year. Such oscillations can be explained in part by the variability in the number of total natural disasters occurring during the relevant year and by the existence of other regional EO-based emergency response services (e.g. Copernicus EMS, Sentinel Asia) triggered by national entities in Europe or in Asia Pacific.

In 2012, the Charter covered 8 of the 10 most severe disasters by fatalities (table 6-1); this confirms the fact that the Charter remains focused on major disasters. Indeed, among the last four years (2009-2012), the Charter was triggered for 14 of the 15 most severe natural disasters, as reported by EM-DAT (Table 6-2).

Top 10 Disasters – Number Killed – 2012				
<i>The text in bold & italic indicates Charter response</i>				
Date	Country	Type	# Killed	#Affected people
<i>5/12/2012</i>	<i>Philippines</i>	<i>Tropical cyclone</i>	<i>1,901</i>	<i>6,246,664</i>
<i>01/08/2012</i>	<i>Pakistan</i>	<i>General flood</i>	<i>480</i>	<i>5,049,364</i>
<i>07-10/2012</i>	<i>Nigeria</i>	<i>General flood</i>	<i>363*</i>	<i>7,000,867</i>
<i>11/08/2012</i>	<i>Iran</i>	<i>Earthquake</i>	<i>306</i>	<i>61,546</i>
<i>11/07/2012</i>	<i>Russia</i>	<i>Flash flood</i>	<i>172</i>	<i>5,500</i>
01/01/2012	Japan	Local storm	134	7,766
<i>28/04/2012</i>	<i>China</i>	<i>General flood</i>	<i>132</i>	<i>13,119,000</i>
24/06/2012	Bangladesh	General flood	131	5,148,475
<i>26/06/2012</i>	<i>India</i>	<i>General flood</i>	<i>120</i>	<i>2,200,000</i>
<i>06/08/2012</i>	<i>Philippines</i>	<i>General flood</i>	<i>116</i>	<i>4,451,725</i>

Table 6-1. Ten most severe disasters by number of fatalities in 2012 (events covered by Charter activations are indicated in bold and italics). Source: EM-DAT [RD1] (filtered according to the typology of disasters covered by the Charter)

*Charter was triggered 3 times to cover the flooded areas in Nigeria between August and October.

Top 15 Disasters – Number Killed – 2009-2012				
<i>The text in bold & italic indicates Charter response</i>				
Date	Country	Type	# Killed	#Affected people
<i>12/01/2010</i>	<i>Haiti</i>	<i>Earthquake</i>	<i>222,570</i>	<i>3,700,000</i>
<i>11/03/2011</i>	<i>Japan</i>	<i>Earthquake and tsunami</i>	<i>19,848</i>	<i>368,820</i>
<i>14/04/2010</i>	<i>China P Rep</i>	<i>Earthquake</i>	<i>2,968</i>	<i>112,000</i>
<i>28/07/2010</i>	<i>Pakistan</i>	<i>Flash flood</i>	<i>1,985</i>	<i>2,0359,496</i>
<i>4-5/12/2012</i>	<i>Philippines</i>	<i>Tropical cyclone</i>	<i>1,900</i>	<i>6,246,664</i>
<i>07/08/2010</i>	<i>China P Rep</i>	<i>Landslide</i>	<i>1,765</i>	<i>4,7200</i>
<i>29/05/2010</i>	<i>China P Rep</i>	<i>General flood</i>	<i>1,691</i>	<i>134,000,000</i>
<i>15/12/2011</i>	<i>Philippines</i>	<i>Tropicalcyclone</i>	<i>1,439</i>	<i>1,150,300</i>
<i>30/09/2009</i>	<i>Indonesia</i>	<i>Earthquake</i>	<i>1177</i>	<i>679,402</i>
07-09 /2009	India	flood	992	1,886,000
<i>11/01/2011</i>	<i>Brazil</i>	<i>General flood</i>	<i>900</i>	<i>45,000</i>
<i>05/08/2011</i>	<i>Thailand</i>	<i>General flood</i>	<i>813</i>	<i>9,500,000</i>
<i>7/08/2009</i>	<i>Taiwan</i>	<i>Storm</i>	<i>630</i>	<i>2,307,523</i>
<i>23/10/2011</i>	<i>Turkey</i>	<i>Earthquake</i>	<i>604</i>	<i>32,938</i>
<i>2/10/2009</i>	<i>Philippines</i>	<i>Storm</i>	<i>539</i>	<i>4,478,491</i>

Table 6-2. Fifteen most severe disasters by number of fatalities (2009-2012) (events covered by Charter activations are indicated in bold and italics). Source: EM-DAT [RD1] (filtered according to the typology of disasters covered by the Charter)

In addition, according to the Charter rules, the Charter was activated in 2012 for events with high economic impact, or major environmental impact or threat to human life, for example:

- Hurricane Sandy, USA, in November 2012, which causes large destruction causing threat to human life and a very large economic damage.
- Volcanic eruption in Guatemala (volcano de Fuego), in May 2012, which affected air navigation (ash clouds) and threatened neighbourhood villages.
- Wildfires in Algeria, in August 2012, which affected agricultural sectors with over 64,000 hectares of fruit trees and 4,000 hectares of cereals destroyed.

The Charter covered 18 of the 50 most severe natural disasters by fatalities (list in annex) recorded by EM-DAT in 2012 (45% of 2012 activations), excluding droughts and extreme temperature events. The number of Charter events that are triggered by disasters in the annual top 50 fluctuates slightly year-by-year but there is a positive trend (Figure 6-1). These 18 activations were made by Charter Authorized Users for disasters in their countries (Algeria, China (2), India, Nigeria (3), USA), by AUs on behalf of other countries (Guatemala, Madagascar (2), Niger, Russia) and, by Charter Cooperating Bodies (UN bodies and ADRC) (Chad, Haiti, Iran, Pakistan, Philippines (2), South Sudan). A large part corresponds to hydro-meteorological events (floods and ocean storms).

There was no Charter activation for 32 of the 50 most severe disasters events (by fatalities):

- 14 occurred in countries with an AU (Algeria, China, India, Japan, and USA). AUs were able to judge appropriately between triggering the Charter and using an alternative service. Some of these events (4) were covered by Sentinel Asia, without escalation to the Charter.
- 18 of these occurred in countries which have no direct access mechanisms to the Charter. All fall well within the hazard types of the Charter. They all are in the top band of disasters by fatalities for that year.
 - o 15 occurred in Asia (Afghanistan, Bangladesh, Korean Democratic Republic, Myanmar, Pakistan, Philippines); Sentinel Asia was activated for 2 events in the Philippines.
 - o 3 occurred in Africa (Kenya) and Latin America (Peru and Colombia).

It is expected that the implementation of Universal Access will improve Charter access globally that could increase the number of annual requests of activations. However, 80 countries without Authorized Users have already benefited from the Charter thanks to the different arrangements set up to improve Charter access. For instance, over 2007-2012 circa 60% of activations were not direct requests but requests on behalf of a user in a country without an Authorized User. That suggests that Universal Access would not dramatically increase the volume of requests hence the burden on EO mission owners/operators. On the other hand, the Charter will need to evaluate carefully the validity of calls in order not to overstrain the Charter mechanism.

This year a larger number of activations in Africa (Cameroon, Senegal, Madagascar, Niger, Nigeria, Chad) can be explained by, on one hand, adverse meteorological situations (seasonal cyclones in Southern Africa and significant seasonal rains in Western and Central Africa) and on the other, a better knowledge of the Charter and its services by African entities, thanks to awareness campaigns carried out by Charter members during the past several years.

6.2 System performance assessment

6.2.1 Assessment of timeliness for Charter services provided in 2012

The system performance review confirms that the 2012 timeliness is equivalent to that of 2007, 2008, 2009, and 2011. The triggering time (On-Duty Operator, ODO, receives the User Request Form, URF, and the Emergency on-Call Officer, ECO, contacts the PM) is on average less than one day.

The histogram in Figure 6-2 indicates for 2011 and 2012 the acquisition time of the first satellite images received after the Charter was activated. This parameter estimates the rapidity of Charter tasking and relevant image acquisition. It is calculated as [Date of first crisis image acquisition - Date of Charter activation]. It is important to note that the PM/Value Adder may not use the first crisis scene to generate the first information product, e.g. if the first scene is too cloudy or too coarse to monitor the impact, etc.

On average, acquisition time is better than two days. Some images are available on the same day as the activation. This is particularly the case when images are already acquired through Charter member's "background missions", such as CSA's Disaster Watch initiative, even before the Charter is activated.

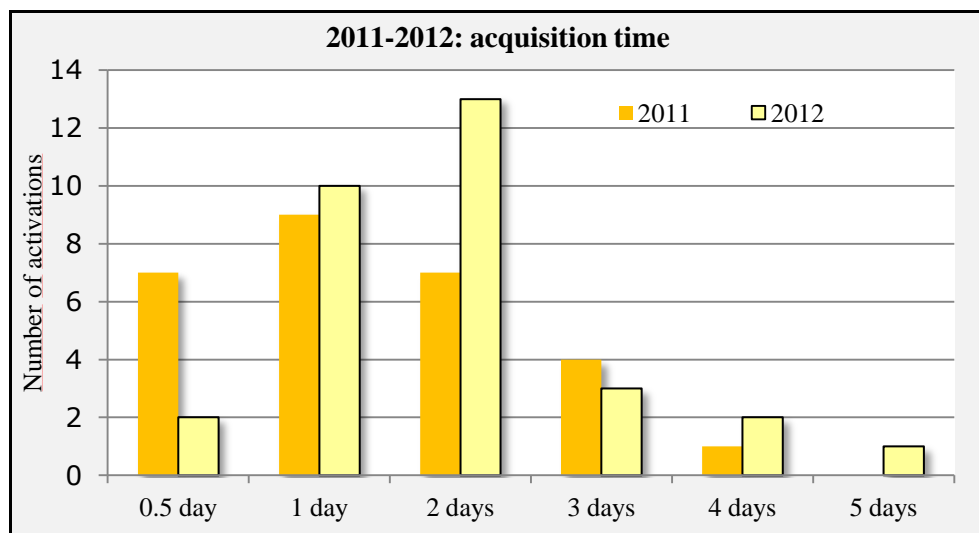


Figure 6-2. Time interval between Charter activation date and date of first data acquisition (2011-2012).
Statistics generated using PM reports information.

It is difficult to compare this to user requirements *in general* and EO systems will always be slower than needed for certain users. The constraint being the timeliness of access to new observations (and cloud-free observations in the case of optical systems) in the aftermath of a hazard impact; more satellites will be needed to reduce this constraint. More radar satellites, in particular, would reduce the effect of cloudy weather conditions in disaster zones on the Charter's performance. Many users indicated that providing crisis mapping (i.e. based on fresh acquisitions) on a daily basis and starting on Day 1 is an appropriate target.

In some cases, additional delay is caused by a change of the Areas of Interest or imprecise information given by the requestor of a Charter activation, because this implies a re-tasking of the satellites.

It should also be noted that activation of the Charter by an AU or a Cooperating Body after a disaster event can fluctuate between < 1 to 3 days, but could be longer as shown in Figure 6-3.

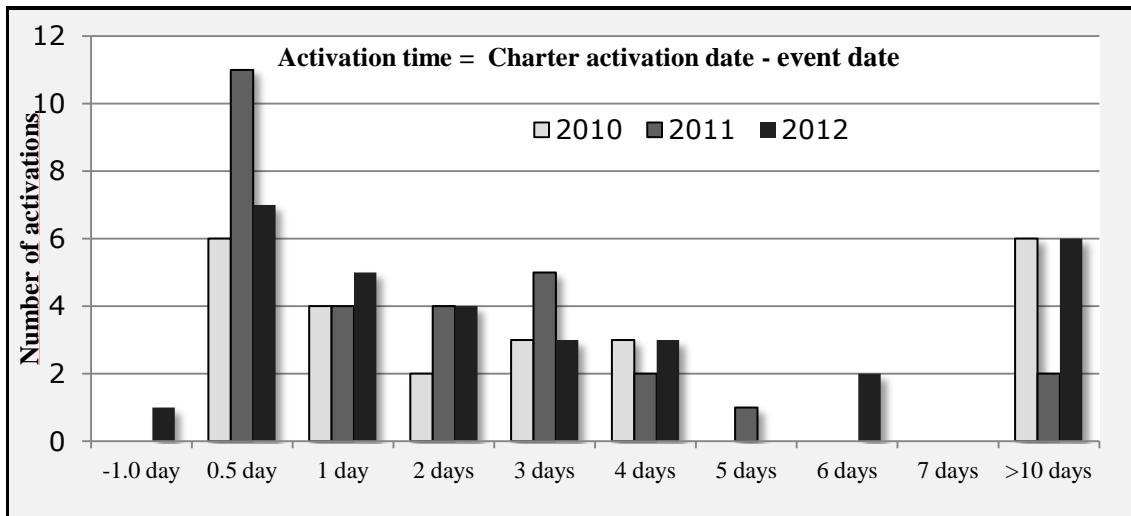


Figure 6-3. Time to activate the Charter by an AU or a Charter Cooperating Body (2010-2011-2012).
Statistics generated using PM reports information

During the period 2010-2012 the activation of the Charter by an AU or Cooperating Body after a disaster event occurred on average in 3.5 days: within one day for around 40 % of the cases, but longer in others. In 25% of cases in 2010 and 2012, the Charter was activated with a delay of up to 10 days. For one case in 2012, the Charter was triggered in anticipation (flooding in UK, December).

Activation time is mainly linked to the event type and the authorized user or end user decision process concerning the need for geo-information. In some cases, delay in activating the Charter could have an impact on the usefulness of the Charter products, in particular after flash flood events or hurricanes landing.

6.2.2 Assessment of EO data supply chain for Charter services provided in 2012.

The Charter worked to resolve two main issues regarding the data supply chain:

- 1) Easier access to all Charter EO data by PMs/VARs during activations.
- 2) Find an alternative way to the Internet for delivering raw data in case of low bandwidth connection or "black out" after a major disaster.

For 1) the Board decided to improve the Charter current workflow by operating two distribution systems (HDDS and COS2/CGT) for data delivery during an event (see section 3.3).

In 2012 USGS' HDDS and CGT were in place and COS-2 was in development (see section 3.2).

For 2) EUMETSAT and NOAA will make available GEONETCast/EUMETCast systems as a data delivery tool to PMs/VARs in countries where GEONETCast/EUMETCast stations are in place. This system will not replace the current practice of delivering Charter imagery via the Internet. In addition, these systems will be used to deliver products generated by the PMs to the end users, when necessary.

In addition, the scenario guidelines used by the Charter Emergency-on-Call Officers, PM procedures and working policy guidelines were reviewed to maintain a high-quality operational service. Some PMs stressed the need to further revise and simplify some scenario guidelines in order to task only the most useful satellites to avoid PM overburden and increase efficiency (e.g. in case of flooding during rainy seasons in tropical and equatorial areas, they recommended to order only radar data since cloud cover is almost permanent).

6.3 Assessment of products and services

Although the Charter's mandate is limited to supplying satellite data quickly and at no cost, Charter members invested effort and resources to provide crisis mapping and damage assessment for most of the Charter activations. Value-adding services were carried out by using in-house or external resources or through cooperation with other EO-based emergency services (e.g. cooperation with the GMES SAFER project for 2 activations and with Copernicus EMS for one). UNITAR/UNOSAT provided value-added services for 8 of the 40 activations in 2012.

The training of new Project Managers in Russia is part of the Charter members' commitment to regularly enhance the PM network and improve the Charter services worldwide. Such regular growth will contribute to avoid PMs' overload (e.g. the same PM which manages two consecutive activations) and to achieve PMs' availability from the same geographical area of the disaster. PM training activities are essential to support the implementation of the Universal Access initiative and further training events have been planned for 2013.

6.4 Users' appraisal

Charter's end users are in general satisfied by the Charter products and services. However, a few remarked that the EO crisis products were too coarse to observe and estimate damages (e.g. wind storms in small islands with traditional habitat). Such cases could be limited by a better filtering of requests to avoid Charter activation for events that are not major or for events where the impacts cannot be efficiently assessed by Charter EO data.

Examples of recurrent users' recommendations reported by the Project Managers are:

- Need for technical training to improve end user awareness (use and exploitation of Charter products).
- Involve specialist partners in further processing and interpretation of data (VA partners, local actors, scientific community, etc.).
- Receive information products as vector data to be directly exploited in GIS. In some activation, PMs/VA organizations already provided GIS layers to the end users.

It can be noted that there is an increase in end users able to perform EO and GIS processing; this is particularly the case in Asia (e.g. Philippines).

The Charter continued its efforts to increase awareness at the national level in Africa, through Formal Consultation with National Disaster Management Authorities (3 countries were visited in 2012: Botswana, Zimbabwe and Malawi). Efforts in Asia have been via regional meetings and conferences organized by Sentinel Asia.

Working at national level helps to develop a network of users with increased awareness. The process helps attain a better understanding of the institutional and operational organization of a

given country. This allows the assessment of specific national users' needs and capacity building requirements for EO data processing and interpretation. Information gathered is useful for the Universal Access process.

6.5 Communication assessment

Several channels were used to ensure a better and a larger communication to Charter stakeholders and general public:

- Publication of 3 newsletters.
- Charter Twitter account. All Charter activations and news are emphasized by being tweeted by the Webmaster. 300 followers were counted by end of 2012 (many more will actually be reached due to re-tweets of Charter messages, e.g. through Charter agency twitter accounts).
- Preparation of the Universal Access brochure and dissemination using the Charter website.
- Announcement of the Universal Access initiative through Charter website, UNOOSA, UNITAR/UNOSAT and GEO websites
- Participation to international events all over the world to promote the Charter and the Universal Access initiative.
- Audio-video slideshow on the BBC addressed to a general public.

The commitment of the Charter representatives in promoting this initiative is always high. The Charter movie and brochure in English and French are distributed and used as at conferences and workshops both nationally and internationally. Additional material relevant to new members (DLR, KARI & INPE) has been prepared to keep the Charter brochure up to date.

7 Conclusions

2012 was marked by the official entry of the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) as Charter member. EUMETSAT is the fourteenth Charter member.

In 2012, the Lead agencies were on a six-monthly rotational basis: the Canadian Space Agency, CSA, January to April, the Japanese Space Agency, JAXA, April to October, and the French Space Agency, CNES, October to December.

There were 40 activations with an average of 3.3 per month in 2012, a number slightly higher than 2011 but equal to 2008 and 2009. In total the Charter was triggered for 364 disasters in 105+ countries since 2000. August and September were the months with the largest number of activations due to large rains in Western Africa and Asia, and ocean storms in the Caribbean and North America. Eight (8) activations were among the ten (10) most severe disasters in 2012, confirming the fact that the Charter is firmly focused on major disasters. In particular, the Charter was requested to monitor the impact of the typhoon Bopha in the Philippines, which caused 1,900 fatalities and affected 6 million persons and, to analyse the damage caused by the hurricane Sandy in Haiti and the US, which is recorded as the most damaging hurricane after hurricane Katrina in 2005. The Charter demonstrated once again its capability to respond to major disasters, by utilising its resources appropriately and collaborating with other programmes to enhance value-added capacity.

The Universal Access (UA) initiative was formally launched in September 2012. It was announced through communications on the websites of the Charter and of Charter partners (GEO, UNITAR/UNOSAT and UNOOSA). Two applications were received by the end of 2012.

Efforts were devoted to the improvement of Charter operations and data management. CNES further improved the interface of the Charter Geographic Tool (CGT), and ESA started the development of Charter Operational System (COS-2). The Charter members agreed to operate two data distribution systems: the COS-2/CGT and USGS' Hazards Data Distribution System (HDDS) systems to satisfy the needs and meet the constraints of the Charter members.

Collaboration with Charter Cooperating Bodies (UNOOSA, UNITAR/UNOSAT, and ADRC) remains one of the major avenues for channelling additional activation requests and improving awareness of the Charter worldwide. The outreach programme in Africa in the form of formal user consultations was concluded with the visits of the national disaster management authorities in Botswana, Malawi and Zimbabwe.

The Russian National Emergency Management Centre (EMERCOM), the Russian Federal Space Agency (ROSCOSMOS) and Russian Space Systems (RSS) were trained by USGS as Charter Project Managers, increasing the PM pool. Staff of six Chinese organizations (China National Space Administration (CNSA), National Space Science Centre, China Centre for Resources Satellite Data & Application (CRESDA), Chinese Society of Astronautics, the Beijing Institute of Control Engineering, China Meteorological Administration and National satellite Meteorological Centre) were further trained by ESA on the Charter and Earth Observation capabilities for crisis mapping.

Three Charter newsletters were issued in 2012. In addition, promotion of the Charter activities and of the Universal Access initiative was carried out through the participation of Charter

members at international and regional events as well as publications and press releases. Twitter is an additional tool to widely publicize Charter activations and other relevant news, and to raise public awareness of the comprehensive information available on the Charter's website (www.disasterscharter.org).

8 Annex

List of 50 most severe disasters (by number of fatalities) recorded by EM-DAT (2012).

Note: EM-DAT events were filtered according to the typology of disasters covered by the Charter.

Country	Type of event	Date	Fatalities	Charter
Philippines	Tropical cyclone	4-5/12/2012	1901	X
Pakistan	General flood	01/08/2012	480	X
Nigeria	General flood	01/07-31/10 (4 months)	363	X (3 Charter act.)
Iran Islam Rep	Earthquake	11/08/2012	306	X
Russia	Flash flood	11/07/2012	172	X
Japan	Local storm	01/01/2012	134	
China P Rep	General flood	10- 22/05/2012	132	X
Bangladesh	General flood	24/06/2012	131	
India	General flood	26/06/2012	120	X
Philippines	General flood	06/08/2012	116	X
Philippines	Earthquake	06/02/2012	113	
Bangladesh	Local storm	10/10/2012	108	
China P Rep	General flood	22/06/2012	91	
Niger	General flood (3 months)	15/07-15/10	91	X
Korea Dem P Rep	General flood	18/07/2012	88	
China P Rep	Earthquake	12/09/2012	81	X
China P Rep	General flood	21/07/2012	77	
Madagascar	Tropical cyclone (Depression Irina)	26/02/2012	77	X
Philippines	Landslide	05/01/2012	75	
Haiti	Tropical cyclone (Hurricane Sandy)	24/10/2012	75	X
Guatemala,	Earthquake	07/11/2012	74	X
Afghanistan,	flood	18/05/2012	74	
Afghanistan	Earthquake	11/06/2012	73	
Kenya	General flood	20/04/2012	73	
Korea Dem P Rep	Tropical cyclone	28/08/2012	59	
Philippines	Tropical cyclone	31/07/2012	58	
China P Rep	General flood	09/07/2012	58	
United States	Tropical cyclone (Hurricane Sandy)	28/10/2012	54	X

China P Rep	General flood (longman, Dixi.)	08/05/2012	53	
Algeria	General flood	03/02/2012	49	X
Colombia	General flood (one month)	15/03/2012	48	
India	General flood	16/09/2012	45	
United States	Local storm	02/03/2012	41	
India	Tropical cyclone	04/11/2012	40	
Myanmar	Earthquake (ground shaking)	11/11/2012	38	
India	General flood	21/08/2012	37	
Philippines	Tropical cyclone	25/10/2012	36	
Madagascar	Tropical cyclone (Giovanna)	14/02/2012	35	X
China P Rep	Storm (tropical cyclone)	08/08/2012	34	
South Sudan	General flood	1/08-29/08	32	X
India	General flood	04/08/2012	30	
Japan	General flood	12/07/2012	30	
Pakistan	General flood	23/10/2012	26	
Bangladesh	Local storm	06/04/2012	25	
Philippines	Storm (tropical cyclone)	25/12/2012	24	
Peru	Landslide	17/10/2012	22	
India,	General flood	19/09/2012	21	
Afghanistan	General flood	12/05/2012	20	
Algeria	General flood	31/08/2012	20	
Chad	General flood	06/08/2012	20	X