

International Charter Space & Major Disasters



Executive Secretariat

6th Annual Report

January-December 2006

Status	version	Date	author
Draft	1.0	15 February	B. Jones
Completed	2.0		B. Jones
Checked	2.1		J. Bequignon

CONTENTS

1	INTRODUCTION.....	4
1.1	PURPOSE AND SCOPE.....	4
1.2	APPLICABLE DOCUMENTS	4
1.3	REFERENCE DOCUMENTS	4
1.4	LIST OF ACRONYMS.....	6
2	EXTERNAL RELATIONS.....	7
2.1	NEW MEMBERS	7
2.2	COOPERATING BODIES	7
2.3	AUTHORISED USERS	7
3	INTERNAL BUSINESS.....	8
3.1	PROJECT MANAGER TRAINING.....	8
3.2	INTEGRATION OF NEW MEMBERS.....	8
4	OPERATIONS	9
4.1	CHARTER ACTIVATIONS	9
4.2	ANOMALY REPORTS	11
4.3	FTP SITE	11
4.4	RESOURCE REPORT.....	13
5	COMMUNICATIONS	16
5.1	WEB SITE	16
5.2	PROMOTION MATERIAL	17
5.3	CONFERENCES & PRESENTATIONS	17
5.4	PRESS RELEASES AND PRESS CUTTINGS	18
6	ASSESSMENT	20
6.1	OVERALL IMPACT	20
6.2	SYSTEM PERFORMANCE ASSESSMENT	21
6.3	SERVICE AND PRODUCT ASSESSMENT	21
6.4	USERS APPRAISAL	22
6.5	COMMUNICATION ASSESSMENT	22
7	CONCLUSIONS	23
8	APPENDIX – ACTIVATION SUMMARY.....	24
8.1	ACTIVATION #92, ENGLISH CHANNEL OIL SPILL	24
8.2	ACTIVATION #93, PHILIPPINES LNDSLIDE	25

8.3	ACTIVATION #94, ALGERIA EARTHQUAKE.....	26
8.4	ACTIVATION #95, ELBE FLOOD, GERMANY.....	27
8.5	ACTIVATION #96, CZECH FLOODING.....	28
8.6	ACTIVATION #97, AUSTRIA FLOODS.....	30
8.7	ACTIVATION #98, TISZA / KOEROESFLOODS, HUNGARY.....	31
8.8	ACTIVATION #99, DANUBE FLOODS, ROMANIA.....	32
8.9	ACTIVATION #100, MERAPI ERUPTION.....	34
8.10	ACTIVATION #101, SURINAME FLOODS.....	35
8.11	ACTIVATION #102, INDONESIA EARTHQUAKE.....	37
8.12	ACTIVATION #103, ARGENTINA FLOODS.....	39
8.13	ACTIVATION #104, LEBANON OIL SPILL.....	40
8.14	ACTIVATION #105, PAKISTAN FLOODS.....	41
8.15	ACTIVATION #106, ETHIOPIA FLOODS.....	42
8.16	ACTIVATION #107, PHILIPPINES OIL SPILL.....	43
8.17	ACTIVATION #108, SUDAN FLOODS.....	44
8.18	ACTIVATION #110: BULGARIA, OIL SPILL.....	46
8.19	ACTIVATION #111: SRI LANKA, FLOODS.....	47
8.20	ACTIVATION #112: ETHIOPIA, FLOODS.....	49
8.21	ACTIVATION #113: SOMALIA, FLOODS.....	51
8.22	ACTIVATION #114: KENYA, FLOODS.....	53
8.23	ACTIVATION #115: PHILIPPINES, HURRICANE.....	55

1 Introduction

1.1 Purpose and scope

This document constitutes the annual report on the operations of the International Charter "Space & Major Disasters" prepared by the Executive Secretariat as laid down in [AD1]. It covers the 2006 calendar year.

The report was built upon the following input:

- Working documents, notes and actions of the Executive Secretariat,
- Input from the Communication Group,
- Project managers' reports for each activation,
- Personnel communications.

The report follows the same structure as the work plan of the executive secretariat

Chapter 1 is the present introduction.

Chapter 2 deals with external relationships : new members, cooperating bodies and authorised users.

Chapter 3 depicts internal business, mainly procedure updates and integration of new members.

Chapter 4 reports on the operations, anomalies and resource consumption.

Chapter 5 reports on communication activities, material and tools.

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

Eventually some conclusions are drawn in chapter 7.

1.2 Applicable documents

[AD1] Charter "Space and Major Disasters"

[AD2] Charter implementation plan, RSCSA-PL0098

[AD3] Project manager procedure, RSCSA-PR0419

[AD4] Emergency on Call Officer procedure, RSCSA-PR0418-C

1.3 Reference documents

[RD1] G. Campbell, PM report, ref. ACT092_EnglishChannel_OS_Prelim

- [RD2] F. Ranera, PM report, ref. ACT093_Philippines_LS_Final
- [RD3] M. Simon, PM report, ref. ACT094_Algeria_EQ_Final
- [RD4] T. Schneiderhan, PM report, ref. ACT095_Germany_FL_Final
- [RD5] K. Scholte, PM report, ref. ACT096_Czech_FL_Final
- [RD6] L. Ghaye, PM report, ref. ACT097_Austria_FL_Final
- [RD7] T. Schneiderhan, PM report, ref. ACT098_Hungary_FL_Final
- [RD8] T. Schneiderhan, PM report, ref. ACT099_Romania_FL_Final
- [RD9] B. Jones, PM report, ref. ACT100_Merapi_VE_Final
- [RD10] A. Keith, PM report, ref. ACT101_Suriname_FL_Final
- [RD11] K. Scholte, PM report, ref. ACT102_Indonesia_EQ_Final
- [RD12] A. Soldano, PM report, ref. ACT103_Argentina_FL_Final
- [RD13] T. Schneiderhan, PM report, ref. ACT104_Lebanon_OS_Final
- [RD14] E. Bjorgo, PM report, ref. ACT105_Pakistan_FL_Final
- [RD15] E. Bjorgo, PM report, ref. ACT106_Ethiopia_FL_Final
- [RD16] A. Retiere, PM report, ref. ACT107_Philippines_OS_Final
- [RD17] E. Bjorgo, PM report, ref. ACT108_Sudan_FL_Final
- [RD18] S. Cherchali, PM report, ref. ACT109_Luxembourg_FL_Final
- [RD19] A. Steel, PM report, ref. ACT110_Bulgaria_OS_Final
- [RD20] E. Bjorgo, PM report, ref. ACT111_SriLanka_FL_Final
- [RD21] E. Bjorgo, PM report, ref. ACT112_Ethiopia_FL_Final
- [RD22] E. Bjorgo, PM report, ref. ACT113_Somalia_FL_Final
- [RD23] J. Smith, PM report, ref. ACT114_Kenya_FL_Final
- [RD24] R. Nezelek, PM report, ref. ACT115_Philippines_FL_Prelim

[RD25] A. Retiere, PM report, ref. ACT116_Indonesia_FL_Prelim

[RD26] EM-DAT: The OFDA/CRED International Disaster Database - www.em-dat.net - Université Catholique de Louvain - Brussels – Belgium

1.4 List of acronyms

AU	Authorised User
BNSC	British National Space Council
CSA	Canadian Space Agency
CNES	Centre National d'Etudes Spatiales
DDSC	Direction de la Défense et de la Sécurité Civiles
DLR	Deutsche Luft- und Raumfahrtagentur
CONAE	Commission Nacional de Actividades Espaciales
DMC	Disaster Management Constellation
ECO	Emergency on Call Officer
ESA	European Space Agency
EUR-OPA	European Open Partial Agreement
IFRC	International Federation of Red Cross / Red Crescent societies
JAXA	Japanese Aerospace Exploration Agency
NOAA	National Oceanic and Atmospheric Administration
ODO	On Duty Operator
OOSA	Office for Outer Space Affairs
PA	Partner Agency
PM	Project Manager
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNOPS	United Nations Office for Project Services
UNHCR	United Nations High Commissary for Refugees
USGS	United States Geological Survey
VAR	Value adding reseller
WFP	World Food Programme

2 External relations

2.1 *New members*

No new members were received in 2006.

China has agreed to join the Charter, but has not confirmed meeting attendance for signing or responded to plans for training.

Formosat began providing data to the Charter through NSPO-Spot Image/CNES.

The U.S. commercial vendors, DigitalGlobe and GeoEye, attended the 2006 fall meeting and both expressed an interest in providing data through the USGS. Barbara Ryan sent a letter of invitation to both companies, but USGS has received no response to date.

An enquiry was received from Brazil.

2.2 *Cooperating bodies*

The level of activity and requests coming from UN through the cooperation agreement was welcomed and acknowledged.

Discussions continued with UN OOSA and other agencies in order to strengthen the relationship with those beneficiary entities within the UN system, such as OCHA or WFP. Another objective was to increase the visibility of the Charter itself. In particular the UN COPUOS Scientific and Technical Committee, offered the opportunity to present the delegations with a status report on the Charter and for a splinter meeting with the UN OOSA staff.

2.3 *Authorised Users*

DMC has updated the Authorized User list to include Algeria.

JAXA has updated the Authorized User information for Japan.

3 Internal business

3.1 *Project Manager Training*

CONAE and USGS both sponsored a Project Manager training session to help indoctrinate a new team of Project Managers.

CONAE trained 12 project managers in the region, with representation from Argentina, Venezuela, Uruguay, Peru, Paraguay, Panama, Costa Rica, and Chile. USGS sent letters to the attendees and to the head of their organizations welcoming them to the Charter.

USGS trained 7 project managers from the USGS, Department of State Humanitarian Information Unit, Pacific Disaster Center, Federal Emergency Management Agency, and the state of New York.

3.2 *Integration of new members*

Operational integration of JAXA began during the second half of the year.

A 3-day training session attended by experienced mission planners from CNES, CSA, ESA, DMCII, and USGS with staff and observers from JAXA was organised in Tokyo in September of 2006.

Operational integration of JAXA will take place after the completion of their integration testing in 2007.

4 Operations

4.1 Charter activations

The following table summarises the 25 regular activations during the reference period.

The Call-ID is the unique number assigned by the ODO to any User Request Form received. The number of activations actually recognised differs from the Call-ID as some calls are not processed. Such calls are listed in 4.2

Call ID	Activation ID and description	activation date
113	92 English Channel, Oil Spill	February 3, 2006
114	93 Philippines, Landslide	February 17, 2006
115	94 Algeria, Earthquake	March 21, 2006
116	95 Germany, Flooding	April 1, 2006
117,118	96 Czech Republic, Flooding	April 4, 2006
119	97 Austria, Flooding	April 7, 2006
120	98 Hungary, Flooding	April 14, 2006
121	99 Romania, Flooding	April 18, 2006
122	100 Indonesia, Volcanic Eruption	April 25, 2006
123	101 Suriname, Flooding	May 10, 2006
124	102 Indonesia, Earthquake	May 27, 2006
125	103 Argentina, Flooding	July 27, 2006
126	104 Lebanon, Oil Spill	July 29, 2006
127	105 Pakistan, Flooding	August 11, 2006
128	106 Ethiopia, Flooding	August 17, 2006
129	107 Philippines, Oil Spill	August 22, 2006
130	108 Sudan, Flooding	August 25, 2006
131	109 France, Flooding	October 4, 2006
132	110 Bulgaria, Oil Spill	October 31, 2006
133	111 Sri Lanka, Flooding	November 2, 2006
134	112 Ethiopia, Flooding	November 3, 2006
135,136,138	113 Somalia, Flooding	November 13, 2006
137	114 Kenya, Flooding	November 17, 2006
139	115 Philippines, Flooding	December 1, 2006
140	116 Indonesia, Flooding	December 27, 2006

Table 4-1 List of 2006 activations

In the following cases, two or more requests were received:

- 92 Czech Flood, (European Commission and Swiss National Emergency Operations Center)
- 113 Somalia Flood, (UNOOSA – 3 times for changing areas of interest)

As agreed in such cases, data were sent to each requestor in parallel. There was discussion on the Somalia activation as to whether there should have been new activations or if the Project Manager should have worked with the agencies to expand the area of concern.

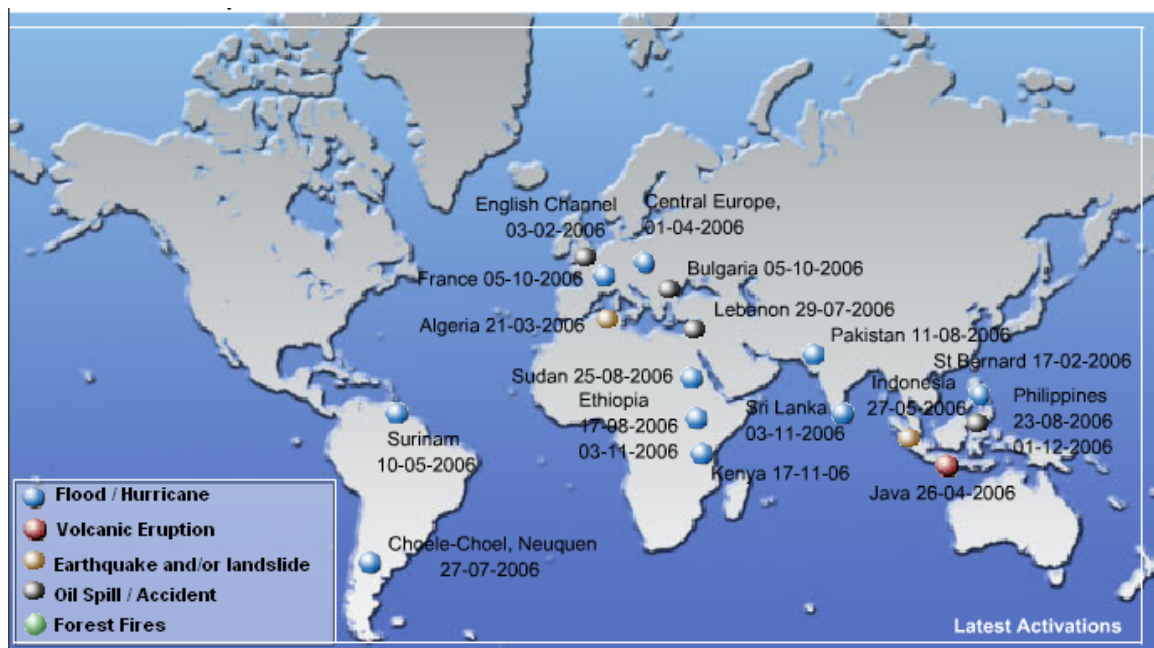


Figure 4-1 Charter activations 2006

Figure 4-1 shows the geographic location of 2006 activations.

Figure 4-2 depicts the number of calls since November 2000. A sustained level of activity observed since April 2003 is being maintained, with a rate of 2 calls a month and an average of 1.9 call per month since November 2000.

<u>Year</u>	<u>Average # of calls per month</u>
2001	1
2002	1.6
2003	1.6
2004	2.1
2005	2.7
2006	2.3

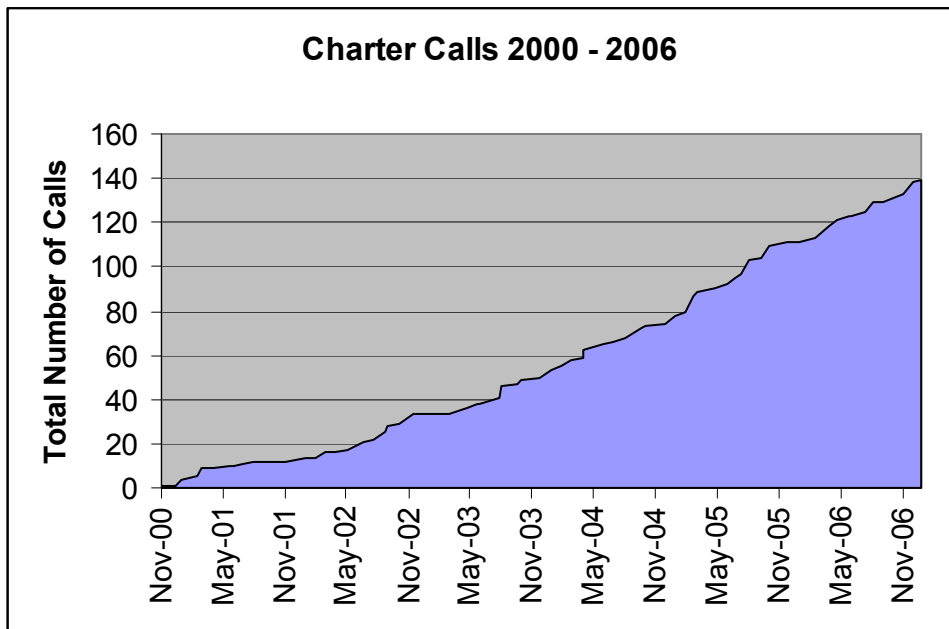


Figure 4-2 Cumulative calls since 2000

4.2 Anomaly reports

Call 138 was rejected as the request was considered to be part of an ongoing activation. The Project Manager expanded the area of the previous activation.

2 anomaly reports were generated during this period and mostly dealt with procedural errors, usage of out-of-date forms, etc. The Executive Secretariat analysed all of them and reported to the board.

4.3 FTP site

The FTP site has been an increasingly used resource for operations. A special folder for each new call is created on the FTP site, where the ECO can find a digital copy of the user request form and where the full dossier may be dropped.

The FTP site is daily used as an archive of reports, procedures, minutes of meetings and related material. In addition, the FTP site has been used occasionally as a temporary repository to exchange raw data amongst space agencies, Project managers and sometimes authorised users. The FTP site has been expanded to include sample data sets to be used by Project Managers for training and also to include an area for all agencies to provide their appropriate logo and copyright information for use by the Project Managers and value added resellers on products.

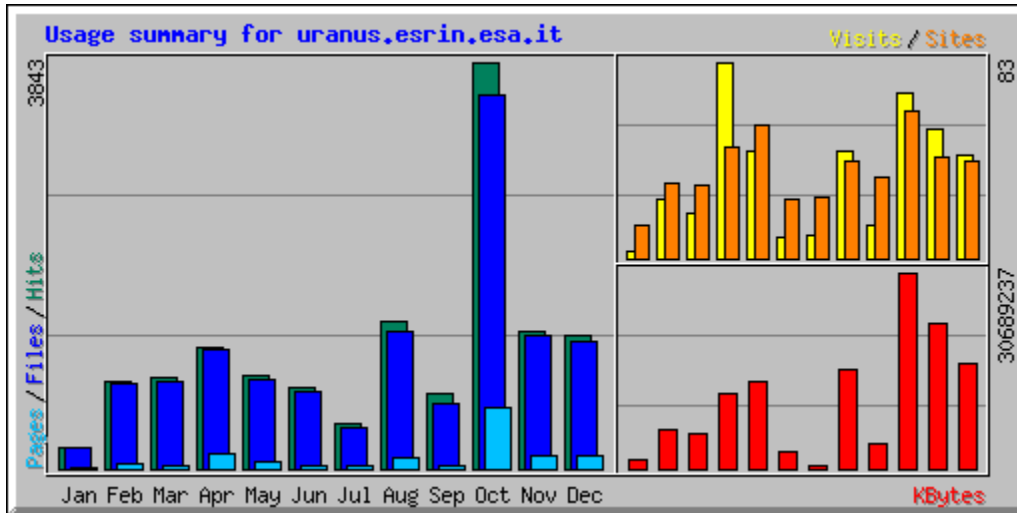


Figure 4-3 - FTP site usage statistics 2006

Summary by Month										
Month	Daily Avg				Monthly Totals					
	Hits	Files	Pages	Visits	Sites	KBytes	Visits	Pages	Files	Hits
Dec 2006	43	41	4	1	41	16318329	44	124	1200	1250
Nov 2006	43	42	3	1	43	22721012	55	116	1264	1304
Oct 2006	128	117	19	2	62	30689237	70	580	3533	3843
Sep 2006	24	20	0	0	34	3907427	14	19	608	702
Aug 2006	45	41	3	1	41	15532078	45	99	1300	1395
Jul 2006	13	12	0	0	26	449234	10	20	380	430
Jun 2006	25	24	0	0	25	2563696	9	24	722	767
May 2006	28	27	2	1	56	13693477	45	72	837	878
Apr 2006	39	38	5	2	47	11814073	83	147	1117	1139
Mar 2006	27	26	0	0	31	5486737	19	28	829	857
Feb 2006	29	28	1	0	32	5957458	25	52	803	826
Jan 2006	7	7	0	0	14	1488031	3	3	204	205
Totals						130620789	422	1284	12797	13596

Figure 4-4 - FTP monthly usage 2006

4.4 Resource report

There were 342 images used this year. This is down from last year, but we did not have a major disaster such as the tsunami or Katrina. There was an average of 12 scenes used for each activation, while the high average per single resource is 2 (for SPOT). This shows enough the capacity of the Charter and the power of joining forces at moderate expenses of resources.

The SPOT family remains by and large the mostly used resource, followed by ENVISAT. Optical data (SPOT, IRS, LANDSAT, DMC, SAC-C) still exceeds radar data

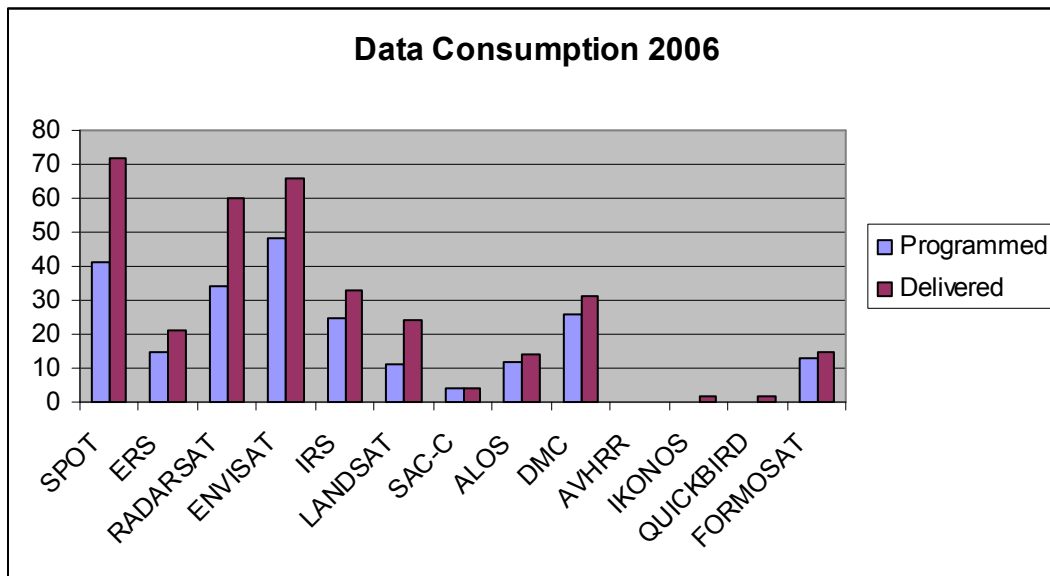


Figure 4-5 Resource consumption

Resource	SPOT	ERS	ENVISAT	RADARSAT	IRS	AVHRR	LANDSAT	SAC-C	DMC
Programmed	41	15	34	48	25	0	11	4	26
Delivered	72	21	60	66	33	0	24	4	31
Max per call	7	10	11	5	8	0	9	4	7
Min per call	0	0	0	0	0	0	0	0	0
Average per call	2.5	0.7	2.1	2.3	1.2	0.0	.9	0.2	1.1

Resource	ALOS	IKONOS	QUICKBIRD	FORMOSAT
Programmed	12	2	2	13
Delivered	14	2	2	15
Max per call	4	2	2	6
Min per call	0	0	0	0
Average per call	.5	.1	0.1	.5

Table 4-1 Total and average resource consumption

In terms of human resources provided by the partner agencies, ECO services were provided on a weekly basis by ESA, CNES, CSA, ISRO, USGS, DMC, and JAXA on an equal footing. The random nature of calls resulted in a rather balanced workload on all partner agencies with 5 calls processed by CONAE and DMC, 4 by ESA and ISRO, 3 by CNES, and 1 each by CSA and USGS. Some ECOs had to handle 2 calls in a week on duty and some had to face changing areas of interest as floods spread widely.

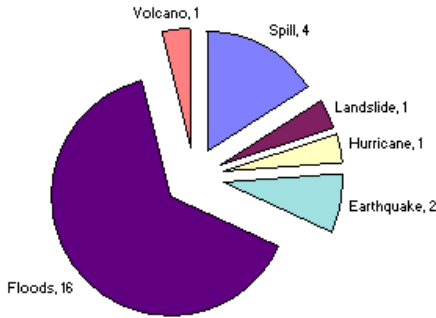


Figure 4-6 Type of disasters

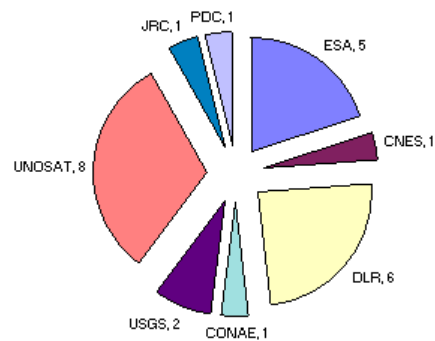


Figure 4-7 Project manager per agency

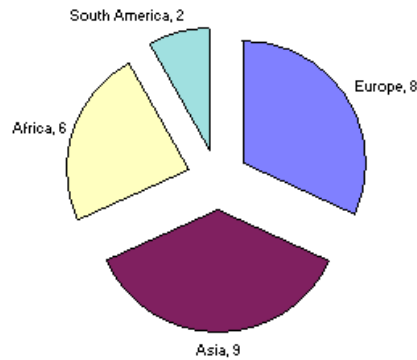


Figure 4-8 Geographic distribution

Still in terms of human resources, the ESA “family” provided 12 project managers, followed by UN agencies (7) accounting for more than half of the total, followed by USGS family (3), and CONAE(1) (Figure 4-7).

France	Argentina	Austria	Germany	European Commission	Sweden	UN	United States
1	1	1	2	6	1	10	2

Table 4-2 Number of calls per country

As far as Authorised users were concerned, France has placed 1 call. 10 calls originated from the UN organisations. 10 calls originated from European AU's, and 3 from Americas. Table 4-2 provides a list of callers where only the primary caller was considered.

5 Communications

5.1 Web site

The web site has been part of the standard communication activities. The following table shows statistics on the web site filtered from robots and internal traffic.

Summary by Month										
Month	Daily Avg				Monthly Totals					
	Hits	Files	Pages	Visits	Sites	KBytes	Visits	Pages	Files	Hits
Dec 2006	24791	22407	1035	579	16899	59844760	17972	32086	694625	768524
Nov 2006	29154	26093	1237	670	18279	80521459	20107	37127	782791	874631
Oct 2006	28336	25287	1426	688	18359	98864243	21334	44227	783897	878430
Sep 2006	24763	22061	1212	615	15738	87809189	18479	36377	661857	742896
Aug 2006	23718	21060	1260	576	14792	81390561	17869	39064	652865	735264
Jul 2006	25220	23067	960	551	15838	37994497	17100	29767	715078	781823
Jun 2006	26108	23263	1037	594	16336	31906192	17829	31126	697911	783253
May 2006	35049	31473	1417	782	21943	44968569	24242	43953	975671	1086534
Apr 2006	31414	28106	1224	692	17805	30975980	20088	35522	815075	911011
Mar 2006	36233	30716	1257	749	20332	37260668	23243	38996	952210	1123242
Feb 2006	36682	32675	1386	811	20115	35548330	22722	38815	914914	1027096
Jan 2006	34576	30918	1196	729	20279	39884637	22620	37105	958483	1071879
Totals						666969085	243605	444165	9605377	10784583

Table 5-1 Charter web monthly usage 2005

These figures are also presented in the following chart. Overall 2006 has seen more than 10,000,000 hits, around 700 daily visits with a yearly traffic above 600 Terabytes.

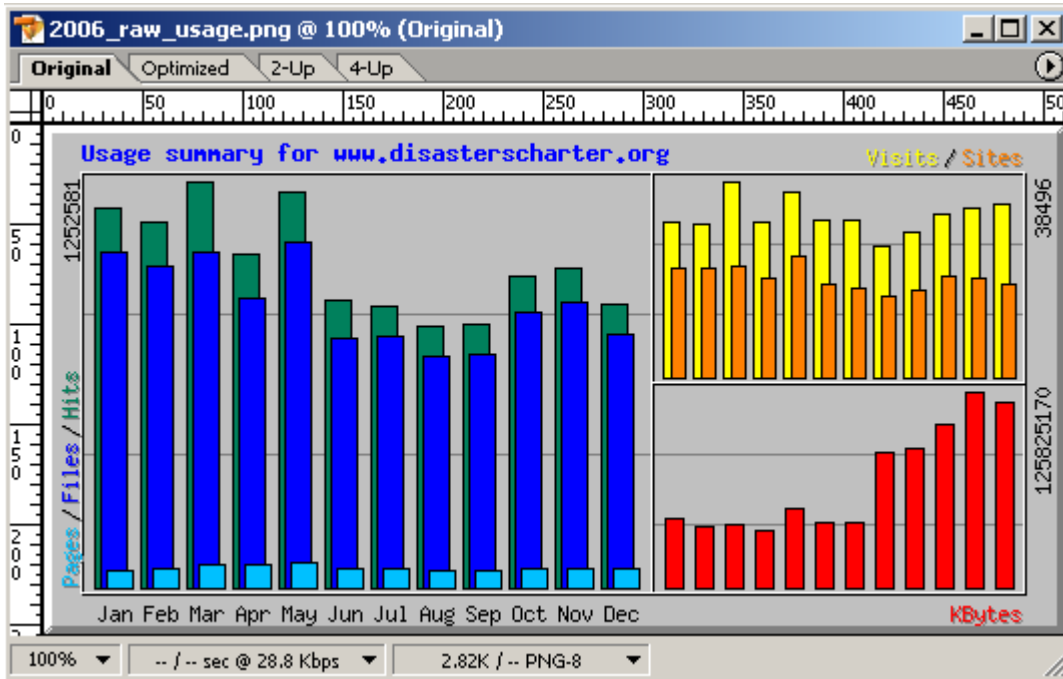


Figure 5-1 Charter web usage statistics 2005

5.2 Promotion material

The web site has been a very important communication vehicle this year.

5.3 Conferences & presentations

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

Event	Venue	Date	Speakers
EWC3	Bonn, DE	March 27-29	
UN STDM	Damascus, Syria	April 22-26	
World Conference on Disaster Management	Toronto, Canada	July 18-21	
Summer School	Alpbach, AT	July 25 – August 3	
IDRC	Davos, CH	August 26-Sept 1	
GDM	Goa, India	September 26-27	
Asia Conf Remote Sensing	UlanBator, MG	October 9-13	
AARSE	Cairo, Egypt	October 30- November 2	

GIS-RS Natural Risk	Cartagena, CO	September 24-29
----------------------------	---------------	-----------------

Table 5-2 List of conferences with Charter presence

5.4 Press releases and press cuttings

The following table summarises the main press releases and web stories issues by the partner agencies during this period. Such issues are related to major disasters and charter activation, such as the Asian tsunami, the Kashmir earthquake or the Romanian floods, or to celebrations, such as accession of JAXA and BNSC-DMC to the Charter or the 5th anniversary of the Charter, or eventually the EURATECH exercise.

Press releases

Date	Issuing agency	Title	Notes
15 February	CSA, CNES	Emergency Response to Volcanic Eruptions by the International Charter 'Space and Major Disasters'	Charter web

Table 3 - Press release

The next table is a selection of press / web cuttings relating to the Charter, often repeating the aforementioned press releases, and to some extent measuring the effectiveness of this communication vehicle.

Other web cuttings, such as the entry in the *Wikipedia* encyclopaedia or the entry in the French educational web site are evidences of the long-term impact of the Charter.

As already outlined in the 2004 annual report, the Asian tsunami has been a milestone inasmuch it revealed the capabilities of satellite imagery for emergency relief to a wide public.

Press cuttings

Date	Title	Source
6 April	French Industry Develops Emergency SatCom Tool	Space News
17 April	ESA Satellite Helped Management of German Floods	Space Daily
1 May	JAXA Satellite Watching Indonesian Volcano	Space Daily
19 May	Flooding in Suriname: International Charter Activated	Innovations Report
20 July	DMC International DMCII Wins European Commission Contract for Agricultural Monitoring	M2 Presswire
13 October	Deimos and Surrey Satellite Technology Contract for Spanish Imaging	Newstex
1 December	Small Satellites Play Big Role	Factiva from Dow Jones

Table 4 - Press cuttings

6 Assessment

6.1 Overall impact

One may try to assess the overall impact of the Charter on management of the major disasters which hit the planet in 2006. As in 2005, the analysis was performed against the International Disaster Database EM-DAT listing of disasters set up by the OFDA/CRED of Université Catholique de Louvain [RD26].

Figure 6-1 below reports the “top-ten” disasters in terms of death established by OFDA-CRED. The Charter was activated for the top 3 disasters, plus the eighth ranked disaster in the number of deaths. This indicates a downward trend from 2005, where all but 1 of the top 10 disasters were responded to by the Charter.

Top 10 Disasters – Number Killed – 2006 Red Text Indicates Charter Response			
Date	Country	Type	# Killed
27/05/2006	Indonesia	Earthquake	5778
30/11/2006	Philippines	Typhoon	1399
17/02/2006	Philippines	Landslide	1112
16/07/2006	China	Typhoon	820
17/07/2006	Indonesia	Tsunami	802
05/08/2006	Ethiopia	Flood	498
10/08/2006	China	Typhoon	373
13/08/2006	Ethiopia	Flood	364
12/07/2006	Korea	Flood	278
19/06/2006	Indonesia	Flood	236

Figure 6-1 2006 top 10 disasters by number of deaths. Source : EM-DAT [RD26]

This analysis suggests that in 2006, the Charter had been recognised by the worldwide disaster communities as a useful mechanism for very large events, thanks to its links to national civil protection agencies as well as to the United nations specialised

organisations, and at the same time, as a tool used for more specific or regional events through capillary relationship of its members with regional and local emergency management organisations.

6.2 System performance assessment

In 2006 too, very good reaction times were noted. The standard turnaround time is close to 2 days in average. Performance expectations from civil protection authorities are high, especially for those who benefited from good performances in the past and some of them were sometimes disappointed not to obtain such performances in a sustained mode. While the Charter mechanism worked correctly in 2006, its performance is bound by the performances of the satellite systems brought by the partner agencies.

Activation 100, the Merapi Volcano, provides an interesting example of an activation based on a forecast with high risk damage that might have been caused by a volcanic eruption. The eruption did not occur, but the volcanologists involved with the activation are certain that thousands of lives could be saved with pre-event activations such as this.

6.3 Service and Product assessment

The following section is a short outlook of value-adding services that Charter partner agencies had provided beyond their obligations under the Charter, in dedicated contracts (CNES), contracts under the GMES programme (ESA with the RESPOND and RISKEOS projects), in-house or external resources (CONAE, USGS, ISRO, CSA). The UN have been contributing noticeable through the UNOSAT programme, which is also a partner of the RESPOND project.

There were no major disasters in 2006, but the total number of disasters remained fairly constant. There were at least 2 instances where the Charter was used to monitor a possible disaster. One in the case of the Merapi Volcano and one in the case of a possible dam rupture caused by flooding. In both cases, the predicted disaster did not occur, but the Charter provided insight into the possibilities that might have occurred.

One could notice the slightly different level of service expected by emergency management organizations – chiefly civil protection agencies or UNOCHA/UNDAC that send rescue teams shortly after the event - which require information within 3 days, and humanitarian organizations – typically UN specialized organizations such as WFP – which can accommodate longer delays.

There have also been more requests about using Radar data for interferometric studies in regards to deformation of volcanoes and effects of earthquakes. There have also been more requests for data sharing and storage for use in future response efforts.

6.4 Users appraisal

The users were again very appreciative of the the information gained through the maps that were generated with Charter products. Many were used as briefing tools and to help decision makers decide on response strategies.

The cooperative work with the UN organisations again allowed Charter coverage in situations where the Charter mechanism may not be known.

Further feedback

A number of other types of users not directly involved in emergency and rescue operation have also expressed the interest for the products prepared within the Charter framework.

Such user organisations encompass flood or forest management authorities, local government and local civil protection services.

6.5 Communication assessment

Relatively few enquiries came from general public and several requests came from authorities, other applying to become and Authorised User. Since these authorities are the prime target of the communication, it shows the efficiency of the actions conducted so far and in particular, the efficiency of the participation to selected conferences.

The list of conferences shows a rather wide coverage, with a presence well distributed over the world.

Once more communication messages could be streamlined along the following lines:

- Provision of a synthetic view of the situation, supporting strategic planning
- In some specific cases products may be used also for tactical decisions
- Best usage is achieved if triggered in time, or whenever possible prior to the actual disaster;
- Provision of regular updates in long-lasting (several days) operations
- Products are useful for immediate recovery actions, within the scope of the Charter
- Excellent communication tool towards local government and citizens.

7 Conclusions

2006 has been a year of growth with the participation of BNSC/ DMC, USGS, and JAXA. Some procedures will be modified to accommodate the growth in membership and additional space assets.

While its traditional user base – civil protection agencies – is familiar with its usage, it has been used or considered by a wide community of actors, noticeably through the Internet. Communication should be adapted in order to cope with this public and media coverage.

8 Appendix – activation summary

8.1 Activation #92, English Channel oil spill

Disaster Description: After an accident with another ship, chemical tanker ECE sank in the English Channel with 10,316 tons of phosphoric acid and 85 tons of fuel about 30 miles Northwest of Guernsey. The Charter was triggered by MIC to assess the possible slick caused by fuel (effects of phosphoric acid cannot be mapped by EO).

Date of Disaster: Wednesday, 01 February 2006

Date of Activation: Friday, 03 February 2006

Date of PM Selection: 6 February 2006

Authorized User: ENV-MIC, European Commission

End User: ENV-MIC

ECO: G. Crowley, DMCII

PM: G. Campbell, ESA

Satellites Tasked: SPOT2 SPOT4 SPOT5 ERS2 RADARSAT1
 ENVISAT IRS-1C LANDSAT SAC-C AVHRR
 ALOS DMC

SPOT2 archive 1 new

SPOT4 archive new

SPOT5 archive new

ERS2 archive new

RADARSAT1 archive new 3

ENVISAT archive new

IRS-1C archive new

LANDSAT archive new

SAC-C archive new

AVHRR archive new

ALOS archive new

DMC archive new

Data Delivery: ESA tasked its GMES MARCOAST to carry out the analysis

Data Evaluation: ESA tasked its GMES MARCOAST to carry out the analysis which was performed on ERS-2 scans already acquired. It became clear that no oil was visible. In accordance with the AU the call was then closed without further analysis

Final Product: n/a

Problems: DESCW tool would not start and did not allow ENVISAT tasking

PM Recommendations: n/a

Comments: n/a

8.2 **Activation #93, Philippines Indslide**

Disaster Description: A huge landslide on the Island of Leyte caused at least 200 deaths and 1,500 missing. Some 500 houses and a primary school were buried under the mud that fell from a mountain escarpment after 2 weeks of continuous rains..

Date of Disaster: Friday, 17 February 2006

Date of Activation: Friday, 17 February 2006

Date of PM Selection: 20 February 2006

Authorized User: UN OCHA through UNOOSA cooperating body

End User: UNOCHA

ECO: S. Paoloni, SERCO for ESA

PM: F. Ranera, SERCO for ESA

Satellites Tasked: SPOT2 SPOT4 SPOT5 ERS2 RADARSAT1
 ENVISAT IRS-1C LANDSAT SAC-C AVHRR
 ALOS DMC

SPOT2 archive 1 new
 SPOT4 archive new
 SPOT5 archive 1 new 5 cloudy
 ERS2 archive new
 RADARSAT1 archive 1 new 1
 ENVISAT archive 1 new 1
 IRS-1C archive new 3
 LANDSAT archive new
 SAC-C archive new
 AVHRR archive new
 ALOS archive new 2
 DMC archive new 5

Data Delivery: Optical data unusable due to cloud cover until 22 February thanks to JAXA ALOS AVNIR, SAR data difficult to access. Several products were distributed in hardcopies!

<u>Data Evaluation:</u>	Early products useful for coordination of operations, detailed products appreciated for quality but too late for a practical use. Some of the products used by the local authorities for their report to the President of Philippines,
<u>Final Product:</u>	Space maps, geocoded images in UTM provided by GMES RESPOND consortium
<u>Problems:</u>	SAR data were difficult to access (commercial conflict for RADARSAT, ERS-2 to be transferred from Taiwan station, ENVISAT data delivery took 1 week)
<u>PM Recommendations:</u>	Need to order both SAR and optical high resolution data. <u>For such emergencies resolution is a key parameter</u> Clarify roles and responsibilities between Charter and RESPOND
<u>Comments:</u>	

8.3 **Activation #94, Algeria earthquake**

Disaster Description: An earthquake measuring 5,8 on the Richter scale killed 4 people and wounded more than 60 others in the area of Laâlam, in the North-East of the Algeria, close to the coast. About 30 houses collapsed and civilians and military dispatched provided help at the scene and continued to do so throughout the night. Several aftershocks followed the first quake, forcing inhabitants to spend the night outside. The Director of the Health Service in Béjaia - 60km from Laalam - declared in the evening that nobody had been badly injured and that they had suffered only from fractures or emotional shock. "They have all been given the best of care", he added. Algeria is often affected by earthquakes as the north of the country is located in a seismic area where the Eurasian and African plates conjoin. Algiers and the surrounding area was hit on May 21, 2003, by a violent seism that left 2300 dead and more than 10 000 wounded.

<u>Date of Disaster:</u>	Tuesday, 21 March 2006
<u>Date of Activation:</u>	Tuesday, 21 March 2006
<u>Date of PM Selection:</u>	22 March 2006
<u>Authorized User:</u>	DDSC, France
<u>End User:</u>	DGPC, Algerian civil protection
<u>ECO:</u>	V. Shailaja Nair, ISRO
<u>PM:</u>	M. Simon, Serco from ESA

<u>Satellites Tasked:</u>	<input checked="" type="checkbox"/> SPOT2 <input type="checkbox"/> SPOT4 <input checked="" type="checkbox"/> SPOT5 <input checked="" type="checkbox"/> ERS2 <input type="checkbox"/> RADARSAT1 <input checked="" type="checkbox"/> ENVISAT <input checked="" type="checkbox"/> IRS-1C <input type="checkbox"/> LANDSAT <input type="checkbox"/> SAC-C <input type="checkbox"/> AVHRR <input type="checkbox"/> ALOS <input type="checkbox"/> DMC SPOT2 archive new SPOT4 archive new SPOT5 archive 1 new 1 ERS2 archive new RADARSAT1 archive 1 new 1 ENVISAT archive new IRS-1C archive 0 new 1 LANDSAT archive new SAC-C archive new AVHRR archive new ALOS archive new DMC archive new
<u>Data Delivery:</u>	First products available on 22 March, crisis data on 24 March through a dedicated server
<u>Data Evaluation:</u>	The main update in the crisis situation has been the presence of a dam damaged by the earthquake that could potentially affect the whole area if it collapsed, and that was being purged for safety
<u>Final Product:</u>	Maps provided by the GMES RISKEOS consortium
<u>Problems:</u>	Difficulties to locate with precision the area affected by this relatively small event which made high resolution data slower
<u>PM Recommendations:</u>	n/a
<u>Comments:</u>	Good communication between the PM and all parties involved. Rapid feedback

8.4 Activation #95, Elbe flood, Germany

<u>Disaster Description:</u>	.
<u>Date of Disaster:</u>	Saturday, 01 April 2006
<u>Date of Activation:</u>	Saturday, 01 April 2006
<u>Date of PM Selection:</u>	April 3 rd 2006
<u>Authorized User:</u>	GMLZ, Germany
<u>End User:</u>	Various Federal Departments of Water Management (Saxonia, Brandenburg, Saxonia-Anhalt, Lower-Saxony)

<u>ECO:</u>	S. Paoloni, Serco for ESA
<u>PM:</u>	T. Schneiderhan, DLR
<u>Satellites Tasked:</u>	<input type="checkbox"/> SPOT2 <input type="checkbox"/> SPOT4 <input checked="" type="checkbox"/> SPOT5 <input checked="" type="checkbox"/> ERS2 <input checked="" type="checkbox"/> RADARSAT1 <input type="checkbox"/> ENVISAT <input checked="" type="checkbox"/> IRS-1C <input type="checkbox"/> LANDSAT <input type="checkbox"/> SAC-C <input type="checkbox"/> AVHRR <input type="checkbox"/> ALOS <input type="checkbox"/> DMC SPOT2 archive 1 new SPOT4 archive new SPOT5 archive 4 new 1 ERS2 archive 4 new 6 RADARSAT1 archive 1 new 2 ENVISAT archive new IRS-1C archive 1 new 1 LANDSAT archive 1 new 1 SAC-C archive 3 new 0 AVHRR archive new ALOS archive new DMC archive 3 new 0
<u>Data Delivery:</u>	
<u>Data Evaluation:</u>	The provided maps helped to coordinate relief activities and evacuation plans. The data will be used in flood models to extract the areas of different risk levels for the prevention of future losses
<u>Final Product:</u>	The available information for the products were: Topographic maps, GIS data, DEMs, and various satellite data like IRS-P6, ERS-2 and RADARSAT. From the RADARSAT data flood masks of the inundated areas were extracted and imprinted on LANDSAT archived image or on the topographic maps (scale 1:50 000).
<u>Problems:</u>	Call was very late with respect to disasters RADARSAT not available due to commercial conflict. Coordination with other relating calls
<u>PM Recommendations:</u>	Increase awareness of AUs and coordination of multiple, related calls to be improved. Copyright for topographic maps
<u>Comments:</u>	

8.5 Activation #96, Czech flooding

Disaster Description: Severe flooding took place in the beginning of April 2006 in Central Europe due to long term heavy rainfalls. In the Czech republic at least 4 people have perished in the floods. Around 2,500 people were evacuated near Znojmo, Litomerice and Usti Nad labe, in South Bohemia and Moravia.

Date of Disaster: Saturday, 01 April 2006

Date of Activation: Tuesday, 04 April 2006

Date of PM Selection: 5 April 2006

Authorized User: EN-MIC, European Commission

End User: Centre for Waste Management, Water Research Institute, Prague.

ECO: L. Vintenet, CNES

PM: K. Scholte

Satellites Tasked: SPOT2 SPOT4 SPOT5 ERS2 RADARSAT1
 ENVISAT IRS-1C LANDSAT SAC-C AVHRR
 ALOS DMC
 SPOT2 archive 1 new
 SPOT4 archive new
 SPOT5 archive 1 new 2
 ERS2 archive new 3
 RADARSAT1 archive 2 new 2
 ENVISAT archive 0 new 1
 IRS-1C archive new 1
 LANDSAT archive 9 new
 SAC-C archive new 1
 AVHRR archive new
 ALOS archive new
 DMC archive new 3

Data Delivery: First crisis product derived from ESA rolling archive and made available on dedicated FTP server on 5 April 2006. Flood extent maps, flood impact maps and flood dynamics maps.

Data Evaluation: Czech users could obtain access to data as well as products. Viktor Levitus, spokesman of the Czech end users reported appreciation of products and cooperation

Final Product: Delivered through the GMES RISKEOS consortium (SERTIT)

Problems: Communication with Czech end users was difficult due to language issues Anomaly with ENVISAT. No order could be taken over the week-end. ESA rolling archive server was down

PM Recommendations:

Comments:

8.6 Activation #97, Austria floods

Disaster Description: Due to violent rainfalls and melting snow the Morava River (march river) has been swelling fast. the level rose to nearly the quadruple over normally. On Sunday evening (April 2, 2006) a dam burst on the March river which separates Austria from Slovakia flooding the Austrian village of Duernkrut. Roughly 200 people were evacuated from the village, which was partially submerged by 1 meter of water.

Date of Disaster: Sunday, 02 April 2006

Date of Activation: Wednesday, 07 April 2004

Date of PM Selection: 10 April 2006

Authorized User: Federal Alarm Centre, Austria

End User: Federal and Regional Alarm Centre, Lower Austria

ECO: L. Vintenot

PM: L. Ghaye, Serco for ESA

Satellites Tasked: SPOT2 SPOT4 SPOT5 ERS2 RADARSAT1
 ENVISAT IRS-1C LANDSAT SAC-C AVHRR
 ALOS DMC

SPOT2 archive 0 new 1

SPOT4 archive 0 new 1

SPOT5 archive new

ERS2 archive 2 new

RADARSAT1 archive 1 new 1

ENVISAT archive 0 new 1

IRS-1C archive new

LANDSAT archive 1 new

SAC-C archive new 1

AVHRR archive new

ALOS archive new

DMC archive new 0

<u>Data Delivery:</u>	First crisis product received on April 11. SAC-C image on April 9 nearly cloud free
<u>Data Evaluation:</u>	The AU was rather satisfied with the received products. the AU provided a series of aerial photographs which could be compared with EO data and validated the information derived from satellite data.
<u>Final Product:</u>	More than 11 products delivered through the GMES RISKEOS contract (SERTIT) via their FTP server
<u>Problems:</u>	Late activation
<u>PM Recommendations:</u>	Standardise data delivery mechanisms from partner agencies
<u>Comments:</u>	

8.7 Activation #98, Tisza / Koeroesfloods, Hungary

<u>Disaster Description:</u>	Severe flooding disasters took place in the beginning of April 2006 in Central Europe due to long-term heavy rainfalls combined with intense snow melt. The flooding of large swathes of the Czech Republic, Slovakia, Romania and the German region caused death toll from swollen rivers rose and people were evacuated from their homes. In Hungary, the most critical situation shifted from the Danube river, where the water level had reached the highest levels for more than 100 years, to the Tisza river (April 18, 2006). In particular the cities of Szolnok and Szeged were affected, where the Hungarian civil protection tried to reinforce the dams with sand bags. In total about 40 settlements were endangered by the flood..
<u>Date of Disaster:</u>	Friday, 14 April 2006
<u>Date of Activation:</u>	Friday, 14 April 2006
<u>Date of PM Selection:</u>	15 April 2006
<u>Authorized User:</u>	ENV-MIC, European Commission
<u>End User:</u>	Ministry of the Interior, Hungary; Department for International Relations, Hungary
<u>ECO:</u>	B.K. Jones, USGS
<u>PM:</u>	T. Schneiderhan, DLR

Satellites Tasked: SPOT2 SPOT4 SPOT5 ERS2 RADARSAT1
 ENVISAT IRS-1C LANDSAT SAC-C AVHRR
 ALOS DMC
SPOT2 archive 1 new
SPOT4 archive new
SPOT5 archive new 1 cloudy
ERS2 archive 0 new 2
RADARSAT1 archive 1 new 1
ENVISAT archive new
IRS-1C archive new 1
LANDSAT archive new 1
SAC-C archive new
AVHRR archive new
ALOS archive new
DMC archive new

Data Delivery:

Data Evaluation: The MIC evaluated the products in the following way : good quality, products needed more rapidly, extension for events with a longer duration needed

Final Product: 6 flood extent maps at 1:75,000 provided through GMES RISKEOS consortium, focussed on large towns along Rivers Tisza and Koeroes. GIS shapefile files sent as well

Problems: N/A

PM Recommendations: Tight contact between AU and PM/VA eases the ongoing work and coordination of the call. And the product can be updated and improved due to user demands as well.

Comments: Very good contacts with AU. No problem for a relatively small area. More contact with the end user would have made products more adapted.

8.8 Activation #99, Danube floods, Romania

Disaster Description: Severe flooding disasters took place from the beginning of April to mid of May 2006 in Central Europe due to long-term heavy rainfalls combined with intense snow melt. In Romania large parts along the Danube river were flooded during a time period of 4-5 weeks. In this time several villages were inundated due to dam breaks along the Danube river, i.e. at Bistret. Additionally, large parts of the Danube Delta were flooded. The situation in Romania was critical over several weeks due to the fact that the

water level peak of the Danube flood was long and rainfall set in periodically..

<u>Date of Disaster:</u>	Beginning April 2006
<u>Date of Activation:</u>	Tuesday, 18 April 2006
<u>Date of PM Selection:</u>	19 April 2006
<u>Authorized User:</u>	ENV-MIC, European Commission
<u>End User:</u>	Ministry of Environment and Ministry of Agriculture, Romania
<u>ECO:</u>	R. Gonzales, CONAE
<u>PM:</u>	T. Scheniderhan, DLR
<u>Satellites Tasked:</u>	<input type="checkbox"/> SPOT2 <input checked="" type="checkbox"/> SPOT4 <input type="checkbox"/> SPOT5 <input type="checkbox"/> ERS2 <input checked="" type="checkbox"/> RADARSAT1 <input checked="" type="checkbox"/> ENVISAT <input checked="" type="checkbox"/> IRS-1C <input checked="" type="checkbox"/> LANDSAT <input type="checkbox"/> SAC-C <input type="checkbox"/> AVHRR <input type="checkbox"/> ALOS <input checked="" type="checkbox"/> DMC SPOT2 archive 0 new SPOT4 archive 0 new 2 SPOT5 archive new ERS2 archive new RADARSAT1 archive 1 new 1 ENVISAT archive 0 new 0 IRS-1C archive 1 new 0 LANDSAT archive 0 new 3 SAC-C archive new AVHRR archive new ALOS archive new DMC archive 0 new 7 21 archive
<u>Data Delivery:</u>	Data were delivered to the Romanian Space Agency (ROSA) which had a large GIS with data up to 1:25,000
<u>Data Evaluation:</u>	Good cooperation with many precious products. Large echo in Europe on this Call. ROSA was very happy about the "good and fruitful cooperation" and the resulting products.
<u>Final Product:</u>	DLR produced the first map after the dam break at Bistret through the RISKEOS consortium. All the other product were provided by ROSA
<u>Problems:</u>	
	<u>PM Recommendations:</u> .: It is recommended to implement a 24/7 automated processing chain at the data providers.

It is recommended to implement a 24/7 contact hotline at the data providers. It wasn't possible to reach someone at ESA after 17 h and during the weekend.

Data exchange between End Users and Value Adder should be intensified.

Good results and good cooperation during the Call showed the possibilities and disadvantages of a third party value adding.

Clear procedures should be work out for the case of non-GMES-VA like in this case. There are obvious advantages to let the VA be done by institutions or organisations that are situated closer to the event.

Comments:

8.9 **Activation #100, Merapi eruption**

Disaster Description: Indonesian Center for Vulcanology and Geological Hazard Mitigation raised the alert status for Mt. Merapi Volcano in Central Java to Level 3 on 12 April 2006 - level 3 means that volcanic activity has increased and that an eruption might be imminent. The Indonesian authorities evacuated several villages. The volcanic eruption threat remained for several weeks..

Date of Disaster: Wednesday, 12 April 2006

Date of Activation: Tuesday, 25 April 2006

Date of PM Selection: Tuesday, 25 April 2006

Authorized User: Jay Feuquay, USGS

End User: Indonesian Center for Volcanology and Geologic Hazard Mitigation (CVGHM) through the American Embassy in Indonesia

ECO: R. Pietsch, CSA

PM: B.K. Jones, USGS

Satellites Tasked: SPOT2 SPOT4 SPOT5 ERS2 RADARSAT1
 ENVISAT IRS-1C LANDSAT SAC-C AVHRR
 ALOS DMC
 SPOT2 archive 1 new
 SPOT4 archive new

SPOT5 archive 2 new 3
 ERS2 archive new 1
 RADARSAT1 archive new
 ENVISAT archive new 1
 IRS-1C archive new
 LANDSAT archive new 3
 SAC-C archive new
 AVHRR archive new
 ALOS archive new 1
 DMC archive new 2t2

Data Delivery: ERS data had to be transferred from Singapore station
 There was some problem getting the data to the users in the field.
Many of the images had the summit extracted and compressed for viewing by the scientists in the field There was more success with this method, but there were still problems encountered with bandwidth/communications to the field.

Data Evaluation: It seems that most of the charter data was too low of spatial resolution to adequately monitor Merapi's dome growth. The SPOT 5 image had a pretty useful ~3.5m resolution, but the one image we have was cloudy at the summit.
If the monitoring goes on for a substantial amount of time, as Merapi did, it is unlikely that the Charter response can continue for that amount of time.

Final Product: No actual products were provided by the end-user of this activation.

Problems: Trouble at obtaining IRS data

PM Recommendations: For monitoring dome growth and assessing ediface stability frequent, sub-2.5m data as a part of the Charter would be great.

Comments:

8.10 Activation #101, Suriname floods

Disaster Description: During the start of May Suriname had seen unprecedented amounts of rain. Disaster officials in the country said that 175 villages close to the Suriname and Marowijne rivers in southeastern and central Suriname were worst affected. It is thought that between 25,000 and 30,000 people had fled their homes for higher ground, and several people had been reported missing. President Ronald Venetiann declared the area in the remote lowlands a disaster zone, and the mili-tary had been

called to help with the aid operation. May is the start of the rainy season in Suriname, though according to government officials the high amount of rain they had had since the start of the month is very rare..

Date of Disaster: Early May 2006

Date of Activation: Wednesday, 10 May 2006

Date of PM Selection: 12 May 2006

Authorized User: Cooperating body UN-OCHA through UNOOSA

End User: UN-OCHA Emergency Services Branch, Field Information Support Section

ECO: V. Shailaja Nair, ISRO

PM: A. Keith, RSAC for ESA

Satellites Tasked: SPOT2 SPOT4 SPOT5 ERS2 RADARSAT1
 ENVISAT IRS-1C LANDSAT SAC-C AVHRR
 ALOS DMC
 SPOT2 archive 1 new
 SPOT4 archive new 1
 SPOT5 archive new 1
 ERS2 archive new
 RADARSAT1 archive 2 new 1
 ENVISAT archive 1 new 3
 IRS-1C archive new 2
 LANDSAT archive new
 SAC-C archive new
 AVHRR archive new
 ALOS archive new
 DMC archive new 2

Data Delivery: First product delivered on May 17, 2006

Data Evaluation: Products were delivered quickly utilising all data that was given. However as the data focused on the initial AOI did not cover the main flood affect areas that was later discovered the products were of limited use. "The flooded areas are the upper Suriname (above the dam), Tapanahony and Lawa River (border with French Guyane) The areas that you are mapping are north of the disaster area. MapAction has maps of the correct areas." - Dr. Gustavo Bretas, Roll Back Coordina-tor, PAHO-WHO (Amazon Region). Minne Boelens of the Dutch Ministry of Defence praised the speed of the response of the various agencies and partners. He received all products "in good order and in a timely fashion"

Final Product: Maps delivered through GMES RESPOND consortium by SERTIT

Problems: Although the products provided by SERTIT were accurate on time, they proved to have limited use to the end-user. The main reason for this was the area of interest (AOI) defined by the AU in conversation with CNES only corresponded to a portion of the affected area (of very large extent exceeding several 60x60km footprints). At the Charter Call's initiation it was recognised by the AU and their partner UNOSAT that due to the extent of the crisis area a particular area-of-interest needed to be chosen in order to focus the data collection particularly that of SPOT. Also taken into consideration were the geographic attributes of the area: the 60km diameter AOI chosen had less forest cover, thus making it easier to map flooded areas, and had a higher concentration of population. After secondary users were added to the project and field data received, it became apparent that the areas worst affected by the flooding were not covered by the original AOI. All satellite imagery other than ASAR WSM also did not cover the worst affected areas. The RESPOND consortium (and crisis mapping provided SERTIT) agreed in the light of this information to create additional maps using the WSM of this area but with limited success (i.e. no flooding features detected from these data; note that the area is primarily covered with dense forest). Unfortunately this meant that the products created by SERTIT had limited success in the field. In parallel RESPOND partner MapAction created in field mapping products (not using EO) that were local (in terms of spatial extent) but useful in this situation

PM Recommendations: More discussion with the cooperating bodies that decide the AOI and the VAC would have avoided problems. Given the nature of the area, tropical during flooding, SAR is the instrument of choice however a warning should be issued that flood mapping in dense forest may have some limitations.

Comments:

8.11 Activation #102, Indonesia earthquake

Disaster Description: A magnitude 6.3 earthquake struck the Island of Java 20km south from Yogyakarta causing 4,611 life losses with 100,000 people left homeless.

<u>Date of Disaster:</u>	May 26, 2006
<u>Date of Activation:</u>	May 27, 2006
<u>Date of PM Selection:</u>	May 29, 2006
<u>Authorized User:</u>	German Ministry of Foreign Affairs
<u>End User:</u>	German Red Cross
<u>ECO:</u>	T. Duverger, CNES
<u>PM:</u>	K. Scholte, DLR
<u>Satellites Tasked:</u>	<input type="checkbox"/> SPOT5 archive 1 new 1 <input type="checkbox"/> RADARSAT1 archive 1 new 1 <input type="checkbox"/> ENVISAT archive 2 new 2 <input type="checkbox"/> LANDSAT archive 1 new 1 <input type="checkbox"/> ALOS archive new 2 <input type="checkbox"/> IKONOS archive (quick looks only) 2 <input type="checkbox"/> Quickbird archive 2
<u>Data Delivery:</u>	Products delivered by DLR through web site and email to the end user.
<u>Data Evaluation:</u>	Products were very well received by the end user with whom regular communications were maintained.
<u>Final Product:</u>	All maps were provided in UTMZON 49 S (WGS84) under ESA Respond contract. Vectors made available for GIS integration.
<u>Problems:</u>	Due to budgetary limitations, on top of Charter data DLR decided to procure QuickBird imagery rather than IKONOS from the local supplier (CRISP) While DLR was the VAC to produce a series of PRODUCTS at the same time UNOSAT also produced another series with unfortunately some duplication of work.
<u>PM Recommendations:</u>	N/A
<u>Comments:</u>	No processing of the RADARSAT images could be made as the 4-year period between 2 images was too large to use backscatter information for deriving damages to building and infrastructure

8.12 Activation #103, Argentina floods

Disaster Description: On July 12, 2006 took place the most important flood of the Neuquén river since records exist. This was a consequence of the intense precipitations. All tributaries were flooded and led to what is estimated as a millennial flood.

Date of Disaster: 12 July 2006

Date of Activation: 27 July 2006

Date of PM Selection:

Authorized User: SIFEM, Argentina

End User: Autoridad Interjurisdiccional de Cuencas (basin authority)

ECO: R. Gonzales, CONAE

PM: A. Soldano, CONAE

Satellites Tasked: SPOT2 SPOT4 SPOT5 ERS2 RADARSAT1
 ENVISAT IRS-P6 LANDSAT SAC-C AVHRR
 ALOS DMC

SPOT2 archive 0 new

SPOT4 archive new 2

SPOT5 archive 1 new 2

ERS2 archive new

RADARSAT1 archive new

ENVISAT archive new

IRS-P6 archive 1 new 1

LANDSAT archive new

SAC-C archive new

AVHRR archive new

ALOS archive 2 new 2

DMC archive new

FORMOSAT

Data Delivery: First product delivered on July 30, 2006

Data Evaluation: Thanks to these maps the final User had a clear vision of the flood situation.

Final Product: 21 space maps and products overlaid on SIG250 from IGM

Problems: N/A

PM Recommendations: N/A

Comments: N/A

8.13 **Activation #104, Lebanon oil spill**

Disaster Description: In the course of the conflict in the Middle East, the oil-fuelled power plant of Jieh, located directly on the coastline approximately 30 km south of Beirouth, was hit by Israeli bombs on July 13th and 15th, 2006. A large part of the fuel of the storage tank (about 15 000 t) was spilled into the Mediterranean Sea as a result of the blast. Another tank spilled about 5 000 t into the Sea. The Lebanese ministry of environment estimated that approximately 20 000 t of Diesel were emitted into the sea. During the first three weeks after the accident about 150 km of the Lebanese coast were affected by the oil pollution and partly contaminated. The oil spill drifted along the coast in northern direction (coastal current) into Syrian territory..

Date of Disaster: Saturday, 15 July 2006

Date of Activation: Saturday, 29 July 2006

Date of PM Selection: 30 July 2006

Authorized User: ENV-MIC, European Commission

End User: Lebanese Ministry of Environment, Danish marine pollution team

ECO: G. Toyos, CONAE

PM: T. Schneiderhan, DLR

Satellites Tasked: SPOT2 SPOT4 SPOT5 ERS2 RADARSAT1
 ENVISAT IRS-1C LANDSAT SAC-C AVHRR
 ALOS DMC
 SPOT2 archive 0 new
 SPOT4 archive new
 SPOT5 archive 1 new 1
 ERS2 archive new
 RADARSAT1 archive 2 new 3
 ENVISAT archive 1 new 10
 IRS-P6 archive new 2
 LANDSAT archive new 2
 SAC-C archive new
 AVHRR archive new
 ALOS archive new
 DMC archive new
 MODIS 6 archive, ASTER 1 new

<u>Data Delivery:</u>	First oil spill map issues on 31 July 2006
<u>Data Evaluation:</u>	
<u>Final Product:</u>	4 maps provided through the GMES MARCOAST and DLR
<u>Problems:</u>	In cases of Charter requests the needed time range of programming should not exceed 36 hours. ESA programming takes 4 days. Need to clarify the role of JRC.
<u>PM Recommendations:</u>	Tight contact between AU and PM/VA eases the ongoing work and coordination of the call. And the product can be updated and improved due to user demands as well. Information of AU and End users to trigger the charter in anticipation/ or at least in time (in an early state of the event) is needed
<u>Comments:</u>	The Authorised User ENV-MIC had established cooperation with UNOCHA/UNEP team and European Maritime Safety Agency (EMSA), acting as a primary gateway for Charter data.

8.14 Activation #105, Pakistan floods

<u>Disaster Description:</u>	Floods in Pakistan due to unusually heavy rains.
<u>Date of Disaster:</u>	Saturday, 05 August 2006
<u>Date of Activation:</u>	Friday, 11 August 2006
<u>Date of PM Selection:</u>	12 August 2006
<u>Authorized User:</u>	Cooperating body UN OCHA through UN OOSA
<u>End User:</u>	UN OCHA local office SUPARCO, Pakistan
<u>ECO:</u>	F. Cattaneo, Serco for ESA
<u>PM:</u>	E. Bjorgo, UNOSAT
<u>Satellites Tasked:</u>	<input type="checkbox"/> SPOT2 <input type="checkbox"/> SPOT4 <input checked="" type="checkbox"/> SPOT5 <input type="checkbox"/> ERS2 <input checked="" type="checkbox"/> RADARSAT1 <input checked="" type="checkbox"/> ENVISAT <input checked="" type="checkbox"/> IRS-1C <input checked="" type="checkbox"/> LANDSAT <input type="checkbox"/> SAC-C <input type="checkbox"/> AVHRR <input type="checkbox"/> ALOS <input type="checkbox"/> DMC SPOT2 archive new SPOT4 archive new

SPOT5 archive 0 new 2
 ERS2 archive new
 RADARSAT1 archive 1 new 1
 ENVISAT archive 0 new 2
 IRS-1C archive 5 new 3
 LANDSAT archive 1 new 1
 SAC-C archive new
 AVHRR archive new
 ALOS archive new
 DMC archive new

Data Delivery: First post-disaster map available on 18 August. reference map on 16 August

Data Evaluation:

Final Product: SPOT5 derived flood extent were shared with SUPARCO and intergated in their GIS. Reference maps using available archive.

Problems: Delivery of SPOT5 took a bit long due to public holidays (15 August). IRS data should be available on-line.

PM Recommendations:

Comments:

8.15 Activation #106 , Ethiopia Floods

Disaster Description: Floods in Ethiopia caused by the Nile river.

Date of Disaster: Early August 2006

Date of Activation: Thursday, 17 August 2006

Date of PM Selection: 18 August 2006

Authorized User: Cooperating body WFP through UNOOSA

End User: Vulnerability and Mapping Unit, WFP

ECO: V. Shaliaja Nair, ISRO

PM: E. Bjorgo, UNOSAT

Satellites Tasked: SPOT2 SPOT4 SPOT5 ERS2 RADARSAT1
 ENVISAT IRS-1C LANDSAT SAC-C AVHRR
 ALOS DMC

SPOT2 archive 1 new
 SPOT4 archive 1 new 1
 SPOT5 archive 0 new 0
 ERS2 archive new
 RADARSAT1 archive 1 new 2
 ENVISAT archive new
 IRS-1C archive new
 LANDSAT archive new
 SAC-C archive new
 AVHRR archive new
 ALOS archive new
 DMC archive new

Data Delivery: First flood map derived from SPOT delivered on 23 August

Data Evaluation: Relatively large areas of water saturated soils on the image. The SPOT derived flood extent superimposed on archived LANDSAT with SRTM contour heights was perceived as the most useful map

Final Product: Flood map derived from SPOT imagery overlaid on LANDSAT archive, provided by UNOSAT

Problems: No ECO dossier transmitted to PM although programming was carried out by ECO

PM Recommendations:

Comments:

8.16 Activation #107, Philippines oil spill

Disaster Description: On 11 August 2006, the oil tanker Solar sunk off the coast of Guimaras Island in the Philippines. By 24 August 2006, some 50,000 gallons of oil had leaked into the sea, polluting more than 300 km of coastline and threatening fishing as well as other islands of the Philippines. A state of emergency was declared in the Philippines on 25 August 2006. .

Date of Disaster: Friday, 11 August 2006

Date of Activation: Tuesday, 22 August 2006

Date of PM Selection: 24 August 2006

Authorized User: Cooperating body UNEP/UNOCHA through UNOOSA

End User: Joint UNEP/UNOCHA Environment Unit

<u>ECO:</u>	G. Crowley, DMCII
<u>PM:</u>	A. Retiere, UNOSAT
<u>Satellites Tasked:</u>	<input type="checkbox"/> SPOT2 <input type="checkbox"/> SPOT4 <input type="checkbox"/> SPOT5 <input type="checkbox"/> ERS2 <input checked="" type="checkbox"/> RADARSAT1 <input checked="" type="checkbox"/> ENVISAT <input type="checkbox"/> IRS-1C <input type="checkbox"/> LANDSAT <input type="checkbox"/> SAC-C <input type="checkbox"/> AVHRR <input type="checkbox"/> ALOS <input type="checkbox"/> DMC SPOT2 archive 1 new SPOT4 archive new SPOT5 archive new ERS2 archive new RADARSAT1 archive 0 new 1 ENVISAT archive 0 new 3 IRS-1C archive new LANDSAT archive new SAC-C archive new AVHRR archive new ALOS archive new DMC archive new
<u>Data Delivery:</u>	First product delivered on 24 August 2006 through UNOSAT website
<u>Data Evaluation:</u>	very good feedback from the joint UNEP/OCHA team as well as from Philippine National Disaster Coordination Unit. Used to facilitate coordination of relief efforts
<u>Final Product:</u>	2 maps derived from ENVISAT and RADARSAT imagery and LANDSCAN and SRTM data provided by UNOSAT
<u>Problems:</u>	N/A
<u>PM Recommendations:</u>	
<u>Comments:</u>	Very timely availability of imagery made it possible to deliver maps 24 hours after acquisition and 48 h after activation. Had the charter been triggered earlier even higher coordination impact could have been achieved

8.17 Activation #108, Sudan floods

<u>Disaster Description:</u>	Torrential rain which started in the Sudan at the beginning of August 2006 increased to a large-scale emergency by 25 August. Floods and heavy rain killed 27 people and damaged about 10,000 homes, according to government and other sources. .
<u>Date of Disaster:</u>	Mid-August 2006

Date of Activation: Friday, 25 August 2006

Date of PM Selection: 26 August 2006

Authorized User: Cooperating body WFP through UNOOSA

End User: WFP vulnerability analysis and mapping unit, Ethiopia

ECO: G. Crowley, DMCII

PM: E. Bjorgo

Satellites Tasked: SPOT2 SPOT4 SPOT5 ERS2 RADARSAT1
 ENVISAT IRS-1C LANDSAT SAC-C AVHRR
 ALOS DMC
 SPOT2 archive 0 new
 SPOT4 archive new
 SPOT5 archive new
 FORMOSAT archive 0 new 2
 ERS2 archive new
 RADARSAT1 archive 1 new 3
 ENVISAT archive 0 new 2
 IRS-1C archive new
 LANDSAT archive new
 SAC-C archive new
 AVHRR archive new
 ALOS archive new
 DMC archive 1 new 2

Data Delivery: Data delivered to WFP in Khartoum with some assistance from Rome office and others. First post disaster map available on 30 August 2006

Data Evaluation: Good feedback . However the flood caused less damage than anticipated with water level decreasing rapidly and hence a short time window for observations. Derived maps were of limited use for decision making during the flood.

Final Product: For this call the end user had extensive GIS and processing capability and preferred to do the value addition

Problems: N/A

PM Recommendations: Field office are very valuable must be trained to handle charter requests. Use a wider variety of raw data (ENVISAT SPOT and DMC)

Comments: Use of FORMOSAT appreciated.

8.18 Activation #110: Bulgaria, Oil Spill

Disaster Description: On the morning of October 2nd, a large oil slick was detected flowing into Bulgarian territory on the Danube river from Serbia.

Date of Disaster: 05 October 2006

Date of Activation: 05 October 2006

Date of PM Selection: 06 October 2006

Authorized User: MIC (Monitoring and Information Centre, DG-ENV, EC)

End User: Bulgarian State Agency for Information Technologies and Communications, Bulgarian Ministry of State Policy for Disasters and Accidents

ECO: Shailaja Nair/ISRO

PM: Alan Steel/JRC

Available data: SPOT-5:

Source_ID	Date	Type	Channels	Pixel [m]
50872620607070933371J	07.07.06	MS	4	10
50872620607070933351A	07.07.06	Pan	1	2.5
50862610610100906361A	10.10.06	Pan	1	2.5
50862610610100906391J	10.10.06	MS	4	10

Formosat2:

Source_ID	Date	Type	Channels	Pixel [m]
00152077001	11.10.2006	MS	4	8M
00152077002	11.10.2006	Pan	1	2M
00152077003	12.10.2006	MS	4	8M
00152077004	12.10.2006	Pan	1	2M

ALOS-Avnir:

Source_ID	Date	Type	Channels	Pixel [m]
00152077001	11.10.2006	MS	4	8M
00152077002	11.10.2006	Pan	1	2M

00152077003	12.10.2006	MS	4	8M
00152077004	12.10.2006	Pan	1	2M

Radarsat:

- 18 March 2002 04:33 UTC (reference image)
- 08 October 2006 16:29 UTC
- 09 October 2006 04:40 UTC

ERS2:

- 07 October 2006 09:03 & 20:22 UTC
- 10 October 2006 20:27 UTC

Envisat ASAR:

- 07 October 2006 08:35 UTC
- 10 October 2006 08:40 UTC

Final Product: A small number of output maps have been created.

Problems:

If data had been acquired before October 5th, the extent of the oil slick may have been detectable from space. The 3 day delay between the event and the activation of the Charter prevented that.

End User Recommendations:

It is important that organisations that are located close to the event, and have close links to the civil protection and environmental monitoring authorities of the region/country affected, become involved in the value adding process.

Charter calls should be linked to a budget for financing the work of the value adding organisations. In this case, there was no available budget.

Comments:

I would like to acknowledge, on behalf of the International Charter, the positive and intelligent response from the organizations that provided EO data for this call, which greatly facilitated the work carried out. These are CNES and Spot Image, ESA's EO Help Desk, JAXA and Radarsat's Mission Management Office

8.19 Activation #111: Sri Lanka, Floods

Disaster Description: Floods started late October 2006 with a gradual increase in extent and damage.

Date of Disaster: Late October 2006

Date of Activation: 02 November 2006

Date of PM Selection: 06 November 2006

Authorized User: United Nations Development Programme (UNDP) through United Nations Office for Outer Space Affairs

End User: Ananda Mallawatantri and Vincent Hubin/UNDP and UNOCHA

ECO: Dr. Guillermo Toyos/CONAE

PM: Einar Bjorgo/UNOSAT

Available data:

SPOT-5:
24 Feb 03
7 Nov 06
8 Nov 06

SPOT-4:
4 Nov 06

Radarsat:
25 Aug 02
8 Nov 06

Envisat ASAR:
3 Nov 06
10 Nov 06
13 Nov 06
16 Nov 06

Final Product: Pre-disaster overview maps were produced using SPOT 5 data covering the most affected districts. In addition, UNOSAT produced pre-disaster overview maps on elevation from SRTM, population distribution from Landsat, general map from Landsat ETM+ and rainfall map from MODIS. Post-disaster flood area maps were derived from Radarsat-1 data.

Problems:

Still unclear as to what archive data are available from ENVISAT. However, Radarsat-1 already provided needed information on flood.

End User Recommendations:

It took four days before UNOSAT was officially designated PM. This is a bit long and should be shortened.

Disseminated products met user needs, but as is often the case, the end-user would like to see products received within even shorter time frames.

Comments:

Radarsat-1 imagery processed provided good overview of the flooded situation.

8.20 Activation #112: Ethiopia, Floods

Disaster Description: Floods started late October 2006 with a gradual increase in extent and damage.

Date of Disaster: Late October 2006

Date of Activation: 03 November 2006

Date of PM Selection: 06 November 2006

Authorized User: World Food Programme (WFP) through United Nations Office for Outer Space Affairs

End User: Kedir Shemsu/WFP

ECO: Dr. Guillermo Toyos/CONAE

PM: Einar Bjorgo/UNOSAT

Available data: SPOT-5:
12 Aug 05

SPOT-4:
6 Nov 06
7 Nov 06
11 Nov 06

Formosat 2:
10 Nov 06

Radarsat:
26 Feb 02
6 Nov 06

Envisat ASAR:
19 Nov 04
12 Nov 06
15 Nov 06
18 Nov 06 x2

19 Nov 06 x2

Final Product:

As of 15 November 2006, seven value added products had been distributed to the end users. This included population distribution using LandScan, elevation map using SRTM, pre-flood general overview using Landsat 7 (in A3 and A0 format as requested by end user), detailed pre-flood overview using SPOT 5 (in A3 and A0 format as requested by end user) and flood crisis map showing flooded areas as derived from Radarsat-1 data merged onto Landsat 7 background map.

Problems: Both user and PM was a bit frustrated over difficult access radar imagery, mostly due to technical issues. This caused some delay in providing maps showing extent of floods to the user.

Problems with data compatibility of provided Radarsat-1 data. Standard Radarsat CEOS format supported by ERDAS software used by UNOSAT, but naming convention on downloaded files differed. This caused delays in production. However, Radarsat was very helpful in finding the solution to the problem. The problem was significant to the extent that the distributor of ERDAS in Switzerland and its technical support was not able to solve the problem and it had to be addressed to the headquarters of Leica geosystems who in turn worked out a solution with Radarsat/MDA.

System for image delivery and download information (link, username, password) for ENVISAT data should be revised. Currently there are too many stations, service offices and actors involved even for a single call and key information is frequently not available to the PM on time. This is meant as constructive suggestions for ESA to review procedures and propose improvements. It is not a criticism as the PM is aware of the significant efforts ESA puts into supporting the Charter and its Users. PM is willing to provide more details and information from a PM-perspective on how this can be done.

ECO dossier would benefit from having a summary of ordered archived and programmed scenes. In the cases where the ECO dossier does provide this it makes the PM able to focus more of her/his efforts on the operational aspects.

Unfortunately, no new SPOT scenes were exploitable, as the 6 and 11 November scenes could not be processed by SPOT Image due to various technical problems and the 7 November scene was too cloudy.

End User Recommendations:

It took three days before UNOSAT was officially designated PM. This is a bit long and should be shortened.

Disseminated products met user needs, but as is often the case, the end-user

would like to see products received within even shorter time frames.

Comments:

Radarsat-1 imagery processed provided good overview of the flooded situation, and in combination with optical data constituted a good flood reference map

8.21 Activation #113: Somalia, Floods

Disaster Description:

Floods started late October 2006 – escalation of effects from floods 11-12 November and still ongoing

Date of Disaster: Late October 2006

Date of Activation: 13 November 2006

Date of PM Selection: 14 November 2006

Authorized User: UN Office for the Coordination of Humanitarian Affairs (OCHA) through United Nations Office for Outer Space Affairs

End User: Matthew Olins, Pierre Gelas/OCHA
Craig Von Hagen, Julia Stone/FAO
Ndambuki A. Mutua/WFP
John Marinos/UNHCR

ECO: Gary Crowley/DMCII

PM: Einar Bjorgo/UNOSAT

Available data: SPOT-5:
02 Dec 06

SPOT-4:
09 Jun 06
17 Nov 06
22 Nov 06
03 Dec 06

Formosat 2:
16 Nov 06
17 Nov 06
20 Nov 06
21 Nov 06

19 Nov 06

20 Nov 06

Radarsat:

13 Dec 01

17 Nov 06

20 Nov 06

16 May 06

27 Nov 06

06 Dec 06

04 Dec 06

Envisat ASAR:

14 May 06

21 Dec 04

11 Feb 06

26 Jan 06

18 Nov 06

29 Jan 06

2 Nov 06

18 Nov 06

21 Nov 06

24 Nov 06

08 Nov 06

DMCII:

15 Nov 06

21 Nov 06

23 Nov 06

26 Nov 06

Final Product:

Both maps produced by UNOSAT through systematic discussions and coordination with end user to target areas and include information needed in the field, and Charter imagery derived flood extent vectors shared in digital format with a wide variety of actors were most appreciated and made a fundamental impact on how decisions were made for planning and implementing the response to the disaster. Flood extent vectors were combined with the latest field-verified population distributions. Due to the complex situation in Somalia, the security aspect is very important. Maps were also used in this context to coordinate and discuss with Government representatives and Union of Islamic Courts representatives for securing relief aid delivery to people in need.

Problems: None reported.

End User Recommendations:

Flood extent derived from radar imagery matched very well with that from optical imagery. With the frequent revisit interval of FORMOSAT this is useful

for “validation” of areas cloud covered on day X but cloud free on day X+1.

Comments:

Overall a relatively large scale Charter activation

Products from this call had a significant impact on the way the various actors planned their operations and responded to the needs

The availability of FORMOSAT-2 data provides a new dimension to operational support by the Charter. This is an excellent complementary data source to the existing range of sensors.

8.22 Activation #114: Kenya, Floods

Disaster Description:

Floods started early November 2006 – gradual increase in extent and damage.

Date of Disaster: Early November 2006

Date of Activation: 17 November 2006

Date of PM Selection: 17 November 2006

Authorized User: US Geological Survey (USGS)

End User: Gideon Galu/FEWS NET

ECO: Gary Crowley/DMCII

PM: Jodie Smith/USGS

Available data: SPOT-5:
Any between 19 Nov 06 and 30 Nov 06

SPOT-4:
15 Jun 06
28 Apr 06
4 Aug 06

Formosat 2:
Requested by ECO –not tasked by CNES.

Radarsat:
23 Nov 06
01 Mar 02
30 Mar 01

31 Jan 01

Envisat ASAR:

21 Sep 06

27 Nov 06

10 Nov 05

24 Nov 06

30 Apr 05

21 Nov 06

Landsat:

22 Nov 06

20 Dec 06

Also used any available ASTER, Quickbird, and IKONOS

Final Product:

Several flood maps were produced and sent to the field. The first one released was generated from MODIS data, as it was available before the Charter data.

Problems:

I am not very familiar with processing RADAR data and we have only a few RADAR experts in house. I was offered some training on RADAR processing but after activation is not a good time to get training. It would be useful to have some training data sets and time available to become more familiar with the processing required for unfamiliar data sets prior to an activation.

End User Recommendations:

This was a rather complicated emergency due to the widespread nature of the flooding, the persistence of the heavy rains, and the movement of the effected areas. Three areas were initially targeted, onemore was added immediately after the activation, and other areas were requested as the flood water moved downstream and more rain fell. I am not sure that we were able to capture the full extent of the emergency.

End user would like to have infrastructure digitized from the commercial imagery, to be available for the next emergency, but it is still unclear if this work will be done or who should be responsible for doing it. USAID was cautious about supporting this type of work under the auspices of FEWS NET, given work plans already in place.

Comments:

Communication and feedback from the end users occurred on a near daily basis. Their needs and capabilities were communicated fairly well and they also provided feed back on how the products were being used. I received copies of some of the products that they made themselves. The most notable feedback comments are quoted below

- “The overlay with the flood polygon is excellent.”
- “You really did it for us, the QB image overlay was great! It was presented during the KFSSG technical team and I think we will have more audience

tomorrow to show off some of this work. The representative of the Office of President was very impressed. This disaster has proved to be an excellent opportunity for USGS and partners to showcase the resources available to support decision making. We are scheduling a USAID briefing early next week on flooding and other food security aspects in our region.”

- “thank you. I am sure that the Kenya Water Resource Ministry will find this image quite useful”
- “The images and flood polygons you put together are one of best info available on the flood situation to the Kenyan and International agencies involved in the ongoing flood relieve effort. And in all the meetings I attended people want more flood polygons and figures.”

8.23 Activation #115: Philippines, Hurricane

Disaster Description:

Typhoon Durian hit the Philippines on November 29, 2006.

Date of Disaster: 29 November 2006

Date of Activation: 1 December 2006

Date of PM Selection: 1 December 2006

Authorized User: United Nations Office for the Coordination of Humanitarian Assistance (UN OCHA) through UN Office of Outer Space Affairs (OOSA)

End User: Craig Williams/OCHA

ECO: Simone Paoloni/ESA

PM: Richard Nezelek/Pacific Disaster Center (PDC)

Available data: SPOT-5:
Any between 02 and 06 Dec 06

Radarsat:
08 Dec 06
30 Apr 98
10 Aug 06

IRS 1C:
Any between 02 and 08 Dec 06

DMC II:
Any between 02 and 08 Dec 06
Any between Jun and Nov 06

Envisat ASAR:

05 Dec 06

07 Dec 06

06 Sep 06

22 Aug 06

11 May 06

ALOS:

05 Dec 06

Final Product:

OCHA used the data to create maps for their coordination work to plan the response and make sure various actors had a common reference related to damage assessments.

Problems:

Coordinating and communicating between Europe and Hawaii for a disaster in the Philippines caused some delay. An additional contact in the disaster area could have been helpful.

End User Recommendations:

None

Comments:

In addition, the maps were used by the following agencies in the Philippines: the NDCC (Natural Disaster Coordination Council), the Philippine Volcanology and Seismology (PHIVOLCS), Department of Environment and Natural Resources (DENR) and NAMRIA, the Philippine mapping agency. The maps were used to further the agencies' geohazard assessments and geological surveys to support the formulation/development of immediate projects relative to relocation and resettlement, zoning and the like.