United Nations Institute for Training and Research

Operational Satellite Applications Programme

UNOSAT

satellite solutions for all

Brief on the use of

The International Charter Space and Major Disasters

ABSTRACT

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Introduction

As a result of the opportunity for United Nations agencies and programmes to benefit from the International Charter Space and Major Disasters (Space Charter) since 2003 UN humanitarian relief staff and managers involved in responding to natural and technological disasters have been receiving more geographic information. This was made possible by processing data from Space Charter satellite sensors and has increased the exposure of UN users to satellite derived information.

The agreement giving the UN access to the Space Charter was discussed over two years with UN partners such as the UN Office for Project Services (UNOPS), the UN Office for Outer Space Affairs (UNOOSA), and the UN Office for the Coordination of Humanitarian Affairs (UNOCHA), and others including UNHCR. At the time when these negotiations took place, the UN Institute for Training and Research (UNITAR) launched what was to become its Operational Satellite Applications Programme (UNOSAT).

For historical reasons, it was decided in 2003 to begin the joint effort with the UN with the Vienna based UNOOSA as the UN Collaborative Body. This arrangement was at that time a natural choice by the Space Agencies although UNOOSA is not a humanitarian entity. Today this arrangement leaves open the question of how humanitarian entities benefitting from the Space Charter should have a more visible presence to help the Space Charter evolve into a setup in which the actual UN users are properly involved and have an active role. In such perspective, it is useful to remember that UNOCHA is the UN organization formally mandated with the coordination of humanitarian relief, while most Space Charter final users are UN entities with an operational mandate in the area of relief (WFP, UNICEF for example), or in the area of recovery (UN-HABITAT, UNDP, UNEP for example).

UNOSAT in the context of the UN system

The institutional identity, mission and mandate of UNOSAT as an operational programme of UNITAR in cooperation with UNOPS and CERN are illustrated in Annex A to the present report.

Institutional cooperation

The mechanisms, fora, and tools used by UNOSAT to carry out institutional inter-agency cooperation are described in Annex B to the present report. These mechanisms are important because the promotion and use of space applications for emergency response cannot be achieved efficiently by any institution working in isolation from the others.

Facts and figures

The UNOSAT Rapid Mapping service commenced its operational activities in 2003. This was closely linked to the new opportunity for United Nations organizations to access data provided through the Space Charter. The instructions provided by the Charter Board to the UN in 2003 are relevant to the UN-Charter review. The analysis of the support work done by UNOSAT on these instructions is provided in Annex C to the present brief.

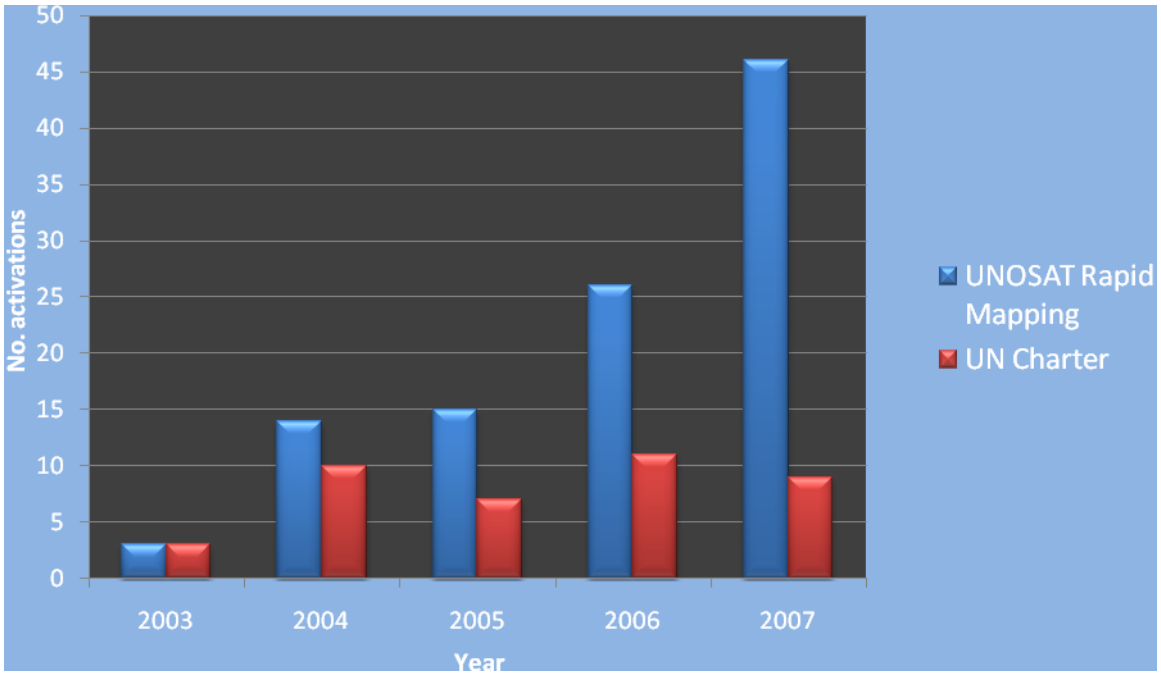

Figure 1: Evolution of UNOSAT Rapid Mapping activations and number of Space Charter activations requested by the UN system

Figure 1 above illustrates the evolution of the number of UNOSAT Rapid Mapping interventions (jobs) upon request by UN sister agencies, their implementing partners, and UN Member States. The total number of UNOSAT intervention (in blue) includes also cases in which the Space Charter was requested by a UN user. One intervention is defined as one emergency in one country.

Figure 1 also shows the evolution of the Space Charter activations requested by UN users. The statistical base has been normalized so as to account for certain Space Charter activations that covered more than one country. Thus, the two graphs are intercomparable.

From the figure, one can see that the UN Space Charter activations have been relatively stable since 2004, accounting to roughly one per month on average. Over the same period, due to

UNOSAT consolidation of its operational capability and to predictable funding from UN member states, UNOSAT Rapid Mapping interventions have increased steadily.

Therefore, as of 2007, UNOSAT received support from the Space Charter for approximately one fourth of its 46 Rapid Mapping interventions. The remaining three fourths have used data from other sources, such as publicly available, no-cost data from bilateral agreements with data providers, and purchase of commercial data. As of 2007, UNOSAT's Rapid Mapping activity is 100% funded through earmarked bilateral donor support, including the cost of being Project Manager and the cost of value adding. This donor support was actively facilitated by OCHA.

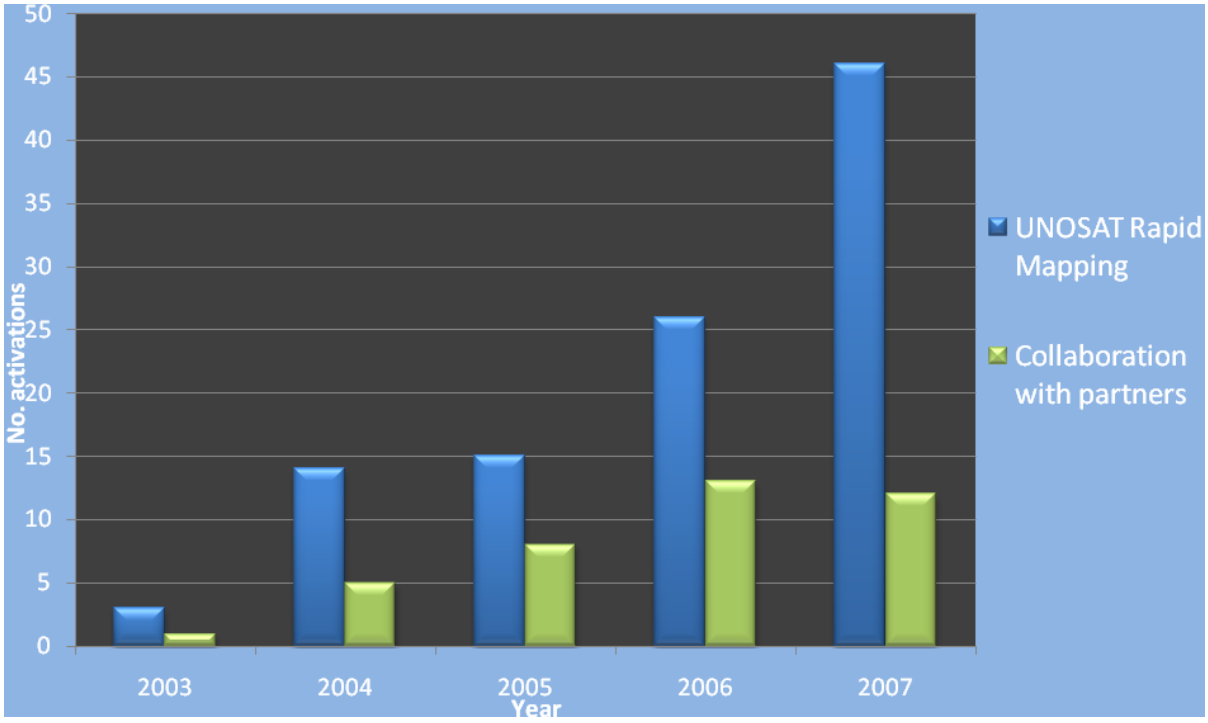

Figure 2: Number of Rapid Mapping interventions and partnership with service providers

Figure 2 above illustrates the number of Rapid Mapping activations, including Space Charter activations, and the corresponding number of interventions where UNOSAT worked with partners. A total of 12 out of 46 activations in 2007 were carried out together with partners.

It is important that even with increased resources and capability, UNOSAT continues to practice a policy of partnership and cooperation, not working in isolation during Space Charter activations. This is based on concrete experience showing the value of teaming up to better respond to the geo-information needs of the UN user community when responding to disasters and emergencies. These partners include DLR/ZKI, Sertit, the US State Department, USGS, and ITHACA.

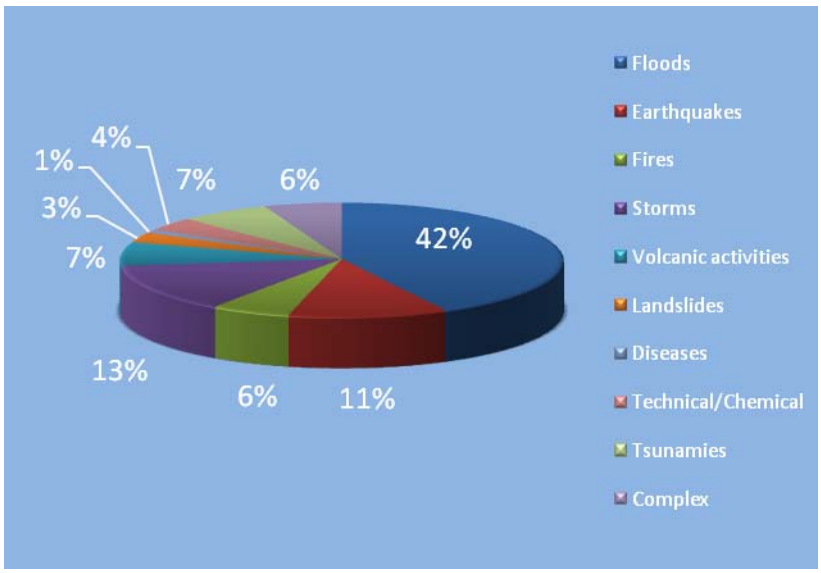

Figure 3: Rapid Mapping activations by disaster type (2003-2007)

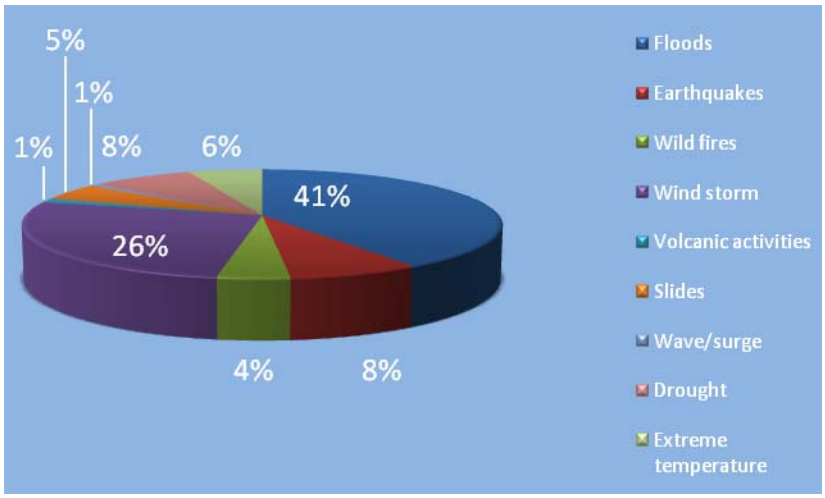

Figure 4: Global occurrence of natural disasters by type (average 2000-2005), source EM-DAT

Figure 3 above is a pie-chart showing in which type of emergency UNOSAT activations have been used. Figure 4 shows the overall occurrence of natural disaster in the world by disaster type (averaged over the years 2000-2005 as compiled by OFDA/CRED in the EM-DAT database - www.em-dat.net).

The comparison between the two figures illustrates that UNOSAT activities are distributed according to the overall breakdown of disaster types, thus the coverage is balanced and consistent. This is an important factor for the promotion of the Space Charter. In addition it is evident from the comparison that this work does indeed respond to user-needs.

Project Manager

UNOSAT is frequently requested to act as Project Manager for UN Space Charter calls, 27 times in total. This is related to UNOSAT's operational capacity, communication lines with the field as well as extensive practice of the Space Charter mechanisms. This experience has in turn provided UNOSAT with significant insight of the strengths and weaknesses of the Space Charter as currently used by the United Nations.

There have been a substantial number of cases where the PM role is coupled with value adding. This ensures no waste of time since the PM function and value adding work are co-located. Ensuring the PM and value adding in-house is also efficient from an operational point of view because data download, preliminary analysis and user requirements can be discussed more quickly. This is also an effective method when proposing additional scenes or revised programming to Space Charter members. As shown above, UNOSAT often works in partnership with external actors when that is applicable, however it must be said that that spreading tasks and responsibilities too widely may reduce the efficiency of operations to the detriment of the users.

The time span from when a Space Charter activation has been triggered to when the PM is appointed is now normally well managed. On some occasions, there has been a delay causing some loss of time, but in general the PM is nominated within acceptable time frames.

UNOSAT has put in place specific human and technical resources with dedicated donor funding to guarantee that the role of PM can be carried out effectively and is always available when a user request occurs. UNOSAT does not receive funds from space agencies funders of the Space Charter for its work as PM or value adder.

Mapping and analysis (value adding)

The operational capacity in place at UNOSAT includes a 24/7 On-Call Officer, a 24/7 production team during disaster events, and the IT capacity provided by CERN (one of the world's most advanced computing centres and where the World Wide Web was born). The IT infrastructure and Internet capacity is among the very best, providing a 10 Gigabit backbone and a 1 Gigabit router system, a significant advantage when downloading large volumes of satellite imagery for analysis.

The staff involved in image processing, analysis and mapping has a diversified background, including remote sensing, GIS analysis, logistics, agronomy, meteorology, geophysics, cartography and IT. In addition, all production staff has field experience in geo-spatial information management, which is important to understand user needs. The Rapid Mapping team typically consists of 6 people, but may also draw on other UNOSAT staff working on non-emergency projects if required. This capability allowed to generate some support and assistance to Space Charter PM's during non-UN activations, such as to USGS and CONAE, when requested.

Information dissemination

Space Charter products are distributed through the various UNOSAT information dissemination means. These include e-mail notification, the Global Disaster Alert and Coordination System (GDACS) – where UNOSAT is the dedicated mapping partner, the VirtualOSSOC (the main operational site for early responders to major disasters), GeoRSS feeds, visible hosting on ReliefWeb (main humanitarian portal for the UN and partners), and on AlertNet (main portal for NGOs), the UNOSAT website and more and more third-party distribution channels using and forwarding RSS feeds.

Through these means, Space Charter derived products (maps, analyses, statistics, data) are sent to HQ and field users. Primary field users belong to the requesting UN end-user organization, but a wide range of additional users covering the various humanitarian UN organizations, national entities and NGOs also receive the products thanks to this capillary dissemination system.

Space Charter products are distributed thematically – as key baseline information – as well as distributed geographically – field, national offices, regional offices and headquarters.

According to UNOSAT web-statistics, the website most frequently visited from www.unosat.org (i.e. visitors being linked from UNOSAT website to other website) is www.disasterscharter.org, generating thousands of new visitors to the Space Charter website.

User Feedback

Of the 40 UN Space Charter activations during 2003-2007, the majority came from OCHA (22) and WFP (13), see Figure 5. Of OCHA's 22 requests, 17 originated from OCHA Field Coordination Support Section (FCSS) in Geneva.

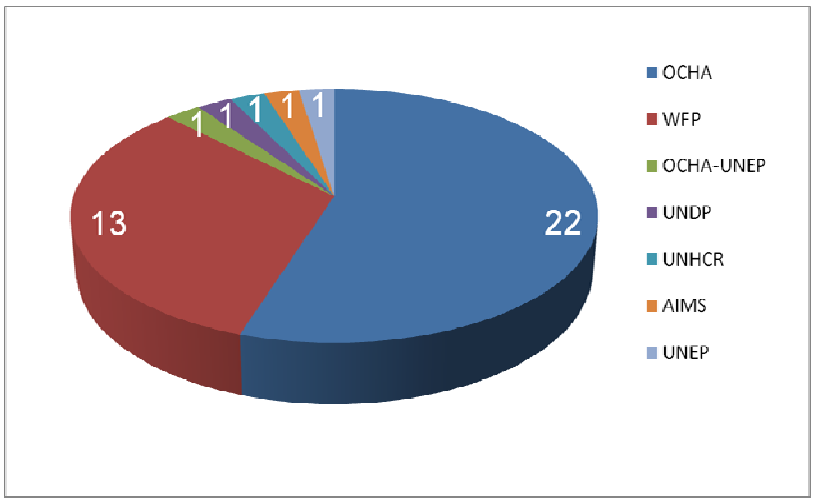

Figure 5: UN requesting agencies for Space Charter activations, 2003-2007.

Several PM reports from Space Charter activations provide detailed feedback from the users in Figure 5 above, as well as other end-users. Some general high-level points have been generated using this literature and also using experience accumulated directly by UNOSAT during non-Charter interventions.

- Value added products should include as a standard imagery derived vectors, not just maps, because desktop mapping is frequently used during emergencies, and online mapping applications, such as Google Earth and Virtual Earth are also used by many actors.

- Considering more often the possibility of triggering in the imminence of a disaster, for example in the case of tropical cyclones (whose path can be determined in advance). At the same time there should be a standard quick and easy mechanism to cancel a Space Charter call if a disaster did not occur, or if other information is already meeting user requirements.

- Take into consideration the user specific need when a triggering is made, for example only raw data may be required when an internal processing capacity exists, as in the case of WFP.

Facilitating UN Request Submissions

UNOSAT has been facilitating the triggering of the Space Charter by UN users all along. From 2003 to 2007, 100% of UN users called the UNOSAT 24/7 emergency line to seek support in requesting the activation of the Space Charter. The support provided is usually assisting the end-user in specifying the requirements, filling in the URF and sending this to the ODO via UNOOSA in Vienna.

The accumulated operational experience concerning what works and what doesn't when using earth observation in support to humanitarian relief should not be viewed only as technical experience. It is through this experience, internal analyses, as well as discussions within the UN community that UNOSAT has developed the necessary knowledge to recommend technical, procedural and institutional improvements.

Conclusions

Based on the experience gained in working with the UN humanitarian users, and as Chair of the UNGIWG Remote Sensing Task Group, UNOSAT has identified the following recommendations for improving the Space Charter for maximum benefit of the end-users.

HIGH-LEVEL RECOMMENDATIONS

1. The Space Charter mechanism would benefit from a shift in focus from space-focused to user-focused. The current system does not allow enough active involvement of the

humanitarian entities responsible and accountable for the emergency response work that the Space Charter wants to support.

2. It is desirable to improve the procedure for the submission of the URF to the ODO, preferably by allowing sending the URF directly to the ODO with copy to UN Cooperating Body.
3. Enhance the coordination at the regional and national level between humanitarian actors present in the field (for example by using OCHA regional offices present in all regions) and national emergency management officials that one day may become authorized requested the triggering of the Space Charter. This coordination is essential since a national emergency not requesting international assistance may not constitute a humanitarian emergency in the UN context.

DETAILED SUGGESTIONS

4. The training of Project Managers should be more extensive and in order to ensure what has been learned is not forgotten during a disaster when the pressure is high, regular PM exercises should take place. This will also foster collaboration among the various Space Charter members and their implementing partners.
5. Satellite derived maps, analyses and data should be provided even more timely than today. The Space Charter should revise all parts of the chain, including triggering mechanisms, scenarios, PM procedures, and value adding procedures. Although user needs vary, the general feedback is that the information should reach the end-users more rapidly (this would also maximize the impact of the invested efforts).
6. Enhance the Charter scenarios in order to limit the number of sensors tasked during an event in order to save resources. With more sensors available through the Space Charter, more possibilities exist to meet user needs. This is a positive thing. However, often similar sensors are tasked and similar information is generated at the same time. The ECO should discuss more actively with the user or PM to ensure best use of resources. UNOSAT is providing separate input to the current Space Charter scenarios to contribute to facilitate solving this issue.
7. Use of more geographic tools and interfaces to manage activations: to complement the URF with pinpointing on Google Earth for example. During activations, the status of data supply should be indicated using geographic tools. In addition, a catalog of the Charter data should become available after the crisis.

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ANNEX - A

UNOSAT in the context of the UN system

UNOSAT Identity - UNOSAT is the UN Institute for Training and Research (UNITAR) Operational Satellite Applications Programme, implemented in co-operation with the UN Office for Project Services (UNOPS) and the European Organization of High Energy Physics (CERN). UNOSAT is a people-centered programme delivering satellite solutions to relief and development organizations within and outside the UN system to help make a difference in the life of communities exposed to poverty, hazards and risk, or affected by humanitarian and other crises.

UNOSAT Mission - In this context, the UNOSAT mission is to deliver integrated satellite-based solutions for human security, peace and socio-economic development, in keeping with the mandate given to UNITAR by the UN General Assembly since 1965, and relying on the flexibility and result-oriented management capability of UNOPS.

UNITAR Mandate - Pursuant to General Assembly resolution 1934 (XVIII) of 11 December 1963 and resolution 42/197 of 11 December 1987, the United Nations Institute for Training and Research is established for the purpose of enhancing the effectiveness of the United Nations in achieving the major objectives of the Organization.

UNITAR is governed by a Board of Trustees and is headed by a UN Assistant-Secretary-General as its Executive Director. The Institute is supported by voluntary contributions from governments, intergovernmental organizations, foundations, and other non-governmental sources

UNITAR's Mission - UNITAR's mission is to deliver innovative training and conduct research on knowledge systems to develop the capacity of beneficiaries. Building on our experience, we optimize expertise, information and knowledge-sharing to achieve this mission.

UNOPS Institutional mission - UNOPS is the United Nations Office for Project Services providing integrated operational management -- from start-to-finish or ad hoc services, established by the UNDP Executive Board in 1995 in consultation with and reporting to ACBQ as a separate and identifiable entity of the UN system (decision E/1995/34, 1st Regular Session 1995, para 44, pp. 13-14).

UNOPS services include selecting and hiring project personnel, procuring goods, contracting, training, managing financial resources, and administering and supervising loan activities. More than twenty United Nations system partners in more than 130 countries. Furthermore, in its procurement and contracting activities UNOPS work with the private sector, educational institutions, and non-governmental organisations.

UNOPS has extensive presence in the field world wide and has regional offices in Nairobi, Johannesburg, Tunis, Abidjan and Kinshasa.

ANNEX - B

Institutional cooperation

The mechanisms, fora, and tools used by UNOSAT to carry out institutional inter-agency cooperation are described in Annex B to the present report. These mechanisms are important because the promotion and use of space applications for emergency response cannot be achieved efficiently by any institution working in isolation from the others.

IASC

The Inter-Agency Standing Committee (IASC) is a unique inter-agency forum for coordination, policy development and decision-making involving the key humanitarian UN and NGO actors. The IASC was established in June 1992 in response to United Nations General Assembly Resolution 46/182 on the strengthening of humanitarian assistance. General Assembly Resolution 48/57 affirmed its role as the primary mechanism for inter-agency coordination of humanitarian assistance.

Under the leadership of the Emergency Relief Coordinator, the IASC develops humanitarian policies, agrees on a clear division of responsibility for the various aspects of humanitarian assistance, identifies and addresses gaps in response, and advocates for effective application of humanitarian principles. The following agencies are members of the IASC: FAO, OCHA, UNDP, UNFPA, UNHCR, UNICEF, WFP and WHO. There are several standing invitees, including for example ICRC, IFRC, IOM, and the World Bank.

UNOSAT participates regularly in IASC meetings and Task Forces that are created to respond to specific disasters (among others, the 2004 Tsunami, the 2005 Pakistan EQ). In addition, UNOSAT discusses annually with IASC members the review of UNOSAT Rapid Mapping activity, which includes the promotion and use of the Space Charter.

During the latest review in September 2007, the users unanimously recognized the benefits brought about by the Space Charter and expressed appreciation for the services provided by UNOSAT rapid mapping. The IASC participants also noted with satisfaction UNOSAT's active participated in the IASC Sub-Working Group on Preparedness and Contingency Planning, the Inter-Agency Information Management Working Group, as well as in two cluster working groups of the humanitarian reform process, and other fora such as UNGIWG.

UN Geographic Information Working Group (UNGIWG) Remote Sensing Task Group

UNOSAT is Chair of the UNGIWG Remote Sensing Task Group. As part of the activities jointly decided within the Task Group for 2008, UNOSAT is actively pursuing ways to improve the UN use of the Space Charter in its mandated capacity as Remote Sensing Task Group Chair. One of the objectives of this Task Group is to expand the range and objectives for the International Space Charter to better comply with UN requirements. Activities for 2008 include suggestions to improve Space Charter functionality; in particular to ensure imagery derived maps are disseminated on a timely basis to UN agencies. Thus, current procedures are evaluated by this Task Group.

Bilateral agreements

Moreover, UNOSAT also has a Cooperation Framework Agreement with OCHA, where one of the elements of cooperation is particularly dedicated to the Space Charter. The agreement designates UNOSAT as the default provider to OCHA of rapid mapping products and services based on satellite imagery.

UNOSAT has similar operational arrangements already signed or in the making with the following

- UNICEF
- UNHCR
- WHO
- WMO
- UN-HABITAT
- ILO
- UNDP
- UNEP

The above illustrates the clear role of UNOSAT in providing satellite solutions to UN sister agencies and UN Member States. This includes satellite solutions for disaster managers, but also tools and methods to the benefit of a wide range of applications useful for the communities and people that the United Nations organizations are set to serve.