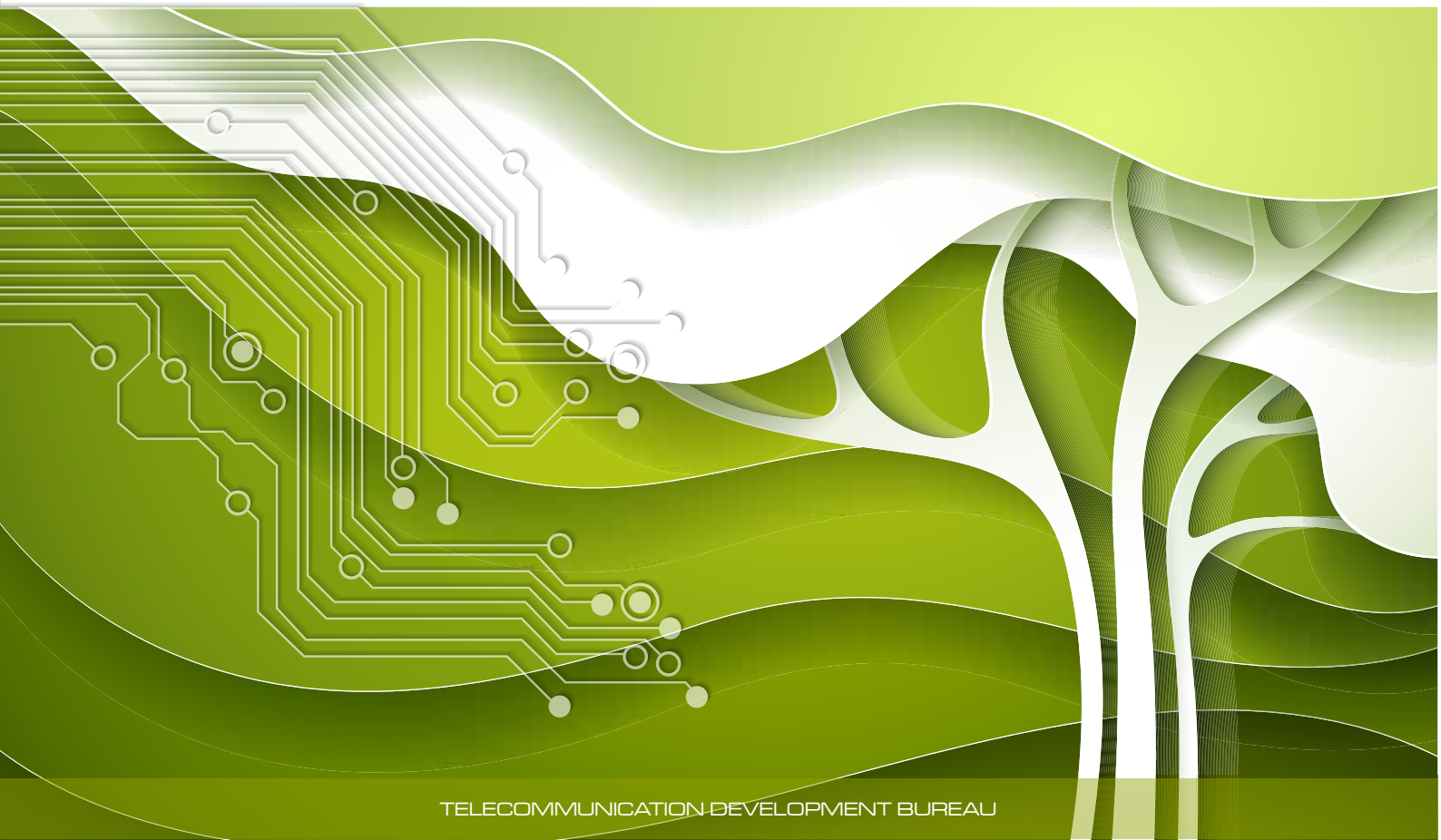
REPORT 2016

BY THE SMART SUSTAINABLE DEVELOPMENT MODEL ADVISORY BOARD

SMART SUSTAINABLE DEVELOPMENT MODEL



TELECOMMUNICATION DEVELOPMENT BUREAU

This report was prepared by Advisory Board members of the Smart Sustainable Development Model (SSDM) Initiative (www.itu.int/en/ITU-D/Initiatives/SSDM/Pages/default.aspx) launched by the Telecommunication Development Bureau (BDT), International Telecommunication Union (ITU), in 2012 to explore innovative and collaborative ways of harnessing the full potential of ICTs for the benefit of all worldwide.

Revision V1.0 4 December 2015

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BY THE SMART SUSTAINABLE DEVELOPMENT MODEL ADVISORY BOARD

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http://www.itu.int/SSDM

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PREFACE

It is with great pleasure that I present the next major phase of the Smart Sustainable Development Model (SSDM) Initiative. Begun in 2012, the main objective of the SSDM Initiative is to bring information and communication technology for development (ICT4D) and disaster management (ICT4DM) together in conceptual, planning and implementation activities. Enabling this to happen will be a major step forward in our ongoing support of the poorest and most vulnerable communities worldwide.

Building on the work of the Advisory Board in compiling the first major output of the SSDM Initiative – the SSDM report 2015 – we are now proposing an approach, which will take us further down the road in Advocacy and Global Dialogue, Innovation, and Resource Mobilization for this Initiative. In each area, concrete proposals are specified that will promote what we seek: a "smart" combination of development goals for ICT4D and ICT4DM that support the new post-2015 development era.

I would like to thank the Hon. John Nasasira, Minister of ICT, Uganda, who is the Chairman of the SSDM Advisory Board, Mr. Jose Manuel Toscano, Director General, International Telecommunications Satellite Organization (ITSO), who is the Vice Chairman, and all Board Members for their excellent efforts in compiling this report.

Actions should speak louder than words, and I strongly believe that we in the ICT community, can use the actions here suggested, to make a significant, positive and sustainable difference to communities worldwide, in their everyday lives, as well as times of their utmost distress and crisis.

Brahima Sanou
Director
Telecommunication Development Bureau
International Telecommunication Union

ACKNOWLEDGEMENTS

This report documents the achievements of the three Task Forces of the Smart Sustainable Development Model (SSDM). In response to both the challenges and the opportunities from information and communication technology (ICT) contributions to political, social, economic and environmental development, the reports of the Task Forces support the work of ITU by recommending strategies within the framework of the SSDM Initiative.

International Telecommunication Union would like to thank the Chairman of SSDM Advisory Board, Hon. John Nasasira for his continuing exceptional direction resulting in the publication of these Task Force achievements. ITU would also like to thank the Chairmen of each Task Force for their advice, guidance and efforts in compiling the reports.

The Chairmen of the Task Forces are: Ms Donna Bethea-Murphy of Inmarsat Inc., Chairman of the Innovation Task Force; Mr Flavien Bachabi of Intelsat, Chairman of the Resource Mobilization Task Force; and Mr Christian Roisse of Eutelsat IGO, Chairman of the Advocacy and Global Dialogue Task Force. Mr Jose Manuel Toscano, Director General, International Telecommunications Satellite Organization (ITSO), and Vice Chairman of the SSDM Advisory Board, acted as the coordinator of all three Task Forces.

ITU would like to thank the members of each Task Force for their hard work and commitment in producing the contents of this report. Task Force members can be found in Annex 5 of this report. In conjunction, the very wide and senior participation in these working groups has achieved a remarkable roadmap that can be applied to the SSDM concept.

FOREWORD

If we believe that Information and Communication Technologies (ICTs) are serving as the most important driving force behind countries' economic and social integration into the wider global community, as I stated in the first report on the Smart Sustainable Development Model (SSDM) Initiative, then we must also believe that we have to implement these possibilities.

The Director of the Telecommunication Development Bureau (BDT) of the International Telecommunication Union (ITU) established the SSDM Initiative as a an international, multi-stakeholder platform, that seeks to link ICT for Development (ICT4D) with ICT for Disaster Management (ICT4DM), leading to sustainable development and optimal use of resources, while minimizing additional financial investments and in particular, by making the use of possible excess satellite capacity.

To implement this Initiative, the Director of the BDT invited experts from government, private sector and academia to form the first SSDM Board. It remains a continuing honour for me to be endorsed as the Chairman of the SSDM Board. I would like to take this opportunity to thank the Director of the BDT for his support of this Initiative.

Following the first meeting of the Advisory Board of the SSDM Initiative, working groups were established to report on the key areas of Policy, Regulatory and Advocacy; Infrastructure and Technologies; and Financing, Partnership and Business Models. The Smart Sustainable Development Model Report 2015 emerged from these efforts and comprehensively discussed and analysed the prospects for such an initiative.

As a result, the Advisory Board decided that the emphasis should be put on a clear roadmap consisting of a list of specific actions that would be needed collectively to implement SSDM futures. Three new Task Forces—for Advocacy and Global Dialogue; Innovation; and Resource Mobilization—were convened in 2015 to address this need and provide a comprehensive strategy to help us to realize the promise of SSDM.

The Smart Sustainable Development Model Report 2016 report is a step by step approach, building on the first developments of the SSDM Report 2015, but moving into a new era of direct stakeholder engagement with tangible and practical issues. It provides a clear picture to all the stakeholders in the field about fulfilling the endeavour of SSDM Initiative.

I look forward for continued progress of this Initiative in 2016.

Hon. John Nasasira
Chairperson, Advisory Board
Smart Sustainable Development Initiative
Minister of ICT, Government of Uganda

EXECUTIVE SUMMARY

This report details a strategy to implement the International Telecommunication Union (ITU) Smart Sustainable Development Model (SSDM) Initiative. The SSDM was developed in 2012 by the ITU Development Telecommunication Bureau (BDT) to encourage dual-use of ICT for development (ICT4D) and ICT for disaster management (ICT4DM).

An SSDM approach could dramatically benefit both sectors in terms of efficiency, cost-effectiveness and sustainability. Moreover, making full use of a combined and dual-use approach has real prospects of saving lives and communities. As such, SSDM represents one of the most far reaching concepts in international development to date.

How to bring this about and deliver the SSDM Initiative is the main objective of this report.

Several action items have been developed by three Task Forces (responsible for Advocacy and Global Dialogue, Innovation, and Resource Mobilization, respectively) integrated by Advisory Board Members of the SSDM Initiative. Building on the SSDM Report 2015, the Task Forces have been given objectives of developing specific approaches in terms of concrete actions. The actions are now available for public and private stakeholders to develop. Many of the action items show a high degree of interrelationship and the resulting synergies are expected to provide major practical benefits moving forward.

ADVOCACY AND GLOBAL DIALOGUE

In **Advocacy and Global Dialogue**, the goal is to show the social, financial and economic benefits of investing in ICT for development (ICT4D) and for disaster management (ICT4DM) bearing in mind that a global

dialogue should be organised through the development of platforms in which all stakeholders could meet and exchange.

INNOVATION

In **Innovation**, the goal is to support SSDM by identifying the possibilities, requirements and constraints offered by technology in what is an extremely dynamic environment.

RESOURCE MOBILIZATION

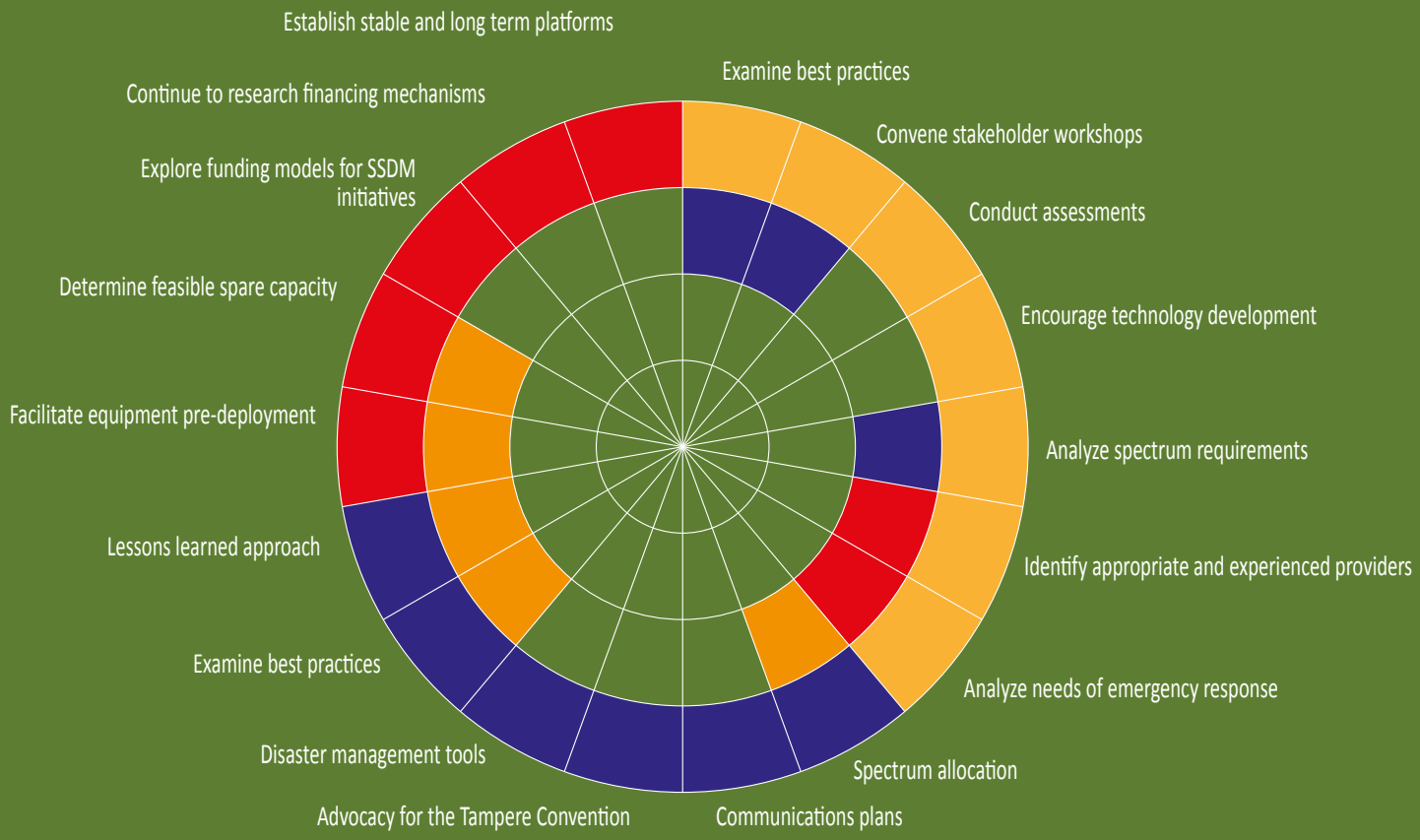
In **Resource Mobilization**, the goal is to explore additional funding models and research best practices for allocating resources to SSDM initiatives. The actions identified for this taskforce focus on identification, assessment and analysis of current practices in the effort to highlight or recommend approaches to funding and resource allocation. Additionally, this Task Force has prepared a *Disaster Management and Sustainable Development Platform Proposal* for consideration by stakeholders.

1

INTRODUCTION

Resource mobilization

Innovation



Advocacy and global dialogue

The International Telecommunication Union (ITU) Smart Sustainable Development Model Initiative (SSDM) was launched in 2012 by the ITU Development Telecommunication Bureau (BDT) to explore innovative and collaborative ways of harnessing the full potential of ICTs for the benefit of all. Given that the world is threatened by disasters of unprecedented frequency and magnitude, that continue to cause massive disruption to developed and developing economies alike.

The objective of the SSDM Initiative is to create a framework for optimizing the use of information and communication technology (ICT) resources for both development (ICT4D) and disaster management (ICT4DM) purposes with the intention that a dual ICT4D and ICT4DM approach may be efficient, cost-effective and timely in the utilization of scarce resources.

The work of the SSDM Advisory Board, composed of high-calibre individuals with a range of interests and expertise in emergency telecommunications and sustainable development, including policy makers, satellite operators, regulators and service providers, culminated in the publication of a first report in January 2015. This report regroups detailed evaluations carried out by three working groups especially set up for the purpose: respectively, the Working Group on Policy, Regulation and Advocacy; the Working Group on Infrastructure and Technologies and the Working Group on Financing, Partnerships, and Business Models.

Following the approval of the report combining the work of the three working groups, the Advisory Board adopted an approach to fulfil the SSDM Initiative's objectives in providing an appropriate response to disasters. The approach mainstreams the activities into three categories which are advocacy and global dialogue, innovation and resource mobilization. Accordingly, three taskforces were established one combining Advocacy and Global Dialogue (AGDTF) and one each on Innovation (ITF) and Resource Mobilization (RMTF). These Task Forces have provided substantive strategies to develop the SSDM concept further and Figure 1 shows the outputs from the individual Task Forces as colour-coded areas. A feature of the outputs is high congruency between recommendations and plans from the different Task Forces and these commonalities are also marked.

1.1 SSDM CONCEPTS AND DEFINITIONS

1.1.1 SUSTAINABLE DEVELOPMENT

The World Commission on Environment and Development (WCED, 1987) considered sustainable development as: "Our common future, sustainable development is the development which meets the needs of the present without compromising the ability of future generations to meet their own needs". It contains within it two key concepts, respectively that of needs (in essence needs of the world's poor to which priority should be given), and that of constraints, deriving from the state of technology and social organization on the environment's ability to meet present and future needs. Sustainable development encompasses economic growth, environmental protection, and social equality.

1.1.2 ICT FOR DEVELOPMENT AND DISASTER MANAGEMENT

ITU data on global ICT4D over the period of 2003-2013 indicates high speed networks have become an increasingly indispensable part of the global infrastructure and are shaping the development of countries and communities. The challenges faced by most countries in matters of development, disaster preparedness and response vary; nevertheless, it is universally accepted that, with the right infrastructure and technologies, the challenges of disaster mitigation and response requirements can be addressed. In any case, ICT needs to be carefully evaluated and adjusted to requirements of sustainable development.

The process for establishing ICT4D and ICT4DM requires a global and coordinated approach involving three specific elements: people (whether individuals or entities); policy (whether national, regional or international) and technology. This process can only be performed with an active and committed participation and cooperation from a wide cross section of stakeholders.

1.1.3 KEY STAKEHOLDERS

The three working groups identified and presented a non-exhaustive list of key stakeholders involved in ICT4D and ICT4DM, which includes international organizations, policy and decision makers at national government levels, public representatives (parliamentarians), civil society organizations and NGOs, end-user beneficiaries, national and global private sector companies, academics, researchers, and civil servants.

Table 1 KEY IDENTIFIED STAKEHOLDERS

	ICT DEVELOPMENT PLANS AND STRATEGIES	ICT DEPLOYMENT AND TRAINING	DISASTER PREPAREDNESS AND RESPONSE
Government Agencies	Develop internal strategies.	Develop internal strategies.	Develop internal strategies.
Communications Ministry	Develops ICT development plans and policies, including spectrum.	Develops incentives for ICT deployment; foster capacity building initiatives.	Supports role of communications in disaster response.
National Regulatory Authorities (NRAs)	Support policy and strategy development.	Create and manage licensing and authorization regimes for infrastructure and technologies, including spectrum.	Support licensing and authorization of technologies for disaster response.
Disaster Management Agency	Identifies requirements for technologies and services for disaster management to support development of ICT strategies and policies.	Incorporates technologies into disaster management plans; supports training for first responders and citizens in using technologies for disaster response.	Incorporates technologies into disaster management plans; identify communications needs/requirements
Citizen users	Identify priorities and needs for development and ICTs.	Incorporate ICT tools into daily life; participate in training; drive demand for new technologies.	Often serve as de facto "first responders" in a disaster.
First responders and volunteers	Identify requirements for technologies and services for disaster management to support development of ICT strategies and policies.	Incorporate technologies into disaster response plans; participate in training.	Incorporate technologies into disaster response plans.
UN	Promotes role of ICTs in development strategies.	Promotes role of ICTs in development strategies, and supports development of ICT infrastructure and services; supports capacity building initiatives.	Supports disaster relief and response efforts; supports recovery efforts.
NGOs and relief workers	Identify requirements for technologies and services for disaster management to support development of ICT strategies and policies.	Incorporate technologies into disaster response plans; participate in training.	Incorporate technologies into disaster response plans.

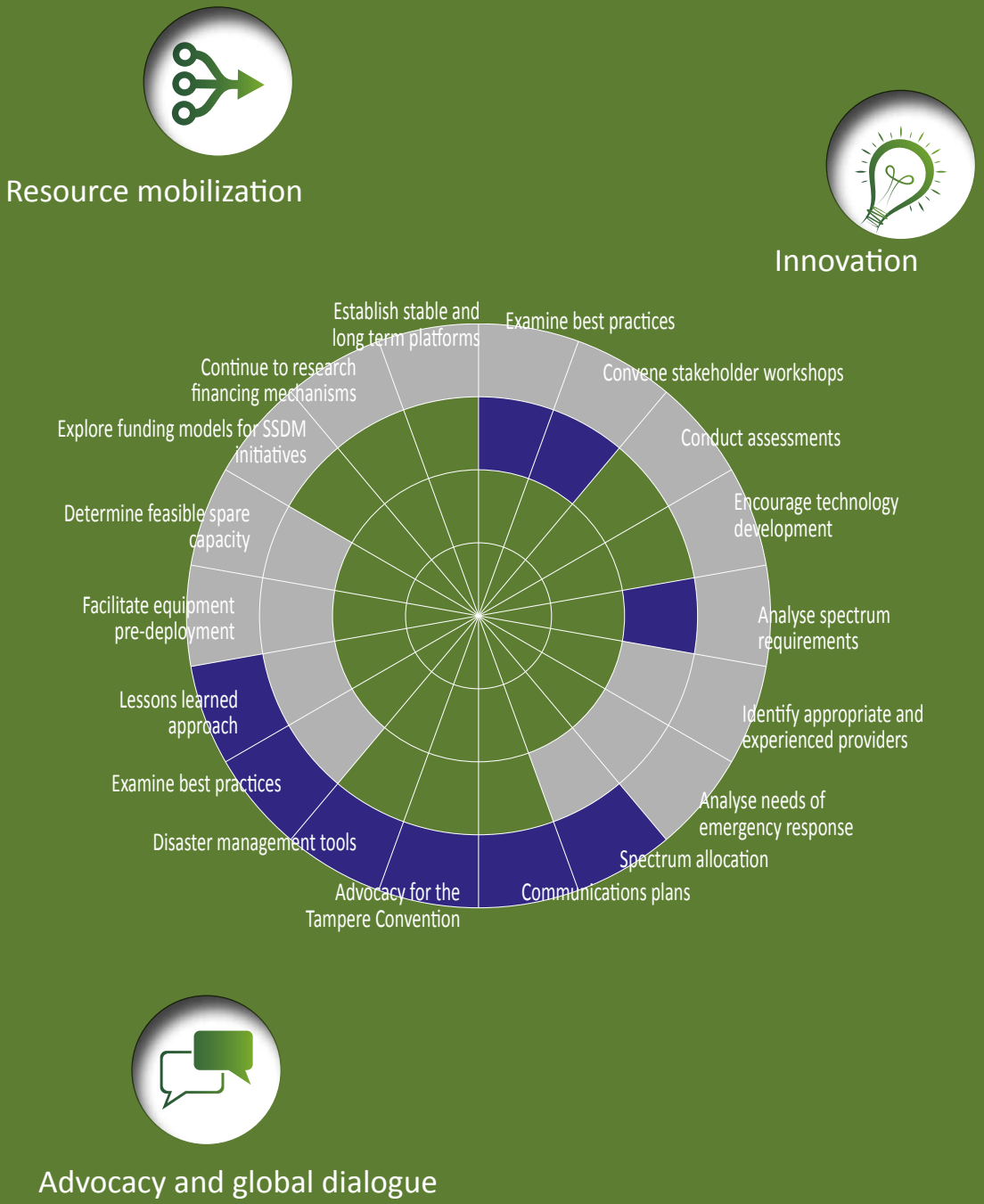
	ICT DEVELOPMENT PLANS AND STRATEGIES	ICT DEPLOYMENT AND TRAINING	DISASTER PREPAREDNESS AND RESPONSE
Local government agencies	Identify requirements for technologies and services to support development of ICT strategies and policies.	Deploy technologies to support delivery of government services; supports training.	Incorporate technologies into disaster management plans; identifies community needs/requirements; supports response.
Private sector	Develops new technologies and services to meet customer needs; advocates for technology and infrastructure deployment.	Leads on deployment of infrastructure, technologies and services; provides training support for users/customers.	Develops new technologies to meet emergency requirements; deploys technologies/services for disaster response; rebuilds/repairs damaged infrastructure.

2

ADVOCACY AND GLOBAL DIALOGUE

FIGURE 2

ADVOCACY AND GLOBAL DIALOGUE ACTION PLAN



ACTION	INITIATIVE
Encourage policy for efficient spectrum allocation	Encourage governments to engage with all stakeholders, including through mechanisms such as public consultations regarding spectrum allocation and management to provide greater transparency and ensure that spectrum regulators take into consideration current and future trends as well as developing spectrum allocation needs. For example, wireless broadband is a future trend that requires a spectrum management plan that allows for its growth and development.
Identify existing and efficient tools for communications plans	Utilize spectrum auditing, monitoring and enforcement techniques to ensure compliance with licensing and user requirements. To do this, we need to: Maintain a database of domestic and international communications systems and technical parameters to determine when systems are or are not in compliance. Create and disseminate a rule book containing licensing information relevant to ICTs utilized in the disaster context so that relevant parties are aware of regulatory requirements and can prepare accordingly in preparation for natural disaster.
Advocate for the Tampere Convention and its ratification	Identify frontline stakeholders and empower them to spread awareness of the Tampere Convention and encourage its ratification and use.
Maintain, assess, review and update disaster management tools	Periodically review national disaster management plans, universal access/ service policies, regulations and practices, and encourage updates and changes as necessary.
Examine best practices	Encourage the adoption of international best practices to effectively address growing ICT trends as well as the needs created by newly-emerging technologies and make such best practices public and openly exchanged between regional and international regulatory bodies.
Support the importance of the lesson learned approaches	Share and promote the importance of the lesson learned approaches, emphasizing the importance of preparedness support and actions such as the sharing of information, best practices, toolkits and resources to enable member and regional preparedness.

2.1 INTRODUCTION

The goal of the Advocacy and Global Dialogue (AGD) Task Force is to show the social, financial and economic benefits of investing in ICT for development (ICT4D) and for disaster management (ICT4DM) bearing in mind that a global dialogue should be organized through the development of platforms, in which all stakeholders could meet and exchange ideas and experiences. This strategy sees substantive common interest with Actions 1, 2, and 5 of the Innovation strategy.

According to UNESCO's definition, advocacy is the deliberate process, based on demonstrated evidence, to directly and indirectly influence decision makers, stakeholders and relevant audiences to support and implement actions. In practice it can take several forms such as lobbying, public relations, social mobilization, campaigning, policy development, awareness raising, empowerment, media work or communications. The basis of advocacy actions should be knowledge. Knowledge management is about getting the right information to the right people at the right time, therefore knowledge of what ICT can bring to disaster management and sustainable development is paramount to the success of advocacy actions.

Based on the exchanges and discussions under the auspices of the SSDM Advisory Board, several implementing and enforcing actions were identified and presented. The achievements contained in the SSDM Report 2015, published by the ITU are the basis on which the AGD Task Force's plan is derived.

The SSDM Advisory Board which is composed of very high level members emanating from a wide range of key stakeholders, means that the SSDM Initiative could engage in targeted advocacy actions in the same way that the UN has done to achieve the Millennium Development Goals[1], and is expected to fulfil the UN Sustainable Development Goals. As stated in the UNESCO advocacy toolkit[2], in addition to the recognition of the individual advocating role (i.e. the right person to achieve the right goal at the right time), advocacy requires the building of relationships (personal, public and institutional) and the securing of partnerships to help organize people and groups to achieve the set goal.

The SSDM ADG Task Force members, as stakeholders in the establishment of ICT4D and ICT4DM, consider this Initiative to be crucial for the worldwide community. They emphasize that the ITU is the only body able to implement the SSDM Initiative, whilst continuing to perform its obligation pertaining to the ratification of the only existing international regulatory instrument for telecommunication assistance (the Tampere Convention), as well as maintaining and enhancing its mission as a catalyst for cooperation in the development of ICT. ITU remains a major stakeholder of the international community for defining, presenting, favouring and promoting all approaches which could be used as tools to serve an overall and international ICT4D and ICT4DM strategy.

1 www.un.org/millenniumgoals/advocates/index.shtml

2 *www.unicef.org/evaluation/files/Advocacy_Toolkit.pdf*

2.2 ACTION 1

ENCOURAGE POLICY FOR EFFICIENT SPECTRUM ALLOCATION

Encourage governments to engage with all stakeholders, including through mechanisms such as public consultations regarding spectrum allocation and management to provide greater transparency and ensure that spectrum regulators take into consideration current and future trends as well as developing spectrum allocation needs. For example, wireless broadband is a future trend that requires a spectrum management plan that allows for its growth and development.

ICTs are used in all phases of the disaster management process but can also be of enormous benefit even before disaster strikes. When used in conjunction with planning, ICT can greatly reduce the impact of natural disasters. Planning encompasses different steps: risk identification, reducing underlying risks, preparedness, early warning systems, knowledge management and education. Together with an enabling policy and favourable regulatory environment, synergies can be created between ICT4D and IC4DM. To facilitate preparedness and establishment of robust ICT infrastructures, consideration should be given to spectrum plans and strategies.

2.2.1 THE SIGNIFICANCE OF WIRELESS IN ICT4D AND ICT4DM

Innovation in wireless technology—particularly in wireless broadband—offers substantial promise in bridging the gap between have- and have-not communities. Recognizing the significant economic and social benefits of broadband service, many governments are encouraging the deployment of wireless technologies with cost effective solutions via policy initiatives. These include ICT development plans, national broadband plans and other strategies with the objective of facilitating a true national reach of broadband.

Wireless and satellite communications may also have specific advantages in times of disasters. Existing telecommunication networks may be seriously damaged or impacted and damage to landline networks may be greater and more extensive compared to wireless networks. Generally, the impact of disasters on satellite communications is minimal and the recovery to optimum operations is much more rapid.

2.2.2 THE SIGNIFICANCE OF SPECTRUM MANAGEMENT

Considering the above, spectrum management policy is a key driver for improving wireless coverage. Spectrum is a fundamental building block for wireless networks and technologies but, as a scarce and limited resource, needs to be managed and developed in an efficient manner. A number of approaches are being followed by the governments and regulators to meet the spectrum demand including reallocation of existing

spectrum, introduction of unlicensed spectrum regime, spectrum sharing, improved coding and modulation techniques etc. Another objective of all these different methods is to increase spectral efficiency.

The primary objective of spectrum management is to coordinate the use of spectrum among users in order to standardize the use of equipment and create an interference-free environment. The regulators allocate use of spectrum by issuing licenses to use portions of spectrum with specific parameters. Since the wireless networks have the capability to transmit signals over a large area including across national boundaries, the management and coordination of spectrum on an international basis is carried out under the rules and regulations governed by the ITU. The role of the ITU is to coordinate efforts to eliminate interference between wireless networks of different countries and to improve the use of spectrum on a global basis. For example, the ITU, through the World Radiocommunication Conference (WRC) process, also takes the lead in globally identifying spectrum band that can be used for wireless technologies. The identification and subsequent allocation of any spectrum range for a particular technology will facilitate international harmonization resulting in global availability and lower-cost subscriber/end-user equipment.

The demand for spectrum is experiencing a near-continual increase as more and more bandwidth-hungry devices and applications are introduced. Although such devices and applications are usually more spectrally efficient than their predecessors, the requirement of higher and higher data speeds results in demand for additional spectrum to meet ever-increasing requirements. The satellite industry, for example, has introduced high throughput satellite (HTS) technology which employs use of smaller beams (against the legacy global beam platforms) in the Ka band, which helps in reusing the spectrum, thereby increasing the capacity of such HTS systems manifold. The satellite industry offers a wide variety of communication and navigation services and solutions such as satellite phones, VSATs and other broadband terminals, GPS receivers, backhaul, tele-centres, etc., but these are wholly dependent on availability of spectrum.

Today the commercially viable spectrum bands that are used for deployment of various wireless technologies, including terrestrial and satellite, range from about 500 kHz (AM radio) to approximately 30 GHz (satellite systems in Ka band). Satellite technologies are evolving to higher spectrum ranges of 42-45 GHz and a few systems have been already launched (V-band).

2.2.3 THE POLICY NEED

Ensuring efficient spectrum allocation through promoting transparency by adopting non-discriminatory spectrum management policies is highly recommended given that spectrum is a scarce and finite resource. It is therefore important that appropriate consideration be given to the process of spectrum allocation to ensure that wireless-based ICT services, including both terrestrial and satellite, are able to perform effectively and without causing or encountering interference. In this regard, national policies and/or regulations should clearly address the allocation of spectrum to accommodate emergency services. Additionally, this needs to be liaised at international level to avoid any cross-border interference during times of disaster.

- Governments should engage with all stakeholders, and with the general public, through mechanisms such as public consultations regarding spectrum allocation and management, to provide greater transparency.

- Spectrum regulators should take into consideration current and future trends as well as developing spectrum allocation needs. Public consultation with stakeholders regarding spectrum management decisions will promote fuller participation in the decision-making process, thus allowing for a more transparent and responsive regulatory environment.
- Spectrum plans and strategies should consider ICT4D and take into consideration the full diversity of radio-communications requirements in order to support disaster management. In addition, when allocating spectrum, procedures and mechanisms should also bear in mind requirements for coordination and avoidance of interference. In this regard national policies and/or regulations should clearly address the allocation of spectrum to accommodate emergency services.
- Government and national regulatory authorities should include in their plans recommendations from the Tampere Convention related to regulatory barriers. Existing regulations need to address the issue of "exempting specified telecommunication resources from the application of those regulations during the use of such resources for disaster mitigation and relief".
- Measures should also be taken to ensure the harmonization of spectrum for broadband wireless access as well as the interoperability between network equipment and terminals.
- In all, protecting spectrum used for critical connectivity requirements is crucial and such a spectrum should not be shared with other new and planned wireless services, unless sharing studies confirm that the new and planned service will not cause interference to the incumbent service in that particular frequency band.

2.3 ACTION 2

IDENTIFY EXISTING AND EFFICIENT TOOLS FOR COMMUNICATIONS PLANS

Utilize spectrum auditing, monitoring and enforcement techniques to ensure compliance with licensing and use requirements. To do this, we need to:

Maintain a database of domestic and international communications systems and technical parameters to determine when systems are or are not in compliance.

Create and disseminate a rule book containing licensing information relevant to ICTs utilized in the disaster context so that relevant parties are aware of regulatory requirements and can prepare accordingly in preparation for natural disaster.

Policing spectrum to ensure compliance with licensing and requirements for use mainly, if not exclusively, falls into the attributions of national regulators and administrations. The maintenance of a database

consisting of communications systems, which would be classified as being in compliance with licensing requirements, and/or the creation of a rule book to prepare for natural disasters seem counterproductive and often too restricted to government-level stakeholders.

To promote stakeholder inclusion, importance should be given to experiences, best practices and case study approaches of efficient tools for communications plans. In its role of catalyst and aggregator of stakeholders, the international and regional events of ITU-D could provide a forum where high quality exchanges could arise. Based on the work and reports of such fora tools could be identified and derived.

ITU-D Study Groups provide an opportunity for all Member States and Sector Members (including Associates and Academia) to share experiences, present ideas, exchange views, and achieve consensus on appropriate strategies to address ICT priorities.[3] ITU-D Study Groups are responsible for developing reports, guidelines, and recommendations based on input received from the membership. Specifically the ITU Study Group 2 (SG2) was established in accordance with Resolution 2 (Rev. Dubai, 2014) to examine, through Questions adopted by the ITU Membership at the *World Telecommunication Development Conference 2014,* issues relating to ICT applications, cybersecurity, emergency telecommunications and climate-change adaptation. In particular one substantive topic of SG2 includes the use of telecommunications/ICTs for natural disaster preparedness, mitigation and relief.

Considering policing spectrum, and in relation to Study Question 5/2 on Emergency Communications, SG2 is developing an online toolkit that will include information and links to resources within and external to the ITU, on the topic of emergency communications. Included in the proposed initiative is information on country emergency communications plans, and information on any relevant licensing and regulatory rules or procedures that are applicable to disaster preparedness and response. If this database includes a "last updated" column for each country, the user can decide if the information is up to date when responding to an emergency.

According to the last **Report of the Rapporteur Group Meeting on Question 5/2 in September 2015,**[4] three main outputs have been agreed:

- Best practice report analyzing case studies and ICT examples and experiences, as appropriate.
- Checklist[5] or Guidelines on Developing a national disaster communications response plan or framework.
- Ongoing updates of the Handbook and online toolkit, as a living document/resource.

In all, the outcome and work of SG 2 should be shared and promoted.

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3 http://www.itu.int/net4/ITU-D/CDS/sg/index.asp?lg=1&sp=2014

4 http://www.itu.int/md/D14-SG02-R-0015/en

5 See: ITU Emergency communications checklist

2.4 ACTION 3

ADVOCATE FOR THE "TAMPERE CONVENTION"

Identify frontline stakeholders and empower them to spread awareness of the Tampere Convention on the Provision of Telecommunications Resources for Disaster Mitigation and Relief Operations and encourage its ratification and use.

The Tampere Convention[6] on the Provision of Telecommunications Resources for Disaster Mitigation and Relief Operations (the "Tampere Convention") is a multilateral treaty governing the provision and availability of communications equipment during disaster relief operations. It is primarily focused on transportation of communications and related equipment over international boundaries by many stakeholders. The Tampere Convention arose out of the first Intergovernmental Conference on Emergency Telecommunications "ICET-98" in Tampere, Finland in 1998. It came into effect on 8 January, 2005. At the time of publication of this report, there are 48 parties to the agreement, although not all have ratified the treaty.

As identified in the SSDM Report 2015, one of the greatest impediments to the transport and use of telecommunications equipment is the regulatory hurdles that make it difficult to import and deploy telecommunications equipment for emergency use. The treaty attempts to simplify and streamline the use of telecommunications equipment in disaster situations by calling on signatories to facilitate the provision of telecommunication assistance. The intent of the treaty is to waive any regulatory barriers for the use of telecommunication resources in disasters. Such barriers can include licensing, use of various frequencies and import controls on the importation of communications equipment. There have been several well documented events in recent history where the rapid deployment of communications equipment was delayed due to regulatory requirements, the most glaring being delays related to the importation of duties and taxes on equipment.

- The importance of the Tampere Convention is that it essentially sets out a process for the request and supply of telecommunications assistances, while at the same time allowing the Member State to direct and have control over how that assistance is provided within its territory. It also requires Member States to make an inventory of ICT resources and to develop a plan about how to deploy such resources. The ITU assists in fulfilling objectives of the Tampere Convention through a number of means.
- The difficulty is that the incentives behind the Tampere Convention appear to have stalled and, while there are presently 48 signatories, many of those Member States have not ratified the convention or have done very little to meet its objectives. There are also Member States who would likely benefit from the provisions of the Tampere Convention, but have not taken any steps to sign or ratify the treaty. Further, recent events dealing with emergency communications, such as the ICT for Developing and Saving Lives at ITU Telecom World 2014 and the recent ICT4DRR multi-

6 www.ifrc.org/Docs/idrl/I271EN.pdf

stakeholder Forum, while providing valuable discussion on emergency communications, have not dealt with the importance of the Tampere Convention or have only made passing reference to it.

Properly implemented, the Tampere Convention can provide a valuable base for assisting in the rapid deployment of telecommunications infrastructure. In order to renew interest in the Tampere Convention the following is proposed:

- ITU (and specifically ITU-D)/commercial satellite interests/disaster relief agencies/radio amateurs/ Member States, which have benefited from the Tampere Convention, need to be engaged in creating awareness around the Tampere Convention.
- Through events and workshops such as ICT4DR and ITU Telecom World, ITU could provide a new showcase for the Tampere Convention including highlighting its many benefits. There should be renewed focus on the very real problem of the provision of telecommunications infrastructure during disaster relief and encouragement of Member States of ITU to sign and ratify the treaty. For example, a specific forum could be held at a forthcoming ITU Telecom World, to highlight the benefits of the Tampere Convention and have a panel explain the real world difficulties of providing communications infrastructure. A renewed effort could also be made within ITU-D SG2 to push for more signatories to the Tampere Convention.
- An updated link for the Tampere Convention on the ITU website (and linked from the SSDM website) should be explored and expanded on. The present link on the ITU website provides only a basic review of the Tampere Convention. The links on how to sign and ratify the agreement should be updated and moved to a more prominent position on the website.
- The Tampere Convention can be a vital assistance to radio amateurs, many of whom travel to different countries with their own equipment to assist in disaster communications. The implementation of a "roaming" agreement amongst Member States to allow cross-border recognition of amateur licenses should be considered. In the past, a Global Amateur Radio Emergency Conference ("GAREC") has been held often in concert with a similar ITU event. In recent years, the GARECs have not occurred mainly due to financial constraints. Coupling a GAREC with an ITU event would assist in allowing radio amateurs and other interested stakeholders to attend and expand on the benefits of the Tampere Convention.
- An online publication should be developed highlighting the Tampere Convention, its many benefits and providing real world examples of how cross-border issues have hampered the rapid deployment of communications infrastructure. There is very little information on the Tampere Convention, or its practical effect, available on the Internet. There should be an accessible online document which provides practical information on the benefits of the Convention and similar advice on lobbying Member States to adopt same.

The Tampere Convention can play a vital role in disaster communications. ITU and other stakeholders (both amateur and commercial) need to assist in the recognition and adoption of this vital treaty.

2.5 ACTION 4

MAINTAIN, ASSESS, REVIEW AND UPDATE DISASTER MANAGEMENT TOOLS

Periodically review national disaster management plans, universal access/service policies, regulations and practices, and encourage updates and changes as necessary.

2.5.1 THE CONTEXT OF NATIONAL DISASTER PLANS

Based on the recommendations made by the three working groups in the SSDM Report 2015, national disaster management plans should be reviewed and updated on regular basis. In the overview of best practices on policies and regulations, while considering the role of telecommunications and particularly satellite communications in saving lives and coordinating relief efforts, national agencies should continuously review and update plans to take into account changes and upgrades in technology.

More precisely, as stated by the 2015 Working Group on Infrastructure and Technologies, disaster management plans should be constantly reviewed to accommodate new technologies and their applications to disaster response and recovery. The review of partnership models and financing mechanisms undertaken by the Working Group on Financing, Partnerships, and Business Model, proposes that national disaster management plans as part of national governments attributions should be used, combined and reassessed in the light of public-private partnerships in order to create a broader platform for disaster management[7].

As stated in the SSDM Report 2015, in order to guarantee access to essential telecommunications before, during and after disasters and to allow each country to have a prepared disaster management plan in place which allocates sufficient budgets to establish preparedness and recovery in due time, potential financing mechanisms should be reviewed. Furthermore, in order to give all the population access to alert systems early enough to minimize loss of life and damage, preparedness is essential.

2.5.2 THE CONTEXT OF UNIVERSAL ACCESS/SERVICE POLICIES

Potential financing mechanisms need to be reviewed, to guarantee access to essential telecommunications before, during, and after disaster. These would allow each country to have a prepared disaster management plan in place with sufficient budget for both preparedness and recovery in due time. As such, on a regulatory level, universal access funding mechanisms might form a way to achieve the objective of connecting all people to disaster relief systems.

Universal Service (US) and Universal Access (UA) are often used interchangeably. US generally refers to providing service to individuals or households and UA that of communities. Initially, and according to the ITU, US means that every household or individual in a country has the opportunity for telephone service and UA means that everyone in a community can gain access to a publicly-available telephone, although

7 See for more details the *emergency.lu* model of ICT4DM as a successful and workable model

not necessarily in their homes. Today, these concepts are increasingly being re-conceptualized to include broadband services.

UA has been adopted as a policy goal within many developing countries and as means of providing availability to telecommunications services at affordable prices, to the greatest possible percentage of the population[8]. It supports the three primary principles of availability,[9] affordability,[10] and accessibility[11]. The universal access fund (UAF) practice has been widely adopted because it serves as an incentive for the provision of services to regions traditionally regarded as unattractive to private telecommunications providers[12]. Despite penetration rates for mobile technology, universal access has not yet been achieved in many countries, where rural and remote areas remain underserved.

The universal service fund (USF) is typically funded via some form of contribution mechanisms from telecommunications service providers/operators. In most cases, the operator contributions are in the form of a levy, based on a percentage of annual operating revenues. The USF fee can also be a portion of an overall annual regulatory fee, which could be on a fixed or reviewed basis. Other sources of funding include licensing fees, direct contributions from governments, contributions from international agencies such as the World Bank, regional development banks, and so on.[13]

According to a recent GSMA[14] study, which covers 64 countries worldwide, most of the USFs reviewed remain inefficient and ineffective. The scope of the study considered the need for an updated overview of the global status and performance of USFs and that of an assessment regarding significant developments and trends in the design and administration of USFs. Whilst some countries, such as Rwanda and Peru, seem to have been successfully deploying USFs in rural areas, in most cases very few funds appear to disburse everything they collect. These unused funds could be reinvested in the economy if directed towards increasing access to telecommunications services in rural areas for early warning disaster alerts.

In addition, ITU recommends that work should be carried out to allow these funds to be properly used. More study, for example, is sometimes needed on the underlying regulatory and legal frameworks involved or of contributing factors in some countries (such as lack of technological neutrality or service flexibility, or in excessive bureaucracy, insufficient oversight, and non-transparent processes). Poorly-conceived regulatory frameworks of the USFs can also pose as an obstacle to the introduction of the most cost efficient commercial and viable solutions.

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8 ICT Regulation Toolkit, Universal Access: An Overview, International Telecommunication Union, 4, Accessed: Jan. 22, 2014.

9 Expressing the fact that service should be provided without geographical discrimination; id.

10 The price of telecommunications services should not be a limiting factor to access; id.

11 Those receiving telecommunications services should be treated in a non-discriminatory manner with regard to service quality and pricing; id.

12 Regulatory and Market Environment, Universal Service Fund and Digital Inclusion for All, Report, , September 2013, Telecommunication Development Sector, at 118-119, *available at* http://www.itu.int/en/ITU-D/Regulatory-Market/Documents/USF_final-en.pdf

13 ITU, Universal service fund and digital inclusion for all, June 2013 (USF Study)

14 GSMA, Survey of Universal Service Funds, Key Findings, April 2013; http://www.gsma.com/publicpolicy/wp-content/uploads/2013/04/GSMA-USF-Main-report-final1.pdf

In the SSDM report 2015, examples of Rwanda and Peru are presented in detail as implementing an efficient and successful USF[15]:

2.5.2.1 The case of Rwanda

The Government of Rwanda decided to promote and implement the concept of universal access (UA) in the ICT sector using regulatory tools through the enforcement of a law determining the functioning of a Universal Access Fund (UAF) and the public operator's contribution. The UAF's objective has been to connect institutions in rural and remote areas. It is financed by contributions from licensed operators (2% of their annual turnover net of interconnection payments from all operators) and international donations. Some 2500 km of fibre have been installed by the Rwanda Development Board [16] and the network has been operational since the end of 2010, providing broadband connectivity to institutions in remote and underserved areas. To achieve the 2015 Millennium Development Goals (MDGs), more broadband infrastructure was deployed through the use of wireless technology (a mix of Wimax and Satellite VSATs) as a last mile solution to connect villages and homes.

2.5.2.2 The case of Peru

Peru has experienced significant growth as a result of its telecommunications reform [17] and has seen a substantial expansion in its telecommunication services[18]. The structure of Peru's UAF provides an excellent framework which achieved stipulated universal access goals. Peru's "*Fondo de Inversión en Telecomunicaciones"* (FITEL), created in 1993, and since 2008 an agency established to promote the universal access of telecommunications to low-income, rural regions of Peru, provides subsidies for private telecommunications companies to deliver appropriate programmes. FITEL reports directly to the Ministry of Transportation and Communications, and is financed with a 1 per cent levy of gross operating revenues on all telecommunications providers.[19]

FITEL has reviewed the funding structure periodically to ensure that it has remained in balance with the country's evolving universal access requirements and changing market realities.[20] FITEL has awarded the implementation of telecommunications projects to the private sector through a public and competitive tendering process for all projects where the financing amount is above USD 1 million. As is the case with many universal access and service funds, FITEL has awarded its projects to the bidder that requested the

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15 See section for more details 4.8.2 and 4.8.3 of the 2015 SSDM Report

16 The Rwanda Development Board was set up by bringing together all the government agencies responsible for the entire investor experience under one roof. This includes key agencies responsible for business registration, investment promotion, environmental clearances, privatization and specialist agencies which support the priority sectors of ICT and tourism as well as SMEs and human capacity development in the private sector

17 *Supra*, note 8.

18 Jeffery Bernstein, Information Technology in Peru, *Liberalization and Deregulation,* last accessed Jan.23, 2014, http://www.jsbernstein.com/initeb/liberalization.html

19 Regulatory Market Environment, *Supra* note 28 at 109; Peru: Experience of the FITEL payphone Programme, ICT Regulation Toolkit, last accessed Jan. 24, 2014.
http://www.ictregulationtoolkit.org/en/toolkit/notes/practicenote/3143

20 Id.

least amount of subsidy. In addition, the bidder had to pass eligibility criteria and meet certain technical, legal and financial requirements and there are a combination of other selection criteria.

For the universal access project, the country is divided into six tendering regions. Four separate rounds of USF tenders were conducted between 1998 and 2004 and served: 213 localities in FITEL I; 2.170 localities in FITEL II; 2.520 localities in FITEL III; and 1.614 localities in FITEL IV. For example the FITEL II programme included the provision of 500 public Internet access points in rural areas and combined rural broadband services to rural satellite connectivity.

The FITEL experience is an example of a successful USF implementation and has demonstrated the importance of designing projects through the evaluation of key regulatory conditions, especially tariffs and interconnection, as prerequisites for success.

2.5.3 REVIEWING THE USF APPROACH

In conclusion, disaster management tools in the form of national disaster management plans, universal access/service policies, and regulations and/or practices need to be periodically reviewed to adjust to changes. These tools need to be constantly reassessed in the light of evolving ICT, as a social, financial and overall economic benefit for better management of natural disasters. As stated by the ITU, "In order to 'future proof' USFs to the greatest practical extent, the underlying legal and regulatory frameworks must be structured so as to ensure that policies and parameters can be modified quickly and effectively to accommodate the need for a new USF vision and respond to rapidly changing and evolving priorities."[21]

If current USFs do not appear to be the most appropriate mechanism to achieve universal service and further social and economic development, it would still be beneficial for governments to consider whether USFs are appropriate and relevant, or whether alternative policy instruments may deliver better results. As such, the private and public sector could consider other alternatives and financial instruments such as public-private partnerships (PPPs), large deployment projects or voluntary country-by-country yearly insurance fees guaranteeing access to sufficient "always on" satellite capacity and allowing delivery of broadband services to all including rural communities.

2.6 ACTION 5

EXAMINE BEST PRACTICES

Encourage the adoption of international best practices to effectively address growing ICT trends as well as the needs created by newly-emerging technologies and make such best practices public and openly exchanged between regional and international regulatory bodies.

21 USF Study,p.120

The goal of this action is not only to collect and engage best practices for advocating ICT4DM, but also to serve as a method for encouraging a debate over best practices and to select which practices may best address future challenges in this sphere. The common ground for this theme would be to consider that best practice is an enabler of an overall international disaster management strategy.

In order to support effective deployment of ICTs, there must be a need for sharing of best practices and a willingness on behalf of stakeholders to modify present practices in order to better respond to communications during times of disaster. What has become readily apparent is that, with the increased use of both ICT and mobile telecommunications, individuals are much more reliant on mobile technology to obtain information and to communicate. Indeed, in some cases mobile communication is the only effective and available method of ICT for individuals. The SSDM Report 2015 clearly identified two relevant objectives: firstly to guarantee communications between the public, government, disaster relief agencies and other stakeholders; and, secondly to ensure that messages and communications between members of the public can still occur as efficiently as possible.

Without defining what the best available practices are, the SSDM Report 2015 highlighted satellite technology and the deployment of satellite communications devices as a potential best practice. It also referred to the use of amateur radio operators and other actors. Presenting an overview, the Report stated that although each country faces unique challenges and characteristics in both development and disaster preparedness and response, many principles are universal in ensuring smart, sustainable development of ICT infrastructure and new technologies which take account of disaster mitigation and response requirements. The bedrock of these principles is increasing coordination between stakeholders.

2.6.1 SSDM BEST PRACTICES

The SSDM Report 2015 suggests general principles and features of best practice that can be listed as follows. In addition, this report contains a benchmark summary of best practice principles found in other organizations in Action 3.2.

2.6.2 POLICY AND PLANNING BEST PRACTICE

- **Commitment to support**. Disaster mitigation planning must be tailored to the specific needs of each region. Although the infrastructural capacity and ability to respond in the event of a disaster varies significantly by nation, it is the responsibility of the international community to respond in times of need and be prepared to come to the aid of a nation willing to accept assistance.
- **Enabling policy.** Countries should ensure that there are enabling regulatory and policy environments, including consideration of spectrum and satellite capacity requirements and licensing frameworks, to allow for prepositioning and rapid deployment of technologies and services.
- **Multipurpose, resilient planning**. ICT development plans, national broadband plans and other strategies by telecommunication regulators should seek to invest in infrastructures that are both multipurpose and resilient in the face of the natural disasters most frequently faced in individual national geography.

- **Operational continuity**. Consideration is needed for both resiliency of infrastructure to the effects of disaster, but also for redundancy. Countries should consider how continuity of operations will be ensured if primary infrastructure is damaged or destroyed and should take account of network capacity considerations for demand spikes immediately following a disaster. Satellite communications can be especially critical in the aftermath of disasters and to provide primary, redundant and backhaul links delivering services to remote and rural areas.
- **ICT4D/ICT4DM coordination and consistency.** When developing an ICT development plan, government agencies should ensure that there is coordination and consistency with the aims of the Member State's disaster management plan, supporting development of the technologies—whether primary or redundant—which are expected to be used in response to, or recovery from, a disaster.
- **Regular plan review.** Disaster management plans should be reviewed regularly to accommodate new technologies and their applications for disaster response and recovery. Technology-neutral policies must be put in place, to the extent possible, in order to ensure the effectiveness of the disaster response efforts.
- **Training review.** When a new technology is incorporated into a disaster management plan, cross-training should occur with other relevant stakeholders, such as NGOs and relief workers, local government agencies, and the private sector.

2.6.3 TECHNOLOGY AND IMPLEMENTATION PRACTICE

- **Innovative business models.** Public-private partnerships and other innovative business models can be effective in identifying ways to deploy smart sustainable infrastructure and new technologies.
- **Technology review.** Countries should consider the new technologies listed in the Catalogue[22,] and evaluate the underlying infrastructure requirements for deployment of these technologies. Differing countries, geographic environments, and risk level for particular types of disasters would lead to different choices in technology and infrastructure deployment. New technologies are more diverse and interoperable. Assessments of technology and infrastructure options should consider performance or functional requirements vs. specific equipment requirements, or to consider how diverse technologies may be interchangeable and flexible for multiple uses.
- **Power requirements for SSDM**. Smart Sustainable Development Models should take account of power requirements as well as independent power sources to ensure continued functionality in the event of a failure of the power grid. Consideration should be given to use of solar power or other renewable resources.

22 See Annex 9 of the SSDM Report 2015

2.6.4 COMMUNITY REQUIREMENTS

- **Meeting information needs.** One of the most important assets in managing any disaster response or recovery effort is "information". In today's ICT environment, citizens demand greater and faster access to information via ICT devices, particularly in the aftermath of a disaster. Infrastructure and new technology considerations should acknowledge the need for access to information applies to both disaster response officials and the public alike.
- **Effective public warning.** Smart Sustainable Development approaches should consider how to provide effective public warning via resilient technologies. Public warning and alert systems are critical to help save lives. A variety of systems have been implemented to date for various types of disaster and population needs. Collaboration with meteorological and weather-mapping organizations that monitor conditions or seismic activity via satellite or other means can help support public warning systems.
- **Support from the amateur radio service.** The resource of the amateur radio service should continue to be utilized as new technologies are developed. For the most part, amateur radio operators have more than a passing interest in the art and science of radio and many make important contributions of a scientific nature and have developed new technologies to aid in disaster communications. However, the best asset the amateur radio service brings to emergency communications transcends technology. It provides skilled people "on the ground" who can communicate using whatever technology is available.

2.6.5 BEST PRACTICE ADVOCACY

Advocating for the identified best practices means that international, regional and national dialogue be encouraged. To favour such a debate the following is proposed:

- **Model plan**. The ITU and other stakeholders should develop a model plan which could serve as an example to implement certain best practices. An example disaster management model plan could be created in order to showcase new technologies and their applications for disaster response. The model plan would be made available online and would be a basis for discussion at ITU level.
- **Training.** Online training for both national and regional stakeholders should be made available, in a similar way to ITU's Spectrum Management Training Programme (SMTP).[23] Individuals would be trained from the "ground up" as to what the best practices are on ICT4D and ICT4DM and to provide practical examples of how such practices can be implemented. Consideration should be given to some form of certification for individuals and others.
- **Removing regulatory barriers.** Any regulatory hurdles to implementing best practices should be identified and become the focus for consideration at the ITU level. Removing regulatory hurdles

23 See http://www.itu.int/en/ITU-D/Pages/News.aspx?ItemID=23

to allow the free flow of communications amongst the public and a disaster situation should be a key objective.

- **Disseminating best practices.** Publication of the best practices, such as the ones identified in the SSDM Report 2015, both online and in traditional means, is crucial. Best practices are the backbone of the work of the SSDM Initiative and require additional publicity and attention. The ITU and other stakeholders must be prepared to highlight the best practices at ongoing international meetings (for example, ITU Telecom World and other disaster management conferences), while also providing concrete advice and directions on how all stakeholders can adopt and embrace the Initiative.

2.7 ACTION 6

SUPPORT THE IMPORTANCE OF THE LESSON LEARNED APPROACHES

Share and promote the importance of the lesson learned approaches, emphasizing the importance of preparedness support and actions such as the sharing of information, best practices, toolkits and resources to enable member and regional preparedness.

Based on the developments presented in the SSDM Report 2015, it is essential to promote the importance of the lessons learned approach. In order to benefit from sustainable financial and business models, the importance of sharing the experience(s) on how a particular country faced a disaster or an emergency situation needs to be stressed.

Countries which have suffered major recurring disasters, are in a preeminent position to share their experiences and knowledge. Not only is it vital to provide detailed descriptions of the implementation of a specific policy during a particular operation, but the lessons learned through its implementation should also be presented from both a success and failure point of view.

Auditing how a disaster situation is best handled may be challenging because of the large number of intervening stakeholders (both at the national or international level) and also because the focus should be on assessing policy, infrastructure, technology or cooperation, while bearing in mind the question of technological neutrality.

In the SSDM Report 2015, many examples of lessons learned initiatives may be found. Amongst them two initiatives should be highlighted as emphasizing the importance of preparedness.

The initiative of the Japanese government in response to the earthquake and tsunami of 2011 is a highly appropriate example of a nationally-led initiative.

The *Tsunami Global Lessons Learned Project Disaster Recovery Toolkit* should be recommended and promoted as a significant initiative of benefit to the Asia Pacific region and the world.

Following the earthquake and tsunami in Japan in March 2011, the Ministry of Internal Affairs and Communications of Japan sought to aggregate data and lessons learned with other entities in Japan. These concerned the response of Japan's networks and telecommunication infrastructure, existing plans and processes regarding the disaster and the initiation of steps to be better able to use ICT to respond to future disasters. Consequently, a study group was formed to consider the communications response to a possible future large scale disaster.

2.7.1 RESPONSE TO THE JAPANESE EARTHQUAKE AND TSUNAMI OF 2011

The group focused on issues related to:

- Network congestion.
- Measures in the event that base stations or relay stations are damaged.
- Future network infrastructure and disaster resilience.
- The manner of future Internet utilization considering internet usage during the earthquake.

The case of Japan is an example of best practice given the country clearly reflected on lessons learned both for Japan and for other countries.

In a statement made at WTDC-14 in April 2014[24], H.E. Mr Masahiro Yoshizaki, Vice-Minister for Policy Coordination of Japan, acknowledged the wide range of support received from all over the world and stated that his country's policy emphasis was now on prevention and preparedness. He stated that Japan was planning to share its experiences, knowledge and technologies with other countries and to cooperate with them in capacity building.

In March 2013, Japan hosted the ITU-D Study Group 2 Rapporteur Group meeting on utilization of telecommunications/ICT for disaster preparedness, mitigation and response. In the same month, Japan and the ITU co-hosted a symposium on disaster communications in Sendai, the city hit by the earthquake. In February 2014[25] the World Bank and Japan established a partnership to improve disaster risk management in developing countries[26].

2.7.2 THE TSUNAMI GLOBAL LESSONS LEARNED PROJECT DISASTER RECOVERY TOOLKIT

The Tsunami Global Lessons Learned Project (TGLLP) was created with a view to gathering, learning and sharing from experiences of the 2004 earthquake and tsunami, and other disasters in the Asia-Pacific region

24 www.itu.int/en/ITU-D/Conferences/WTDC/WTDC14/Pages/item.aspx?ItemID=1009

25 www.worldbank.org/en/news/press-release/2014/02/03/world-bank-and-japan-partner-to-improve-disaster-risk- management-in-developing-countries

26 www.gfdrr.org

that occurred between 1993 and 2013. The project sought to deliver three principal outcomes: a global lessons learned study, a *Discovery Channel* documentary tracking the recovery, and a disaster recovery toolkit for recovery practitioners.

At the launch of the Tsunami Legacy in 2009[27], an announcement was made regarding the development of a set of handbook and guidance notes targeted specifically at recovery programme leaders and practitioners. The Disaster Recovery Toolkit contains six books[28]:

1. Handbook for Disaster Recovery Practitioners
2. Training Manual – Learning Workshop on Recovery and Reconstruction
3. Guidance on Critical Facilities
4. Guidance on Housing
5. Guidance on Land Use Planning
6. Guidance on Livelihood

Developed by the Tsunami Global Lessons Learned Project Steering Committee (TGLLP-SC) in partnership with the Asian Disaster Preparedness Centre (ADPC), the Handbook for Disaster Recovery Practitioners has derived learnings and good practices in the form of 'key considerations' from large-scale recovery and reconstruction (R&R) programmes undertaken in the aftermath of disasters from Asia and other regions. The learning has been derived from large-scale R&R programmes implemented in the last two decades in Asia, from 1993 to 2008.

Overall, the "Disaster Recovery Toolkit" facilitates an approach which is comprehensive, holistic and cross-sectoral. In taking a ten-year overview of the recovery process, it covers the long-term management of post-disaster recovery and collects key recovery documents produced in tsunami affected countries.

While targeting practitioners responsible for implementing recovery programmes, it also aims at providing a "how to" guide on development, implementing and managing complex post-disaster recovery programmes. As Helen Clark[29] stated in her speech when launching the Disaster Recovery Toolkit, its specific guidelines focusing on housing, livelihoods, critical facilities, and land-use are useful independently, but they are also integrated within the context of a more general framework for recovery and reconstruction. In all, the aim of the toolkit, as a handbook is to "offer guidance on how to do it better in the future".

27 http://reliefweb.int/report/indonesia/tsunami-legacy-innovation-breakthroughs-and-change

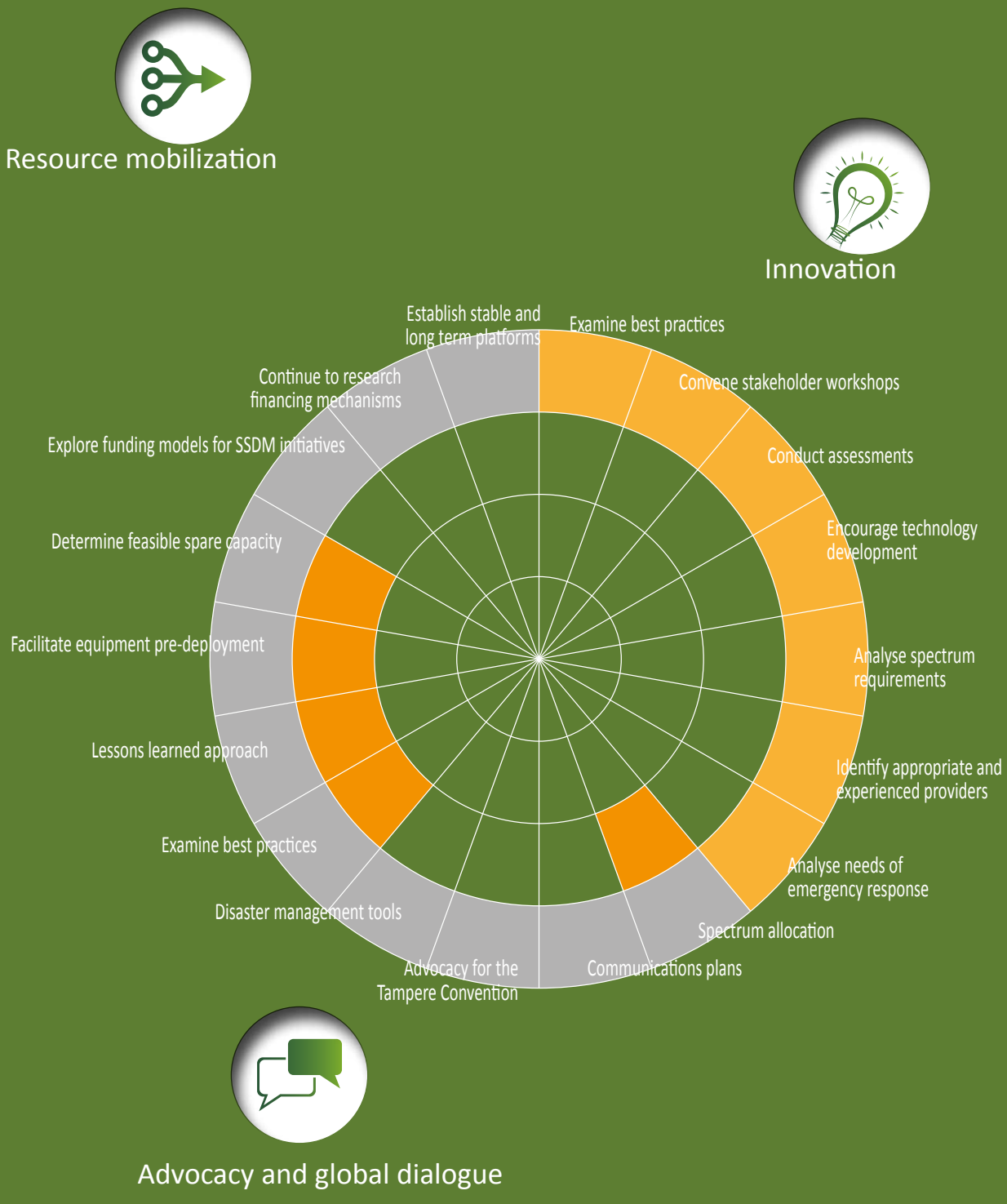
28 TGLL, Tsunami Global Lessons Learned Project Steering Committee, 2009. http://reliefweb.int/report/world/launch-disaster-recovery-toolkit-developed-tsunami-global-lessons-learned-project

29 http://www.undp.org/content/undp/en/home/presscenter/speeches/2015/02/09/helen-clark-speech-at-the-launch-of-the-tsunami-global-lessons-learned-project-disaster-recovery-toolkit.html

3

INNOVATION

FIGURE 3
INNOVATION ACTION PLAN



ACTION	INITIATIVE
Examine best practices	Prepare a list of best practices regarding the deployment and use of telecommunications equipment by international organizations, governments, NGOs, and private companies to areas affected by disaster.
Convene stakeholder workshop	Convene a workshop for all relevant stakeholders on developing or updating existing ICT development and national disaster management plans consistent with the Smart Sustainable Development Model.
Conduct assessments	Conduct capacity, resource, and technology assessments and if necessary develop partnerships with countries willing to provide assistance should disaster strike through agreements such as the Tampere Convention.
Encourage technology development	Encourage operators and service providers to continue developing innovative technologies and applications that will help meet Smart Sustainable Development objectives.
Analyse spectrum requirements	Analyze the current level of spectrum utilized by ICTs in disaster contexts to ensure that emergency ICT services are allocated sufficient amounts of spectrum and that their services can be executed effectively and without creating or causing unacceptable amounts of interference.
Identify appropriate and experienced providers	Identify ICT service providers and organizations which have a history of engaging in the cross-border transport of resources and aid during times of disaster.
Analyse needs of emergency response	In order to analyze the needs of emergency response, create and distribute surveys to service providers.

3.1 INTRODUCTION

The objective of the Innovation Task Force is to determine the possibilities, requirements and constraints offered by SSDM-relevant technology. Innovation across technologies will be the bedrock on which the future success of SSDM Initiative is founded. The spread of mobile broadband—to cite one example—is enabling communications connectivity reach and depth of a kind that would have been considered impossible even two decades ago. A rapid innovation process can not only respond quickly but enable rapid refinement in product and services to meet changing needs.

Beyond technology however, we also look to ways in which organizations and individuals themselves can formulate innovative solutions to the challenges involved. This strategy has substantially common interests with Actions 1, 5, and 6 of Advocacy and Global Dialogue for spectrum activities, lessons learned and best practice activities, and Actions 1 and 2 of Resource Mobilization.

3.2 ACTION 1

EXAMINE BEST PRACTICES

Prepare a list of best practices regarding the deployment and use of telecommunications equipment by international organizations, governments, NGOs, and private companies to areas affected by disaster.

3.2.1 ITU-D STUDY GROUP 2

The ITU-D Study Group 2 Report[30] covering the years from 2010-2014 drew the following conclusions regarding best practices for governments, NGOs, and private industry in response to natural disasters and are incorporated into this report:

3.2.1.1 Telecommunications are integral to disaster management

Governments, private sector entities, NGOs, and citizens all use telecommunications/ICTs to collect and communicate information to save lives and coordinate relief efforts. The following are the main considerations related to technologies:

1. More work is needed to help make telecommunications infrastructures more resilient to disasters, especially in developing countries where infrastructure is less able to withstand a catastrophic disaster.
2. Diversity of transmissions (redundancy) and network capacity considerations for demand spikes immediately following a disaster are important to ensure communications are not interrupted.
3. New bandwidth intensive tools (such as mapping tools, cloud services, smart phones) are changing emergency communications practice.

30 Question 22-1/2 Utilization of Telecommunications/ICTs for Disaster Preparedness, Mitigation and Response, Final Report (2012) International Telecommunication Union, *available at* http://www.itu.int/dms_pub/itu-d/opb/stg/D-STG-SG02.22.1-2014-PDF-E.pdf.

4. Disaster plans should be continuously reviewed and updated to take account of technology changes or as uses of existing telecommunications are better understood.

3.2.1.2 Enabling environment

In addition to infrastructure and technology considerations, having an enabling regulatory and policy framework in place is important to ensure that emergency telecommunications response is not hindered.

3.2.1.3 Information management

One of the most important assets in managing any disaster response or recovery effort is “information”. Preparedness efforts should consider information requirements for various organizations involved in relief and response efforts, as well as citizens, to ensure that telecommunications infrastructures and systems are available following a disaster.

3.2.1.4 Enabling citizens to communicate

Whereas public safety officials or relief organizations may have been a principal focus for disaster communications planning and response, telecommunications are empowering citizens to more actively engage in disaster response, for example, through the increased use of social media and mobile phones. Emergency telecommunications planning should take account of the ways in which citizens communicate information.

3.2.1.5 Disaster response is multistakeholder

Governments cannot—and do not—address disasters alone. These entities must also coordinate in advance of disasters. In the event of a disaster, government, private sector, NGOs and citizens must all come together to exchange information and facilitate a response. Because of this, many countries engage with a vast array of stakeholders when developing a national disaster telecommunications plan, including through development of public-private partnerships and other mechanisms to support collaboration.

3.2.1.6 Preparedness

Advance planning is critical for saving lives. This cuts across all of disaster response, with telecommunications/ICTs playing a role in almost every area of disaster response management. Pre-positioning ICT equipment, planning for excess capacity requirements, training of personnel, and educating citizens on alerting tools and escape plans are all best implemented when planned in advance.

3.2.1.7 Public warning and alerts

Public warning and alert systems are critical to help save lives. Depending on the types of disasters and the communication needs of populations, a variety of systems have been implemented. Collaboration with weather mapping organizations that monitor conditions via satellite can help support public warning systems.

3.2.2 GOVERNMENTAL AND INTERGOVERNMENTAL PRACTICE

The US State Department's **Advisory Committee for International Communications and Information Policy** had the following recommendations[31] for the US Government; however, many of the recommendations are applicable to governments of other countries.

They are summarized here:

1. Foster global disaster preparedness and help to reduce barriers often faced by private, public, and NGO ICT providers.
    a. Offer information resources and examples of successful practices or country case studies and recent innovations to foster development of internal disaster ICT preparedness capacities.
    b. Support (including providing financial or in-kind resources) and advocate for training and capacity-building initiatives—by government, NGO and private sector experts—in ICT-related disaster response and preparedness, particularly for developing countries.
    c. Ratify the UN Tampere Convention. In absence of ratification, governments should recognize, support and promote the implementation of certain core principles behind the Tampere Convention as being important to facilitating more effective disaster response.
2. Increase recognition of ICT providers as a critical infrastructure in the context of international disaster preparedness.
    a. Agencies responsible for international disaster and humanitarian response should formally recognize telecommunications/ICTs as a critical infrastructure for international disaster preparedness, response and recovery planning, and should encourage such recognition by other governments, NGOs and international organizations involved in disaster relief and recovery.
    b. Encourage advance ICT resource planning, including pre-positioning of ICT equipment and information/collaboration services and training of personnel, by countries and organizations.
3. Improve interagency coordination and expedite engagement between host country response leads and public, private and NGO ICT service/solution providers.
    a. In anticipation of emergencies, governments should identify agency point(s) of contact responsible for ICT aspects of international disaster response, including specific liaison(s) with host countries on ICT aspects of disaster preparedness, response and recovery.
    b. In anticipation of emergencies, governments should analyse their own ability to offer direct ICT assistance to other governments following a disaster.
    c. Governments should partner more effectively with private, public sector or NGO personnel that could be used to support governmental efforts in disaster response and recovery.

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31 Recommendations to Enhance Information and Communications Technology (ICT) Aspects of U.S. International Disaster Response, US Department of State (Nov. 27, 2011) *available at* http://www.state.gov/e/eb/adcom/acicip/disasterresponse/179203.htm.

4. Improve communication and information flows regarding use of ICTs during an international disaster.
    a. In anticipation of emergencies, governments should develop relationships with, and maintain Points of Contact lists of foreign officials responsible for ICTs, disaster preparedness and response, and the operation of ICT-related critical infrastructure and key resources.
    b. Governments should identify a common interface point(s) that can field questions from private, public and NGO ICT providers, and collect information from the host nation for dissemination to private, public and NGO ICT providers.
    c. Governments should provide support and share guidance on international best practices for host country ICT impact, needs, and capability assessments.
    d. Governments should work with the relevant host government points of contact to facilitate entry of needed external technology and expertise resources.
    e. Governments should promote the sharing of information across the ICT response sector and host nations to foster a common understanding of needs, resources, priorities and status of response and recovery efforts during a disaster.

The European Commission[32] also echoed policy recommendations of standards being applied across all European Member States, thereby facilitating a system that is both scalable and usable across many different platforms.

3.2.3 OTHER INTERNATIONAL ORGANIZATIONS

The European Satellite Operators' Association[33] and the **Global VSAT Forum**[34] both identify recommendations that are similar to the above listed items. Measures may be broadly broken down into two categories: policy and training recommendations. Policy recommendations figure into the recommendations prominently. Policy is an umbrella term that includes regulatory, legal, managerial, planning, institutional cooperation, and other necessary steps to put support systems in place from a policy perspective.

Training recommendations are also a recurring theme. These include familiarizing personnel with equipment, equipment upkeep, managerial training, coordination with other personnel and other networks, and so on. This includes necessary steps to put support systems in place from an operational planning/implementation perspective.

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32 Final Report Summary – Emergency Support System, Project Reference 217951European Commission Community Research and Development Information Service (Jan 20, 2015) *available at* http://cordis.europa.eu/result/rcn/155812_en.html.

33 Satellite Communications for Aid and Emergency, European Satellite Operators' Association, *available at* https://www.esoa.net/upload/files/publications/newsletter_satellitesAidEmergency.pdf.

34 http://www.cmu.edu/silicon-valley/dmi/workshop2011/presentations/birnbaum-steve.pdf

3.3 ACTION 2

CONVENE STAKEHOLDER WORKSHOPS

Convene a workshop for all relevant stakeholders on developing or updating existing ICT development and national disaster management plans consistent with the Smart Sustainable Development Model.

ICTs are used throughout all stages of the disaster management process: from preparation, to maintenance, implementation, and finally, use. The efficacy of ICT during response to disaster depends heavily on the preparation completed before use becomes necessary.

As part of that preparatory process, recommendation 6 from the SSDM Report 2015, suggested that the SSDM group "convene workshops for all relevant stakeholders on developing ICT development plans and national disaster management plans consistent with the Smart Sustainable Development Model." Identifying relevant stakeholders and satellite sector participants in a position to be able to provide ICT when disaster strikes is the first step in assessing capabilities. From there, ICT development and national disaster management plans can be created and implemented based on the knowledge of regional capabilities. This section takes the first step toward the development of emergency disaster plans by identifying the primary stakeholders by region for purposes of developing or updating existing ICT development and national disaster plans.

Implementable disaster response preparations require the cooperation of all key stakeholders—in this case, the public sector and the private sector. Annex 4 sheds light on which regions certain private sector operators have satellite capabilities. It also contains a brief summary of their capabilities and service applications, which is a first step in determining which entities and operators should participate in disaster response preparations and what roles they may play. The public sector fuels many ICT policy considerations and national strategies. Falling within the ambit of the public sector, local and state governments have specific roles to play during disaster response situations. Governmental preparation in anticipation of, as well as the continuation of governance after, a disaster event are both equally crucial in disaster response and cannot function independently in the absence of a cohesive partnership with the private sector as well as the local population. For this reason, identifying local and regional governments and NGOs is equally crucial in establishing workshops to develop and implement disaster response strategies.

Once key stakeholders and ICT providers are determined, capacity, resource, and technology assessments provide necessary foundational knowledge useful in developing partnerships with public and private sector participants willing and able to provide assistance should disaster strike. Knowledge of stakeholders, regulatory permissions, technological harmony, and service capabilities are critical to providing life-saving communications in disaster response scenarios.

ICT providers must work with local officials, governments, NGOs, and volunteers to put disaster response strategies into action. The challenges associated with the preparation, development, and implementation of disaster response strategies are numerous but the list above of best practices serves as guidance to simplify the process for all stakeholders involved.

A sample workshop agenda is shown in Annex 3.

3.4 ACTION 3

CONDUCT ASSESSMENTS

Conduct capacity, resource, and technology assessments and if necessary develop partnerships with countries willing to provide assistance should disaster strike through agreements such as the Tampere Convention

A table of providers, the regions that their satellites serve, and their communications capabilities is provided as Annex 4 to this report. The first step in convening a workshop is to determine the relevant participants in each region and then to identify their various capabilities as far as disaster response is concerned.

3.5 ACTION 4

ENCOURAGE TECHNOLOGY DEVELOPMENT

Encourage operators and service providers to continue developing innovative technologies and applications that will help meet Smart Sustainable Development objectives.

Sustainable development and the objectives within SSDM are recurring themes throughout not only the ITU and the UN but also in regional gatherings and in private industry. Sustainability is already discussed throughout the ITU Study Groups 1 and 2 and will see increasing relevancy given the pace of technological change. Meanwhile, to improve awareness, the SSDM objectives should see visibility at major international forums such as UN and ITU conventions.

Symposiums such as WTIS-15 already contain strong focus on sustainability and sound environmental stewardship and represent an opportunity to drive awareness of SSDM's objectives.[35] Because the two align so closely, it is an opportunity to showcase the SSDM proposals.

In addition to the intergovernmental and regulatory levels, operators and service providers are also increasingly recognizing the added benefits of including sustainable development objectives within their

35 Open Working Group proposal for Sustainable Development Goals United Nations Department of Economic Development (2015) *available at* https://sustainabledevelopment.un.org/focussdgs.html.

business strategies. Telecommunications markets and customers are becoming increasingly selective towards companies that include sustainable development as a focus, and this provides a strong incentive to the ICT sector to focus on sustainability measures. The momentum generated at the consumer and end-user level can spur further action in that direction as operators and service providers, who are primarily revenue and turnover motivated, can reap the added benefits of increased trust by customers, as well as the security of international and regional support for their efforts.

3.6 ACTION 5

ANALYSE SPECTRUM REQUIREMENTS

Analyse the current level of spectrum utilized by ICTs in disaster contexts to ensure that emergency ICT services are allocated sufficient amounts of spectrum and that their services can be executed effectively and without creating or causing unacceptable amounts of interference.

Efforts to analyse current levels of spectrum are ongoing at the time of this report and necessarily implicate projections of future required spectrum to be of use in planning for effective execution of services. Results and conclusions are forthcoming.

3.7 ACTION 6

IDENTIFY APPROPRIATE AND EXPERIENCED PROVIDERS

Identify ICT service providers and organizations which have a history of engaging in the cross-border transport of resources and aid during times of disaster.

Please see Annex 4 to this Report for a list of service providers and organizations that have provided resources.

3.8 ACTION 7

ANALYSE NEEDS OF EMERGENCY RESPONSE

In order to analyse the needs of emergency response, create and distribute surveys to service providers.

Please see Annex 2 to this Report for an example survey to be distributed to emergency response providers.

4

RESOURCE MOBILIZATION

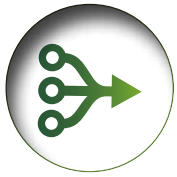
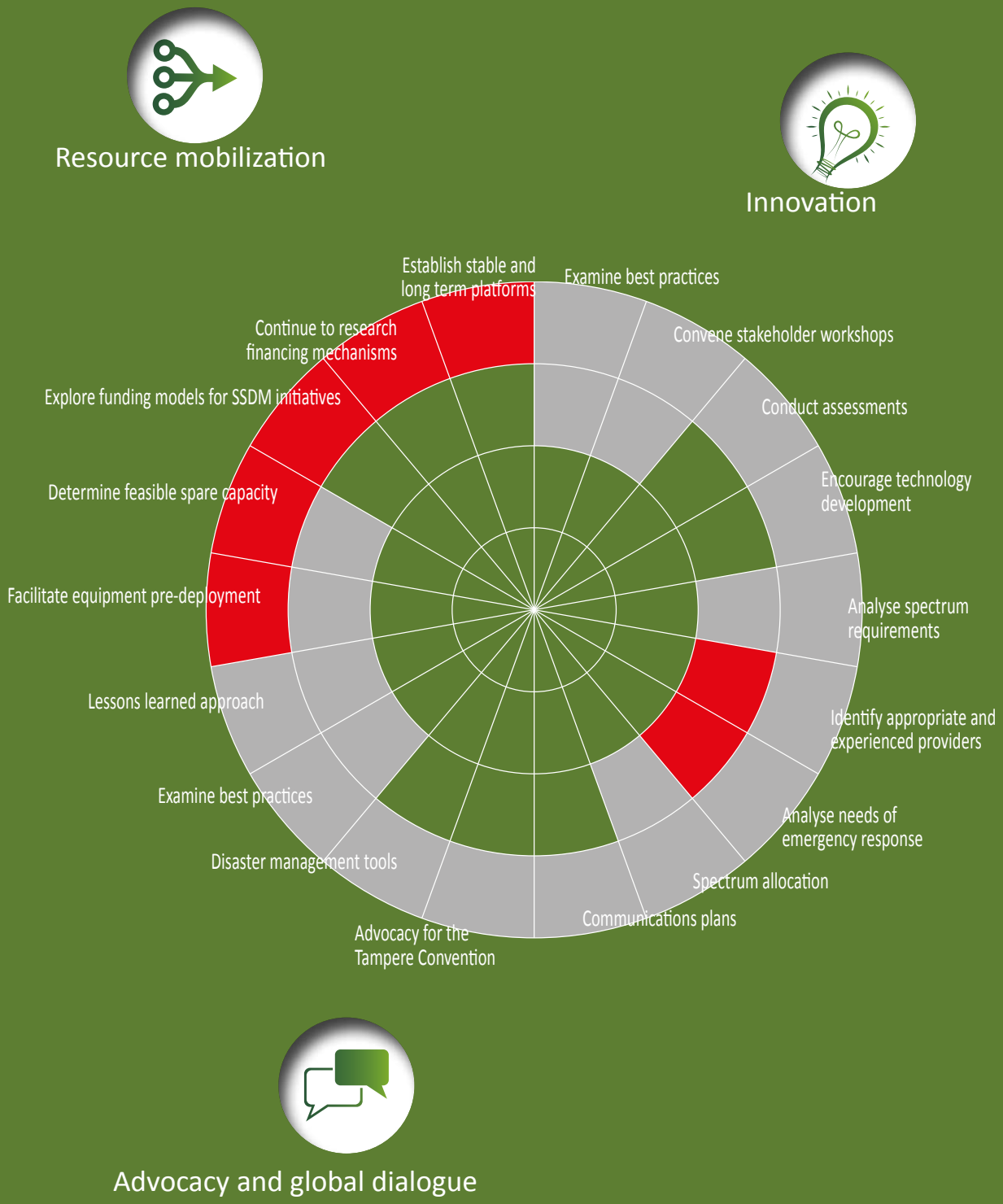


FIGURE 4
RESOURCE MOBILIZATION ACTION PLAN



ACTION	INITIATIVE
Facilitate equipment pre-deployment	Facilitate the pre-deployment of terminals and end-user equipment and training of first responders by ensuring awareness of the functionalities and capabilities of new technologies such as space and terrestrial based technologies and platforms.
Determine feasible spare network and organizational capacity	Determine the feasibility of using spare network and organizational capacity during times of disaster that could be made available to different regions and analyze the technical steps required to use such spare capacity in disaster relief and mitigation contexts.
Explore funding models for SSDM Initiatives	Explore additional funding models for SSDM Initiatives. Due to the difficulty of administering universal service funds (USFs), it is not recommended that they be used as a primary funding source. Charitable organizations, as well as loans and subsidies such as those afforded by multilateral financing organizations may provide alternative funding sources.
Continue to research financing mechanisms	Continue to research financing mechanisms, exploring loans and subsidies, as well as more out-of-the-box and innovative approaches.
Establish stable and long term platforms	Establish a more stable and long-term operational platform for delivering disaster telecommunications relief services through primary or backup telecommunication systems, including those which can be movable or portable.

4.1 INTRODUCTION

The Resource Mobilization (RM) Task Force is responsible for exploring additional funding models and researching best practices for allocating resources to the SSDM Initiative. The actions identified for this taskforce focus on identification, assessment and analysis of current practices in the effort to highlight or recommend approaches to funding and resource allocation. Action points overlap with Actions 6 and 7 in Innovation, particularly in terms of identifying appropriate service provider expertise and needs analysis.

4.2 ACTION 1

FACILITATE EQUIPMENT PRE-DEPLOYMENT AND TRAINING

Facilitate the pre-deployment of terminals and end-user equipment and training of first responders by ensuring awareness of the functionalities and capabilities of new technologies such as space and terrestrial based technologies and platforms.

ICT infrastructure plays a critical and timely role in almost every aspects of disaster management. The pre-positioning and pre-deployment of equipment and training of first responders or personnel employed by local and national disaster management entities is therefore an essential part of disaster management and relief. This training is necessary because it helps and facilitates a timely and effective response to the impact created by the disasters. In addition, it is also important to plan in advance for excess capacity requirements. These issues must be incorporated into national disaster management policies and regulations.

Although the requirement is of immediate deployment, use and operation, delays in shipping and transportation may often occur. It is therefore of utmost importance that not only the equipment to be deployed be readily available, fully functional, and ready for immediate use, but also that first responders are trained and equipped to use them. An effective disaster response and management plan requires immediate deployment and use: time should not be wasted on the transportation, shipping and training.

The first responders and personnel employed by local and national disaster management agencies, NGOs and international agencies deploying teams in response to incidents of disasters should be up-to-date on the functionalities and capabilities of new technologies. Such new technologies include space- and terrestrial-based technologies and platforms. Furthermore, first responders and/or personnel should get continuous hands-on training on the use and operation of equipment that will be used during such events.

In addition, it is also important to promote and support risk awareness so that affected areas and regions can plan in advance and implement effective measures for disaster response, management and relief. The promotion of risk awareness is an integral step in mitigating disaster risk and implementing risk reduction techniques. The disaster management agencies, national governments, donors, NGOs, and other relevant stakeholders should make available resources including training materials, videos, and research studies that

can assist in raising awareness through providing and sharing information on the effective methods and techniques employed for disaster response, management and relief.

The equipment that is deployed for disaster response, management and relief should come with all the necessary support and accessories, including solar chargers, as disasters may also affect the power infrastructure. It is critical that the national policies and regulations should recommend and encourage pre-positioning and pre-deployment of subscriber equipment, training of the first responders and the personnel working for the local and national disaster management agencies, planning for excess capacity requirements and focusing on additional power over the affected areas.

The national policies and regulations should facilitate and support the following important elements that are part of disaster response, management and relief:

- Developing partnerships with donors willing to provide assistance through international conventions such as the Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations or under a bilateral agreement and arrangement to provide and support ICT capabilities.
- Creating a favourable policy and regulatory environment that enables the timely and efficient deployment of services. A strong ICT infrastructure cannot function effectively unless it exists within a framework that facilitates the pre-deployment and pre-positioning of the ICT equipment.
- Establishing and maintaining an up-to-date database of equipment suppliers and service providers.

The partnership models for pre-positioning and pre-deployment for disaster management and subsequent development, training of personnel and risk awareness can be established and implemented through varied business arrangements and corporate social responsibility as described here in Action 2.The involvement of the private sector in disaster management activities and operations helps in mobilizing resources under joint actions, sustainability/corporate social responsibility as well as knowledge transfer.

There are different kinds of partnership models that are contemplated as well as implemented for activities related to pre-positioning and pre-deployment of equipment earmarked for disaster management and disaster relief. Existing arrangements between international donor agencies, satellite industry (consisting of satellite operators and their service distributors and partners), the international and national NGOs, and the telecommunication industry in general at different levels, have proven to be successful and effective (e.g. *Nethope, Telecoms Sans Frontieres, emergency.lu*). Notwithstanding these, there is however a need to expand more systematically on such partnership models, in particular through the involvement of local and national governments as well as the international finance institutions for pre-deployment of sufficient quantity of equipment in areas and regions that are prone to natural disasters. The partnership models should also include continuous access to full solution (satellite capacity, services provision, terminals, human resources) and training of personnel as well as support for the continuous monitoring of the health and operational readiness of the equipment.

Therefore, to complement an international coordination body for ICT4D and ICT4SD, national governments should be fully involved as they are key players in the success of the above-mentioned partnership models. It is critical that the national governments develop policies, planning, and regulatory frameworks that enable the success of such partnerships.

National disaster relief policy and response plans should include the possibility of pre-deployment of equipment, training of personnel on such equipment, and dissemination of risk awareness. The national disaster policy should also incorporate facilitating the cross-border movement of such equipment streamlined customs clearance, availability of technical support and manpower, and so on. ITU could become a facilitator between the coordination body involved and national governments and facilitate the development of efficient national plans which can greatly support, facilitate, and improve response efforts in the case of a disaster. Equally important is the regional collaboration which can help if the affected country is not in a position to support the disaster relief activities on its own, as experienced in most of the cases that were struck by national disasters.

4.3 ACTION 2

DETERMINE FEASIBLE SPARE NETWORK AND ORGANIZATIONAL CAPACITY USE

Determine the feasibility of using spare network and organizational capacity during times of disaster that could be made available to different regions and analyse the technical and organizational steps required to use such spare capacity in disaster relief and mitigation contexts.

Participation in partnerships for development and/or disaster management in principle provide the opportunity for the satellite industry to take the leadership in promoting social contributions, ethical business practices and driving corporate social responsibility to enhance consumer confidence. The implementation in practice may prove difficult though as discussed further below.

Commercial enterprises, whether privately held or public, are responsible for creating value for their owners. Public companies have boards of directors with a fiduciary responsibility to ensure that the company creates value for its shareholders. While privately-held companies may have more flexibility in decision-making, depending upon their ownership structure, there is still a focus on bottom-line financial performance and value creation via growth and improved profitability.

In order to participate in public-private partnerships in support of humanitarian objectives and sustainable development, corporate managers must be able to present a compelling business case that focuses on the benefits to be achieved, and how these benefits support the company's vision and mission, in addition to driving improvements in the financial metrics.

Commercial enterprises can partner with governments or non-profits via either cash or in-kind contributions, or a combination of both. In-kind contributions have the greatest potential for mutual benefit, but are

limited to domains in which the products and services of the commercial enterprise are well-suited to the needs of the partner humanitarian entity. For example, companies specializing in logistics services are well-suited to provide in-kind contributions to emergency relief organizations. In the case of satellite operators, their knowledge, technical expertise, and network assets (primarily satellite capacity) are a strong match for information and communication technology for development (ICT4D) and information and communication technology for disaster management (ICT4DM) partnerships.

4.3.1 NETWORK CAPACITY CONSIDERATIONS

However, the realities of the satellite industry are that inventories of satellite capacity are finite and limited with long lead times for introducing more supply, and that filling that capacity to the greatest extent possible with paying commercial customers is the key focus in generating top-line revenues. The concept of allocating "spare" capacity to humanitarian initiatives is therefore somewhat elusive. In order to succeed, satellite operators need to minimize the amount of capacity sitting idle in their fleet at any given time. That said, there is generally always capacity, whether unused or pre-emptible, that can quickly be made available in response to disaster relief initiatives. The capacity thus allocated is generally diverted for a limited period of time, until local networks are restored. While this model may work for ICT4DM partnerships, it is not as feasible for ICT4D partnerships, where the need for the capacity is longer term. The use of pre-emptible capacity is not seen as a solution for ICT4D because it would be contradicting the purpose to pre-empt assigned capacity for commercial reasons during a disaster event.

Similarly, the technical resources at satellite operators tend to be "right-sized" to support the volume of commercial business at hand while at the same time minimizing costs in order to maximize profitability. In other words, there are no engineers idly waiting to be neither mobilized during a disaster, nor available to spend a lot of time focusing on the implementation of rural networks where the return on investment is minimal.

Finally, while satellite operators offer solutions to their customers that include ground-based network infrastructure, such as remote terminals and connectivity via teleports and hubs, keeping such infrastructure in "stand-by" mode for rapid deployment in an ICT4DM scenario is not cost-effective. Although the satellite operator may own a teleport facility, they are not in the business of manufacturing ground-based network components and must purchase this equipment from third parties, which limits the feasibility of their being able to contribute this type of equipment to humanitarian partnerships.

This last point is also important because it implies that provisioning of any ICT4D and/or ICT4DM services (under the umbrella of the ITU) needs to encompass an end-to-end solution including platform services as well as enabling services. Therefore the identification of a solution for satellite transponder capacity alone is just one piece of the puzzle. This aspect will be discussed in more detail in Action 5 at 4.5.

4.3.2 ORGANIZATIONAL CAPACITY CONSIDERATIONS

So what then, could be the motivators for satellite operators in partnering with humanitarian organizations to support ICT4D and ICT4DM objectives?

According to a report by The Conference Board[36], there are five main elements of a business case for humanitarian partnerships as shown below. Some of these are more bottom-line focused, while others reflect more intangible benefits:

4.3.2.1 Enhancing a company's external reputation

In terms of enhancing a company's external reputation, there is a significant amount of "free" publicity that derives from being a visible partner in a high-profile disaster relief operation. There has also been a strong trend in recent years for companies to take a serious approach to the concept of Corporate Social Responsibility (CSR). CSR has become a recognized component of a company's value, and partnering to provide telecommunication services for development and disaster management in the developing world shows a solid commitment to CSR. This type of focus can contribute directly to shareholder perception of value through standardized scoring via mechanisms such as the Dow Jones Sustainability Index (DJSI).

4.3.2.2 Uniting employees around a common cause

The CSR factor also comes into play in uniting employees around a common cause. Many companies are able to attract and retain top talent by promoting vision and mission statements that attempt to align and motivate their employees around meaningful contributions to making the world a better place. Leveraging commercial products, such as satellite network solutions, in support of concrete initiatives to improve people's lives can be a strong motivator and strengthen the message of the common cause.

In addition, employees may have the opportunity to expand their skill sets by learning from their participation in humanitarian initiatives. Some companies have attributed improved scores on employee satisfaction surveys at least in part due to their participation in humanitarian partnerships. In addition, the companies themselves can benefit by learning from the strengths of the humanitarian partner organizations in areas such as being agile and adaptable in difficult circumstances.

4.3.2.3 Increasing sales and customer loyalty

Although there are many factors that go into a customer's buying decisions, a commitment to CSR can, for some customers, be a discriminator in selecting with whom they want to do business. Thus, humanitarian partnerships can directly contribute to increasing sales and customer loyalty. This can be particularly true for companies, such as satellite providers, who serve commercial customers located or doing business in the developing regions of the world where humanitarian initiatives are being deployed.

4.3.2.4 Identifying possible business opportunities in areas that would otherwise be hard to access

In some instances, providing support for disaster management or development initiatives can allow companies to identify possible business opportunities in areas that would otherwise be hard to access.

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36 Corporate Responses to Humanitarian Disasters: The Mutual Benefits of Private-Humanitarian Cooperation, Research Report R-1415-08-WG, The Conference Board, 2008.

Establishing a brand presence via participation in relief or development efforts can be a way to get a foot in the door in markets that are underserved or dominated by competitors.

4.3.2.5 Encouraging growth and investment

Finally, humanitarian partnerships in the areas of ICT4D have the potential to encourage growth and investment in areas benefiting from the initiatives. Successful deployment of ICTs in a sustainable model can stimulate economic growth that is mutually beneficial to infrastructure providers, such as satellite operators, as well as their customers in the region.

As economic growth takes hold, the communities being served can attract outside investment to seed continued growth, again allowing the market for satellite operators and their customers in the region to grow. In addition, by "getting in on the ground floor" in providing network infrastructure in rural markets, operators can create both technological and reputational "stickiness" that will ensure that as markets grow, they become the provider of choice for expanded services. With respect to ICT4DM, if married to ICT4D initiatives that can enhance disaster preparedness and thereby accelerate the recovery process, humanitarian partnerships can have the further benefit of creating resilience in these markets.

4.3.3 IMPLEMENTATION ISSUES

These five business case motivators for commercial partners, although very real in their potential, are also very difficult to quantify when a company is making near-term decisions on deployment of resources and is trying to ensure that targets for revenues and profitability are attained. Returning to some of the challenges outlined earlier, striking this balance between the need to achieve near-term results and making the investment in a humanitarian partnership, where benefits are longer term and less tangible, can be enabled by leveraging partnership characteristics and funding elements that help "bridge the gap".

For example, a satellite operator may not be able to provide "free" capacity for a multi-year development initiative, but may be willing to offer it for a discount or on a progressive charge basis that may start out as a no-charge contribution, but for which the fee increases according to a fixed schedule or as project milestones are achieved. Similarly, in disaster relief efforts, in order to avoid the scramble to identify capacity "after the fact" and the logistics of allocating it to the situation, if the initiative is structured so that the operator is compensated for keeping a dedicated pool of capacity available, even if the compensation is not at market value, that will allow the operator to provide support without having to sacrifice near-term objectives. This is the model in place for *emergency.lu*, where dedicated capacity is allocated and paid for by the funding partner—in this case the Luxembourg government.

In conclusion, the five business case motivators for commercial partners all remain realistic but we should recognize that they are not primary drivers for the engagement of private companies. Therefore, likewise we should consider if these motivators can realistically be the prime fundament for the ITU becoming a player for the provision of ICT4D or ICT4DM services. This question is particularly valid if aiming at a sustainable model.

In addition, as noted earlier, it may not be feasible for the satellite provider to contribute third party ground equipment to an ICT4D or ICT4DM initiative. Thus, a partnership model would need to include as a partner an equipment manufacturer with the ability to contribute remote terminals, uplink/downlink chains, hubs, and so on. And depending on the resources of the satellite provider, the partnership may also need to include a teleport operator in order to provide connectivity to terrestrial networks. Here again, the model for *emergency.lu* addresses this need by including a telecommunications equipment manufacturer as a contributing member of the partnership.

As a result, any viable ICT4D or ICT4DM initiative needs to procure an end-to-end solution including platform services as well as enabling services and to discuss these from both, the technical and financing perspectives.

4.3.4 PUBLIC-PRIVATE PARTNERSHIP SCENARIOS

Various scenarios of a public-private partnership (PPP) between the ITU and commercial companies are conceivable to reach the ITU objective, by defining 'who does what' along the following value chain elements:

- Platform owner.
- Ground platform services (equipment and operations).
- Satellite transponder services.
- Enabling services (transport and others).
- End-users (development and aid organizations).

4.3.4.1 Scenario 1a Owner and financer

Here, the ITU becomes the owner and the financer of the platform, similar to *emergency.lu*, and commissions one (or several) private companies for procuring and operating the ground platform, the satellite capacity and any other enabling services such as transport. In consultation with the end-users (such as aid and development organizations) the ITU identifies the projects and commissions the implementation of the projects with the private companies. There would be a fixed cost component for the equipment, the operational resources and the satellite capacity being on stand-by plus a variable cost component to be incurred in line with the efforts required by the project implementation. In this scenario the ITU would be prominently positioned and recognized as a driving player and implementer in the ICT4D or ICT4DM domain and consequently would also carry the prime financial efforts.

4.3.4.2 Scenario 1b: Owner

As in scenario 1a, the ITU becomes the platform owner, with the difference that the service providers donate services in-kind (satellite operators provide capacity into a pool, equipment and ground platform operators donate equipment and resources and so do enabling services providers). ITU acts as an integrator and operator of the platform, which will require some dedicated resources. In this scenario the ITU would also be prominently positioned and recognized as a driving player in the ICT4D or ICT4DM domain but fully depend on the willingness of in kind contributions made available by industry partners. This scenario may

be preferred from an ITU perspective but may be difficult to implement due to the points highlighted above. Alternatively, the ITU could delegate the responsibility of the ownership to an external governmental body.

4.3.4.3 Scenario 2: Joint venture

The ITU enters a joint venture (JV) with one or several commercial companies jointly acting as both the platform owner and the service provider. The JV can be formed based on cash contributions of the ITU and cash and/or in-kind contributions of the commercial companies. This scenario would allow the ITU to take an active role in the ICT4D or ICT4DM domain similar to scenario 1 but share the investments with commercially interested partners.

Based on the above considerations, the Task Force believes that it will be very difficult for the ITU to become a platform operator of a viable and sustainable ICT4D or ICT4DM service without a substantial financial investment and ongoing expenses. Therefore, the ITU may want to consider an alternative PPP approach by which it would become an important enabler and facilitator for the ICT4D or ICT4DM services but leave the ownership of platform assets and the implementation of projects to the commercial market:

4.3.4.4 Scenario 3: Facilitator

The ITU becomes a facilitator of ICT4D or ICT4DM services between development and aid organizations on one side and commercial companies on the other side. In consultation with end-users, a designated ITU office identifies the projects and commissions the implementation of the projects with the private companies. Under this PPP umbrella, the commercial companies carry the investments and ongoing expenses for the provision of the platform, space, and other services as in any other business. The commercial companies are being identified through an RFP process and projects procured and implemented through the ITU have to be labelled e.g. “an ITU project” or similar. In this scenario the ITU would have a strategic and publically perceived role in the ICT4D or ICT4DM domain as well but little or no direct financing requirements. At the same time, the “normal” commercial mechanisms and incentive structures of private business would remain in place and allow for an effective project implementation.

For more longer term sustainable projects such as the recent *Connect a School*, the ITU would take the initiative to engage charitable organizations and institutions (such as the European Development Fund, EIB, Regional Development Bank, World Bank, individual countries) having as a main purpose poverty eradication and the promotion of social-economic development in the less developed countries. The ITU, as facilitator, would also provide those potential donors with a guarantee that their donations will serve the purpose as proposed.

The working group suggests that the SSDM Advisory Board considers and further explores the implementation of scenario 3 above.

In this context the SSDM Advisory Board also needs to consider the type and level of services it wants to provide to ensure sustainable services for the satellite sector. This aspect is being further discussed and outlines the possible scope of an initial ITU platform.

4.4 ACTION 3

EXPLORE ADDITIONAL FUNDING MODELS FOR SSDM INITIATIVES & CONTINUE TO RESEARCH FINANCING MECHANISMS

Action #3- Explore additional funding models for the SSDM Initiative. Due to the difficulty of administering universal service funds (USFs), it is not recommended that they be used as a primary funding source. Charitable organizations, as well as loans and subsidies such as those afforded by multilateral financing organizations may provide alternative funding sources.

Continue to research financing mechanisms, exploring loans and subsidies, as well as more out-of-the-box and innovative approaches.

4.4.1 THE NEED FOR STABLE FUNDING

Natural and man-made disasters are highly unpredictable. They do not have a regular behaviour, but may strike at anytime, anywhere. For the SSDM to work effectively, it must remain active and operational at all times. The system must be on stand-by in case a disaster happens. In this sense, the ICT4Ds and ICT4DMs will need permanent operational funding, in order to avoid improvising and last minute ad hoc solutions to respond to disasters. This permanent operational funding will imply the building of a kind of project finance system that needs to be available for a long-term and at a regular basis.

ITU currently has two sources of financing SSDM: through its own internal capital; and through loans and subsidies. As the SSDM is undoubtedly a major project, ITU's internal capital may not be the best solution, given the high number of other projects being sponsored and held by ITU.

Loans and subsidies are popular sources for financing projects, especially ones similar to the SSDM Initiative. Many multilateral financing organizations might agree to support the Initiative financially. It is important to note that many of these multilateral financing organizations aim to invest in the private sector, when the sector has a well-established project to foster sustainable development. Therefore, many of the funds would be directed to the private sector partners.

4.4.1.1 World Bank Group

Through its **Disaster Risk Management** (DRM) team, the World Bank helps its client countries to assess exposure to hazards and address disaster risks. It provides technical and financial support for risk assessments, risk reduction, preparedness, financial protection, and resilient recovery and reconstruction. The Bank's DRM portfolio has grown about 20 per cent annually for the last five years to USD5.3 billion in FY14. In providing support for DRM, the World Bank promotes a comprehensive, multisector approach to managing disaster risk.

The **Global Facility for Disaster Reduction and Recovery** (GFDRR), a global partnership of 41 countries and seven international organizations, is the World Bank's institutional mechanism for DRM. The GFDRR helps high-risk, low-capacity developing countries better understand and reduce their vulnerabilities to natural hazards and adapt to climate change. The GFDRR provides grant financing and technical assistance to help mainstream disaster and climate risk management policies into country-level strategies. It also serves as a global platform for knowledge-sharing and capacity building for disaster and climate resilience. Through funding and expertise, GFDRR supports countries to develop and implement tailored financial protection strategies that increase the ability of national and sub-national governments, homeowners, businesses, agricultural producers, and low income populations to respond quickly to disasters.

In 2012-2014, the World Bank invested USD1.4 billion in improving disaster preparedness. This included investing in hydro-meteorological and early warning systems. In Nepal, for example GFDRR awarded USD 600 000 to civil society organizations to build flood resilience using a community-based approach in the Kosi Basin.

4.4.1.2 International Finance Corporation (IFC)

The IFC is a member of the World Bank group. It is the largest global development institution focused exclusively on the private sector in developing countries. With a consistent Triple-A credit rating, the IFC raises virtually all funds for lending activities through the issuance of debt obligations in international capital markets. The IFC can provide funds in a number of ways. Among its funding products and services there are funds, equity, and syndications.

Loans. Through loans from their own account, the IFC finances projects and companies for typically 7 to 12 years. The loans are also made to intermediary banks, leasing companies, and other financial institutions for on-lending.

Equity. Equity investments provide developmental support and long-term growth capital. The IFC invest directly in companies' equity and also through private-equity funds. IFC generally invests between 5 and 20 percent of a company's equity. The IFC also invest through profit-participating loans, convertible loans, and preferred shares.

Syndicated Parallel Loans. Through a syndicated loan system, a group of lenders collectively lends money to a borrower. In 2009, the IFC began syndicating parallel loans to International Financial Institutions (IFIs). The IFC acts as the loan administrator, using its existing syndication platform, deal-structuring expertise, and global presence to identify investments, perform due diligence, and negotiate loan documents in cooperation with parallel lenders.

To be eligible for IFC funding, a project must meet a number of criteria:

- Be located in a developing country that is a member of IFC.
- Be in the private sector.
- Be technically sound.
- Have good prospects of being profitable.

- Benefit the local economy.
- Be environmentally and socially sound, satisfying lender environmental and social standards as well as those of the host country.

4.4.1.3 Inter-American Development Bank (IDB)

Similarly to the IFC, the IDB, through its Structured and Corporate Finance Department (SCF), provides tailor-made medium and long-term direct loans, guarantees and technical cooperation for large companies and state-owned enterprises, financial institutions, and investment funds.

The SCF also has a Syndicated Parallel Loan program to IFIs, where the IDB acts as the loan administrator and uses its syndication expertise to identify investments, structure deals, and negotiate loan documents with the borrower in coordination with all parallel lenders.

4.4.1.4 Inter-American Investment Corporation (IIC)

A member of the IDB Group, the IIC is a multilateral organization founded in 1985 to promote the development of the private sector in its member countries in Latin America and the Caribbean, with special emphasis on small and medium-sized enterprises (SMEs).

The IIC channels its funding to its customers through senior loans, subordinated debt instruments, and equity and quasi-equity investments. Loans can also be syndicated with other international banks (A/B loans). In addition, the IIC provides supply chain financing, which could be ideal for the early deployment stages of the initiative.

4.4.1.5 Bill and Melinda Gates Foundation

The Bill & Melinda Gates Foundation is the largest private foundation in the world. Launched in the year 2000, the primary aims of the foundation are, globally, to enhance healthcare and reduce extreme poverty.

The Foundation has an Emergency Response program that aims to reduce suffering, disease, and death in countries affected by natural disasters and complex emergencies. In addition to responding directly to emergencies, the Gates Foundation works to help improve the speed and performance of first responders in the first critical hours of an emergency.

The Foundation has responded, *inter alia*, to the Ebola virus outbreak in West Africa, cholera outbreaks in Cameroon, floods and landslides in Kashmir and Nepal, and Typhoon Haiyan in the Philippines.

The Foundation's Emergency Response focuses on a number of aspects of disaster response. Within its Emergency Relief program, the Foundation helps respond to three types of emergencies: a) Rapid-onset emergencies; b) Complex emergencies; and c) Slow-onset emergencies.

Within the Learning and Innovation program, the Foundation collaborates with other foundation programs to develop and study new approaches to disaster assistance, including innovative tools and technologies. The SSDM Initiative could prospectively benefit from the Gates Foundation as partner.

4.4.1.6 Disaster Relief Emergency Fund (DREF)

The DREF was established by the International Federation of Red Cross and Red Crescent Societies (IFRC) in 1985 to provide immediate financial support to Red Cross and Red Crescent National Societies, enabling them to carry out their unique role as first responders after a disaster.

Its main purposes are:

- Start-up funding for the IFRC and National Societies to respond to large scale disasters—the "loan facility"; and
- Funding for National Society responses to small- and medium-scale disasters and health emergencies for which no international appeal will be launched or when support from other actors is not foreseen—the "grant facility".

The SSDM could benefit from a partnership with the DREF, since both the loan and the grant facilities are also used to help National Societies prepare for imminent crises, by funding early action procedures to reduce the risks populations face from an evolving event which has been identified as an immediate threat, and prepare to respond when disaster strikes. This applies to impending extreme-weather events such as cyclones, evolving floods, increased volcanic activity, political violence and food insecurity.

4.4.1.7 Central Emergency Response Fund (UN OCHA CERF)

The CERF is a humanitarian fund established by the United Nations General Assembly. Its objectives are: 1) promote early action and response to reduce loss of life; 2) enhance response to time-critical requirements; and 3) strengthen core elements of humanitarian response in underfunded crises. CERF's purpose is to enable more timely and reliable humanitarian assistance to those affected by natural disasters and armed conflicts.

The CERF pools contributions from donors—mainly governments, but also foundations, companies, charities and individuals—into a single fund, which is set aside for immediate use at the onset of emergencies.

The immediate availability of funds, the CERF could contribute with the SSDM by providing immediate financial support for each time the Initiative is put to work in response to a disaster. Moreover, CERF allocations are designed to complement other humanitarian funding sources, such as country-based pooled funds and bilateral and multilateral funding.

4.4.2 OTHER FINANCIAL STRATEGIES

4.4.2.1 Syndicated revolving loans and credit facilities

Many multilateral financial institutions and other organizations (e.g. charitable organizations) are available and on board with sustainable development and disaster relief programs. However, the SSDM imports an innovative program - a year-round alert system - that needs to be immediately effective and operative every

time it is needed. In this sense, permanent financial availability is needed. Syndicated revolving loans[37] and credit facilities,[38] where the funders would be more than just one of the institutions above mentioned, can be a good way to provide the financial health the SSDM needs to be effective.

4.4.2.2 IP address licensing

Access to IP is critical for the development (and thereafter enhancement) of disaster relief infrastructure and equipment. It is therefore critical that the IP is available for free or at a non-prohibitive cost to the SSDM, as well as to other actors pursuing ventures of a similar nature. The IP does not necessarily need to be open source, but what must be avoided is expensive and unaffordable access to IP for humanitarian purposes.

Accordingly, one model could be for those who own the IP to license the rights thereto for humanitarian purposes to an organization or agency (e.g. the agency managing SSDM). Through this licensing model, the IP would be accessible to all, but only for humanitarian purposes. Commercial rights will not be transferred to the agency and therefore, the agency would not be able to grant licenses for commercial purposes; the commercial rights will remain with the actual owner of the IP, who shall remain free to continue to grant licenses as it wishes to any other interested party. In short, the transfer of the right to use the IP to the agency and the free access thereto is limited to humanitarian applications, in this case, disaster management and relief.

4.5 ACTION 4

ESTABLISH STABLE AND LONG TERM PLATFORMS

Establish a more stable and long-term operational platform for delivering disaster telecommunications relief services through primary or backup telecommunication systems, including those which can be movable or portable.

4.5.1 DISASTER MANAGEMENT AND SUSTAINABLE DEVELOPMENT PLATFORM PROPOSAL

In reviewing the partnership models and financing mechanisms surveyed by the Task Force, we have identified a business model of ICT4DM as a successful and workable model that can be adapted and scaled in order to create a broader platform for disaster management. A more detailed description of that model can be found in Table 2. The model is inspired by the existing *emergency.lu* model but is not limited to the technology or capacity deployed today by the overall solution. In order to have global reach and availability, this platform would need to be facilitated by ITU, but should be owned and operated by a multilateral and international anchor stakeholder having the telecommunications knowledge, the capabilities, expertise, and influence to implement the technological, policy, and operational aspects of deploying ICTs for disaster

37 A Syndicated Revolving Loan is a loan collectively granted by a group of lenders, where the borrower borrows up to a limit, repay, and then re-borrow the loan.

38 A Credit Facility is a payment system in which the borrower has a line of credit available for the purposes of financing the project.

management. In addition, in a manner similar to the way in which for example the *emergency.lu* resources have been leveraged by the SATMED development initiative, such a platform could form the basis for ICT4D partnerships that would be based on the principles and framework established by the SSDM Initiative.

Since 2002, the ITU has provided satellite-based assistance to countries in the aftermath of disasters. The first deployment was in January 2005 in response to the 2004 December South-East Asian earthquake and tsunami. Since that time, the ITU has focused on enhancing its ability to provide telecommunications/ICT services and applications for disaster mitigation at all phases of disaster management, i.e., disaster prevention, disaster preparedness, disaster response/relief, and telecommunications network rehabilitation/reconstruction and to provide telecommunications/ICT to Member States and other entities involved or affected by disasters.

The financing, based mainly on in-kind contributions (equipment, space segment/air-time) and funding from other institutions, requires the ITU to base the support services more on an ad hoc contribution model rather than on a recurrent and stable platform, on which all ITU Member States could rely. Moreover, we understand from the ITU itself that it is a cumbersome and expensive process, since buying capacity on an ad hoc basis has proven to be much more expensive than anticipating the costs on a longer-term basis.

Based on the ITU's experiences in addressing these needs in an ad hoc fashion, the Task Force, based on the work and recommendations of the previous WG-FPBM, recommends that a more stable and long-term operational platform be established for delivering disaster telecommunications relief services at all times and to all places based on the business model inspired from the *emergency.lu* case. The proposed platform would be dedicated to restoring communications on behalf of and for Governments. As such, it would complement, rather than compete with, the services provided by the UN ETC and other humanitarian international organizations, where the focus is specifically on supporting NGOs and humanitarian aid organizations.

4.5.2 STRUCTURE OF PROPOSED SYSTEM

It is proposed that the global platform be positioned under a particular and different name to underline the stand-alone character of the service. "Global Platform for Recovery and Development (GPRD)" is the proposed working title.

This platform could be implemented in a modular, step-by-step approach allowing the solution to grow over time, for example:

- **An elementary model** to address a disaster recovery and relief satellite communications solution to be deployed at the request of a participating government to the Global Platform/anchor stakeholder for periods of up to 6 months.
- **A progressive model** to address a sustainable satellite communications solution globally for development purposes for periods of 6 to 36 months.

- **A sustainable development model** to address both the disaster recovery and relief and the connectivity needs of the population on a more stable basis to help development in education, agriculture and health issues, for example.

The owner of the platform and the provider of the services would be an international organization with expertise in emergency response and deployment of ICTs on a global scale. The platform would be made available to participating governments through a procedure to be established. Models for financing the platform would need to be explored and developed in order that the governments who utilize the platform would have a stake in its ownership.

Since we assume that the Global Platform will be managed by an existing multilateral entity, one avenue to be explored is a modest fee for the participating members in order to provide a recurrent financial base for setting up the platform, and this could be complemented by an ITU initiative to engage charitable organizations (for example, entities such as the Gates Foundation) and institutions with a poverty eradiation and social-economic promotion agenda for less developed countries (for example, the European Development Fund, EIB, Regional Development Bank, World Bank, and individual governments, and so on). ITU as facilitator would also provide those potential donors a guarantee that their donations will serve the designated purpose.

The WG-FPBM proposal assumed the setup of the platform and the service under the progressive model and the sustainable model and building on existing infrastructures such as *emergency.lu*. Such an approach would enable maximum reuse of, and synergies with, the existing sustainable disaster relief infrastructure by sharing both ground equipment and satellite capacity and the incremental cost for additional applications.

4.5.3 OWNERSHIP AND SUB-CONTRACTING

The owner of the platform, in a role analogous to that of the Luxembourg Government in *emergency.lu*, would have to set up its own team for management of the deployment priorities and establish the technical and logistical operations through sub-contractors.

Regarding the sub-contracting of service providers for the operation of the platform, it is proposed that the platform owner would launch an open call for tender process to select a basic set of services which could be complemented by additional RFP, and solutions depending on the nature and scope of the disaster. The bidding entities would be invited to provide an offer for an end-to-end solution, including satellite capacity and fully managed services. The possibility to reuse existing infrastructures for humanitarian purposes should be positioned as an advantage.

The retained service provider would procure and offer all relevant elements of the service including equipment and orientation of the service toward the example of *emergency.lu*. In addition, the retained service provider would provide training to the platform owner's operational team and other support personnel as required.

In addition, we foresee that, as for *emergency.lu*, the platform owner will have to enter into complementary agreements for providing quick transportation of satellite telecommunications equipment, utilizing

established logistics channels from an existing organization engaged in transport of humanitarian goods and equipment, such as the ICRC.

Table 2 indicates provisional, high level network specifications, including the assumption that a minimum of upfront satellite capacity and some initial equipment would be procured from a turnkey solution provider. The satellite capacity could be shared with existing humanitarian relief infrastructures such as *emergency.lu* when needed and to optimize the so-called fast start services. The table includes an estimation of the needs for capacity and equipment at each step of the business model with the long-term objective in mind to deliver also on the need for sustainable development services in these countries.

Table 2 Global Platform for Recovery and Development Progressive Model

	GPRD Fast Start Start-up Model (*Emergency.lu*) (5 deployable units) 2014-2015	GPRD Progressive Model (10 deployable units)* 2015-2016	GPRD Sustainable Development Model (50 deployable units) 2017
HUB Platforms	3	3 (partially reusable from emergency.lu)	3 (partially reusable from *Emergency.lu*)
Deployable Antennas	Rapid Deployable Unit (inflatable antennas) (1)	Regular Deployable Units (standard antenna) (10)	Regular Deployable Units (standard antenna) (50)
Transponder Capacity in Mbps	4 Mbps	20 Mbps (can be pooled with emergency.lu)	50 Mbps (can be pooled with other models)
Service Management	End-to-end service management	End-to-end service management (can be shared with emergency.lu)	End-to-end service management (can be shared with *Emergency.lu*)
Transportation	Rapid transportation	Fast transportation	Normal transportation
Additional services	VoIP	VoIP	VoIP, e-health, e-education

ANNEX 1

TASK FORCE PARTICIPANTS

SSDM Initiative	Affiliation
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ANNEX 2

TELECOMMUNICATION EMERGENCY RESPONSE SURVEY

CATEGORY	QUESTION ITEM	COMMENTS/POSSIBLE RESPONSES
Company Details		
* required	**Company Name ***	
	Company Address *	Main office
	Company Address Country*	
	Contact details - telephone *	Include country code
	Contact details email*	
	Company registration number	
	Date of incorporation	
Telecommunication service and equipment portfolio		Description of all telecom services and equipment currently provided
Service		
	Other Company Offices -Country *	Where services and equipment can be provided
	Service type *	(Voice, Data including VoIP and Multimedia, Broadcast [one way transmission], Other)
	Service infrastructure * What infrastructure do the services you provide?	(Terrestrial mobile – cellular, VHF, UHF, Terrestrial fixed, Satellite mobile, Satellite fixed, Other)
	List telecommunication companies that supply the above services *	Services that would be used in an emergency situation only
Equipment		

CATEGORY	QUESTION ITEM	COMMENTS/POSSIBLE RESPONSES
	Briefly describe the telecommunication equipment you can deploy in 1 hour	Assuming an emergency situation within your national jurisdiction
	Briefly describe the telecommunication equipment you can deploy in 5 hours	Assuming an emergency situation within your national jurisdiction
	Briefly describe the telecommunication equipment you can deploy in 10 hours	Assuming an emergency situation within your national jurisdiction
	Describe any limiting factors in deploying telecom services and/ or equipment in an emergency situation	E.g. stock limitations, staffing/ manpower, logistics etc.
Practical assistance and partners		Tariff packages and working with downstream responders
	Do you have prior experience in responding/assisting to an emergency situation in your national jurisdiction?	
	If yes**, please briefly describe prior emergency situations your company actively responded to**	

CATEGORY	QUESTION ITEM	COMMENTS/POSSIBLE RESPONSES
	If yes**, please select what type of partner you have previously worked with in response to an emergency**	(Government, Government-affiliated company, Non-governmental Organization – Local, Non-governmental Organization – International, Other)
	Please specify the names of organizations that your Company has a preexisting arrangement with	Specifically in response to an emergency
	Do you already have special commercial plans/packages available in the event of an emergency situation i.e. humanitarian plans.*	
	If no**, please explain why packages are not available.**	E.g. newly incorporated, size limitations etc.
	***If yes*, please briefly outline packages that would be applicable to an emergency response.**	
Service provider feedback		
	Please enter any additional information about your Company's ability to respond to an emergency situation below	

ANNEX 3

AGENDA FOR WORKSHOP ON TELECOMMUNICATIONS FOR DISASTER RESILIENCE

TIME	TOPIC
09.00-09.30	**Welcome & introduction**
09.30-11.00	**Session 1 – Preparedness & mitigation (Part I)** • National disaster management plan – framework, implementation and funding • Spectrum management • Public Information campaign and technology training • Data collection for predictive modelling Case study: Indonesia – Public Information campaign Case study: Uganda – flood warning system
11.00-11.15	REFRESHMENTS
11.15-12.45	**Session 2 – Preparedness & mitigation (Part II)** • ITU - ITU Framework for Cooperation in Emergencies (IFCE) • National disaster plan – international resource organisation • Foreign aid, NGOs and media Case study: ITU-D Pacific Islands project – investment in dual-use equipment Case study: Haiti – lessons learned
12.45-14.45	LUNCH
14.45-16.15	**Session 3 – Reacting to the emergency** • Human resilience and training • Asset utilisation Case study: Japan - The Great East Japan Earthquake recovery Case study: TSF - Nepal

ANNEX 4

INDUSTRY RESOURCES: SERVICE PROVIDER INVOLVEMENT IN DISASTERS AND SATELLITE SERVICES LISTING

TABLE 3 SERVICE PROVIDER INVOLVEMENT IN DISASTERS

No.	PROVIDER	TYPE OF RELIEF	EVENT	YEAR
1	**Vodafone Foundation**	11kg mobile network set up in 10 minutes	Nepal earthquake	2015
2	**FedEx Corp**	Relief transportation	Nepal earthquake	2015
3	**Emergency Telecommunications Cluster (ETC)**	Shared internet connectivity and telecommunications services.	Nepal earthquake	2015
4	**Swedish Search and Rescue team, SWIFT**	Satellite communication	Nepal earthquake	2015
5	**Thaicom**	Satellite communication	Nepal earthquake	2015
6	**Intelsat**	Satellite capacity – Teleport	Nepal earthquake	2015
7	**Swedish Search and Rescue team, SWIFT**	information and communications equipment	Cyclone Pam - Vanuatu	2015
8	**Sony Mobile**	1,400 units of XperiaTM E1 smartphones at cost price	Ebola relief	2014
9	**Smart Communications, Inc. (Smart) Norway**	Communications equipment to restore telephone communications	Typhoon Haiyan Philippine	2013
10	**SES**	Satellite communication	Typhoon Haiyan Philippine	2013

No.	PROVIDER	TYPE OF RELIEF	EVENT	YEAR
11	**Vodafone Foundation**	11kg mobile network set up in 10 minutes	Typhoon Haiyan Philippine	2013
12	**Emergency Telecommunications Cluster (ETC)**	Security and data telecommunications services	Syrian Civil War	2013
13	**Intelsat**	satellite capacity	Typhoon Haiyan Philippine	2013
14	**Ericsson Response™**	Temporary base stations	Haiti earthquake	2010
15	**Ericsson Response™**	Mobile networks	Northern Uganda	2007
16	**Ericsson Response™**	Communications networks	Jiangxi province earthquake in China	2005
17	**Ericsson Response™**	300 mobile phones for doctors	SARS outbreak in China	2003
18	**Smart Philippines**	Satellite communications	Typhoon Haiyan Philippine	2013
19	**IEC Telecom**	Satellite communications	Typhoon Haiyan Philippines	2013
20	**Cygnus telecom**	Satellite communications	Nepal Earthquake	2015
21	**Thuraya Telecommunications Company**	Donated handsets and airtime	Ebola, Malawi floods, Vanuatu, Philippines, Haiyan, Nepal Earthquake	2013, 2014, 2015
22	**Nethope**	Satellite communications	Nepal Earthquake	2015

Table 4 Satellite services listing

KEY	POSITION	SATELLITE NAME	OPERATOR	MSS	FSS	CONUS	NORTH AMERICA	AK/HI/CARIB	CENTRAL AMERICA	SOUTH AMERICA	EUROPE	AFRICA	MIDDLE EAST	ASIA	INDIA/ INDIAN OCEAN	ATLANTIC OCEAN	AUSTRALIA	PACIFIC OCEAN	RUSSIA
1	LEO	Iridium	Iridium Communications	X		X	X	X	X	X	X	X	X	X	X	X	X	X	x
2	3 E	Rascom 1R (RASCOM-QAF 1R)	RascomStar-QAF		X						X	X	X						
3	3 E	Eutelsat 3B (E3B)	Eutelsat Communications S.A.		X					X	X	X	X	X					
4	5 E	Astra 4A (Sirius 4)	SES S.A.		X						X	X							
5	5 E	Astra 2D	SES S.A.		X														
6	5 E	SES 5 (Sirius 5, Astra 4B)	SES S.A.	X	X						X								
7	7 E	Eutelsat 7A	Eutelsat Communications S.A.		X						X	X	X						
8	7 E	Eutelsat 7B	Eutelsat Communications S.A.		X						X	X	X	X					
9	9 E	Eutelsat 9A	Eutelsat Communications S.A.		X						X								
10	9 E	Eutelsat KA-SAT 9A	Eutelsat Communications S.A.		X						X		X						
11	10 E	Eutelsat 10A	Eutelsat Communications S.A.		X						X	X	X		X				
12	13 E	Eutelsat Hot Bird 13B	Eutelsat Communications S.A.		X						X	X	X						
13	13 E	Eutelsat Hot Bird 13C	Eutelsat Communications S.A.		X						X	X	X						
14	13 E	Eutelsat Hot bird 13D	Eutelsat Communications S.A.		X						X	X	X						
15	16 E	Eutelsat 16B	Eutelsat Communications S.A.		X						X	X							
16	16 E	Eutelsat 16C	Eutelsat Communications S.A.		X														
17	16 E	Eutelsat 16A	Eutelsat Communications S.A.								X	X	X		X				
18	17 E	Amos 5	Spacecom Satellite Communications								X	X	X						
19	19 E	Astra 1L	SES S.A.		X						X								
20	19 E	Astra 1KR	SES S.A.		X						X								
21	19 E	Astra 1M	SES S.A.		X						X	X	X						

KEY	POSITION	SATELLITE NAME	OPERATOR	MSS	FSS	CONUS	NORTH AMERICA	AK/HI/CARIB	CENTRAL AMERICA	SOUTH AMERICA	EUROPE	AFRICA	MIDDLE EAST	ASIA	INDIA/ INDIAN OCEAN	ATLANTIC OCEAN	AUSTRALIA	PACIFIC OCEAN	RUSSIA
22	19 E	Astra 1N	SES S.A.		X						X								
23	20 E	Arabsat 5C	Arabsat		X							X	X						
24	21 E	AfriStar 1 (Afristar)	Worldspace Satellite Radio	X						X		X	X	X					
25	21 E	Eutelsat 21B (E21B, W6A, Eutelsat W6A)	Eutelsat Communications S.A.		X						X	X	X	X					
26	21 E	Artemis	Avanti Communications Ltd	X	X						X	X	X						
27	23 E	Astra 1E	SES S.A.		X														
28	23 E	Astra 3B	SES S.A.		X						X		X						
29	25 E	Inmarsat-3F5 (Inmarsat 3F5, I3F5, IND-W)	Inmarsat plc	X															
30	25 E	Inmarsat-4F2 (Inmarsat 4-F2, I4F2, IND-W)	Inmarsat plc	X															
31	25 E	Eutelsat 25B (E25B, Eurobird 2A, Es'hail 1)	Eutelsat Communications S.A.		X							X	X	X					
32	25 E	Alphasat I-XL (Inmarsat XL, Inmarsat-4AF4)	Inmarsat plc	X							X	X	X	X					
33	26 E	Badr 4 (ARABSAT 4B)	Arabsat		X						X	X	X						
34	26 E	Badr 6 (Arabsat 4C, Arabsat 4AR)	Arabsat		X							X	X						
35	26 E	Badr 5 (Arabsat 5B)	Arabsat		X							X	X						
36	28 E	Astra 2C	SES S.A.		X						X								
37	28 E	Astra 2A	SES S.A.		X						X								
38	28 E	Astra 2F	SES S.A.		X						X	X							
39	28 E	Astra 2E	SES S.A.		X						X	X							
40	28 E	Astra 2G	SES S.A.		X						X								
41	29 E	XTAR-EUR	XTAR LLC		X					X						X			
42	31 E	Eutelsat 31A	Eutelsat Communications S.A.		X														
43	31 E	Astra 2B	SES S.A.		X														
44	31 E	Arabsat 5A	Arabsat		X							X	X						
45	31 E	Hylas 2	Avanti Communications Ltd		X						X	X	X						
46	31 E	Astra 5B	SES S.A.								X								
47	33 E	Eutelsat 33C	Eutelsat Communications S.A.		X						X								
48	33 E	Eutelsat 33B	Eutelsat Communications S.A.		X						X		X	X					
49	33 E	Intelsat 702	Intelsat		X														

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50	33 E	Intelsat 28 (Intelsat New Dawn)	Intelsat		X						X	X	X						
51	36 E	Eutelsat 36A (E36A, W4, Eutelsat W4)	Eutelsat Communications S.A.		X							X		X					
52	36 E	Eutelsat 36B (E36B, W7, Eutelsat W7)	Eutelsat Communications S.A.		X						X	X	X	X					
53	38 E	Paksat 1R	Pakistan Ministry of Information Technology and Telecommunications								X	X	X						
54	39 E	HellasSat 2 (Hellas Sat 2, Intelsat K-TV, NSS K-TV)	Hellas-Sat (Arabsat subsidiary)		X						X								
55	40 E	Express AM7 (Ekspress-AM7, Экспресс АМ7)	Russian Satellite Communications Company	X	X														
56	42 E	Turksat 2A (Eurasiasat 1, Türksat 2A)	Turksat																
57	42 E	Turksat 3A (Türksat 3A)	Turksat		X						X		X	X					
58	42 E	Nigcomsat 1R	NASRDA	X	X							X	X	X					
59	42 E	Turksat 4A	Turksat		X						X		X						
60	44 E	Thuraya 2	Thuraya Telecommunications Co.	X							X	X	X	X			X		
61	45 E	Astra 1F	SES S.A.	X															
62	45 E	Intelsat 12 (IS 12, PAS 12, Europe*Star 1)	Intelsat		X						X			X					
63	46 E	Azerspace (Africasat 1A)	AzerCosmos OJS Co		X						X	X		X					
64	47 E	Intelsat 10 (IS 10, PAS 10)	Intelsat		X						X	X	X	X					
65	48 E	Eutelsat 48A	Eutelsat Communications S.A.		X						X	X	X	X					
66	48 E	Eutelsat 48D	Eutelsat Communications S.A.		X						X	X	X						
67	48 E	Yahsat 1B (Y1B)	Al Yah Satellite Communications Company PrJSC (Yahsat)		X						X	X	X	X					
68	49 E	Yamal 202 (Yamal 200 KA-2, Ямал-202)	Gazprom Space Systems		X						X		X	X					

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69	50 E	Galaxy 26 (G-26, Telstar 6, Intelsat Americas 6, IA-6)	Intelsat		X						X	X		X					
70	50 E	NSS 5 (Intelsat 803)	SES S.A.		X													X	
71	51 E	Sirius 3	SES S.A.		X						X								
72	52 E	TurkmenAlem 520E (TurkmenÄlem 520E, Turkmenspace 1, Turkmensat-1, MonacoSat)	SSI Monaco/Ministry of Communications of Turkmenistan		X							X	X						
73	53 E	Express AM6 (Ekspress AM6, EAM6, Eutelsat 53A, E53A)	Russian Satellite Communications Company	X	X														
74	53 E	Yahlive (Y1A, Yahsat Y1A, Yahsat 1A)	Al Yah Satellite Communications Company PrJSC (Yahsat)								X	X	X	X					
75	55 E	Insat 3E	Indian National Satellite (INSAT)		X									X					
76	55 E	GSAT 8 (Insat 4G)	Indian National Satellite (INSAT)		X									X					
77	55 E	Yamal 402 (Yamal 400 KA-2, Ямал-402)	Gazprom Space Systems		X						X		X	X					X
78	55 E	GSAT 16	Indian National Satellite (INSAT)		X									X					
79	56 E	Express AT1	Russian Satellite Communications Company		X														X
80	57 E	NSS 12	SES S.A.		X						X		X	X					
81	58 E	Kazsat 3	JSC KazSat		X								X	X					
82	60 E	Intelsat 904 (IS-904)	Intelsat		X														
83	60 E	Astra 1G	SES S.A.		X						X								
84	61 E	ABS-4 (ABS 2i, Mobisat-1, MBSAT 1)	ABS		X									X				X	
85	62 E	Intelsat 902 (IS-902)	Intelsat		X						X	X	X	X					
86	63 E	Inmarsat-5F1 (Inmarsat 5F1, I5-IOR)	Inmarsat plc	X	X						X	X	X	X	X				
87	64 E	Intelsat 906 (IS-906)	Intelsat		X														
88	64 E	Inmarsat-3F1 (Inmarsat 3 F1, I3F1, IOR)	Inmarsat plc	X	X										X				
89	65 E	Amos 4	Spacecom Satellite Communications		X						X		X	X					X

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90	66 E	Galaxy 27 (G-27, Intelsat IA-7, Telstar 7)	Intelsat		X								X	X					
91	66 E	Intelsat 17 (IS-17)	Intelsat		X						X	X	X		X				
92	66 E	Intelsat 26 (Jcsat 4, Jcsat R, IS-26)	Intelsat		X							X	X	X					
93	69 E	Intelsat 20 (IS-20)	Intelsat		X						X	X	X	X					
94	70 E	Eutelsat 70B (E70B, W5A, Eutelsat W5A)	Eutelsat Communications S.A.		X						X	X	X	X			X		
95	74 E	Insat 3C	Indian National Satellite (INSAT)	X										X	X				
96	74 E	Insat 4CR	Indian National Satellite (INSAT)		X										X				
97	74 E	GSAT 7 (Insat 4F)	Indian National Satellite (INSAT)		X										X				
98	74 E	GSAT 14	Indian National Satellite (INSAT)		X										X				
99	75 E	ABS-2 (ST 3, Koreasat 8, Condosat 2)	ABS									X	X	X					X
100	76 E	Apstar 7	APT Satellite Holdings Ltd.								X	X	X	X				X	
101	79 E	Thaicom 5 (Agrani 2)	Thaicom Plc.											X				X	
102	79 E	Thaicom 6 (Africom 1)	Thaicom Plc.																
103	80 E	Express AM22 (Sesat 2, Ekspress AM22)	Russian Satellite Communications Company (Intersputnik)/ EUTELSAT		X						X								
104	80 E	Express AM2 (Ekspress AM2)	Russian Satellite Communications Company	X	X									X					X
105	82 E	JCSat 6 (JCSat 4A)	SKY Perfect JSAT Corporation		X									X	X		X	X	
106	83 E	Insat 4A	Indian National Satellite (INSAT)		X										X				
107	83 E	GSAT 10	Indian National Satellite (INSAT)		X										X				
108	83 E	GSAT 12	Indian National Satellite (INSAT)		X										X				
109	85 E	Horizons 2	SKY Perfect JSAT Corporation/Intelsat		X														
110	85 E	Intelsat 15 (IS-15, JCSat 85)	Intelsat		X								X	X	X				X
111	86 E	Kazsat 2	JSC KazSat		X									X					X

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112	88 E	ST 2	Singapore Telecommunications Ltd. (SingTel)/ Chunghwa Telecom Co. Ltd.		X								X	X	X				
113	88 E	Chinasat 12 (ZX-15A, Chinasat 15A, ZX-12, Apstar 7B, SupremeSat 1)	China Satellite Communications Co. Ltd.(China Satcom)		X														
114	90 E	Yamal 401 (Yamal 400 KA-1, Ямал-401)	Gazprom Space Systems		X														X
115	91 E	Measat 3 (Measat 3, Malaysia East Asia Sat 3)	MEASAT Satellite Systems Sdn. Bhd.		X														
116	91 E	Measat 3A (Measat 1R)	MEASAT Satellite Systems Sdn. Bhd.		X							X	X	X	X				
117	91 E	Measat 3B (Jabiru 2)	MEASAT Satellite Systems Sdn. Bhd.		X									X	X		X		
118	92 E	ChinaSat 9 (Zhongxing-9, ZX-9, 9)	China Satellite Communications Co. Ltd.(China Satcom)		X									X					
119	93 E	Insat 4B	Indian National Satellite (INSAT)		X										X				
120	93 E	Insat 3A	Indian National Satellite (INSAT)		X									X	X				
121	95 E	NSS 6	SES S.A.		X							X	X	X			X		
122	95 E	SES 8	SES S.A.		X									X					
123	96 E	Express AM33 (Ekspress AM33)	Russian Satellite Communications Company	X	X								X	X					X
124	98 E	Thuraya 3	Thuraya Telecommunications Co.	X	X									X	X		X		
125	98 E	Chinasat 11	China Satellite Communications Co. Ltd.(China Satcom)		X							X	X	X	X		X		
126	101 E	AsiaSat 5	Asia Satellite Telecommunications Co. Ltd.		X									X				X	
127	103 E	Express AM3 (Ekspress AM3)	Russian Satellite Communications Company		X														X
128	105 E	Asiastar 1 (Asiastar)	Worldspace Satellite Radio		X	X				X		X	X	X					
129	105 E	Asiasat 7 (AsiaSat 5C)	Asia Satellite Telecommunications Co. Ltd.		X								X	X					
130	105 E	Asiasat 8	Asia Satellite Telecommunications Co. Ltd.		X								X	X	X				

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131	108 E	Telkom 1	PT Telekomunikasi Indonesia Tbk		X									X					
132	108 E	NSS 11 (AAP 1, GE 1A, Worldsat 1)	SES S.A.		X									X	X				
133	108 E	SES 7 (Protostar 2, Indostar 2, Galaxy 8iR, Cakrawarta 2, Protostar II)	SES S.A.		X									X				X	
134	110 E	N-SAT-110 (Superbird 5, Superbird D, NSAT 110, N-Sat 110, JCSAT 110)	SKY Perfect JSAT Corporation		X									X					
135	110 E	Bsat 1B (B-Sat 1B)	Broadcasting Satellite System Corp.		X									X					
136	110 E	BSat 3B	Broadcasting Satellite System Corp.		X									X					
137	110 E	ChinaSat 10 (Zhongxing-10, ZX 10, Sinosat 5, Xinnuo 5, 10, SupremeSat)	China Satellite Communications Co. Ltd.(China Satcom)		X									X					
138	110 E	BSat 3C (JCSat 110R)	Broadcasting Satellite System Corp.		X									X					
139	110 E	BSat 3A	Broadcasting Satellite System Corp.		X									X					
140	113 E	Koreasat 5 (Mugungwha 5)	KT Corporation/ Korean Agency for Defense Development (ADD)		X									X					
141	113 E	Palapa D (Palapa D1)	PT Indosat Tbk		X								X	X			X		
142	116 E	ABS-7 (Koreasat 3, Mugungwa 3)	ABS		X								X						
143	116 E	ChinaSat 6B (ZHONGXING 6B, 6B)	China Satellite Communications Co. Ltd.(China Satcom)		X									X				X	
144	116 E	Koreasat 6 (Mugungwha 6)	KT Corporation		X									X					
145	118 E	Telkom 2	PT Telekomunikasi Indonesia Tbk		X									X	X			X	
146	119 E	Thaicom 4 (Ipstar 1, Measat 5)	Thaicom Plc.		X									X	X		X		
147	120 E	Asiasat 3S	Asia Satellite Telecommunications Co. Ltd.		X								X	X	X		X		

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148	120 E	Asiasat 6 (Thaicom 7)	Asia Satellite Telecommunications Co. Ltd.		X									X			X		
149	122 E	Asiasat 4	Asia Satellite Telecommunications Co. Ltd.		X									X			X		
150	124 E	JCSat 4B (JCSat 13)	SKY Perfect JSAT Corporation		X									X					
151	125 E	ChinaSat 6A (Zhongxing-6A, ZX-6A, Sinosat 6, Xinnuo 6, 6A)	China Satellite Communications Co. Ltd.(China Satcom)		X									X			X		X
152	128 E	JCSat 3A (JCSat 10)	SKY Perfect JSAT Corporation		X									X				X	
153	128 E	JCSat RA (JCSat 12)	SKY Perfect JSAT Corporation		X									X				X	
154	128 E	COMS 1 (Chollian)	Korea Aerospace Research Institute (KARI)		X									X					
155	132 E	JCSat 5A (JCSat 9, N-Star D)	SKY Perfect JSAT Corporation		X									X				X	
156	132 E	Vinasat 1	Vietnam Posts and Telecommunications Group (VNPT)		X									X	X		X	X	
157	132 E	Vinasat 2	Vietnam Posts and Telecommunications Group (VNPT)		X									X				X	
158	134 E	Apstar 6 (APStar 5B)	APT Satellite Holdings Ltd.		X								X	X	X				X
159	136 E	N-Star-C	SKY Perfect JSAT Corporation		X														X
160	138 E	Telstar 18 (Apstar 5, Apstar V)	Telesat Canada Ltd.		x									x				x	
161	140 E	Express AM5 (Ekspress AM5, EAM5)	Russian Satellite Communications Company	x	x														x
162	140 E	Express AT2	Russian Satellite Communications Company		x														x
163	142 E	Apstar 9A (ChinaSat 5A, Zhongwei 1, Chinastar 1, 5A, ZX-5A)	APT Satellite Holdings Ltd.		x									x					x
164	143 E	Inmarsat-4F1 (Inmarsat 4-F1, I4F1, PAC-W)	Inmarsat plc	x										x			x	x	
165	143 E	Kizuna (WINDS)	JAXA (Japan Aerospace Exploration Agency)		x									x				x	
166	144 E	Superbird C2 (Superbird 7)	SKY Perfect JSAT Corporation		x									x	x			x	

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167	146 E	Palapa C2	PT Indosat Tbk		x								x				x		x
168	148 E	Measat 2 (Africasat 2)	MEASAT Satellite Systems Sdn. Bhd.		x						x	x	x						
169	150 E	JCSat 1B (JCSat 5)	SKY Perfect JSAT Corporation		x									x				x	
170	152 E	Optus D2	Optus Communications		x												x		
171	154 E	JCSat 2A (JCSat 8)	SKY Perfect JSAT Corporation		x									x					
172	156 E	Optus D3	Optus Communications		x												x		
173	157 E	Intelsat 5 (PAS 5, Arabsat 2C, Badr C)	Intelsat		X							X	X	X					
174	157 E	Intelsat 706 (IS-706, Intelsat 7-F6)	Intelsat		X												X		
175	158 E	Superbird 3 (Superbird A3, Superbird C)	SKY Perfect JSAT Corporation		X									X				X	
176	159 E	ABS-6 (ABS 1, LMI 1, Condosat 1)	ABS		X							X	X	X			X		
177	160 E	Optus D1	Optus Communications		X												X		
178	162 E	Superbird B2 (Superbird 4)	SKY Perfect JSAT Corporation		X									X					
179	164 E	Optus B3 (Aussat B3)	Optus Communications	X	X												X		
180	164 E	Optus 10	Optus Communications		X												X		
181	166 E	Intelsat 19 (IS-19)	Intelsat		X	X											X		
182	169 E	Intelsat 8 (IS 8, PAS 8)	Intelsat		X									X					
183	172 E	Eutelsat 172A (AMC 23, Worldsat 3, AMC 13, GE 2i, GE 23)	Eutelsat Communications S.A.		X									X					
184	178 E	Inmarsat-3F3 (Inmarsat 3F3, I3F3, POR)	Inmarsat plc	X										X			X	X	
185	180	Intelsat 18 (IS-18)	Intelsat		X	X											X	X	
186	177 W	Astra 3A	SES S.A.		X						X								
187	177 W	NSS 9	SES S.A.		X													X	
188	177 W	Yamal 300K (Ямал-300К)	Gazprom Space Systems		X														X
189	139 W	AMC 8 (GE 8, Aurora 3, Aurora III)	SES S.A.		X	X		X											

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190	137 W	AMC 7 (GE 7)	SES S.A.		X	X		X											
191	135 W	AMC 10 (GE 10)	SES S.A.		X	X		X											
192	133 W	Galaxy 15 (G-15, Galaxy 1RR)	Intelsat		X	X		X											
193	131 W	AMC 11 (GE 11)	SES S.A.		X	X		X											
194	129 W	Galaxy 12 (Galaxy XII, G-12)	Intelsat		X	X		X											
195	129 W	Ciel 2 (Ciel II)	Ciel Satellite Group & Echostar		X	X		X											
196	127 W	Horizons 1 (Galaxy 13, Linkstar 4, Galaxy XIII)	SKY Perfect JSAT Corporation/Intelsat		X	X													
197	125 W	Galaxy 14 (G-14)	Intelsat		X	X		X											
198	125 W	AMC 21	SES S.A.		X	X			X										
199	123 W	Galaxy 18 (G-18)	Intelsat		X	X		X											
200	121 W	Galaxy 23 (G-23, IA-13, Telstar 13, EchoStar 9)	Dish Network Corporation/Intelsat		X	X		X	X										
201	119 W	Directv 7S (DTV 7S, DBS 7S, USABSS-18)	DirecTV, Inc.		X	X													
202	119 W	Echostar 7	EchoStar Corporation		X	X		X											
203	119 W	Anik F3	Telesat Canada Ltd.		X														
204	119 W	Echostar 14 (Echostar XIV)	EchoStar Corporation		X														
205	117 W	Eutelsat 117 West A (E117WA, Satmex 8)	Eutelsat Communications S.A.		X	X		X	X	X									
206	116 W	Sirius FM-6 (Radiosat 6)	XM Satellite Radio Holdings Inc./Sirius Satellite Radio		X	X													
207	115 W	Eutelsat 115 West A (E115WA, Satmex 5)	Eutelsat Communications S.A.		X	X			X	X									
208	115 W	XM 4 (XM Blues)	XM Satellite Radio Holdings Inc./Sirius Satellite Radio		X	X													
209	115 W	XM 1 (XM Roll)	XM Satellite Radio Holdings Inc./Sirius Satellite Radio		X	X													
210	115 W	ViaSat 1 (VIASAT-IOM)	ViaSat Inc		X	X		X											

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211	115 W	Eutelsat 115 West B (E115WB, Satmex 7)	Eutelsat Communications S.A.		X	X			X	X									
212	113 W	Eutelsat 113 West A (E113WA, Satmex 6)	Eutelsat Communications S.A.		X	X				X									
213	111 W	Anik F2 (CANSAT KA-4)	Telesat Canada Ltd.		X	X	X												
214	111 W	Echostar T1 (TerreStar 1, CANSAT-24)	EchoStar Corporation		X	X	X												
215	111 W	Wildblue 1 (KaStar 1, iSky 1, WB-1)	ViaSat Inc		X	X	X												
216	110 W	Echostar 10 (Echostar X)	EchoStar Corporation		X	X													
217	110 W	Directv 5 (Tempo 1)	DirecTV, Inc.		X		X												
218	110 W	Echostar 11 (Echostar XI)	EchoStar Corporation		X	X													
219	109 W	Nimiq 2 (Telesat-DTH 2)	Telesat Canada Ltd.		X		X												
220	107 W	Anik F1	Telesat Canada Ltd.		X		X												
221	107 W	Anik F1R	Telesat Canada Ltd.		X		X												
222	107 W	Echostar 17 (Jupiter 1, Spaceway 4)	EchoStar Corporation		X		X												
223	107 W	Anik G1	Telesat Canada Ltd.		X		X		X	X								X	
224	105 W	AMC 15	SES S.A.		X	X	X	X											
225	105 W	AMC 18 (GE 18)	SES S.A.		X		X	X											
226	103 W	AMC 1 (GE 1)	SES S.A.		X	X		X											
227	103 W	Directv 10	DirecTV, Inc.		X	X													
228	103 W	Spaceway 1 (Spaceway F1)	DirecTV, Inc.		X		X	X											
229	103 W	Directv 12 (RB-2A)	DirecTV, Inc.		X		X												
230	103 W	SES 3 (OS-2, AMC 1R)	SES S.A.		X	X	X	X											
231	103 W	Directv 15	DirecTV, Inc.		X	X	X	X											
232	103 W	AMSC 1 (MSAT 2)	LightSquared / Skyterra Communications Inc.		X	X	X												
233	101 W	Directv 4S (USABSS-13)	DirecTV, Inc.		X	X	X												

KEY	POSITION	SATELLITE NAME	OPERATOR	MSS	FSS	CONUS	NORTH AMERICA	AK/HI/CARIB	CENTRAL AMERICA	SOUTH AMERICA	EUROPE	AFRICA	MIDDLE EAST	ASIA	INDIA/ INDIAN OCEAN	ATLANTIC OCEAN	AUSTRALIA	PACIFIC OCEAN	RUSSIA
234	101 W	Directv 8	DirecTV, Inc.		X	X	X	X	X										
235	101 W	Directv 9S (USABSS-21)	DirecTV, Inc.		X	X		X											
236	101 W	SES 1 (AMC 4R, AMC 4R, AMC 5RR, OS-1)	SES S.A.		X	X	X	X	X										
237	101 W	Skyterra 1	LightSquared / Skyterra Communications Inc.	X	X	X	X	X											
238	99 W	Galaxy 16 (G-16)	Intelsat		X	X	X												
239	99 W	Directv 11	DirecTV, Inc.		X	X	X												
240	99 W	Spaceway 2 (Spaceway F2)	DirecTV, Inc.		X	X	X	X											
241	99 W	Directv 14 (Directv BSS-99W, RB-1)	DirecTV, Inc.		X		X			X									
242	98 W	Inmarsat-4F3 (Inmarsat 4-F3, I4F3, PAC-E)	Inmarsat plc	X	X	X	X	X	X	X									
243	97 W	Galaxy 19 (G-19, Intelsat Americas-9, IA-9)	Intelsat		X	X	X	X											
244	96 W	Echostar 6 (Sky 1B, MCI 2)	EchoStar Corporation		X	X		X											
245	96 W	Sirius FM-5 (Radiosat 5)	XM Satellite Radio Holdings Inc./Sirius Satellite Radio		X	X													
246	95 W	Galaxy 3C (G-3C)	Intelsat		X	X	X												
247	95 W	Spaceway 3 (Spaceway F3)	EchoStar Corporation		X	X	X												
248	95 W	Intelsat 30 (ISDLA-1, DLA 1)	Intelsat		X	X		X		X									
249	93 W	Galaxy 25 (G-25, Intelsat Americas 5 (IA 5), Telstar 5)	Intelsat		X	X	X	X											
250	93 W	Echostar G1 (ICO G1, DBSD G1)	EchoStar Corporation		X	X	X	X											
251	92 W	Brasilsat B3	Star One (EMBRATEL)		X					X									
252	91 W	Galaxy 17 (G-17)	Intelsat		X		X			X	X								
253	91 W	Nimiq 6	Telesat Canada Ltd.		X		X												
254	89 W	Galaxy 28 (G-28, Telstar 8, Intelsat Americas 8, IA 8)	Intelsat		X		X			X									
255	87 W	SES 2 (AMC 5R, AMC 26)	SES S.A.		X	X	X												
256	87 W	Tupac Katari 1 (TKSat 1, Tupac Katari Sat 1)	Bolivian Space Agency (ABE)		X					X									

KEY	POSITION	SATELLITE NAME	OPERATOR	MSS	FSS	CONUS	NORTH AMERICA	AK/HI/CARIB	CENTRAL AMERICA	SOUTH AMERICA	EUROPE	AFRICA	MIDDLE EAST	ASIA	INDIA/ INDIAN OCEAN	ATLANTIC OCEAN	AUSTRALIA	PACIFIC OCEAN	RUSSIA
257	86 W	Nimiq 1 (Telesat-DTH 1)	Telesat Canada Ltd.		X		X												
258	85 W	AMC 16 (GE 16)	SES S.A.			X	X	X											
259	85 W	XM 3 (XM Rhythm)	XM Satellite Radio Holdings Inc./Sirius Satellite Radio		X	X													
260	85 W	XM 5 (Sirius XM-5)	XM Satellite Radio Holdings Inc./Sirius Satellite Radio		X		X												
261	84 W	Hispasat 1C (DFS 3)	Hispasat		X		X		X	X	X								
262	84 W	Brasilsat B4	Star One (EMBRATEL)		X					X									
263	83 W	AMC 9	SES S.A.		X	X													
264	82 W	Nimiq 4	Telesat Canada Ltd.		X	X	X												
265	81 W	AMC 5 (GE 5, Nahuel 1B)	SES S.A.		X	X													
266	81 W	AMC 2 (GE 2)	SES S.A.		X					X									
267	79 W	Intelsat 16 (IS-16, PAS-11R)	Intelsat		X														
268	79 W	Sky-Mexico 1 (RB-2, SKYM-1, DIRECTV KU-79W)	DirecTV, Inc.		X			X	X										
269	78 W	Venesat 1 (Simon Bolivar 1)	Venesat		X					X									
270	77 W	Echostar 1 (USABSS-16)	EchoStar Corporation		X	X													
271	77 W	Echostar 8	EchoStar Corporation		X	X			X										
272	77 W	QuetzSat 1	SES S.A.		X	X	X		X										
273	75 W	Star One C3	Star One (EMBRATEL)		X					X									
274	73 W	Nimiq 5	Telesat Canada Ltd.		X	X	X												
275	72 W	AMC 6 (GE 6, Rainbow 2)	SES S.A.		X	X	X	X	X	X									
276	72 W	ARSAT 1	ARSAT (Empresa Argentina de Soluciones Satelitales Sociedad Anonima)		X					X									
277	70 W	Star One C2	Star One (EMBRATEL)		X				X	X									
278	70 W	Star One C4	Star One (EMBRATEL)		X														
279	68 W	Astra 1H	SES S.A.		X						X								
280	68 W	Astra 1D	SES S.A.		X						X								
281	67 W	AMC 4 (GE 4)	SES S.A.		X	X	X		X	X									
282	67 W	AMC 3 (GE 3)	SES S.A.		X	X	X	X											
283	65 W	Star One C1	Star One (EMBRATEL)		X					X									

KEY	POSITION	SATELLITE NAME	OPERATOR	MSS	FSS	CONUS	NORTH AMERICA	AK/HI/CARIB	CENTRAL AMERICA	SOUTH AMERICA	EUROPE	AFRICA	MIDDLE EAST	INDIA/ INDIAN OCEAN	ASIA	ATLANTIC OCEAN	AUSTRALIA	PACIFIC OCEAN	RUSSIA
284	63 W	Brasilsat B2	Star One (EMBRATEL)		X					X									
285	63 W	Telstar 14R (Estrela do Sul 2, EDS 2)	Telesat Canada Ltd.		X	X		X		X									
286	62 W	Echostar 3	EchoStar Corporation		X	X													
287	61 W	Echostar 12 (Rainbow 1, Cablevision 1)	EchoStar Corporation		X	X													
288	61 W	Amazonas 2	Hispasat		X	X	X			X									
289	61 W	Amazonas 3	Hispasat		X					X									
290	61 W	Echostar 16 (Echostar XVI)	EchoStar Corporation		X	X													
291	61 W	Amazonas 4A	Hispasat		X	X	X		X	X									
292	58 W	Intelsat 21 (IS-21, PAS-21)	Intelsat		X		X		X	X	X								
293	56 W	Galaxy 11 (G-11)	Intelsat		X					X									
294	56 W	Intelsat 805 (IS-805)	Intelsat		X				X	X									
295	55 W	Amazonas 1 (Amazonas)	Hispasat		X	X	X			X									
296	55 W	Inmarsat-5F2 (Inmarsat 5F2, I5-AOR)	Inmarsat plc	X	X														
297	54 W	Inmarsat-3F4 (Inmarsat 3 F4, I3F4, AOR-W)	Inmarsat plc	X	X														
298	53 W	Intelsat 23 (IS-23)	Intelsat		X		X		X	X	X	X							
299	50 W	Intelsat 1R (IS 1R, PAS 1R)	Intelsat		X		X		X	X	X	X							
300	47 W	NSS 703 (Intelsat 703)	SES S.A.		X											X			
301	47 W	NSS 806 (Intelsat 806)	SES S.A.		X					X	X								
302	45 W	Intelsat 14 (IS-14, PAS 14)	Intelsat		X		X		X	X	X	X							
303	45 W	Echostar 15	EchoStar Corporation		X	X													
304	43 W	Intelsat 9 (IS 9, PAS 9, PAS-23)	Intelsat		X		X		X	X	X								
305	43 W	Intelsat 11 (IS-11, PAS-11)	Intelsat		X	X			X	X									
306	40 W	SES 6	SES S.A.		X		X		X		X					X			
307	37 W	NSS 10 (AMC 12, Star One C12, Worldsat 2, GE 1i)	SES S.A.		X		X												
308	37 W	Telstar 11N (Telstar 11R)	Telesat Canada Ltd.		X		X				X	X				X			
309	34 W	Intelsat 903 (IS-903)	Intelsat		X				X	X									

KEY	POSITION	SATELLITE NAME	OPERATOR	MSS	FSS	CONUS	NORTH AMERICA	AK/HI/CARIB	CENTRAL AMERICA	SOUTH AMERICA	EUROPE	AFRICA	MIDDLE EAST	ASIA	INDIA/ INDIAN OCEAN	ATLANTIC OCEAN	AUSTRALIA	PACIFIC OCEAN	RUSSIA
310	34 W	Hylas 1 (HylasOne, Hylas One)	Avanti Communications Ltd		X						X								
311	32 W	Intelsat 25 (Protostar 1, Protostar I, Chinasat 8, Zhongxing 8, IS-25)	Intelsat		X											X			
312	30 W	Hispasat 1E	Hispasat		X		X		X	X	X	X							
313	30 W	XTAR-LANT (Spainsat 1)	XTAR LLC		X	X					X								
314	29 W	Intelsat 701 (IS-701, Intelsat 7-F1)	Intelsat		X		X		X										
315	27 W	Intelsat 907 (IS-907)	Intelsat		X	X	X		X	X	X	X							
316	24 W	Intelsat 905 (IS-905)	Intelsat		X							X	X						
317	22 W	SES 4 (NSS 14)	SES S.A.		X		X		X		X	X	X						
318	20 W	NSS 7	SES S.A.		X		X		X	X	X	X	X						
319	18 W	Intelsat 901 (IS-901)	Intelsat		X		X												
320	18 W	Intelsat 7 (IS-7, PAS-7)	Intelsat		X						X	X	X	X					
321	15 W	Telstar 12 (ORION 2)	Telesat Canada Ltd.		X		X		X	X	X	X							
322	15 W	Inmarsat-3F2 (Inmarsat 3F2, I3F2, AOR-E)	Inmarsat plc		X											X			
323	14 W	Express A4 (Express A1R, Ekspress A1R, Express 41R, Express 41P, Atlantic Bird 14)	Russian Satellite Communications Company		X									X					X
324	12 W	Eutelsat 12 West A (E12WA, Atlantic Bird 1, AB1)	Eutelsat Communications S.A.		X	X	X		X	X	X								
325	11 W	Express AM44 (Ekspress AM-44)	Russian Satellite Communications Company		X				X	X	X	X				X			
326	8 W	Eutelsat 8 West C (Eutelsat Hot Bird 13A, HB13A, HB6, HotBird 6, Hot bird 6)	Eutelsat Communications S.A.		X							X	X	X					
327	8 W	Eutelsat 8 West D (E8WD, Eutelsat 3A, E3A, XINNUO 3, Sinosat 3, 5C, ChinaSat 5C)	Eutelsat Communications S.A.		X														
328	8 W	Eutelsat 8 West A (E8WA, AB2, Atlantic Bird 2)	Eutelsat Communications S.A.		X						X	X							

KEY	POSITION	SATELLITE NAME	OPERATOR	MSS	FSS	CONUS	NORTH AMERICA	AK/HI/CARIB	CENTRAL AMERICA	SOUTH AMERICA	EUROPE	AFRICA	MIDDLE EAST	ASIA	INDIA/ INDIAN OCEAN	ATLANTIC OCEAN	AUSTRALIA	PACIFIC OCEAN	RUSSIA
329	7 W	Nilesat 102	Nilesat (The Egyptian Satellite Co.)		X						X	X	X						
330	7 W	Nilesat 201	Nilesat (The Egyptian Satellite Co.)		X							X	X						
331	7 W	Eutelsat 7 West A (E7WA, AB7, Atlantic Bird 7, Nilebird, Atlantic Bird 4R)	Eutelsat Communications S.A.		X							X	X						
332	5 W	Eutelsat 5 West A (E5WA, AB3, Atlantic Bird 3, Stellat 5)	Eutelsat Communications S.A.		X		X		X	X	X	X							
333	4 W	Amos 2	Spacecom Satellite Communications		X	X					X		X						
334	4 W	Thor 3	Telenor Satellite Broadcasting		X						X								
335	4 W	Amos 3 (Amos 60)	Spacecom Satellite Communications		X		X		X	X	X	X	X						
336	3 W	ABS-3 (Agila 2, Mabuhay 1, ABS 5)	ABS		X														
337	3 W	ABS-3A	ABS		X					X		X	X						
338	1 W	Intelsat 10-02 (Intelsat 1002, Intelsat Alpha-2, Intelsat X-02, IS-1002)	Intelsat		X						X	X	X						
339	1 W	Thor 5 (Thor 2R)	Telenor Satellite Broadcasting		X						X		X						
340	1 W	Thor 6 (Intelsat 1W, IS-1W)	Telenor Satellite Broadcasting		X						X								
341	1 W	Thor 7	Telenor Satellite Broadcasting		X														

Table 5 Satellite service listing comments

KEY	COMMENT	KEY	COMMENT
1	Iridium operates 66 active NGSO satellites, allowing worldwide voice and data communications using handheld and portable devices.	**172**	24 Ku-band transponders, with 8 back-up channels also available, to provide fixed communications and direct television broadcasting services to Australia and New Zealand
2	12 Ku-band transponders, 8 C-band transponders to provide fixed voice, data telecommunications and Internet access as well as broadcasting satellite services to the whole African continent, although its footprint extends beyond Africa to include part of Europe and of the Middle East.	**173**	28 C-band transponders, 28 Ku-band transponders. Deployed at 50.15 East orbital position to operate there in inclined mode under the ITU filings of Turkey. Planned for relocation to 157East orbital location to replace ageing Intelsat 706.
3	51 C, Ku and Ka-band transponders to provide video, data, Internet and telecom services across Europe, Africa, the Middle East, Central Asia and parts of South America. A Ku-band payload of up to 30 transponders will be connected to widebeam footprints over extended Europe and East Africa. A steerable beam will add further flexibility, with coverage possible of South America or African regions. This capacity will address video contribution, corporate networks, data and telecom markets. A C-band payload with 12 transponders connected to a pan-African beam will respond to continued high demand for capacity for telecom services. A Ka-band payload of nine transponders connected to steerable beams that are in particular expected to cover Africa and South America will meet expanding connectivity requirements for corporate networks and Internet access.	**174**	26 C-band transponders, 14 Ku-band transponders.
4	40 BSS and 12 FSS Ku-band transponders as well as 2 Ka-band transponders covering Europe and Africa (designated as Astra 4A)	**175**	14 Ku-band; Asia-Pacific region; voice and video communications.
5	16 Ku-band transponders providing Direct-to-home, broadcasting and multimedia services	**176**	28 C-band, 16 Ku-band; business services, public voice and data services, broadcasting, direct-to-home; Eastern Europe, CIS, South and Southeast Asia, Africa, Middle East, Australia.
6	24 C-band transponders, 36 Ku-band transponders to provide direct-to-home broadcasting, broadband, point-to-point, and VSAT services in Europe and Africa. Will also carry L-band navigation payload as part of the European Geostationary Navigation Overlay Service (EGNOS)	**177**	24 Ku-band transponders to provide voice and video for Australia and New Zealand
7	58 Ku-band transponders; covers whole of sub-Saharan Africa and provides connectivity to Europe and Middle East. There is also Ka-band capacity available on this satellite.	**178**	23 Ku-band and 6 Ka-band transponders to provide business communications to Japan and Okinawa.
8	56 Ku and Ka-band transponders. W3D satellite will deliver three key coverage zones: high-power Ku-band coverage of Europe with a beam centred over Central Europe and Turkey particularly optimised for Direct-to-Home (DTH) reception; extensive coverage across Europe, North Africa and the Middle East as far as Central Asia, via a Ku-band beam for professional video links and data networks; and Ku-band coverage of Sub-Saharan Africa and Indian Ocean islands for regional telecommunications and Internet services. Interconnection with Europe will also be possible with the African coverage through a combination of Ka-band frequencies in Europe and Ku-band frequencies in Africa.	**179**	15 Ku-band transponders covering Australia and New Zealand. Provides telephone, TV, mobile communications, air traffic control. Also has 1 L-band transponder, Ka-band beacon and laser retroreflector.
9	38 Ku-band transponders to provide video and Internet services to Europe.	**180**	24 Ku-band transponders to provide high quality broadcast services to households, and two way voice and data communication services to areas in and around Australia and NZ
10	82 Ka-band spotbeams for consumer broadband services across Europe and the Mediterranean Basin.	**181**	24 C-Band and 34 Ku-Band transponders to provide telecommunication services and enhanced distribution of content throughout Asia-Pacific region with reach to the Western United States, Australia and New Zealand.
11	Up to 46 Ku-band, 10 C-band and S-band transponders to provide professional video, broadband, business networks, telecommunications and mobile TV services to Europe, Middle East, Africa and Indian Ocean.	**182**	24 Ku-band and 24 C-band transponders providing television broadcasting to Asia-Pacific. Planned for relocation to 169E orbital position.

KEY	COMMENT	KEY	COMMENT
12	64 Ku-band transponders to provide radio and television coverage through 950 digital channels to Europe, North Africa, and the Middle East.	**183**	20 Ku-band, 18 C-band transponders. Broadcast, Internet, business; Ku-band tailored to broadband for Boeing (Hughes) Connexion; Pacific region.
13	64 active Ku-band transponders covering Europe, North Africa, Middle East.	**184**	22 (+11) L-band transponders (22W Power amplifiers), C-band uplink. 7 Wide Spots and 1 Global Beam to provide broadcasting, business services and mobile communications to Pacific Ocean Region
14	64 active Ku-band transponders covering Europe, North Africa, Middle East.	**185**	24 C-band and 12 Ku-band transponders to provide telecommunication services. The satellite's C-band payload will serve Eastern Asia, the Pacific and the Western United States and its Ku-band payload will serve French Polynesia, Eastern Australia and the United States.
15	20 Ku-band transponders to cover Europe and North Africa; 20 active channels	**186**	20 transponders; provide follow-on capacity for the Kopernikus satellite of Deutsche Telekom AG, contracted for 10 transponders on spacecraft; German-speaking countries of Germany, Austria and Switzerland.
16	18 Ku-band transponders to provide high-speed Internet access, high-volume data transmission, video broadcasting, messaging and positioning services.	**187**	44 C-band transponders covering the Pacific Ocean Region
17	53 Ku and 3 Ka-band transponders to provide broadcasting, broadband, video, data transmission and internet access services to Europe, Middle East, the Indian Ocean Islands and Africa.	**188**	8 C-band 72 MHz transponders and 18 Ku-band 72 MHz transponders. Moving to 183 East (177W) location.
18	18 C-band and 18 Ku-band transponders to feature a fixed pan-African C-band beam and three steerable Ku-band beams — all covering Africa with connectivity to Europe and the Middle East.	**189**	24 C-band transponders to provide cable television and radio programming services to CONUS, Alaska, Hawaii, Caribbean.
19	29 Ku-band transponders, 2 Ka-band transponders	**190**	24 C-band transponders to provide cable programming services to CONUS, Alaska, Hawaii, Caribbean.
20	32 Ku-band transponders	**191**	24 C-band transponders.
21	36 Ku-band transponders to provide DTH (including HDTV) services to Europe, Middle East and Africa.	**192**	28 C-band transponders and L-band payload for GPS navigation to in-flight aircrafts. Covers North America, Alaska, Hawaii and Caribbean.
22	52 active Ku-band transponders to provide direct-to-home digital and high-definition television broadcasting to Europe	**193**	24 C-band transponders.
23	26 active C-band transponders, 12 active Ka-band transponders to provide a wide range of telecommunication services to MENA	**194**	24 C-band transponders. Spare Satellite for NA region.
24	3 L-band transponders to provide digital audio and multi-media communications to Africa, Middle East, Asia, Latin America and Caribbean.	**195**	32 Ku band transponders to deliver high-definition and other TV services throughout North America.
25	40 Ku-band transponders to provide data, professional video and government services across Europe, North Africa, the Middle East and Central Asia. It will be equipped with one broad footprint sweeping across Europe into North Africa and Central Asia, and two dedicated high-power beams to add increased flexibility for regional coverage of North Africa and the Middle East.	**196**	24 C-band and 24 Ku-band transponders covering CONUS
26	Steerable Ka-band spot beam up to 450Mbps data transmit capacity, steerable S-band user beam and L-band Land Mobile beam fully compatible with the EMS (European Mobile System) payload developed by ESA.	**197**	24 C-band transponders covering North America and Caribbean.
27	18 Ku-band transponders to provide 54 to 108 digital TV programs to W. Europe (backup for 1B, 1C or 1D)	**198**	24 Ku-band transponders to beam television broadcasts across the United States, Canada, Mexico, Central America and the Caribbean.
28	60 Ku-Band and 4 Ka-Band transponders to provide direct-to-home (DTH) broadcast services and two-way broadband services across Europe and Middle East.	**199**	24 Ku-band and 24 C-band transponders to provide advanced television and data throughout North America

KEY	COMMENT	KEY	COMMENT
29	22 (+11) L-band transponders (22W Power amplifiers), C-band uplink. 7 Wide Spots and 1 Global Beam to provide broadcasting, business services and mobile communications. Limited services on a single spot beam, back-up and leased capacity	**200**	24 C-band, 4 Ka-band, 32 Ku-band transponders. C-band capacity owned by Intelsat
30	228 Narrow Spots, 19 Wide Spots and 1 Global Beam to support the new Broadband Global Area Network (B-GAN) for internet and intranet solutions, video on demand, video-conferencing, fax, e-mail, telephone and high-speed LAN access	**201**	54 Ku-band transponders for Direct-to-home TV services
31	32 Ku-band and 14 Ka-band transponders to provide services to Middle East, North Africa and Central Asia. Satellite owned and to be operated with ictQatar	**202**	32 Ku-band transponders covering CONUS, Hawaii, Alaska and Puerto Rico.
32	The Alphasat mission definition is based around two main service types: BGAN directional (as currently provided by Inmarsat iv) BGAN omni-directional (including handheld services) covering Europe, Middle East, Africa and parts of Asia.	**203**	32 Ku-band, 24 C-band and 2 Ka-band transponders to provide voice and video throughout North America.
33	32 Ku-band transponders	**204**	103 Ku-band transponders to provide expanded DTH services for DISH Network's subscribers
34	24 C-band and 20 Ku-band transponders to provide direct TV broadcasting services to a vast zone stretching from Morocco to the Persian Gulf, and covering a large part of sub-Saharan Africa.	**205**	24 C-band and 40 Ku-band transponders to provide Fixed Satellite Services to serve the continental United States to Argentina as well as the Caribbean, all of Latin America and the major cities of Brazil (will replace Satmex 5)
35	56 Ku and Ka-band transponders to provide full in-orbit back-up capacity both for Badr-4 and Badr-6 television services, covering a stretched zone encompassing the entire Middle East and North Africa (MENA) region, and beyond. Complementary missions will include supporting the expected boom of HD-TV and, thanks to its Ka-band capacity, the development of new sophisticated interactive television services from broadcasters.	**206**	1 X/S-band transponder to provide state-of-the-art digital audio radio programming directly to cars, homes and portable radios coast to coast. Planned to be stationed at 116.15 West orbital location after in-orbit testing at 120 West orbital slot.
36	32 Ku-band (for first five years; 28 after) transponders to provide Direct-to-home; broadcasting, multimedia services to continental Europe	**207**	24 C-band, 24 Ku-band; Internet, voice and data, analogical and digital television and multimedia.
37	32 Ku-band (for first five years, 28 after) transponders to provide voice and video communications to Europe.	**208**	2 active X/S-band transponders, each with 16 active (6 spare) 228-w TWTAs to provide state-of-the-art digital audio radio programming directly to cars, homes and portable radios coast to coast.
38	60 Ku-band and 3 Ka-band transponders to deliver next generation broadcast, VSAT and broadband services in Europe and Africa	**209**	13.3 kw Digital Audio Radio, 2 active S-band transponders, each w/16 active (6 spare) 228-w TWTAs. Backup satellite for XM 3 (XM Rhythm).
39	60 Ku-band transponders, and 4 Ka-band transponders to deliver next generation broadcast, VSAT and broadband services in Europe and Africa and enhance and secure its existing offering to major Direct-to-Home (DTH) markets in the UK and Ireland.	**210**	56 Ka-band transponders to serve the accelerating growth in bandwidth demand for multimedia Internet access over North America
40	ASTRA 2G will serve to deliver next generation broadcast, VSAT and broadband services in Europe and Africa, and will carry Ku- and Ka-band payloads at 28.2° East.	**211**	C and Ku-band transponders to provide Fixed Satellite Services (FSS) in the Americas.
41	12 X-band (6 RHCP + 6 LHCP) transponders to provide coverage from Eastern Brazil and the Atlantic Ocean, across Europe, Africa, and the Middle East as far east as Singapore (2 global beams, one fixed and 4 steerable)	**212**	36 C-band and 24 Ku-band transponders to provide voice, data, and video services to Mexico, South America, and the continental United States.
42	20 Ku-band transponders	**213**	24 30W C-band, 40 127W Ku-band, 50 90W Ka-band transponders to provide broadband and multimedia services for northern US states and Canada
43	30 Ku-band (for first five years, 28 after) transponders to provide Direct-to-home, broadcasting and multimedia services	**214**	S-band transponders to provide new-generation mobile communications services across the United States and Canada

KEY	COMMENT	KEY	COMMENT
44	16 active C-band transponders, 24 active Ku-band transponders to provide the large range of satellite communications services such as television backhauling and broadcasting, telephony, business communications, Internet trunking and the provision of VSAT and other interactive services, over sub-Saharan Africa, North-Africa and the Middle East.	**215**	35 Ka-band user spot beams and 6 gateway beams to provide Broadband Internet Access via satellite to North America
45	24 active Ka-band user beams and six gateway beams to provide two-way communications services for high-speed delivery of data to Northern and Southern Africa, Eastern Europe and the Middle East.	**216**	Direct-to-home transmission of voice, video and internet.
46	Eastern European and neighbouring markets for DTH, Direct-to-Cable (DTC) and contribution feeds to Digital Terrestrial Television (DTT) networks. ASTRA 5B will also carry a hosted payload for the European Commission's (EC) European Geostationary Navigation Overlay Service (EGNOS). 31.5° East is currently served by ASTRA 2C.	**217**	32 Ku-band transponders providing direct broadcasting and digital television to North American subscribers.
47	24 (+6) Ku-band transponders covering Western and Central Europe as far west as Canary Islands.	**218**	29 Ku-band transponders to provide direct-to-home services to CONUS
48	24 Ku-band transponders providing connectivity from western Europe through Middle East and Central and South Asia.	**219**	32 Ku-band and 2 Ka-band transponders for television broadcasting.
49	26 C-band transponders, 10 Ku-band transponders.	**220**	36 C-band and 48 Ku-band transponders; broadcasting, business; North and South America; faulty solar panels may affect operations by 2005.
50	28 C-band (failed) and 24 Ku-band 36 MHz transponder units to deliver wireless backhaul, broadband and television programming to part of Europe, Middle East, Africa and Sub-Saharan regions.	**221**	32 Ku-band, 24 C-band and 2 (WAAS) L-band transponders to provide services across North America.
51	31 Ku-band transponders covering Western Russia and majority of central and southern Africa.	**222**	60 downlink beams (Ka-band) will deliver HughesNet® broadband satellite services in North America
52	70 Ku-band transponders to provide digital video and telecommunications services over Europe, North Africa, the Middle East and Central Asia and South Africa	**223**	16 transponders in extended Ku-band over Canada, 24 C-band and 12 Ku-band transponders over South America to provide direct-to-home and telecommunication services. First commercial military X-band payload (3 transponders) with coverage over the Americas and the Pacific Ocean including Hawaii. In-orbit testing at 109W orbital positions
53	18 Ku-band and 12 C-band transponders to provide services to Pakistan, Afghanistan, India, Iran, parts of Middle East, parts of Africa and Europe	**224**	24 Ku-band and 12 Ka-band transponders covering US (including Hawaii and Alaska), part of Canada and Mexico. Leased to Echostar Satellite Services.
54	30 Ku-band; television broadcasting services for the 2004 Summer Olympic Games in Athens.	**225**	24 C-band transponders covering CONUS, Canada, Caribbean and Mexico
55	36 Ku-band, 24 C-band and 2 L-band transponders	**226**	24 C-band and 24 Ku-band transponders to provide broadcasting, business, cable, mobile services to 50 states and Caribbean
56	20 Ku-band BSS (33Mhz) and 12 Ku-band FSS (36 MHz) transponders to provide direct-to-home voice, video, and data transmissions to countries between central Europe and the Indian subcontinent.	**227**	32 broad-beam and 55 spot-beam Ka-band transponders to will provide HDTV to CONUS.
57	24 Ku-band transponders to provide telecommunication services as well as direct TV broadcast services through Europe, Turkey and Central Asia	**228**	72 Ka-band transponders to provide direct broadcast services to North America and Hawaii
58	4 C, 14 Ku, 8 Ka and 2 L-band transponders to provide the most optimal and cost effective voice, data, video, internet and application service/solutions	**229**	32 (+12) Ka-band transponders, 55 (+15) Ka-band Spot-Beam transponders to provide HDTV throughout North America
59	24 Ku-band and 2 Ka-band transponders. Testing at 50East orbital position	**230**	24 active C-band, 24 Ku-band transponders and Commercially Hosted Infrared Payload (CHIRP) replacing AMC-1 satellite.
60	128 active L-band elements, 17-w SSPAs C-band 2 active + 2 spare to provide a GSM-compatible mobile telephone services to multiple regions	**231**	30 high power transponders in Ku-band, 24 transponders in Ka-band, 18 transponders in Reverse Band, and will be able to operate from up to five orbital locations from 99°W to 119°W, covering Continental US (CONUS), Alaska, Hawaii and Puerto Rico

KEY	COMMENT	KEY	COMMENT
61	16 Ku-band transponders	**232**	6 L-band transponders and Ku-band capacity to provide mobile telephone, radio, facsimile, paging, position location, and data communications for US/Canada users on land, at sea, and in the air.
62	30 Ku-band; highest powered Ku-band cross connection between South East Asia and Europe.	**233**	48 Ku-band transponders
63	24 C-band and 12 Ku-band transponders to provide services to Azerbaijan, Central Asia, Europe and Africa.	**234**	32 Ku-band and 4 Ka-band transponders
64	24 C-band, 24 Ku-band providing Direct-to-home video channels to Asia, Africa, Middle East, Europe	**235**	52 Ku-band and 2 Ka-band transponders to cover Conus, Alaska, Hawaii with 27 spot beams
65	20 Ku-band transponders providing full coverage of Europe, Middle East, parts of Africa and Asia.	**236**	24 active C-band and 24 Ku-band transponders
66	32 Ku-band transponders covering Europe, North Africa and the Middle East as well as providing service continuity for TV programmes over the Indian Ocean with a directional beam.	**237**	152 transponders (L and Ku band) to provide 4G-LTE open wireless broadband network coverage to North America including Alaska, Hawaii, Puerto Rico, the Virgin Islands, Mexico and the Caribbean Basin.
67	46 Ka-band transponders, 60 spot beams to provide services to government and commercial customers in the Middle East, Africa, Europe and South West Asia	**238**	24 C-band and 24 Ku-band transponders to provide standard TV and HDTV to all parts of North America
68	18 C-band; provide communications for gas corporation operations throughout Eurasian continent.	**239**	32 (+12) Ka-band transponders, 55 (+15) Ka-band Spot-Beam transponders to provide HDTV throughout North America
69	24 C-band and 28 Ku-band transponders to provide coverage of Europe and portions of Asia and Africa.	**240**	72 Ka-band transponders to provide direct broadcast services to North America and Hawaii
70	38 C-band and 6 Ku-band transponders to provide services for Pacific Ocean region (shared capacity with Intelsat). Placeholder for Turksat 4B satellite.	**241**	24 Ka-band and Reverse DBS transponders to provide video services to North and South America continents
71	15 Ku-band transponders covering Europe	**242**	228 Narrow Spots, 19 Wide Spots and 1 Global Beam to support the new Broadband Global Area Network (B-GAN) for internet and intranet solutions, video on demand, video-conferencing, fax, e-mail, telephone and high-speed LAN access
72	38 active Ku-band transponders shared over 3 beams. Turkmenistan Minister of Communications owns 26 TPs and the rest 12 TPs with Middle East/North Africa coverage are fully leased to SES.	**243**	24 C-band and 28 Ku-band transponders to provide advanced cable television, data, and telecommunications services to customers throughout North America, Alaska, Hawaii, Mexico, and Puerto Rico.
73	30 C-band, 40 Ku-band, 12 Ka-band, 2 L-band transponders	**244**	32 Ku-band transponders covering CONUS, Hawaii, Alaska and Puerto Rico. Operating at 96.2 West orbital position under Bermuda's ITU license
74	14 active C-band transponders, 20 Ku-band transponders, 21 Ka-band transponders to provide DTH coverage in The Middle East, Africa, Europe and South West Asia.	**245**	1 X/S-band transponder to provide state-of-the-art digital audio radio programming directly to cars, homes and portable radios coast to coast.
75	24 C-band transponders to provide communications services for India.	**246**	24 C-band and 16 Ku-band to provide Direct-to-home broadcast of video and Internet to North America
76	18 Ku-band transponders and GAGAN payload	**247**	24 Ka-band regenerative downlink hopping spot beams covering North America (17 regional spots, 21 city spots and CONUS)
77	46 Ku-band transponders	**248**	4 C-band and 73 Ku-band transponders to provide DTH services to southwest coast of the United States, South America excluding Brazil, and a portion of the Caribbean
78	24 normal C, 12 extended C and 12 Ku-band transponders + Ku-band beacon	**249**	24 C-band, 28 Ku-band; U.S., southern Canada, Mexico, Caribbean.
79	32 Ku-band transponders to cover Russia	**250**	S-band and Ka-band transponders to provide Mobile Satellite Services (MSS) throughout the USA, including Alaska, Hawaii, Puerto-Rico and US Virgin Islands.
80	40 C-band and 48 Ku-band active high-power transponders to enable communications services for telecommunications providers, broadcasters, corporations, and governments in Europe, Africa, the Middle East, India and other parts of Asia.	**251**	28 C-band transponders for voice and video communication.
81	28 Ku-band transponders	**252**	24 C-band and 24 Ku-band transponders to provide telephone and television services to South and North America and Europe.

KEY	COMMENT	KEY	COMMENT
82	44 C-band and 12 Ku-band transponders, broadcasting, business services, direct-to-home TV broadcasting, telecommunications, VSAT networks	**253**	32 high powered Ku-band transponders. Bell TV has agreed to fully lease this new satellite for its lifetime to serve the fast-growing number of Bell TV subscribers across Canada.
83	32 Ku-band transponders providing Direct-to-home tv; multimedia to Europe	**254**	28 C-band, 36 Ku-band, 24 Ka-band; video and data transmissions to all countries in North and South America.
84	16 S-band and 1 Ku-band transponder to provide S-DMB services to cellular phones and other portable devices in Japan and South Korea.	**255**	24 active C-band and 24 Ku-band transponders + Commercially Hosted Infrared Payload (CHIRP). There is also Ka-band payload present on the satellite although not licensed (by FCC) to be used at 87W position.
85	44 C-band and 12 Ku-band transponders, broadcasting, business services, direct-to-home TV broadcasting, telecommunications, VSAT networks	**256**	26 Ku-band, 2 C-band and 2 Ka-band transponders
86	89 Ka-band beams generated by two transmit and two receive apertures to provide high-speed broadband mobile satellite communication services up to 50Mbps to Indian Ocean Region. 6 Steerable spot beams to direct additional capacity where it is needed. First satellite of Global Xpress network.	**257**	32 Ku-band transponders for television broadcasting.
87	44 C-band and 12 Ku-band transponders, broadcasting, business services, direct-to-home TV broadcasting, telecommunications, VSAT networks.	**258**	24 Ku-band and 12 Ka-band transponders to cover CONUS, Alaska, Hawaii. Leased to Echostar Satellite Services
88	22 (+11) L-band transponders (22W Power amplifiers), C-band uplink. 7 Wide Spots and 1 Global Beam to provide broadcasting, business services and mobile communications over Indian Ocean region	**259**	2 active X/S-band transponders, each with 16 active (6 spare) 228-w TWTAs to provide state-of-the-art digital audio radio programming directly to cars, homes and portable radios coast to coast.
89	8 Ku-band and 4 Ka-band transponders to provide the services to Asia, Russia, Middle East and Europe.	**260**	X/S-band transponders. It will enhance the existing XM satellite fleet, ensuring XM subscribers across North America continue receiving high-quality, digital-music, entertainment and data services.
90	24 C-band and 24 Ku-band transponders to provide voice and video services	**261**	24 transponders in Ku-band and several X-band. Third of Spain's communications satellites with government, commercial and military application.
91	25 Ku-band and 24 C-band transponders to serve customers in Europe, Northern Africa and India, as well the Middle East	**262**	28 C-band to provide voice and video communications to all of South America.
92	12 C-band transponders, 28 Ku-band transponders. After purchasing by Intelsat will be moved to position 50.5E as a place holder to keep the position for Turksat.	**263**	24 Ku-band transponders to provide television programmes, government agencies and enterprise networks to CONUS and Mexico.
93	28 C-band, 50 Ku-band and one Ka-band transponders to provide a wide range of telecommunications, video, voice and data transmission services to Asia, Africa, Middle East, Europe.	**264**	32 active high-power transponders Ku-band and 8 Ka-band transponders to provide digital HDTV to Canada and America. Fully leased to Bell TV.
94	48 Ku-band transponders to provide Voice/data networks, Broadband applications, Governmental services and Professional Video services to Europe, Middle-East, Central Asia, Far East/Australia and Central Africa	**265**	16 Ku-band transponders to provide broadband internet, business television services to CONUS. Planned for redeployment to 79W orbital position
95	24 normal C-band transponders, 6 XC transponders, two S-band broadcast satellite (BSS) transponders and one mobile satellite service (MSS) transponder providing voice, video and digital data services to India and neighbouring countries.	**266**	24 Ku-band and 24 C-band transponders. Planned for relocation to 96.2 West orbital position and operate there pursuant to Argentine ITU filings
96	12 high-power Ku-band transponders to provide Direct-To-Home (DTH) television services, Video Picture Transmission (VPT) and Digital Satellite News Gathering (DSNG)	**267**	24 active Ku-band transponders with two groups of 16-for-12 redundant linearized TWTA's transponders
97	UHF, C-band and Ku-band transponders to cover India's landmass	**268**	24 active Ku-band transponders and 2 active R-Band transponders providing Direct-to-Home broadcast services to the Mexico, Central America, and Caribbean Regions
98	6 Extended C-Band transponders, 6 Ku-band transponders and 2 Ka-band beacons	**269**	14 C-band transponders (radio and TV signal), 12 Ku-band (data and high speed Internet) and 2 Ka-band (future digital TV signal transponders to cover most of South American continent and part of Caribbean areas, and provide communications and broadcasting services to Venezuelan as well as the surrounding region

KEY	COMMENT	KEY	COMMENT
99	51 Ku, 6 Ka and 32C band transponders to provide a wide range of services for Asia, Russia, Africa, and the Middle East, including DTH, cable TV distribution, multimedia applications, as well as data networks and telecommunications services.	**270**	16 Ku-band transponders to cover Western United States to Central/Mountain region.
100	28 C-band and 28 Ku-band active transponders to provide reliable broadcasting and telecommunications services over the Asia Pacific Region, Africa, Middle East and a part of Europe.	**271**	32 Ku-band transponders covering CONUS and Mexico.
101	25 C-band and 14 Ku-band transponders to provide television and Internet services to the Asia-Pacific region.	**272**	32 Ku-band transponders to provide coverage of Mexico, USA, and Central America. The satellite is fully contracted to a subsidiary of EchoStar Corporation and will be used in part by Dish Mexico, an EchoStar joint venture, for Direct-To-Home (DTH) services in Mexico
102	18 C-band and 8 Ku-band transponders to serve the growing satellite television market in Thailand, Laos, Cambodia, Myanmar, Southeast Asia and Africa.	**273**	28 C-band, 16 Ku-band transponders to provide telecommunication services to South America
103	24 (+8) Ku-band transponders to provide a package of communications services (digital TV, telephony, videoconferencing, data transmission, the Internet access) and to deploy satellite networks by applying VSAT technology.	**274**	32 Ku-band transponders
104	16 C-band, 12 Ku-band and 1 L-band transponders to provide a package of communications services (digital TV, telephony, videoconferencing, data transmission, the Internet access) and to deploy satellite networks by applying VSAT technology.	**275**	32 Ku and 24 C-band transponders to provide business (government and VSAT), media and entertainment services to CONUS, Canada, Mexico, Caribbean, Central America and South America (steerable Ku-band beam).
105	12 C-band, 12 Ku-band; relay voice, data, television signals via Ku-band to eastern Asia, Australia, New Zealand, India; via C-band to eastern and southern Asia and Hawaii. Digital TV.	**276**	24 Ku-band transponders to provide data, telephone, and television transmission services for Argentina, Chile, Uruguay, Paraguay, and Bolivia. Currently being tested at 81 West orbital position
106	12 Ku-band, 12 C-band transponders for data and TV services.	**277**	28 C-band, 16 Ku-band, and 1 X-band transponders providing Telecom, Internet and digital services for Brazil, South America and Mexico
107	18 C-band transponders, 12 Ku-band transponders and GPS aided Geo Augmented Navigation (GAGAN) payload. India land mass and wide coverage.	**278**	48 Ku-band transponders to provide the coverage of the entire Brazilian territory and the expansion of the service to the Western South and Central America, as well as Mexico and mainland United States.
108	12 Extended C-band transponders to be used for tele-education, telemedicine and to support village resource centres.	**279**	32 Ku-band (for first five years, 28 after) transponders providing Direct-to-home TV; multimedia; broadcasting to Europe.
109	20 active Ku-band transponders. Moving to 85 East orbital slot.	**280**	18 (+6) Ku-band transponders to cover continental Europe. Placeholder for the upcoming Turkmenspace-1 satellite launch.
110	22 active Ku-band transponders to provide Video and Data Services for Middle East, Indian Ocean Regions and Russia. SKY Perfect JSAT owns 5 of 22 Ku-band transponders on Intelsat 15 satellite under the name JCSAT-85 and offers capacity serving Asia, the Indian Ocean Region and the Middle East.	**281**	28 Ku and 24 C-band transponders to provide broadcasting, cable, internet services to CONUS, Canada, Mexico, Caribbean, Central America, South America.
111	16 (+4) Ku-band transponders to provide voice and video communications throughout Kazakhstan, Central Asia, the Caucasus, and parts of Russia	**282**	24 Ku- and 24 C-band to provide broadcasting, business, cable services to CONUS, Hawaii, Caribbean and southern Canada. Moving to 67 West location
112	41 Ku-band and 10 C-band transponders to provide services to Central Asia, South-East Asia, India sub-continent Middle East and Mediterranean Sea	**283**	28 C-band, 16 Ku-band, and 1 X-band transponders providing Telecom, Internet and digital services for Brazil, South America and Mercosul
113	24 C-band and 23 Ku-band transponders to provide commercial communication services to Africa, Europe, the Middle East, Central Asia and the Asia-Pacific region	**284**	24 C-band; several X-band.
114	36 Ku-band and 17 C-band transponders providing for the coverage zone over the whole Russian and CIS territory	**285**	46 active Ku-band transponders, of which 27 will be fixed and 19 switchable covering Brazil, the Continental United States (including the Gulf of Mexico and northern Caribbean), the Southern Cone of South America, the Andean region (including Central America and southern Caribbean), and the North and Mid-Atlantic Ocean.

KEY	COMMENT	KEY	COMMENT
115	24 C-band and 24 Ku-band transponders	**286**	32 Ku-band transponders to cover Central/Mountain region to Eastern U.S.
116	12 Ku-band and 12 C-band transponders to provide C-band communications services throughout Asia, the Middle East and Africa, and Ku-band direct-to-home television broadcasting to Malaysia and Indonesia.	**287**	36 Ku-band transponders to provide DTH telecommunications to CONUS
117	48 Ku-band transponders to expand the SatCom capacity over Malaysia, Indonesia, India and Australia	**288**	54 Ku-band transponders, 10 C-band transponders to provide a full range of telecommunications services to Brazil, and North and South America
118	22 active Ku-band transponders for broadcast satellite services (BSS) to provide communications services across China (including Hongkong, Macao and Taiwan)	**289**	33 Ku-band and 19 C-band to provide services covering Brazil, Latin America and the United States. 9 Ka-band spot beams are also included, providing the first Ka-band coverage over Latin America.
119	12 Ku-band and 12 C-band transponders to provide direct-to-home voice and video communications throughout India.	**290**	32 Ku-band transponders to provide expanded services, including HD programming, for DISH Network's more than 14 million direct-to-home television subscribers in the United States.
120	12 C-band, 6 extended C-band, 6 Ku-band for voice, video and data transmission to West Asia, East Asia, India; augment present INSAT capacity for communication and meteorological services.	**291**	24 Ku-band transponders to provide coverage to the Americas and respond to the increasing demand of direct-to-home and high-definition television broadcasts.
121	50 Ku-band transponders to cover Asia, Australia, Africa, Middle East and 12 Ka-band super high gain uplink beams	**292**	24 C-band and 36 Ku-band transponders for broadband, video and voice applications with coverage over the Americas and Europe
122	24 active Ku-band transponders of 36 or 54 Mhz capacity switchable amongst 33 channels and 2 beams to provide communication services to South Asia and Indo-China regions.	**293**	24 C-band, 40 Ku-band transponders. Planned for relocation to 60.1 East spot after Nov 15 2015
123	16 Ku-band, 10 C-band and 1 L-band transponders to provide TV & radio broadcasting, telephony, data transmission, VSAT applications, multimedia services, presidential and governmental mobile communications, commercial mobile communication to Russia, Kazakhstan, northукт areas of Middle East, Mongolia and China.	**294**	38 C-band and 6 Ku-band transponders, broadcasting, business services, direct-to-home TV broadcasting, telecommunications, VSAT networks
124	128 active L-band elements, 17-w SSPAs C-band 2 active + 2 spare to provide a GSM-compatible mobile telephone services to multiple regions including Southeast Asia.	**295**	36 Ku-band, 27 C-band transponders to provide services for North and South American continents.
125	19 Ku-band and 26 C-band transponders to provide commercial communications to China, East Asia, China Sea, South Asia, Indian Ocean, the Middle East, Africa and Australia.	**296**	89 Ka-band beams generated by two transmit and two receive apertures to provide high-speed broadband mobile satellite communication services up to 50Mbps to Atlantic Ocean Region. 6 Steerable spot beams to direct additional capacity where it is needed. Second satellite of Global Xpress network.
126	26 C-band, 14 Ku-band transponders to provide improved power and coverage to AsiaSat's customers across the Asia Pacific region.	**297**	22 (+11) L-band transponders (22W Power amplifiers), C-band uplink. 7 Wide Spots and 1 Global Beam to provide broadcasting, business services and mobile communications to Atlantic Ocean region-West
127	16 C-band, 12 Ku-band and 1 L-band to provide TV & radio broadcasting, telephony, data transmission, Internet access, videoconferencing and other services to all of Russia.	**298**	24 C-band transponders, 15 Ku-band transponders to provide communications services for the Americas, Europe and Africa.
128	3 L-band transponders to provide digital audio and multi-media communications to Africa, Middle East, Asia, Latin America and Caribbean.	**299**	36 C-band, 36 Ku-band; direct-to-home (DTH) digital video and Internet services; Americas, Caribbean, Europe, Africa.
129	28 C-band and 17 Ku-band transponders and a Ka-band payload. Its region-wide high power C-band beam covers Asia, the Middle East, Australasia and Central Asia, with Ku-band beams serving East Asia, South Asia and a steerable Ku beam.	**300**	10 Ku-band and 26 C-band transponders to provide inclined capacity over the Atlantic Ocean Region. Planned for retirement as of October 2014
130	24 Ku-band transponders and a Ka-band beam to provide direct broadcasting, private networks and broadband connectivity for customers in China, India, Southeast Asia and the Middle East	**301**	28 C-band and 3 Ku-band transponders to cover Latin America, Iberian peninsula, Canary Islands, Western Europe and+N185 much of Eastern Europe.

KEY	COMMENT	KEY	COMMENT
131	24 C-band and 12 extended C-band transponders to provide voice and video communications to Indonesia and other regional countries	**302**	40 C-band and 22 Ku-band transponders to cover Americas, Europe and Africa
132	24 C-band, 24 Ku-band transponders providing direct-to-home voice, video and data transmission in India, China and Philippines.	**303**	32 Ku-band transponders to provide BSS services to CONUS and Puerto Rico. Moving to 45 West orbital position to support the needs of Brasilian market
133	22(+5 spare) Ku-band, 10(+3 spare) S(X)-band transponders to provide robust DTH and other telecommunications services including broadband Internet throughout the Asia-Pacific region	**304**	24 C-band, 24 Ku-band transponders delivering 160 voice, video, data, and Internet channels to Americas, Caribbean, Europe.
134	24 Ku-band; voice and video communications to Japan.	**305**	18 Ku-band transponders serving Latin America (Brazil, part of Mexico, Venezuela and Florida) and 16 C-band transponders serving the USA (CONUS), Mexico and South America.
135	4 active (4 spare) high-power Ku-band transponders to provide voice and video communication for Japan and vicinity.	**306**	43 C-Band and 48 Ku-Band 36 MHz equivalent transponders (38 C-Band and 36 Ku-Band physical transponders) to provide services to Brazil, South cone, the Andean region, North America, Mexico, Central America and the Caribbean. Also featuring an innovative payload for mobile maritime and aeronautical services covering North America, the Gulf of Mexico, North Atlantic and Europe.
136	12 Ku-band transponders to provide direct broadcast services throughout Japan	**307**	72 C-band transponders.
137	30 C-band and 16 Ku-band transponders to provide broadcasting, business services, direct-to-home TV broadcasting, telecommunications and VSAT networks to Asia Pacific region.	**308**	39 high-power Ku-band transponders to provide telecommunication services (video and data applications) to North America, Europe and Africa continents as well as mobile communication services to the Atlantic ocean region.
138	24 active Ku-band transponders to provide direct TV broadcast links for all of Japan.	**309**	44 C-band and 12 Ku-band transponders, broadcasting, business services, direct-to-home TV broadcasting, telecommunications, VSAT networks
139	12 Ku-band transponders to provide direct broadcast services throughout Japan	**310**	8 Ka-band and 2 Ku-band transponders to provide broadband Internet access and to distribute and broadcast High Definition Television (HDTV) and cover 22 countries in Western and Central Europe.
140	24 Ku-band active transponders, 8 SHF-band active transponders, 4 Ka-band active transponders	**311**	16 Ku-band and 36 C-band transponders to provide High definition TV and high speed Internet services.
141	24 standard C-band, 11 extended C-Band and 5 Ku-band transponders to provide telecommunication services to Indonesia, ASEAN countries, Asian countries, Middle East and Australia.	**312**	53 active Ku-band transponders to provide Fixed Satellite Services (FSS) and Broadcast Satellite Services (BSS) to Europe, the Americas, and North Africa.
142	30 Ku-band and 3 Ka-band transponders to provide telecommunication services to Afghanistan/Pakistan and Middle East.	**313**	8 X-band (4 RHCP + 4 LHCP) and 1 Ka-band transponders to provide commercial X-band services to U.S., European and Allied government agencies and military forces covering the United States, South American and African continents and the Middle East. (2 global, one fixed and 3 steerable beams)
143	38 C-band transponders to provide voice and video services to Asia-Pacific and Oceania	**314**	26 C-band and 10 Ku-band transponders; broadcasting, business services, direct-to-home TV broadcasting, telecommunications, VSAT networks. Planned for relocation to 29.5 W orbital position
144	30 active Ku-Band transponders to provide broadcasting and telecommunications services over Korea.	**315**	44 C-band and 12 Ku-band transponders
145	24 (+4) C-band transponders to provide TV, telephony and Internet services to the South-East Asian region (ASEAN), Indian sub-continent and Indonesia	**316**	44 C-band and 12 Ku-band transponders, broadcasting, business services, direct-to-home TV broadcasting, telecommunications, VSAT networks
146	84 Ku-band spot beams, 3 shaped beams, 7 broadcast beams and 18 Ka-band spot gateway (uplink) beams to provide voice, video, and broadband Internet services to 14 countries including India, Thailand, Japan, Indonesia, and Australia.	**317**	52 C-band transponders and 72 Ku-band transponders to provide service to Europe/Middle East, West Africa, North America and South America.
147	28 C-band, 16 Ku-band; broadcasting, internet services, multimedia, telecommunications	**318**	36 C-band, 36 Ku-band; broadcasting, business services; Europe, Africa, the Middle East, the Americas.
148	28 C-band transponders to provide services via its regional beam in South Asia and Southeast Asia, Australia and New Zealand	**319**	44 C-band and 12 Ku-band transponders, broadcasting, business services, direct-to-home TV broadcasting, telecommunications, VSAT networks

KEY	COMMENT	KEY	COMMENT
149	28 C-band, 16 Ku-band; extensive C-band coverage across Asia and targeted Ku-band beams for Australasia, East Asia, and a BSS payload for provision of Direct to Home (DTH) services to Hong Kong.	**320**	14 C-band and 30 Ku-band transponders providing voice and video communications to Asia, Africa, Middle East, Europe. Planned for relocation to 18.2 West orbital slot.
150	44 Ku-band high-power transponders to provide uplink and downlink coverage over Japan, Asia, and Oceania. Additionally, two steerable antennas will provide coverage for new and emerging markets.	**321**	38 Ku-band transponders providing voice and video communications to the Americas, Europe, and Africa
151	24 C-band, 8 Ku-band and 1 S-band active transponders to provide telecommunication services to China, Mongolia, the Korean Peninsula, Japan, Russia, parts of Asia, South Asia, Southeast Asia, Central Asia, West Asia, Australia and New Zealand	**322**	22 (+11) L-band transponders (22W Power amplifiers), C-band uplink. 7 Wide Spots and 1 Global Beam to provide broadcasting, business services and mobile communications to Atlantic Ocean Region-East
152	30 Ku-band high-power transponders and 12 C-band medium-power transponders to provide direct-to-home radio and television services to Japan, Asia-Pacific, and Hawaii	**323**	12 C-Band and 5 Ku-band transponders to provide TV and radio broadcasting, communications, Internet, video-conference and other services to Russia and neighbouring countries.
153	30 Ku-band high-power transponders and 12 C-band medium-power transponders to provide telecommunications service covering Japan, the Asia-Pacific region and Hawaii. In-orbit backup satellite	**324**	24 Ku-band transponders to provide coverage of Europe and the east coast of the United States. Twenty channels, telecommunications services between Europe and the Americas.
154	Korean multi-function geostationary satellite COMS (Communication, Ocean and Meteorological Satellite). S/L-band transponder, Ka-band transponders	**325**	10 C-band (40 MHz) transponders, 16 Ku-band (54 MHz) transponders and 1 L-band (1 MHz) transponder with improved power characteristics to provide digital TV & Radio Services, Internet access, data transfer, video conferencing, VSAT multi services networks deployment as well as for the presidential and governmental mobile communications
155	20 Ku-band, 20 C-band and 1 S-band transponders to cover Japan, Southeast Asia, Hawaii and Lo Oceania	**326**	28 Ku-band, 4 Ka-band transponders providing cable programming and direct-to-home broadcasting. Planned for relocation to 8 West orbital position as Eutelsat 8 West C
156	12 Ku-band, and 8 C-band transponders to provide voice, video, and Internet services to Vietnam, eastern Asia, India, Australia, Japan, and Hawaii	**327**	24 C-band transponders.
157	24 Ku-band transponders to provide radio, television and telephone transmission services for all of Vietnam and certain parts of the Asia Pacific region	**328**	26 Ku-band transponders. European and American coverage.
158	38 C-band transponders, 12 Ku-band transponders	**329**	18 Ku-band transponders covering Middle East, north and central Africa and southern Europe.
159	1 C-band transponder, 20 S-band transponders	**330**	24 Ku-band and 4 Ka-band transponders to provide direct-to-home television, radio and data-transmissions in Middle East, Africa, the Gulf States
160	54 active transponders; one of the most powerful communications satellites built to date; coverage across East Asia and the Pacific Ocean	**331**	56 active Ku-band transponders to provide services to Middle East, Gulf states, North Africa and North-West Africa
161	30 C-band, 40 Ku-band, 12 Ka-band, 2 L-band transponders	**332**	45 transponders; Ku and C-band frequencies, Americas, Europe and Africa.
162	16 Ku-band transponders to cover eastern part of Russia	**333**	11 (+3) Ku-band transponders to provide communication services to Europe, Middle East, East Coast of USA.
163	18 C-band and 20 Ku-band transponders to provide voice and video communications throughout China and neighbouring countries.	**334**	14 Ku-band; Nordic region, central and eastern Europe.
164	228 Narrow Spots, 19 Wide Spots and 1 Global Beam to support the new Broadband Global Area Network (B-GAN) for internet and intranet solutions, video on demand, video-conferencing, fax, e-mail, telephone and high-speed LAN access	**335**	12 Ku-band and 2 Ka-band transponders to cover the Middle East, Europe, Africa, and parts of the Americas.
165	Ka-band transponders enabling super high-speed data communications of up to 1.2 Gbps to bring broadband Internet services into underserved households and businesses, the Wideband Internetworking engineering test and Demonstration Satellite will reach both local markets in Japan and international centres across the Asia-Pacific region	**336**	30 C-band, 24 Ku-band transponders; 190 high fidelity channels and 50,000 simultaneous telephone links.

KEY	COMMENT	KEY	COMMENT
166	28 Ku-band transponders to cover the Asia-Pacific region, the Indian Ocean, Oceania, and the Pacific Islands.	**337**	C and Ku-band services for the Atlantic Ocean region for ABS's existing customers currently residing on ABS 3 satellite.
167	30 C-band, 6 Ku-band; voice and vision communications to a large area bounded by Iran, Vlodivostok, Australia, and New Zealand.	**338**	36 Ku-band, 70 C-band transponders providing television, data, and other telecommunication services to Europe, Africa and the Middle East.
168	6 C-band and 9 Ku-band transponders to provide "inclined" capacity for telecommunications and broadcasting services across Africa, Southern Europe and the Middle East.	**339**	24 (15 FSS and 9 BSS) Ku-band transponders to provide telecommunication facilities for Scandinavia, Europe, and the Middle East
169	32 Ku-band transponders covering Asia-Pacific region (Japan, Korea, most of China, Thailand, Vietnam, Laos, part of Indonesia, part of Malaysia) and Hawaii	**340**	36 (16 FSS and 20 BSS) active Ku-band transponders to provide high power direct-to-home (DTH) television services to the Nordic countries and to serve the growing broadcasting demands within Central and Eastern Europe.
170	24 (+8) Ku-band transponders to provide television and communications services to Australia and New Zealand	**341**	11 Ku-band transponders, dedicated to expanded broadcast services in Europe and additional Ku-band capacity for back-up. Ka-band payload to meet the growing demand for high-bandwidth broadband communications by the maritime industry and includes spot beams over the North Sea, Norwegian Sea, Red Sea, Baltic Sea, the Persian Gulf, and the Mediterranean.
171	16 C-band, 16 Ku-band; coverage to Japan		

ANNEX 5

SSDM ADVISORY BOARD MEMBERS - 2016

CHAIRMAN OF THE ADVISORY BOARD

H.E. Eng. John Nasasira

- Minister of Information and Communications Technology
- Uganda

Hon. John M. Nasasira has held the following portfolios in the Government of the Republic of Uganda:

- Minister of Information and Communications Technology (May 2013 to date)
- Minister of Gender, Labour and Social Development (November 2012 – to May 2013)
- Minister for General Duties in Prime Minister's Office (August - October 2012)
- Government Chief Whip/Cabinet Minister (June 2011 – July 2012)
- Minister of Works and Transport (June 2006 – May 2011)
- Minister of Works, Transport, Housing and Communications (August 1998 – May 2006)
- Minister of Works, Transport and Communications (July 1996 – July 1998)
- Minister of Agriculture, Animal Industry and Fisheries (July 1995 – June 1996)
- Minister of State for Agriculture, Animal Industry and Fisheries (Dec. 1994 – June 1995)
- Deputy Minister of Works, Transport and Communications (April 1992 – Nov. 1994)

- Presidential Advisor on Public Works (July 1991 – March 1992)
- Deputy Minister of Works (April 1989 – June 1991)
- Delegate to the Constituent Assembly (1994 – 1995) that debated, adopted and enacted the 1995 Uganda Constitution.

He was first elected to Parliament to represent Kazo Constituency in February 1989 and has since been re-elected in 1996, 2001, 2006 and 2011. Hon. John Nasasira graduated in 1976 with BSc (Hons) Degree in Civil Engineering from the University of Nairobi. He then qualified as a Chartered Engineer (UK) in 1986 and in the same year became a Member of Institution of Engineers, UK (MICE), a Member of the American Society of Civil Engineers, (MASCE) and a Member of Institution of Engineers of Kenya (MIEK). He is a Fellow of Uganda Institution of Professional Engineers (UIPE) and is the current Patron of this Institution.

Hon. John Nasasira worked with several International Firms of Consulting Engineers engaged in the design and supervision of buildings, water, airports, roads and bridges projects in Eastern African and Middle East (June 1976 – February 1989).

VICE CHAIRMAN OF THE ADVISORY BOARD

Mr José Manuel do Rosário Toscano

- Director General
- International Telecommunications Satellite Organization (ITSO)
- ITU Broadband Commission Member

As Director General of the International Telecommunications Satellite Organization ("ITSO"), an intergovernmental organization based in Washington, DC, with 149 member nations, Mr Jose Toscano is committed to assuring the provision of affordable satellite telecommunications services to all countries of the world.

A telecommunications engineer by training, Mr Toscano has more than twenty five years' experience in the telecommunications sector, and has been actively involved in the definition, development and work of numerous regional and international regulatory initiatives in the telecommunications and satellite communications fields, including with the International Telecommunications Union, the European Commission, and the European Conference of Postal and Telecommunications Administrations.

Mr Toscano, one of the founding members of the Broadband Commission for Digital Development, also has firsthand knowledge and understanding of the critical importance of broadband to the successful promotion and development of innovative information and communication technologies on a global basis.

BOARD MEMBERS

Mr Flavien Bachabi

- Managing Director
- ABS Africa (Pty) Ltd

Flavien Bachabi is currently Managing Director of Africa Broadcast Satellite (Pty) Ltd. In this capacity he is responsible for leading ABS sales and business operations for the African continent. Prior to his current position, Mr Bachabi served as Chairman and Chief Executive Officer of Intelsat (Luxembourg) S.A., as well as Vice President of Business Operations and Intergovernmental Initiatives at Intelsat S.A., and head of Intelsat's corporate headquarters in Luxembourg, between January 2011 and September 2014.

In this capacity, his responsibilities included oversight of all major business operations, joint venture agreements and regulatory filings. He was responsible for managing new business activities with intergovernmental entities and development banks. His prior positions included: Regional Vice President for Africa and Head of Intelsat Africa (Pty) Ltd., where he was responsible for building Intelsat's leading position in Africa with the Continent's premier service providers, Regional Vice President for Africa and Middle East and Group Director, Africa sales. Prior to joining Intelsat in 1996, he spent more than 15 years in senior management roles with the Benin Telecommunications administration, where he led both domestic network and international services. He also has served on the Board of Directors of the Multinational School of Telecommunications of Dakar (ESMT), the African Telecommunications Union (ATU), and the Regional African Satellite Communications Organization (RASCOM).

Mr Bachabi has over 30 years of experience with communication and technology companies, and he earned degrees in Mathematics and Physics from the University of Benin, as well as a Master of Science Degree in Telecommunications Engineering from the Technical Institute of Electronics and Telecommunications of St. Petersburg (LEIS).

Mr Khalid Ahmed Balkheyour

- President and Chief Executive Officer
- ARABSAT

With over 30 years of experience in the telecoms industry, Mr. Khalid Balkheyour has held the role of the President and CEO of the Arab Satellite Communications Organization (ARABSAT) since 2003.

Mr Khalid Balkheyour came to Arabsat from Lucent Technologies where he was the Executive Vice President for Marketing and Sales from 1999 to 2003. Prior to that, he was the Vice President of Operations and Maintenance in the Saudi Ministry of PTT, later known as Saudi Telecommunication Company (STC).

He holds a Masters degree in Electrical Engineering from California State Polytechnic University Pomona in 1981.

Ms Donna Bethea-Murphy

- Senior Vice President
- Inmarsat Global Ltd

Ms Donna Bethea-Murphy is Senior Vice President of Global Regulatory for Inmarsat, the leading provider of global mobile satellite communications services. In this capacity, she leads the company's domestic and international regulatory activities. Prior to Inmarsat, she Vice President, Regulatory Engineering at Iridium Communications Inc. In this capacity, Ms. Murphy was responsible for the company's domestic and international technical regulatory activities, including those related to policy, standards, licensing, and spectrum management.

As a leader and advocate within the satellite community, Ms Murphy has consistently highlighted the importance of satellite services during emergencies and times of disaster. In particular, she has promoted in-country preparedness and disaster planning within the United States and at the United Nations. In part due to these efforts and Iridium's work in disaster preparedness, the ITU selected Iridium as the recipient of its 2012 ITU Humanitarian award for which Donna accepted the award.

Ms Murphy has taken on a leadership role within the industry in other areas and currently serves on the FCC's Communications Security Reliability and Interoperability Council and on the boards of the Satellite Industry Association and the Mobile Satellite Users Association. While working on behalf of satellite companies, both for Iridium and previously for PanAmSat, Ms Murphy has worked to establish regulatory policies to facilitate the successful roll-out of satellite-based Internet, broadband, Direct-to-Home broadcasting, aeronautical, maritime and telephony services.

Prior to joining PanAmSat, Ms Murphy worked for a leading mobile terrestrial operator and advocated company regulatory policy positions before United States government agencies on issues such as Caller-ID, E-911, radio frequency radiation hazards and Communications Assistance for Law Enforcement. Ms Murphy began her career working for the United States Federal Communications Commission where she negotiated bilateral coordination agreements between the US-based satellite operators and foreign administrations, and she represented the US government before international intergovernmental bodies.

M. Bethea-Murphy holds a Bachelors of Science in electrical engineering from Clemson University.

Ms Charlotte Lindsey Curtet

- Director of Communication and Information Management
- International Committee of the Red Cross (ICRC)

As Director of Communication and Information Management at the International Committee of the Red Cross (ICRC) a post she has held since July 2010, Charlotte Lindsey Curtet is responsible for the ICRC's global ICT services, Archives and Information Management, Public and Corporate Communication.

Prior to this post, Charlotte was Deputy Director of Communication, ICRC, from January 2004 to July 2010. In a 21 year career with the ICRC, Charlotte has also held a number of other posts in the ICRC's Headquarters and in field delegations including deputy Head of Division for Policy and Cooperation within the Movement, Head of Women and War Project, and missions in Bosnia-Herzegovina, Kenya, Rwanda, Tajikistan and Croatia in a range of functions.

Ms. Lindsay Curtet holds a Masters degree (MSc. Hons.) in Communication Management. She has honours degree (BA Hons.) in Business Studies majoring in law and marketing. Charlotte has authored several publications including Women facing War published in 7 languages.

Mr Timothy S. Ellam Q.C.

- President
- International Amateur Radio Union

Timothy St. John Ellam QC is a partner in the Litigation and Intellectual Property Groups at McCarthy Tetrault LLP and a former member of the Firm's Board of Partners.

Mr Ellam advises clients over disputes relating to intellectual property, related commercial matters and with international arbitrations. He has appeared as senior litigation counsel in patent, licensing, copyright and technology related trials, arbitrations and hearings. Recent cases where he was lead counsel are recognized in Chambers Global (2011-2015) and Lexpert. He frequently works with the Firm's London office on significant international arbitration matters and on litigation proceedings in the High Court of Justice (Commercial Court).

Mr Ellam is also a Solicitor Advocate (Higher Courts – Civil) in the Law Society of England and Wales and holds Rights of Audience in the Higher Courts in that jurisdiction. He is an IBA Fellow in International Legal Practice; a distinction granted by the International Bar Association and the College of Law of England and Wales in 2005, becoming the first lawyer in Canada to be awarded this designation. He was recently elected to the American Bar Foundation. In 2014, he was appointed Queen's Counsel.

Mr Ellam is also the co-author of Dispute Resolution in the Telecommunications Sector, published by the International Telecommunication Union and the World Bank. He is a recognized speaker in a number of areas relating to intellectual property including privacy and data protection and been a speaker and moderator at a number of ITU Telecoms.

Mr Ellam is also President of the International Amateur Radio Union (IARU), a sector member of the ITU. Created in Paris, France, in 1925 the IARU has been the watchdog and spokesman for the world Amateur Radio community since 1925. Currently located in Newington, CT USA, the IARU is an UN recognized NGO consisting of over 160 national amateur radio societies around the world. He has represented the IARU at a number of ITU meetings since 2001.

Mr Samer Halawi

- Chief Executive Officer
- Thuraya Telecommunications Company

Samer Halawi has served as Thuraya's Chief Executive Officer since January 2011. Drawing upon his extensive experience in ICT and the global satellite communications industry, Samer is responsible for leading Thuraya's strategic positioning and driving its growth as a prominent global Mobile Satellite Services operator.

Throughout his career, Samer has demonstrated an unwavering commitment to connecting the disconnected via satellite. He has supported a number of non-profit organizations including the ITU, SOS Children's Villages, NetHope, the Rory Peck Trust and the International News Safety Institute with free airtime and satellite equipment enabling rural and remote communications. Samer has been responsible for leading the close collaboration between the Company's Service Partners, NGOs and government organizations to provide satellite communications during times of emergencies in China, Japan, the Philippines and Sierra Leone. Thuraya's services have resulted in countless lives being saved when terrestrial networks were damaged or destroyed.

Before joining Thuraya, Samer played a leading role in starting-up and growing a new venture involved in the digital space that focused on mobile content, IPTV, mobile advertising and web management. Prior to that, Samer was part of Inmarsat's global strategy team where he was responsible for running operations for the Middle East, Africa, and Asia Pacific. Samer's other telecommunications experience relates to his roles at Flag Telecom and ICO Global Communications. His role at ICO followed a private placement for the shares of the company that he led during a three-year period he spent in investment banking in the Middle East.

Samer started his career in the automotive industry where he was part of the Chrysler Corporation and Ford Motor Company. He holds a Bachelor of Science degree in Electrical Engineering from Lawrence Technological University and an MBA with a concentration in Finance from the University of Michigan at Ann Arbor in the U.S.

Mr Rashid Khalikov

- Director
- Office for the Coordination of Humanitarian Affairs (UN OCHA)

Rashid Khalikov joined the Russian Foreign Service in 1976. He worked in New Delhi, Moscow and New York handling humanitarian, political, economic and environmental issues. Mr Khalikov joined the United Nations in 1993. He has worked as a Senior Humanitarian Affairs Officer, Chief of the Office of the Under-Secretary-General for Humanitarian Affairs and Inter-Agency Standing Committee/Executive Committee on Humanitarian Affairs secretariat, and Deputy Director of OCHA Geneva.

In 2005 he became the Head of the OCHA Regional Office for Asia and the Pacific in Bangkok, and the Area Humanitarian Coordinator in the aftermath of the South Asia earthquake. From September 2006 to April 2010, as the Director of OCHA New York, Mr. Khalikov oversaw OCHA's work on policy development, information management, external relations, the Central Emergency Response Fund and other humanitarian financing issues.

In 2009 and 2010, at the request of the Emergency Relief Coordinator, Mr Khalikov led missions to Pakistan, Yemen, the Democratic People's Republic of Korea and Kyrgyzstan to evaluate in-country humanitarian conditions, and to develop recommendations on the UN's humanitarian role in these crises. In March 2010, the UN Secretary-General, Ban Ki-moon, appointed Mr Khalikov as the Director of OCHA Geneva. In March and April 2011, M. Khalikov was the Humanitarian Coordinator for Libya, as designated by the ERC. In August 2011, he led a UN humanitarian mission to Syria.

Mr Khalikov is a graduate of the Moscow State Institute of International Relations and holds a Master's degree in International Law and International Relations.

Mr Jones A. Killimbe

- Director General
- Regional African Satellite Communications Organizations (RASCOM)

Dr Jones A. Killimbe is an MSc and a PhD holder of Telecommunications Engineering from the University of Telecommunications Dresden/Germany. He joined the Tanzania Posts and Telecommunications Corporation (TPTC) in 1989 and later the Tanzania Telecommunications Company (TTCL) in 1994.

Between 1994 and 2003 he held a number of senior positions in the Company including Director of International Operations, Director of Network Construction, Deputy Managing Director, Acting Managing Director and Executive Director. He joined the Regional African Satellite Communications Organizations (RASCOM) in January, 2004 as the second DG/CEO since its establishment in 1993. He was also at one time a member of the Board of Governors of INTELSAT and Board Director/Chairman of RASCOM. He is Chairman of the African Regional Working Party on Private Sector Issues to the Forum on Telecom/ICT Regulation and Partnership in Africa (FTRA).

RASCOM is an African Continental Organization with the mission to launch a dedicated communication satellite for Africa and it brings together 44 African countries plus the West African Development Bank (BOAD). Its headquarters is in Abidjan, Ivory Coast.

Mr Olof Lundberg

- Former Chairman and CEO of ICO Global Communication
- Former Director General of INMARSAT

Mr Lundberg started his career with Swedish Telecom where he gained broad experience in telecommunications and in particular radio. During his time with Swedish Telecom he developed Maritex, an automated HF Telex System and he was involved with several generations of mobile radio.

In different assignments he managed HF Radio and Satellite Services, and also spent time in the regulatory area managing spectrum policy. During this period he participated actively in ITU and CEPT work. In 1979 he was appointed Director General of Inmarsat which he managed from creation through 1995.

At Inmarsat he led the pioneering development of mobile satellite communications in all forms, at sea, on land and in the air. He was CEO and then Chairman and CEO of ICO Global Communications 1995-2000 and Chairman and CEO of Globalstar around 2001-2002.

Mr Lundberg has received the CCIR Award d'Honneur and the ITU Gold Medal. He was awarded the Arthur C Clarke Award, has twice received the Aviation Week and Space Technology Laureate Award and has been inducted into their Hall of Fame. He has received the Tsiolkovsky Medal and is inducted to the SSPI Hall of Fame.

Mr Anudith Nakornthap

- Former Minister of Information and Communication Technology
- Thailand

Group Captain, Mr Anudith Nakornthap is the former Minister of Information and Communication Technology of Thailand. Prior to taking his political career, Mr Anudith Nakornthap was a distinguished pilot serving in the Royal Thai Air Force.

He was repeatedly awarded for his outstanding performance and academic achievements while in the Air Force. Although Mr Nakornthap became well known as a politician in Thailand when he was elected as Member of the House of Representatives from 2007-2011, his role in the Parliament, in fact, began as early as in 2005 when he dually served as a political secretary for Minister of Defense and advisor to Minister of Agriculture and Cooperatives from 2005-2006.

He was also actively involved in the energy sector while he was a member of the Committee on Energy of the House of Representatives in 2007-2011, during which he was appointed as Chairman of the Sub-Committee on Renewable Energy Promotion of the House of Representatives.

H.E. Mr Phillip Paulwell, M.P.

- Minister of Science, Technology, Energy and Mining
- Jamaica

The Hon. Phillip Paulwell M.P. is Minister of Science, Technology, Energy and Mining, leader of Government Business in the House of Representatives and Member of Parliament for the constituency of East Kingston and Port Royal. Minister Paulwell is also the current President of the Caribbean Telecommunications Union, and is one of six Regional Chairmen of Jamaica's governing People's National Party.

An attorney-at-law by profession, he first entered Gordon House as a Senator in 1995. In the General Election of 1997, he contested and won the East Kingston and Port Royal seat, and took his place in the Lower House. He has never lost an election since, and is currently in his fourth consecutive term of political representation. Minister Paulwell served as a Cabinet Minister from January 1998 to September 2007, and his portfolio responsibilities over the years have included Commerce, Industry, Telecommunications, and Energy, and, since his appointment as Minister in January 2012, Science, Technology, Energy and Mining. In this term of office, Minister Paulwell has announced bold plans to introduce tablet computers to schools, to revitalise the bauxite alumina sector and to reduce the high cost of energy.

These goals may seem ambitious, but his record of performance indicates his commitment to successfully executing visionary projects. Among his many achievements, Minister Paulwell is credited with the leading liberalization of the telecommunications sector, and in 2000 received the Gleaner Honour Award for implementing historic measures to introduce competition, breaking the 25-year Cable and Wireless monopoly. More recently, Minister Paulwell piloted the 2012 Telecoms Amendment Act through Parliament, resulting in a historic reduction of mobile call rates from as high as $18.99 per minute to as low as $2.49 in less than 12 months. Also in 2012, Minister Paulwell successfully negotiated to prevent the closure of WINDALCO's Ewarton alumina refinery, preserving over 600 direct jobs, and hundreds more indirect jobs.

Minister Paulwell is a graduate of the University of the West Indies, the Norman Manley Law School, and Excelsior High School.

Mr Christian Roisse

- Executive Secretary
- European Telecommunications Satellite Organization (EUTELSAT IGO)
- ITU Broadband Commission Member

Since July 2005, Christian Roisse has been the Executive Secretary of the European Telecommunication Satellite Organisation (EUTELSAT IGO). He was reappointed for a third mandate in May 2013. EUTELSAT IGO, which has 49 European Member States, has a twofold role. It maintains the rights to use radiofrequencies and orbital locations which were assigned collectively to the Member States by the International Telecommunication Union before the 2001 restructuring and monitors the operations of the Company, in particular to ensure that the Basic Principles are observed.

Prior to this, Christian Roisse was General Counsel of Eutelsat S.A., the world's third largest satellite operator, overseeing the legal activities of the company through the first 4 years of its operations as a French national law company. As Legal Adviser of EUTELSAT from 1988 to 2001, he played a key role in the restructuring of the organization and the transfer of its commercial and operational activities to the French national law company, Eutelsat S.A. which was established for this purpose.

From 1977 to 1988, he was Legal Adviser to France Telecom and Counsellor to the Head of the General Directorate for Industry in the French Industry Department. Christian Roisse holds a Master's degree in Law and a postgraduate Diploma in Public Law. He is a founding Commissioner in the Broadband Commission for Digital Development, established in May 2010 by the International Telecommunication Union and UNESCO and a Member of the Working Group on Long-term Sustainability of Outer Space Activities established by the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS).

He is a member of the International Institute of Space Law, the European Centre for Space Law and a Board Member of the Association pour le Développement du Droit de l'Espace en France (ADDEF). He sits on the Boards of Directors of Eutelsat S.A. and Eutelsat Communications S.A. as Censeur.

Mr Jean-Louis Schiltz

- Former Minister of ICT and Development cooperation
- Schiltz & Schiltz, avocats, Luxembourg
- Guest Professor (Telecommunications law), Luxembourg University

Jean-Louis Schiltz practices law in Luxembourg with focus on technology and finance. He is a Guest Professor at Luxembourg University, where he teaches Internet- and telecommunication law.

From 2004 to 2009, Jean-Louis Schiltz was a Cabinet minister in Luxembourg. He was in charge of media and telecommunications, including Internet. He was also the minister for international development cooperation during that period. In 2006, he was entrusted a third ministerial portfolio, that of Defense.

As the former Minister of Communications, Jean-Louis Schiltz actively promoted Luxembourg in the fields of telecommunications and ICT. He was also in charge of the development of the information and communication networks in Luxembourg. Thus he is the initiator of the LuxConnect project, a high bandwidth network between Luxembourg and primary foreign Internet access centers. LuxConnect is today one of the major actors in the sector and greatly contributes to strengthen the international Internet connectivity of Luxembourg.

Jean-Louis Schiltz is a member of the Broadband Commission for Digital Development.

H.E. Mr Tifatul Sembiring

- Minister of Communication and Informatics
- Republic of Indonesia

H.E. Mr Tifatul Sembiring is an Indonesian politician and minister of Communication and Information Technology of Indonesia. He is chairman of the moderate and Islamic Prosperous Justice Party and Minister of Communication and Information in the Second United Indonesia Cabinet.

He has a degree in computer engineering from the Information and Computing Management School, Jakarta, and was active in a number of Indonesian Islamic organizations from his student days, such as PII, the Indonesian Student's Association.

Mrs Christine Leurquin

- Vice-President, Institutional Relations and Communications
- SES

Christine Leurquin is VP, Institutional Relations and Communications at SES S.A. Positioning the Company within the European Union and other European institutions, such as European Union, ESA or OECD. She regards regulations, provides political support, and engages in setting-up research and Development and institutional projects. She follows the European Institutions' political issues and debates of interest to her company, especially those concerning the crisis management, satellite broadband and mobile multimedia sector. She is a Steering Board member of the Networld2020 and the 5G IA Association.

She is also the key person in the company as regards the GNSS projects such as Galileo and Egnos. She has 30 years of experience in the satellite telecommunications field in Europe. In her previous position, she was the CEO of a company which she started and which introduced new satellite services in Belgium. She turned it into a successful and profitable business. With her ability to speak various languages, Mrs Leurquin has been able to market in the areas that services are not yet established and she provides SES with that extra incentive to attaining clients in the regions.

Career Steps: Vice-President, European Programs, SES (2006-2007); Senior Manager, European Programs, SES-GLOBAL (1999-2006), President and CEO, Sait Videohouse SA (1992-98) ; Head of Space Data Division, Sait Systems SA (1989-92)

Associations and Accomplishments: Founder of ESOA and Chairman of the Executive Committee of ESOA (European Satellite Operators Association)(2004-2006), Regular Expert in Advisory groups European Institutions, Vice-Chairman of ISI (2004-2008),Founding member of the 5G PPP Association.

Education: University of Chicago, Management Courses (2001); H.E.C. OF St-Louis, Brussels, M.B.A. (1987-89), Germanic Languages (English/ German/ Passive Dutch/ American Culture), Master's degree, ULB, (1983).

Mr Andrew Sukawaty

- Chairman
- Inmarsat Plc.
- United Kingdom

Andy Sukawaty is the Chairman of Inmarsat PLC (LSE), having previously been both Chairman and CEO between 2003 and 2012. He led the company through its privatization and subsequent listing on the London Stock Exchange. During this period, Inmarsat launched new services on the back of the launch of a new global constellation of satellites and grew its revenues and profits dramatically. He has over thirty years' experience in the communications services arena including telephone, wireless, cable TV and satellite.

He is a pioneer in mobile communications; involved in launching some of the first cellular mobile phone systems in the early 80s in the US. He then crossed the Atlantic to start a UK mobile operator (which became T-Mobile UK). He went on to run NTL Ltd in the UK and in 1996 returned to the US to start up the US national mobile phone operator, Sprint PCS. After four years in which the company established the leading growth position in the US wireless industry he left to enter the Cable TV industry in Europe.

In addition, he is currently an Executive in Residence for the global private equity firm, Warburg Pincus. He has held various non-executive director roles including the Deputy Chairman of O2, Powerwave Technologies and others. He is the former Chairman of Xyratex (NASDAQ) and Ziggo (Euronext). In June 2013 he became an Independent Non-Executive Director of BSkyB (LSE).

A graduate of the University of Minnesota (MBA) and the University of Wisconsin (BBA), he is on the Board of Advisers of the University of Wisconsin Department of International Studies.

Mr Masahiro Yoshizaki

- Former Vice-Minister for Policy Coordination
- Ministry of Internal Affairs and Communications
- Japan

Mr Masahiro Yoshizaki is the former Vice-Minister for Policy Coordination of the Ministry of Internal Affairs and Communications of Japan.

- 1979 Entered the Ministry of Posts and Telecommunications (MPT).
- 2001 Director of ICT Accessibility and Human Resources Development Division, Information and Communications Policy Bureau, MIC, Director of Information Policy Division, Information and Communications Policy Bureau, MIC.
- 2002 Director of Municipal Tax Planning Division, Local Tax Bureau, MIC.
- 2004 Director of General Policy Division, Information and Communications Policy Bureau, MIC.
- 2005 Director of the General Affairs Department, National Institute of Information and Communications Technology (NICT).
- 2006 Director of Policy Planning Division, Minister's Secretariat, MIC.
- 2007 Deputy Director-General for IT Strategy Commerce and Information, Policy Bureau, Ministry of Economy, Trade and Industry (METI).
- 2009 Vice-President, National Institute of Information and Communications Technology.
- 2010 Director-General of the Kanto Bureau of Telecommunications, MIC.
- 2011 Director-General for Policy Coordination, Minister's Secretariat, MIC.
- 2012 Director-General of the Information and Communications bureau.
- 2013 Vice-Minister for Policy Coordination International Affairs.

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ISBN: 978-92-61-16511-6

Printed in Switzerland
Geneva, 2016

Photo credits: Sutterstock