



Contribution to Grand Societal Challenges

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Foreword

The Lund Declaration [1] has put much emphasis on the necessity for the European research community to respond to the Grand Challenges of our times. Hence, the European Knowledge Society is invited to tackle these and develop new and sustainable solutions in areas such as global warming, tightening supplies of energy, water and food, ageing societies, public health, pandemics and security with the objective to contribute to the emergence of an eco-efficient economy in Europe.

Following this declaration, the European Commission (EC) Research DG published a report on "**The Role of Community Research Policy in the Knowledge-Based Economy**" [2] prepared by the European Research Area Expert Group (ERA-EG). It has identified ways to maximise the efficiency of Community research policy in the post-2010 period. It came up with several recommendations among which the concentration of research effort to solve major societal problems also referred as "Grand Societal Challenges".

Then, the European Commission (EC) Research DG published another report on "**Strengthening the role of European Technology Platforms in addressing Europe's Grand Societal Challenges**" [3]. This report summarises the work of an Expert Group on ETPs, convened by DG Research in early 2009, to examine how the activities and achievements of the current 36 ETPs should evolve in the near future. This report proposes that all ETPs should be encouraged to work in flexible clusters focused on addressing the key societal challenges facing Europe. The clusters should involve all relevant stakeholders, work across all aspects of the knowledge triangle (Innovation, research, education), and be responsible for implementing potential solutions. ETPs will be able to contribute more to focus research programmes towards the challenges faced by European society and also to bring the results of that research to the global marketplace.

In this context, the members of the Integral SatCom Initiative European Technology Platform (ISI) have launched a specific action at the last General Assembly held on 7-8 April 2010 in Toulouse, France, with the objective to identify the research topics in Satellite Communication that could contribute to help in addressing the Grand Societal Challenges, as well as contributing to the debate on the highest European priorities regarding the identification of technology solutions to respond to European Grand challenges.

This document constitutes a first contribution as input for the discussion during the upcoming "ETP 2010, Working together on societal challenges" scheduled in Brussels, 11-12 May 2010. ISI is ready to cooperate with other European Technology Platforms as well as with the relevant Experts Groups or Panels in order to reach consensus on the main European societal challenges, where our European Technology Platforms can provide solutions based on new technologies.

1- Grand Societal Challenges

There are a number of ideas regarding the current and future European Grand Societal Challenges. During 2010, the European priorities on Grand Societal Challenges will be defined. So far, the Lund Declaration identifies several themes calling for solutions to tackle them. Indeed, each of them raises significant challenges to be overcome:

- **Global warming:** In the current changing climate, how to better manage (prevention and recovery) the consequence of natural disasters such as flooding, fire forest, hurricane, dry area extension which tend to increase in numbers but also in intensity ?
- **Tightening supplies of energy, water and food:** In a constraint resource environment, how to improve the efficiency of the consumption, the recycling rate while further reducing waste ?
- **Ageing societies:** As the life duration of people increases, this raises numerous issues among which economical, social inclusion, accessibility.
- **Public health:** How to provide medical care to everyone while minimising discrimination ?
- **Pandemics:** With the global and fast circulation of people and animals, disease can spread fast. How to improve the prevention and recovery in case of wide spread diseases since they potentially have a huge impact to the economy but also social stability.
- **Security:** How to improve the security of European citizens and their goods within but also outside Europe ?

For all these challenges, telecommunication technologies are useful to contribute to the necessary observation of the context, diagnostic of the situation and action plan for the recovery. Therefore, from these Grand Challenges, the European ICT Community have identified 5 main areas where ICT can contribute [4]:



- **Smart energy grids:** The aim is to optimise the overall energy consumption while minimising risks of congestion and black-out; accommodate renewable sources of energy; handle charging of devices and provide better information to the customers;
- **Smart environmental information systems:** The aim is to collect real time environmental data to support the location and operation of various renewable energy production centres; the efficient management of intelligent buildings, safer road transport systems or general public information on environmental risks and hazards;
- **Smart systems for transport and mobility:** Intelligent Transport Systems (ITS) will prevent traffic jams by bringing efficiency to mobility through real time management of public and private transport resources, traveller information and decision making tools;
- **Smart healthcare systems:** The aim is to reduce the medical costs and improve patient comfort by increasingly providing medical treatment in domestic environment rather than in hospitals;
- **Smart culture and knowledge (content) management systems:** The aim is to develop smart Internet-enabled content management systems in order to help people manage the increased volume of information and archives produced by the rich European culture and knowledge.

In addition, the ISI community propose to add 2 additional areas which are sufficiently relevant for European competitiveness, economic growth and well being of the European citizens :

- **Broadband for all:** the right of each European citizen to access to the Information society without any geographical discrimination, particularly for the new generation networks which will provide extra-broadband capacity for enterprises and citizens, as crucial tools for the economic development and social well being;
- **Smart Security systems:** the need to develop solutions to efficiently address Disaster management and External security actions, Border and maritime surveillance, Critical infrastructure protection and Transport security.

2- ISI Possible Contributions

Based on a preliminary analysis, whose results are also currently under review for publication in the ASMS/SPSC 2010 conference [5], the following have been identified as possible contributions of ISI and SatCom to the identified Grand Societal Challenges:

Combining their dependability/resilience and ubiquitous access properties, SatCom can be profitably exploited in the following application domains and enabled smart infrastructures in support of the Grand Societal Challenges:

- **Smart culture and knowledge (content) management systems:** SatCom can assist in a cost effective manner the high resolution content delivery in areas beyond reach of any terrestrial access system (e.g. efficient Ultra HD and 3D content delivery to low density populated areas but also on board vessels, aircraft, trains, buses or light vehicles) as well as in emergency situations where exact and timely available information content is essential to the first responders, rescue teams and survivors for the crisis management. By connecting people around the globe, SatCom also contribute to protect and promote the diversity of cultural expressions.
- **Smart healthcare systems:** to assist patients under medical treatment in their homes and interconnect hospitals and medical teams in low density populated areas. Moreover, as the need for improving healthcare in rural and low density populated areas intensifies and the importance of bringing the international medical community together in the years ahead grows, SatCom are ideally positioned to facilitate the flow and sharing of medical expertise and information between medical centres.
- **Smart systems for transport and mobility:** to alert about events (e.g. accidents, traffic jams, local bad weather conditions) impacting the traffic at regional level and provide guidance to the public and private transport resources, the travellers and decision making tools via fixed or mobile broadcast systems. Satcom can also support asset monitoring anywhere beyond terrestrial reach (low density populated areas, over seas) and hence ensure a permanent status report.
- **Smart environmental information systems:** SatCom are ideal to collect in a synchronous and real time manner, data from sensors deployed over a wide area (regional, national or continental), on board observation satellites or on board Unmanned Aerial Vehicles (UAV). They can, also be used to relay the collected measurements to the relevant users for the early detection of disasters and to provide alert and guidance services for civil protection.



- **Smart energy grids:** to monitor the power grid and contribute to ensure the energy supply. SatCom can contribute to implement a global and secure energy grid. In particular, it is well suited to optimise the efficiency of the global monitoring and black-out management, hence contributing to secure the energy supply. Furthermore, telecom satellites can easily back-up high availability links of the communication and control network in critical parts of the smart energy grids.
- **Broadband for all:** Currently, more than 90% of households in Europe may access basic Internet (0.6 Mbps). This number falls to less than 40% for the Internet broadband (2 Mbps) and less than 10% for the High speed internet broadband (10 Mbps). This is far from the European goals. Given that the last percentage of households are the most expensive to connect, this demonstrates that Europe is facing a big challenge to reduce the speed divide which is likely to affect more than 10% of the European population (about 10 Million households) distributed over 40-50% of the territory. SatCom is and will remain the most cost efficient access technology in such low population density areas (e.g. < 50-100 inhabitants per km²) since it is able to aggregate traffic demand over a regional, national or even pan-European coverage. Besides, SatCom is the unique access technology able to provide broadband connectivity to vessels and aircrafts. In addition, satellites in operation are extremely energy efficient during their life time (up to 15 years). They contribute to reduce the carbon emission given that they are exclusively solar powered, and the latest launch rocket technology uses “clean” O₂ & H₂ from ethanol or from sea water using hydroelectric power. All in orbit satellites use less energy than 1 terrestrial TV mast while ensuring pan european coverage. Broadband service delivery by satellite is achieved with a coverage over many regions and its infrastructure deployment doesn't require any digging of the earth ground nor complex installation of masts or antennas. This fits well with the emission reduction targets of the EU.
- **Smart security systems:** Thanks to their inherent dependability, and ubiquitous access capability, SatCom are key component of telecom infrastructure for security missions given the strong requirements for availability anywhere anytime,

These are preliminary views of the ISI Community in terms of possible SatCom contributions in response to the Grand Societal Challenges, which will be further elaborated in subsequent documents. ISI expresses its wishes to get firmly involved in the corresponding debates to run throughout 2010 either as inter-European Technology Platforms Group or in cooperation with the Expert Panels and with the European Commission staff.

References

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