European Technology Platform on Integral SatCom Initiatiue

About the Integral SatCom Initiatiue (ISI)

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The Integral SatCom Initiative is an Information and Communication Technologies (ICT) European Technology Platform. Led by European SatCom industry. It is acknowledged by the European Commission to address Satellite Communications strategic research challenges. ISI currently gathers 194 members organizations representing all the European SatCom industry stakeholders from 28 different countries. It includes members from manufacturing industry,

ean Commission mation Society and Media

Issue nº8



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www.isi-initiative.org

The time for European SatCom research

he European Commission has recently approved a communication on a revamped European Space strategy under the title "Towards a Space strategy for the European Union that benefits its

citizens". In addition to the "traditional" pillars (satellite navigation, monitoring the environment, security and space exploration), there is a full chapter devoted to competitiveness, making a clear case for space industry policy as an integral part of the Europe 2020 strategy.

In this context, Satellite Communications (SatCom) is considered a key area for industrial competitiveness, as it generates the largest share of revenues in the space industry, as well as a key innovation enabler, since it

provides access to a broad range of economic and social services. These range from high speed Internet and broadcasting to specific crucial public services, such as those related to safety. For example "eCalls" -on vehicle emergency calls- can automatically provide the vehicle location, and can therefore be instrumental in saving lives, by bringing faster assistance. SatCom is also an enabler of many innovative future services, such as those using positioning systems and earth observation data. There is also a potential commercial value, as SatCom could

play an important role as content distributor for TV in the Internet infrastructure.

The goals of the Digital Agenda for Europe, to provide access to basic broadband to all Europeans by 2013 and 30 Mbps access by 2020, provide an opportunity for satellite communications to play a specific role. SatCom has the potential to provide wider broadband access to rural and sparsely populated areas, where it will complement the use of terrestrial-based solutions, and add to coverage and capacities in urban and suburban areas.

It is estimated that at the moment, basic broadband is still not available to about 10 million European households, mainly located in rural areas. Satellite communications, is an indispensable complement to terrestrial solutions to meet the target of 100% access



to basic broadband by 2013. Current satellite technology enables access rates in the 2 to 10 Mb/s range. This would already be compatible with the first Broadband objective of the Digital Agenda for Europe.

In the longer term, satisfying the second objective for Broadband access at 30 Mb/s would require a new generation of very high throughput satellites. Industry is currently working on this new generation of SatCom. As this is a longer term issue, options should be explored for supporting industry in this endeavour through future R&D and innovation funding and support.

Some resources for research in these areas are already available through the FP7 ICT work programme 2011-12. The next Call

for Proposals (Call 8) foresees support to industry for the design of very high capacity satellite systems. In particular there is an objective addressing "Flexible, resilient, broadband satellite communication" with the aim to develop innovative system and service architectures and technologies for ultra high capacity satellite communication systems with seamless integration capabilities. They should enable resilient and flexible infrastructures to support institutional missions and should integrate navigation systems and sensor networks. Success in these seamless integration capabilities will allow satellite industry to position itself within an overall end-to-end service approach.

Head of Unit "Future Networks", DG-Information

ISI has already started the process for the definition of a strategic research agenda giving details of industry plans to develop these capabilities in the longer run. There are already some specific challenges we can identify today, such as increasing the twoway capacities in a cost-effective manner, leading to a new generation of satellites with a 1000 GB/s throughput and integrating seamlessly terrestrial and satellite applications and services as mentioned above. These will require integrated network and spectrum management capabilities, optimising network resources and Quality of Service whilst minimising costs and energy consumption. The integration of all the above mentioned systems is necessary if we are to provide critical services which require integrated solutions, which is particularly

> critical for security and safety applications, where the role of satellites is essential.

I am fully aware that ISI is working hard in the above lines so as to ensure the future provision of essential services as described in the European Commission recent communication on Space strategy. Time is ripe now to explore the avenues for the deployment of future infrastructures capable to meet the requirements of basic public services, and ensuring a competitive European industry. I do hope that this Call for

Proposals is just a starting point for more ambitious actions in line with the targets set out in Europe 2020.

The strategic nature of the public areas supported by satellite applications and the important role played by SatCom in the required service infrastructure raise the need for Europe to own a solid technological base on satellite communications and therefore excellence in research in this field is a must for a future competitive space industry.

Contributions from the ISI stakeholders will be very welcome in this undertaking.

Luis Rodríguez-Roselló Society and Media – European Commission

1. Satcoms are essential for the dynamism of European Space Industry

The European space sector is 50 years old, and ranked second behind the US space industry. Up stream industry generates 6 billion euros revenues and employs more than 30000 high skilled human resources all located in Europe. The downstream industry generates many times greater revenues as well as employment and stimuli for technological growth in all industrial sectors.

R&D Innovation will be evaluated in its capacity to really enable manufacturing in Europe of new products and satellite systems, efficient and competitive. The policy should aim in particular at keeping one technological step aheads new emerging countries. European communication satellite infrastructures have to be eligible for EC support (space infrastructure (as fibre), user terminal, subscriptions,), and these infrastructures should be encouraged to be designed and produced IN Europe

ISI positions in regard of Common Strategic Framework program

The European SatCom industry accounts to 65% of the European space industry in terms of revenues and employment. It has proven to be so far:

· Innovative, with first commercial digital SD, HD, 3D TV services and state of art in other SatCom markets;

• Competitive, with 50% of sales in commercial market compared to 20% for the US Satcom industry and even less percentage in other space countries.

· Independent, with a large portfolio of critical products designed and manufactured in Europe.

It is therefore essential that the European Commission defines and funds an ambitious appropriate SatCom program framework aiming at reinforcing the European SatCom industrial base, industrial policy and the related financial support framework in order to maintaining its leadership in commercial markets, and its technological independence especially for institutional and governmental strategic markets. This requires increased funding rate (e.g. 75%) especially for projects targeting institutional markets, as well as cost computation policy comparable to national agencies' one. This policy is consistent with the European efforts on promotion of Future Networks for Telecommunications.

2. The role of Satcom in the Space policy has to be enhanced

An EU industrial policy which will aim at maintaining and improving the competitiveness of the European manufacturing industry is mandatory. The success of

3. Satcoms: catalyser for new ICT services

"Satcom has proven to be a catalyser and a key enabler to make emerge new addedvalues services for mass market like digital TV, HD TV. It is also a key complement to terrestrial technologies for other types of applications under mobility and fixed usage, like backhauling for 3G / 4G cellular networks, public safety communications. R&D focused on the development of innovative space technologies is mandatory in order to ensure an efficient and competitive implementation of new ICT services for citizens, such as e-health, high speed services for areas not well served by terrestrial networks, future internet.

4. Satcom is an enabler for other ICT technologies such as secured networks, TU broadcast, Telecom global networks

Satellite telecommunications deliver a full range services including among others: broadcast and other program distribution such as telecommunications and private data networks, mobile fleet / traffic management and telemedicine. They are also critical in providing backhaul to wireless systems and backbone to the Internet connectivity.

Today SatCom offer the most successful model of distribution in the video business. Satellite has been at the forefront of digital TV & high definition television ("HDTV") development and should also be considered as one of the best platforms for the development of 3-D and interactive on demand digital services in Europe.



5. Satcom to further contributes to the European Policies on security, transport and energy and to serve the related EU citizens' needs

Robust, secured telecommunication means are needed to support the reinforced EU engagement in security matters embedded in the Lisbon Treaty under the responsibility of the European External Action Service.

SatComs are key contributors to such telecommunication means especially to

support Crisis management, External security actions, Border, Maritime and Critical infrastructure surveillance, Transport security missions.

6. Satcom to contribute to the development of Rural areas

The Europe 2020 Strategy has underlined in its Digital Agenda the importance of broadband deployment to promote social inclusion and competitiveness in the EU and set ambitious targets.

SatCom broadband solutions are evolving thanks to increasingly capacitive satellites.

Initially based on broadcast Ku band satellite, broadband services are also now delivered via multi-beam Ka band satellites. The SatCom industry is engaged in further improvements to increase satellite capabilities in terms of service rate and throughput while reducing terminal costs to provide affordable ultra fast internet services especially in low density populated areas. Improvements also includes service hybridisation with broadcast.

SatComs are crucial for the development and further growth of the other two strategic sectors of space

SatCom systems with data relay services are critical to minimise response of Earth Observation systems based on low earth orbiting satellites. They are also used to augment navigation services with improved integrity and location accuracy (e.g. EGNOS).

ISI Steering Committee



The SatCom Contribution to **Emergency Applications**

ireless communication technology is becoming a critical component of any emergency communications infrastructure. not only because of its portability, but equally due to low cost and

capability to operate independently from fixed and potentially vulnerable wire line-based infrastructure.

Communication is a vital part of the First Responders' (FRs) operation as it connects him/her with the operations center at all times providing the valuable information that is necessary for the crew's well being as well as a useful tool for the overall performance enhancement. In the EU FP7 Large Scale Integrated Project "A holistic approach towards the development of the first responder of the future", funded under grant agreement n. 242411 within the call SEC-2009.4.2.1: "First Response of the future", which started on July 1st 2010 and whose duration is four years, satellite communications play a vital part since they are the backbone communications that facilitate the availability of local awareness (from the operation theatres) to any given and remotely-located Emergency Operation Centre (EOC).

Satellite communications are therefore of paramount importance, given the ability of the satellite signal to reach even the most isolated of regions (especially where other



The Emergency Network.

communication infrastructure is not present), so that they are crucial in ensuring the continuous monitoring of first response operations.

Effective and real-time on-scene data transmission, video and voice communications. FRs locations are made feasible and available at all times with the use of satellites. At the same time, an emergency network has to employ a secure telecommunications infrastructure. Therefore, this large scale IP project has to tackle many important issues of communication security as well. The overall system architecture for an emer-

and Reggio Emilia - Italy

gency network should be flexible, scalable, reliable and interoperable.

A communication infrastructure to support such an architecture can be implemented through the functional and physical decomposition in several subsystems with different features, following a hierarchical approach (Figure 1).

The envisioned architecture shows that data from the FRs is sent in real-time to the locally operating Mobile EOC and then filtered, grouped and relayed to the remotelocated EOC.

Maintaining the link between the dispersed FRs and the EOC is made feasible through the use of satellite communications at all times, given the fact that FRs normally act either in remotely located areas with limited communication infrastructure or in sites where existing communications might be crippled by the occurred disaster. A reliable, which means resilient and robust, communication infrastructure has to be set up and operated and this involves effective cooperative communications. Therefore, once again, satellite communications represent a fundamental element of

any ad-hoc, reliable emergency network.

> Maurizio Casoni, University of Modena

The Spanish ISI technology platform initiatives t its last General Assembly of the Spanish eISI technology

platform a renewal of the Chair and VicechairPersons. was made: Mr. Carlos Belmonte (Indra), Mr. Teodoro Borja (Isdefe), Mr. Angel Alvaro (Thales Alenia Space España) and Mrs Patricia Iñigo (EADS-Casa) are now the new leaders of the Spanish initiatives. In this effort, the

PROJECT		LEADER	PARTICIPANTS	
	The main goal of SESAMO is the indutrial rese- arch of relevant technologies in the field of satlelli- te communications linked with the mobility con- cept	THALES ALENIA SPACE ESPAÑA	16	
	MOVISAT has the main objectives of research and technology development in the fields of infras- tructures for broadcast, sound and television, in the new environment of multi-standard and conver- gence of services	THALES ALENIA SPACE ESPAÑA	12	
WIMSAT	The main target of WIMSAT is to achieve the sui- tability of broadband technologies based on DVB- RCS and Wimax take relevant part in the new generation networks and, in particular, IMS	Grupo ERICSSON	11	
39 participants + 23M€				

The Spanish eISI was created in 2006 and it includes today more than 160 organizations (25 new members joined in 2010), with the following profile structure

ISI Community: much interest on the upcoming Call 8

Budapest, on May 18-19, 2011, benefiting from the celebration of Future Internet Conference, Fuuture Internet Assembly and ICT proposers day.

It was organized by Alessandro Vanelli-Coralli, University of Bologna, and Sandro Scalise, DLR, with the support of FP7-ICT - FISI Support Action.

The ISI Networking Session has been held at Budapest University of Technology and Economics. The meeting was kindly hosted by Prof. Istvan Frigyes. 20 experts from the SatCom research community attended the event.

ISI technology platform did organize a ISI Networking Meeting in On May 18, 2011 afternoon, the Proposers presented their ideas according to the schedule reported in the meeting Agenda.

> On May 19, 2011 morning, three round tables were organized in order to coordinate proposals addressing similar topics. The tables were organized according to the following three main areas:

- Broadband Satellite Communications.

- Institutional Applications using SatComs.

- SatCom and Future Internet.

Dr. Julián Seseña ROSE Vision, Secretariat ISI



ENTIDADES EISI Universidades/OPI's 14% Asociaciones/ **Fundaciones** 15% Centros Tecnológicos 6%





- activities of the European ISI are observed and taken as the guide for the Spanish Activities.
- Several national projects have been carried out during last years thanks to the priority given by the Spanish Ministry of Industry to highly tech and ambitious projects. Among others, those indicated in the table.

For the Call 8 of the FP7 and CELTIC PLUS CALL 2, the eISI has prepared a full dossier of initiatives and project proposals, which can be downloaded at http://www.ametic.es/idi

Empresas 65%



Dr. Julián Seseña ROSE Vision, Secretariat ISI



FP7 Projects: MUSCADE

The last decade has seen a revolution in the distribution of motion content: from analogue to digital and then from SDTV to HDTV. Both the delivery and the content creation industries exploited these advances, for the final benefit of consumers. Today, 3DTV is widely considered as the next step forward in home entertainment.

MUSCADE (Multimedia Scalable 3D for Europe) is a 3-year Collaborative Project led by Astrium which investigates future 3DTV systems beyond stereoscopic 3D. The project is co-funded by the European Commission under the 7th Framework Programme (FP7). It combines the strengths of twelve European partners, consisting of a balanced mix between academics (University of Surrey, Fraunhofer HHI), public organizations (EBU), SMEs (Holografika, KUK Filmproduktion, Trinnov Audio) and large industries (Astrium, Disney Research, RAI, SES ASTRA, Technicolor, Telecom Italia).

The MUSCADE project aims at developing a technically efficient and commercially successful 3DTV broadcast system by generating major innovations in 3DTV capturing, data representation, compression, transmission and rendering. The MUSCADE reference system architecture is shown in Figure 1.

At the production side, multi-view camera rigs and microphone arrays are used to record 3D video and spatial sound, generating a generic and display agnostic 3DTV representation format as shown in figure 2. Then audio-visual data are post-processed, either offline during post-production or in real-time for live broadcasting. In a further postproduction process the captured and post-processed audio-visual 3D scenes can be mixed with computer generated 3D content or archived 3D material.

After postproduction, the processed audiovisual 3D data is compressed and encapsulated into a suitable transmission format. The streams are then fed into the transmission channels investigated in the project i.e. wireline (ADSL, FTTH), wireless (DVB-T2, WLAN, WiMAX) and satellite (DVB-S2) using both emulated and actual links. At the receiving side, the audio and video signals have to be decoded and rendered







video plus depth 4), data from the first MUSCADE shooting

according to the requirements of the display and sound system. As far as video is concerned, 2D displays, stereoscopic dis-

plays with glasses and several types of autostereoscopic displays will be supported, while for audio, different multichannel reproduction systems such as binaural, stereo, 5.1, 7.1 and wave field synthesis will be used.

In parallel of the development of the 3DTV prototype system, activities focusing on the user experience evaluation are conducted in order to ensure the production of 3D content meeting today's consumers' expectations. The results of the project in terms of audio/video coding, content production, transmission protocols and display adaptation are also provided as inputs to the relevant stan-

dardization bodies.

The project is currently in its first phase, consisting in the development of a non real-time prototype of the system. The final objective of MUSCADE, which is running

until the end of 2012, is to demonstrate a complete multiview 3DTV live chain over wireline, wireless and satellite networks.



Guillaume Berenger Astrium EADS

Improving Public Safety and Security communications thanks to hybrid MANET-Satellite networks obile wireless Ad hoc Networks (MANET) can improve significantly the communication capability of

Public Safety forces deployed in a mobile, unknown and dynamic environment. The

benefits of such networks come from their capacity to provide connectivity without any infrastructure, their rapidity of deployment and their flexibility to topology changes.

However, if MANET can provide intra communication between deployed Public Safety forces, they are not designed to ensure remote connectivity. Public Safety forces often operate in areas where terrestrial infrastructures have been damaged, destroved or are non existent or congested. Therefore a combination of satellite communications and MANET appears as the best option to fulfil the complete communication needs, covering both local and long distance connectivity. Furthermore, satellite systems can easily deal with mobility, can provide inter-MANET connectivity and can also take benefit from their inherent broadcast capability over a large area.

The current trend, in the military communication domain, so called Network Centric Operation, aims at providing seamless connectivity to the forces, through different networks. Applied to the Public Safety and Security domain, this concept would foster a single integrated system composed of two segments, one satellite and one MANET, instead of two separated networks be considered. This integration raises a certain number of challenges in order to ensure the best level of communication capability and the end-users confidence in the future integrated systems.

In the frame of the FP7 programme, the European Commission supports a Collaborative research project called MONET to address the technical network challenges linked to such a hybrid system. This project, coordinated by Tekever, invol-

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ves end-users and experts from different Public Safety bodies like ISDEFE and the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief (URSZR). Tekever and Astrium as industrial partners and the Universities of Rome and of Surrey bring their technical expertise in both MANET and satellite segments, as well as their system engineering knowledge.

The objective is to optimise the integration of the satellite links in the MANET network, to optimise network resources and link availability, to provide Quality of Service (QoS) and Quality of Experience (QoE) and to minimize costs and energy.

This project is on-going, and after a first phase of end-users requirements assessment, the consortium is now working on the most promising optimisations identified, essentially focusing on routing protocols, bandwidth and network efficiency techniques, optimised OoS mechanisms and real time services adaptations. Routing protocols include energy aware and QoS oriented protocols, geo-localised protocols and loadbalancing optimisations.

Laboratory tests and demonstration in real field will allow to validate and to demonstrate, at the end of the 30 month project, the added value of the proposed optimisations.



ISI relevant events			
4th ISI SatCom day	October 19, 2011	Brussels, Belgium	http://www.isi-initiative.org/
14th general assembly of ISI	October 18, 2011	Brussels, Belgium	http://www.isi-initiative.org/
13th general assembly of ISI	June 15, 2011	Warsaw, Poland	http://www.isi-initiative.org/
Info day CELTIC and Call 8.	0	*	
Joint Net!Works and ISI networking session	June 14, 2011	Warsaw, Poland	http://www.isi-initiative.org/
ISI technical session with Terrestrial at FUNES	June 16, 2011	Warsaw, Poland	http://www.futurenetworksummit.eu/
	-		2011/files/FutureNetworkSummit2011_CallforPapers.pdf
Future Internet Week & Future Internet Assembly	October 24-28, 2011	Poznan, Poland	http://www.future-internet.eu/events/ eventview/article/future-internet-assembly-poznan.html
MOBILITY 2011	October 23-28, 2011	Barcelona, Spain	http://www.iaria.org/
		-	conferences2011/MOBILITY11.html
ITU Telecom World 2011	October 24-27, 2011	Geneva, Switzerland	ITU Telecom World 2011
IEEE MeshTech 2011	October 17, 2011	Valencia, Spain	http://www2.ing.unipi.it/meshtech11/
ISCIT 2011	October 12-14, 2011	Hangzhou, China	http://www.iscit2011.org/
ICOST 2011	October 10-12, 2011	Shanghai, China	http://www.icost.info
Future Networks 8th FP7 Concertation Meeting	October 6-7, 2011	Brussels, Belgium	http://ec.europa.eu/information_society/
			events/future_networks/concertation/index_en.htm
4th IEEE International Workshop			
On Wireless and Internet Services	October 4-7, 2011	Bonn, Germany	http://www.wmngroup.co.uk/wise2011/
CONCORD 2011	October 6, 2011	Seville, Spain	http://iri.jrc.ec.europa.eu/concord-2011
Satellite Communication and			
Navigation systems working group	October 4-6, 2011	Wessling, DLR	
17th edition of the Ka and Broadband			
Communications, Navigation and			
Earth Observation Conference	October 3-6, 2011	Palermo, Spain	www.kaconf.org
SIIT 2011	September 28-30, 2011	Berlin, Germany	http://siit2011.org/
ALETI Summit	September 27-30, 2011	Guatemala	http://www.imtjonline.com/?entryid116=147321
ETSI Future Networks Technologies Workshop	September 26-27, 2011	Sophia Antipolis, Fr	ance http://www.etsi.org/WebSite/
			NewsandEvents/FNT/FutureNetworkTechnologies.aspx
SatNEx III Summer School 2011	September 5-9, 2011	Siena, Italy	(http://satnexiiisummerschool2011.dii.unisi.it/index.ht
EUSIPCO 2011	Agt. 29-Sept. 2, 2011	Barcelona, Spain	www.eurasip.org
Broadcast & Cable 2011	August 23-25, 2011	Sao Paulo, Brazil	http://www.broadcastcable.com.br/
UK Space Conference	July 4-5, 2011	Warwick University,	UK http://www.ukspaceagency.bis.gov.uk/20601.aspx
High Level European Conference on "PUBLIC			
PROCUREMENT OF INNOVATION"	June 27-28, 2011	Torino, Italy	http://www.comune.torino.it/relint/PPI/
3rd Conference: ICWMC 2011	June 19-24, 2011	Luxembourg	http://www.iaria.org/conferences2011/ICWMC11.html
1st AnnualDigital Agenda Assembly	June 16-17, 2011	Brussels, Belgium	http://ec.europa.eu/information_society
			/digital-agenda/daa
Future Network & Mobile Summit 2011	June 15-17, 2011	Warsaw, Poland	http://www.futurenetworksummit.eu/2011/files/
			FutureNetworkSummit2011_CallforPapers.pdf
6th Annual European Spectrum			
Management Conference	June 14-15, 2011	Brussels, Belgium	www.spectrummanagement.eu
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