THE INTEGRAL SATCOM INITIATIVE
EUROPEAN TECHNOLOGY PLATFORM - WWW.ISI-INITIATIVE.ORG

European Technology Platform «Integral SatCom Initiative»:
prospects for R&D cooperation on Satellite Communication systems
with Russian industry

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Agenda

ISI ETP overview

Strategic Research & Innovation Agenda

Prospects for R&D cooperation with Russian industry
ISI overview
ISI context

European SatCom industry

- 65% of the European satellite manufacturing industry turnover (up and down stream revenues) and employment (30000 Highly skilled jobs),
- Essential element of any global networks;
  - Network electronic media (> 77 Million Households in Europe), Digital inclusion (Broadband access), Security and Defence
- Driving force for technologies development, applicable to all industrial sectors
- Satellite industry is a worldwide high technology market
Technology platform for Satellite Communications

- 200+ members organizations representing all the European SatCom industry stakeholders
  - manufacturing industry, network operations and service provision, SMEs, research centers and academia, European and National Institutions.
- To create critical innovation mass to identify and address SatCom research challenges
  - To develop innovative technologies, products and services up to in-orbit validation and large scale pre operational experimentations
  - To undertake Standardization, Regulatory and Marketing activities
- To define the required European framework which will
  - pave the way for development of future SatCom solutions adapted to EU needs
  - reinforce the European SatCom industry competitiveness

* Strategic Research and Innovation Agenda for SatCom
* Position papers with respect to policy related topics

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ISI membership

- Mainly European SatCom industry stakeholders

*ISI* membership initiative.org
ISI Governance and Structure

ISI Chairman
Nicolas Chuberre
Thales Alenia Space

ISI Vice Chairman
Jean-Francois Charrier EADS Astrium

ISI Steering Council
- Manufacturing Industry
  - Thales Alenia Space
  - EADS Astrium
  - Gilat Satellite Networks
- Network and Service Provision
  - Atos Origin
  - SES Global
  - Telespazio
- SME
  - ROSE Vision
  - Space Hellas
- Research Institutions and Academia
  - DLR
  - University of Bologna
  - University of Surrey

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## ISI research capabilities and priorities

<table>
<thead>
<tr>
<th>European policy</th>
<th>SatCom added value</th>
<th>SatCom emerging solutions</th>
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<tbody>
<tr>
<td>Digital Agenda</td>
<td>Overcome the Digital/Speed divide when targeting ubiquitous broadband coverage objectives with internet speeds gradually increasing up to 30 Mbps</td>
<td>Powerful multi beam satellite networks, for cost optimised broadband access in low populated density areas</td>
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<tr>
<td>Security and Defence Policy</td>
<td>Improve Europe’s capacity to prevent and respond to crisis or disaster situations wherever they may occur</td>
<td>Flexible satellite networks for global, secured and resilient communications (ISICOM initiative)</td>
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<tr>
<td>Future Internet</td>
<td>Resilience, QoE booster, Cost effective service delivery over wide coverage</td>
<td>Integration with terrestrial networks</td>
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The Strategic Research & Innovation Agenda
ISI SRIA Objective:
- Definition of the European SatCom industry research and innovation priorities

SRIA defined through a stepped approach:
- Identification of SatCom contributions to the Digital Agenda for Europe
- Mapping of SatCom Systems on Digital Agenda objectives
- Analysis of technical and non-technical Enablers
- Definition of Research and Innovation topics
- Prioritization of Research and Innovation topics
SatCom and Policy objectives - 1

- **Fast and ultra fast Internet access**
  - coverage of at least 10M households, fundamental tool to achieve the goal of broadband access for everyone in low density populated areas not reachable by other solutions

- **Transport and mobility**:
  - Monitoring, event alert, guidance to public and private transport resources, travellers decision making anywhere beyond terrestrial reach

- **Energy**
  - Support to optimized Smart Grid monitoring, black-out management, high availability back-up for communications and control networks in critical scenarios.

- **Security**
  - key components of telecom infrastructure for security, emergency missions, rescue teams and survivors thanks to inherent dependability, and ubiquitous access capabilities
SatCom and Policy objectives - 2

- **Environmental monitoring:**
  - Satellite and UAV for synchronous and **real time collection and relay of sensor data** over small to extremely wide areas, up to continents wide

- **Digital literacy, skills and inclusion (content)**
  - **Support to cost effective solutions** for delivery of high resolution content in areas beyond reach of other access systems.

- **Healthcare**
  - Healthcare in rural and low density populated areas by facilitating the flow and sharing of medical expertise and information among medical centres and from homes to hospitals and medical teams.
## SatComs and Policy objectives

<table>
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<tr>
<th>Objectives/Satellite Syst</th>
<th>Broadcast systems</th>
<th>Backbone systems</th>
<th>Broadband fixed/mobile</th>
<th>Narrowband mobile sat syst.</th>
<th>Governmental fixed /mobile</th>
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<td>Energy (Smart Energy grid)</td>
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SatCom challenges (1/2)

- **Performance:**
  - maximum service rate capability, service availability, and QoS in line with terrestrial networks through advanced space segments.

- **Cost reduction:**
  - improved space segment throughput, network management process, optimisation of space and ground equipment production, installation, and maintenance.

- **Network integration (satellite with terrestrial systems):**
  - integration into Next Generation Networks at core (e.g. IMS) and access network.
  - support of unified service delivery to end-user through mobility among access methods, and satellite and terrestrial links.
Flexibility
- to enhance operators economics and mitigate business risks over satellite lifetime flexibility and reconfigurability of
  - satellite payload to adapt to evolving market conditions and support different of the satellite mission.
  - satellite coverage, frequency plan, transmit power, capacity allocation, connectivity scenarios.

Integration with navigation and observation systems
- to support the delivery of new services and applications able to enlarge the SatCom market.

Resilience and Security
- Increase service radio link availability and system resilience to major disruption events.
SatCom enablers

Non-technical enablers
- Regulatory framework
- Standardization framework
- In orbit validation for innovative space segment technologies/payloads
- Business model, best practice, etc

Technical Enablers
- Increased service performance
- Optimized operational cost
- Improved Quality of Experience
- Increased space segment capability
- Capacity distribution scenarios
- Connectivity scenarios
- Terminal profile and usage conditions
- Service coverage configuration
- Enrichment of service offer
5 Research and Innovation areas

- Space segment
- Ground infrastructure
- Terminals
- Radio Interfaces
- Networking
- Services and applications

Bruxelles, October 6-7, 2011

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Strategic research and innovation topics (1/2)

- **Space segment: High-Throughput, Flexibility and Reconfigurability**
  - Markets and Resources
  - Capacity and Throughput
  - Flexibility and Reconfiguration
  - Interference and Management

- **Ground infrastructure: Distributed Processing**
  - High capacity feeder links
  - Multigateway architectures for distributed processing of feeder links signals
  - Distributed radio resource management algorithms for fully meshed networks
  - Advanced Interference management and cancellation techniques

- **Radio Interfaces: Efficiency and Robustness**
  - Cognitive radio
  - Cooperative techniques
  - Multi beam/feed transmission techniques
  - Interference management techniques
  - Waveform design
  - Fading and channel impairments countermeasures
  - Channel modelling
  - Flexible radio interfaces for QoS
Networking: Integration and Convergence

- Network management harmonisation between satellite and terrestrial networks
- Adaptive middleware to cope with new approaches e.g., dynamic spectrum management and cooperative techniques
- De-centralised radio resource management algorithms
- Flexible resource management among different radio interfaces
- Vertical handover techniques between terrestrial and satellite interfaces
- SatCom Role in Future Internet

Terminals: User-Friendliness and Reconfigurability

- Consumer and Professional Handheld
- Collective Mobile Broadband and Broadcast
- Fixed Broadband and Broadcast
- M2M and SCADA

Services and applications: Ubiquity and Dependability

- Ubiquitous Broadband Access
- Emergency Bidirectional Communications and Backhauling
- Ubiquitous Messaging Services (SMS over Satellite, M2M, SCADA, Smart Infrastr.)
- Enhanced Broadcast Experience
Stepped approach

- Identification of SatCom contributions to the Digital Agenda  [Completed]
- Mapping of SatCom Systems on Digital Agenda objectives    [Completed]
- Analysis of Enablers and Enabling Technologies    [Completed]
- Identification of Research and Innovation topics   [Completed]
- Prioritization of Research and Innovation topics    [Under approval]

SRIA is a living document contributions are always welcome on any topics, no need to be a SatCom expert:

- Integration and convergence
- Service and applications
- R&D aspects
- ...
Prospect for R&D cooperation with Russian industry
15th ISI General Assembly - April 10, 2012 in Brussels/Belgium

- 1. Steering Council and Working Groups activity reports
- 2. Interactive R&D workshop to prioritize the research innovation topics
  - Interactive session with the audience via a web tool
- Expected attendance
  - ISI members
  - Rusian delegates are invited to take part

5th ISI SatCom day: - April 11, 2012 in Brussels/Belgium

- 1st Workshop on ISICOM (SatCom for security missions)
- 2nd Workshop on Very high speed Broadband internet access via Satellite in Europe
  - About next generation satellite infrastructures to fulfil the Broadband for all objective
- Expected attendance
  - Policy makers from European parliament and european Commision, Space agencies, SatCom industry, terrestrial ICT industry, ICT research community
  - Rusian delegates are invited to attend this workshop

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ISI future plans - 2

FUNEMS: Jul 4 - 6, 2012 in Berlin/Germany
(http://www.futurenetworksummit.eu)

- 1. Support to the definition of Thematic Priorities
- 2. Support to the conference organization
  - Special session on integrated satellite communications
  - Technical Program Committee
  - Financial support
- Expected attendance
  - ICT research community, terrestrial ICT industry, SatCom industry

6th Advanced Satellite Multimedia Systems
Sept 5 - 7, 2012 in Baiona/Spain
(http://www.asms2012.org)

- 1. Conference organization
  - ASMS general chairmanship
  - Technical Program Committee
  - Financial support
- Expected attendance
  - ICT research community, SatCom industry, Space agencies
  - ISI members

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ISI Cooperation with National Platforms

ISI has several National Technology Platforms as mirrors

- ISI also links with national Technology plaforms
  - The ISI vision and Strategic research agenda are further customized and adapted to national environment to multiply and amplify the reach of the ISI
  - The national technology Plaforms find ISI as the natural channel to launch national initiatives in the overall European context
  - Example of National Technology Platforms: Spanish eISI (http://www.ametic.es/idi)
Visit us at
www.isi-initiative.org

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secretariat@isi-initiative.org

THANK YOU