ARTES Applications Programmes; Business Opportunities

IAP Information Day
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Prof. Amnon Ginati
European Space Agency (ESA)

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ARTES Applications & User Driven Missions

- ARTES 3-4
  - Demonstration
- ARTES 20 (IAP)
  - Feasibility
  - Demonstration
- ARTES 21
  - SAT-AIS Initiative
- New Culture
  - Third-Party Funding / Innovation Fund

The three value chains in commercial satellite applications

- Communications
  - Terminal for consumer and business users
  - Sale of satellite capacity (or time)
- Navigation
  - Launch services
- Earth Observation
  - Satellite manufacturing

Values for the year 2009 in billions of € (Satcom)

- Potential of Integrated Applications
- Value-Adding Services

COURTESY OF Euroconsult
ARTES programme elements
approach Demand-Supply

User Driven
ARTES Path
IA Services Users, Stakeholders Driven

LEAD MARKETS
(Innovation Friendly)

MANUAL MARKETS

ARTES 3-4 Applications Path
SAT-COM products developments initiated by industry/service providers
ARTES 3-4 User Terminal/
Ground Segment Path
product development initiated by industry

Product Capabilities (competitive advantages, better performance, reduced cost, ...)
12 Ongoing projects: total commitment of €15 M; 50% co-funding
- ISIDE 4 Africa: educational Content in Africa, Project, 800 k€, Coordinator: Micromedia (I)
- Internet 4 Dev. Countries: Low Cost Hybrid Terminal Triple Play Solution, 2.35 M€, Prime: Forway (S)
- TS4CI: Telemedicine for Correctional Institutions, 1.5 M€ (Phase I), Prime: Teleios (I)
- Sensibles: Satellite Enhanced Network Systems enabling flexible capacity management for closed user groups in the maritime community, 1.4 M€, Prime: ITS (I)
- NXY: Local caching of multimedia content in a satellite based multicasting delivery system, 1 M€, Prime: Avanti (UK)
- COTTW: Enhancement for Collaborative TV for New Multimedia Standards, (CCN43), 950 k€, Prime: Cybercitus (LUX)
- SatElctions: Open e-Training Network for Millennium Development Goals, (CCN43), 4.67 M€, Prime: Openet (I)
- Stereoscopic Broadcasting, 918 k€, OpenSky (I)
- REACT: Communication exchange for emergency response, 420 k€, Skywatch (IRL)
- Planet (F), SMART (F), SmartPush VOD (NL), Three projects in the Newcomers Initiative: total 932 k€

3 Planned projects: total commitment of €6.7 M; 50% co-funding
- TS4CH: Telemedicine for Correctional Institutions, 1.9 M€, Prime: TBC, Italy
- SatBridge: Infocommunity on S-Band, 3.7 M€, Prime: ITS (TBC), Italy
- SatADSL: Network for financial institution in Africa, 1.2 M€, Space&Sea, B

Synergy measures with ARTES 20 programme was implemented and mutual enrichment leading to revitalisation of ARTES 3-4.

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ARTES 20 User Driven and in partnerships Demonstration Projects

**On-GOING Projects** with a total commitment of €17.2 M (>=50% co-funding):
- **SpaceGrid**: Power grid management, 1.05 M€, Users: TERNA (I)
- **T4M4D**: Teledmedecine for Medical Operations in Distant Areas, 2.05 M€, Users: MoDs from F, D, I, E (Djibouti, Herat, Miasar-Sharif)
- **Talking Fields**: Integrative Use of Satellite Techniques to Optimize Agricultural Production, 1 M€, Users are PC-Agrar GmbH and Land-data Eurosoft, representing 30,000 farmers in Europe.
- **AMAZON**: Real Time Satellite-based Teledmedicine Services for Professional Clinical Users in Remote Locations, 700 k€, Users: International SOS
- **S2BAS**: Space Service Benefits in Aviation Systems, 1.3 M€, Stakeholder: Techno Sky (I), representing Air Traffic Control users for local airports.
- **WaterWatch**: Space Based Services for Water Irrigation Management of Vineyards in South Africa, 600 k€, Users: Dept. of Agriculture of South Africa, 0.31 M€
- **SAT-AIS Data Center**: Data Processing centre for Sat-AIS Services, 4 M€, EMSA
- **Blue Bell**: Cargo ships transport between European harbours: Custom, Ship owners, After approval within 3 weeks

**Under preparation**:
- **UAS**: UAS Demonstration Mission 1st Phase; 1.2 M€; User: EDA

**Operational Service**:
- **FlySafe bird strike risk reduction** in aviation be operated by KNMI (Royal Netherlands Meteorological Institute).
- **IAEA**: Nuclear site monitoring (Brazil, Hungary, Armenia, Ukraine); Users: IAEA; Successfully operating. Additional 8 nuclear sites are in preparation.
Developing new services for new user communities

User Demand  Feasibility Study  Demo  Operational Service

Earth Observation  Tele-communication  Navigation

Manned Space Flight

Integrated Application Promotion
Ambassador Platforms (AP)

Geographic and or Thematic AP representation

NO: AP for E-Health in inaccessible regions (by NST)
UK: AP for Enhanced mobility
AT: AP for Integrated Application in Central & Eastern European Countries (by ESPI)
FR: AP for Environmental Risks & Hazards in the Mediterranean Region (by Pôle Risques)
FI: AP for the Baltic Sea Region (in prep. Q2 2011)
CH: AP for alpine environment (in prep. Q3 2011)
IT: AP for maritime Security (in prep. Q3 2011)
GER: AP topic not yet fixed (in prep. Q4 2011)
ES: AP for EU adoption of renewable energies (CENER)
Objectives:
- Implementation of sustainable telemedicine services on a scalable infrastructure.
- An overall overview on the critical aspects of the African eHealth for Sub-Saharan Africa Program.
MT Innovation Fund

Successful Examples of Established Services

- FlySafe, Bird Strike Avoidance
- Safeguard Services for IAEA
Birds and Flight Safety

GAF (1997-2004): 360 collisions/year
RAF(<2004): 110 documented serious accidents

Estimated conservative cost due to damage and delays of commercial aircraft worldwide: 1.2 billion USD per year

July 15 1996 a Belgian C-130 crashed at Eindhoven Air Base due to a bird strike. 34 people were killed and 7 people were seriously injured.
FlySafe Intermediate Results

“It’s just to let you all know that FlySafe is really able to do spectacular things”

Example: Gulls movement
Woensdrecht Airbase, NL

Night of
Feb. 20th
2008

(photo RNLAF).

Example:

Night of
Feb. 20th
2008

(photo RNLAF).
Improvements Needed for the Local Situation Anticipation of Birds Crossing the Airport
Hudson river (New York – 15/01/09)

IAEA needs:
- GIS, to acquire information on the areas of interest
- Integrated Satellite-Based System to connect all Nuclear Power Plants to IAEA
- Satcom for secure and reliable communications

Space assets involved:
- Earth Station
- Ground station
- Fixed and mobile
- Real-time (confidentiality is a must)

Headquarters of IAEA Safeguard Services

Nuclear Safeguard and Verification
IAP- Multi-Satellite Network

Users Driven
European Satellite AIS Mission

Satellite-based Automatic Identification System (SAT-AIS) Programme

DG-MARE / ESA Joint Action Team & European Steering group:
EC DGs (MARE, ENV, TREN, JLS, INFSO, TAXUD, ENTR, JRC) FRONTEX, EDA, & EMSA / ESA Partnership

Request of DG MARE based on information demand of Belgium Crisis Centre, having lost the vessel POMPEI and asking for latest position at 14:00 on April 21, 2009
Delivery of latest vessel position by LuxSpace at 16:00 (captured at 7:00 of the same day)
Request for vessel track of the past days at 19:00 of 21 April
First information available at 22:00 on 21 April
Second information with final anchor place (4.58) on April 22 at 23:00

Ship was hijacked 700 nm off Somalia coast and 100 nm from destination (Port Victoria / Seychelles Islands)
**Event Overview**

- **22nd January 2010**: EMSA/ESA Information Meeting in Lisbon
- **17th February 2010**: JCB Meeting (Info, Note ESA/JCB(2010)18)
- **31st March 2010**: SAT-AIS Information Meeting
- **26/27th April 2010**: SAT-AIS 1st Industry Information Workshop
- **19 & 20th May 2010**: JCB, SAT-AIS documents discussed & finalised
- **2nd September 2010**: SAT-AIS 2nd Industry Information Workshop
- **13 July 2010**: JCB approved ARTES 21 with achieved subscription level
- **2 July 2010**: EMSA / ESA Agreement signed by DG and EMSA Director

**MAP**

- **Northern N. Atlantic server**
- **North Sea AIS server**
- **Mediterranean AIS server**
- **Northern N. Atlantic server**
- **IAP Data Processing Centre**
- **SAT-AIS Space Node in the SafeSeaNet Server**

**Map Notes**

- Greenland
- Ferred Island
- Canada
- Groenland
- Feroe Island
- North Sea AIS server
SAT-AIS
Activity Status

SAT-AIS Initiative Work Plan

Antares 5.1 Work Plan 2010 (Adendum)

Antares Pre-development
End-to-End Testbed
Receiver Development (TBD)

ARTES 5.2
covered in developments

ARTES 20
Proposal

ARTES 21
Programme Proposal

ODEM - Operational Demonstration Mission

Alternative System Solution
Hybrid Model Elaboration
ODEM cost benefit assessment

Receiver Development (TBC)

Quarter 2011

ITT’s to be prepared 2nd Quarter 2011

ITT published on EMITS 9 Feb

TEB report under preparation

Proposals under evaluation

ITT published on EMITS

Negotiation meetings took place

ITT under preparation

Internal task based on end to end testbed

ITT’s to be prepared 2nd Quarter 2011

SAT-AIS
Schedule
• **Background:**
  - UAS (Unmanned Aerial Systems) steadily become more important for e.g. surveillance tasks.
  - Until now, UAS have only been deployed routinely in segregated airspace because of safety reasons.
  - The safe and secure integration into “non-segregated airspace” is still a challenge:
    - Technology is not proven
    - Regulation is missing
    - Little practice and experience

• **Objective of the Feasibility Study:**
  - Investigate the technical and economical feasibility of UAS services in non-segregated airspace supported by space systems for:
    - Command & Control, Sense & Avoid, Air Traffic Control
    - Operational service provision (UAV Payload data transmission, e.g. camera, radar, etc.)
  - Simulations and demo project preparation specifically in the civil domain: pipeline monitoring

**Application example:**

**Maritime Surveillance**

• **User:**
  - Coast Guard, Environmental Authorities, etc.

• **Need:**
  - Detect illegal immigration, vessels, pollution, oil spill, etc. over large areas of water
  - High surveillance coverage in time and space
  - All weather capability

• **UAS solution:**
  - Can replace manned aircraft and provide a more cost efficient solution than available today
**Application example:**

**Prestige oil spill (ASAR)**

17 November 2002

2 December 2002

**Application example:**

**Ash Cloud monitoring**

- **Users:**
  - Volcanic Ash Advisory Centres, Met Offices, Aviation Authorities, Airlines
- **Need:**
  - Complimentary information regarding volcanic ash distribution and composition (ground and space sensors already used today), to use for reporting/alerting and validation of models
- **UAS solution:**
  - UAS can fly to areas of volcanic ash to obtain samples, to measure density etc.
  - Direct reporting to e.g. Met Offices
SAR detected ships
SAR ships & AIS tracks
Correlation SAR & AIS
Remaining uncorrelated ships & UAS for identification

Mission Video
### ARTES 3-4 and ARTES 20 Applications Demo Projects

<table>
<thead>
<tr>
<th></th>
<th>ARTES 3-4</th>
<th>ARTES 20 demo</th>
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<tbody>
<tr>
<td><strong>scope of work</strong></td>
<td>satcom based applications products</td>
<td>Integrated applications services multiple space assets</td>
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<tr>
<td><strong>originator</strong></td>
<td>Industry, service providers</td>
<td>ESA, industry, service provider, users, stakeholders, institutes, etc</td>
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<td><strong>pilot utilisation phase</strong></td>
<td>with end users (if applicable) in their operational environment</td>
<td>with end users in their operational environment</td>
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<tr>
<td><strong>business plan</strong></td>
<td>yes</td>
<td>yes for commercial services, simplified for institutional services</td>
</tr>
<tr>
<td><strong>price</strong></td>
<td>50% of the eligible costs</td>
<td>50% (&gt;100%) of the eligible costs</td>
</tr>
</tbody>
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### ITT ARTES 3-4: how to apply

- **Invitation Letter**
  - => How to prepare the outline proposal and the full proposal

- **Special Tender Conditions**

- **Draft Contract**
  - Management Requirements
    - Study Activities
    - Ground Segment Activities
    - Space Segment Activities
  - Satcom Applications
  - => How to organise the work and its deliverables
ITT ARTES 20: how to apply

• Invitation Letter

• Special Tender Conditions
  • Feasibility Studies
  • Demonstration Projects

• Draft Contract
  • Management Requirements
  • Feasibility Studies
  • Demonstration Projects

=> How to prepare the outline proposal and the full proposal

=> How to organise the work and its deliverables

ARTES 3-4 and 20 Outline Proposal

- The Outline Proposal is a key step in the process of preparation of the project
- It allows ESA to understand the ground of your ideas, and provide early feedback to highlight potential problems in the successive steps of the project preparation process
- It allows ESA to extract the information required to prepare the internal paper to be submitted to the relevant ESA internal committees (for ARTES 20: JCB, for ARTES 3-4 and 20: Adjudication Committee, and Industrial Policy Committee when required)

The outline proposal is an instrument for collaboration and reciprocal help rather than a formal burden
ARTES 3-4 and 20 Outline Proposal

- The specific content of the outline proposal is indicated in the relevant Special Tender Conditions
- Points to remember for the preparation of the Outline Proposal:
  - Quantity and quality are not correlated: be concise, go to the crucial points, explain the value of proposed ideas for key actors (e.g. end users, payers, your company, the rest of the project team)
  - Position your idea: are there other ways to do similar things (e.g. using terrestrial communication means?). Openly present pros and cons, this helps ESA to understand, appreciate and eventually help
  - Be clear about starting point, new elements to be realised, final outcomes, and what is expected to be still missing at the end for a commercial exploitation
  - If you have strong opinions/reasons for not following the ESA waterfall approach, indicate this clearly in the outline. Describe the alternative approach you have in mind, and explain the rationale for this choice

ARTES Applications Workshop
April 5th & 6th 2011, ESTEC

“360° Assessment” is essential!

- Following the consolidation of TIA-A, it was decided to establish a dedicated event with wider scope and reach a wider communities, introduce and discuss possible measures proposed by ESA to improve the effectiveness and reduce the risk for the ARTES applications area
- Collection and analysis of feedback via Questionnaires & Communications (62 responses, 38% of the total 162 addresses, have been gathered)
- Target audience: end users and associated stakeholders, service providers, industry and NDs
- Present results of, and lessons learned by, recently concluded and ongoing ARTES applications projects
- Present the point of view of end users and other key stakeholders
- Offer the opportunity for info exchange between demand (end users interested in using space based solutions) and supply (providers of space based products, applications & services)
Conclusions

- Main growth in the value chain: Ground Systems and Applications
- Increase automation and distant management
- Support the development and optimization of infrastructure, logistics & resources
- Optimize reactivity in case of emergency
- Artes Applications in general and IAP in particular offer unique opportunity for SMEs, in support of innovative solutions for future challenges
Thank You!

Contact information

URL: http://iap.esa.int

European Space Agency