



ESA-EDA: Paving the Way for New UAS Capabilities in Europe

Dr. Stefan Gustafsson, ESA

Jens Fehler, EDA

Noordwijk, 11th – 12th May 2010

Integrated Application Promotion



**Earth
Observation**

**Tele-
communication**

Navigation

→ **Developing new services for new user communities**

**User
Demand**

**Feasibility
Study**

Demo

**Operational
Service**

Position
X coordinate : 3603.1
Y coordinate : 4114913.17
Z coordinate : 40.427
Latitude (deg) : 44.2658 N
Longitude (deg) : 670.45
Elevation (m) : 38355
-30
: 5
Z coordinate
Latitude (deg)
Longitude (deg)
tion (m)



UAS + Satellites = New capabilities

- Long range/endurance
- Fly low, fly high ...
- Flexible payload



- Enabler for insertion of UAS into General Air Space
- Downlink high bandwidth payload data to the user in near real-time

- Flexible usage
 - Anywhere, anytime ...
 - (Almost) any payload
- Information available when you need it → quick reaction
 - Adapting UAS mission
 - Alerting ground units
- Potential economical benefits
 - Flexible deployment
 - Higher utilisation
 - Development of specialised platforms

UAS supported by Integrated Space Systems



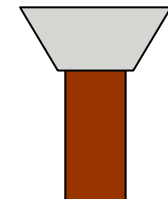
Satellite Relay
of
Payload Communication
&
VHF Aeronautical
Communication

- Space provides a solution for:
 - Real-time, secure, and reliable communication links with **global coverage**
 - Very precise navigation without ground equipment
- Facilitates the sharing of airspace with other aircraft
 - UAS's can be deployed "anywhere"
 - Maximizes use of the UAS payload



The UAV carries a payload, e.g. camera, radar, or other electronic sensors

VHF Aeronautical
Communication



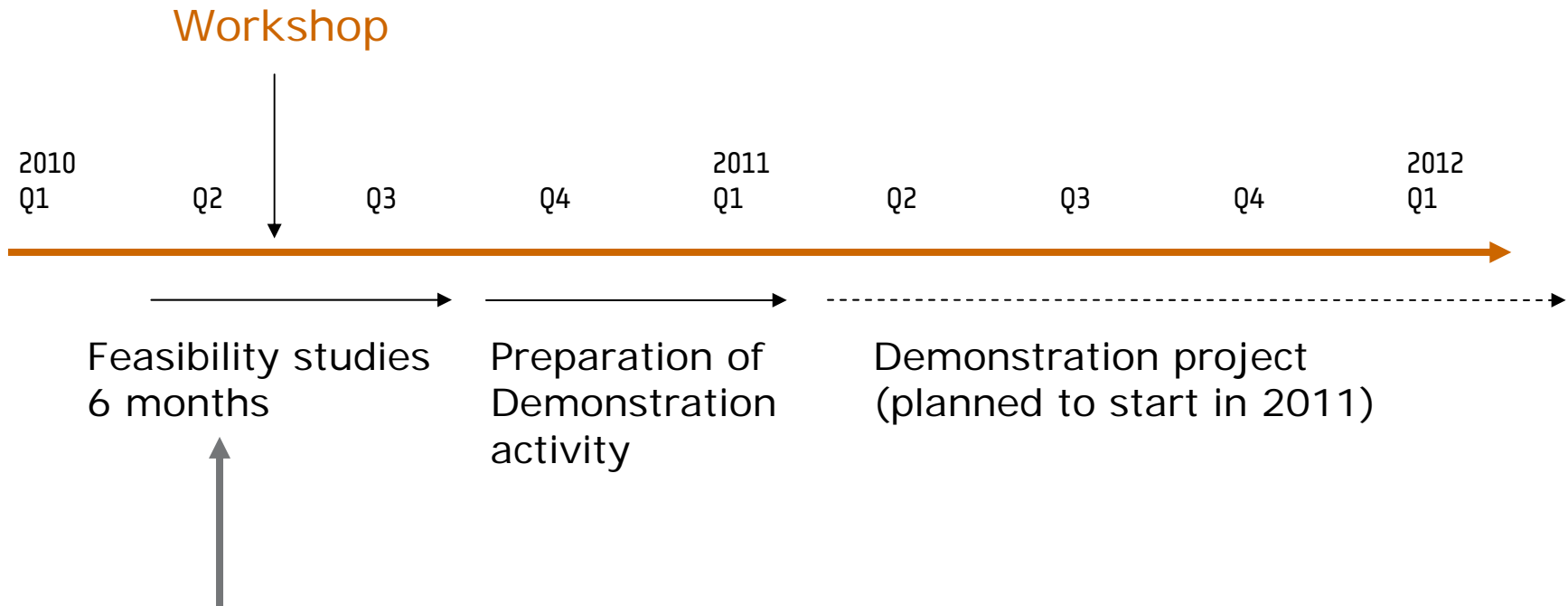
End user
of UAV
payload data

E.g. Coast Guard
or Owner of
infrastructure

UAV Ground
Control
Station

Ground control station can
be located anywhere on earth

Air Traffic Management
- Should be able to handle the
UAS as "any aircraft"



Two feasibility studies started in March 2010

- ESA contract with Indra Espacio, Spain
- EDA contract with EADS Astrium, France

Close coordination between ESA and EDA



- Determine feasibility of a **satellite service** and plan a **UAS mission** to demonstrate
 - Integration into **non-segregated airspace** using satellite communication to relay C2, S&A, and ATC
 - Added value of satellites for **payload** data communication
- Investigate the viability and non-technical issues
- Provide a roadmap
- First step:
 - Identify user and stakeholder needs

Agenda – Afternoon 11th May

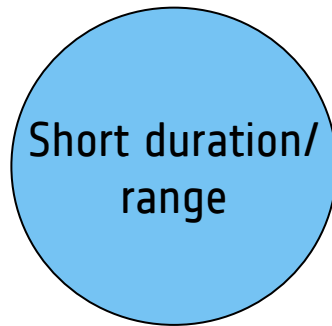
- 14:00 New perspectives for users
- 14:20 Recapitulation of user needs
- 14:40 Presentation
Feasibility Study SINUE by Indra Espacio
- 15:05 Coffee break

- 15:25 Presentation
Feasibility Study IDEAS by EADS Astrium
- 15:50 Presentations
Recommendations for mission selection
- 16:10 Panel discussion
- 17:00 Cocktail in ESTEC

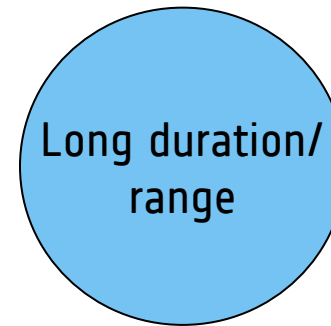


- **Information** (specific to each user)
 - On time, any time
 - Need for high flexibility in obtaining information
 - Possibly, near real-time data is needed
 - At specific places
 - From specific spots to large areas
- Information provided by various sensors
 - Visual, IR
 - Radar, LiDAR
- Type of information may vary during a mission
 - For example: first spotting something irregular, then investigating in detail
- On board processing requirements depends on information needs and data rate available for payload link

Two types of missions



→
UAV size increases



- Typically low altitude
- UAV launched locally
- BLOS capability depends on scenario
- Agricultural and forestry monitoring, emergency services

- Low to high altitudes
- UAV may be launched from distant location
- BLOS capability is crucial
- Integration into General Air Space critical
- Mineral exploration, pipeline inspection, border and water surveillance



- UAS are already used for a large variety of purposes, but for the business to take off on a large scale a number of issues need to be tackled
 - Legal issues for using UAS operationally
 - Reliability and safety must be proven
 - Need for open standards
- **Affordability**
 - Specifically for commercial applications