ESA GOVSATCOM Precursor Outline Proposals

Summary Reporting to ESA/EDA Bilateral

23 May 2016

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- Continued High level of industrial participation triggered by industry ambition in governmental market
- All Notification-of-Intent contributions resulted in Outline Proposals
- 8 consortia with 10 proposals (plus few optional proposals) lead by
  - 8 operators/ service providers and 2 primes
- 5 Lead industry MS (ES;FR;IT;LU;UK) plus several (potential) partner industry MS (e.g. AT; BE; CA; DE; ES; FI; IR; SE; NL; NO; PT...)

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- Availability of significant industry co-investment (co-funding of innovative parts and 100% of recurrent cost)

- 50% co-funding requested from ESA for innovative part

- 8 proposals focused on use of existing missions (pooling & sharing) at an average price to ESA of about 20MEURO

- Two proposals focused on new space assets at an average price to ESA of about 40MEURO

- Currently targeted overall ESA co-funding envelop 60-100MEURO

- Consolidation of number and scope of proposals on-going (e.g. priorities for existing missions; priority for new technologies) to adjust to available budget → In coordination with ESA/EDA TF

- Target 28 June ESA MS Workshop (incl. EDA participation)

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ARTES Applications Programmes

Input

ESA-EDA BILATERAL, 23 MAY 2016,

09:30-11:30

EDA, BRUSSELS

Doc.: **ESA-TIAA-HO-2016-0xxx**
Issue: **1.2**
Date: **13 May 2016**

Draft Agenda

1. Review of Policy Developments

a.   EDA and ESA Contributions to the EC's Space Strategy for Europe
b.   Coordination of Policy Messages for the 30 May 2016 Informal Space Council
c.   Update on ESA Ministerial Council Preparations
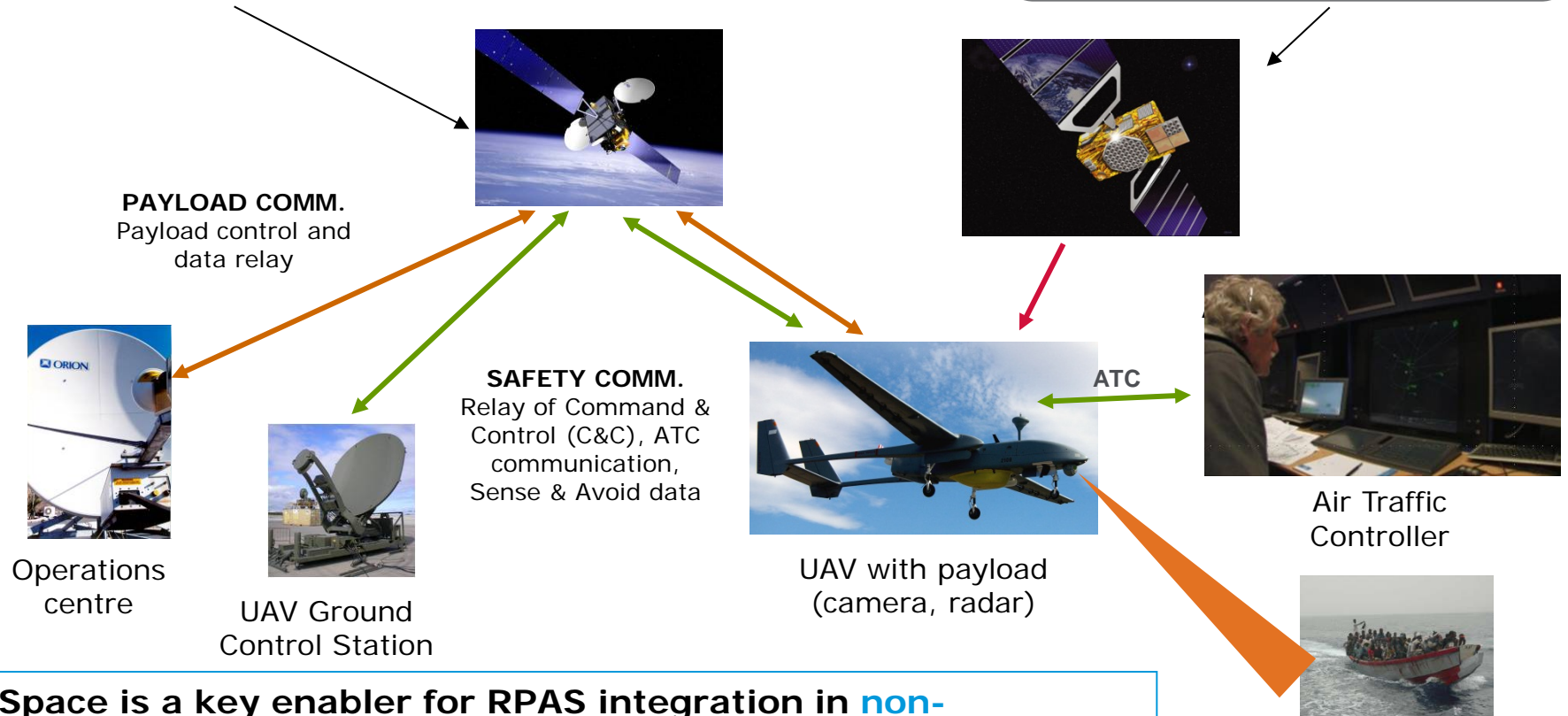
2. Opportunities for Cooperation

a.   GOVSATCOM: State of Play
b.   Cyber Defence Cooperation Implementation (Joint R&T Study) [Joint ESA-EDA Note]
c.   DeSIRE Way Forward: Initial Ideas for a 3rd Phase of Cooperation [Joint ESA-EDA Note TBC]
d.   Earth Observation Cooperation Opportunities Implementation [Joint ESA-EDA Note]
e.   EDA Information on Developing a European Radio-Navigation Policy
f.   ESA Information on Innovative Funding Mechanisms (TIA – Equity Fund TBC)

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Space assets are fundamental for Remote Piloted Aircraft Systems (RPAS) operations

Highly reliable and secure **satellite communication** is required for Beyond Line-of-Sight operations and NRT download of sensor data.

Highly accurate **satellite navigation** is essential for precise navigation and for georeferencing of UAV acquired imagery

PAYLOAD COMM.
Payload control and data relay

SAFETY COMM.
Relay of Command & Control (C&C), ATC communication, Sense & Avoid data

ATC

Air Traffic Controller

Operations centre

UAV Ground Control Station

UAV with payload (camera, radar)

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Space is a key enabler for RPAS integration in non-segregated airspace - pre-requisite for extensive adoption of RPAS-based applications
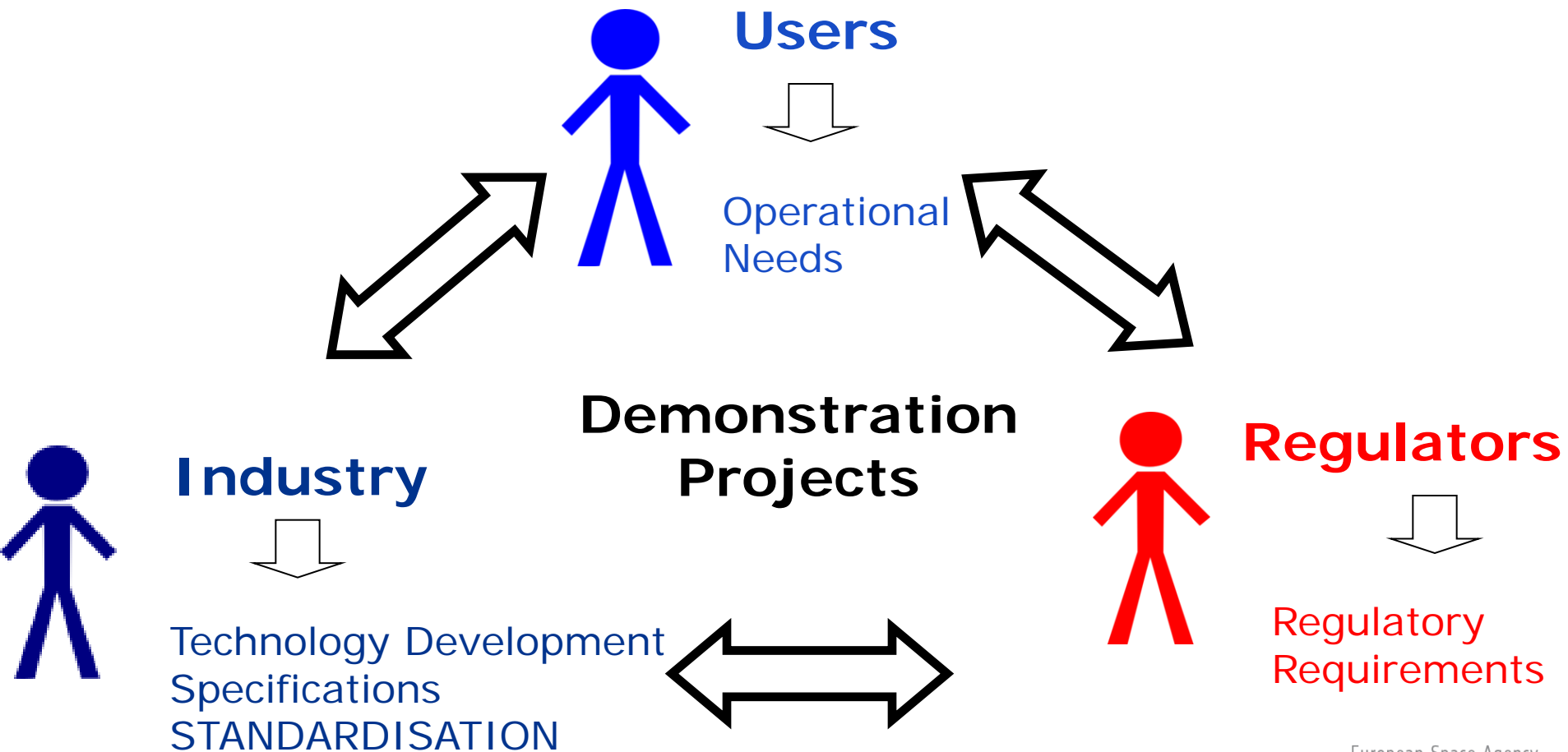
3

EDA-ESA collaboration on RPAS
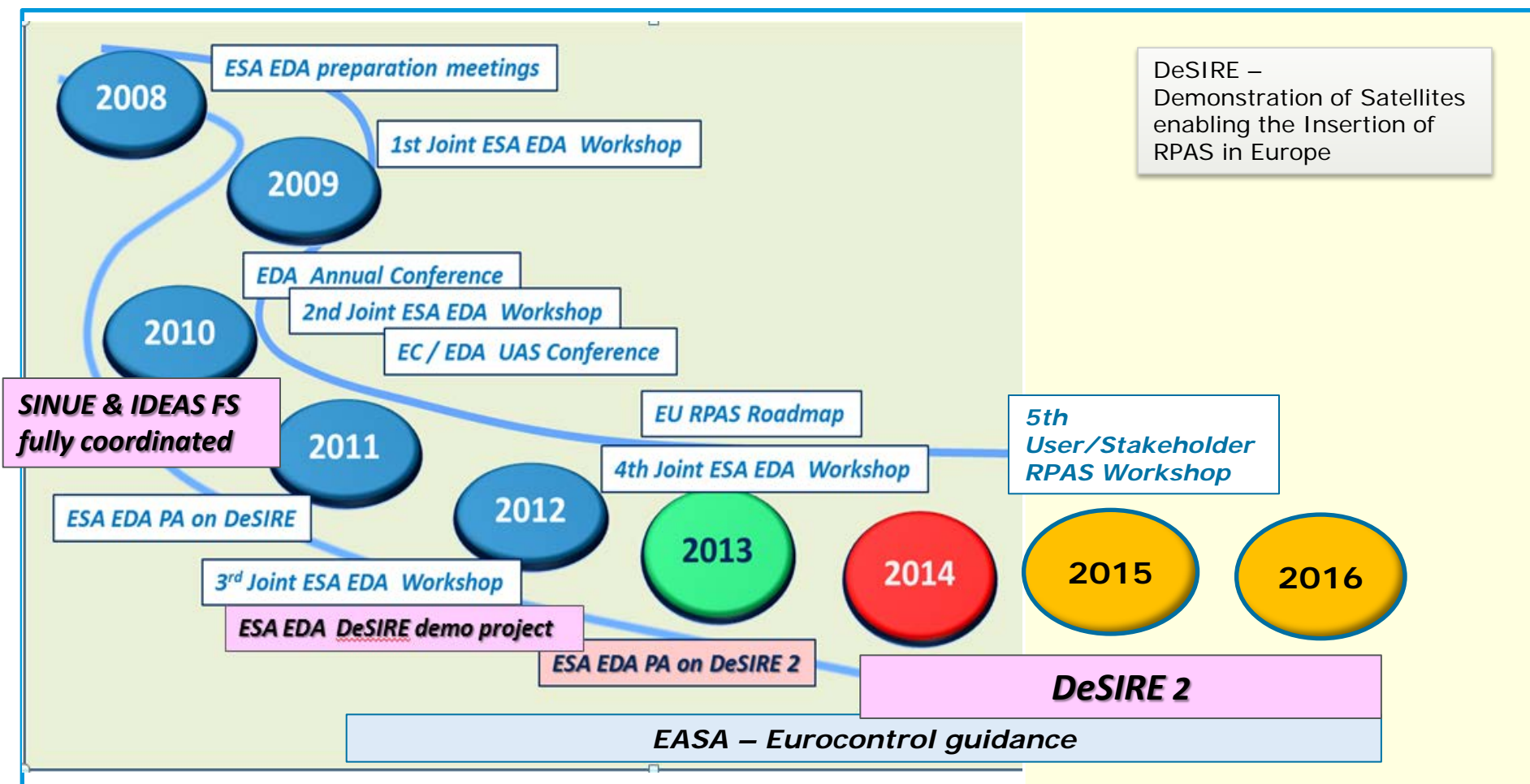
EASA and Eurocontrol have joined this initiative supporting the DeSIRE* and DeSIRE 2 projects.

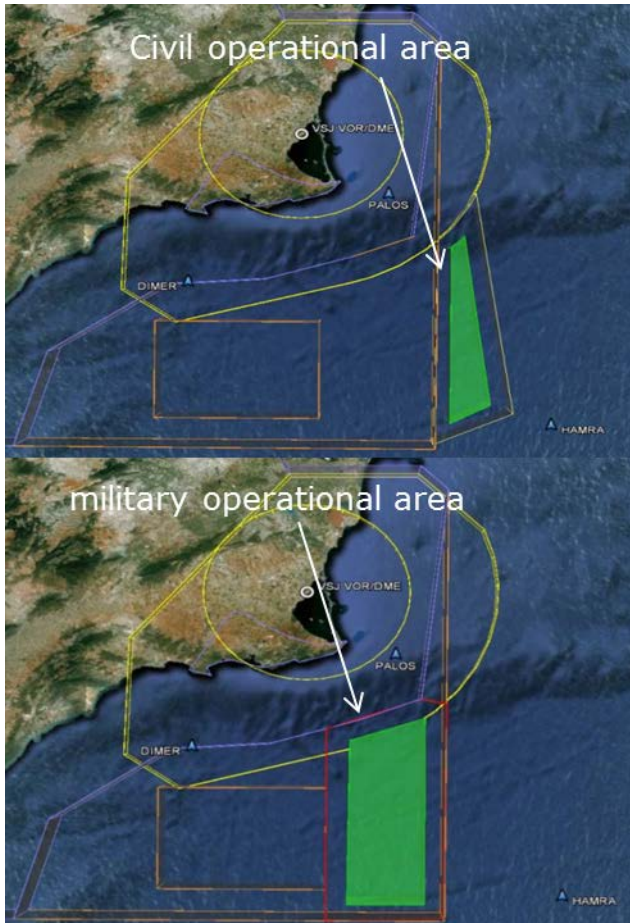European Space Agency

ESA- EDA joint demonstration roadmap: concept

Provide convincing demonstrations involving all stakeholders

Users
Operational Needs

Demonstration Projects

Industry
Technology Development Specifications STANDARDISATION

Regulators
Regulatory Requirements

# DeSIRE

Civil operational area

military operational area

- has demonstrated that RPAS in BRLOS* conditions relying on SatCom could timely proceed with Traffic Controller instructions/clearances in non-segregated airspace with a realistic separation exercise;
- coordination with civil and military ATC for entering and leaving different control areas (military or civil) was demonstrated;
- has generated evidences that satellite technologies for RPAS safety communications could be acceptable in terms of link quality for integration in non-segregated airspace;
- safety measures and contingency procedures for BRLOS communication loss have been defined, implemented and approved by local authorities;
- sense and avoid solutions for improving pilot situational awareness were tested and demonstrated.

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*Beyond Radio Line Of Sight

DeSIRE 2 Search and Rescue scenario
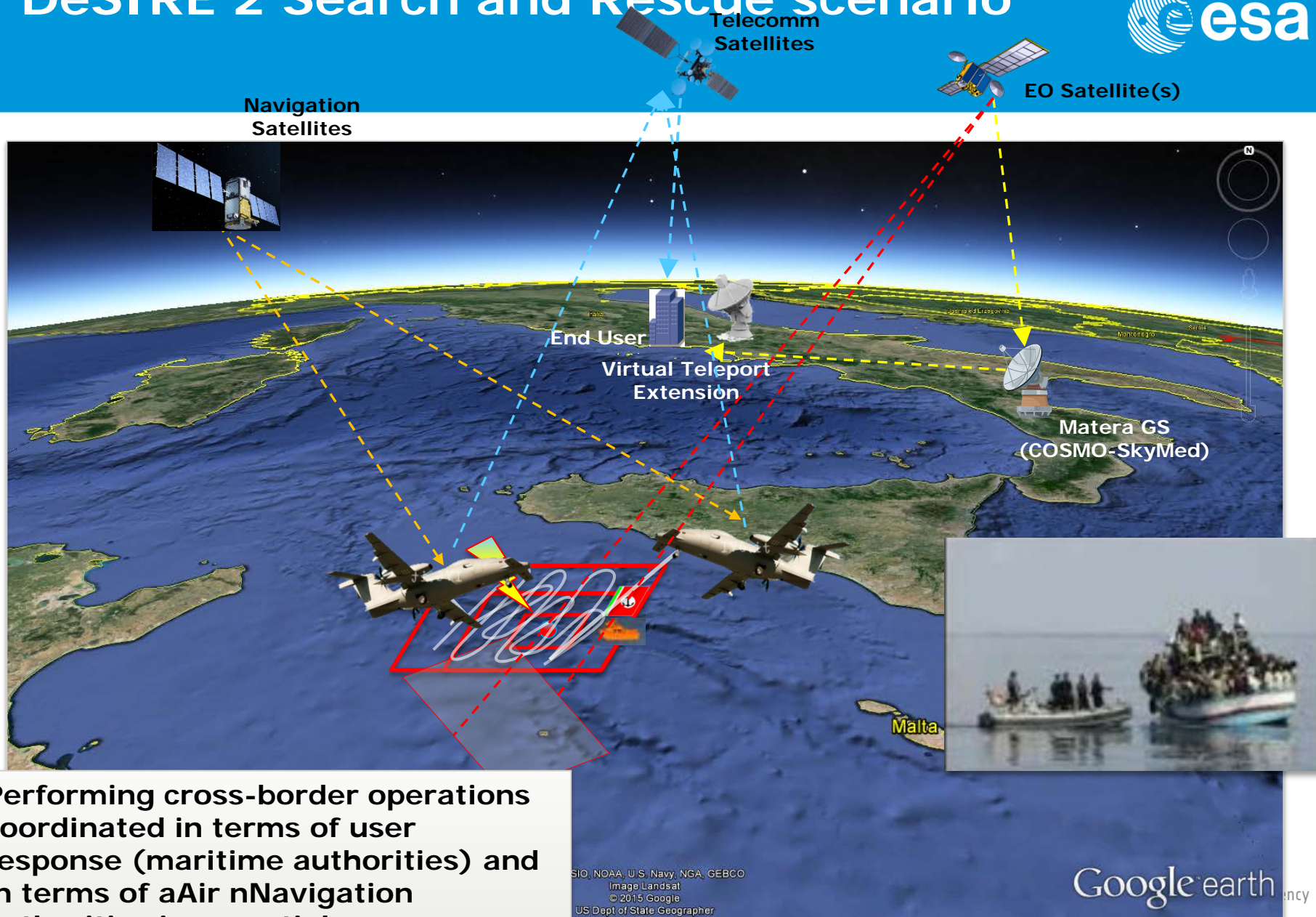
Performing cross-border operations coordinated in terms of user response (maritime authorities) and in terms of aAir nNavigation authorities is essential.

7

Increasing needs of RPAS and space assets for services

(e.g. maritime surveillance and Search/Rescue due to the current security situation at the borders of Europe)

Demonstrate:

air traffic management and collision avoidance capabilities for large-scale RPAS (Beyond Radio Line Of Sight operations + integration in the non-segregated airspace)

at multi-national/EU level the capability to perform RPAS-based operations for crisis management or surveillance purposes (e.g. migration crisis)

operations can be conducted in a secure manner and be resilient to cyber-attacks

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*Beyond Radio Line Of Sight

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ESA Information on Innovative Funding Mechanisms

The goal :

Foster new utilization of existing space capacity and capability, in close partnership with end-users, through the development of integrated (different space and non space technologies) applications projects which demonstrate a potential for sustainable services.

Incubator of Services

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Integrated Application Promotion (IAP) Scope

Aviation & RPAS

Transport & Logistics

Tourism

Education & Development

Energy

Safety & Security

Environmental Resource Management

Media & Broadcasting

Addressing global challenges in different thematic areas

Finance, Investment & Insurance

Maritime & Offshore

Food & Agriculture

Infrastructures & Smart Cities

Health

Sustainable services based on
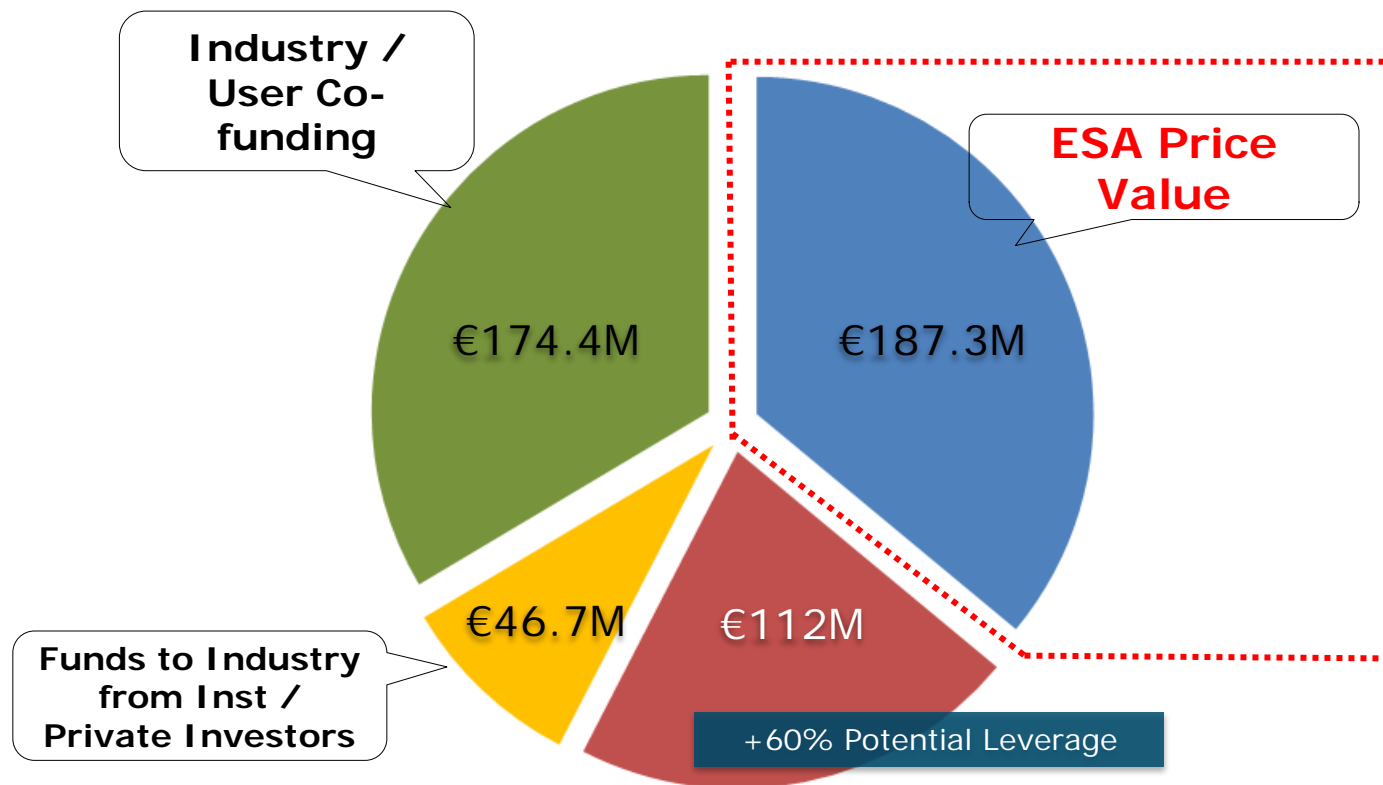
- SATCOM
- SATEO
- SATNAV
- SATAIS
- SATADS-B
- SSW
- HSF
- …..
- …..

in combination with terrestrial systems!

The offer
- Financial support
- Technical & Business expertise
- Promotion
- ESA "branding"
- Networking
- Access to 3rd party funding

pean Space Agency

IAP
Financial Structure

Industry / User Co-funding

ESA Price Value

€174.4M

€187.3M

€46.7M

€112M

Funds to Industry from Inst / Private Investors

+60% Potential Leverage

Seraphim Space

European Investment Bank

European Space Agency

55 project's impact appraised against
10 Societal -Economic indicators

#	Description	Measure
1	Revenue	Euro
2	Exports	% of revenue going to export
3	Jobs	no. of employees created or sustained linked to the project
4	Investment leverage	Euro, includes total 3rd party investment in terms of equity, debt, grant, public funds or M&A following on from the ARTES project, as compared to the ESA co-funding
5	R&D spend uplift	Increase in the ratio of R&D expenditure/revenue
6	Extent of the value chain	Number of business relationships. This includes consortium partners, suppliers, distributors etc.
7	Addressable market size	Potential financial value without possibility to compare or aggregated
8	Value creation	May be linked to a financial measure without possibility to aggregate figures
9	Societal benefits	E.g. improvement in emergency distress, better education in rural schools, saved lives due to telemedicine
10	Innovation impacts	E.g. market disruption and patents

1) **Cumulated revenue to Date, 2.7 : 1; Cumulated revenue projection 2020, 15.3 : 1**

€901 M
Discounted 5% p.a.

€159 M

€59 M

ESA Funding Cumulated revenue to date Cumulated revenue projection b

2) **>70% of revenue goes to export**

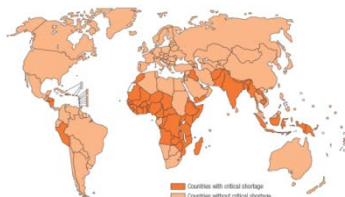3) **326.5 Jobs created**

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IAP
Strategic Partnerships

Maritime *Activities*

RPAS Activities

eHealth for Sub-Saharan Africa

Space for Rail

"SMAP Fund"
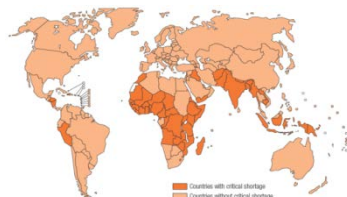
Space for Mediterranean Acceleration Programme

or Official Use

1) **EMSA/ESA SAT-AIS initiative → EC/EMSA are investing 10.2 M€**
2) **1st RPAS Pilot Service 10 € for EMSA**
3) **The following one, RPAS Pilot Services (with FRONTEX and EFCA) to Monitor Fishery /Migration etc. (~60M€/ 2017)**

EUROCONTROL

LUX DEV

eHealth for Sub-Saharan Africa

European Railway Agency

Space for Rail

European Investment Bank

"SMAP Fund"

Space for Mediterranean Acceleration Programme

or Official Use

IAP activities related to Remotely Piloted Aircraft Systems - RPAS

ESA

Feasibility

- **Unmanned Postal Delivery**
- **BIOSCOPE crop mgmt service for potato farmers**
- **STEAM ship emission aerial measure-ments**
- **UASatcom exploration & pipeline monitoring**
- **SAFEDEM enhanced and safe demining**
- **PalmOil-Vision carbon footprint in palmoil sector**
- **SINUE Integrating RPAS into non-segregated airspace**

Demonstration

- **B-LiFE biological crisis field laboratory**
- **RAPSODY UAV based S&R (1) and Pollution Monitoring (2) Services**
- **KORE crop precision farming**
- **SAFEDEM enhanced and safe demining**
- **DeSIRE Integrating RPAs into non-segregated airspace**
- **DESIRE 2 Integrating RPAs into non-segregated airspace**

Operational

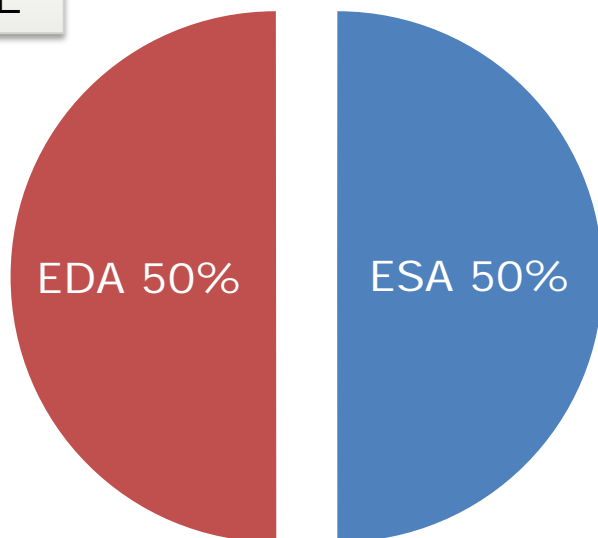- **SURMON (UASatcom) exploration & pipeline monitoring**

RPAS range: Micro to MALE RPAS

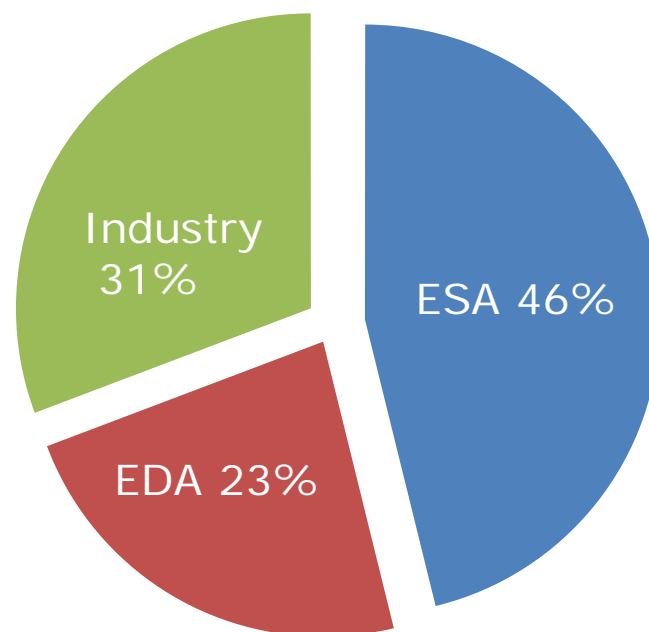**Space assets: Satcom, SatNav integration with sat EO data**

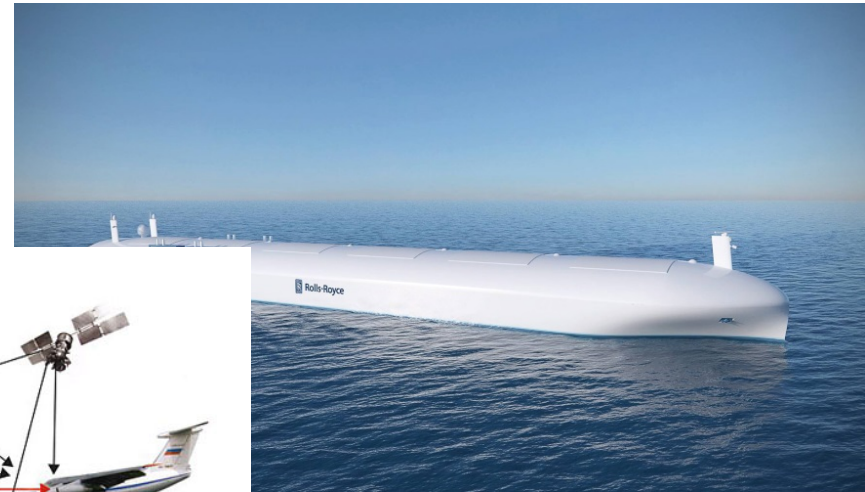## User / Customer Engagement

DeSIRE

EDA 50%   ESA 50%

DeSIRE 2

Industry 31%   ESA 46%

EDA 23%

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What is next?

Cyber-security

Unmanned Maritime Vehicles

ADS-B

Emergency response

CBRN

Others???

IAP Evolution

IAP III

One Stop Shop
to support Industry to establish Space based Applications & Services

5th WS Geneva, SSO "Lift 2 Space" 1600/~300

2017 - 2019

IAP II

3rd WS Rome, ASI: Dual Use, ~250

2016

2015

6th WS, Brus. BELSPO "Space for SMEs and start-ups" ~320

2013

2014

1st WS, ESTEC: Initial WS, ~150

4th WS Luxinno./EIB Financing & "Space4Med" ~ 260

2012

2011

2nd WS Harwell, UKSA/TSB: Users, ~200

2010

2009

IAP I

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