Space Systems for Safety and Security

Ubiquitous, disruptive, secure and resilient communications for critical infrastructures and governmental services

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Thematic Session #3 : Space systems and applications for Safety and Security

PSCE Conference in Paris 2019

A new Age for SATCOM solutions supporting key European infrastructures

- Modernisation of key European infrastructures recognised as essential to the future of the EU economy, society, security, autonomy

  - Transport (ATM, …), Energy, Finance, Health,…

- Next generation digital networks are a major enabler of this modernisation

  - From segregated to unified : systemic risk, need for European autonomy

- SATCOMs are in the middle of an unprecedented wave of innovation and diversification of its offering, are recognised as important parts of these networks

- Disruptive US/China projects under development, services already offered

  ⇒ Huge opportunity for users, challenge for Europe that can not stay behind

European Space Agency

ESA : introduction & financial prospects

- The European Space Agency : 22 Member States, from the EU but not only

- All Space fields covered, including SATCOMs

- Ministerial Councils decide of the strategy, programmes and funding :
    - November 27-28, 2019, in Sevilla (Spain)
    - 14.4 B€ globally for 5 years
    - Including : 1.57 B€ for SATCOM over 3 years (+35% / previous period)

- For SATCOM, ESA Programme is ARTES, with two complementary objectives :
    - Make European Industry still more competitive on World markets
    - Make European solutions available that respond to European institutional needs

SATCOM at ESA : ARTES
Advanced Research in Telecommunication Systems

Objectives

- Make European Industry still more competitive on World markets
- Make European solutions available that respond to European institutional needs

Partnerships, Co-funding

- Well established frameworks for partnership with Industry/Operators, public organisations, etc…

Tool box

- User needs identification
- System studies
- Pilots for user needs consolidation
- R & D
- Early service demonstrations
- System development
- Pre-operational system deployment & validation
- ….

SATCOM Space systems for Safety and Security

- "4S" as one of the 3 ARTES Strategic Programme Lines for 2020-2022

- Aims to :

  - prepare response to European "regulated"/critical infrastructures needs or governmental security users needs,

  - support European competitiveness on world SATCOM institutional markets

- Provision of end to end solutions & services :

  - short/mid term (<2025), based on existing space infrastructure,

  - mid/long term end (>2025) based on Next Generation space infrastructure

- More than 235 M€ directly allocated to 4S, with up to 750 M€ allocated to Generic lines that may be partly mobilised if needed to start activities & projects

4S infrastructure and services : 4 main user segments

UBIQUITOUS

DISRUPTIVE

SECURE

RESILIENT

Example #1 ESA/IRIS : a digital data link for ATM

... Capacity

Data link is a MUST to enable a safe, efficient and cleaner European Sky

The growth of data capacity needs is very high: we will face congestion soon... Saturation is expected as from 2024

Complementary solutions to VDLM2 have to be implemented to sustain the need growth in a consistent manner

... And RESILIENCE of the ATM digital data link

European Space Agency

ESA/IRIS : programmatic takeaways for inspiration

- Initially, an ESA-Initiated preparatory phase

- Then, development phase through a partnership with a private satellite operator to offer the service based on its L-band solution platform supported by its existing and future fleet of satellites

- Initial Operational Capability achieved in 2019

- Space 19+ : aims for EASA service certification, Full Operational Capability and start of service by 2022

- Nota : *ESA already working on Next Generation space segment that may be required by future needs of Civil Aviation and Air Traffic Management*
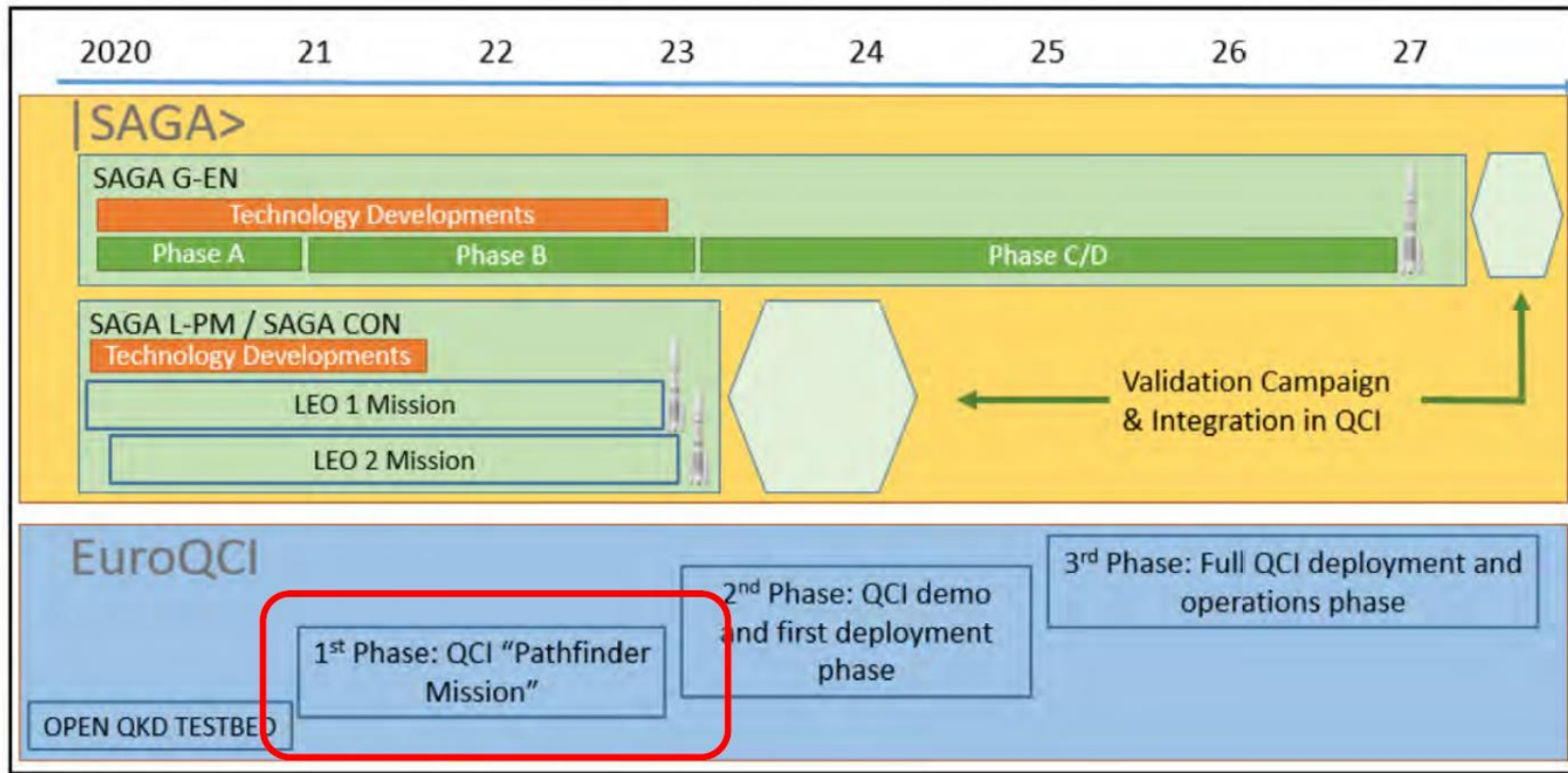
Example #2 : SAGA quantum key distribution for secured European Communications

https://www.esa.int/ESA_Multimedia/Videos/2019/04/Ultra-secure_communications_via_SAGA

European Space Agency

SAGA - Road map

4S
Next Generation SATCOM European Infrastructure responding to future user needs
Preparatory Programme

European Space Agency

Future needs call for deployment of NG solutions
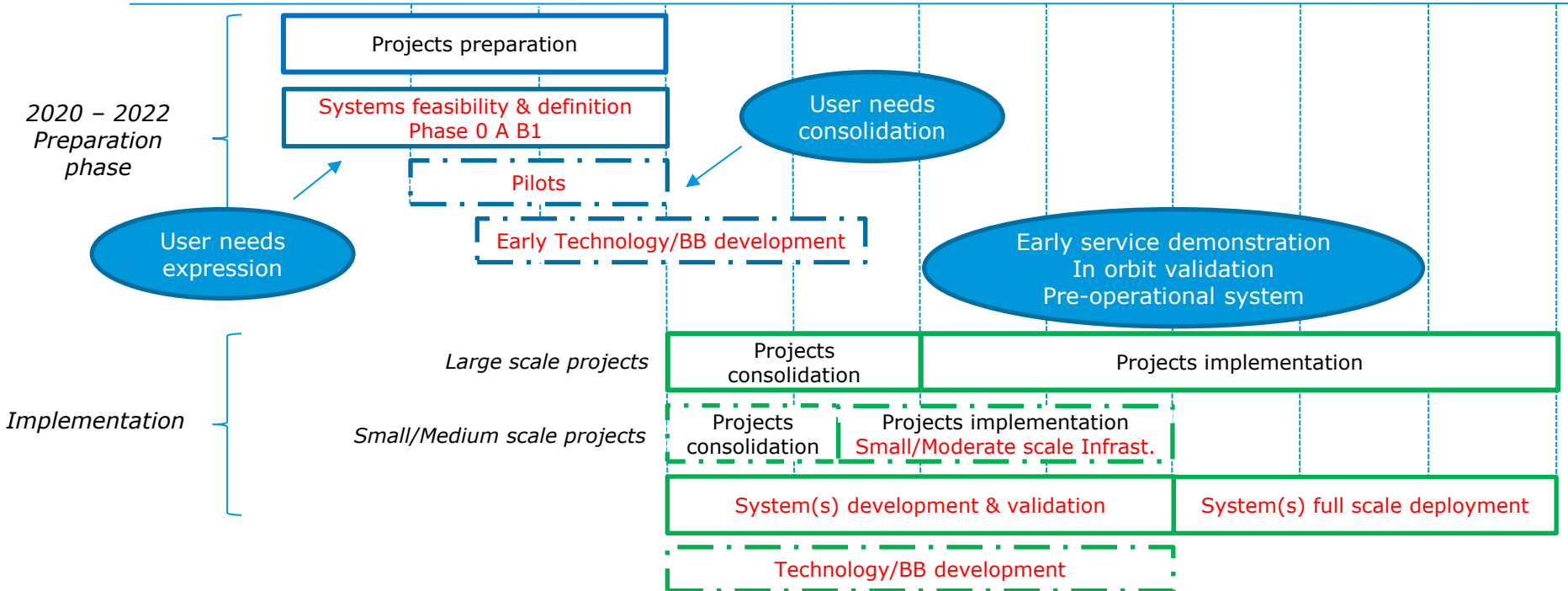
- SATCOM interest for communication needs of critical infrastructures and governmental users has been recognised, in Europe and elsewhere

  —Transport (ATM, …), Energy, Finance, Health,…

- Beyond existing space segments, new highly innovative ones may respond to brand new classes of needs and widespread usage

- In terms of SATCOM infrastructure, real disruption when compared to what is operational today : to be progressively deployed over the 2025-2030 period

- European financial resources limited when compared to the US / China :

  ⇒ *Strong need to exploit synergies at system level between different vertical segments needs, between institutional needs and commercial needs*

Need to start now, with all stakeholders and user communities on board, ARTES/4S as an effective programmatic framework with a solid history of partnerships

Road Map for Future European 4S Infrastructure Project(s) implementation decision by 2023
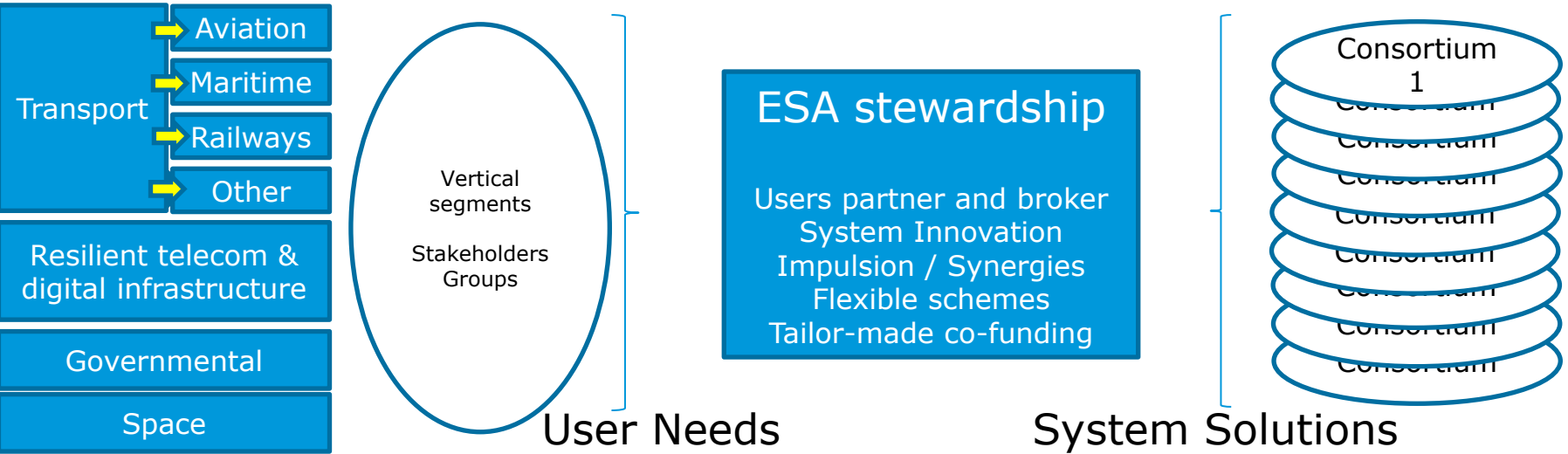
1st step : Preparatory system studies 2020
Stewarded by ESA, with full stakeholders and industry involvement

Highly diversified user needs and vertical segments environments

Highly diversified and initiative-enabled consortia

Transport
- Aviation
- Maritime
- Railways
- Other

Resilient telecom & digital infrastructure

Governmental

Space

Vertical segments

Stakeholders Groups

User Needs

ESA stewardship

Users partner and broker
System Innovation
Impulsion / Synergies
Flexible schemes
Tailor-made co-funding

Consortium 1
Consortium
Consortium
Consortium
Consortium
Consortium
Consortium
Consortium

System Solutions

- Outcome :
  ⇒ Consolidation of user needs, Global Master plan
  ⇒ Consortia-proposed disruptive projects for implementation decision based on consolidated user needs and results of system studies

Conclusion- takeways

ESA/4S and the PSCE community

- Under its ARTES (telecom) programme, ESA established a 4S Strategic Line focussed on communication needs of European critical infrastructures & governmental users

  ⇒ Sufficiently funded for 2020/2022 at November 27-28 Ministerial Council

- ESA/ARTES (telecoms) programme provides a full tool box and cooperative framework, both to support <u>European-wide</u> initiatives and <u>National</u> ones

  ⇒ Concept studies, service pilots, Space R & D, service demonstrations, …

- Involvement of "4S" user communities is highly expected and essential, with two time horizons :

  – Short/mid term (<2025): new services based on existing space segment

  – Mid/long term (>2025): future services based on NG space segment