Council of the European Union
General Secretariat

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LIMITE

ESPACE

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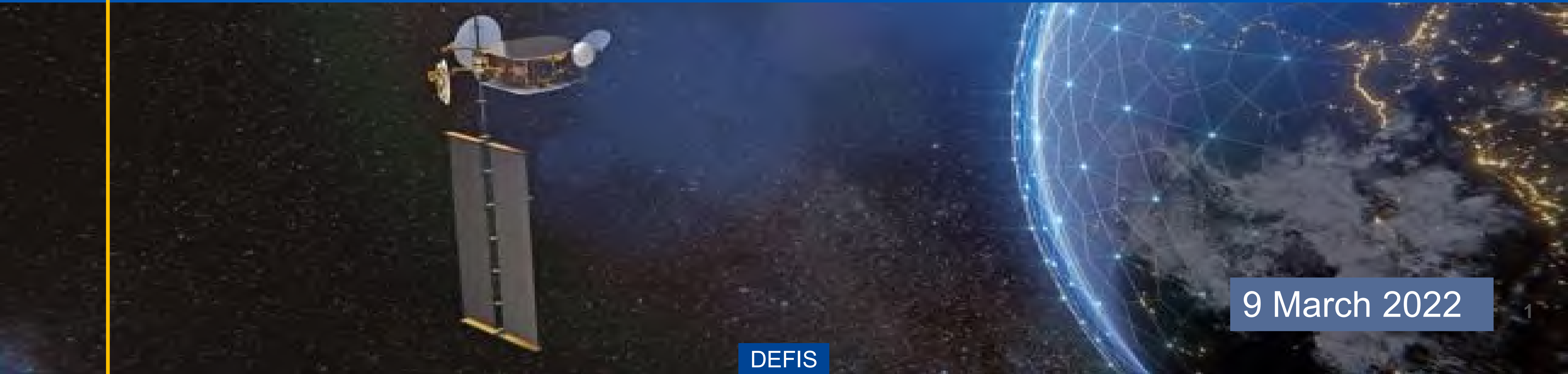
WORKING DOCUMENT

From:	General Secretariat of the Council
To:	Working Party on Space
Subject:	Secure Connectivity Programme : Impact Assessment - PPT presentation

Delegations will find attached PPT by the Commission with the view to the Space Working Party meeting on Wednesday 9 March 2022.

Secure Connectivity Programme – Impact Assessment

Space Working Party

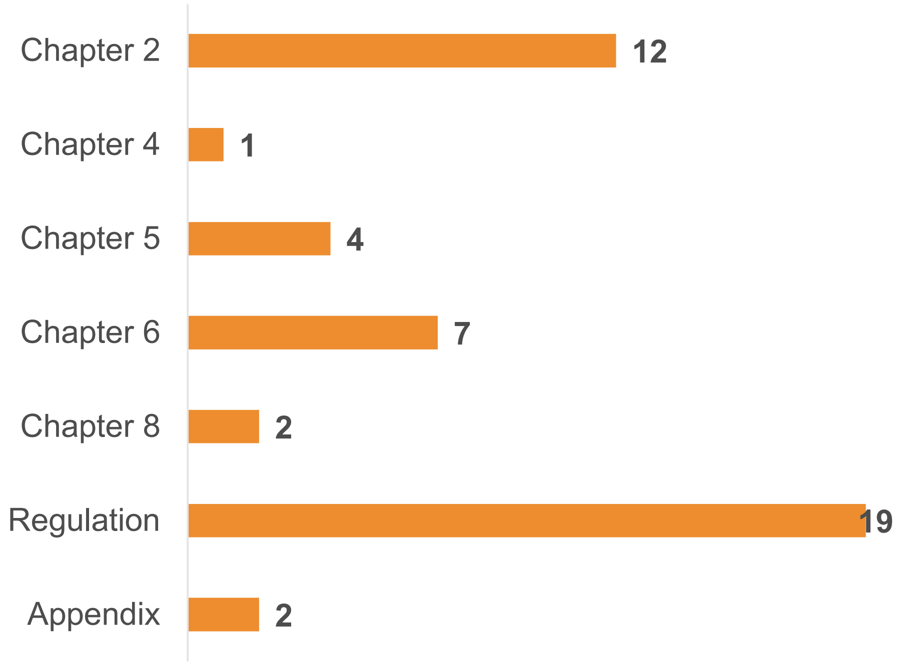


9 March 2022

DEFIS

Questions received

Questions received



1. **Problem definition and objectives: Chapter 2, Chapter 4**
   - Evidence of the demand evolution and gap
   - Frequencies
2. **Options: Chapter 5.3 + 5.7**
   - Roles and responsibility in terms of design
   - Budget commitment
3. **Impacts: Chapter 6.1, 6.2**
   - CAPEX calculation
   - Price of service
   - Economic impact calculation
   - Environmental impact: contribution to the Green Deal
4. **Preferred option: Chapter 8**
   - Methodology questions to the preferred option
5. **Additional issues to be addressed under the legislative proposal**
   - Implementation: governance and system architecture
   - Market conditions
   - Financing
   - Roadmap of the services

Reminder: Annex 1 contains responses to 2nd RSB opinion – integral part of IA

1. Problem definition and objectives: What evidence underpins the evolution of user needs, the necessary solution and the lack of it?

QUESTIONS

- Evidence of a capacity gap and its evolution
- Incomplete picture of current capacities
- Analytical coherence of the overall intervention logic
- Geographical scope of frequencies

IA ELEMENTS

- Primarily a **qualitative** gap, not a quantitative gap:
  - Latency
  - Coverage
  - Security

  The ENTRUSTED study preliminary results confirm MS evolution towards these needs
- **Quantitative**: a first quantitative assessment has been performed in the frame of the ESSCS study and is shared in Annex 4 of the IA. Member States will be invited to Workshops to:
  - Qualify the use-cases
  - Provide insight on national needs

  Towards the elaboration of the service portfolio (Art. 7(3))
- **Users**: Public Authorities relevant to the identified use-cases (see next slide), to be designated by MS relevant Secure connectivity competent authority (similar to PRS and Govsatcom approach)
- **Picture of current capacities:**
  - all existing EU governmental capacities have been mapped, already in Govsatcom
  - all capacities are GEO, mostly centred on EU : **No low latency capacities, no coverage on high latitudes**
- **Frequencies**:
  - Objective to secure frequencies for governmental uses. Current filings considered address the global need

Governmental use cases are evolving, requiring higher performance and global coverage

Governmental service needs (High level civil military user needs)

CONNECTING KEY INFRASTRUCTURES

- Governmental & Institutional secure communications
- Management of Infrastructures (air, rail, road, traffic management
- Galileo (augmentation), Copernicus (data relay)
- Command and control of smart grids and M2M (energy, finance, health, data centres…)

CRISIS MANAGEMENT AND EXTERNAL ACTIONS

- Civil protection
- CFSP- CSDP – National missions
- Humanitarian aid, DG ECHO satcom services
- Telemedicine
- Maritime emergencies (search and rescue)

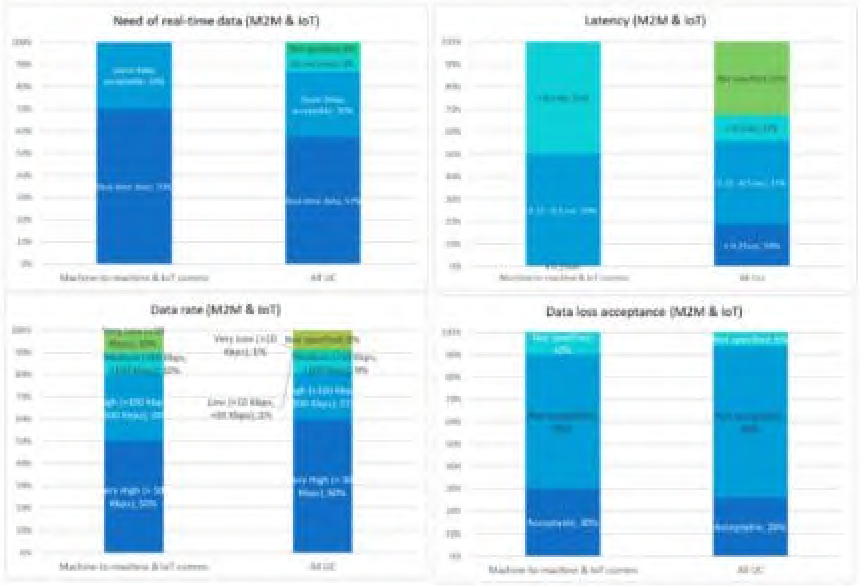
SURVEILLANCE

- Border and remote areas surveillance
- Remote Piloted Aircraft systems
- Maritime surveillance
- Arctic region coverage
- Complement to military missions
- Space surveillance

Source: Work group on High Level Civil Military User Needs for Governmental Satellite. Communications

Evolving requirements (ENTRUSTED, completed by Industrial study)

- Performance (Latency, real time data, data rate, data loss acceptance)



- Global coverage, in particular polar regions
- Similar initiatives in the US, RU, CN

Source: Entrusted study

Industrial studies outcome on user needs

ESSC study

Performance evolution for Europe

ESSCS-BB5G-SRV-0134 Performance evolution for Europe

The service shall benefit from the following performances :

			Land Mobile Satellite Access in Europe		
UN	Requirement	Unit	2020-2025	2025-2030	2030-2040
1	Forward link	[Peak speed] in Mbps	500Mbs[13]	5Gbs	15Gbs[14]
2	Return link	[Peak speed] in Mbps	50Mbs	500Mbs	1.5Gbs
3	Number of active terminals global	[# of active terminals]	10% of travellers	10% of travellers	30% of travellers At Peak among 26,000 trains
4	Number of simultaneously active terminals	%	Variable (from low to medium)	Variable (from low to medium)	Variable (from low to high)
6	Density of users	[Terminals / sq. Km]	~500 travellers in high speed trains		
8	RTT Latency	[milliseconds]	See Table 8-2; Impact on user experience has to be considered in case of several technologies available in the same area		
12	Data volume *consumed per user in average*	[GB/Month]	300	1500	4500
13	User satellite terminal type	-	Flat panel and low profile antenna system		

[13] 3GPP TS 22.261: 50Mb/s per user * 100 users (~ 20% among 500 in high-speed trains)

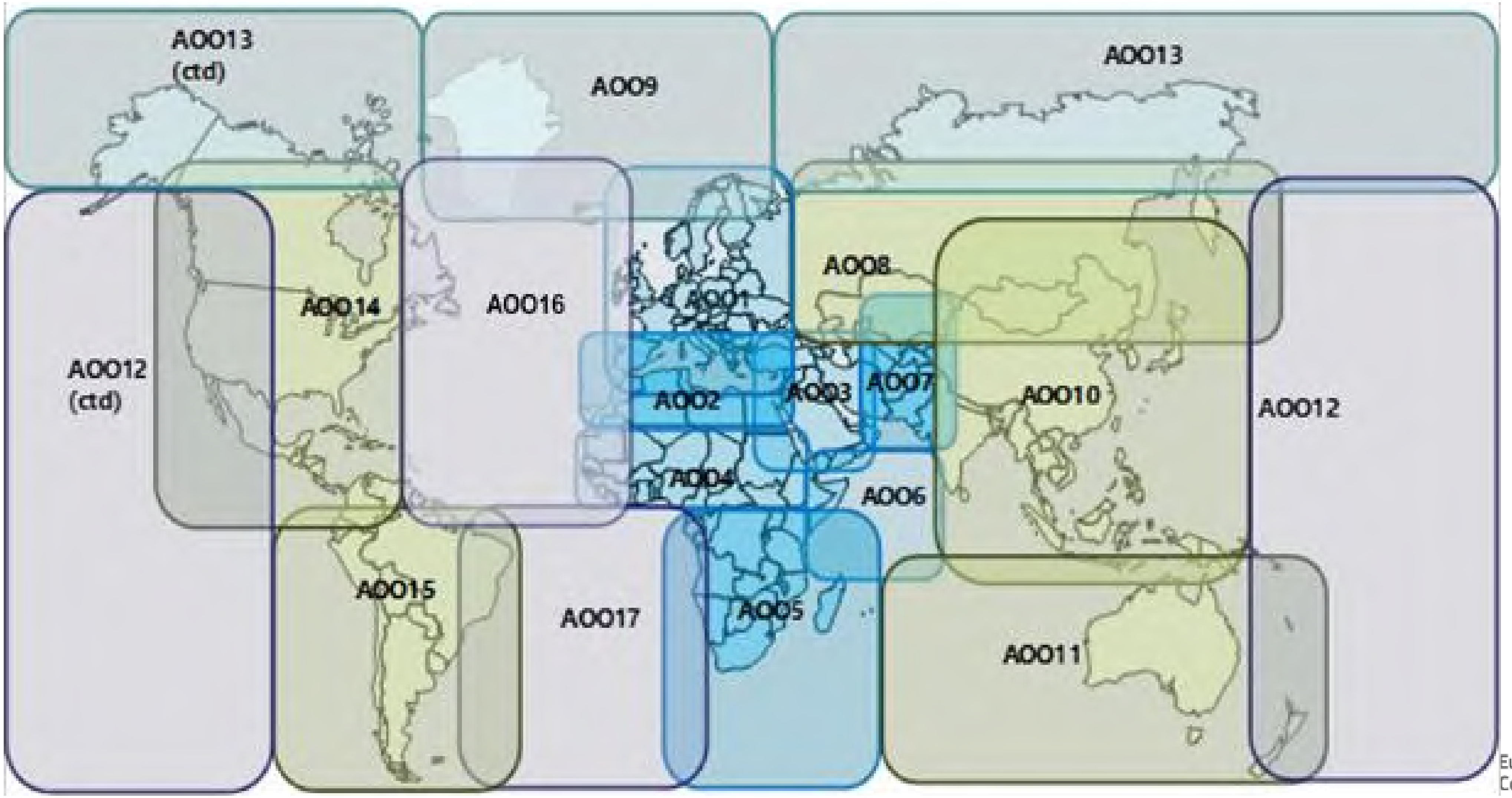
[14] 3GPP 5G : high-speed trains requirements are the following: DL=15Gbs/train, UL=7.5Gbps/train

New Space studies

SATELLITE COMMUNICATIONS FOR EUROPEAN GOVERNMENTS // SURVEILLANCE // LAND BORDER SURVEILLANCE

User types	Nb Users (2026)	Min rate* (Mbps)	Max rate** (Mbps)	MT*** (GB/month)	Latency (ms)	Security grade	Coverage needs
✓ FRONTEX / Surveillance HQ (Land and Maritime) ✓ Critical Infrastructure such as Nuclear Power Plants	~ 60	80	800	10000	150	✓ Full PQC	✓ Available Worldwide ✓ Mainly European mainland
✓ Institutional Communications (Embassies, EU Representations Offices) ✓ Humanitarian Aid (Refugee camps)	~ 200	40	400	5000	250	✓ Full PQC	✓ Available Worldwide
✓ Civil Protection (Hospitals, Ambulance, Fire Stations) ✓ Polar region (Hospitals, Schools, Government offices)	~ 500	20	200	2500	250	✓ Full PQC	✓ Available Worldwide ✓ Mainly European mainland
✓ Staff deployed (Medical, Police, election observation .....) ✓ Helicopters and UAVs ✓ Support to space infrastructures (GALILEO, EGNOS) ✓ EU External Action Service	> 1500	4	40	500	250	✓ Full PQC	✓ Available Worldwide ✓ Mainly European mainland

For each family of use-cases, areas of operations have been defined using the geographical typology defined by Member States early 2010's



Frequencies

Governmental

- **Secured filing in the Gov. Ka-band**
  - French filing elaborated in Summer 2020
  - Submitted to ITU October 2020
  - Confirmed regulatory status in April 2021
  - Excellent regulatory priority
  - Supports up to 19,000 satellites in LEO and MEO
  - French Authorities have provided European Commission with ‘letter of confidence’: filing available for Secure governmental use

Filing governance similar to Galileo

Commercial

BIU deadline	Status	Admin	Operator	Satellite network	Orbit type	10700-10950 MHz	10950-11200 MHz	11200-11450 MHz	11450-11700 MHz	11700-12750 MHz	12750-13000 MHz	13000-13250 MHz	13750-14500 MHz
BIU	N	UK	Oneweb	L5									
BIU*	**N**	**F**	**TAS**	**MCSAT-2 L**									
30/06/2021	C	LIE	Kleo	3ECOM									
27/06/2021	C	NOR	SpaceX	STEAM									
02/09/2021	C	UK	SES	O3B-C									
18/09/2021	C	LIE	Kleo	3ECOM									
11/11/2021	C	NOR	Norsat	NORSAT									
30/06/2023	C	NZL	-	APOG									
22/06/2023	C	UK	Oneweb	THEO									
28/06/2023	C	RUS/IK	Intersputnik	IK-NGSO-A									
28/06/2023	C	CAN	Kepler	MULTU									
01/01/2024	C	RUS/IK	Intersputnik	IK-NGSO-A									
01/01/2024	C	USA	SpaceX	USASAT-NGS									
01/01/2024	C	USA	SpaceX	USASAT-NG									
01/01/2024	C	USA	SpaceX	USASAT-NG									

Ka

BIU deadline	Status	Admin	Operator	Satellite network	Orbit type	17300-17700 MHz	17700-17800 MHz	17800-18600 MHz	18600-18800 MHz	18800-19300 MHz	19300-19400 MHz	19400-19600 MHz	19600-19700 MHz	19700-20200 MHz	20200-21200 MHz	27500-28600 MHz	28600-29100 MHz	29100-29500 MHz	29500-30000 MHz	29500-30000 MHz	30000-31000 MHz
BIU	N	USA	US DoD	USCSID-P	HEO			X	X	X	X	X	X	X	X						
BIU	N	USA	Iridium	HIBLEO-2FL	LEO							X						X			
BIU	N	USA	US DoD	USCSID-P	HEO			X													X
BIU	N	USA	US DoD	USPOL	HEO										X						
BIU	**N**	**UK**	**SES**	**O3B-A**	**MEO**			**X**		**X**						**X**	**X**				
BIU	**N**	**UK**	**SES**	**O3B-B**	**MEO**			**X**		**X**						**X**	**X**				
BIU	N	USA	Iridium	HIBLEO-2FL2	LEO							X						X			
BIU	C	CAN	Telesat	CONSTELLATION	LEO	X	X	X		X	X	X		X		X	X	X	X	X	
BIU*	N	F	TAS	MCSAT-2 LEO-2	LEO			X		X				X		X	X			X	
BIU*	**N**	**F**	**SES**	**MCSAT-2 HEO**	**MEO**			**X**	**X**	**X**				**X**		**X**	**X**	**X**	**X**	**X**	
BIU	N	F	Oneweb	MCSAT LEO	LEO			X	X	X	X	X	X	X		X	X	X	X	X	
BIU	N	LIE	Kleo	3ECOM-1	LEO	X	X	X		X	X	X	X	X		X	X	X	X	X	
27/06/2021	C	NOR	SpaceX	STEAM-2	LEO	X	X	X		X	X	X	X	X		X	X	X	X	X	
18/07/2021	C	UK	Oneweb	L5	LEO		X	X	X	X	X	X	X	X			X	X	X		
27/06/2021	**C**	**F**	**ADS**	**AST-NG-C-1**	**LEO-MEO**					**X**	**X**	**X**	**X**				**X**	**X**	**X**		
02/09/2021	**C**	**G**	**SES**	**O3B-C**	**LEO-MEO**			**X**		**X**				**X**		**X**	**X**	**X**	**X**	**X**	

- Commercial filings to be provided by industrial partner
- Several filings identified in EU

Overall intervention logic

Question:

- *What is the analytical coherence between the problem definition, objectives, options, criteria for the comparison of options and the definition of future monitoring indicators of the proposal?*
- *What are the explanations on the choice of policy options with regard to technical solutions? The choice of a concession model is far from obvious given that the primary goal of connectivity should be to primarily trigger a market driven approach ensuring connectivity solutions for European citizens in underserved regions;*

PROBLEM

Governmental satcom user needs are evolving towards higher security, low latency and global coverage solutions; however, the current EU satcom assets do not meet these new needs.

OBJECTIVE

- **Ensure provision of satcom solutions** to meet MS needs;
  - thus to increase the resilience of MS by guaranteeing access to these solutions;
  - to ensure that these needs are not critically dependent upon third party solutions.

POLICY OPTIONS

0. **Baseline: rely on current inadequate EU satcom offer**
1. **Full-public: Build** and own an EU-public solution
2. **Concession: Buy** a service
3. **Non-EU private sector:** Buy a new solution from the Non-EU private sector

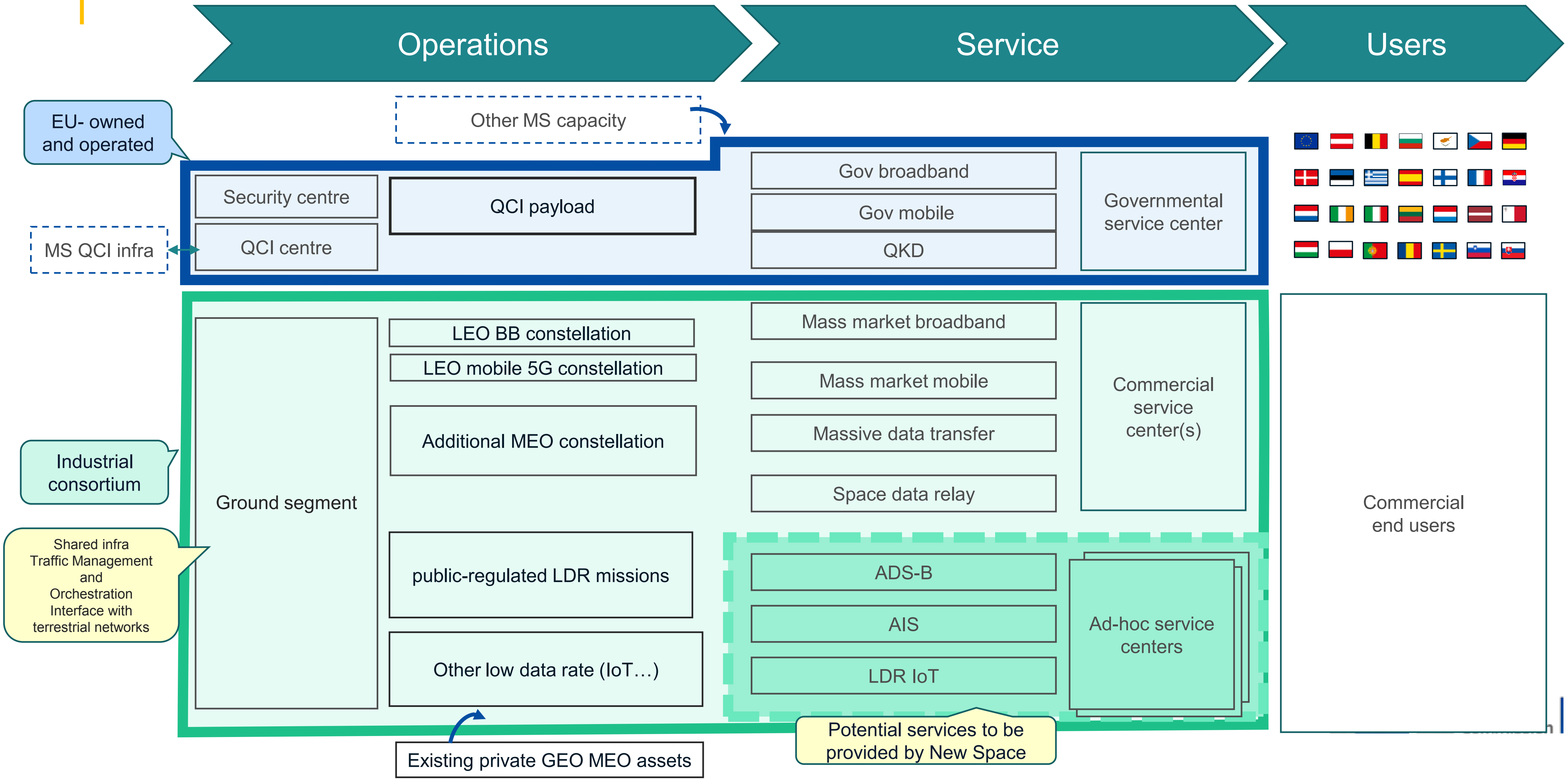
2. Description of options: Concession

- How is the Concessionaire supposed to be involved in the design of the satellite system design, specification and procurement for public services?
- Which time period would the "commitment to long term service payments" cover and are they committed?

- Specifications (in options 2 and 3) :
  - Governmental services: **specifications** need to be issued by the contracting authority, **Design** to be proposed by industry and public sector to **validate and accreditate against service needs**
  - Commercial services: specification, design and validation up to the concessionnaire
  - Financial Commitment: approach similar to the one used for Galileo GSOP

ILLUSTRATIVE

Operational organisation between public and private



3. Impacts: Clarifications regarding the economic impact calculations and environmental contributions of the proposed Programme

- How is the CAPEX calculated and does it include costs for maintenance and operation?
- More detailed explanation of the calculations for the economic impact
- Questions related to the price of the service
- What is the contribution to the Green Deal

- CAPEX costs include all expenditures for the current MFF. Operations are identified on top, see table 3 p. 29
- CAPEX has been calculated using the inputs from the industrial study, using cost assumptions taken from both costing scenarios (commercial-in-confidence) elaborated in the frame of the ESSCS study on
  - Space segment
  - Ground segment
  - Launchers
  - End-user segment
  - Security

Focus on cost : No service fees in a service based approach

Question:

The table on page 31 referring to the budget for Option 2 refers to a CAPEX of 4bn EUR, but no service fee paid by the Union. How does that relate to the statements on page 24 that the "intervention logic should therefore follow a service-based approach"?

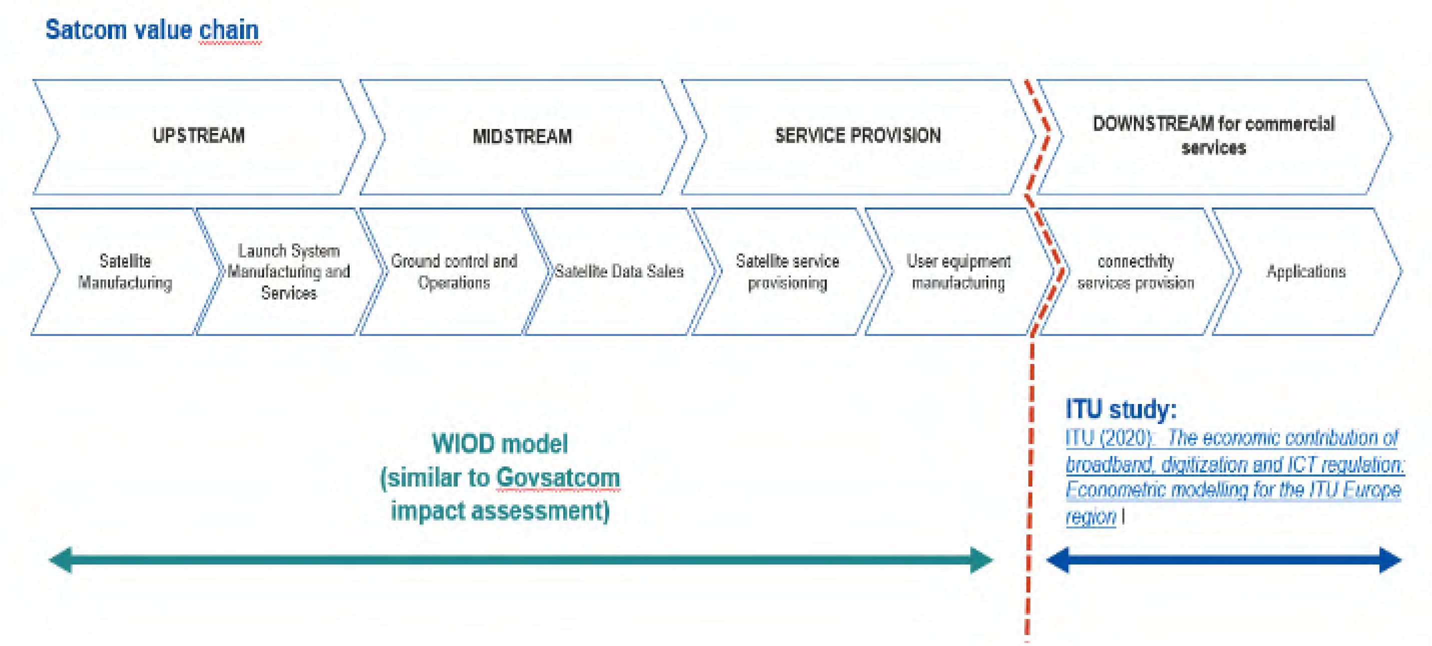
	CAPEX for the Union in EUR	Annual OPEX for the Union in EUR	Annual Service costs paid by the Union in EUR	Comments
Option 0: Baseline	180 million	Not applicable	40 million from 2025 to 2027	Services would be procured depending on budgetary availability (currently 40m in current MFF)
Option 1: Fully public	6 billion	250 million	Not applicable	
Option 2: PPP / Concession	4 billion	170 million	Not applicable	Current assumption based on power/bandwidth allocation: two-third of costs for public sector (EU+MS)
Option 3: Stake in non-EU constellation	tbd[76]	Not applicable	400 million	Provided that a private operator manages to deploy the infrastructure allowing to provide the new services, bandwidth would be sold on a market price basis.

Table 3: Cost impact per option

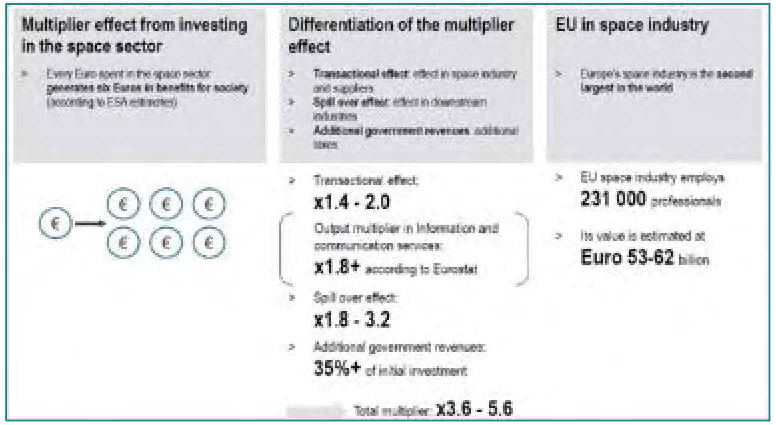
- 'service-based- approach refers to the choice not to address policy options in terms of architecture but in terms of service.
- In table 3, the notion of service fees means that there is a private operator leveraging a fee (e.g pay-per-use). In option 2, services to government are provided by the public sector to MS on a free-of-charge basis

Further elements on the calculations for the economic impact have been provided in Annex 1 of the impact assessment

Model used by segments of the value chain



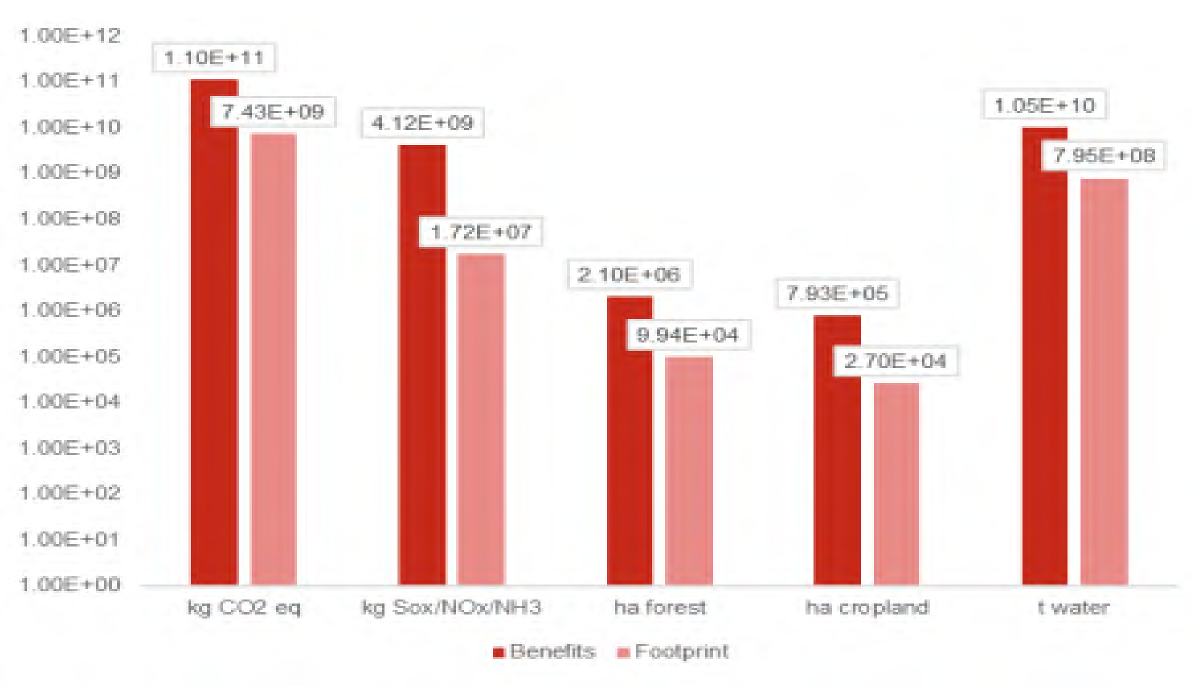
Cost



Source: Timmer, M. P., Dietzenbacher, E., Los, B., Stehrer, R. and de Vries, G. J. (2015), "An Illustrated User Guide to the World Input–Output Database: the Case of Global Automotive Production" , Review of International Economics ., 23: 575–605 (link to 2016 release)

Green deal: CO2 emissions (see annex 1 – p. 68 ff)

PwC report on footprint of Space Programme



- Compared to other industry sectors, **the manufacturing of spacecraft does not emit significant GHG emissions**. Moreover, once in service, the system relies only on solar power.

The initiative has similar **positive contribution towards environmental objectives** as the Galileo and Copernicus. A dedicated study on the environmental benefits stemming from the use of the components is approximately 2 orders of magnitude higher than the environmental footprint generated by the construction, deployment (including the launches and the production of launchers) and use over the complete life time (22 years) of these systems.

- Compensation mechanism foreseen in draft Regulation Art. 15(7)
- Additional requirments could be requested in the context of the ITT

4. Preferred option: Methodology behind the selection of the 'Preferred option'

- Can the Commission demonstrate that the problem drivers and increasing hybrid and cyber threat levels justify the retained policy option (concession model) in terms of proportionality, budgetary impact and urgency?

- Are the criteria used for the comparisons of the options allow for a subjective assessment? Did you avoid bias through sensitivity analysis?

- Based on the Better Regulation methodology
  - **Problem drivers justify the policy objectives :** threats justify the need for a resilient and secure system

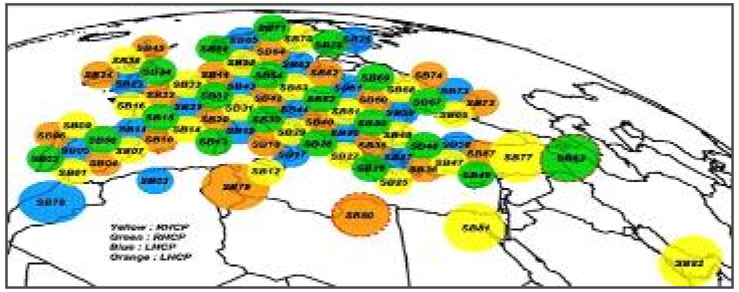
  - Assessment criteria are the same for all impact assessments: Policy Options are assessed in terms of
    - **Effectiveness** (compared to the specific objectives)
    - **Efficiency** (based on economic, social and environmental impacts)
    - **Coherence** with other EU policies

- The gap between MS assets and needs is qualitative – sensitivity analysis would not be relevant

Beyond impact assessment…

Networks infrastructure preserved – selective destructions only so far

Attack on Viasat / Ka-Sat



OPEN SOURCE DATA ONLY

- **Attack**
  - Triggered on 24 feb 2021
  - Service disruption in UA and elsewhere in northern Europe
  - More than 10k receivers impacted (and not reparable)
  - 5 800 wind turbines in Germany disconnected from their command centres – Report filed by operator to BSI

- **Assumptions on modus operandi**
  - “0 day” malware affecting selected categories of receivers
  - Penetration through ground segment or supply-chain attack

Starlink support

- **Activation**
  - Request from UA government on 26 Feb
  - Signal activated over UA the same day
  - Terminals received 28 Feb

  - Jamming/cyber attacks faced since 1st March