

Study to examine the Standardisation/Certification needs for the upstream and downstream of the European Space sector and to evaluate potential options for EU interventions

CEN-CENELEC
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The study aims at assessing the evolution needs in terms of standardisation in a set of different space domains

Context of the Study

Standards ensure the **security and reliability** of products and services, by offering detailed guidelines and methodologies on processes to be followed. The application of standards enables a sound development of products and services and limit the risk of failure.

Standards facilitate **cross-border trading** between different organisations, removing technical trade barriers, by supporting **interoperability** between products and services, both within Europe's single market and also with the rest of the world.

The proposal from the Commission to the Council and the European Parliament issued on the 6th of June 2018 mentions the need for standardisation as set out hereafter:

- **Article 6** mentions that certification and standardisation activities shall **support an innovative Union space sector**
- **Article 43** states that certification and standardisation operations should be covered as eligible actions under **Galileo and EGNOS**. In particular, standardisation activities are of utmost importance for the sound provision of **the safety-of-life service**
- **Article 61** stresses that actions enhancing the standardisation of **GOVSATCOM user equipment** shall be pursued.

Objectives of the Study

1

State of play analysis identifying a set of standardisation gaps











2

Definition of potential solutions addressing the identified gaps

3

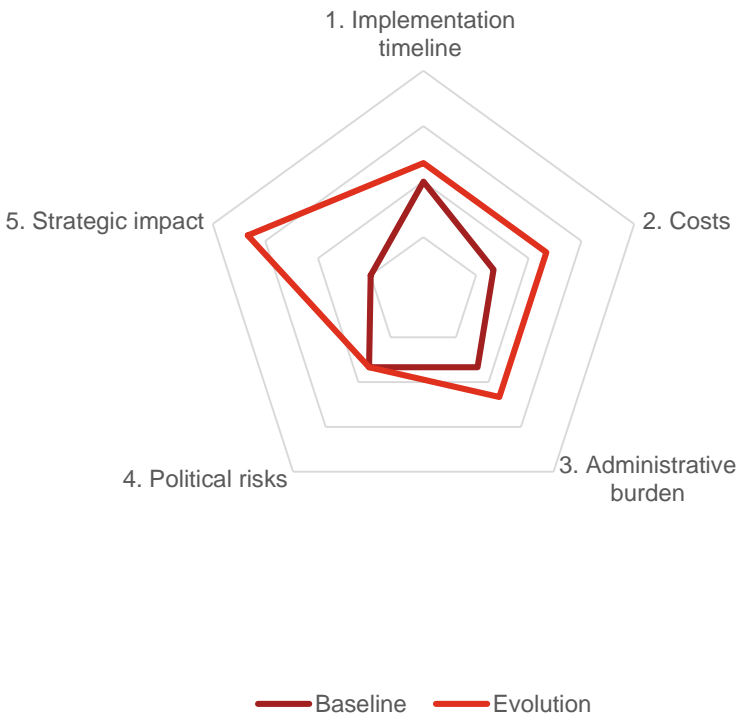
Design and evaluate a baseline and evolution scenario

The study examines the main space domains and focuses on the segments which are at a low maturity level in terms of standardisation and certification

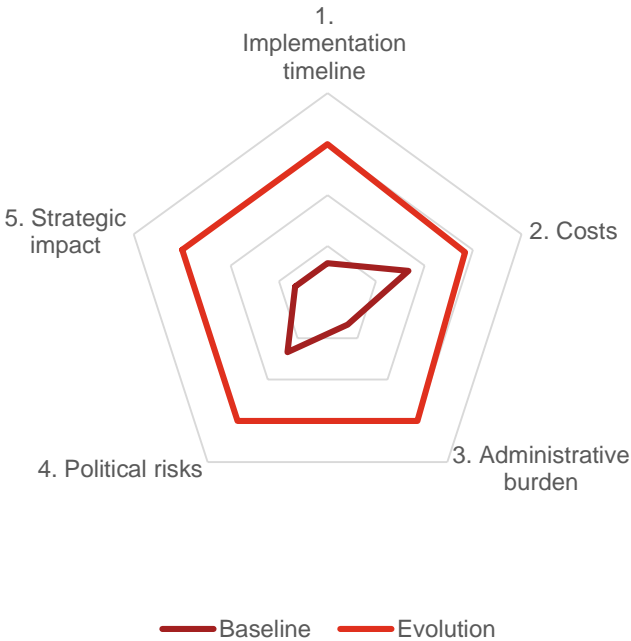
Domains	Baseline	Evolution scenario
1  Navigation	<ul style="list-style-type: none"> • <i>Maintain 'as it is'</i> 	<ul style="list-style-type: none"> • Ensure the implementation of actions identified by the EC and the GSA
2  Earth Observation	<ul style="list-style-type: none"> • <i>Maintain 'as it is'</i> 	<ul style="list-style-type: none"> • Define a comprehensive and unified set of standards for processing and formatting activities • Enhance the access to Copernicus data and ensure their interoperability • Raise awareness on the existence of standards and engage with SMEs for the development of new standards • Implement a certification setup for EO data in legal applications
3  SSA	<ul style="list-style-type: none"> • <i>Maintain 'as it is'</i> 	<ul style="list-style-type: none"> • Encourage the harmonisation of SST data processing • Develop high level and basic standards for the processing of NEO data • Define and/or agree upon a common set of metrics and scales for the various SWE applications • Mandate an entity to develop a Space Traffic Management system and its operating standards
4  GOVSATCOM	<ul style="list-style-type: none"> • <i>Maintain 'as it is'</i> 	<ul style="list-style-type: none"> • Creation of a GOVSATCOM certification for user segment • Creation of standards for hybrid user segments
5  Mega-constellations	<ul style="list-style-type: none"> • <i>Maintain 'as it is'</i> 	<ul style="list-style-type: none"> • Harmonise standards and technical requirements between European member states • Standardise mass production processes and transfer existing COTS' certifications
6  Small-satellites	<ul style="list-style-type: none"> • <i>Maintain 'as it is'</i> 	<ul style="list-style-type: none"> • Develop a common and internationally accepted definition of small-satellites • Define & develop suitable integration, testing and decommissioning standards for small-satellites • Ensure small-satellite standards will not impede the launch of innovative technology
7  Micro-launchers	<ul style="list-style-type: none"> • <i>Maintain 'as it is'</i> 	<ul style="list-style-type: none"> • Ensure that the qualification procedures for micro-launchers are compatible with business models • Ensure that new comers are aware of the current procedures
8  Digitalisation	<ul style="list-style-type: none"> • <i>Maintain 'as it is'</i> 	<ul style="list-style-type: none"> • Ensure the translation of Industry 4.0 manufacturing processes into space standards • Ensure a common frequency for IoT
9  In Orbit Servicing	<ul style="list-style-type: none"> • <i>Maintain 'as it is'</i> 	<ul style="list-style-type: none"> • Implement Standard Operating Procedures to support the service offering of IOS • Standardise docking procedures and certify the corresponding docking technologies
10  European Standardisation bodies	<ul style="list-style-type: none"> • <i>Maintain 'as it is'</i> 	<ul style="list-style-type: none"> • Raise EU SMEs' awareness on standards and certification by supporting communication initiatives • Support the ECSS for the training of emerging space actors • Support the identification and nomination of relevant experts affected to the JTC5's WGs

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Earth observation gaps in terms of standardisation are to be found mainly in the use of data by SMEs and end users

Id	Gaps	Potential solutions	Comparative analysis
2A	Absence of standards for processing and formatting activities	Define a comprehensive and unified set of standards for processing and formatting activities by leveraging the Copernicus Data and Information Access Services (DIAS).	 <p>1. Implementation timeline</p> <p>2. Costs</p> <p>3. Administrative burden</p> <p>4. Political risks</p> <p>5. Strategic impact</p> <p>— Baseline — Evolution</p>
2B	Lack of harmonised set of standards to be applied to a widely diversified panel of application at downstream level		
2C	Lack of awareness on standardisation, qualification and certification practices in most downstream domains	<ul style="list-style-type: none"> • Raise awareness on the existence of standards and engage with involved stakeholder on the possibilities to develop new standards. 	
2D	Lack of willingness/resources by industry players, especially SMEs, to engage in standardisation processes	<ul style="list-style-type: none"> • The focus shall be put on their potential use and derived benefits, in order to both involve and train unaware users, and persuade and engage reluctant ones in the adoption of best practices. 	
2E	Absence of certification process for the use of EO data in legal context	Implement a certification setup for EO data in legal applications	

Data processing methods for the three domains composing SSA, are scattered between different stakeholders, which impedes the harmonisation of activities that require international cooperation to be fully efficient

Id	Gaps	Potential solutions	Comparative analysis
3A	<i>Issues with SST data compatibility</i>	Encourage the harmonisation of SST data processing	 <p>1. Implementation timeline</p> <p>2. Costs</p> <p>3. Administrative burden</p> <p>4. Political risks</p> <p>5. Strategic impact</p> <p>— Baseline — Evolution</p>
3B	<i>Absence of standards for technical interface of NEO capabilities</i>	Develop high level and basic standards for the processing of NEO data	
3C	<i>Absence of a common and well-defined set of SWE metrics and scales</i>	Define and/or agree upon a common set of metrics and scales for the various SWE applications	
3D	<i>Lack of “Space Traffic Management” system to regulate and standardise LEO for satellite operators</i>	Mandate an entity to develop a Space Traffic Management system and its operating standards	

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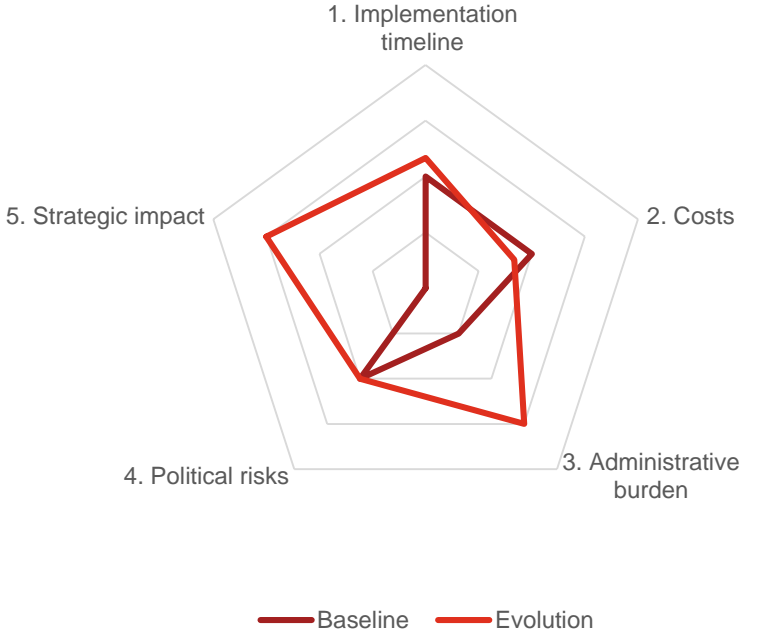
For the use of GOVSATCOM there are different certification procedures for the user-segment for each satellite operator and no standard for hybrid user-segment.

Id	Gaps	Potential solutions	Comparative analysis
4A	<i>No common certification procedure for user-segments</i>	Creation of a GOVSATCOM certification for user segment	<p>1. Implementation timeline</p> <p>2. Costs</p> <p>3. Administrative burden</p> <p>4. Political risks</p> <p>5. Strategic impact</p> <p>— Baseline — Evolution</p>
4B	<i>No standard for hybrid user-segment</i>	Creation of standards for hybrid user segments	

The reinforcement of standardisation and certification practices for mega-constellations activities is required to ensure the sound exploitation of space

Id	Gaps	Potential solutions	Comparative analysis
5A	<i>Absence of standardisation and certifications applicable to all market players</i>	Harmonise standards and technical requirements between European member states.	<p>1. Implementation timeline</p> <p>2. Costs</p> <p>3. Administrative burden</p> <p>4. Political risks</p> <p>5. Strategic impact</p> <p>— Baseline — Evolution</p>
5B	<i>Lack of standards for mass-production and qualifications for COTS and processes which are considered by new entrants</i>	Standardise mass production processes and transfer existing COTS' certifications.	

For the time being, there is no standardisation and certification framework tailored to small-satellite activities


Id	Gaps	Potential solutions	Comparative analysis
6A	<i>Absence of a universal definition of small satellites</i>	Develop a common and internationally accepted definition of small satellites.	 <p>1. Implementation timeline</p> <p>2. Costs</p> <p>3. Administrative burden</p> <p>4. Political risks</p> <p>5. Strategic impact</p> <p>— Baseline — Evolution</p>
6B	<i>Low level of maturity for standardisation practices applied to small-satellite integration</i>	Define and develop suitable integration, testing and decommissioning standards for small-satellites.	
6C	<i>Existing upstream space standards are not fully adapted to small-satellite activities</i>	Ensure small-satellite standards will not impede the launch of innovative technology	

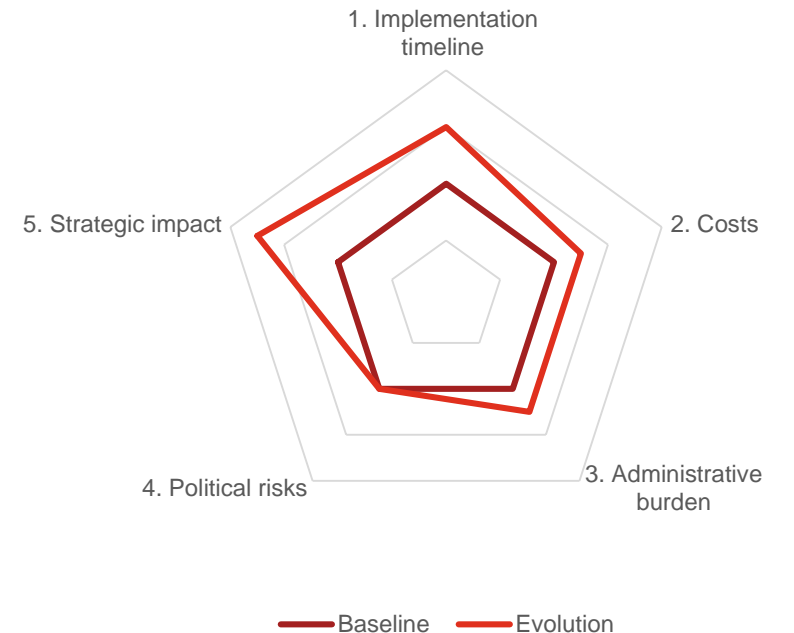
As an emerging space activity, Micro-launchers do not benefit from a mature set of standards and certifications

Id	Gaps	Potential solutions	Comparative analysis
7A	<i>Qualification of launch vehicles</i>	Ensure that the qualification procedures for micro-launchers are compatible with business models	
7B	<i>Lack of awareness and flexibility</i>	Ensure that new comers are aware of the current procedures	

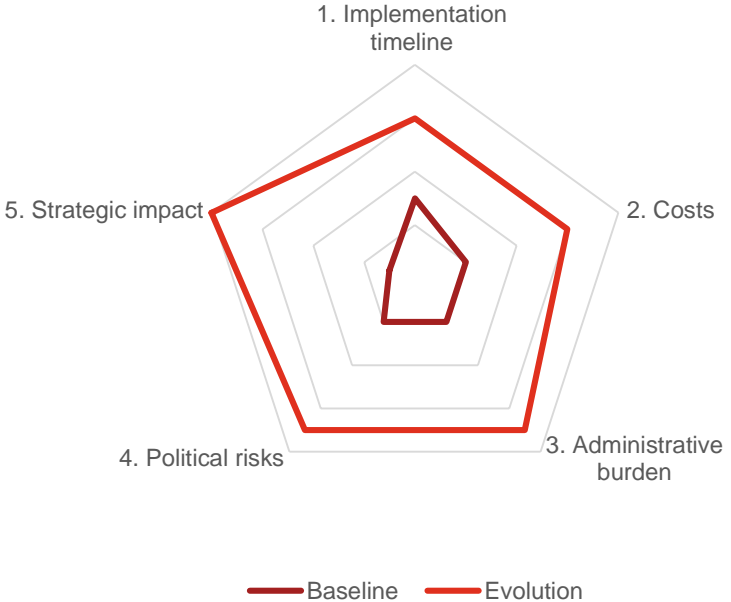


The main gaps and challenges to be addressed in the Digitalisation domain appear at upstream level

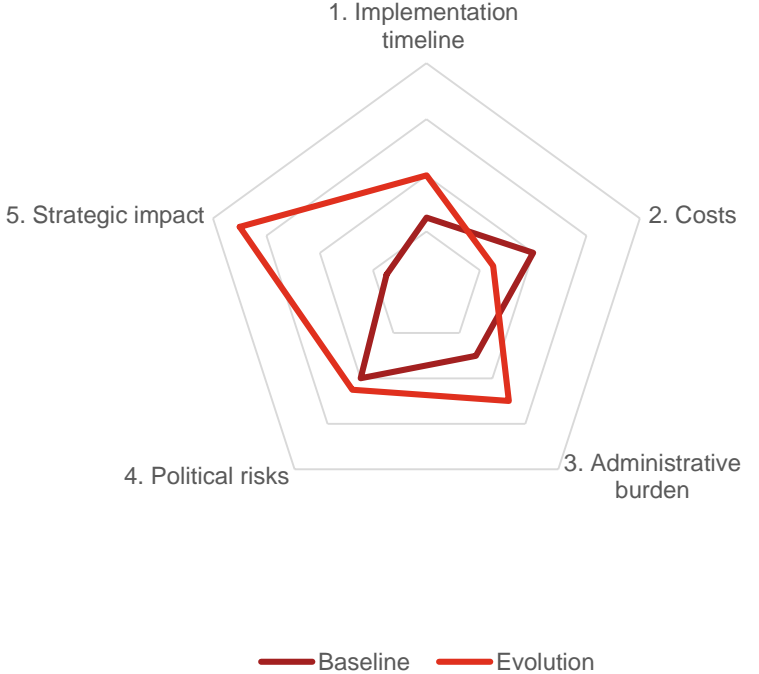
Id	Gaps	Potential solutions	Comparative analysis
8A	<i>Compatibility of new manufacturing technologies with existing standards</i>	Ensure the translation of Industry 4.0 manufacturing processes into space standards	
8B	<i>Absence of standards for frequency use for upcoming constellation dedicated to Internet of Things</i>	Ensure a common frequency for Internet of Things (activity supported by the JTC5)	



The development of standards for production and docking technologies could support the emergence of IOS activities

Id	Gaps	Potential solutions	Comparative analysis
9A	None of the several types of services provided by IOS are regulated or standardised	Implement Standard Operating Procedures to support the service offering of IOS	 <p>1. Implementation timeline</p> <p>2. Costs</p> <p>3. Administrative burden</p> <p>4. Political risks</p> <p>5. Strategic impact</p> <p>— Baseline — Evolution</p>
9B	No standards nor certifications for docking technologies for both client & servicing satellites	Standardise docking procedures and certify the corresponding docking technologies	

Standardisation activities performed by European Standardisation bodies could be supported to promote user uptake

Id	Gaps	Potential solutions	Comparative analysis
10A	<i>Difficulty to reach downstream and inform them on the existence of standards</i>	Raise EU SMEs' awareness about standards and certification supporting communication initiatives	 <p>1. Implementation timeline</p> <p>2. Costs</p> <p>3. Administrative burden</p> <p>4. Political risks</p> <p>5. Strategic impact</p> <p>— Baseline — Evolution</p>
10B	<i>Difficulty to reach and support new entrants in their understanding and adoption of standards</i>	Support the ECSS for the training of emerging space actors	
10C	<i>Scarcity of experts for some of the JTC5 working groups (Future activities in space standardisation)</i>	Support the identification and nomination of relevant experts affected to the JTC5's WGs	

The impact analysis shows that evolution scenario would place standardisation and certification activities in support of the European space ecosystem and lead to positive impacts in comparison with the baseline.



Implementation timeline	The initiatives proposed in the evolution scenario would be deployed in the short and medium term, but would lead to significant time efficiency for standardization activities in the medium and long term.
Costs	Initial investments supporting the implementation of potential solutions are assumed to lead to savings in the medium term.
Administrative burden	Overall, the potential solutions comprised in the evolution scenario aim at simplifying administrative processes related to standardisation and certification activities.
Political risks	The evolution scenario would reduce political risks by fostering the use of standards and promoting European cooperation.
Strategic impacts	The development of standards proposed in the evolution scenario would strongly support the competitiveness of European SMEs.

Thank you

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