



Discussions: requirements, barriers and R&D gaps

EU Space User Consultation Platform 2022

Infrastructure session – 3 October 2022



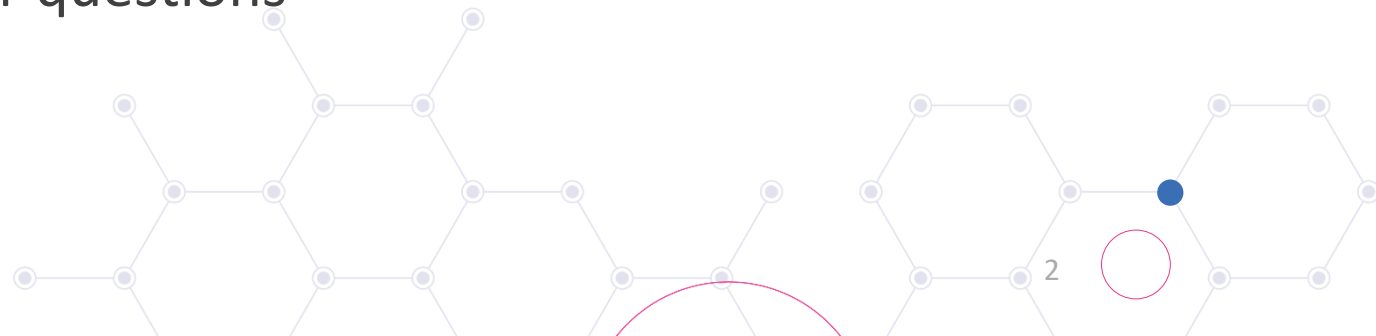
Rules for discussing



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- Use **Polls** tab to answer the questions (automatically updated)
- Use **Q&A** tab for other comments or questions
- Silence means agreement





Participants' profile

Question 1: Which group do you belong to?

(e.g. Infrastructure managers, Construction companies, Service providers, Consultants, etc.)



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Participants' profile – Use of EO

Question 2: Do you already use Earth Observation data/products/information in your activities?

(Yes / No)



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Participants' profile – Use of EO

Question 3: For those who already use EO, what EO data/products/information do you use and for which purpose?



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Participants' profile – Use of EO

Question 4: For those who do not use EO, what are the main reasons?

(e.g. Lack of expertise, Technical limitations, Regulatory issues, Cost, etc.)



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Barriers, drivers and gaps

Question 5: Do you see major non-technical obstacles to the uptake of EO-based services in the infrastructure market?

(e.g. Cost of VHR data, Lack of "certification" framework for EO data, etc.)



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Barriers, drivers and gaps

Question 6: What are the main technical limitations to the use of EO in the infrastructure market?



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Barriers, drivers and gaps

Question 7: Do you see R&D gaps that would need to be filled in to support the uptake of EO in the infrastructure market?



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Barriers, drivers and gaps

Question 8: Which drivers / enabling factors could support the uptake of EO in the infrastructure market?

(e.g. Legislation, Best practices, etc.)



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User needs and requirements



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Question 9: What applications are we missing, if any?

Cluster "Infrastructure planning"	Cluster "Infrastructure construction and monitoring"	Cluster "Environmental impact monitoring"	Cluster "Timing and Synchronisation of Telecommunication networks"
Applications	Applications	Applications	Applications
"Infrastructure site selection and planning"	"Construction operations"	"Environmental impact assessment of infrastructures"	"Data centre"
"Permitting"	"Monitoring of impact of human activities on infrastructure"		"Digital Cellular Network "
"Vulnerability analysis"	"Official Development Assistance support monitoring"		"Professional Mobile Radio"
	"Pipeline monitoring"		"Public Switched Telephone Network"
	"Post-construction operations"		"Satellite Communication"
			"Small cells"

Source: EUSPA EO and GNSS Market Report



User needs and requirements



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Question 10: What operational scenarios are we missing, if any?

Application "Infrastructure site selection and planning"	Application "Construction operations (monitoring)"	Application "Post-construction operations (monitoring)"	Application "Environmental impact assessment of infrastructures"
<p>Operational scenarios</p> <ul style="list-style-type: none"> • Site characterisation (Land cover / Land use, topography, geological evaluation...) • Risk assessment wrt. ground deformation • Risk assessment wrt. natural hazards (e.g. floods, droughts) • Risk assessment wrt. climate change 	<p>Operational scenarios</p> <ul style="list-style-type: none"> • Construction progress monitoring (alignment with schedule) • Construction conformity monitoring (alignment with plans) • Construction stability monitoring 	<p>Operational scenarios</p> <ul style="list-style-type: none"> • Ground deformation monitoring (to assess risk on structural health) • Vegetation encroachment monitoring • Land cover / land use change monitoring (in the surroundings) 	<p>Operational scenarios</p> <ul style="list-style-type: none"> • Ground motion monitoring (caused by works during the construction phase) • Air and water pollution assessment • Biodiversity loss assessment



User needs and requirements

Question 11: Would you suggest to consider other/additional parameters than/to those used in the RUR?



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ID	TBC
Application	Construction operations
Users	Infrastructure owners and/or operators, Construction and public works companies, Financial institutions financing the construction (including international organisations in case of ODA projects).
User Needs	
Operational scenario	Construction progress monitoring (alignment with schedule) - Monitor the progress of construction activities to verify that construction progresses according to the original planning and detect deviations from schedule if any.
Size of area of interest	<1 km ² for localised infrastructures <1 km-width corridor along line infrastructures 1-15 km ² for extended infrastructures
Scale	Not applicable
Frequency of information	From weekly to quarterly
Other (if applicable)	Not applicable
Service Provider Offer	
What the service does	Provide reports on the construction progress achieved between two different moments in time and assess its compliance to the planning (when the planning is available to the provider).
How the service works	Automated or semi-automated detection of newly built assets based on algorithms comparing successive images of the construction area.
Service Provider Satellite EO Requirements	
Spatial resolution	From a few dozens of cm up to ~5 m
Temporal resolution	From daily to monthly
Data type / Spectral range	Optical Visible and NIR, SAR.
Other (if applicable)	Not applicable
Service Inputs	
Satellite data sources	VHR/ HR Optical satellites and SAR satellites.
Other data sources	UAV



User needs and requirements

Discussion on requirements per application/scenario (next slides)

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Other (if applicable)	Not applicable
Service Inputs	
Satellite data sources	VHR/ HR Optical satellites and SAR satellites.
Other data sources	UAV

Parameters	Summary of requirements
Frequency of information	
Scale	
Spatial resolution	
Temporal resolution	
Data type	
Other	
Other data sources	



User needs and requirements

Question 12: Would you agree with the following user needs & requirements?

Application "Infrastructure site selection and planning"	Parameters	Summary of requirements
<p>Operational scenarios</p> <ul style="list-style-type: none"> • Sc1: Site characterisation (Land cover / Land use, topography, geological evaluation...) • Sc2: Risk assessment wrt. ground deformation • Sc3: Risk assessment wrt. natural hazards (e.g. floods, droughts) • Sc4: Risk assessment wrt. climate change 	Frequency of information	One-off All
	Scale	Ability to measure ground deformation of a few mm/year Sc2
	Spatial resolution	From a few dozen of cm up to ~10 m Sc1 From a few m up to ~10 m Sc2 From ~10 m up to ~100 m Sc3 From ~100 m up to ~1 km Sc4
	Temporal resolution	From monthly to a few months in general All
	Data type	Optical and Synthetic Aperture Radar (SAR) in most cases All Hyperspectral Sc1 Infrared Sc1 Sc3 Sc4
	Other	Availability of historical data Sc2 Sc3
	Other data sources	Digital Elevation/Terrain Models (DEM/DTM) Sc1 Sc2 Sc3 In situ (e.g. for geological analysis) Sc1 Non satellite-based historical data Sc3 Sc4



User needs and requirements

Question 13: Would you agree with the following user needs & requirements?

Application "Construction operations (monitoring)"	Parameters	Summary of requirements
Operational scenarios <ul style="list-style-type: none"> • Sc1: Construction progress monitoring (alignment with schedule) • Sc2: Construction conformity monitoring (alignment with plans) • Sc3: Construction stability monitoring 	Frequency of information	From weekly to quarterly updates One-off (in case of final control) or monthly updates <div style="float: right;"> <input type="checkbox"/> Sc1 <input type="checkbox"/> Sc3 <input type="checkbox"/> Sc2 </div>
	Scale	To be defined <div style="float: right;"><input type="checkbox"/> Sc3</div>
	Spatial resolution	From a few dozen of cm up to ~5m From a few dozen of cm up to ~1m From a few m up to ~10 m <div style="float: right;"> <input type="checkbox"/> Sc1 <input type="checkbox"/> Sc2 <input type="checkbox"/> Sc3 </div>
	Temporal resolution	Daily to monthly Weekly to monthly Daily to weekly <div style="float: right;"> <input type="checkbox"/> Sc1 <input type="checkbox"/> Sc2 <input type="checkbox"/> Sc3 </div>
	Data type	Optical/SAR SAR Near Infrared (NIR) <div style="float: right;"> <input type="checkbox"/> Sc1 <input type="checkbox"/> Sc2 <input type="checkbox"/> Sc3 <input type="checkbox"/> Sc1 </div>
	Other	-
	Other data sources	Unmanned Aerial Vehicles (UAVs) <div style="float: right;"><input type="checkbox"/> Sc1 <input type="checkbox"/> Sc2</div>



User needs and requirements

Question 14: Would you agree with the following user needs & requirements?

Application	Parameters	Summary of requirements
"Post-construction operations (monitoring)"	Frequency of information	6-monthly to yearly All
	Scale	Ability to measure ground deformation of a few mm/year Sc1
Operational scenarios	Spatial resolution	From ~1 m up to ~20 m Sc1 Sc3 From a few dozen of cm up to ~20 m Sc2
	Temporal resolution	Monthly All
	Data type	SAR Sc1 Optical, NIR and SAR Sc2 Sc3
	Other	Historical ground deformation data Sc1
	Other data sources	-

- **Sc1:** Ground deformation monitoring (to assess risk on structural health)
- **Sc2:** Vegetation encroachment monitoring
- **Sc3:** Land cover / land use change monitoring (in the surroundings)





User needs and requirements

Question 15: Would you agree with the following user needs & requirements?

Application "Environmental impact assessment of infrastructures"	Parameters	Summary of requirements
Operational scenarios <ul style="list-style-type: none">• Sc1: Ground motion monitoring (caused by works during the construction phase)• Sc2: Air and water pollution assessment• Sc3: Biodiversity loss assessment	Frequency of information	From weekly to monthly <input type="button" value="Sc1"/> From daily to weekly <input type="button" value="Sc2"/> Yearly in general <input type="button" value="Sc3"/>
	Scale	To be defined <input type="button" value="Sc1"/>
	Spatial resolution	From ~1 m up to ~10 m <input type="button" value="Sc1"/> <input type="button" value="Sc3"/> From ~10 m up to ~100 m <input type="button" value="Sc2"/>
	Temporal resolution	Weekly in general <input type="button" value="Sc1"/> From sub-daily to daily <input type="button" value="Sc2"/> Monthly in general <input type="button" value="Sc3"/>
	Data type	SAR <input type="button" value="Sc1"/> Spectrometer <input type="button" value="Sc2"/> SAR and Optical <input type="button" value="Sc3"/>
	Other	Historical data (To detect if changes are caused by the presence of the infrastructure in case of pollution or biodiversity loss)
	Other data sources	-



User needs and requirements

Question 16: What types of users are we missing, if any?

Main user communities considered in the RUR (General infrastructures)

- Infrastructure managers (owners and/or operators)
- Construction and public works companies
- Public authorities, including regulatory authorities, from local (e.g. municipalities) to European level
- Financial institutions involved in the funding of infrastructures
- International development organisations

Main user communities considered in the RUR (Telecommunication networks)

- Telecommunication operators (end users for Timing & Synchronisation applications)
- Telecommunication network equipment providers
- Radio-spectrum regulators
- Standardisation organisations

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