



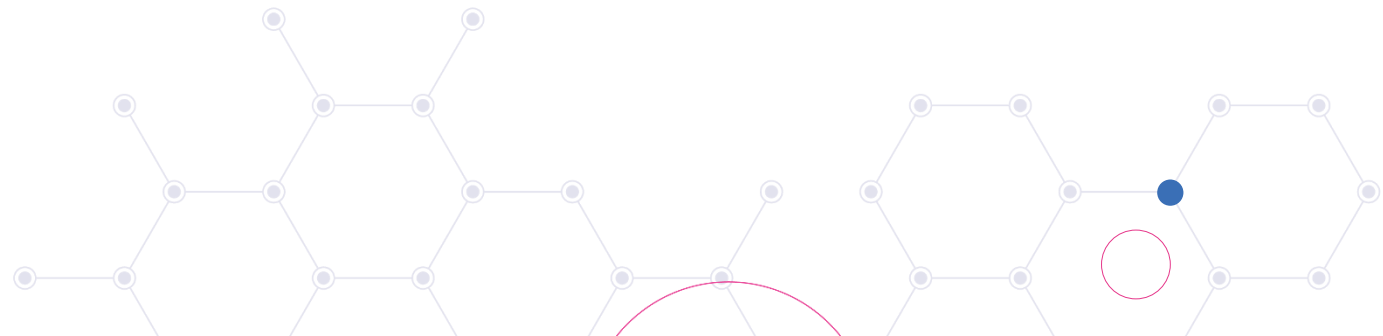
EU Space User Consultation Platform 2022

EO-related User needs and requirements

Infrastructure session

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03/10/2022





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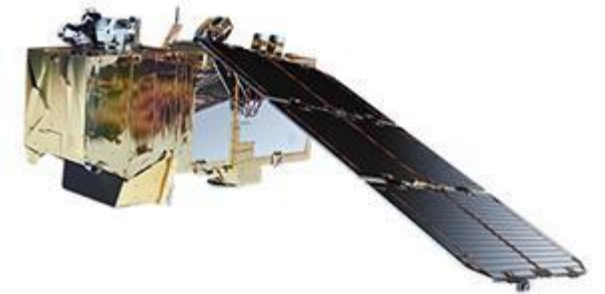
- Context
- Role of Reports on User Requirements (RURs)
- Overview of the RUR for Infrastructures
 - Document structure
 - Applications and operational scenarios
 - UR gathering approach





Context

- Past User Consultation Platforms (UCPs) addressed infrastructures through two different angles:
 - GNSS for construction activities (Sessions on Surveying)
 - GNSS for network synchronisation in the domains of Telecommunications, Electricity transmission and Finance (Sessions on Timing and Synchronisation)
- First time that infrastructures are addressed through a dedicated session
- First time that the contribution of Earth Observation to the infrastructure market is addressed





Reports on User Requirements (RURs)

- Aim at providing EUSPA with an up-to-date view of current and potential future user needs and requirements
- Living documents periodically updated by EUSPA
- Serve as key inputs to the UCP
- Publicly available

Approach for latest RURs

1. Build on the latest EUSPA market report (2022) and previous Reports on User Requirements for GNSS (e.g. RUR "Surveying" and RUR "Timing and Synchronisation" for the RUR on infrastructures)
2. Identify **relevant applications & operational scenarios**
3. Define **what user needs & requirements** to collect
4. Collect preliminary **needs & requirements** from experts (e.g. service providers, users)
5. UCP: **review & update** the reports



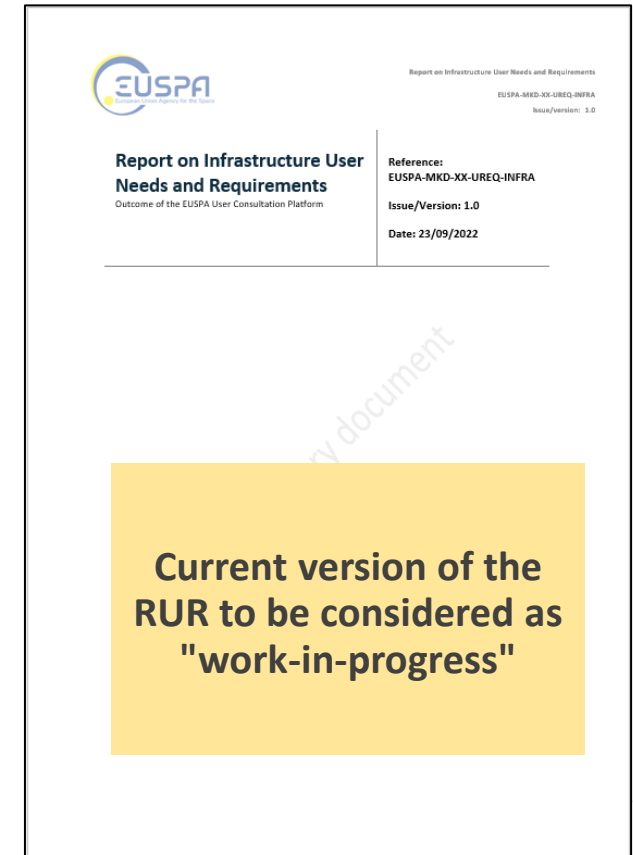
Introduction to the RUR "Infrastructure"

Aims to **start gathering user needs and requirements** related to the various phases of the infrastructure life cycle and relevant to:

- Position, navigation, and timing (PNT)
- Earth Observation (EO) → **primary focus**

Also includes:

- Market overview & trends
- Overview of main user communities and market players
- Considerations about policy, regulation and standards





Selection of applications



15 applications grouped into 4 "clusters":

- Infrastructure planning
- Infrastructure construction and monitoring
- Environmental impact monitoring
- Timing & Synchronisation for Telecom networks



Different levels of investigation for the applications:

- TYPE A:** Applications for which needs and requirements relevant to EO have been investigated. GNSS-related requirements from previous RURs have been kept "as is".
- TYPE B:** Applications for which GNSS requirements existed from previous RURs and have been kept "as is". No further analysis has been made.
- TYPE C:** EO-only applications for which needs and requirements have not been investigated at this stage



Final selection of applications (Type A - UR relevant to EO)

- Infrastructure site selection and planning
- Construction operations (monitoring)
- Post-construction operations (monitoring)
- Environmental impact assessment of infrastructures



Subsegment	Application	Types of Application / Level of Investigation	
Infrastructure Planning	Infrastructure Site Selection and Planning	A	
	Permitting	C	
	Vulnerability Analysis	C	
Infrastructure Construction and Monitoring	Constructions Operations	A	
	Monitoring of impact of human activities on infrastructure	C	
	ODA Support Monitoring	C	
	Pipeline Monitoring	B	
	Post-Construction Operations	A	
Environmental Impact Monitoring	Environmental impact assessment of infrastructures	A	
Timing & Synchronisation of Telecommunication Networks	Data Centre	B	
	Digital Cellular Network (DCN)	B	
	Professional Mobile Radio (PMR)	B	
	Public Switched Telephone Network (PSTN)	B	
	Satellite Communication (SATCOM)	B	
	Small Cells	B	

EO only application GNSS only application Hybrid/synergetic application (combined use of EO and GNSS)



Operational scenarios

Operational scenarios defined for the four **selected applications** to support the gathering of user needs and requirements

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

Characterisation of user needs and requirements relevant to EO

- Two types of "users":
 - End users (e.g. infrastructure managers)
 - Intermediate users (service providers)
- Characterisation:
 - (End) User needs: "What is the problem to be solved?"
(→ "User needs" part of the table)
 - Solution: "How the problem can be solved?"
(→ "Service Provider Offer" part of the table)
 - EO-related requirements: "Which data are needed to deliver the solution?"
(→ "Service Provider Satellite EO Requirements" and "Service inputs" part of the table)

Example

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

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