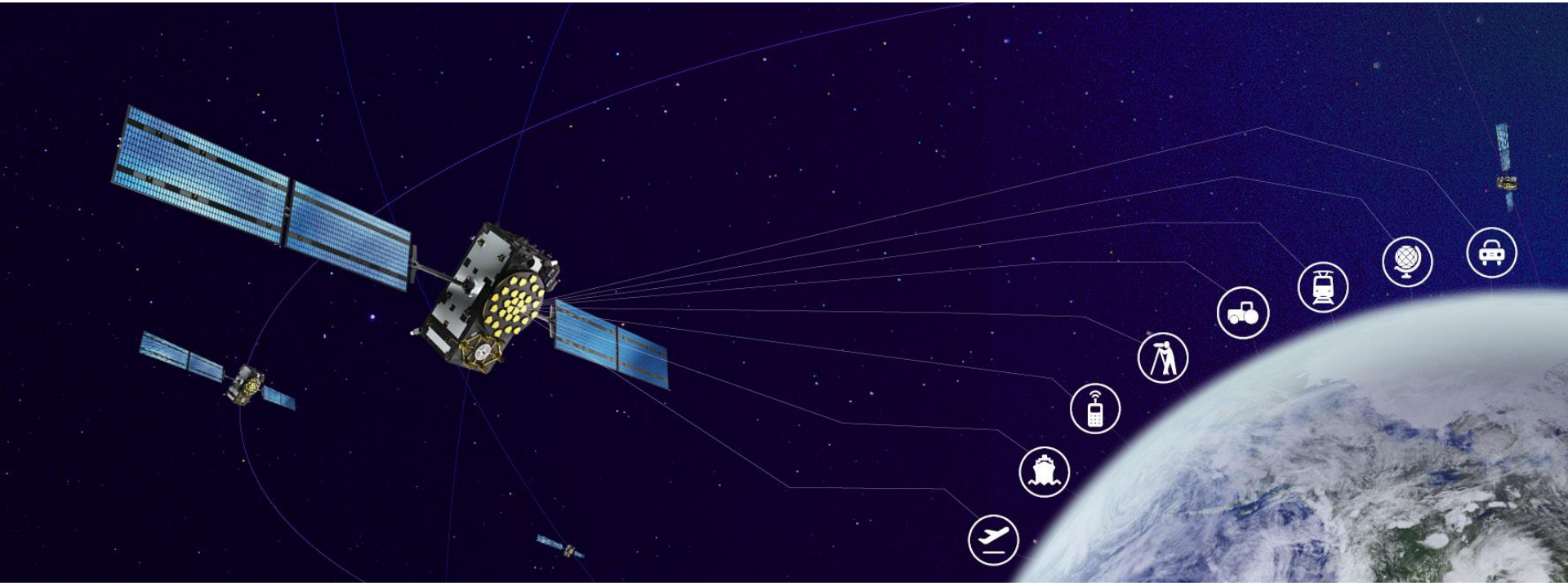

# Integrity Service complementing EGNSS High Accuracy – Technical informative session

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# Agenda

- How to interact
- Framework of the call for tenders
- Context
- Main objectives
- Main tasks
- Remarks
- Questions from the audience / AOB

# Useful links

- Tender documentation: https://ted.europa.eu/udl?uri=TED:NOTICE:431184-2020:TEXT:EN:HTML
- GSA info note: https://www.gsa.europa.eu/newsroom/news/invitation-tender-integrity-service-complementing-egnss-high-accuracy
- To access the links in the tender documentation (e.g. Reference Documents), please **copy and paste the entire url** in the web browser if the link does not correctly open when clicking it.

# How to interact (2/2)

- Technical questions are collected at the end of the session
- Administrative/legal questions can be submitted to the following link: https://etendering.ted.europa.eu/cft/cft-questions.html?cftId=6888 (log-in required)
- This presentation will be available as soon as possible and in any case no later than one week after the Webinar on the GSA website:

  https://www.gsa.europa.eu/newsroom/event-highlights

# Framework of the call for tenders

- The scope of research and development actions for EGNSS Mission and Services focuses on studying enhancements and new features for already defined services (e.g. Galileo Open Service, EGNOS (European Geostationary Navigation Overlay Service) Data Access Service, etc.), as well as developing concepts for new services (Galileo Emergency Warning Service, Ionosphere Prediction Service for EGNSS users, etc.).
- The study about the “integrity service complementing EGNSS High Accuracy” will be fully financed by the European Commission (EC) under the H2020 framework programme for research and innovation, within the budget allocated to the evolution of EGNOS mission
- The European GNSS Agency (GSA) will be in charge of the technical supervision of the study on behalf of the EC.

# Autonomous transport Context

Autonomous transportation (such as autonomous cars, ships or trains) is the future of the transport industry and will revolutionise the landscape of vehicle, vessel or train design and operations.

With increasing level of automation, the system is entrusted to substitute the human driver incrementally for all functions like system steering, environment monitoring and system fall-back operation until all modes are performed by the system.

<u>However, it will require operations to be at least as safe as the existing ones.</u>

# Role of E-GNSS in autonomous transport

In terms of GNSS performance, autonomous navigation requires high-precision accuracy at extremely low-cost and size.

Most importantly, this performance must be achieved with high reliability while operating in complex environments. Integrity plays a major role to ensure the safety and certification demands of new markets, like automotive.

However, no single technology can currently meet these requirements everywhere, at all times and under any condition.

Modern vehicles, vessels or unmanned crafts already include an array of sensors of varying sophistication which could contribute to their autonomous operations. Sensor fusion is considered a key enabler for the development of fully autonomous driving technology.

# Objective of the tender

The objective of the study is to analyse under which conditions an integrity service complementing EGNSS high accuracy would be beneficial for safety-relevant applications such as level 5 autonomous driving in the road domain in the 2030+ timeframe **without disrupting the current business models of established service providers**.

The contractor shall develop a safe and reliable method for fusing the data from different sensors including EGNSS as the main sensor (EGNOS V3.X and Galileo G1G/G2G) to provide a positioning solution in a functionally safe manner.

The study shall address to which extent the proposed service for road users requires evolutions of the current EGNSS services, user equipment or of the service provision scheme to provide the required integrity assurance.

The contractor shall also analyse once the service is defined up to which extent the proposed integrity service fulfils the needs of autonomous transport in the maritime and rail domains.

# Main objectives

- Perform a critical assessment of road user and service requirements
- Define, develop, test and validate an appropriate **integrity concept** to cope with the local environment in the road sector.
- Perform a safety case analysis (associated with autonomous driving level 5)
- Analyse the costs and potential benefits of the service
- Define the service provision concept and implementation roadmap

# Activities shall be divided in 6 tasks

- Task 0 – Management
- Task 1 – Integrity for High Accuracy domain analysis and User Needs
- **Task 2 – Definition of integrity model complementing EGNSS high accuracy**
- **Task 3 – Service Definition**
- Task 4 – Decision Criteria for the new integrity service
- Task 5 – Roadmap for service implementation

# Task 0 - Management

The contractor shall manage (contract, documentation, project status, travel plan, deliverables, interfaces, quality,…) the project and provide a **Project Management Plan** in the proposal.

The Tenderers shall provide a **PMP** in the proposal and at T0 the Contractor shall provide an updated issue of the Plan which will be discussed during the Kick-off meeting.

# Task 1 – Integrity for High Accuracy domain analysis and User Needs

- Identify the key stakeholders
- Identify the key decision criteria for the different stakeholders
- Determine the legal and regulatory constraints and standards
- Identify road terminology and translate it into GNSS terminology
- Critically analyse and update the analysis on user needs [RD11] and [RD21] and analyse the possible evolutions in the 2025-2035 timeframe.

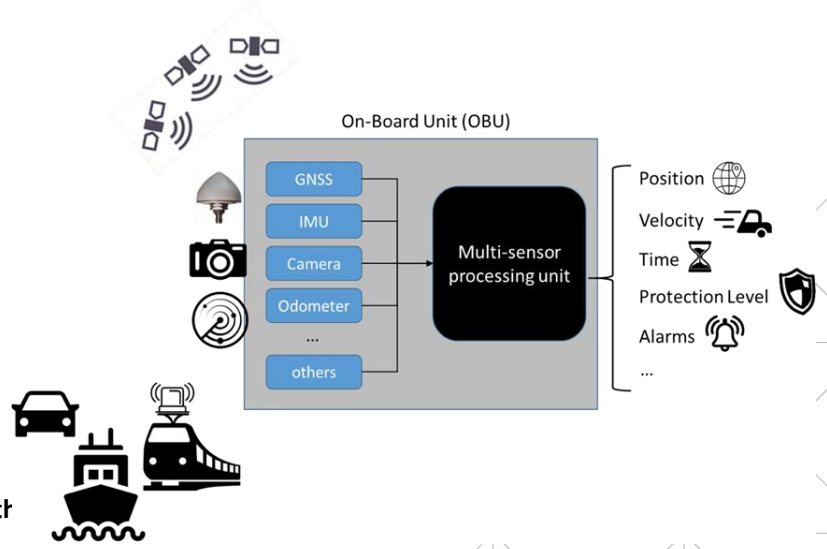
[RD.11] EGNOSHA User Needs, Market Forecast & Competitive Analysis.
Reference: EGNOSHA-D110. Version: V3.2. Date: 19/12/2018
[RD.21] Technical analysis of the apportionment of GNSS in autonomous driving and definition of the integrity requirements suitable for road safety critical applications.
Reference: GSA/OP/09/16/Lot3/SC2 Version: D3.2. Date: May 2019.
Documents can be found on this link: https://etendering.ted.europa.eu/document/document-file-download.html?docFileId=87865

- Propose a list of experts to create a **working group under the umbrella of the User Consultation Platform (UCP)** including key experts that will contribute and validate the outcomes and deliverables of each task.

# Task 2 – Definition of integrity model complementing EGNSS high accuracy

The contractor shall develop in Task 2 a generic concept of integrity complementing EGNSS high accuracy for level 5 autonomous vehicles in the road sector. It shall identify the different scenarios (urban, tunnel, port, canopy, etc.), the local environment for the different scenarios, operations, the requirements per scenario and operation, other sensors needed (including the EGNSS high accuracy receiver as the main sensor) and how they shall be combined to allow the OBU to achieve the integrity and the performance needed.

A guide to define the integrity concept is proposed in the Annex 7 of the tender specifications

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# Activities for Task 2

- Study and characterise the multipath, environmental conditions and interference in the road environment.
- **Define the concept of integrity at user level for autonomous vehicles (level 5) in the road sector**
- Perform a **safety case** analysis
- Define EGNOS and Galileo mission requirements that would feed the assessment of the impact on the EGNSS system.
- Define the requirements of a receiver model of the OBU and the antenna model to comply with the needs defined.
- Define the minimum requirements for the test campaign needed to validate the integrity concept proposed

# Activities for Task 2

Because EGNSS is combined with other sensors, the integrity service complementing EGNSS high accuracy cannot guarantee integrity of the position computed when combining these sensors.

Consequently, it is assumed that the integrity service complementing EGNSS high accuracy provides integrity primarily in the pseudorange domain, leaving barriers against local feared events to be defined and implemented by the receiver manufacturers.

Signal in Space requirements shall then be identified and characterised accordingly. Note that the concept of integrity proposed (either at signal in space or at user level – or both) will directly impact the OBU configuration.

The contractor is invited to assess other alternatives.

# Task 3 - Service definition

Based on CFI.1 and CFI.2 (to be provided at T0) the contractor shall define the characteristics of the integrity service complementing EGNSS high accuracy tailored to road users highlighting the different performance to suitably equipped users.

[CFI.1] High Accuracy Service Info Note v1.0
[CFI.2] HA SIS ICD v1.2

# Activities for Task 3

- Define the service Concept of Operations
- Define the service performance requirements per scenario and operation
- Define EGNOS and Galileo contribution to the service
- Define the legal, safety and regulatory requirements applicable
- Define high-level service provision requirements for the service
- Analyse the suitability of the integrity concept and its service definition to fulfil the needs for the maritime and rail domains.

[RD.3] Report on Maritime User Needs and Requirements.
Reference: GSA-MKD-MAR-UREQ-229399. Issue/Version: 2.0. Date: 01/07/2019
[RD.4] Report on Rail User Needs and Requirements.
Reference: GSA-MKD-RD-UREQ-250286. Issue/Version: 2.0. Date: 01/07/2019
[RD.11] EGNOSHA User Needs, Market Forecast & Competitive Analysis.
Reference: EGNOSHA-D110. Version: V3.2. Date: 19/12/2018

# Task 4 – Decision Criteria for the new integrity service

The main goal of the task is to identify the key decision criteria for each stakeholder that motivates their decision to provide or adopt the proposed service and to understand the implementation costs that could hinder the service adoption by users.

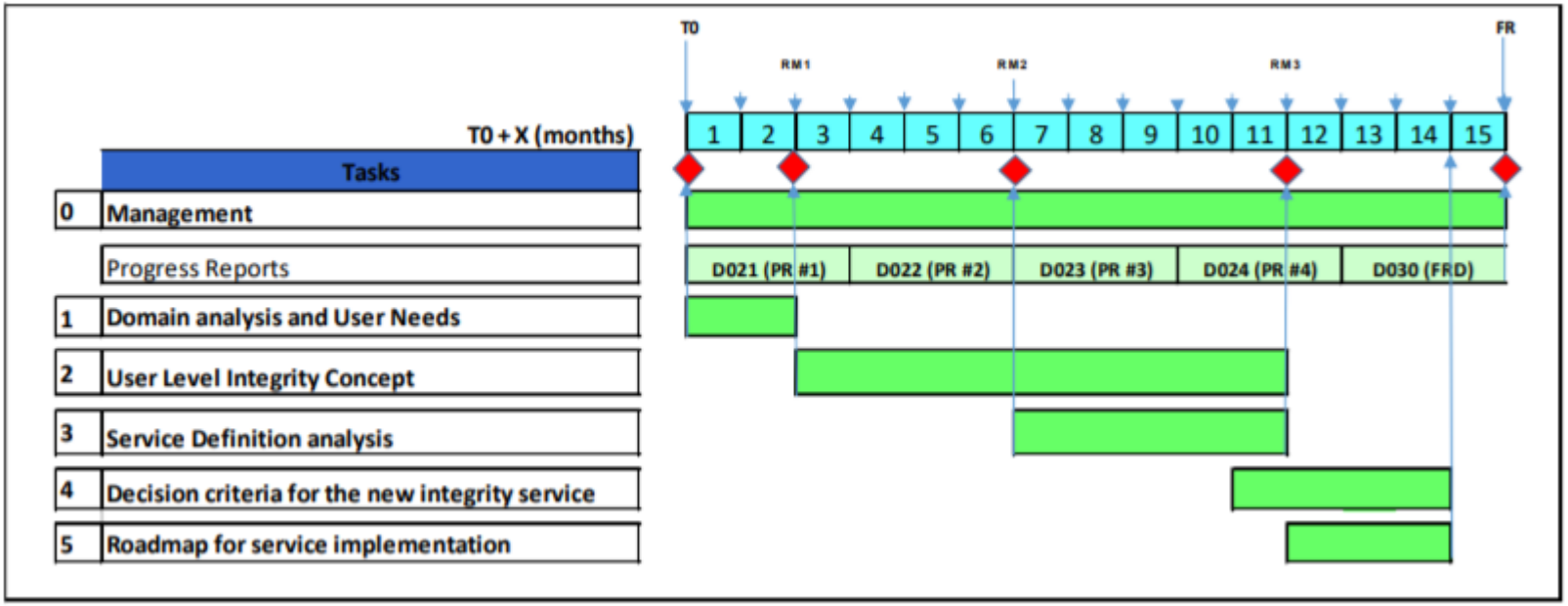
[RD.14] EGNOSHA CBA for Target Users.
Reference: EGNOSHA-D310. Version: V2.1. Date: 30/09/2019
[RD.15] EGNOSHA CBA for Service Providers. Reference:
EGNOSHA-D320. Version: V2.1. Date: 30/09/2019
Documents can be found on this link: https://etendering.ted.europa.eu/document/document-file-download.html?docFileId=87865

# Task 5 – Roadmap for service implementation

The contractor shall identify the next activities that shall be carried out to go ahead with the **service implementation.**

- definition of pre-requisites for a **service operational introduction**
- process required to implement the service including the key decision criteria for each stakeholder that motivates their decision to provide or adopt the proposed service and the stoppers that could hinder the service adoption by users.

# Indicative schedule




- T0 : Signature of the Contract. The execution of the tasks begins
- T0 + 15 days: Kick-off meeting in Brussels (or via telco)
- The Tenderers are requested to provide, in their proposal, a critical analysis of the schedule above and a more detailed schedule of individual tasks

# Milestones plan

| Project Review | | Objective | Schedule |
|---|---|---|---|
| KOM | Kick-Off Meeting | Review the project management plan. | T0+15d |
| RM1 | Review Meeting 1 | Final review of the domain analysis and user needs. | T0+2m |
| RM2 | Review Meeting 2 | Initial Review of User Integrity Concept. | T0+6m |
| RM3 | Review Meeting 3 | Final Review of the User Integrity concept and of the Service definition. | T0+11m |
| FR | Final Review | Final Review of the decision criteria analysis and roadmap activities.<br>Final review for the Final Report.<br>Final Review of the project outcomes, conclusions and way forward. | T0+15m |

# Useful Tips

- Don’t use verbatim information available in the Tender Specifications or any other reference document.
- Be as specific as possible (e.g. avoid characterising user requirements as high/medium/low).
- Explain clearly the methodology proposed to assess and validate the outcomes of the different tasks
- Do not forget to provide the CV’s of all the proposed personnel and show the allocation of each team member to the tasks and duties allocated to him/her

# Keep in mind

- Do not forget to include a first iteration of Tasks #1, #2 and #3 in your proposal.
- Be clear and concise: less is more
- Repetitions should be avoided

# Keep in mind

- Maximum price per contract: 350.000 EUR
- Deadline for proposal submission: 03/11/2020 @16:00CET
- Duration: 15 months, not subject to renewal

The ball is now in your court!!

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# Linking space to user needs

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