



European GNSS Supervisory Authority

Seventh Framework Programme of the European Community for Research, Technological Development and Demonstration Activities (2007 to 2013)

'Cooperation' Specific Programme

Theme: Transport (including Aeronautics)

Sub-theme: Support to the European Global Navigation Satellite System (Galileo) and EGNOS

Activity: 7.4.1.EXPLOITING THE FULL POTENTIAL

Area: 7.4.1.3 Scientific Applications

Funding Scheme: Collaborative Project

## **DESCRIPTION OF TOPIC GALILEO – 2011.1.3-1**

**Use of Galileo and EGNOS for scientific applications and innovative applications in new domains**

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**Caveat:** Final availability of budget for this Call is subject to Commission Decision to delegate the management of the Call to GSA. Whilst this is considered a technical formality, potential applicants are informed that, in the absence of such a Decision, the GSA will not be in a position to award any grant. Therefore, the potential applicants are kindly requested to take this into account in the assessment of their investment in any preparatory work. The GSA expects to get notified of the Commission Decision early next year. As soon as this is the case, a notice of information will be published on the Cordis and Participant Portal websites.

## I. INTRODUCTION

### I.1. Context

Satellite navigation is a large and growing market. As a key enabler in applications in many transport and other domains, it is benefiting business, governments and citizens. To fully take advantage of these opportunities, Europe has decided to embark on its own satellite navigation programmes. The European Global Navigation Satellite System (GNSS) programmes include Galileo and EGNOS.

EGNOS is an SBAS system that is operational for non SOL applications and will be certified for SOL in 2010. EGNOS service is available through geostationary satellites or terrestrial links (EDAS). More information on EGNOS can be found on: <http://www.egnosc-portal.eu/>.

Galileo is a global positioning and timing system, complementing and co-existing with current GNSS like GPS. More information on Galileo can be found on: [http://ec.europa.eu/enterprise/policies/space/galileo/index\\_en.htm](http://ec.europa.eu/enterprise/policies/space/galileo/index_en.htm).

In parallel to the development of the GNSS systems, Europe has launched an ambitious R&D programme to stimulate so-called downstream markets. In 2011 the R&D activities related to Galileo will be implemented by both the European Commission and the GNSS Supervisory Authority (GSA, on behalf of the European Commission).

The programme covers GNSS applications development, GNSS receiver's development, international cooperation, education, innovation and enabling activities.

The objectives for this topic and other topics dealing with applications are:

- € Stimulate adoption of EGNOS and EDAS;
- € Prepare markets for Galileo introduction;
- € Stimulate EU GNSS industry competitiveness.

The topic will address the use of EGNOS (via satellite and via EDAS) and early Galileo services (using signal simulator or IOV/IOC satellites) for scientific applications (applications for scientific use or with a high degree of scientific innovation). These applications should also be supported by a realistic business case. In this way, the topic is complementary to the GNSS Science Call under the Evolutions Programme of ESA and no overlaps are expected (or allowed).

The topic is open to universities, research institutes, SMEs and large companies. SMEs participation is an EU priority and a priority in FP7. The approach taken in this 3<sup>rd</sup> call is broadly similar to the 1<sup>st</sup> and 2<sup>nd</sup> call. However, the requirements have been updated. The funding instrument is Collaborative Projects.

### I.2. Special conditions

None

### I.3. List of Acronyms

EC	European Commission
EDAS	EGNOS Data Access System
EGNOS	European Geostationary Navigation Overlay Service

ESA	European Space Agency
FP6, FP7	6 <sup>th</sup> , 7 <sup>th</sup> Research Framework Programmes
GKMF	Galileo Knowledge Management Facility
GMES	Global Monitoring for Environment and Security
GNSS	Global Navigation Satellite System
GSA	European GNSS Supervisory Authority
IOV	In Orbit Validation
PPP	Precise Point Positioning
RIMS	Ranging and Integrity Monitoring System
RTK	Real Time Kinematics
SME	Small or Medium Enterprise <sup>1</sup>

#### 1.4. Note on terms used

The word *shall* is used to indicate mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (*shall equals is required to*). The word *should* is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain course of action is deprecated but not prohibited (*should equals is recommended that*). The word *may* is used to indicate a course of action permissible within the limits of the standard (*may equals is permitted to*).

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<sup>1</sup> Please note that the new European SME definition (Commission Recommendation 2003/361/EC) is the legal basis for this topic in order to define an eligible SME. The new European definition of an SME came into force on 1 January 2005 raising the financial ceiling above which a company is no longer classified as SME. To qualify as an SME, a company has to meet four requirements: 1. be an organisation or enterprise engaged in economic activity; 2. have fewer than 250 employees, calculated as annual working units (AWU); 3. have an annual turnover of €50 million or less, or have a balance sheet not exceeding €43 million; and 4. be autonomous in terms of managerial independence and the ownership of its equity. This requirement entails several conditions. Full details of the EU definition can be found at: [http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index\\_en.htm](http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm).

## II. TOPIC DESCRIPTION

### II.1. Scope and objectives

The objective of the proposed project should be to develop an application for scientific use or with a high degree of scientific innovation, but also with a demonstrated business case. The project should address the benefits derived by the use of Galileo and EGNOS, considering the future commercial impact that the application might have. Of particular interest is the domain of scientific applications for Earth Observation, possibly combining GNSS and GMES.

Application development should be seen in a broad context. It includes the development, adaptation and/or integration of new software, hardware, services, datasets etc.

Particularly interesting application areas include:

- € Earth observation and remote sensing
  - o Earth/environmental observation, combining GNSS and GMES.
  - o New approaches for weather forecasting e.g., new ways of using GNSS signals to measure atmospheric conditions.
  - o Geodesy and geodynamics applications, including tectonic motion measurements, ground deformations and earth gravity field observation.
  - o Remote Sensing using GNSS reflections for Ocean monitoring, soil moisture, ice, snow observation applications.
  - o Tropospheric and ionospheric effects on Galileo signal.
- € Innovative application domains
  - o GNSS based authentication solutions and geosecurity location-based services, e.g. digital rights management, hardware configuration and management, access control to information and services, virtual site licenses.
  - o New fields of applications for EGNOS e.g., application of EGNOS integrity beyond aviation.
  - o Multi-constellation analysis and implementation of high accuracy solutions for demanding applications, e.g. carrier phase measurements on several frequencies, enhanced RTK, PPP.
  - o Timing and synchronisation applications.
  - o Indoor navigation using pseudolites or other means
  - o Robotics and industrial processes.
  - o New fields of applications for EDAS e.g., innovative use of RIMS observations available in EDAS datastream.

### II.2. Evaluation criteria

The projects will be evaluated against the standard criteria applicable to Collaborative Projects in FP7. The sections below describe how these criteria should be interpreted given the specific topics and objectives of the GNSS activities in the Transport Work Programme.

#### II.2.1. S/T QUALITY

“SCIENTIFIC AND/OR TECHNOLOGICAL EXCELLENCE (RELEVANT TO THE TOPICS ADDRESSED BY THE CALL)”

- SOUNDNESS OF CONCEPT, AND QUALITY OF OBJECTIVES
- PROGRESS BEYOND THE STATE-OF-THE-ART
- QUALITY AND EFFECTIVENESS OF THE S/T METHODOLOGY AND ASSOCIATED WORK PLAN

Within the context of this topic, the proposal should aim to be innovative, going beyond the state of the art, especially in the use of GNSS. This could mean the application of technologies such as Galileo, EGNOS or EDAS to new markets, applications or business models.

### *11.2.2. IMPLEMENTATION*

“QUALITY AND EFFICIENCY OF THE IMPLEMENTATION AND THE MANAGEMENT”

- APPROPRIATENESS OF THE MANAGEMENT STRUCTURE AND PROCEDURES
- QUALITY AND RELEVANT EXPERIENCE OF THE INDIVIDUAL PARTICIPANTS
- QUALITY OF THE CONSORTIUM AS A WHOLE (INCLUDING COMPLEMENTARITY, BALANCE)
- APPROPRIATENESS OF THE ALLOCATION AND JUSTIFICATION OF THE RESOURCES TO BE COMMITTED (BUDGET, STAFF, EQUIPMENT)

Within the context of this topic, the quality of the consortium refers not only to the scientific and technical abilities but also to market understanding and business expertise. The consortium should aim to gather proven experience and expertise in the market segment of the application(s) developed in the project in its ranks. Ideally, the project coordinator would have a leading position in the specific market. The consortium should have a demonstrable capability to commercialise the products and services developed in the project.

### *11.2.3. IMPACT*

“POTENTIAL IMPACT THROUGH THE DEVELOPMENT, DISSEMINATION AND USE OF PROJECT RESULTS”

- CONTRIBUTION, AT THE EUROPEAN [AND/OR INTERNATIONAL] LEVEL, TO THE EXPECTED IMPACTS LISTED IN THE DESCRIPTION OF TOPICS UNDER THE RELEVANT TOPIC/ACTIVITY
- APPROPRIATENESS OF MEASURES FOR THE DISSEMINATION AND/OR EXPLOITATION OF PROJECT RESULTS, AND MANAGEMENT OF INTELLECTUAL PROPERTY.

In this topic, focus is primarily on impact through the use and exploitation of project results. The consortium should have a clear intention to commercialise the products and services developed, at least in the medium to long term. Hence there is a requirement to provide a convincing market entry plan in the proposal. The consortium should also highlight previous achievements in the specific market of the application developed.

The project should also contribute to the adoption of Galileo, EGNOS or EDAS e.g., early Galileo signals are used, EGNOS or EDAS technologies are applied in new ways, the application facilitates wide adoption of EGNOS, the application leads to an increased understanding of the market or user requirements in fields that are particularly relevant for Galileo, the project contributes to the identification and resolution of obstacles for the adoption of Galileo and EGNOS.

Furthermore the project should aim to create impact in terms of public benefits (e.g., reducing carbon emissions, increasing safety) – including benefits to the scientific community.

Regarding impact through dissemination, the release of practical tools to the GNSS developer community (function libraries, sample code, algorithms etc.), ideally with free open source license – are a particular area of interest.

### *11.2.4. Additional Recommendations*

- € The project should take into account, to the extent feasible, relevant standards and regulations on safety, security and other aspects.
- € The project should use, to the extent feasible, iterative/incremental development methodologies which enable early demonstration of results.

€ The consortium may employ *PhD students* to carry out RTD activities.

### 11.3. Deliverables

The project shall provide at least the following outputs during its lifetime.

Nr.	Description	Status <sup>2</sup>	Dissemination Level <sup>3</sup>
1	Detailed project plan including team organisation, contacts;	M	CO
2	Quarterly progress reports based on a template to be supplied by the GSA;	M	CO
3	Meeting minutes of all review meetings;	M	CO
4	Technical feasibility study;	R	PU + CO
5	Commercial feasibility study including market potential assessment (when relevant) and expected economics (relevant cost and revenues);	R	PU + CO
6	Dissemination plan containing an overview of all events, conferences and exhibitions that will be attended as well as workshops and presentations that will be organised. For each of these the consortium should indicate the relevance of the event, activity of the consortium at the event, target audience and the objectives to be achieved.	M	PU
7	Presentation/slide show, report, poster and animated audiovisual presentation on project outcomes that can be disseminated to the general public. These deliverables should be provided in electronic format. Furthermore a project website should be established and gather all public project outcomes. ;	M	PU
8	Report on market trial including technical and user-experience;	M	PU + CO
9	Rough business and exploitation plan. Building upon the previous deliverables and project outcome, the plan constitutes an assessment of the business potential of the application and how this potential can be captured. Such a plan should contain the following elements: <ul style="list-style-type: none"> <li>a. Concept or product description;</li> <li>b. Assessment of market potential;</li> <li>c. Competition analysis, product positioning and marketing strategy;</li> <li>d. Business model (e.g. make vs. buy, sources of revenues, pricing strategy) and exploitation economics (e.g. break-even analysis);</li> <li>e. Organisation and team;</li> <li>f. High-level implementation plan;</li> <li>g. Rough projected financials (i.e. profit and loss) including assumptions;</li> <li>h. Identification and discussion of main risks.</li> </ul>	M	CO

<sup>2</sup> M: Mandatory, R: Recommended, O: optional

<sup>3</sup> Recommended dissemination level: PU = Public; PP = Restricted to other programme participants (including the GSA); RE = Restricted to a group specified by the Consortium (including the GSA); CO = Confidential, only for members of the Consortium (including the GSA). In some cases it is recommended to have at least part of a CO deliverable be adapted for public dissemination.

Nr.	Description	Status <sup>2</sup>	Dissemination Level <sup>3</sup>
10	Analysis of specific aspects : [1] Value added by EGNOS/EDAS; [2] Value added by Galileo, in particular the Commercial and Public Regulated Services; [3] Report on the identification and proposes solutions to obstacles for the adoption of Galileo and EGNOS; [4] Regulatory and legal aspects of the application; [5] Standardisation aspects.	R	PU + CO
11	Final report based on GSA template. It should cover all project activities including R&D and exploitation activities; activities related to dissemination, knowledge contribution, FP7 coordination and user fora. The report should include an executive summary.	M	PU + CO
12	Source code and related documentation of main developments	R	PU

#### II.4. Schedule and milestones

The total duration of the project shall be less than 24 months. The project shall be split in several phases and several milestones shall be identified.

As a minimum, the following milestones shall be foreseen:

- Kick-off meeting covering at least deliverable 1;
- First review meeting covering e.g., deliverables 4-6
- Second review meeting covering e.g., deliverables 7-10;
- Final review meeting covering deliverables 11-12.

In addition to the above milestones more frequent interactions will most likely be needed. At least once every 3 months an interaction will take place possibly using a conferencing facility.

#### II.5. Interaction with GSA and the European Commission

The consortium shall appoint one person to be the single point of contact towards the GSA. The consortium should report to GSA whenever requested. The consortium is responsible for organising meetings. Any deviations from the workplan should be communicated to GSA as soon as possible.

The GSA will appoint one or more external experts as project reviewers. One person in the GSA will act as Project Officer and be the first point of contact for technical and general matters. Finally, the GSA Contracts Officer will be responsible for administrative, financial and legal aspects of the grant agreement.

The GSA and the European Commission or their experts may also provide assistance in the following areas:

- € Technical support in e.g. review of project deliverables, provision of Galileo and EGNOS documentation;
- € Support in networking with other SMEs and participants in other projects of the Galileo Calls;
- € Access to GNSS documentation via GSA's GKMF. The GKMF is the Galileo Knowledge Management Facility that is hosted by the GSA. It contains documents and results from the research activities on Galileo, and allows users to search and retrieve public information on



GNSS. The GKMF may also serve as documentation management system and dissemination tool for the projects funded under the Galileo FP7;  
€ Facilitating access to GNSS simulators.



### III. RECOMMENDATIONS FOR WRITING THE PROPOSAL

Proposals should follow the guidelines as they are explained in the Guide for Applicants for this topic. Note that there are several guides; for this topic it is the guide that covers the funding scheme collaborative projects and describes the default single stage evaluation process. Consortia are expected to complete both a part A with administrative and financial information and a part B with the technical proposal. The guide for applicants has clear instructions on both part A and part B.

For this topic we propose some additional recommendations for part B that should be followed as well. In particular we expect an assessment of market potential, competing technologies and a high level business plan to be part of the proposal. It will be critical for the evaluation.

- € Consortia are encouraged to write in a concise and factual style and keep within the page limits mentioned in the guide for applicants.
- € Any classified information should be included in a separate annex that is not included in the main proposal submitted via EPSS. See Guide for Applicants for more information.
- € Section 1.1 – S/T objectives refers to the project objectives and should be included in sufficient level of detail. These project objectives should be measurable and verifiable e.g., objective: develop application prototype delivering specified functionality, verification: trial. Include a table that summarises the objectives. Note that this section is critical for the evaluation
- € Section 1.2 - describe both state-of-the art R&D as found e.g., in scientific journals as well as actual commercial or pre-commercial activities. Describe what is unique or innovative about this proposal. If relevant, describe any links with other programmes in particular Eurocontrol and SESAR JU. Include supporting material for this in an annex.
- € Section 1.3 - clearly show what is concretely available at each stage e.g., demonstrator, prototype, pre-commercial product. Note also our recommendation regarding iterative development. In addition, indicate flexibility in the work plan e.g. depending on the outcome of the trial, earlier steps may be revisited or later steps may be tackled in different ways.
- € Section 2.1 - additionally describe how the organisational structure allows for flexibility and fast and efficient decision making. Explain how the interface with GSA is managed. Also explain how the consortium will ensure quality control of the deliverables.
- € Section 3.1 – we would recommend to focus on 4 categories of impact:
  1. The impact resulting from the (commercial) exploitation of the research. Briefly describe how each consortium member is intending to exploit project results commercially. Include a brief description of the market potential and the consortium's positioning. Note that this section is critical for the evaluation.
  2. The benefits for the European GNSS programmes and the adoption of EGNOS and Galileo.
  3. The contribution to the GNSS developer community e.g., via free open source software libraries, knowledge sharing.
  4. The creation of public benefits (e.g., environment, safety).
- € Section 3.2 – this section is linked to the previous one. For each type of impact, you should describe the actions that are planned to achieve this.
  1. Exploitation of the research: include a high level business plan with a brief concept description including possible business model, technical architecture, assessment of the current state of technology and the innovation proposed; a preliminary assessment of market potential; a preliminary analysis of competing offers and technologies; Note that this section is critical for the evaluation.
  2. Benefits for the European GNSS programmes: explain the actions planned to maximise the benefits to the European GNSS programmes.
  3. Contribution to the GNSS developer community: dissemination plan, tools and software to be shared, other relevant activities.
  4. Public benefits: any specific activities to increase public benefits.