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**COMMISSION STAFF WORKING DOCUMENT**

**SUMMARY OF THE IMPACT ASSESSMENT**

**Accompanying document to the**

**COMMUNICATION FROM THE COMMISSION TO THE COUNCIL, THE  
EUROPEAN PARLIAMENT, THE EUROPEAN ECONOMIC AND SOCIAL  
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**Action Plan on Global Navigation Satellite System (GNSS) Applications**

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## COMMISSION STAFF WORKING DOCUMENT

### SUMMARY OF THE IMPACT ASSESSMENT

#### 1. **PROBLEM DEFINITION: WHAT IS PRECISELY THE PROBLEM, WHO IS MOST AFFECTED AND WHY IS PUBLIC INTERVENTION NECESSARY?**

In the year 2000 a new technology was made available to the world, after having been restricted for many years to US military usage: satellite-based positioning and timing for civilian use, through the provision by the US to access their GPS signal, free of charge but with no guarantee of service. This led to the creation of a new market of GNSS products and services, called downstream GNSS applications which, in 2008, were worth €124 Bn.

The market is primarily building upon basic positioning and timing signals but is expected to benefit from the planned introduction of authentication and encryption of signals. Experts envisage that 75% of this market be provided by products and services linked to mobile telecommunications and personal handsets, 20% for intelligent transport systems for road and the remaining 5% for other domains of application.

As the GPS was offering no guarantee of performance or reliability, EU Member States decided in 2001 to launch the EU GNSS project with two systems providing signals guaranteed for civilian use: EGNOS and GALILEO. Other countries (Russia, China, India and Japan) have recognised the strategic value of GNSS and declared their intention to deploy GNSS capabilities for civilian use including the development by their industry of applications based on their own system.

In spite of Europe's investments in its GNSS infrastructure and the availability of EGNOS, the share of the European industry in the GNSS applications market is low compared with the share that Europe is capable to achieve in other sectors of high-technology, which constitutes a problem since:

- Applications based on GALILEO and EGNOS would contribute decisively to the development of a knowledge-base society and to the creation of high-value jobs within the EU. Europe is therefore missing a huge opportunity if it does not take the appropriate share of the expected economic benefit resulting from GNSS applications. Also, if GALILEO and EGNOS do not become the underlying GNSS standard in Europe, many application domains may remain locked with technologies which prevent them from benefiting from the added-value of new advanced services.
- The limited usage of applications based on EGNOS and GALILEO leads to critical dependencies as GNSS are very pervasive, and provide position, navigation, and timing information upon which depend a whole range of daily-life activities and Europe's security and social and economic development. By relying only on GPS-based applications, the EU would be exposed to the effects of the un-availability of the GPS signal, which cannot be controlled since its primary objective is to support the military operations of a third-country.

As a consequence, the problem affects the European society overall, and in many ways.

Meanwhile, uncertainty around the European GNSS has been weakening confidence in potential downstream business. Growing "competition" from third countries (US, Russia, China, India) has also changed the context for the development of GNSS applications to the detriment of European players as these systems could enter into operation at about the same time as GALILEO. Furthermore, GNSS cannot be considered as a traditional market as the US, Russian and Chinese systems are placed under military control, and their specifications subject to military rather than commercial considerations: the home-grown industries of these countries can directly benefit from the military-funded programs to develop applications and services to a sufficient level of maturity before they are brought into the civilian markets.

As a consequence, compensating for the absence of such resources is necessary to grasp, in Europe, the same overall indirect benefits resulting from EGNOS and GALILEO as those brought, for instance, by GPS in the US.

Current plans in that respect are limited to raising awareness among the aviation community towards adopting EGNOS and GALILEO for safety of life applications (primarily for en-route navigation and landing procedures); conducting market studies and providing information to actors in other segments potentially interested in using the open signal or the commercial service of EGNOS and GALILEO (e.g. agriculture for precision farming, road charging, asset tracking, scientific applications, oil and gas, surveying, mapping), or the future search and rescue service of GALILEO (primarily for fisheries and maritime transport); granting the €38 million left for the funding of research and development in GNSS applications, and monitoring the about €50 million worth of ongoing projects in the area.

This Impact Assessment demonstrates the need for a more extensive action plan, through the analysis of a series of policy options envisaged to foster the development of EGNOS and GALILEO downstream applications and to enhance the quickest, deepest, broadest development of applications across all domains.

## **2. ANALYSIS OF SUBSIDIARITY: IS EU ACTION NECESSARY, AND DOES IT ADD VALUE?**

The EU right to act is based particularly on article 172 of the Treaty on the functioning of the European Union, and the subsequent regulation on GALILEO and EGNOS<sup>1</sup>.

The use of EU satellite navigation systems can have wide/deep economic, social and environmental impact; the promotion of EU GNSS directly supports EU strategic priorities such as the Lisbon Agenda, it is transnational in nature and it does cut across several policy fields necessarily to be coordinated at EU level.

The adoption of EU GNSS signals in several application domains requires compliance with international standards and certification, for instance in aviation or maritime transport. Action at EU level would then avoid duplication and waste of efforts at Member State level.

The lack of EU action or the undertaking of fragmented or uncoordinated action by Member States alone would limit the marketability of the identified applications (e.g. different

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<sup>1</sup> Council Regulation No 1321/2004 on the establishment of structures for the management of the European satellite radio-navigation programmes and Regulation (EC) No 683/2008 of the European Parliament and of the Council of 9 July 2008 on the further implementation of the European satellite navigation programmes (EGNOS and GALILEO)

standards in GNSS-based road charging systems) and create barriers to the free circulation of goods and services, or inequality of treatment of the European citizens.

### **3. OBJECTIVES OF EU INITIATIVE: WHAT ARE THE MAIN POLICY OBJECTIVES?**

The objectives of EU actions are to remove barriers and obstacles preventing the maximisation of the benefits generated by EGNOS and GALILEO for the citizens and the industry of the Member States of the European Union by:

- (1) Ensuring that EGNOS and GALILEO technologies are applied and adopted early in transport and non transport domains where they can bring benefits
- (2) Ensuring that the European industry (particularly SMEs) captures an increasing market share of the GNSS downstream application markets (33% at least<sup>2</sup>)

### **4. POLICY OPTIONS: WHICH OPTIONS HAVE BEEN CONSIDERED AND WHICH HAVE BEEN ASSESSED IN DETAIL?**

The following policy options have been assessed:

Option 1: No policy change (i.e. the baseline scenario).

No further activities would be performed by the Commission beyond what it is already in its work-plan and no additional budget or resources would be required.

Option 2: Discontinue existing EU actions (e.g. cut R&D funds).

The EC could decide to discontinue any activity aimed at promoting the development of downstream applications.

Option 3: Regulate across application domains, making mandatory use of EGNOS or GALILEO.

The EC proposes to the Council and the Parliament extensive regulations with the aim to make mandatory the use of GNSS in as many key domains of applications as possible.

Option 4a: Improve the framework conditions for the market to work through a comprehensive Action Plan.

The EC would undertake the over 70 actions that address all the issues (across a dozen of transport and non transport domains) highlighted during the stakeholder consultation process that started with the Green Paper of 2006.

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<sup>2</sup> The share that Europe is capable to achieve in other sectors of high-technology is in the order of one third of the global market. In telecommunication for instance, it reaches 38% (Source: ISTAG Report to the EC: "Shaping Europe's Future through ICT", 2006). Such a target is indeed coherent with the Lisbon objective for the EU to become the most competitive and dynamic knowledge-based economy in the world.

Option 4b: Improve the framework conditions for the market to work through a targeted Action Plan

The EC would select a subset of the actions envisaged in option 4a. The first step leading to option 4b would be to limit domain-specific actions within a small number of the most promising domains, whilst providing sufficient ground favourable to innovation across domains and to the "bottom-up" uptake of GNSS services. EC would pursue 24 actions.

Option 5: Adopt a consultative approach (i.e. coordinate and invite all players to deliver the necessary actions)

The EC would involve all relevant public and private stakeholders in an *ad hoc* permanent consultative body that should follow closely the roll out of EGNOS and GALILEO downstream applications, and tackle the underlying causes of the key problem to ease the functioning of the market forces.

## **5. ASSESSMENT OF IMPACTS: WHAT ARE THE MAIN ECONOMIC, ENVIRONMENTAL AND SOCIAL IMPACTS ASSOCIATED WITH IN TERMS OF BENEFITS AND COSTS?**

Pursuing the objectives will result in significant Economic, Social and Environmental impacts across EU-27 and beyond. EU GNSS can also become a reliable tool to enforce internal and external policies.

As demonstrated by several trials, tests and R&D projects, using EGNOS or GALILEO can generate increase in the efficiency and safety of aviation, rail and maritime transports. It can also allow new pricing schemes on road, fully in line with CO2 emission reduction plans, and it is the key enabler to new strategies and services to improve road transport. Disabled and elderly people will see their mobility improved, and all citizens will benefit from accurate location based services like real time information on public transport, available services in the vicinity, or emergency rescue.

Satellite navigation downstream applications are knowledge-intensive businesses that enable creation of high value added job occupations all along the value chain (i.e. from hardware and software manufacturing to the service provision). The market size of GNSS downstream applications is expected to grow at an annual average 22 % over the next 11 years<sup>3</sup>.

Some applications are infrastructure-enhancing and generate several economic spill-overs. Increasing capacity of existing infrastructure and making a more efficient use of them will also contribute to the reduction of congestion, pollution and other environmental damages<sup>4</sup>.

Policy options will cost between €3 and €50 M per year from 2010 onwards, including R&D budget. Neither substantial incremental administrative burden nor compliance costs are envisaged at this stage, as the suggested policy option aims at creating better framework conditions for the market forces to operate. Overall the effort to be spent in delivering the policy is tiny proportion of the expected benefits.

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<sup>3</sup> Len Jacobson, based on several sources (2007)

<sup>4</sup> Some examples: Navteq 2009 research proved that car navigators increase fuel efficiency by 12%; EGNOS enabled landings reduces fuel burning and noises over inhabited areas, rail track network can be optimised

## 6. COMPARISON OF OPTIONS: WHAT IS THE PREFERRED OPTION ON THE BASIS OF WHICH CRITERIA OR JUSTIFICATION?

Policy option 1 entails no change of what is currently being performed. Its main benefit lies in the fact of adding neither new tasks and activities nor new resources to the EC. Existing actions will be carried out (except R&D that will have no funds beyond 2011) but this will not be enough to tackle the problem of slow development of downstream applications. It will eventually leave the EU GNSS industry timid and in the current state of uncertainty.

The only benefit of Policy option 2 is to marginally cut down on the very few resources currently devoted to GNSS downstream application development but it entails, even more than policy option 1, a very negative impact on the EU GNSS industry, MS and EU citizen.

Policy option 3 sends an immediate positive signal to the EU GNSS industry and may even rally enough attention to get applications kicked off in certain domains, but with strong opposition from some Member States and of some stakeholders who consider regulations invasive and inappropriate. The cost of regulating and enforcing from EC side is also be significant.

Policy option 4a outreaches extensively across many segments and constitutes a balanced mix of regulation and supportive actions for the downstream applications market. Nevertheless, the human resources required for its implementation may simply make it too expensive, with a benefit/cost ratio much lower in respect to the next option. This policy could allow to reach all our objectives, but would however require a level of resources far beyond what can be granted to the European Commission.

Policy option 4b focuses the limited resources available on priority application segments, creating a positive momentum in the downstream industry involved in the most promising markets, thus potentially breeding further efforts beyond the scope of the action plan itself. Its cost will be largely compensated by the achievements expected from the action plan. This policy will require fewer resources than option 4a and concentrate them so as to fulfil most of our objectives. It fits quite well with what was expressed during the consultations.

Policy option 5 may attract some stakeholders in the EU GNSS programs and therefore generate a positive attitude towards EGNOS and GALILEO. However, the actual results of this policy option are likely to be poor in the absence of further incentives, and given that the lengthy interactions needed to coordinate so many players would not allow addressing the urgency of the problem. It could however achieve results in the long term, providing improved user requirements for GNSS.

This Impact Analysis leads the European Commission to propose to the Council and to the European Parliament to address the problem cause by the limited, slow development and adoption of downstream applications based on EGNOS or GALILEO through the adoption of the targeted action plan described in Policy option 4b.

*Table: Pros and cons of the five options, and how they lead to the proposed choice of option:*

	<b>Effectiveness in reaching objectives</b>	<b>Efficiency in using resources</b>	<b>Consistency with EU objectives, strategies and priorities</b>
<b>Option 1</b>	<u>High risk to be ineffective:</u> too limited efforts	Only uses limited resources	Consistent
<b>Option 2</b>	<u>Highly ineffective:</u> will send wrong message to GNSS industry and stakeholders	Saving of R&D money, focus of management on other issues	Not consistent
<b>Option 3</b>	<u>Ineffective,</u> mainly because of strong opposition from MS and industry to invasive regulation	Limited effort, high admin burden on MS/Private sector	Not fully consistent
<b>Option 4a</b>	<u>High risk to be ineffective</u> as it is spread across too many domains, and requires resources that cannot be made available	Extensive effort in terms of administration, management, and finances	Consistent
<b>Option 4b</b>	<b>Effective: focusing a reasonable amount of resources on a limited set of priorities</b>	<b>Focused effort in terms of admin/management and proportionate financial</b>	<b>Consistent</b>
<b>Option 5</b>	<u>Highly ineffective:</u> dispersive, can be easily derailed, at the best timing will not fit the need to act fast in the window of opportunity	Time consuming, saving of R&D money	Consistent

**7. MONITORING AND EVALUATION: WHAT ARE THE ARRANGEMENTS TO ESTABLISH THE ACTUAL COSTS AND BENEFITS AND THE ACHIEVEMENT OF THE DESIRED EFFECTS?**

The time span of the proposed policy goes beyond 2020, but focuses initially on 2010-2013. The Action Plan may be revised substantially in the light of the exploitation plans of the EGNOS and GALILEO systems, to be proposed by 2010. Actions will be handled by the European Commission and related Agencies, with the involvement of national and regional authorities in the Member States as appropriate.

The Commission will monitor the trends on the markets and will continuously measure the impact of the actions undertaken, which may lead to update some aspects of the Action Plan regularly, maybe every year as in a “rolling programme”.

As the preferred policy focuses largely on market development, the main indicator of progress to be considered is the share of the market that GALILEO and EGNOS will be able to win, in each domain targeted by the Action Plan, as well as the acceleration of GNSS downstream markets resulting from GALILEO/EGNOS launch.

Other indicators will vary according to the domains: For instance, in road transport, indicators of success will include the measure of the reduction of casualties or of people injured in accidents relevant in the context of the actions undertaken. In aviation, indicators will include the number of EGNOS-equipped aircraft, and the number of airports having adopted and certified EGNOS procedures. As for applications dedicated to disabled or elderly people, an indicator could be the proportion of European citizens using such services.

Sales, employment, investment and innovative activity created by EU GNSS industry in absolute and relative terms will be monitored all along the implementation of the Action Plan, possibly with the assistance of EUROSTAT, and the development of GNSS downstream applications in Europe will be benchmarked against that in other countries through the working groups already established in the context of specific GNSS international agreements, the monitoring of international competitions such as the Galileo Masters, and the support to several information centres in Asia, Latin America, and the Mediterranean countries.

A macro-econometric model will be available by the end of 2010, to measure several aspects of the impact resulting from the adoption of GNSS applications. It will be used to track the effect of this EC policy. A scoreboard will allow for assessing progress in implementation the Action Plan, which will be broadly shared with stakeholders, and reporting will be provided to the Council of the European Union and to the European Parliament.

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