Response to public consultation on GNSS applications Action Plan

RESPONSE FROM THE
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1 Introduction

With an estimated 7% of European Unions GDP relying on GNSS (ca €800 bn) it is time to reduce the risks associated with having only one system. Galileo is the European initiative to provide uninterrupted GNSS services and improve Europe's resilience to system failure. It is also a stimulus for economic activity, so to maximise the benefits for European entrepreneurs to benefit from this technological advancement.

In its impact analysis (COM(2011)5) the European Commission anticipates an impact of GNSS on agriculture as an increase of farmers productivity of 10-20% due to GNSS as well as a reduction in CAP enforcement costs.

The European Commission has started an Action Plan on Applications to increase the adoption. This action plan is now evaluated and the EC has opened a Public consultation on applications of EU satellite navigation programmes (Galileo and EGNOS). The objective of this public consultation is to obtain input and a broader range of views on the way the European Commission should maximise and ensure the market uptake of GNSS downstream applications and of the European GNSS downstream applications in particular.

This document is the response of agricultural users of GNSS, as collectively drafted by participants and stakeholders to the UNIFARM GNSS User Forum in Agriculture.

2 Public Consultation Questions

2.1 General questions on the past APPAP

1. Have you heard of the GNSS Applications Action Plan?

RESPONSE:
YES.

2. If yes, do you think that the GNSS Applications Action Plan has been an effective mean to stimulate the uptake of GNSS applications by the market?

RESPONSE:

YES.

Having an action plan is an important instrument in setting agendas and creating commitment.

3. Are any aspects important for your field of activity missing in the GNSS Applications Action Plan 2010-2013? If so, which and why?

The following agriculture related activities were included in the GNSS APPAP 2010-2013:

Action 10: The European Commission will undertake an awareness campaign targeting agriculture and other natural resource management activities.

Action 15: The European Commission will seek to introduce the use of EGNOS and GALILEO in the management and control systems of EU programmes (e.g. the Common Agriculture Policy.)

And the following horizontal activities are of direct relevance:

Action 18: The European Commission will work towards boosting the synergy between GALILEO, GMES, GEOSS and telecommunication programmes it manages, with a view to enhancing combined services.

Action 24: The European Commission will allocate €38 mio worth of FP7 funding to a broad spectrum of research proposals on GNSS applications in 2011, and will seek additional funding through the mid-term review of FP7 to enable calls to be launched on an annual basis.

RESPONSE:

GNSS is a key enabler for agriculture. It facilitates improvements in resource efficiency, information systems (geo-information) and contributes to the farmers "license to operate". In this sense, the relevance of GNSS to the agricultural sector goes beyond the economic effects. With an agricultural sector being very important in Europe, consuming a lot of attention and budget of the European Union, the APPAP could have taken more actions related to agriculture. In particular, targetted actions to remove uptake barriers in agriculture could have been included, such as actions to:

- Stimulate / improve standardisation of user aspects related to GNSS use (communication protocols, georeferencing etc.);
- Reduce complexity in GNSS related product and service offerings (make comparable the 'promises' of manufacturers and service providers);
- Increase the users knowledge about GNSS and EGNOS in particular, especially on projected and achieved accuracies and signal integrity;
- Stimulate lower prices of receivers, signals (DGPS, RTK) and other components for faster and more intense uptake of GNSS in agriculture.

Another opportunity that could have been exploited is the facilitation of direct interactions between captains of industry from agriculture and leading people in the European Commission, in particular GSA. The visibility of the technology and EU policy to captains of industry and vice versa their vision on the relevance to a European strategy can contribute to further uptake.

Only a few projects under the FP7 are dedicated to agriculture. Actions 18 and 24 can also be combined, comparable to the ESA-IAP programme where SMEs are stimulated to come up with solutions combining both Earth Observation ánd Satellite Navigation.

2.2 Next action plan

4. Do you think the European Commission should launch such an action plan for 2014-2018? Why/Why not?

RESPONSE:

YES.

The use of GNSS is bringing important innovations to agriculture and this has not yet reached all relevant farmers in all EU member states. Also, agricultural manufacturers, suppliers and service providers can continue to innovate their products and services.

5. If yes, do you think the European Commission should focus the action plan on the uptake of the European GNSS systems or should it concern all GNSS systems?

RESPONSE:

There is great diversity in applications in agriculture; each application (group) has its own requirements towards the GNSS signal. From the user point of view, these requirements must be fulfilled to accept the technology. For in-field cultivation operations, farmers and contractors need very high precision, mostly delivered in RTK systems. Besides that, availability and reliability are main concerns of agricultural users.

Therefore, from an agricultural perspective, the European Commission should focus on all GNSS systems and the contribution of Galileo to it. Agricultural users are mainly concerned with value offered/delivered, precision, standardisation and correction signals (in particular RTK).

6. What are the consequences and risks for your field of activity if the GPS or any other GNSS signal were no longer available? Should the European Commission take action to mitigate those consequences and risks?

RESPONSE:

GNSS is already a crucial enabler in specific cultivation practices across Europe and its uptake is often associated with new, large investments such as tractors and implements. In making these investments, farmers consider e.g. the risk and impacts of signal loss or disturbance. It depends largely on the type of application, but several innovations currently in practice rely on continuous availability of the GPS or other GNSS signals.

Examples of applications with serious consequences and risks of signal denial are:

- Automatic documentation through GNSS of all kinds of agricultural practices that provide farmers the ability to prove compliance to industry standards or specific laws and regulations. Non-compliance has a direct impact on income;

Controlled Traffic Farming, mechanical weeding and other cultivation practices through GNSS creates high dependence on signal availability and in particular innovative efficient practices will not be feasible without GNSS. This has a direct economic impact on farmers income and labour film;

Peak period activities (e.g. sowing/seeding; harvesting) are often related to tight windows of opportunity, requiring farmers to maximise their labour and machine efficiency. Farmers depend on GNSS to extend certain practices at dawn or at night. Signal loss will therefore have a direct impact on farmers income;

Crop monitoring systems (including UAVs for Remote Sensing) and crop care robots will depend on GNSS for their navigation and signal loss will virtually put them out of order.

So in general, with the upcoming trends of robotisation, automation and compliance registration, the farming concept will contain more risks towards the availability of GNSS. Existing systems show serious delays in convergence when the GNSS signal is lost during operations, even for a small period. Any signal loss has an economic impact. Therefore, fall back systems and GNSS alternatives are very relevant. This is an important contribution of multi-constellation GNSS and Galileo in particular.

Yes a mitigation plan is very much needed.

7. The European Commission is considering the continuation of several actions from the current GNSS Applications Action plan. Do you agree that the following actions should be continued? Should any other action be continued? If so, why?

- *Action 2: Provide SBAS Middle-East, Eastern & Northern Europe and Africa*

RESPONSE:

YES.

SBAS is relevant to farming anywhere in the world. The areas mentioned are relevant markets for European machine manufacturers.

- *Action 6: Obtain acceptance of Galileo SAR capability by Cospas-Sarsat*

RESPONSE:

Not relevant from Agricultural point of view.

- *Action 7: Launch awareness campaign targeting road transport*

RESPONSE:

YES.

The use of GNSS is regulated for livestock transports and manure transports (e.g. Netherlands, Belgium). Also, logistics processes in the agri-food production chains depend on GNSS. Awareness of the abilities, relevance and risks of GNSS use can however still be increased and improved. Being also part of the agricultural complex, road transport can be an important awareness creator for farmers.

- *Action 12: Investigate expediency of selected Directives*

RESPONSE:

YES.

This is relevant for logistics, trade aspects and traceability of agricultural produce.

- *Action 13: Amend Regulation on digital tachographs*

RESPONSE:

Limited relevance towards livestock transport.

- *Action 20: Establish virtual information centre*

RESPONSE:

An interesting and promising action, however currently not known in agriculture.

7. continued: Should any other action be continued? If so, why?

RESPONSE:

From an agricultural point of view, the actions 3, 10, 15, 18 and 24 should also be continued.

Action 3: Agricultural manufacturers expressed an interest in this activity and it should therefore be continued;

Action 10: Awareness in agriculture is still low, in particular at smaller farms and among agricultural workers EU wide. Given the innovations and advantages that GNSS can bring, awareness campaigns continue to be very relevant. In particular the awareness about Galileo is extremely low;

Action 15: This action should be continued and extended to regulatory compliances and eco-innovations;

Action 18: There is particular relevance in agriculture to make use of all three space assets (navigation, earth observation, communication), so actions to look into synergies and combining services.

Action 24: the H2020 research programme can be an important catalyst for the GNSS innovations and for bridging the gap between research and industry through Private-Public-Partnerships or other means of collaboration. Sufficient budgets for GNSS innovations in agriculture are very important to maintain the growth of GNSS use in agriculture.

8. The European Commission is considering the inclusion of the following types of actions in the GNSS application action plan 2014-2018:

- *Information and awareness actions (e.g. see actions 1-6 in the current GNSS Applications Action Plan)*
- *Certification, coordination and standardisation actions (e.g. see actions 7-11 in the current GNSS Applications Action Plan)*
- *Regulatory actions (e.g. see actions 12-15 in the current GNSS Applications Action Plan)*
- *Horizontal actions (e.g. see actions 16-24 in the current GNSS Applications Action Plan)*

Should other types be added (financing, security, economics of scale,...)? Should one or more of the above types be deleted? If so, why?

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9. Are any aspects important for your field of activity missing with regard to a future GNSS action plan? If so, which and why?

RESPONSE:

Farmers rely more and more on social networks and Communities of Practice for maintaining and extending their knowledge. Specific actions can be taken to maintain these networks and make the GNSS subject more visible.

In agriculture, the use of GNSS is also often directly related to augmentation and correction systems, such as DGPS and RTK. These additional infrastructures should be included in the action plan. The Commission should increase the involvement of the providers of these infrastructures.

GNSS use is also depending on many other aspects of agricultural practices and uptake is besides the signal in space depending on other critical components, such as the applications developed and the standardisation of geospatial data. A future action plan should address these "downstream" activities. In agriculture, manufacturers and application developers are gathered in the Agri Electronic Foundation (AEF) and in the European Technology Platform Manufuture (working group Agricultural Engineering and Technology, AET).

3 Future Action

Based on a first analysis, the European Commission has identified several possible options for future action:

Option 1: The European Commission does not take any further action to stimulate the market uptake of GNSS applications after the completion of the current GNSS Applications Action Plan.

Option 2: The European Commission sets up a GNSS Applications Action Plan 2014- 2018 along the lines of the existing GNSS Applications action plan.

Option 3: The European Commission sets up a GNSS Applications Action Plan 2014- 2018 along the lines of the existing GNSS Applications Action Plan and takes regulatory measures to ensure the uptake of Galileo in critical activities.

The regulatory measures could potentially take one of the following forms:

Option 3.1: The European Union decides to mandate that all critical infrastructures[1] which rely on satellite navigation systems are Galileo enabled. This way, the critical infrastructure can continue to function should a foreign GNSS fail.

Option 3.2: In addition to option 3.1, this option would include that the European Union decides to mandate the use of Galileo-enabled systems in some critical and regulated activities (e.g. transport of dangerous goods, fishing vessels).

Option 4: The European Union requires that any receiver that is marketed in the EU is Galileo-enabled. This way, all equipment using GNSS technology on the EU territory can make use of Galileo, in particular in case of failure of the other GNSS systems.

10. Please rank the above options (and sub-options) according to your preference and motivate that ranking.

RESPONSE:

High to Low:

2. Action plan along similar lines;
3. Mandatory use in critical / regulated activities;
4. required Galileo-enablement for all receivers in the EU;
1. Doing Nothing.

[1] In the sense of the Directive 2008/114/CE of Council, OJ EU L 345/75 of 23.12.2008, mainly the following infrastructures: electricity, oil and gas infrastructures and road, rail, air and maritime transport.

From an agricultural point of view the action plan should be continued in 2014-2018. There are still many issues that can be improved including awareness. Although option 3, "Mandatory Use" can be a great contribution to increased awareness and use, we do not consider this as the preferred way forward. There is a considerable risk that "mandatory use" causes manufacturers of relevant components to lean back and prices remain artificially high. Competition is then not taking off in the optimal way, and it will stop innovations in the long run.
If certain regulations have significant benefits from GNSS, focus should be on the specific requirements and not on technology or the geo-political origin of it.

The action plan should stress that the benefits of the use of Galileo, e.g. it offers higher reliability applications (due to multi constellations), it offers higher precision, better reception in challenged environments (like mountains, forests) and other particular aspects.

11. Do you think other options should be considered? Which options? Why? Why not?

RESPONSE:

Besides mandating the use of Galileo, the use of GNSS in general can be stimulated through targeted policy actions. For instance, in the CAP, the use of GNSS in farm management will increase the chance that farmers are more resource efficient. Providing farmers using these systems with financial benefits (i.e. higher greening bonus) will stimulate GNSS uptake.

12. What would be the economic impact of each of these options on your field of activity? What would be the additional costs for you? How high would such costs be? What benefits would they bring to you?

RESPONSE:

The economic benefits of GNSS use in agriculture are considerable: 7-10% efficiency gains (impacting labour, fuel and inputs) are commonly reported. Variable Rate Application provides reductions in inputs of 20-30% which as economical and ecological impact.
A continuation of the action plan will accelerate uptake and hence accelerate these impacts.

The application of GNSS in parcel measurements is expected to have serious impact on the annual data acquisition, and hence reduced administrative burden and increased re-use.

Mandatory use in agriculture can have a serious impact on users, depending on the level of embodiment of the technology. Currently, the use of GNSS for particular practices involves investments in technology and in knowledge.

13. To what extent do you think that each of these options would secure the market uptake of Galileo?

RESPONSE:

From the agricultural point of view, market uptake of Galileo separately is less relevant. The uptake of multi-constellation GNSS is more important.

14. Do you miss any important aspects in these options? Which and why?

RESPONSE:

The role of SMEs in designing and developing GNSS related applications and innovations must be established.

4 ANNEX: overview of agri-relevant actions from APPAP

EGNOS is already used by some European farmers. Its accuracy and reliability help them save them time, fuel, water and chemicals. Beyond agriculture, GNSS can help protect the environment and manage natural resources, as it constitutes an indispensable source of data, in conjunction with other sources of measurement such as the Global Monitoring for Environment and Security initiative (GMES). The main issue in that domain is to raise the awareness of potential users for the benefits provided by GNSS.

Action 10: The European Commission will undertake an awareness campaign targeting agriculture and other natural resource management activities.

A Common Agriculture Policy addressing environmental factors is boosting the need for details of the precise location of objects and stock.

Action 15: The European Commission will seek to introduce the use of EGNOS and GALILEO in the management and control systems of EU programmes (e.g. the Common Agriculture Policy.)

And the Horizontal actions of most relevance are:

Many GNSS applications need to combine Earth-observation-related services such as the GMES core services, and telecommunication services.

Action 18: The European Commission will work towards boosting the synergy between GALILEO, GMES, GEOSS and telecommunication programmes it manages, with a view to enhancing combined services.

Research on applications proved to be useful for example in speeding up the use of Internet. In the absence of military funding, European Union support for research into civilian GNSS applications represents an important incentive for European universities, research centres, SMEs and large-scale industry.

Action 24: The European Commission will allocate €38 mio worth of FP7 funding to a broad spectrum of research proposals on GNSS applications in 2011, and will seek additional funding through the mid-term review of FP7 to enable calls to be launched on an annual basis.

Other less relevant actions:

Action 13: The European Commission will investigate the expediency of amending the Regulation bearing on digital tachographs, notably to take advantage of the availability of authenticated GNSS-based positioning, timing and speed information.

Action 14: The European Commission will investigate the expediency of a Directive on equipping vehicles with a GNSS and Radio Frequency Identification (RFID) enabled on-board functional unit to provide both the exact authenticated position and the electronic identification of the vehicle, taking duly into account privacy and data protection rules.

Action 13 and 14 are relevant to livestock transport, and all other regulated transports (like manure in some countries).

Action 17: The European Commission will promote the use of EGNOS and GALILEO in surveying in the Member States and third countries. The capabilities of EGNOS and GALILEO for improving the update of geographical databases will be explored by such means as exchanges of best practice and coordination among Member States.

Action 17 is relevant to parcel mapping, related to precision agriculture and to CAP subsidy management and control

Action 19: The European Commission will establish an International EGNOS and GALILEO Application Forum where users, developers, infrastructure managers and systems providers can exchange views to feed into the Europe GNSS evolution project.
Action 20: The European Commission will establish and maintain a virtual information centre and a general awareness and communication campaign. This will also serve to gathering feedback, to feed into the specifications for evolutions of EGNOS and GALILEO.
Action21: The European Commission will increase awareness among SMEs through two instruments of the Entrepreneurship and Innovation Programme (EIP): dedicated action by the 'Enterprise Europe Network', and the GNSS-innovation voucher scheme under 'Innovation Partnership for Satellite-enabled Services'.
Action 23: The European Commission will support, together with the European GNSS Supervisory Authority (GSA), the establishment of an international prize mechanism involving, for instance, regional organizations that promote applications based on EGNOS and GALILEO in a broad range of areas, including social services to ageing or disabled persons and persons with reduced mobility.

The Actions 19, 20, 21 and 23 are relevant actions towards the user communities.

All actions:

Action from APPAP	Relevance for Agriculture (scale 1 (not) -5 (very))
Action 1: Certification of EGNOS is being sought for civil aviation (through the European Aviation Safety Agency (EASA) and according to International Civil Aviation Organization (ICAO) standards), which involves certifying the system and its operator.	1
Action 2: The European Commission will pursue preparatory work on providing the Middle East and Eastern and Northern Europe with SBAS coverage on a par with the level of performance offered by EGNOS in the EU. It will propose scenarios to the forthcoming EU-Africa Summit for establishing SBAS in Africa.	5
Action 3: The European Commission will promote GALILEO and EGNOS enabled chips and handsets through industrial cooperation with GNSS-owner countries and with receiver manufacturers.	5
Action 4: The certification of GALILEO for ADAS will be investigated.	1
Action 5: Adoption of EGNOS, then GALILEO, will be sought for maritime transport in cooperation with the International Maritime Organization (IMO), taking into account International Conventions such as the International Convention for the Safety of Life at Sea (SOLAS).	1
Action6: Acceptance of GALILEO SAR capabilities by the Cospas-Sarsat organisation.	1
Action 7: The European Commission will undertake an awareness campaign including a series of tests to demonstrate the benefits of EGNOS and a marketing campaign targeting the road transport community.	3
Action 8: In conjunction with Eurocontrol, the European Commission will engage in an awareness and market development campaign focusing on aircraft manufacturers, general aviation and small airports.	1
Action 9: The European Commission will engage in an awareness campaign targeting equipment manufacturers and shipbuilders, port authorities and ship owners.	1
Action 10: The European Commission will undertake an awareness campaign targeting agriculture and other natural resource management activities.	5
Action 11: The European Commission will seek to raise awareness and coordinate Member States' activities related to civil protection.	2
Action 12: The European Commission will investigate the expediency of some Directives: One on GNSS-based monitoring of long-range coaches, and one on GNSS-based multimodal logistics. As regards GNSS-based monitoring of the transport of dangerous goods, the European Commission will examine various options concerning the use of telematics jointly developed at the international level (e.g. UNECE and OTIF).	2
Action 13: The European Commission will investigate the expediency of amending the Regulation bearing on digital tachographs, notably to take advantage of the availability of authenticated GNSS-based positioning, timing and speed information.	4
Action 14: The European Commission will investigate the expediency of a Directive on equipping vehicles with a GNSS and Radio Frequency Identification (RFID) enabled on-board functional unit to provide both the exact authenticated position and the electronic identification of the vehicle, taking duly into account privacy and data protection rules.	4
Action 15: The European Commission will seek to introduce the use of EGNOS and GALILEO in the management and control systems of EU programmes (e.g. the Common Agriculture Policy.)	5
Action 16: The European Commission will fund R&D activities aimed at reducing the cost of receivers, underpinning Action 3.	4
Action 17: The European Commission will promote the use of EGNOS and GALILEO in surveying in the Member States and third countries. The capabilities of EGNOS and GALILEO for improving the update of geographical databases will be explored by such means as exchanges of best practice and coordination among Member States.	4
Action 18: The European Commission will work towards boosting the synergy between GALILEO, GMES, GEOSS and telecommunication programmes it manages, with a view to enhancing combined services.	5
Action 19: The European Commission will establish an International EGNOS and GALILEO Application Forum where users, developers, infrastructure managers and systems providers can exchange views to feed into the Europe GNSS evolution project.	3
Action 20: The European Commission will establish and maintain a virtual information centre and a general awareness and communication campaign. This will also serve to gathering feedback, to feed into the specifications for evolutions of EGNOS and GALILEO.	3
Action21: The European Commission will increase awareness among SMEs through two instruments of the Entrepreneurship and Innovation Programme (EIP): dedicated action by the 'Enterprise Europe Network', and the GNSS-innovation voucher scheme under 'Innovation Partnership for Satellite-enabled Services'.	3
Action 22: The European Commission will seek synergies between investment programmes run by the European Investment Bank on behalf of the European Union (e.g. under the Competitiveness and Innovation Programme), and other programmes (e.g. the Technology Transfer programme run by ESA).	3
Action 23: The European Commission will support, together with the European GNSS Supervisory Authority (GSA), the establishment of an international prize mechanism involving, for instance, regional organizations that promote applications based on EGNOS and GALILEO in a broad range of areas, including social services to ageing or disabled persons and persons with reduced mobility.	3
Action 24: The European Commission will allocate €38 mio worth of FP7 funding to a broad spectrum of research proposals on GNSS applications in 2011, and will seek additional funding through the mid-term review of FP7 to enable calls to be launched on an annual basis.	5