Summary of
Achievements in 2015

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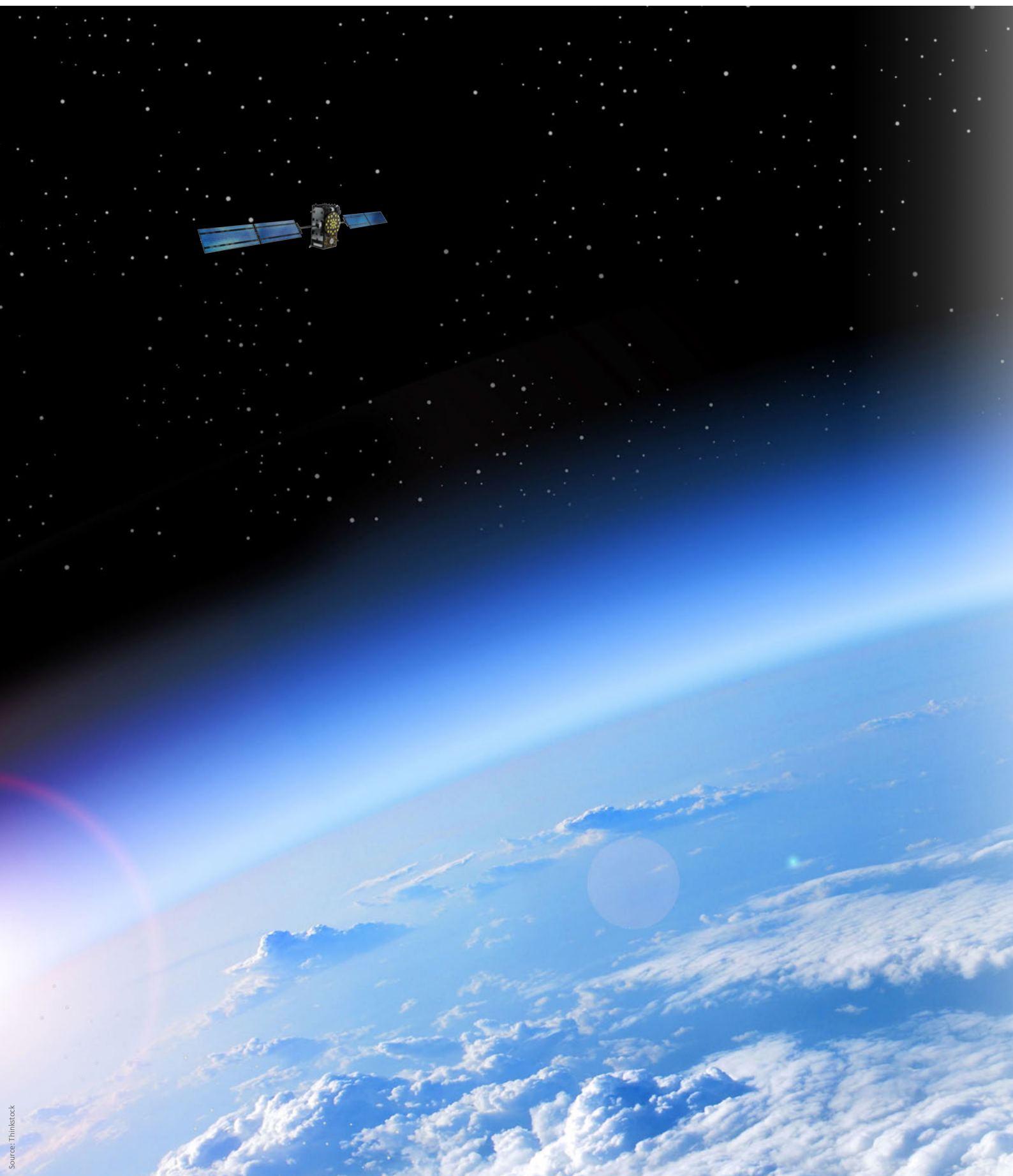
FOREWORD

The GSA: bringing Galileo and EGNOS services to the world

2015 was an important year for finalising the Galileo programme's foundation. From satellite launches to building the ground segment and preparing the downstream market, throughout the course of the year the European GNSS Agency (GSA) built from its experiences and successes with the European Geostationary Navigation Overlay Service (EGNOS). As a result of this work, an array of impressive milestones were achieved that both expanded EGNOS and paved the way for Galileo.

The GSA's activities for the year were diverse. For example, the Agency not only prepared for the successful commercialisation and exploitation of Galileo, but also ensured a seamless service provision and high level of market penetration for EGNOS. In addition, the GSA managed the EU's framework programmes for research and development for European GNSS applications and promoted the use of satellite navigation applications and services.

Among other things, in 2015 the GSA:

• Worked with the European Commission and the European Space Agency (ESA) to ensure a coordinated and smooth transition from a focus on technology/system evolution to an exploitation phase focused on services, applications and the end user.

• Managed the second call for proposals under the Horizon 2020 (H2020) framework programme for research and innovation and continued to oversee the evolution of projects awarded during the initial call.

• Launched the new Fundamental Elements research programme to support the development of Galileo-enabled chipsets and receivers.

• Solidified its reputation as the global leader in GNSS market intelligence with the publication of the fourth successful edition of the GSA's GNSS Market Report, with more than 25,000 copies downloaded.

• Concluded the GSA-ESA working agreement on EGNOS.

• Updated the Galileo exploitation agreement with the European Commission.

• Ensured a constant dialogue with the main actors in the downstream market value chain.

• Promoted the awareness and use of Galileo and EGNOS through a wide range of targeted communications actions, including participation in over 30 tradeshows, workshop and conferences held across Europe.

Carlo des Dorides
Executive Director

2015: A year in review

In preparation for the launch of Galileo Initial Services in late 2016, and in support of the already successful EGNOS programme, in 2015 the GSA's core tasks included:

Preparing the market and ensuring the uptake of EGNOS and Galileo

In 2015, the GSA continued to focus on maximising the market penetration of the European GNSS portfolio. To accomplish this, the Agency targeted specific market segments in order to best position EGNOS and Galileo services to user needs. In doing so, the GSA focused on the integration of Galileo within chipsets and receivers, along with market entry into those segments where Galileo offers a stronger value proposition than other GNSS systems (i.e., Road User Charging, Advanced Driver Assisted Service, current and future connected navigation, rail, maritime, and governmental uses).

The GSA is committed to engaging with users, decision makers and key actors in the value chain within specific market segments to, for example, build support for the integration of Galileo receivers. In addition, the GSA provides ongoing direct technical and market expertise to the European Commission via such regulated applications as the eCall initiative and other legislative initiatives. On the EGNOS side of the equation, the Agency provides maintenance and improvement to stakeholders and users in the programme's priority markets.

WITH AN ANALYSIS OF GNSS USER TECHNOLOGY ISSN 2443-5236

GNSS MARKET REPORT
ISSUE 4

March 2015 | Issue 4

European
Global Navigation
Satellite Systems
Agency

Study shows many receivers are Galileo ready

According to a recent GSA study, chipset and receiver manufacturers are already equipping their devices with multi-constellation capabilities, including Galileo:

- Almost 60% of all available receivers, chipset and modules support a minimum of two constellations
- Of these, nearly 40% are Galileo compatible – a figure that is increasing every day
- The top three providers of smartphone chips are on track to be Galileo compatible by the time Initial Services are declared
- Multi-constellation capability that includes Galileo is becoming a standard feature across all market segments.

Strengthening the GNSS service portfolio

In 2015 the market position of the European GNSS was strengthened in many ways, including:

- **Aviation:** 15 regions and/or business operators were engaged to get EGNOS on board, 100 new airports announced plans to use EGNOS, 359 EGNOS landing procedures were designed, and 245 procedures were published
- **Agriculture:** awarded its 3rd annual Farming by Satellite Prize
- **Surveying:** awarded its second Young Surveyor Prize
- **Road:** supported key eCall and digital tachograph regulations and the update of GNSS tolling schemes in Belgium and Germany
- **Rail:** helped ensure the inclusion of EGNSS as a key development for the European Railway Traffic Management System (ERTMS)
- **Location-based services (LBS):** intensified cooperation and exchange with all mass market chip set and receiver manufactures to help ensure devices are Galileo-ready

Did you know?
In 2015, the Airbus A350 XWB became the first wide-body jet to achieve certification for its installed EGNOS-based landing system – a significant step in the update of the service within the commercial aviation sector.

Source: Airbus

In Focus: Civil Aviation

It was a big year for EGNOS and Civil Aviation. By the end of 2015, 245 Radio Navigation Performance Approaches down to LPV minima were operational at 149 airports. In addition, Approach Procedures with Vertical Guidance (APV Baro) for 70 additional runway ends could be flown with EGNOS vertical guidance.

In total, 174 airports/heliports in 19 countries had EGNOS-based operations implemented. Furthermore, 13 projects were funded through the call for proposals to foster EGNOS adoption in Civil Aviation, and a framework partnership agreement with EUROCONTROL was signed to support the continuous development of EGNOS and Galileo in aviation.

The Market Development Department also worked to better link Europe's space technology with user needs. For example, the Agency continues to translate user requirements and inputs for Galileo service development by carefully monitoring user communities and emerging trends in complementary and substitute technology. It also provided ongoing market and technology monitoring, conducted user satisfaction surveys and updated the European GNSS value proposition by capitalising on its market knowledge and performance at the user level.

Promoting the Benefits of European GNSS

A key component to the overall success of Europe's GNSS programmes is for users, stakeholders and the general public to understand how EGNOS and Galileo benefit them on a daily basis. To accomplish this, the GSA employs a comprehensive communications strategy.

In 2015, the GSA's Communication activities ensured the overall positive awareness of the existence, high performance and many benefits of EGNOS as a confidence-building measure for European GNSS in general and, in particular, Galileo Initial Services. In doing so, EGNOS has

Success Story – EGNOS Flight Event

The first EGNOS Flight Event, organised in collaboration with the European Commission, ESSP, ATR and Airbus, brought together aviation media and other stakeholders for a comprehensive briefing and demonstration of EGNOS, how it works and its significant benefits for the aviation sector. Along with flight demonstrations on-board an ATR 42-600 turboprop, the event assembled a unique array of EGNOS-experienced players – from pilots to operators, service providers and air traffic managers – to discuss how EGNOS is reshaping the future of air transportation in Europe.

Source: GSA

been positioned as the first successful step in the evolution of European GNSS, with Galileo poised to add another dimension of increased service for users.

Based on the ever-increasing awareness of EGNOS, the GSA focused messages on how EGNOS today and, soon, Galileo, help enable technology for application developers who require more precise and reliable positioning, navigation and timing information. The GSA actively promoted participation in the H2020 framework programme for research and innovation and continued to raise awareness on how research projects support the growth of GNSS-powered European businesses.

Ensuring a secure system

In 2015, the GSA's key security activities related to Galileo's Public Regulated Service (PRS) and ensuring that all necessary security accreditation for the different elements of the Galileo system were obtained. Regarding the PRS, the GSA continued to provide technical assistance to the Member States' Competent PRS Authorities (CPAs), including creating processes and procedures and developing a draft PRS need-to-know policy and the design of a classified document management system.

Besides these programme-specific activities, a number of general security activities were also accomplished. For example, two independent network security tests were carried out on the different GSA networks, resulting in several recommendations for improving cyber-security. The GSA also oversaw the development of the GSMC, which manages system security and serves as the operational interface between the Galileo Control Centres and relevant stakeholders.

2015 Communication highlights

- Managed three active websites, including an EGNSS news service that published over 120 articles and leveraged social media to engage key targets
- Implemented exhibitions and other presence at over 30 events
- For the eighth year, promoted EGNSS applications as a main partner in the European Satellite Navigation Competition (ESNC)
- Organised the first EGNOS flight demonstration event for aviation press and stakeholders
- Produced and disseminated numerous timely and effective videos, publications and other communications tools
- Reached out to citizens with the organisation of the first GSA Open Days

Key Galileo security accreditation accomplishments

- SAB approval of three Galileo satellite launches
- Galileo Interim Authorisation to Operated (IATO) extended twice
- Prepared third network security test campaign
- 15 Site Authorisations to operate issued
- 32 ground stations authorised to operate
- Simplification of the interim authorisation process for European companies supporting or directly involved in the development of PRS-related technology
- 86 European companies received valid SAB authorisations

Key EGNOS preparatory accreditation accomplishments

- Independent network security test for the EGNOS Data Access Service (EDAS)
- Reporting on a number of possible cybersecurity improvements
- SAB approval of the terms of reference for the conduct of security assessment

Developing the programme: Tasks delegated to the GSA from the European Commission

In addition to GSA's core tasks, 2015 proved to be a productive year for the Agency in relation to the various delegated tasks that covered preparing the exploitation phases of Galileo and EGNOS and managing GNSS research under the EU's FP7 and H2020 funding initiatives.

Managing GNSS research

The European Commission delegated the responsibility of managing all of the EU's 7th Framework Programme for Research and Innovation (FP7) and H2020-funded programmes relating to GNSS applications to the GSA.

Source: ESA

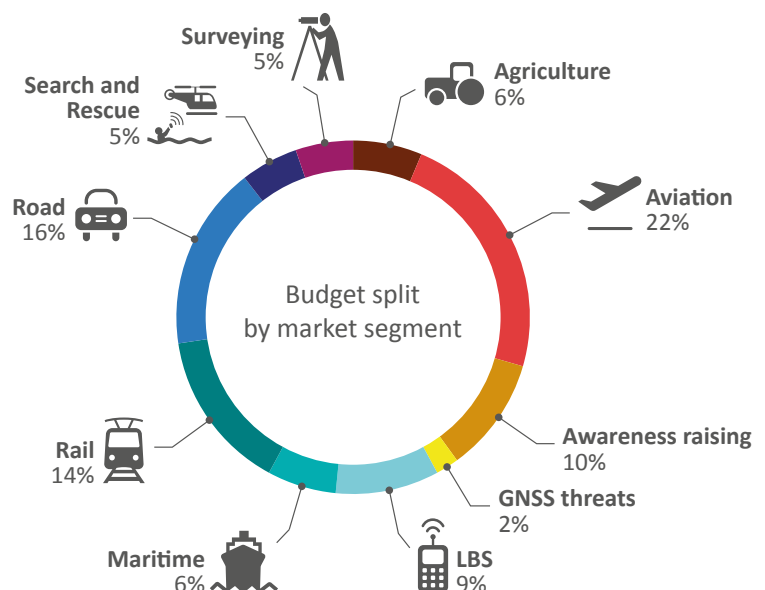2015 was a key year for H2020-funded projects. In the first call, 27 projects were funded, many of which are already producing concrete results, such as range of new innovative commercial products, patents and registered trademarks. A second H2020 call was also issued during the year, with an indicative budget of EUR 25 million. Thirteen proposals were invited to the Grant Agreement preparation phase, with an additional 14 proposals placed on the reserve list.

GNSS in H2020

Horizon 2020 Application R&D portfolio (1st + 2nd calls); fostering application development and adoption in priority markets.

40 projects funded between 1st and 2nd call H2020 for an amount of 65.2 mln €.

Budget split by market segment

- Surveying 5%
- Agriculture 6%
- Search and Rescue 5%
- Aviation 22%
- Road 16%
- Awareness raising 10%
- Rail 14%
- GNSS threats 2%
- Maritime 6%
- LBS 9%

More and more aviation stakeholders are embracing EGNOS

Captain David Rice of Aurigny Airlines said *"LPV was more stable than even the ILS approach, and is not affected by deviations in the localizer or glide path caused by other aircraft".* He further noted that EGNOS-based approaches reduce the pilot's workload by removing the need to switch between autopilot modes. As the EGNOS service level increases, Rice said the savings from not having to make ILS maintenance or replacement investments will more than recover any initial investment made in LPV procedures.

Italy's Ente Nazionale Assistenza al Volo (ENAV) is making things easier for Helicopter Emergency Services (HEMS) operators with newly published EGNOS landing procedures. *"New European satellite navigation technologies, and the services and applications that rely on these technologies, are key when it comes to aviation and flying in remote areas not served by costly ground infrastructure,"* said ENAV *"ENAV's newly published procedures will allow HEMS to take off and land in difficult weather conditions and at night, delivering a round-the-clock emergency service covering all the entire Piedmont region."*

## Exploitation of Galileo and EGNOS

2015 was a very positive year for EGNOS service provision. While at the beginning of the year performance continued to be affected by high ionospheric activity, by the second quarter performance improved significantly and was marked by lower solar and geomagnetic activity. In fact, by the third quarter, performance was amongst the best ever achieved – with very good coverage, particularly in the south – south-western region. The GSA also looked towards expanding the programme's scope to neighbouring countries.

With Galileo Initial Services set to be declared, throughout the course of 2015, the preparatory activities for the Galileo Exploitation phase intensified, most notably with the launch of the Galileo Service Operator (GSOp) procurement process. Internally, the GSA fine-tuned its Galileo Exploitation organisation, including assigning responsibilities and a clear allocation of tasks. Best practices from the GSA's work on EGNOS to manage the schedule, costs, risks, configuration and documentation were implemented, with detailed schedules covering all delegated activities and a full risk management process put into place.

In addition to the GSOp tender, other procurement activities also took place, including preparation for the Galileo Reference Centre (GRC) procurement, with the final publication of the GRC Invitation to Tender and the GRC grant taking place in early 2016. The GSA also managed the execution of contracts supporting the European GNSS Service Centre (GSC), with the deployment of the initial GSC version starting in late 2015. A call for proposals for the development of an EGNSS engine for safety-critical multi-applications in road transportation was published, along with a range of other grants.
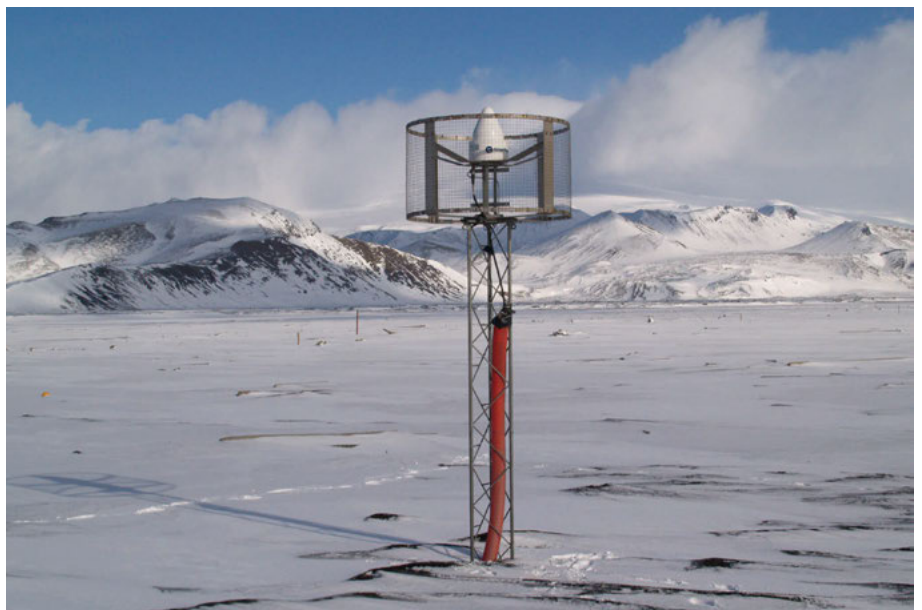
Source: GSA

Growing the GSA support team

As Europe's GNSS programmes continue to mature, so must the team, funding and infrastructure that supports them. For this reason, in 2015 the GSA's role continued to expand. For example, ensuring the Agency was staffed with the specialised talent required was a top priority. Plus, as many procurements and contracts were initiated during the year, the GSA's Legal and Procurement capabilities played an important role in providing services.

On the administrative side, Project Control ensured the effective management of the Administrative Board and key programming documents as the Annual Work Programme and Annual Activity Report. In addition, more than 4,000 financial transactions were processed, with an average payment turn-around of just 13 days – well below the 30 days prescribed by the Financial Regulation.

The GSA's core budget for the year was EUR 27 606 415. In addition in 2015 the Agency also managed a delegated budget of EUR 116 067 789.51 in terms of new commitments for contracts and grant agreements, and EUR 183 108 199 in payments. By the end of the year, the GSA's entire core budget was committed.

2015 Budget Breakdown

Annual core budget
€27,606,415
19%

Overall budget

Commitments for delegated budget
€116,067,790
81%

424 commitments

Number of financial transactions in 2015 (4,267 in total)

3,843 payments

A look back, **a look ahead**

2015 was important for the GSA and the entire European GNSS community, with both EGNOS and Galiloe seeing substantial progress. For Galileo, it was a record-breaking year. With the launch of six satellites, in addition to a ground segment already nearing completion, Galileo's future looks brighter than ever as the programme moves towards the launch of Initial Services. In anticipation of this milestone, the GSA has intensified its efforts to prepare the user segment, via the launch of 'Fundamental Elements' supporting the development of Galileo-capable chipsets and receivers.

EGNOS also provided a solid performance in 2015 – with V2 and V3 ready for launch; this performance will be further enhanced in 2016. From the user perspective, the Agency continued to see an increase in EGNOS adoption across numerous market segments, including maritime and rail. And in the aviation sector, the launch of LPV-200 has seen more and more airports and aircraft operators choosing to become EGNOS-enabled.

Of course, the success of both programmes is heavily dependent on the Agency's ability to convert this technology into tangible benefits for the end user. For this reason, the GSA remains committed to supporting R&D activities through, for example, the Horizon 2020 programme for research and innovation.

Looking to the future, the GSA will soon be putting into practice all that it has been preparing for. In 2016 the Agency will finalise the contract for the future Galileo service provider, and by 2017 the GSA will be fully responsible for the service provision and operations of Galileo.

These are exciting times for European GNSS. As shown in the GSA's 2015 GNSS Market Report, there are more than 4 billion devices using GNSS services, and this number is expected to triple by 2023. The sector is estimated to grow at more than 8% each year until at least 2019.

With all this potential for GNSS – and in particular European GNSS – the GSA is confident that together with the European GNSS community, we will be able to harness this technology and translate it into jobs, business opportunities and economic sustainability for the benefit of all European citizens.

Source: Arianespace

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www.gsa.europa.eu