



European
Global Navigation
Satellite Systems
Agency



GALILEO **EGNOS**

NAVIGATION SOLUTIONS
POWERED BY EUROPE

MyGalileoDrone competition Webinar #2

From disrupting ideas to innovative solutions

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Jan Cernan, Helios

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17 August 2020, 10AM

Agenda



- ☐ GSA & GNSS Introduction
- ☐ GSA MyGalileoDrone contest
- ☐ How to apply? Forms & criteria
- ☐ Development phase
- ☐ Galileo services & Galileo for drones
- ☐ Questions?



GSA MyGalileoDrone



- Who we are?

Mission:

Gateway to Services

- Galileo & EGNOS Operations and Service Provision
- Market Development of the applications and the receivers

Gatekeeper of security

- Security Accreditation
- Operation of Galileo Security Monitoring Centre, governmental service (PRS) activities

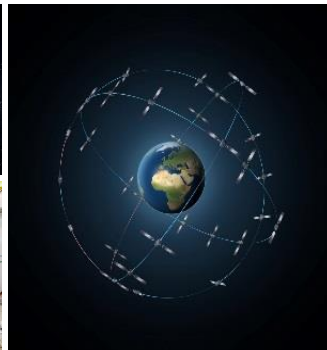
Resourcing:



GSA MyGalileoDrone



European Satellite Navigation Programmes



- Global Navigation Satellite System (GNSS)
- Autonomous infrastructure under EU civilian control
- 26 Satellites constellation today

- European Geostationary Navigation Overlay System
- Increased accuracy and integrity over GPS
- Next version will augment Galileo

GSA MyGalileoDrone

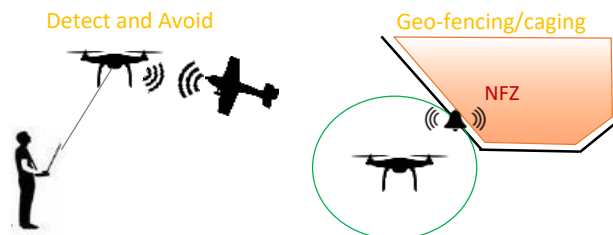


- EGNSS for drones

Increased availability



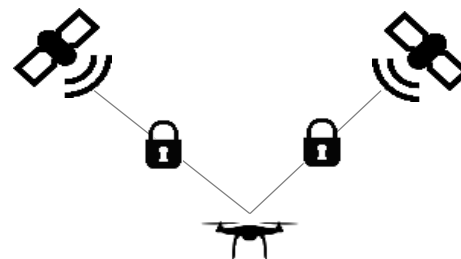
Increased accuracy and integrity



Unprecedented high accuracy for new demanding applications



Embedded authentication features



GSA MyGalileoDrone



MyGalileoDrone contest is open!

The aim of the contest is to design, develop, test and prepare for commercial launch a drone-based application and/or service able to provide a position and/or time fix by using Galileo-enabled receiver.



<https://www.gsa.europa.eu/mygalileodrone>

Galileo can be used on the drone, smartphone app, payload, or in any other device supporting the Galileo drone application.

Flexibility of
using Galileo

The image shows a woman in a red and black plaid shirt and a grey cap, looking up at a drone flying in the sky. She is holding a tablet. The background is a vineyard with green leaves and a mountain range in the distance. In the top right corner, there are logos for the European Union and the European Global Navigation Satellite Systems Agency. The text 'myGalileoDrone' is prominently displayed in the center. Below it, two dark blue boxes contain white text: 'Do you have a **drone-based application** idea?' and 'Do you have what it takes to win **100.000 €**'.

myGalileoDrone

Do you have a **drone-based application** idea?

Do you have what it takes to win **100.000 €**

GSA MyGalileoDrone



Why MyGalileo Drone contest?



Support entrepreneurs, innovators & space enthusiast in Europe



Stimulate drone application developers & service providers to learn about Galileo















Bring new innovative applications to market



GSA MyGalileoDrone



The challenges

 Urban air mobility	 Parcel delivery & eCommerce	 Infrastructure, Inspection	 Leisure
 Maritime surveillance	 Agriculture	 Surveying	 Emergency management
 Scientific applications	 Traffic Management	 U-Space services	 Other applications

GSA MyGalileoDrone



Application/service targeting EU priorities

Drones for European Green Deal



- Robust drone automated navigation solutions
- Smart mobility: urban air mobility, package delivery
- Sustainable maritime and railway transportation
- Field to Fork strategies
- Preserving Europe's natural environment

Drones for European Digital Strategy



- U-Space services leveraging artificial intelligence
- Internet of Things
- Drones services to enable digital connectivity
- Synergies between 5G and Space data
- Efficient and digital surveying
- Infrastructure inspection & maintenance

Drones to Promote our European way of life



- Efficient search and rescue operations
- First aid drones and medicine delivery
- Support to migration processes and border operations

Drones for Resilience and European Recovery

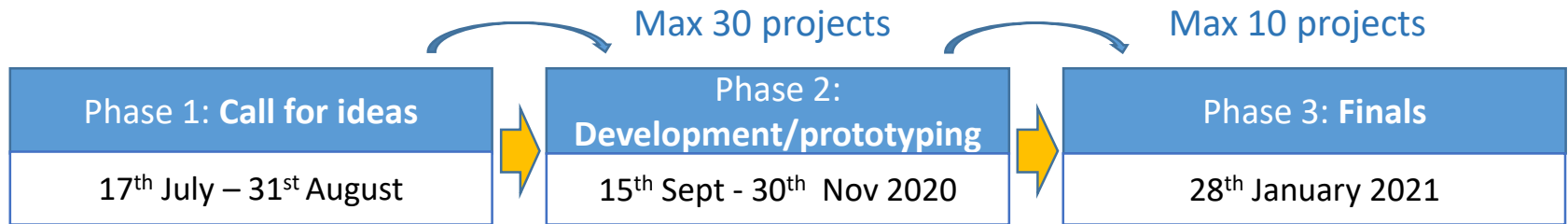



- eHealth: e.g. delivery of samples, tests, disinfection
- Support to safe tourism
- Food production: e.g. crop monitoring
- Support to production & inspection


GSA MyGalileoDrone



3 Phases of the contest




 Idea for application


 Administrative documents


Demo version

Video of the app

Logs of the flights

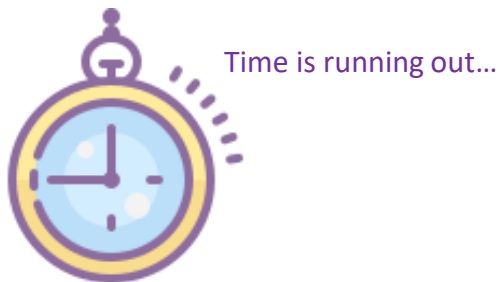


 Presentation to GSA evaluation board

 Demo

How?

- Finals in GSA/EU location
- Demo flight
- Network of investors by GSA



- The proposals will be evaluated by GSA evaluation board
- Selected teams will be announced on the official website

GSA MyGalileoDrone



- 4 Main Prizes






HOW TO APPLY?

GSA MyGalileoDrone



Steps for submitting your idea

- 1) Check the [MyGalileoDrone website](#)
- 2) Read the [Terms of Reference](#)
- 3) Create your profile on the [competition platform](#)
- 4) Submit your brilliant idea 
- 5) Create your profile on [Slack](#) to connect & brainstorm



GSA MyGalileoDrone



Phase 1: Call for ideas

<https://www.gsa.europa.eu/MyGalileoDrone>

myGalileoDrone

Do you have a **drone-based application** idea?

Do you have what it takes to win **€100.000**?

The aim of the contest is to design, develop, test and prepare for commercial launch a drone-based application and/or service able to provide a position and/or time fix by using Galileo-enabled receiver.

Galileo can be used on the drone, smartphone app, payload, or in any other device supporting the Galileo drone application.

€ 100.000
1st PRIZE

196
DAYS

30
SELECTED TEAMS

REGISTER

TIMELINE

CRITERIA

CONNECT WITH US ON OUR SLACK GROUP

Application platform

1

Timeline

Criteria

Slack

For more detailed information go to: [Terms of Reference](#)

GSA MyGalileoDrone



Phase 1: Call for ideas

<https://www.gsa.europa.eu/MyGalileoDrone>

TERMS OF REFERENCE

Please make sure you read the **Terms of reference here** for requirements specifications and duly complete all the forms before submitting your application.

Clarification note #1 is available **here**.

PRIZES

There are 4 prizes for a total of €230.000 awarded as follows:

- **1st Prize:** €100.000
- **2nd Prize:** €60.000
- **3rd Prize:** €40.000
- **4th Prize:** €30.000

AWARD CRITERIA

The following criteria will be considered for the assessment of the projects along the three steps of the contest:

- **Innovation (0-5):** Is this kind of application or service not yet available on the market? Is the application technologically advanced (e.g. using multi-frequency, innovative algorithms)?
- **Market potential (0-5):** Is this application / service sellable after repackaging this idea into a real service? Is there a potential market demand/customer base for this product?
- **Galileo-relevance (0-5):** Is the application / service making use of Galileo? Is the increased accuracy offered by Galileo relevant for the application? Is the increased robustness provided by multi-constellation / multi-frequency relevant for the application?
- **Technical feasibility and service readiness (0-5):** What is the level of progress since the start of the contest? Has the required level of completion for the phase been fully achieved?¹ Is the application/service ready to be delivered in the market?
- **Address regional development needs (0-5):** Does the solution address needs of regional markets or improve the offer available in regional markets for the services proposed to be provided by the drone-based solution? In case additional authorisation are needed from the relevant national authority, are they identified and is the plan to achieve them credible?

2

Read Terms of Reference
&
Clarification notes



For more detailed information go to: [Terms of Reference](#)

GSA MyGalileoDrone



Phase 1: Call for ideas

<https://www.gsa.europa.eu/MyGalileoDrone>

OTHER RESOURCES AND USEFUL LINKS

[Drones Operations White paper](#)

[Raw measurements white paper](#)

[Database of raw measurements](#)

[The forum of raw measurements task force](#)

[Glossary for GPS test](#)

[Galileo-enabled devices](#)

[List of Galileo-enabled drones](#)

Also check other sources

Drone models fitted with Galileo capable receivers by the manufacturer

Manufacturer	Model	Additional Information
ADPM	Ready MT	
ADPM	Ocio	
Aerialtronics	ALTURA ZENITH ATX8	
AIRK	FireClouds FC4r Ultimate	
AIRK	FireClouds FC4r Pro	
AIRK	FireClouds FC4r Core	
AIRK	FireClouds FC4r Now bio	
AIRK	FireClouds FC6 Essence	
AIRK	FireClouds FC8 Plus	
DeLair	UXS iF	
DJI	Phantom 4 RTK	
DJI	M MultiSpectral	
DJI	Agras T16	
DJI	Matrice 200 series V2	
DJI	Matrice 300 RTK	
DJI	Inspire 2	u-blox chip requires re-configuring to enable Galileo capabilities
DJI	Mavic Air 2	requires "super patcher" update to unlock Galileo capabilities
DJI	Mavic Mini	requires "super patcher" update to unlock Galileo capabilities
DJI	Mavic 2 Pro	requires "super patcher" update to unlock Galileo capabilities

Updated list of drone models fitted with Galileo capable receivers

For more detailed information go to: [Terms of Reference](#)




GSA MyGalileoDrone



Phase 1: Call for ideas

<https://mygalileodrone.awardsplatform.com/>

myGalileoDrone competition



Register


Log in

Welcome to myGalileoDrone competition!

- 1 Register an account.
- 2 Start your entry.
- 3 Complete the Application form.
- 4 Submit your entry to be judged.

Good luck!

For further information, please visit [myGalileoDrone website](#).



First name

Last name

Email

Password

Confirm password

☐ I understand and agree that the personal data I provide for the registration will be processed by the GSA in accordance with the privacy statement under section 6 of the competition [Terms of Reference](#).

Register

Email or mobile

Password

☐ Remember me

Log in

[Forgot password](#)

or log in with

Facebook

Twitter



Create your profile

&

Submit your idea!

For more detailed information go to: [Terms of Reference](#)

GSA MyGalileoDrone



Phase 1: Call for ideas

<https://mygalileodrone.awardsplatform.com/>

Submit a proposal in 3 simple steps



You can submit your idea and modify anytime before the official deadline

GSA MyGalileoDrone



Phase 1: Call for ideas

Accompanying documents

Please download the [application form](#), fill it in and upload it below

Select file

Please download the [Declaration of Honour](#) for each participant, fill in the form and upload it here

Select file

Please download the [Financial Identification Form](#), fill in the form and upload it here

Select file

Please download the [Legal Entity Form](#), fill in the form and upload it here

Select file

For more detailed information go to: [Terms of Reference](#)

GSA MyGalileoDrone



Phase 1: Call for ideas

Accompanying documents

- ❑ Application form with the technical description
- ❑ Declaration of honour – each member of the team
- ❑ Financial Identification Form
- ❑ Legal Entity Form *

[illegible]

** Every natural person participating to a team shall submit a “Natural Person” form + a copy of their own ID. Persons representing a legal entity shall submit a “Private Company” or “Public Law Body” form for the legal entity they represent + a extract of the company’s registration.*

For more detailed information go to: [Terms of Reference](#)

GSA MyGalileoDrone



Phase 1: Call for ideas


Financial Identification Form

Files



Financial Identification
English (570.3 KB - PDF)


Download 

Available languages (22) 



**Privacy Statement for Legal Entity and Bank Account
Validation**
English (125.6 KB - PDF)

Download 

Available languages (22) 

For more detailed information go to: [Terms of Reference](#)

GSA MyGalileoDrone



Phase 1: Call for ideas


Legal Entity Form *



Natural Person

English (928.3 KB - PDF)

Download 


Available languages (22) 



Private Companies

English (897.5 KB - PDF)

Download 


Available languages (22) 



Public Law Body

English (818.2 KB - PDF)

Download 


Available languages (22) 



Privacy Statement for Legal Entity and Bank Account Validation

English (125.6 KB - PDF)

Download 

Available languages (22) 

** Every natural person participating to a team shall submit a “Natural Person” form + a copy of their own ID. Persons representing a legal entity shall submit a “Private Company” or “Public Law Body” form for the legal entity they represent + a copy of the company’s registration..*

For more detailed information go to: [Terms of Reference](#)

GSA MyGalileoDrone



Eligibility criteria

Teams:

- ideally from 1 to 7 participants (ideally)
- composed by natural persons or legal entities
- must appoint a team coordinator to serve as the central contact point and represent the team towards GSA.

Natural persons applicant shall be EU Members States citizen or citizen of Switzerland or Norway. All applicants must be at least of 18 years of age by the date of registration to the contest.

In the case of legal entity, its central administration or registered office must be located in the EU Member States or in Switzerland or in Norway.

GSA MyGalileoDrone

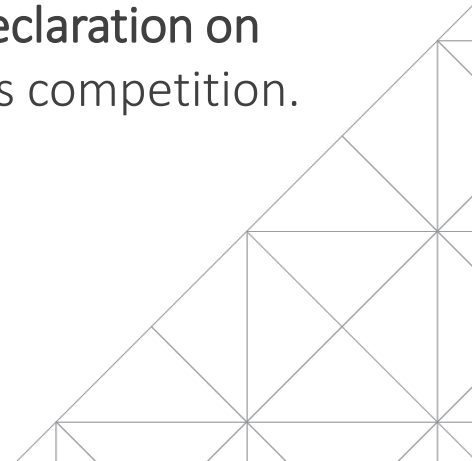


Exclusion criteria

The contest is not open to entry where prohibited or restricted by law and is **not open to employees of GSA, EC and ESA or to immediate family members** (spouses, domestic partners, parents, grandparents, siblings, children and grandchildren) of employees of GSA, EC and ESA or to employees or immediate family members of any of their respective affiliates.



In addition, all applicants shall be able to sign **the Declaration on Honour (Annex 1)** to be allowed to participate to this competition.



GSA MyGalileoDrone



Award criteria

Innovation (0-5): Is this kind of application/service not yet available on the market? Is the application technologically advanced (e.g. using multi-frequency, innovative algorithms)?

Market potential (0-5): Is this application/service sellable after repackaging this idea into a real service? Is there a potential market demand/customer base for this product?

Galileo relevance (0-5): Is the application/service making use of Galileo? Is the increased accuracy offered by Galileo relevant for the application? Is the increased robustness provided by multi-constellation / multi-frequency relevant for the application?

Technical feasibility and service readiness (0-5): What is the level of progress since the start of the contest? Has the required level of completion for the phase been fully achieved? Is the applications/service ready to be delivered in the market?

Address regional development needs (0-5): Does the solution address needs of regional markets or improve the offer available in regional markets for the services proposed to be provided by the drone-based solution? In case additional authorization are needed from the relevant national authority, are they identified and is the plan to achieve them credible?

GSA MyGalileoDrone



Phase 2:
Development/prototyping

15th Sept – 30th Nov 2020

- ✓ Selected teams are developing a demo version of the proposed application and/or service
- ✓ The demonstrator shall implement the general concept, prove feasibility via a flight in a representative scenario and provide a test report
 - ☐ Detailed description of the application/service
 - ☐ Flight tests definition and operations performed
 - ☐ Drone & additional equipment configuration – which GNSS receiver or Galileo equipment is used?
 - ☐ Video of demonstration in flight → show the application in simulated scenario!
 - ☐ Recorded logs/proof of Galileo use in drone or other equipment during the demonstration
 - ☐ **Are you developing software application?** → Submit demo version of the app, showing its functionalities and a report of testing results
- ✓ You will receive technical support during the development



For more detailed information go to: [Terms of Reference](#)

GSA MyGalileoDrone



Phase 2: Development/prototyping - Support during the development

- Demonstration support
 - Assistance to access suitable flying sites
 - Providing list of certified pilots or service providers
- Mentoring scheme
 - Experts supporting selected teams
 - Tailored support to selected team to build the application / service
 - Support to plan and execute the demonstration
 - Support on the development of the business plan

GSA myGalileoDrone

Flying sites for demonstration & pilots



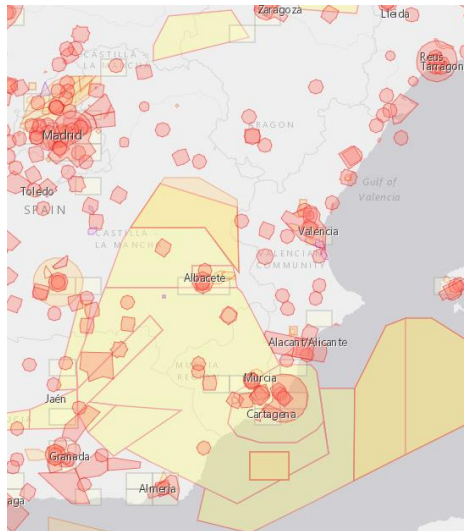
Credit dronescene.co.uk.es 2020-08-13



Credit: stock



Credit: npuasts.com 2020-08-14



Credit: drones.enaire.es 2020-08-13



Credit: nottingham.ac.uk 2020-08-14

GSA MyGalileoDrone



- Do you have questions on the scope of the competition or Terms of reference?

- for additional information write to prizes@gsa.europa.eu
- Subject: 'MyGalileoDrone 2020' + name of your team



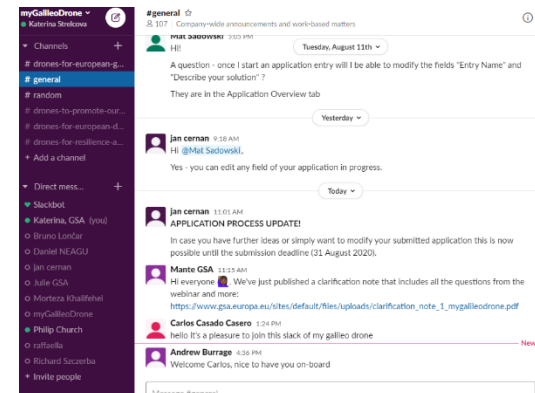
Send the requests for additional information as early as possible before the deadline for submission of each phase.

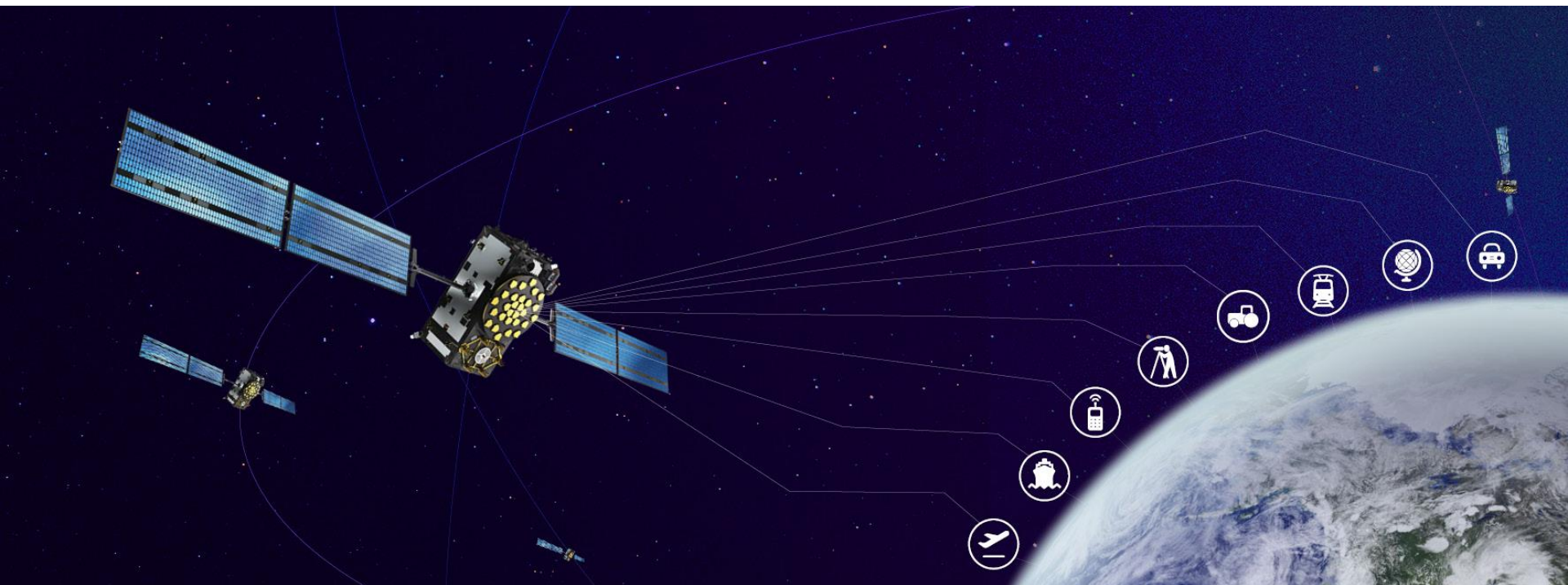
- Do you want to connect with applicants & enthusiast?



Join myGalileoDrone on Slack

Start by entering the email address you use for work.





European
Global Navigation
Satellite Systems
Agency



GALILEO **EGNOS**

NAVIGATION SOLUTIONS
POWERED BY EUROPE

Galileo services

Galileo for drones

Introduction to Galileo Services



- Initial Galileo Services declared the 15th of December 2016, entailing Galileo in Operational phase and the initial provision of:

Galileo Open Service (OS)

Free of charge ranging, positioning and timing service.



Search and Rescue (SAR)/Galileo

Contribution to the Cospas-Sarsat MEOSAR program through the provision of a Forward Link Alert Service.



Galileo Public Regulated Service (PRS)

An encrypted navigation service for governmental authorised users and sensitive applications that require high continuity.



- Galileo Enhanced and FOC (Full Operational Capability) Services:

Search and Rescue (SAR)/Galileo

- Introduction of Galileo Return Link Service (RLS) Ack Type-1 declared the 21st of January 2020
- Additional RLS functionalities expected
- Free of charge



Galileo High Accuracy Service (HAS)

- Free of charge service that will provide corrections through the Galileo signal.
- Position accuracy in the order of decimetres.
- The provision will be through the E6-B signal.



Galileo Authentication Service

- OS-NMA:** Free of charge service that will provide authentication of the navigation data. Inserted into the E1-B signal.
- Signal Authentication Service (SAS):** encryption of the Galileo signals (ranging codes). The provision will be through the E6-C signal.



Galileo and Galileo Services information



Complete description of Galileo system and Services is available within European GNSS Service Centre (GSC) Web Portal <https://www.gsc-europa.eu/>

The screenshot shows the homepage of the European GNSS Service Centre (GSC). The header includes the European GNSS Service Centre logo, navigation links (HOME, FAQ, LOGIN, REGISTER), and social media icons. A red callout box labeled "Galileo General Description" points to the "GALILEO" link in the main navigation bar. A green callout box labeled "Galileo Official Documentation" points to the "ELECTRONIC LIBRARY" link. A grey callout box labeled "Galileo System & Services Status" points to the "SYSTEM & SERVICE STATUS" link. A black callout box labeled "GSC Helpdesk service via Web portal" points to the "GALILEO HELP DESK" section. Another black callout box labeled "Or GSC Helpdesk via email" points to the email address helpdesk@gsc-europa.eu. A purple callout box labeled "Access to the website and register to receive the complete set of services" points to the "REGISTER" link in the header. The main content area features a banner for "Calling for GNSS apps in the COVID-19 response" and a section for "GNSS Apps for COVID-19 response".

Galileo General Description

Galileo Official Documentation

Galileo System & Services Status

GSC Helpdesk service via Web portal

Or GSC Helpdesk via email
helpdesk@gsc-europa.eu

Access to the website and register to receive the complete set of services

<https://www.gsc-europa.eu/>

GNSS and drone operations



GNSS as a key enabling technology for drones:

- Use of GNSS for navigation purposes, enabling the use of GNSS waypoints to follow the trajectory defined in its mission
- Especially relevant for the unmanned air traffic management system to unlock BVLOS (Beyond Visual Line of Sight) operations and to enhance U-Space capacity
- GNSS increasing accuracy and contributing to integrity or a measure of trust on the positioning by a combination with other sensors/technologies (e.g IMU/INS)
- Vertical separation between drones and with conventional aircraft ensured using GNSS as offers improved height accuracy compared with other sensors as barometric pressure altitude sensors (affected by temperature gradients so not providing similar accuracy levels in all situation).
- Other applications enabled by GNSS:
 - “Automated landing” and “Return to home” functionalities
 - Geo-referencing of collected data, for instance, images captured by a camera embarked in a drone
 - In-app taking Geo-fencing, as a key concepts/services to facilitate U-Space implementation

Benefits of using Galileo for drone operations



The introduction of Galileo signals and its future new services leads additional improvements and new functionalities and capabilities to drone operations:

- Increased Galileo navigation performance Vs GPS only, improving significantly accuracy, availability, continuity and reliability of positioning/navigation solution for drones.
- Additionally, Galileo signals modulation, such as the AltBOC used in E5, introduces higher performance against multipath errors in harsh GNSS environments with limited access to open sky, e.g. drones operating in urban canyons

Errors in flight	95% height error	95% 3D error
GPS	4.4 m	4.5 m
GPS+Galileo	1.3 m	1.4 m

GALILEO vs GPS only



Introducing Galileo in drone operations



The introduction of Galileo in drone operations can be accomplished in several ways:

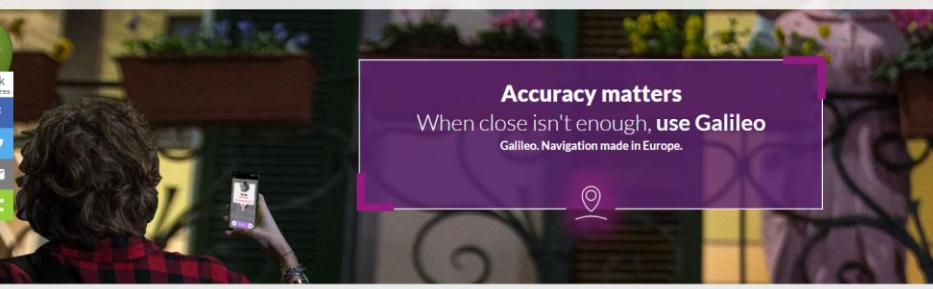
- Commercial drone model or drone built using components, being equipped with a receiver and/or a flight management system compatible with Galileo (see next slides)
- Smartphone App using Galileo for different drone operations:
 - Flying the drone and controlling the camera on board, e.g. [DJI Go](#), [Litchi](#)...
 - UAS Traffic Management (UTM), providing capabilities required as geo-fencing , flight log, drone mapping, surveillance, etcetera. [Airmap](#) and [Unifly](#) provides these services.
- Payloads integrated with drones and using Galileo (based on PVT solution provided by receiver on board) for:
 - Surveillance within a controlled area by means of ADS-B transmitters on board, for instance [DJI Airsense](#)
 - Photogrammetry operations (drones also equipped with cameras suitable for aerial maps) with RTK modules (on board or as a mobile stations) or LIDAR sensors, e.g. [Trimble](#), [DJI](#), [CHCNAV](#)

Commercial drones with a Galileo-enabled receiver




- Visit [UseGalileo](#) web portal to:
 - Search commercial receivers Galileo-enabled collected within “[In the Air](#)” section (also included in next slide excel file).
 - Identify smartphones/tablet supporting Galileo listed within “[Going Mobile](#)” section

USE GALILEO EU
FIND A GALILEO-ENABLED DEVICE TO USE TODAY




Accuracy matters
When close isn't enough, **use Galileo**
Galileo. Navigation made in Europe.

1 484 155 682
Estimated number of Galileo-enabled smartphones today



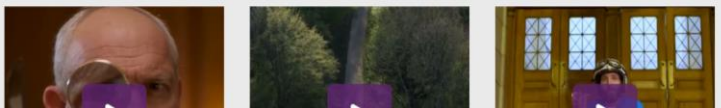
Click here to find out if your phone is Galileo-enabled

Your smartphone is not alone,
discover the other devices that are Galileo-enabled.



Going Mobile → **In the Air**

ON THE ROAD, ON THE WATER, ON THE TRAIN, **IN THE AIR**, ON TIME, INTERNET OF THINGS, **GOING MOBILE**, ON THE FARM, ON THE MAP, DURING AN EMERGENCY, SPACE APPLICATIONS



Enabling Galileo in Drone models locked by default



- There are drone models that, even though are supporting Galileo, by default they require to enable the reception of Galileo satellite signals.
- The guidelines and the SW needed to enable Galileo can be found in drone user manual (see next slide), drone manufacturer FAQs and user or developers forums.
- This is the case for DJI following models:
 - Mavic Pro/Platinum/Alpine White
 - Spark
 - Phantom 4 Pro/Standard/Advanced/Pro V2
 - Inspire 2
- In [Github](#), the platform for developers community, it is offered for free the [SW and guidelines](#) to unlock limitations introduced by DJI, for instance, the Galileo satellites reception.
- In manufacturers' forum, it is described the procedure to configure the drone receiver GNSS supported, for instance <https://forum.dji.com/thread-135156-1-1.html>
- Additional support will be provided by GSA/GSC on enabling Galileo in compatible receivers

Enabling Galileo in receivers/flight navigation systems



- Receivers and flight navigation systems, as u-blox Neo-M9N and Drotek Sirius RTK F9P, allow the configuration of GNSS supported. Similar approach followed by other manufacturers
- Complete description can be found in:
 - U-blox via U-center [SW user guide](#)
 - Drotek RTK F9P [Tutorial](#)

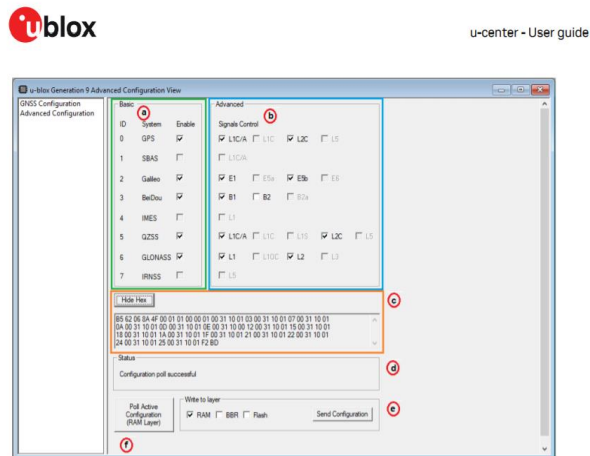
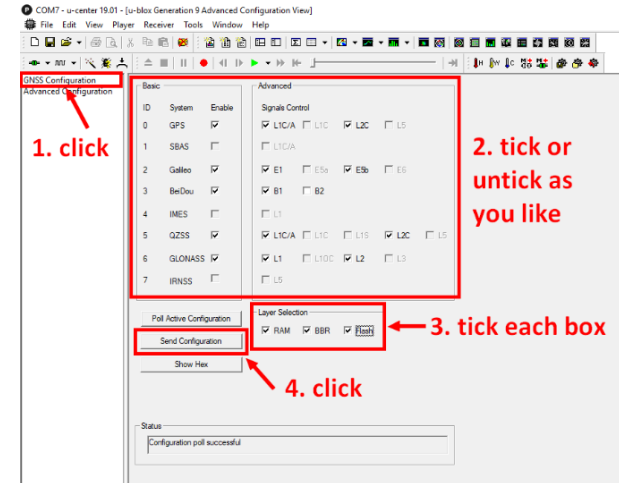


Figure 29: u-blox Generation 9 Advanced Configuration View



Enabling Galileo in receivers/flight navigation systems



- Similarly, Septentrio receivers can be configured to enable the GNSS constellations and signals to be received and processed by their receivers
 - Septentrio via RxTool SW for AsteRx-m2a UAS [Reference Guide](#)



1 How To...

1.24 Check the Capabilities of your Receiver

The capabilities of your receiver are defined by the set of enabled features. The capabilities depend on the hardware, the current firmware version and the current set of permissions. Permissions are further explained in section 1.25.

The command **getReceiverCapabilities** lists the capabilities. You can also check them using the web interface or RxControl (go to *Help > Receiver Interface* and select the *Permitted Capabilities* tab):

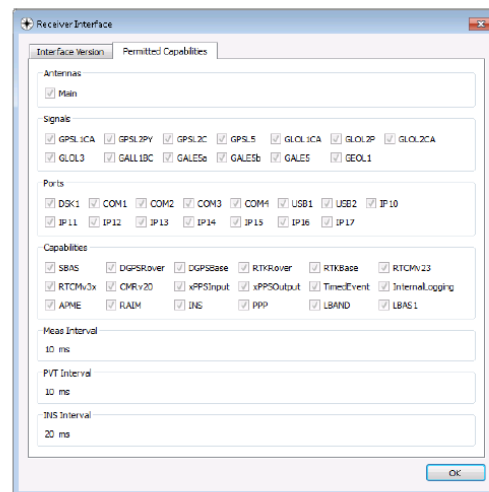
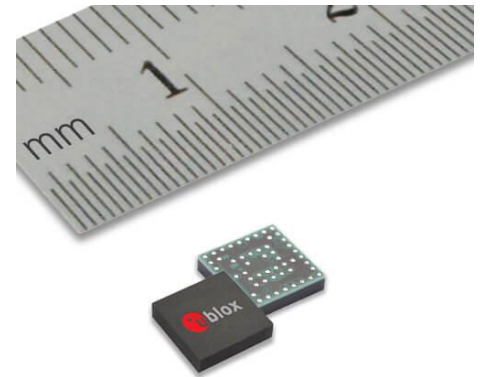


Figure 1-8: Example of receiver capabilities.

Enabling Galileo using “Super-Patcher”



- The “Super-Patcher” can be found [here*](https://github.com/brett8883/DJI_Super-Patcher).
- This can be used on the Mavic, Spark, Phantom 4 and Inspire 2 models.
- Among other additional features, this “Super-Patcher” allows the drone to connect to Galileo GPS satellites in addition to the satellites already available. This means you can expect to see a greater satellite count in the app and a stronger, more reliable, and more accurate GPS signal.



*https://github.com/brett8883/DJI_Super-Patcher

Reconfiguring u-blox chips to utilise Galileo



- The instructions to reconfigure the u-blox chip can be found [here*](#).
- These instructions are applicable for the Spark and Inspire 2 DJI models.
- Additional information on the u-blox chip can be found in the [operating manual here**](#).

*<https://forum.dji.com/thread-135156-1-1.html>

**https://www.u-blox.com/en/product-resources/property_file_product_filter/2696

Android GNSS Raw Measurement applied to drones



- GNSS Raw Measurements allows Android-based devices the access to GNSS raw data, enabling precise positioning techniques to enhance the accuracy of position calculated by the device based on GNSS signals
- The “White Paper on using GNSS Raw Measurements on Android devices” document, publicly available at GSA web portal (<https://www.gsa.europa.eu/gnss-applications/gnss-raw-measurements/workshops-and-resources>), facilitates the GNSS Raw Measurement exploitation and the development of applications on the Android platform
- This document addresses two main objectives:
 - To share knowledge and expertise on Android raw measurements and its wider use, including its potential for high accuracy positioning techniques”
 - Valorise the Galileo differentiators
- This capability is offered in those Android devices from (and included) Nougat version onwards (API level versions greater than or equal to 24)

Click here to
download the
document



Android GNSS Raw Measurement applied to drones

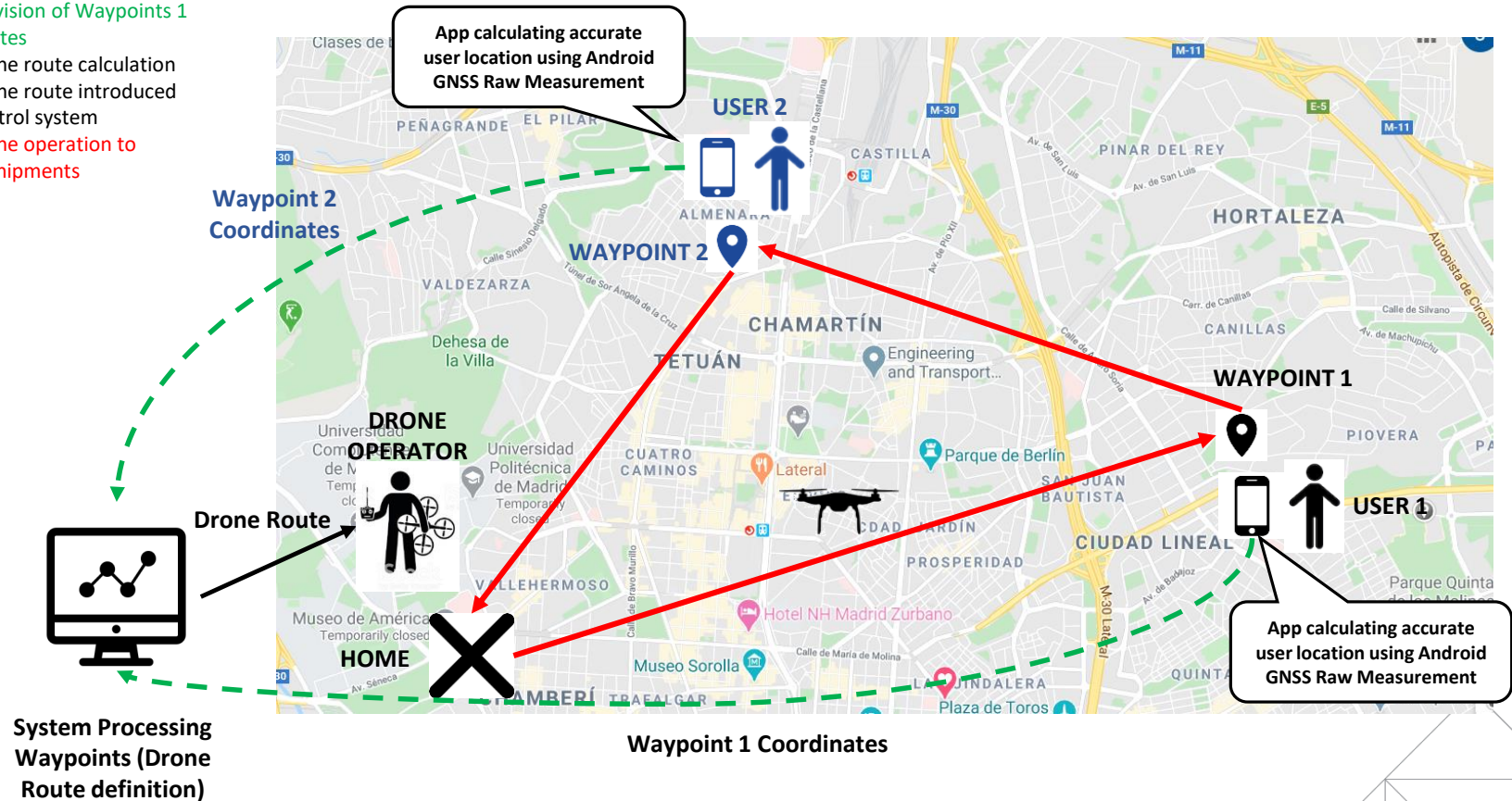


- The following example introduces the definition of an application/service exploiting Android GNSS Raw Measurement:
 - Service is focused on shipment deliveries using drones
 - The service provider develops an App exploiting Android GNSS Raw Measurement
 - This App is provided to the users of this service
 - When an user is the consignee of a package delivery, it is requested to run the App in his/her mobile device (smartphone/tablet).
 - The App sends the accurate location of the consignee to the Service Provided system.
 - This system, based on different parameters (daily plan for deliveries, users locations, drone operation range, etcetera) defines and provides the delivery routes (with the users locations or waypoints) to the drone operator.
 - Then, drone operator introduces these routes into drone control system so the drone automatically flies and delivers the shipment in the locations (waypoints) along the route

Android GNSS Raw Measurement applied to drones



- **Step 1** – Provision of Waypoints 1 & 2 coordinates
- **Step 2** – Drone route calculation
- **Step 3** – Drone route introduced in drone control system
- **Step 4** – Drone operation to deliver the shipments



Companies using Drone for different applications and services



- [Skyward](#) provides Drone as a Service (DaaS) software platform that helps commercial drone operators in industries such as agriculture, construction, film production, and telecommunications track, connect, and manage drones.
- [Amazon Prime Air](#), the future delivery system from Amazon designed to safely get packages to customers in 30 minutes or less using unmanned aerial vehicles, also called drones.
- [senseFly](#) drone solutions simplify the collection and analysis of geospatial data, allowing professionals in surveying, agriculture, engineering and humanitarian aid to make better decisions
- [Verge Aero](#) provides events and venues with the power of live drone performances to attract and amaze audiences.
- [VideoDrone](#), manufacturing drones for technical aerial photography, mapping, measurement and survey tasks
- [Dronebydrone](#) providing aerial services (aerial photography, environmental surveillance, emergency response and protection...)

Before we start with the Q&A...




- The GSA has just launched another exciting competition: Geomatics on the Move!
- More info: gsa.europa.eu/geomaticsonthemove

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