

Annex 6: Updates following the User Consultation Platform 2018

Introduction

The discussions of the UCP 2018 led to the following main modifications:

- An **updated regulatory context** with the endorsement of DFMC GNSS and Market Overview.
- An introduction of an initial set of requirements for **Drones operations**.

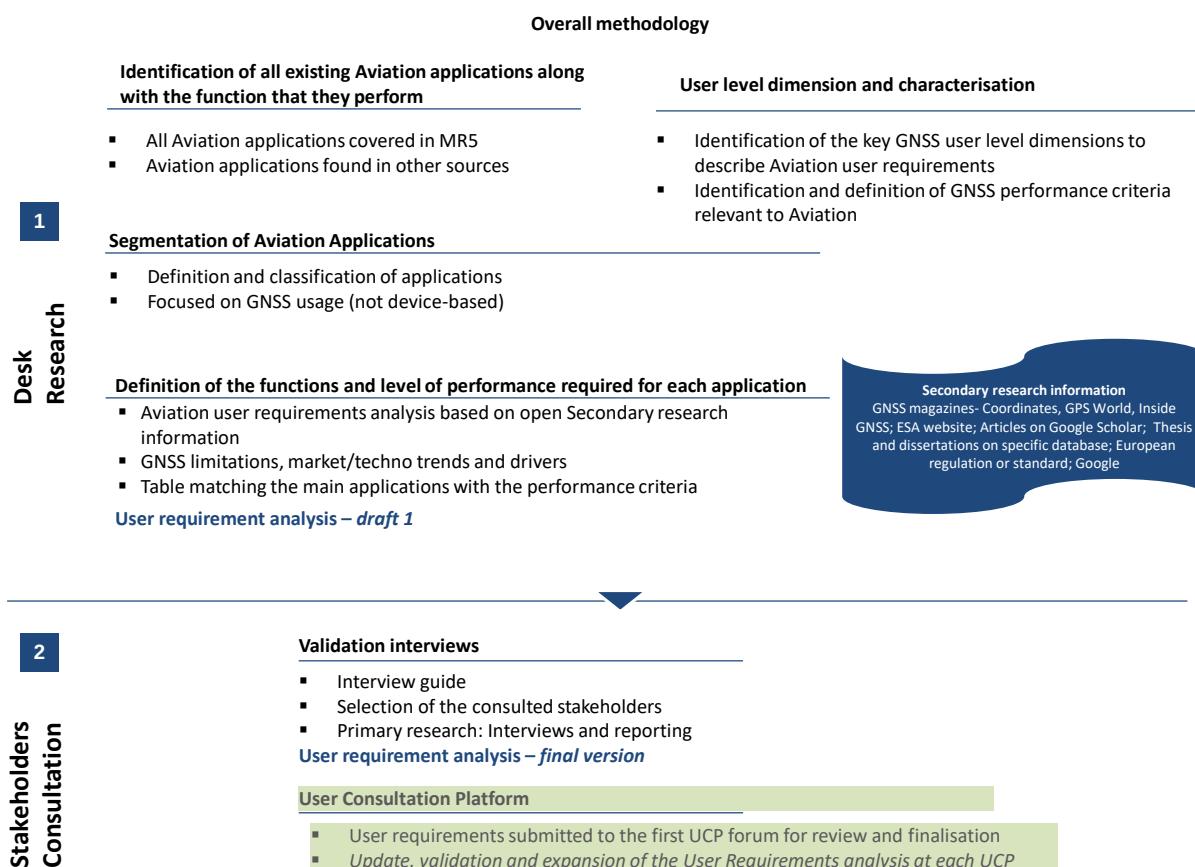
Rationale for the updates

The main sources for these updates are the discussions and decisions taken by the Aviation forum at the User Consultation Platform (UCP) 2018 held at the Pharo Palace in Marseille, on 3rd and 4th December 2018. These findings are recorded in the Aviation panel meeting minutes [RD101].

An additional source of updates is the continuous maintenance work undertaken by the GSA as part of its normal Market Development and Evolution activities.

Updates to Section 1 “Introduction”

The figure 1 page 7 is replaced with this new version:



Update implemented on page 7 of version 2.0.

Updates to Section 2 “Executive Summary”

None

Updates to Section 3 “Reference documents”

The following reference document will be added/updated in the Reference documents table page 16.

Ref.	Ref	Title	Date
Section 03			
[RD101]	GSA-MKD-AV-MOM-246179	User Consultation Platform 2018 – Minutes of Meeting of the Aviation Panel	03 December 2018
[RD102]	Commission IR (EU) No 1207/2011	Laying down requirements for the performance and the interoperability of surveillance for the single European sky Text with EEA relevance.	22 November 2011

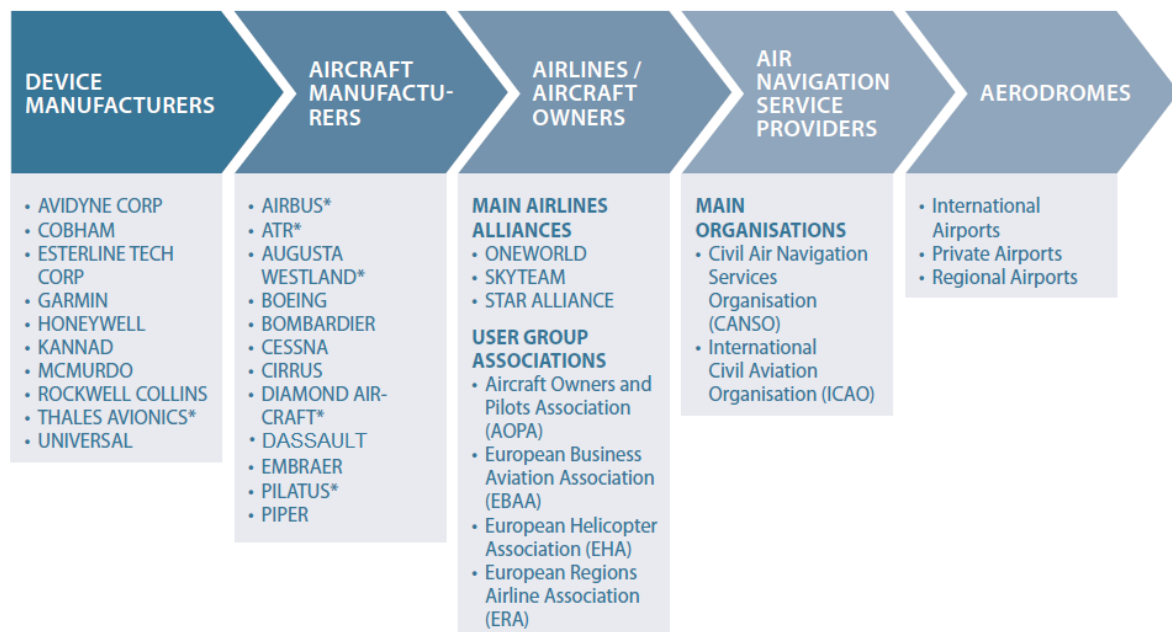


Ref.	Ref	Title	Date
[RD103]	Commission IR (EU) 1028/2014	Amending Implementing Regulation (EU) No 1207/2011 laying down requirements for the performance and the interoperability of surveillance for the single European sky Text with EEA relevance	26 September 2014
[RD104]	Commission IR (EU) 2017/386	Amending Implementing Regulation (EU) No 1207/2011 laying down requirements for the performance and the interoperability of surveillance for the single European sky (Text with EEA relevance.)	6 March 2017
[RD94]	Commission IR (EU) 2017/1048	PBN Implementing Regulation	18 July 2018
Section 04			
[RD94]	Commission IR (EU) 2017/1048	PBN Implementing Regulation	18 July 2018

Updates implemented on page 16 of version 2.0.

Updates to Section 4 “Market Overview and Trends”

Update to figure 3 of section 4.2 “Main Market Players” to include Dassault as part of the Aircraft Manufacturers as agreed with GSA as part of the Market Report version 6 Development.



Update implemented on page 18 of version 2.0.

Update to section 4.4.1 “SESAR” page 18.

The section is updated to reflect the progress of the ATM MP review.

The sentence “The ATM Master plan is being reviewed in 2018” is replaced with “*The ATM Master Plan has been reviewed during 2018 with an SJU lead formal consultation with all ATM stakeholders taking place between July and October. During Q3/4 2019, the updated ATM Master Plan is planned to be published by the SJU.*”

Update implemented on page 19 of version 2.0.

Update to section 4.5.8 “Drones” Page 25

The section is updated to reflect the activities done for drones since the 2017 UCP.

The following paragraph is added at the end of the section:

“Since the 2017 UCP, many different activities have been advanced with respect to drones to determine the GNSS requirements to enable the integration of drones with other airspace users and as part of the U-Space concept. During 2018, GSA launched a survey to gather a set of user requirements for drone operations. At the UCP 2019, the industry confirmed the results ie accuracy requirements horizontally and vertically should be in the sub-metre level with corresponding increases in performance for integrity, continuity and availability.”

Update implemented on page 25 of version 2.0.

Updates to Section 5 “GNSS User Requirements Analysis”

Update to section 5.1.1.1.5 “ICAO Doc 9613: PBN Manual” page 28 to reflect the finalisation of the EASA PBN IR.

The bullet beginning: “PBN Implementing Rule, the Notice of Proposed Amendment (NPA) 2015-01 ...” is replaced in its entirety including with:

“PBN Implementing Rule, Regulation (EC) No 2018/1048, addresses the safety, interoperability, proportionality and coordination issues related to the implementation of Performance-Based Navigation (PBN) within European airspace. The IR extends the PBN implementation requirements beyond the 24 EU aerodromes required by the PCP, mitigates the risks associated with a non-harmonised implementation, and ensures a smooth transition to PBN operations, fully supporting the implementation of the European Air Traffic Management Master Plan. This regulation includes the following provisions:

- *By 2020 : EGNOS approaches (LPV) are to be available to all instrument runways not currently served by ILS.*
- *By 2024 : EGNOS approaches (LPV and CAT I) are to be available to all instrument runways*
- *By 2030 : Preference is given to PBN approaches (LNAV/VNAV and LPV) and ILS will be rationalised to a minimum network level”.*

Update implemented on page 28 of the version 2.0.

Update to section 5.2.1.1.1 “ICAO Future GNSS CONOPS” page 42 to reflect the latest activities at ICAO level.

The paragraphs: “All the possibilities of using multi constellation for Air Navigation have not been explored yet, but a new concept of operations for Multi-Constellation Multi-Frequency receivers is being developed at ICAO level.

Consultation to the users about the benefits of future GNSS CONOPS is ongoing and users are welcome to further contribute.” are replaced with:

“All the possibilities of using multi constellation for Air Navigation have not been explored yet. A new concept of operations for Dual-Frequency Multi-Constellation (DFMC) Global Navigation Satellite System (GNSS), CONOPS 4.6, has been published by the ICAO Navigation Systems Panel on 27 April 2018.

At the 13th ICAO Air Navigation Conference in October 2018, ICAO provided a set of recommendations for states to support the transition of GNSS to DFMC operations.”

Update implemented on page 42 of version 2.0.

Update to section 5.2.4.2 “Autonomous Distress Tracking” page 50 to reflect the evaluation of ADT

The following sentence is added at the end of the section *“The definition of the concept of operations for remote beacon activation is led by manufactures in collaboration with EUROCAE . They are also looking for solutions to deal with distress situation that cannot trigger automatic activation.”*

Update implemented on page 50 of version 2.0.

Update to section 5.2.5.1 “Regulatory requirements” page 51 to reflect the updates in EASA drone regulations. The reference to “NPA2017-05” is to be replaced by reference to “Opinion 01/2018”.

Update implemented on page 51 of version 2.0.

Update to section 5.2.5.4 “Geofencing” page 55 to reflect the updates in EASA drone regulations.

The section of the final paragraph to be replaced is: “However, the requirement for geofencing is already recognised in NPA2017-05. It is expected as part of meeting the expected performances from the NPA that robust integration of navigation and other technology might be needed. This would expect to include EGNOS and Galileo where user authentication may provide added value.”

The text to replace this with is: *“Within the regulation proposed by Opinion 01/2018 the concept of ‘geo-fencing’ is being replaced by ‘geo-awareness’ to better reflect the nature of the requirement already presented in NPA2017-05. This differs in that it places the onus on the drone operator to be aware of airspace limitations and the ‘geo-awareness’ supports the drone operator in this role. The need to determine position and velocity as part of a ‘geo-awareness’ function are expected to lead to demands for performance that require robust integration of various navigation sensors. It is expected that EGNOS and Galileo (with user authentication available) will provide added value.”*

Update implemented on page 55 of version 2.0.

Updates to Section 6 “User Requirement Specification”

Add section 6.4.1 with the following text (new text in *italic*):

6.4.1 Drones regulatory status

The uptake of drone technologies in Europe is strongly dependent on the regulations on the use of drones by different Member States (MS) with regards to policies on authorisation, certification and spatial limitations.

6.4.1.1 EASA

Significant progress on developing a common European regulatory framework for drones has been made in 2018 and 2019. EASA published a prototype regulation in 2015, proposing a proportional and operation centric approach. It introduced three categories of operations, based on risk to third parties, which are: Open (low risk), Specific (medium risk) and Certified (high risk). This proposal was followed by a Notice to Proposed Amendment (NPA) in May 2017 (NPA 2017-05) for the introduction of a regulatory framework for the operation of drones in the open and specific category. The NPA received many comments from all the different stakeholders in the drone industry. EASA followed the consultation with Opinion 01/2018 in February 2018 and a draft delegated regulation “on making unmanned aircraft intended for use in the ‘open’ category available on the market, and on third-country UAS operators” and a draft implementing regulation “on rules and procedures for the operation of unmanned aircraft”. The latter proposed regulation will be accompanied by appropriate Applicable Means of Compliance (AMC) and Guidance Material (GM).

On the 22nd of August 2018 the new EASA Basic Regulation 2018/1139 was published. It establishes common rules in the field of civil aviation and is in force since 11th of September 2018.

On 11 June 2019 common European rules on drones, Commission Delegated Regulation (EU) 2019/945 & Commission Implementing Regulation (EU) 2019/947, were published to ensure safe and secure drone operations across Europe whilst protecting the safety and the privacy of EU citizens, enabling the free circulation of drones and providing a level playing field within the European Union.¹

6.4.1.2 JARUS

The Joint Authorities for Rulemaking on Unmanned Systems (JARUS) is a group of experts from worldwide national aviation authorities (NAAs) and regional aviation safety organisations, whose aim is to develop harmonised rules for UAS. JARUS has been recognized by the European Commission and the European Parliament as the ‘working engine’ to develop the necessary rules for unmanned aircraft. JARUS is in charge of developing the methodology for Specific Operations Risk Assessment (SORA).

6.4.1.3 EUROCONTROL

EUROCONTROL has developed and published three discussion documents so far based on the outputs of the different webinars:

- *UAS ATM Airspace Assessment: to ensure the safe integration of drones into the European airspace, assessments are essential to enable common and harmonised rules and scenarios. This involves taking a look at the airspace volume in which operations are taking place, in*

¹ Source: EASA website

order to examine the associated air and ground risks, and covering all those related elements and requirements which must be taken into account (e.g. re-design, CNS coverage, geofencing).

- *UAS ATM CARS (Common Altitude Reference System): UAS will for sure share airspace with manned aviation, and this will lead to separation requirements. For this it is essential that the altitudes of all of these aircraft are well known, with no place for ambiguity. Manned aviation uses pressure altitude obtained from barometric readings but UAS use inputs from other systems such as satellite based calculations. Each system works well in its domain (manned or unmanned separately), but to ensure safe separation when working together a common altitude reference system needs to be defined.*
- *UAS ATM Flight Rules: UAS operations can be performed by pilots who are not necessarily aware of the rules of the air. UAS themselves usually have very different dynamics to manned aircraft, some of them being not comparable to conventional aviation in both speed and size, implying a certain safety threat to manned aviation when sharing airspace (e.g. under VFR). New flight rules applicable to UAS and to other aircraft operating near them are therefore needed.*

6.4.1.4 EUROCAE

EUROCAE is the European leader in the development of worldwide recognised industry standards for aviation. Eurocae develops standards by industry/members for the industry needs that:

- *Build upon the state of the art expertise of its members and address the global aviation challenges*
- *Are fit for purpose to be adopted internationally*
- *Support the operational, development and regulatory processes*

EUROCAE is running several Working Groups. The one related to drones is WG 105. EUROCAE WG-105 in coordination with RTCA SC-228 is developing standards and guidance material to allow the safe operation of UAS in all types of airspace, at all times and for all types of operations. The work of WG-105 is organized in six groups working in specific areas. Some of the identified areas have GNSS relevance such as geofencing and the emerging UAS Traffic Management.

In February 2019 a new sub-group was created: WG-105 SG-62 "GNSS for UAS". The SG will perform the activities related to GNSS for UAS. The group will publish the "Guidelines on the use of multi-GNSS for UAS". This deliverable is prepared under the H2020 GAUSS project with close cooperation with EC and GSA.

6.4.1.5 European initiatives – SESAR

In 2015, the European Commission mandated the Single European Sky Air traffic management Research Joint Undertaking (SESAR JU) - whose role is to develop the new generation European air traffic management system - to produce a blueprint on how to make drone use in low-level airspace safe, secure and environmentally friendly. Since then, the SESAR JU has received a further

mandate to carry out research and demonstration activities into translating the blueprint into reality.²

U-space is a set of new services relying on a high level of digitalisation and automation of functions and specific procedures designed to support safe, efficient and secure access to airspace for large numbers of drones. In support of this initiative, in 2017 the SESAR Joint Undertaking drafted the U-space blueprint, a vision of how to make U-space operationally possible.

Update implemented on pages 68 and 69 of version 2.0.

Add section 6.4.2 as follows:

6.4.2 Drones User Requirements

The following table presents the Requirements, which are “discontinued” (corresponding to Action: “D”), “reformulated” (corresponding to Action: “R”) and new Requirements to be “added” (corresponding to Action: “A”).

Section 6.4.2.1 Positioning System

Id	Action	Description	Type	Source
GSA-MKD-USR-REQ-AVI-1130	A	The Positioning system shall provide a minimum general (non-urban) Vertical navigation accuracy of 10 m.	Performance (general (non-urban) Vertical accuracy)	[RD101]
GSA-MKD-USR-REQ-AVI-1140	A	The Positioning system shall provide a minimum general (non-urban) Horizontal navigation accuracy of 10 m.	Performance general (non-urban) Horizontal accuracy)	[RD101]
GSA-MKD-USR-REQ-AVI-1150	A	The Positioning system shall provide a minimum Urban Vertical navigation accuracy of 1 m.	Performance (urban Vertical accuracy)	[RD101]
GSA-MKD-USR-REQ-AVI-1160	A	The Positioning system shall provide a minimum Urban Horizontal navigation accuracy of 1 m.	Performance (urban	[RD101]

²<https://www.sesarju.eu/sites/default/files/documents/reports/U-space%20Blueprint%20brochure%20final.PDF>

Id	Action	Description	Type	Source
			Horizontal accuracy)	
GSA-MKD-USR-REQ-AVI-1170	A	The Positioning system shall provide an availability of 95% to 99.5% of the time.	Performance (Availability)	[RD101]

Section 6.4.2.2 Navigation System

GSA-MKD-USR-REQ-AVI-1210	A	The Navigation system shall provide a minimum general (non-urban) vertical accuracy of 10 m.	Performance (general (non-urban) Vertical accuracy)	[RD101]
GSA-MKD-USR-REQ-AVI-1220	A	The Navigation system shall provide a minimum general (non-urban) horizontal accuracy of 10.	Performance (general (non-urban) Horizontal accuracy)	[RD101]
GSA-MKD-USR-REQ-AVI-1230	A	The Navigation system shall provide a minimum urban vertical accuracy of 1m.	Performance (urban Vertical accuracy)	[RD101]
GSA-MKD-USR-REQ-AVI-1240	A	The Navigation system shall provide a minimum urban horizontal accuracy of 1.	Performance (urban Horizontal accuracy)	[RD101]
GSA-MKD-USR-REQ-AVI-1250	A	The Navigation system shall provide an availability of 95% to 99.5% of the time.	Performance (Availability)	[RD101]

Section 6.4.2.3 Geo-awareness System

GSA-MKD-USR-REQ-AVI-1290	A	The Geo-awareness system shall provide a minimum vertical accuracy of 1m.	Performance (Vertical accuracy)	[RD101]
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GSA-MKD-USR-REQ-AVI-1300	A	The Geo-awareness system shall provide a minimum horizontal accuracy of 1.	Performance (Horizontal accuracy)	[RD101]
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Update implemented on page 70 of the version 2.0.

Updates to Annexes

Update to Annex 5 “OVERVIEW OF THE GNSS-BASED NAVIGATION APPLICATIONS IN CIVIL AVIATION” page 106

Update of “PBN SPECIFICATION” table, the first reference “Commission IR (EU) 2017/xxx_” is replaced by “Commission IR (EU) 2017/1048”

Update implemented on page 108 of the version 2.0.

Update of Table 35, page 107 to delete the columns EASA NPA and EASA Opinion and replace with the following:

	PBN IR
Approach	RNP APCH to LNAV/VNAV, LPV minima at - All IREs without ILS by 3 December 2020 - All IREs by 25 January 2024 Where there are terrain or obstacles limitations 2D approaches or RNP AR APCH may be implemented
TMA	From 25 January 2024 RNAV 1 SIDs and STARs or RNP 1 plus altitude constraints and RF legs. For rotorcraft operations ATS routes, SIDs and STARs may be implemented with RNP 0.3, RNAV 1 or RNP 1.
En-route	Maintenance of the current RNAV 5 specification (in addition to free route airspace required by the Pilot Common Project.

Update implemented on page 109 of version 2.0.

Considerations for further User Requirements Analysis

The UCP did not identify any additional applications and associated requirements over what was already included within the RUR.

However, it is noted that there remain requirements related to drones where the performance elements are still to be defined. In the past year there has been extensive work ongoing within the context of GSA funded activities and SJU sponsored VLD and ER activities to determine GNSS (amongst other) performance requirements to support the ongoing evolution of Communication, Navigation and Surveillance required to enable the U-Space concept of operations. It is suggested that in light of the requirements coming from projects such as TERRA and the GSA's own stakeholder surveys that these elements in Annex 6 to the RUR are updated in the next edition.