SESAR	Active	LOC
NAV11.1	Implement precision approach procedures using GBAS CAT II based on GAST C	

REG	ASP	MIL	APO	USE	INT	IND	NM	MET	AIS	USP

Subject matter and scope

In current ILS Cat II operations there is a need to protect the ILS critical and sensitive areas which result in restricted ground movements and extra spacing margins between aircraft in order to accommodate the longer runway occupancy times (ROT) through the need to protect the larger ILS sensitive area. At capacity constrained airports this may lead to flights being diverted or even cancelled. In addition, this is typically also associated with longer flight times, i.e. more fuel being used.

This objective proposes the use of GBAS which has limited (GBAS Local Object Consideration Areas) or no protection areas, usually located outside aircraft movement areas. This allows the reduction of runway occupancy times in low visibility conditions resulting in reduced spacing between arrival aircraft. The amount of runway throughput gained depends on wake turbulence separation and any other additional spacing needs. With a proper siting of the GBAS ground equipment (compliant with the GBAS Local Object Consideration Areas), there's no need for critical/sensitive areas.

Use of GBAS GAST C for CAT II enables:

a) flexible approaches; synergistic with RNAV/RNP, PA where ILS cannot due to geography, signal stability (immune to signal bends inherent in ILS);
b) complement ILS at airports with multiple RWYs during LVP;
c) the rationalization of some ILS thus reducing operation and maintenance costs and optimizing spectrum;
d) PA at aerodromes without SBAS coverage or where PA performances cannot be achieved with SBAS.

Benefits of using GBAS in Low Visibility Conditions include improved resilience of airport capacity with fewer flight cancellations due to LVP in force. GBAS GAST C for CAT II will enable runway ends which are not ILS CATII equipped to be used for CATII operations as long as the runway is CATII qualified. This will have positive effects on gaseous emissions, i.e. less CO2.

NOTE: The benefits mentioned are only gained if a sufficient number of aircraft are qualified; therefore, an action should be included to verify upgradeability of existing aircraft equipage, promote further airborne equipage, monitor aircraft equipage rate and qualification and assess incentives.

NOTE FOR MILITARY AUTHORITIES: It is the responsibility of each Military Authority to review this Objective IN ITS ENTIRETY and address each of the SLoAs that the Military Authority considers RELEVANT for itself. This has to be done on top and above of the review of "MIL" SLoAs which identify actions EXCLUSIVE to MIL Authorities.

Applicability Area(s) & Timescale(s)

Applicability Area (Subject lo local needs)	All ECAC+ States except: Azerbaijan, Bulgaria, Croatia, Cyprus, Denmark, Estonia, France, Georgia, Greece, Hungary, Israel, Italy, Latvia, Lithuania, Maastricht UAC, Malta, Moldova, Montenegro, Morocco, North Macedonia, Norway, Portugal, Romania, Serbia, Slovenia

Timescales:	**From:**	**By:**	**Applicable to:**
IOC used for Analytics functioning only - not for implementation planning	01/07/2022		
FOC used for Analytics functioning only - not for implementation planning		31/12/2030	

References

European ATM Master Plan

OI step -	[AO-0506]-Improve Low Visibility Operations using GLS Cat II operation based on GBAS GAST-C								
	Enablers -	A/C-56a	CTE-N07h						

Legend:	WXYZ-001	Covered by SLoA(s) in this objective	WXYZ-002 zzz	Covered by SLoA(s) in another objective Objective covering the enabler	WXYZ-003	Not covered in the Implementation Plan

Applicable legislation

None

Essential Operational Changes

CNS Infrastructure and Services

NAV11.1	Implement precision approach procedures using GBAS CAT II based on GAST C

SESAR Solution

#119 - GLS CAT II operations using GBAS GAST-C

ICAO GANP - ASBUs

NAVS-B1/1	Extended GBAS

Deployment Programme

- none -	

European Plan for Aviation Safety

RMT.0379	All-weather operations
RMT.0682	Implementation of the regulatory needs of the SESAR common projects

Operating Environments

Airport
Terminal Airspace

Stakeholder Lines of Action (SLoAs)

SloA ref.	Title	From	By
NAV11.1-REG01	Apply EASA and ICAO material to local national regulatory activities		
NAV11.1-ASP01	Install GBAS GAST C CAT II ground equipment		
NAV11.1-ASP02	Design and Publish GBAS CAT II precision approach procedures		
NAV11.1-ASP03	Ensure the conformity assessment of GBAS GAST C CAT II ground equipment		
NAV11.1-USE01	Equip aircraft with systems approved for GBAS GAST C CAT II		
NAV11.1-USE02	Get airworthiness certification and operational approval		

Description of finalised and deleted SLoAs is available on the eATM Portal @ https://www.eatmportal.eu/working/depl/essip_objectives

Expected Performance Benefits

Safety:	Safety of approach, landing and guided-take-off operations based on GBAS GAST C CAT II are as safe as operations based on ILS CAT II assuming the identified safety requirements are met. GBAS improves safety in the segment of avoiding a scenario of false LOC or Glide beam capture.
Capacity:	GBAS has limited (GBAS Local Object Consideration Areas) or no protection areas, usually located outside aircraft movement areas. This allows the reduction of runway occupancy times in low visibility conditions resulting in reduced spacing between arrival aircraft. The amount of runway throughput gained depends on wake turbulence separation and any other additional spacing needs.
Operational Efficiency:	Fewer flights will be cancelled or diverted saving the Airspace User (Main and Regional airliners) associated costs. To be noted that cancellations also affect the subsequent legs planned with those aircraft. Business Aviation see minimal benefits as they fly infrequently to capacity constrained airports during LVP. Avoiding the loss of runway capacity will reduce the level of delay and avoid the associated costs. A key issue is the impact of the primary delays on the subsequent legs to be performed by those aircraft which try to absorb the delay where possible. Higher glide slopes than those possible with ILS, 3.2° even in CAT II weather conditions. Many fielded avionics and ground systems are upgradeable with limited effort
Cost Efficiency:	One GBAS station can provide approaches for multiple runway end as well as multiple approaches per runway end. The GBAS station in the long term is much more cost efficient than the ILS in terms of less maintenance and flight inspection required.
Environment:	The environmental benefits come from the saving of jet fuel due to the resilience of the system in keeping its capacity even in Low Visibility Operations. Fuel savings results in direct reductions in CO2 emissions. There is also a direct benefit in term of local air quality by having less aircraft queuing on the runway for departure conditions. Noise abatement.
Security:	-

Detailed SLoA Descriptions

NAV11.1-REG01	**Apply EASA and ICAO material to local national regulatory activities**	From:	By:
		-	-
Action by:	**Regulatory Authorities**		

NAV11.1	Implement precision approach procedures using GBAS CAT II based on GAST C

Description & purpose:	Publish national regulatory material for GBAS CAT II procedures based on Airworthiness Approval and Operational Criteria for GBAS CAT II (EASA AMC in preparation).		
Supporting material(s):	ICAO - NSP JWG7 WP19 - Concept for GBAS Cat II Operations using ICAO GAST-C 04/2021		
Finalisation criteria:	1 - National regulatory material for GBAS CAT II procedures.		
NAV11.1-ASP01	**Install GBAS GAST C CAT II ground equipment**	From: -	By: -
Action by:	**ANS Providers**		
Description & purpose:	Procure and install GBAS GAST C CAT II ground equipment to support the precision approach procedures based on GBAS CAT II. Perform siting and site feasibility study. Integrate GBAS GAST C CAT II ground equipment in ATC (& airport) infrastructure. Verify performance of installed GBAS GAST C CAT II ground equipment (ground testing, flight testing). Develop maintenance and training material.		
Supporting material(s):	ICAO - NSP JWG7 WP19 - Concept for GBAS Cat II Operations using ICAO GAST-C 04/2021 ICAO - Annex 10 - Aeronautical Telecommunications Url : http://store1.icao.int/ EUROCAE - ED-114B - MOPS For Global Navigation Satellite Ground Based Augmentation System Ground Equipment to support Precision Approach and Landing 09/2019 Url : https://eshop.eurocae.net/eurocae-documents-and-reports/ed-114b/		
ATM Master Plan relationship:	[CTE-N07]-Ground Based Augmentation System (GBAS) [CTE-N07h]-GBAS Cat II based on GAST-C Single-Constellation / Single-Frequency GNSS (GPS L1)		
Finalisation criteria:	1 - GBAS CAT GAST C II is procured, installed and flight tested.		
NAV11.1-ASP02	**Design and Publish GBAS CAT II precision approach procedures**	From: -	By: -
Action by:	**ANS Providers**		
Description & purpose:	Develop GBAS CAT II precision approach procedures at instrument runways. This action includes the following tasks: - Identify runways where GBAS CAT II should be introduced; - Design GBAS CAT II procedures; - Provide Final Approach Segment (FAS) data for GBAS CAT II ground equipment (in EUROCAE ED-114B FAS data file format) - Publish GBAS CAT II procedures in national AIPs.		
Supporting material(s):	ICAO - Doc 8168-Volume II - Aircraft Operations - Volume II - Construction of Visual and Instrument Flight Procedures - Edition 5 / 11/2011 Url : https://store.icao.int/ ICAO - EUR-Doc 013 - Guidance Material on All Weather Operations at Aerodromes Url : https://www.icao.int/EURNAT/Pages/EUR-and-NAT-Document.aspx?RootFolder=%2FEURNAT%2FEUR%20and%20NAT%20Documents%2FEUR%20Documents%2F013%20%2D%20EUR%20Guidance%20Material%20on%20AWO%20at%20Aerodromes&FolderCTID=0x012000DAF95319EADD9946B510C5D7B595637D00AA5EB47B299B9A4BAD1968B24E18655C&View=%7B2666E7DD%2D5F4E%2D4E64%2DB16A%2DCF142A1E5BC9%7D ICAO - NSP JWG7 WP19 - Concept for GBAS Cat II Operations using ICAO GAST-C 04/2021 EUROCAE - ED-114B - MOPS For Global Navigation Satellite Ground Based Augmentation System Ground Equipment to support Precision Approach and Landing 09/2019 Url : https://eshop.eurocae.net/eurocae-documents-and-reports/ed-114b/		
Finalisation criteria:	1 - GBAS CAT II precision approach procedures have been implemented in accordance with guidance material and published in the National AIP, and are in operational use.		
NAV11.1-ASP03	**Ensure the conformity assessment of GBAS GAST C CAT II ground equipment**	From: -	By: -
Action by:	**ANS Providers**		
Description & purpose:	Before putting the ground equipment into service, the ANSP shall ensure that the equipment has been subject to a declaration or certification process confirming the compliance with the appropriate regulatory requirements.		
ATM Master Plan relationship:	[CTE-N07]-Ground Based Augmentation System (GBAS) [CTE-N07h]-GBAS Cat II based on GAST-C Single-Constellation / Single-Frequency GNSS (GPS L1)		
Finalisation criteria:	1 - The appropriate declarations or certificates have been issues.		
NAV11.1-USE01	**Equip aircraft with systems approved for GBAS GAST C CAT II**	From: -	By: -
Action by:	**Airspace Users**		
Description & purpose:	Fit the aircraft with suitably approved equipment GBAS GAST C CAT II equipment compliant to EASA AMC (in preparation).		
Supporting material(s):	EASA - CRI F-27 issue 2 for CAT II operations		

NAV11.1	Implement precision approach procedures using GBAS CAT II based on GAST C

ATM Master Plan relationship:	[A/C-02a]-Enhanced positioning using GBAS single frequency [A/C-56a]-Flight management and guidance for Precision Approach GBAS CATII/III using GPS L1		
Finalisation criteria:	1 - Aircraft have been fitted with suitable GBAS GAST C CAT II equipment compliant to EASA AMC (in preparation).		
NAV11.1-USE02	**Get airworthiness certification and operational approval**	From: -	By: -
Action by:	**Airspace Users**		
Description & purpose:	Apply for approval against EASA CRI F-27 issue 2 for CAT II operations. The applicant needs to submit, to the competent National Authorities, a compliance statement which shows how the criteria of the EASA CS AWO and IR OPS have been satisfied.		
Supporting material(s):	ICAO - NSP JWG7 WP19 - Concept for GBAS Cat II Operations using ICAO GAST-C 04/2021 EUROCAE - ED-114B - MOPS For Global Navigation Satellite Ground Based Augmentation System Ground Equipment to support Precision Approach and Landing 09/2019 Url : https://eshop.eurocae.net/eurocae-documents-and-reports/ed-114b/		
ATM Master Plan relationship:	[A/C-02a]-Enhanced positioning using GBAS single frequency [A/C-56a]-Flight management and guidance for Precision Approach GBAS CATII/III using GPS L1		
Finalisation criteria:	1 - The airworthiness and operational approval has been granted by the competent National Authorities to the operator.		