



सत्यमेव जयते

नागर विमानन मंत्रालय, भारत सरकार
MINISTRY OF CIVIL AVIATION, GOVERNMENT OF INDIA



ICAO APAC SBAS-GBAS IMPLEMENTATION WORKSHOP FOR AIRSPACE USERS

"Enhancing airport accessibility and safety on final approach with SBAS and GBAS"

14th to 16th October 2025
Bengaluru, India



Benefits of SBAS & GBAS for Airspace Users

Moosa T.F.,

Executive Director(ATM-ASM),
Airports Authority of India

Presentation Overview

01

SBAS Systems in the World

Operational & Planned SBAS Systems

02

Users of SBAS & GBAS

Aviation Users & Other Users

03

Benefits of SBAS (Aviation Users)

For Airlines Operators, Helicopter Operators,
Airport Operators & ANS Providers

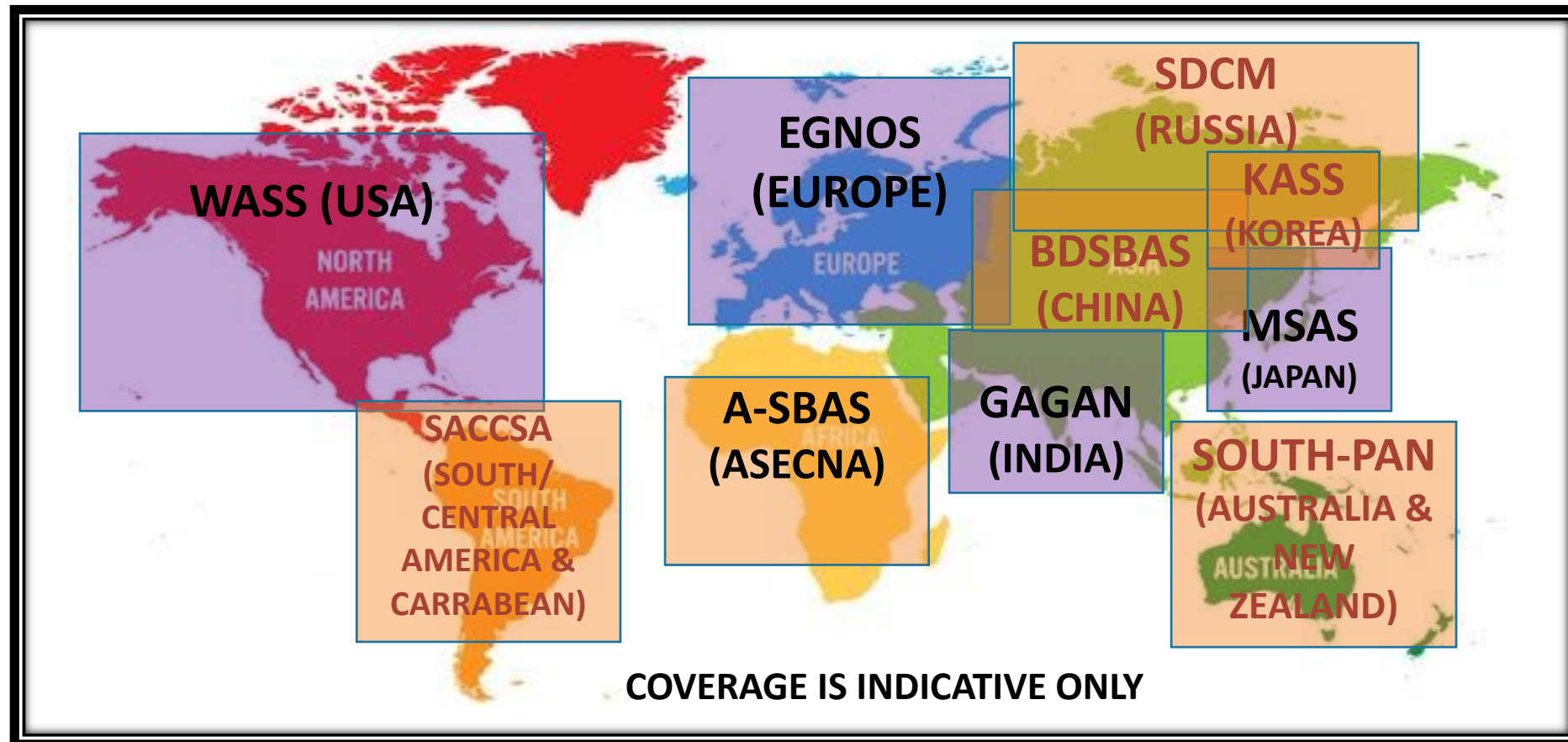
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Benefits of GBAS (Aviation Users)

For Airlines Operators, Helicopter Operators,
Airport Operators & ANS Providers

SBAS SYSTEMS OF THE WORLD

Operational SBAS  Planned SBAS 



USERS OF SBAS & GBAS

AVIATION USERS



AIRLINES
OPERATORS



HELICOPTER
OPERATORS



AIRPORT
OPERATORS



ANS
PROVIDERS

OTHER SECTOR USERS



MILITARY



MARITIME



SURVEYING



PRECISION
AGRICULTURE

BENEFITS OF SBAS (Aviation Users)



AIRLINES
OPERATORS

- Improved Flight Efficiency & Fuel Savings in Terminal and En-route Operations, Emission Reduction.
- Better than LNAV/VNAV (Temperature Dependent): Improved Safety
- LPV upto Precision Approach Cat-I without landing aid.
- Increased Accuracy & Integrity of Navigation.
- More resilient to GNSS RFI.



HELICOPTER
OPERATORS

- Utilize SBAS for point-in-space procedures (PinS), enhancing safety for helicopter landings and operations.

BENEFITS OF SBAS (Aviation Users)



AIRPORT
OPERATORS

- No Airport Ground Equipment/Landing Aid required.
- Economical for small and remote Airports.
- Reduces Delays and Diversion in Bad Wx.



ANS
PROVIDERS

- Wide coverage encompassing number of airports and Regions improving redundancy and potential cross border operation.
- Economic Benefits due to no requirement of Ground Equipment/Landing Aids.
- High Integrity & Safety due to real time integrity Monitoring, FDE, Threat modelling.
- Future resilience to Ionospheric, Multipath and RFI vulnerability by use of DFMC .

BENEFITS OF GBAS (Aviation Users)



AIRLINES
OPERATORS

- Improved Flight Efficiency & Fuel Savings in Terminal Operations, Emission Reduction.
- Precision App Cat I & III (GAST C & D) without landing aids.
- Consistent vertical Guidance: Reduces CFIT, Prevent Approach Path Distortion
- Increased Accuracy & Integrity of Navigation
- More flexibility in location of GBAS equipment's compared to ILS.
- More resilient to GNSS RFI.



HELICOPTER
OPERATORS

- No specific benefits for Helicopter operation due to local coverage only.

BENEFITS OF GBAS (Aviation Users)



AIRPORT
OPERATORS



ANS
PROVIDERS

- Single GBAS can serve multiple RWY ends.
- Minimal critical & sensitive areas compared to ILS.
- Less ground equipment

Capacity & Efficiency:

- Single GBAS serves Multiple RWY ends.
- Supports Multiple Approach Geometries (segmented, Curved, Offset), varying Glide Slopes.
- Supports Multiple simultaneous approaches, dynamic arrival/ departure procedure, advanced sequencing to maximize Terminal Area throughput.
- Reduced inspection/calibration, centralized maintenance w,r,t multiple ILS.



Thank You!