



Ministry of Land, Infrastructure, Transport and Tourism  
Civil Aviation Bureau of Japan



# MSAS Status and Future Plan

ICAO APAC GBAS/SBAS TF2  
September 2020

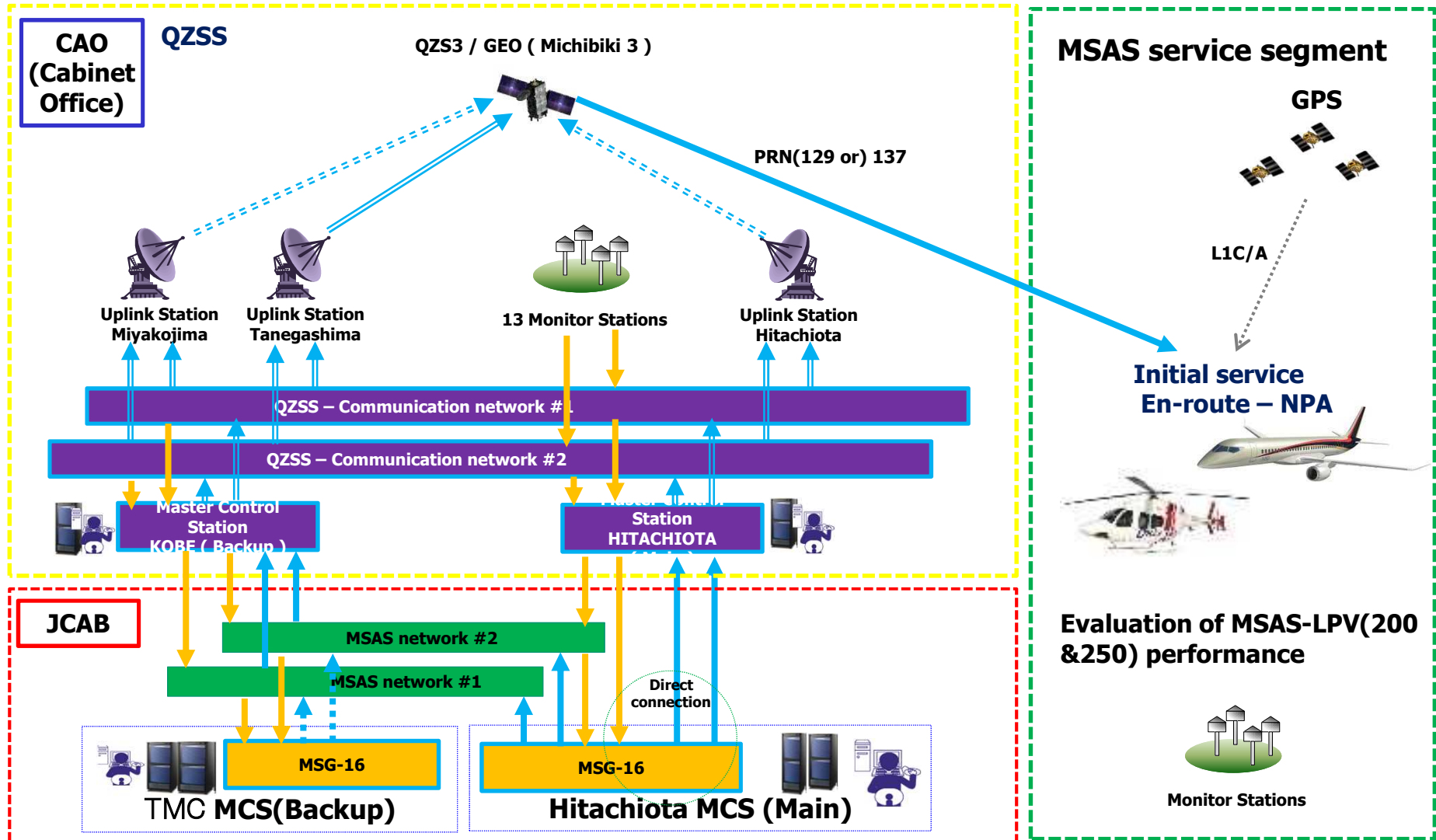
JCAB, MLIT



# Implementation Plan

- **MSAS V1: Initial Phase (Op:2007 ~ 2020.3)**
  - Current MSAS, Dual PRN Operation with MTSAT-2
- **MSAS V2: System Update Phase (Op:2020.4 ~) [Develop:~2020.3]**
  - Development phase from 2015 to 2020.3
  - Single PRN Operation with the QZS-3(GEO).
  - Continue to NPA service
  - Evaluation of MSAS-LPV (250 & 200) performance(2019~) **Current Operation Phase**
- **MSAS V3: LPV implementation Phase (Op:2023 ~) [Develop:2020.4~]**
  - LPV service provided with the QZS-3(GEO), QZS-6(GEO), and QZS-7(GEO).
  - Decision made with stakeholders at 2018.3.
  - JCAB has developed MSAS v3 from 2020.4. **Current Development Phase**
- **MSAS V4: DFMC Validation Phase (R&D:2017 ~)**
  - ENRI began DFMC SBAS experiment from 2017.8 with QZSS satellites.
  - In support of ICAO SARP's validation activity, the initial target performance is LPV 200

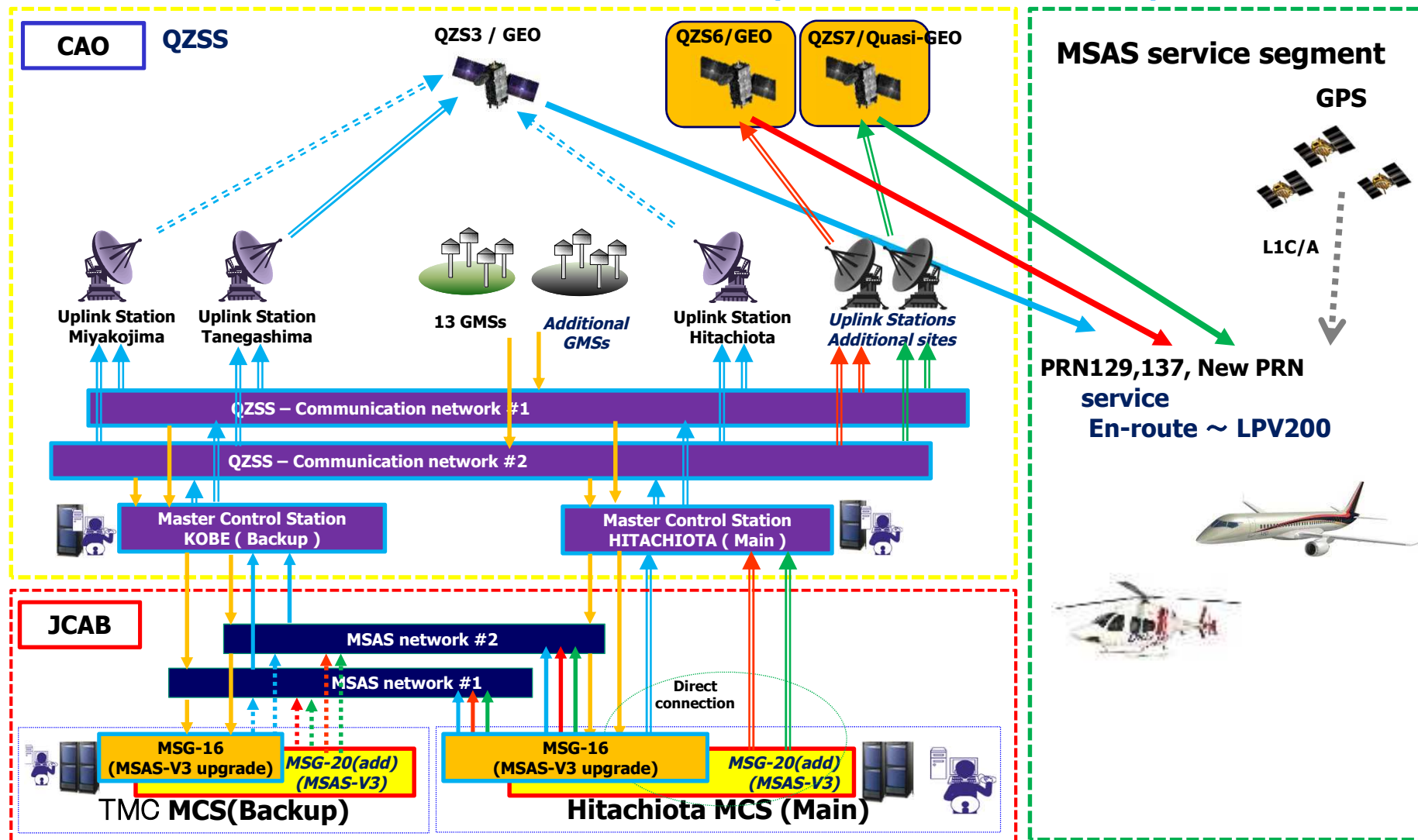
# MSAS V2 System Diagram with QZS-GEO (Op:2020.4 ~)





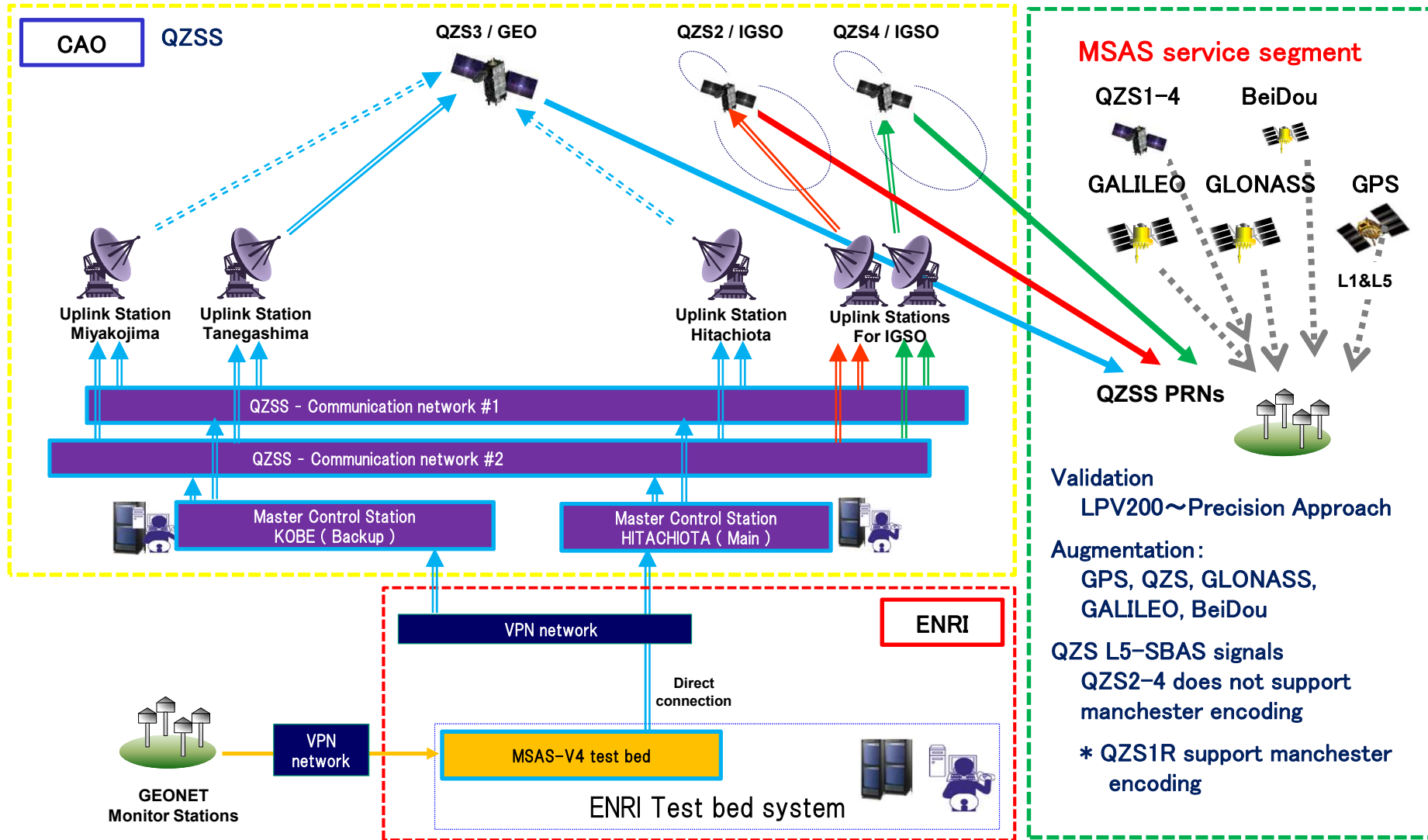
# MSAS V3 Configuration

**[Develop:2020.4~]** (Op:after 2023~)



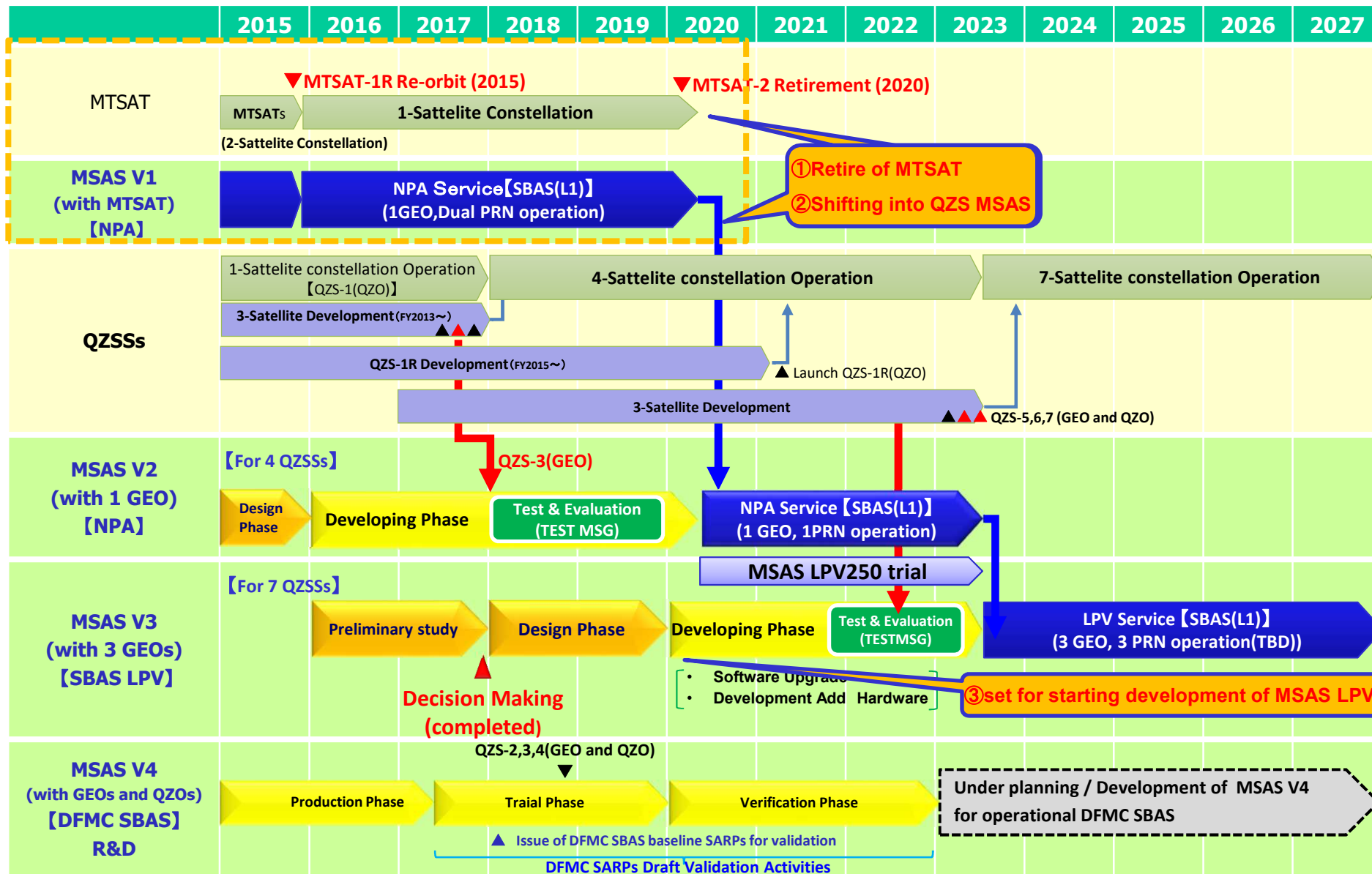
# MSAS V4 validation Configuration

## DFMC-MSAS proto-type(R&D 2017.8~)





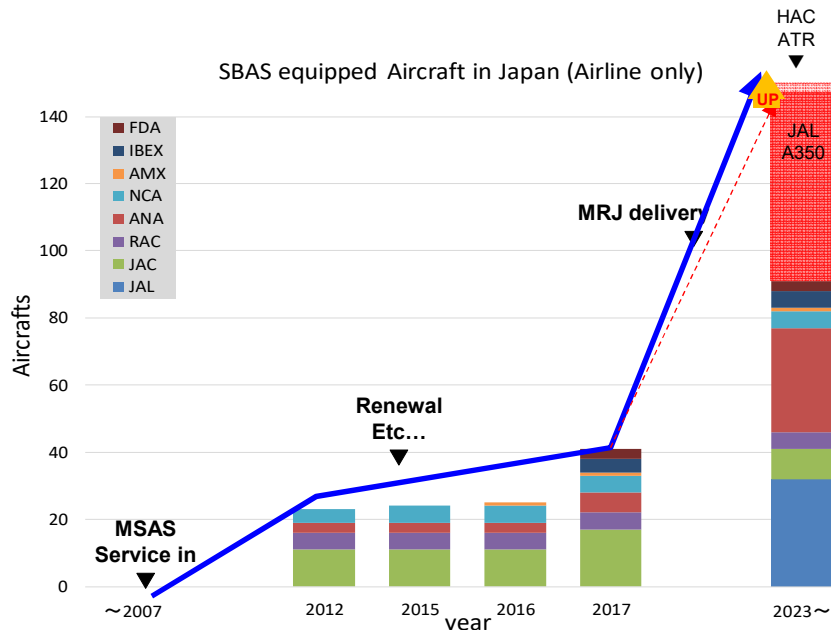
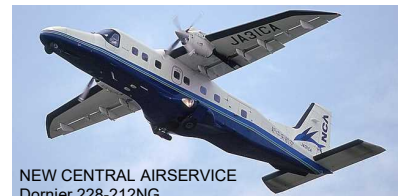
# Future Plan (Near-term schedule)





# MSAS users have been increasing

## Regional Air carrier



Now, They are interested in LPV

## Near Future (LPV Capable)

MRJ ANA:25, JAL:32



Hoping to install LPV

- A320(Peach)
- B777-9X (ANA)
- B737max8(ANA)

## Other users



Private Business Etc...





# Detail plan for implementation MSAS LPV

## Basic concept of MSAS LPV implementation

※ **Now planning**

### <MSAS LPV full-scale operation> 2023~

- At all airports designed IFR approach, excluding 2 military control airports, MSAS LPV is scheduled to commence to operate all at once. (total more than 80 airport)
- After full-scale operation of MSAS LPV, sequentially RNP to LPV will be designed.

### <MSAS LPV trial operation> 2020~

- Using MSAS v2 (one GEO), LPV 250 approach will be introduced step by step from 2020 for the purpose of LPV method evaluation on Airline.
- LPV 250 trial operation will be approved on the condition such as visual meteorological conditions (VMC).

Year		2019	2020	2021	2022	2023	2024	2025	
Development QZSS satellites				▲ Launch QZS#1-R		▲▲▲ Launch QZS#5-7			
MSAS	SBAS satellite	MTSAT-2	QZS #3				QZS #3,6,7		
	SBAS Service level	NPA Service (1 GEO)					LPV200Service (3 GEO)		
		MSAS LPV250 trial					RNP to LPV		



## “GIPTA” Program for enlightenment GNSS introduction in Southeast Asia region.

THE TWENTY-FIFTH ASEAN TRANSPORT MINISTERS MEETING (25<sup>th</sup> ATM)  
14 November 2019, HANOI, Viet Nam

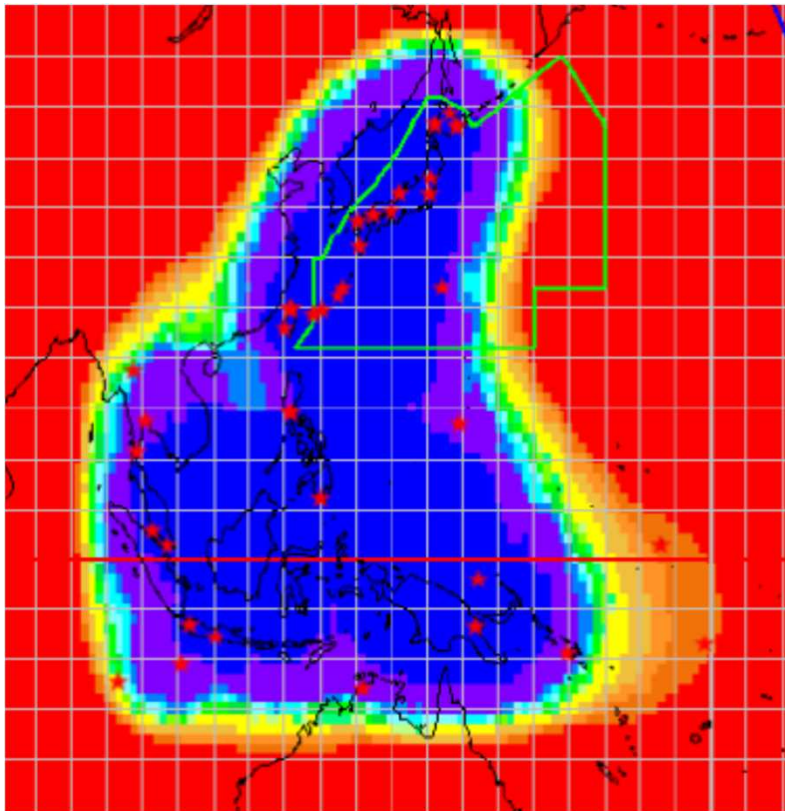
### JOINT MINISTERIAL STATEMENT

Transport cooperation with Dialogue Partners

13. The Ministers lauded the steady progress in the negotiations of ASEAN-Japan Air Services Agreement and looked forward to the speedy conclusion of a more liberal and mutually beneficial ASEAN-Japan Air Services Agreement. The Ministers acknowledged the progress of ASEAN-Japan cooperation through the implementation of the ASEAN-Japan Transport Partnership (AJTP), particularly the activities in the work plan for 2018–2019. The Ministers also welcomed new initiatives under AJTP, which include the Global Navigation Satellite System (GNSS) Implementation Plan Training in ASEAN (GIPTA), Proof of Concept (PoC) on ICT Solutions for Over-loaded Vehicle Control, Joint Research on Bridge Maintenance for ASEAN Cross-Border Corridors, Extension of Vessel Traffic Services (VTS) Operators Training, and Improving Accessibility to Public Transport for People with Disabilities and the Elderly.

# Simulation of MSAS-v3 area expansion

<LPV>



<LPV200 >

