



Quasi-Zenith Satellite System (QZSS) Program Overview

March 23-25, 2004

Munich Satellite Navigation Summit 2004

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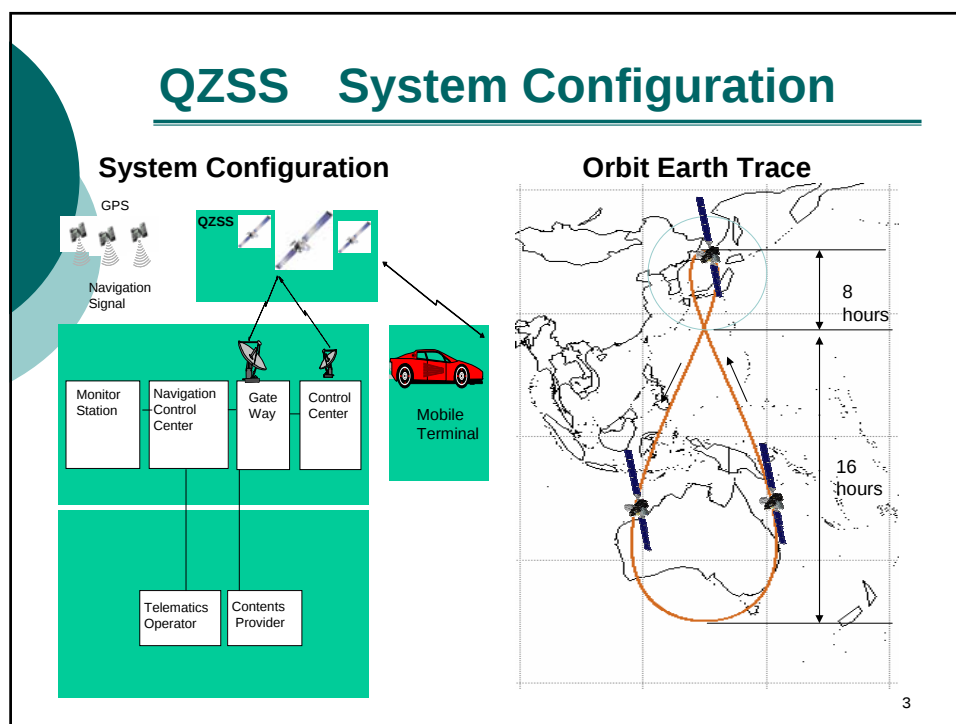
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QZSS Concept

- QZSS is an effective system to overcome the obstacle, to namely intercept of radio waves in many mountainous areas and urban areas and contribute to stable satellite mobile communications and navigation & positioning services.
- Utilization of Quasi-zenith orbit has been studied to provide the following services :
 - (1) GPS Complement : to broadcast positioning signal which is compatible and interoperable with GPS to enhance “accuracy” and “availability”.
 - (2) GPS Augment : to broadcast correction data (D-GPS).
 - (3) Broadcasting & Communication : to provide Broadcast & Communication services mainly toward to mobile users.

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History of the QZSS program (1/2)

- In June 2002: Joint Board was established by MEXT, MPHPT, METI, MLIT and private companies for jointly promoting the QZSS program.
- In November 2002: Private companies established Advanced Space Business Corporation (ASBC) to conduct feasibility study and planning for QZSS.
- The 4 Ministries (MEXT, MPHPT, METI and MLIT) requested the budget for QZSS program for FY 2003 and approved. (Total 5.8B Yen)

MEXT: Ministry of Education, Culture, Sports, Science and Technology
 MPHPT: Ministry of Public Management, Home Affairs, Posts and Telecommunications
 METI: Ministry of Economy, Trade and Industry
 MLIT : Ministry of Land, Infrastructure and Transport

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History of the QZSS program (2/2)

- In October 2003 : CSTP established "Positioning Service Study Panel" under Space Development and Utilization Panel
- In December 2003: The 4 ministries requested the budget for FY 2004 and approved as government budget plan. (Total 8.5B Yen)
- In February 2004: CSTP established Coordination Panel of Satellite Positioning related Government Agencies to coordinate responsible authority for positioning service.

CSTP: Council for Science and Technology Policy

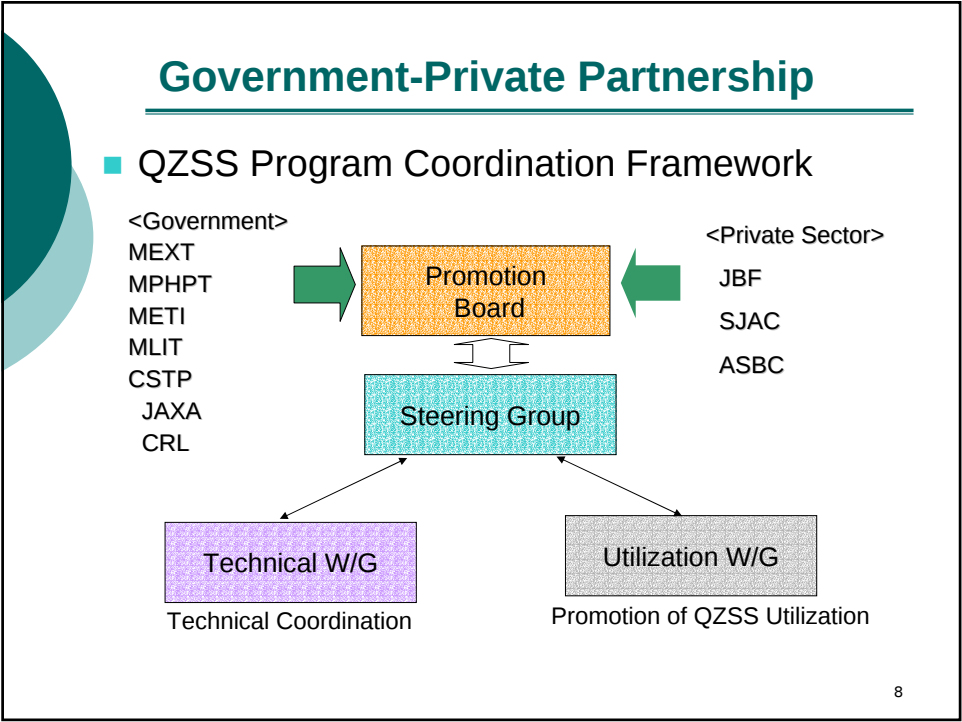
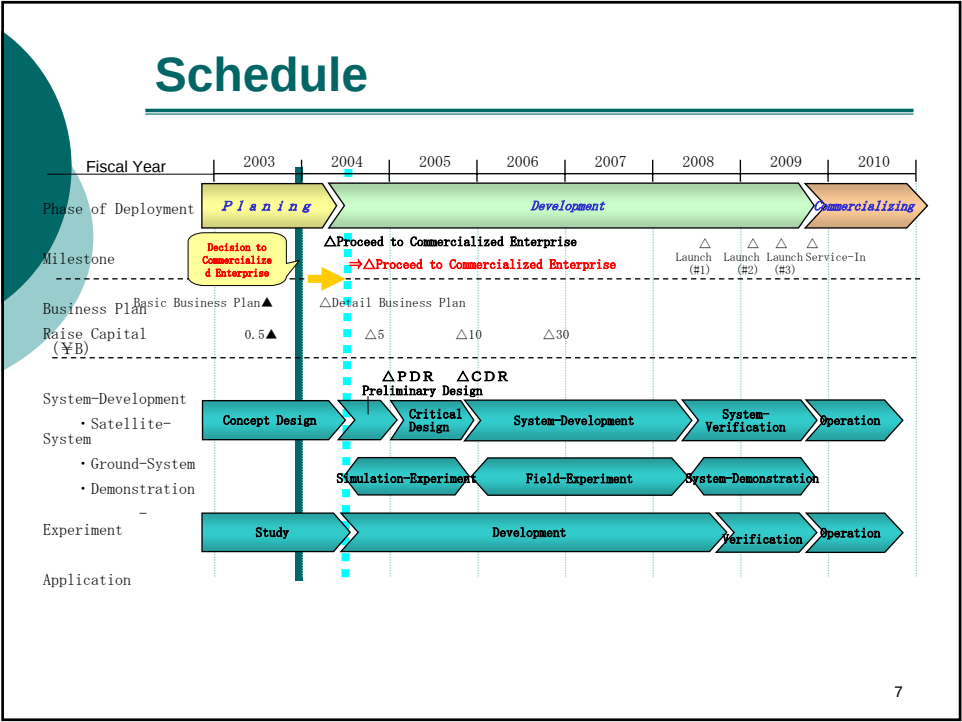
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Current base line of QZSS

- QZSS consists of three satellites on orbit with one ground spare and ground facilities.
- First satellite launch is scheduled to be in FY 2008 and second and third in FY2009.
- Conceptual Study Phase (Phase A) in FY2003.
- Definition Phase (Phase B) in FY2004.
- Design Phase (Phase C) in FY2005.

Note: ASBC will decide to enter into operation in December 2004.

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Task Share between Government and Private Sector

- Government is responsible for mainly GPS complement related technology development and its on-orbit demonstration utilizing QZSS flight opportunity.
- Responsible Authority of GPS Complement service at operation phase is under discussion at CSTP.
- ASBC is responsible for building Broadcasting & Communication System by own fund and creating a business model to make profits from Broadcasting & Communication Services.

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Task Sharing of Satellite Positioning System

	R&D	Utilization ○Establishing Facilities ○Operation
GPS Complement Service	Government's responsibility	Roll of government will be discussed in future
GPS Augmentation Service	Private Sector's responsibility Government takes in charge of high risk R&D	Private Sector's responsibility Except systems operated and planned by government

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R&D by Government

- MEXT(JAXA): Development of GPS Complement service technologies and integration of experimental system.
- MPHPT(CRL): Development of Hydrogen-Maser atomic clock and timing control technologies.
- METI(NEDO, AIST): Development of future bus technologies and timing control technologies.
- MLIT(ENRI, NILIM, GSI): GPS Augmentation technologies.

Note : Responsible Authority for GPS Complement services is under discussion at CSTP.

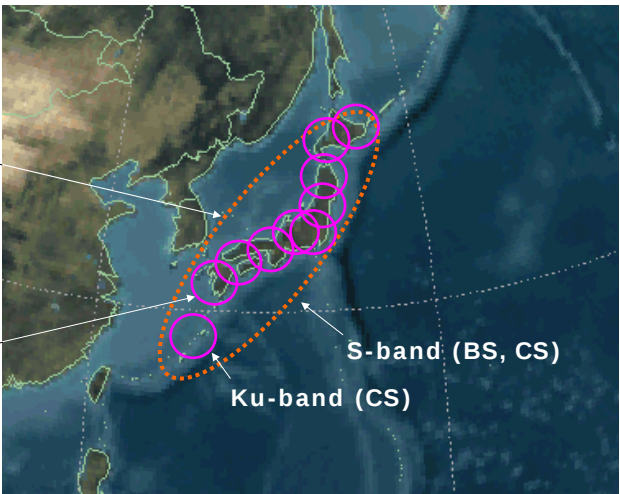
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Broadcasting & Communication Service Area of QZSS by Private Sector (Preliminary)

Example of service area (S-/Ku-band)

S-band: Large size reflector with multiple feeders to minimize spill-over effect.

Ku-band: Number and cell size of beams will be modified based on the demands.



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QZSS satellite positioning services

- To transmit GPS L1, L2 and L5 signal from QZSS. (GPS Complement)
- Broadcasting correction data. (GPS Augment)
- The system consists of Space segment on QZS and Ground facilities.
- Space segment consists of GPS complement equipments and experimental equipments.
- Ground facilities include Master Control Station and Monitor Stations deployed Asia Oceania area.
- Necessarily technologies will be developed in the QZSS program by JAXA and related research institutes.

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CSTP Panel Discussion Items

Following items are discussed in the Space Development and Utilization Panel of CSTP.

- **National Security and Crisis Management**
Satellite positioning system is essential for national security and crisis management. It should be used by government administrations taking in charge of national security.
- **Autonomy**
Autonomy satellite positioning system should be established to keep positioning service in the case of GPS performance degradation due to unforeseen anomaly or failure step by step from the current constellation. This system shall have compatibility and interoperability with GPS.
- **Strategy for Asia and Oceania**
To establish satellite positioning system as considering East Asian and Oceanic countries' utilization.
- **Satellite Positioning System as Fundamental Social Services**
Satellite positioning service is deemed as one of important fundamental social services. GPS Complement can provide essential positioning service and activate various applications by GPS Argument service.

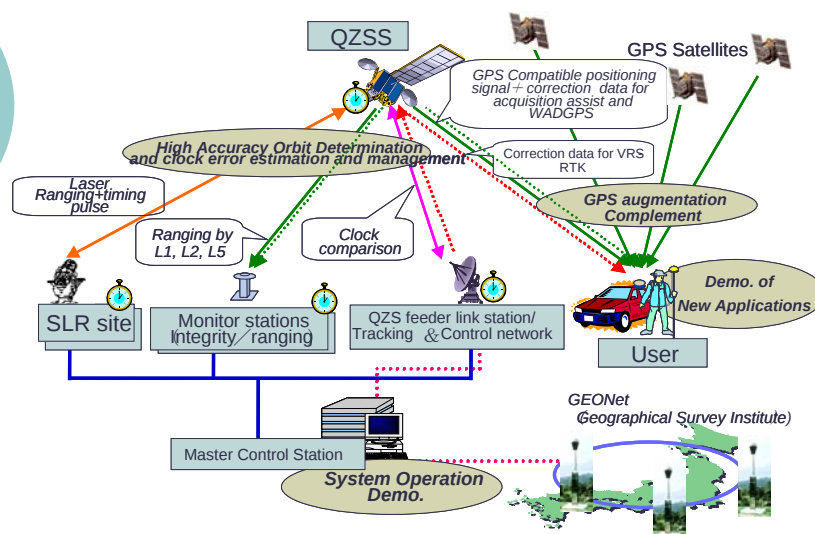
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Summary of report

- Autonomy Satellite positioning system, which has not only compatibility and interoperability with GPS but also ability to operate independently, should be established step-by-step.
- GPS Complement system should be developed by Government.
 - GPS Complement system is effective for national security and crisis management.
 - GPS Complement system improves quality of life by improving availability and accuracy.
- Autonomy satellite positioning system, which provides service for East Asia and Oceania, should be established in future.

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Experimental System for Satellite Positioning by Government



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