

# SPAC Application Demonstration of QZSS

- **GNSS Augmentation Services using Michibiki, QZS\*-1**

**\*Quasi-zenithal Satellite, Japanese navigation Satellite**

- **Application Demonstration**

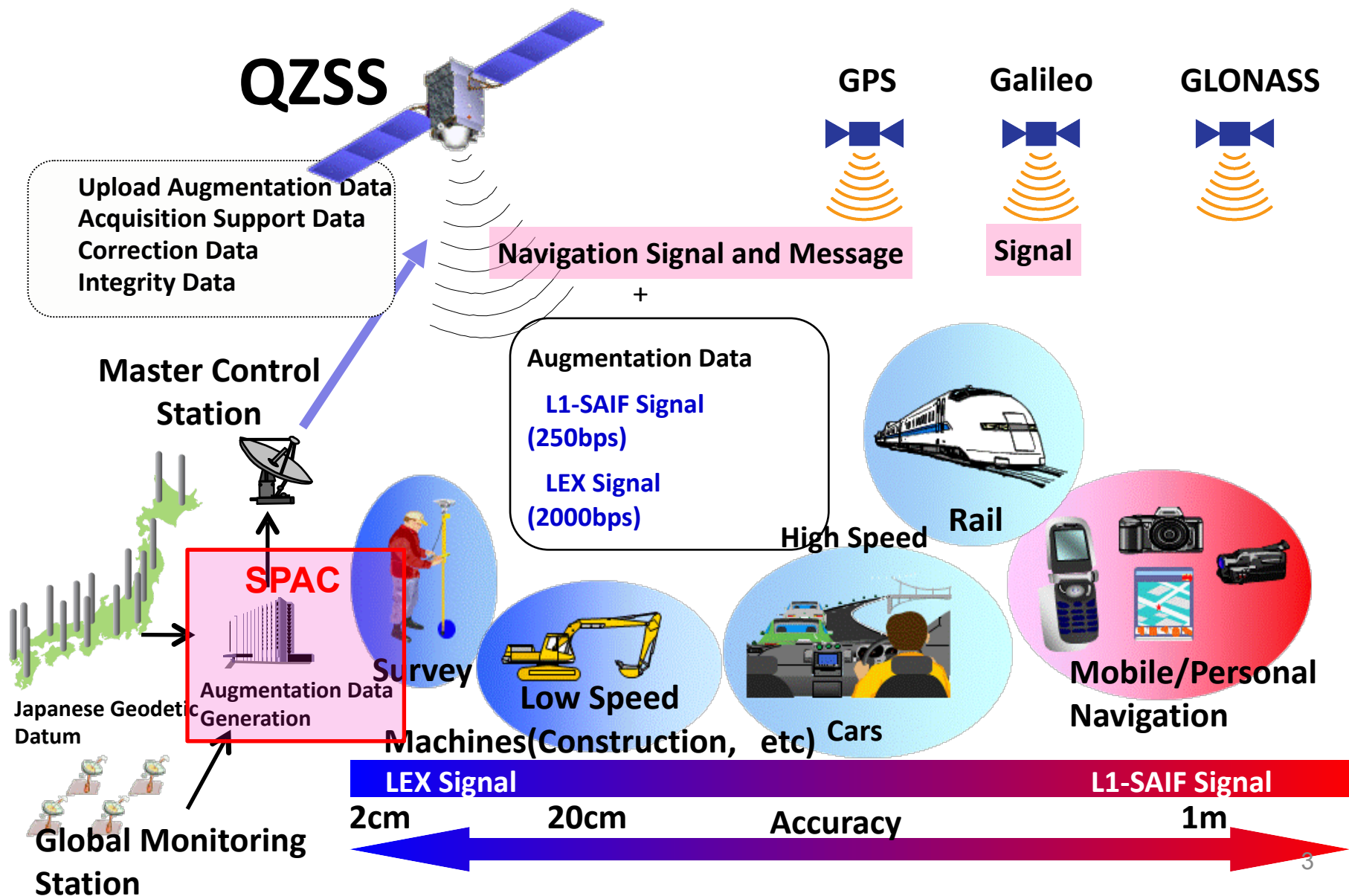
***Satellite Positioning Research  
and Application Center***

**8th June 2017**

# Introduction

- *SPAC has been investigating application of QZSS with our industrial partners, focusing **1)sub-meter class augmentation service with shot messaging function for Mass Market and 2)centimeter class for Professional Market.***
- *Both augmentation services and user terminals have been developed and provided for **user demonstrations using the first QZS, “MICHIBIKI” since 2011.***
- *More than 140 demonstrations are on going and results are being reflected to the services which start from 2018.*

# 1. Augmentation Services using L1-SAIF and LEX signals





## Authentication, Robotics

# Mapping

# Railway · Bus

## IT aided construction & Agriculture

# Machine guidance for construction, agriculture, snowplow

# Natural Disaster Prevention

## Monitoring of Ground Displacement /Land Slide, Rescue Support

# Car Navigation

Navigation, Driving support,  
route optimization, etc. Lane  
recognition

# Land Survey

Stationary/running survey,  
Investigation of mountain forest,  
Cadastral, Registration and Civil  
Engineering.

## Basic Study

## Basic Performance Verification of Positioning Augmentation Data

## Personal Navigation

# Navigation for People in Mountain area, for Disabled People, for sightseeing tourist

144 Plans  
337 Organizations

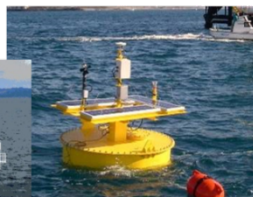


# 2.Application Demonstration

Sea route experiment  
航路実験



Positioning GPS Buoy  
GPSブイへの適用検討



Driving experiment in case of  
an earthquake disaster  
震災時の走行軌跡実験



Air route experiment  
空路実験



Bulldozer Blade Control System  
ブレード自動制御



Combine Automatic Run  
コンバイン自動稲刈り



Overnight Operation 夜間稲転作業



Automated System Operation 無人運転



Navigation for Stamp Rally  
スタンプラリーナビ



Location Guidance System for  
visually-impaired person  
視覚障害者へのガイダンスナビ



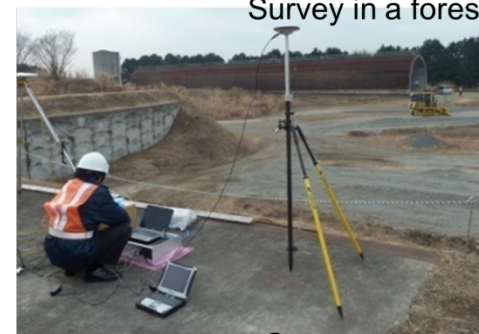
Senso-ji Navi experiment  
浅草寺ナビ実験風景



Action support Application Urgent information reception→Refuge place display



Survey in a forest



Survey



# 3. Special Topic

## Tanegashima Demonstration

Please visit to see the video report @[https://www.youtube.com/watch?v=fq\\_hOFpuio0](https://www.youtube.com/watch?v=fq_hOFpuio0)

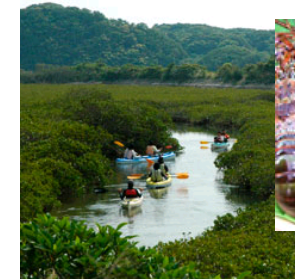
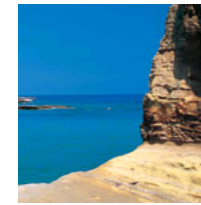


JAXA Tanegashima Space Center



©2012-2013 MAGES./5pb./Nitroplus

### Tourism



### For What?

- QZSS Receiver Evaluation
- Revitalization by Tourism
- QZSS Awareness Improvement

### How?

- Smartphone Stamp Rally
- Game Pilgrimage
- Present Sight Seeing Spots
- QZSS/IMES

### Who are the target

- Young Generation with Strong Science Interests
- ROBOTICS;NOTES Fan
- Viral Diffusion Active People



### Smartphone



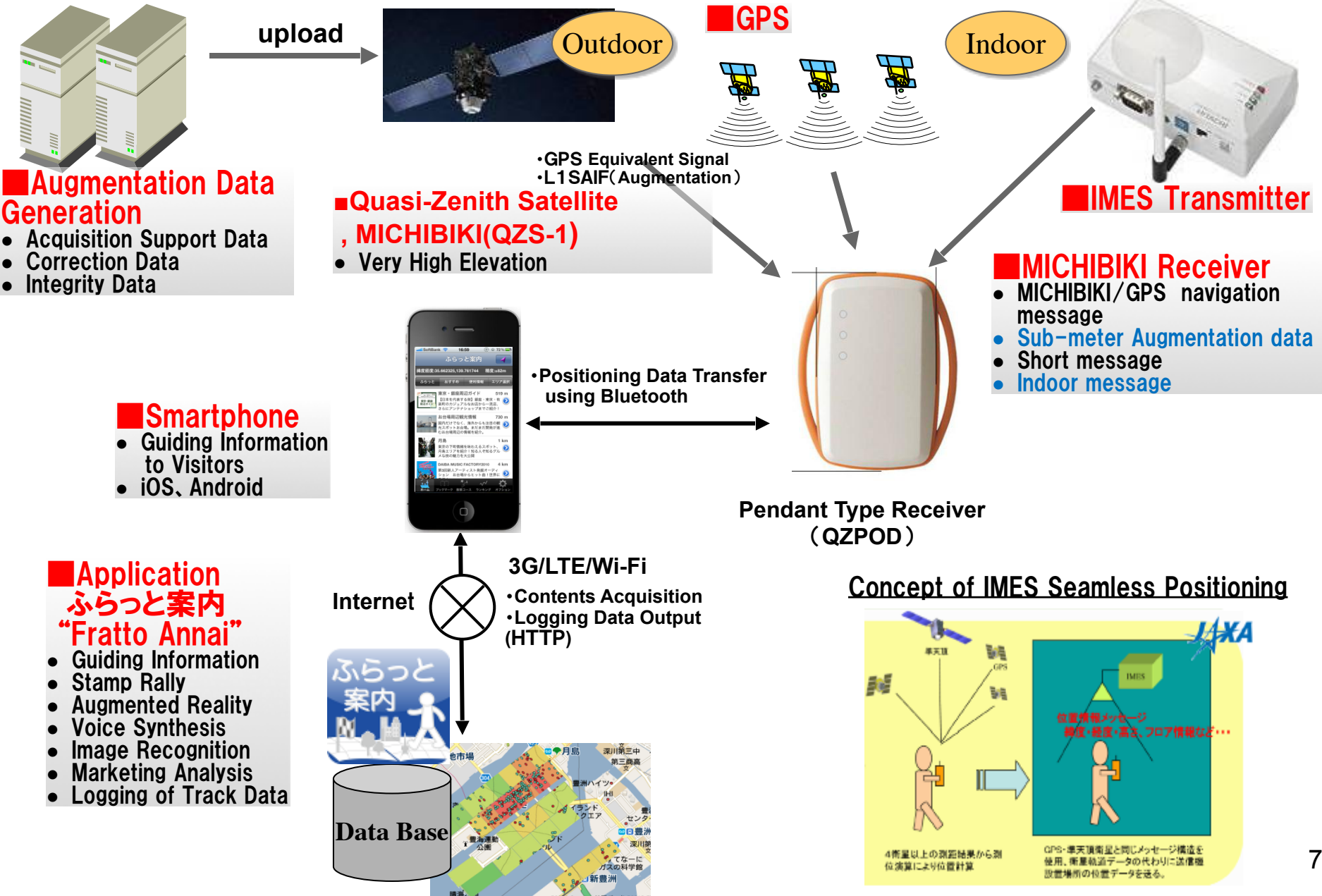
Game  
Worldview

Island Sight  
Seeing Tour

Visitor  
Attraction

Invite Demonstration Participants from Public by  
Attractive Contents

# Tanegashima Demo.(Indoor/Outdoor Seamless Positioning)



## Quick Response Activation by Satellite Short Message



- Distribution of Message  
“Where to Go, next in Stamp Rally”
- Selective Distribution  
to All Regions, or Specified Regions

**Behavior Analysis for Disaster Management**

- Success Rate of Signal Receiving, Response Activation



# Thank you .

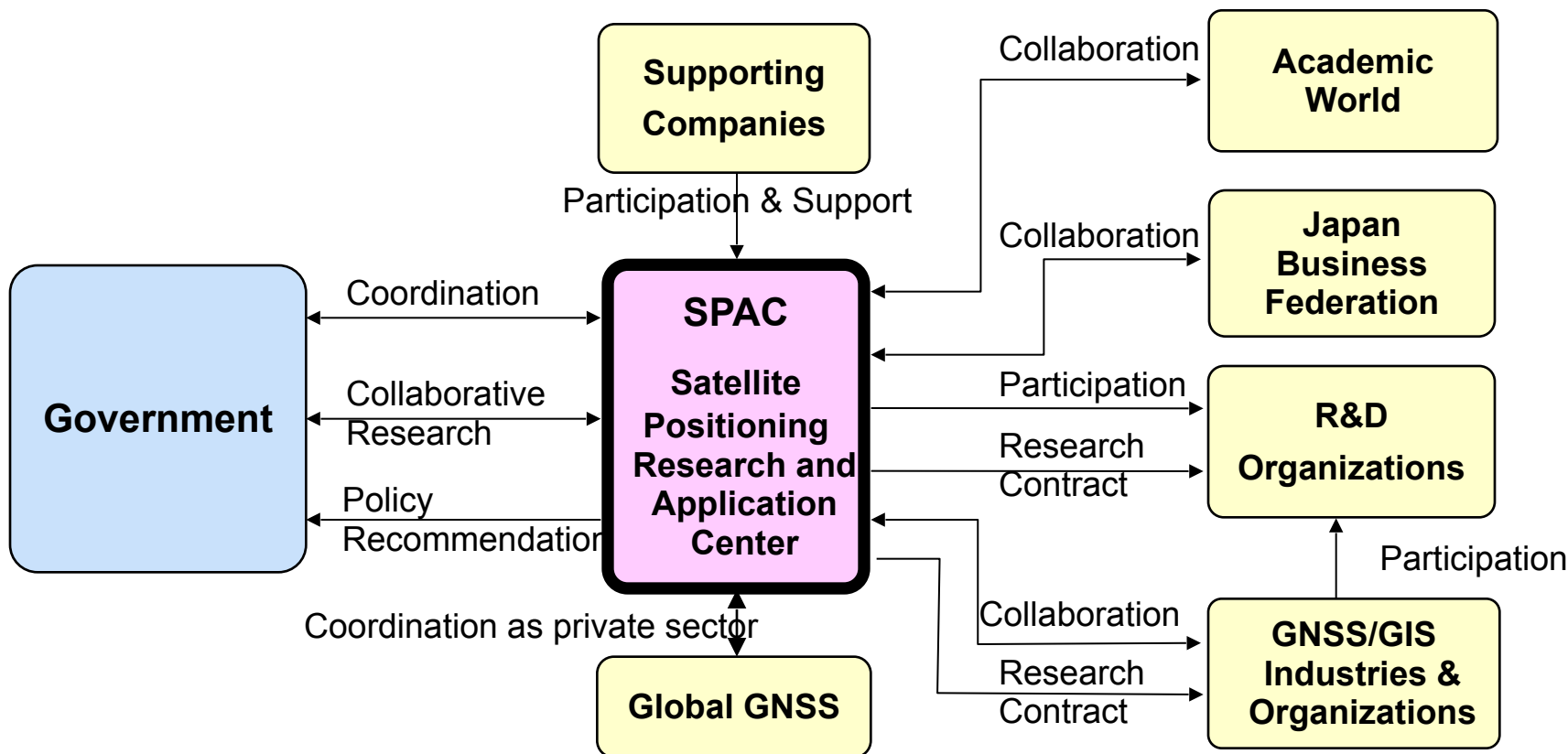
If you need further information, please make contact  
us.

Yasushi Sakurai

[Sakurai.yasushi@eiseisokui.or.jp](mailto:Sakurai.yasushi@eiseisokui.or.jp)

URL <http://www.eiseisokui.or.jp>

## Reference ; SPAC Organization



**Satellite Positioning Research and Application Center (SPAC)** was established in 5 February 2007 approved by the Ministers associated with QZSS research and development (MEXT, MIC, METI and MLIT) to promote navigation satellite technology application and consequential geo-spatial information utilization (<http://www.eiseisokui.or.jp/en/>)