BeiDou Demonstration Project in Korea
- Initial Results

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Congratulations!

- ✓ **Successful launch of the 16th Beidou satellite into space at 11:33 p.m. Beijing Time, October 25 2012**

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BEIDOU Demonstration Project in Korea

✓ Assessment of Beidou performance in Korea

- A typical international cooperation for promoting BEIDOU
- National GNSS Research Center

  In cooperation with Shanghai Jiao Tong University
- Supported by Beidou office(CSNO)

✓ Three applications

- Navigation using CDGPS (NGRC, KARI)
- Surveying/mapping (NGRC, KASI)
- Timing (NGRC, KRISS)

✓ Two-phase pilot project

- 1st phase: Basic assessment including feasibility study (2012)
- 2nd phase: Detail assessment (2013)

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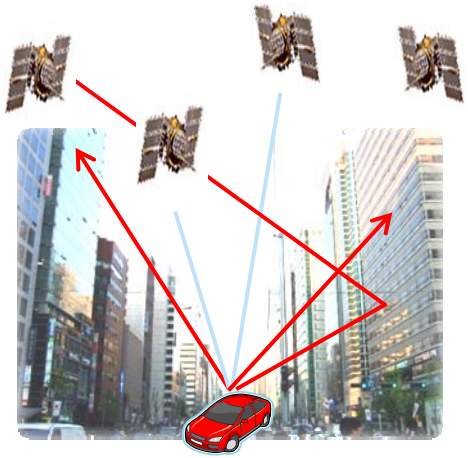
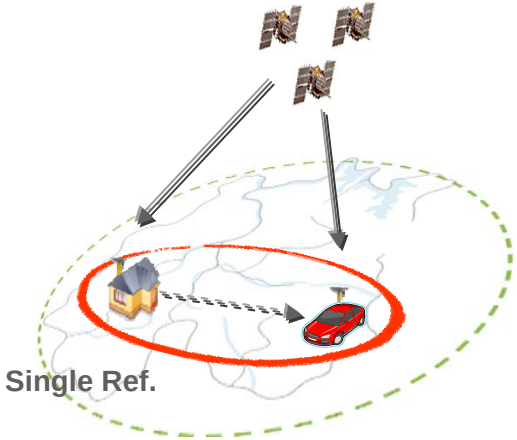
Performance Assessment of Beidou and/or GPS

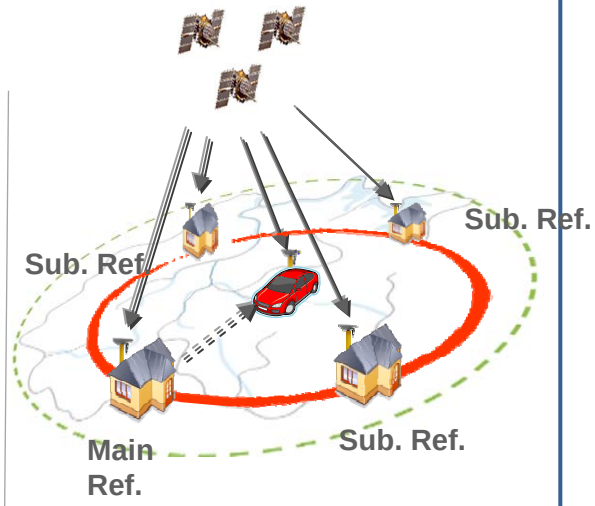
Performance Evaluation of Beidou in the 1st phase



Signal Acquisition and Performance Analysis in Urban Valley



CDGPS using single Beidou RS



CDGPS using Beidou RS Network

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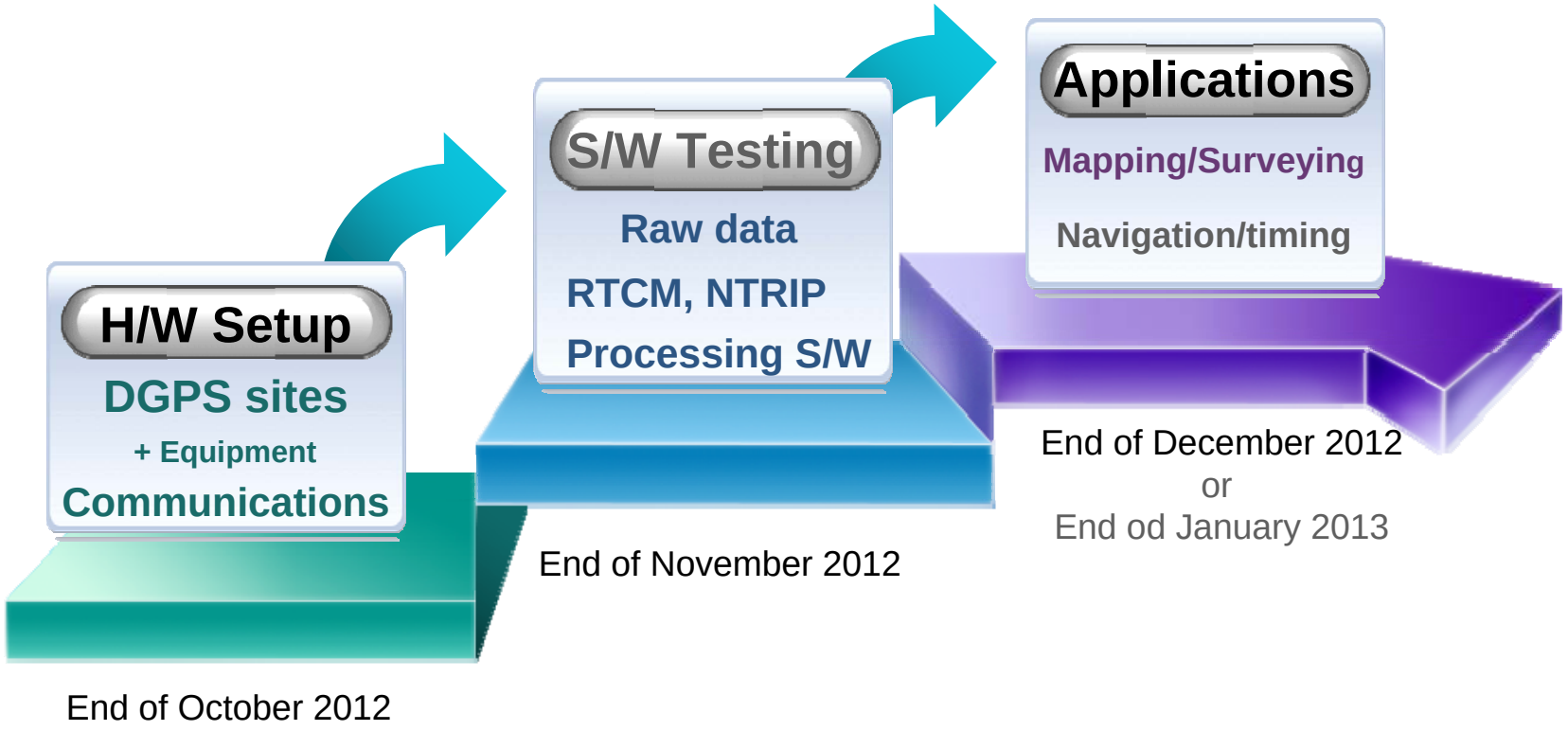
Plans for 1st Phase



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System Configuration

NDGPS Reference Stations (4)

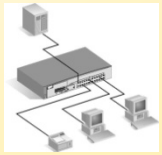
Hardware Configuration

Server (2 or 3)

- **Server for Beidou data archiving**
  - · For providing post-time 1Hz data to SJTU
- **Server for data processing**
  - · RTCM data to the NTRIP Caster
- **Web server**
  - · Data contribution to GNSS users via Web access
- **Server Cabinets (or Racks)**

Communication Equipment

- · **VPN**
- · **Router and Switch (>8 Port)**
- · **TCP/IP Access via Internet**



Accessories

- **UPS Rack Mount**
  - · to protect equipment

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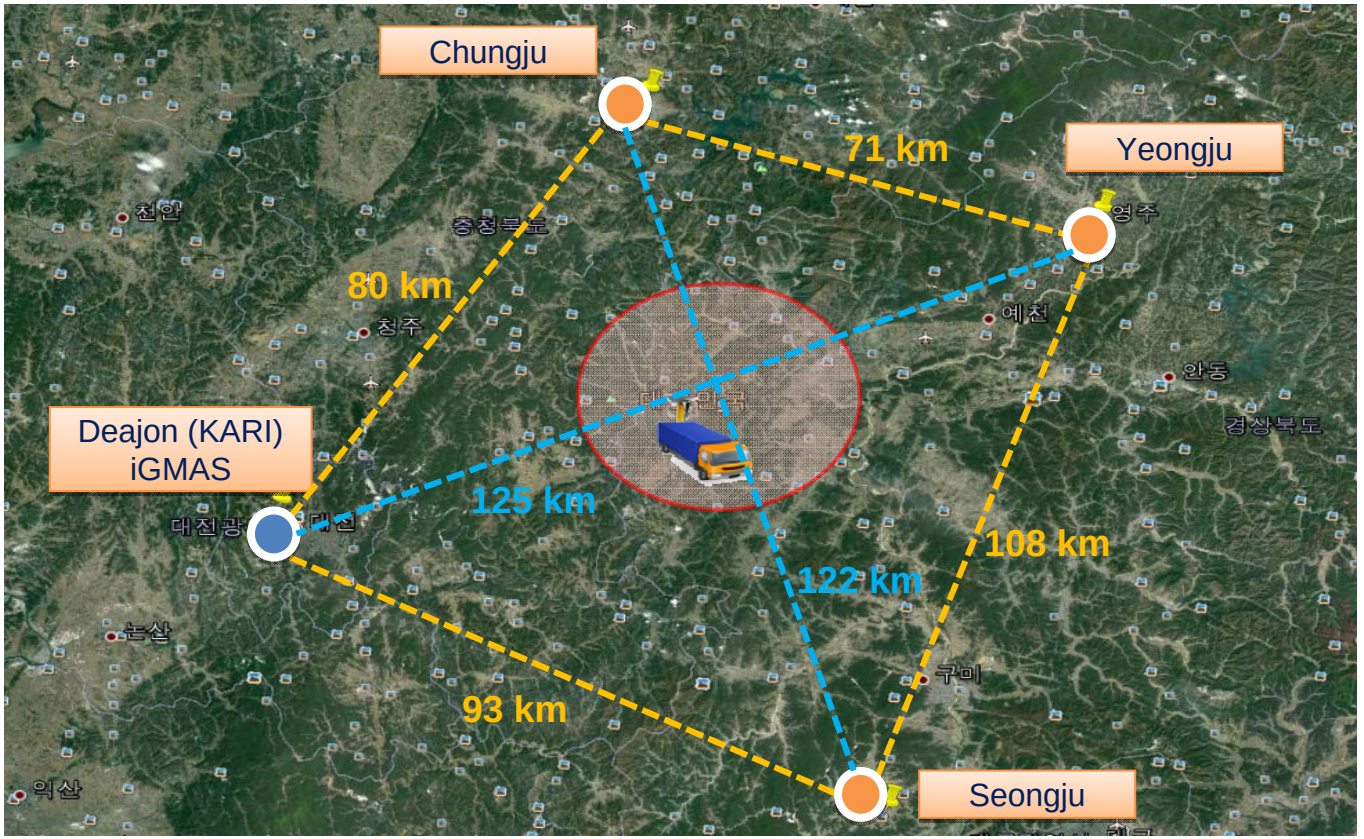
Planned RS Network for Field Test

- ✓ The Distance between the NDGPS Reference Stations is 71km~108km
- ✓ iGMAS site at KARI or KASI (Daejeon)



iGMAS : International GNSS Monitoring and Assessment Service

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Zero baseline Test

✓ Receivers delivered on 25th October, 2012

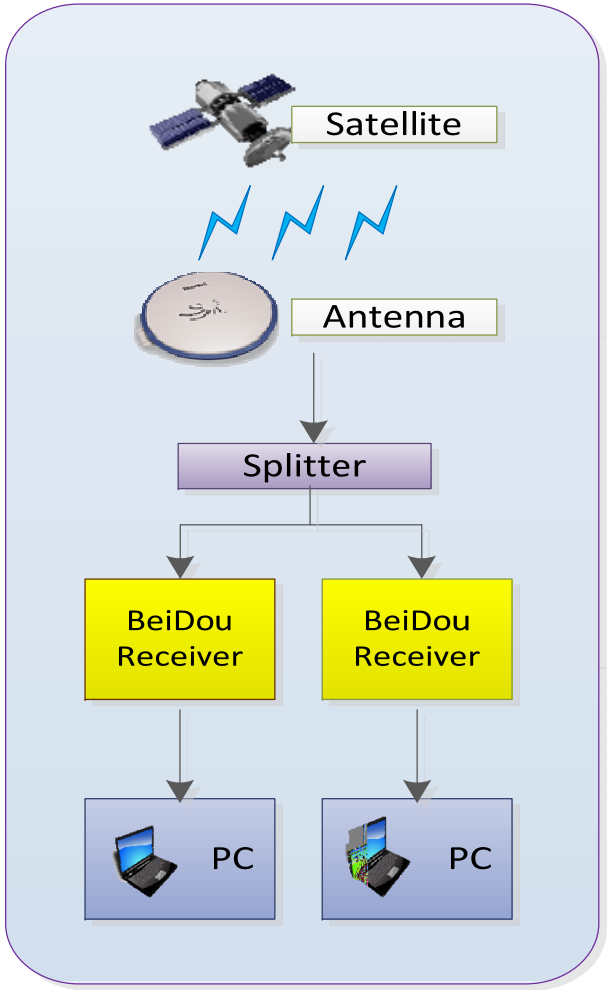
Receiver Spec.

BeiDou M300 GNSS

L1C/A, L1/L2P, B1/B2

Single Point Accuracy(RMS): <1.5m

Static Differential Accuracy :
(Horizontal) ±(2.5+1×10-6D)mm
(Vertical) ±(5+1×10-6D)mm



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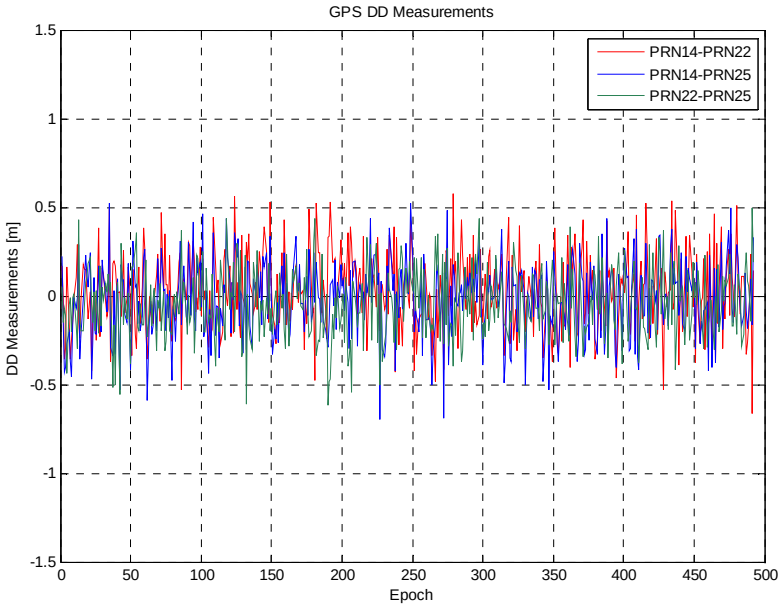
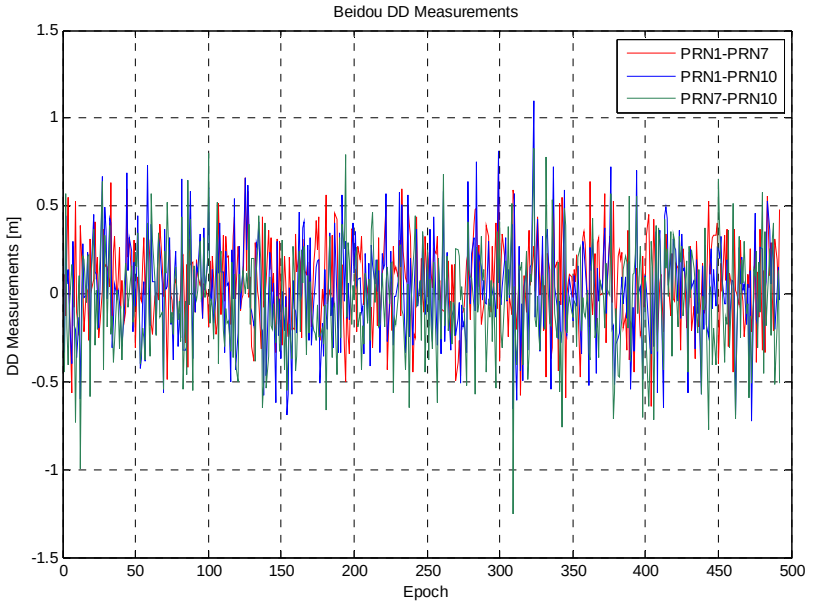
✓ Zero baseline test : DD code quality (L1, B1)

GPS Code Measurement



GPS	Mean [m]	Std. [m]
14-22	0.023	0.215
14-25	-0.018	0.210
22-25	-0.041	0.191

BeiDou Code Measurement



Beidou	Mean [m]	Std. [m]
1-7	0.064	0.245
1-10	0.029	0.287
7-10	-0.035	0.303

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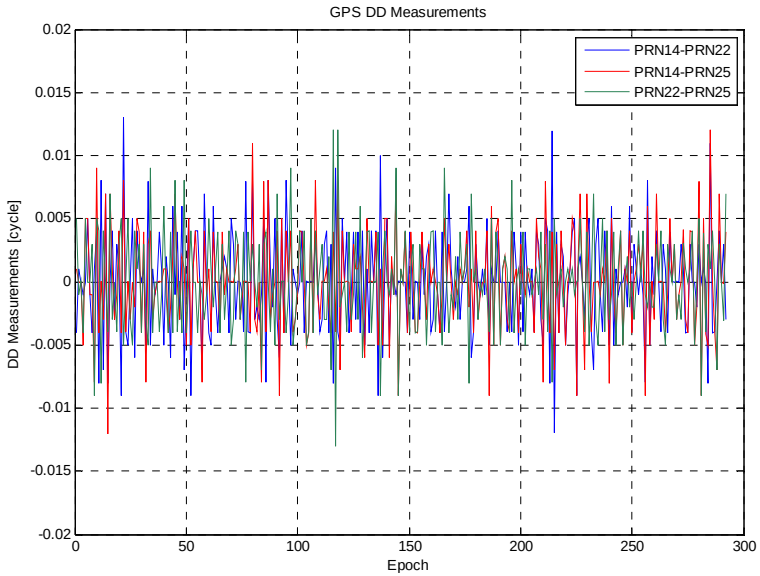
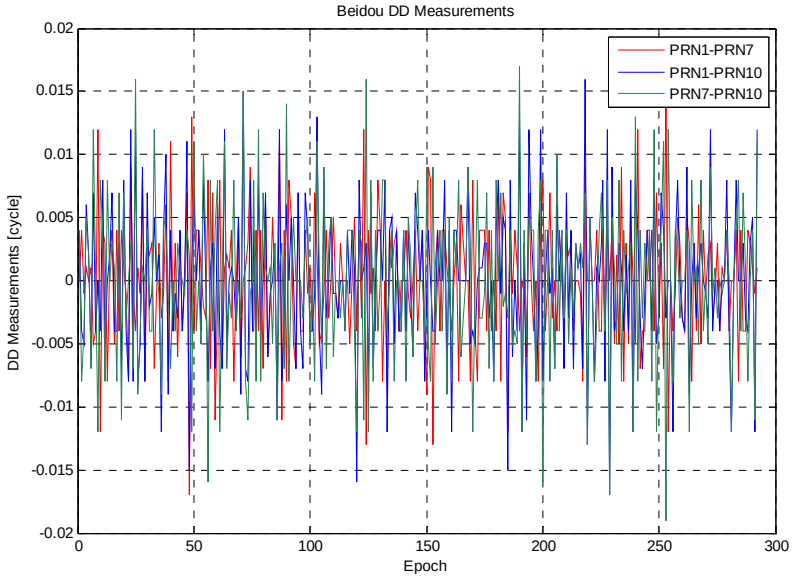
✓ Zero baseline test : DD CP quality (L1, B1)

GPS Carrier Measurement



GPS	Mean [m]	Std. [m]
14-22	0	0.004
14-25	0	0.004
22-25	0	0.004

BeiDou Carrier Measurement



Beidou	Mean [m]	Std. [m]
1-7	0	0.005
1-10	0	0.006
7-10	0	0.007

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Short Baseline Test (static)

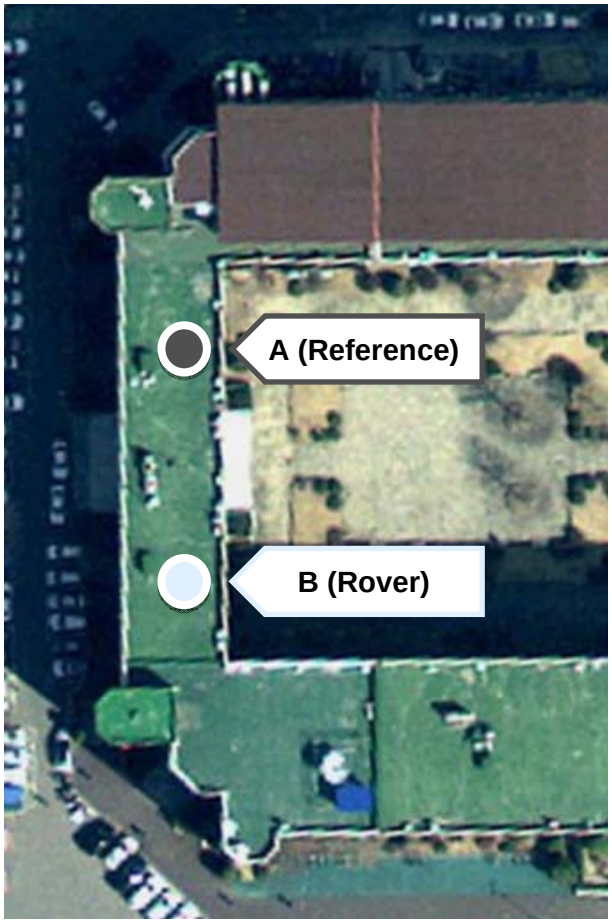
✓ On the roof of E2 building, CNU : about 50m baseline

Reference position (A)

- ECEF: (-3119372, 4087994, 3760895)
- LLH : Latitude : 36.3645
  Longitude : 127.3457
  Altitude : 93.7988

Rover position (B)

- ECEF: (-3119381, 4088014, 3760866)
- LLH : Latitude : 36.3642
  Longitude : 127.3456
  Altitude : 93.7988



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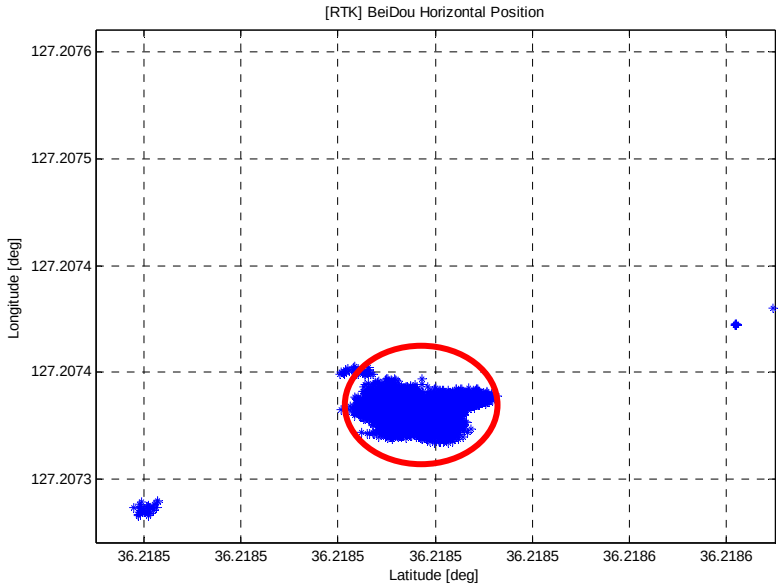
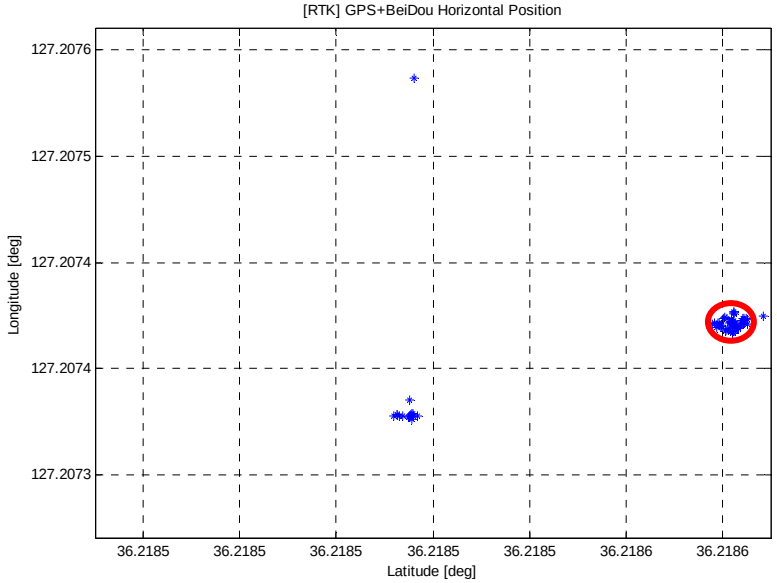
- ✓ Initial result of Short Baseline Test – dual frequency
- ✓ All the necessary information was not extracted from receivers

BeiDou Only



GPS + BeiDou



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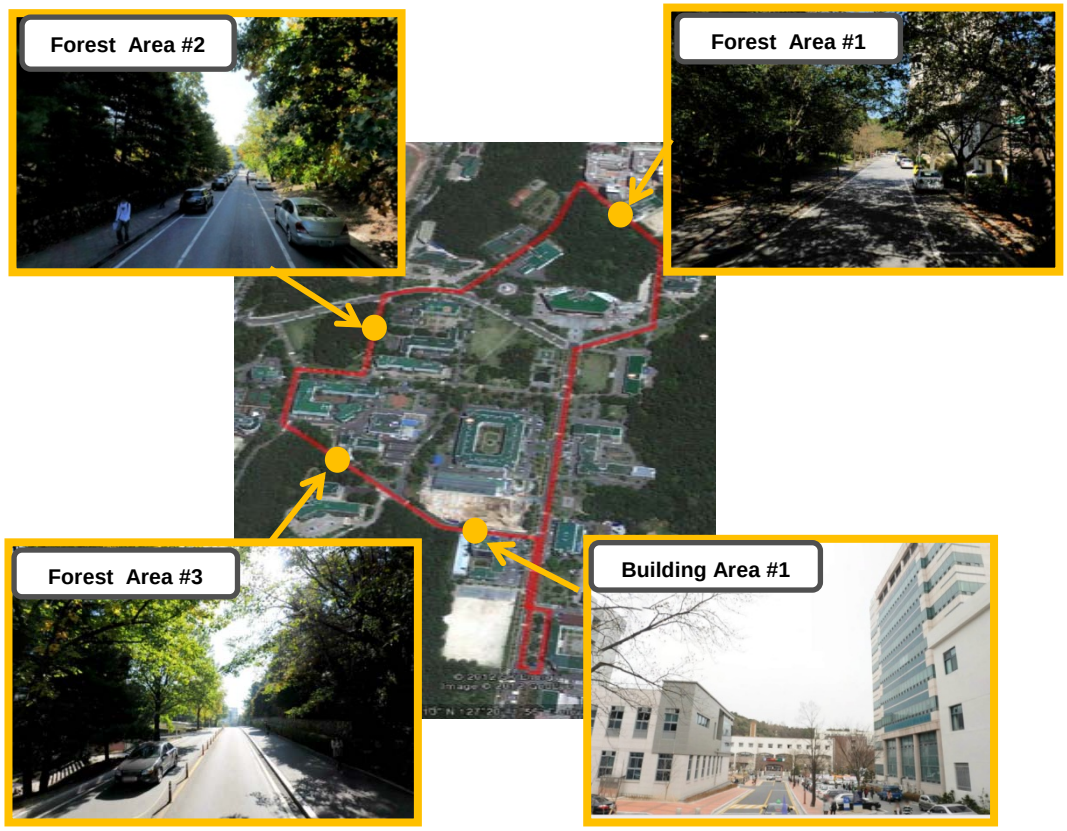
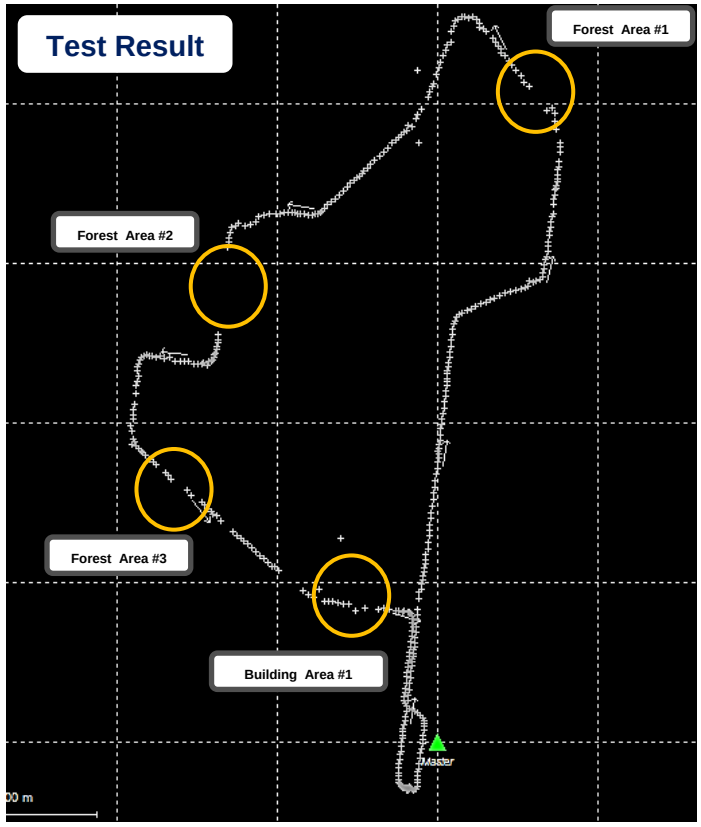
Dynamic Test (urban canyon)

✓ Reference trajectory using NovAtel Receiver at CNU campus





Receiver : Novatel Propak-v3, Post Process S/W : Waypoint

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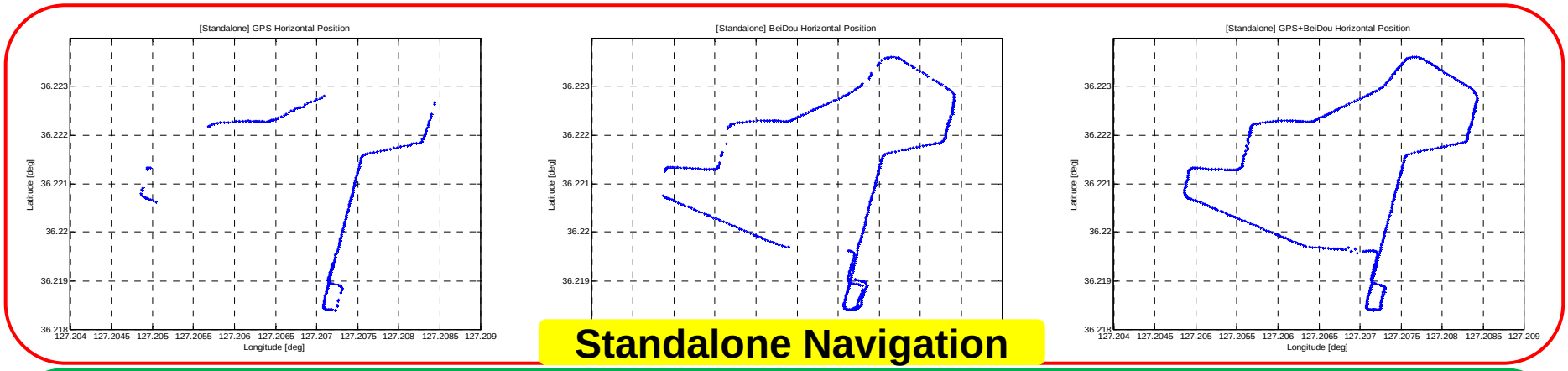
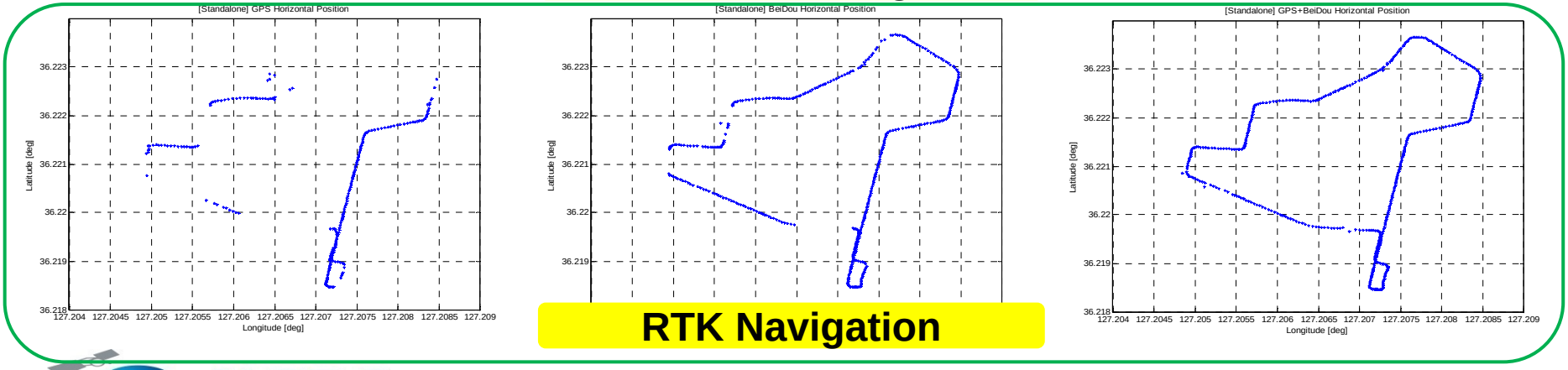
- ✓ Real time dynamic test using BeiDou Receiver – dual frequency
- ✓ The elevation angle of BeiDou SVs is higher

GPS Only	BeiDou Only	GPS + BeiDou





Concluding Remarks

- ✓ **Initial results of BeiDou demonstration in Korea**
  - Zero baseline test → signal quality of BeiDou & GPS
  - Static short baseline test → positioning performance of BeiDou & GPS
  - Dynamic test → navigation performance of BeiDou & GPS
- ✓ **Zero baseline test**
  - GPS signals looked like a little bit better than BeiDou signals but comparable
  - BeiDou is well operated
- ✓ **Static short baseline test, Dynamic test**
  - Complete analysis was not possible since all the necessary information was not available from receivers
  - Nevertheless, benefits of BeiDou is clearly seen as expected due to the increased number of SV, higher elevation angle
- ✓ **Phase 1 will be finished by December 2012**

Expect contributions of BEIDOU

to sustainable GNSS service

through international cooperation

Thank you for listening !