

# GBAS Ionospheric Research Project in Singapore

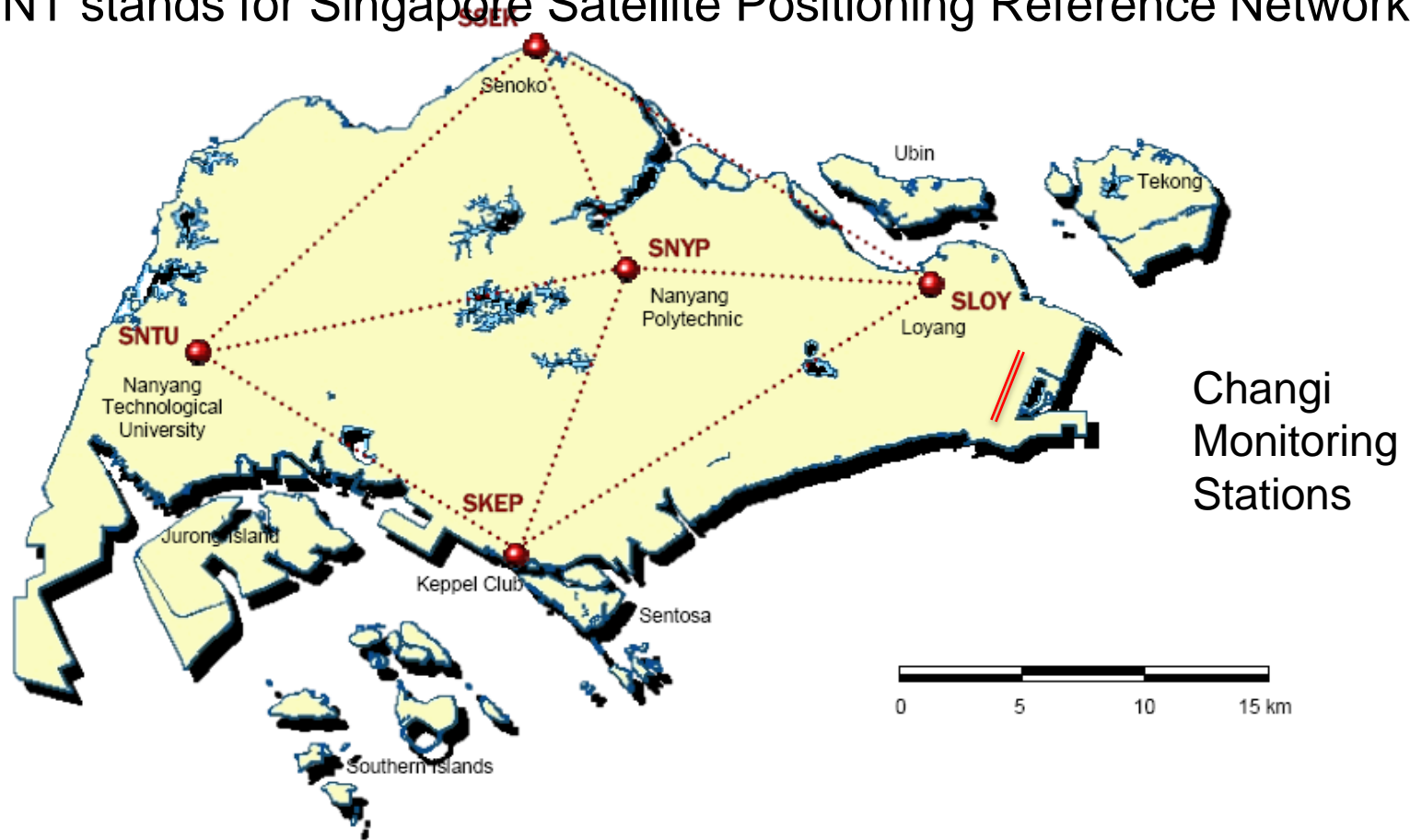
27-29 Feb 2012

# Outline

- Collaboration with Singapore Land Authority (SLA) - **MOU to be signed**
- Ionosphere monitoring stations to study ionospheric impact at Changi Airport – **Stations set-up are completed recently**
- Participation of ICAO Asia-Pac Ionospheric Data Collection And Analysis Working Group

# SiReNT DGPS Network

SiReNT stands for Singapore Satellite Positioning Reference Network



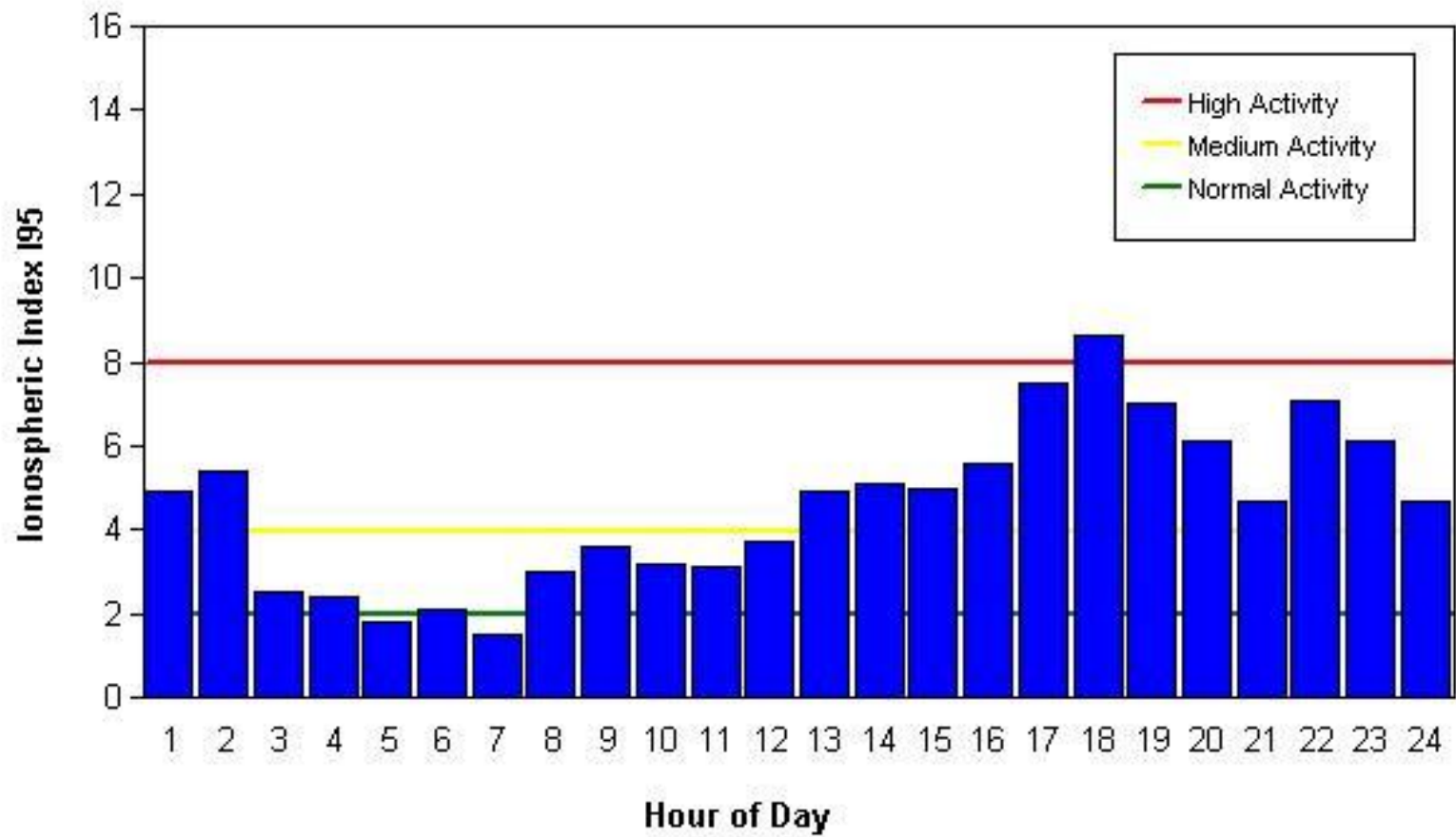
Courtesy to  
Singapore Land Authority (SLA)

# SiReNT RINEX2.11 Sample

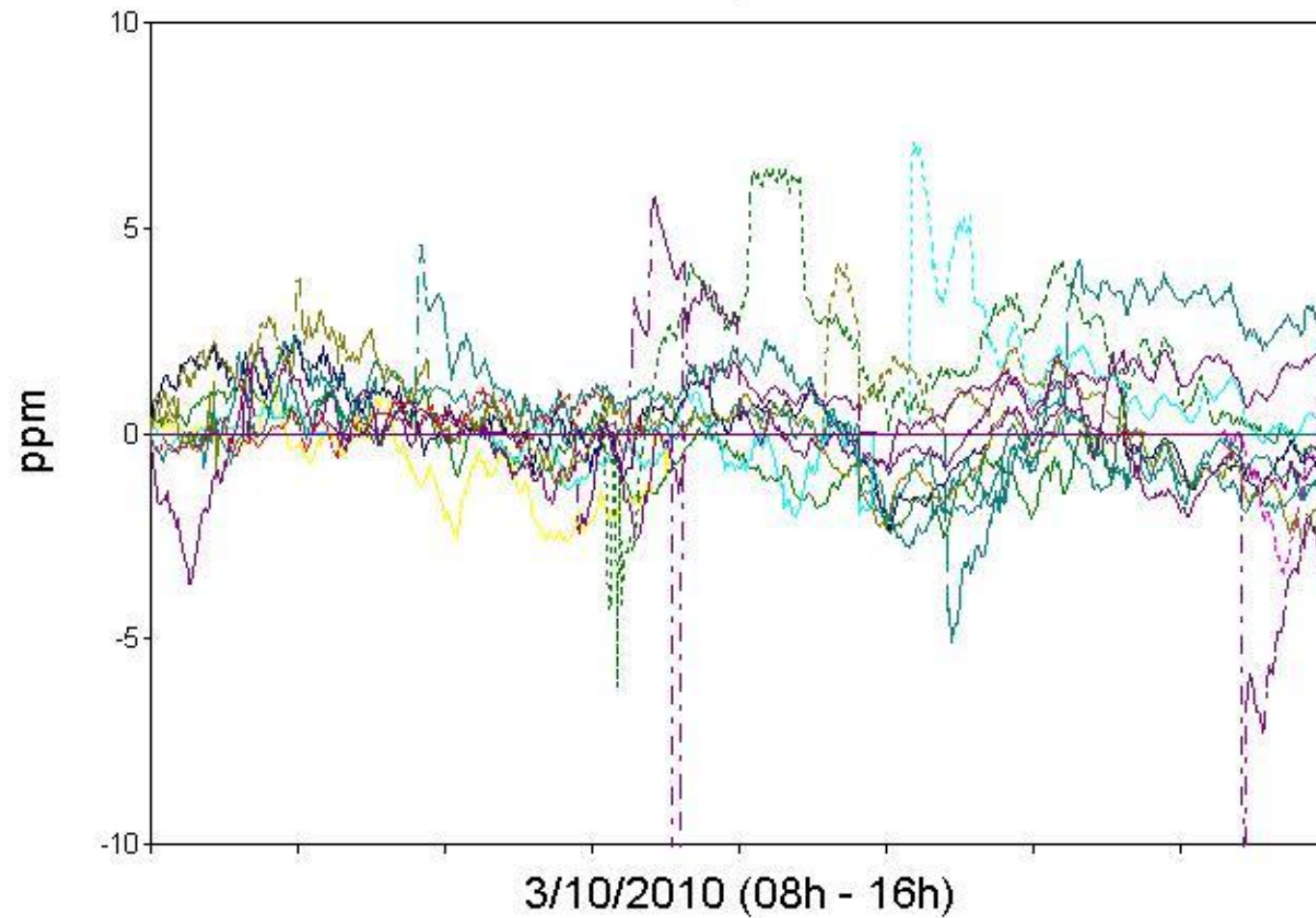
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                2.11      OBSERVATION DATA      SKEP217A.08o
GPSTime 2.50 2620  RINEX Merge      G (GPS)
SKEP                04-Aug-08 10:44:26
SKEP                RINEX VERSION / TYPE
SiReNT              SINGAPORE LAND AUTHORITY  PGM / RUN BY / DATE
4610206114          TRIMBLE NETRS      Nav  1.15  MARKER NAME
0                  OBSERVER / AGENCY
4736A38170          TRM29659.00        REC # / TYPE / VERS
-1521817.0581      6192367.9125      140106.7296  RCV CLOCK OFFS APPL
0.0000            0.0000            0.0000      ANT # / TYPE
1 1 0              APPROX POSITION XYZ
9 C1 P2 C2 L1 L2 S1 S2 D1 D2# / TYPES OF OBSERV
15.000            WAVELENGTH FACT L1/2
2008 8 4 0 0      0.0000000      GPS      TIME OF FIRST OBS
***** COMMENT
Singapore Satellite Positioning Reference Network (SiReNT) COMMENT
***** COMMENT
The APPROX POSITION XYZ coordinates are NOT APPROXIMATE COMMENT
APPROX POSITION XYZ replaced by precise WGS84 VALUE COMMENT
END OF HEADER
08 8 4 0 0 0.0000000 0 11G09G22G14G05G12G18G31G24G21G30G29
22464487.531 22464484.711 -9758506.58406 -7611059.50307
47.000 34.000 -3182.234 -2479.663
24023365.539 24023359.066 -5618631.88406 -3975464.64906
43.000 27.000 2106.172 1641.173
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44.000 29.000 -594.734 -463.429

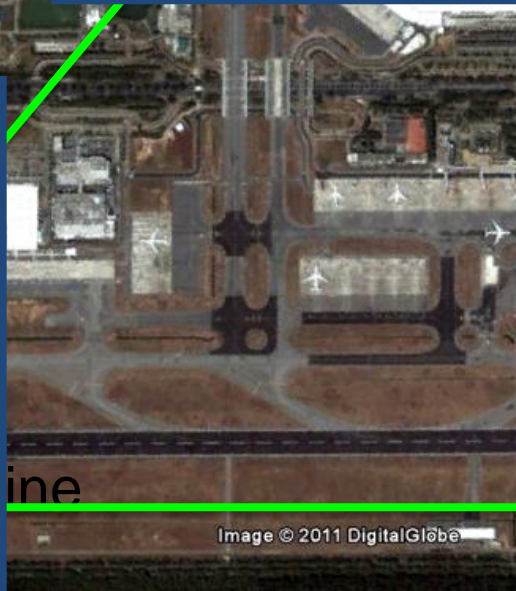
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## Differential Ionosphere East-West



# Location of CAAS' monitoring stations

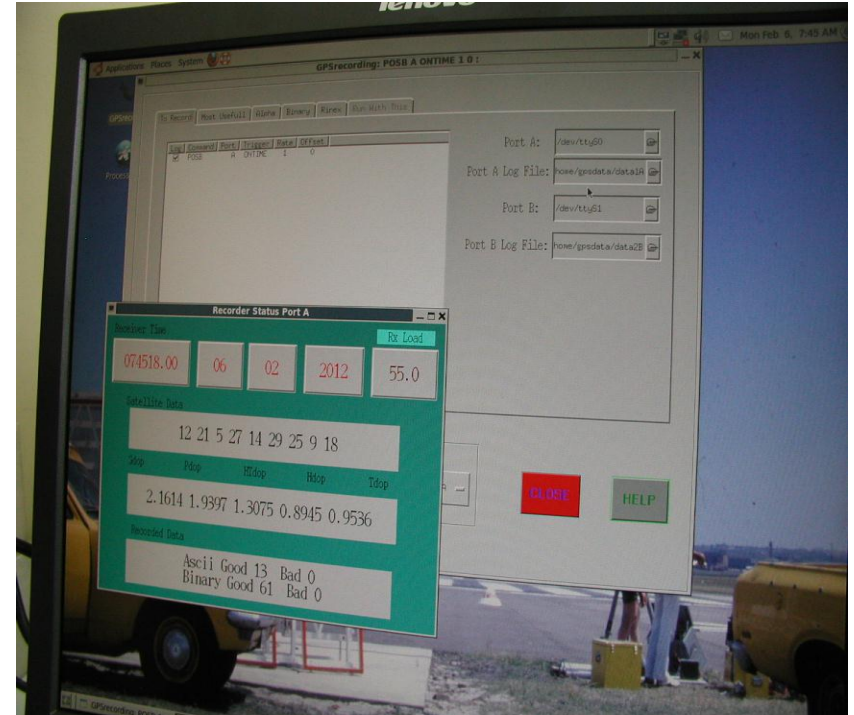
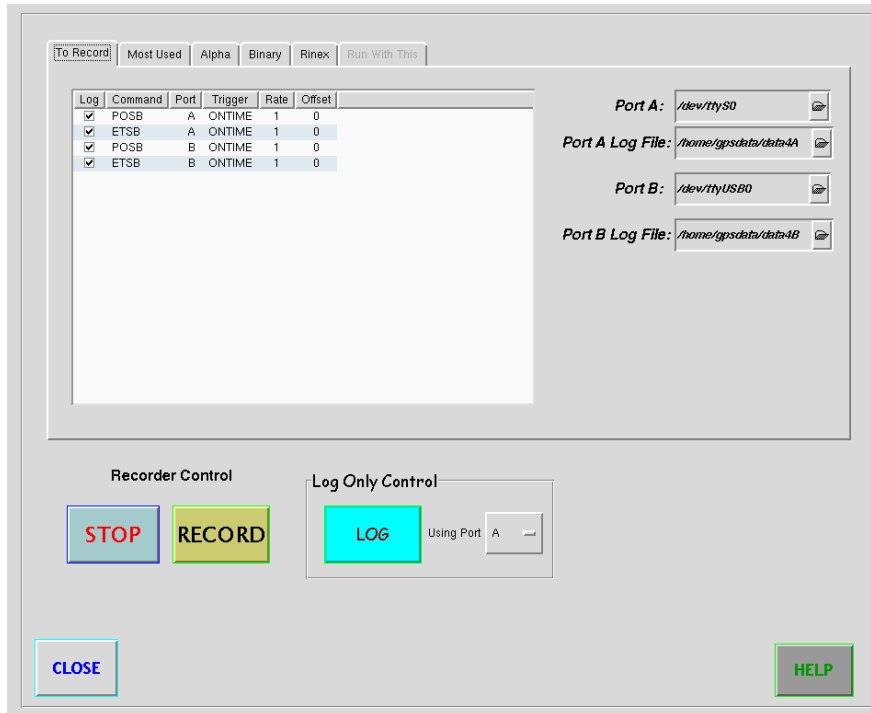


# Indoor GPS receiver and Data logger computer





# Testing of the GPS data collection software



Novtel GPS OEM3 and 4 collecting data about 2 weeks data  
( running at 1/sec and 4/sec ) sitting on the data logger disks .



And others...

Thank you