VLBI2010 Simulations

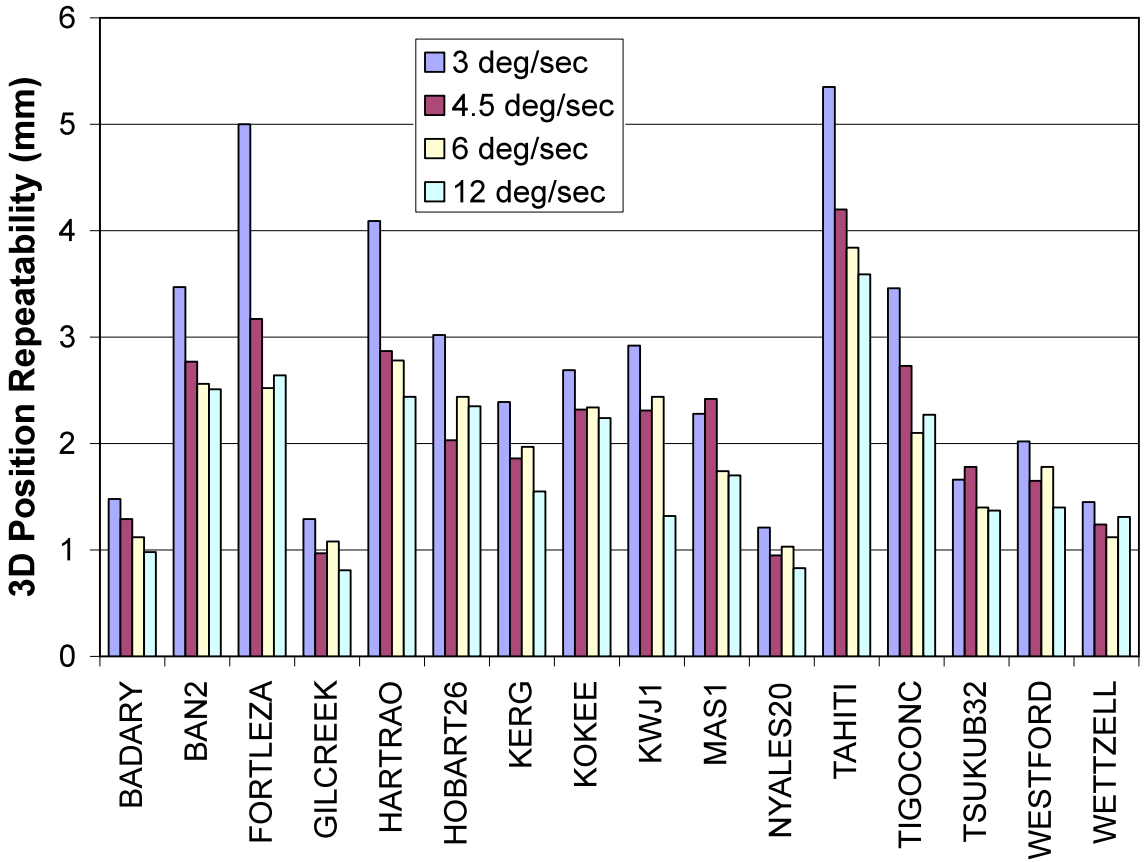
Dan MacMillan
NVI Inc./NASA GSFC

GGOS Working Group on
Ground Networks and Communications
EGU 2008 - Vienna
April 16, 2008

VLBI2010 Antenna Slew Rate

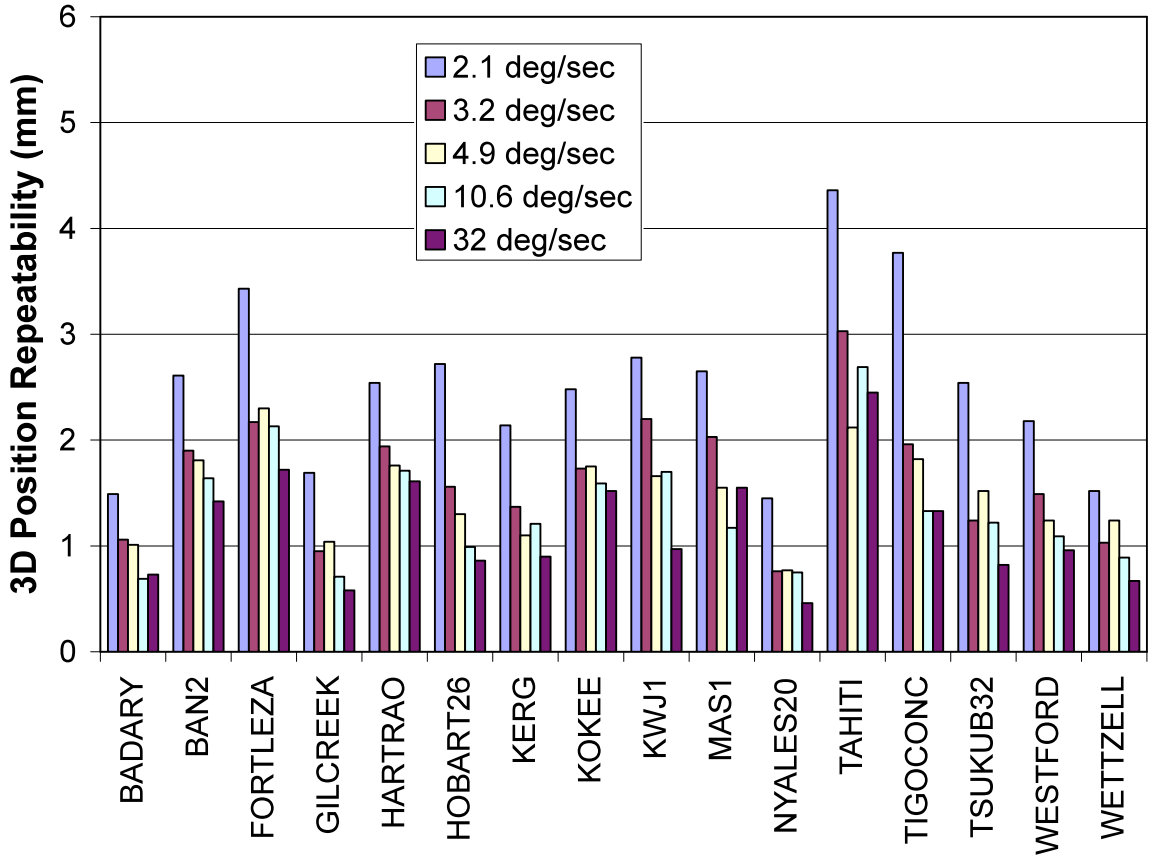
- Slew rate specification is required for VLBI2010 antennas
- We determined the sensitivity of station position scatter to azimuth slew rate
- Ran simulations for 2 types of observing schedules:
  - Schedules made with operational SKED program
  - Uniform sky schedules (Petrachenko)

Antenna Slew Rate



- Schedules made with SKED
- Improvement flattens between 4.5 and 6 deg/sec in azimuth

Antenna Slew Rate



- Uniform sky schedules
- Most of improvement between 2.1 and 4.9 deg/sec schedules

Conclusions

- Observed scatter (CONT05) is underestimated by simulations but better choices of turbulent parameters should improve agreement
- Uniform sky observing schedules yield site observation scan rates that are nearly independent of site in the network and network size
- Operational SKED schedules have 30-40% more observations than uniform schedules but site scan rates vary significantly between sites and different network sizes
- Our simulations indicate that station position scatter does not improve significantly beyond an antenna azimuth slew rate of 5-6 deg/sec
- Results of simulations (3D position repeatabilities) depend significantly on turbulence model parameters
  → Need to include seasonal and site dependence