Orbit Quality Analysis Through Short-arc Technique
Preliminary results

P. Bonnefond(1), O. Laurain(1), Amandine Guillot(2), Nicolas Picot(2), Luca Cerri(2), Christian Jayles(2), Cédric Tourain(2)

(1)OCA/Geoazur, Grasse, France
(2)CNES, Toulouse, France

OSTST meeting – October 8-11, Boulder, CO
Short-arc orbit technique is a laser-based geometrical approach to compute radial (R), along-track (T) and across-track (N) orbit errors from SLR residuals.

3 type of orbit studied (MOE/POE/DIODE) in 4 areas (~10 passes/day)
from 02/26/2013 to 08/19/2013

Europe Area

USA Area

Australian Area

Orbit error (cm)

Bias
R MOE < 1 cm
R DIODE < 2 cm

Bias
T MOE < 2 cm
T DIODE < 5 cm

Bias
N MOE ~ 6 cm
N DIODE ~ 3 cm

Stability
R MOE < 2 cm
R DIODE < 4 cm

Stability
T MOE < 4 cm
T DIODE < 6 cm

Stability
N MOE > 6 cm
N DIODE > 10 cm

Radial (MOE)  Radial (DIODE)
Along-track (MOE)  Along-track (DIODE)
Across-track (MOE)  Across-track (DIODE)
Short-Arc Orbit Technique

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Europe Area

USA Area

Australian Area

from 02/26/2013 to 07/25/2013
SLR data:
   Number of normal points increased since June meeting (from 33 to 41 NP/day over Europe)
   Remains low in average for USA and Australia ~27 normal points per day

Radial orbit errors:
   Stability better than 2 cm for MOE and POE
   Stability better than 4 cm for DIODE
   Small geographically correlated errors (below 1 cm for MOE and POE, 2 cm for DIODE)
   Maybe a small hemispheric effect: -5 mm (Europe/USA) / +10 mm (Australia)

Along-track orbit errors:
   Stability better than 2 cm for POE
   Stability better than 4 cm for MOE
   Stability better than 6 cm for DIODE

Across-track orbit errors:
   A large bias of ~5 cm for both POE, MOE and DIODE
   also large standard deviation (6-10 cm)
   Instrument referencing (CoM position)? Correlation with beta angle (Radiation pressure)?

Radial orbit precision is very close for both MOE and POE
Correlation = 67 to 92% / Slope = 0.6 to 0.8