Orbit Quality Analysis Through Short-arc Technique
Preliminary results

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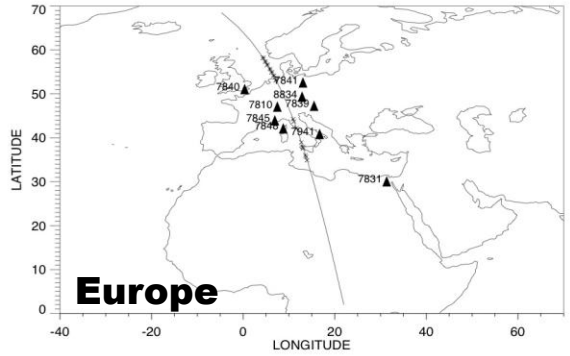
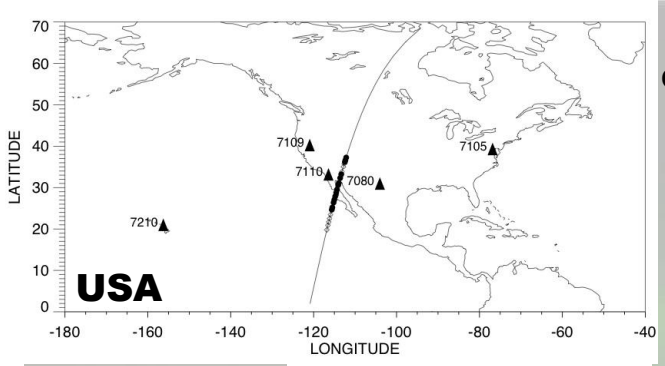
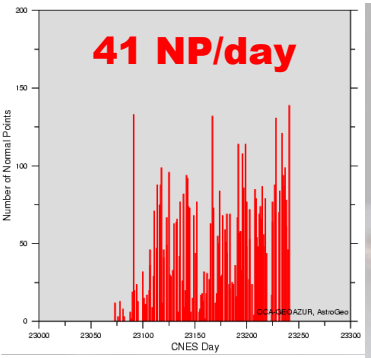
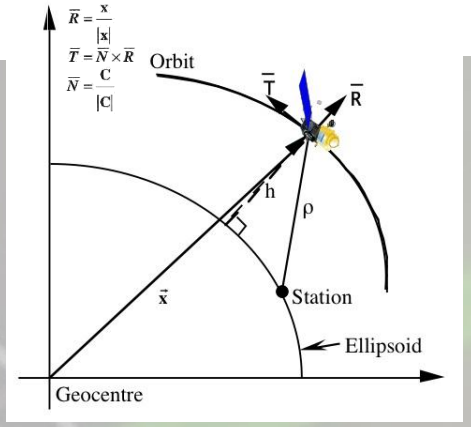
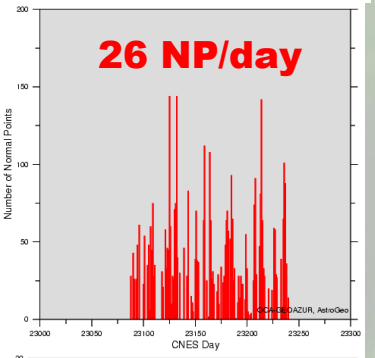
SARAL/AltiKa verification meeting – August 27-29, Toulouse

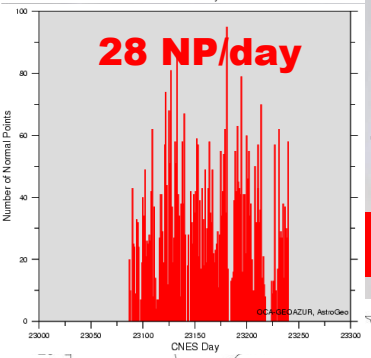


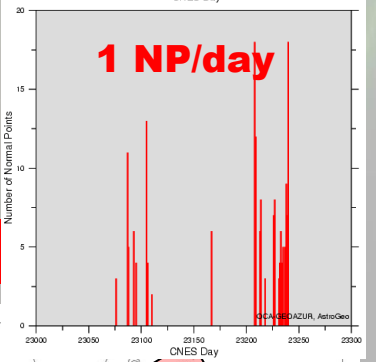








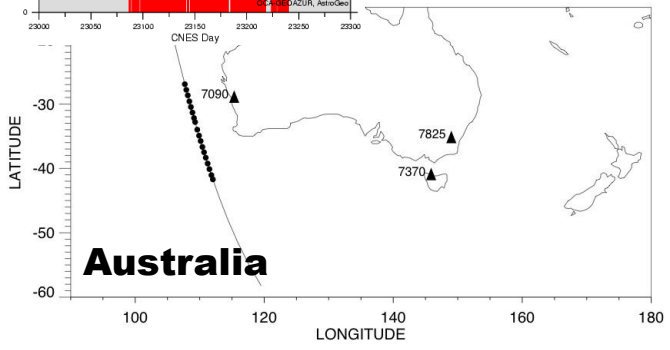


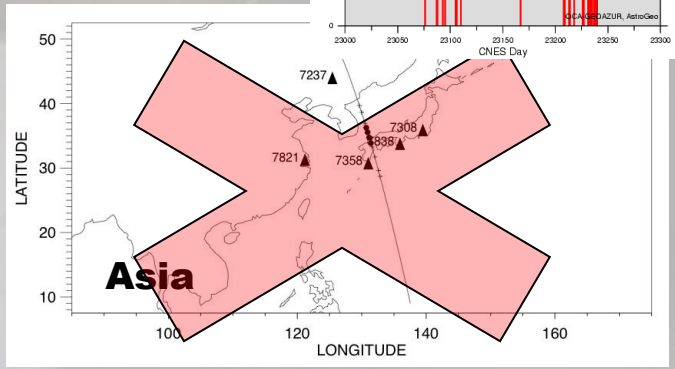


Short-arc orbit technique is a laser-based geometrical approach to compute radial (R), along-track (T) and across-track (N) orbit errors from SLR residuals.

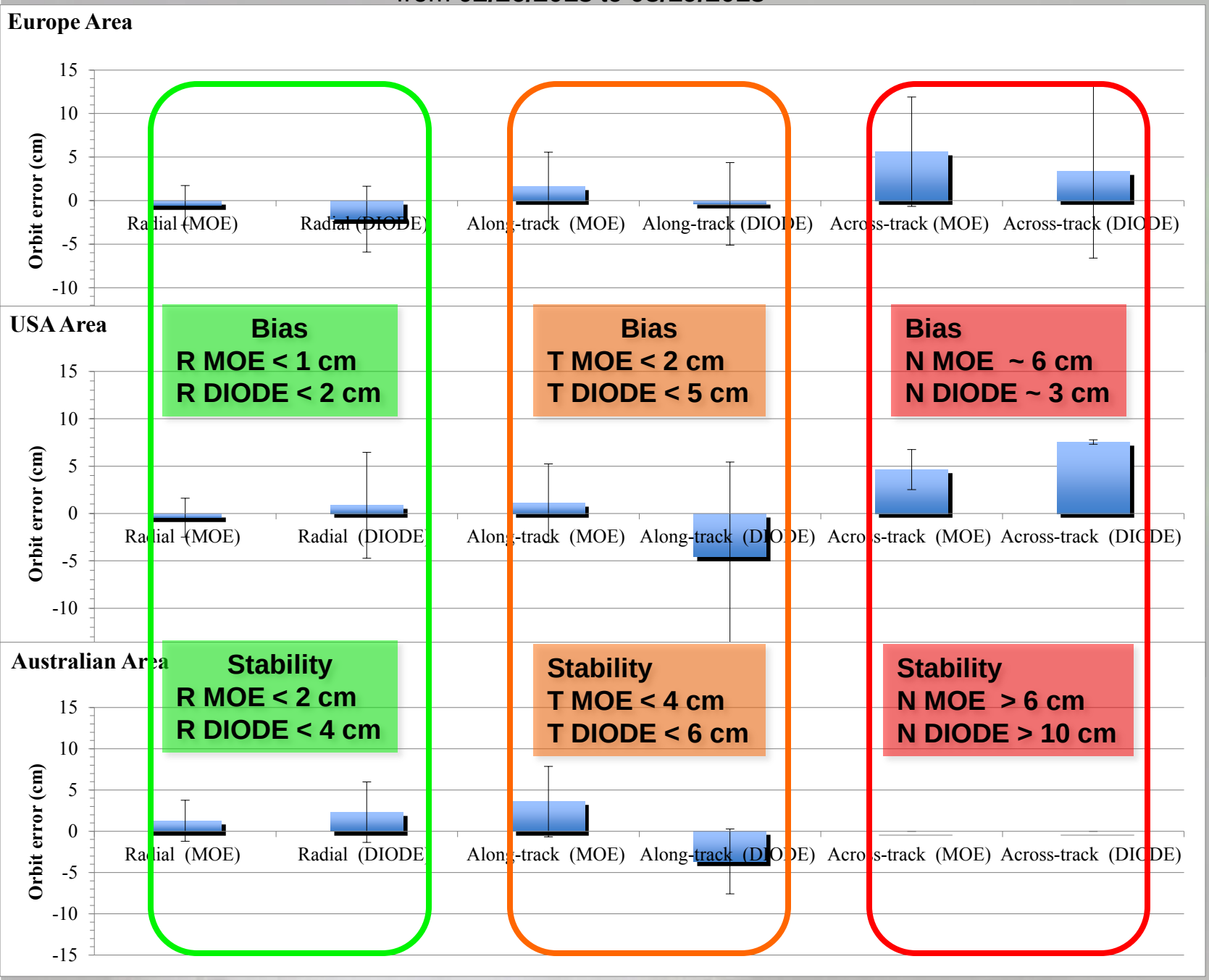
3 type of orbit studied (MOE/POE/DIODE) in 4 areas

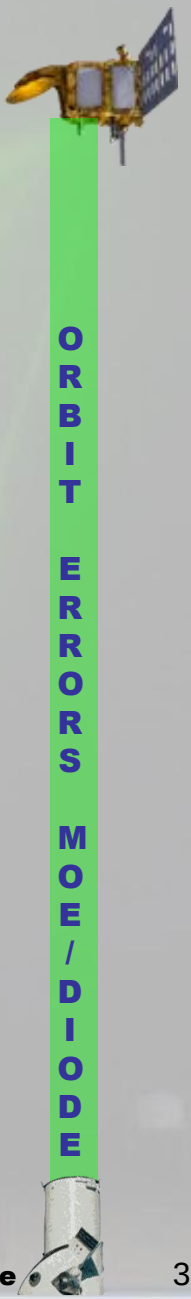
(~10 passes/day)

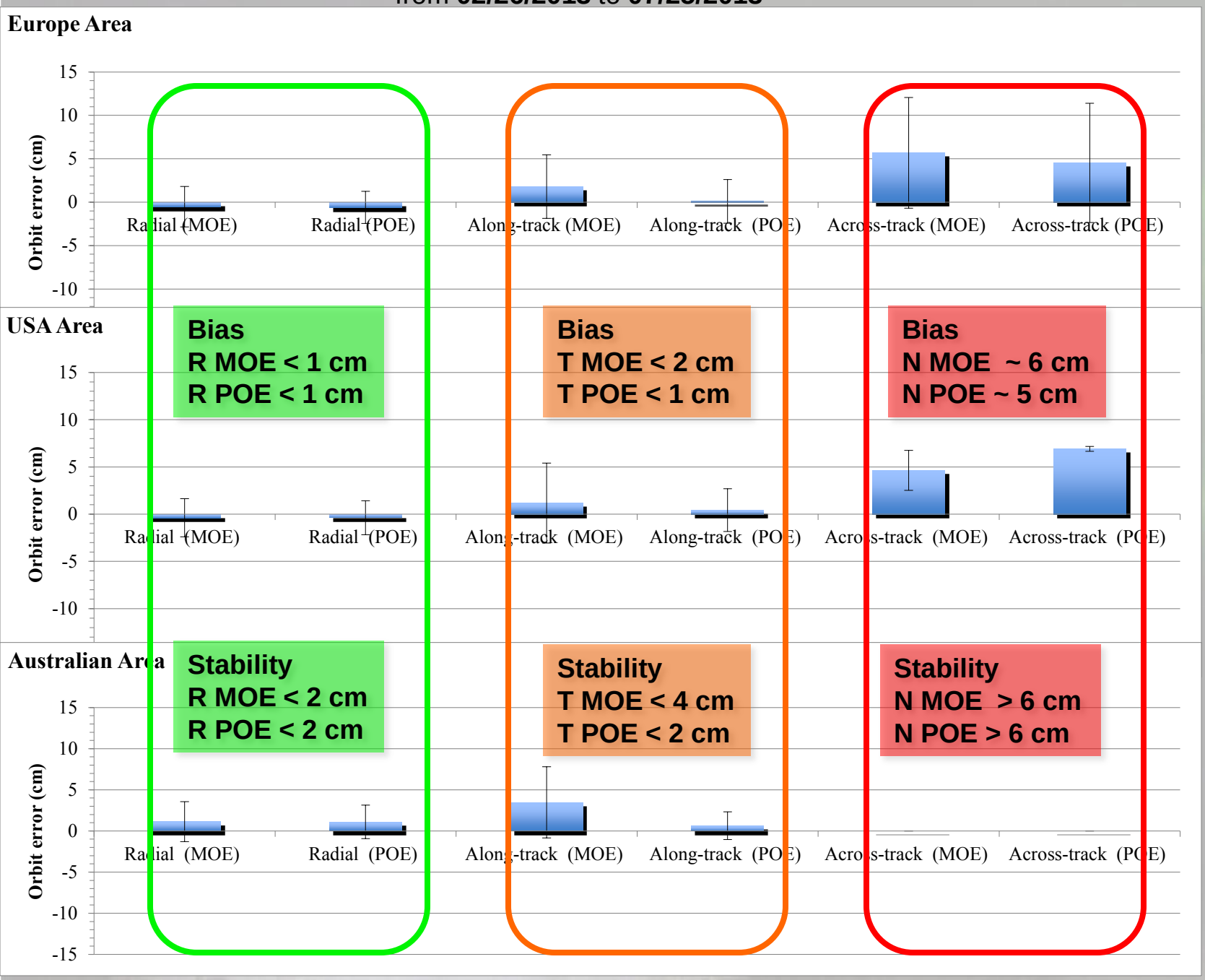




INTRODUCTION


Europe Area
USA Area
Australian Area
Orbit error (cm)
15
10
5
0
-5
-10
-15
Radial (MOE)
Radial (DIODE)
Along-track (MOE)
Along-track (DIODE)
Across-track (MOE)
Across-track (DIODE)
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


ORBIT ERRORS MOE/DIODE



ORBIT ERRORS MOE/POE

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

CONCLUSION