

Report of COL-AC DGFI

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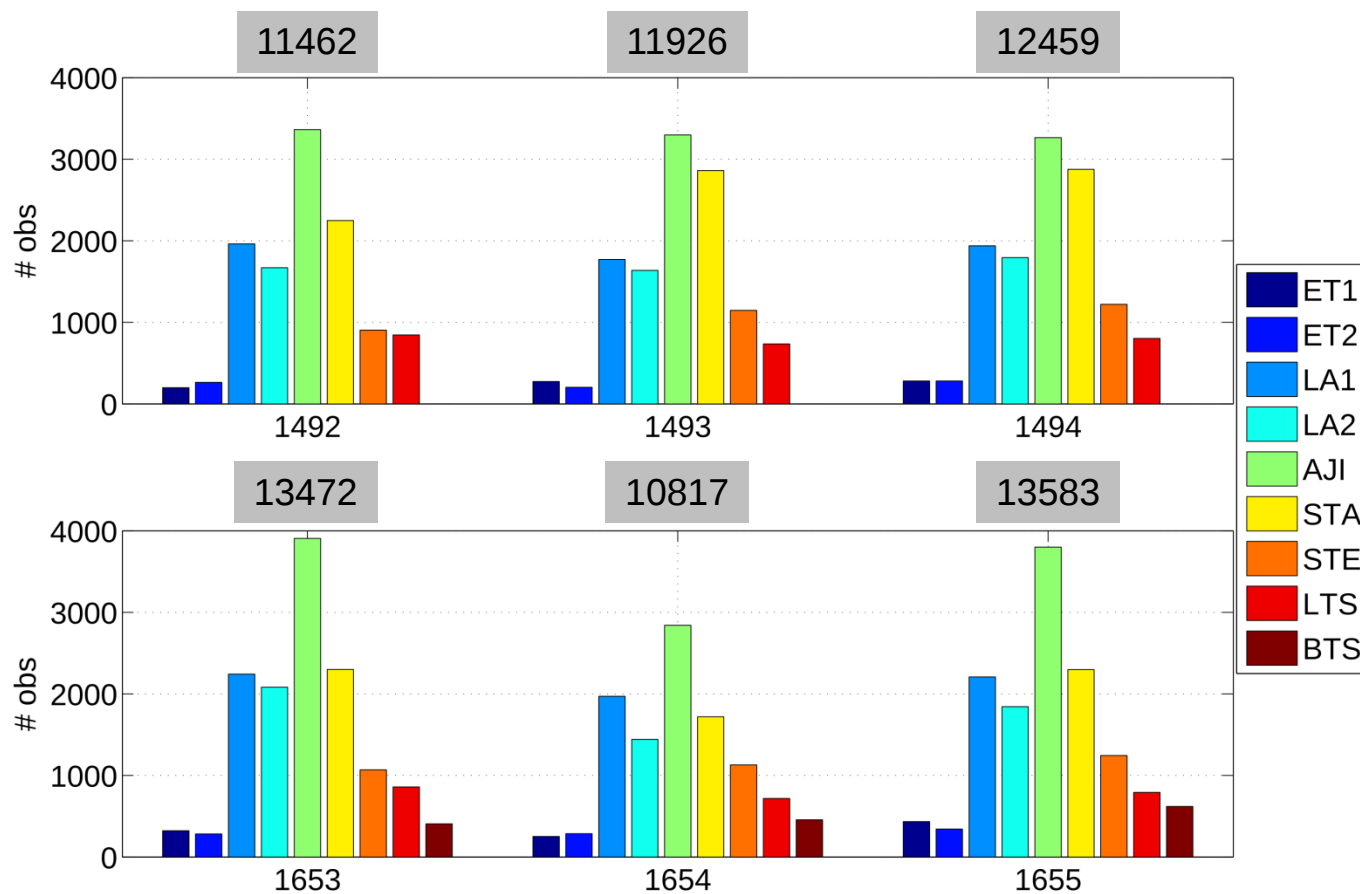


*Combination at the
Observation Level
IERS Working Group*

COL Workshop 2013, 03. May 2013, Munich

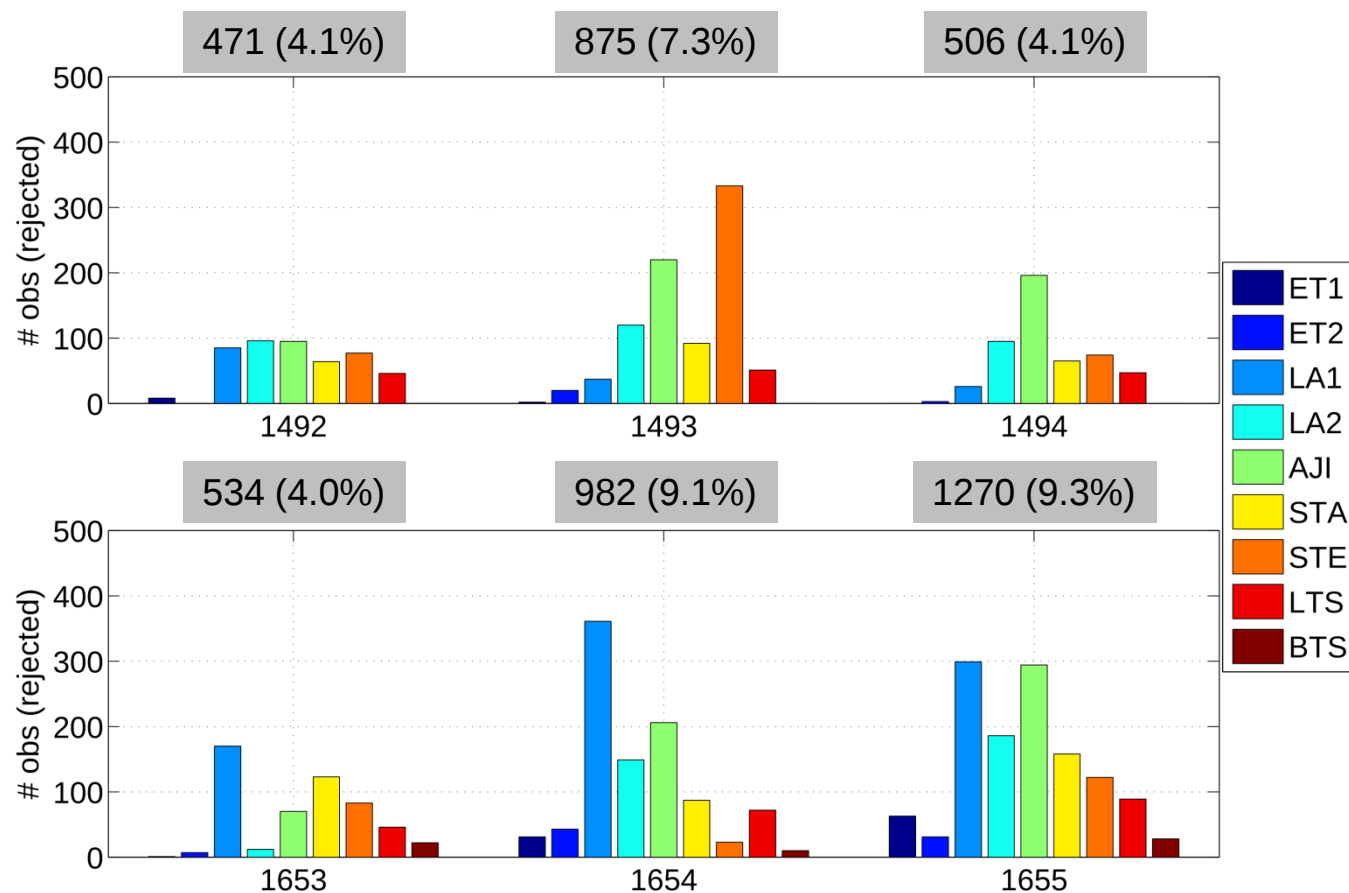
DGFI SLR solution – time period / satellites

- CONT08 period (10.08.2008 – 01.09.2008; gpsweek 1492 - 1494)
 - ET1, ET2, LA1, LA2, AJI, LTS, STA, STE
- CONT11 period (11.09.2011 – 03.10.2011; gpsweek 1653 - 1655)
 - ET1, ET2, LA1, LA2, AJI, LTS, STA, STE, BTS (launched in 2009)



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DGFI SLR solution – COL requests on solution setup

Data set:	
LAGEOS 1 & LAGEOS 2 (+ other satellites)	OK
28 stations, defined by COL-WG	OK

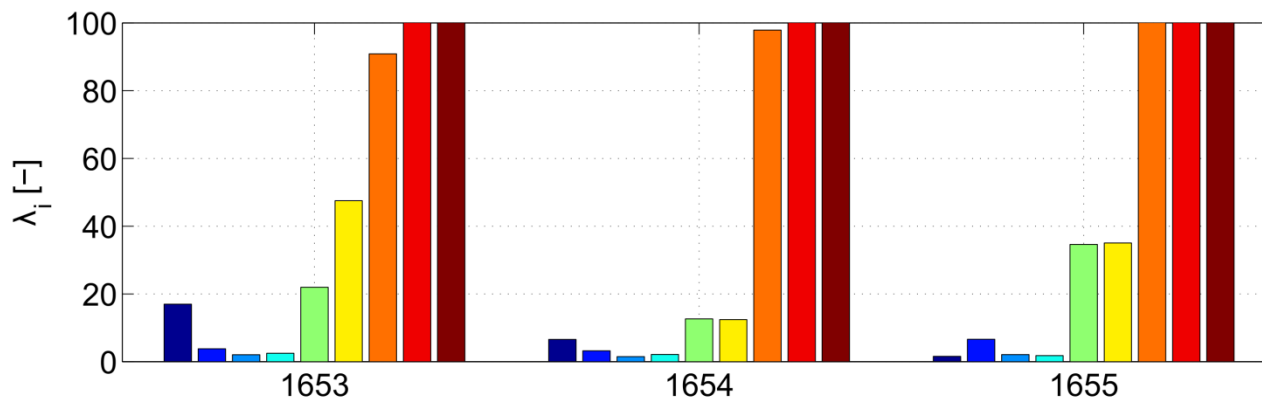
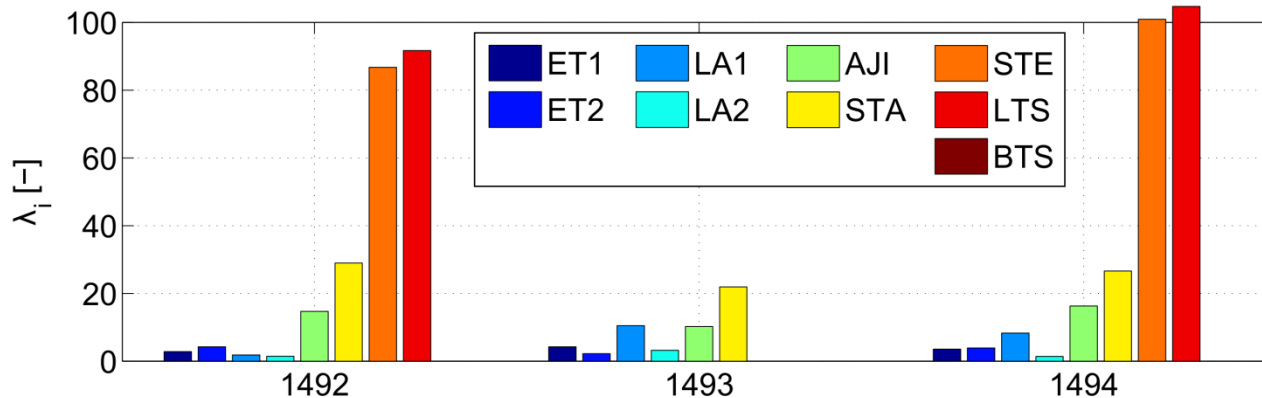
A priori models to be implemented acc. to last COL-WG meeting:	
Station coordinates @ mid-epoch of arc: ITRF2008	OK
Biases (range and time) acc. to ILRS	OK (reduced from NEQs → see AC comparison)
EOP: IERS 08 C04 (X,Y nutation) @ 3h interval	EOP @ 0h in pwl representation

A priori models to be implemented acc. to last COL-WG meeting:	
Gravity field: EIGEN-GRGS RL02 (mean atmospheric gravitational effect and oceanic circulation effect are added)	OK
Atmospheric tide model: Ray-Ponte	Not implemented
Ocean tide loading model: FES2004	OK
Optical tropospheric propagation delay: Mendes-Pavlis	OK
High atmosphere (for LEO processing)	JB2008



DGFI SLR solution – satellite combination

- Relative weighting of satellite-specific NEQs is done by variance component estimation (VCE)
 - Relative weighting factors λ_i with $i = 1, 2, \dots, 9$ (satellites)
 - Huge for STE, LTS and BTS (CONT08: $\lambda_{\max} = 143$, CONT11: $\lambda_{\max} = 1220$)

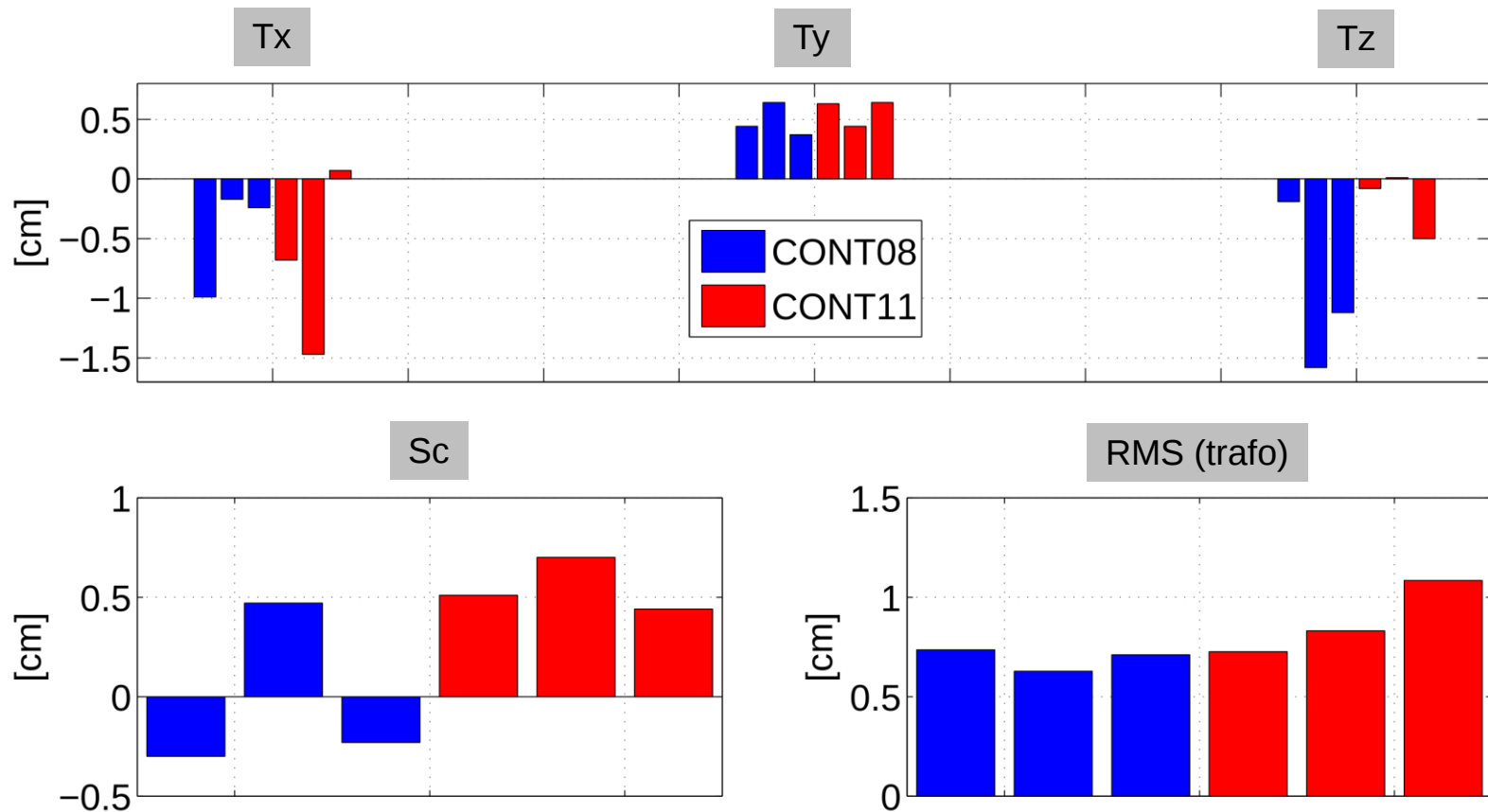


Possible reasons for high λ :

- λ_{BTS} : special reflector type
→ not well designed?
- λ_{STE} : sun-synchronous orbit
→ orbit systematics?
- λ_{LTS} : very low altitude
→ model problems?

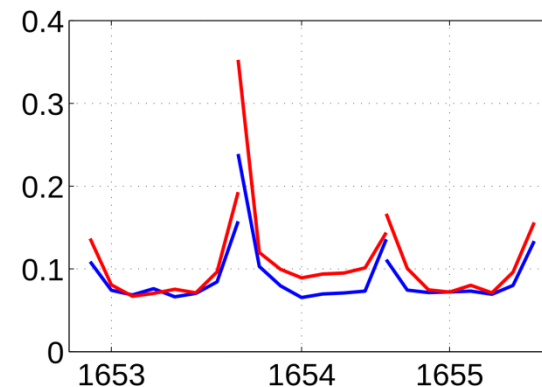
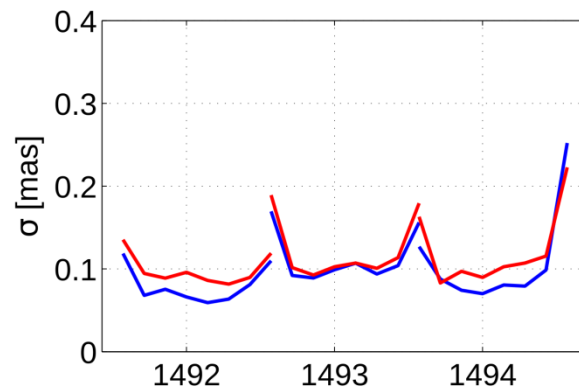
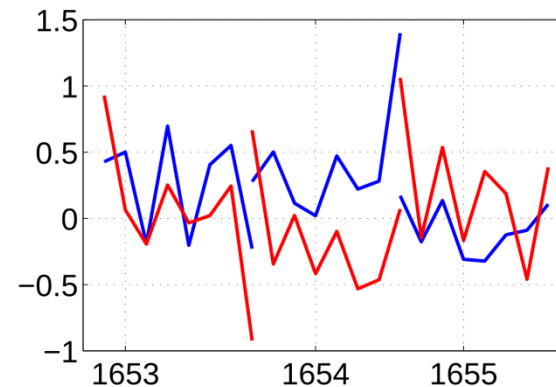
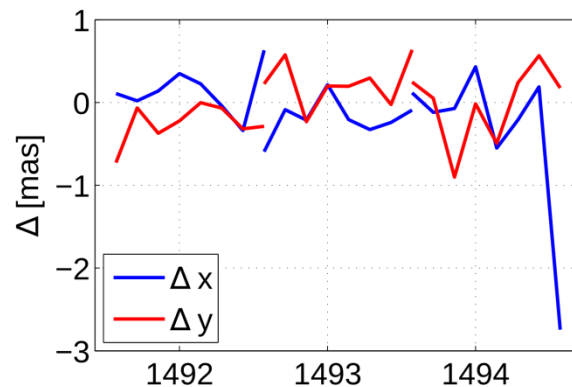
DGFI SLR solution – validation (stations)

- External validation of station coordinates
 - 4-parameter similarity transformation w.r.t. DTRF2008 (translations + scale)
 - Orientation is fixed with NNR condition to a priori coordinates



DGFI SLR solution – validation (pole angles)

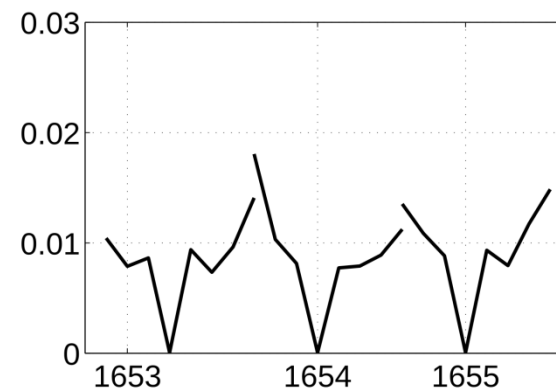
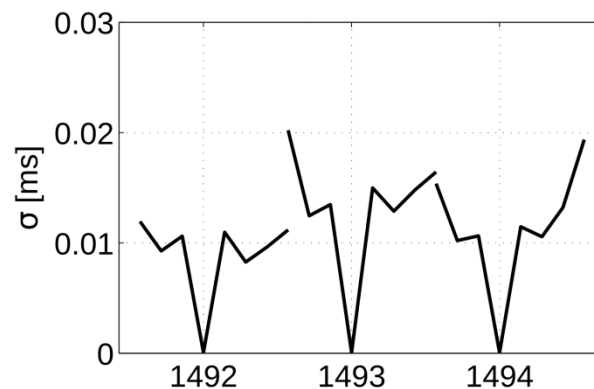
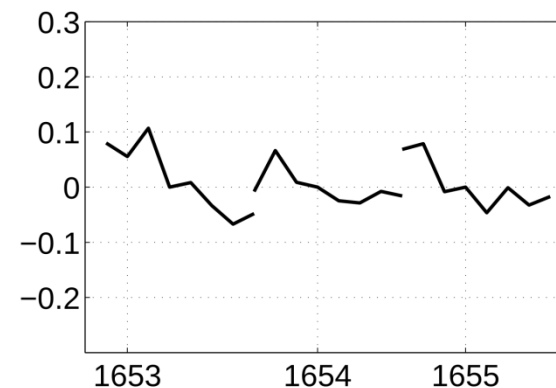
- External validation of terrestrial pole angles
 - Terrestrial pole parameterized as piecewise linear polygon with offsets @ 0h
 - Estimation of corrections w.r.t. IERS 08 C04
 - Values @ arc boundaries have higher STDs since less obs. are available



DGFI SLR solution – validation (UT1-UTC)

External validation of (UT1-UTC)

- (UT1-UTC) parameterized as piecewise linear polygon with offsets @ 0h
- Estimation of corrections w.r.t. IERS 08 C04
- Values @ mid-epoch of the arc are fixed to C04 (due to offset singularity)
- relative information of (UT1-UTC) offsets is systematically affected



DGFI VLBI solution

- ❑ DOGS-RI (RI = Radio Interferometry)
 - new software under development
 - No new submission of NEQs with the old software
- ❑ Robert Heinkelmann left DGFI in 11/2012
 - At the moment, the position is still vacant
- ❑ Last DGFI VLBI submission to COL server on 07.06.2011
 - Solution was computed with OCCAM
 - For details see VLBI analysis by H. Krasna



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