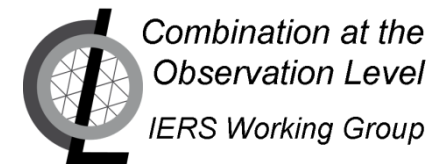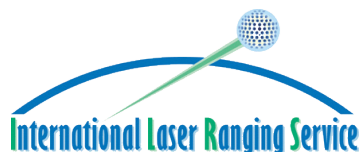# Report of COL-AC DGFI

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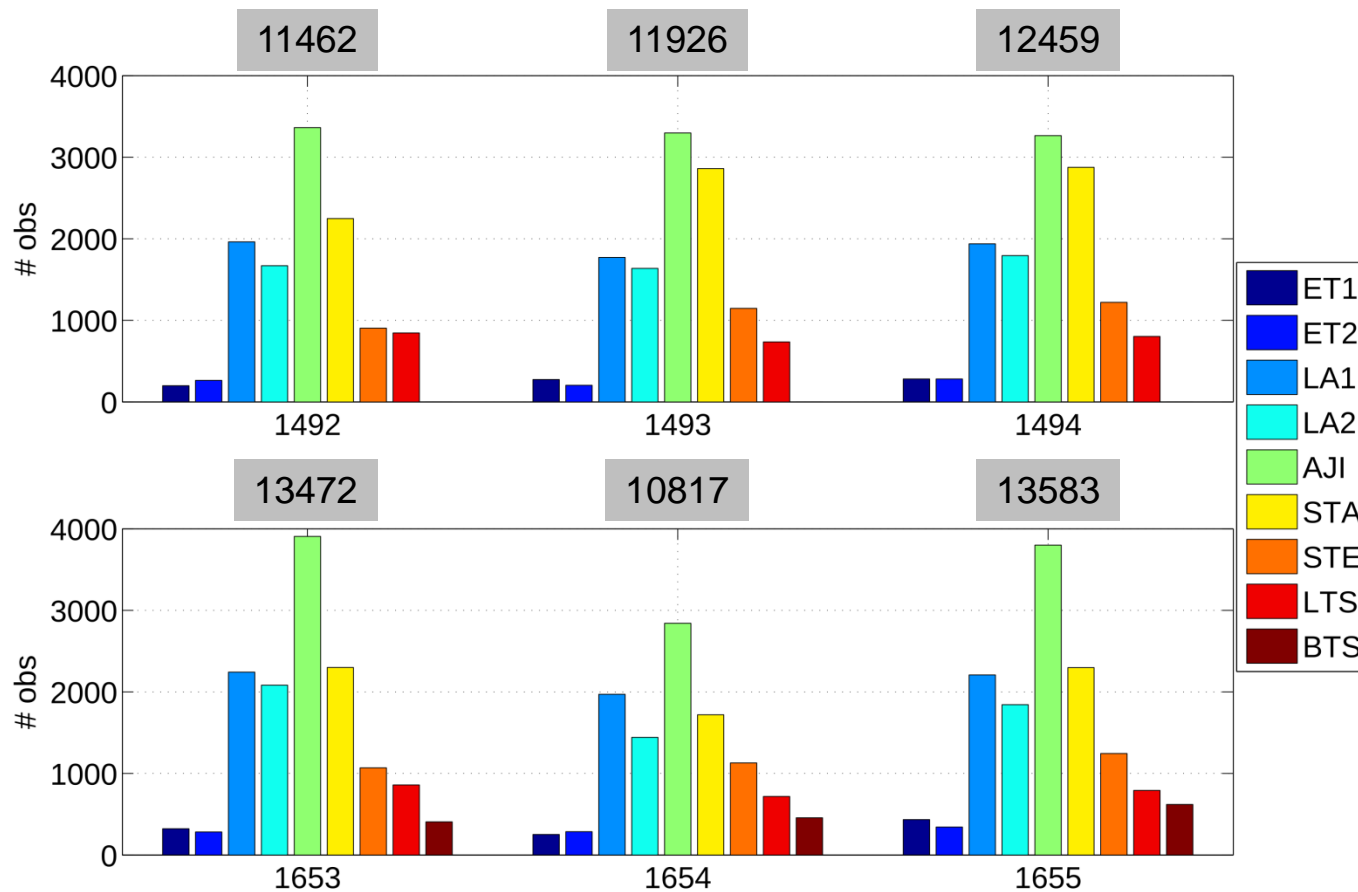
email: *blossfeld@dgfi.badw.de*

Combination at the Observation Level

IERS Working Group

Centre of Geodetic Earth System Research

International Laser Ranging Service

DGFI

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)

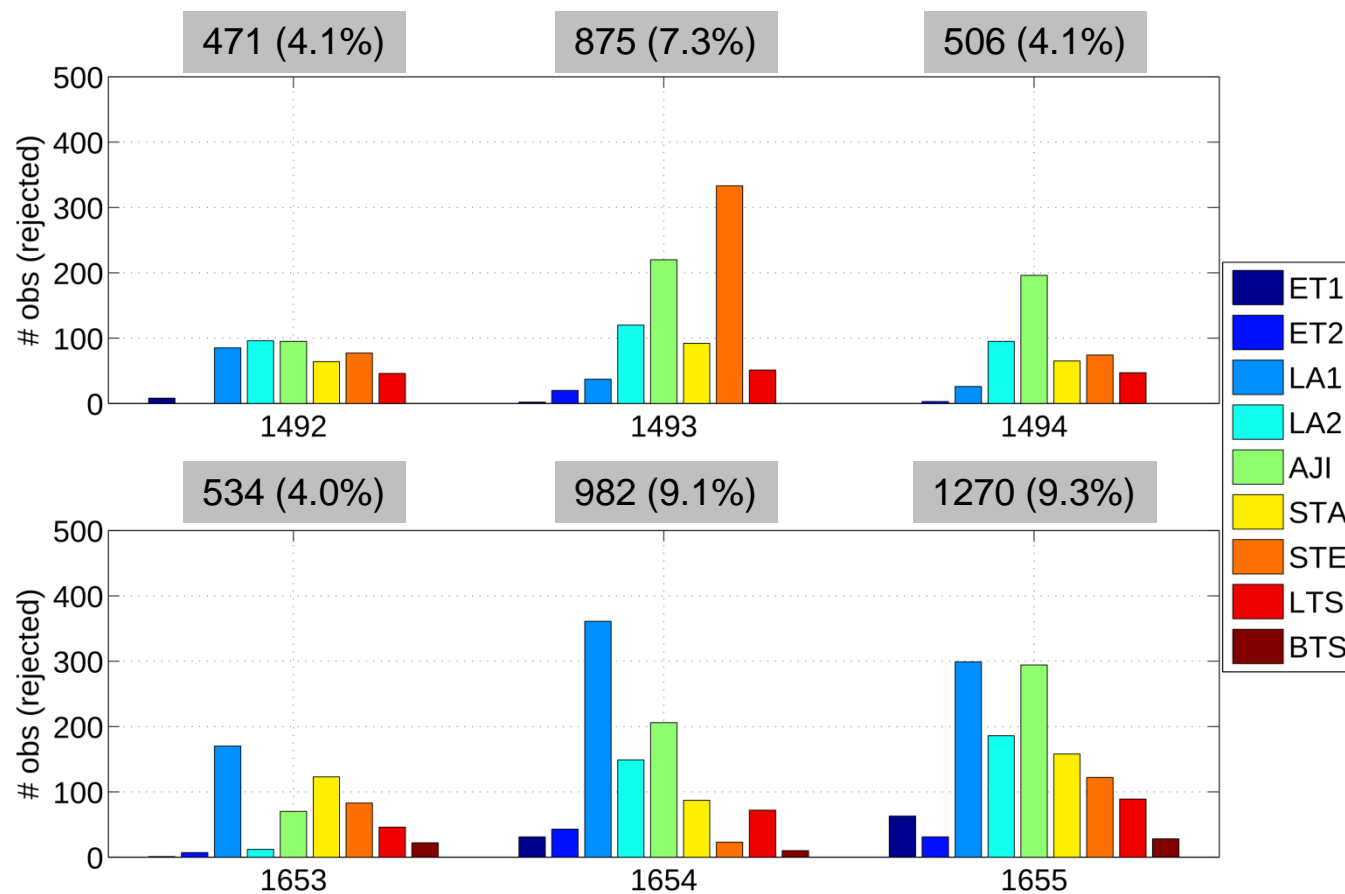 ▪ ET1, ET2, LA1, LA2, AJI, LTS, STA, STE, BTS (launched in 2009)

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 atmospherical 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 $i = 1, 2, ..., 9$ (satellites)

- Huge for STE, LTS and BTS (CONT08: $\lambda_{max} = 143$, CONT11: $\lambda_{max} = 1220$)
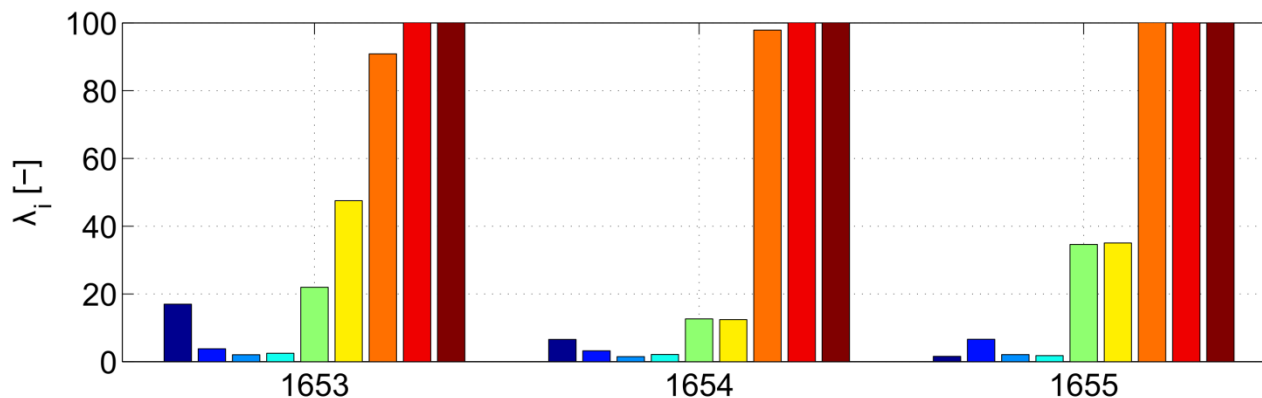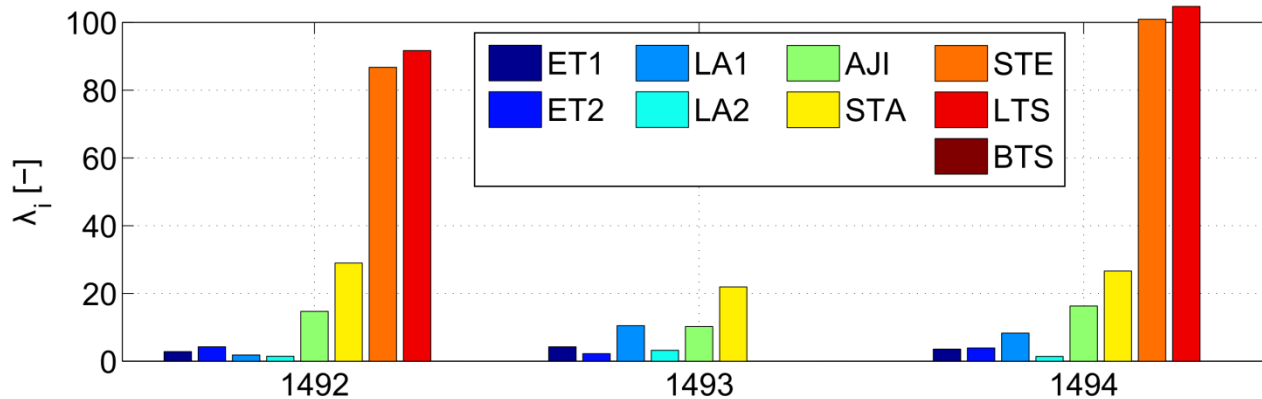
Possible reasons for high λ:

- λ_{BTS}: special reflector type
  → not well designed?

- λ_{STE}: sun-synchronous orbit
  → orbit systematics?

- λ_{LTS}: very low altitude

  → model problems?

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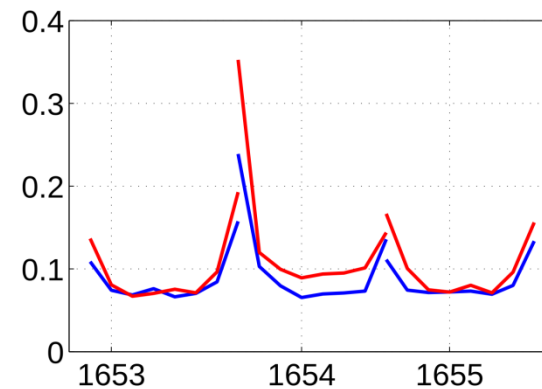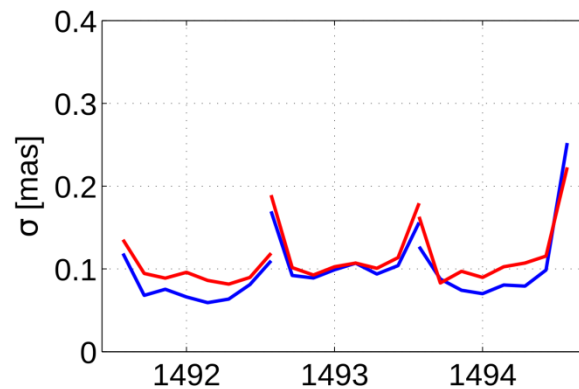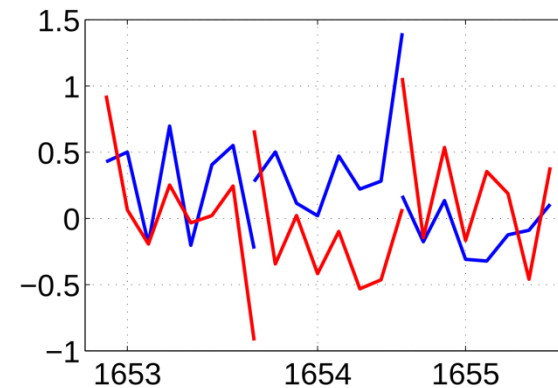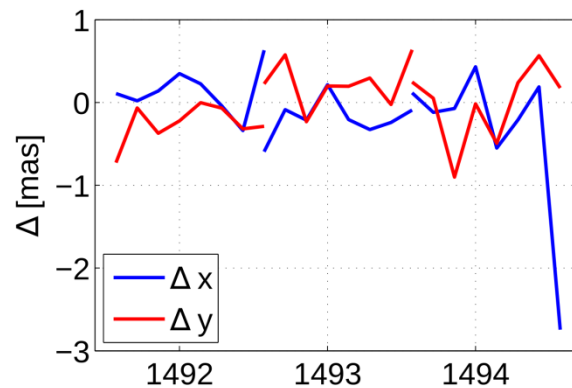COL-Workshop 2013, 03.05.2013

❑ External validation of station coordinates

▪ 4-paramter similarity transformation w.r.t. DTRF2008 (translations + scale)

▪ Orientation is fixed with NNR condition to a priori coordinates


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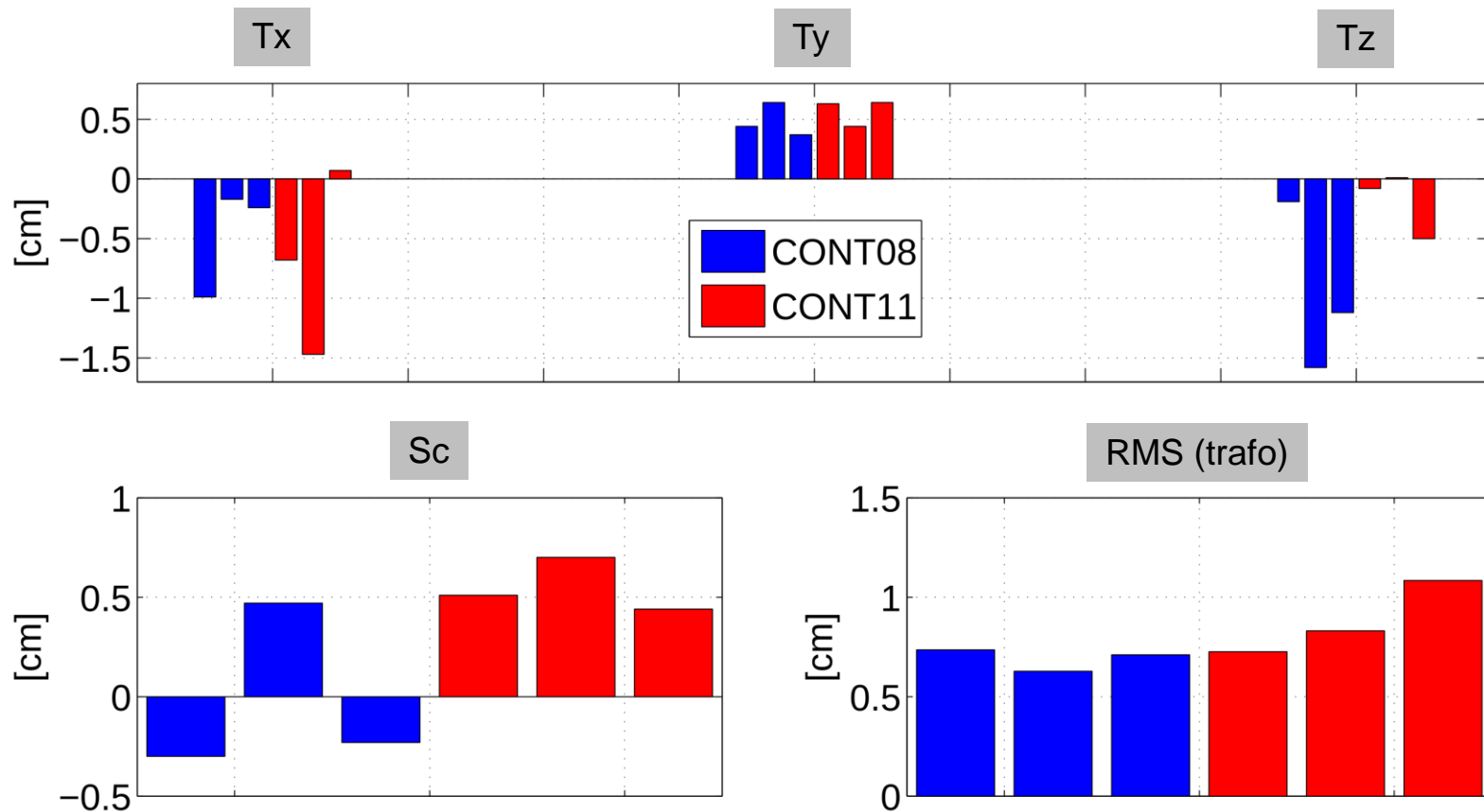
DGFI SLR solution – validation (pole angles)

❑ 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

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❑ 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
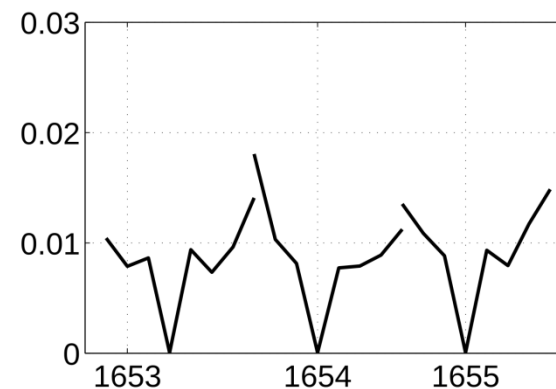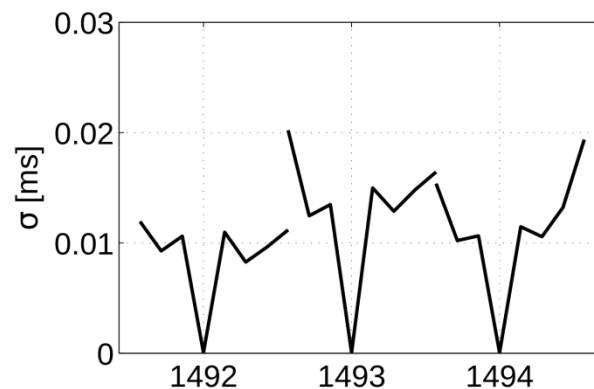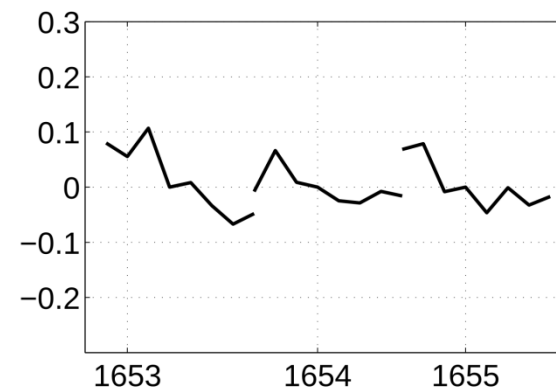
DGFI VLBI solution

- ❑ 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

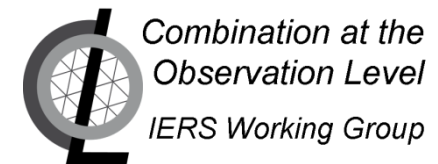 - ▪ For details see VLBI analysis by H. Krasna

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