

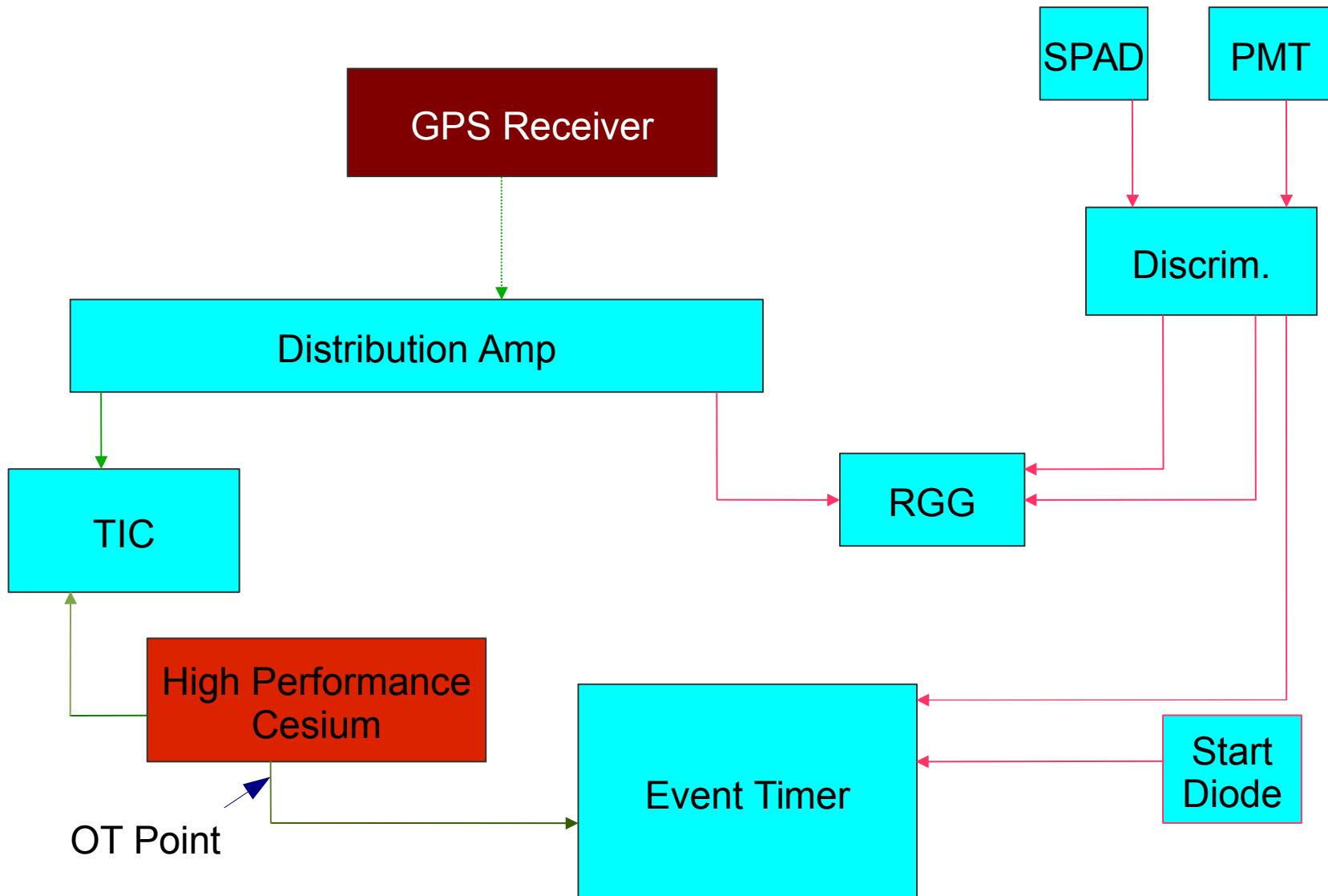
Upgrades and New Capabilities of the GFZ SLR Timing System

Evan Hoffman, Ludwig Grunwaldt, Stefan
Weisheit, Thomas Gerber

GFZ Potsdam



Timing System

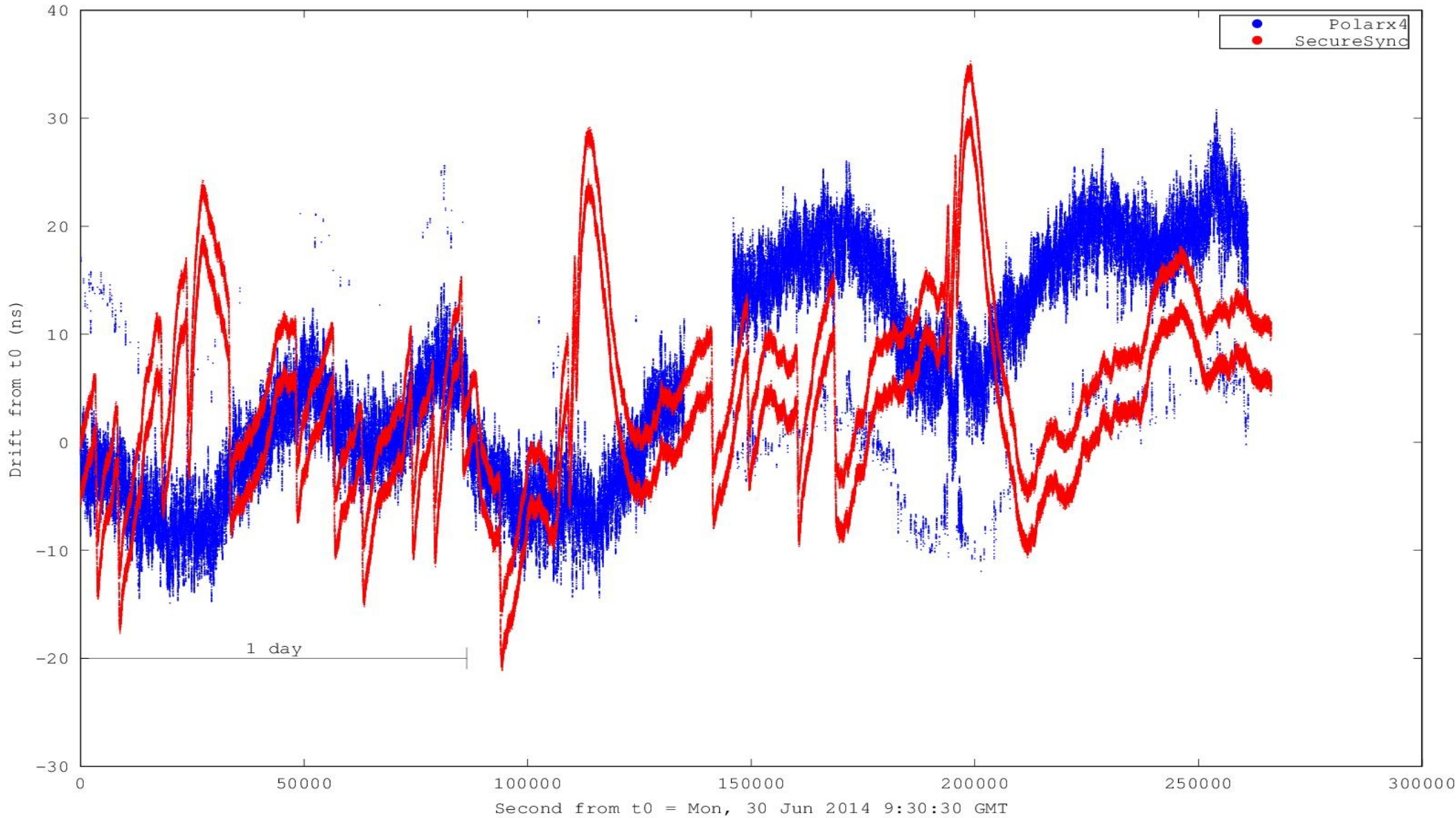


Timing System

- Improvement in frequency stability by orders of magnitude
 - $5 \times 10^{-11} \rightarrow 2.7 \times 10^{-13}$ for 1000 sec avg.
- Allows experiments requiring observations of independent timing source over long term

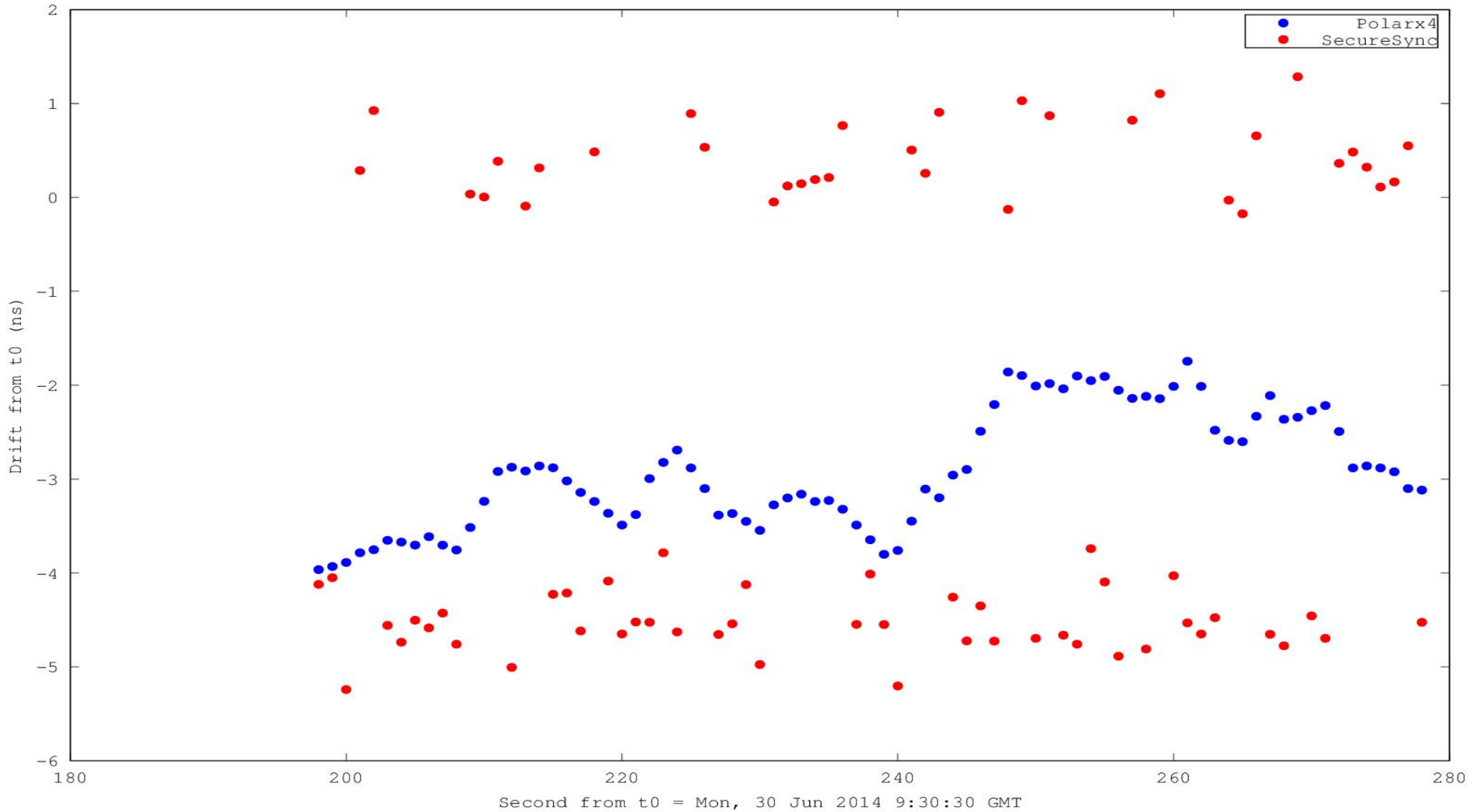
3 Way Test

Aglient Cesium vs Polarx4/SecureSync
Geoforschungszentrum
June 30 2014

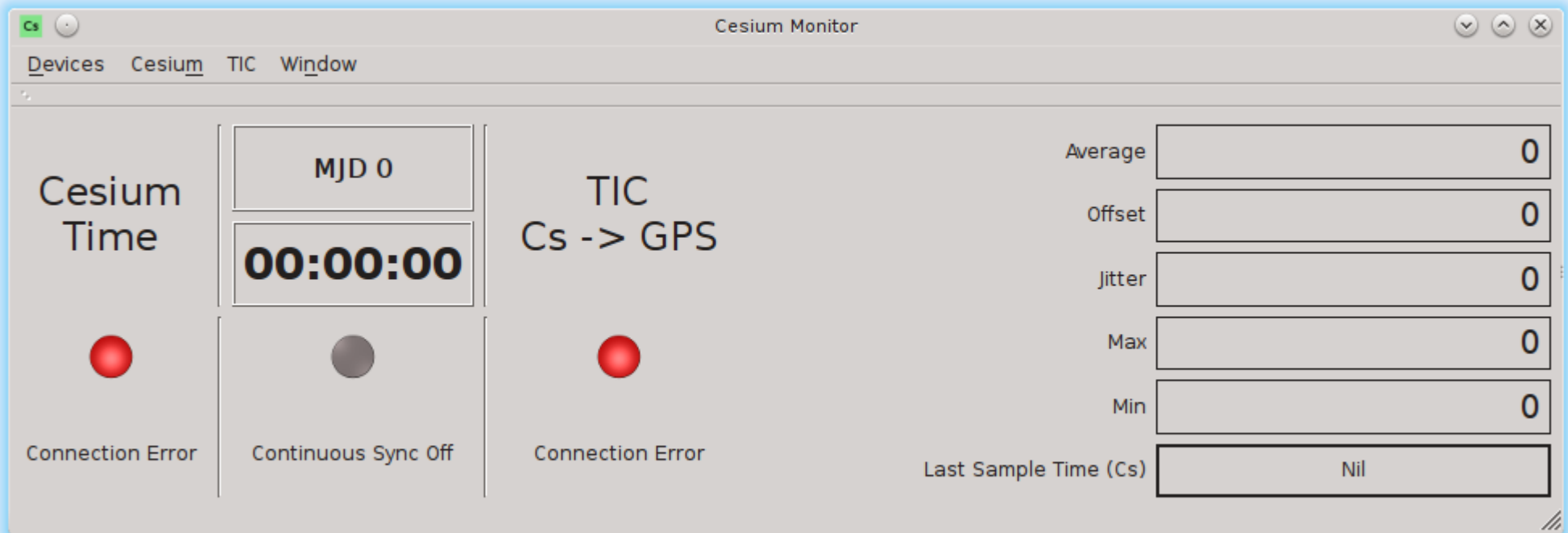


3 Way Test

Aglient Cesium vs Polarx4/SecureSync
Geoforschungszentrum
June 30 2014

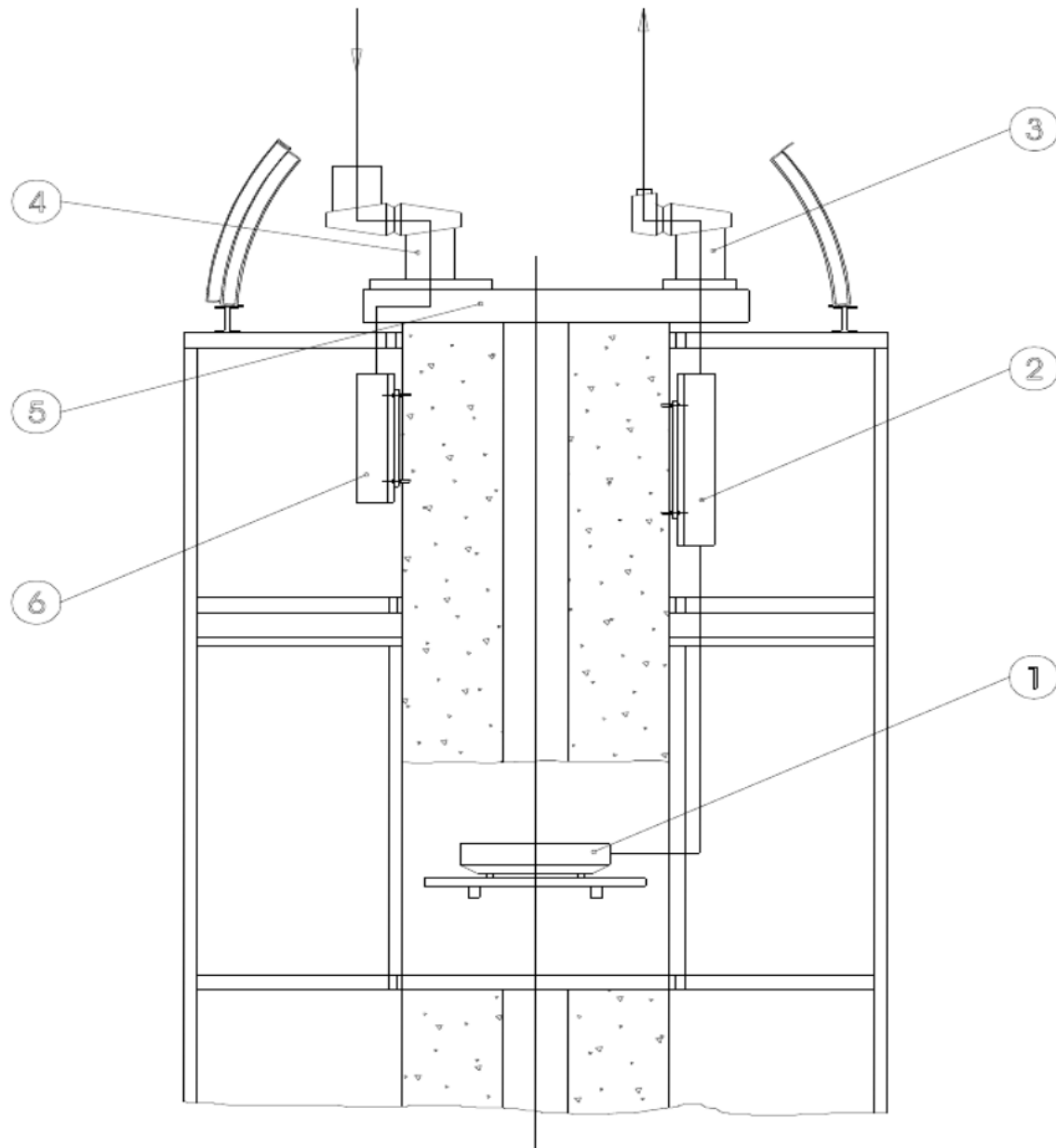


Clock Monitoring Software

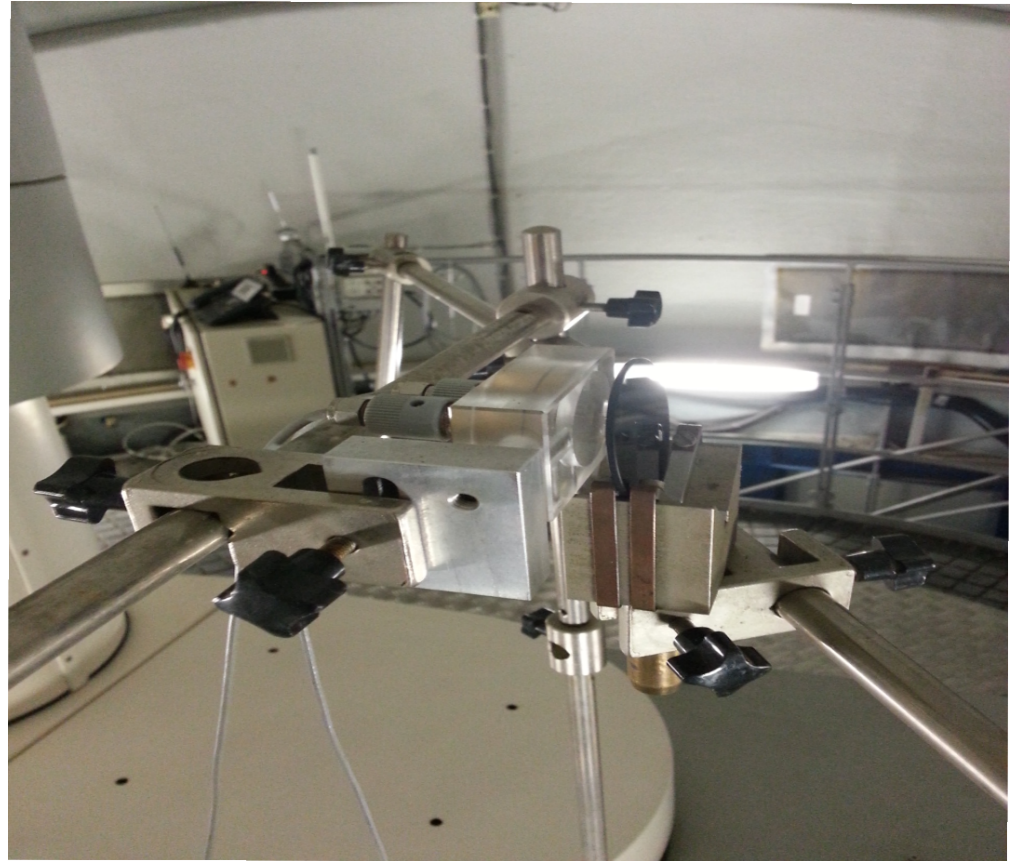
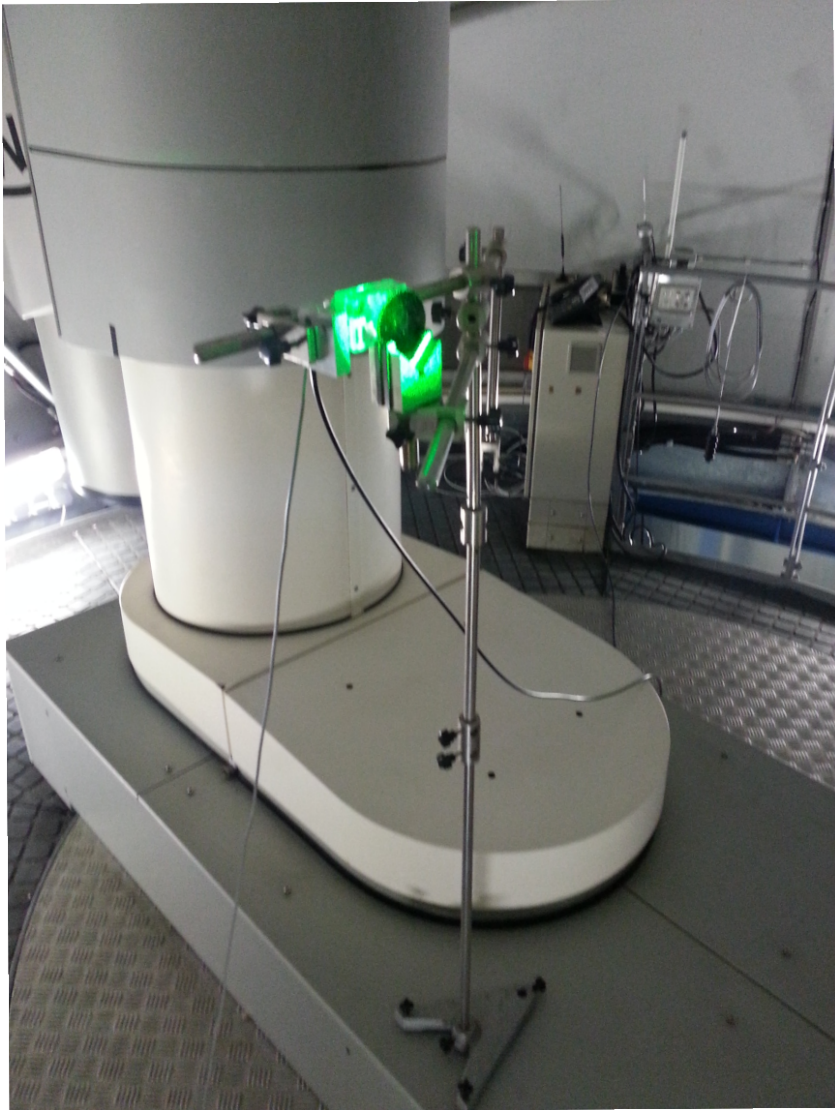


- Keeps log of CS to UTC PPS measurements for UTC traceability
- Reports health of timing system
- Clock comparison and analysis

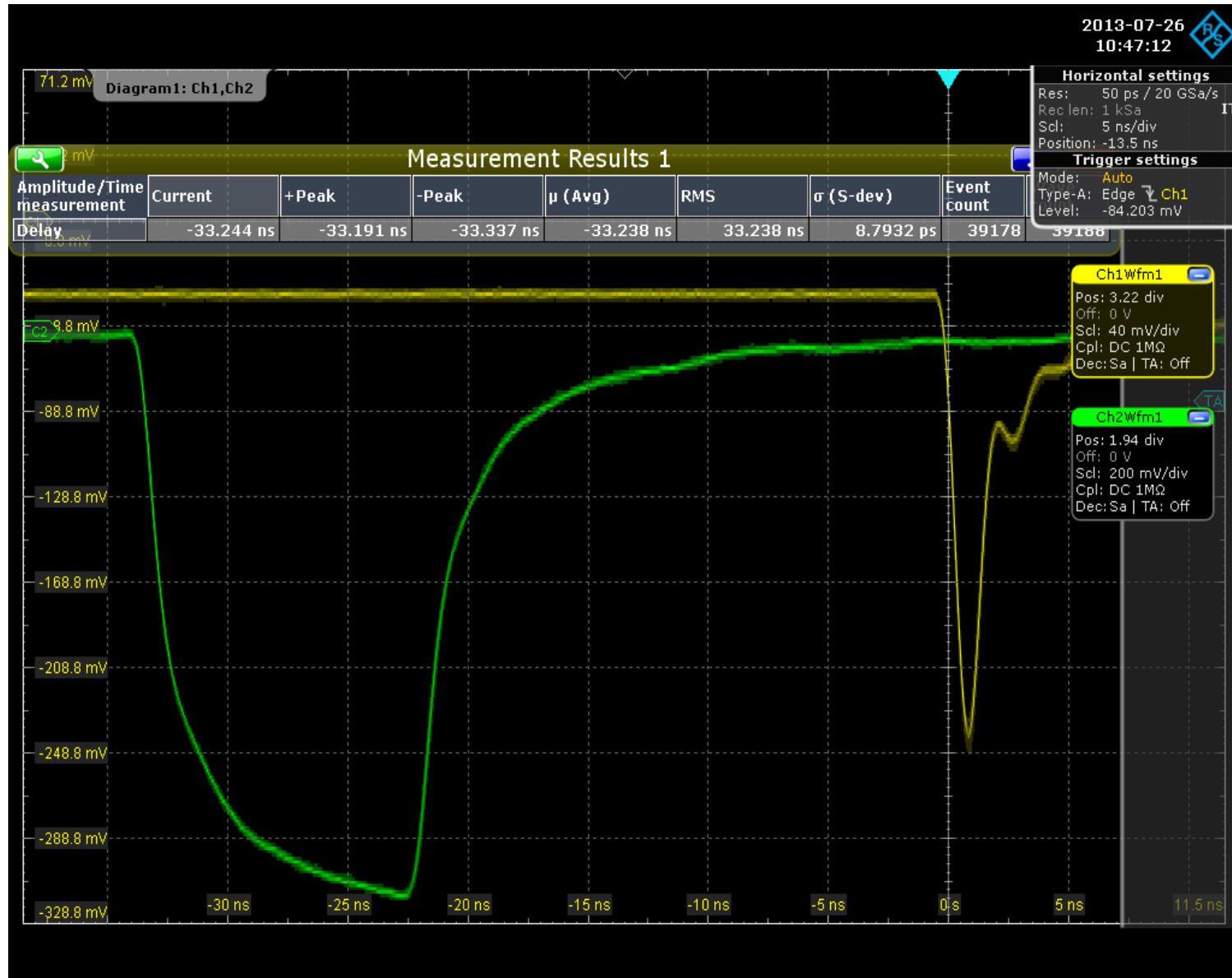
Geometry



Transmit Delay Measurements



Transmit Delay Measurements



Measurement Results

	Average	Std. Dev	Sample Size	
PD Cable Delay (ns)	92.327	0.013	7727	
SD Cable Delay (ns)	5.083	0.009	39879	
SD – PD Direct Meas. (ns)	-33.238	0.009	62659	
PD Peak-toPeak (mV)	220.76	5.738	12287	
PD Fall time (ns)	0.766	0.022	12877	
SD-ET Trigger Uncertainty (ns)	0.053		1	
ND Glass Delay (ns)	0.009		Theoretical	
Dist. Btw. INV of Telescopes (ns)	6.926		Given	
STDDEV of Measurements				0.018
SD – PD Delays removed (ns)				53.998
Delay from TX INV cross to SD (ns)				50.535