



VIENNA UNIVERSITY OF TECHNOLOGY
DEPARTMENT OF GEODESY
AND GEOINFORMATION



UNIVERSITY *of*
TASMANIA

Beobachtungsplanung und Auswertung des australischen VLBI-Netzwerks (AuScope)

D. Mayer¹, J. Böhm¹, J. Lovell², L. Plank², J. Sun³

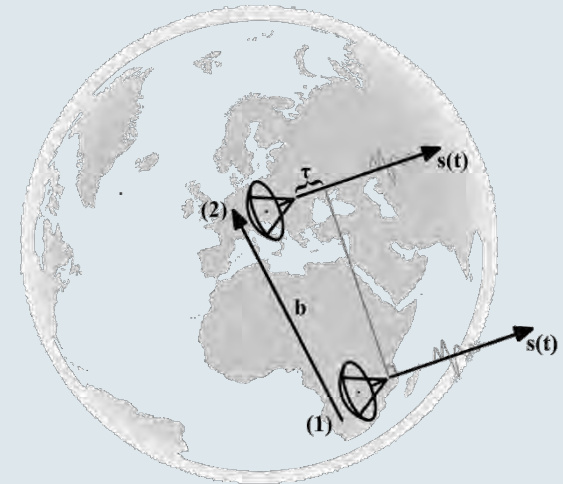
¹Vienna University of Technology, Vienna, Austria

²University of Tasmania, Hobart, Australia

³Shanghai Astronomical Observatory, Shanghai, China

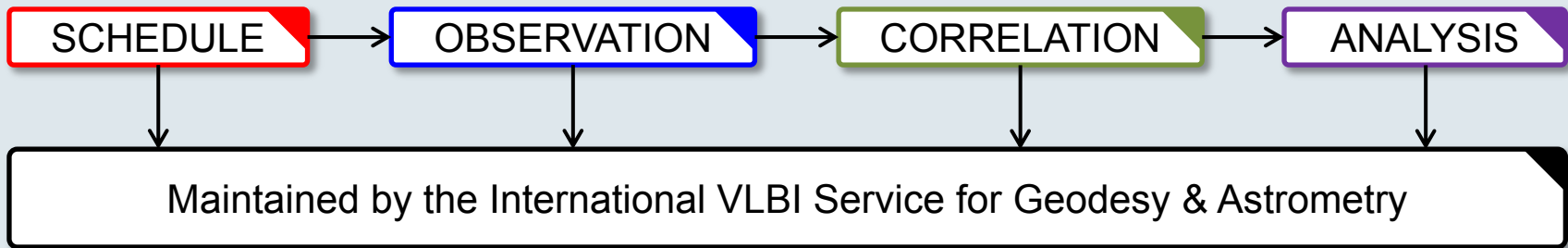
VLBI: Array of radio telescopes observe extragalactic sources.

Products: Reference Frames, Earth Orientation Parameters etc.



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VLBI workflow:



3 telescopes (12 m)

- Hobart
- Katherine
- Yarragadee

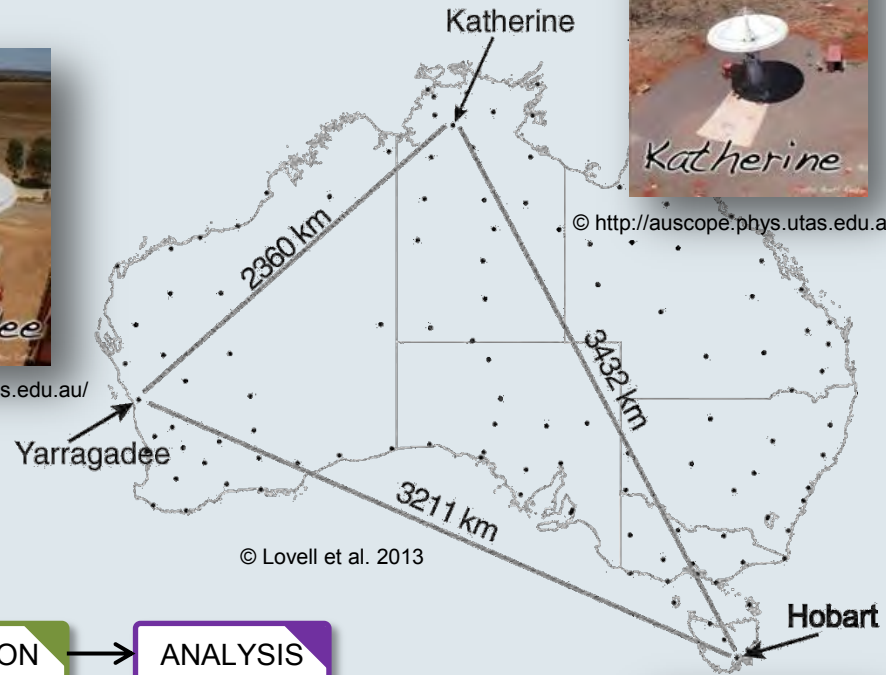
1 correlator facility



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Workflow from schedule to analysis carried out by AuScope



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Other participating telescopes:

- Hobart (Australia), 26 m telescope
- Warkworth (New Zealand), 12 m telescope
- HartRAO (South Africa), 26 m telescope
- HartRAO (South Africa) 15 m telescope



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Geodetic session

- Observe as many scans as possible to get good coordinate time series

Astrometric session

- Focus on southern sources – more observations to new sources

Twin experiment

- Experiments with the two sibling telescopes Hh – Ht and Ho - Hb

Continuous campaign

- Observing continuously for 15 days at least once a year



Catalogs are maintained at UTAS

- Synchronised with GSFC
- Own source lists
- Fast changes (e.g. SEFD, flux)

Schedules are prepared in Vienna

- Drafted on short notice
 - Latest files are used
 - Fast reaction to problems (e.g. warm receivers or drop out of stations)

Features of schedules

- No sources with less than 4 observations (iterative scheduling)
- A more evenly distribution of observations over sources
- No single baseline observations for astrometric schedules



Sibling telescope → 2 telescopes with different properties on the same site



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Problems for scheduling:

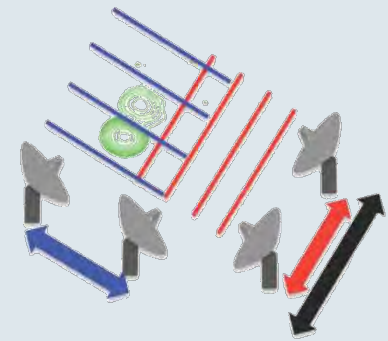
- Properties such as slew speed and SEFD are very different
- Many observations from both telescopes to the same source

Solution: Two schedules are created and then mixed



Effect of source structure on baselines

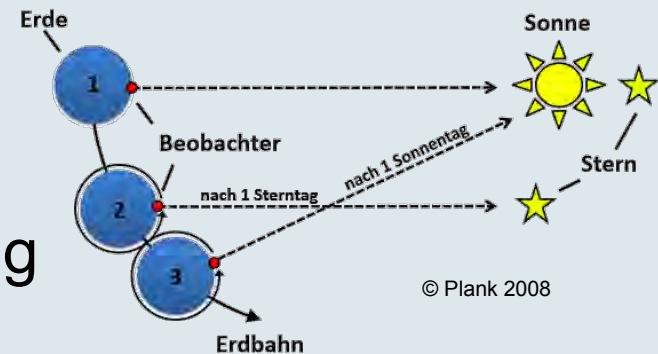
- Depends on orientation of baseline to source
- Systematic error in VLBI observations



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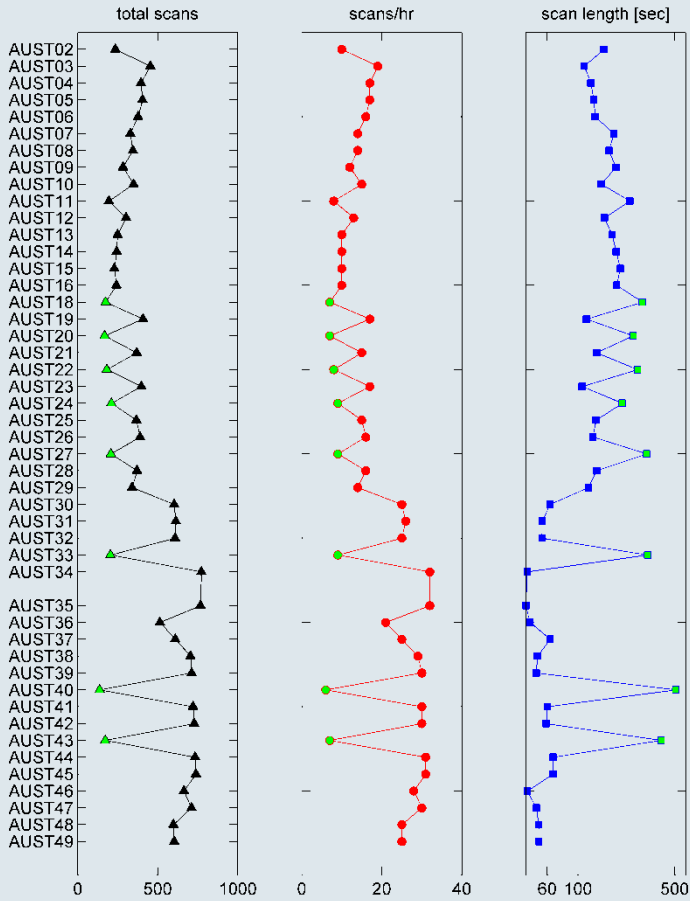
Error is reduced by sidereal scheduling

- Is used for the continuous campaign
- Same baseline source geometry in every session
- Error due to source structure is constant

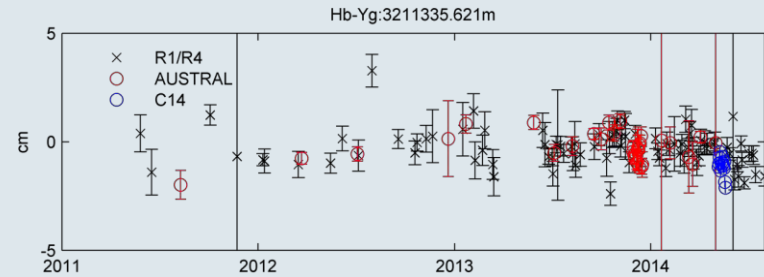
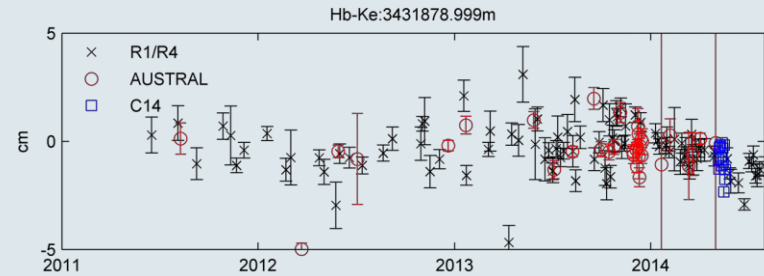
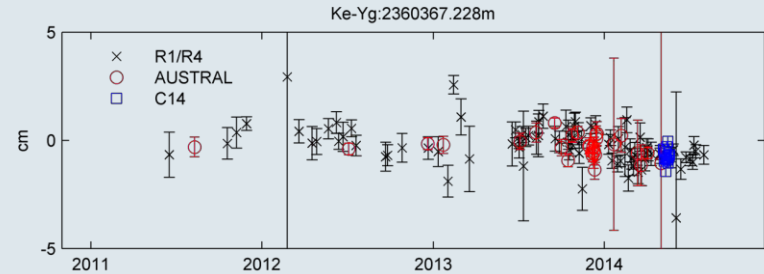


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Focus on sources with limited number of observations.

Source	Aust18	Aust20	Aust22	Aust24	Aust33	Aust40	Aust43
0002-478						s	s
0048-427						s	s
0122-003	x	x	x	x	s	s	s
0107-610	x		x				
0230-790	x	x	x	x	s	s	s
0312-770						s	s
0743-673					s	s	s
0758-737	x	x	x	x	s		
1030-590	n/d	n/d	n/d	n/d	s	s	
1336-237	x	x	x	x	s	s	s
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

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AuScope network

- 3 main telescopes + 4 telescopes which observe sometimes
- Workflow from schedule to analysis carried out by AuScope
- 4 different session types
 - Geodetic sessions – improve coordinate time series
 - Astrometric sessions – southern sources
 - Twin sessions – experiment with sibling telescopes
 - Continuous sessions – sidereal schedules