

## LOFAR Development Roadmap

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On behalf of the LOFAR development team

LOFAR Community Science Workshop  
April 7, 2014



## LOFAR Development Roadmap

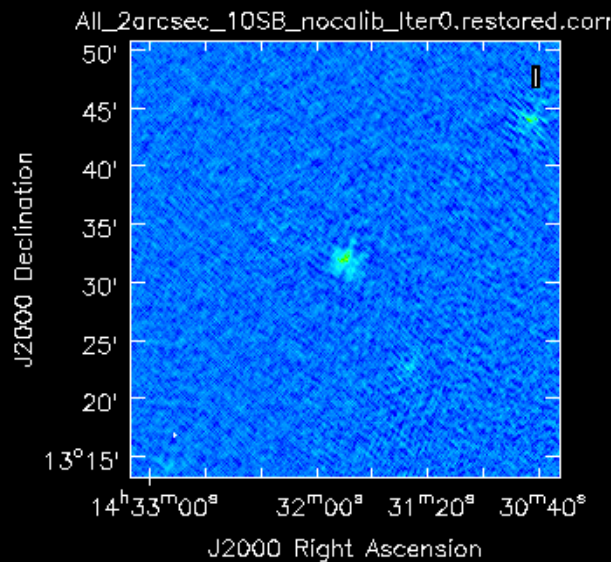
Calibration and Imaging Tiger Team  
Kickoff of 3R Development Plan  
Formation of Long-baseline Team

LOFAR Community Science Workshop  
April 7, 2014



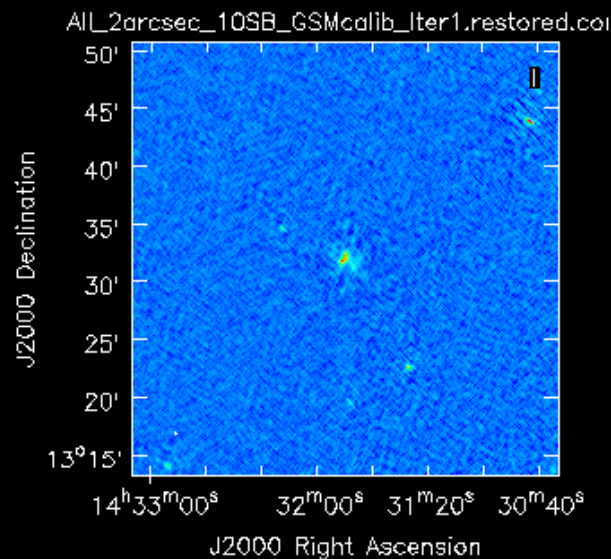
- **Dedicated Imaging and Calibration Tiger Team (Group Leader: G. Heald)**
- **Goal is to reach thermal noise limited imaging with the automated pipeline**
- **Many topics (self-cal, DD effects, performance, smart-demixing, etc.)**

## *No phase calibration*



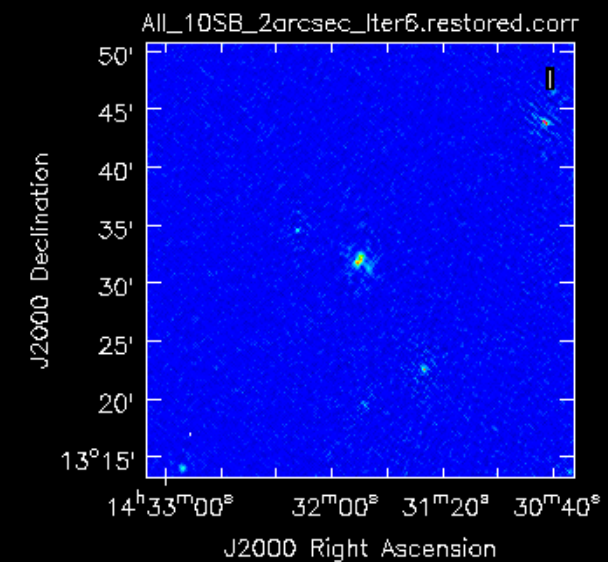
*50 mJy*

## *GSM calibration*



*10 mJy*

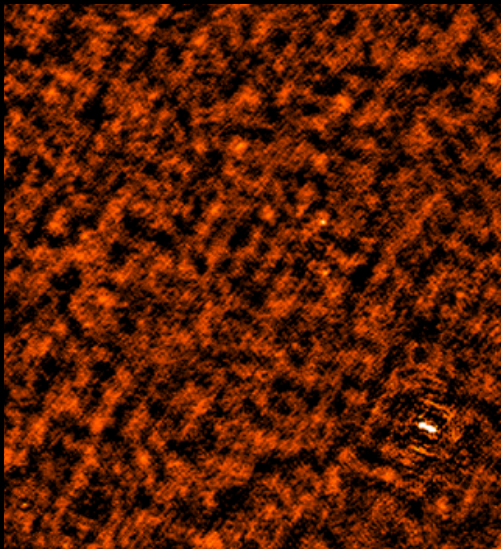
## *Self-calibration*



*2 mJy*

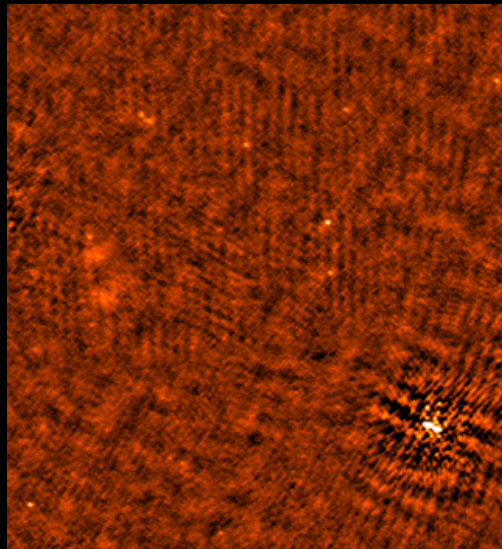
- Dedicated Imaging and Calibration Tiger Team (Group Leader: G. Heald)
- Goal is to reach thermal noise limited imaging with the automated pipeline
- Many topics (self-cal, DD effects, performance, smart-demixing, etc.)

*Only Self-calibration*



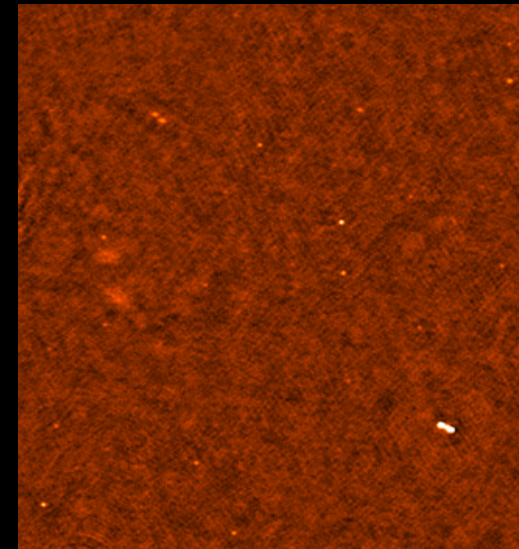
*10x thermal*

*DD cal. (40 directions)*



*3x thermal*

*DD cal. (100 directions)*



*thermal*

## *Project Leader: Hanno Holties*

### **Relief**

- Improve support for LOFAR operational activities and processes
- Reduce pressures of manual operations on Science Support personnel

### **Robustness**

- Minimize need for users to check for and act on unexpected behaviour
- Software to truthfully and consistently maintain and report state
- Software to be maintainable and robust against component failures
- Design for minimal effort required to incorporate (future) changes

### **Responsiveness**

- The system is to support triggers and dynamic behaviour
- Performance requirements from operational processes and science cases

## Project Organization

- ILT committed software development effort at ASTRON ~8 FTE
- Core formed by Observatory Software Support Group
- Contributions from ASTRON R&D, Astronomy Group, GLOW
- Project plan covers 2014 - 2015
- Project lead Hanno Holties

## Challenges

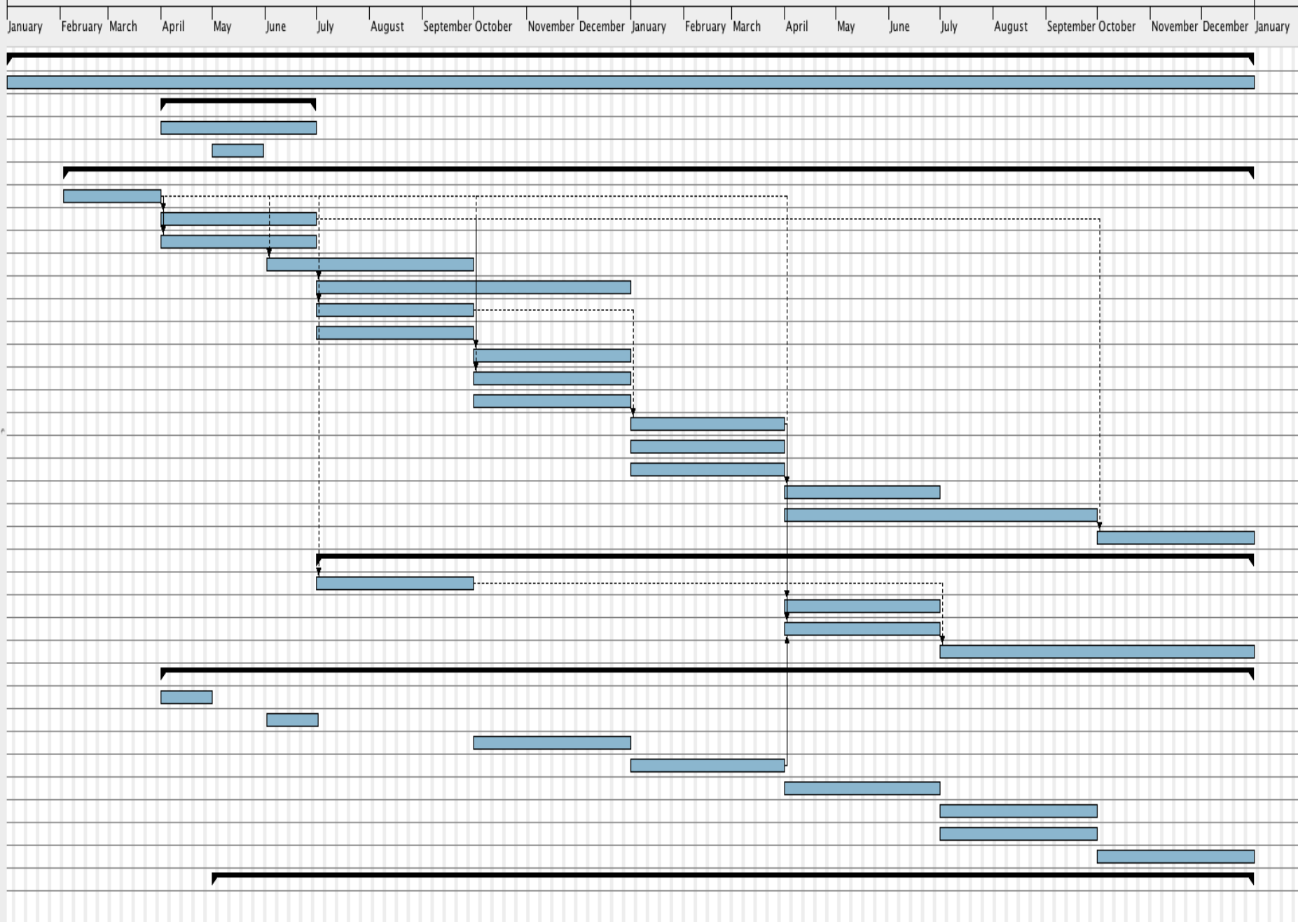
- Incorporate efforts for maintenance and support
- Resource competition from other projects (COBALT, Apertif, etc.)
- Reliable task estimation and planning

## *Development of functional blocks in tracks by core teams*

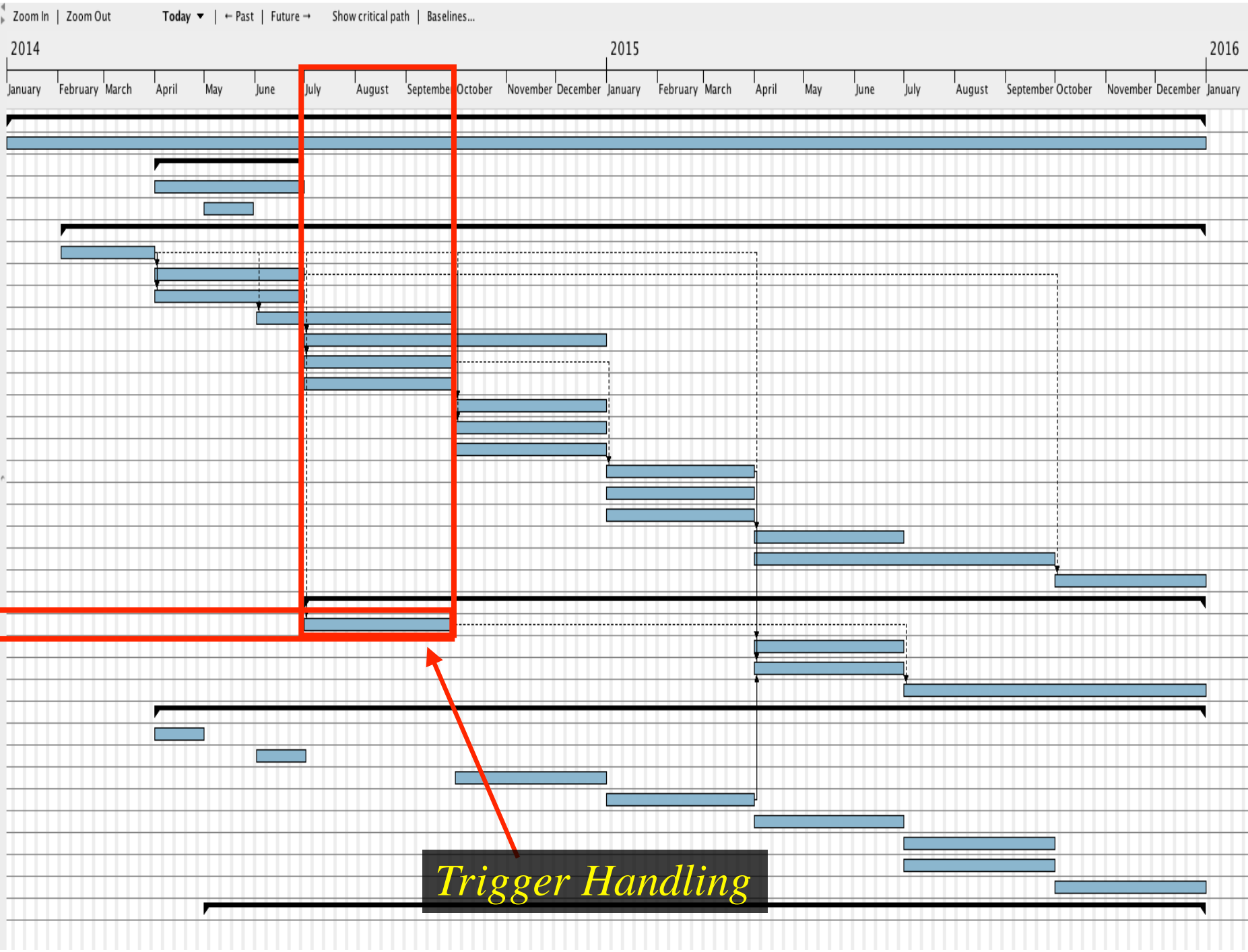
- **Clear goals per track**
  - *Primary deliverable(s): realistic & ready by the end of track*
  - *Secondary deliverables: Prioritized, finish as many as possible*
- **“Time boxed”: tracks have fixed start and end time**
  - *Unfinished secondary deliverables are returned to the backlog*
- **One lead engineer for each track**
  - *Responsible for achieving goals (time, functionality)*
  - *Reports in meetings and to 3R project lead*
- **Small core team for each track**
  - *More than one developer*
  - *Contributions from/to other teams*



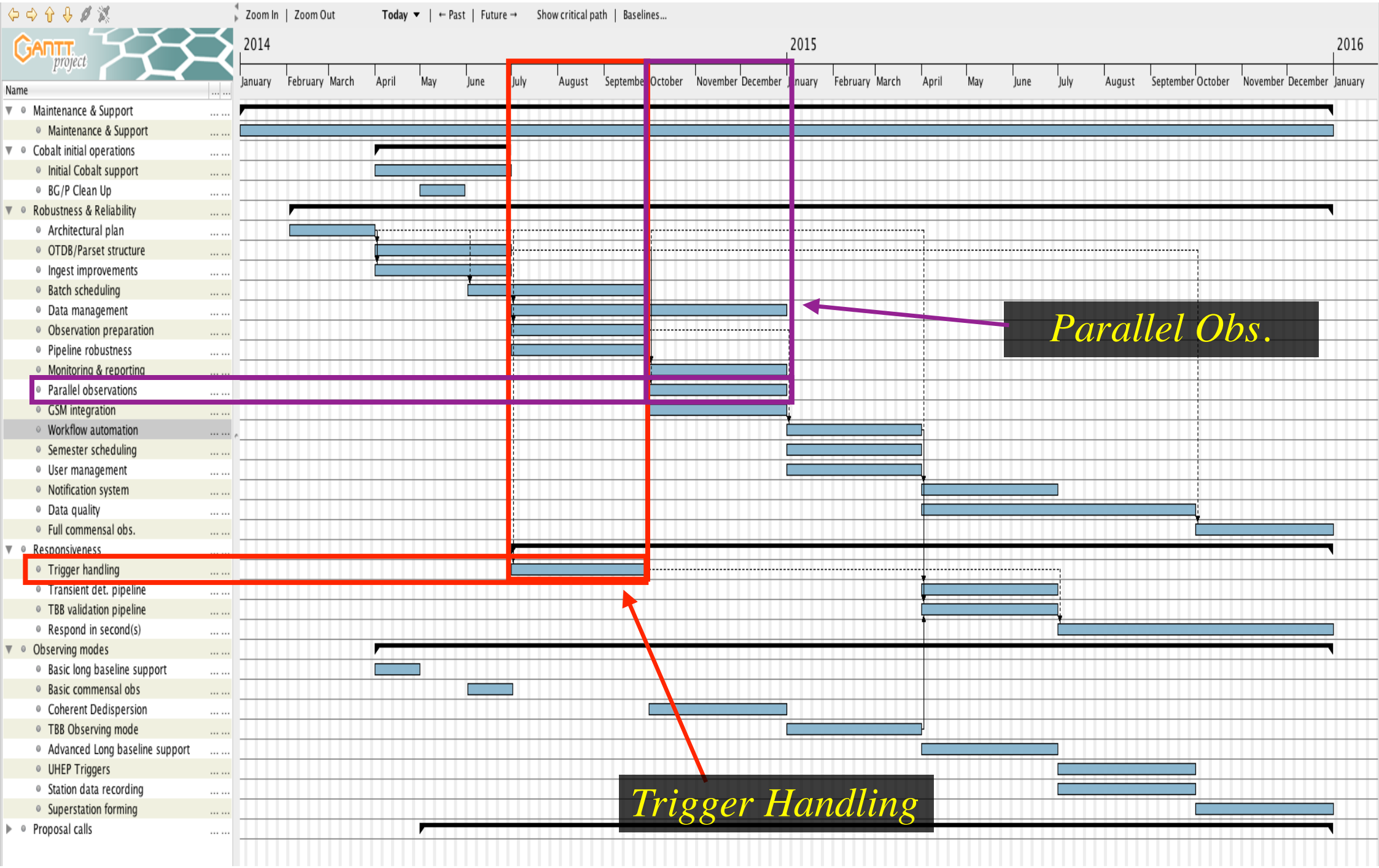
- Name
- ▼ Maintenance & Support
  - Maintenance & Support
- ▼ Cobalt initial operations
  - Initial Cobalt support
  - BG/P Clean Up
- ▼ Robustness & Reliability
  - Architectural plan
  - OTDB/Parset structure
  - Ingest improvements
  - Batch scheduling
  - Data management
  - Observation preparation
  - Pipeline robustness
  - Monitoring & reporting
  - Parallel observations
  - GSM integration
  - Workflow automation
  - Semester scheduling
  - User management
  - Notification system
  - Data quality
  - Full commensal obs.
- ▼ Responsiveness
  - Trigger handling
  - Transient det. pipeline
  - TBB validation pipeline
  - Respond in second(s)
- ▼ Observing modes
  - Basic long baseline support
  - Basic commensal obs
  - Coherent Dedispersion
  - TBB Observing mode
  - Advanced Long baseline support
  - UHEP Triggers
  - Station data recording
  - Superstation forming
- Proposal calls

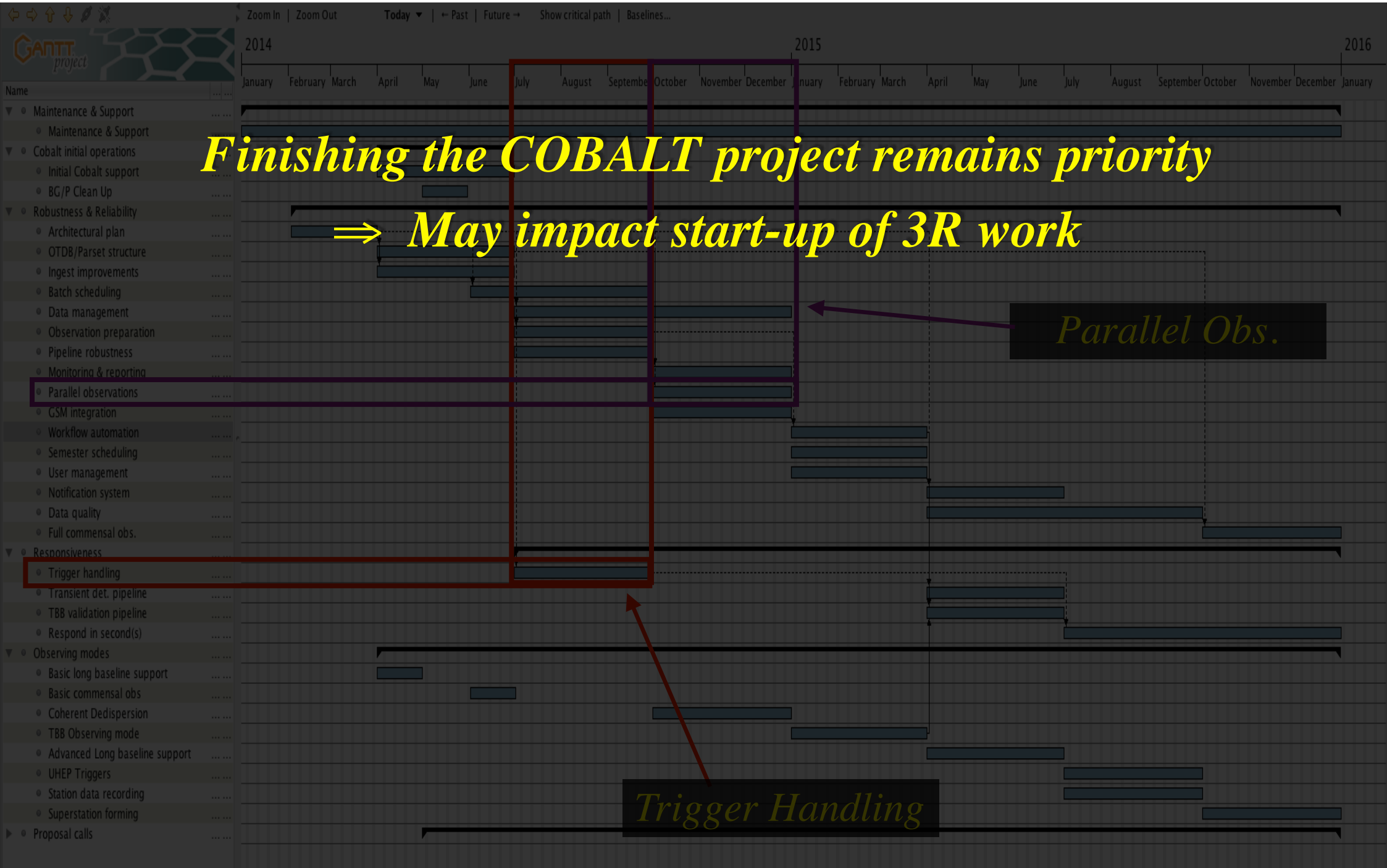






*Trigger Handling*





## Team Communication

- Daily standup meetings (complete 3R team, focus on bottlenecks)
- Weekly planning (complete 3R team, planning 1+ weeks)
- Weekly coordination (lead engineers, focus on priorities and progress)

## Resource Management

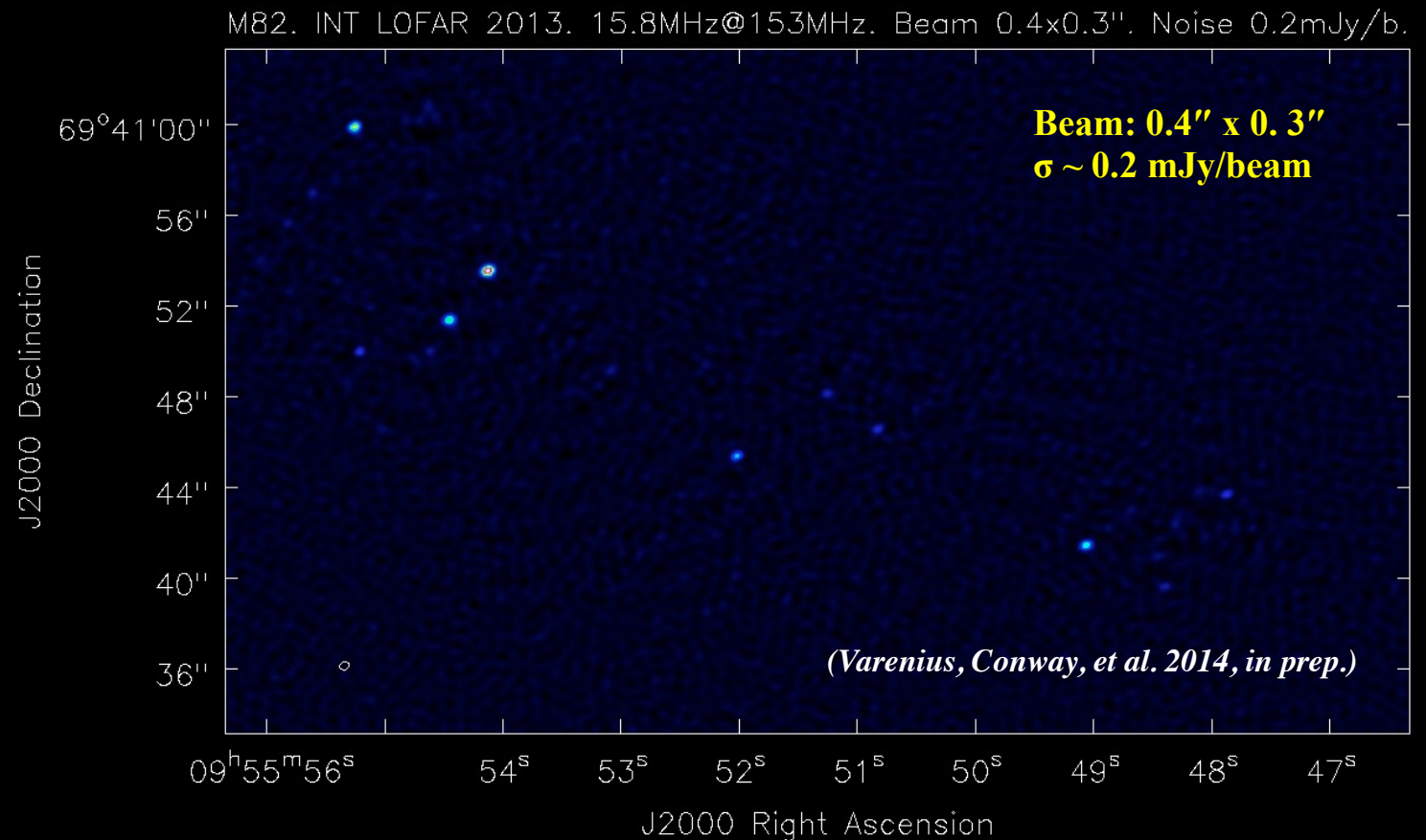
- ASTRON resource planning (~4x per year, allocate ASTRON resources)
- KSP PIs meetings (~2x per year, present planning and collect feedback)
- ILT board meetings (~2x per year, present planning, formal approval)

- **Small, dedicated team to develop long-baseline imaging**
- **Goal is to develop prototypes and oversee integration into operational system**
- **J. McKean, A. Deller, M. Brentjens, +Developer, +LB Working Group**

*Low-level effort*

*Initial prototype  
integration underway*

*Longer term planning*



# Summary

*Active development of imaging pipeline*

*New 3R development team formed and underway*

*Two year project plan available and being reviewed*

*COBALT timeline may delay start of 3R project*

*Modest long-baseline development planned*



**LOFAR**

**The End**