

Receivers in the New Parkes Operations Model

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Outline

- Parkes Operations Model Background focused on receivers.
- Ad interim solution: implementation and results.
- New receiver fleet outline (to set the scene for science and tech details talks).



New operations model background

- The new Parkes Operations model is on since October 2012
- Based on the following inputs:
 - To keep "The Dish" delivering cutting-edge science
 - Reduced staff support
 - Remote Operations
 - Reduced instrumentation complexity
 - Focused on projects requiring less support
 - Progressive reduction of support
 - Moderate reduction for the first 2-3 years of new operations model
 - Ultimate goal of 40% over the years (5 year time)



Implementation

- Reduced support, especially Science Operations (SO).
- No after hour support (SO or EO) except in case of emergency (safety of telescope or people on site).
- Remote observations.



Remote Observations

Remote observations and reducing complexity to cope with that

• Remote observations:

- No need of manual reconfigurations during operations (switch matrix, new MCP, new generator, drive UPS, TPS, ...)
- Many automatic setups
- Require simpler training => Most of it can now be self-accomplished by the user (online training)
- Monitoring and alert software (FROG, PORTAL,...)
- Setup specific to individual projects looked after by project team members (Project Expert)



Reducing complexity

• Remote observations and reducing complexity to cope with that

• Reducing complexity:

- Smaller number of receiver changes
- Reduced system complexity
- Reduced project diversity



Overall strategy

- The strategy to obtain the needed simplification is in three steps:
- 1. Long term strategy for receivers
 - Replacing the entire fleet with a smaller number of Ultra Wide Receivers and a new array (PAF).
- 2. Ad interim solution
 - Based on current receiver fleet
 - Reduced number of receiver changes
- 3. Backends
 - Decommissioning a few backends.
 - Mostly those redundant, with no or marginal loss of capability



AD INTERIM SOLUTION: receiver changes

- Reducing number of receiver changes has been essential to cope with support cut and no support after hours (except emergencies)
- receiver changes require significant support
 - Setup and calibration
 - Resolving receiver related faults (mostly associated to receiver changes)
 - Keeping track of project related to the installed receivers
- Smaller number of system changes => higher reliability (essential for no support after hours)
- Reduced receiver availability
 - less project diversity,
 - Required to cope with reduced support



Receiver changes

- Receiver changes reduced to 6 a semester (Since October 2012)
- Receivers to use are decided at any semester accounting for:
 - Scientific merit of proposals
 - Compatibility with the 6 receiver changes
 - Compatibility with reduced amount of support
- Most demanded receiver by highly ranked projects has continued to be:
 - MB-20
 - 10/50cm
 - Up most of the time
- Other receivers have been scheduled for up to 4 week time each
- Unscheduled highly ranked projects kept for the next semester



Receivers used in the first semesters

• (besides MB-20 and 10/50cm)

In these first two semesters (12OCT, 13APR)

- H-OH: a highly ranked large project has required H-OH for long runs twice a semester.
- 2-3 high frequency receivers scheduled for VLBI a semester.
- Not much demand for other receivers otherwise.
- Real or because of the feeling of few chances to get scheduled?

Overall the new model has worked well:

- Highly ranked projects has got time and the requested receiver scheduled.
- A highly ranked project not scheduled in 13APR, but scheduled in 13OCT (74 MHz).
- Another highly ranked project not scheduled in 13OCT: rank kept for the next semester (MARS).
- Some small impact, as expected, but overall it has worked well.



IMPACT ON TELESCOPE USAGE?

Frequency	Receiver	Usage (2009-2011)	Usage (120CT-13APR)
1.2-1.6 GHz	MB-20	54.4 %	63.2 %
700-764 MHz 2.6-3.6 GHz	10/50 cm	16.4 %	14.2 %
1.2-1.8 GHz	н-он	5.5 % (now ~1%)	15.0 %
2.2-2.5 GHz	GALILEO	4.6 % (now ~1%)	0.0 %
6.0-6.7 GHz	Methanol 6	2.4 %	1.1 %
8.1-8.5 GHz	MARS	2.4 %	2.5 %
2.3+8.5GHz (S/X) 5 GHz (C)	Multi band (S/X , C)	1.4 %	1.5 %
12-15 GHz	Ku	0.4 %	0.0 %
16-26 GHz	13 mm	4.3 %	2.2 %



A NEW RECEIVER FLEET: long term solution

• Ideal solution:

- Replacing the entire fleet with a smaller number of receivers
- Permanently installed in focus cabin (F/C)
- Eliminate the need of receiver changes: increase reliability, reduce support needs
- Without limiting the telescope scientific capability
- More: it will increase it!
- And will reduce complexity.
- Room available in Focus Cabin (F/C)
 - One large array
 - Two single pixel receivers.
- PAF to replace the 20cm multibeam
- Two Ultra Wide Band receivers to cover 0.7-26 GHz to replace the other rx



1) PAF

Phase Array Feed (PAF) array:

- 700-1800 MHz
- Same number of beams as ASKAP (36).
- T_{sys} = 40-50 K
- Science: see Naomi's talk
- Details on assessment: see Graeme's talk



2) UWB low frequency

- 0.7-4.0 GHz
- 6:1 ratio frequency range
- Cryogenic
- Tsys = 30-35 K
- Science: see Dick's talk
- Details on assessment: see Graeme's talk



3) UWB high frequency

- To cover 4-26 GHz
- 6:1 ratio feeds are too challenging at this frequency range
- Two sub-packages. Possible option:
 - 4-14 GHz
 - 12-26 GHz
 - To extend it down to 2.3 GHz?
 - To assess the best frequency range for the high frequency packages
- T_{sys} = 30 K (4-14 GHz)
- T_{sys} = 60-100 K (16-26 GHz)
- Science: see Simon's talk
- Details on assessment: see Graeme's talk



NEW RECEIVER FLEET: benefits

- Increase flexibility and agility (all frequencies always available)
- State-of-the-art broadband receivers: to open new space of parameters (high potential for new discoveries)
- Many new frequency bands covered.
- Survey receiver (PAF) will cover ~3x larger band than MB-20.
- Scientific potential of Parkes will be dramatically improved.
- No receiver changes: increase reliability, reduce support need
- Reduce complexity (smaller number of systems)
- Preserve leading position in receiver development (both PAFs and UWB receivers are among SKA plans)
- Funds and resources to be pursued

Thank you

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