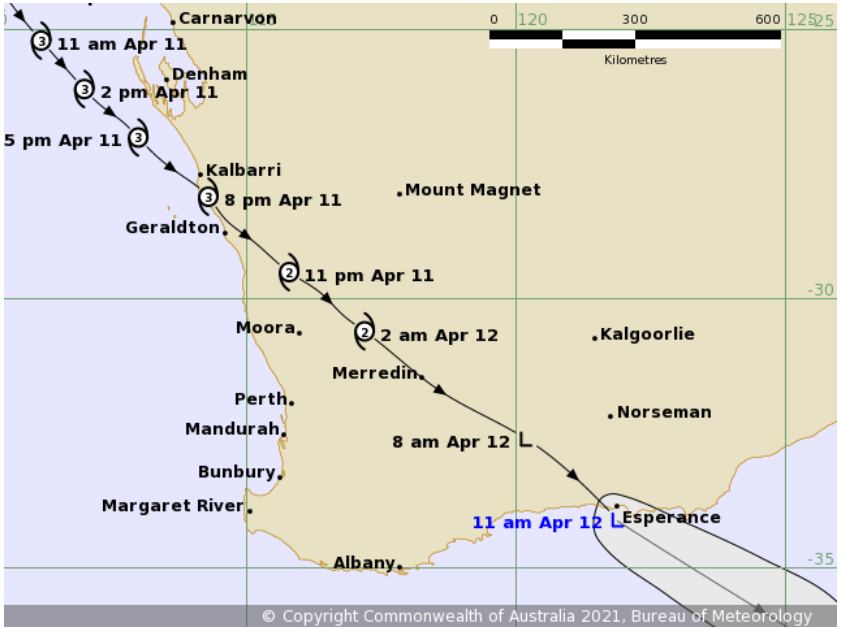
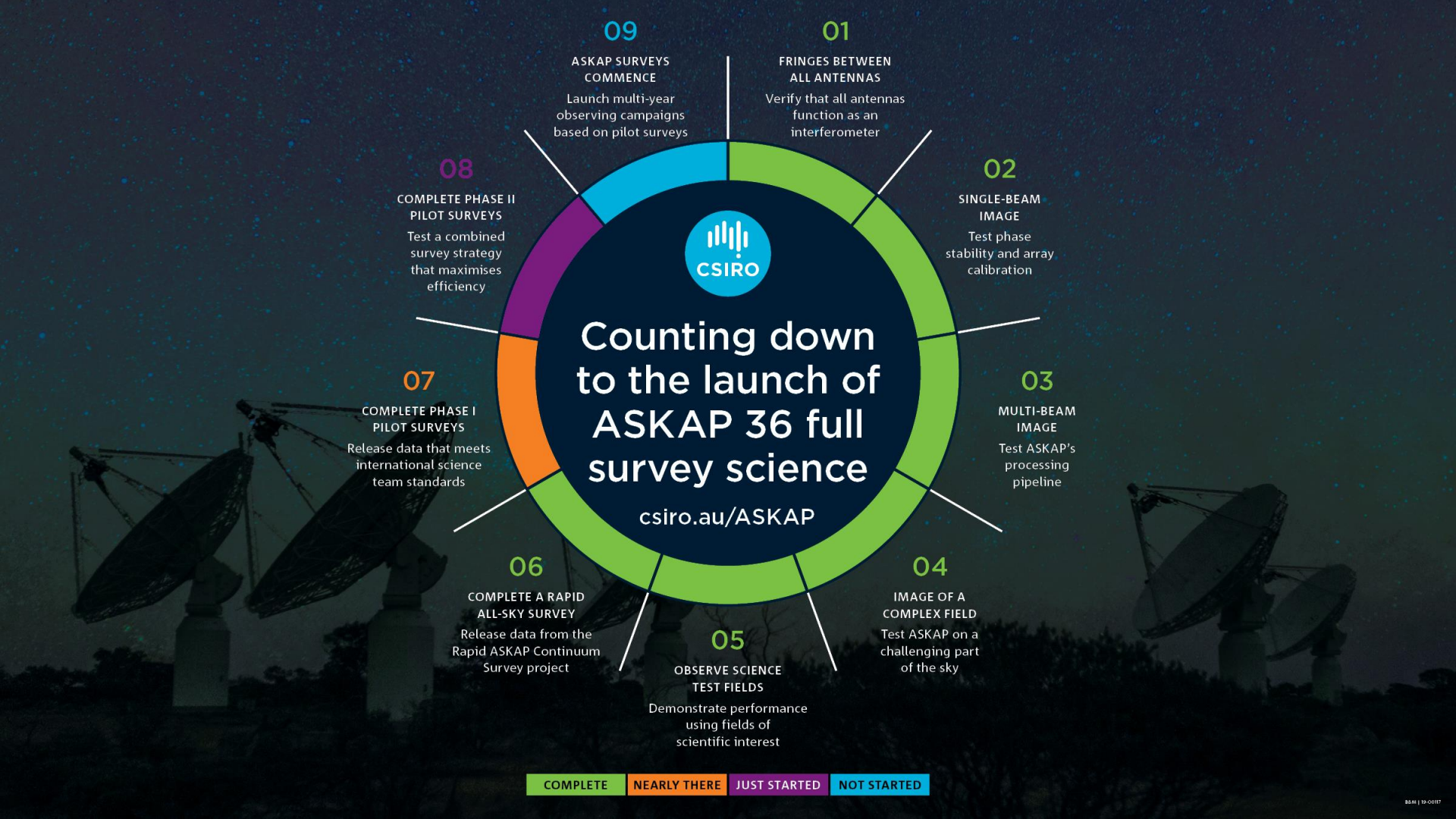
ASKAP Update for ATUC

Aidan Hotan

Tropical cyclone Seroja

- No staff at the MRO, but ASKAP monitoring shows no problems
  - Winds reached about 65 km/h at site, antennas pre-stowed, 4.4 mm of rain
- Network to MRO depends on mains power at repeater stations
  - Battery backup for at least 24 hours
  - ASKAP switched to low-power mode on Monday afternoon for safety in case of network disruption
  - Normal operations will resume when grid power is restored to the region




09
ASKAP SURVEYS COMMENCE
Launch multi-year observing campaigns based on pilot surveys
01
FRINGES BETWEEN ALL ANTENNAS
Verify that all antennas function as an interferometer
08
COMPLETE PHASE II PILOT SURVEYS
Test a combined survey strategy that maximises efficiency
02
SINGLE-BEAM IMAGE
Test phase stability and array calibration
CSIRO
Counting down to the launch of ASKAP 36 full survey science
csiro.au/ASKAP
07
COMPLETE PHASE I PILOT SURVEYS
Release data that meets international science team standards
03
MULTI-BEAM IMAGE
Test ASKAP's processing pipeline
06
COMPLETE A RAPID ALL-SKY SURVEY
Release data from the Rapid ASKAP Continuum Survey project
04
IMAGE OF A COMPLEX FIELD
Test ASKAP on a challenging part of the sky
05
OBSERVE SCIENCE TEST FIELDS
Demonstrate performance using fields of scientific interest
COMPLETE
NEARLY THERE
JUST STARTED
NOT STARTED

Pilot Surveys Phase II

- Testing readiness for sustained survey operations

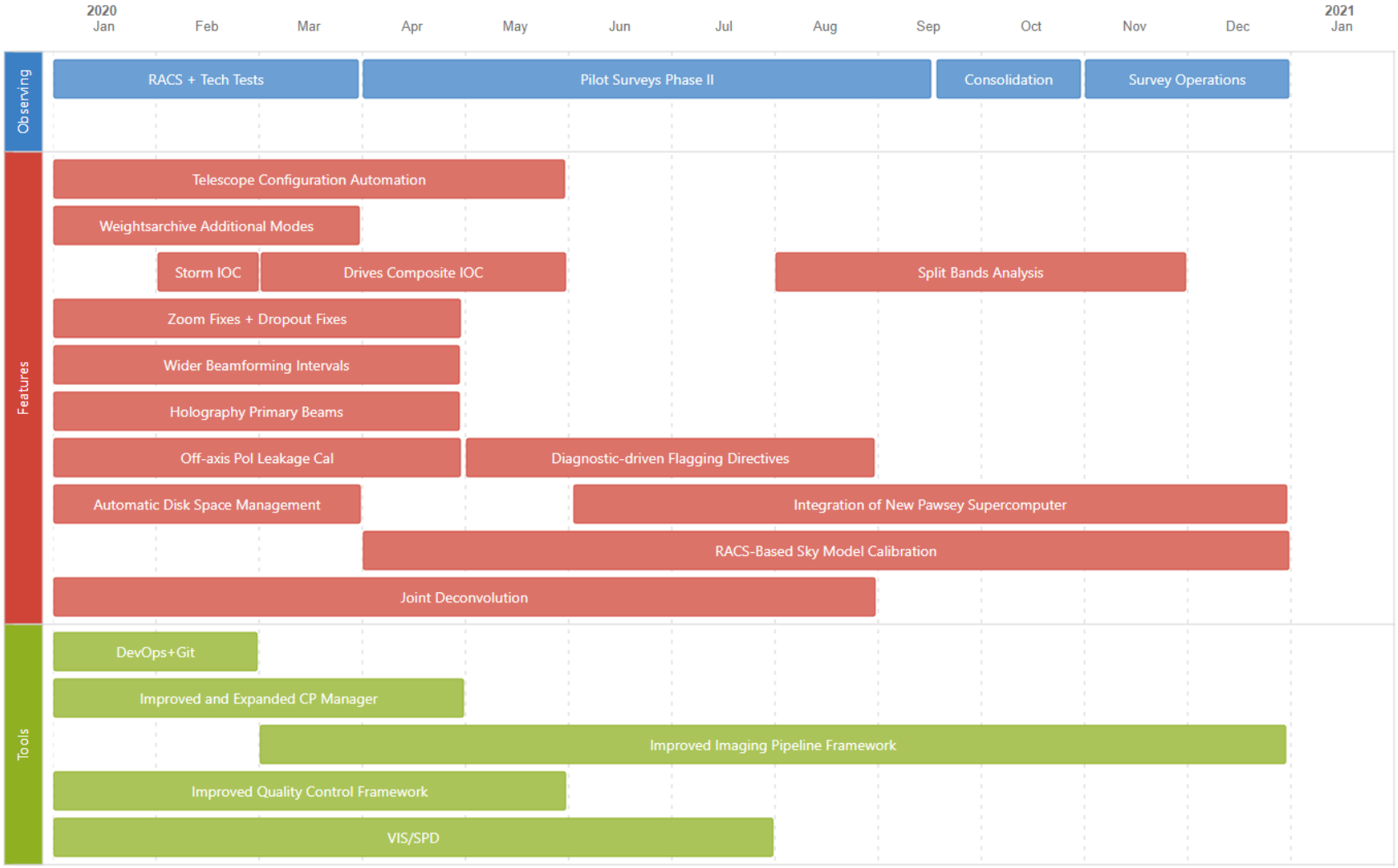
- Technical tests (Verifying changes to the telescope)
- Quality gates (Confirming data content and quality)
- Science targets (Providing prompt access to processed data)

- Autonomous scheduling (see Vanessa's talk)

- Data access via CASDA only (for science targets)

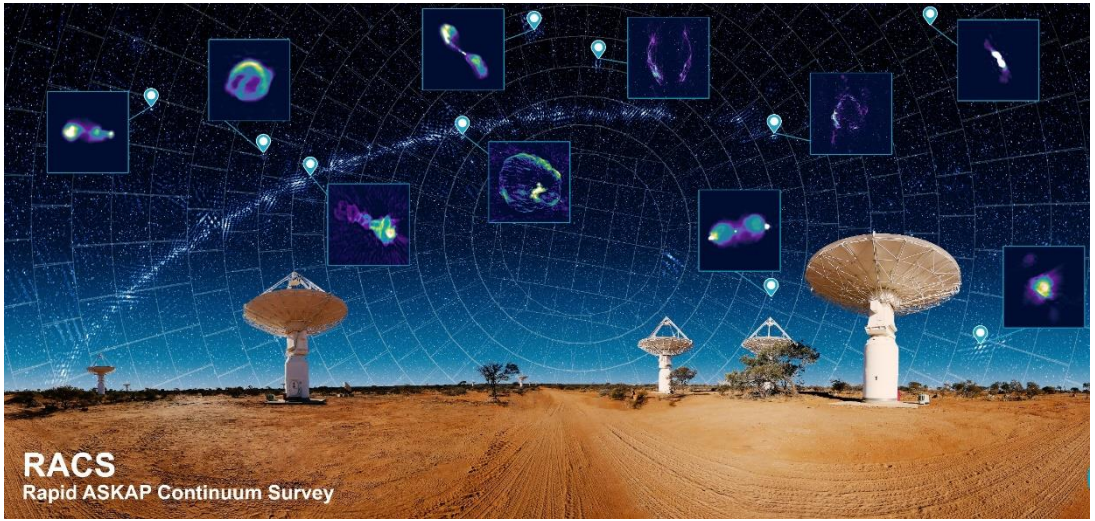
System Development Update

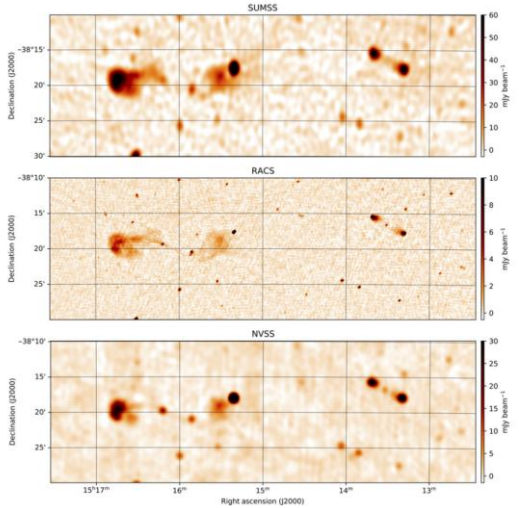
- Correlator stability (channel dropout) investigations ongoing
- ASKAPsoft restructure and performance improvements
- Zoom mode operational support
  - Beam weights archive updates in progress, knowledge of spectral windows
  - Fringe rotation now works correctly on long baselines in zoom modes
- Holography primary beam correction support
  - Implemented in ASKAPsoft 1.1, tested for Stokes I on previous RACS fields
    - Field-averaged flux scale correct to 1% (10% with Gaussian beam model)
  - Pipeline support soon, will need to measure beams for all footprints


2020
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2021
Jan
Observing
RACS + Tech Tests
Pilot Surveys Phase II
Consolidation
Survey Operations
Features
Telescope Configuration Automation
Weightsarchive Additional Modes
Storm IOC
Drives Composite IOC
Split Bands Analysis
Zoom Fixes + Dropout Fixes
Wider Beamforming Intervals
Holography Primary Beams
Off-axis Pol Leakage Cal
Diagnostic-driven Flagging Directives
Automatic Disk Space Management
Integration of New Pawsey Supercomputer
RACS-Based Sky Model Calibration
Joint Deconvolution
Tools
DevOps+Git
Improved and Expanded CP Manager
Improved Imaging Pipeline Framework
Improved Quality Control Framework
VIS/SPD

Rapid ASKAP Continuum Survey

- RACS band 1 fully released, global catalogue paper submitted
- RACS band 2 fully observed, awaiting processing
- RACS band 3 strategy to be determined
  - Could be done as filler during Pilot Surveys Phase II observations in band 3





SWAG-X Observatory Project

- SWAG-X: Survey With ASKAP of GAMA-09 + X-ray
  - This evolved from the MoU between AAL/eROSITA DE, and from discussions with the eROSITA team about multi-wavelength data to support eFEDS
- Consultation with existing ASKAP survey science teams (SSTs) was used to develop SWAG-X in a way that maximised science for SSTs
- SWAG-X observations started 1st November 2019 (also a test observation done in October 2019)
  - The October continuum-only test has been released already
  - Spectral processing ongoing at high priority to clear disk space

Field	Freq	Int (hr)	RMS	Footprint	Pitch	Tiles	Timescale	Mode
eFEDS-low	888 MHz	2 x 8	~20 µJy	closepack36	1.05	3 x 2	Observed	Continuum + spectral
eFEDS-high	1296 MHz	2 x 8	~20 µJy	closepack36	0.9	3 x 2	Observed	Continuum + spectral

Science Data Processing

- Full surveys will require ongoing improvements
  - Data throughput needs to increase and latency decrease
  - Software patches need to occur more frequently and with less risk
  - Standard modes need to be established for each survey

- 1-week turn-around is possible but needs to become routine
  - Automation of pipeline launch and recovery
  - Address common reasons for job failures (in conjunction with Pawsey)

- Continued improvement of validation and release workflows
  - Communication with team representatives, tracking of job status

- Migration to Setonix (upgraded Pawsey supercomputer) later this year

CASDA Highlights

- Rapid ASKAP Continuum Survey (RACS)
  - First all-sky continuum survey with ASKAP, first band at 888 MHz
  - All 903 fields deposited and released in Dec
  - More than 2000 sessions/users accessed RACS data collection pages in Dec

- ASKAP Pilot Survey Phase I data now available
  - All EMU, VAST, WALLABY released
  - Other SSTs: all or some data in CASDA, validation and release pending

- Pilot Survey Phase I processing is getting close to completion
  - FLASH is the largest outstanding survey
  - DINGO has three low-band fields remaining

CASDA News

- Pawsey moving to new Ceph/S3 storage
  - 50 PB of disk-based object storage
  - Plan is for this (or some of it) to be available August 2021
  - CASDA expected to live entirely on object storage (no more tape!)

- May/June 2021 development must prioritize this storage migration

- Very limited development time for other enhancements

Future CASDA Plans

(All subject to funding)

- Stage 4.1 (July to Oct 2021)
  - Migrate to new servers at Pawsey (Nimbus)
  - Cutover to new Pawsey storage
  - Performance testing on new Pawsey storage and servers
  - UI enhancements (e.g. improve accessibility of cutout service)
  - Enable partial release of a single SBID

Future CASDA Plans

(All subject to funding)

- Stage 4.2 (July to Oct 2022)
  - Enhancements to search for commensal observations
  - Improve validation workflow for large datasets
  - Support ATCA (BIGCAT) and Parkes (UWL + CryoPAF) data
  - Migrate ATOA (ATCA and Parkes raw data only)
  - Install CARTA visualisation tool
- Stage 4.3 (Feb to June 2023)
  - Improve file transfer: investigate new methods to transfer files, improve download speeds
  - SST support, TBD by user feedback

Questions for ATUC

- Regarding Pilot Surveys:
  - Is the community ready to transition into full survey mode upon conclusion of Pilot Surveys Phase II?

- Regarding CASDA:
  - Is the planned prioritisation okay?
  - Could do some Stage 4.2/4.3 work earlier, at the cost of delaying other items
    - Note that 4.1 is essential (migration to new servers at Pawsey)
  - What sort of training material would be helpful?
    - More videos? Example scripts?