

Overview of Observation Preparation and Scheduling on the MeerKAT Radio Telescope

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The MeerKAT radio telescope performs a wide variety of scientific observations. Observation durations range from a few minutes, to many hours, and may form part of observing campaigns that span many weeks.

The short term scheduling functionality has expanded from simple queues to support for automatic scheduling (queuing). To support long term schedule planning, the MeerKAT telescope includes an Observation Planning Tool which provides configuration checking as well as dry-run environments that can interact with the production system. Observations are atomized to support simpler specification, facilitating machine learning projects and more flexibility in scheduling around engineering and maintenance events.

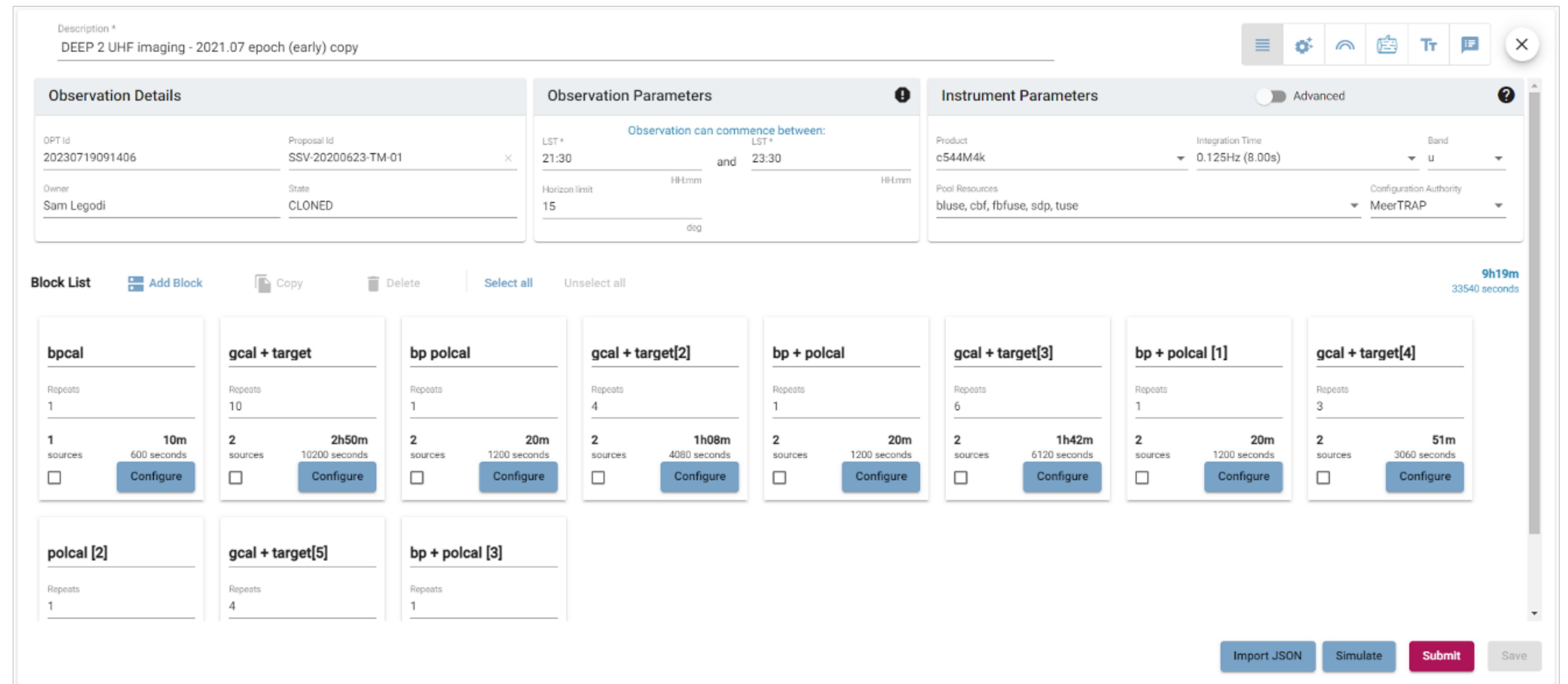


Figure: Configuring an observation using the MeerKAT Observation Planning Tool interface

The MeerKAT Radio Telescope is composed of 64 antennas. Subsets of antennas may be selected and grouped along with other resources into a controllable collection known as a **subarray**. MeerKAT can instantiate up to 6 independent subarrays, each with its own tasks and observation schedule.

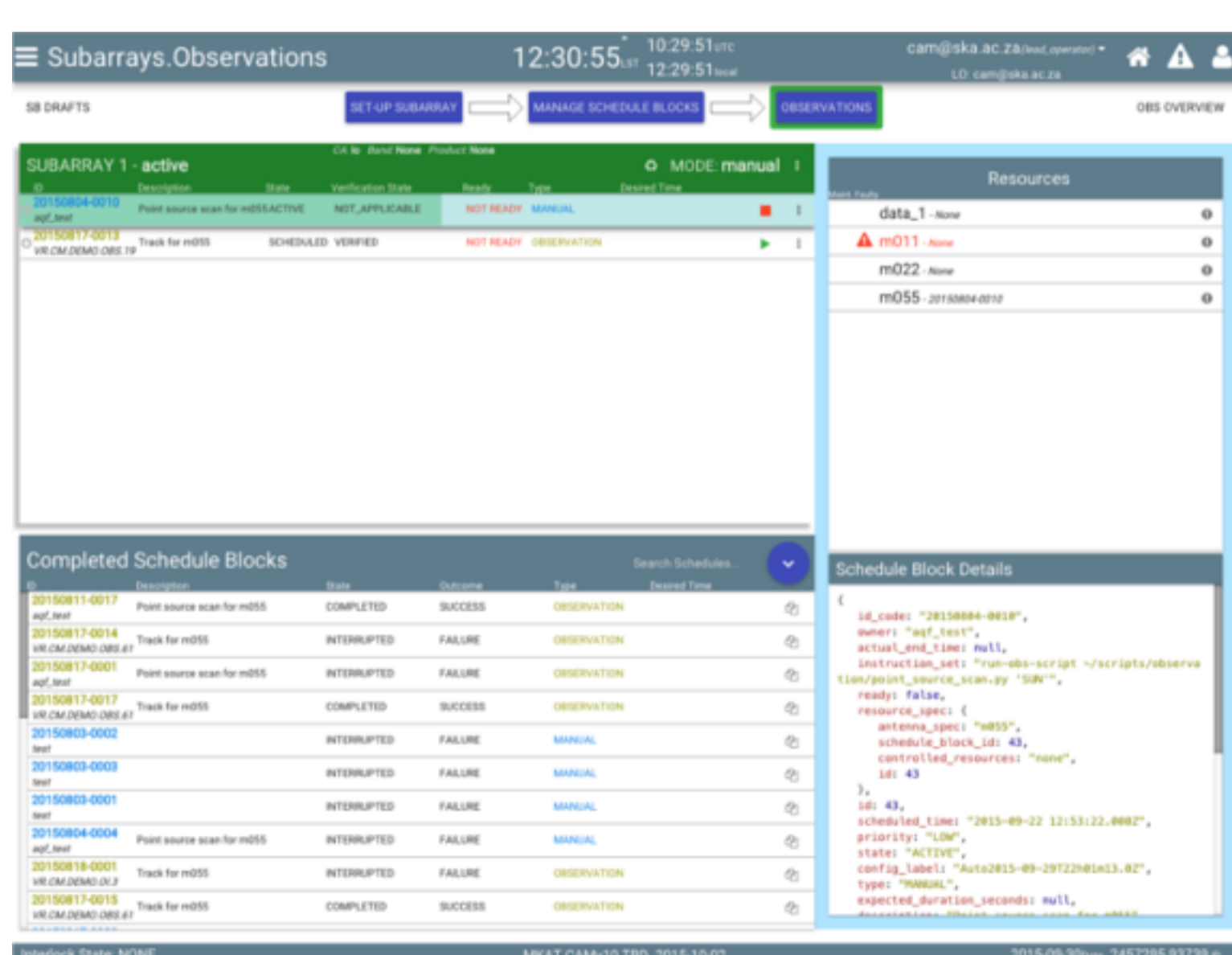
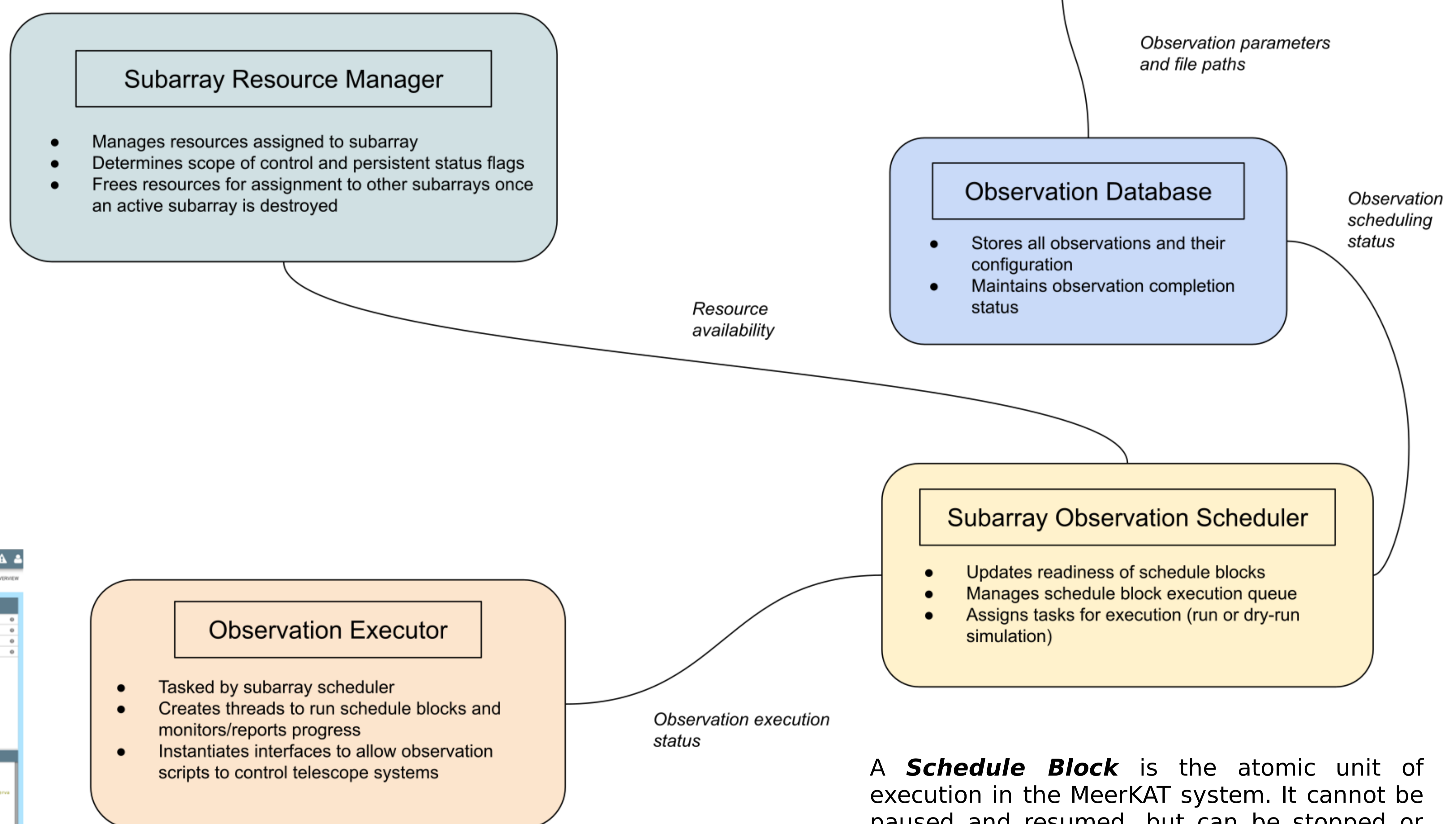


Figure: Managing the scheduling queue and observations using the MeerKAT Control and Monitoring graphical user interface

A **Schedule Block** is the atomic unit of execution in the MeerKAT system. It cannot be paused and resumed, but can be stopped or cancelled. Schedule blocks can be grouped and arranged to execute complex observation campaigns that last many hours.



Photos courtesy of South African Radio Astronomy Observatory (SARAO)