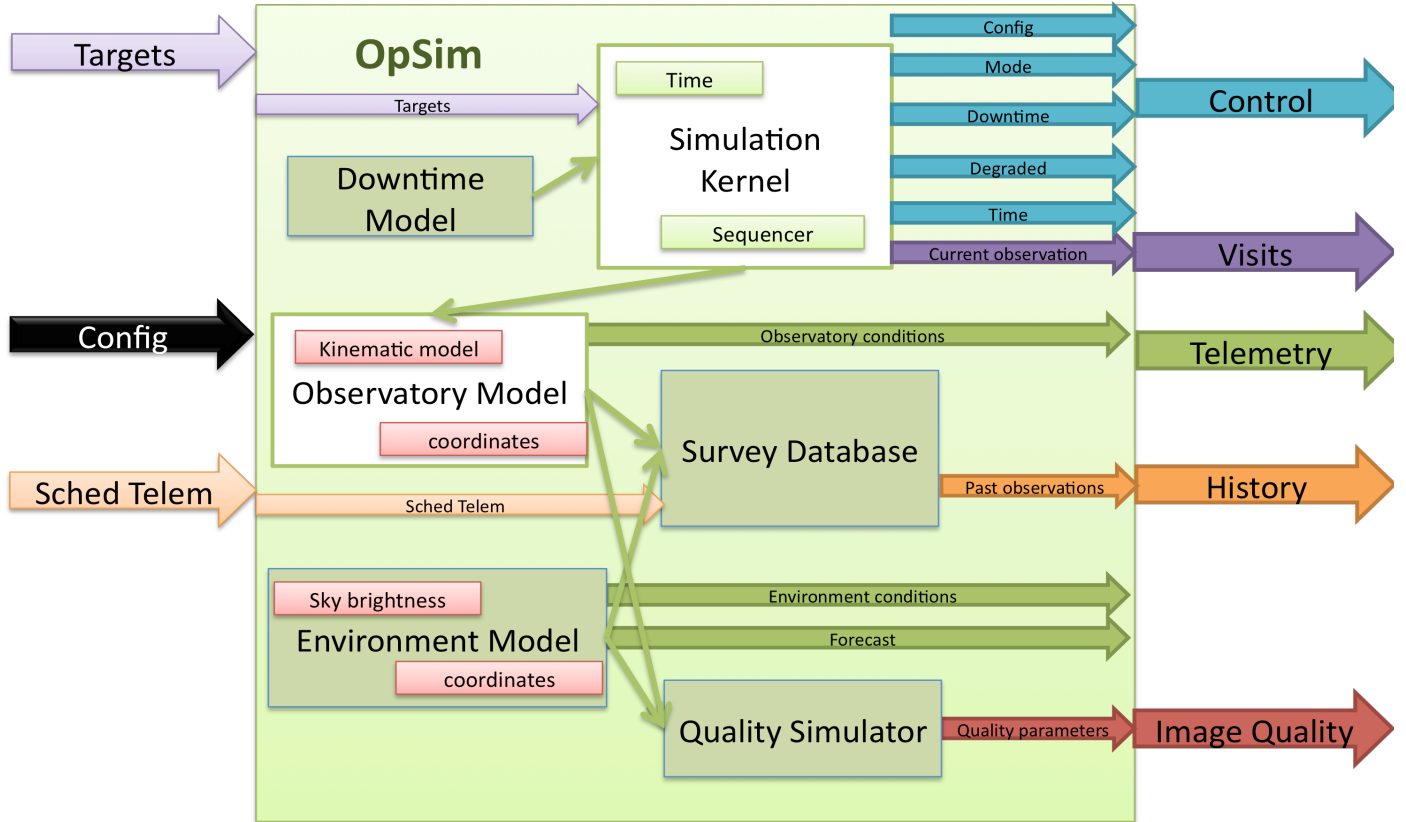
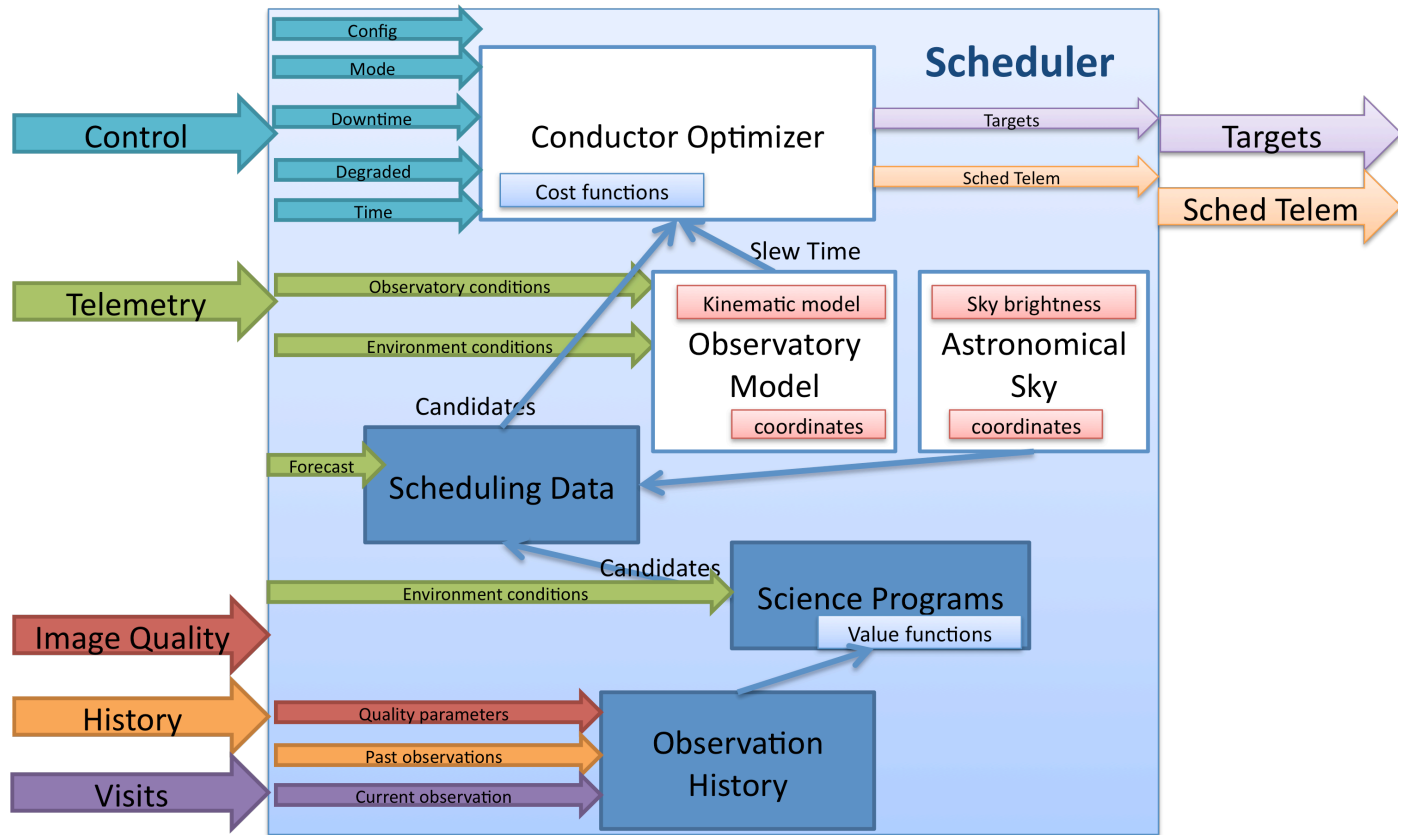


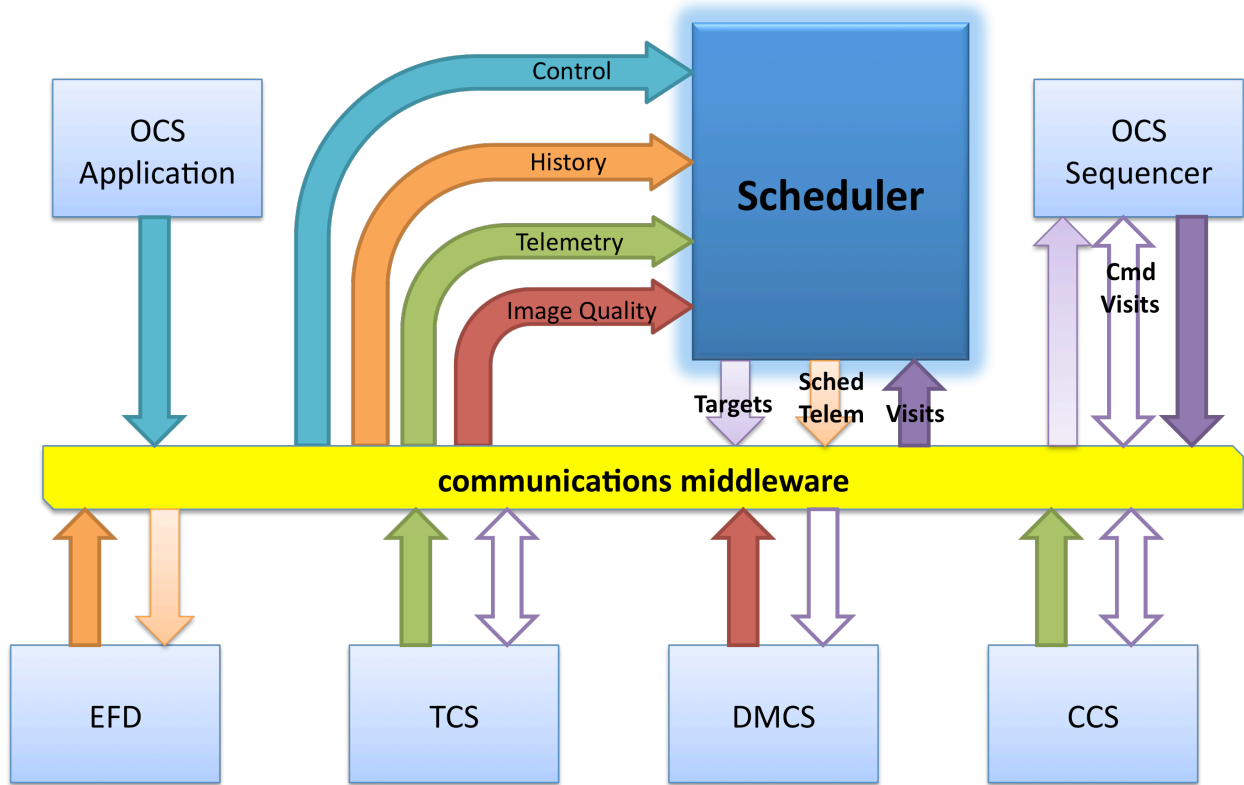
OpSim Internal Block Diagram



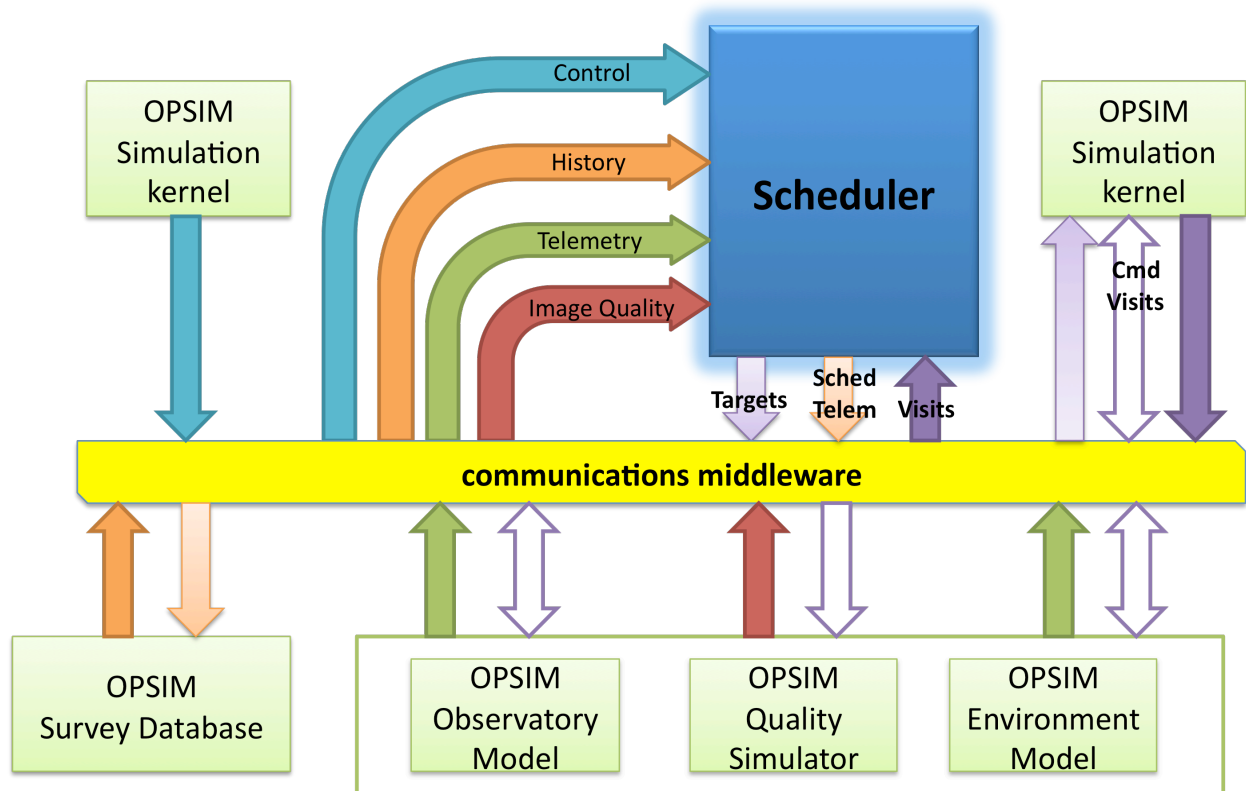
Scheduler Internal Block Diagram



Scheduler Interfaces in OCS



Scheduler Interfaces in OPSIM



1 Scheduler Interfaces

The Scheduler is integrated into the OCS architecture following the same message-based framework. This is all the inputs and outputs are actually publication and subscription of topics, classified in terms of commands, events and telemetry. This schema provides all the flexibility for the control aspect of the problem, as well as immediate access to relevant information from the system.

1.1 Inputs

1.1.1 Control

1.1.1.1 Config

Scheduler configuration parameters

1.1.1.1.1 System

All the configuration parameters that define the observatory as a system, such as:

- the observatory location
- the observatory kinematic parameters like accelerations and maximum velocities for the mount and dome, used to configure the telescope model in the slew time estimations. These parameters need to be adapted to the actual behaviour of the observatory.

1.1.1.1.2 Survey

All the configuration parameters that define the survey to perform, such as:

- the detailed configuration of each science program, such as the sky region, the number of visits, the sequence of filters, the time interval sequences, sky brightness limits, airmass limits, seeing limits, etc.
- the relative priorities and activation dates of the different science programs

1.1.1.1.3 Scheduler

The configuration parameters that affect the behaviour of the scheduler, such as:

- the size and resolution of the look ahead window
- the weight of the cost functions
- definition of the optimization algorithms

1.1.1.2 Mode

The operation mode in which the scheduler works. This is a place holder, not yet defined by the OCS.

For now at least the modes to activate and suspend the scheduler automatic operation shall be considered, triggering when appropriate the "resume-survey" action in which the scheduler obtains the history of past visits from the survey DB and updates the hits history for each configured science program in order to resume the survey.

1.1.1.3 Downtime

This is a control signal to indicate a downtime and its cause, in order to suspend the scheduling of targets but keeping track of the time dependant priorities.

1.1.1.4 Degraded

Place holder, not yet defined by the OCS. It shall be used to configure the scheduler considering a limited capacity in the observatory. For example a reduced speed in the mount, a reduced range in the dome position, a limited set of available filters in the camera, etc.

1.1.1.5 Time

The survey time signal, which in simulated operations is different than the system time. This time is used to update the internal models and the priorities of the time dependant science programs.

1.1.2 Telemetry

1.1.2.1 Observatory conditions

States, positions, velocities, filter, etc.

1.1.2.2 Environment conditions

seeing, clouds coverage, wind speed and direction, etc.

1.1.2.3 Weather Forecast

From external models.

1.1.3 History

1.1.3.1 Past observations

Access to the complete history of observations, needed at cold-start.

1.1.3.2 Current observation

Current visit from OCS-Sequencer.

1.1.3.3 Image Quality

IQ feedback from DM (or Camera?) about a past observation. Once received, this information is appended to the corresponding elements of the history of observations in its internal representation, and will affect the merits for future targets in the corresponding science programs.

1.2 Output

1.2.1 Proposed targets

Field identification, coordinates, offset, angle, value rank, cost rank, overall rank, number in sequence, proposals involved, predicted slew time, predicted sky brightness, predicted seeing.

1.2.2 Scheduler Telemetry

Internally produced telemetry. Intermediate computations, ranks evaluation, look-ahead data, sequence planning, and any useful data for evaluating the performance of the Scheduler.