

**Atacama
Large
Millimeter
Array**

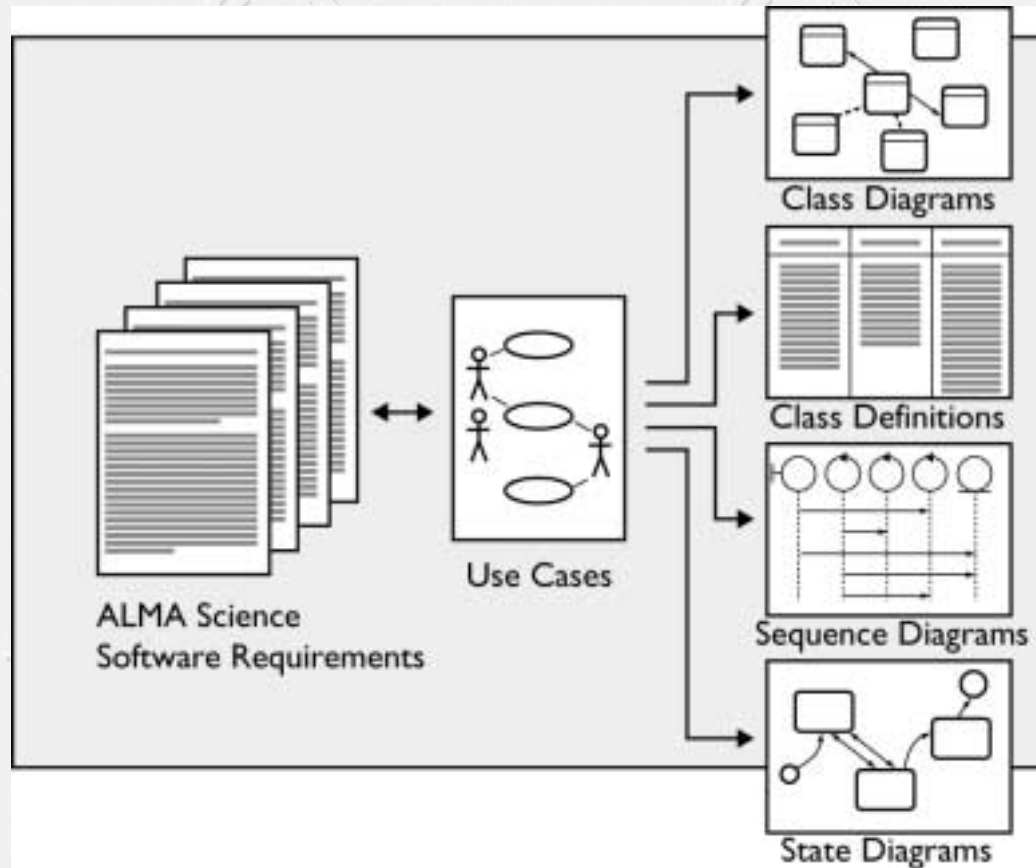
ALMA Software Analysis

Joseph Schwarz
ESO

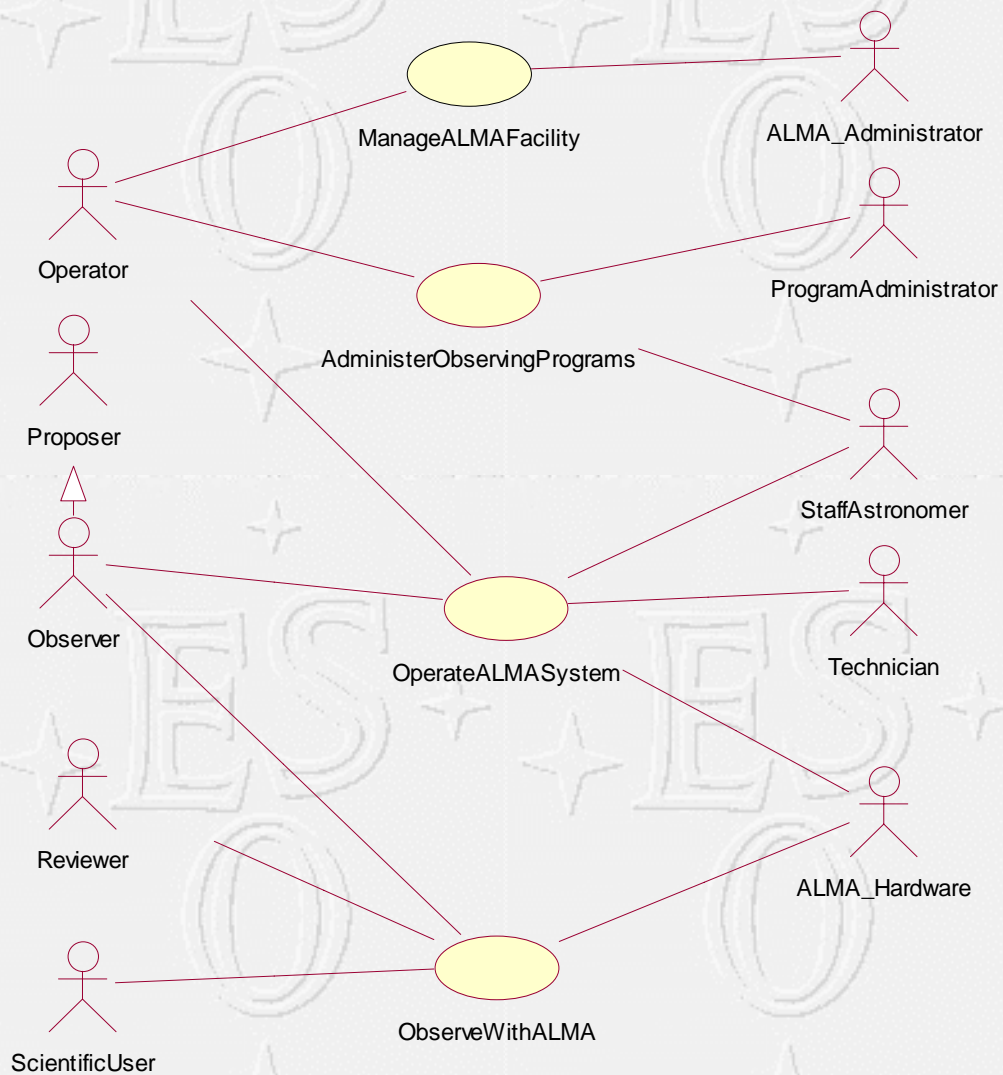
High-Level Analysis

- Bridge from requirements to design
- Main deliverables:
 - Class, sequence & state diagrams
 - System architecture & packaging
- Working group:
 - P. Grosbol, G. Harris (NRAO), R. Lucas (IRAM),
D. Muders (MPIfR), J. Schwarz, R. Warmels

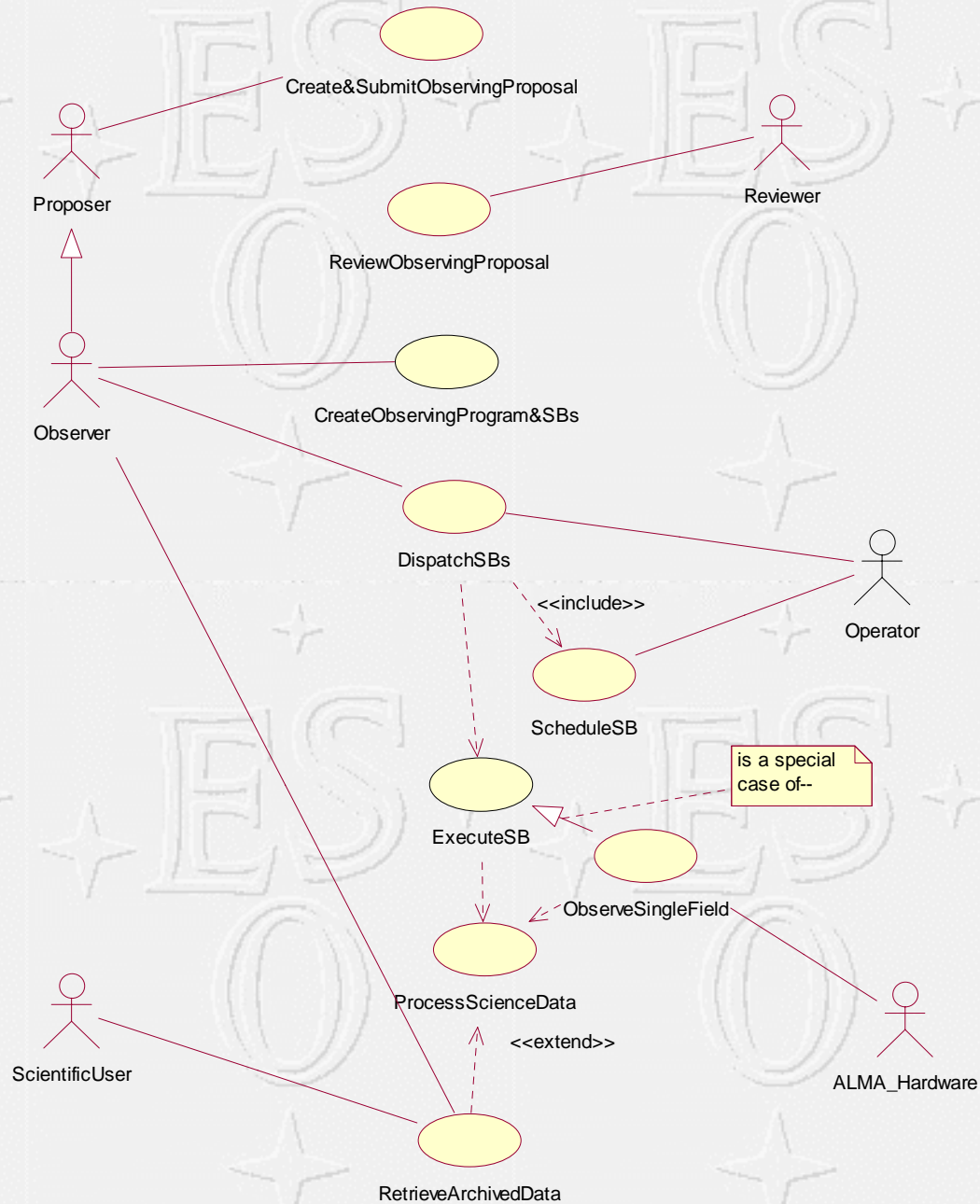
Our Analysis Process



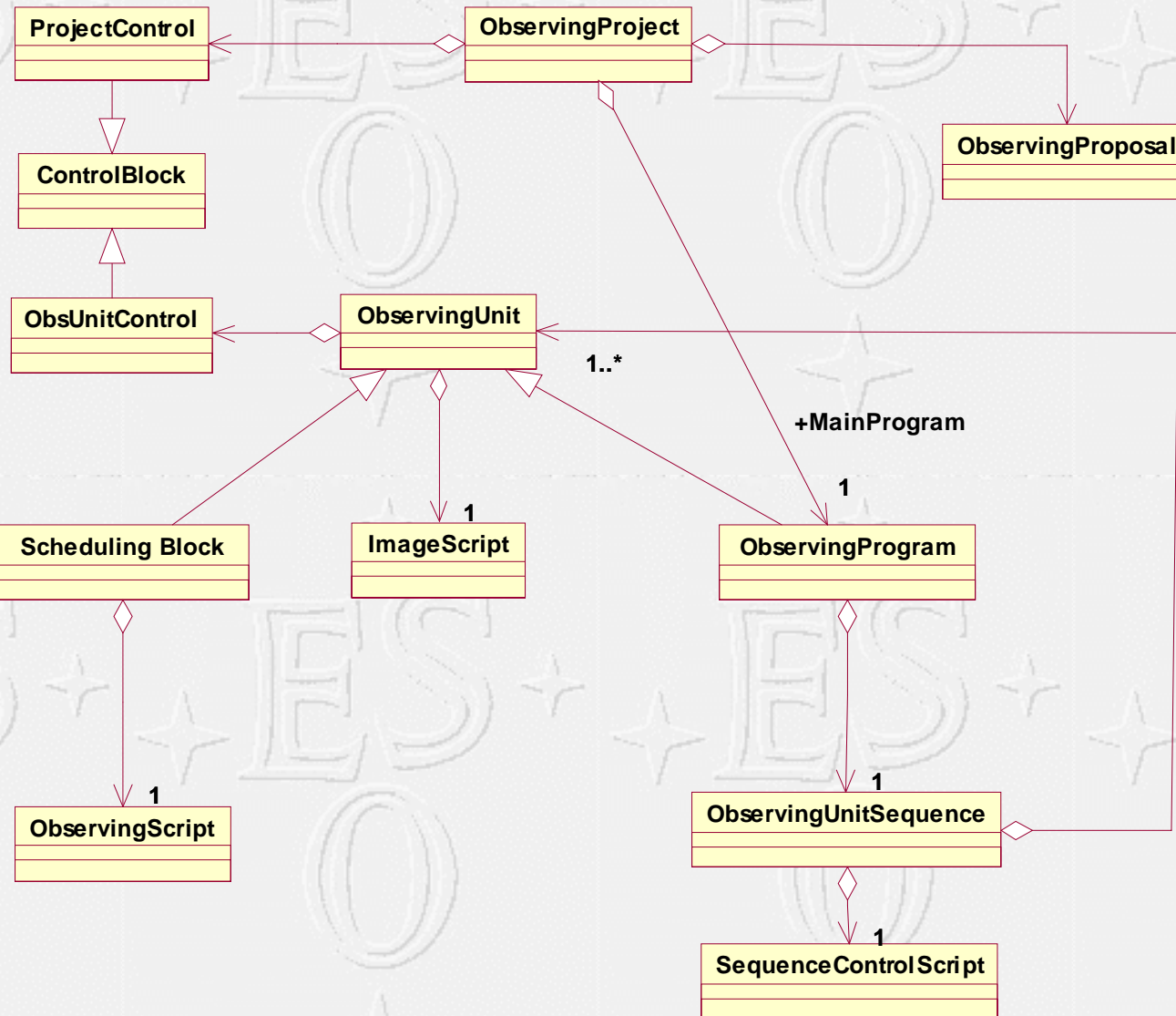
ALMA Use Case Roadmap



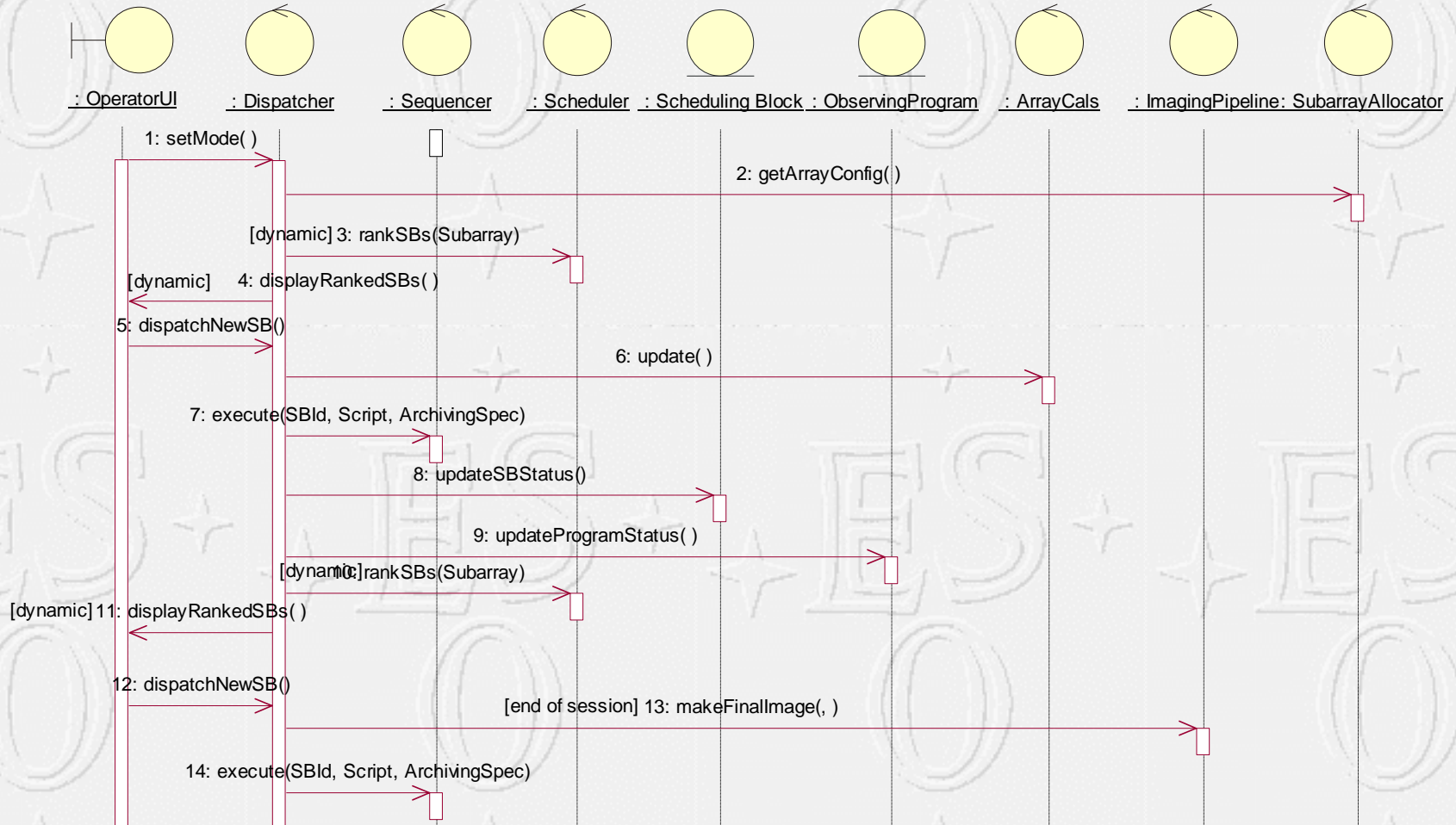
Observe with ALMA UC Diagram



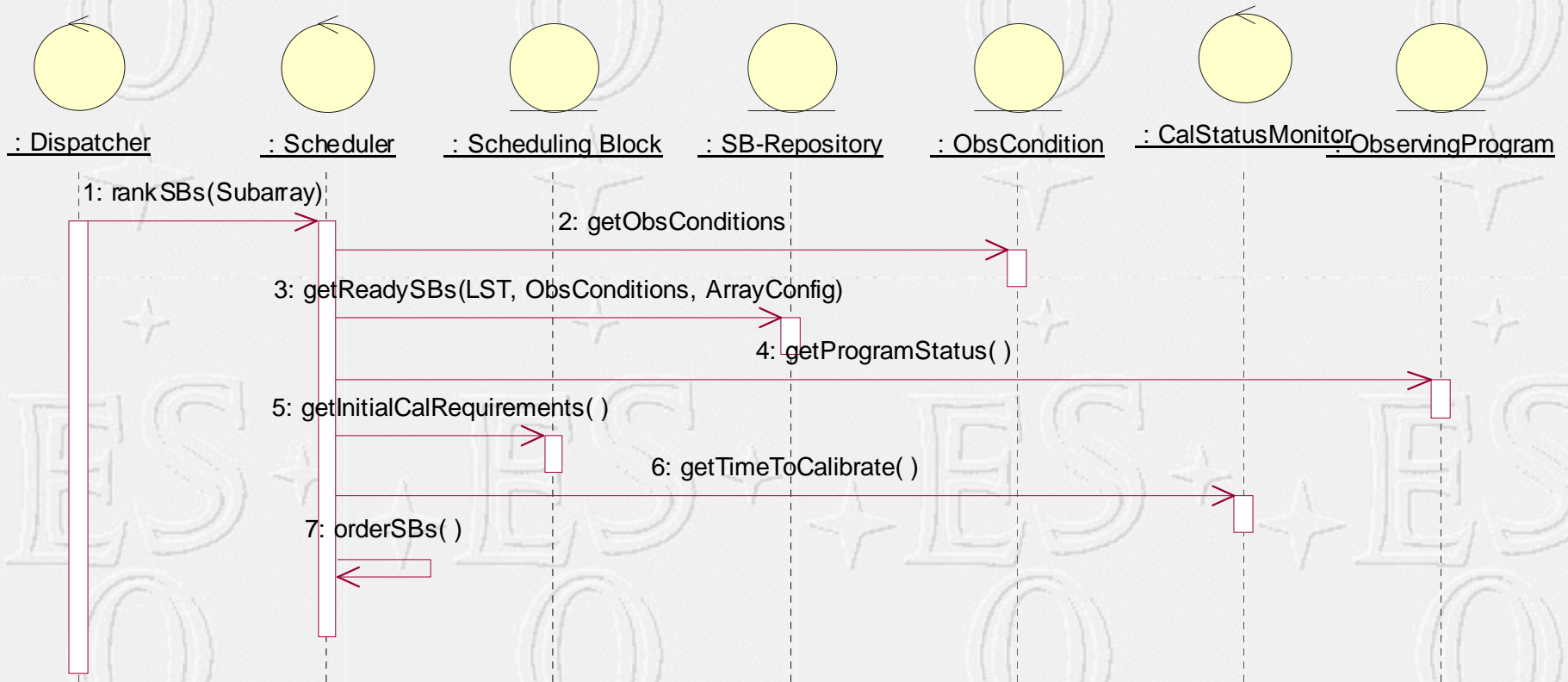
Observing Project Hierarchy



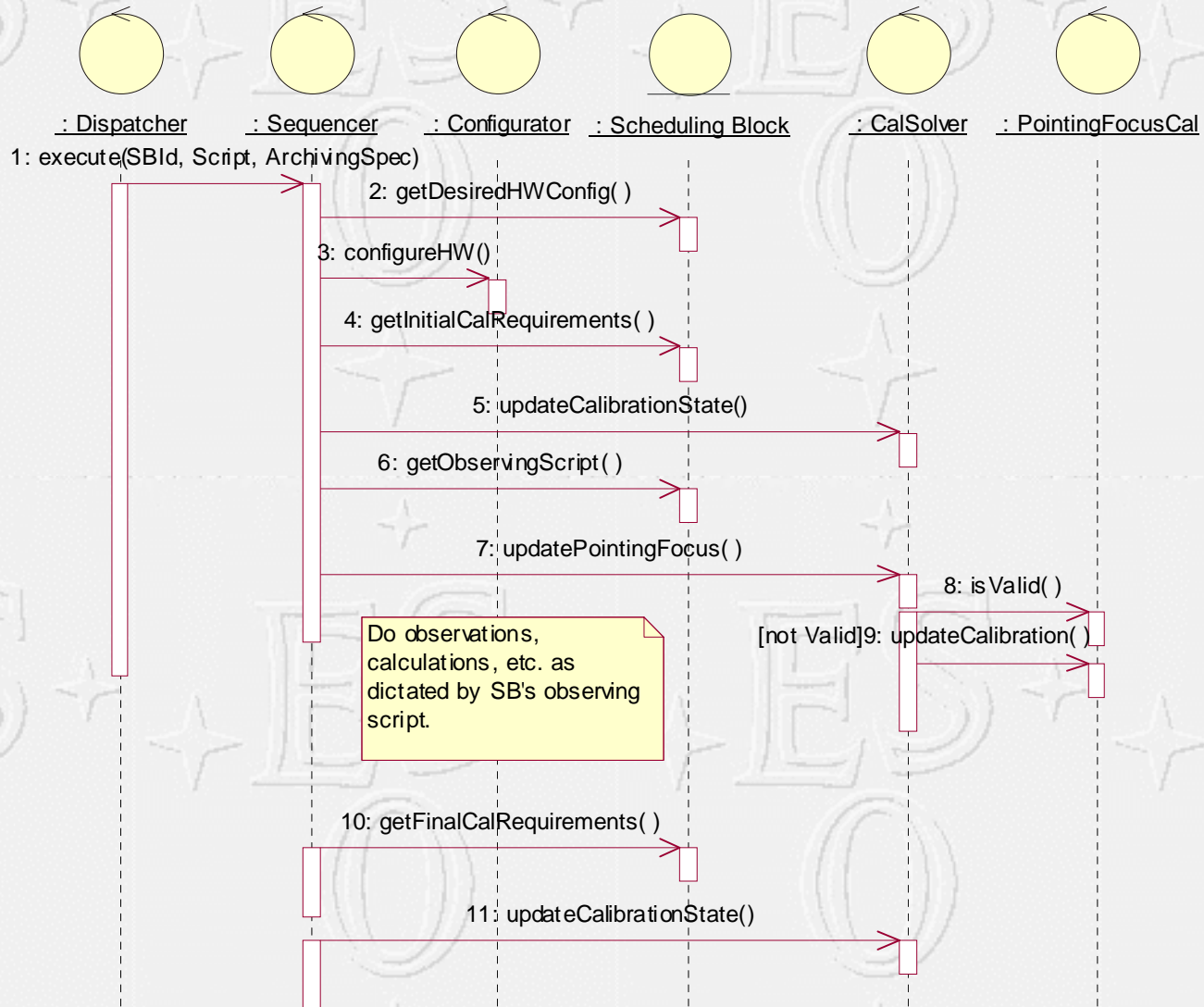
Dispatch Scheduling Block Seq Diag



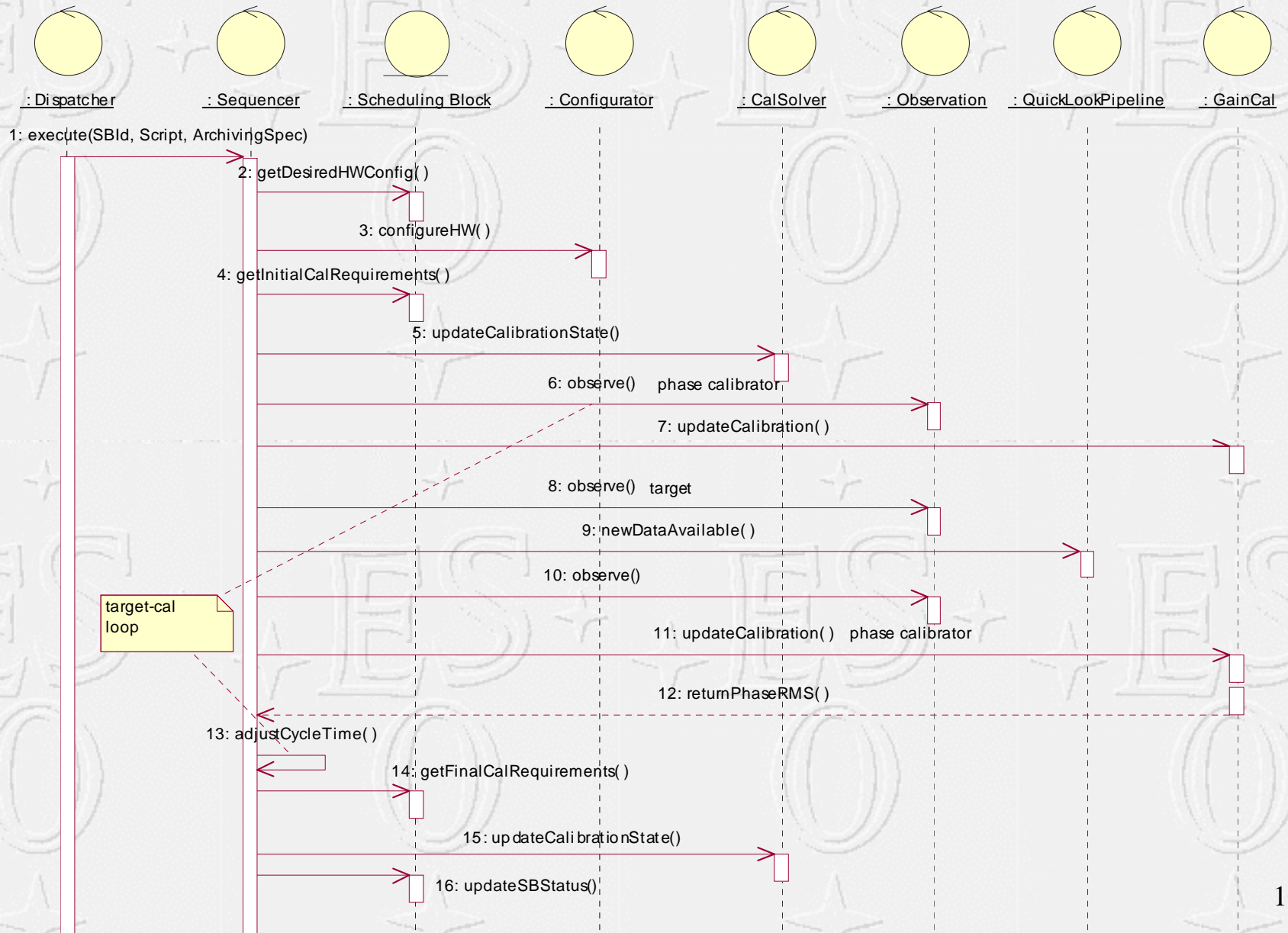
Schedule SB Sequence Diagram



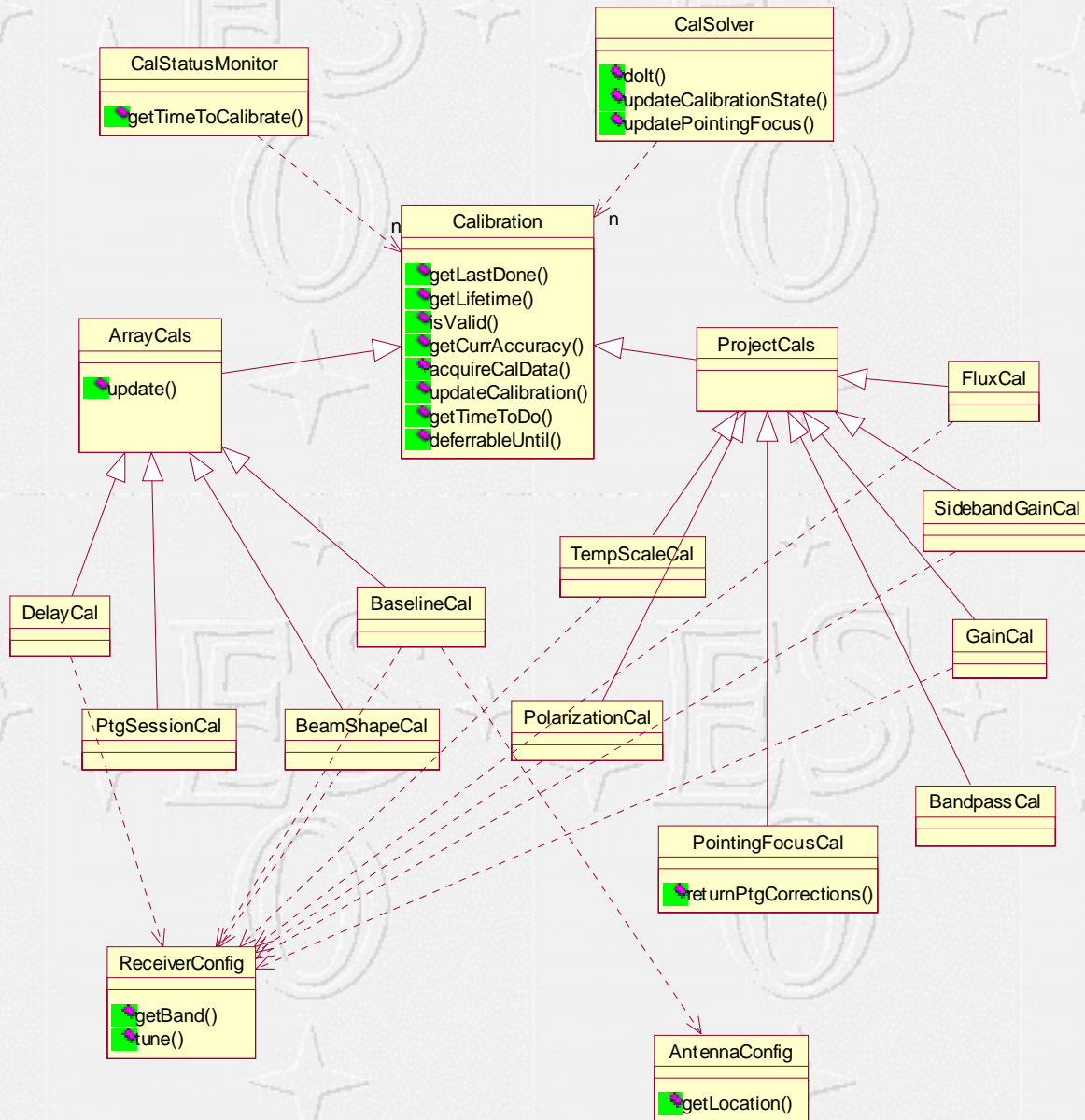
Execute SB Sequence Diagram



Observe Single Field Seq Diagram



Calibration Class Diagram



Calibration Class Descriptions (ala CRC)

Class Name	Description	Responsibilities
CalSolver	Coordinates the execution of all necessary calibration observation.	<ul style="list-style-type: none"> •know calibration required •perform calibration observations
Calibration	Is an abstract base class for all calibrations of a subarray and provides generic methods to access the status of a particular calibration.	<ul style="list-style-type: none"> •know validity •know validity period •signal expiration •estimate time to perform calibration •know when must be done (deferrable?) •acquire calibration data
ArrayCal	Indicates that this is a calibration that is performed for the array as a whole (<i>e.g.</i> , baseline, delay, pointing session & beam shape)	<ul style="list-style-type: none"> •As for Calibration class
ProjectCal	Indicates that this is a calibration that is performed for a single project or subprogramme (although it could be shared among different ones)	<ul style="list-style-type: none"> •As for Calibration class
CalStatusMonitor	Checks the calibration status of a subarray.	<ul style="list-style-type: none"> •estimate time for calibration

Calibration classes: Issues

- Possibility of asynchronous update mechanisms
 - Calibration can know when it expires
 - Configuration changes can mark cal as invalid
- How should responsibilities be divided?
 - Know the state
 - Acquire the calibration data
 - Reduce the calibration data
 - Dependence on pipeline & cal group discussions

Analysis Status

- Initial Analysis Doc circulated to SSR and presented/discussed in Grenoble 1-2 March
- Second version circulated to SSR and ALMA s/w developers in May
- Version for review is about 1 month late
 - Changes to requirements
 - Manpower shortfalls

Requirements & Analysis Issues

- Lifecycle for Observing Project hierarchy
- How to do the packaging
- Escalating requirements
 - *Expected, but not so quickly!*
 - *Need to stick to codified requirements, and formally change them when necessary*