Project Phase 2: OO Analysis and Design

ITCS431 Software Design and Development

Present to

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Use Case Description

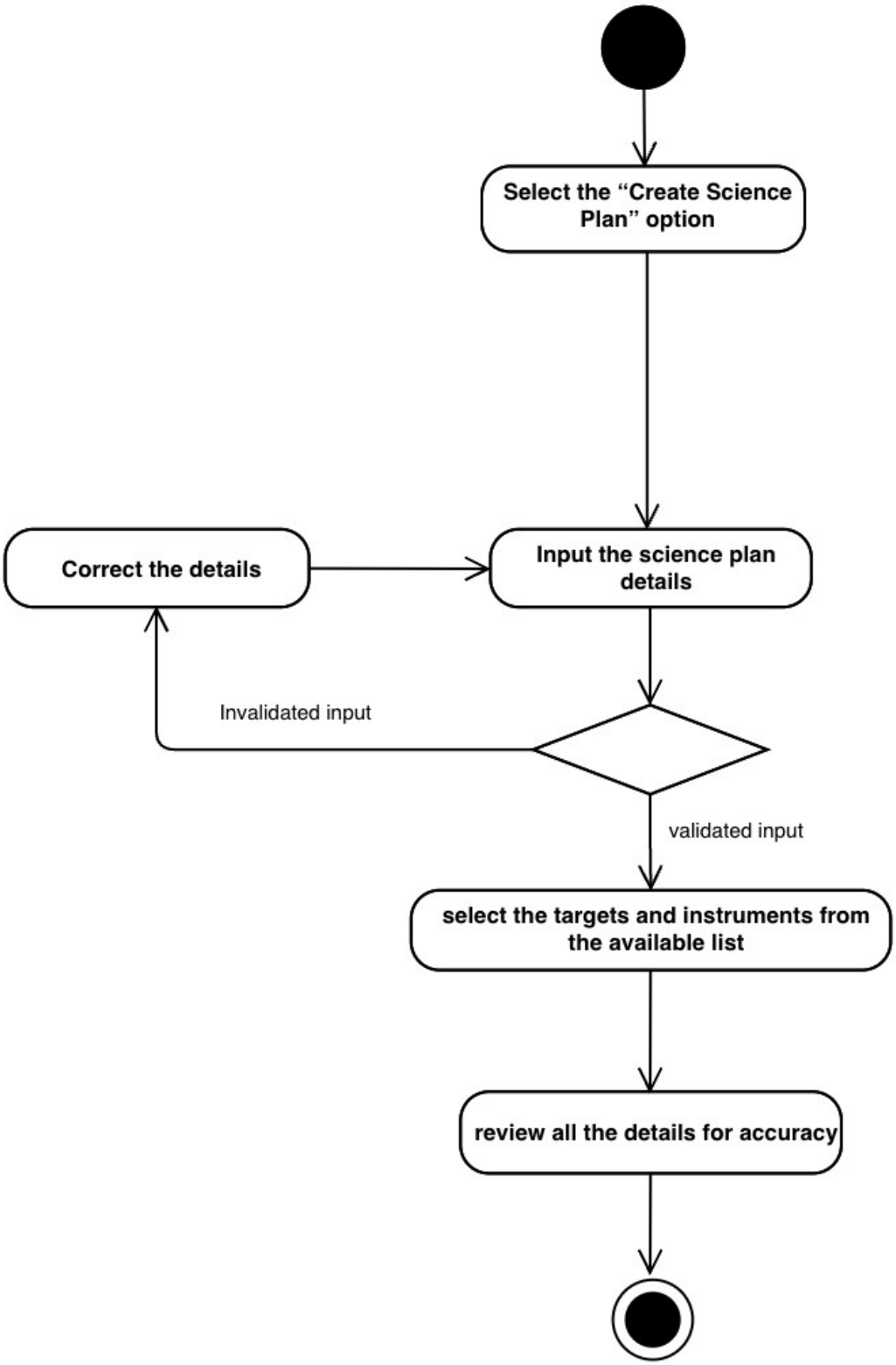
Use Case Name: Create a Science Plan	**ID:** U001	**Importance Level:** High
Primary Actor: Astronomer		**Use Case Type:** Essential
Stakeholders and Interests: Astronomers-interested		
Brief Description: This use case details the process by which an astronomer creates a plan for scientific observation.		
Trigger: The astronomer decides to commence a new observation project. **Type:** Functional		
Relationships: - Association: Astronomer, Observatory Scheduler - UserInclude: Access Telescope Schedule, Access Star Catalogues - Extend: - - Generalization: Submit a Science Plan		
Normal Flow of Events: 1. The astronomer selects the "Create Science Plan" option in the GTCS interface. 2. The astronomer inputs the science plan details, including the plan ID, objectives, target celestial objects, and necessary instruments into the form presented by the GTCS. 3. The astronomer chooses the targets and instruments from the available list within the GTCS. 4. The astronomer reviews all the details of the science plan for accuracy.		
Subflows: Invalid Input S-1 The system validates inputs and flags any errors or conflicts. S-2 Astronomer corrects the details and resubmits the plan.		
Alternate/Exceptional Flow: -		

Use Case Name: Validate an Observing Program	**ID:** U002	**Importance Level:** High
Primary Actor: Science Observer		**Use Case Type:** Detail, Essential
Stakeholders and Interests: Science Observer-wants		
Brief Description: This use case details the process by which a Science Observer validates the observing program prepared by an Astronomer to ensure it is correctly set up and can be executed by the telescope system.		
Trigger: This use case is the completion of an observing program by an Astronomer, which then needs validation. **Type:** External		
Relationships: - **Association:** Science Observer is associated with the system - **UserInclude:** Creating and submitting an observing program. - **Extend:** - - **Generalization:** -		
Normal Flow of Events: 1. The Science Observer conducts initial checks for completeness and adherence to submission guidelines. 2. The Science Observer uses simulation tools to validate the observed program's expected outcomes. 3. The Science Observer marks and approves the program for execution or returns it to the astronomer with feedback for refinement.		
Subflows: In case of any discrepancies or issues, the Science Observer may: S-1: Request modifications to the observing program. S-2: Provide feedback to the Astronomer.		
Alternate/Exceptional Flow: 1. The observing program does not meet the validation criteria. 2. The necessary data for validation is incomplete or unavailable. 3. System errors prevent the validation from completing.		

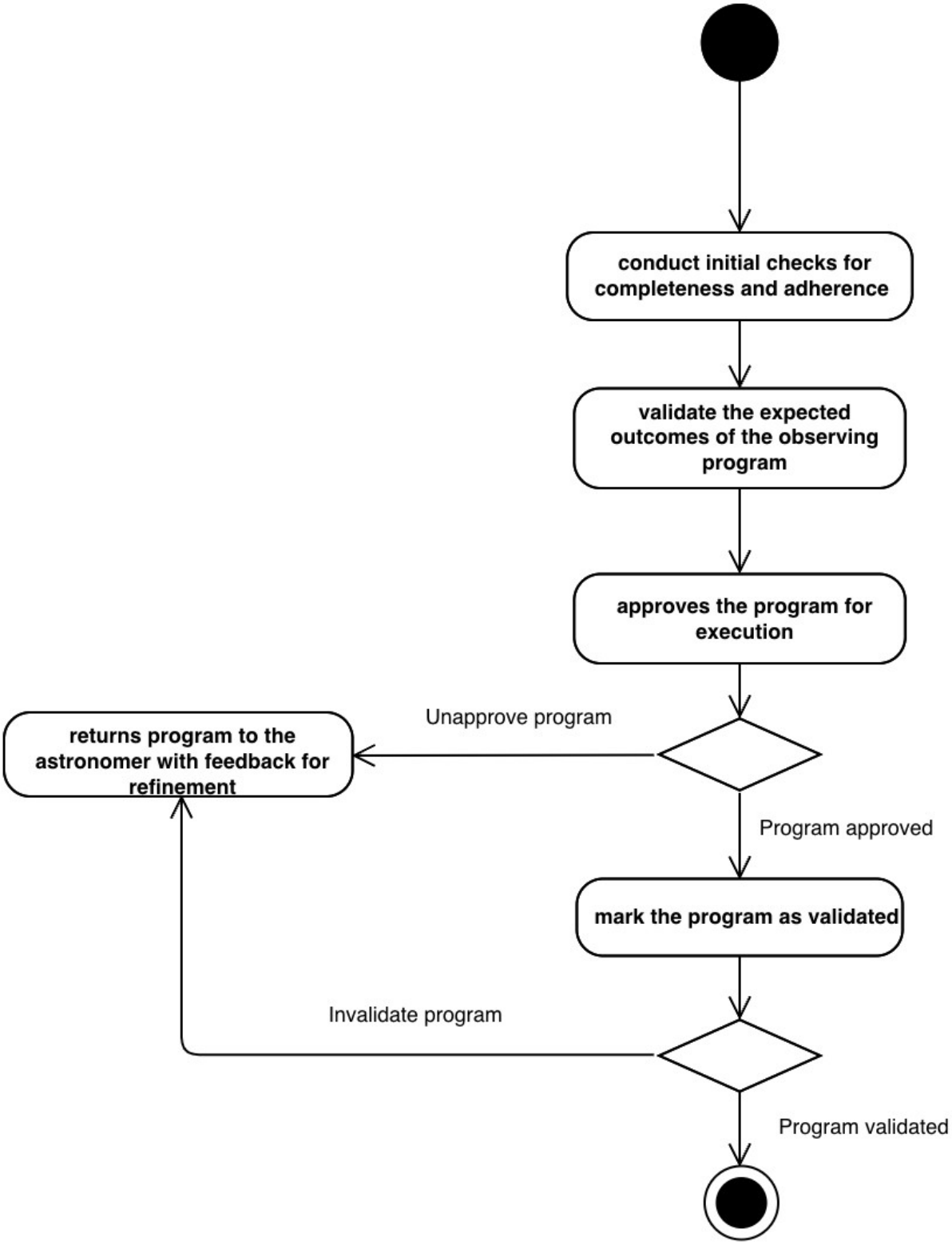
Use Case Name: Manage Astronomical Data	**ID:** U003	**Importance Level:** High
Primary Actor: Science Observer		**Use Case Type:** Detail, Essential
Stakeholders and Interests: Science Observer-Require, Astronomer-Need		
Brief Description: This use case details the process of managing astronomical data collected through observations made by the GTCS. It encompasses the storage, organization, retrieval, and maintenance of data integrity.		
Trigger: The need to store new observational data, update existing data, or retrieve data for analysis. **Type:** External		
Relationships: - Association: Science Observer who performs the data management. - UserInclude: Validate Collected Astronomical Data Integrity - Extend: - - Generalization: -		
Normal Flow of Events: 1. The science observer performs a preliminary check to ensure data quality. 2. The science observer manages permissions for data access. 3. The science observer collects the data from the observation system. 4. The science observer reviews the data storage for accuracy and security. 5. The science observer ensures that the data is accessible for authorized personnel.		
Subflows: If there is a need to update existing data, the system provides an editing interface to modify the selected datasets.		
Alternate/Exceptional Flow: If the system detects inconsistencies or errors during data processing, it alerts the Science Observer, who must then resolve the issues or escalate them as needed.		

Activity Diagram

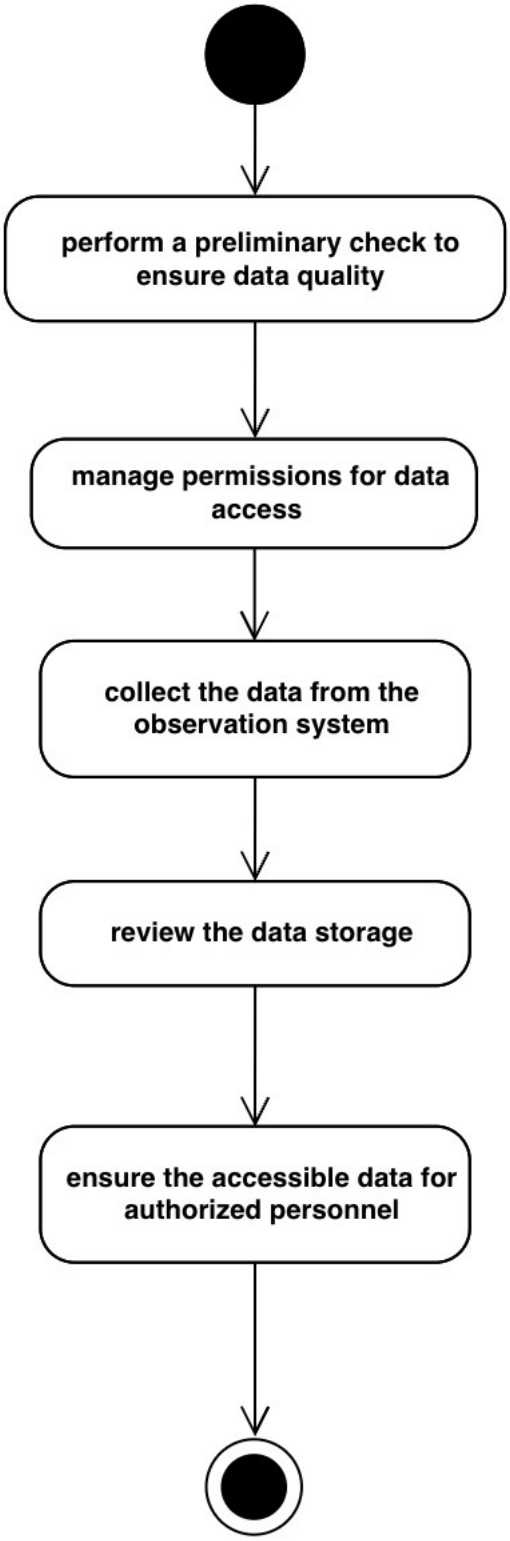
U001: Create a science plan



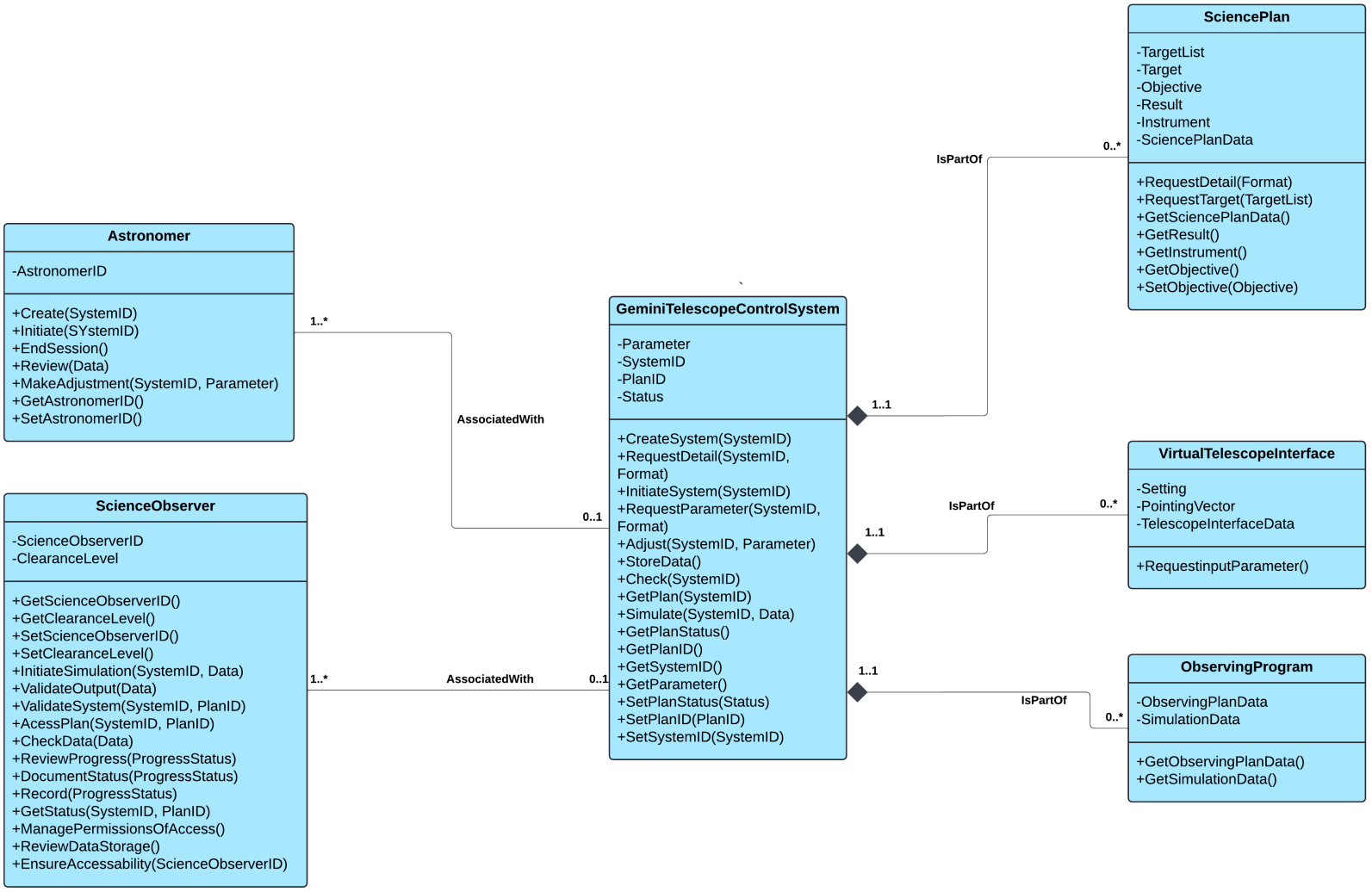
U002: Validate an Observing Program



U003: Manage Astronomical Data

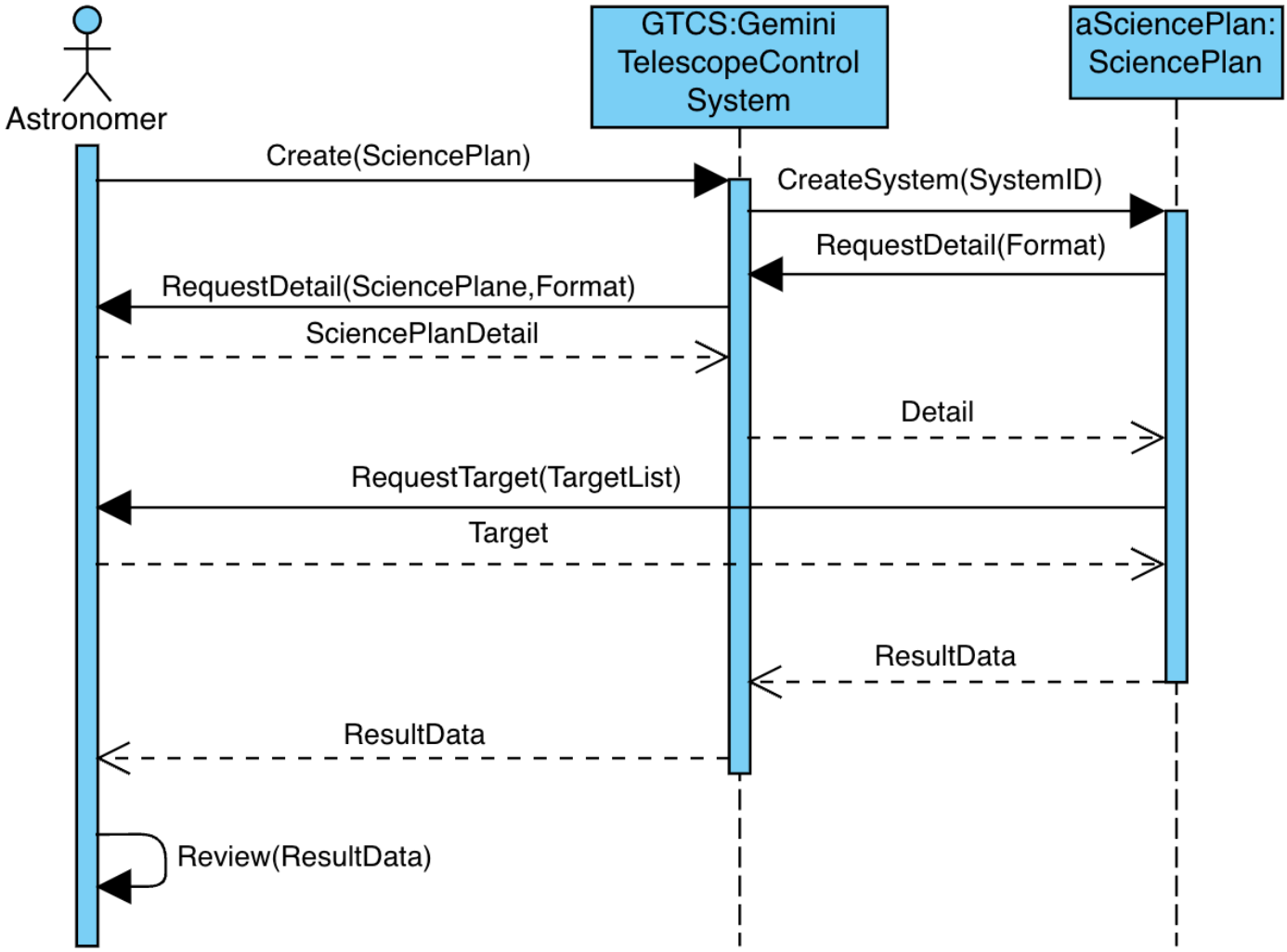


Class Diagram

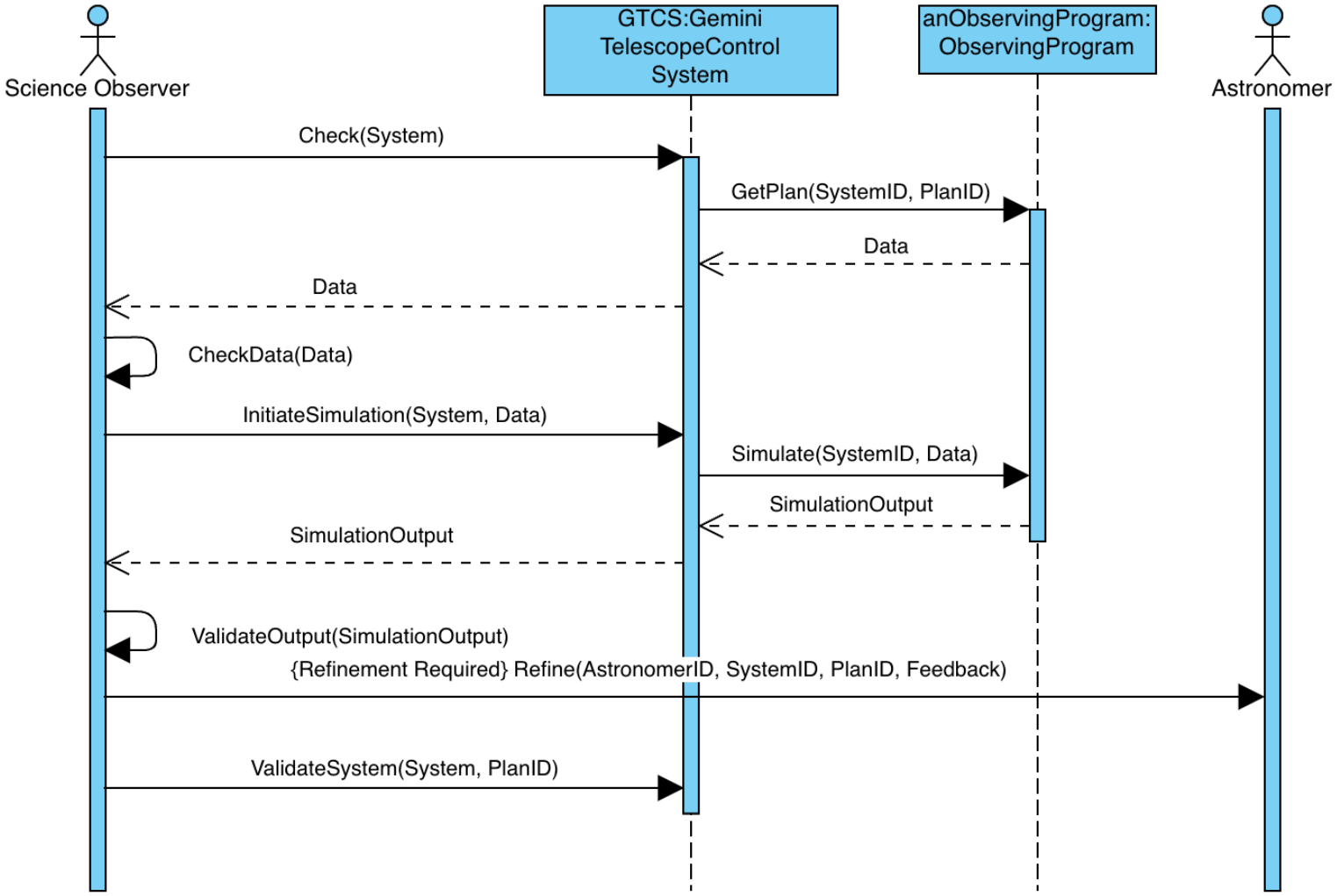


Sequence Diagram

U001: Create a science plan



U002: Validate an Observing Program



U003: Manage Astronomical Data