Faculty of ICT, Mahidol University

# Project Gemini phrase 1 : Analysis of 5 selected use cases


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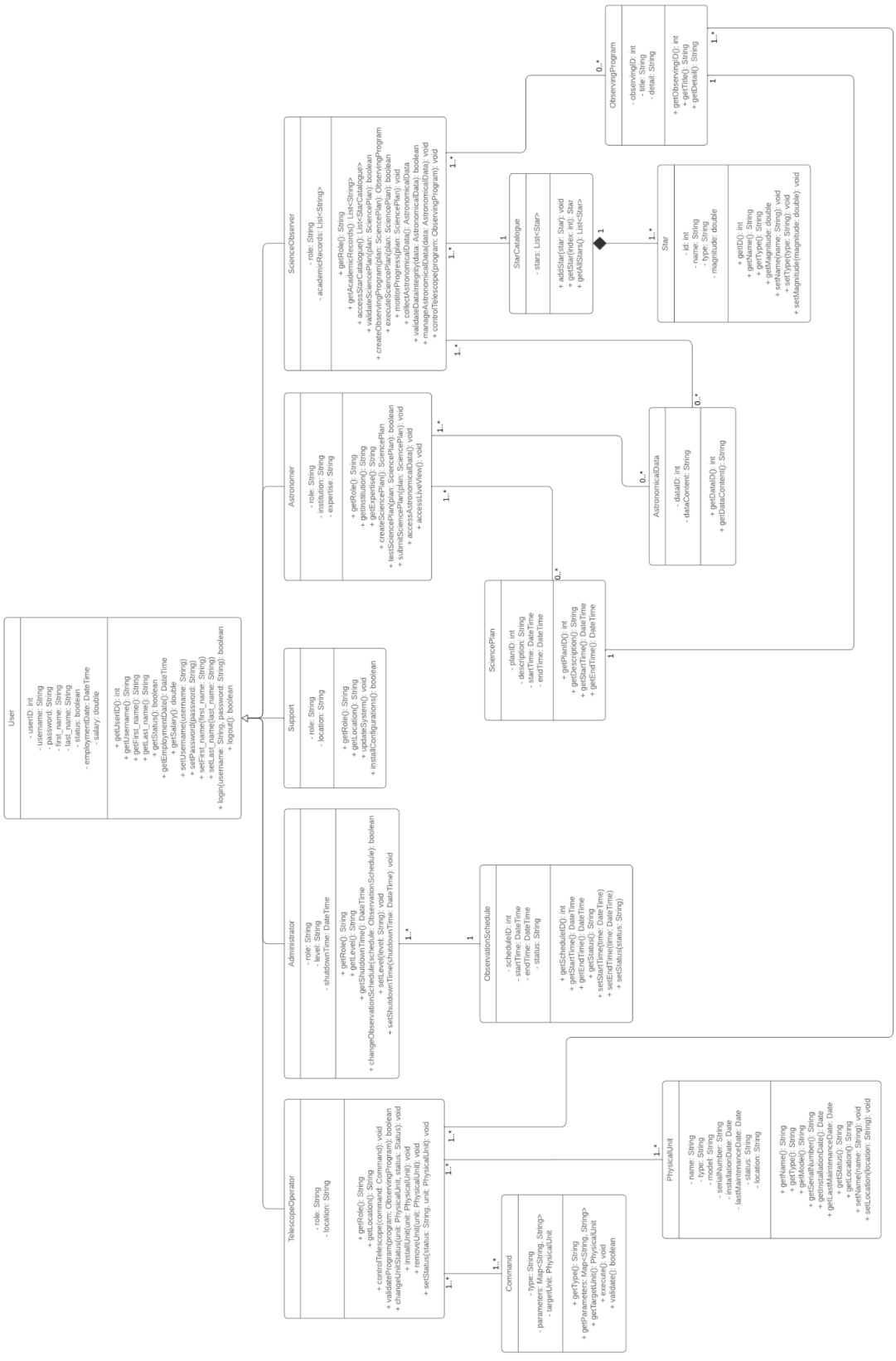
# Class Diagram



## ID:1 - Use case description

| | | |
|---|---|---|
| **Use Case Name:** Access astronomical data | **ID**: 1 | **Importance Level:** Medium |
| **Primary Actor:** Science observer | | **Use Case Type:** Essential |

**Stakeholders and Interests:**
Science observer - wants to collect and manage astronomical data
Astronomer - wants to access collected astronomical data

**Brief Description:**
This use case describes the ability of astronomers and science observers to access collected astronomical data from the system.

**Trigger:** The astronomer wants to know and access astronomical data for analysis.

**Type**: External

**Relationships:**
Association: Astronomer
Include: -
Extend: -
Generalization: User

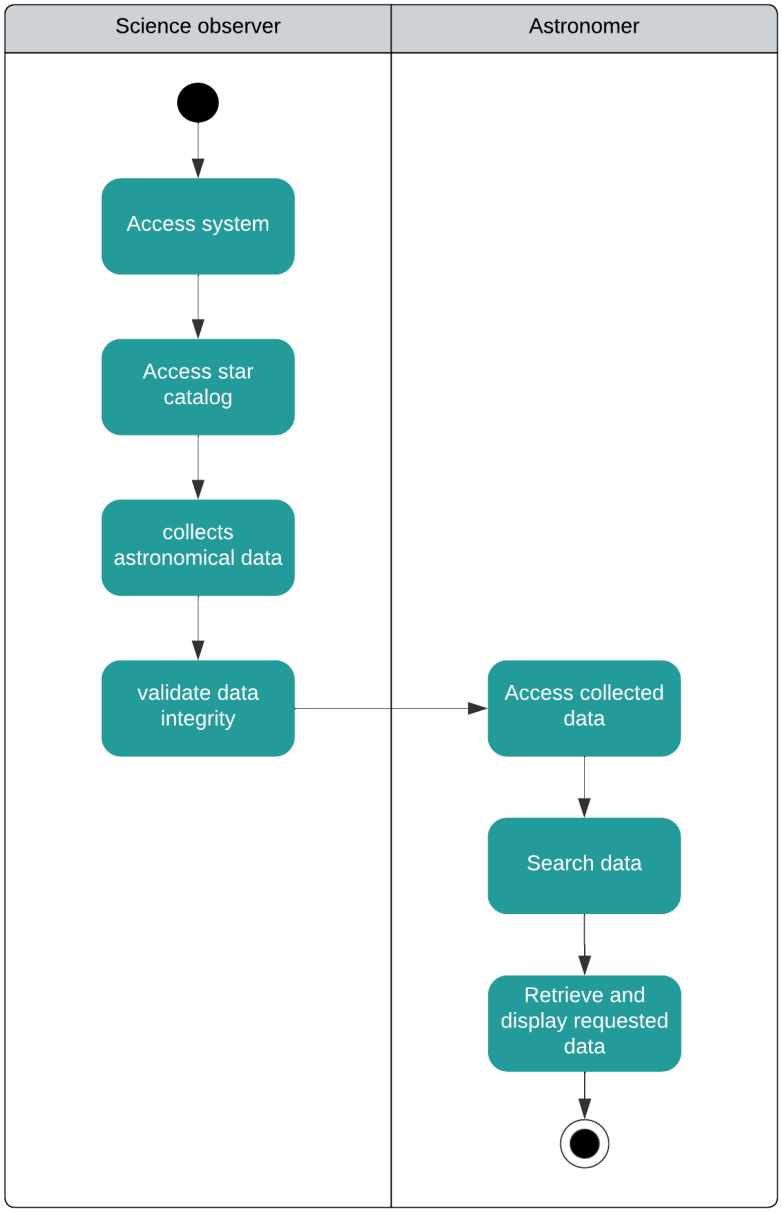
**Normal Flow of Events:**

1. The astronomer or science observer logs into the system.
2. The science observer has access to the star catalog.
3. The science observer collects astronomical data.
4. The science observer validates the integrity of the collected astronomical data.
5. The astronomer accesses collected astronomical data.

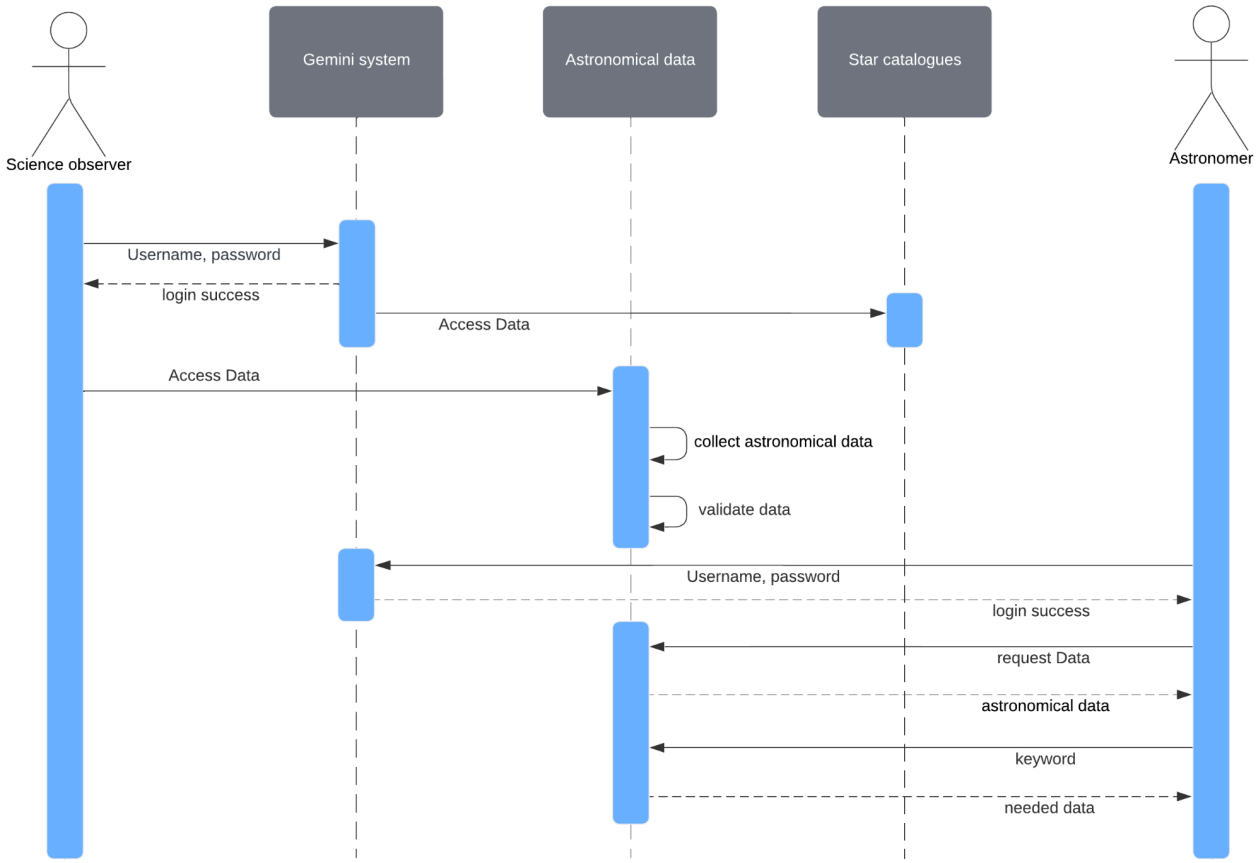
**Subflows:**
S–1: Searching for the astronomical data the astronomer needs.
1. The system displays all astronomical data to astronomers.
2. The astronomer searches for data.
3. The system retrieves and displays the requested astronomical data.

**Alternate/Exceptional Flow:**
- The system will notify the user if the requested data is unavailable in the system's database or archives.
- If the system encounters technical issues while retrieving the data, it will notify the user.

## ID:1 - Activity Diagram



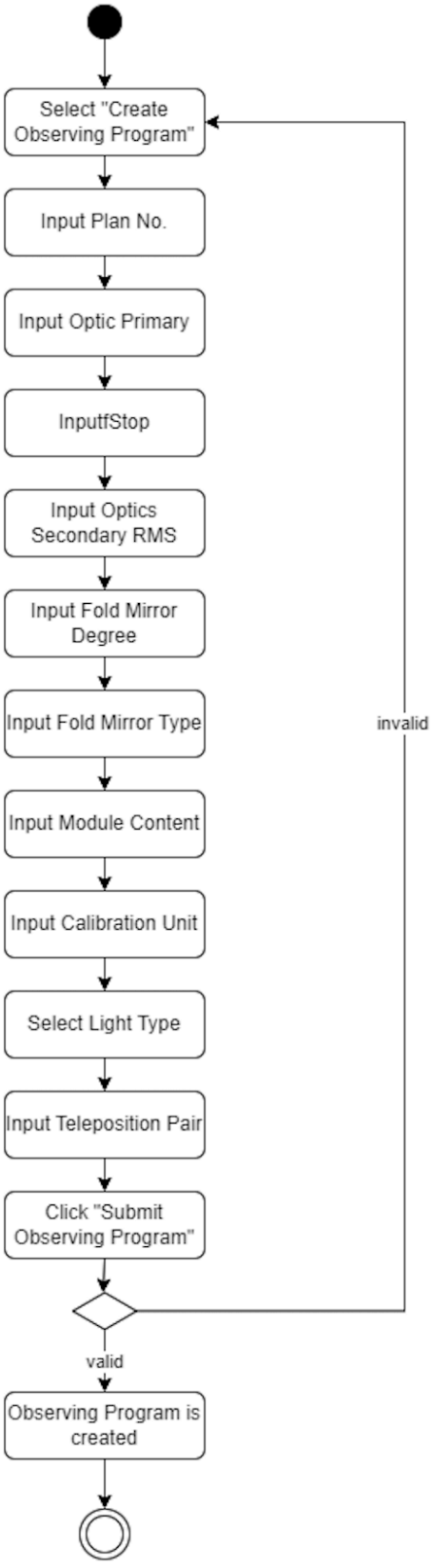
## ID:1 - Sequence Diagram



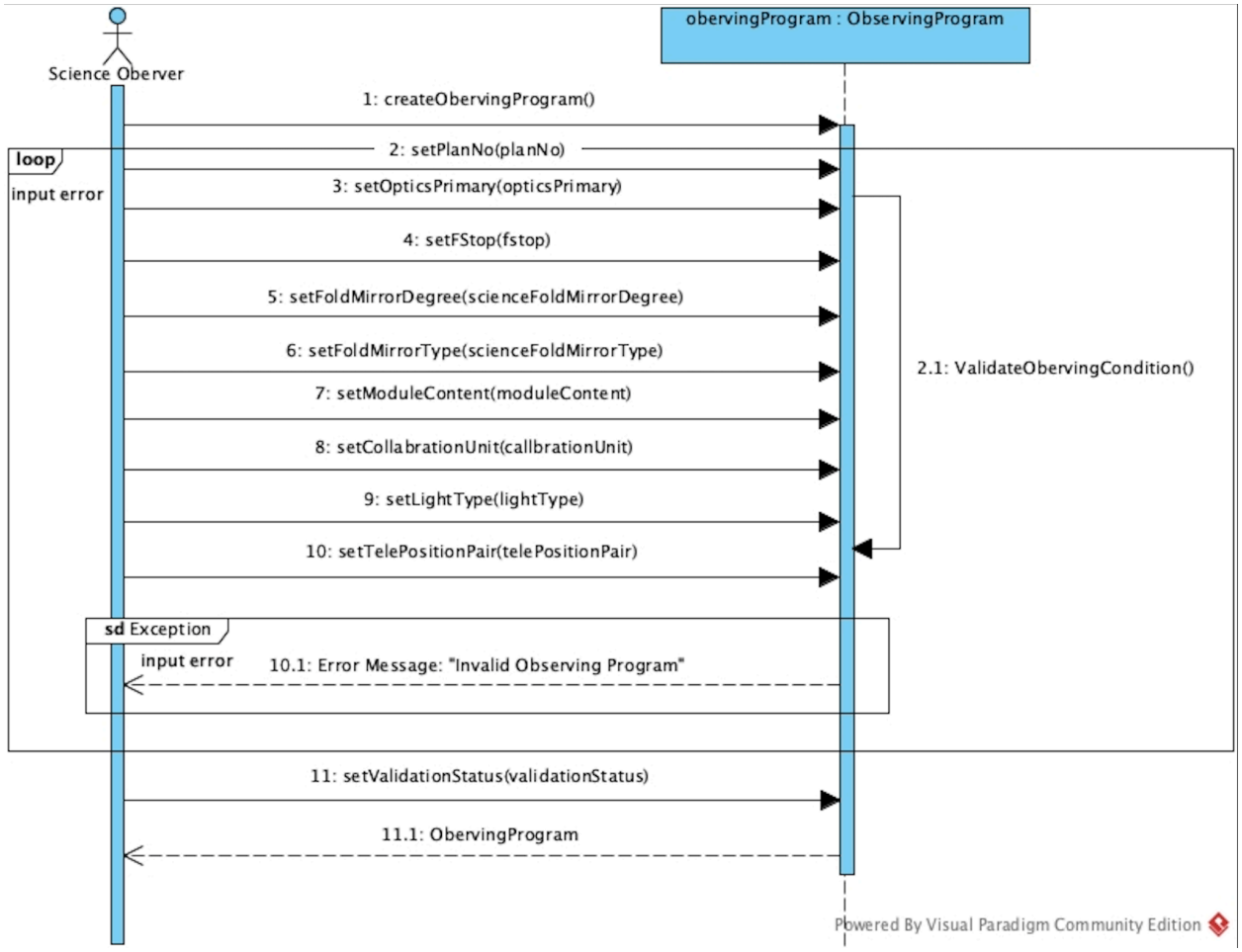
## ID:2 - Use case description

| | | |
|---|---|---|
| **Use Case Name**: Create an observing program | **ID**: 2 | **Importance Level:** High |
| **Primary Actor:** Science observer | | **Use Case Type:** Essential |
| **Brief Description**: The Science Observer creates an observing program based on the Science Plan | | |
| **Trigger:** The astronomer wants to conduct an observing program<br><br>**Type**: External | | |
| **Preconditions:**<br>1. The Science Observer is authenticated by logging in to his/her account<br>2. The Science Plan is created, tested via the virtual telescope, and submitted to the system by the Astronomer<br>3. The Science Plan is validated by the Science Observer | | |
| **Normal Flow of Events:**<br>1. The Science Observer selects the “Create Observing Program” option from the menu<br>2. The system displays a create observing program page, which contains several fields to input and a button to submit the program.<br>3. The Science Observer inputs the details of the observing program including plan no., optic primary, f-Stop, optics secondary RMS, and fold mirror degree.<br>4. The Science Observer selects the fold mirror type option.<br>5. The Science Observer inputs the module content and calibration unit.<br>6. The Science Observer selects the light type of option.<br>7. The Science Observer inputs the teleportation pair.<br>8. The Science Observer clicks the submit button to create the observing program.<br>9. The system displays the state of the observing program (valid/invalid). If it’s invalid, return to step 3. | | |
| **Postcondition:**<br>1. The details and configurations of the observing program are stored in the observing program datastore | | |

## ID:2 - Activity Diagram



## ID:2 - Sequence Diagram



## ID:3 - Use case description

| **Use Case Name:** Change Observation Schedule | **ID**: 3 | **Importance Level:** High |
|---|---|---|
| **Primary Actor**: Administrator | | **Use Case Type:** Necessary |

**Stakeholders and Interests:**

- Science Observer
- Astronomer

**Brief Description:**

This will provide data when the administrator will change the plan for observation.

**Trigger:**

When the administrator has to change the schedule from a request form from a system control center.

**Type:** External

**Relationships:**

Association: Administrator
Include: -
Extend: -
Generalization: -

**Normal Flow of Events:**

1. If there are any issues occurring.
2. The System Control Center will get a notice from observers.
3. Administrator gets the notice to the system.
4. Administrator check the current observation schedule
5. Administrator checks the available day to reschedule.
6. Administrator reschedule on the systems.
7. Administrator announced the new schedule for observation.

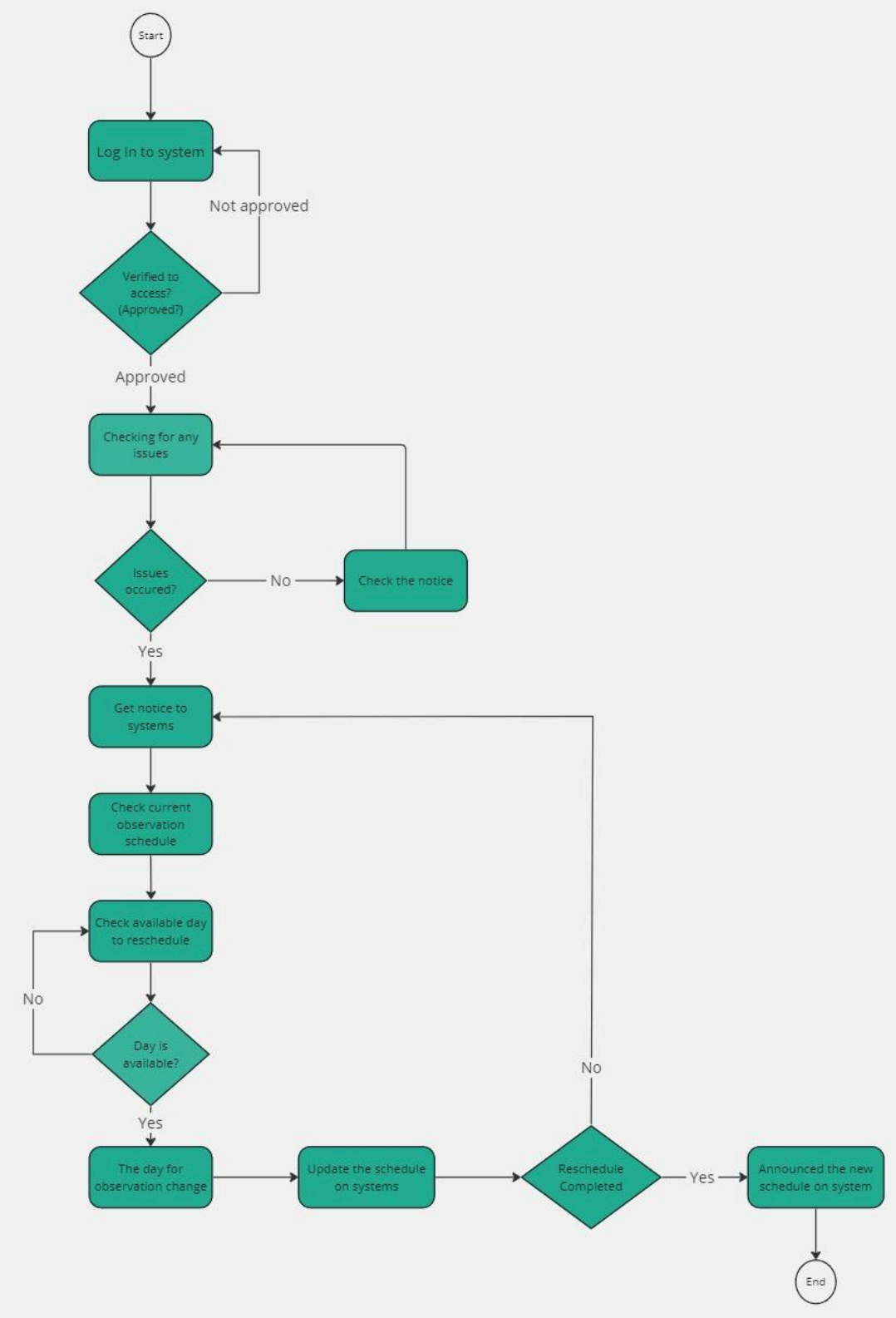
**Subflows:**

- The rescheduling should be announced to the science observer and astronomers. Also, it should be known to the related people.
- This schedule should be accessed by using the authentication process to verify identity.
- The new schedule should be announced directly to the systems.

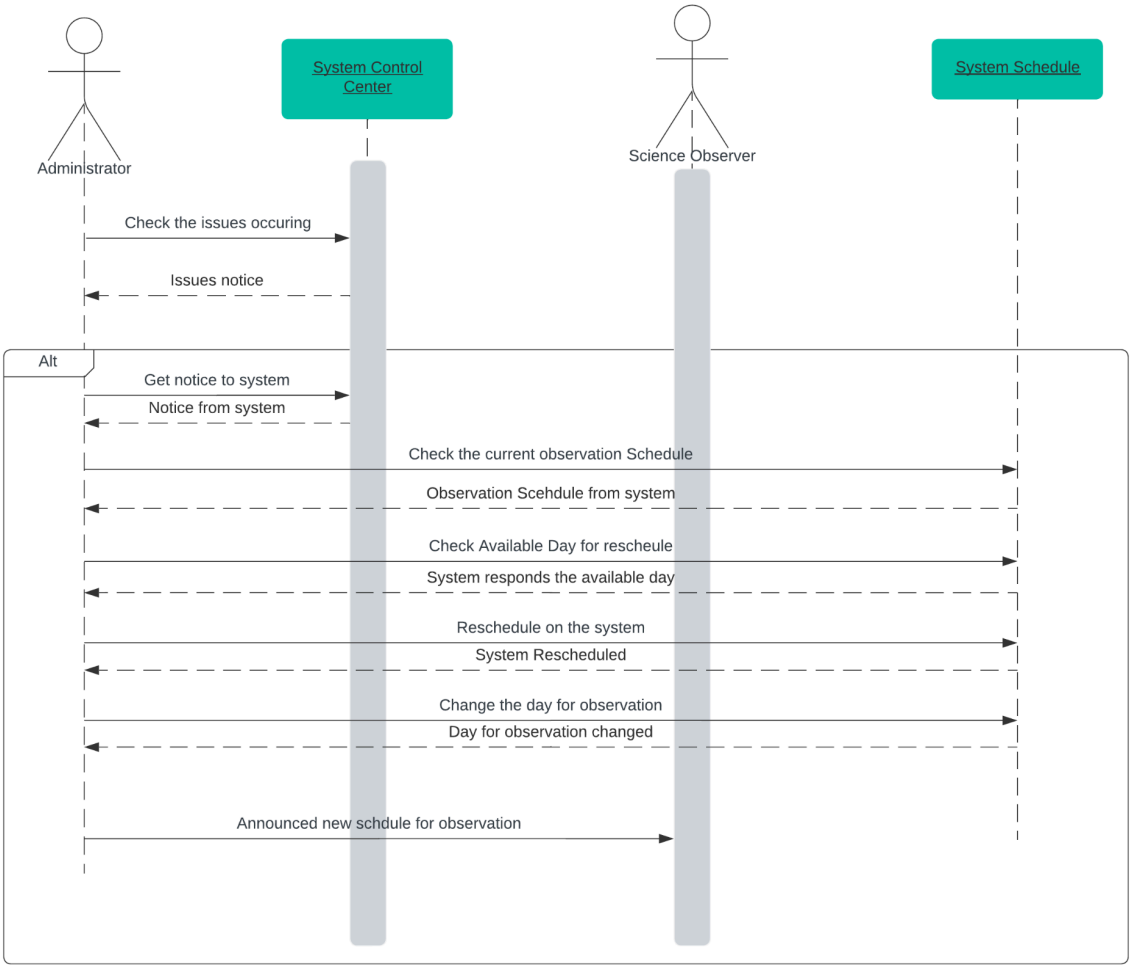
**Alternate/Exceptional Flow:**

- The schedule that makes changes will not be available for unrelated people.
- If conflict issues occurred during rescheduling the administrator will not be able to schedule new for new observation.

## ID:3 - Activity Diagram



## ID:3 - Sequence Diagram



## ID:4 - Use case description

| **Use Case Name:** change unit status | **ID:** 4 | **Importance Level:** High |
|---|---|---|
| **Primary Actor:** TelescopeOperator | | **Use Case Type:** Functional |

**Stakeholders and Interests:**
TelescopeOperator: Track and manage telescope readiness for observation tasks.
Astronomer: Plan their observations and rely on functional instruments.
Administrator: Making informed decisions regarding equipment usage and upkeep.

**Brief Description:**
Changing unit status means updating the equipment's condition to know if it's ready for observation.

**Trigger:** When equipment experiences a failure or malfunction, it triggers a change in status to indicate the need for repair or replacement.

**Type:** external

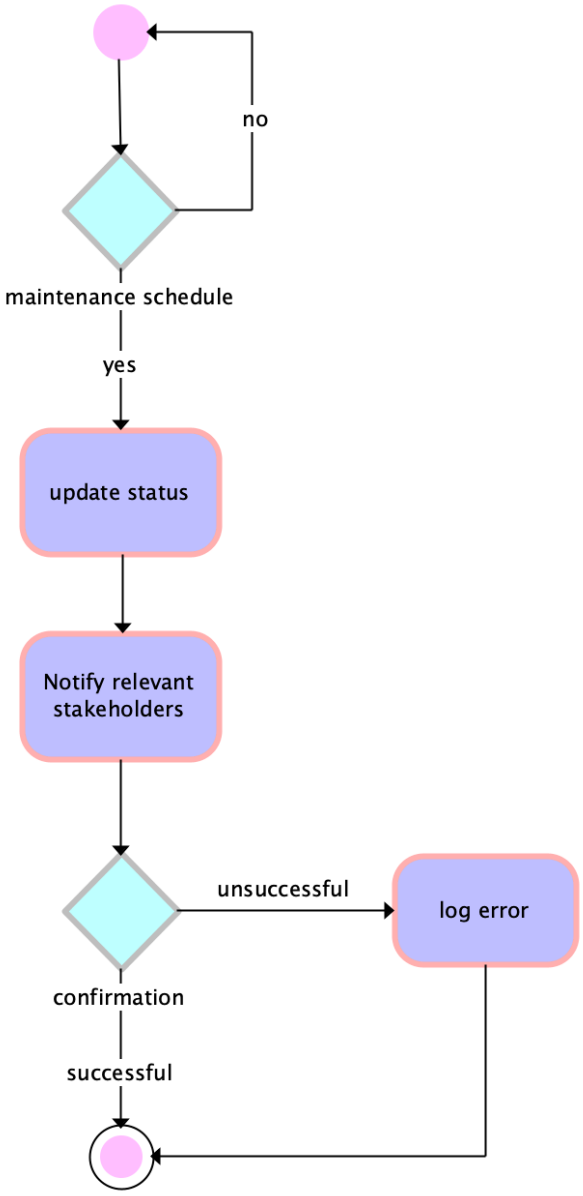
**Relationships:**
Association: TelescopeOperator, Administrator
Include: Install & Remove unit
Extend: To effectively execute the task of changing unit status within the broader context of telescope operations.
Generalization: -

**Normal Flow of Events:**
1. Scheduled maintenance to start the process.
2. The system checks if the trigger is valid.
3. If valid, the telescope status is changed.
4. Telescope operators are informed.
5. The change is confirmed and recorded.
6. The system goes back to its regular tasks.

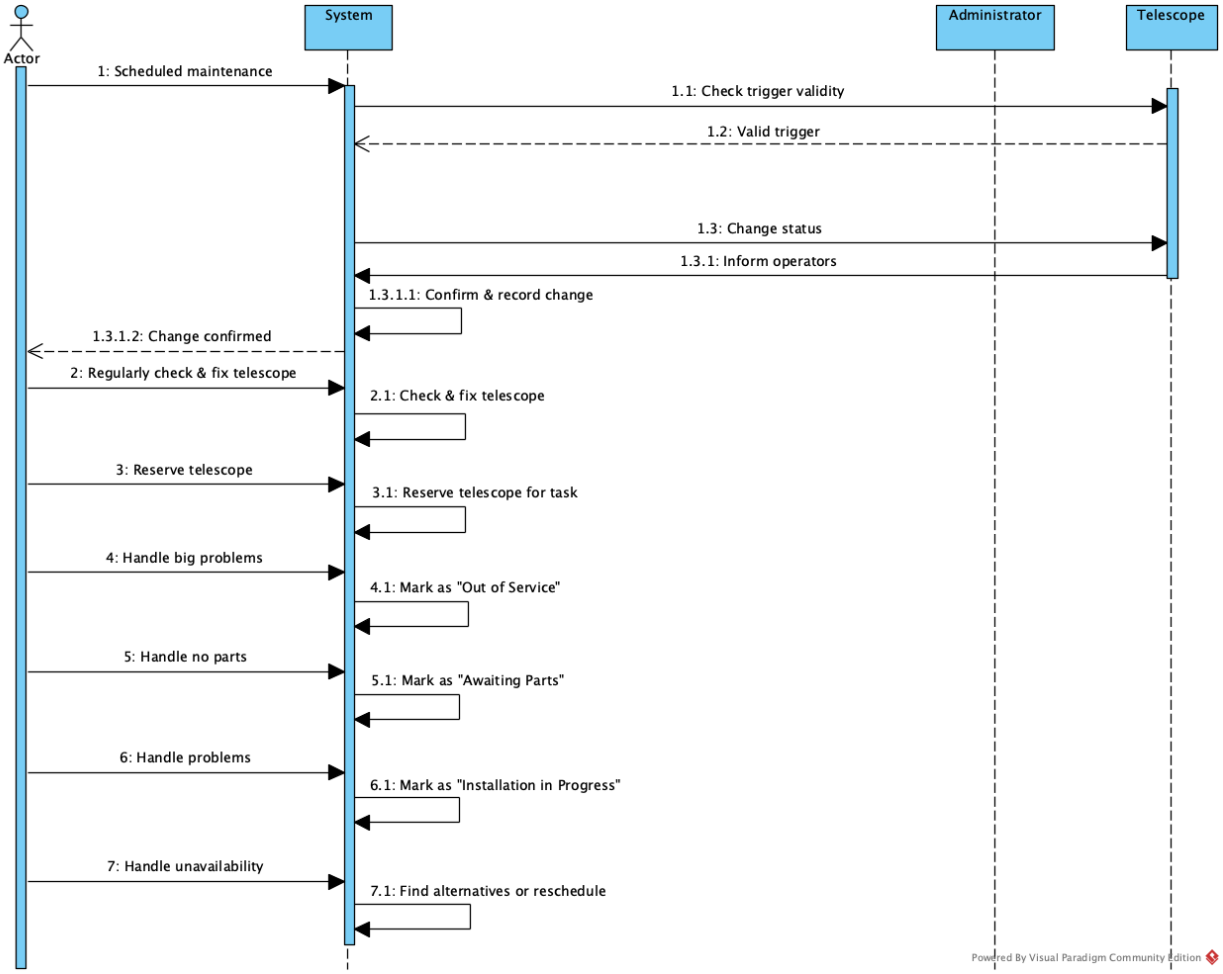
**Subflows:**
1. should be regularly checking and fixing equipment to ensure it's working correctly.
2. should be reserving it for the task, and ensuring it's available and ready for use.

**Alternate/Exceptional Flow:**
1. If there are big problems, mark it as "Out of Service."
2. If there are no parts, mark it as "Awaiting Parts."
3. If there are problems, mark it as "Installation in Progress."
4. If not available, find alternatives or reschedule.

## ID:4 - Activity Diagram



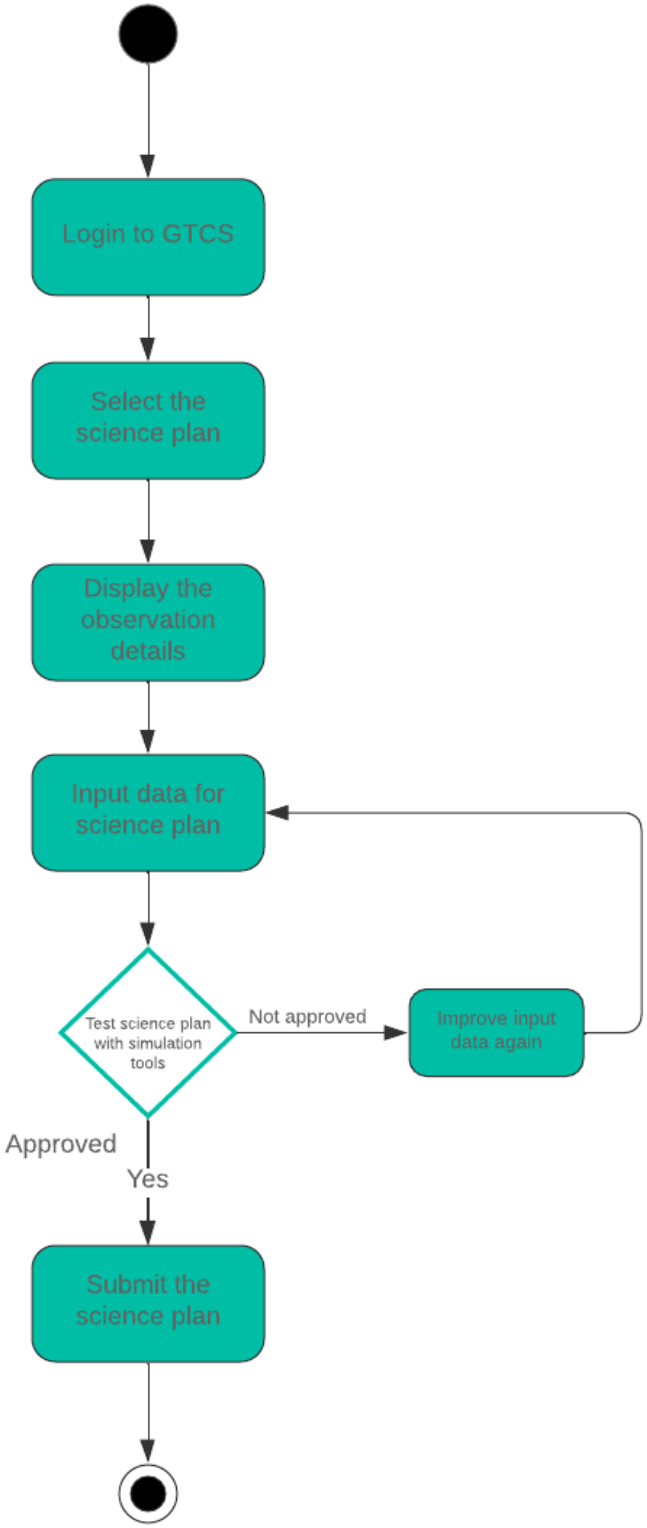
# ID:4 - Sequence Diagram



## ID:5 - Use case description

| | | |
|---|---|---|
| **Use Case Name:**Create Science plan | **ID**: 5 | **Importance Level**: Hight |
| **Primary Actor:** Astronomer | | **Use Case Type:** Functional |
| **Stakeholders and Interests:**<br>Science observer:Science observation and the collect of data<br>Astronomer:Scientific observation | | |
| **Brief Description**: This use case allows astronomers to create a plan for Science observation. | | |
| **Trigger:** An astronomer plans to execute an observation.<br>Type: initial processing | | |
| **Relationships:**<br>Association:Science observer,Astronomer<br>Include:Test a science plan<br>Extend: for real time adjustment<br>Generalization: - | | |
| **Normal Flow of Events:**<br>1. Astronomers log in the Gemini Telescope Control system(GTCS).<br>2. Astronomers select the science plan.<br>3. The system shows detail about observation times, required instruments.<br>4. Astronomers input data such as<br>5. Astronomers submit scientific plans. | | |
| **Subflows:**<br>Astronomers test the plan in GTCS's simulation capabilities to verify the viability of the science planning. | | |
| **Alternate/Exceptional Flow:**<br>If the science plan is not approved during the validation process, the astronomer will resubmit the plan. | | |

## ID:5 - Activity Diagram



## ID:5 - Sequence Diagram