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Use Case Scenarios

Scenario 1, Scientist: Track Objects in Space:

Primary Actor: Scientist

Goal: Retrieve and view orbital object data categorized by type

Precondition: The program is running, and the user selects the “Scientist” role from the UI

Trigger: The user selects “Track Objects in Space” from the menu

1. The system presents the following object type options:
   1. Rocket Body
   2. Debris
   3. Payload
   4. Unknown

2. The user selects “Debris.”

3. The system filters objects of type Debris using the data loaded by Filereader.java and maintained in memory by TrackingSystem.

4. For each debris object, the system displays

1. Record ID
2. Satellite Name
3. Country
4. Orbit Type
5. Launch Year
6. Launch Site
7. Longitude
8. Avg. Longitude
9. Geohash
10. Days Old

5. The system logs the action using Logger.java:

[timestamp] Scientist filtered objects by type: Debris

**Postcondition:**

Debris objects are displayed, and the user’s action is logged. The user may return to the main menu.

Scenario 2, Scientist: Assess Orbit Status and Risk Level:

Primary Actor: Scientist

Goal: Evaluate which debris are still in orbit and determine their risk level

Precondition: Debris data is loaded into memory; user has access to the Scientist role

Trigger: The user selects “Assess Orbit Status” from the menu

1. The system provides options:
   1. Track Objects in LEO
   2. Assess if Debris is Still in Orbit

2. The user selects “Assess if Debris is Still in Orbit.”

3. The system evaluates all objects of type Debris, checking:

1. If orbitType is not null or empty
2. If longitude is valid
3. If daysOld < 15,000
4. If conjunctionCount ≥ 1

4. Using Debris.assessOrbitStatus() and calculateRiskLevel(), the system:

1. Determines still\_in\_orbit (boolean)
2. Assigns risk\_level: Low, Moderate, High

5. The results are appended to:

1. A new CSV file (updated\_rso\_metrics.csv)
2. A TXT report summarizing exited debris (exited\_debris\_report.txt)

6. The system logs the following:

[timestamp] Scientist ran orbit status and risk level assessment

[timestamp] Updated debris data saved to updated\_rso\_metrics.csv

[timestamp] Exited debris report saved to exited\_debris\_report.txt

**Postcondition:**

The new CSV and TXT files are saved, and all actions are logged. The user is returned to the menu.