Object Oriented Analysis And Design

De-Orbiting Active Debris By Dual-Arm Space Robot

Problem Statement :

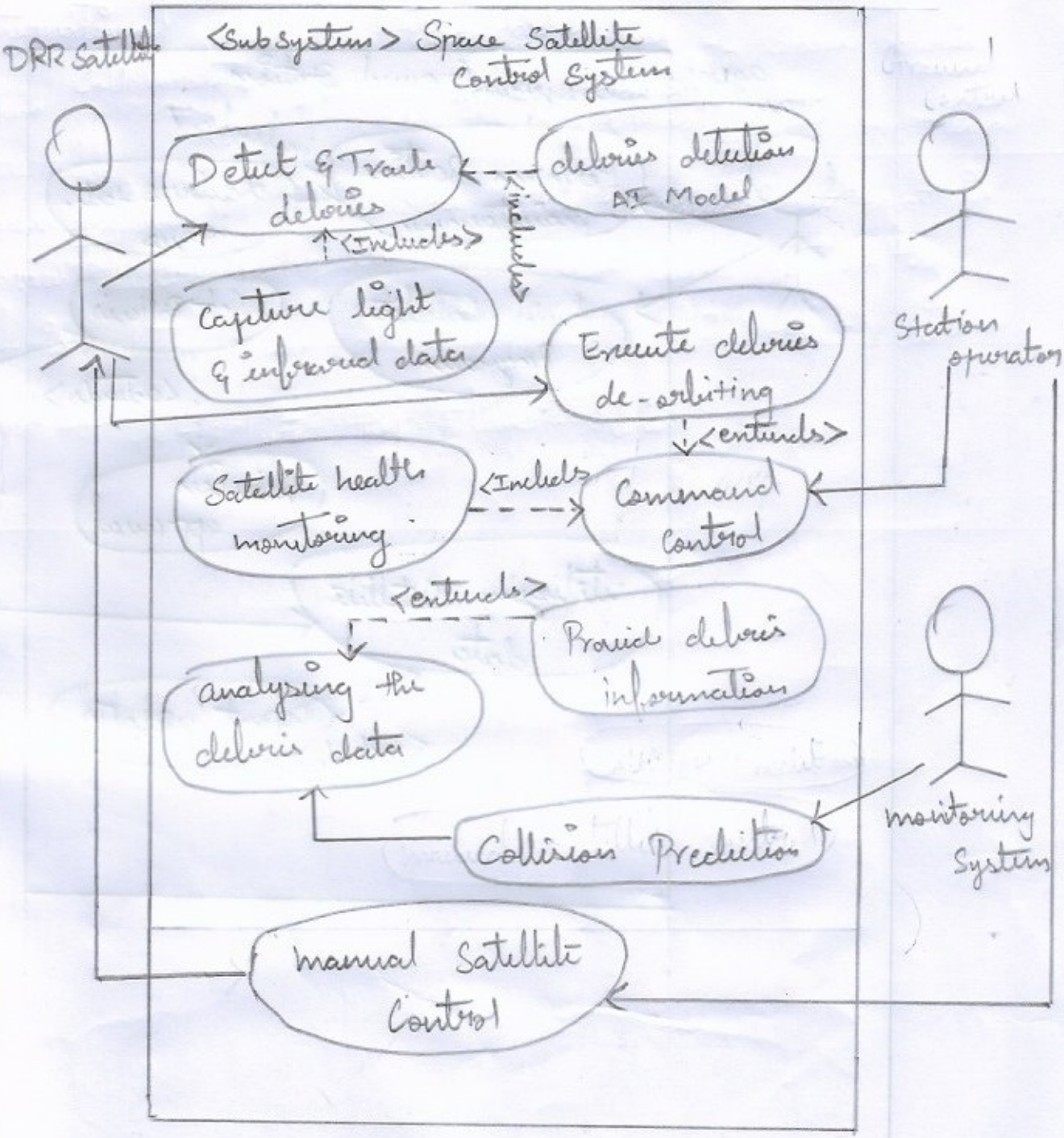
Active debris removal (ADR) technology is an effective approach to remediate the Proliferation of Space debris, which Seriously threatens the operational Safety of orbital Spacecraft. By using the Dual-Arm Space robot in the Artificial intelligence the Robot will capture the debris data then analysing the debris orbit will help to de-orbite the active debris.

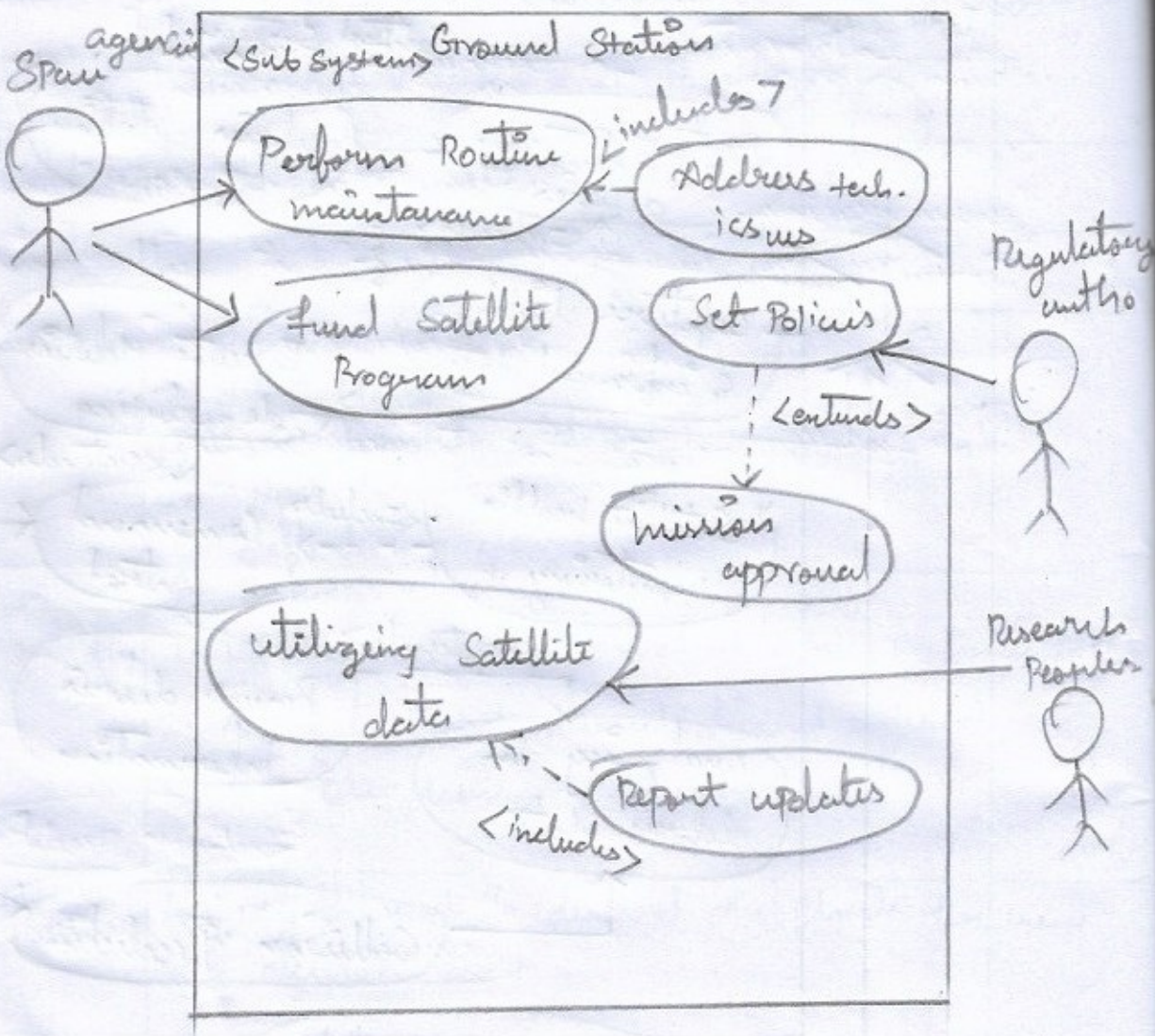
PRIMARY ACTORS	USE CASES
Debris Removal Robotic Satellite	1. Detect & track debris 2. Execute debris Removal 3. Send debris data to Station 4. Change the threshould
Ground Control Station operator	5. Satellite command 6. Satellite control 7. monitor Satellite health 8. analysing the debris data.
Space debris monitoring System	9. provide debris information 10. Collision prediction.
Satellite maintenance Technicians	11. Perform Routine maintenance 12. Address technical issues.
Space Agencies	13. Fund Satellite programs 14. Set policies and guidelines
Regulatory Authorities	15. Enforce compliance 16. mission approval

PRIMARY ACTOR	USE CASES
Research Institutions	17. Utilize Satellite Data 18. Collaborate on Studies
International Collaborators	19. Data Sharing 20. Coordinate removal
Communication Service Providers	21. Ensure data Transmission
Public media	22. Report updates

ID & NAME:	UC-1 / Detect & track debris		
Created By:	SRINIVASAN. J.P	Date Created	22/01/24
Primary Actor	DRR Satellite	Secondary Actor	Debris detection system
Description	DRR Satellite Capture the lights send to the detection System. the detection System will command the Satellite to de orbit the debris		
Trigger:	The debris detected in the System		
Precondition	PRE-Satellite Should be Idle, PRE-2: System		
Post condition	POST-1: Damage check		
Normal Flow	1. Capture lights 2. detect debris 3. move towards debris 4. wait for an command 5. de-orbitting debris 6. Damage check		
Alternate Flow	1. no lights change infrared mode continue STEP 2 2. Command not received discard mission 3. Satellite damage recovery mode		
Exceptions	4a. command is discard the check for new debris		
Priority	High		
Frequency of use	average of 2 debris per day		
Business Rules	BR-1		
other Information	1. Satellite can discard the mission anytime the Satellite detect any damage		
Assumptions	Assume that average of 10 degree can be detected.		

use case diagram




Space agencies
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Perform Routine maintenance
Address tech. issues
Fund Satellite Programs
Set Policies
Regulatory authority
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mission approval
utilizing Satellite data
Researchers Peoples
Report updates
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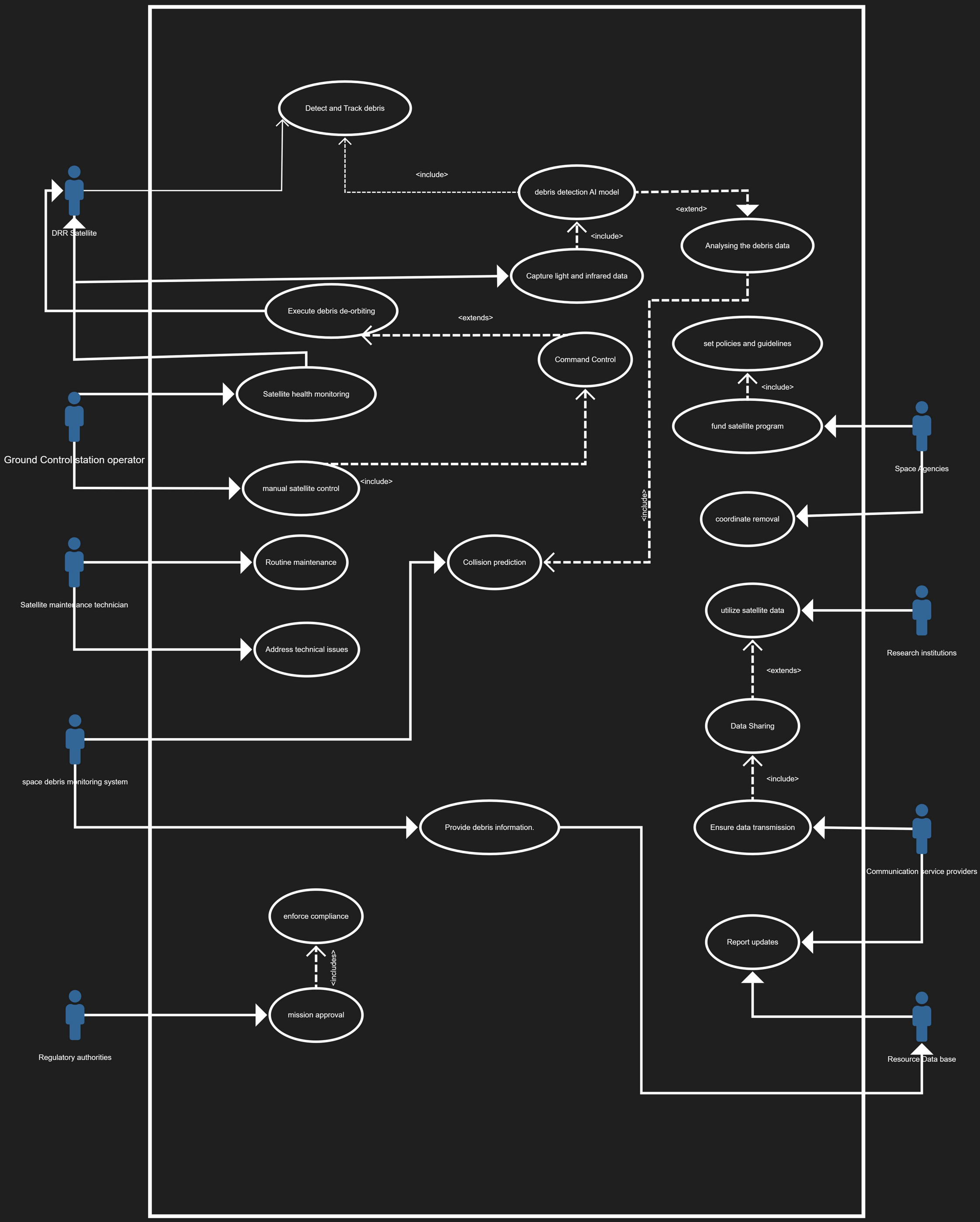
Detect and Track debris
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Analysing the debris data
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Capture light and infrared data
Execute debris de-orbiting
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Command Control
set policies and guidelines
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Satellite health monitoring
fund satellite program
Ground Control station operator
Space Agencies
manual satellite control
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coordinate removal
Routine maintenance
Collision prediction
Satellite maintenance technician
utilize satellite data
Research institutions
Address technical issues
<extends>
Data Sharing
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space debris monitoring system
Provide debris information.
Ensure data transmission
Communication service providers
enforce compliance
<includes>
Report updates
mission approval
Regulatory authorities
Resource Data base