

2026 Engineering Challenge Scenario

Location: Main Asteroid Belt between Mars and Jupiter

Date: Near Future

Mission: Test AI system CLAIR for the CASE autonomous mining program

The age of AI has reached space.

Computerized Long-range Asteroid Inventory Resource, or CLAIR, has been developed to replace humans in surveying and cataloging objects in the vast asteroid belt.

Two three-member teams have arrived in the G4 region of the asteroid belt to calibrate CLAIR's systems. One team is composed of veteran asteroid surveyors, the other, technicians for the new CLAIR system. Their mission is to perform asteroid surveys in a region of previously surveyed objects. This will provide a baseline to gauge the accuracy and speed of both the human and AI methodologies.

This mission will be invaluable in transitioning to the future use of **Complete Autonomous Space Entities**. The CASE program will remove the need for direct human contact with the dangerous business of mining asteroids.

Surveys consist of targeting intended asteroids and categorizing them by size, shape, albedo, rotation, surface texture, and mineability. Each team will independently survey the same asteroid. Once both teams have completed their survey, the next survey target will be identified. There are ten asteroids on the mission agenda.

Team Taurus

Veteran asteroid surveyors who use standard survey methods and tools. They have a discriminating eye for detail, a wealth of experience determining and characterizing astronomical objects, and a working knowledge of converting base ten numerals to base 2 (binary).

- **Astronomer**
Uses reference guides to pinpoint asteroid locations. Operates the ship's targeting camera. Directs the survey process performed by the Taurus team.
- **Surveyor**
Monitors ship sensors to collect information on asteroid attributes. Operates the spectroscopy spectrum laser.
- **Data Analyst**
Partners with the Surveyor to review sensor results and classify asteroids being surveyed. Makes the final decision on survey submissions.

Team Pisces

Technicians who have spent years developing and tuning CLAIR for survey activities in the asteroid belt. They will be making the final adjustments to CLAIR's operating parameters and confirming it can successfully complete real-life surveys.

- **Systems Analyst**
Reviews CLAIR system documentation. Determines which CLAIR systems are necessary for each successive asteroid survey.
- **Resource Manager**
Manages the resources allocated to each enabled CLAIR system. Finds the proper resource balance required by CLAIR to successfully complete surveys.
- **Test Manager**
Requests surveys from the CLAIR system. Runs diagnostic scans as needed. Reports survey's successes and failures. Directs the survey steps performed by the CLAIR team.

Teams will need to decide which team member will fill each role before coming to the challenge.