ComSSA
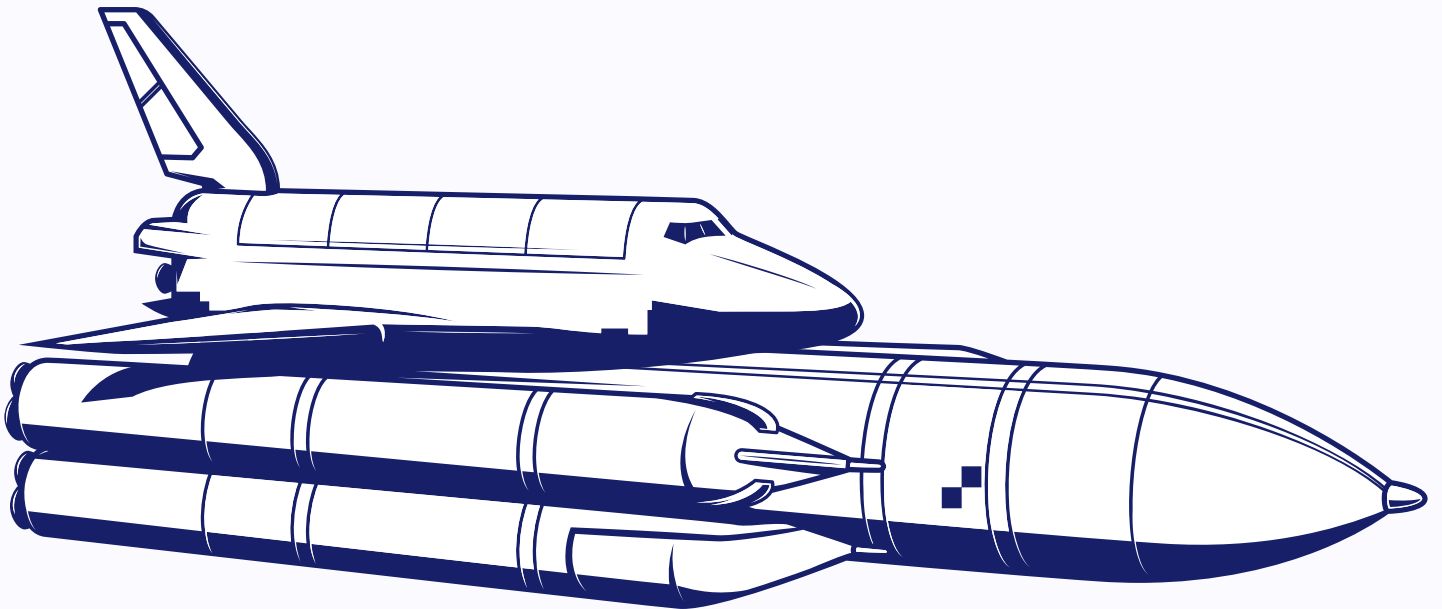# HACKATHON

OPERATION

INTERSTELLAR ODYSSEY
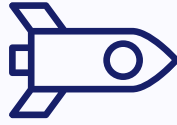

PROBLEM STATEMENT

PREPARED FOR
Respected Contractors

APPROVED BY
The Chairman

ELECTRICAL ENGINEERING, COMPUTING AND MATHEMATICAL SCIENCES

Powerledger VGW VIRTUAL GAMING WORLDS bankwest ATLASSIAN imc .auDA

SCENARIO

> I'm not sure how much of this message will reach you, but there's something here you need to see. Everything depends on this getting back to earth. Please hurry, they are watching me - **[end transmission]**

The year is 2030. Two months ago, the event now referred to as the First Contact altered the fate of humanity. When an unknown alien vessel was discovered travelling towards Earth, the world's greatest minds came together to explore solutions on how to handle the scenario. One team of contractors, Stack Underflow, created a novel solution using light signals and the behaviour of atoms to establish a universal communication protocol. During the first contact scenario, this communication was implemented to great success. After agreeing on basic phrases, the vessel opened up and beckoned us to enter. Choosing to represent all of humanity, one brave astronaut volunteered to follow the request and enter the vessel. As soon as they were inside, however, all communication was lost. Even our advanced sensors struggled to capture what happened next, but the vessel began rapidly moving out of the atmosphere, and we lost track of it soon after.

Yesterday, we received an emergency broadcast from the astronaut. They are alive! But they trapped on an asteroid-like body orbiting on the outskirts of the solar system. We estimate that, using conventional space travel technology, arriving at the asteroid's location would take 2 years in the optimal scenario. They were only able to get through one communication, but if we have any chance of rescuing them and discovering what happened, we must act now.

ComSSA
HACKATHON 2022

Powerledger
ATLASSIAN
VGW VIRTUAL GAMING WORLDS
imc
bankwest
.auDA
ELECTRICAL ENGINEERING, COMPUTING AND MATHEMATICAL SCIENCES

PROBLEM STATEMENT

Overall Problem

Your goal is to identify potential issues and propose solutions to the overall problem outlined in the scenario:

Rescuing the astronaut in an interstellar journey spanning 2 years.

Your solutions can focus on any sub-aspect of this problem you can identify. Focus on creativity, feasibility, and engagement with the scenario.

Optional Considerations

The following are additional aspects to the scenario, which you may optionally choose to consider when proposing your solution:

- It was recently discovered that the aliens are capable of altering their physical appearance dramatically. Discussion has begun to address the possibility of an alien infiltrator posing as an astronaut on our vessel and different methods of xeno-detection.
- During the initial contact, the aliens mysteriously deactivated a number of our automated defence systems. It has since been theorised that the aliens were able to adapt and compromise our systems via radio communication protocols.
- After deliberating over the vast resources required for the mission to be successful, countries around the world have agreed to collaborate on the project together. It remains ambiguous who should control different aspects of the project. Concerns have been raised in regards to how hidden agendas and bad actors could compromise the security and efficiency of the operation.

Please note you are **NOT** required to address any of the above information.

Also avoid spreading yourself too thin – try to focus on a specific problem within the scenario.

SAMPLE SOLUTION

To get you started in developing your own solutions, we have provided a solution developed by one of the council's own internal research teams:

Combatting Space Junk

After considering the journey's length and destination, we determined that there is a high probability of encountering foreign debris, or "space junk", which may be orbiting Earth as well as other celestial bodies. Since both the debris and spacecraft travel at extremely high speeds, the impact of even a miniscule piece of foreign debris with a spacecraft could create big problems. The earlier any debris is detected, the more time there is to decide if a collision avoidance manoeuvre is required. To address this issue, we propose a system that can continuously track hazardous objects and deliver real-time information for the flight crew and mission control.

A network of exterior sensors will use various frequencies to scan for foreign objects within a 10km radius in all directions of the spacecraft. Sensors are calibrated to determine the size and velocity of space debris, and the data is categorised and processed by the "Foreign Object Surveillance System" (FOSS), taking into account any object's trajectory. Trained AI couples the FOSS data with the planned flight path to produce a 3D model and provide the crew with navigational suggestions.

Powerledger
ATLASSIAN
VGW VIRTUAL GAMING WORLDS
imc
bankwest
.auDA
ELECTRICAL ENGINEERING COMPUTING AND MATHEMATICAL SCIENCES

ADDITIONAL ADVICE

As you may have noticed, the final details of the problem you are to solve are highly open-ended. This is intentional – we are looking for you to think critically, identify a specific issue (or issues) in the provided scenario and provide a comprehensive and well-researched solution.

Your final submission will be in two parts: First, you will present your solutions in a conference-style discussion, a good opportunity to demonstrate implemented parts of your solution. The top 8 pitches (as voted by attendees) will then present to the central council in the form of a short 7-minute presentation to our panel of expert judges. While the final decision will be left purely to the judges, your solution will be graded on the following metrics: **Identification of Problem**, **Research/Contextual Background**, **Creativity of Solution**, **Demonstration of Feasibility**, and **Overall Presentation**. A copy of the marking guide will be made available to you.

You can think of your submission as a business pitch – while coding a demo or designing part of your solution certainly helps, no part needs to be actually implemented as long as you can convince the panel that it is a feasible and effective solution. We understand there are a wide range of technical skill levels participating in the Hackathon, so focus for marking will prioritise creativity and innovation over technical skills. The Hackathon team will be here to support you during the event, and make sure to take advantage of the experienced in-person and online mentors at every opportunity.

If you are uncertain about any aspects of the scenario not outlined in this document, you can choose to make reasonable and justified assumptions.

The future of humanity may well rest in this mission, and in your hands.

Good luck,
The Chairman.

ComSSA
HACKATHON 2022

Powerledger
ATLASSIAN
VGW VIRTUAL GAMING WORLDS
imc
bankwest
.auDA
ELECTRICAL ENGINEERING, COMPUTING AND MATHEMATICAL SCIENCES