



TECH ZOO 2022-23

Podar International School (CBSE) Nerul

Astronomical Devices – Astronomic instruments

OSCAS (Outer Space Collision Avoiding System)

Working Model

PROJECT SYNOPSIS

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Introduction

First, I would like to extend my heartfelt thanks to the Podar International School (CBSE) Nerul, for arranging this amazing competition and giving us all a platform to showcase our stimulating scientific ideas.

I am here to present the synopsis of my own idea that will be translated to a working model if given an opportunity.

The Problem

We all know how important the spaceships in today's technological world are. Spaceships are deployed in the space for the various critical missions. Usually, all the space missions are extremely costly, and the success and the failure of such missions greatly lies in the health of the spaceship itself.

The biggest challenge for the spaceships deployed for critical space missions, is to avoid asteroids and other debris in the space.

Even though the latest cutting-edge technologies can easily handle this problem, it is not very economical. The current technologies work with a camera and AI to prevent collisions with debris and asteroids in the space. However, as expensive as it sounds, this technology is not affordable.

Also because of the new spaceships' enormous technology costs a fortune, this adds up to the amount

This calls for an affordable solution.

The Solution

I have tried to overcome the above problem with an idea that gives rise to a working model. I have named the device as OSCAS (Outer Space Collision Avoiding System). The idea is original, and the design and solution is solely thought and implemented by me.

Project Description and Working

The OSCAS, uses **Ultrasound Object Detection Technology**, instead of a Camera and AI unlike other devices to make it cost efficient.

Diagram 1.1 below, shows the Spaceship and Ultrasound Sensors mounted on it

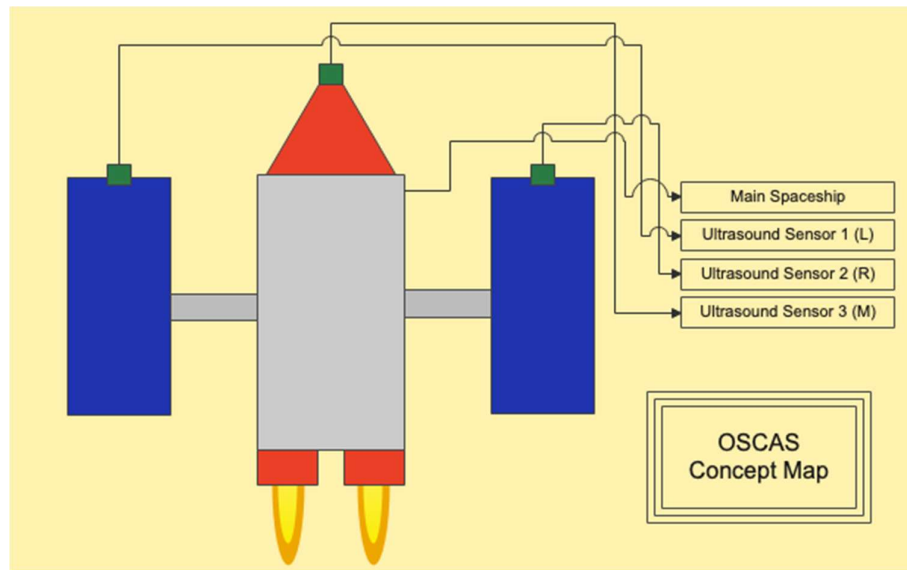


Diagram 1.1: The OSCAS Concept Map

The OSCAS works on the principle of travel of sound.

The OSCAS consists of three Ultrasound (US) sensors that are mounted on the spaceship. These sensors transmit and receive sound waves that a human ear cannot perceive. When the transmitted sound waves collide on any object in their path, they reflect and are received back by the US sensors mounted on the spaceship. The US sensors then pass the information to the code about the distance between the object and the sensor.

Next, the Arduino uno (the brain of the project) processes the information by received from all three US sensors and graphs it into a radar like interface for human convenience. It also consists of some LED bulbs indicating the distance between the object and the spaceship. The US sensor 1 and 2 are mounted on servo motors, so they keep on rotating and are responsible to detect the hurdles on the either side of the spaceship. US Sensor 3 is mounted in the Centre and is responsible to track the objects/hurdles coming from the front.

Advantages

- Less complex architecture
- Highly cost effective
- Solves major issues related to the mankind in todays technological world
- Robust

Points worth noting:

- Ultrasonic waves used in the prototype model can be replaced with high range signals like laser
- Microcontroller Arduino Uno used fort this prototype can be replaced by high end controllers for the large-scale projects

Economic Viability

- The project is highly viable economically considering that the current technologies are very costly.
- The prototype is also economic as it uses only few electronic components

Components Used

Item	Quantity	Total Cost (INR)
Arduino Uno	1	1500
Ultrasound Sensors	3	300
Jumper cables	20	100
Servo Motors	2	400
Miscellaneous	NA	200
Grand Total ₹ 2500		