



# Radio Telescope

## Astronautics Club - Project Proposal

International Institute of Information Technology, Hyderabad

*Respected Sir/Ma'am,*

The Astronautics Club plans to start a new project – building a functional Radio Telescope. This hands-on initiative will provide students with practical experience in radio astronomy, electronics, data analysis, and collaborative problem-solving.

Our goal is to build a low-cost, small-scale radio telescope capable of detecting celestial radio emissions. Initially, the telescope will focus on strong radio sources like the Sun and progress to more advanced observations.

We will use the CHART (Completely Hackable Radio Telescope) model with our own optimizations. The initial design will include:

- A parabolic dish antenna with a feedhorn system for focusing incoming radio waves
- A Low Noise Amplifier (LNA) and bandpass filter to enhance weak celestial signals
- A Software-Defined Radio (SDR) receiver for flexible signal processing
- Data acquisition and processing software using GNU Radio and Python-based tools

In the following sections, we share our implementation timeline and potential future improvements. We welcome suggestions and collaborations to make this project a valuable learning experience for all involved.

**Regards,**

Madhan Sai Krishna

Co-Coordinator, Astronautics Club

# Implementation Timeline

## Phase 1: Research & Planning

- Study radio telescope designs, focusing on HI-line detection and planetary emissions
- Develop a detailed blueprint for the antenna, receiver, and data pipeline
- Estimate budget and procure required components

## Phase 2: Construction & Assembly

- Build the parabolic dish and feedhorn system
- Assemble the LNA, filters, and SDR receiver setup
- Perform initial system integration and debugging

## Phase 3: Testing & Calibration

- Test the system using terrestrial radio sources
- Conduct celestial tests and compare signals with public datasets
- Calibrate the telescope for accurate measurements
- Optimize performance through iterative refinements

## Phase 4: Data Collection & Analysis

- Implement data processing techniques to extract meaningful information
- Document findings and prepare presentations for the club
- Schedule and conduct observation sessions, beginning with the Sun

## To-do:

- Add the budget and components list
-