

# Programmable Ultra-Lightweight System Adaptable Radio Satellite Base Station

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## Sponsoring Program(s)

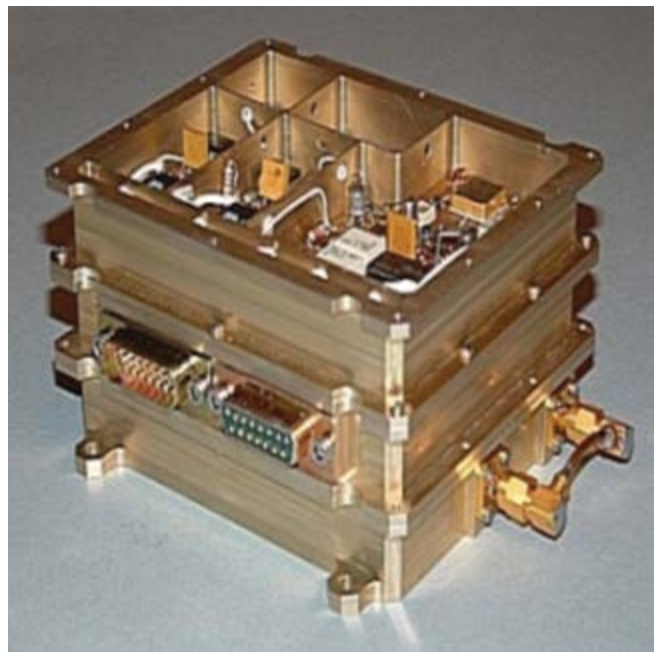
Marshall Space Flight Center/Center Management  
and Operations  
Technology Investment Program

## Project Description

With the explosion of the CubeSat, small sat, and nano-sat markets, the need for a robust, highly capable, yet affordable satellite base station, capable of telemetry capture and relay, is significant. The Programmable Ultra-Lightweight System Adaptable Radio (PULSAR) is NASA Marshall Space Flight Center's (MSFC's) software defined digital radio, developed with previous Technology Investment Programs and Technology Transfer Office resources. The current PULSAR will have achieved a Technology Readiness Level-6 by the end of FY 2014. The extensibility of the PULSAR will allow it to be adapted to perform the tasks of a mobile base station capable of commanding, receiving, and processing satellite, rover, or planetary probe data streams with an appropriate antenna.



**Ground station antennas.**



**Pulsar stack.**

### ***Anticipated Benefits***

MSFC does not have a tracking antenna and relies on the Near Earth Network (NEN) to implement its data processing requirements of payload operations for the International Space Station. A deployable asset, such as GATR Technologies' portable antennas, provides an avenue for the MSFC Engineering Directorate personnel to engage directly with the tracking, commanding, and processing of satellite systems and data. This provides an avenue to gain hands-on experience with rapid deployment and operation) of base station assets.

### ***Potential Applications***

With a coming explosion of small sats and nanosats, the current NENs will become overworked quickly trying to accommodate all of these satellites and their data/commanding requirements. By having an affordable, mobile ground station, many of these satellites could talk directly to the organizations that launched them.

A mobile base station will augment the few ground station resources available east of the Mississippi, strategically positioning MSFC with a competitive advantage to secure future competed work in the areas of Office of Chief Technology exploration programs such as the HOPE, LCAS, EV-I, TMD-12, as well as FASTSat-HSV01 follow-on small sats and CubeSats. This will provide the ability to accommodate small, short-term missions.

### **Notable Accomplishments**

Individual components are arriving at MSFC for test and integration.

TIP