

# Satellite Missile and Tracking System (SATRACK)

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**Abstract-** The root of the rocket can be followed back to the roman war machine the launch. The guided rocket was conceived when Werner Von Siemens proposed a guide torpedo for submarines in the late nineteenth century. From these beginnings the present day trident and tomahawk are guided from the skies utilizing the GPS signals. This workshop manages the estimation idea that tests the rocket exactness. SATRACK gets, rebroadcast, records and tracks the satellite signs sent by the GPS signals. The gathering and rebroadcast of the signs is finished by rocket equipment called the GPS interpreter. The ground telemetry stations comprise of the RF receiving wire and recorders for the information. Post-flight preparing and demonstrating are done later at the SATRACK Facility. Likewise the significant blunder supporters of the rocket flight are controlled by the demonstrating done. There is broad utilization of reenacted motions in this strategy. This course likewise tosses light on the real leap forward advancements that were produced amid the examination paving the way to the last type of this innovation. The significant favorable circumstances, burdens and future uses of this strategy is additionally talked about. This direction framework assessment idea is the best in the present test and assessment innovation for guided weapons frameworks.

**Keywords-** SATRACK, Missiles, Ballistic Missiles, Defenses

## I. INTRODUCTION

The word reference significance of direction is the way toward controlling the way of a question towards a given point. This point might move. On the off chance that the objective is moving with respect to the guided question then the procedure of direction is needy upon the position and speed of the moving target. These days all the ballistic rockets are guided with the assistance of GPS satellites. Satrack has been a noteworthy supporter of the improvement and operational achievement of present day ballistic rockets. It is essentially used to give an exceptional observing capacity to assessing the blunder model of any weapon framework. Satrack fundamentally approves and screens the rocket direction blunder display in the flight test program. The purpose for utilizing the satrack for assessing and approving the blunder demonstrate is its capacity to get record, rebroadcast and track the satellite flag. It recognizes the real

blunder supporters that are mindful to miss the track of the rocket from its foreordained way.

## II. OBJECTIVE

The main goal of our examination paper is to make wellbeing observing framework straightforward and precise right now in our paper we are checking just SATRACK office likewise has the considerable favorable position that the entire information acquired from the practice runs can be utilized to get a direction mistake demonstrate. The recorded information alongside the reproduction information from the models can create a far reaching direction blunder show. This will bring about the arrangement that is the best flight way for the rocket.

## III. METHODOLOGY

In our proposed design we are using technology one is Satellite Translator.

### A. Block Diagram

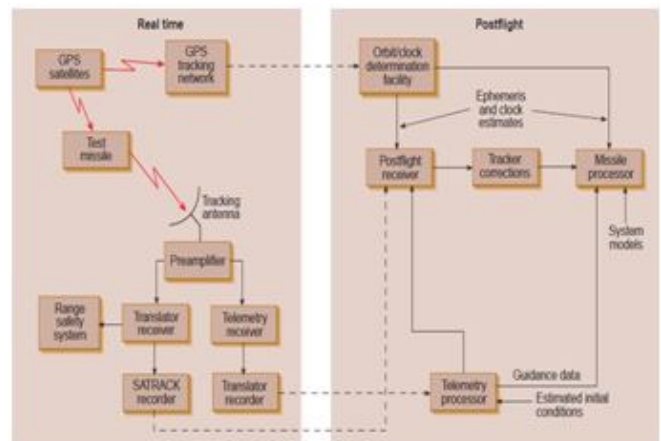


Fig 1. Block Diagram of Satrack system

### B. Working

The guideline of inactivity is essentially utilized as a part of the direction arrangement of rockets. This framework gives the middle of the road push to the rocket to bring it back on the best possible way. The initially guided rocket gets the customized data before its dispatch. Regardless of whether

there is no electromagnetic contact between the rocket and the starting station, the rocket can make restorative change in the flight way itself. Inertial direction measures all in flight increasing velocities and demeanor control framework produces comparing rectification signs to keep up the best possible battle way. The utilization of inertial direction removes a great part of the mystery from long range rocket conveyance. The eccentric outside powers following up on the rocket are detected by the accelerometers and the solutions created by them causes the rocket to amend its way.

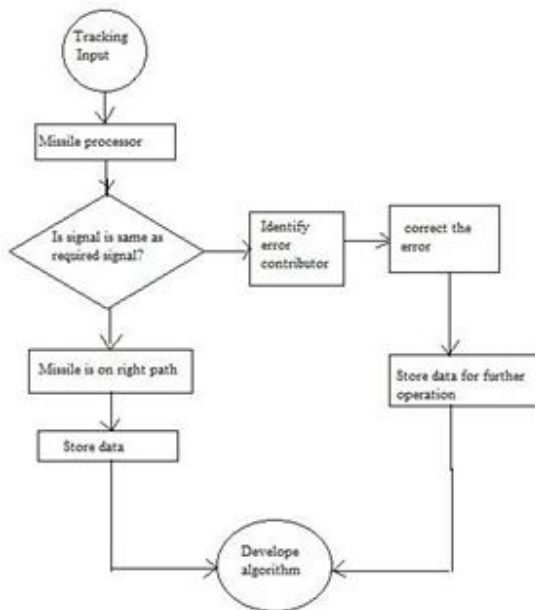


Fig 2. Flow chart of Satrack

For various days encompassing the rocket, the GPS ground stations gets, tracks and records the GPS signals. Amid the rocket dispatch, signs of GPS are gotten by rocket, changed in recurrence, and are given to the surface station. The rocket signals are gotten and isolated by the following radio wire. The post-flight process utilizes the recorded information to give satellite ephemerides and clock gauges followed flag information from the post-flight beneficiary, and rocket direction sensor information. After the flag following information are rectified, all the dissected information and the framework components are utilized by the rocket processor to deliver the information items.

**IV. GPS SIGNAL**

The signs for the GPS satellite route are two L-band recurrence signals. They can be called L1 and L2.L1 is at 1575.42 MHz and L2 at 1227.60 MHz .The balances utilized for these GPS signals are-

- Narrow band clear/procurement code with 2MHz data transfer capacity.
- Wide band scrambled P code with 20MHz data transfer capacity.

L1 is balanced utilizing the thin band C/A code as it were. This flag will give a precision of near a 100m as it were. L2 is adjusted utilizing the P code. This code gives a higher exactness near 10m that is the reason they are scrambled. The parameters that a GPS flag conveys are scope, longitude, elevation and time. The regulations connected to every recurrence give the premise to age estimations used to decide the separations to each satellite. Following of the double recurrence GPS signals gives an approach to adjust estimations from the impact of refraction through the ionosphere. A substitute recurrence L3 at 1381.05MHz was additionally used to adjust for the IONOSPHERIC impacts.

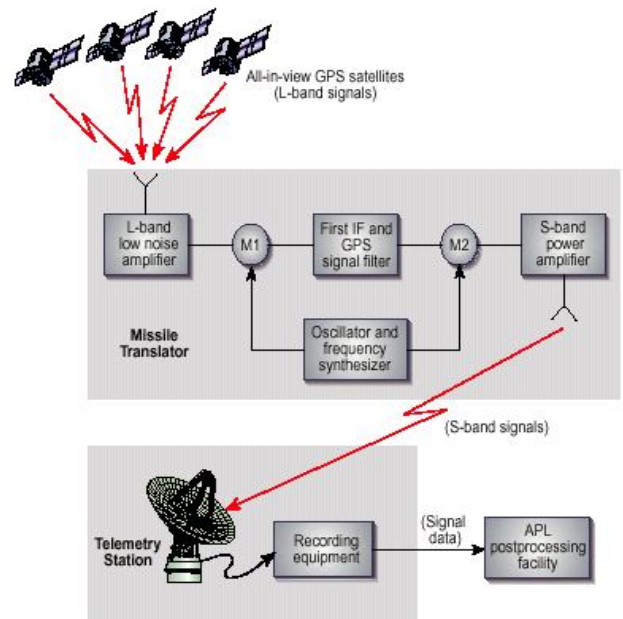


Fig 3. Satrack Concept

**V. SATRACK EVOLUTION**

The satrack innovation began to advance when the Global situating System had been created in the year 1973. It would have been an incredible favorable position if the utilization of GPS is considered in the satellite test program. Just the adjustments in the rocket and ground station configuration were required. The satrack advancement is started to carry into reality the rocket with the GPS offices included

The evolution of the satrack is as follows:

- Satrack 1- A technology project to develop the processing system using Trident 1 missile (1973-1983)
- Satrack 2- The operational system designed to meet system requirements of Trident 2 missile (1983-present)
- Satrack 3- Current system upgrade and future applications

| System    | Established in | Designed for   | Antenna Used     | Frequency Used   |
|-----------|----------------|----------------|------------------|--|
| Satrack 1 | 1973-1983      | Trident 1 (C4) | S-band & GPS     | L1-1575.42 MHz<br>L2-1227.60 MHz                                   |
| Satrack 2 | 1983-present   | Trident 2 (D5) | Wraparound array | L1-1575.42 MHz<br>L2-1227.60 MHz<br>L3-same as positioning signals |
| Satrack 3 | Present        | Both C4 & D5   | GPS              | -----  |

Fig 4. Comparison Between Satrack Evolution

### VI. BALLASTIC MISSILE

A ballistic rocket takes after a ballistic direction to convey at least one warheads on a foreordained target. These weapons are just guided amid generally short times of flight a large portion of their direction is unpowered, being administered by gravity and air protection if in the climate. Shorter range ballistic rockets remain inside the Earth's climate, while longer-ran intercontinental ballistic rockets (ICBMs), are propelled on a sub-orbital flight direction and spend a large portion of their flight out of the environment. The New Strategic Arms Reduction Treaty AKA New START Treaty with Russia sets a top on the quantity of atomic warheads that can be conveyed on intercontinental ballistic rockets, submarines, or substantial aircraft by every nation. Cindy Otis, Teen Vogue, "Trump Administration Hopes to Increase American Nuclear Weapons Arsenal," 12 Feb.2018.



Fig 5. Ballistic Missile

Ballistic rockets can change broadly in range and utilize, and are regularly separated into classifications in light of range. Different plans are utilized by various nations to classify the scopes of ballistic rockets,

### VII. MISSILE DEFENCE

A ballistic missile destroying rocket is a rocket which can be conveyed to counter an approaching atomic or non-atomic ICBM. ICBMs can be blocked in three districts of their direction support stage, mid-course stage or terminal stage. Right now China, the US, Russia, France, India and Israel have created ballistic missile destroying rocket frameworks, of which the Russian A-135 ballistic missile destroying rocket framework, US Ground-Based Midcourse Defense, Systems have the ability to block ICBMs conveying atomic, synthetic, organic, or regular warheads.



Fig 6, Ballistic Missile Defense System

### VIII. ADVANTAGES

- Supervisory Position Reporting
- External Sensor Supported
- Geo- Fencing
- Integrated Motion Sensor
- Field programmable

### IX. APPLICATIONS

- Best flight path for aircrafts during post flight processing. Provides error guidance model.
- Orbiter determination of Vehicle Tracking.
- Uses of SATRACK for Army and Air Force missile test applications (1983–present).



Fig 6. Satellite communication

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## X. CONCLUSION

The satrack has the noteworthy commitment to the effective improvement and operational accomplishment of the Trident weapon framework. It assumes an imperative part in giving a remarkable observing capacity in keeping up the rocket direction. The advancement and research in the innovation in charge of bringing the most recent GPS collector, interpreter, information recorders, and rocket processors in the rocket flight program to screen and assess the blunder display. This model distinguishes the significant mistake patrons in charge of the misalignment of the rocket way. The improvement of satrack anticipates the execution of the Low Cost Missile Test Kit. This innovation likewise created refined instruments for ideal target recognition, investigating techniques, and the utilization of costly flight tests resources were additionally resulting from the satrack examine.

## XI. CURRENT TRENDS

- Batch mode processing
- Full Digital implementation
- Evolution Capability for cumulative flight test Accuracy.
- Flexible architecture Receiver (FAR)

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