Design Approach:

Constrains Used: Read\_write lock at data receiver at base address, Threads, socket programming, rand(), timestamp function.

Rocket Side:

Client Socket programming:

1. Temperature\_ControlSystem :

Data is generated Randomly using rand() function within range 20 to 300, and data stored in data structure containing other fields such as Unique Program ID, Packet Number and Timestamp, and is transmitted using TCP/IP protocol (socket programming as a client).

1. Temperature\_Thrusters :

Data is generated Randomly using rand() function within range -100 to 100, and data stored in data structure containing other fields such as Unique program ID, Packet Number and Timestamp, and is transmitted using TCP/IP protocol (socket programming as a client).

1. Acceleration\_Rocket :

Data is generated Randomly using rand() function within range 2 to 20, and data stored in data structure containing other fields such as Unique program ID, Packet Number and Timestamp, and is transmitted using TCP/IP protocol (socket programming as a client).

1. Gyro\_Rocket :

Data is generated Randomly using rand() function within range -100 to 100, and data stored in data structure containing other fields such as Unique program ID, Packet Number and Timestamp, and is transmitted using TCP/IP protocol (socket programming as a client).

Ground Station Side:

1. Data Receive Function is used using Server configuration of Socket programming and accept() is used to receive data from above clients. Received data is stored in Message Queue.
2. Temperature\_Analysis : This will read temperature data by checking program ID and packet number and is analyzed and compared with threshold <60 or >50. If the data is out of threshold range, Monitor Function is triggered.
3. Rotaiton\_Analysis: This will read gyro and acceleration data using comparing program ID and packet number and is then compared with threshold( i.e., acceleration >16 and gyro >90) for last 3 readings. If the data is out of threshold range, Monitor Function is triggered.
4. Monitor Function: This is display for critical information and warnings.

Temperature\_Thrusters

Socket Initialization

Socket Initialization success

No

Yes

Temperature Analysis

Periodic Transmission of data for every 1 sec

Rotation\_Analysis

**End**

Start

Initialize

Ideal

End

Monitor(Display Alert)

**Start**

Acceleration\_Rocket

Gyro\_Rocket

Temperature\_ControlSystem

Server side

Client side

Data Receiving and stroing in Message Queue

If Temp is <60 or >50

Socket Initialization success

yes

yes

No

No

loop