

Review of Student Satellite at IITB

Date: 29th May, 2008

Time: 10am to 12:30pm

Venue: Seminar Hall, Aerospace Department Main Building, IIT Bombay

Professors Present:

1. Dr. B.N. Suresh, Director of Institute of Space Science and Technology & Ex-Director VSSC
2. Prof K. Sudhakar, Aerospace Engineering
3. Prof PM Mujumdar, Aerospace Engineering
4. Prof Kurien Isaac, Mechanical Engineering
5. Prof Hemendra Arya, Aerospace Engineering
6. Prof. SP Bhat, Aerospace Engineering
7. Prof. Prabhu Ramchandran, Aerospace Engineering

Students Present:

1. Saptarshi Bandyopadhyay, System Engineer and PD
2. Shashank Tamaskar, Controls Sub-System Head and PD
3. Payload Sub-System Team: Ahsish Goel, Subhasis Das, Pranjal Bordia, Abhinav Mittal, Varun Jog
4. Controls Sub-System Team: Mallesh B, Jaideep Joshi, Chandrika B, Varzawan Batliwala
5. On Board Computer Sub-System Team: Omkar Wagh, Pratik Chaudhiri, Ashay Awate, Vishnu Sresht, Prashant Sachdeva, Antariksh B, Chiraag Juvekar
6. Power Sub-System Team: Mehul Tikekar, Ameya Damle, Soham, Nikhil Kumar, Narendra
7. Structures Sub-System Team: Haripriya, Ayanagshu Dey, Niranjana Parab, Mayank

Chaturvedi, Parag Pathak, Manas Rach

8. Communication Sub-System Team: Kartavya Neema, Amol P, Deepika, Viraj Deshpande, Siddarth M

The presentation on the current status of the Satellite was given by System Engineer Saptarshi Bandyopadhyay. The issues that were discussed in the meeting are as follows:

1. The essential features of successful satellite project are a)Good system engineering, b)Communication between different teams, c)Each team is good in its own field but they might possibly lack integration skills
2. The weight and power requirements of the payload must be determined first.
3. The most favorable/preferred orbit must be found and the compromise that has to be made in the available orbit must be studied.
4. There are standard well defined Launch vehicle interface for small satellites. It will be an easy job to adopt it on our satellite.
5. The team must primarily worry about building the satellite. ISRO will take care of other problems like making facilities available once there is full support from ISRO.
6. Weight budget and power budget are absolutely essential. Regular control on the budget very important. Weight budget must be precise upto gram level. Each fastener and the smallest of the components must be looked into. If weight increases then torquers might fail and power consumption will increase.
7. Payload team should work out weight, power and volume requirements. The satellite is built around the payload. Safety factor of $\sim 1.2 - 1.3$ can be used. Use of aluminium alloy is suggested as they are light.
8. The panel commented that Excellent job was done by the team till now!
9. The team was told to make a table of components, with source, weight, volume and power. They were told to make assumption if data isn't available and update it when data is available. Also some reserve must be kept for unforeseen issues.
10. The team was told to find CG and MI constraints and study the integration aspects surrounding it.

11. The team was advised to keep the payload simple and focus on building a satellite which worked. They must clearly define an objective irrespective of its simplicity, and it will be excellent if the satellite does its job they have specified. They should not look into enhancements.
12. A separate team can be made that looks into future payloads.
13. The team was advised to freeze the payload and its requirements.
14. The Data for the thermal cycles for the given orbit can be made available.
15. A peer group of youngsters in ISAC can be formed for dialogue with us.
16. Specification of angular rate of satellite at the time of injection into orbit is less than 1deg/sec. Usually 0.2 - 0.5 deg/sec. The team should use 1.5 deg/sec for safety.
17. Over designing will finally add to your weight and power budget, so regular control on them is necessary.
18. Launch vehicle interface for small satellites is available in a Book that will be made available to the team by Dr.BN Suresh.
19. The team must test circuits for certain levels of radiation during integration. They were advised to use COTS or industrial grade components as 600 - 700 km orbit wont have problems. Small satellites dont require to last long like operational satellites.
20. The team was advised to take more effort in finding the weights of the components while some reserves can be kept.
21. A single database must be maintained. Any change made must be told to others and question must be well defended. There is no need to know everything about the other subsystems, but all members should aim to become good system engineers.
22. Success criteria of the satellite must be charted out which includes Lifetime of satellite, depends of lifetimes of each components, etc.