

Flow:

- 1) Types of telescope – due to various constrain it was decided to use visible telescopes
- 2) Payloads thought
 - a) Measurement of aerosol
 - b) study the relationship between lightning & TGFs
 - c) Image the sun in the hydrogen alpha band in order to examine the chromosphere (FalconSat 7)
 - d) study relationship between solar flares and energetic particles
 - e) measurement of the cosmic X-ray background
 - f) continuous observation of solar irradiance

For (b) & (e) telescopes measuring gamma rays & X-rays was required respectively. So, ditched.

(f) can be very imp. Because it directly affects climate on earth.

(d) is a good option to be used in constellation because they can take simultaneous measurements at different locations and determine whether an event occurs at the same time throughout the belts or instead travels across the belts, changing over time and space.

3) I also studied about one other satellite (PRISM) which has used deployable telescope (because for (c) deployable telescope was needed.

4) One problem I am facing with (d) is that we need medium earth orbit (~800 km). We need to orbit in VAN ALLEN Radiation belt. (though I found a satellite DEMETER which was initially launched at an altitude of 710km but after few months due to some mishap lowered to 660km.

5) Main challenge before telescope payload was transfer of image taken to ground as images are of large size & so high speed was required. We have access to VHF frequency through which high speed can't be achieved but getting license for S band is difficult. PRISM – data rate was only 9600 bit/s & image transfer was possible due to data compression algorithm.

6) Next step was to study about sensors/instruments which can be used to achieve above payload.

- I found most instruments used more than one camera/detector which results in their high volume/mass. So, it would be a good idea to use a constellation of small satellites in which each satellite has only one camera/detector.
- I was not able to find any commercial available detector for (c). So, if we wish to continue on that we need to take the help of that university.
- AVHRR is an instrument after looking at whose dimensions I thought that it may be used for our payload.

7) In next step I tried to find about professors related to my payload

- 1) For aerosol, Chandra Venkataraman
Institute Chair Professor of Chemical Engineering, IITB

She has published papers on aerosol. Infact there is an aerosol lab in chemical engineering department of our institute.

- 2) For study of sun & solar magnetic fields, I can't find any professor in our institute. But I did find 2 professors in Indian Institute of Astrophysics (IIA):

- S.P. Rajaguru rajaguru@iiap.res.in
- BANERJEE DIPANKAR dipu@iiap.res.in

8) Our main aim is to make a reliable bus which can operate successfully in space & our next missions or other student space satellite projects can simply duplicate it irrespective of their payload. NENO_AM (the satellite for aerosol measurement) is also manufactured with same concept.

9) One more interesting thing I found was that CSSWE (the satellite studied for (d)) has used measuring tape as deployable monopole antenna.