



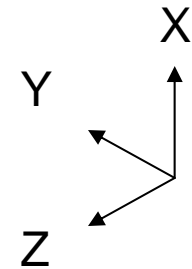
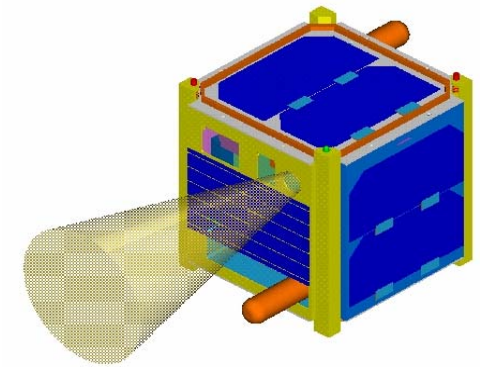
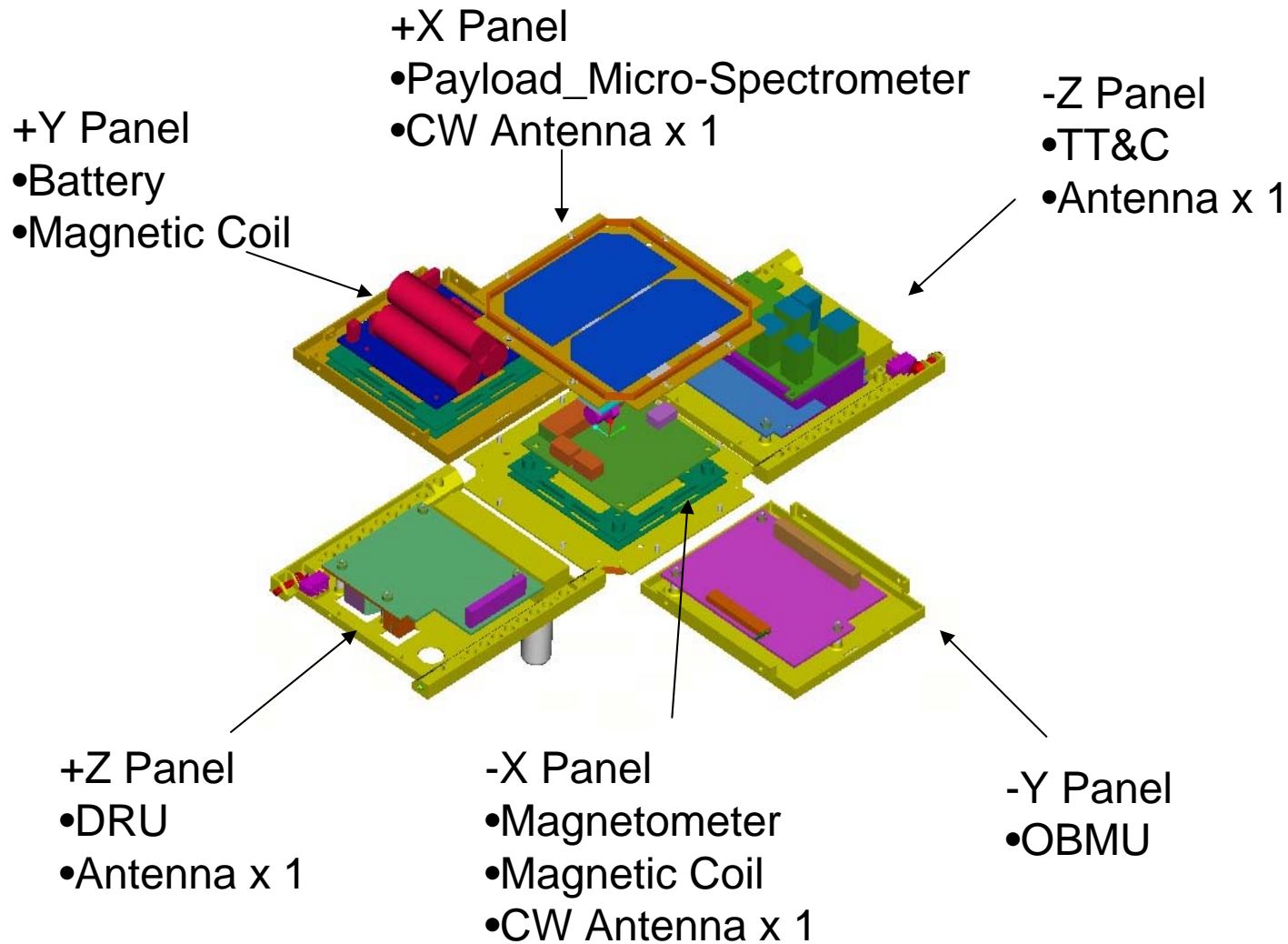
YamSat Introduction

YamSat Team
Albert Lin (NSPO)

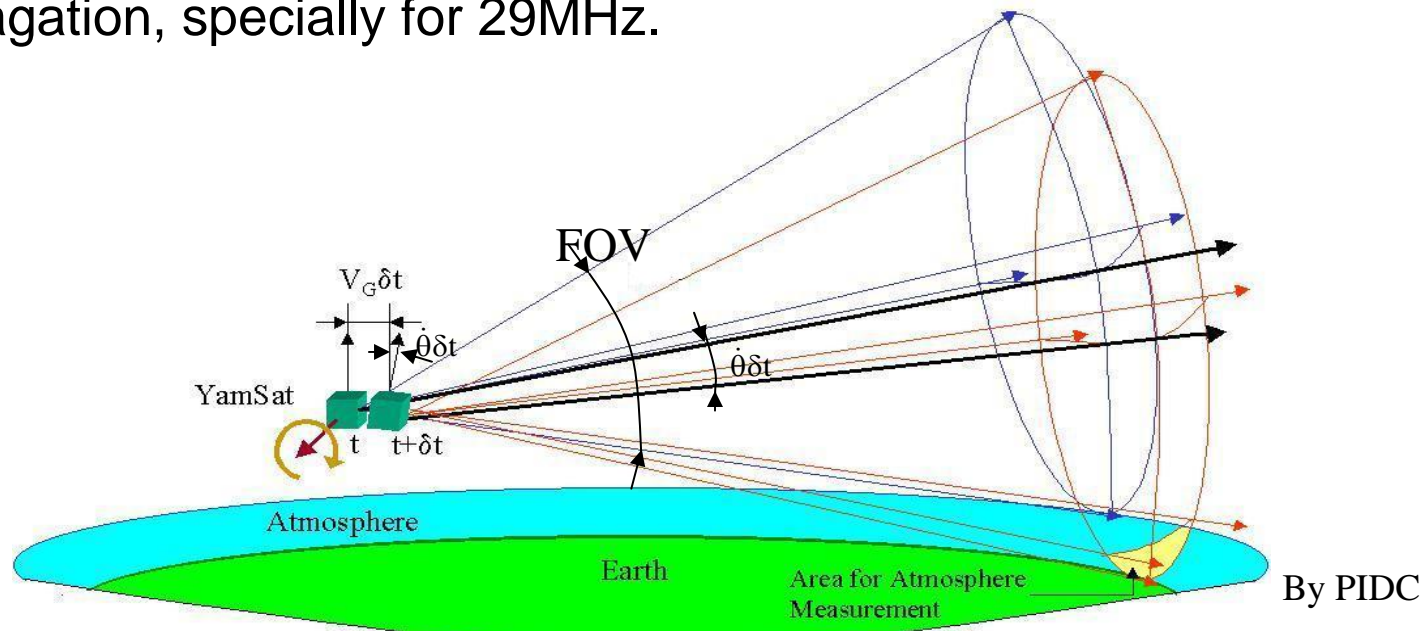
Yamsat website <http://www.nspo.gov.tw>

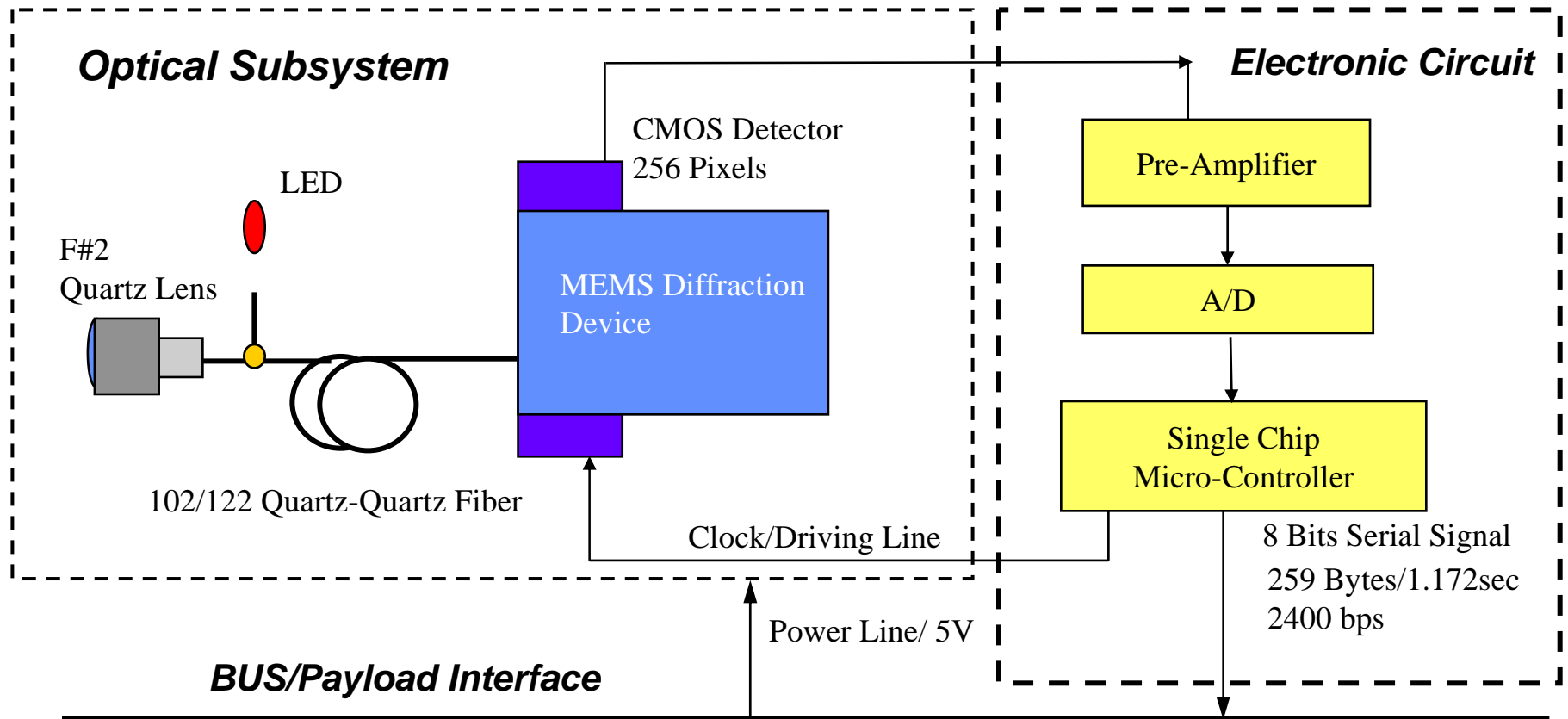
- Mission:
 - Y: ‘Young’, developed by young people.
 - A: Amateur Radio Communication
 - M: Micro-spectrometer payload with Micro Electro Mechanical Systems (MEMS) technology
- Orbit: (TBD)
- Launch Vehicle: the Dnepr from the Russian launch site at Baikonour.
- Target Launch Time: Fall 2004 (TBD)
- Mass: within 1kg, Volume: 10cm*10cm*10cm
- Mission Life: 1 month ; Design Life: 2 months
- Power: multi-junction GaAs solar cells, and Si solar cells, surface mounted; rechargeable battery; secondary voltage 5V
- Amateur Radio Communication: Uplink/Downlink-145.85MHz , Data Rate: 1200bps, half duplex, FSK; CW downlink frequency 29.355MHz, Morse code, 70 characters/min.
- On-Board Computer: 80C52 micro-controller, 32K bytes external RAM
- Attitude Determination & Control: B-dot control with a magnetometer and magnetic coils
- Passive thermal control
- Structure: Aluminum

Main Activities	Start ~ End	Period
1. Working Start Date (WSD)	2001/03/29	
2. Mission Analysis and System Design	2001/04~05	2 months
3. System Design Review (SDR)	2001/05/28	
4. Preliminary Design	2001/06~07	2 months
5. Preliminary Design Review (PDR)	2001/07/24	
6. Critical Design	2001/08~09	2 months
7. Critical Design Review (CDR)	2001/09/27	
8. Flight HW Manufacture and Assembly	2001/10~12	3 months
9. Test Readiness Review (TRR)	2002/01/15	
10. Satellite Environmental Testing	2002/01~03	3 months
Total Period		1 year

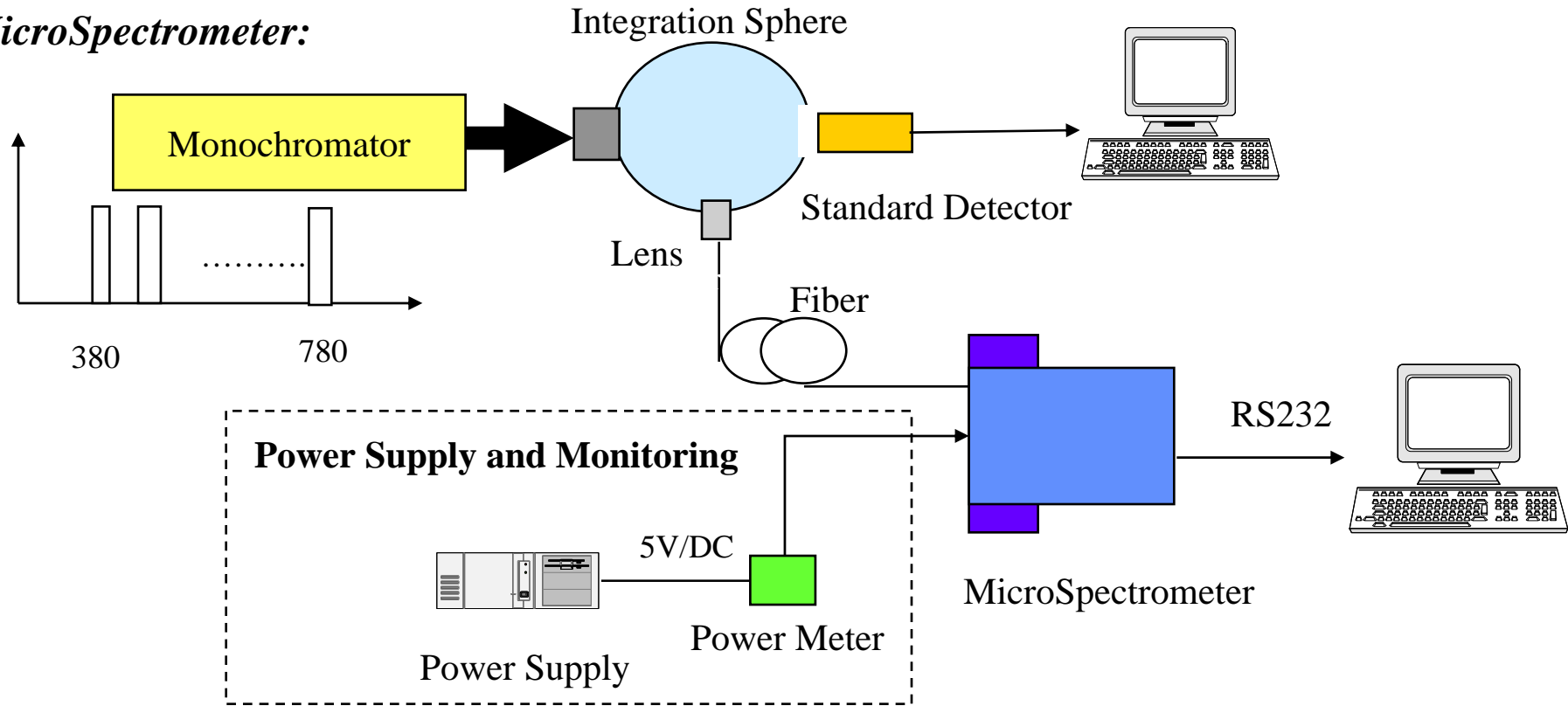


- Study the atmosphere elements by measuring the sunlight scattering spectrum from the atmosphere. The measurement characteristics of the micro-spectrometer payload are: detection spectrum range 380nm ~ 780 nm, 256 bands, 12 nm resolution per band.
- Study the atmosphere condition from the unusual albedo value, e.g. volcanic aerosol using micro-spectrometer by measuring the solar energy reflected from the Earth (Albedo).
- In addition, user can also study the Ionosphere's effect on RF wave propagation, specially for 29MHz.

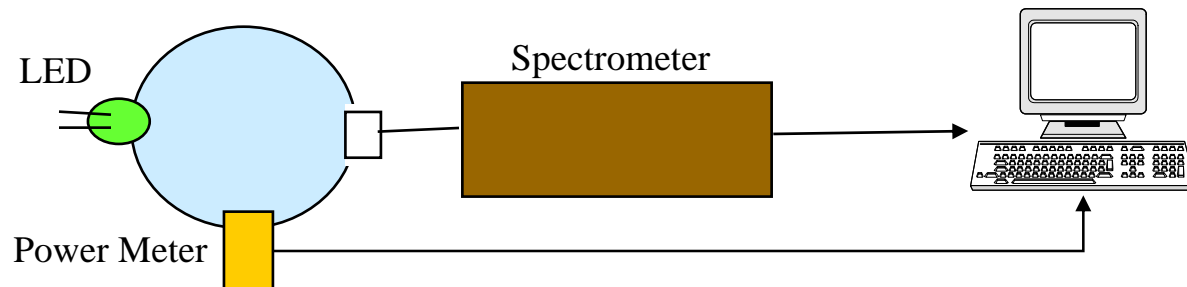


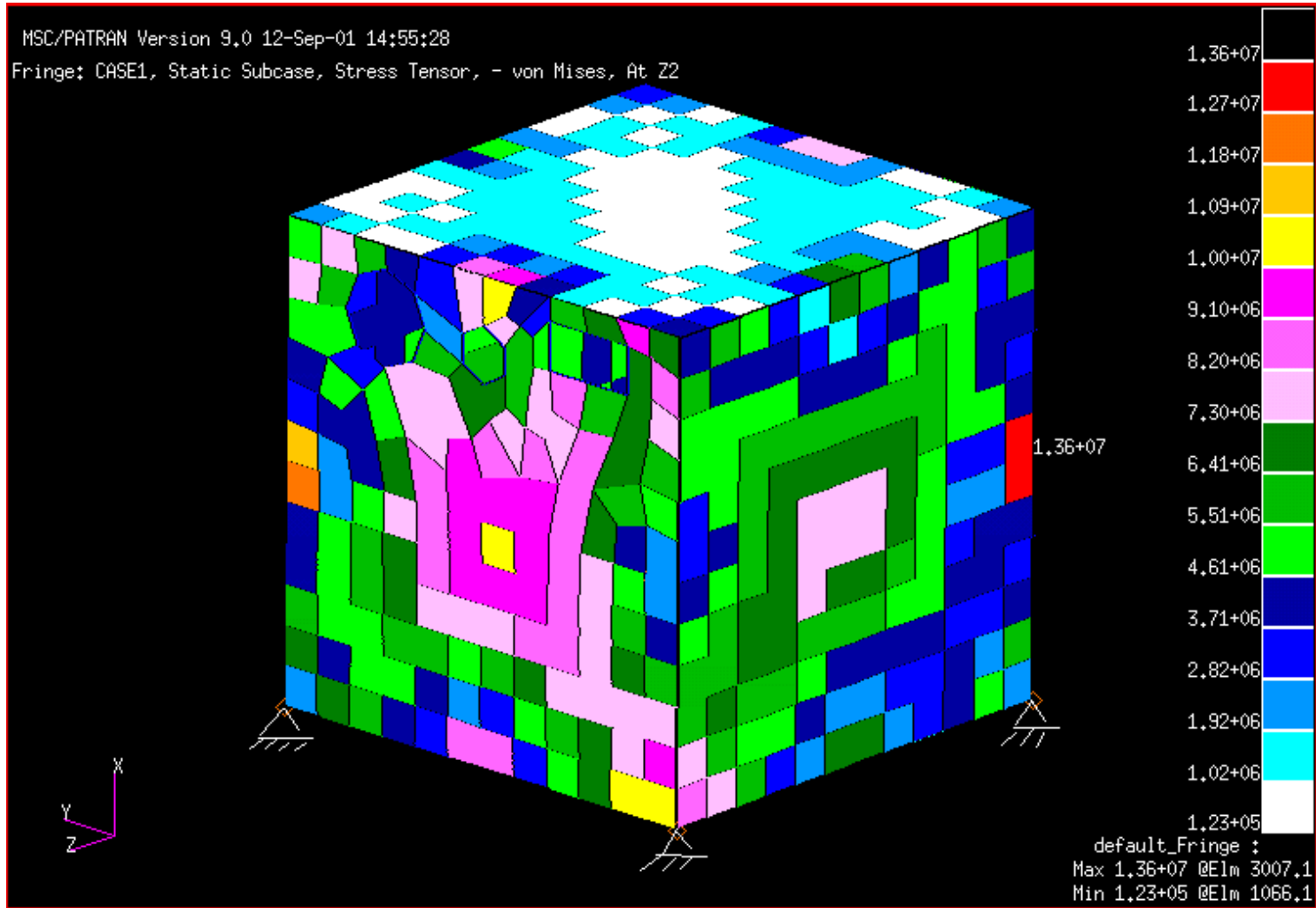


MicroSpectrometer:

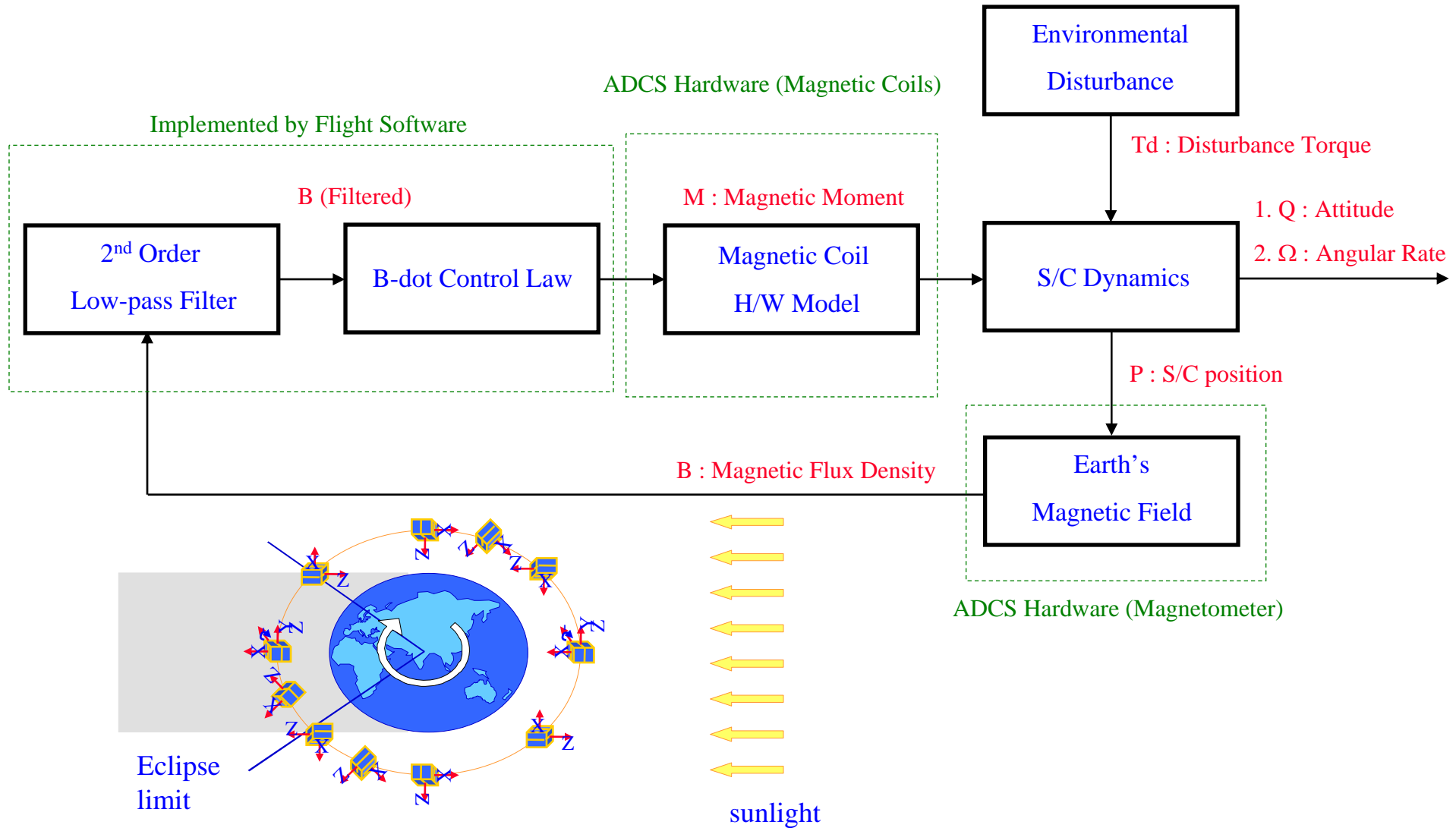


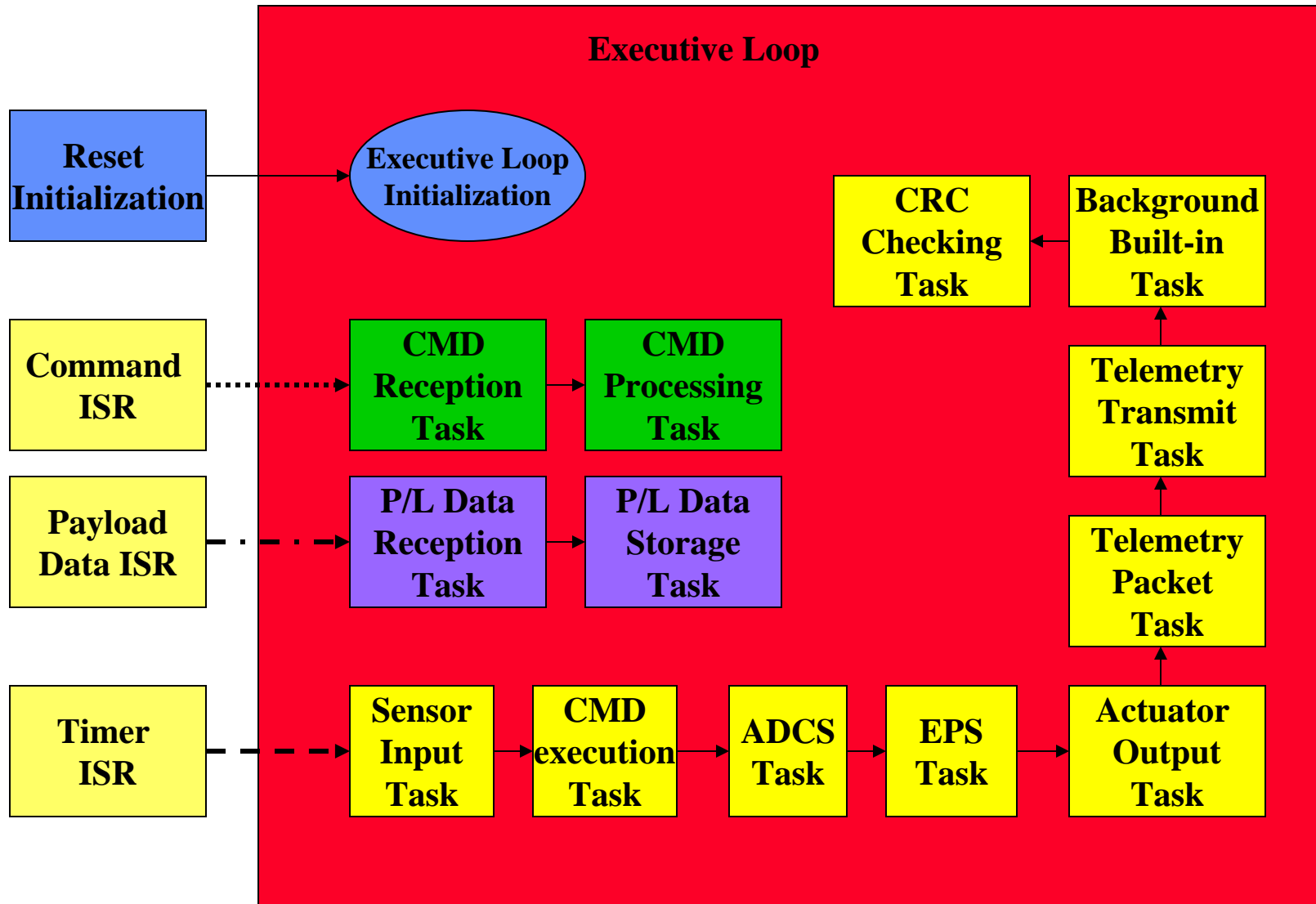
LED:





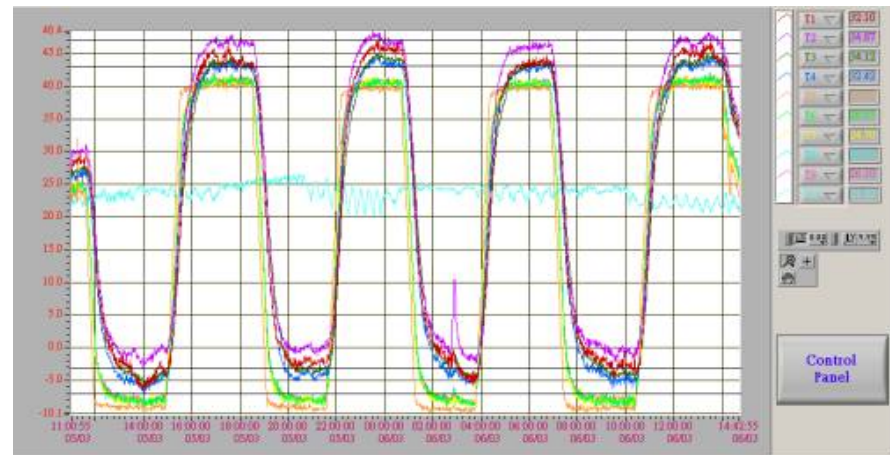
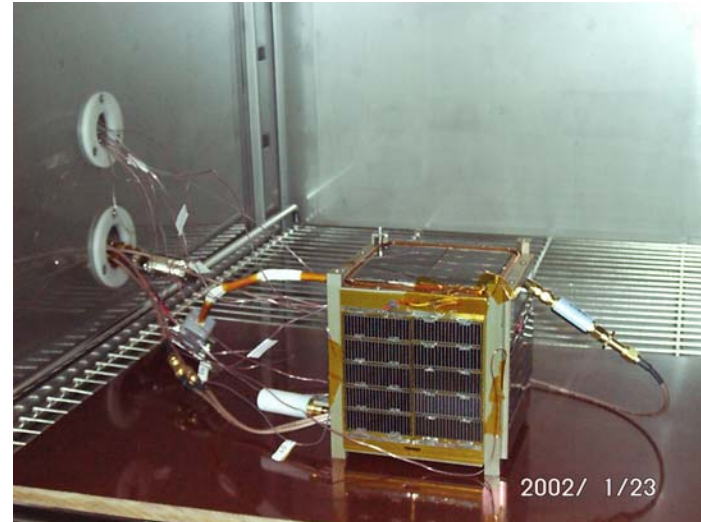
ADCS Subsystem Design - Control System Block Diagram







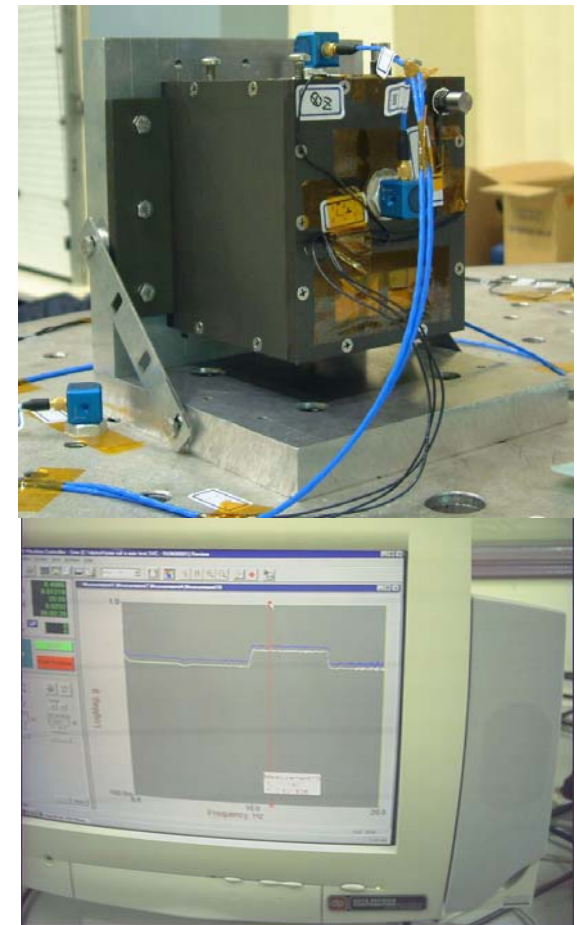
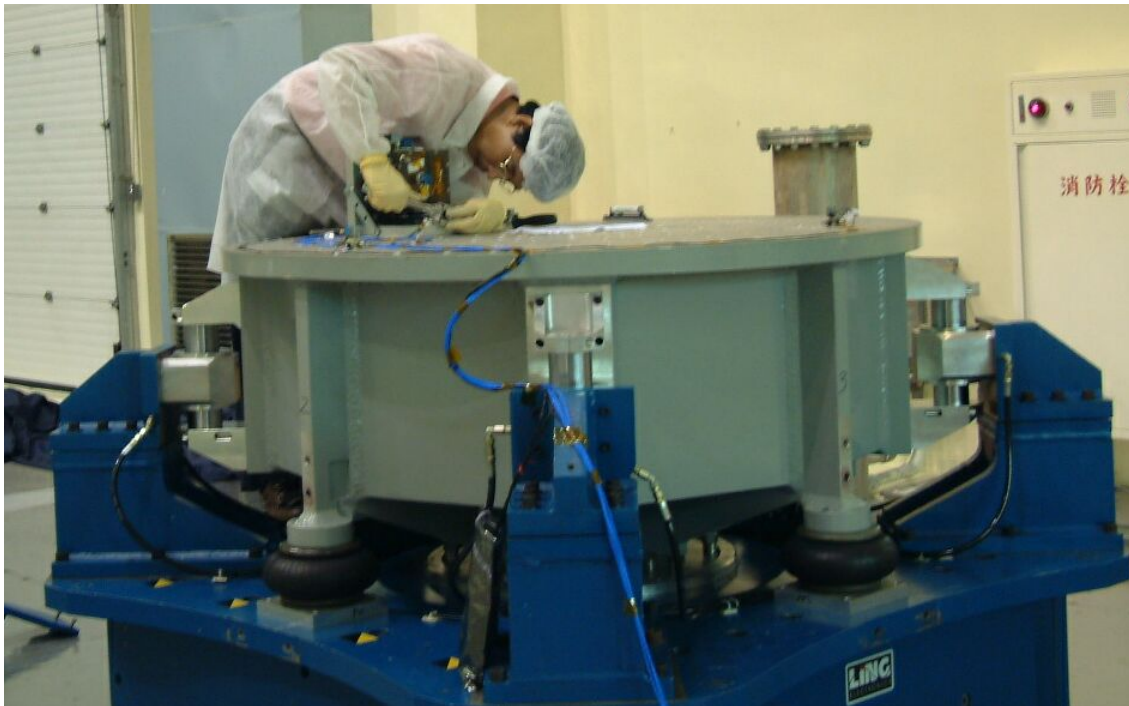
Items	YamSat-1A	YamSat-1B
Purpose	Final Flight	Backup; Demonstration; Fit Check
Solar Panel with Cells	1 Si +5 GaAs	6 Si
Battery	E-ONE ICR 18500A	Panasonic P-150S
Low Battery Voltage Cutoff Circuit	For ICR 18500A	For P-150S
CW Antenna	Wires with Teflon coating, and metal supporters. (better protection)	Wires with enamel coating
Mass	867g	843g
Others	Same	Same



- Test Condition: YamSat-1A is under 5×10^{-7} mbar vacuum condition.



- **Test Condition: YamSat is installed in Test P-POD**
- **Sine Sweep Test: freq range: 1600 Hz, Sweep rate: 2 oct/min, Test level: 0.2g**
 - **Sine Burst: Test freq : 20 Hz Test cycle: 40 cycles, Test level: 10.25g**
 - **Random Vibration**



- One amateur ground station uses two YAGI antennas for VHF communication with 12dBi-antenna gain and 100W-transmitter power to receive both YamSat telemetry and Morse code signal sent from the amateur communication payload.
- Continuous wave (CW) circuit generates tracking beacon and SOH data under the control of the on-board controller.
- The Call sign of the ground station is “BN0SPO” and the call sign of the YamSat is “BN01A”.



● YamSat Call Sign: BN01A



The International Amateur Radio Union

Since 1925, the Federation of National Amateur Radio Societies
Representing the Interests of Two-Way Amateur Radio Communication

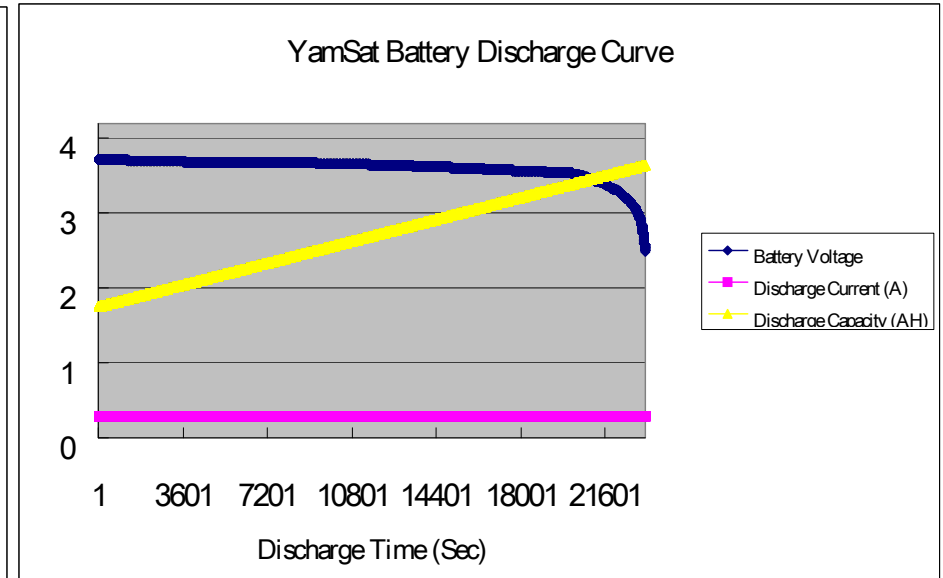
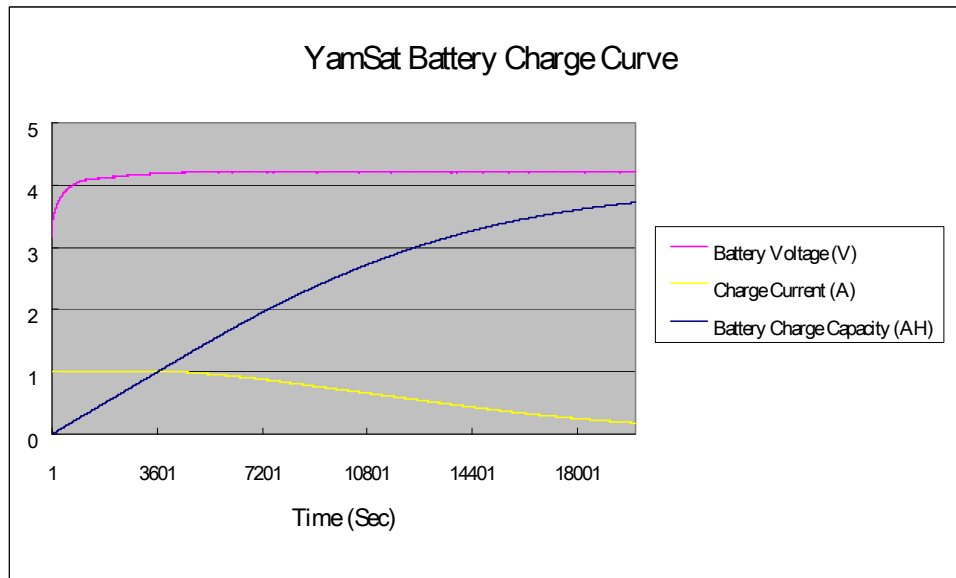
**IARU Amateur Satellite Frequency
Coordination**

[Back to List of Sats formally submitted](#)

YamSat	Updated: 06/02/2004	Responsible Operator	Hjin-Chia Lin BN01A
Supporting Organisation	National Applied Research Laboratories, Taiwan		
Contact Person	albert_lin@nspo.org.tw.no spam		
Headline Details: A Cubesat to be launched in fall 2004 on a DNEPR vehicle. Scheduled to have a one month service life using 2 metres as main data downlink with 500mwatt output with a 10 metre CW beacon. Website info at http://www.nspo.org.tw			
Application Date:	05/02/2004	Freq coordination completed on	

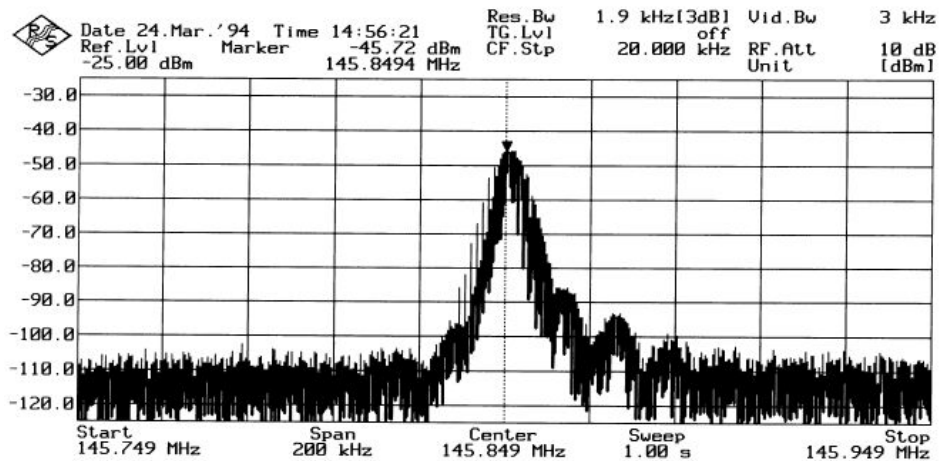
The IARU Amateur Satellite Frequency Coordination Status pages are hosted by AMSAT-UK as a service to the world wide Amateur Satellite Community

- **The YamSat-1A Flight Battery capacity was retested on 2004/3/4.**
 - *Charge Condition: maximum charge current is 1 Amp., maximum charge voltage is 4.2V*
 - *Discharge Condition: fixed discharge current 0.28 Amp., end of discharge voltage is 2.5V*
 - *YamSat-1A Flight Battery capacity is 3.6 Amp-Hour.*

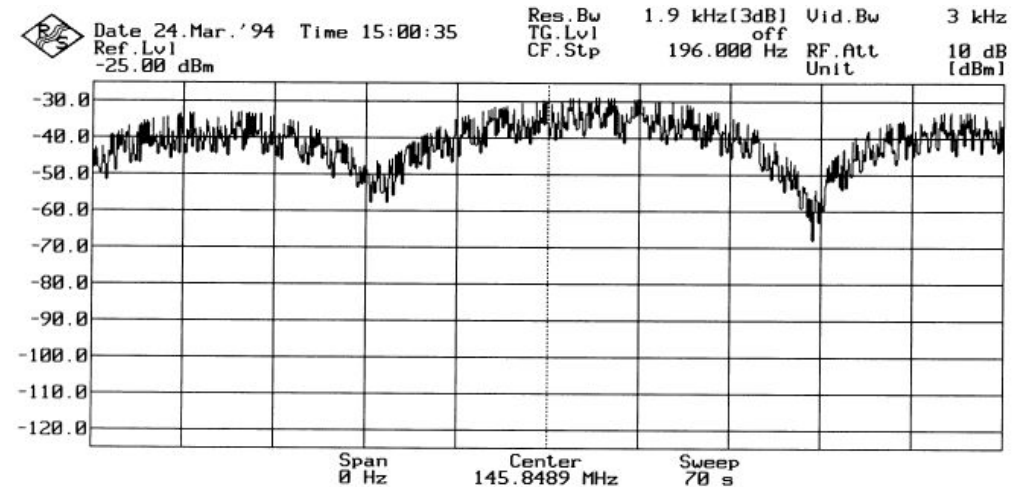


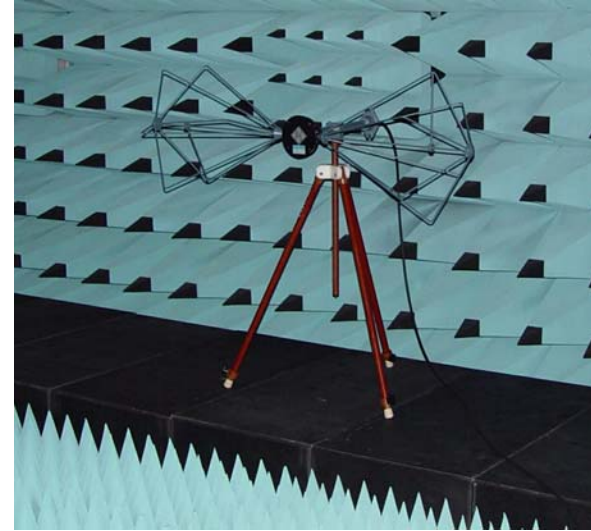
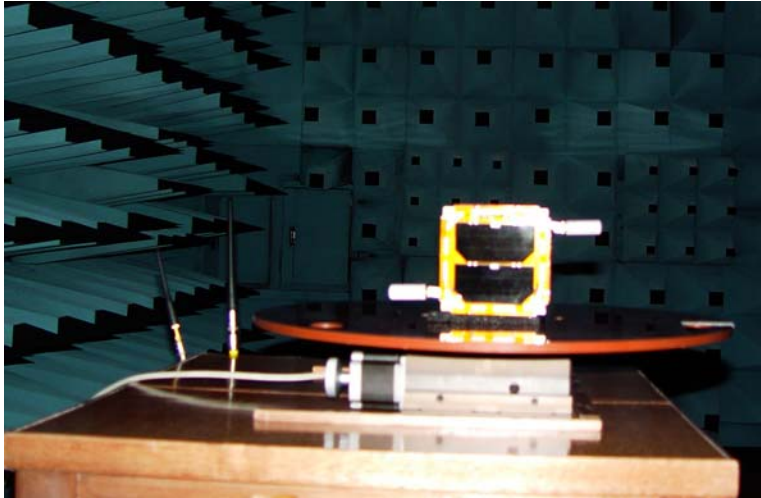
- Retest YamSat-1A RF patterns in NSPO Anechoic Chamber on 2004/03/24. The test distance is 9.28m.

YamSa-1A with flight battery, 0 deg orientation, VHF pattern

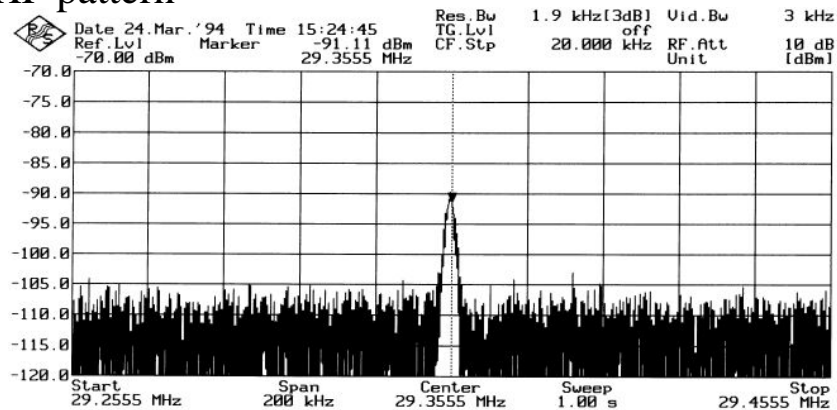


YamSa-1A with flight battery, rotation, VHF pattern

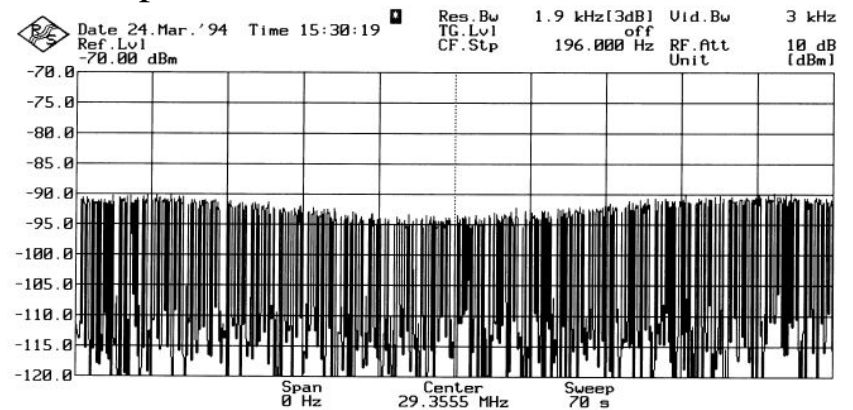




YamSa-1A with flight battery, 0 deg orientation, HF pattern



YamSa-1A with flight battery, rotation, HF pattern with Morse codes





System Integration,
Subsystem Design, I&T,
Flight Operation



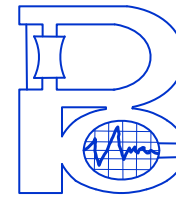
Antenna Deployment,
Ground Station



: Solar Array Assembly



Rechargeable Battery



PIDC: Micro-Spectrometer



Electrical Board Soldering



: Amateur Radio League

NCU Institute of Space Science 國立中央大學 太空科學研究所

: Space Science Research



: Attitude Analysis



: Micro-controller & RAM

台翔航太工業股份有限公司 : Structure Manufacture