



CLTP-6 Final Report



Participant: Alaaeldin Hassan

**National Authority for Remote Sensing and Space
Science (NARSS), Cairo, Egypt**

CLTP Objective

- This program will contribute to capacity building in space technology and to improve teaching methods-based space engineering education.

CLTP Activities

- ❑ Welcome and participant Presentations
- ❑ Familiarization with boards
 - 6 boards
- ❑ Soldering some connectors and components
 - Tools
 - Checking your soldering connections
- ❑ Configuring the XBee
- ❑ Microcontroller Programming
- ❑ Reading from Tuna term
 - Sensors reading
- ❑ Making Parachute
- ❑ Space Test
 - Thermal and vibration test
- ❑ Make paper rocket
- ❑ Launch and read data (GPS, Sensors, Camera pictures)

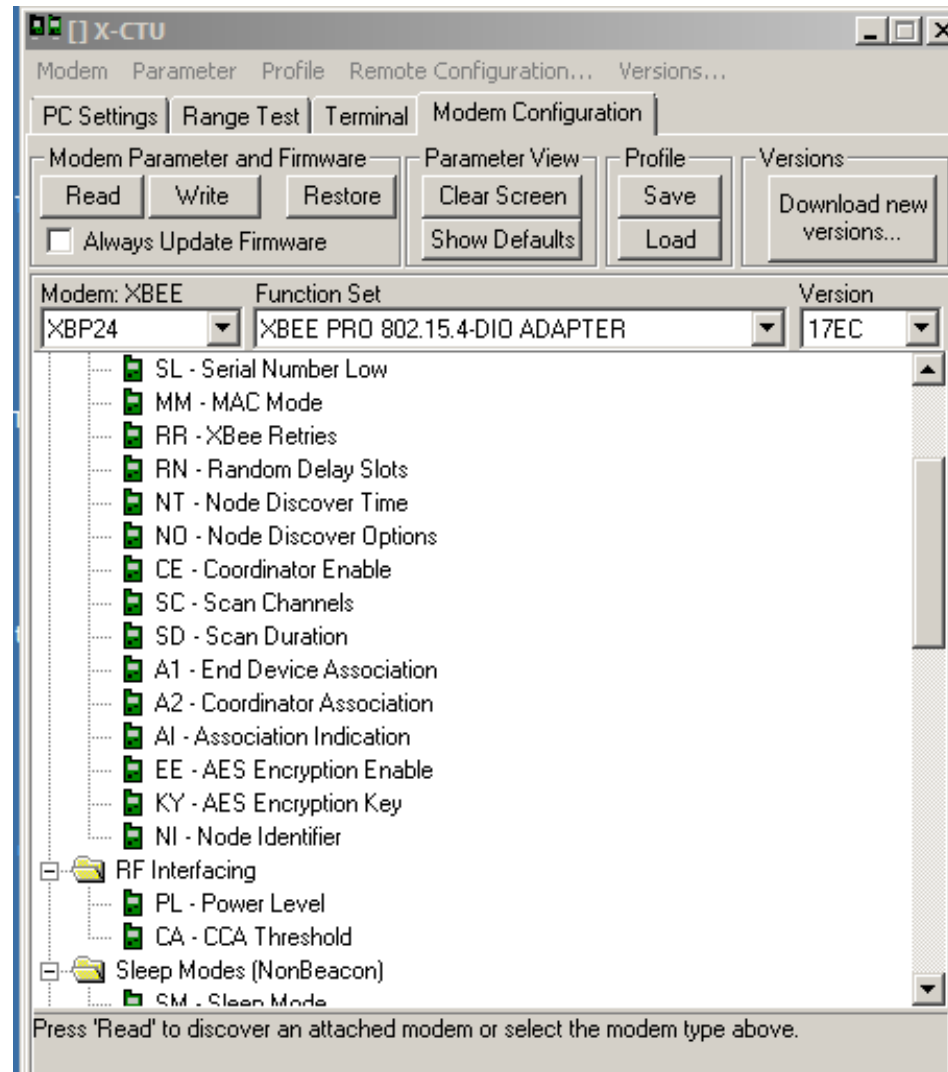
CanSat Boards

- CanSat Boards
 - GPS Board
 - Battery ,PS
 - sensors board, Scientific payload
 - OBC
 - Camera , imager
 - Communication
- Soldering some connectors and components
 - Tools
 - Checking your soldering connections



Configuring the XBee

- ❑ X- Cut for Modem configuration
- ❑ Reading from Tuna term



Microcontroller Programming

MPLAB X IDE v3.00 - Cansat1 : default

File Edit View Navigate Source Refactor Run Debug Team Tools Window Help

default PC: 0x0 z dc c : W:0x0 : bank 0 How do I? Keyword(s)

Projects X Files Classes

- Cansat1
 - Header Files
 - Important Files
 - Source Files
 - cansat1 with gyro code.c
 - Libraries
 - Loadables
- E16LCDemo_pic24hj256gp610a_pim_1
 - Header Files
 - Important Files
 - Linker Files

main() - Navigator Cansat1 - Dashboard X

- Cansat1
 - Project Type: Application - Configuration: default
 - Device
 - PIC16F877A
 - Checksum: 0x0FCF
 - Compiler Toolchain
 - hi-tech-picc (v9.83) [C:\Program Files\HI-TECH Software\PICC\
 - Production Image
 - Memory
 - Usage Symbols disabled. Click to enable Load Symbols.
 - Data 368 (0x170) bytes
 - Program 8192 (0x2000) words
 - Debug Tool
 - PICkit3: BUR144374071
 - Debug Resources
 - Program BP Used: 0 Free: 1
 - Data BP: No Support
 - Data Capture BP: No Support
 - Unlimited BP (S/W): No Support

Start Page x cansat1 with gyro code.c x

```
676 SPRINTL(AD, "AD4:%d", ADRESH*256+ADRESL);
677 if (SEP == HIGH) put_string(AD);
678 EEPROM_Write(AD); __delay_ms(10);
679
680 // IO3=AN5 accel x
681 ADCON0bits.CHS = 5; ADCON0bits.GO = 1; while(ADCON0bits.GO);
682 sprintf(AD, "AD5:%d", ADRESH*256+ADRESL);
683 if (SEP == HIGH) put_string(AD);
684 EEPROM_Write(AD); __delay_ms(10);
685 // IO4=AN6 accel y */
686 ADCON0bits.CHS = 6; ADCON0bits.GO = 1; while(ADCON0bits.GO);
687 sprintf(AD, "AD6:%d", ADRESH*256+ADRESL);
688 if (SEP == HIGH) put_string(AD);
689 EEPROM_Write(AD); __delay_ms(10);
690 // IO5=AN7 accel z
691 ADCON0bits.CHS = 7; ADCON0bits.GO = 1; while(ADCON0bits.GO);
692 sprintf(AD, "AD7:%d%c%c", ADRESH*256+ADRESL, 0x0d, 0x0a);
693 if (SEP == HIGH) put_string(AD);
694 EEPROM_Write(AD); __delay_ms(10);
695
696
697 // Temperature Sensor
```

Output X

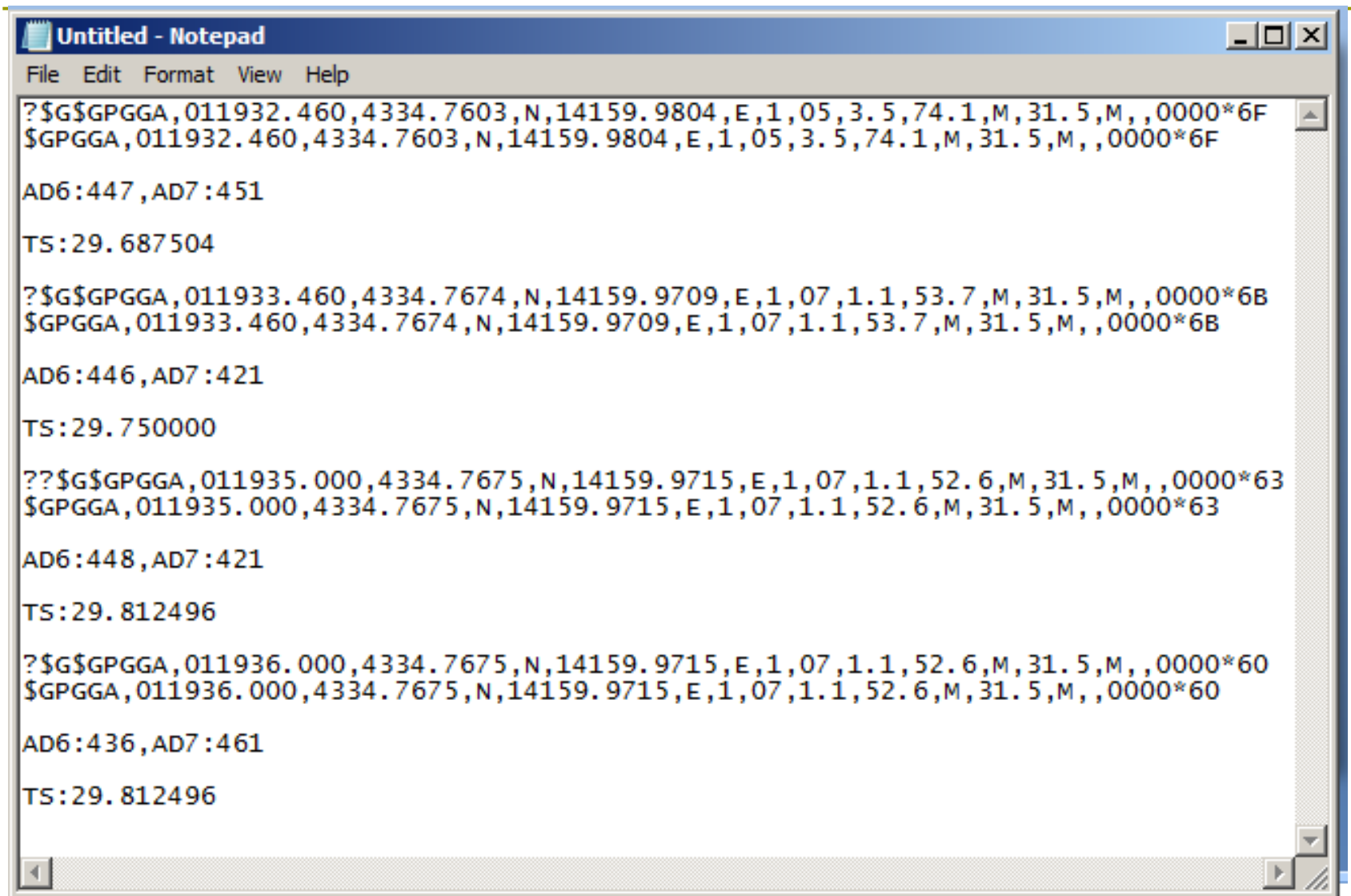
Project Loading Warning x Configuration Loading Error x

Warning: Project "Cansat1" refers to file "C:\Users\TOSHIBA\MPLABXProjects\Cansat1.X\cansat1 with gyro code.c" that contains spaces. Some of the files in this Project "Cansat1" contain spaces or odd characters in their name or their path. This could potentially

741:1 INS

EN 5:41 AM 9/3/2015

Sample of Sensors Reading



The image shows a Notepad window titled "Untitled - Notepad" with a menu bar (File, Edit, Format, View, Help). The text content is as follows:

```
?$G$GPGGA,011932.460,4334.7603,N,14159.9804,E,1,05,3.5,74.1,M,31.5,M,,0000*6F
$GPGGA,011932.460,4334.7603,N,14159.9804,E,1,05,3.5,74.1,M,31.5,M,,0000*6F

AD6:447,AD7:451

TS:29.687504

?$G$GPGGA,011933.460,4334.7674,N,14159.9709,E,1,07,1.1,53.7,M,31.5,M,,0000*6B
$GPGGA,011933.460,4334.7674,N,14159.9709,E,1,07,1.1,53.7,M,31.5,M,,0000*6B

AD6:446,AD7:421

TS:29.750000

??$G$GPGGA,011935.000,4334.7675,N,14159.9715,E,1,07,1.1,52.6,M,31.5,M,,0000*63
$GPGGA,011935.000,4334.7675,N,14159.9715,E,1,07,1.1,52.6,M,31.5,M,,0000*63

AD6:448,AD7:421

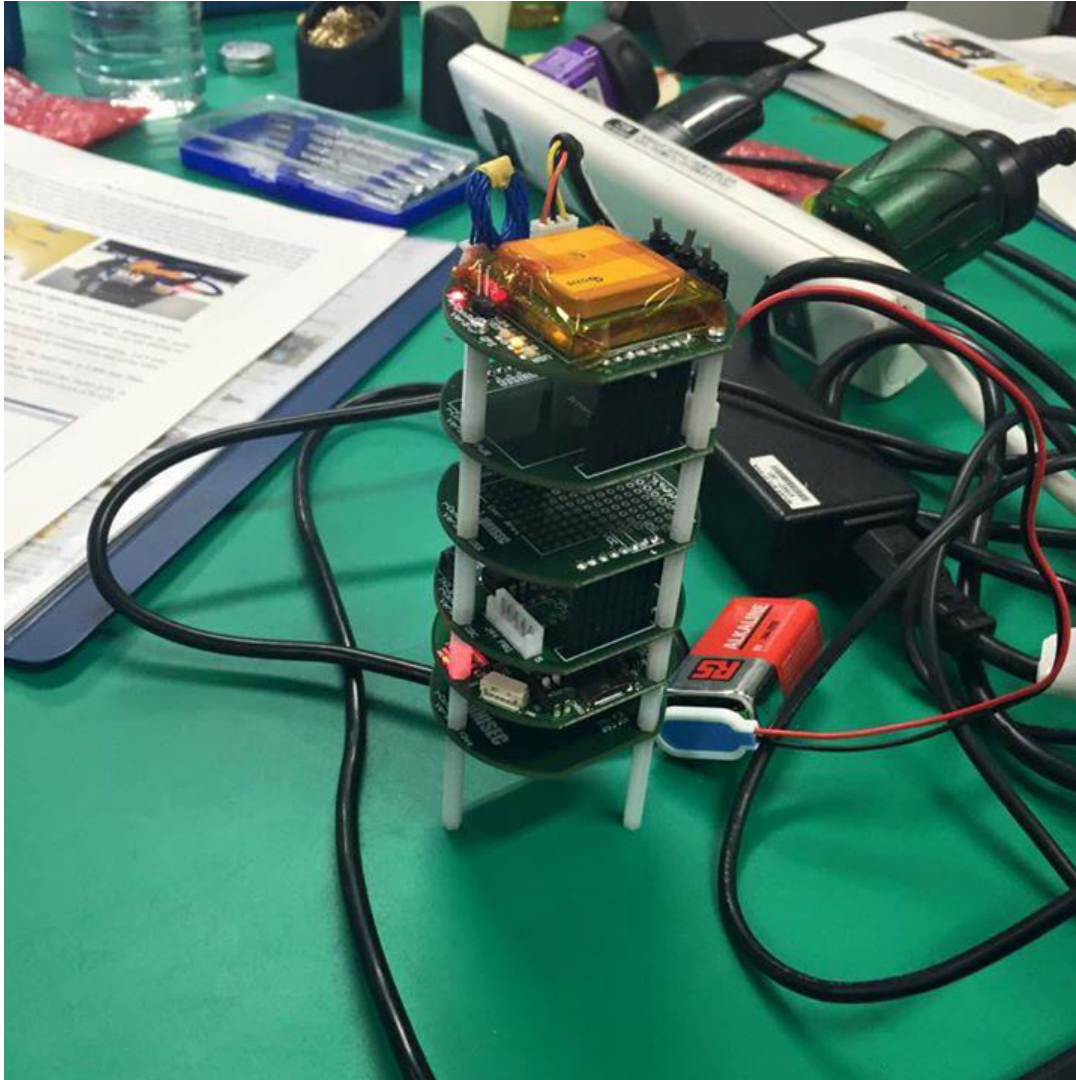
TS:29.812496

?$G$GPGGA,011936.000,4334.7675,N,14159.9715,E,1,07,1.1,52.6,M,31.5,M,,0000*60
$GPGGA,011936.000,4334.7675,N,14159.9715,E,1,07,1.1,52.6,M,31.5,M,,0000*60

AD6:436,AD7:461

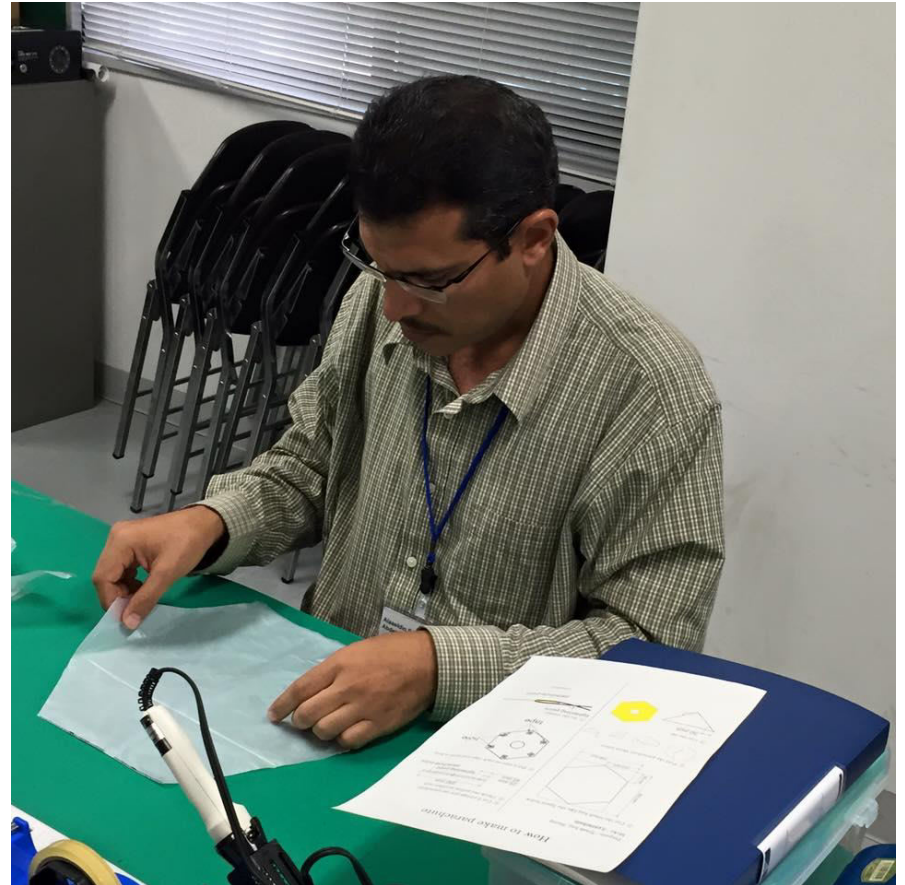
TS:29.812496
```


CanSat is Ready



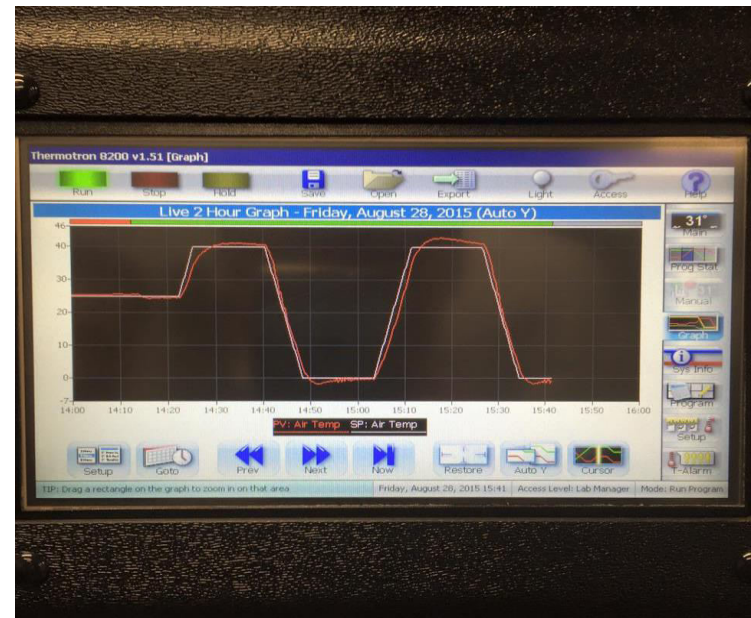
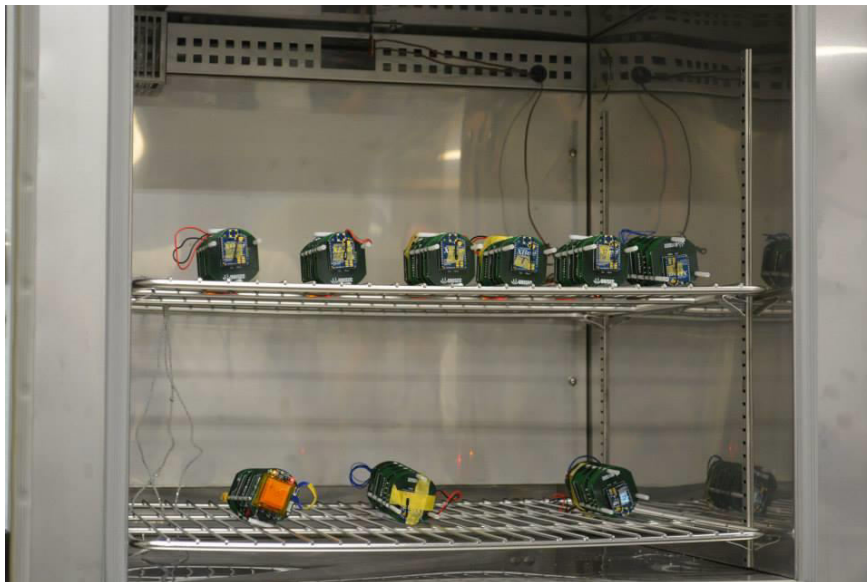
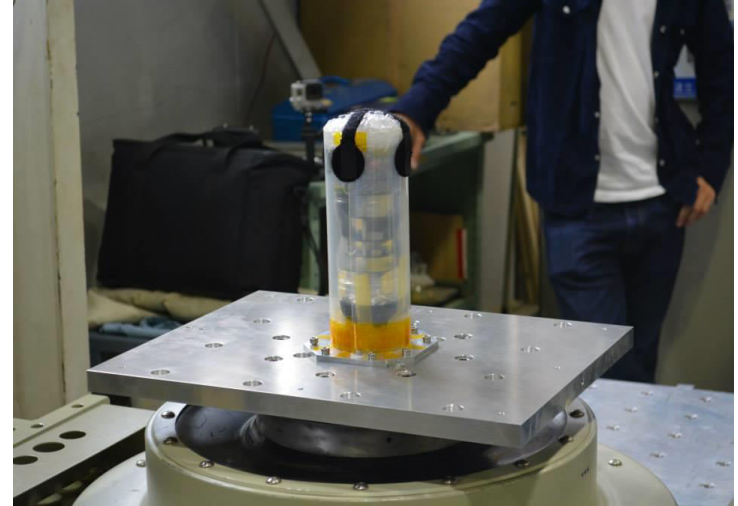
Making Parachute

- ❑ Cutting the pieces
- ❑ Attach strings
- ❑ Fastening to the Cansat structure
structure



Thermal and Vibration Test

- ❑ Vibration and shock Test
- ❑ Thermal cycle test
 - (Orbit operation 0 to 40 C)

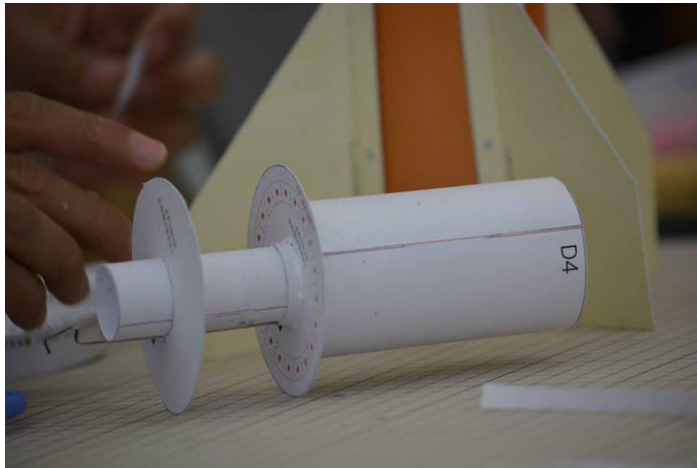


Leaving Hokkaido University



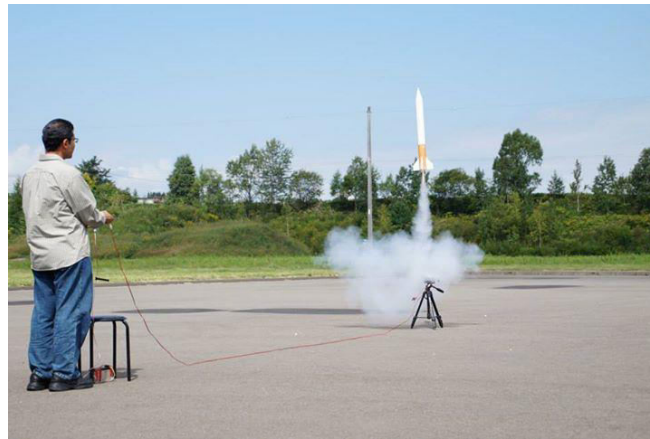
Paper Rocket Assembly

- Make paper rocket



Launching

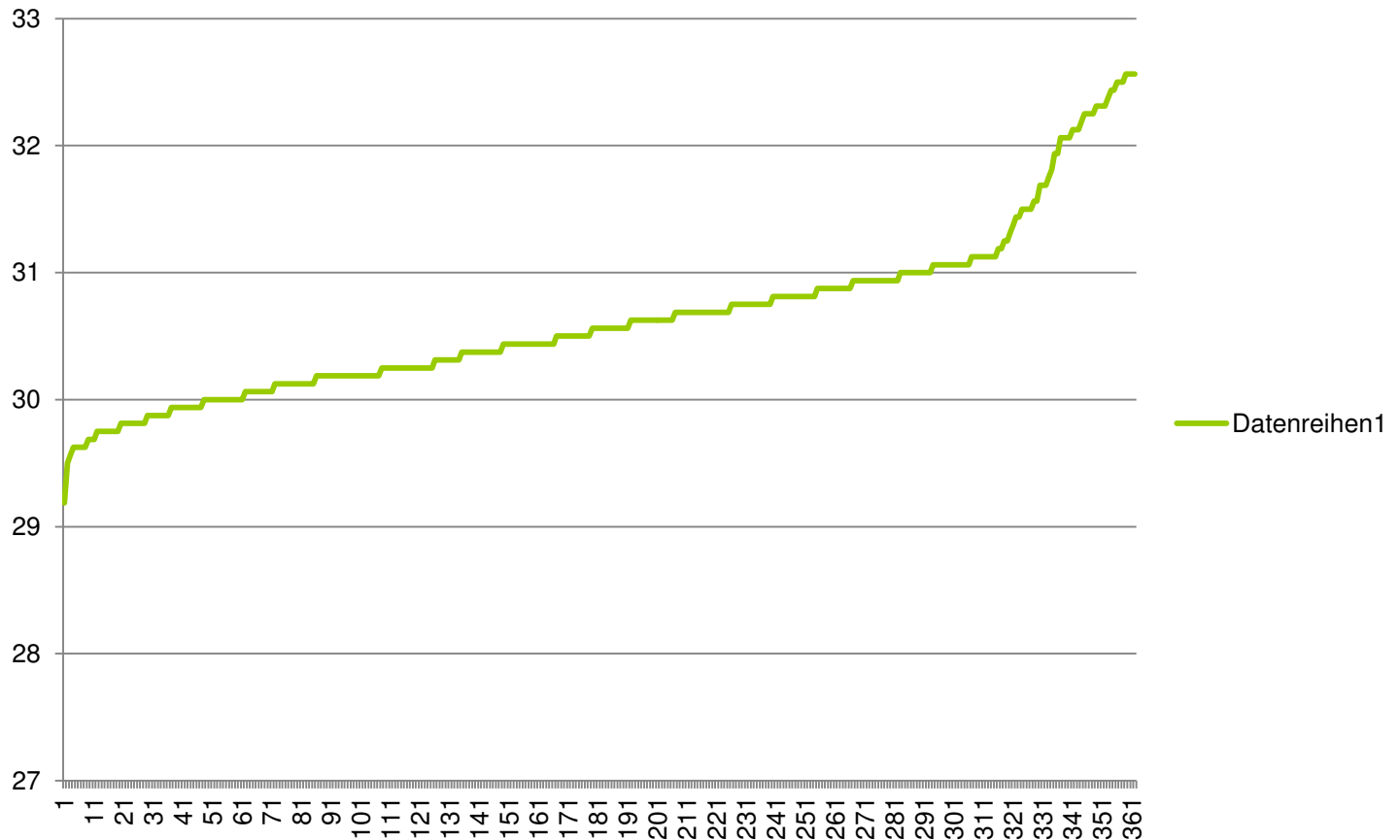
- ❑ Launch
- ❑ Successful parachute opening and safely landing



Mission Data Analysis

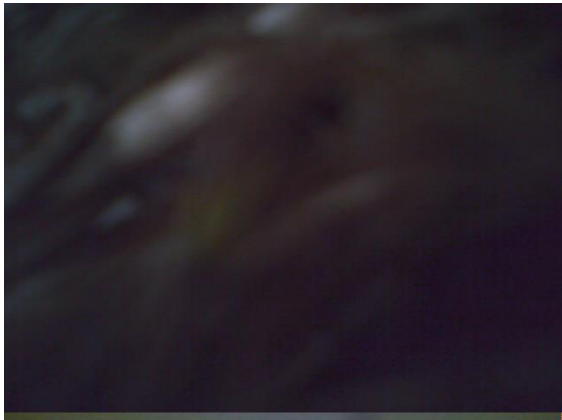
- Reading and analyzing Cansat data
 - GPS data
 - Camera images
 - Sensors data (Temperature sensor)

Sensors data (Temperature sensor)



Mission Data

- Camera images



Thank You



Hokkido university and all professors from universities
Teaching Assistance
Sponsors
UE company
All participants