KALAM SAT

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TEAM MEMBERS

1) S SAI SHIVA RAMA KRISHNA-EPS

2)G MADHU-OBC & COMMUNICATION

3)B MANJULA NAIK-PAYLOAD

4)V VISHAL-STRUCTURAL AND DESCENT CONTROL

5)P NAVEEN KUMAR- GUI

SYSTEM OVERVIEW

MISSION SUMMARY

The WCRCWF2021/22 is designed to simulate all aspects of a real Satellite/Space mission, including design, development, testing, launch, operations, and data analysis, by means of teamwork.

- The Rocket launch The Rockets for the launch campaign will be provided by the organizer. The Rocket would deploy its parachute at apogee, together with the CanSat. Just after the apogee (0-2 seconds later), the CanSat would separate from the Rocket and make separate parachute descent.
- Primary and secondary CanSat missions
  - Primary mission: The team must build a CanSat and program it to accomplish the following compulsory primary mission: To measure AIR POLUTION after release and during descent and transmit these data as telemetry to the Ground Station at least once every 2 seconds. During the post-flight analysis, it must be possible for the team to analyze the data obtained and display it in graphs.
  - Secondary mission: Each team through its Ground Station must be able to send a telecommand (uplink) to CanSat, during the descent, which must be possible to register visually by the Jury (e.g. deploy of some parts, fake solar panels, antenna, door, National flag etc.. Literally anything that can be seen from the ground).

STRUCTURE

SPECIFICATIONS

WEIGHT : 42 GRAMS
DIMENSIONS :
HEIGHT : 115 MM
DIAMETER : 66MM
MATERIAL USED : PLA

DESCENT CONTROL SYSTEM

We used three parachute system as a descent control system



PAYLOAD

PAYLOAD : AIR POLLUTION MEASURMENT

S.NO	SENSOR USED	POLLUTANT MEASRMENT
1	MICS 6814	NITROGEN DIOXIDE **NO2** AMMONIA GAS **NH3** CARBON MONOOXIDE **CO**
2	MQ 131	OZONE GAS O3
3	DHT11	TEMPURATURE HUMIDITY

ON BOARD COMPUTER

- **ARDUINO NANO**

PROCESSOR-ATMEGA328P
PROM-32KB
RAM-2KB
EEPROM-1KB

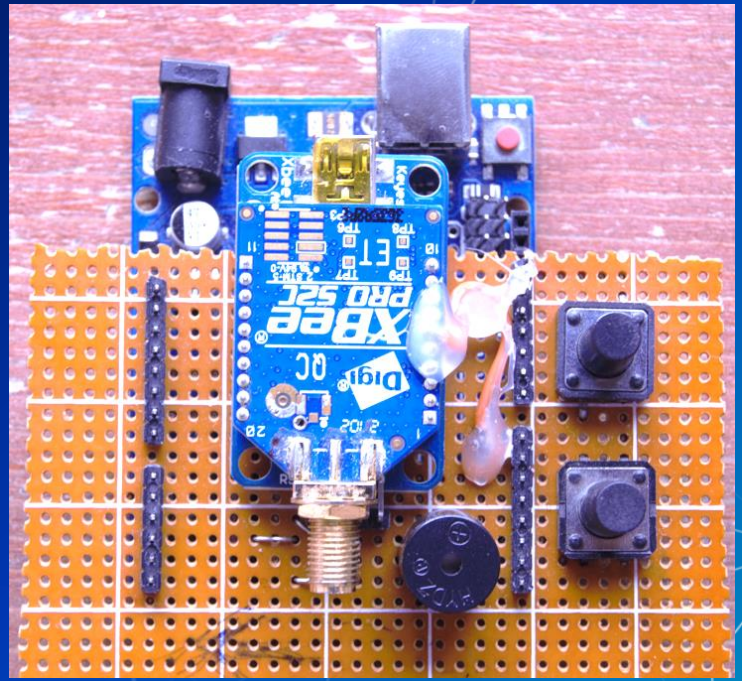
COMMUNICATION

KEYPOINTS

- RF TRANSMITTER USED: XBEE PRO S2C
- COMMUNICATION INTERFACE –UART
- REFERENCE DISTAN CE-1000 METER
- DATA RATE – 100BPS TO 1MBPS
- FREQUENCY RANGE-2.4GHZ

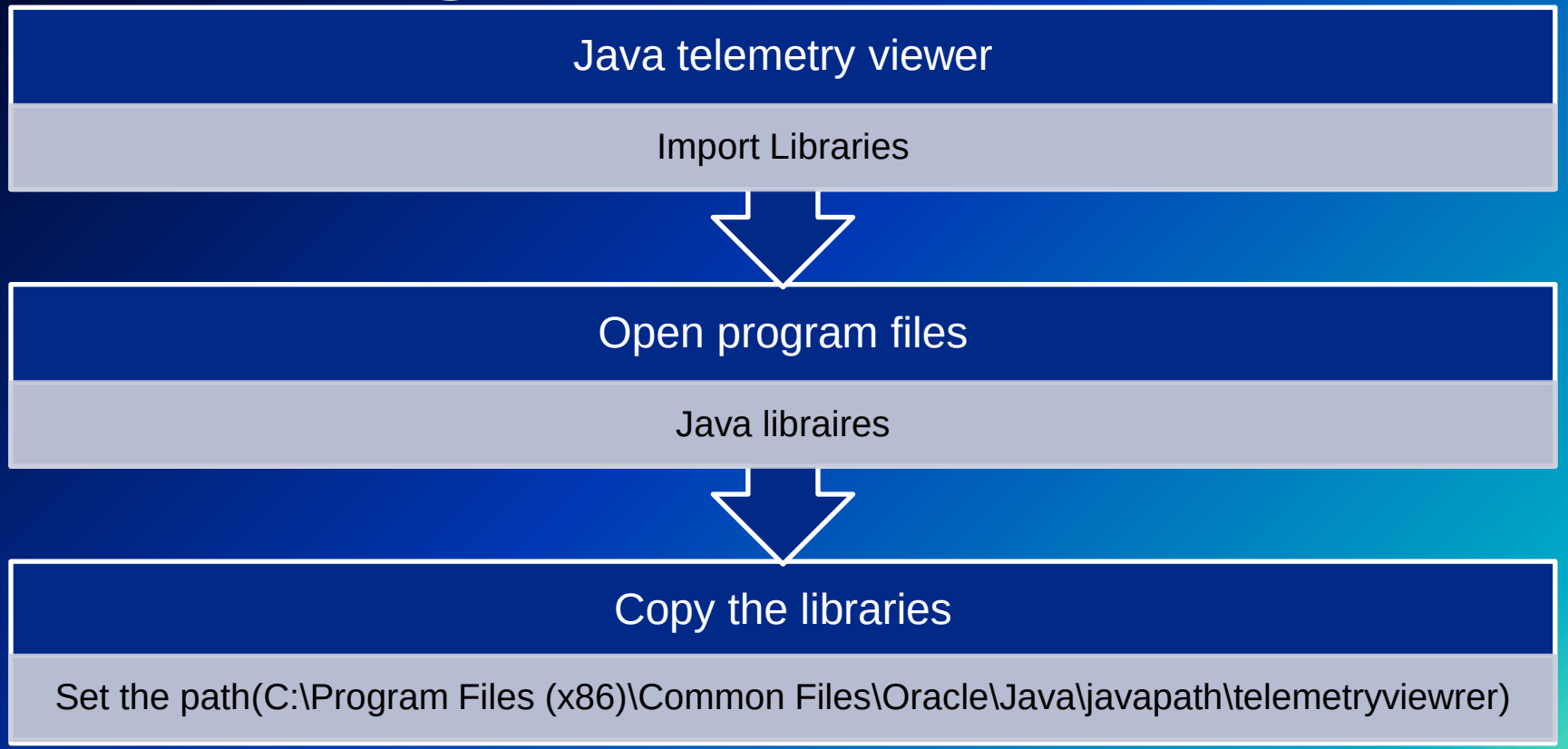
GROUND STATION

GROUND STATION

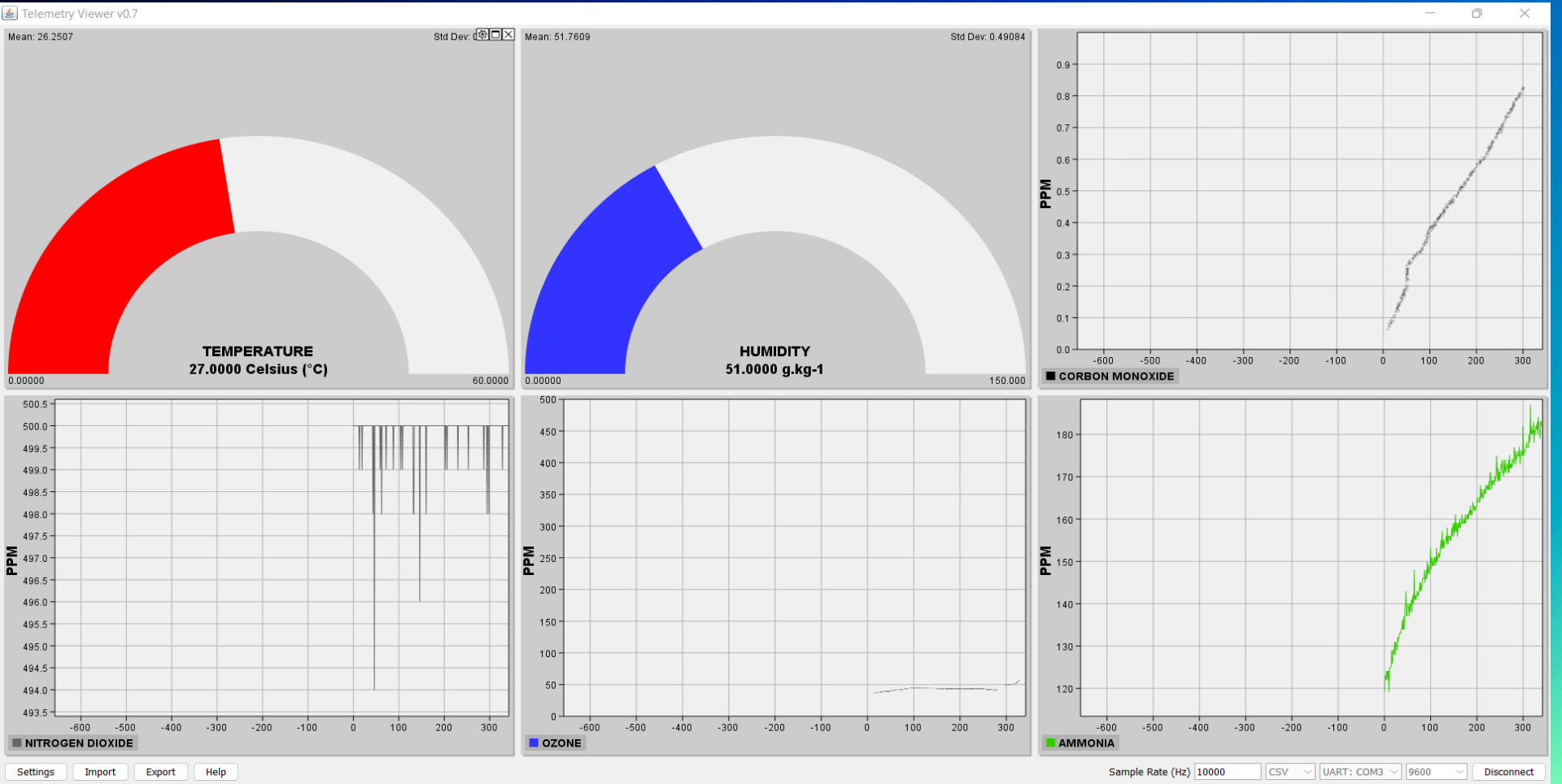


GRAPHICAL USER INTERFACE

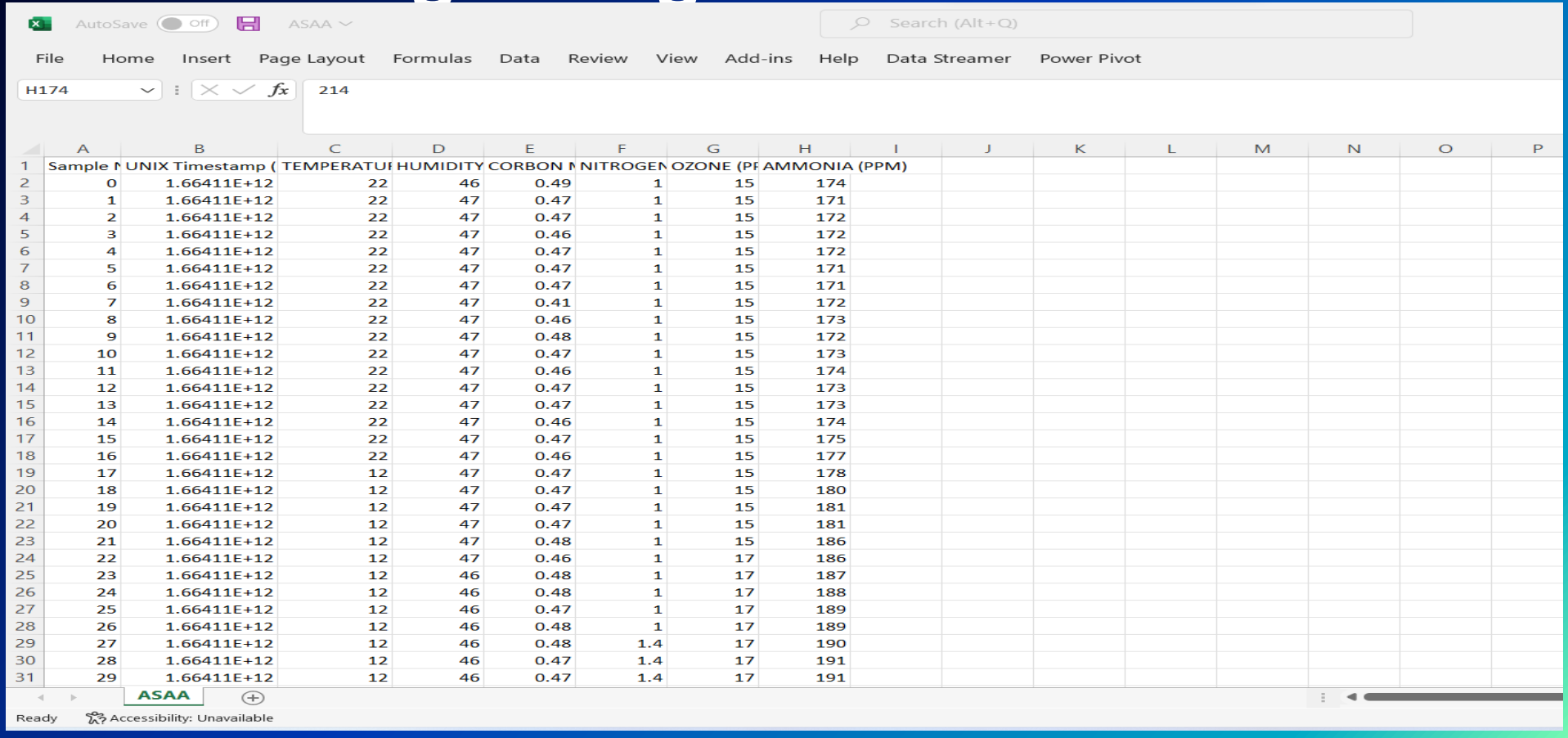
GUI creating Process



INTERFACE DESIGN



Data saving through .CSV file



AutoSave Off ASAA

Search (Alt+Q)

File Home Insert Page Layout Formulas Data Review View Add-ins Help Data Streamer Power Pivot

H174 214

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Sample N	UNIX Timestamp (	TEMPERATUI	HUMIDITY	CORBON N	NITROGEN	OZONE (PF	AMMONIA (PPM)								
2	0	1.66411E+12	22	46	0.49	1	15	174								
3	1	1.66411E+12	22	47	0.47	1	15	171								
4	2	1.66411E+12	22	47	0.47	1	15	172								
5	3	1.66411E+12	22	47	0.46	1	15	172								
6	4	1.66411E+12	22	47	0.47	1	15	172								
7	5	1.66411E+12	22	47	0.47	1	15	171								
8	6	1.66411E+12	22	47	0.47	1	15	171								
9	7	1.66411E+12	22	47	0.41	1	15	172								
10	8	1.66411E+12	22	47	0.46	1	15	173								
11	9	1.66411E+12	22	47	0.48	1	15	172								
12	10	1.66411E+12	22	47	0.47	1	15	173								
13	11	1.66411E+12	22	47	0.46	1	15	174								
14	12	1.66411E+12	22	47	0.47	1	15	173								
15	13	1.66411E+12	22	47	0.47	1	15	173								
16	14	1.66411E+12	22	47	0.46	1	15	174								
17	15	1.66411E+12	22	47	0.47	1	15	175								
18	16	1.66411E+12	22	47	0.46	1	15	177								
19	17	1.66411E+12	12	47	0.47	1	15	178								
20	18	1.66411E+12	12	47	0.47	1	15	180								
21	19	1.66411E+12	12	47	0.47	1	15	181								
22	20	1.66411E+12	12	47	0.47	1	15	181								
23	21	1.66411E+12	12	47	0.48	1	15	186								
24	22	1.66411E+12	12	47	0.46	1	17	186								
25	23	1.66411E+12	12	46	0.48	1	17	187								
26	24	1.66411E+12	12	46	0.48	1	17	188								
27	25	1.66411E+12	12	46	0.47	1	17	189								
28	26	1.66411E+12	12	46	0.48	1	17	189								
29	27	1.66411E+12	12	46	0.48	1.4	17	190								
30	28	1.66411E+12	12	46	0.47	1.4	17	191								
31	29	1.66411E+12	12	46	0.47	1.4	17	191								

ASAA

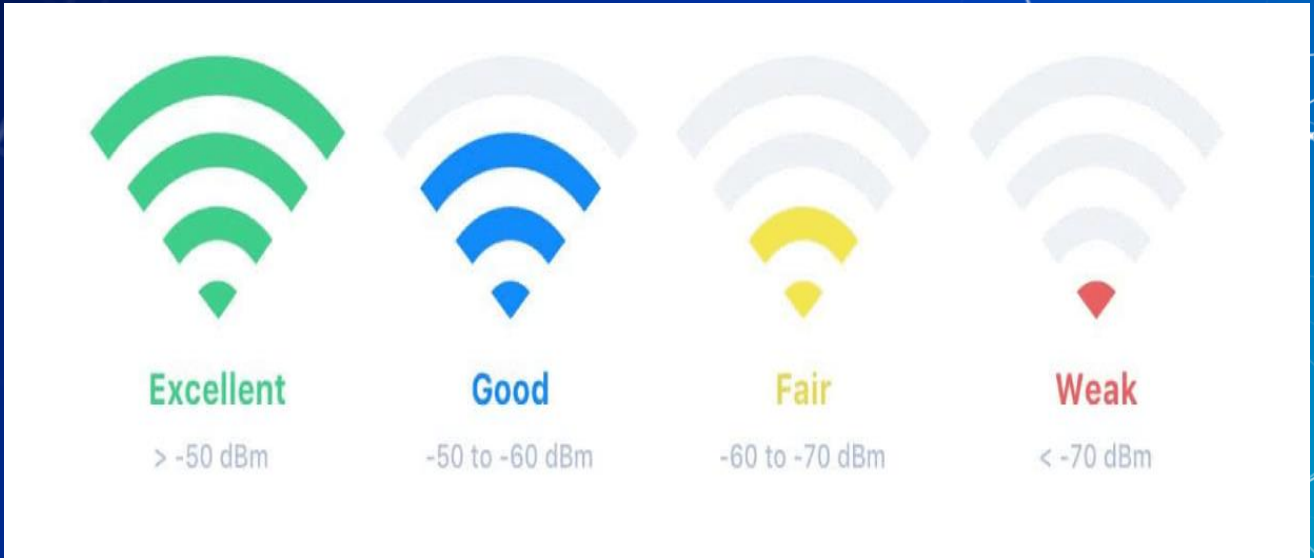
Ready Accessibility: Unavailable

POSITION RETRIEVEL

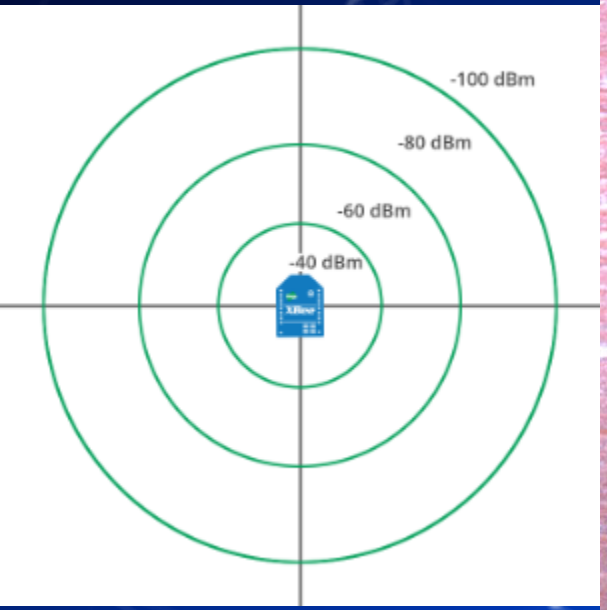
WHAT IS RSSI ?

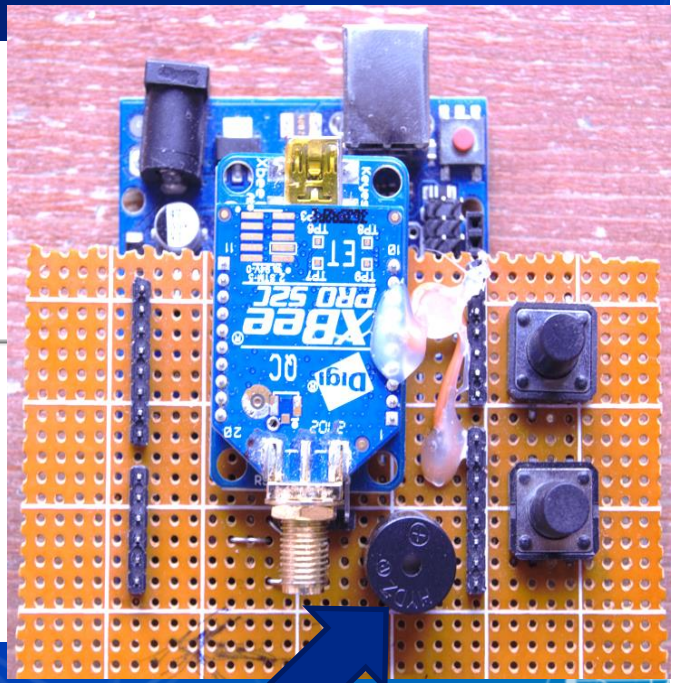
- RSSI stands for Received Signal Strength Indicator, and measures how well a Reciever device can hear (receive) a signal.

SIGNAL STRENGTH



WHAT IS RSSI TRACKING?



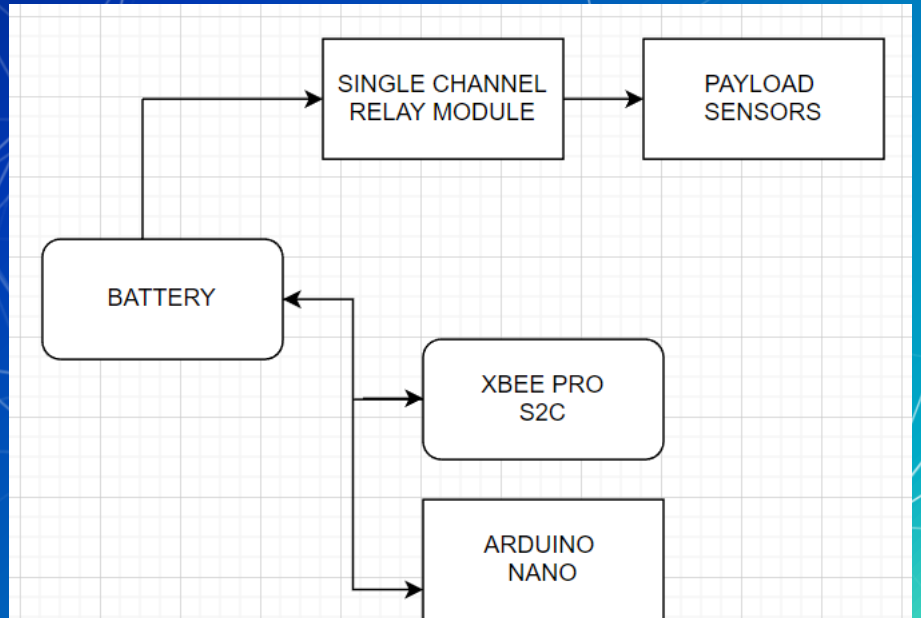



```
  rssisignal  =pulseIn(rpin,LOW,20A0);
  if((rssisignal<=20) && (rssisignal!=0)){
         digitalWrite(BUZZER,HIGH);
         delay(50);
         digitalWrite(BUZZER,LOW);
         digitalWrite(BUZZER,HIGH);
         delay(50);
         digitalWrite(BUZZER,LOW);
  }
 if((rssisignal<=50) && (rssisignal>=20)){
  digitalWrite(BUZZER,HIGH);
         delay(100);
         digitalWrite(BUZZER,LOW);
         digitalWrite(BUZZER,HIGH);
         delay(100);
         digitalWrite(BUZZER,LOW);
}

if((rssisignal<=150) && (rssisignal>=50)){
  digitalWrite(BUZZER,HIGH);
         delay(200);
         digitalWrite(BUZZER,LOW);
         digitalWrite(BUZZER,HIGH);
         delay(200);
         digitalWrite(BUZZER,LOW);

}
```

ELECTRICAL POWER SYSTEM

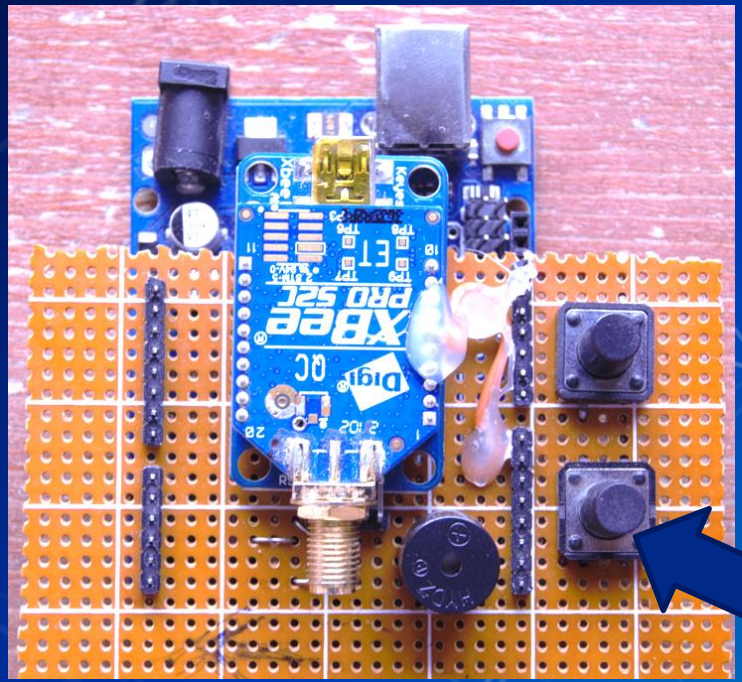
KEY POINTS OF EPS :

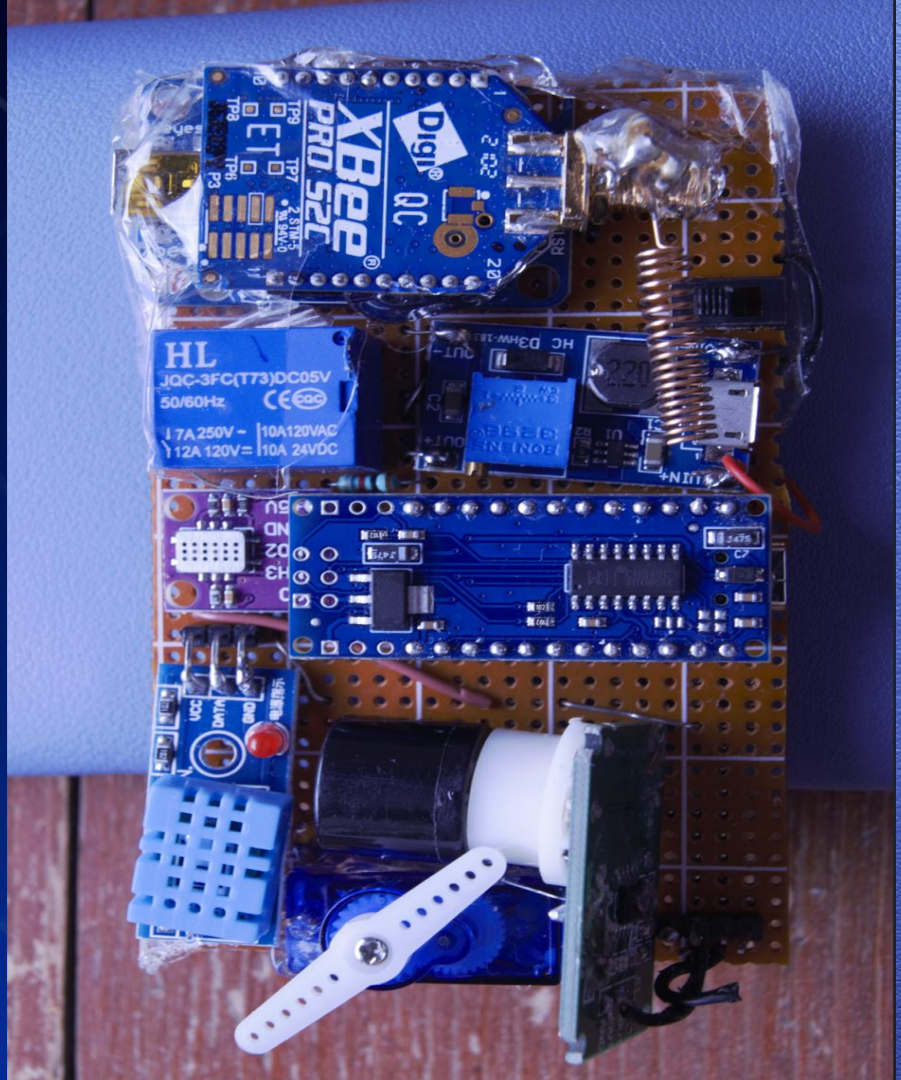
1. ALL SUBSYSTEMS WORKS UNDER 5V
2. EPS MODULE SHOULD GIVE CONTINOUSE SUPPLY OF 5V
3. POWER SAVING METHODS ARE IMPLEMENTED TO SAVE BATTERY POWER

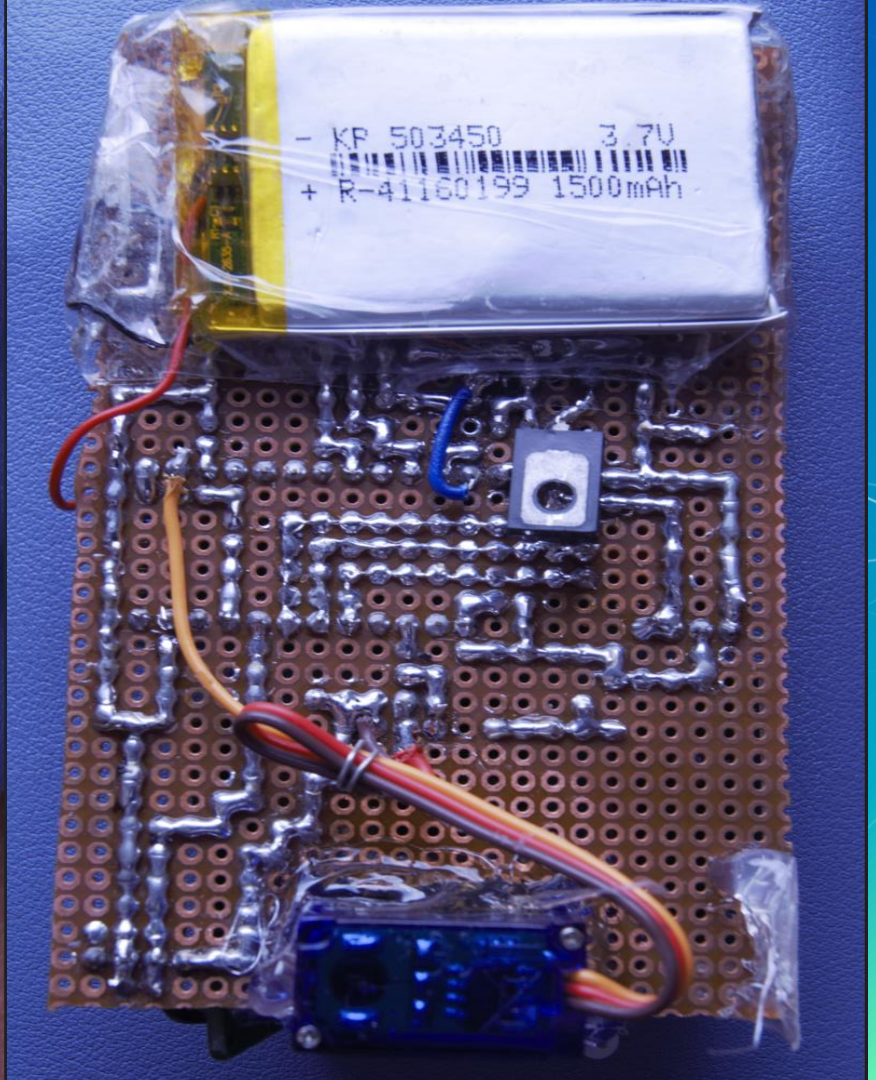


POWER SAVING METHODS IMPLEMENTED

- We used single channel relay module to control the outflow of power from battery to subsystems




XBee
PRO S2C
Digi
HL
JQC-3FC(T73)DC05V
50/60Hz
7A 250V ~
12A 120V=
10A120VAC
10A 24VDC


- KP 503450 3.7V
+ R-41160199 1500mAh

SN0	TECHNICAL REQUIREMENTS	OUTCOME
1	All the components of the CanSat must fit inside a standard soft drinks can (115 mm height and 66 mm diameter),	HEIGHT-115MM DIAMETER-66MM
2	The antennas, transducers and other elements of the CanSat cannot extend beyond the cans diameter until it has left the launch vehicle.	NO ANTENNA LEFT OUT BEFORE LAUNCH
3	The mass of the CanSat must be between a minimum of 100 grams and a maximum of 150 grams.	MASS-147 GRAMS
4	Explosives, detonators, pyrotechnics, and inflammable or dangerous materials are strictly forbidden.	NO EXPLOSIVES ARE USED
5	The CanSat must have a recovery system (a 3 parachutes attached to the CanSat), capable of being reused after launch.	3 PARACHUTE SYSTEM IS USED
6	Inclusion of a positioning system for retrieval (beeper, radio beacon, GPS, etc.) is recommended.	RSSI TRACKER IS USED FOR RETRIEVAL
7	The CanSat must be powered by a battery	BATTERY IS USED FOR POWER
8	The opening of the CanSat parachutes will be scoring. The strength of the parachute must be tested to ensure that the system will operate nominally.	PARACHUTE IS OPENED SUCCESFULLY

PRIMARY MISSION:

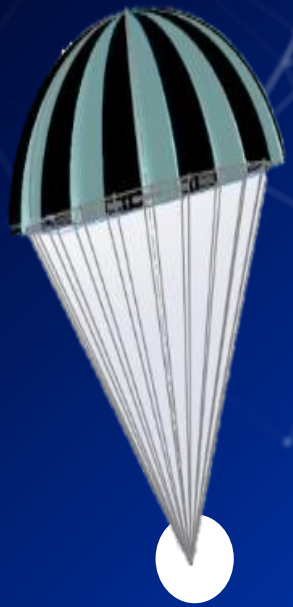
- MESAURMENT OF AIR POLLUTION

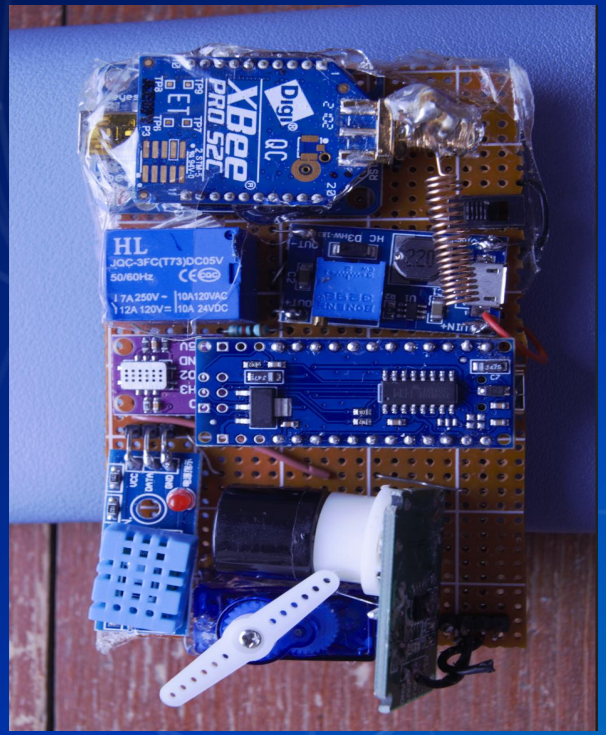
OUTCOME:

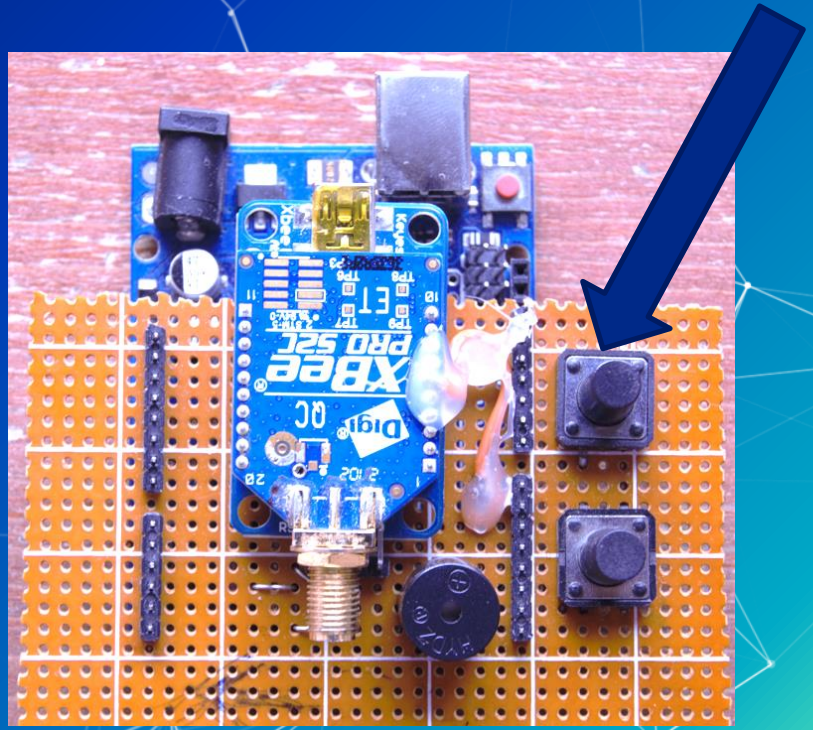
B	C	D	E	F	G	H
X Timestamp (	TEMPERATUI	HUMIDITY	CORBON M	NITROGEN	OZONE (PI	AMMONIA (PPI
1.66411E+12	22	46	0.49	1	15	174
1.66411E+12	22	47	0.47	1	15	171
1.66411E+12	22	47	0.47	1	15	172
1.66411E+12	22	47	0.46	1	15	172
1.66411E+12	22	47	0.47	1	15	172
1.66411E+12	22	47	0.47	1	15	171
1.66411E+12	22	47	0.47	1	15	171
1.66411E+12	22	47	0.41	1	15	172
1.66411E+12	22	47	0.46	1	15	173
1.66411E+12	22	47	0.48	1	15	172
1.66411E+12	22	47	0.47	1	15	173
1.66411E+12	22	47	0.46	1	15	174
1.66411E+12	22	47	0.47	1	15	173

SECONDARY MISSION:

- SENDING A TELECOMMAND








THANKS!