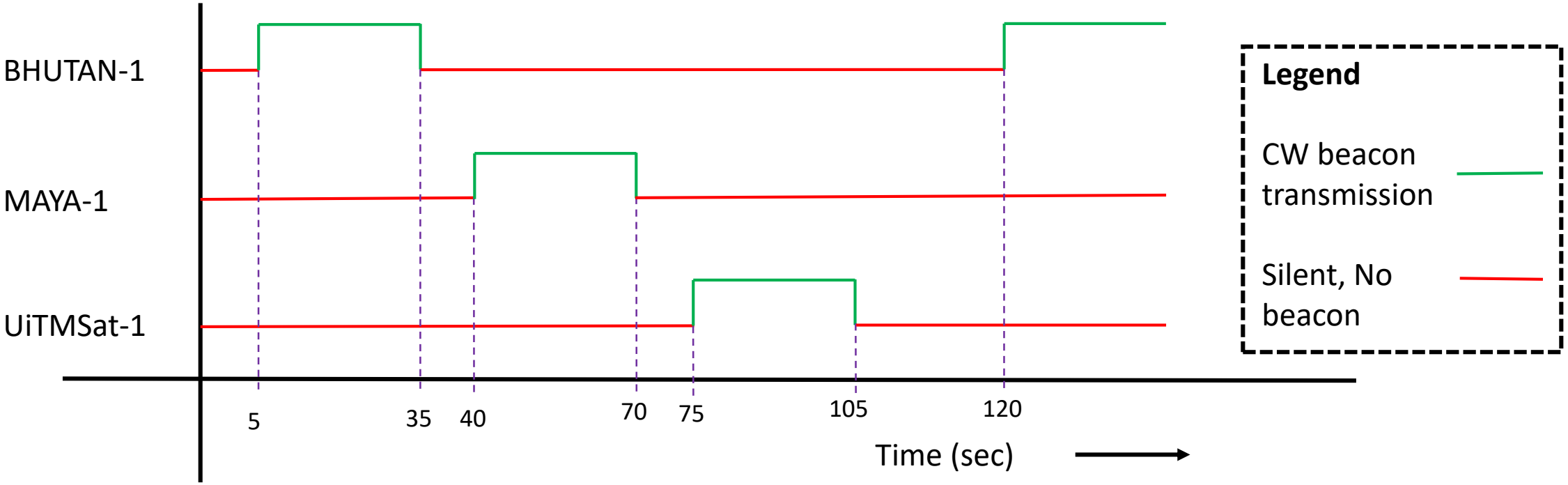
BIRDS-2
COMMUNICATION PLAN

Release into Orbit and Antenna Deployment

- The Three CubeSats will be deployed into the orbit from Japanese Kibo Module of ISS.
- All 3 satellites will be released together from a single J-SSOD in following order:
  - 1st BHUTAN-1
  - 2nd MAYA-1
  - 3rd UiTMSat-1
- There will be no RF transmission until 30 mins after release from ISS
- Each satellite carries 1 VHF and 1 UHF monopole deployable antennas for communications. The antennas will deploy right after 30 min mark has passed.

CW MORSE Coded Beacon Transmission Sequence

- All 3 CubeSats transmit beacon at same frequency, **437.375 MHz**
- Since the 3 satellites will be flying together initially after release from ISS, the beacon signals can interfere with each other if transmitted at the same time. So, to avoid the interference, following transmission sequence as shown in the figure below has been adopted.



CW MORSE Coded Beacon Format

Satellite Call Sign						Satellite ID						Housekeeping Data																			
j	g	6	y	k	‘x’	b	i	r	d	‘x’	‘x’	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T

Hex Digit	Information
A	Battery Voltage
B	
C	Battery Current
D	
E	Battery Temperature
F	
G	OBC Temperature
H	
I	Backplane Temperature
J	

Satellite Name	Call Sign	Satellite ID
BHUTAN-1	JG6YKL	BIRDBT
MAYA-1	JG6YKM	BIRDPH
UiTMSat-1	JG6YKN	BIRDMY

Hex Digit	Information
K	COM96 TRx Temperature
L	
M	COM-2 TRx Temperature
N	
O	Mission Board Temperature
P	
Q	Status Bits
R	
S	
T	

Uplink Command Approach

- Also, the uplink frequency for all 3 satellites are same. So a command sent to one of the satellite will be received by all 3 initially when they are flying together.
- To tackle this issue, satellite call sign is specified in the uplink command to which it is intended to. The satellites after receiving the command will check the call sign and execute it if the call sign matches it’s own or else discard it.
- In addition, there is a shut off command which will stop the transmission of RF (including beacon) for 10 mins. So, this command will be used in initial phases to turn off beacon transmission from other two satellites before sending a downlink command to one of the satellites to avoid any possible interference.