# BIRDS-4 Communication Plan

# Uplink Command
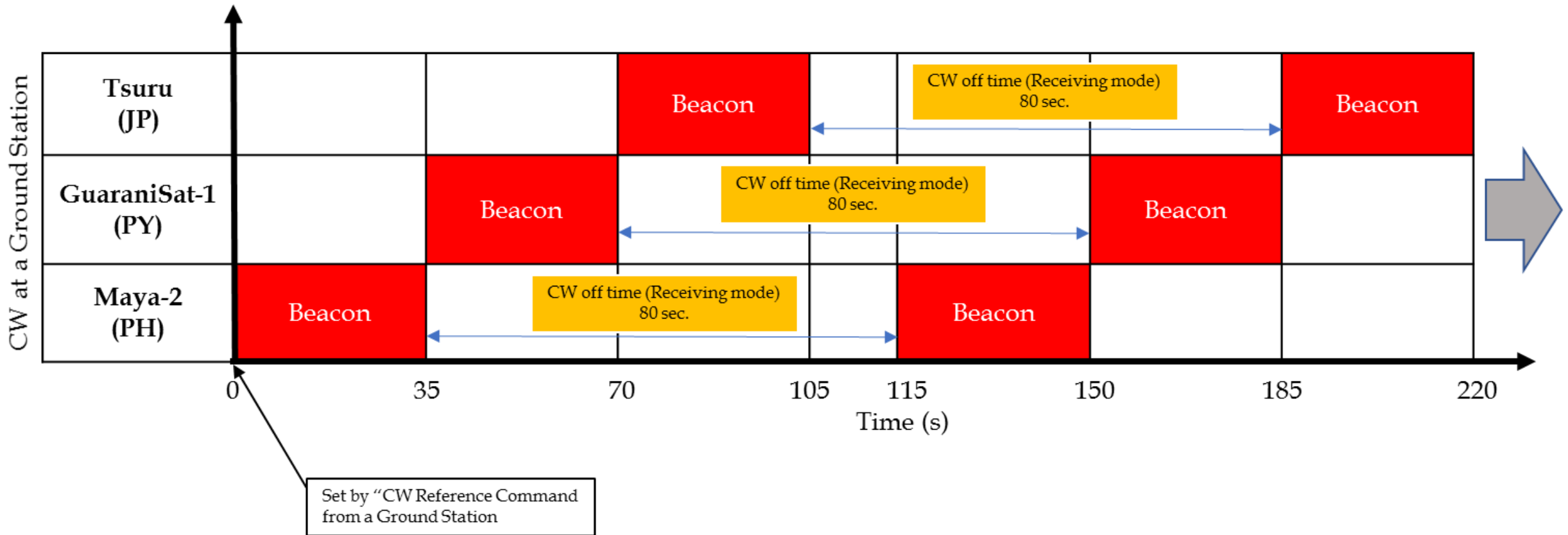
❑ The BIRDS-4 satellites use the same uplink frequencies. The uplink command contains a header that specifies the target satellite. Only the satellite specified in the header responds to the command. Other satellites not specified ignore the command.

❑ There is a command (CW Reference Command) to halt all RF transmission for approximately 10 minutes. The three satellites share the same downlink frequency in time-division-multiple-access manner. This command gives the time reference for each satellite to start CW transmission.

# CW Transmission

There may be a risk of CW signal interfere when the satellites fly in proximity to each other. To mitigate that, the following solutions are adopted:

- ❑ Each satellite repeats cycles of CW transmission time and CW off time. Satellite's CW off time duration shall be at least two times longer than CW transmitting time. During the CW off time, the satellite goes to listening mode.

- ❑ All satellites shall have different CW starting time. The reference time is the time when the satellite is deployed. The reference time can be updated by sending "CW Reference Command" from a ground station.

# CW transmission example of BIRDS-4 satellites

# Downlink Telemetry

There may be a risk of FM packet signal interfere with CW signals from other satellites when the satellites fly in proximity to each other. To mitigate, the following steps are taken:

- ❑ Send General Command to stop RF temporally from all satellites.
- ❑ All the satellites nearby halts RF transmission for approximately 10 minutes and go to receiving mode.
- ❑ Send an command only to a specific satellite to downlink FM packet