

# BIRD uplink and downlink communication plan

11 July 2016

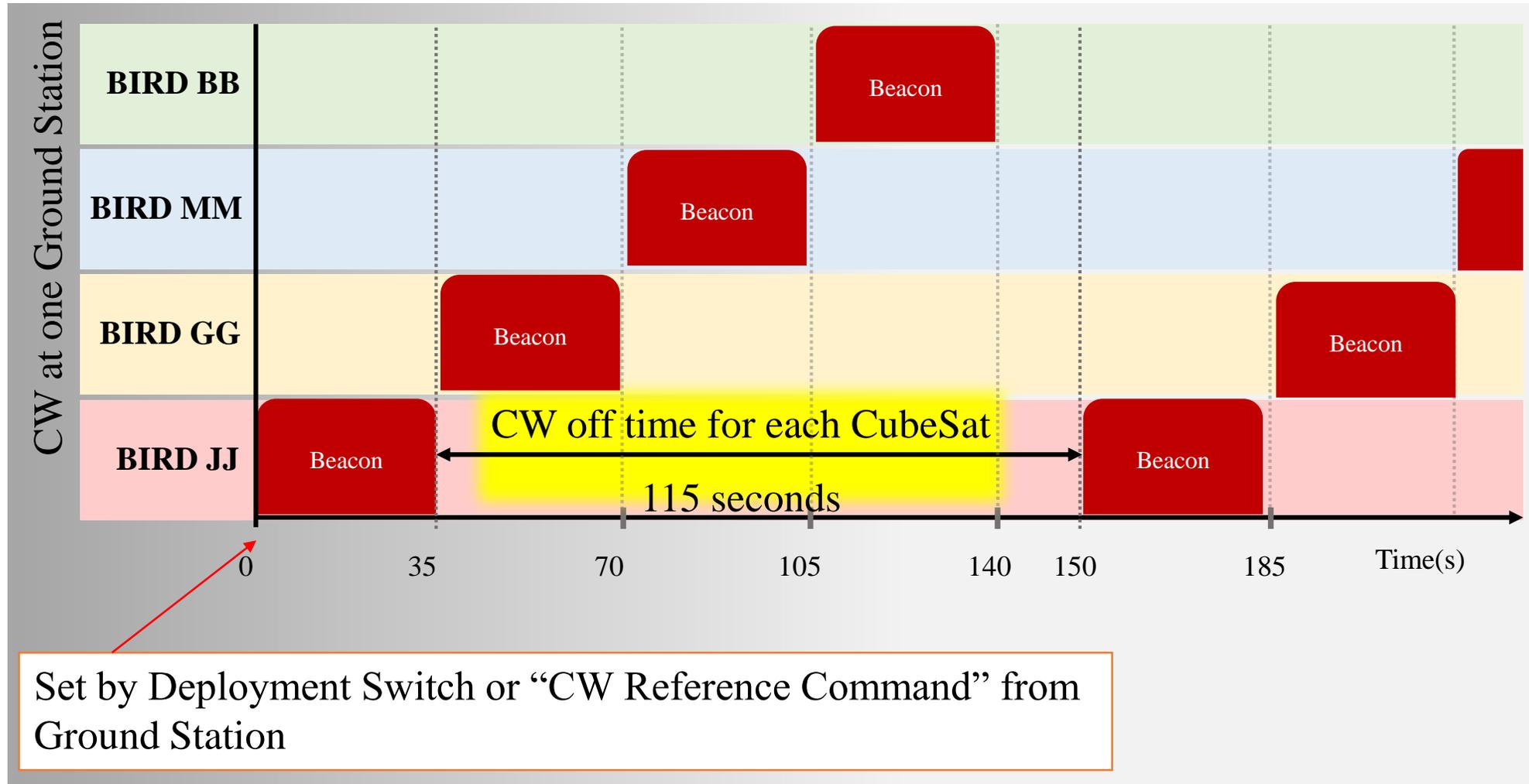
# Uplink command

- ❑ The BIRDS satellites use the same uplink frequencies. The uplink command contains a header that specifies the satellite targeted. Only the satellites specified in the header respond 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 four 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, the following solutions are adopted
  - ❑ Each satellite repeats cycles of CW transmission time and CW off time. Satellites CW off time duration shall be at least three times longer than CW transmitting time.
  - ❑ 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 four Birds satellite



# 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,
  1. Send General Command to stop RF temporally of all the satellites
  2. All the satellites nearby halts RF transmission for approximately 10 minutes
  3. Send an command only to a specific satellite to downlink FM packet

# Downlink Telemetry

