Lost Link Datalink Recovery – Flight Manual Description
NASA DFRC 2008 Fire Mission
UAS COA Application Attachment

"Track changes" is used in this document to highlight the significant differences in this attachment between the 2008 plans versus last years' 2007 WSFM plans. Change tracking (and hence "change bars") have been suppressed for editorial and non-philosophical changes.

From MQ-9A Flight Manual. Some changes have been made for clarity.

Arming Time:

During the arming time, the RCM waits to see if a command link dropout is only temporary before taking the rest of the reestablishment actions in the following table. The arming time can be 2 seconds or 70 seconds:

1. If the aircraft is operating on the C-band or Ku-band command link when the dropout occurs, the arming time is 2 seconds.
2. If transitioning into C-band LOS, the arming time is 2 seconds.
3. If transitioning into C-band digital line of sight or Ku-band, the arming time is 70 seconds.

In all types of lost link, the following event takes place: At 2 seconds of lost uplink, the RCM downlinks a warning message that is presented on the status display in the GCS. This message indicates a lost link condition and the type of link lost: LOS, digital LOS or Ku-band (One or more lost links may be going on simultaneously).

Time/Condition	Process
Arming time +1 second.	If an LOS lost link condition still exists, the RCM places RX1 on the primary uplink frequency and RX2 on the secondary uplink frequency. **NOTE** At and beyond this point, the operator may switch the GDT to the second uplink frequency, in case the uplink frequency in use is being jammed.
Arming time + 10 seconds	If an LOS lost link condition still exists, the RCM switches RX1 and RX2 between primary and secondary command link frequencies at 10-second intervals.
Arming time + 100 seconds	If an LOS lost link condition still exists, the RCM selects the directional antenna for RX1 and the upper omni antenna for RX2. Thereafter it switches RX1 between the lower omni antenna and the directional antenna every 3 minutes.
Arming time + 2 minutes or SPMA offline	If operating in digital LOS mode, after 2 minutes of lost link or if SPMA goes off line, whichever comes first, the aircraft will return to standard LOS mode.
Arming time + 2 minutes	If an LOS lost link condition still exists, the RCM selects the auto track option for the directional antenna.

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Time/Condition	Process
Arming time + 4 minutes	If an LOS lost link condition still exists, the RCM ensures that TX1 and TX2 are set to On and High Power.
Arming time + 3.5 minutes	If a Ku-band lost link condition still exists, the RCM performs the following actions: • 3 minutes-30 seconds to 3 minutes-40 seconds: Sets SPMA to Standby. • 3 minutes-40 seconds to 3 minutes-50 seconds: Sets SPMA power Off for 10 Seconds. • 3 minutes-50 seconds to 6 minutes-50 seconds: Sets SPMA power On and performs power-up initializations. • After above, repeat the above procedures if Ku-band link is not reestablished every 6 minutes-20 seconds.

Notes:
1. If at any time the aircraft is able to reestablish RF datalink during the lost link process, all lost link procedures will be reset, and the aircraft will proceed with its assigned mission. Autonomous flight will be resumed, or real-time control will be reestablished.
2. If digital LOS mode is being used, a standard LOS command link is still transmitted; the aircraft will use the standard
command link to prevent entering lost link condition. In this case, audio to the VHF/UHF radio will be inoperative.
3. Once a command link is reestablished, both LOS receivers are placed on the same frequency.
4. If there is a GCS command mismatch with the LOS RX1 omni/directional antenna configuration once the link is
reestablished, the following message is displayed in the GCS: "Mismatch in Tx 1 Omni/Direc. selection."
5. LOS transmitters are turned On inside of lights-off-range in Ku lost link.
6. LOS transmitters are turned On when cycling through the emergency mission in Ku lost link.