# Lost Link Procedures

The ScanEagle has a series of mission parameters that are physically loaded into its memory prior to flight. These parameters define the locations of emergency runways, lost link flight plans, and timing and safety limits used by the aircraft in the event of lost link or lost-navigation situations. Although configurable in flight, these parameters are typically designated for a given launch and recovery site and are configured for the anticipated flight environment and mission variables.

The Scan Eagle follows an autonomous procedure if communications from the GCS fail. These procedures will terminate in a belly-landing at one of two specific locations if communications are not re-established. During simultaneous operations and in the event of a dual-lost-link situation, the aircraft operating in the West UAS Area is to be pre-programmed to execute its lost-link recovery/abort procedure after a 1 hour holding pattern to provide 30 minutes for the first aircraft to terminate (at either Aardvark or abort point) and to permit support personnel to secure the area for the next recovery. If there is a simultaneous lost link situation, both aircraft are preprogrammed to climb 500' after 10 seconds in an attempt to regain link then hold at their distinctive and designated holding patterns -- aircraft shall always be vertically separated by 500 feet.

| ScanEagle Lost-Link Procedure |
|---|
| 1. The lost-uplink procedure begins after [10 Sec] time has passed without the ScanEagle receiving any messages from the ground. The ScanEagle then flies [50 kts or safe] airspeed, holds its current altitude, and starts a periodic reset of its communications channels. |
| 2. If orbiting, the ScanEagle will fly directly to the nearest flight-plan waypoint. Otherwise, if tracking a flight-plan, the ScanEagle will continue the route and climb after [60 seconds] . |
| 3. The ScanEagle climbs for a designated period of time [no more than 60 seconds] towards the highest of three altitudes: its current altitude, [safe altitude = 8,000ft MSL], or the altitude calculated for line-of-sight communications with the ground station not to exceed ceiling of designated COA. |
| 4. The ScanEagle continues tracking its current-flight plan for [60 seconds] time. If link not established within that period, it will track to the nearest waypoint on the Abort flight plan |
| 5. After reaching the home holding pattern, the ScanEagle continues to orbit overhead in the home holding pattern for [30-minutes] time to allow the ground crew time to re-establish communications and secure the landing area. |
| 6. If communications have still not been re-established, the ScanEagle selects the appropriate direction for a landing on the designated emergency runway [on the centerline of the Aardvark airstrip] for a belly-landing. This runway selection considers the current winds as measured by the ScanEagle, and the runway prioritization previously programmed into memory. |

When an aircraft in the West UAS area is identified as in lost-link status, the aircraft operating in Jacks Valley will climb to an altitude at or above 1000' AGL and proceed to its holding pattern until the lost-link aircraft regains signal or is recovered via Aardvark. If the UA is the West area does NOT regain its link within 10 minutes, the UA in Jacks Valley will recover via SkyHook before West UA can recover.

When an aircraft operating in Jacks Valley is identified as in lost-link status, the aircraft operating in the West Area will continue its mission and monitor the lost-link aircraft until the lost-link aircraft regains signal or is recovered via Aardvark.

Communication among team members is important. Visual observers and PIC must remain vigilant and meticulously coordinate throughout the recovery operations. The table and figure below depicts waypoint placement for the abort flight plan (which can be updated throughout a flight) as well as the holding pattern used in lost link procedures. Not depicted on the figure Wave-off rectangular pattern that will remain west of Aardvark and below 500' AGL.

# Lost Link Procedures

| Home Pattern Waypoints | | |
|---|---|---|
| | | |
| **West UAS Holding** | | |
| 70 | N  39° 02' 14.97" | W  104° 53' 40.72" |
| 71 | N  39° 02' 26.91" | W  104° 53' 41.05" |
| 72 | N  39° 02' 27.30" | W  104° 53' 09.88" |
| 73 | N  39° 02' 15.35" | W  104° 53' 09.47" |
| **Jacks Valley Holding** | | |
| 80 | N  39° 01' 37.45" | W  104° 52' 37.31" |
| 81 | N  39° 01' 37.90" | W  104° 52' 06.16" |
| 82 | N  39° 01' 26.64" | W  104° 52' 05.97" |
| 83 | N  39° 01' 26.09" | W  104° 52' 37.20" |
| **Runway Recovery Waypoints** | | |
| Abort Point | N  39° 01' 49.49" | W  104° 53' 05.71" |
| Rwy 17 FAF | N  39° 02' 26.33" | W  104° 50' 43.96" |
| Rwy 35 FAF | N  39° 01' 42.03" | W  104° 50' 37.90" |



Recovery

West UAS Holding

71 72 70 73

West UAS Area
0-3000' AGL

90

Jack's Valley
0-3000' AGL

80 81 83 82

Jack's Valley Holding

UV-18 Climb Corridor at or above 1000' AGL

FAF

GCS Location

Area D
0-500' AGL

FAF