

## **Lost Link Procedures:**

The Draganflyer X6 Helicopter has been designed to deal with various fail-safe scenarios such as a lost data link or loss of communications. As pointed out in this section its one thing to have an aircraft that can deal with this issue and it is also very important to have complimentary crew procedures.

Before going into the fail-safe procedures, let's talk about the aircraft transmitter/controller.

The aircraft transmitter is specifically designed for the X6 aircraft and features a direct sunlight viewable touch screen display. In addition to the visual display the transmitter provides audio tones and alerts to direct the pilots attention to the screen and/or alert condition.

The basic screen, on the transmitter, provides indications and status on the essential health of the overall system. From left to right on the display the system indicates transmitter battery health, aircraft battery health, data link quality, GPS satellites and quality of GPS.

## **Aircraft Fail Safe procedures:**

Before take-off the Pilot in Command (PIC) and observer look over the immediate area or use Google Earth imagery to determine designated "safe zones" for an emergency landing. These areas are agreed upon and other ground crew members involved with the mission are briefed on the location and circumstances for which they will be used.

Aircraft lost data link procedures:

The DX6 was created to allow the PIC and flight crew to proactively manage the threat of Lost Link situations by steadily providing the operator and crew situational data that allows the PIC the option to terminate a mission long before Link is lost. The DX6 on-board autopilot computer is constantly monitoring the received signal strength and quality of data being exchanged with the PIC Transmitter illustrated above. If the signal degrades during flight a proportional visual bar graph that changes color illustrates the signal quality. A good signal is green; as the signal gets weaker the bar graph proportionally gets smaller and starts to turn yellow. As the signal quality gets worse it turns red and indicates an alarm condition. In addition to the visual indications the transmitter will also provide an audio alert drawing attention to the display. By scanning the instrument panel and noting the signal strength indication, the DX6 transmitter provides sufficient data to enable the PIC to detect a communications link problem early enough to avoid a fail-safe condition.

Based on the situation the PIC will either set the aircraft down in a designated safe zone or start flying the aircraft home before Link is effectively lost.

In the event of an emergency landing in a safe zone, the Observer will communicate the situation to the ground crew and point out any hazards to the PIC. The Observer will always collocate, within speaking distance, with the PIC mitigating the possibility for loss communications between PIC and Observer.

The PIC needs to investigate the reason for the data problem. It could be caused by some kind of interference or a signal strength situation, so quite often just a change in altitude or bringing the aircraft back towards to PIC will clear the problem.

Once the aircraft data link improves, the PIC needs to determine if the aircraft is being jammed in a given area, if there is just a poor signal in the area, or if there is a technical problem. Based on this information the PIC will determine whether the mission will continue or be aborted.

Assuming the problem doesn't improve or the PIC notes the signal strength dipping more frequently or signal deteriorating even more though not entirely lost, the PIC will land the aircraft in a safe zone and the Observer will communicate the situation to the ground crew and point out any hazards to the PIC.

If the data link fails the PIC will lose communications and subsequent control of the aircraft. If this happens the aircraft autopilot will enter a fail-safe within one second of the condition being detected and "auto land". The aircraft will place itself in a stationary hover and begin a slow descent. Through feedback via on-board inertia sensors, when the aircraft touches down and lands, the aircraft motors/rotors are powered off.

At this point the aircraft is recovered and powered off by ground crew or the flight crew and the mission is aborted.