

## Communications

The RMAX is flown in manual mode during takeoff and landing, using a 72 MHz modified Futaba transmitter and receiver pair designed to be more reliable than standard COTS RC equipment. Figure 1 shows the transmitter. In addition to utilizing a ruggedized transmitter, the receiver uses two antennas set at 135 degrees apart to minimize the likelihood of loss of signal (Figure 2). A frequency monitor is used to observe all 72 MHz radio signals that may potentially interfere with the helicopter operation.

When the helicopter is switched over to autonomous flight, the wePilot is commanded from the ground control station (GCS) by a Maxstream (Digi) XTend 900 MHz radio. This radio is dedicated to communications from the GCS to the helicopter for flight commands only. Additionally, certain payloads will use a Maxstream 900 MHz radio as well, operated by the payload controller. The choice of the same manufacturer for the 900 MHz radios should prevent interference between the two channels.

During flight operations, the pilot and all ground personnel remain in constant contact due to proximity or through the use of handheld radios. The mission coordinator / observer provides primary commands to the pilot, relaying any navigational information originating from the payload operator. The mission coordinator serves as the observer and monitors air traffic communications by listening to a handheld aircraft transceiver set to the KPSK CTAF frequency. The mission coordinator has the authority to override flight commands / actions from the pilot, payload operator and GCS operator in the event that a safety of flight issue is detected. The mission coordinator / observer stands within 1m of the pilot at all times and scans the airspace for intruding manned aircraft.



Figure 1 – RC Transmitter for RMAX



Figure 2 – RMAX antenna placement