

Ground control station

The wePilot4RMAX is the flight control system for the Yamaha RMAX. The wePilot4RMAX uses the underlying Yamaha Attitude Control System (YACS) and adds velocity and position control features based on GPS. The helicopter operator can control the RMAX in traditional Manual / YACS mode, or in Assisted Mode (speed commands from the RC transmitter or the Ground Control Station). A waypoint guidance package allows automatic take-off, pre-programmed flight trajectory tracking and automatic landing with engine shut-down.

The wePilot4RMAX ground control station (GCS) interface has numerous features:

1. Allows flight commands to be uploaded during a flight mission
2. Provides health monitoring of the helicopter
3. Allows an overlay of the ground terrain so that visualization of the flight path is enhanced

The flight controller is designed to return the helicopter to its starting waypoint in the event that communications are lost. Signal strength is monitored and presented to the GCS operator so that adequate warning of a signal degradation is available.

In general, a minimum of three people are required to operate the helicopter: The GCS operator, an observer / mission coordinator, and the pilot (see Figure 1). In cases where the payload requires a separate operator, a fourth person will be present sitting next to the GCS operator or standing next to the pilot. The observer / mission coordinator will be located within 1 m of the pilot and will possess a two-way radio to communicate with the GCS operator. The pilot is present to take-off and land the helicopter, and position the helicopter so that the GCS operator can gain control for an autonomous flight. The pilot is also present in the event that manual control must be taken over at any time during the mission.



Figure 1 – Pilot, mission coordinator / observer and GCS communications

The pilot can operate the helicopter using a control inceptor built by Futaba for Yamaha. Figure 2 shows a picture of the remote control transmitter.



Figure 2 – Yamaha RMAX RC Transmitter

The GCS interface is shown in Figure 3. As can be seen, the interface presents situational awareness necessary for the safe operation of the helicopter. This includes an artificial horizon, nadir view of the overflight area, velocity information, and health monitoring of the helicopter.

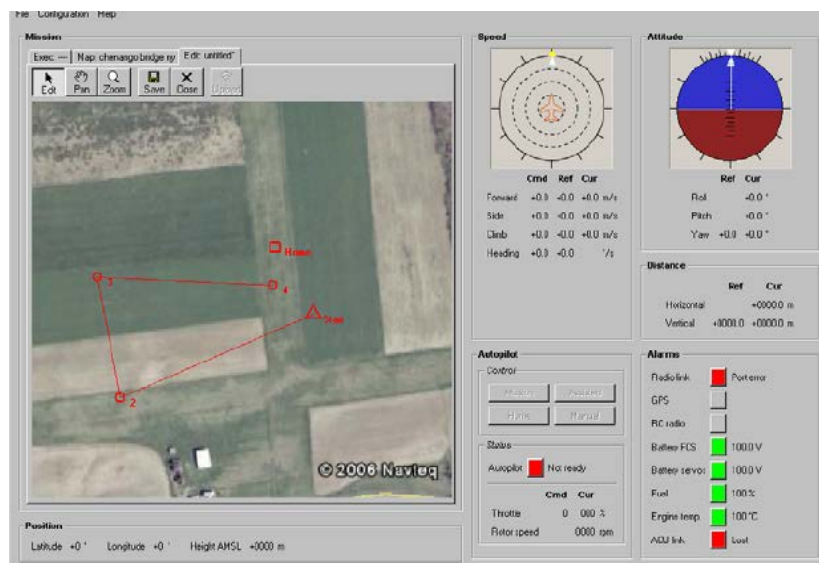


Figure 2 – GCS Interface for the wePilot4RMAX