

AIRCRAFT DESCRIPTION: Quarter-Scale Piper Cub UAS

Description: The “Quarter-Scale Piper Cub” UAS described here is based on a commercially available model built and sold by Horizon Hobbies under the Hangar 9 brand. As the name indicates, this model is a ¼ size scale replica of the famous J-3 “Cub” build by Piper Aircraft. Its large wing area and slow, stable flight characteristics make it a good-flying R/C airplane and the model is very popular with R/C pilots. These safe and stable characteristics also make it a good choice for a UAV platform which will be used for aerial imaging and telemetry tests. This particular model has gotten excellent reviews by magazines and Internet reviewers who describe it as a stable aircraft with very predictable flight characteristics.



Figure 1. Horizon Hobbies Hangar 9 “Quarter-Scale Piper Cub” UAS

The Quarter-Scale Piper Cub will take off and land by manual PIC-directed radio control. It utilizes the Cloudcap Technologies Piccolo autopilot computer, which gives it the capability of autonomously flying a pre-programmed route. During manually controlled flight, the Quarter-Scale Piper Cub is controlled by a hand-held transmitter, like other R/C aircraft. The transmitter is part of the Piccolo ground control station (GCS) computer. Inside the aircraft is the Piccolo autopilot computer which includes 2.4 GHz receiver/transmitter, servo control board, and GPS receiver. The Piccolo autopilot uses 3-axis gyro and accelerometers to control the aircraft. This is done via the servo motors on the control surfaces and engine throttle. In addition to GPS speed and altitude, the Piccolo autopilot uses barometric altimeter and airspeed measurement.

Specifications:

Manufacturer:	Horizon Hobbies (Hangar 9)
Wing Span:	106 inches
Wing Area:	1,630 sq. inches
Wing Loading:	21.73 oz/sq ft
Length:	68 inches
Height:	18 inches
Weight:	16.5 pounds
Power plant:	gasoline-powered, four-cycle, single-cylinder 26cc Evolution engine
Maximum speed:	35 knots
Cruising speed:	25 knots
Range:	5 miles
Service Ceiling:	1,200 feet AGL
Flight Time:	15 – 30 minutes

Airfoil type:	flat bottom (Clark Y, NACA 4415)
Control surfaces:	Ailerons, elevator, rudder
Construction:	Wood structure with Mylar film covering
Control link:	Piccolo transmitter through GCS (2.4 GHz spread spectrum link)

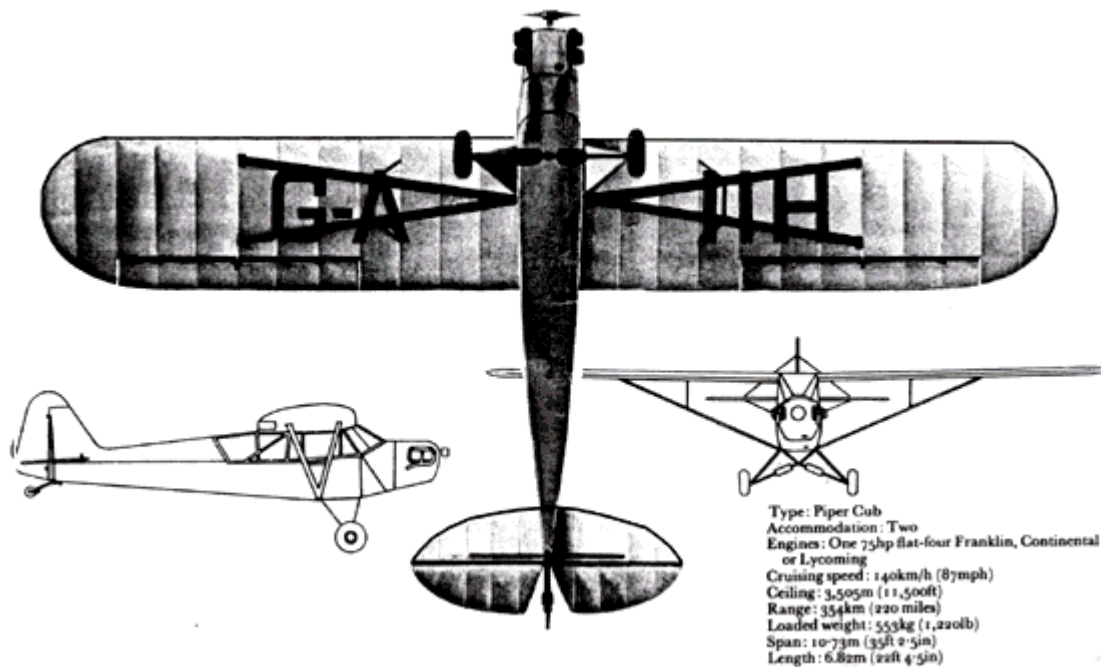


Figure 2. Original J-3 Cub by Piper Aircraft (UAS is ¼ size scale model)

Some additional pictures are included on the next page.



Figure 3. Piper Cub in flight (Right side)



Figure 4. Piper Cub in flight (Left rear)



Figure 5. Piper Cub in flight (Left front)



Figure 6. Piper Cub in flight (Right side)

The “Quarter Scale Piper Cub” UAS is finished in bright yellow covering, which enhances its visibility for observers and pilot.

Filename: COA Appl 1165_AIRCRAFT DESC.doc

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C.O.A. Draft #1165

27 May 2009