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G8-R
Austere Field Light Attack Aircraft

UF HERBERT WERTHEIM COLLEGE of ENGINEERING **MAE**

Design requirements
- 15,000 hours / 25 years service
- ≥ 30,000 ft service ceiling
- Two-person crew
- Takeoff and landing over 50ft obstacle in ≤ 4000 ft
- Takeoff altitude up top 6000 ft in semi-prepared runways
- Up to 3000 lbs payload

Abstract
The G8-R Austere Field Light Attack Aircraft is meant to be an affordable option to provide close air support to ground forces given short notice. The G8-R is a turboprop aircraft seeking to break into the niche light attack market currently dominated by competitors such as the EMB 314/A-29 Super Tucano and the AT-6 wolverine. Turboprop aircraft have a large efficiency advantage over traditional jet engines for the types of missions previously taken by helicopters where absolute speed is not a necessity. G8-R is designed to ensure takeoff and landing on short and rough runways. The scope of mission design includes both shorter flights and a longer ferry mission.
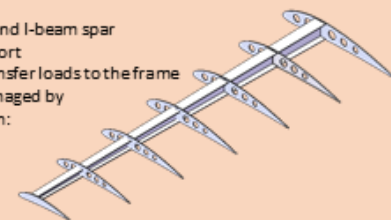
Fuselage Semi-monocoque Structure
- Combines longerons and frames at several cross sections to allow for individual skin plate placement
- Simpler structure reduces manufacturing and maintenance costs
- Optimal stress performance and maintenance

Specifications

Engine Type	Pratt & Whitney PT6A-68 1250 hp
Propeller	91 in 5-blade Harzell ASC-II
Gross weight	11,823 lb
Wing Airfoil	NACA 6413
Wingspan	46 ft
Wing Area	333 ft^2
Fuel capacity	Wing 180 Gal – Auxiliary 80 Gal
Radar	AirMaster C compact all-in-one system
Armaments	MK-82 / GBU-12 Bombs AIM-9L Missile

Performance

Max speed	350 kt
Cruise speed	272 kt
Takeoff distance	3050 ft
Landing distance	2585 ft
Cruise range	1008 NM
Endurance	16.8 hrs

Wing Structure
- Combines multiple ribs and I-beam spar for maximum load support
- Stringers attached to transfer loads to the frame
- Cyclical wing fatigue managed by careful material selection:
  - CFRP skin and stringers
  - Aluminum spar

Stability and Control
- During takeoff, with an expected front-wheel lift speed of 125 ft/s, the pilot need only use the elevator control to increase the aircrafts angle of attack above 7 degrees to lift off the runway
- When landing, maximum flap deflection of -6 degrees
- For a crosswind landing, the aircraft should be able to maintain trim conditions at an 11.5° side slip angle while using less than a 20° rudder deflection

Stealth Considerations
- Radar countermeasures such as radar-absorbent paint and minimized radar cross-section
- Reduced visual and noise detection attributed to painting techniques to match battlefield environment and streamlined fairings

M621 Air to Ground Weapon System
- 750 rpm fire rate
- 20x102 mm ammunition
- 250 rounds of ammunition storage
- Loaded Weight of 377 pounds

Cost Analysis
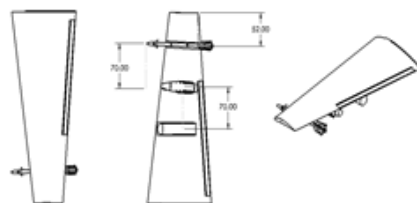**Total Flyaway Cost (Fifty Aircraft) - $884.7 Million**

Total Operating Cost (Fifty Aircraft) - $46.5 million
Maintenance Material Cost – $7.2 million
Maintenance Labor Cost – $13.5 million
Fuel Consumption Cost – $7.2 million
Military Crew Cost – $18.6 million