

BUILDING AN AIRCRAFT ✈️

Alexander Black, Henry Dorking,
Alexandra Gaskins, Bradley Loss, Vivek
Tolani, Kyle Worley, Yonatan Zigdon

OBJECTIVE

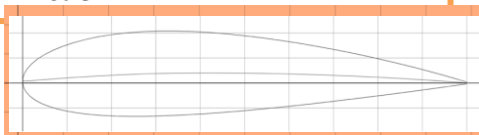
Create an austere field light attack aircraft that can provide close air support to ground forces.

REQUIREMENTS

- ✦ $\leq 4,000$ ft for takeoff and landing
- ✦ 3000lb of armament
- ✦ Integrated gun for ground targets
- ✦ Service life of 15,000 hours over 25 years
- ✦ Service ceiling $\geq 30,000$ ft
- ✦ Two crew members with zero-zero ejection seats
- ✦ Reasonable cost for design

Step 1: Wing Design

- ✦ Airfoil: NACA 2417
- ✦ Wingspan, Root/ Tip Chord (ft): 45.5, 11.0/4.96
- ✦ Wing Reference Area (ft²): 362.97
- ✦ High Lifting Devices: Fowler flap, leading edge flaps
- ✦ Sweep & Twist Angle: 2° & 3°



Step 2: Engine Selection

- ✦ Engine: Pratt & Whitney PW123 Turboprop (x2)
- ✦ Horsepower: 2400shp each
- ✦ SFC/h: 0.52lb/hp each

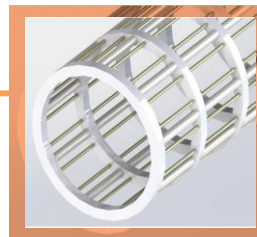


Step 3: Fuel Tank Design

646 gallons of fuel are stored in the fuselage and the wing-tip tanks, within self-sealant bags in case of rupture along with explosive proof foam.

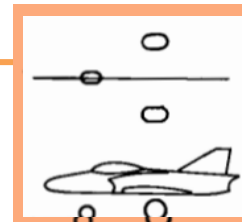
Step 4: Fuselage Design

- ✦ Structure: Semi-monocoque
- ✦ Length: 42.5ft
- ✦ Avg. Diameter: 7.25ft
- ✦ Material: Al 6063-T6 (Bulkheads, Stringers, Skin), Steel AISI 4130 (Longerons)



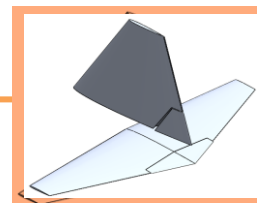
Step 5: Landing Gear Design

- ✦ Tire Placement: Tricycle
- ✦ Tires: (Type III Tires)
 - ✦ Nose Tire Size: 8.50-10
 - ✦ Main Tires Size: 15.00-16



Step 6: Tail Design

- ✦ Tail Shape: Conventional
- ✦ Airfoil: NACA 0007 symmetric
- ✦ Control Surfaces: Traditional Rudder/Elevators



Step 7: Weapon Selection

- ✦ Heavy Bombs: (2500lbs)
 - ✦ Five Mark 82 Bombs
 - ✦ Mixed Bombs: (3160lbs)
 - ✦ One Mark 82 Bomb
 - ✦ Two Bru-61/a bomb carriers w/ Eight GBU-39B small bombs
 - ✦ Rocket Package: (3240lbs)
 - ✦ Four AGM 65 Maverick ATG
 - ✦ One M261 Rocket Launcher w/ Hydra 70 rockets
- *Each layout has two .50 M2 Browning Machine Guns

Combine

Final Product

The BC-1 Rock Python



Range: 1072nmi
Payload: 3240lbs
Gross Weight: 27,258lbs
Total Cost: \$225 million each