

**Product Design: Aircraft Redesign**

**Design Brief:** The **BHS 3-D Design Company** has been hired by *NewCo Aircraft Systems* to design and model a variant of a popular single engine, propeller powered aircraft. The variant should change the shape profile of the aircraft to improve at least one of the following:

- load characteristics
- fuel efficiency
- comfort
- performance

The following Design Constraints must be considered and adhered to:

- Designers must choose from the list of Approved Aircraft below:

Piper Cherokee 140 1970	Beech Bonanza G36	Boeing Stearman – PT-17
Piper Archer II 1977	Cirrus SR20	Rockwell Commander 112B
Piper Tomahawk II	Grumman General AA-5	Ercoupe 415C
Piper Saratoga 301	Mooney M20	Cessna 170 B
Cessna 182 R	Cessna 177 RG	Cessna 206 H

- The overall and individual dimensions of the aircraft cannot vary by more than 5% of the original design.
- Designers must write an approved pre-design narrative explaining the expected design gains as a result of their redesign.
- Designers must write a detailed report of the final results of their design change, describing the improvements that will be realized by their designs.
- Designers will have to research their designs and compile a detailed spec sheet of the original design

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***Stakeholders:*** *NewCo Aircraft Systems* (profits), FAA, Aircraft owners and renters.

### ***Research and Investigation:***

#### Spec Sheet:

Crew and Passengers \_\_\_\_\_

Length \_\_\_\_\_

Wing Span \_\_\_\_\_

Height \_\_\_\_\_

Wing Area \_\_\_\_\_

Empty Weight \_\_\_\_\_

Takeoff Weight \_\_\_\_\_

Powerplant (Engine) \_\_\_\_\_

Maximum Speed \_\_\_\_\_

Cruise Speed \_\_\_\_\_

Stall Speed \_\_\_\_\_

Range \_\_\_\_\_

Service Ceiling \_\_\_\_\_

Rate of Climb \_\_\_\_\_

Cabin Width (Max) \_\_\_\_\_

Cabin Height (Max) \_\_\_\_\_

Notes:

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***Initial Design Procedures:*** Using images from the Internet, create the following aircraft parts:

Parts		Designer	
Empennage		Wing Assembly	
Wings		Tires	
Ailerons		Rims	
Flaps		Landing Gear Struts	
Vertical Stabilizer		Landing Gear Assembly	
Rudder		Windshield	
Horizontal Stabilizer (or Stabilator)		Side windows	
Horizontal Trim		Doors	
Propeller		Spinner	

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*Sketches:*

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***Daily Design Log:*** Explain the challenges and successes that you encountered during each day of design. Use complete sentences and give as much detail as possible

<b>Date</b>	<b>Log Entry</b>

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