MAE 200 Aircraft Analysis
Due Friday, November 23rd, 5 pm

****Incoming transmission****
****Carrier signal: Alpha-2-6-9-Echo-Charlie-5-5-8****
****Source: Iron Man Mark XLVI****
****Image downloaded****

****Message proceeds****
Hey, how's it going. So listen, I got a favor to ask. SHIELD got wind of a secret HYDRA base, so we paid it a visit. Knocked some heads, blew up some stuff, and hacked a couple of computer systems. All in a day's work. They're apparently building some new aircrafts, or studying some old ones, we're not sure. Fury wants to know their threat level. Well, I'm clearly kind of busy right now, these dozen crullers aren't going to eat themselves. So I've attached the drawings and other random data we pulled from their computers. Can you put it all together and get Fury his information? Great. Thanks. I owe you one.

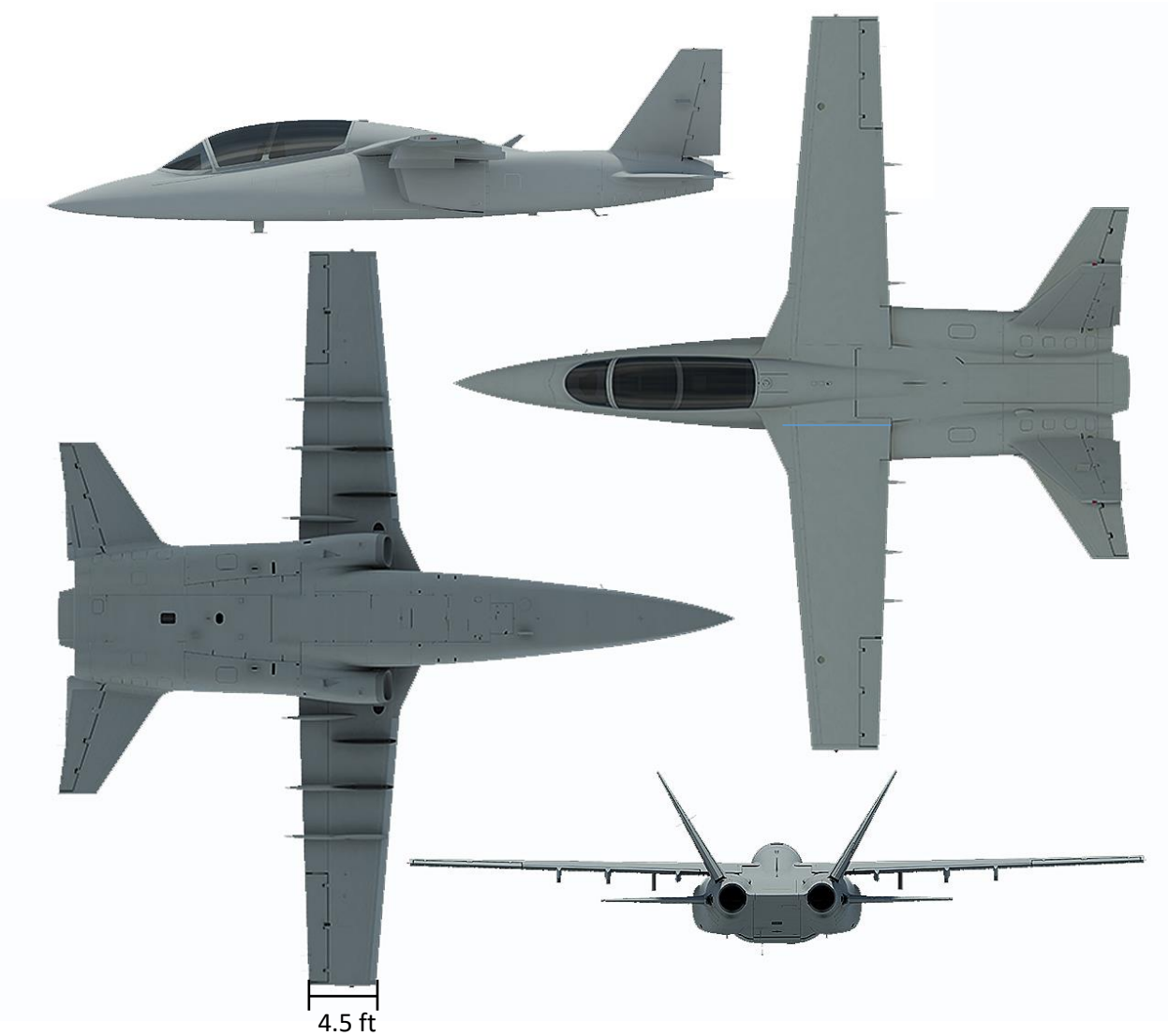
****Message ends****
****Files follow****

Listen Stark, I need you to run these drawings and data through that fancy computer of yours and tell me what I need to know.

1) What's their maximum range, and at what velocity and altitude?
2) What's their maximum endurance at sea level and at what velocity?
3) The helicarrier has an operating altitude of 15,000 ft and velocity of 250 ft/s. If these aircrafts chase the helicarrier and match speed, what's the max duration could they operate?
4) What's their best absolute and service ceiling? And at what velocities?
5) What's their max rate of climb at sea level?

And don't give me any of your excuses Stark. If I find you off partying with a supermodel, I'm dumping your junk in the East River.

Nick Fury, Director of SHIELD
****Obtained schematic****



Hydra X6 attack bomber

****Obtained test flight data****

<u>Test flight 1 – Max velocity</u>
Time: 8/22/2016, 15:35 Zulu
Fuel load: 3,000 lb, half max
Take-off weight: 15,000 lb

Altitude: 20,000 ft
Max velocity achieved: Mach 0.68

Range at max velocity: 300 miles
L/D at flight conditions: 6.594

Test flight 2 – Max endurance
Time: 8/23/2016, 08:11 Zulu
Fuel load: 3,000 lb, half max
Take-off weight: 15,000 lb

Altitude: 20,000 ft
Max endurance: 1.533 hr
Flight velocity for max endurance: Mach 0.3233
L/D at flight conditions: 15.331

-----End of Message-----

Now the technical report and grading part

Turn in a typed group report with the following sections and information. The report can be turned in either via Canvas, in-class, or to my office before the due date and time.

1) A title with all team members names as subtitle
2) An introduction to the problem/request.
3) A re-statement of the given information and their use to the analysis.
4) The equations and procedure taken to obtain the results.
5) Plots of the following
    a. T_R and T_A vs. velocity at sea level.
    b. P_R and P_A vs. velocity at sea level, 15,000 ft, and 20,000 ft.
    c. Rate of climb vs. velocity at sea level.
6) Table with the information requested by Director Fury (range, endurance, ceiling, etc)
7) A conclusion of the analysis, and any particular observations about the aircraft.

Formatting guidelines

- Times New Roman, Arial, Calibri, or other standard fonts.
- Size 12 for text, minimum 10 for graphs and figures.
- Caption and number all figures.
- Full justify all text, and center figure captions.
- Number the sections

Points allocations
Technical engineering content (did you get the answer and the required parts): 50
Explanation of the problem and process: 30
Report formatting and grammar: 10

Amusing or in-character/in-universe report: up to +10 bonus