



## History of the F-20:

The F-20 Tigershark, developed by Northrop in 1975, was a compact and versatile fighter aircraft designed for high speed. Due to high competition from the F-22 Raptor this plane was quickly turned obsolete. The death of two test pilots due to high g-forces sealed its fate. Top speed: 2.0 Mach (1500 mph) Length: 47' Wingspan: 28' Range: 370 miles Ceiling: 55,000'

## Final Results:

Length: 3.8'  
Width: 2.3'  
Weight: 2.46 kg  
Max thrust: 1.7kg  
Minimum take off velocity: 20 mph

$$v = \sqrt{\frac{2mg}{C_l Ad}}$$

$m$  = mass,  $g$  = gravity,  $C$  = lift coefficient,  $A$  = lift surface area,  $d$  = air density

Strength of  $\frac{1}{2}$  by 2 inch thick carbon fiber block: 88.8 lbs



# F-20 Tigershark



Image #1: Fuselage Molds 7/14/2023



Image #2: Fuselage 1/15/2024



Image #3: Wing Molds with carbon fiber layer 2/16/2024



Image #4: Wing layout 2/17/2024



Image #5: Wings being attached 3/19/2024



Image #6: Rear flaps being attached 3/19



Image #7: Landing gear being Installed 4/1/2024



Image #8:  
Servos, ESC,  
receiver, and  
electronics  
4/2/2024



Images #8-10:  
Painting  
process  
(Jungle Camo)  
5/4/2024



## Project Overview:

The main goals of the project were to create an exact fully flight capable replica of the F-20 Tigershark including retractable landing gear and discrete techniques of hiding all pushrods and servos. The goal behind all of this was to do structural and aerodynamic tests on the planes airframe and materials. The plane was built using the composite materials of carbon fiber and epoxy, using 3d printed molds to hold the form of the plane, and a few smaller parts being directly 3d printed. Image #1 shows the two massive molds used to create the fuselage of the plane. The mold was covered in an anti stick chemical with the carbon fiber and epoxy being layered on the inside. Image #2 shows the bare fuselage. Image #3 shows the molds used for the wings which only had one layer of carbon fiber vs the two on the fuselage to save weight. Image #4 shows the internal organization of the wing. Image #5 shows the wings being connected to the fuselage. Image #6 shows the engine and flaps being attached. Image #7 shows the landing gear being installed. Image #8 shows the wiring of the servos, electric speed controller, radio receiver, and battery. Then to conclude images #8-10 show the plane's painting process which was inspired by the F-35's Jungle Camo.