

Knights Experimental Rocketry *Valkyrie*

Valkyrie is the University of Central Florida's and the State of Florida's **first student-built liquid-bipropellant rocket to fly**. In less than 11 months our small team of students went from whiteboard drawings to a successful launch. *Valkyrie* was designed for the Friends of Amateur Rocketry's Dollar Per-Foot Competition out near Death Valley in California. The launch of *Valkyrie* was a testament to the ambition and passion of our undergraduate members within Knights Experimental Rocketry, many of whom pioneered this project with no previous experience. One of the most unique and exciting features of the vehicle was the propulsion system, as liquid-bipropellant engines are the standard in space flight and are rarely seen at the collegiate level. The rarity of this propulsion type posed a first-of-its-kind challenge to our team here at UCF and paved the way for future and current projects (like the ones Knights Experimental Rocketry is currently undertaking). The challenge of creating a bi-propellant rocket in such little time and with less than \$4,200, led to a creative and simple design of the propellant tanks, and a simplified injector. The propulsion system was not the only unique aspect of the vehicle, as the airframe also boasted first-of-its-kind features for the university. *Valkyrie's* airframe included an aerodynamic boat tail interlaced as a composite with the fins, reducing the drag on the vehicle and increasing its altitude effectively. In the Summer of 2023, *Valkyrie* roared off the launch rail in Mojave California, and flew to 4,884 ft at speeds greater than 300 mph. In less than five minutes, *Valkyrie* launched and landed in one piece completing all launch competition requirements and winning close to \$5,000 for the team.

(Photos Below)



Photo of the Aerostructures team wet laying a section of the carbon fiber composite airframe.



Photo of the Propulsion team securing the propulsion system for static fire testing.



Photo of the first successful static fire.



Photo of the team after a wet dress rehearsal, before leaving for California.



Photo of *Valkyrie* waiting to be loaded onto the launch rail in Mojave California.



Photo of the Aerostructures team carrying *Valkyrie* out before her maiden flight.

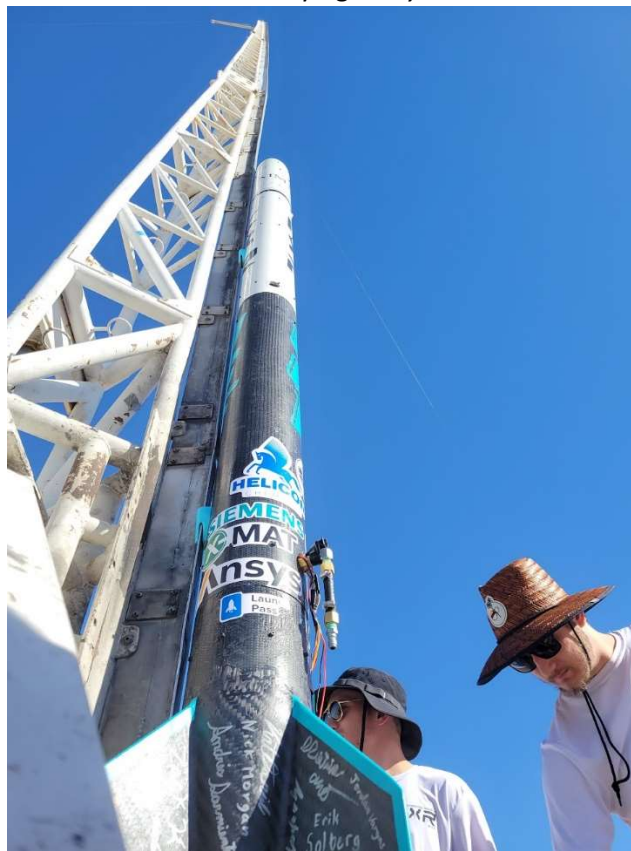


Photo of the Propulsion team readying the engine for flight.

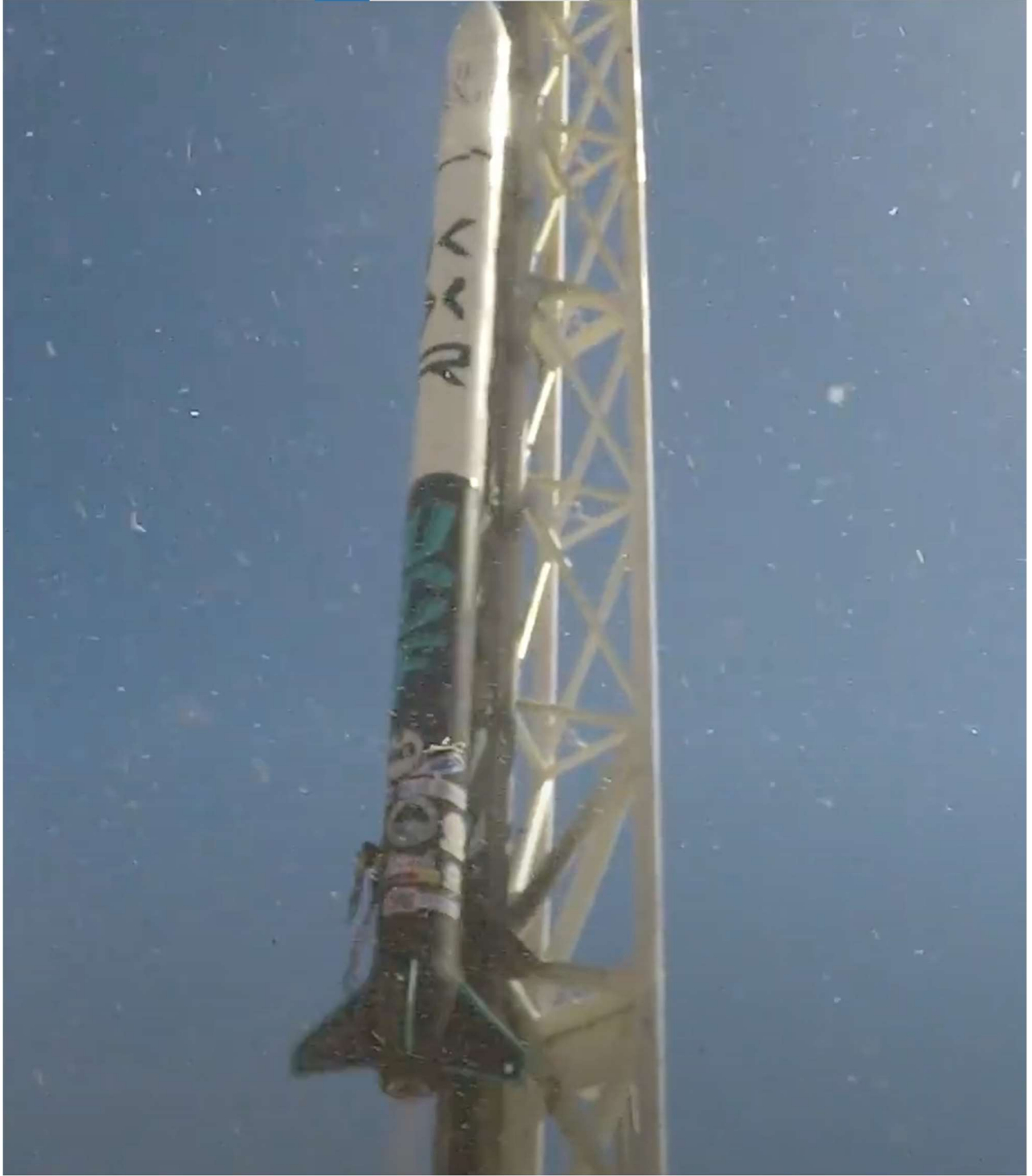


Photo of *Valkyrie* lifting of (1/2).



Photo of *Valkyrie* lifting off (2/2).



Photo of the team carrying *Valkyrie* after being recovered.