



SOLAR POWERED HELICOPTER



SCOTT JORDAN, SJORDAN2@UMD.EDU
SCIENCE, DISCOVERY AND THE UNIVERSE
AEROSPACE ENGINEERING

Background

The Gamera Project began as the Human Powered Helicopter, but after its success, the HPH was converted into a Solar Powered Helicopter. The main quadcopter structure remained, but the entire propulsion and control systems were replaced to run electrically instead of mechanically. The 352 solar cells can theoretically supply up to 1400 watts distributed amongst 4 motors. 660 watts are required to liftoff with a 95lb pilot

Goals

The main goal of this project is to get sustained liftoff of all four rotors simultaneously with a human pilot in the cockpit. If this is achieved, it will be the first ever piloted solar powered helicopter. The goal of the solar team is to collect sunlight, convert it into usable electricity and supply the motors with the correct levels of voltage and current. All four motors must receive equal power to achieve lift. Successful takeoff requires only a few inches for a few seconds.

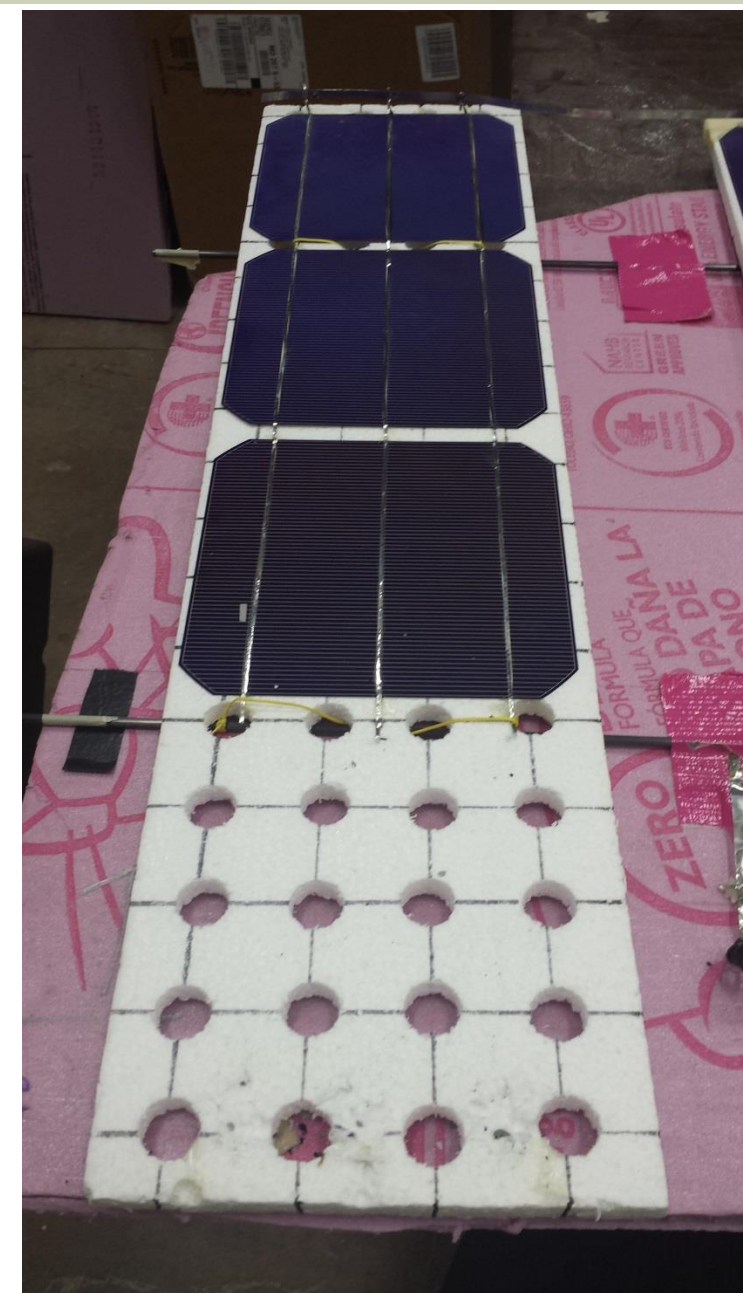


Photo Credit: Scott Jordan

Methods

A general overview of how panels are built*:

- Cut foam backing to fit four solar cells
- Solder 3 tabbing wires onto each of four cells
- Solder four cells together
- Glue same four cells to foam
- Repeat x10
- Connect the sets into series using bus wire
- Tie all eleven sets to carbon-fiber frame with string allowing space in between sets for structural joints
- Repeat x7

*This process is ever evolving as the project goes on

Results/ Progress

To date, eight solar panels are constructed. These panels often require repair due to the fragility of the solar cells. The panels have been successfully tested individually and with the structure and motors. Gamera has successfully lifted off with 40lbs in the cockpit. The lightest pilot is about 80lbs. Research has begun into how to further improve solar panel design, including new, improved cells with higher efficiency (currently 18% efficiency). A new wiring system has been installed to more evenly distribute power, increase balance, and decrease weight. And the process of making panels is constantly being refined. All eight panels are in good shape, and the team is prepared to fly any day with good weather.