



# Future Aircraft Sizing Tool (FAST)

TECHNOLOGY NUMBER: 2024-318



## OVERVIEW

Open-source MATLAB-based software for aircraft design and analysis

- Simplifies and enhances accuracy of both conventional and electrified aircraft design
- Useful for aerospace engineering, research, education, aircraft design consultancy

## BACKGROUND

The aviation industry has consistently sought ways to innovate aircraft design and propulsion systems to improve efficiency, reduce emissions, and meet evolving demands. Traditionally, aircraft design has heavily relied on iterative methods and extensive prototype testing, which can be time-consuming and costly. Historical databases of aircraft and engine data have existed but were not effectively utilized for predictive design and technology trend analysis. With rising interest in electrification and next-generation propulsion systems, existing tools often lack the capability to explore a wide range of new design paradigms swiftly, from traditional to electrified architectures. There is a growing need for advanced tools that can accurately simulate, analyze, and predict the impacts of new technologies in the early stages of the design process, thus saving time and resources while accelerating the development of more efficient and innovative aircraft.

## INNOVATION

The Future Aircraft Sizing Tool (FAST) represents a significant advancement in the field of aircraft design software. Developed under NASA's Electrified Powertrain Flight Demonstration project, this MATLAB-based, open-source tool facilitates the design and analysis of both conventional and electrified aircraft. With minimal input required from users, FAST breaks down the complexity typically associated with aircraft design, making it accessible to a broad audience including aerospace engineers, researchers, and enthusiasts. Its versatility in supporting any propulsion architecture allows for innovative exploration in both conventional and sustainable aviation. The potential applications of FAST are extensive, including the optimization of new

## Technology ID

2024-318

## Category

MOSS - Michigan Open Source  
Software

## Inventor

Nawa Khailany  
Paul Mokotoff  
Huseyin Acar  
Gokcin Cinar  
Michael Tsai  
Maxfield Arnson  
Janki Patel

## Learn more



aircraft designs, education, research, and consultancy in aerospace design projects. This tool is poised to advance the field by making sophisticated design capabilities available to a wide range of users.

## **ADDITIONAL INFORMATION**

### PROJECT LINKS:

- [FAST Project Website](#)
- [FAST Code Repository](#)
- [FAST YouTube Channel](#)

### DEPARTMENT/LAB:

- [Gokcin Cinar, Aerospace Engineering](#)

### LICENSE:

- Apache 2.0