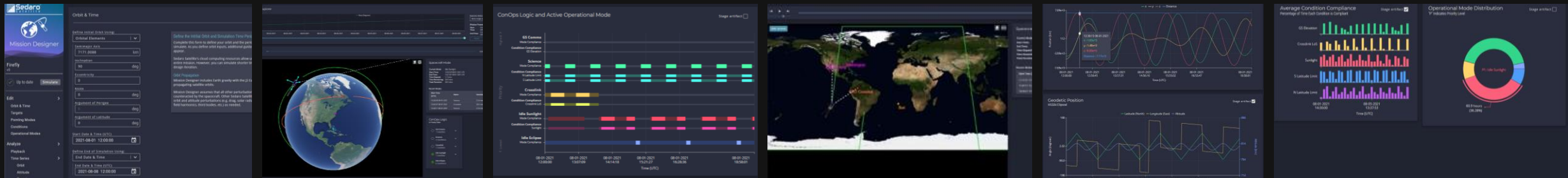


# CubeSat Digital Engineering with Sedaro Satellite and OpenMBEE

CubeSat Developers Workshop 2021  
April 27-29, 2021

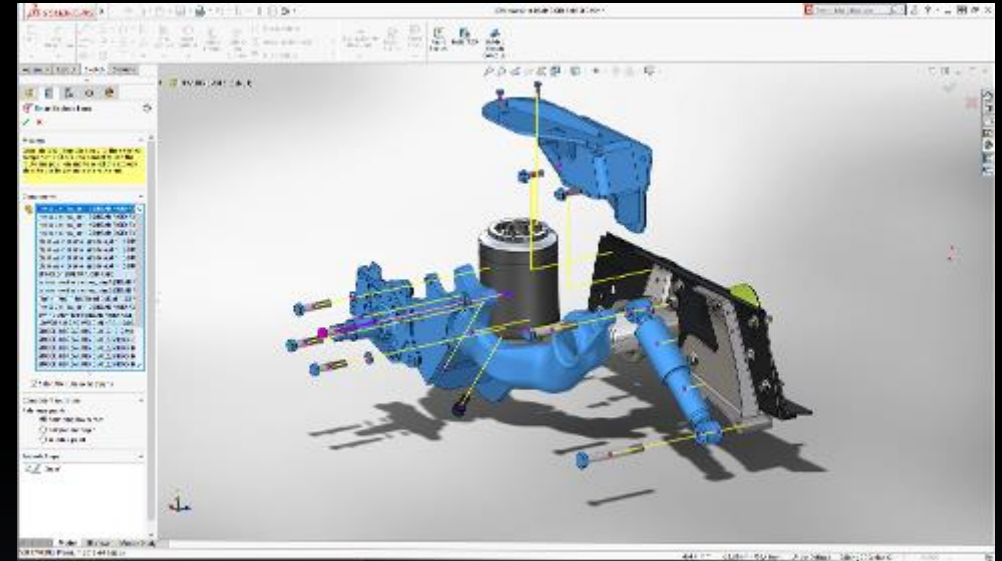
Robbie Robertson, Sebastian Welsh, Daniel Martin  
Sedaro Technologies



# What is Digital Engineering?

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- Haven't we already been using engineering software tools for decades now?

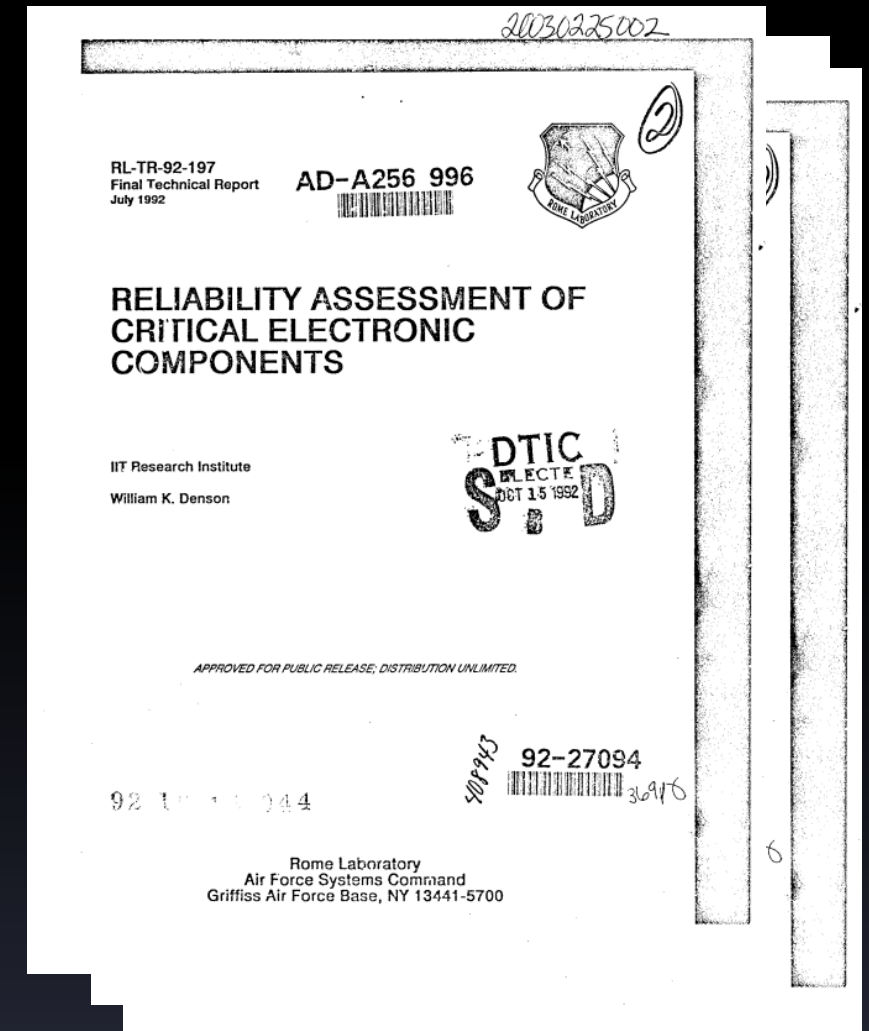


<https://solidworks.com/>

# What is Digital Engineering?

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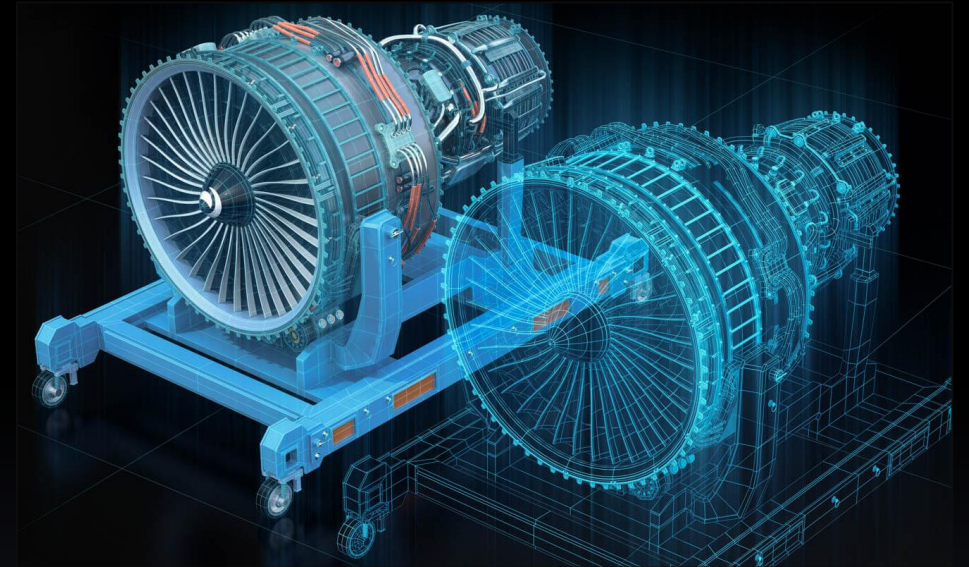
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  - Reduces document-based communication
  - Streamlines information exchange



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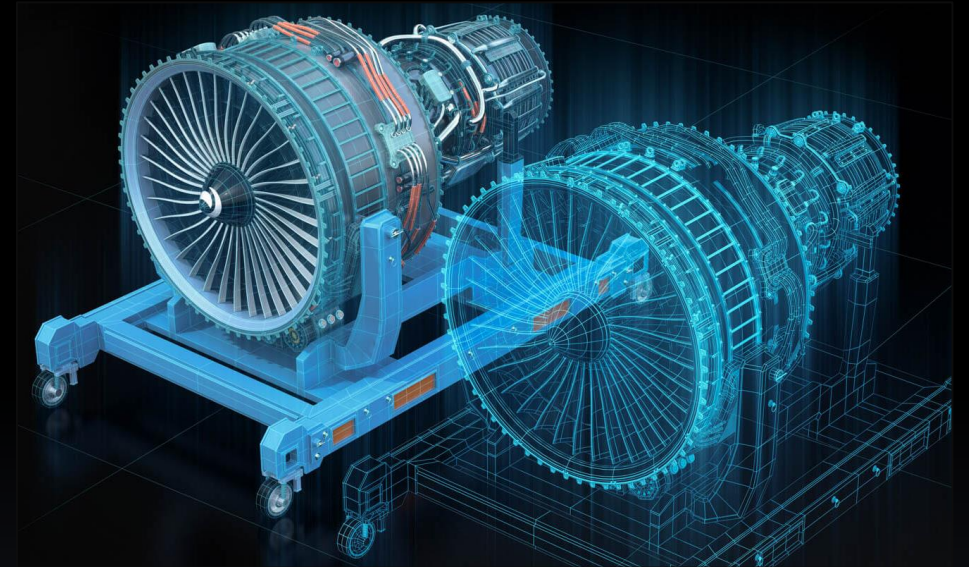


<https://job-wizards.com/en/digital-twins-doubling-the-potential-for-innovation/>

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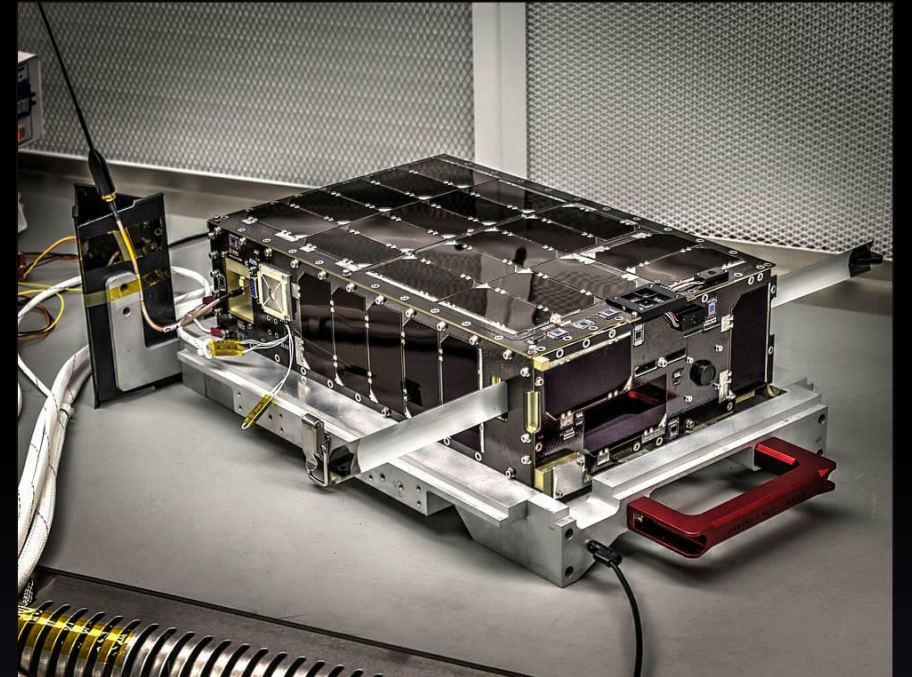


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# Digital Engineering for CubeSats

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- CubeSats provide opportunities to try out innovative concepts (technology & processes)

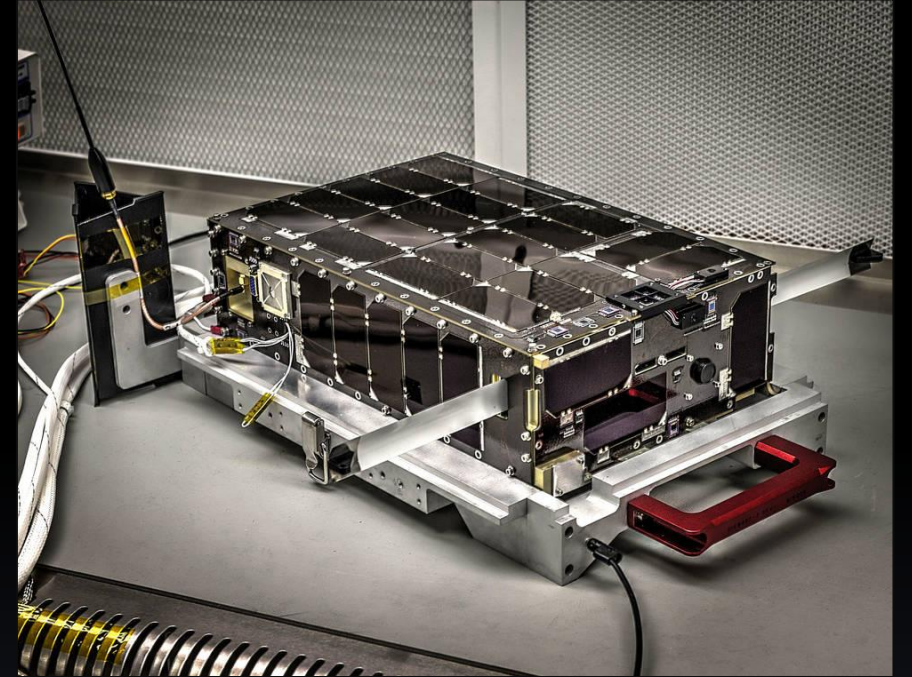


<https://www.nasa.gov/feature/goddard/2018/dellingr-the-little-cubesat-that-could>

# Digital Engineering for CubeSats

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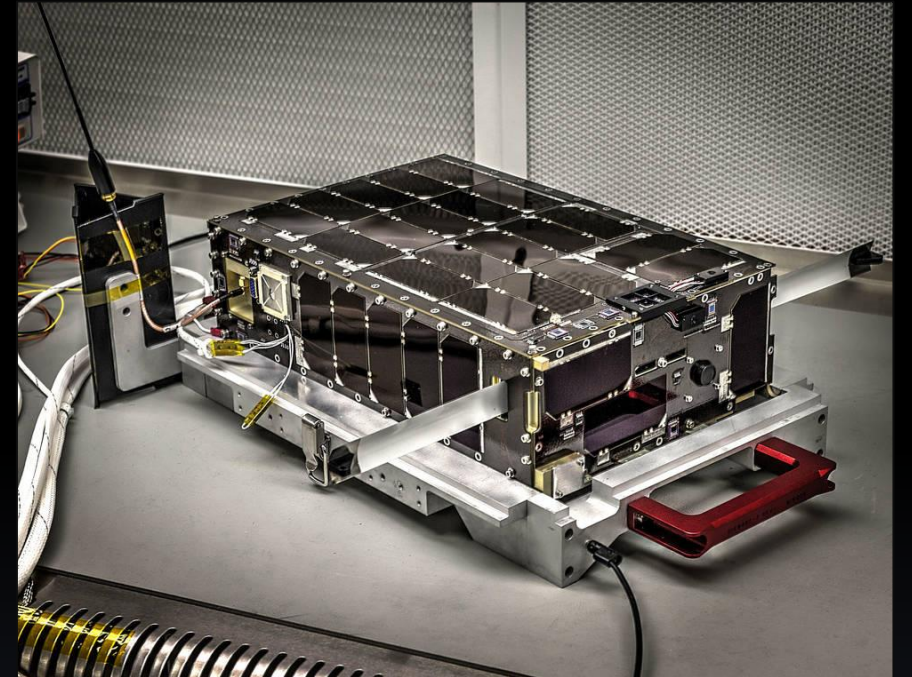


<https://www.nasa.gov/feature/goddard/2018/dellingr-the-little-cubesat-that-could>

# Digital Engineering for CubeSats

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- CubeSats provide opportunities to try out innovative concepts (technology & processes)
- Tight budgets and schedules require efficiency
- CubeSat standard could allow for re-use of similarly standardized DE tools and workflows



<https://www.nasa.gov/feature/goddard/2018/dellingr-the-little-cubesat-that-could>



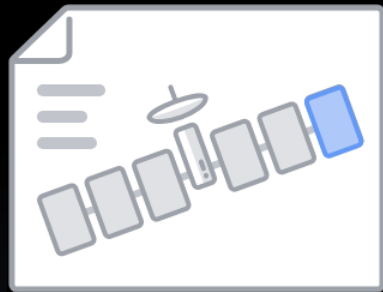


Mission  
Designer



MMS

VE



Model Development  
Kits (MDKs)



Model Management  
System (MMS)



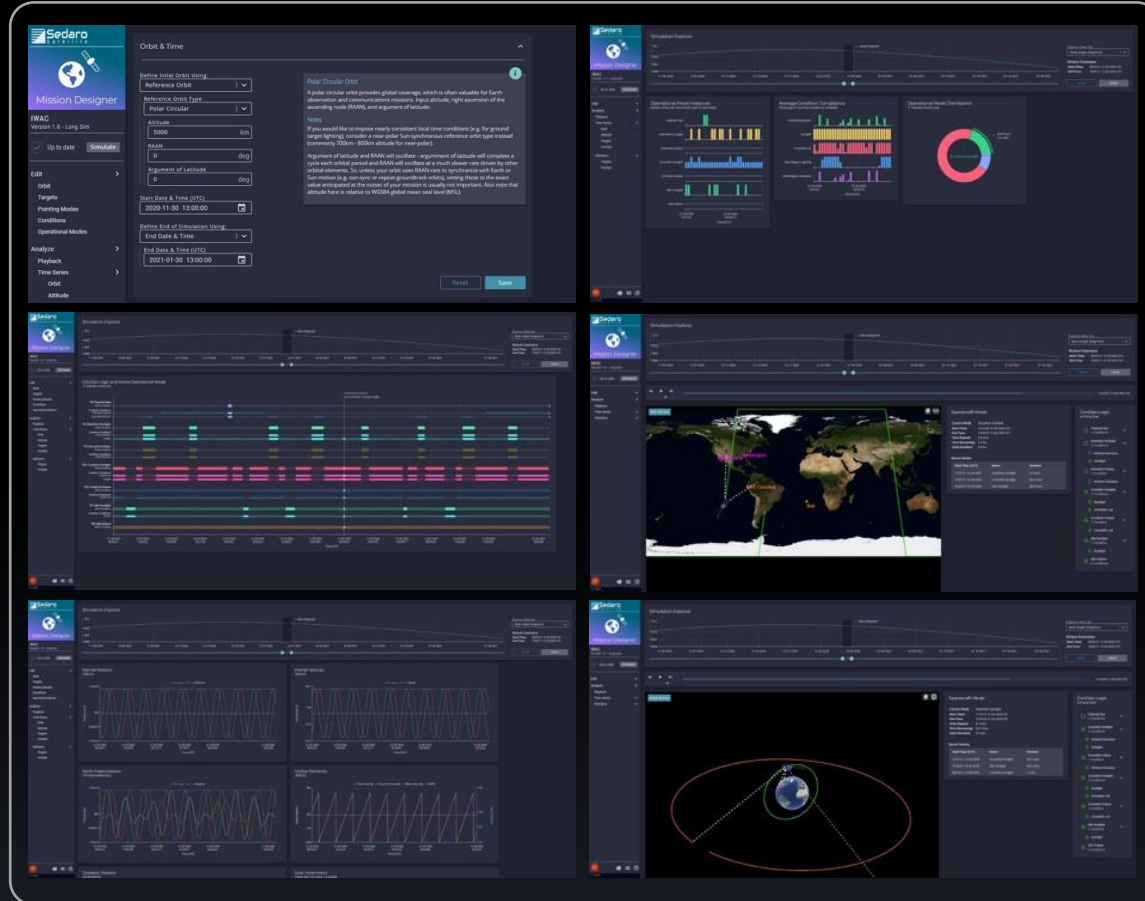
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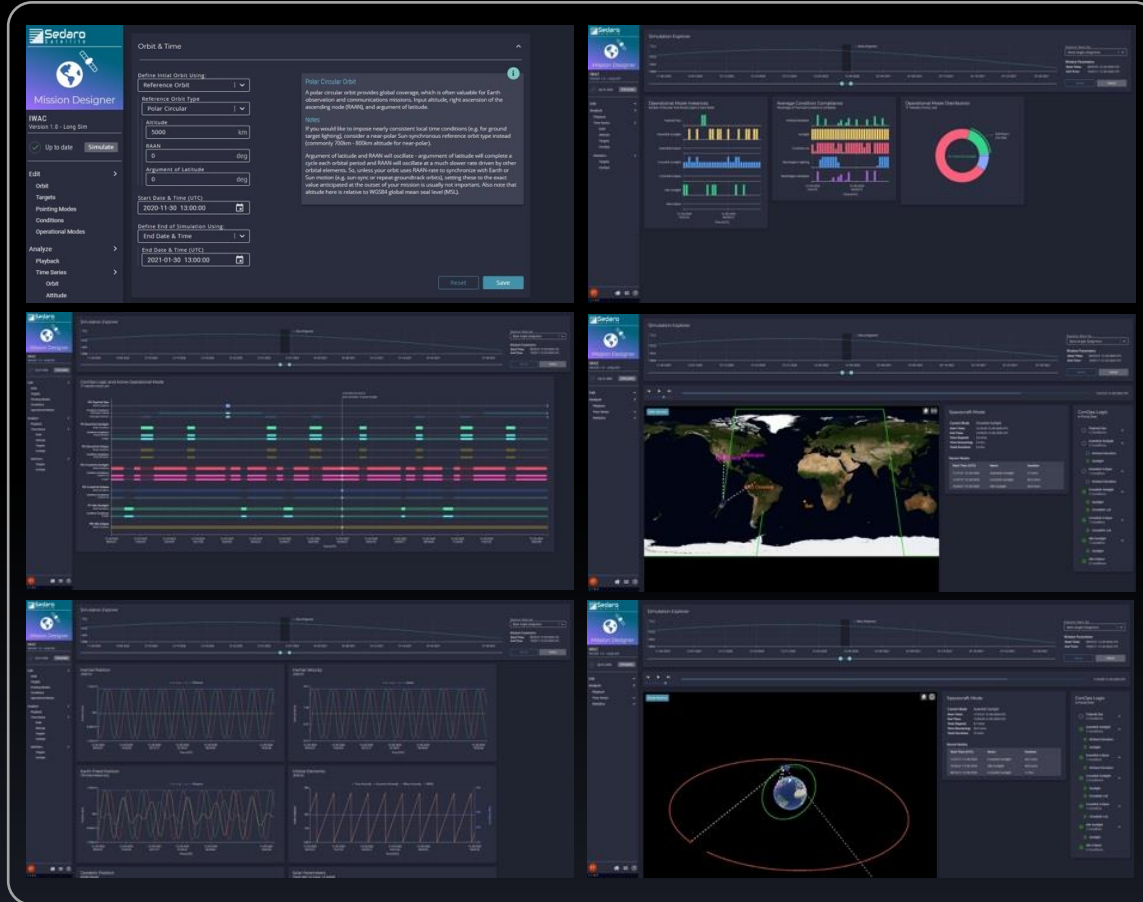
[openmbee.org](https://openmbee.org)



Mission Designer  
Orbit - Pointing - ConOps

Q2 2021





**Mission Designer**  
Orbit - Pointing - ConOps

Q2 2021



**Energy Balance**  
Solar Arrays - EPS - Battery

Q1 2022



**Attitude Control**  
Actuators - Sensors

Q1 2023



**Link and Data**  
TX - RX - Antenna

Q3 2022



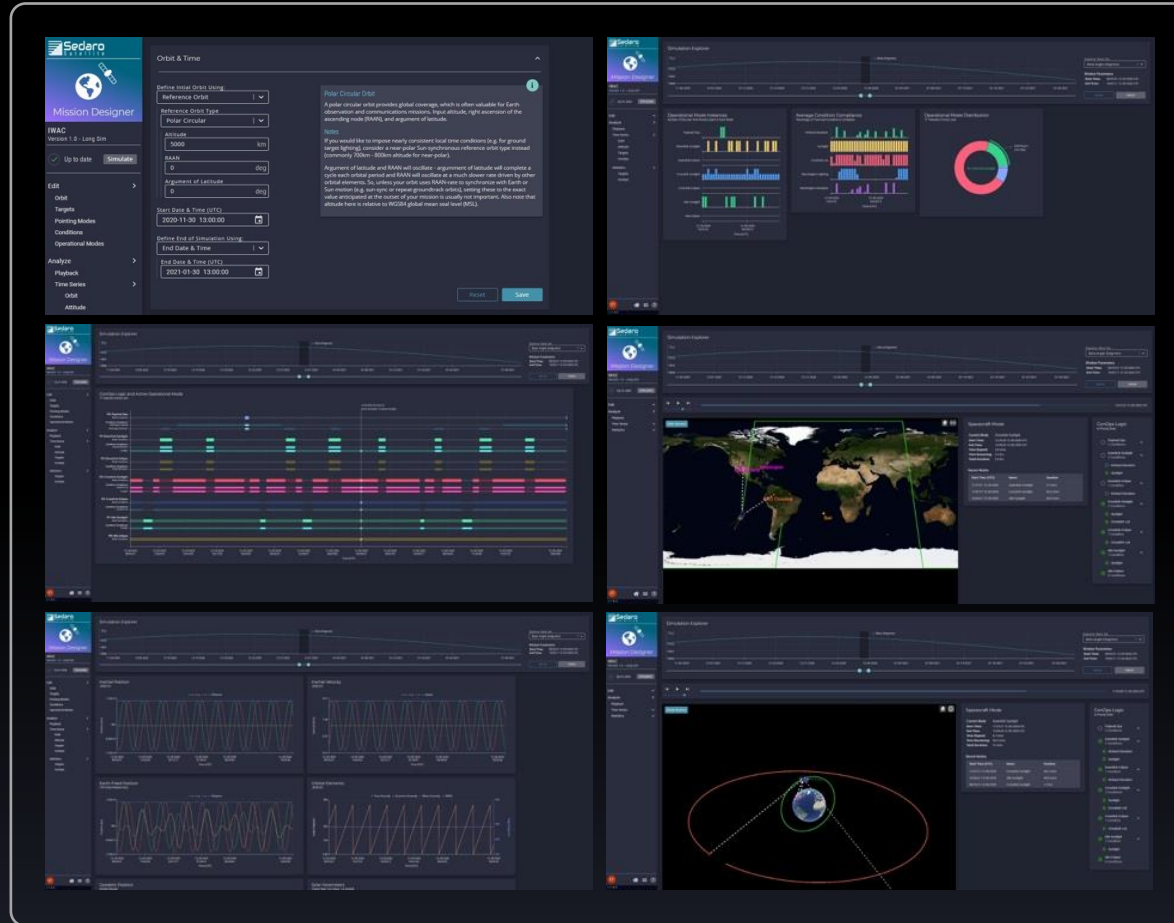
**Thermal**  
Interfaces - Materials - Control

Q1 2023



**Propulsion**  
Thrusters - Fuel - Deorbit

Q1 2023



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Q1 2023

 **Trade Study**  
Architecture Design

Q4 2023

 **Radiation**  
EEE Devices - Shielding

Q4 2023

 **Reliability**  
PMP - Redundancy

Q4 2023

## User 1: Systems Architect

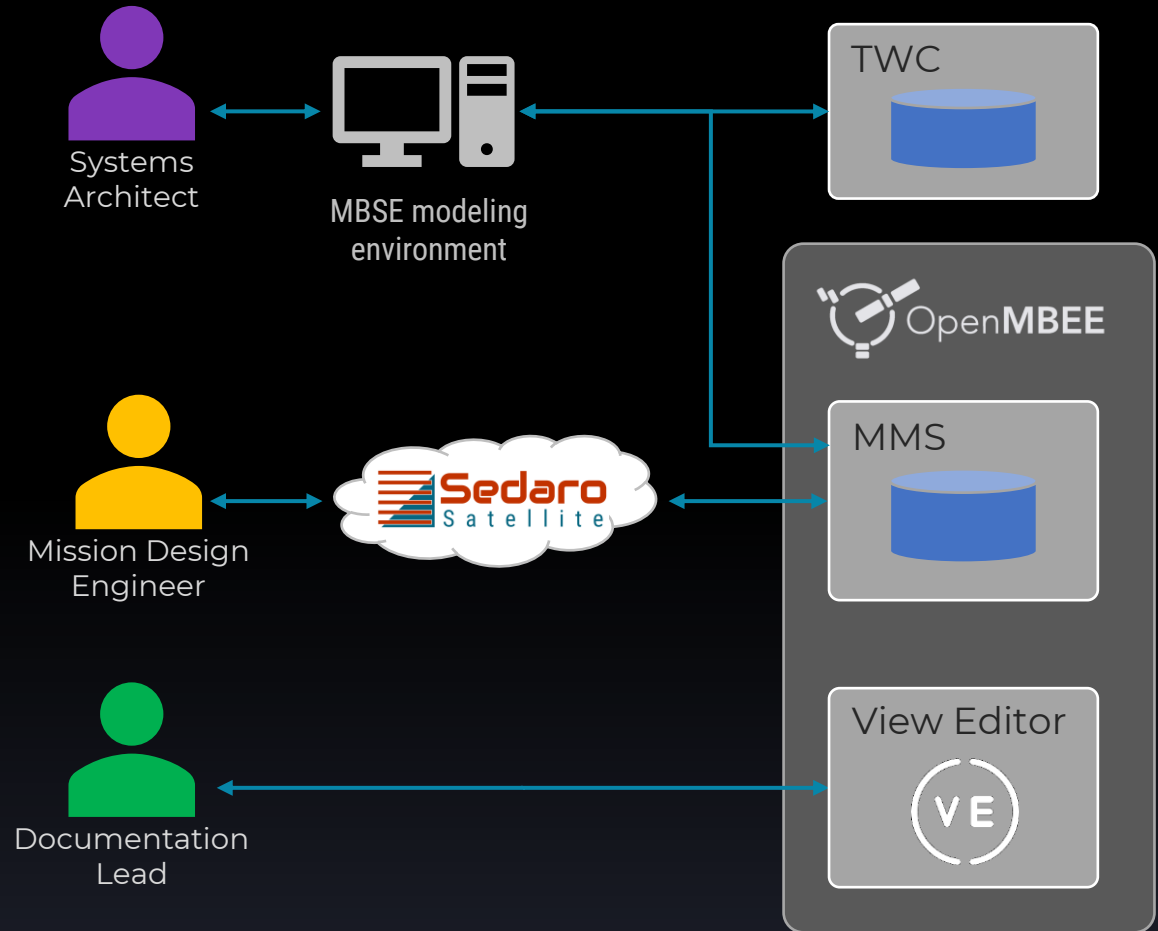
Works in Cameo Systems Modeler (CSM) to build a SysML model of the mission, incorporating blocks from the SSB package to expose value properties for Sedaro Satellite

## User 2: Mission Design Engineer

Works in Sedaro Satellite to develop a model, simulate, and refine the mission design

## User 3: Documentation Lead

Works in View Editor to create documentation that incorporates design information and simulation results from Sedaro Satellite





Accelerating the development  
of space systems

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(781) 573-3276