

## DESIGN SERVICES

# Space Vehicles and Satellites



### THE CHALLENGE

Spacecraft programs need to make critical ADCS, propulsion, sensor, and power trade-offs early, before design lock, but optimizing these trade-offs while maintaining schedule momentum is difficult. When GNC and subsystem models don't drive early design choices, teams risk discovering compromises too late. And when hardware and software integration becomes the pacing item, timing, interface, and performance gaps surface only after full system integration is already underway.



### THE SOLUTION: ACCELERATING DEVELOPMENT

▶ **TRADE FAST, CONVERGE EARLY, INTEGRATE CLEANLY**

The FLEX Embedded Software and Simulation framework and our space subsystems model library run comprehensive ADCS, propulsion, power, and sensor trades up front, keeping that exact architecture into SIL, HIL, and flight.

▶ **FLIGHT SOFTWARE BUILT ALONGSIDE THE SIMULATION, NOT AFTER IT**

GuideTech's customized GNC and flight software are developed and validated in closed-loop simulation early, so requirements and interfaces stabilize before design lock.

▶ **HARDWARE-IN-THE-LOOP EARLY TO ELIMINATE INTEGRATION SURPRISES**

Our team integrates flight software, avionics, and sensors through computer and hardware-in-the-loop tests to verify timing, I/O, and performance long before full-stack bench testing.

▶ **GNC AND FLIGHT SOFTWARE DESIGNED AROUND YOUR MISSION, NOT A TEMPLATE**

We develop GNC and autonomy tailored to your specific vehicle and concept of operations to achieve your design's maximum performance.



## APPLICATIONS

- ▶ **DESIGN OF**
  - Satellites
  - Payloads
  - Re-entry vehicles
- ▶ **REMOTE PROXIMITY OPERATIONS**



*"GuideTech has helped us turn advanced maneuver concepts into executable missions."*

*Jeff Thornburg, CEO  
Portal Space Systems*

## CORE CAPABILITIES

- ▶ **MODELING AND SIMULATION**
  - Library of high-fidelity models for typical satellite subsystems
  - N-DOF equations of motion for articulating and flexing structures
  - Multi-body support for RPO simulations
  - High-fidelity environmental modeling for solar, gravitational, aerodynamic, and magnetic disturbances
- ▶ **GUIDANCE AND NAVIGATION SOFTWARE**
  - Trajectory Planning
  - Mission Manager
  - Absolute & Relative Navigation
- ▶ **PERFORMANCE ANALYSIS AND TRACKING**

Automated test suite runs 1,000s of variations of your mission(s) nightly to track performance trends
- ▶ **FLIGHT CONTROL SOFTWARE**
  - RCS
  - Reaction Wheels
  - Magnetorquers
  - Gimballed Engines
  - Differential Thrust
  - Solar Array Alignment
  - MPPT Battery Charging
- ▶ **AVIONICS SELECTION AND INTEGRATION**
  - Our experience and quick simulation creation help you select the optimal avionics from the start
  - Embedded software for avionics integration
  - Computer-in-the-loop and hardware-in-the-loop simulations

