



Cost Effective Small Spacecraft Missions is an ARC core competency

ARC hosts for the Agency:

- Small Spacecraft Technology Program (SSTP)
- Small Spacecraft Systems Virtual Institute (S3VI)

Key interest areas:

- Vehicle & system-level autonomy
- Free-flying life and space science missions
- Multi-spacecraft missions (swarms, formations, distributed autonomy)

Major Functions/Capabilities:

Full mission lifecycle capabilities in-house

- Mission design
- Project management
- Systems engineering
- Design, development, and production at all levels – from components to complete bus
- Integration and Testing
- Mission Operations

Science & Technology Payloads

Specializing in microfluidics, life sciences, search for life, autonomy, proximity operations



Current Small Spacecraft Activities

Payload Accelerator for CubeSat Endeavors (PACE) initiative

- Links NASA's Flight Opportunities Program (FOP) and Small Spacecraft Technologies Program (SSTP) to enable rapid development of key technologies
 - V-R3X -- 3 x 1U, on orbit (launched 1/24/2021) Cross-link, ranging, and coordinated measurement technology demonstration
 - Advanced Development Project (ADP) avionics stack -- a modular, flexible, low cost, short lead time, CubeSat-oriented system
 - Intrepid payload – a highly integrated gamma / neutron particle detector

Starling

- Swarm of 4 x 6U to test multiple distributed mission technologies; Launch currently planned for ~April 2022

TechEdSat

- Agile demonstration of new technologies, incl. RF devices, AI processor, drag brake
- TES-10 – 1 x 6U (launched 2/15/2020, deployed from ISS; TES-9 – awaiting launch opportunity; TES-11 – in development

BioSentinel

- 6U deep-space mission on Artemis-1 to study effect of radiation on cellular life
- In final I&T for delivery to SLS



Cont'd

ACS3 - Advanced Composite Solar Sail System

- Solar sail deployment tech demo - 12U – with LaRC

HelioSwarm

- SMD Heliophysics Medium Explorer mission, Phase A
- Study multi-scale turbulence in the heliosphere
- ESPA hub + swarm of 8 smallsat Nodes

Distributed Spacecraft Autonomy (DSA)

- HIL/SIL Testbed for distributed autonomy capabilities

AstroBee

- IVA free-flyer on ISS for development and demonstration of software and hardware in microgravity, without space environment constraints



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