

NASA Technology:

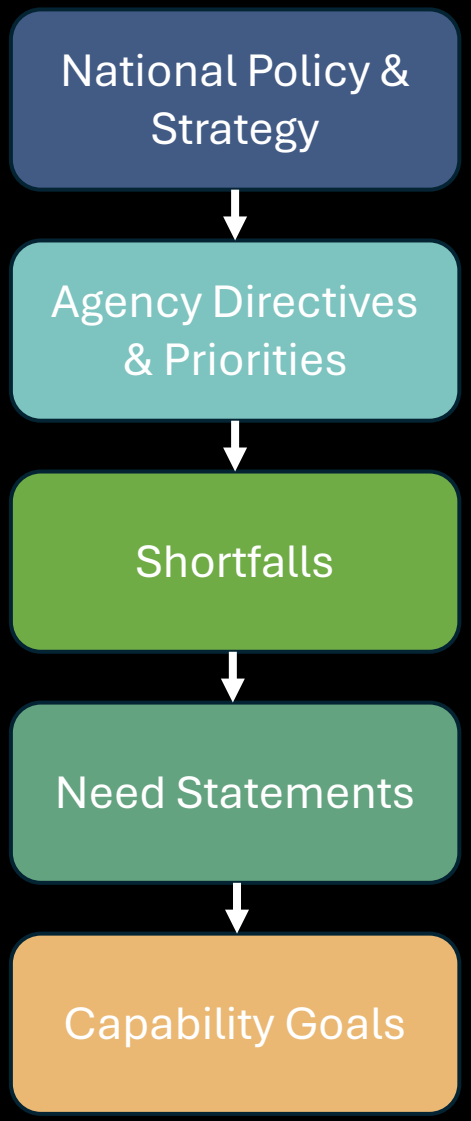
NASA Civil Space Shortfalls: Relevance to SmallSats

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OVERVIEW



Description:

Executive Orders, White House Research & Development Priorities, National Initiatives

Ignition Priorities, NASA mission needs

A technology area requiring further development to meet future exploration, science, and other mission needs.

Provide additional definition and context

A quantitative statement defining the desired future performance state of technologies in a capability area needed to address a Shortfall Need or Opportunity

Relevance to Smallsats:

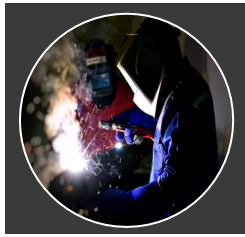
Strategic Drivers

Guide technology research and development solicitation topics, and inform investment decisions

SmallSats expand the ability to execute unique missions through rapid development and cost-effective deployment and demonstration of capabilities

COMMUNITY FEEDBACK

- **32 Shortfalls:** Broad integrated categories of needs and opportunities
- **182 Need Statements:** Subsets within the Shortfalls that provide additional definition and context



Space Community: Ranked top 15 Shortfalls



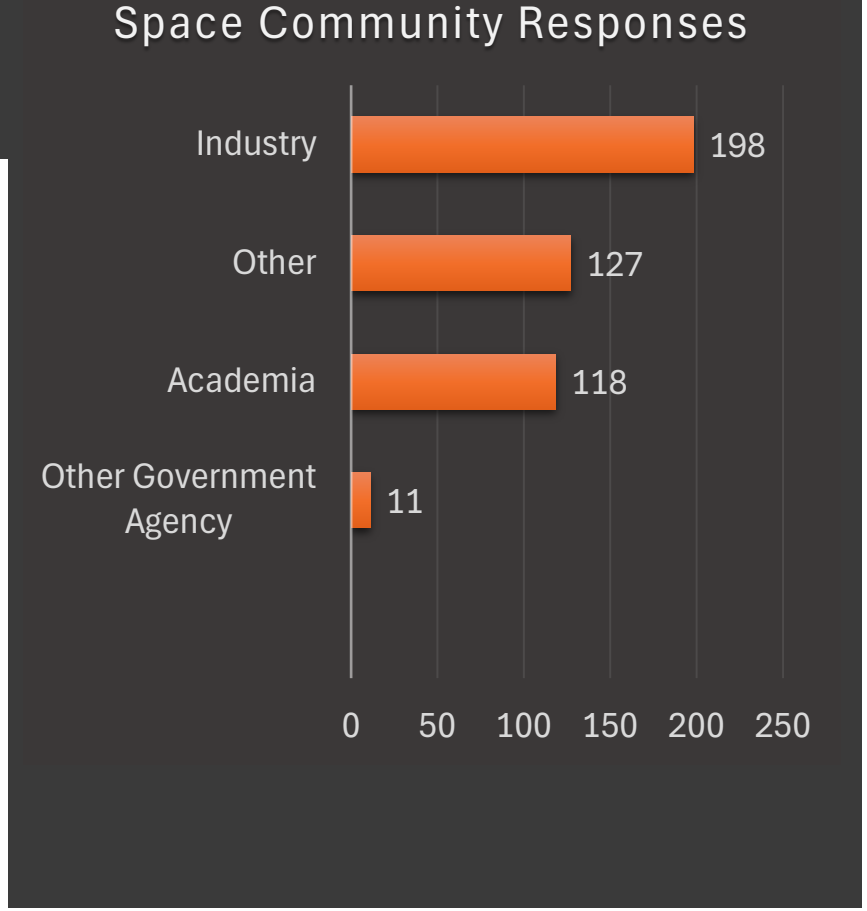
NASA Exploration: 72 ranked Need Statements derived from Architecture Definition Document



NASA Science: Provided top 19 priority Need Statements



NASA Centers: Provided top 25 priority Need Statements



Full Results:

https://www.nasa.gov/spacetechpriorities/

SHORTFALLS & NEEDS MOST RELEVANT TO SMALLSATS (in prioritized order)

Shortfalls Relevant to SmallSat Community:

SFID	Description
SF25	Provide on-board advanced computing capabilities for space operations.
SF23	Transport and maneuver uncrewed spacecraft for missions in cislunar and deep space.
SF13	Perform advanced remote sensing and science measurements with improved sensing capabilities and autonomy.
SF24	Provide tracking and navigation of crew and assets in space.
SF28	Autonomously monitor, inspect, maintain, and repair space assets.
SF32	Develop an affordable and resilient supply chain for space exploration.
SF27	Emplace and maintain large, stable space platforms and observatories.
SF14	**Perform missions with small spacecraft beyond low Earth orbit.**
SF07	Provide communication solutions to assets and crew during missions to Mars.
SF30	Reduce likelihood and consequence of impacts with in-space objects.
SF31	Provide space technology demonstration environments.
SF29	Protect Earth from destructive impacts from naturally occurring objects near Earth.
SF22	Provide a ground support infrastructure capable of supporting a launch cadence sufficient for continuous lunar access and missions to Mars.

Full Results:

https://www.nasa.gov/spacetechpriorities/

Top 20 Needs Most Relevant to SmallSat Community:

Need ID	Description
24.03	Provide autonomous orbit determination, navigation, and pointing of operating spacecraft in deep space.

Top 20-40 Needs Most Relevant to SmallSat Community:

Need ID	Description
13.09	Provide advanced networking needed for multi-spacecraft responsive space operations.
25.02	Develop space-based computing technology needed for autonomous on-board operations.
14.04	Provide reliable transportation for small spacecraft to destinations beyond cislunar space.
24.04	Extend U.S. space situational awareness capabilities to cislunar space.
24.05	Develop a lunar position, navigation, and timing architecture capable of scaling to long term operational needs.
27.01	Provide precise attitude control for ultra-stable observatories.
23.05	Provide in-space diagnostics for electric propulsion.
23.02	Provide low-cost science observations from orbits requiring continuous propulsive activity.
13.08	Autonomously perform science operations on commercial LEO destinations and lunar surface laboratories.
28.01	Implement space-based manufacturing techniques for in-situ repairs and replacement of hardware components.

SOLICITATIONS INFORMED BY SHORTFALLS & NEEDS



Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR) Program



Tipping Points/ Announcements of Collaborative Opportunities (TP/ACO)



Space Tech Research Grants (STRG)



Prizes, Challenges & Crowdsourcing (PCC)



Flight Opportunities


Help us turn this vision into reality!
Ask us questions at the NASA Disruptive Technology booth
See Christopher Baker's "Future Directions" presentation
10:45-11:10am Tuesday for more in-depth coverage