NASA Small Spacecraft Systems Virtual Institute: An Overview and Future Plans

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Craig D. Burkhard

Deputy Director, Small Spacecraft Systems Virtual Institute

www.nasa.gov/smallsat-institute

S3VI Mission Statement

National Aeronautics and Space Administration

- Advance clear communications and coordination regarding small spacecraft activities across NASA.
- Provide the US smallsat research community with access to mission enabling information.
- Maintain engagement with small spacecraft stakeholders in industry, government and academia. Support the overall small spacecraft community.

S3VI is a NASA-wide virtual institute managed at NASA Ames Research Center, with participation from HQ, LaRC, GSFC, JPL, MSFC, and GRC.

S3VI is jointly sponsored by NASA's Space Technology Mission Directorate (STMD) and the Science Mission Directorate (SMD).

Major Activity Areas

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- Strategic Communications, Coordination, and Outreach

  Increase overall awareness of programs, opportunities and activities across NASA, coordinate messaging for small spacecraft activities and future plans

- The Small Spacecraft Body of Knowledge (SSBoK)

  Collect and disseminate best practices, capture technology information and data for small spacecraft community and publish the State of the Art (SoA) of Small Spacecraft Technology Report

- Special Studies

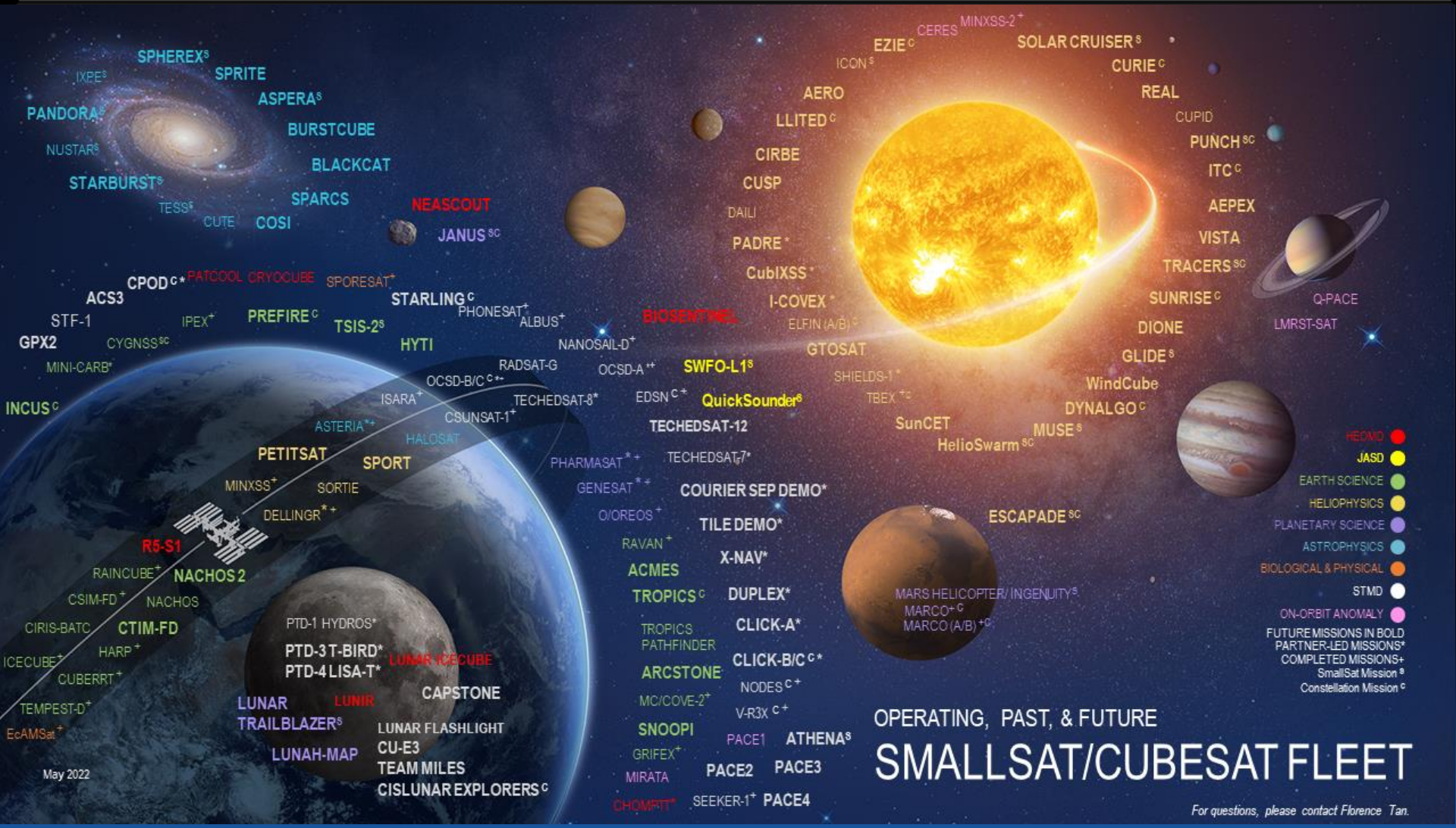
  Facilitate or execute special studies to inform, assist, or educate stakeholders

- Support to the NASA Small Spacecraft Coordination Group (SSCG)

  Support SSCG meetings, serve as liaison with OGAs, conduct external workshops and public events, co-author papers and presentations, serve on solicitations panels and reviews

NASA SmallSat/CubeSat Fleet

National Aeronautics and Space Administration



Small Satellite Information Search

National Aeronautics and Space Administration

https://s3vi.ndc.nasa.gov/

Search small satellite information...

Select Source(s)

NASA's Small Spacecraft Systems Virtual Institute (S3VI) uses web technologies, databases, and virtual collaboration tools to collect, organize, and disseminate small spacecraft knowledge for the benefit of NASA and the community. S3VI has established this federated search capability that serves as an entry point to the SmallSat Parts On Orbit Now (SPOON) database and other NASA-internal and external databases to allow the public to search multiple databases for small spacecraft parts, technologies and conference proceedings. Currently, S3VI's federated databases consist of: the NASA Technology Portfolio System (TechPort), the NASA Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) Program, the NASA Electronic Parts and Packaging (NEPP), satsearch, PMPedia, Small Satellite Conference Proceedings, CubeSat Developers Workshop Proceedings, Inter-Planetary Small Satellite Conference Proceedings and NASA's CubeSat Launch Initiative.

https://s3vi.ndc.nasa.gov/

Small Satellite Information Search

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Source	Type of Content
Federated/Common Search	The federated search capability serves as an entry point to NASA-internal and external databases to allow the public to search multiple databases for small spacecraft parts, technologies and conference proceedings.
NASA TechPort	Technical project information for the novel and crosscutting activities that are taking place across NASA
NEPP Radiation Parts and Publications	This database contains NASA Goddard Space Flight Center test reports on radiation tested electronics.
SmallSat Parts On Orbit Now (SPOON)	Small spacecraft parts and technologies that have achieved technology readiness level (TRL) 5 or more
Satsearch Database	Space products & services from global suppliers, including a myriad of small satellite components, subsystems, and platforms.
PMPedia (The Aerospace Corporation Database)	Collection of EEE (Electrical, Electronic, Electromechanical) non-space grade components with relevance to space applications.
NASA Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) Program	Proposals that were awarded to small U.S. high technology companies and research institutions that participated in government-sponsored research and development (R&D) efforts in key technology areas needed by the agency and also have significant potential for successful commercialization.
Small Satellite Conference Proceedings	Conference proceedings presented at each of the Annual Small Satellite Conferences held in Logan, Utah from 1987 through 2021
CubeSat Developers Workshop Proceedings	Proceedings presented over the past fifteen years at each of the CubeSat Developers Workshops held in San Luis Obispo, CA
Interplanetary Small Satellite Conference Proceedings	Proceedings presented over the past seven years
NASA's CubeSat Launch Initative (CSLI) Reports	Final reports and publication lists for the small satellite payloads built by educational institutions, nonprofit organizations, and NASA Centers and programs that flew on past launches.

Community of Practice

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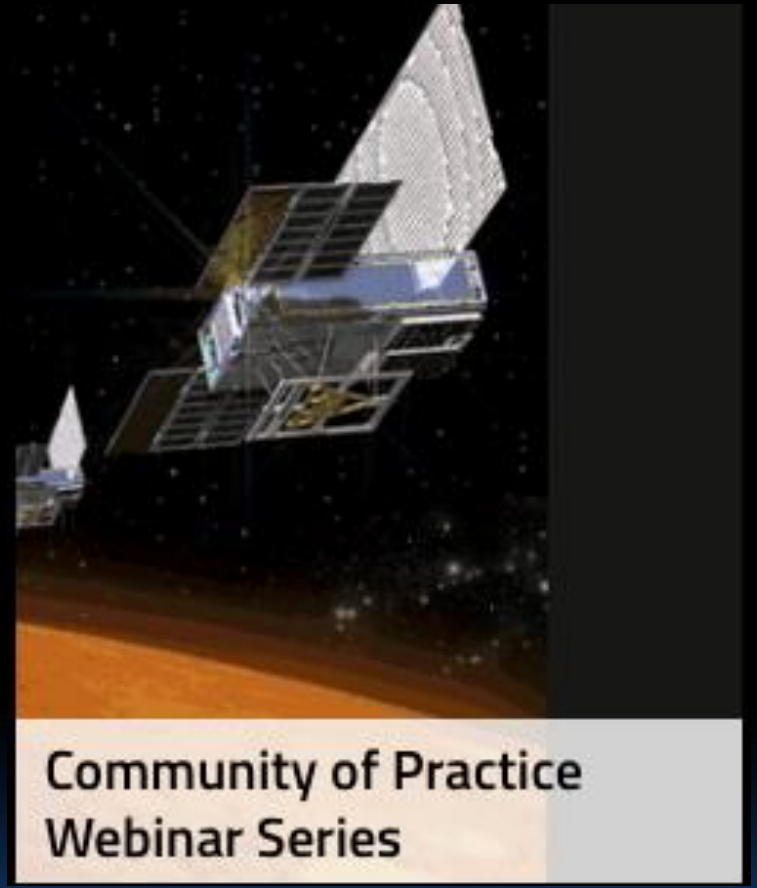

Lessons Learned and Mission Accomplished Webinars by leading experts

Space Mission Design Tools

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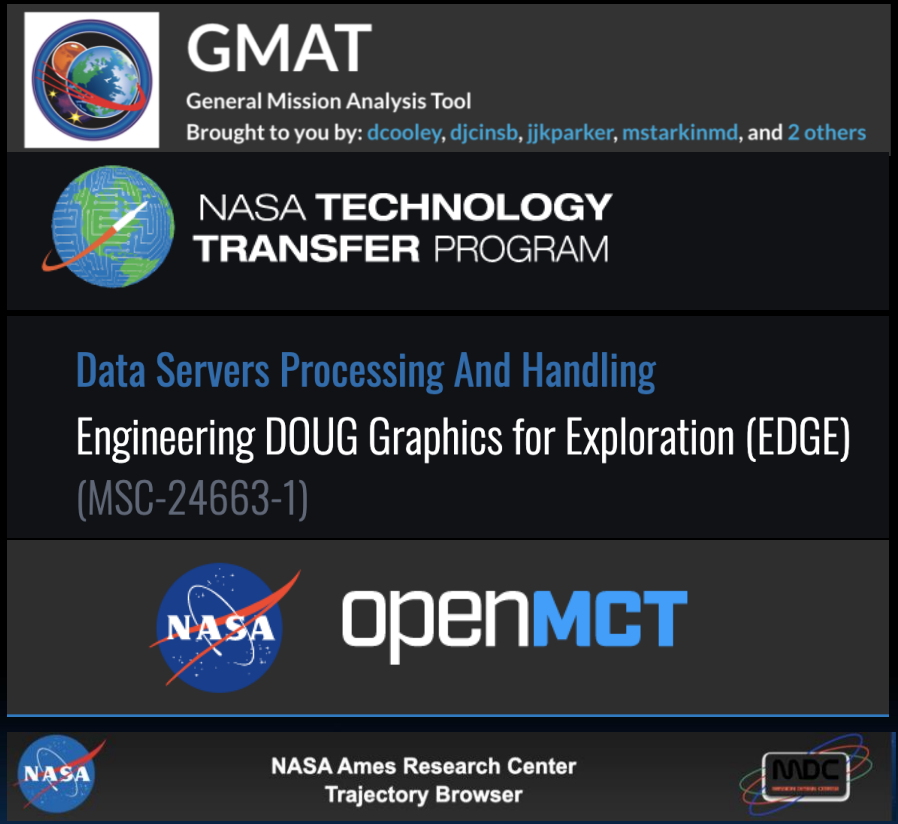

The S3VI lists software tools found useful in the development of small spacecraft missions. The list is restricted to publicly available software from NASA or the Open Source community.

Design tool categories include:

- Small Spacecraft Avionics
- Guidance, Navigation, and Control
- Satellite Constellation Remote Sensing
- Trajectory Design and Optimization Tools
- Mission Operations Software
- Project Cost Estimation
- Radiation Analysis
- Graphics Rendering
- NASA Tech Transfer Program: Software in 15 different space project categories

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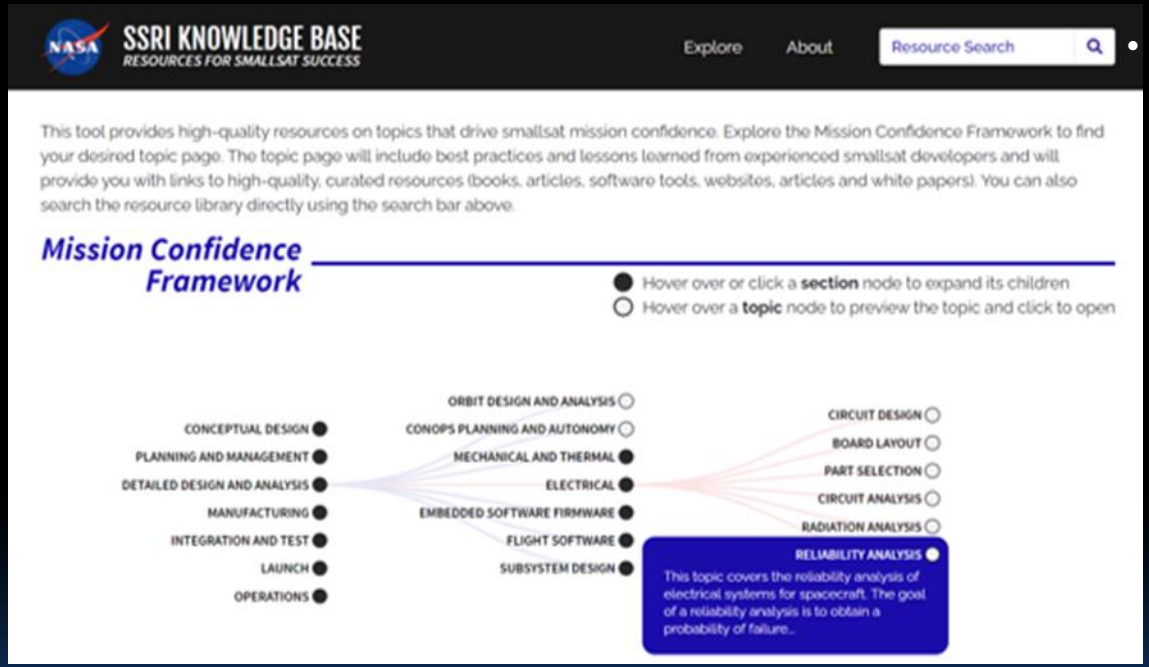
Small Spacecraft Body of Knowledge
Small Spacecraft Reliability Initiative (SSRI) Knowledge Base



https://s3vi.ndc.nasa.gov/ssri-kb/

- Leverage knowledge from the SmallSat Community
- Free, publicly available tool targeting SmallSat mission successes
- Go-to starting place for information on a broad range of topics

2022 Enhancements:

- Expanded content: additional 58 topic pages and 533 unique resource items
- Application Programming Interface (API): to allow access from other software programs and websites
- Improved interfaces for user Inputs

S3VI will increase awareness of the Knowledge Base through training sessions, side bar meetings and papers/presentations at various small satellite conferences

SmallSat State of the Art Report

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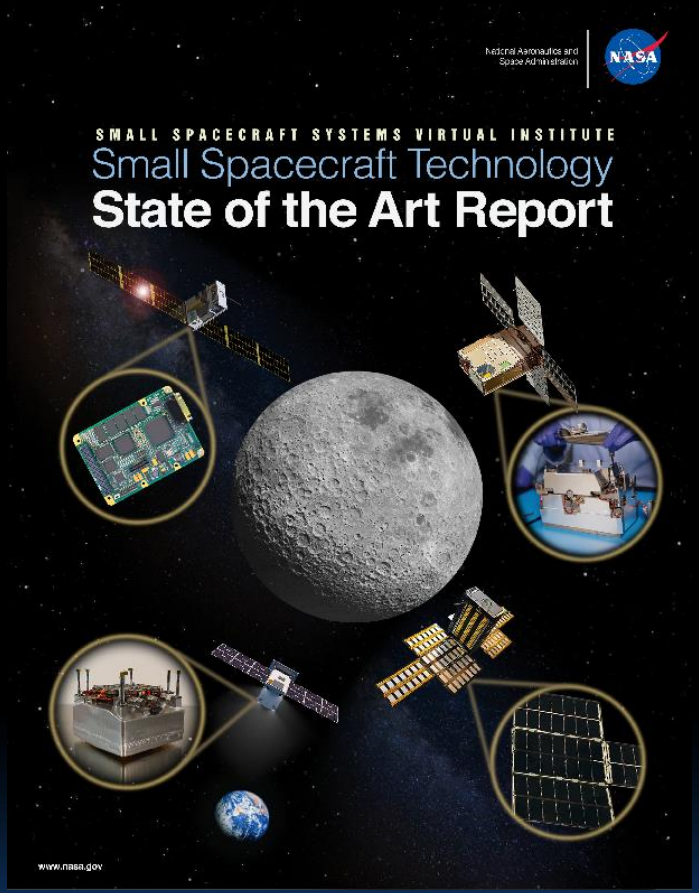

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Contents

Information collected and reviewed by NASA experts, updated annually

Quarterly Newsletter

National Aeronautics and Space Administration

Small Spacecraft Systems Virtual Institute
A Quarterly Brief of NASA's Small Spacecraft Community Resources

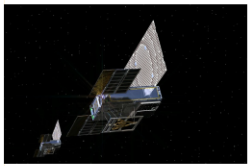
In This Issue - August 2021

Upcoming! • Small Spacecraft Reliability Initiative Knowledge Base Tool Update • NASA at the 2021 Small Satellite Conference • Community of Practice Webinar Series Schedule • New Mission Design Tool • Around the Agency • Recent NASA Launches

Upcoming Events & Releases

- August 9: NASA Town Hall at the 2021 Small Satellite Conference
- August 17: SSRI Knowledge Base Tool Demonstration and Community Feedback Discussions (abstract to be posted)
- August 18: Community of Practice Webinar - Integrated Microfluidic Bioanalytical Systems for CubeSats: Growing and Monitoring Microbial Cultures in Outer Space
- September 7: 23rd Annual Small Payload Ride Share Symposium - Session 1
- September 21: 23rd Annual Small Payload Ride Share Symposium - Session 2
- October 5: 23rd Annual Small Payload Ride Share Symposium - Session 3
- October 19: 23rd Annual Small Payload Ride Share Symposium - Session 4
- Early Fall: 2021 NASA Small Spacecraft Technology State of the Art Report release
- Fall: 2021 NASA Small Spacecraft Forum Report release

NASA's SSRI Knowledge Base Tool Adds 24 New Topic Pages and Resources!



SSRI Knowledge Base Tool

The Small Spacecraft Reliability Initiative (SSRI) Knowledge Base is a comprehensive and searchable online tool that consolidates and organizes resources, best practices, and lessons learned from previous small satellite missions. 24 new topics pages were added in July 2021. Read more.

Community Engagement

NASA at the 2021 Small Satellite Conference

NASA Participation Guide

Small Spacecraft Systems Virtual Institute
A Quarterly Brief of NASA's Small Spacecraft Community Resources

From the Director's Desk

Welcome to the Fourth Edition of the Small Spacecraft Systems Virtual Institute (S3VI) Resource Brief!

March 11th marked the one-year anniversary of the California Bay Area's original shelter in place order. NASA's Ames Research Center, located in the Bay Area and the resident center of the Small Spacecraft Systems Virtual Institute, instituted mandatory telework orders to all but essential personnel and as of this writing, remains in mandatory telework status with only mission-critical staff allowed access. Read more

Upcoming Events and New Postings

NASA's Small Spacecraft Reliability Initiative (SSRI) Knowledge Base is Released!

The SSRI Knowledge Base is a comprehensive and searchable online tool that consolidates and organizes resources, best practices, and lessons learned from previous NASA, other government agencies, and academic small satellite missions. This free, publicly available tool is released and is available to the entire SmallSat community.

Read More and Access the Tool

Join us for the April 2021 Community of Practice Webinar

Opportunities for SmallSat Missions with the New Near Space Network

by
LaNetra Tate, Ph.D.
NASA Goddard Space Flight Center

Wednesday, April 21
10:00AM-11:00AM PDT

Bookmark the Monthly Webinar Schedule for Recorded and Upcoming Webinars

Small Spacecraft Systems Virtual Institute
A Quarterly Brief of NASA's Small Spacecraft Community Resources

From the Director's Desk

Welcome to the second edition of the Small Spacecraft Systems Virtual Institute (S3VI) Resource Brief!

Like much of the aerospace industry, the small spacecraft community shares in the challenges brought about by the COVID-19 pandemic. Supply chains, development and launch schedules have all experienced impacts over the past several months. By now, hopefully more project teams are returning to the lab armed with the social distancing protocols that are now the new normal everywhere. Read more

Upcoming Events and New Postings

Attend NASA's Live and Pre-recorded Activities at the 2020 Small Satellite Conference August 1-6, 2020

SmallSat2020 Registration Required

NASA Live Side Meetings - Aug 3
- Intro to Radiation Effects
- NASA Town Hall
- R-GENTIC: Webtool Walk-Through

NASA Pre-recorded Activities
NASA Short Talks August 1-6
NASA Exhibits August 1-6

Publication of the 2020 Small Spacecraft Technology State of the Art Report is Expected in September!

Coverage includes:

- Complete Spacecraft
- Power & Propulsion
- Guidance Navigation & Control
- Structures, Materials & Mechanisms
- Thermal Control
- Command & Data Handling
- Communications
- Integration
- Launch & Deployment
- Ground Data Systems & Operations
- Passive Deorbit Devices
- Flight Software

The S3VI Newsletter is released quarterly to a distribution of ~7500 contacts

S3VI Web Portal Redesign

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The Small Spacecraft Systems Virtual Institute is launching an effort to re-design and update its web portal (https://www.nasa.gov/smallsat-institute) to better support the overall small spacecraft community through communication and coordination of small spacecraft activities via its web presence. Input from the community on how we might improve the web portal is welcome. As you think about the type of input you would like to offer, please consider the following questions.

- What information about small spacecraft is hard for you to find or obtain? Or that you wish was easier to find or obtain?
- How do you currently keep up to date on small spacecraft developments?
- What websites do you currently visit when seeking small spacecraft information?
- Are you subscribed to any websites, newsletters, RSS feeds, or other s sources of small spacecraft information that "push" information to you?
- What is your impression of the Small Spacecraft Systems Virtual Institute (S3VI) web portal site?
- What information would you expect or hope to find on the Small Spacecraft Systems Virtual Institute site?
- Any additional thoughts or comments?

Please email us at

agency-smallsat-institute@mail.nasa.gov

with your input

Questions

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FLEET CHART

INFORMATION SEARCH

2021 SMALLSAT STATE OF THE ART

SSRI KNOWLEDGE BASE TOOL

COMMUNITY OF PRACTICE WEBINAR

S3VI QUARTERLY NEWSLETTER