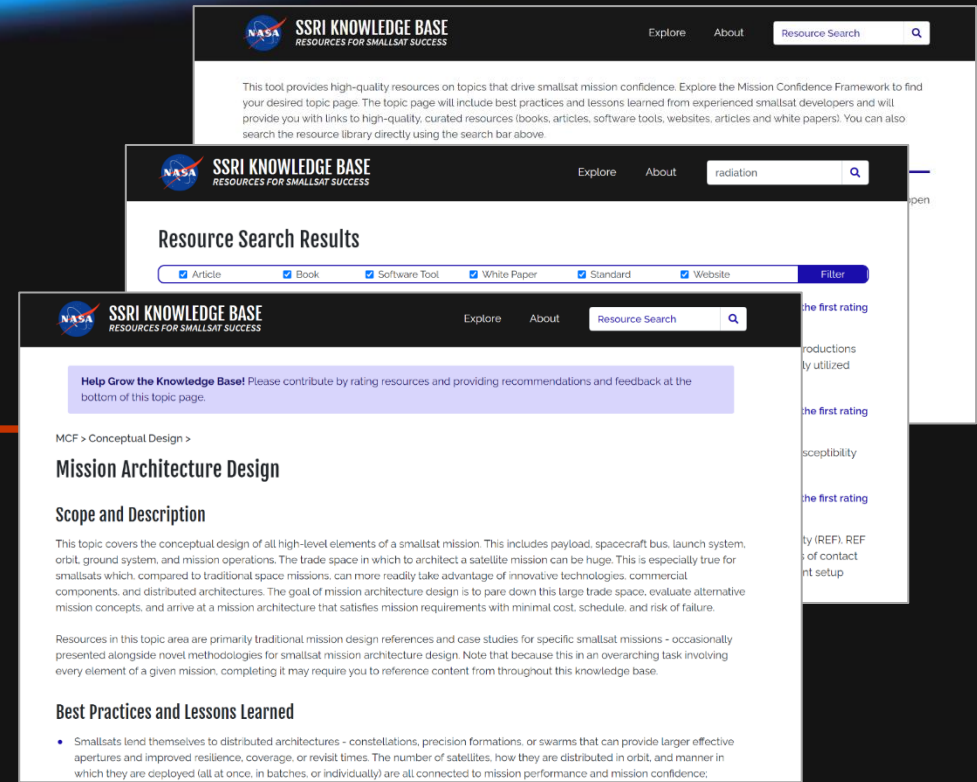


The SSRI Knowledge Base Tool: An Update and Future Plans

Small Satellite Conference
August 7-12, 2021

The Small Satellite Reliability Initiative Team
Presented by Michael Johnson/ NASA Goddard Space Flight
Center



SSRI KNOWLEDGE BASE
RESOURCES FOR SMALLSAT SUCCESS

Explore About Resource Search

This tool provides high-quality resources on topics that drive smallsat mission confidence. Explore the Mission Confidence Framework to find your desired topic page. The topic page will include best practices and lessons learned from experienced smallsat developers and will provide you with links to high-quality, curated resources (books, articles, software tools, websites, articles and white papers). You can also search the resource library directly using the search bar above.

SSRI KNOWLEDGE BASE
RESOURCES FOR SMALLSAT SUCCESS

Explore About radiation

Resource Search Results

Article Book Software Tool White Paper Standard Website Filter

SSRI KNOWLEDGE BASE
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Explore About Resource Search

Help Grow the Knowledge Base! Please contribute by rating resources and providing recommendations and feedback at the bottom of this topic page.

MCF > Conceptual Design >

Mission Architecture Design

Scope and Description

This topic covers the conceptual design of all high-level elements of a smallsat mission. This includes payload, spacecraft bus, launch system, orbit, ground system, and mission operations. The trade space in which to architect a satellite mission can be huge. This is especially true for smallsats which, compared to traditional space missions, can more readily take advantage of innovative technologies, commercial components, and distributed architectures. The goal of mission architecture design is to pare down this large trade space, evaluate alternative mission concepts, and arrive at a mission architecture that satisfies mission requirements with minimal cost, schedule, and risk of failure.

Resources in this topic area are primarily traditional mission design references and case studies for specific smallsat missions - occasionally presented alongside novel methodologies for smallsat mission architecture design. Note that because this is an overarching task involving every element of a given mission, completing it may require you to reference content from throughout this knowledge base.

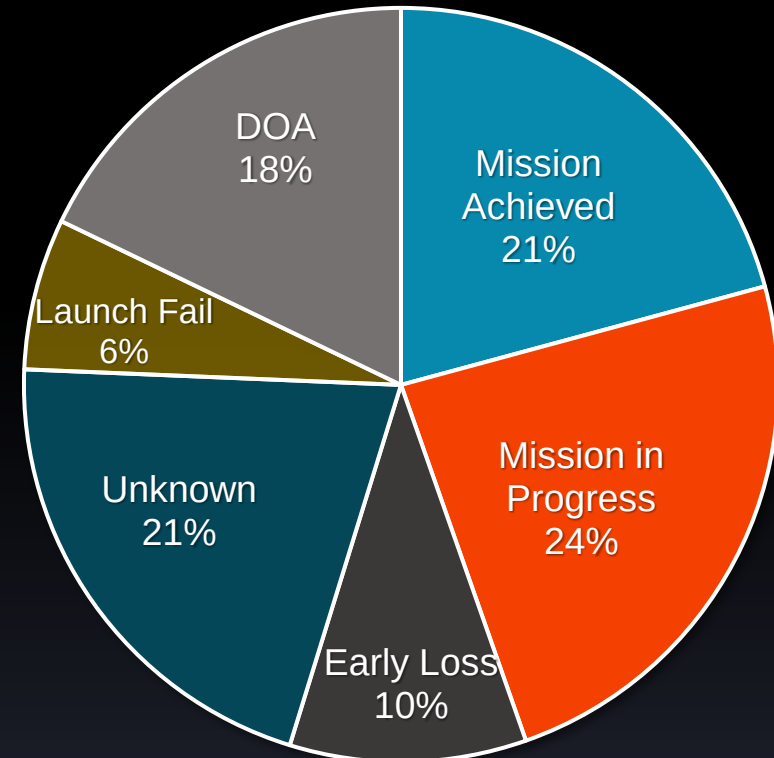
Best Practices and Lessons Learned

- Smallsats lend themselves to distributed architectures - constellations, precision formations, or swarms that can provide larger effective apertures and improved resilience, coverage, or revisit times. The number of satellites, how they are distributed in orbit, and manner in which they are deployed (all at once, in batches, or individually) are all connected to mission performance and mission confidence.

The Problems

- Too many small satellite missions fail
- Systems and processes used for large/heritage missions are not necessarily appropriate for SmallSat missions
- Constant change and innovation to keep up with

CubeSat Mission Status
2000-2020



Data from M. Swartwout
<https://sites.google.com/a/slu.edu/swartwout/home/cubesat-database>

Our Approach: Wikipedia for SmallSats

Strengths of Wikipedia



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

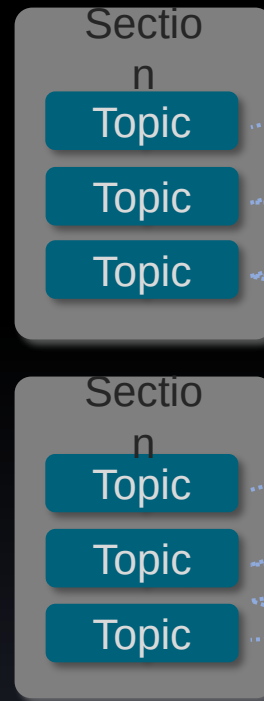
Final moderation by the SSRI, not the user community. Tool is accessible at:

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

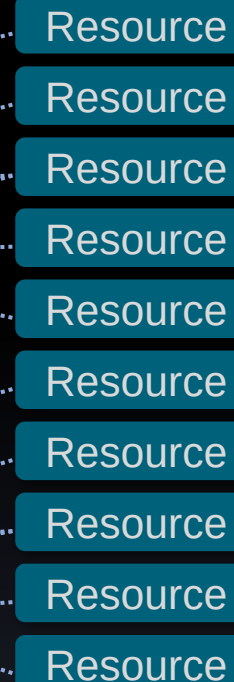
Structure

Mission Confidence Framework

- Order, structure, context
- Best practices & lessons learned
- User interfaces for submitting feedback and recommendations



Resource Library



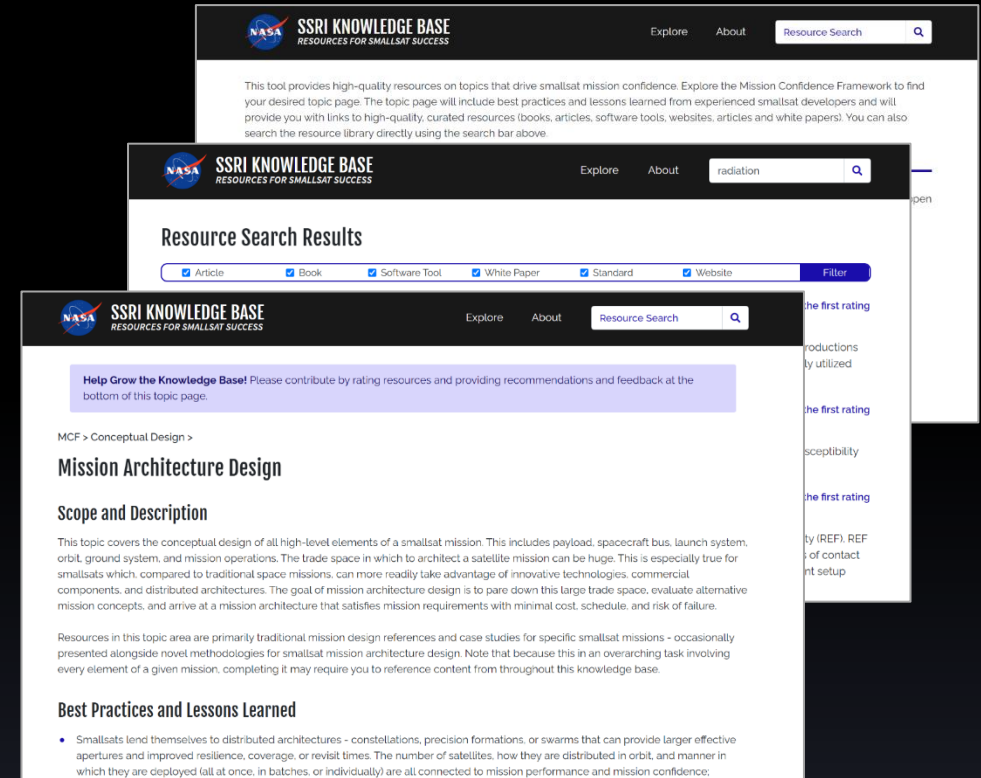
- Third-party content
 - Articles, books, software tools, white papers, standards, and websites
- Access to resource
- SmallSat context
- Ratings

The SSRI Knowledge Base: <https://s3vi.ndc.nasa.gov/ssri-kb/>

The Solution: Wikipedia for SmallSats

Coming Enhancements

- Expanded content- additional 18 topic pages and 180 unique resource items
- Application Programming Interface- to allow access from other software programs & websites
- Improved interfaces for user input





Try out the SSRI Knowledge Base at:

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

Have questions? Want to get involved?

Catherine Venturini/ The Aerospace Corporation

Craig Burkhard/ NASA

Bruce Yost/NASA

Michael Johnson/ NASA

Special thanks to Robbie Robertson/ Sedaro Technologies

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