CURRENT PROGRAMS TAKE A STEP-WISE APPROACH TO VARIOUS PHASES OF SPACE MISSIONS THAT MAY LEAD TO INCONSISTENCIES BETWEEN CONCEPTUAL DEVELOPMENT, DESIGN, ASSEMBLY, INTEGRATION, TESTING, AND OPERATIONS. THIS SUBTOPIC SEeks TO INTEGRATE THESE PHASES BY PROVIDING A CONSISTENT SOFTWARE/HARDWARE ENVIRONMENT FOR SPACECRAFT DEVELOPMENT TO OPERATIONS. EXTENSIBLE/MODULAR, STANDARDS-BASED, AND COTS SOLUTIONS FOR SOFTWARE AND HARDWARE TO IMPROVE TRANSITION THROUGH THE VARIOUS PHASES, ESPECIALLY TRANSITION TO OPERATIONS, IS HIGHLY ENCOURAGED.

ONE OF THE POTENTIAL BENEFITS OF SMALL SPACECRAFT MISSIONS IS TRANSFORMATION OF THE PAYLOAD INTEGRATION PROCESS. TRADITIONALLY PAYLOADS AND EXPERIMENTS WERE DELIVERED TO PAYLOAD INTEGRATION FACILITIES THAT WERE GEOGRAPHICALLY CLOSE TO THE LAUNCH SITE.

THIS SUBTOPIC IS LOOKING FOR WAYS TO STREAMLINE THIS PROCESS BY REDUCING THE NEED FOR THIS ACTIVITY TO BE CARRIED OUT TO CLOSE PROXIMITY TO THE LAUNCH SITE. THIS WILL RESULT IN INTEGRATION OCCURRING AT HOME FACILITIES AND REDUCED LEAD TIMES DUE TO A DECREASE IN ASSOCIATED PLANNING ACTIVITIES.

SIMILARLY, TO FACILITATE INTEGRATION OF SPACECRAFT SUBSYSTEMS WHEN USING COTS PRODUCTS FROM MULTIPLE VENDORS, INTEGRATION OF THE SPACECRAFT SUBSYSTEMS THEMSELVES COULD BENEFIT FROM THE EARLY USE OF FLEXIBLE-STANDARD SMART INTERFACING HARDWARE THAT CAN AC commodate an array of interface standards including Ethernet, Spacewire™, USB 2.0, RS-422, and I2C.

THIS SUBTOPIC IS SEEKING PROPOSALS IN THE FOLLOWING, BUT NOT LIMITED, AREAS:
- Automated test equipment / automated Breakout boxes;
- Testing of subsystems in geographically distributed locations;
- Standardized interfaces with launch vehicles with frequent launch opportunities.

Phase 1 - Research should demonstrate the technical feasibility of systems-level approach to streamlining processes while simultaneously improving program consistency, repeatability, improved testing, and lower cost. Additionally, the scope of Phase 1 includes identification and evaluation of these alternative subsystem integration, test, and payload processing architectures, as well as the associated payload accommodations hardware and technologies that might be required. Commercial applicability should be addressed.

Phase 2 - Emphasis should be placed on developing and demonstrating the technology under test conditions based on emerging nanosat and small launch vehicles now in development or integration with secondary and tertiary payload launch opportunities. Additionally, a path should be outlined that shows how the technology could be commercialized or further developed into space-worthy systems. When applicable, researchers should deliver a demonstration unit for testing at the completion of the Phase 2 contract.