In-Space Structural Assembly and Construction

Specific Research Objectives include:

- Innovative connection approaches/architectures that enable on-orbit geometry adaptation. Areas of interest include structural connections, electrical connections, fluid connections, thermal connections or combinations of these.
- Methods for in-situ connection verification (smart joints).
- Innovative reversible joining systems for robotic operations that minimize mass, energy and complexity while maximizing assembled stiffness, strength, stability, heat transfer, power density, etc.

Application orbits include LEO/GEO/Lunar. Nominal mechanical joining requirements are:

- Class 1: Structural Truss Joints.
  - Strength: 100N to 500N axial target
• Class 2: Module Joints.
  ▪ Strength: > 0.4 g (Mars Extensible) with 0.25 meter cubic module connected on one face
    with uniform density of 640 Kg/m3.
• Current from milliamp to amps per contact.
  ▪ Voltage 28 to 100V DC
• Assembly/Disassembly: 20-50 times.

References:

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  Verhey Timothy R.; Chato, David J.; Saucillo, Rudolf J.; Blue, Douglas R.; and Carey, David: “Orbital
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