4.11 Hybrid Inflatable Pressure Vessels

Statement: A technology for inflatable pressure vessels with varied applications.

Technology description: The innovations include an inflatable pressure vessel restraint layer design algorithm for building any shape or size inflatable module and an enhanced design for an inflatable shell vessel that interfaces with rigid structures with a simulation software that predicts and analyzes loads and elongations on these interfaces. The innovation allows for high-strength inflatable modules that have tension strength exceeding 4,000 kg for every 25 mm-wide strap. Another design takes into consideration the distance between inflatable and rigid connections such as a window and minimizes them by reducing the number of unattached restraint layer straps. With this new configuration the transfer of force moments at the interface between the inflatable structure and the rigid structure are eliminated. Overall, a stronger more resistant inflatable module with a simpler design and fewer parts is made possible.

Benefits of the product: This technology offers several benefits:

- Effective: Allows successful design and fabrication of hybrid inflatable vessels.
- Cost-Effective: Minimizes the number of unattached and unwoven straps.
- Secure: Prevents protrusion of the inflated bladder by eliminating gaps.

Areas of application: Inflatable temporary volumes could be used for emergency applications and at construction sites:

- Hospitals.
- Command posts.
- Hangars for storage.
- Construction sites.