+ Home

Welcome

+ Fabrication Technologies
+ Repair & NDE Technologies
+ Technologies Archive

Choose another element:
+ ISRU
+ LOCAD

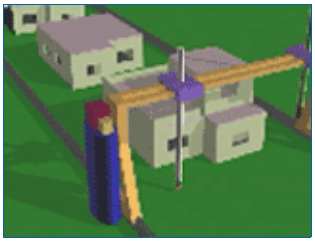
Habitat Structures Overview

Gamma and particle radiation constitute a serious but reducible threat to long-term survival in space environments. Habitat manufacturing and assembly technologies that incorporate in situ resources provide options for autonomous, affordable, pre-positioned habitat environments with radiation shielding features and protection from micrometeorites and exhaust plumes.

The ISFR Habitat Structures subelement is focused on the development of lunar and Martian habitat structures with environmental protection features fabricated primarily of in situ resources and deployed with a high degree of automation. Current agency approaches depend on pre-fabricated habitat structures which require excessive upmass. Utilizing in situ resources for producing habitat structures in place or enhancing pre-fabricated structures as opposed to sole usage of pre-fabricated structures will significantly reduce upmass requirements.

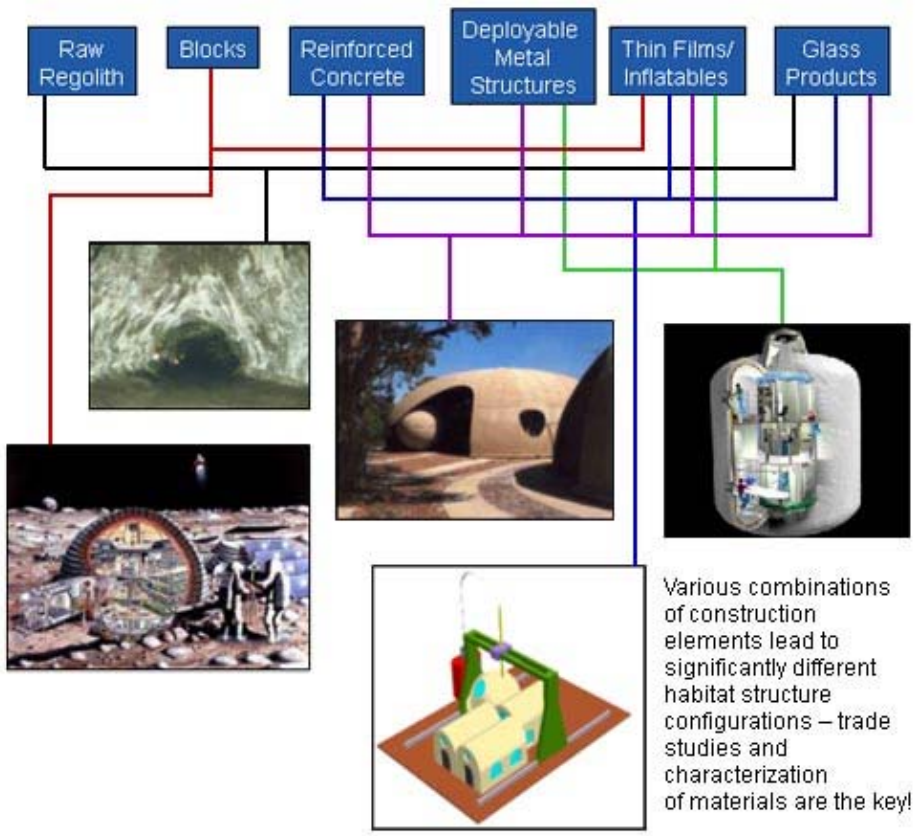
Habitat Structures will investigate six basic structural concept categories based primarily on in situ materials. These categories of construction products are described below.

- **Raw Regolith**: Structures formed by subsoil positioning over and around personnel and equipment enclosures or through the use of existing subsurface features such as caves or lava tubes. Regolith may also be used in conjunction with other technologies.
- **Blocks**: Carved rock or regolith configured into construction blocks or bricks and configured into a habitat structure.
- **Reinforced Concrete**: Structures formed from regolith based concrete.
- **Thin Films/Inflatables**: Structural components erected by inflation or assembled as liners in other structural elements.
- **Deployable Metal Structures**: Deployable structures which will work in concert with other components such as regolith or inflatables.
- **Glass Products**: Structural elements or components fabricated from regolith-based glass.



Contour Crafting video
(Size: 50 MB)
Used with permission by: University of Southern California
Get Windows Media Player 10

Since no single technology will meet structural, radiation shielding, and minimal upmass/upvolume goals, combinations of technologies are being evaluated as integrated construction approaches.



A TRL6 sub-scale semi-autonomous capability is planned for FY09 to be compatible with the Spiral 1/2 Lunar Robotic Exploration Program (LREP) missions to demonstrate the integrated concept that evolves from the selected technologies.

For more information, please contact:

Project Manager: Carole McLemore
(256) 544-2314
Carole.A.McLemore@nasa.gov

Curator: Anthony Goodeill
NASA Official: Carole McLemore
Last Updated: 26 July 2016.