

## ***Rapid Deployment Inflatable Container:***

Compact shipping containers for disasters in high density urban areas.

### **Mission:**

To design provisional housing units that serve as efficient, useful environments, allowing inhabitants to live in dignity as part of the fabric of their neighborhood. To make the units as compact as possible, facilitating storage and transportation of a greater number than typical mobile trailer and/or shipping container systems allow. The units will also facilitate the rebirth of the neighborhood through flexible staging and the ultimate fulfillment of a master plan that corrects previous urban planning short falls, activates streetscapes, and maximizes green space.

### **Scenario:**

Prior to hurricane landfall, information on potential disaster locations identified by SLOSH modeling data is transmitted to designers for analysis. Open space areas immediately suitable for provisional housing are identified and preliminary master planning begins. Post hurricane landfall, debris removal commences and the master plan for the site is completed. The first provisional housing units are sent to existing open spaces and areas of debris removal while temporary inflatable structures are used to provide goods and services in close proximity. Additional provisional housing units are brought to the site to realize the completed master plan. As provisional housing needs decrease, units are first removed in locations where businesses are needed, followed by those located on permanent housing sites. The final units removed from the area occupy the locations of new parks and green space. As units are removed from the site, they are refurbished and stored for future need. Units unable to be refurbished are

nearly completely recyclable due to high steel content.

### **Deployment:**

Units are sealed for transport and delivered using conventional methods. Two units can be delivered at a time using a "low-boy" trailer, or a single unit can be delivered using a smaller trailer in situations where site constraints restrict the size of truck allowed. Upon delivery, the compact size and relatively low weight of the individual units allow for the use of a small, maneuverable crane, an ideal situation in dense or debris-filled areas with limited staging. The first units are set in place at grade, seated on a 6" thick, reinforced concrete slab on grade. These units are not intended for living, but for providing locations of basic services such as electricity, water, waste, and compressors. Habitable units are then stacked on top of the service units, providing a secure distance from the street level activities of an area in transition. As the habitable units are stacked in place, a circulation/service core and walkway system is erected at each level. This work is done by hand, using standard pipe and clip technology. Stair and elevator systems make use of existing scaffold technologies to save time and cost.

### **Housing:**

Each unit is a compact, modular structure divided into two sections, one rigid and one inflatable. The rigid section is structural, constructed using light gage metal decking and wall studs filled with insulation. It is designed to support the weight of other units stacked above, up to nine in total. It contains all necessary furnishings and connections for

services. Services run through the floor and roof of the unit and connect to prefabricated main lines running through the core. A translucent, inflatable double wall bladder, based on NASA space habitats, is packed within the rigid section and deploys when the unit is set in position and connected to the compressor at the base. To increase long term sustainability, the inflatable structure is equipped with windows and integral photovoltaic cells. Windows provide natural light and ventilation, and the photovoltaic cells along with helium inflated wind turbines provide electricity for the completed structure.

With a stored footprint of 105 gsf, each fully deployed unit has an interior net area of 190 sf and is designed to join with other units into multiple apartment configurations. Prefabricated furniture, kitchen, bathroom, and/or storage modules are included in each unit, with the distribution dependent upon the family size and bedroom count. Single units are used for studio apartments or combined into one through three bedroom apartments, using flexible links. A variety of predesigned, expandable apartment configurations prevent a monotonous array of uniform structures. Configurations are adaptable to specific site constraints or obstructions, maximizing the use of available space. Within each apartment, adequate space is provided for wheelchair access regardless of need. The only necessary accessibility adjustments are made to the prefabricated kitchen and bathroom modules. Although certain items such as the kitchen, bathroom, and storage modules will be fixed into place, individuals or families moving in to the apartments will have the ability to locate loose furniture items (beds, tables, etc.) based on their personal tastes.