A single, self-contained housing core configured for containerization is provided. The housing core includes a first section having a floor and a first portion of walls. A second section is connected with the first section to define at least one cavity. The second section includes a ceiling and a second portion of the walls. The second section also includes a reservoir. Deployment items are disposed with the first and second sections. Implants are disposed within the first and second sections. Loose items are disposed with the first and second sections. Methods and systems of constructing a dwelling unit including the housing core and transporting the housing core via intermodal transport are also disclosed.
PREFabricated Containerized Housing

TECHNICAL FIELD

[0001] The present disclosure is directed to prefabricated housing and, more particularly, to a single, self-contained sustainable housing core configured for intermodal containerization and transport with related methods for construction of a complete dwelling and systems, which may utilize unskilled labor to assemble on site.

BACKGROUND OF THE INVENTION

[0002] Prefabricated housing for dwellings is well known. Some prefabricated housing modules were factory built and transported to a local building site via truck trailer. These early housing modules failed when competing with site built homes due to the resultant high costs and/or extreme designs. These high costs and cumbersome transportation methods prevented such prefabricated housing from reaching other markets, making availability within reach of only a limited regional market.

[0003] More recent attempts have been made to overcome the associated high costs with early prefabrication housing in an effort to compete with conventional homes. These prefabricated housing systems were designed as wide-load truck size sections, which were joined on site. These designs suffered from drawbacks such as the shipping of empty space and the performance of extensive redundant site work to reconnect the modules and their associated components. These attempts also disadvantageously failed to address the issues of very low cost, sustainability and worldwide distribution of housing units for dwelling.

[0004] These attempts also do not provide a solution to the worldwide challenges of providing a domicile of shelter and safety for those in need of a home and especially in underdeveloped geographies. People living in underdeveloped geographies lack access to safe drinking water, basic sanitation, and have no access to grid electricity. In addition, manufactured housing to date has failed to consolidate demand and as a result are not able to take advantage of high volume mass production to reduce cost. Such limited regional use fails to create the necessary demand in volume to apply high technology solutions to these domicile issues for those in need. As a result, no known prefabricated manufactured housing to date has achieved sustainable, off grid power and water and sanitation in a viable way.

[0005] Intermodal shipping containers bring goods to every corner of the world. Many cities include shipping ports that have the capability of handling these standard shipping containers. Standards are determined by the International Organization For Standardization (ISO), which is located in Geneva, Switzerland and publishes the International Standards. For example, five common container lengths include 20 foot (21), 40 ft, 45 ft, 48 ft, and 53 ft. The 20 ft container is the most common length worldwide and the ISO provides International Standards for the 20 foot container. For example, such published International Standards for the 20 ft container include volume (1,169 ft³), maximum gross mass (52,910 lb), empty weight (4,850 lb) and net load (48,601 lb).

[0006] Containerization is a system of intermodal freight transport using standard ISO containers. Such shipping containers can be transported by ship, rail, truck or air. However, due to the abundant use of these shipping containers, the return and reuse of these shipping containers has become a drawback.

[0007] Therefore, it would be desirable to overcome the disadvantages and drawbacks of the prior art with a single, self-contained housing core configured for containerization and related methods for construction of a dwelling and systems for intermodal freight transport thereof. Further, it would be desirable if the housing core and related methods and systems for intermodal freight transport provide low cost, sustaining domiciles of shelter and safety for those in need of a house in various geographies for worldwide distribution. It is most desirable that the housing core and related methods and systems of the present disclosure are advantageously employed to provide an affordable home that is self-sustaining and utilizes renewable energy and conservation techniques such that the home avoids drawing on non-renewable resources. It is contemplated that such a housing core includes internet access. It is further contemplated that the housing core of the present disclosure is easily and efficiently manufactured and assembled.

SUMMARY OF THE INVENTION

[0008] Accordingly, a single, self-contained housing core configured for containerization is disclosed with related methods of construction of a dwelling and systems for intermodal freight transport thereof, which overcome the disadvantages and drawbacks of the prior art. Desirably, the housing core and related methods and systems, provide low cost, sustaining domiciles of shelter and safety for those in need of a home and in various geographies for worldwide distribution. The housing core and related methods and systems may be advantageously employed to provide an affordable home that is self-sustaining and utilizes renewable energy and conservation techniques such that the home avoids drawing on non-renewable resources or the need to be connected to utility infrastructure. It is envisioned that the housing core has wireless internet access and/or land line internet access. It is further envisioned that the housing core is easily and efficiently manufactured and assembled.

[0009] It is envisioned that the core includes all the mechanical, electric and hydraulic systems of the dwelling, as well as the spaces and fixtures to use these systems. The core needs no additional work on site for those systems to function. It is contemplated that the core is a rigid, reinforced structure, which provides lateral stability to the construction of the dwelling. This is advantageously enhanced by the construction of a rigid roof using development items (e.g. wood I-beams and panels). This rigid flat plane roof is laterally braced by the core and extends lateral stability to exterior walls. Alternatively, the roof could be a fabric, suspended between the rigid core and columns and other structural elements.

[0010] It is contemplated that the housing core configured for containerization is a transport mechanism for materials required for the construction of the dwelling.

[0011] In one particular embodiment, in accordance with the principals of the present disclosure, a single, self-contained housing core configured for containerization is provided. The housing core includes a first section having a floor and a first portion of walls. A second section is connected with the first section to define at least one cavity. The second
section includes a ceiling and a second portion of the walls. The second section also includes a reservoir, such as, for example, a water tank.

[0012] Deployment items such as, for example, a roof membrane and installed components such as, for example, refrigeration units are disposed in the at least one cavity of the first and second sections. Implants are disposed within the first and second sections. The implants may include high pressure laminate floor surfaces, plumbing pipe trees, electric harness and receiver fittings, etc. Incidental or loose items such as flooring, for example, carpet and portland cement, are disposed with the first and second sections.

[0013] The first and second sections may be injection molded. The sections may also be manufactured by other methods including vacuum forming. The first section may be configured as a lower half and the second section may be configured as an upper half. The first and second sections may be fabricated from plastic, wood, steel and/or aluminum. The first and second sections can be coated with a hard finishing compound so that the wall surfaces are cleanable and sanitary. The first and second sections may include corner and edge reinforcements. The housing core may have a cross-sectional I-beam configuration to provide strength.

[0014] It is contemplated that the housing core complies with ISO standards for intermodal freight transport. It is further contemplated that the housing core is configured for standard containerization of a 20 ft high cube container and/or stand-alone operation.

[0015] Alternatively, the housing core includes water conservation components and/or recycling components. Alternatively, the reservoir is configured to collect natural elements. The housing core can include loose items being disposed in at least one cavity of the first and second sections. The housing core can include installed components disposed with the first and second sections. The deployment items include a septic system.

[0016] The at least one cavity is configured to support materials for walls. The walls are constructed to enclose at least 1,000 square feet of enclosure. The housing core may be configured for construction having solid walls at its corners.

[0017] The first section and the second section may be connected to define a plurality of cavities. The deployment items can be disposed with aligned openings of the first and second sections. The housing core may include panels configured to protect the housing core. The panels are removable from the housing core to form a wall extending from the housing core. The housing core is configured for assembly as a dwelling and provides immediate lateral stability of the dwelling.

[0018] In an alternate embodiment, in accordance with the principles of the present disclosure, a method for intermodal freight transport of a containerized housing core is provided. The method includes the steps of: providing a single, self-contained housing core, the housing core including a first section and a second section; injection molding a first section; implanting components with the first section during injection molding; injection molding a second section; implanting components with the second section during injection molding; joining the first section and the second section, which creates at least one cavity therebetween; disposing deployment items within the at least one cavity; disposing installed items within the at least one cavity; transporting the housing core via intermodal freight transport; installing deployment items with the first and second sections; and constructing a dwelling unit with the housing core. The method may include the step of constructing extension walls with the housing core to construct the dwelling unit. The method may include the step of consolidating deployment items in the cavity, whereby the step of consolidating includes partial installation of the deployment items and expansion of the deployment items during construction of the dwelling unit. The housing core includes a manufactured, affordable dwelling, which utilizes renewable energy and conservation techniques, and can be delivered worldwide.

[0019] In another alternate embodiment, a single, self-contained dwelling unit configured for containerization is provided. The dwelling unit includes a lower half having a floor and a lower portion of walls. An upper half is joined with the lower half to define a plurality of cavities. The upper half includes a ceiling and an upper portion of walls. The upper half also includes a reservoir. Deployment items are disposed in the plurality of cavities. Implants are disposed with the lower half and the upper half. Loose items are disposed in the plurality of cavities. The lower half and the upper half are joined in an I-beam configuration. Extension walls are disposed in the plurality of cavities.

[0020] The housing core is designed to provide the aspects of a shelter in a package that can be deployed by an unskilled worker, or an end user of the housing core. The house core can be a combination of factory built mechanical and electrical systems coupled with local construction of the shell or enclosure.

[0021] For example, the housing core may include a kilowatt system, including one hundred square feet of photovoltaic power, as is contemplated, to be built into the housing core's structure and will produce 1200 to 1600 kilo-watt hours (kwh) of power annually. It is envisioned that such a power supply is sufficient to provide energy for refrigeration, pumps for water management, light and internet capability. The need for battery storage can be minimized by cycling energy use and conservation techniques. Other renewable power sources can be incorporated when appropriate, such as thermal and/or solar in regions where heat is needed, and wind generation.

[0022] The housing core provides a dwelling, which includes rain harvesting and water management. Even in semi-arid grassland areas, adequate rainfall can be harvested and stored by the components of the housing core to get through dry seasons. A rain harvesting area or water tank of the housing core is contemplated for each unit. For example, the housing core can include a rain harvesting area, which is 28 by 44 feet or about 1200 square feet with primary storage of about 1000 gallons and secondary storage as needed depending on rainfall and frequency. The water management of the housing core may include recycling water, specially designed fixtures, bathing and laundring techniques, etc. Alternatively, sanitary disposal of waste is achieved by specially-designed deployment items such as, for example, septic systems.

[0023] The dwelling can provide housing for 4 to 8 persons and provide at least 25 gallons of water per day. This can be collected from about 12 inches of rain per year, and this amount can be supplemented by other methods. Purification methods are well known and can be implemented with minimal electric power.

[0024] The housing core may be configured to provide dwelling for rural areas whereby population densities are low. Alternatively, the housing core may be utilized with areas
having densities of 12 housing cores or about 70 people per acre. It is contemplated that the housing core can include 1200 square feet of living space. Thus, each core can house a single family, an extended family or even two families.

[0025] In one embodiment, the housing core is configured as a one-story structure. The housing core can effectively harvest rainwater and solar energy, and needs no infrastructure. It is envisioned that a plurality of housing cores may be employed in other configurations such as two-story, three-story and/or multiple story structures. In an alternate embodiment, the housing core(s) may be utilized for small schools and medical centers. Walls may be built with indigenous material, which could be customized to fit specific requirements. Multiple cores could be linked for larger structures.

[0026] Alternatively, each housing core can be constructed with compacted earth foundations and floors, and require no centralized infrastructure. The housing cores can be constructed on platforms.

[0027] The housing core design utilizes a system of containerization, which is a component for worldwide delivery. This advantageous system eliminates disposal or returning empty space. In one embodiment, the housing core is transported as a 20 ft container and meets ISO standardized dimensions and specifications. It is envisioned that the relatively small size of the housing core, along with its stackable and weatherproof intermodal handling capabilities, allows stockpiling of multiple housing cores at a storage facility. It is further envisioned that a plurality of housing cores, including thousands of units, could be distributed domestically and throughout the world. For example, such housing cores can be shipped by relief agencies or to be received by communities in the process of building.

[0028] Advantageously, the containerized housing core does not require opening until it reaches its desired transport destination. Once dispatched to a desired location, or shipped to a predetermined geography, all portions and/or components of the containerized housing core are used to complete the housing unit or dwelling. In one embodiment, an outer protective skin of the housing core includes panels, which would be removed at the transport destination. The panels may be used as a roof deck of the housing core upon which a waterproof membrane is disposed. The housing can include reinforced structural corners, employed for shipping and stacking, to form the structure of the housing core. The core provides rigidity and lateral stability for the dwelling, which allows for facile on-site assembly. The housing core configuration provides for no packaging waste, nor any container or portion thereof to return and/or store. Construction and mechanical systems, such as photovoltaic systems, including walls incorporating them, are constructed, assembled and completed prior to shipping and/or transport.

[0029] Within the containerized housing core, the remaining volume is packed with prefabricated materials for roof span and water harvesting. Windows and doors, also packed with the housing core, are deployed once the housing core is disposed at its desired location and the dwelling including the housing core is site constructed. It is contemplated that there is sufficient remaining space within the housing core, in addition to the deployable construction materials, to include other appropriate items, such as, bicycles, tools (for example, mud brick presses and compaction devices), clothing, sewing machines, bedding, medical items, books, computers and cellular phones, musical instruments and food. It is further contemplated that specialized agencies could supply these items.

[0030] It is envisioned that the containerized housing core meets the standards of design, and delivers comfort and livability to users of diverse cultures, economic status and geographic location.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031] The above and other objects, features and advantages will become more readily apparent from the specific description accompanied by the following drawings, in which:

[0032] FIG. 1 is a perspective view of a containerized housing core, in accordance with the principles of the present disclosure;

[0033] FIG. 2 is a perspective view of a first portion of the housing core shown in FIG. 1;

[0034] FIG. 3 is a perspective view of a second portion of the housing core shown in FIG. 1;

[0035] FIG. 3A is a side elevation view of the housing core shown in FIG. 1;

[0036] FIG. 3B is a cutaway view of the housing core shown in FIG. 3A;

[0037] FIG. 3C is a cutaway view of the housing core at the center shown in FIG. 3B;

[0038] FIG. 3D is a cross-section view of the housing core shown in FIG. 3C;

[0039] FIG. 4 is a top cutaway view of the housing core shown in FIG. 1;

[0040] FIG. 4A is a side cross section view of the housing core shown in FIG. 4;

[0041] FIG. 5 is a top plan view of the roof of a dwelling constructed from housing core shown in FIG. 1;

[0042] FIG. 6 is a top plan cutaway view of a dwelling constructed from the containerized housing core shown in FIG. 1; and

[0043] FIG. 7 is a top plan cutaway view of the housing core shown in FIG. 6.

[0044] Like reference numerals indicate similar parts throughout the figures.

DETAILED DESCRIPTION OF THE INVENTION

[0045] The exemplary embodiments of the single, self-contained housing core configured for containerization and related methods of construction for dwellings and systems for intermodal freight transport thereof are disclosed and discussed in terms of prefabricated housing and more particularly, in terms of low cost, sustainable dwellings and domiciles of shelter and safety. It is envisioned that the advantages of the present disclosure may be utilized for the benefit of those in need of a home and in various geographies. The housing core and transport system may be employed for domestic, regional and/or worldwide distribution. It is envisioned that the present disclosure may be used with a range of applications including those employing renewable energy and conservation techniques. It is further envisioned that the housing core is constructed to form a dwelling, which is designed to provide a shelter in a package that can be deployed by those at various skill levels including the most basic such as the end user. The housing core may also include components addressing needs such as personal cleanliness, food storage and preparation, and education, and may include
water supply, power supply, internet and sanitation. The housing core can be factory built including mechanical and electrical systems, and coupled with the local construction of the shell or exterior walls of the dwelling unit to create a complete dwelling unit.

[0046] It is also envisioned that the housing core may provide the foundation for a single dwelling unit, combined with other housing core(s) as a plurality of dwelling units and constructed together as a multiple dwelling unit and/or constructed as a plurality of units or plurality of multiple dwelling units to form a community configuration. It is further envisioned that the housing core of the present disclosure may alternatively be used with existing or constructed on site utilities such as appropriate water, sewer and power supply as provided by a local or regional utility and connected as is known to one skilled in the art.

[0047] The following discussion includes a description of a housing core, related components, assembly of the containerized unit, containerized transport of the housing core, and exemplary methods of constructing dwellings including the housing core in accordance with the principles of the present disclosure. Alternate embodiments are also disclosed. Reference will now be made in detail to the exemplary embodiments of the present disclosure, which are illustrated in the accompanying figures. Turning now to FIG. 1, there is illustrated a single, self-contained housing core 10 configured for containerization in accordance with the principles of the present disclosure.

[0048] The components of the housing core are fabricated from materials suitable for prefabricated housing, such as, for example, wood, compressed particle board, metals, plastics and/or other materials, depending on the particular application and/or preference of the manufacturer and/or end user. Semi-rigid and rigid plastics as well as foam plastics are contemplated for fabrication, as well as resilient materials, such as rubber. The frame, walls, plumbing, circuitry, and interior fixtures of the housing core may be fabricated from those suitable for a dwelling and/or shelter application. One skilled in the art, however, will realize that other materials and fabrication methods suitable for assembly and manufacture, in accordance with the present disclosure, also would be appropriate.

[0049] Detailed embodiments for the present disclosure are disclosed herein, however, it is to be understood that the described embodiments are merely exemplary of the disclosure, which may be embodied in various forms. Therefore, specific functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present disclosure in virtually any approximately detailed embodiment.

[0050] Referring to FIGS. 1-3, housing core 10 is configured for transport as a 20 foot intermodal container, which is handled and stacked as a standard container pursuant to applicable ISO standards, which are known to those skilled in the art. At the desired location or final building site, the entire container and components of housing core 10 will be used for construction of the dwelling unit. For example, housing core 10 is transported in containerized format having approximate dimensions, 20′ x 8′ x 9′. It is envisioned that other sized container dimensions, such as 40′, 45′, 48′ and 53′ may be employed including custom configurations.

[0051] Housing core 10 includes panels 12 used to protect housing core 10 and its components. Panels 12 are configured as an outer cover or protective skin for housing core 10. Panels 12 are removed at the final building site and reused for construction. For example, panels 12 may be reused to construct roof 86 (FIG. 5) of the dwelling unit for housing core 10. Panels 12 may be used to construct other portions of the dwelling unit. Panels 12 are rectangular in configuration, however, other shapes are also envisioned such as, circular, triangle, etc.

[0052] Panels 12 include access cavities 16, which communicate in between cavity or cavities 14, discussed in more detail below, of housing core 10. Cavities 16 are configured for receipt of the forks of a forklift (not shown) or the like. As such, housing core 10 can be easily maneuvered and manipulated for shipping and storage. It is envisioned that housing core 10 may not include cavities 16 or include a single cavity 16, or multiple cavities 16.

[0053] Housing core 10 includes an injection molded first section, such as, for example, a lower half 18, as shown in FIG. 2, including a floor 20 and a first portion, such as, for example, lower portion 22 of walls 24. It is contemplated that lower half 18 may be formed, alternative to injection molding, by various fabrication methods such as manual construction, machine forming, vacuum forming, etc. Floor 20 may include a platform, poured foundation, etc.

[0054] Lower half 18 includes a first bathroom 26 with a shower 28, a toilet 30 and sinks 32. Lower half 18 also includes a second bathroom 34 with similar components, and a food preparation area 36 with sinks, countertop, etc. It is envisioned that lower half 18 may have various component configurations, such as a single bath, alternate counter design, closets, showers or bathtub arrangement and alternate access openings, and separate toilet rooms.

[0055] Housing core 10 includes an injection molded second section, such as, for example, an upper half 38, as shown in FIG. 3. Upper half 38 is joined with lower half 18 to define a plurality of cavities 14. These cavities 14 define space to accommodate disposal of various items, discussed below, as well as rooms, cabinets, fixtures, appliances, etc. of the dwelling unit including housing core 10.

[0056] Upper half 38 includes a ceiling 40 and a second portion, such as, for example an upper portion 42 of walls 24 separating the core into two halves. Upper half 38 includes a reservoir, such as, for example, a water tank 44. It is contemplated that upper half 38 may be formed, alternative to injection molding, by various fabrication methods such as manual construction, machine forming, vacuum forming, etc. It is further contemplated that housing core 10 may be formed as a single structure such that the first section and the second section are connected and subsequent joining of the halves is not required. The first section and the second section may be monolithically formed, integrally connected, etc. It is envisioned that the reservoir may be configured to support other fluids in multiple compartments and/or other materials.

[0057] Referring to FIGS. 3A, 3B, 3C and 3D, the arrangement of cavities disposed with housing core 10, walls 24 and floor 20 are designed to achieve the maximum strength for each molded half 18, 38. Both upper half 38 and water tank 44 of upper half 38 are reinforced by vertical ribs disposed along housing core 10 in both directions. Housing core 10 includes walls 102 (FIGS. 2 and 7) of the toilet and bath enclosure as well as a longitudinal rib 106 disposed adjacent food preparation area 36. When halves 18, 38 are joined, the resultant section is an I-beam configuration with web 106 such that reinforcing ribs support the top 40 and bottom flanges 20. The
connection between upper half 38 and lower half 18 is proximate to the neutral axis of the structure of housing core 10 and be staggered or offset where the stresses are minimal. Walls 102 create additional reinforcing such as by creating box beam cross sections.

[0058] The ends of housing core 10 are solid (FIG. 3A) as is the center cross section (FIG. 3C) and corners 51, which can be further reinforced, to accommodate the handling and lifting stresses applied to housing core 10 during movement and handling. These stresses distribute through I-beam configuration (106+20+40) (FIG. 3D) of the structure of housing core 10, as well as exterior panel 12 cladding, which is in place when lifting occurs. I-beam configuration (106+20+40) also provides support for internal connections, walking surfaces and attachment points of housing core 10 for reinforcement for day-to-day loads applied to housing core 10 and its components. This configuration also creates lateral stability, which facilitates construction of the completed dwelling. Reinforcement can be incorporated into housing core 10 to accommodate stresses in an efficient manner.

[0059] Referring to FIGS. 4, 4A and 5, beams 78 are used for the structural framing of roof 86. These beams 78 are placed below ceiling 40 and run the length and the width of housing core 10 through aligned openings 58. Access through ports 16 allow a forklift type machine to lift housing core 10 utilizing the strength and placement of beams 78 to position it into its final prepared site.

[0060] Upper half 38 stores a roofing membrane 46 to be deployed out on the deck of roof 86. Upper half 38 includes intermodal corner fittings 50 and photovoltaic panels 90, which is installed with the containerized housing core 10 prior to transport. A natural light and ventilation shaft 54 may be disposed with ceiling 40. Upper half 38 also includes openings 56, which facilitate alignment of portions 22 and 42 of walls 24. Openings 58 of upper half 38 facilitate loading and unloading of beams 78 for roof 86. It is envisioned that upper half 38 may have various component configurations, such as alternate opening disposal, and provide storage for various items. Roof 86 may be constructed from various materials.

[0061] Deployment items and installed components, as will be discussed in further detail below, are disposed with lower half 18 and upper half 38. Implants are disposed within the lower half 18 and upper half 38 and are included in the molding process. Implants include high pressure laminate floor surfaces, plumbing pipe trees, electrical wire harness, and receiver fittings, etc. Incidental or loose items are also disposed with lower half 18 and upper half 38, in spaces such as 14, 67, 67a, 44 and 82.

[0062] Housing core 10 is a system, which facilitates transport and storage of its components. The components are used for the construction of the corresponding dwelling unit including housing core 10. It is contemplated that components may also be disposed in shower stalls 67, 67a of baths 26 and 34, respectively. In its containerized form in preparation for transport, housing core 10 has first bathroom 26 and second bathroom 34, which define suitable bathing and toilet spaces for use. Each bathroom 26, 34 may have natural light and ventilation, as shown in FIG. 3. Each bathroom 26, 34 may be variously configured and dimensioned with housing core 10. For example, each bath may be approximately 50 square feet in floor space. It is envisioned that food preparation area 36 has a 15 foot long counter with cabinets and appliances. Water tank 44 and photovoltaic solar array 90 may be built in with ceiling 40. Water and electric systems along with their fixtures are disposed within housing core 10 and are installed prior to transport. It is envisioned that water tank 44 is a primary water reservoir, however, housing core 10 may include a secondary reservoir, or a plurality of reservoirs.

[0063] In containerized form in preparation for transport, housing core 10 includes exterior windows and doors 72 disposed within the space and area of cavities 14 defined by first bathroom 26. It is envisioned that 8-10 windows/doors may be disposed therein.

[0064] A septic tank 74 is disposed within the space and area of cavities 14 defined by second bathroom 34. It is envisioned that septic tank 74 is approximately 900 gallons although other sizes are contemplated. A back up battery 52 is stored within housing core 10.

[0065] Aligned openings 58 provide access for placement and transport of beams 78. For example, multiple beams 78, which are fill length, for example, 196" long, can be stored over or through shower stall 67 and 67a and extend the length of housing core 10. Beams 78 can be accessed for loading and unloading through aligned openings 58. Beams 78 may be stored at an area just below the ceiling of first bathroom 26 and through second bathroom 34 with access through aligned openings 58 and above windows 72 and tank 74. Branches 64 extend electric and waste water hook-up to septic tank 74, and electric to spaces 100, are also included with core 10.

[0066] The advantageous design of the present disclosure does not require installers skilled in the art of electrical or plumbing. If the final site is in a region where heating is required, this can be provided through a separate heating system of housing core 10 such as thermal solar or conventional boilers, which can be included as a loose item. Such loose items can vary in style depending on climate.

[0067] In another embodiment, a method for intermodal freight transport of the containerized housing core 10 is provided. This method includes the steps of providing housing core 10, which includes lower half 18 and upper half 38. The molded shell or lower and upper halves 18, 28 of housing core 10 enclose and support the integrated systems for the dwelling structure employing housing core 10, which are installed prior to transport.

[0068] The shell of housing core 10 also serves as a structural carrier for other separate and loose components as discussed herein. Lower half 18 and upper half 38 are injection molded as is known to one skilled in the art in a configuration to conform to standard intermodal container dimensions. It is contemplated that housing core 10 may be formed as a single structure. Various components, as discussed herein, are implanted with lower half 18 and upper half 38 during formation of housing core 10.

[0069] The lower and upper halves 18, 38 are injection molded utilizing a high, (for example, 3 to 6 pound per cubic foot) density foam plastic (for example, Styrofoam) material, which is injected and cured in the mould as is known to one skilled in the art. A wood matrix material and/or recycled waste material may also be used for fabrication of halves 18, 38. The molds may be made of steel or aluminum and configured to fabricate lower half 18 and upper half 38. This advantageous configuration allows the draft needed for releasing the halves 18, 38 from the moulds.

[0070] Further, this process allows implants to be placed into the mould before injection of the plastic or other material. Such implants could be high pressure laminate floor surfaces, plumbing pipe trees and receiver fittings, electric chases or
harnesses, reinforcing grounds or attachment points, shower pans 28, and universal intermodal corner fittings 50 and reinforced edges 51. Implants can include waste lines cast into mould of housing core 10 and have a terminus at either end to be connected to the exterior installed septic tank 74, as shown in FIG. 6. [0071] After each of first half 18 and second half 38 have been released from their respective moulds, a process to join the sections and finish the connections and surfaces is employed. It is envisioned that a coating may be applied to the various surfaces such as a hard finishing compound, etc. Housing core 10 is joined with corner reinforcement 51 and other reinforcements, and conforms to international intermodal container standards. Lower half 18 and upper half 38 are joined, which creates a plurality of cavities 14 therebetween. Cavities 14 are disposed within housing core 10 about the various structures of housing core 10, such as bathrooms, walls, partitions, etc. Various components are installed with lower half 18 and upper half 38.

[0072] Installed components such as refrigeration 62, toilets 30, sinks 32, solar panels 90 and battery bank 52 are then added to housing core 10. Installed components may be used with housing core 10 to achieve the overall goals of enhanced energy efficiency and conservation, long term reliability and simplicity in use. Installed components are completely installed into housing core 10 and connectable with core or local utilities. No additional or minimal work is required at the final building site for installed components. It is contemplated, however, that parts of systems may be added or created during factory molding of housing core 10 such as shower pans 28, skylights 54, cabinets and countertops. Such additional systems may include water conserving techniques and recycling, and related equipment, including bathing, laundering and sanitary components. Purification systems may also be employed.

[0073] Housing core 10 may also include a highly efficient photovoltaic system with battery storage and computer power management to include lighting, internet and ventilation. These systems can be installed with ceiling 40 adjacent and under the rim of water tank 44. Batteries 52 are disposed below ceiling 40 in the central part of housing core 10. Other placement configurations are also envisioned.

[0074] The systems of housing core 10 may also include energy efficient food management equipment, and cooking and cleaning systems. These may include highly efficient refrigeration, which would warm water held in a separate pre-molded roof tank. Cooking equipment can be equipped with anti-bacterial devices such as ultraviolet light exposure devices.

[0075] Roofing membrane 46 is preinstalled or flushed into the inner wall of water tank 44 and easily deployed by rolling it out and unfolding it onto roof deck 86. It is contemplated that a roofing membrane is provided for each side of roof 86. It is further contemplated that tank 44 may be configured to collect and/or harvest natural elements, such as, for example, rain, water condensation, and may include solar collecting elements.

[0076] Deployment items or materials needed for the completion of the housing unit are disposed within the plurality of cavities 14. Deployment items include beams 78, or the structural components to span from the edge of the housing core 10 at the final site to the locally built exterior walls 88. For example, beams 78 are fabricated from composite materials and sized to span the 19'-6" length of sleeping rooms 100 and common room 98, and are sloped to collect rainwater and drain into water reservoir 44. Beams 78 create roof 86. Panels 12 span roof 86 creating a solid deck surface onto which roofing membrane 46 is deployed. It is contemplated that panels 12 may be about 1 inch thick and 4' by 8' in size, and that a plurality of panels 12 may be used, such as, for example, seventy. Windows 72 and doors with screens are fabricated, for example, with PVC material and glass. Windows 72 and doors are installed into walls 88, which are constructed from local materials.

[0077] A sanitary system of housing core 10 includes septic tank 74, which (for example, 800 gallons and/or 5' by 5' by 4' fabricated from polypropylene) is installed into the final site adjacent to the constructed housing core 10 (FIG. 6). Tank 74 is pre-plumbed with a leaching field and attached to branch connections 64 of the waste line of housing core 10. This sanitary system includes a combination of waterless composting and conventional septic as is known to one skilled in the art. It is envisioned that advanced concepts in sanitary design may be used which are designed to generate organic soil from human waste as is known to one skilled in the art. An additional water storage tank in the form of a flexible fabric tank may be disposed at the final site, above or below ground. The additional tank may hold an additional 1,000 gallons of water. Depending on the climate, one or several additional tanks can be employed to supplement the 1,000 gallon water tank 44 of housing core 10.

[0078] When the moldings are completed and the installed components are tested (for example, by connection to utility systems and quality tests), the remaining cavities 14 within housing core 10 is filled with deployment items such as beams 78, which slide in through openings 58 at each end of housing core 10, and are placed under ceiling 40 running the full length of housing core 10. Septic tank 74 is disposed in second bathroom 26. Doors and windows 72 are disposed on their edge on the floor in first bathroom 34. Secondary water tanks are folded and positioned above the toilets. Panels 12 sheath the entire housing core 10, including four sides and roof 86. It is envisioned that panels 12 may be three to four deep with staggered joints, which may be screwed into structural implants as a final step to reinforce and protect the entire package of components of housing core 10.

[0079] Deployment items are disposed within the plurality of cavities 14 of housing core 10. It is envisioned that such various efficient building products may be utilized to construct the dwelling unit employing housing core 10. It is contemplated that these items are partially installed into the core itself, such as roofing membrane, or are provided loose ready for installation at the final site.

[0080] Incidental or loose items can include cooking utensils, tools, Portland cement (for example, to stabilize compacted floor and foundation construction), polypropylene carpet, moderate heating system and internet ready computers. Such incidental items may also include bicycles, clothing, temporary supply of food, bedding, books, school supplies, musical instruments, sporting goods, etc.

[0081] Incidental items can be placed in the remaining spaces, including the shower stalls, areas in and above the cabinets and counters, space in water tank 44 and below the solar panels. It is envisioned that these spaces total approximately 300 cubic feet and are concealed and protected under panels 12 sheathing.

[0082] Housing core 10 is transported in containerized form via intermodal freight transport as is known to one
skilled in the art. Referring to FIGS. 5-7, the containerized housing core 10 is transported via intermodal transport to the final site or desired location for constructing the dwelling unit. Housing core 10 is disposed for construction at the final site.

[0083] Deployment items and incidental items, are removed from housing core 10 for assembly and/or construction. Branches 64, which extend the electrical and sanitary systems beyond the core as needed to construct the dwelling unit are assembled and connected as required. Roof 86 is constructed, as shown in FIG. 5, from beams 78 spanning between the upper edge of housing core 10 and final site exterior extension walls 88. Interior portion wall 89 could be built in various configurations, in accordance with the principles of the present disclosure. Photovoltaic cells 90 are fixed and flank each side of light/vent shaftway 54. Beams 78 and panels 12 are configured to form a rainwater collection surface 92. An interface 94 defines a conduit between collection surface 92 and water tank 44. Membrane 46 is rolled out to cover the roof deck created by panels 12. It is contemplated that membrane 46 may cover all or only a portion of the roof deck.

[0084] Extension walls 88 are constructed with housing core 10 to form a 1,200 square foot dwelling. Other sized dwelling space is also contemplated. The dwelling space may be variously configured to meet the requirements of a particular building site and/or preferences of a user. As shown in FIG. 6, the dwelling unit includes a porch 96. Porch 96 may be variously configured and dimensioned, or may not be included. The remaining portion of housing core 10 is centrally disposed within the dwelling unit adjacent to living area 98 and sleeping areas 100. The toilets are connected for communication with septic tank 74, which is buried exterior and adjacent to the dwelling unit. First bathroom 26 and second bathroom 34 are desirably located, as well as food preparation area 36. Windows 72 and doors are mounted and positioned with extension walls 88 as desired.

[0085] In an alternate embodiment, housing core 10 includes the materials for extension walls, similar to extension walls 88, which are assembled with housing core 10, via disposal with cavities 14, prior to transport at a manufacturing facility or the like. Housing core 10 includes the materials of the extension walls to form a complete dwelling or housing unit for inter modal freight transport and construction at a final building site, similar to that described herein, to provide a home in various geographies. Housing core 10 has the materials to create an exterior wall system including the extension walls to complete the dwelling unit including housing core 10. These materials may include a plurality of columns 79 (vertical structural components), some additional beams and about 2,000 square feet of reinforced fabric, which would be stretched between the columns and extend from roof 86 to the perimeter base of exterior walls (88). Other materials and quantities are also contemplated.

[0086] It will be understood that various modifications may be made to the embodiments disclosed herein. Therefore, the above description should not be construed as limiting, but merely as exemplification of the various embodiments. Those skilled in the art will envision other modifications within the scope and spirit of the claims appended hereto.

What is claimed is:

1. A single, self-contained housing core configured for containerization, the housing core comprising:

   a first section including a floor and a first portion of walls;
   a second section connected with the first section to define at least one cavity, the second section including a ceiling and a second portion of the walls, the second section also including a reservoir;
   deployment items being disposed in the at least one cavity of the first and second sections; and
   implants being disposed within the first and second sections.

2. A housing core according to claim 1, wherein the first and second sections are fabricated from foam, plastic, wood, steel, aluminum or recycled waste material.

3. A housing core according to claim 1, wherein surfaces of the first and second sections are coated with a hard finishing compound.

4. A housing core according to claim 1, wherein the first and second sections include corner and/or edge reinforcements.

5. A housing core according to claim 1, wherein the housing core complies with ISO standards for intermodal freight transport.

6. A housing core according to claim 1, wherein the housing core is configured for standard containerization of a 20-foot container.

7. A housing core according to claim 1, wherein the housing core is configured for stand-alone operation.

8. A housing core according to claim 1, wherein the housing core includes water conservation components.

9. A housing core according to claim 1, wherein the housing core includes recycling components.

10. A housing core according to claim 1, wherein the implants include high pressure laminate floor surfaces, plumbing pipe trees or receiver fittings.

11. A housing core according to claim 1, wherein the first section is injection molded.

12. A housing core according to claim 1, wherein the second section is injection molded.

13. A method for intermodal freight transport of a containerized housing core, the method comprising the steps of:

   providing a single, self-contained housing core, the housing core including a first section and a second section;
   injection molding a first section;
   implanting components with the first section during injection molding;
   injection molding a second section;
   implanting components with the second section during injection molding;
   joining the first section and the second section to define at least one cavity configured for disposal of deployment items and loose items therebetweem;
   disposing deployment items within the at least one cavity;
   disposing loose items within the at least one cavity;
   transporting the housing core via intermodal freight transport;
   releasing the deployment items;
   installing the deployment items with the first and second sections; and
   constructing a dwelling unit with the housing core.

14. A housing core according to claim 1, wherein the first section and the second section are vacuum formed.

15. A housing core according to claim 1, wherein the first section is joined with the second section to define at least one cavity.

16. A method for intermodal freight transport of a containerized housing core according to claim 13, further comprising
the step of constructing exterior walls from materials stored within the housing core to construct the dwelling unit.

17. A method for intermodal freight transport of a containerized housing core according to claim 13, further comprising the step of consolidating deployment items in the at least one cavity, whereby the step of consolidating includes partial installation of the deployment items and expansion of the deployment items during construction of the dwelling unit.

18. A housing core according to claim 1, wherein the housing core has a cross-sectional beam configuration to provide strength.

19. A single, self-contained dwelling unit configured for containerization, the dwelling unit comprising:
   a lower half including a floor and a lower portion of walls;
   an upper half joined with a lower half to define a plurality of cavities, the upper half including a ceiling and an upper portion of the walls; the upper half also including
   a reservoir configured for collection of water;
   deployment items being disposed in the plurality of cavities;
   implants being disposed with the lower half and the upper half;
   loose items being disposed in the plurality of cavities,
   wherein the lower half and the upper half are joined in an l-beam configuration; and
   extension walls being disposed in the plurality of cavities.

20. A housing core according to claim 1, wherein the first section and the second section are connected to define a plurality of cavities.

21. A housing core according to claim 1, wherein the deployment items are disposed with aligned openings of the first and second sections.

22. A housing core according to claim 1, further comprising panels configured to protect the housing core and being removable from the housing core to form a wall extending from the housing core.

23. A housing core according to claim 1, wherein the housing is configured for assembly as a dwelling and provides immediate lateral stability of the dwelling.

24. A housing core according to claim 1, wherein the reservoir is configured to collect natural elements.

25. A housing core according to claim 1, further comprising loose items being disposed in the at least one cavity of the first and second sections.

26. A housing core according to claim 25, wherein the at least one cavity is configured to support materials for walls, which are constructed to enclose at least 1,000 square feet of enclosure.

27. A housing core according to claim 1, further comprising installed components disposed with the first and second sections.

28. A housing core according to claim 1, wherein the deployment items include a septic system.

29. A housing core according to claim 1, wherein the housing core is configured for construction having solid walls at its corners.

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