

System and Method for Modular Expansion

Field of Invention

5 This invention relates to the use of prefabricated volumetric construction in building construction, in particular, the use of one or more extendable modules.

Background

10 In a construction industry, a shorter construction time will lead to projects being completed on time and thus reducing the operation costs. One solution is to use portable construction such as prefabrication, which may take less time compared to traditional construction. However, transporting the prefabrication modules from the factories to on-site for assembly tends to be slow and these modules have to be individual transported.

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 It would therefore be desirable to provide a modular construction system which overcomes or alleviates the above disadvantages, or which at least provides a useful alternative.

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Summary of Invention

 In a first aspect of the invention provides a modular structure assembly comprising a primary modular unit being arranged to receive at least first secondary
25 modular unit. The at least first secondary modular unit is pivotally mounted to the primary unit at one end. The at least first secondary modular unit is arranged to pivot about the center of rotation of the one end of the primary modular unit, wherein actuating the at least one secondary modular unit from a retracted position to an extended position so that in the extended position, at least a part of the at least one
30 secondary modular unit projects from the primary modular unit.

In one embodiment of the invention, in the retracted position the at least one second modular unit is flushed with the primary modular unit.

5 An advantage of having the secondary modular unit being able to actuate from the retracted position to the extended position is that instead of transporting three separate modular units, in the retracted position, at least two modular units can be transported collectively in one instance as the secondary modular units are nested in the primary modular unit.

10 In another embodiment of the invention, at least one secondary modular unit may be arranged to be pivoted mounted in one plane and at least other secondary modular unit arranged to be pivoted mounted in second plane.

15 Alternatively, the first secondary modular unit and the second secondary modular unit may be arranged such that both modular units are opposed.

Alternatively, the modular structure assembly may include more two or more secondary modular units, wherein one secondary modular unit is pivotally mounted to the distal end of the primary modular unit, and the other modular unit is pivotally mounted to the proximate end of the primary modular unit.

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Alternatively, the one secondary modular unit and the other secondary modular are pivotally mounted on the same plane of the primary modular unit.

25 Alternatively, the one secondary modular unit and the other secondary modular are arranged to pivot about the center of the distal end and proximate end accordingly.

Alternatively, the one secondary modular unit arranged to be pivotally mounted to one end of the primary modular unit in one plane and the other secondary modular

arranged to be pivotally mounted to one end of the primary modular unit in other plane of the primary modular unit.

5 The advantage of having the secondary modular units pivotally mounted to one end of the same plane of the primary modular unit or having the secondary modular units pivotally mounted in different planes to each other, allows the user to have a bespoke solution.

10 In a second aspect of the invention provides an engagement apparatus, the apparatus comprising opposing first and second rotatable plates such that first and second rotatable plates abut each other, said first rotatable plate includes a first cavity dimensioned to receive a column bushing, said second rotatable plate includes a second cavity dimensioned to receive a base bushing, wherein said base bushing sits within the second rotatable plate so as to rotate relative to the second rotatable plate.

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Alternatively, the first rotatable plate includes a column attached to a column mounting plate.

20 Alternatively, the second rotatable plate includes a pin and a bushing mounting plate, said pin extends into the first rotatable plate.

Alternatively, the column bushing is sized to move freely within the first cavity of the first rotatable plate.

25 Alternatively, the first rotatable plate or the second rotatable plate may be attached to one end of the primary modular unit. When a moveable momentum is applied to the engagement apparatus, the unattached rotatable plate pivots about the center of the attached rotatable plate.

Advantageously, when a movable momentum is applied to the engagement apparatus, only the unattached rotatable plate moves and the attached rotatable plate may act as a sliding platform for the unattached rotatable plate. Both rotatable plates are in close proximity to each other such that the members abut. When a vertical load is applied to the engagement apparatus such that the resultant force may causes a deflection on the load, resulting in a tilt in the rotatable plates. Unlike ball bearing, a tilt will not result in a misalignment and any failure as a result of the tilt will be prevented. So, the engagement serves to provide a sliding platform and prevents failure during to a tilting motion.

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Alternatively, the pin and the column may be made from mild steel.

Alternatively, the pair of rotatable plates and bushing may be made from brass.

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Alternatively, the pair of rotatable plates may be made from mild steel.

One advantage of using bushings instead of ball bearings to allow axial rotation, is that a slight tilt on a load acting on a rotating apparatus with ball bearing installed, will cause the apparatus to stop working, as the ball bearings are no longer aligned and is unable to provide a rotational motion. Since the bushings are adjacent to one another, so when a tilt occurs there may be a lesser chance of a misalignment. Brass also serves to provide to reduce the frictional forces between the two rotatable members.

In a third aspect of the invention provides a method of deploying modular units, the method comprising the steps of providing a primary modular unit, pivotally moving at least one secondary modular unit on the primary modular at one end, wherein the moving moment allows lateral movement of the at least one second modular unit from a retracted position to an extended position, and in the extended position, the at least one secondary modular unit projects from the primary modular unit.

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Brief Description of Drawings

The invention will be described in detail with reference to the accompanying drawings, in which:

5 **Fig. 1** shows a perspective view of a modular structural assembly according to one embodiment of the invention;

Fig. 2 shows a perspective view of a primary modular unit according to one embodiment of the invention;

10 **Fig. 3** shows a perspective view of a secondary modular unit according to one embodiment of the present invention;

Fig. 4 shows a perspective view of a secondary modular unit according to one embodiment of the present invention;

Fig. 5 shows a top view of a modular structure assembly according to another embodiment of the invention;

15 **Fig. 6** shows an exploded view of an engagement apparatus according to one embodiment of the present invention;

Figs. 7-11 show several perspective views of a modular structure assembly according to embodiments of the invention;

20 **Fig. 12** shows a perspective view of an engagement apparatus according to one embodiment of the present invention.

Detailed Description of Embodiments of the Invention

25 In the following description, numerous specific details are set forth in order to provide a thorough understanding of various illustrative embodiments of the invention. It will be understood, however, by the skilled person that embodiments of the invention may be practiced without some or all of these specific details. It is understood that the terminology used herein is for the purpose of describing particular embodiments only, and is not intended to limit the scope of the invention. In the drawings, like reference

numerals refer to same or similar functionalities or features throughout the several views.

5 In this embodiment, the modular units may be fabricated from hot or cold formed steel members or mild steel members.

10 In an alternative arrangement, the modular units may be fabricated from pre-cast concrete panels. Other known building materials may be used, whilst still within the scope of the invention.

15 In general terms, the invention seeks to provide a modular structural assembly having a primary modular unit and at least one secondary modular unit. The at least one secondary modular unit pivotally mounted to the primary modular unit at one end, wherein actuating the at least one secondary modular from a retracted position to an extended position, so that in the extended position at least a part of the at least one secondary modular unit projects from the primary modular unit. In the retracted position, the at least one secondary modular unit is wholly within the primary modular unit such that the at least one secondary modular unit is nested within the primary modular unit.

20 In one embodiment of the invention, a modular structure assembly comprising a primary modular unit 100 arranged to receive at least a first secondary modular unit 200, the at least the first secondary modular unit 200 pivotally mounted to the primary modular unit 100 at a one end, wherein the at least the first secondary modular unit 200 is arranged to selectively actuate from a retracted position to an extended position so that 25 in the extended position, at least a part of the at least the first secondary modular unit 200 projects from the primary modular unit 100.

Alternatively, the primary modular unit 100 may be arranged to receive at least a first and second secondary modular unit 200, 300.

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Alternatively, the primary modular unit 100 may be arranged to receive a second secondary modular unit 300 pivotally mounted on the first secondary modular unit 200 wherein the modular units 200, 300 pivot about a center of an axis of one end of the primary modular unit 100. So that the second secondary modular unit 300 is stacked on top of the first secondary modular unit 200.

Alternatively, the primary modular unit 100 may be further arranged to receive the first secondary modular unit 200 is arranged to pivot within a first horizontal plane, and the second secondary modular unit 200 is arranged to pivot within a second horizontal plane.

Alternatively, the first secondary modular unit 200 and the second secondary modular unit 300 are arranged to project from opposed sides of said primary modular unit 100.

Alternatively, the shape of the primary modular unit 100 and the secondary modular unit 200 may be different.

Alternatively, the shape of the primary modular unit 100 and the secondary modular unit 200 are the same.

Alternatively, the dimensions of the primary modular unit 100 and the secondary modular unit 200 are the same.

Alternatively, the dimensions of the primary modular unit 100 and the secondary modular unit 200 are the different.

Alternatively, the assembly may include an engagement apparatus 600 according to the present invention.

According to one embodiment of the invention, a primary modular unit 100 which is a prefabricated volumetric construction module having secondary modular units which are extendable modules 200, 300 are provided and illustrated in Figs. 1 to 3 and 5. The first and second secondary modular units 200, 300 are provided and illustrated in Figs. 3 to 4. The engagement apparatus 600 is provided and illustrated in Fig. 6. The primary modular unit 100 includes a plurality of columns and beams, the columns 204, 206, 212, 216, 226, 234 are joined together to provide a self-supporting structure. The self-supporting structure at least defines a top, a bottom, opposite sides and opposite ends. Upper beams may be provided as top rails 218, 228, and lower beams may be provided as bottom rails 230, 232, 238. The arrangement and shapes of the primary modular unit 100 and the secondary units 200, 300 are shown in Figs. 7-11. A pylon having an engagement apparatus 600 mounted one end of a primary modular unit 100 is shown in Fig. 12.

In one embodiment, the primary modular unit 100 may further include one or more cross-bracings 224, 240 joining the beams 218, 228, 230, 232, 238 and columns 204, 206, 212, 216, 226, 234. The primary modular unit 100 further includes a plurality of corner castings 208, 214, 220, 246 and 228, 236, 244. The pairs of corner castings 208, 214, 220, 246 and 228, 236, 244 are arranged at corners of the primary modular unit 100 (see Fig. 2). In an alternative embodiment, it is to be appreciated that more than one pairs of corner castings may be employed at a corner of the primary modular unit 100.

As illustrated in Fig. 1, the primary modular unit 100 having a first secondary modular unit 200 and a second secondary modular unit 300 pivotally engaged to the primary modular unit 100 by an engagement apparatus 600. In one embodiment, at least two columns 404, 408 of the second secondary modular unit 300 are engaged to the beams 238 and 230 of the primary modular unit 100. Accordingly, while a pivot column 406 is engaged to the opposite beam of the primary modular unit 100 is arranged to allow the second secondary modular unit 300 to pivot about a center of rotation adjacent

to an end of the primary modular unit 100, which is in this case is the vertical axis of column 406, allowing the second secondary modular unit 300 to pivot into the primary modular unit 100 and thus nesting in the primary modular unit 100.

5 In an alternative embodiment, the second secondary modular unit 300 may be provided with a pivot column 406 at both ends of the second secondary modular unit allowing both columns 404, 408 of the extendable second module to pivot into the primary modular unit 100. In another alternative embodiment, the engagement assembly includes a column attached to the upper and lower beam of primary modular unit 100,
10 the column having a rotatable base, the extendable module is engaged to the column allowing the extendable module to slide up and down the beams of primary modular unit 100.

 In one embodiment, a second secondary modular unit 300 may be provided,
15 where the second secondary modular unit 300 is arranged to pivot about a center of rotation adjacent to an end of the primary modular unit 100.

 Alternatively, the first and second secondary modular units 200, 300 may be arranged to pivot about a center of rotation adjacent to an end of the primary modular
20 unit 100, where the center of rotation of the first and second secondary modular units 200, 300 may be located at the same end.

 Alternatively, the first and second secondary modular units 200, 300 may be arranged to pivot about a center of rotation adjacent to an end of the primary modular
25 unit 100, where the center of the second secondary modular unit 300 may be located at opposed end to the center of rotation of the first modular unit 200.

 While the primary modular unit 100 of Figs. 1 and 2 are illustrated as having cuboid shape, it will be appreciated that the primary modular unit 100 may take on other
30 shapes.

Alternatively, the second secondary modular unit 300 may be stacked on top of the first secondary modular unit 200 wherein the modular units 200, 300 are pivotally mounted to one end of the primary modular unit 100, and arranged to pivot about the center of rotation about the one end of the primary modular unit 100.

Alternatively, the first secondary modular unit 200 may be pivotally mounted to the primary modular unit 100 at one end in a first plane, and the second secondary modular unit 300 may be pivotally mounted to the primary modular unit 100 at another end in a plane different from the first plane.

Alternatively, the first secondary modular unit 200 may be pivotally mounted to the primary modular unit 100 at one end and movably mounted to the primary modular unit 100 at opposed end.

Alternatively, the first secondary modular unit 200 may be pivotally mounted to the primary modular unit 100 to pivot about the center of rotation of the primary modular unit in a clockwise direction and the second secondary modular unit 300 may be pivotally mounted to the primary modular unit 100 to pivot about the center of rotation primary modular unit in an anti-clockwise direction.

Alternatively, the first secondary modular unit 200 may be pivotally mounted to the primary modular unit 100 to pivot about the center of rotation of the primary modular unit in an anti-clockwise direction and the second secondary modular unit 300 may be pivotally mounted to the primary modular unit 100 to pivot about the center of rotation primary modular unit in a clockwise direction.

Referring to Fig. 3, the first secondary modular unit 200 includes a plurality of columns and beams, the columns 304, 314, 318 joined together to provide a self-supporting structure. The self-supporting structure at least define a top, a bottom,

opposite sides and opposite ends. Upper beams may be provided as top rails 318, 320, and lower beams may be provided as bottom rails 310, 306, 312. A pivot column 314 is arranged at corner of the first secondary modular unit 200 (see Fig. 3). In an alternative embodiment, it will be appreciated that more than one pivot column 314 may be employed at each corner of the module 200.

Referring now to Fig. 4, the second secondary modular unit 300 includes a plurality of columns and beams, the columns 410, 414 joined together to provide a self-supporting structure. The self-supporting structure at least define a top, a bottom, opposite sides and opposite ends. Upper beams may be provided as top rails 410, 412, and lower beams may be provided as bottom rails 402, 418, 420. The second secondary modular unit 300 may further include one or more cross-bracings 416 joining the beams 402, 418, 420, 410, 412 and columns 410, 414. A pivot column 410 is arranged at corner of the second modular unit 300 (see Fig. 4). In an alternative embodiment, it will be appreciated that more than one pivot column 140 may be employed at each corner of the primary modular unit 100.

While the first and second secondary modular units 200 and 300 of Figs 3 to 4 are illustrated as having triangular shape, being a convenient shape in which to nest multiple extendable modules within the module, it will be appreciated that the first and second secondary modular units 200 and 300 may take on other shapes.

Accordingly, such an arrangement allows expansion of additional modules, allowing the installation of additional rooms in an apartment. In addition, shipping of the primary modular unit 100 of the present invention allows shipping with first and second secondary modular units 200, 300 encapsulated in the primary modular unit 100 during transportation, this greatly reduces the cost of having to transport three separate modules. Moreover, the pivoting mechanism of the present invention, allows the extendable modules to be rapidly build in-situ with minimal manpower. Further, the extendable modules may be of any shape which provides a bespoke option.

As illustrated in Fig. 5, the first secondary modular unit 200 and the second secondary modular unit 300 are arranged in the same plane, such that when the first secondary modular unit 200 and the second secondary modular unit 300 are in an extended position, the modular units 200, 300 are opposed.

Alternatively, according to one embodiment of the present invention, the modular platform 500 comprising a primary modular unit 100, said primary modular unit 100 having an engagement device 201, 202 for receiving at least one secondary modular unit 200, 300, wherein the at least one secondary modular unit 200, 300 is configured to engage the engagement device 201, 202 to pivot about the center of the engagement device 201, 202, such that the at least one secondary modular unit 200, 300 moves from a retracted position to an extended position and in the extended position, the at least one secondary modular unit 200, 300 extends from the primary modular unit 100.

Alternatively, the first secondary modular unit 200 is arranged to receive a second secondary modular unit 300, said second secondary modular unit 300 pivotally mounted to first secondary modular unit 200 at one end.

Alternatively, the first secondary modular unit 200 is arranged to pivot with a first horizontal plane, and the second secondary modular unit 300 is arranged to pivot within a second horizontal plane.

Referring to Fig. 6, the engagement apparatus 600 includes a column 406 having a hollow core, said column 406 is welded or otherwise fixed to a first side of a column mounting plate 604 forming a first rotatable plate 601, said column mounting plate 406 having a first cavity dimensioned for receiving a column bushing 606 on a second side, said column bushing 606 having a first aperture arranged to receive a pin 612. The column 406 may be in a tubular shaped configuration. The diameter of the column

bushing 606 is configured to be smaller than the diameter of the first cavity of the column mounting member 604 such that at least a part of the column bushing 606 is arranged to protrude and extend through the first cavity. The column bushing 606 includes a circumferential flange that is larger than the diameter of the column mounting plate 604. The column bushing 606 is sized to move freely within the first cavity of the mounting plate 604 by welding or adhesive or screw, rivets or fasteners. The column 406 may be mounted and attached to the column mounting plate 604 by welding or adhesive or screw, rivets or fasteners. The apparatus further includes a base bushing 608 having a circumferential flange at one end, and a second aperture for receiving the pin 612. A bushing mounting plate 610 includes a second cavity dimensioned to receive the base bushing 608, wherein at least part of the base bushing 608 protrudes through the cavity of the bushing mounting plate. The flange of the base bushing 608 prevents the bushing 608 from completely entering the bushing mounting plate 610. The base bushing 608 may sit within the bushing mounting plate 610 and so to rotate relative to the plate 610. The pin 612 includes one end with a diameter smaller than the opposed end. The circular shaped pin 612 is dimensioned to have a diameter smaller than the inner core of the column 406. The pin extends into bushings 606, 608 and plates 604, 610, where at least a part of the pin 612 extends into the column 406.

In one embodiment, the apparatus comprising opposing first and second rotatable plates 601, 603 such that first and second rotatable plates abut each other, said first rotatable plate 601 includes a first cavity dimensioned to receive a column bushing 606, said second rotatable plate 603 includes a second cavity dimensioned to receive a base bushing 608, wherein said base bushing 608 sits within the second rotatable plate 603 so as to rotate relative to the second rotatable plate 603.

In one embodiment, the first rotatable plate 601 or the second rotatable plate 603 is attached to one end of the modular structure assembly 100.

Alternatively, a space may be formed between the base bushing 608 and the column bushing 606 such that the bushings do not touch one another.

Alternatively, the first rotatable plate 601 is coupled to the second rotatable plate
5 603.

Alternatively, the first rotatable plate 601 includes a column 406 attached to a column mounting plate 604.

10 Alternatively, the second rotatable plate 603 includes a pin 612 and a bushing mounting plate 610, said pin 612 extends into the first rotatable plate 601.

Alternatively, the column bushing 606 is sized to move freely within the first cavity of the first rotatable plate 601.

15 Alternatively, at least part of the pin 612 protrudes the second rotatable plate 603 such that the protruded part coupled with the column 604.

Alternatively, the column 406 may be arranged to receive the pin 612.

20 Alternatively, the plates 604, 610 may be circular shaped or any other shapes.

Alternatively, the column 406, column mounting plate 604, bushing mounting plate 610 and pin 612 may be made of steel. The column bushing 606 and the base
25 bushing 608 may be made of brass.

Referring to Fig. 7, Fig. 7 shows a modular assembly structure 700 according to one embodiment of the present invention, the structure having a primary modular unit

708 having a rectangular shaped arranged to receive a plurality of secondary modular units 702, 704, 706 on the same plane. The secondary modular units 702, 704, 706 having a rectangular shaped are pivotally mounted to the primary modular unit 708 at one end in the same plane. The secondary modular units 702, 704, 706 are configured to pivot about the center of rotation about the rotation in a first plane from a retracted position to an extended position. In the extended position, at least a portion of the secondary modular units 702, 704, 706 extends the primary modular unit 708.

Alternatively, the secondary modular units 702, 704, 706 may be of the different shapes or sizes.

Referring to Fig. 8, Fig. 8 shows a modular assembly structure 800 according to one embodiment of the present invention, the structure having a primary modular unit 802 having a rectangular shaped arranged to receive a plurality of secondary modular units 804, 806 on the same plane. The secondary modular units 804, 806 having a square shaped are pivotally mounted to the primary modular unit 802 at one end in the same plane. The secondary modular units 804, 806 are configured to pivot about the center of rotation about the rotation in a first plane from a retracted position to an extended position. In the extended position, at least a portion of the secondary modular units 804, 806 extends the primary modular unit 802.

Alternatively, the secondary modular units 804, 806 may be of the different shapes or sizes.

Referring to Fig. 9, Fig. 9 shows a modular assembly structure 900 according to one embodiment of the present invention, the structure having a primary modular unit 902 having an octagonal shaped arranged to receive a secondary modular unit 904. The secondary modular unit 904 having a hexagon-like shaped is pivotally mounted to the primary modular unit 902 at one end in the same plane. The secondary modular unit 904 is configured to pivot about the center of rotation about the rotation in a first plane from

a retracted position to an extended position. In the extended position, at least a portion of the secondary modular unit 904 extends the primary modular unit 902.

Referring to Fig. 10, Fig. 10 shows a modular assembly structure 1000 according to one embodiment of the present invention, the structure having a primary modular unit 1002 having a circular shaped arranged to receive a secondary modular unit 1004. The secondary modular unit 1004 having a circular-like shaped is pivotally mounted to the primary modular unit 1002 at one end in the same plane. The secondary modular unit 1004 is configured to pivot about the center of rotation about the rotation in a first plane from a retracted position to an extended position. In the extended position, at least a portion of the secondary modular unit 1004 extends the primary modular unit 1002.

Referring to Fig. 11, Fig. 11 shows a modular platform 1100 according to one embodiment of the present invention having a plurality of modular structure assembly, said plurality of modular structure comprises at plurality of primary modular units 1108, 1110, 1112 and a plurality of first and second secondary modular units 1102, 1104, 1106, 1114, 1116, 1118. The plurality of primary modular units 1108, 1110, 1112 having a first and a second engagement apparatus (not shown) in the same plane, said first and second engagement apparatus arranged to receive the plurality of first and second secondary modular units 1102, 1104, 1106, 1114, 1116, 1118. The first engagement apparatus and the second engagement apparatus may be attached to the primary modular unit 1112, 1110, 1108 at one end and the second engagement apparatus may be attached to the primary modular unit 1112, 1110, 1108 an opposed end in the vertical axis, wherein the plurality of first and second secondary modular units 1102, 1104, 1106, 1114, 1116, 1118 are configured to engage the first and second engagement apparatus so as to pivot about the center of rotation of the vertical axis of the engagement apparatus, such that the plurality of first and second secondary modular units 1102, 1104, 1106, 1114, 1116, 1118 move from a retracted position to an extended position, and in the extended position, the plurality of first and second secondary

modular units 1102, 1104, 1106, 1114, 1116, 1118 extend from the primary modular unit 1112, 1110, 1108. The modular structure assembly may be clustered together by stacking the modular structure assembly vertically and/or arranged adjacently forming a three level structure.

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Alternatively, the modular structure assembly may be clustered together, at a distal end may comprise a vertically arranged modular structure assembly and at a proximate end may comprise a vertically arranged modular structure assembly, therebetween a plurality of primary modular units coupling the both ends.

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Alternatively the modular platform may comprise a plurality of modular structure assembly according to one embodiment of the present invention, said plurality of modular structure having a plurality of primary modular units and a plurality of secondary modular units, wherein each modular structure assembly are coupled in one plane so as to form a cluster.

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Alternatively, the plurality of secondary modular units include at least two secondary modular units attached to a primary modular unit.

20 Referring to Fig. 12, Fig. 12 show a pylon 1200 having an engagement apparatus 600 mounted to one end and an engagement apparatus 600 mounted to the opposed end of the primary modular unit 1200. The column is arranged to pivot about the center of an axis of the primary modular unit 100. The column may be arranged to engage a secondary modular unit 200, said secondary modular unit 200 is arranged to
25 actuate from a retracted position to an extended position. In the extended position, the pylon is configured to withstand the rotation load and cantilevered weight of the secondary modular unit 200.

The system may include a method of deployment for modular structure assembly, the method comprising the steps of providing a primary modular unit, pivotally mounting at least one secondary modular unit on the primary modular unit at a one end, wherein the moving monument allows rotational movement of the at least one
5 secondary modular unit from a retracted position to an extended position, and in the extended position, the at least one secondary modular unit extends from the primary modular unit.

It is to be understood that the embodiments and features described above should
10 be considered exemplary and not restrictive. Many other embodiments will be apparent to those skilled in the art from consideration of the specification and practice of the invention. Furthermore, certain terminology has been used for the purposes of descriptive clarity, and not to limit the disclosed embodiments of the invention.

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Claims

1. A modular structure assembly comprising:
 - a primary modular unit arranged to receive at least a first secondary modular unit;
 - 5 the at least the first secondary modular unit pivotally mounted to the primary modular unit at one end;
 - wherein the at least the first secondary modular unit is arranged to selectively actuate from a retracted position to an extended position so that in the extended position, at least a part of the at least first secondary modular unit projects from
 - 10 the primary modular unit.
2. The assembly according to claim 1, wherein the primary modular unit is arranged to receive at least first and second secondary modular unit.
- 15 3. The assembly according to claim 1, wherein the first secondary modular unit is arranged to receive a second secondary modular unit, said second secondary modular unit pivotally mounted to first secondary modular unit at one end.
- 20 4. The assembly according to claim 3, wherein the first secondary modular unit is arranged to pivot with a first horizontal plane, and the second secondary modular unit is arranged to pivot within a second horizontal plane.
- 25 5. The assembly according to claim 1, wherein the at least one secondary modular unit and the at least other secondary modular unit are arranged to project from opposed side of said primary modular unit.

6. The assembly according to claim 1, wherein the shape of the primary modular unit and the secondary modular unit are different.
- 5 7. The assembly according to claim 1, wherein the shape of the primary modular unit and the secondary modular unit are the same.
8. The assembly according to claim 1, wherein the assembly includes an engagement apparatus according to claim 9.
- 10 9. An engagement apparatus for a modular structure assembly, the apparatus comprising:
- opposing first and second rotatable plates such that first and second rotatable plates abut each other;
- 15 said first rotatable plate includes a first cavity dimensioned to receive a column bushing;
- said second rotatable plate includes a second cavity dimensioned to receive a base bushing;
- wherein said base bushing sits within the second rotatable plate so as to rotate
- 20 relative to the second rotatable plate.
10. The apparatus according to claim 9, wherein the first rotatable plate includes a column attached to a column mounting plate.

11. The apparatus according to claim 9, wherein the second rotatable plate includes a pin and a bushing mounting plate, said pin extends into the first rotatable plate.
12. The apparatus according to claim 10, wherein the column bushing is sized to move freely within the first cavity of the first rotatable plate.
13. The apparatus according to claim 9, wherein the bushings are made of brass.
14. A modular platform comprising :
- a plurality of modular structure assembly according to claims 1 to 8, said plurality of modular structure having a plurality of primary modular units and a plurality of secondary modular units;
- wherein each modular structure assembly are coupled in one plane so as to form a cluster.
15. The modular platform according to claim 14 wherein the plurality of secondary modular units include at least two secondary modular units attached to a primary modular unit.
16. A method of deployment for modular structure assembly, the method comprising the steps of:
- providing a primary modular unit;
- pivotally mounting at least one secondary modular unit on the primary modular unit at a one end;

wherein the moving monument allows rotational movement of the at least one secondary modular unit from a retracted position to an extended position, and in the extended position, the at least one secondary modular unit extends from the primary modular unit

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