

## Longterm Outdoor Shelter

### The structure as shown is 14 ft dia.

Using a "T-10" parachute as a covering, this entire assembly weighs less than 20 kilos, easily handled by one person. Disassembled, it will fit in a standard GI duffle bag. (Sea Bag) Assembled, it may be moved or rotated by two people. Erection time is on the order of two hours for two people. The frame is free standing, uses no fasteners or glue, and is most aerodynamic in shape. The structure pictured has withstood 30 knot winds without anchors. Rounded shape is easily camouflaged.

Usable interior space is on the order of 150 sq feet, equivalent to a 12 x 12 room. In field use, it has housed 4 men in moderate comfort. A significant factor in this comfort is the high 8 ft+ headroom.

Crew Housing:	6 bunks (stacked); 10 men "hot racking"
Control / Communications:	2 bunks plus equipment tables
Equipment storage/ shop:	Max 22 ft dia will cover a full size pickup Including working space on both sides

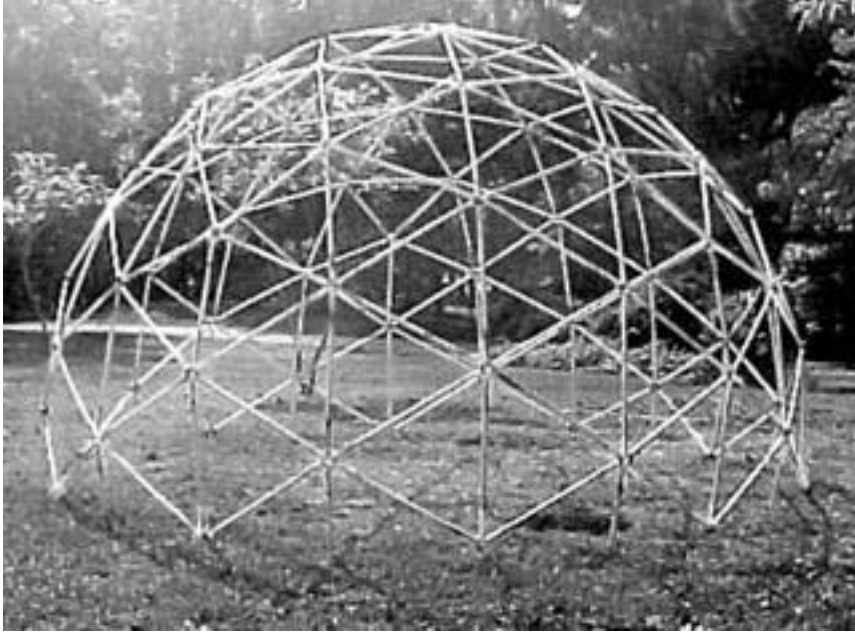
#### Sizes:

Standard size is slightly less than 14 ft diameter, approx 100 inches tall.

Smaller size is not recommended as a practical structure, but may be made as small as 8 ft diameter, center height approx 5 ft.

Largest size recommended is 22 ft dia; the kit would contain pieces up to 4 ft length and weight would increase proportionally. Covering would still be a T-10 parachute, but would require skirts even in mild weather.

83 inch frame kit (166 inch dia.; pictured) Frame only, no cover	500
Hub Kit; including cutting and erection instructions Buy your own pipe, cut per instructions for any size 48" to 130" Radius	300
Custom size frame kit (up to 130" Radius)	600



## Erecting the Dome

Start by clearing an erection site. The dome itself will require a circle some fourteen feet in diameter. An extra foot or more leaves room to work around the structure as it takes shape. While it can be erected on a light slope, level ground is recommended. A shallow ditch some four inches deep will add to the stability of the structure as well as provide better drainage, if it is to be used for an extended period.

Near the center of the clearing, lay out the various parts in separate piles. The kit contains extra parts, the plastic tends to be brittle in extremely cold weather. It is normal to have a few pieces left over. The kit contains the following:

Blue Hubs:	6 Pcs
Red Hubs	36 PCs
Green Hubs	36 PCs

Green hubs have a strut permanently attached.

GREEN Hubs (5 hole)	8 Pcs
Green-Green Struts	30 PCs
Red-Green Struts	105 PCs
Red-Red Struts	40 PCs
Yellow Struts	10 PCs

The dome will be erected without a door. When it is raised into its final shape, a door will be opened. During erection, struts WILL pull out of hubs. This is frustrating, becoming more so as the process proceeds. Be patient, reconnect them, and try to "grin and bear it". The end result is well worth the effort. There is a way to raise the dome without the loose joints and without help. The method is rather slow and requires intimate knowledge of the geometry of the structure. Although frustrating, the following procedure is the least difficult. Struts of different colour coding are NOT interchangeable. Each length is an integral part of the "geodesic" structure.

Start with a BLUE hub and a GREEN hub, with the strut attached. Observe that the strut is in the GREEN hub at a slight angle. The BLUE hub is attached to the other end of the strut at the same angle. Be sure the hub angles complement each other. With the strut lying flat, both hubs should kick up ten degrees. Attach four more GREEN hubs, forming a five sided spider.

Flipped over, the BLUE hub should be supported some six to eight inches high by five legs. Make note that the GREEN hubs angle down, increasing the angle of the struts. Attach GREEN-GREEN struts between each GREEN hub. The end result will be a five sided figure with the center (BLUE) elevated slightly. Make six of these. Double check the hub angles (dihedral) make the sections of a curve.

Set aside five of the pents (5 sided figures). Place one on the ground with the BLUE hub down. Attach three RED-GREEN struts to each GREEN hub. Until you are familiar with the mechanics of this structure, be sure to match colour for colour, strut to hub. With three RED-GREEN struts attached to each of the Green hubs, attach RED hubs to the ends of the struts. The struts will fall at sixty (60) degree intervals, the joints having two or three struts connecting to a common hub. Attach a RED-RED strut between each RED hub to complete four of the five sides of the figure.

You should now have a five sided figure that is open on one side and is quite large and cumbersome. If a tree or vehicle is handy, propping the large pent will help later. Follow the above directions to erect four more of the large pents.

The sixth pent will have no hubs on the ends of the RED-GREEN struts. Otherwise, it is constructed the same as the first five.

## FINAL ASSEMBLY

With five large pents erected, plus a sixth with no perimeter, we are ready to start assembly.

Take a pent in hand such that the BLUE hub is bulged out away from you. Place one corner on the ground such that the top edge is horizontal and the open edge is at the 11:00 o'clock position. Place against a prop; a tree, vehicle, or a helper works well. Stand a second pent in the same orientation alongside and to the right of the first. Both should tilt inward slightly. Connect the side with no hubs to the adjacent side of the first pent. The two pents will share the hubs and struts along this edge. Shift the assembly until it will remain propped on its own.

Take a third pent and attach to the first two, using the same process. The structure, with a little adjustment, will be free standing. Attach a fourth pent, making a reasonably stable structure.

At this point, the form and size of the structure will have become apparent. It is recommended that the top chords be installed now. Doing so allows the top to be set in place as a single piece. Set the last large pent into position and connect the struts to form a ball like structure.

There are several GREEN hubs that have only five (5) holes drilled. May be six, with one plugged or drilled undersize. Neither do they have struts attached. With the odd hole pointing downward, attach three (3) GREEN-RED struts to fill in the triangular gaps along the lower sides of the dome, making ten (10) smaller triangular openings.

There are ten (10) half struts. These are inserted into the RED hubs at the apex of the lower openings to form a lower perimeter of twenty segments.

## ANCHORING

If the structure is to be anchored, it should be done now. If let into a ditch, smooth out the ditch to match the perimeter. Let the structure find its own form, do not force it to conform to a non-circular or irregular perimeter. Working around the outside edge, lift the frame to permit it to shift into position. Make at least three passes, or more, until all the forces equalize.

Anchors may be iron pins or pieces of wood. Length should be greater than eight inches, more depending on the density of the ground. A good form is a "checkmark" shaped piece cut from a tree branch inserted through each of the ten hubs that contact the ground. Ten more straight pieces may be inserted under the short struts such that the strut fits over the anchor, preventing sideways movement.

Now is the time to place the door. If the local wind is known, place the door on the lee side. If the wind is not known, place the door to the south, bearing east a little. Bottom line, put it where you need it.

A normal sized door starts with a BLUE hub. Remove the BLUE hub on the side desired. Remove the GREEN hub immediately below. Remove the RED hub at ground level. This will reveal a roughly square opening. Remove the struts extending into the opening. If the structure is to be permanent, the four struts between the BLUE hub and the connecting GREEN hubs may be cut. This is not recommended. Replace the GREEN hubs with the extra hubs to finish off the opening.

A shorter but wider door may be opened by removing an area between two BLUE hubs, creating an arch like opening. Use whichever is most appropriate for your application.

## COVERING

Climate is what you expect; weather is what you get. Depending on the expected weather, lower coverings may be added or deleted to provide airflow as needed.

On domes from 60 to 100 inch size (radius), a T-10 parachute will fit snug at the top, becoming looser toward the bottom. Pull the parachute into place, but do not tie it off. Pull the center shrouds through the BLUE hub in the top such that the opening in the canopy is about a foot across. Tie off the shrouds to the inside of the frame.

If skirts are to be used, attach them now. Extra length should be gathered near the door, for later use. If the dome is let into a ditch, place the skirts into the ditch, then backfill into a berm to help shed ground water. To make tie points in the skirts, do not cut a slot. Place a small stone, about an inch across, into a dimple in the skirt material. Tie it off inside to make a knot, then tie the cord to the framework. This will help draw up the excess length along the upper edge of the skirt material.

If the weather is warm, pull the canopy out to a flaring shape, using the shrouds as you would tent shrouds, holding the edge out from the frame, leaving space for airflow.

If cold is expected, the canopy shrouds may be tied to stones or heavy pieces of wood such that they hang straight down.

The opening at the crown of the dome provides ventilation sufficient that a small fire or heater may be used inside. Be careful to leave space for air intakes between the canopy and the skirt.

## CAMOFLAUGE

If the application is such that camouflage is desirable, careful attention should be paid the overhead profile. A secondary covering may be hanged overhead to break the circular outline. Be sure to leave air space over the crown. From ground level, the semicircular form lends itself well to a dense brush thicket. Netting should be sufficient.

## MISCELLANEOUS NOTES

If the climate is such that mosquitos are a problem, attach mosquito netting above the skirt line before the canopy is pulled into place. Draw it tight using the suggested method for skirting. After attaching the skirting, utility tape may be used to seal the net to the skirt. This is only practical if a double door or vestibule arrangement is used.

Depending again on weather, the excess canopy may be pulled out from the door to form a roof, or left hanging with weights to make it more weather tight.

The excess skirt may be pulled out to form part of a vestibule as needed for mosquito netting.

If a fire or heater is used inside, place it in the center. This to provide the best draft through the canopy. Remember that 'Carbon Monoxide' is heavier than air, and will settle into low areas.