

# ***New Solar Telescope Telescope Enclosure***

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# ObservaDome

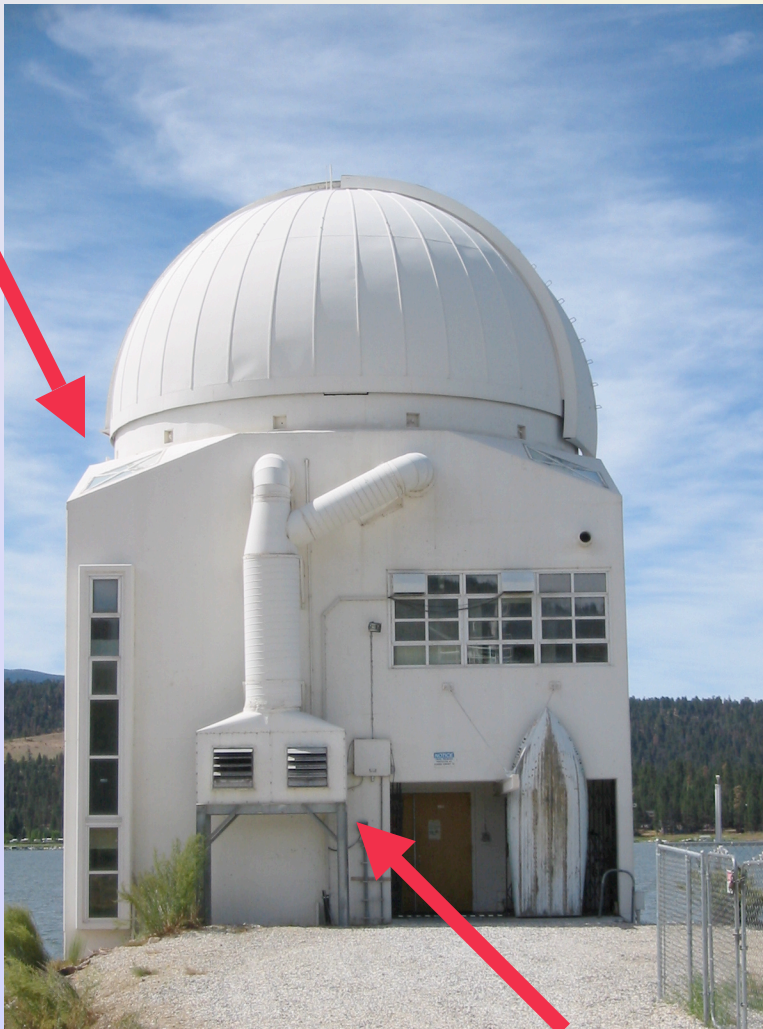
- ❑ 30 ft diameter double skin insulated aluminum dome with 36" cylindrical section \$234,400
- ❑ Fixed base angle ring \$7,200
- ❑ Electrically operated shutter \$150,000
- ❑ Power bars: shutter/ground \$7,900
- ❑ DC variable speed motor \$7,300
- ❑ Control console: shutter/windscreen control \$7,300
- ❑ Friction drive encoder \$7,300
- ❑ Titanium dioxide paint \$3,000
- ❑ Electrically operated valve \$3,000
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- ❑ Shipping \$12,800
- ❑ Labor \$63,000
- ❑ **Total cost \$411,200**
- ❑ Design and implementation of an up-and-over type shutter \$150,000



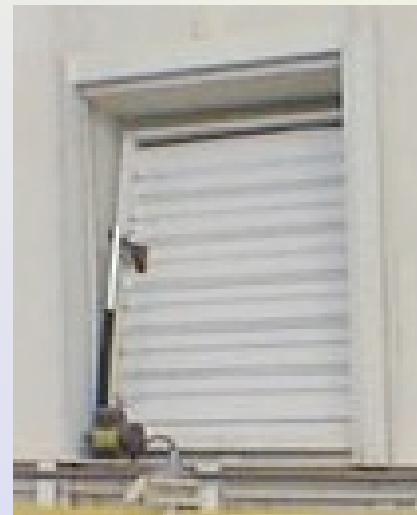
# *Modification of Existing Dome*

- Removal of cabinets
- Louvers
- Fans
- Air conditioning
- Insulation
- Encoder for dome rotation
- Windscreen
- Modification of up-and-over dome shutter

# ***BBSO – Dome Shutter/Window Fans***

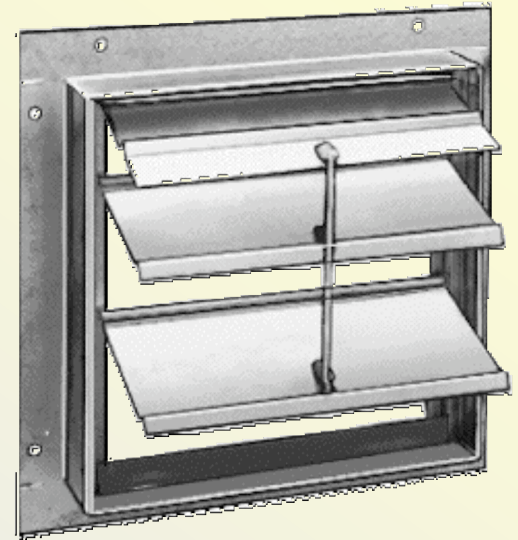


# ***KPNO – 0.9 Meter Telescope***



# Louvers 24" □ 24"

- ❑ Built to last, these shutters have 24-ga. aluminum blades. Maximum velocity is 2500 fpm. Temperature range is -20° to +130° F.
- ❑ **Aluminum Frame:** Frame is extruded, corrosion-resistant aluminum which is .063" thick except for drop-in mount shutters which have .05" thick frames. Frame depth is 1 7/8" for surface- and recessed-mount shutters and 1 3/8" for drop-in mount.
- ❑ **Galvanized Steel Frame:** Frame is 14-ga. steel, our strongest. Frame depth is 1 3/8".
- ❑ **Gravity Operated:** Also called automatic, these shutters stay open as long as air flows against the blades.
- ❑ **Pull Chain:** Also called manual, these shutters open and close with a tug on the pull chain.
- ❑ **Motorized:** Their 115 VAC motor opens and closes these shutters.



**\$200 each**

# *(Foam) Insulation*

- ❑ **K factor (thermal conductivity):** Rates the ability of a material to conduct heat. The lower the  $K$  factor, the greater the insulation value.
- ❑ **R value (thermal resistance):** The higher the  $R$  value, the greater insulation value. Calculate  $R$  value by dividing the thickness of a material by its  $K$  factor.
- ❑ **Example 1:** Melamine (flame resistant)  $K = 0.26$  Btu/hr/in @  $24^\circ\text{C}$   
 $\Rightarrow R = 7.7$  @ 2" thickness ( **$\$55/\text{m}^2 \Rightarrow$  total material cost =  $\$8,500$** )
- ❑ **Example 2:** Polyurethane foam  $K = 0.17$  Btu/hr/in @  $24^\circ\text{C}$   
 $\Rightarrow R = 12$  @ 2" thickness ( **$\$35/\text{m}^2 \Rightarrow$  total material cost =  $\$5,500$** )
- ▼ Rigid phenolic foam insulation has the highest  $R$  value of 8.3 per inch in a closed cell version.
- ▼ Interior applications require that it be covered with an appropriate fire rated material. Specialized equipment and experienced contractors required for large projects. UV (ultra violet) light degradation can occur if not protected from sunlight. Must be protected from prolonged exposure to water/moisture.

# ***BBSO – Interior Support Structure***

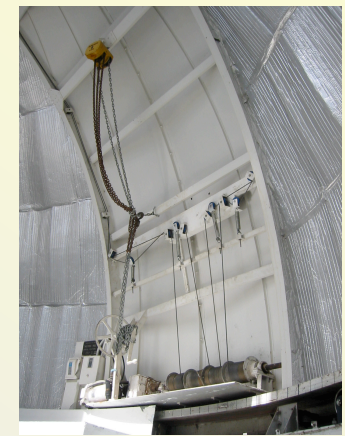




# ***BBSO – Dome Drive***



# ***BBSO – Dome Shutter***



# ATST – Dome Shutter

