University of Arizona Mirror Lab
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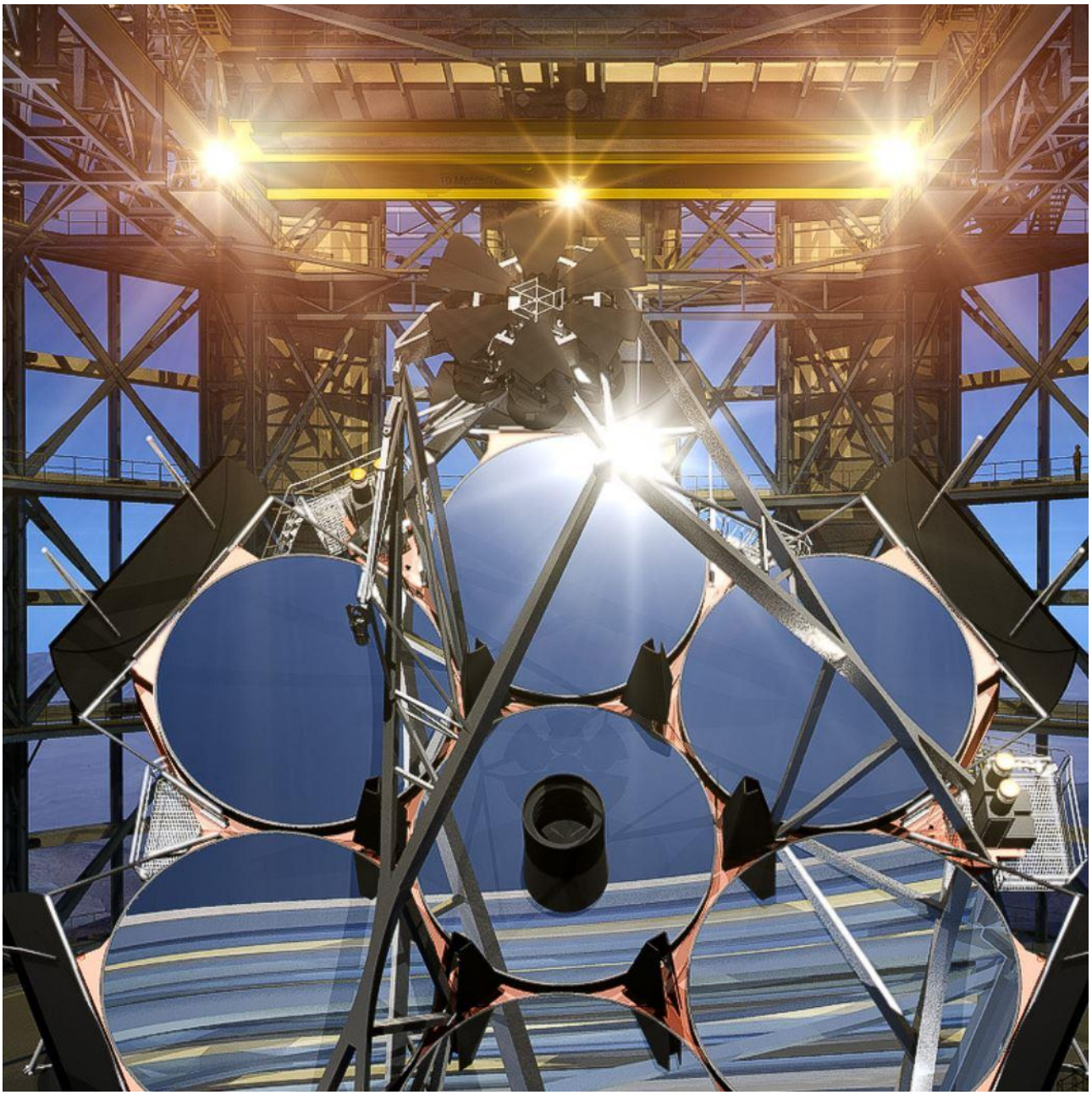
The University of Arizona has many world-renowned activities, but one of the least known is the Richard F. Caris Mirror Lab.

Although relatively unknown, even on the University of Arizona campus, it is an important piece of the lengthy process of creating a large mirror for a telescope.

It’s important because the mirror must be perfect as to its parabolic shape. A telescopic mirror captures light from an object and reflects it to a lens. There are many rays from the mirror which combine to form an image. A parabolic surface causes all the rays to be focused on one spot, the lens.

The Giant Magellan telescope mirror is cast in six parts. The second part has been cast, polished, packaged and shipped for storage before the other parts are complete.



There are three stages to the creation of a mirror, such as those created at the Mirror Lab. The most recent mirror is destined to be used in the Magellan telescope in the Atacama desert near La Serena, Chile. When completed, it is expected to be 10 times more powerful than the Hubble Space Telescope.

The first stage is casting the mirror from a large glass block which is heated in a special oven. The glass block is created by

inserting hundreds of Ohara low expansion E6 glass blocks. The mold is placed In a large rotating oven (Figure 1). The glass is heated to over 2000 degrees F. for several months. Cooling takes several more months. In order to make the mirror lighter, hollow hexagonal cores are inserted in the oven before the glass is inserted.

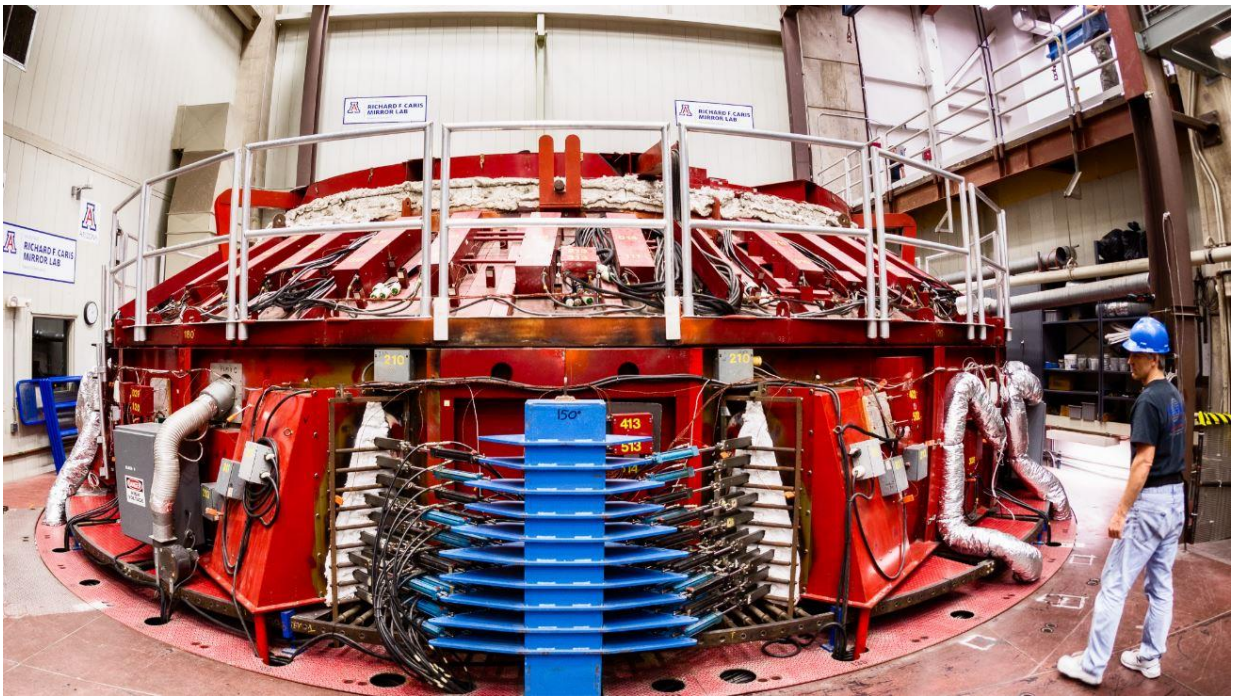


Figure 1

The second stage is polishing the glass (Figure 2) to a very smooth surface, maintaining the parabolic curvature with accuracy of 5 microns (about 0.01 millimeter).

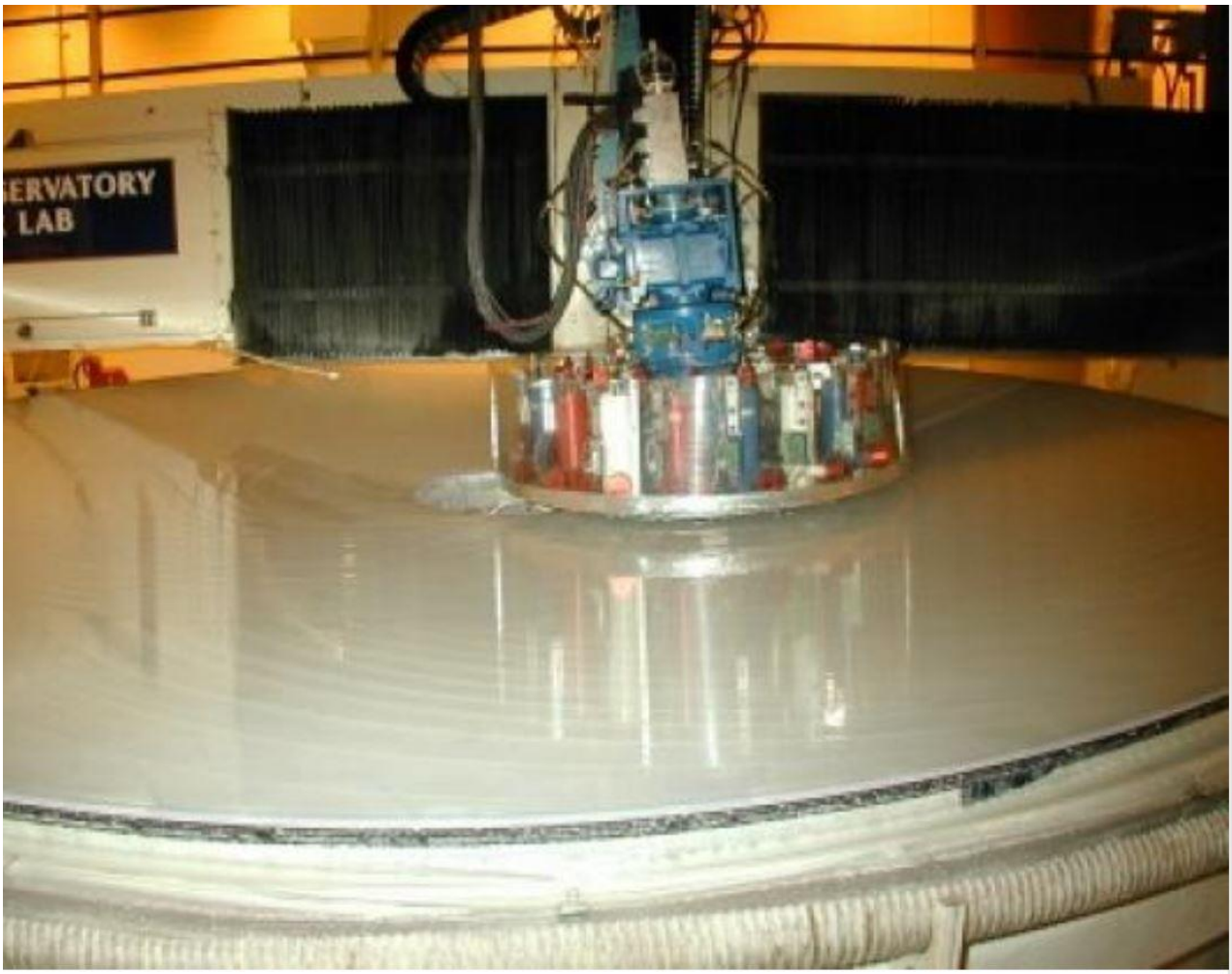
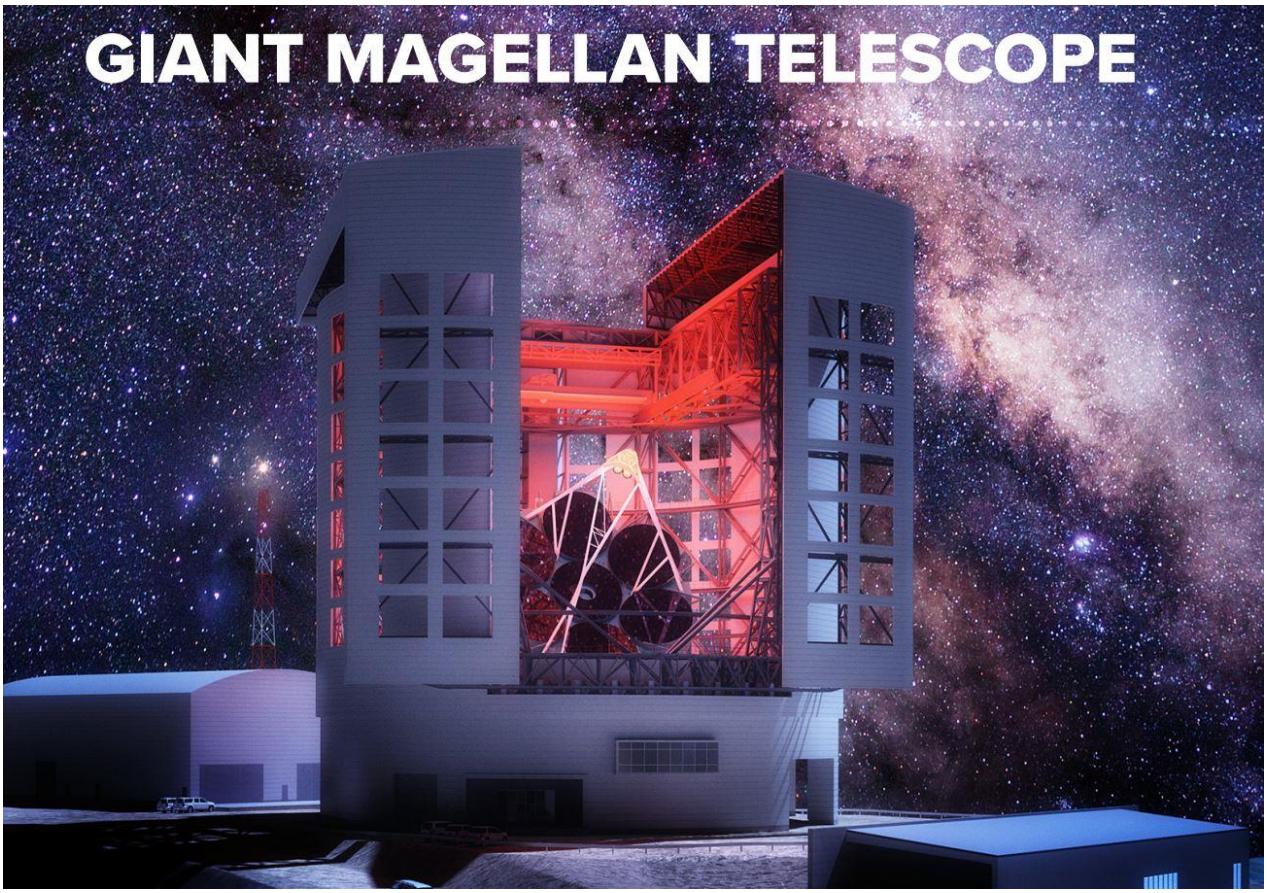


Figure 2

The next stage is packaging the disk for shipping and storage (Figure 3).

Figure 3

The telescope when finally constructed ca. 2027 (Figure 4).



See www.mirrorlab.arizona.edu, www.gmto.org for more information.