

●● Joint Symposium by OSJ and OSK on Optical Design & Fabrication

Invited I 7월 11일(금) 9:10~9:40 피닉스볼룸 I(A)



## 한국표준과학연구원의 대형광학계 개발현황

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KRISS is the only place that can make high precision large optics over 1 m in diameter in Korea. It has many facilities related to the testing and fabrication of large optics, including 2 m CNC machine, testing tower, and coating chamber. Also, There are several testing methods used in KRISS. Using those facilities and testing methods, KRISS made several 1 m class mirror with high precision.

### • Biograph

I received the Ph.D. degree in physics and astronomy from University College London in 1999. I had been working at the Satrec initiative Co. Ltd. for four years which is specialized in small satellite.

Now, I am working at Korea Research Institute of Standards and Science as a principal research scientist. My current areas of interest include large optics fabrication and testing.

## Testing and fabrication of large optics in KRISS

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KRISS is the only place that can make high precision large optics over 1 m in diameter in Korea. It has many facilities related to the testing and fabrication of large optics. One of major facilities is 2 m CNC machine. It can lightweight, grind and polish the optics more than 2 m in diameter by changing the proper tools at each stage. Another facility is the testing tower. It is located over the 2 m CNC machine so that the optics under fabrication can be tested without moving it to the testing room. This has advantage in that it reduces the risk of damage during the movement for testing and manufacturing time. The height of testing tower is about 8 m so that the optics of radius of curvature within the range of 1~6 m can be tested. Another important facility is the coating chamber. It was designed to handle up to 2 m optics and coat the surface with the uniformity of more than 95%.

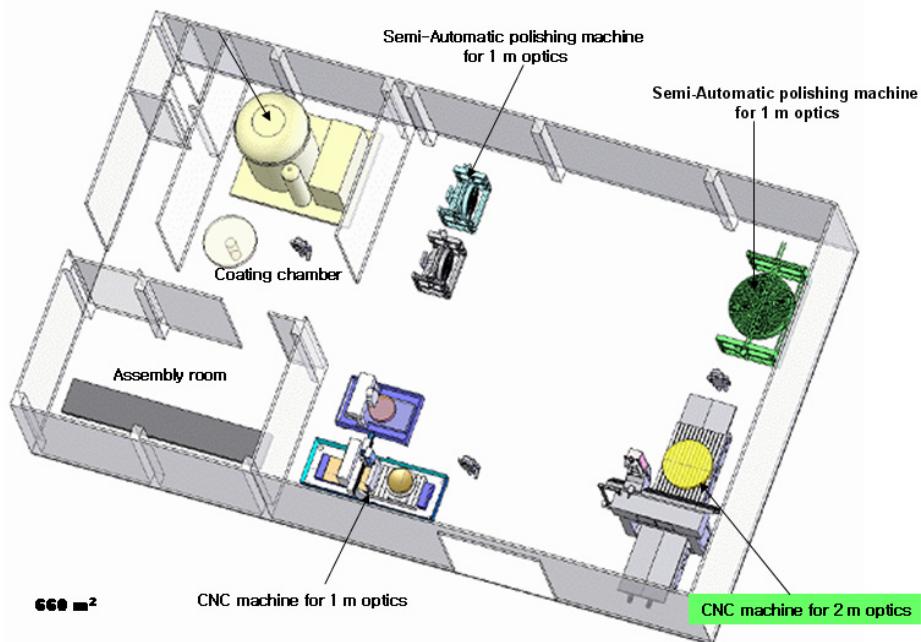


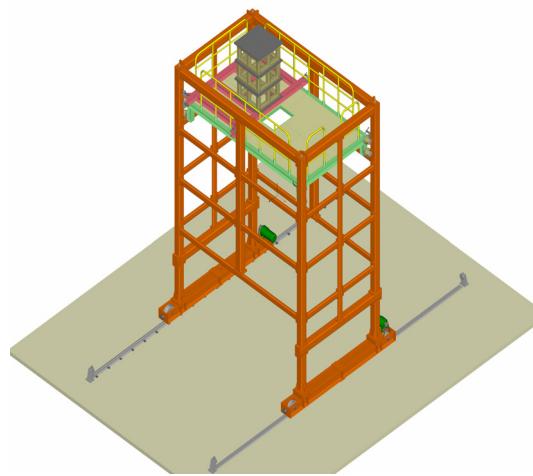
Fig. 1 Layout of large mirror lab in KRISS

The testing technology should be accompanied by the fabrication facilities. The fabrication of mirror is done after the surface error of mirror is measured.

Therefore, the accuracy of mirror surface depends on the the accuracy of testing method. KRISS has several testing methods; in terms of mechanical and optical testing. When the surface is rough, we do measure the surface using a commercial coordinate measuring machine. When the surface is in the early stage of polishing, Hartmann sensor with null lens can be used. And when the surface is close to the target shape, null corrector with interferometer can be used. KRISS can make the conventional lens type null corrector as well as the CGH (Computer Generated Hologram) null corrector. KRISS has a laser writer for fabrication of CGH up to 300 mm in diameter.



(a) 2 m CNC machine in KRISS



(b) shematic diagram of testing tower

Fig. 2 CNC machine with testing tower

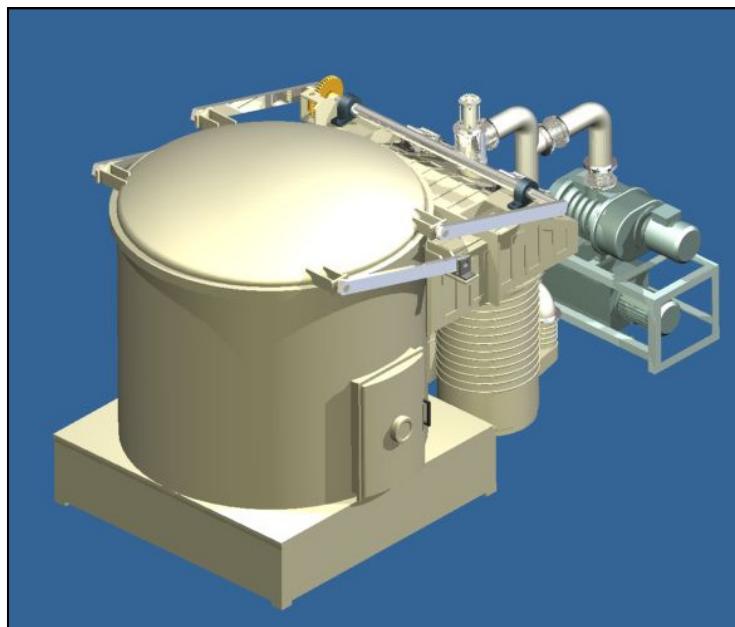


Fig. 3 Schematic diagram of 2 m vacuum chamber in KRISS