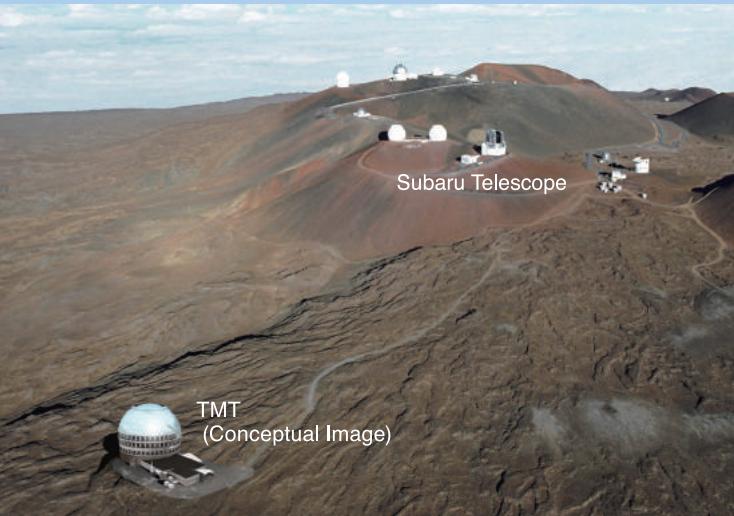


## Subaru Telescope on Mauna Kea, Island of Hawai'i

The summit of Mauna Kea at 4200-m altitude (13 796 feet), where the air pressure is two-thirds of what it is at sea level, offers clear and dry nights throughout the year. It's considered one of the best sites for astronomy observations. There are 13 telescopes operated by more than 10 countries on this mountain. Construction of the Thirty Meter Telescope just started.



### See the Telescope Up Close

- Daytime guided tours are offered on certain weekdays. Sign up on-line at the Subaru Telescope's website, a minimum of one week in advance.
- English tours usually start at 11:30 a.m. and last about 40 minutes.
- Please come and wait in front of the designated entrance at the enclosure building. The staff guide will greet you at the scheduled time.
- People who are younger than 16 years old, or pregnant, or have conditions that could worsen at high altitude are not able to participate in the tour.
- See details at:  
<http://subarutelescope.org/Information/Tour/Summit/index.html>

**SUBARU TELESCOPE**  
National Astronomical Observatory of Japan  
650 North A'ohoku Place, Hilo  
Hawai'i 96720, U.S.A.  
  
Website:  
<https://www.subarutelescope.org>

2018.02



**SUBARU**  
Telescope  
すばる望遠鏡  
8.2 m Optical-Infrared Telescope



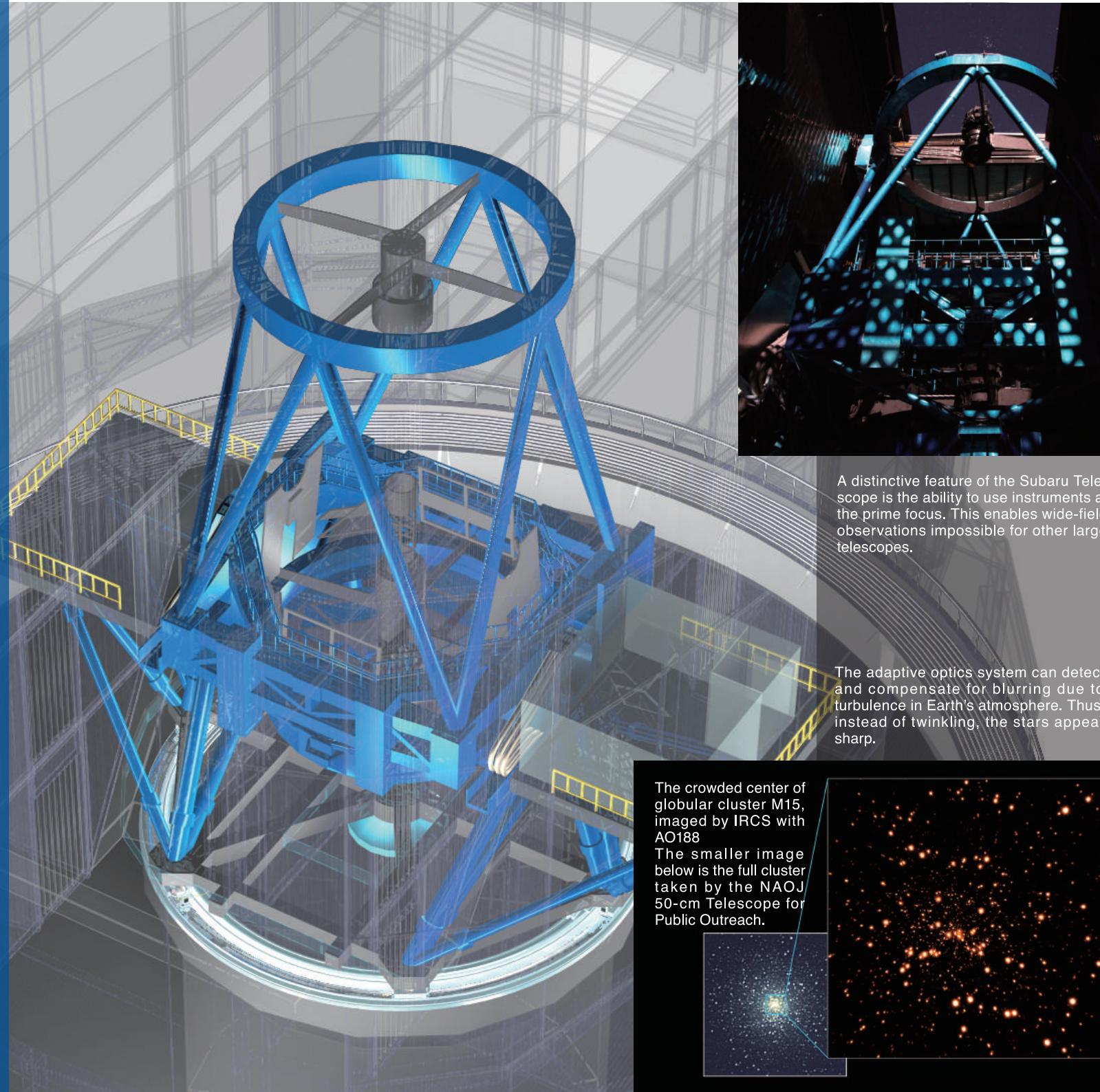
NAOJ

# advanced Technologies at Subaru Telescope

The Subaru Telescope was built and is operated by the National Astronomical Observatory of Japan. It started collecting light from the Universe in 1999. The primary mirror size of 8.2 meters makes it one of the largest optical infrared telescopes in the world.

The primary mirror is made of Corning's Ultra Low Expansion glass, which resists temperature variations. The fabrication took seven years. When the mirror "area" is expanded to the size of the Island of Hawai'i, the roughness of the surface is less than the thickness of a piece of paper. The shape of the mirror is maintained by 261 robotic actuators. No matter where the telescope points, they cancel the effects of sag due to gravity.

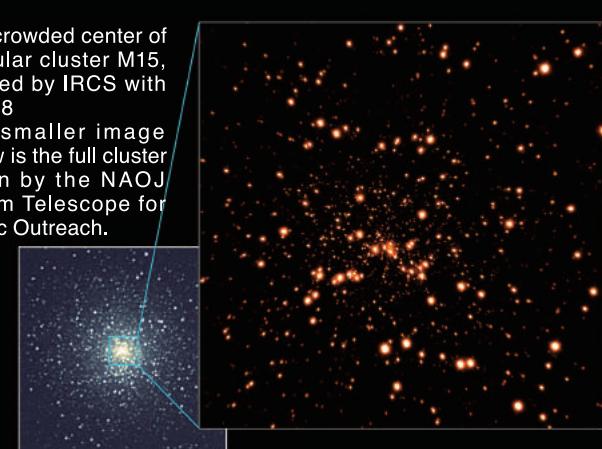
To achieve an extremely accurate 0.1 arc-second while tracking a target, this hefty, 550-ton telescope sits on a hydraulic bearing (consisting of a thin film of oil between the mount and the rail). Linear motors drive the telescope smoothly. The cylindrical shape of the enclosure suppresses the effects of warm air inside and outside, and allows astronomers to record sharp images with the Subaru Telescope.



A distinctive feature of the Subaru Telescope is the ability to use instruments at the prime focus. This enables wide-field observations impossible for other large telescopes.

The adaptive optics system can detect and compensate for blurring due to turbulence in Earth's atmosphere. Thus, instead of twinkling, the stars appear sharp.

The crowded center of globular cluster M15, imaged by IRCS with AO188. The smaller image below is the full cluster taken by the NAOJ 50-cm Telescope for Public Outreach.



# true pictures of **the Universe** by Subaru Telescope

Equipped with a variety of instruments, the Subaru Telescope enables observations of a wide range of objects—from those in the solar system to distant galaxies 13 billion light-years away. The observations contribute to the understanding of how stars and planets form, how galaxies evolve, how the large scale structure of the universe grows.



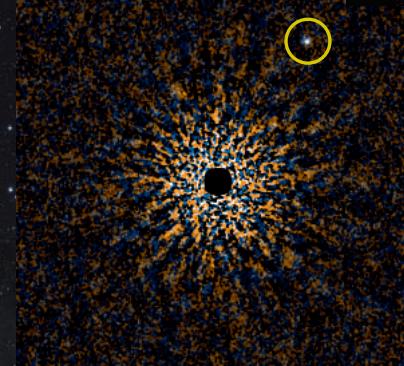
► Andromeda Galaxy (M31) imaged by the new ultra-wide field-of-view instrument Hyper Suprime-Cam

© Hiromitsu Kohsaka/HSC Project/NAOJ



▲ A composite image of Jupiter captured by the Subaru Telescope's IRCS (InfraRed Camera and Spectrograph) with the AO188 adaptive optics instrument

► Comet ISON (C/2012 S1) imaged by Hyper Suprime-Cam  
© HSC Project/NAOJ



▲ The exoplanet GJ 504 b orbiting a Sun-like star, caught in action by HICIAO (High Contrast Instrument for the Subaru Next Generation Adaptive Optics) with AO188

► A galaxy 12.9 billion light-years away, detected by Suprime-Cam

## Navigating the Outer Solar System

Throughout history observations of solar system objects helped develop humanity's perception of the universe. The Subaru Telescope is discovering new objects in the outskirts of the solar system and thus revising our understanding of the formation and evolution of systems with (exo)planets.

## Searching for the Beginning of this Universe and Origin of Life

Ever wonder if there is any world—other than Earth—which harbors life as we know it? Or, how the universe got started and came to be as we see it today? To answer these fundamental questions, the Subaru Telescope continues to develop instruments that offer sharper images, deeper studies and wider fields of view. These include the advanced adaptive optics system and the ultra-wide-field imager.