



The 2015 Middlebury College Observatory Upgrades Program

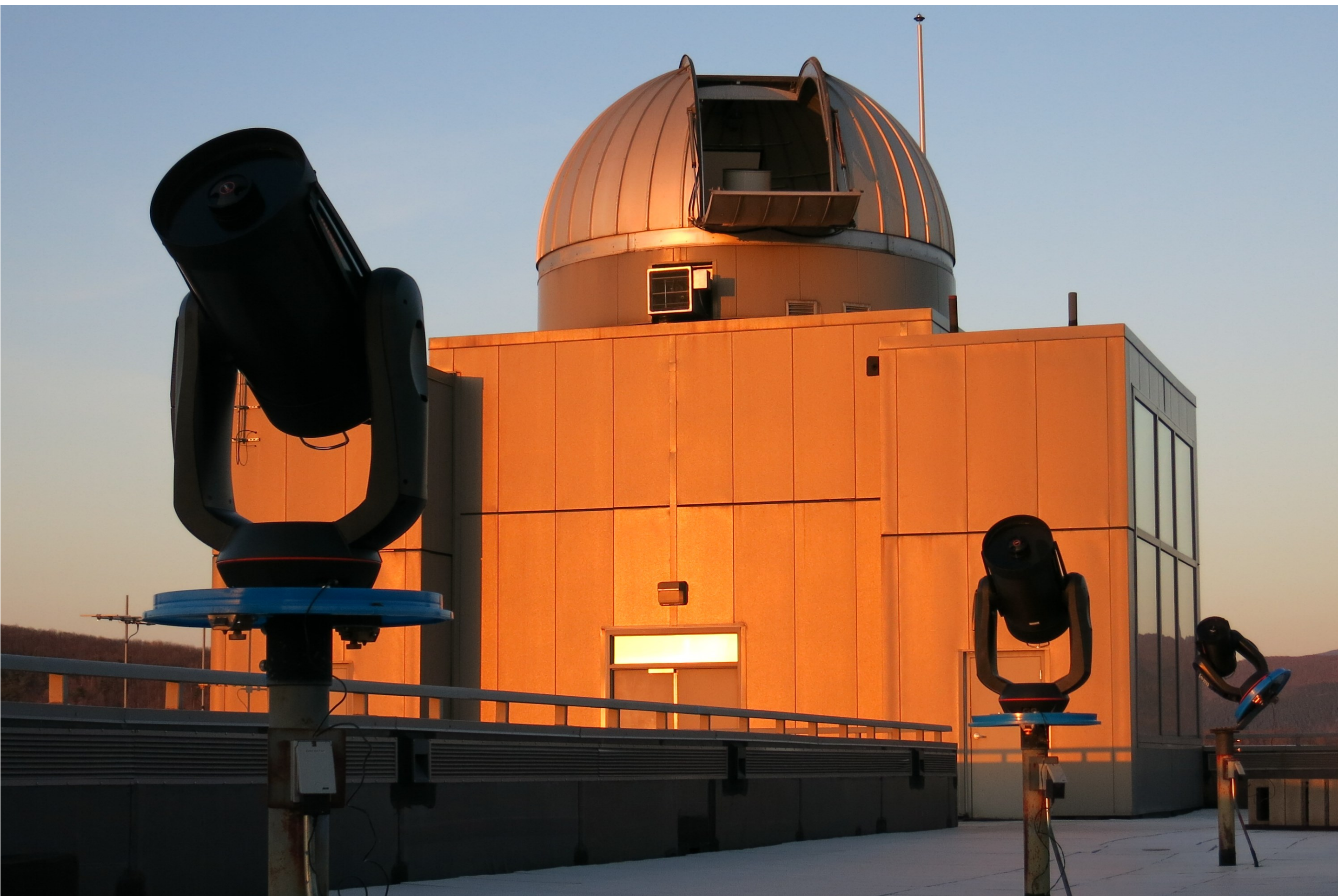
Overview

Middlebury College Observatory has a well-equipped and ideally-located observatory that serves curricular, research, and outreach purposes for both the College as well as the community at large. Built in 2000 and 2001, the current Observatory has benefitted from both modern equipment and an optimal location perched atop McCardell Bicentennial Hall. These have served the Observatory and the College well and have helped develop the Observatory into a vibrant, interdisciplinary College resource. The Observatory has not only supported students in a variety of Physics courses over the years, for both majors and non-majors (courses 155, 165, 261, 500, 704, 705, and 1105), but has also supported other curricular programs and welcomed thousands of members of the College community, local school children, and the public.

However, telescope and instrument technologies have advanced considerably in the last 15 years and the Observatory has necessarily been exposed to the elements while pursuing its mission. We have implemented a set of upgrades that have transformed the Observatory, and especially its 24” telescope, taking advantage of technological and engineering developments over the last decade and a half, replacing old, outdated, worn, and underperforming components, and preparing for the adoption of new observing modes. These upgrades have substantially increased telescope use and observing time. The upgrades program positions Middlebury College Observatory as a model college observatory that will better educate and connect students and the surrounding community to the Universe under dark Vermont skies.

History

Observational astronomy has a history at Middlebury going back to the 19th century. In fact, Old Chapel, which was completed in 1836, was “crowned with an octagonal Greek Revival cupola that functioned as the college’s first observatory” (Andres & Johnson, *Buildings of Vermont*, 2014, p. 126). Over the last two centuries, astronomical observatories have observed the skies from various locations across campus in support of the College’s academic mission.



Upgrades

From hardware to software, and mechanical to electrical, multiple core components of the Observatory were successfully upgraded as part of this program. The 24” telescope has been upgraded with a modern control system, digital motor controllers, absolute encoders, modified instrument support infrastructure, and motorized optical tube covers. The dome has been upgraded with a modern control system and slip ring electrical conductors. The primary and secondary mirrors of the 24” telescope have been re-aluminized for the first time, thereby improving mirror performance and telescope light-collecting efficiency. The primary and secondary CCD cameras have been replaced with more modern, quantum-efficient instruments supporting higher data transfer rates. Additionally, a wide variety of other accessories and auxiliary components were improved, upgraded, or replaced.

Image credits: Jacob Brady '17, J. Kemp.

Timeline

The Observatory upgrades were accomplished over an accelerated schedule. While planning and preparation for the upgrades lasted about eight months, the Observatory upgrades themselves occurred over three intense months during a single summer and included deconstructing and rebuilding much of the 24” telescope.

Curricular use of the 24” telescope and the Observatory were unaffected and, in Fall 2015, students of Physics 155—An Introduction to the Universe reaped the benefits of a more robust, capable, user-friendly, and efficient astronomical observatory with which to explore the Universe. The community was welcomed back to the Observatory on a beautiful, clear autumn evening to view the stunning total lunar eclipse on September 27.

Future

Although the core upgrades have now been completed, additional upgrades continue to further enhance the capabilities and performance, as well as program diversity, of the Observatory without affecting its availability for curricular, research, and outreach use.

Students

Central to the Observatory’s activities and mission are the students of the College. Students have the opportunity to use the Observatory for curricular and research purposes as well as informal stargazing events, and they form an integral part of the Observatory’s outreach program.

Support

The 2015 upgrades program at Middlebury College Observatory and its 24” telescope could not have been successfully completed without the involvement and generosity of the Michele and David (’76) Mittelman Family Foundation. The Mittelman Foundation has made an immediate and pronounced impact upon both students and the community here at Middlebury through its philanthropic support for astronomy and the Observatory.

