

PROJECT OVERVIEW

About the NATE Project

Science That Brings People Together Under the Eclipses

The **North African Telescope Eclipse (NATE)** project is an international citizen-science and research initiative built around one of the rarest events in astronomy: a total solar eclipse. Led by the **Instituto de Astrofísica de Canarias (IAC)** in partnership with **Université Mohammed VI Polytechnique (UM6P)** in Morocco and the **National Solar Observatory (NSO)** in the United States, NATE unites scientists, students, teachers, engineers, and volunteer citizen scientists from Spain, Morocco, and the United States in a shared pursuit: to observe, understand, and share the wonder of the Sun's outer atmosphere — the solar corona.

NATE encompasses **two eclipses**. A rehearsal and training campaign took place around the August 12, 2026 solar eclipse in Palencia, Spain — bringing together the Canary Islands, the sparsely populated regions of inland Spain, and North Africa in preparation. The project's central scientific campaign will take place on **August 2, 2027**, when a total solar eclipse sweeps across Northern Morocco, offering the longest totality recorded there in centuries.

Our Mission

1. **Advance solar science.** By synchronizing a network of telescope stations along the eclipse path, NATE captures coronal imagery that no single observation point could ever provide, contributing new data on the dynamics of the Sun's magnetic field and plasma — knowledge essential to understanding and forecasting space weather.
2. **Build lasting scientific capacity and public engagement.** NATE trains secondary-school and university students, teachers, and citizen scientists to operate real research-grade instruments, turning a fleeting celestial event into a durable legacy of astronomy education across Morocco.

A Three-Country Partnership

Partner	Country	Role
Instituto de Astrofísica de Canarias (IAC)	Spain	Scientific leadership, telescope design and funding, joint field-team training
Université Mohammed VI Polytechnique (UM6P)	Morocco	Programme coordination, field-team leadership, community hub network, public outreach
National Solar Observatory (NSO)	United States	Scientific and technical expertise in coronal observation, drawing on the Citizen CATE experience

Local municipalities and youth associations across the ten Moroccan host communities round out the partnership as on-the-ground collaborators, hosting stations, supporting logistics, and helping deliver outreach to residents and schools.

The Multi-Station Telescope Network

At the heart of NATE is a **synchronized network of roughly ten telescope stations** deployed along approximately 450 km of Northern Moroccan coastline, from Asilah to Saïdia. Each station is funded and supplied by IAC and operated by a trained three-person field team. Because totality

reaches each station at a slightly different moment as the Moon's shadow races across the country, the combined, overlapping observations extend the effective window of continuous coronal data collection to **roughly ten minutes** — more than double what any individual station could capture alone.

The model is directly inspired by the **Citizen CATE (Continental American Telescopic Eclipse) Experiment**, conducted in the United States during the 2017 and 2024 total solar eclipses by the U.S. National Science Foundation (NSF), the National Solar Observatory (NSO), and the Southwest Research Institute. Citizen CATE proved that a coordinated network of trained volunteers, operating standardized instruments across a wide geographic path, can produce publication-quality scientific data impossible to gather from any single site.

The Science: Studying the Solar Corona

The solar corona — the Sun's outer atmosphere — is visible to the naked eye from Earth's surface only during the brief minutes of a total solar eclipse. Studying it matters because the corona is the source of solar flares and coronal mass ejections, the drivers of **space weather** events that can disrupt satellites, power grids, and communications on Earth. Better observations of coronal structure and magnetic-field dynamics translate directly into better forecasting and mitigation of geomagnetic storms.

The August 2, 2027 eclipse gives NATE an exceptional scientific window: totality will last close to **five minutes at its longest station** (Martil/Tétouan), with the Sun reaching an altitude of roughly **40 degrees** above the horizon — far more favorable observing geometry than the low, brief eclipse visible from Spain in 2026.

Legacy

Once the eclipse has passed, the telescope equipment acquired for each of the ten stations will be **donated to the host communities**, leaving behind a lasting scientific and educational legacy: trained observers, functioning instruments, and a new generation of Moroccan students introduced to research-grade astronomy.

"Eclipses are among the astronomical phenomena with the greatest power to bring people together in shared wonder. NATE seeks to amplify that effect."