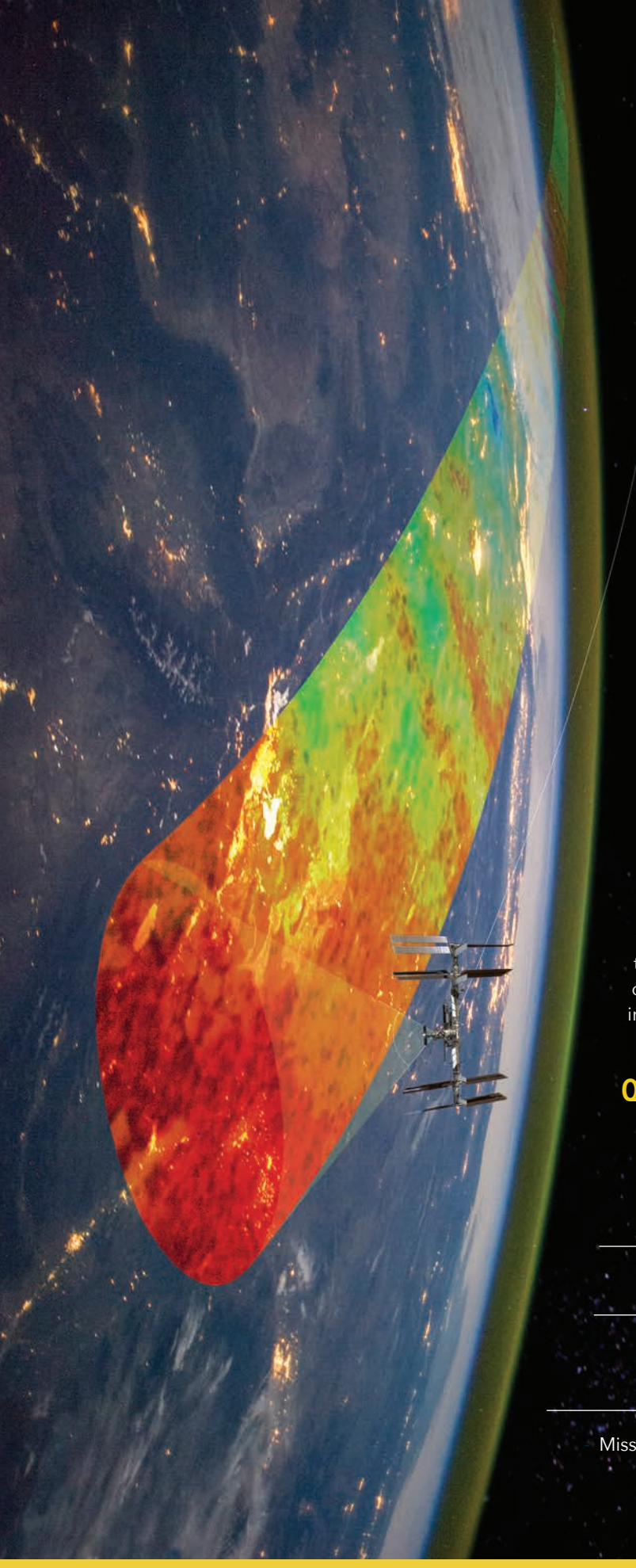

ATMOSPHERIC WAVES EXPERIMENT AWE

The Atmospheric Waves Experiment (AWE) is a NASA Mission of Opportunity that will provide the first global characterization of small-scale atmospheric gravity waves (AGWs) that originate in Earth's lower atmosphere. AWE will unravel the mystery of how AGWs affect space weather, which can disrupt navigation, tracking, and communication systems.

AGWs are invisible pulses of air mainly caused by disturbances in the troposphere, ranging from strong winds flowing over steep mountains to powerful thunderstorms, tornadoes, and hurricanes. As AGWs propagate upward, they grow rapidly in amplitude and can quickly transport energy and momentum from the troposphere into the ionosphere-thermosphere-mesosphere.

The AWE payload consists of a single instrument, the Advanced Mesospheric Temperature Mapper (AMTM), attached to the International Space Station in a nadir-viewing configuration. Once in place, the AMTM instrument will capture wide field of view nighttime images at the rate of one image per second for two years. The AMTM will produce high-quality temperature maps of AGWs near the mesopause region using well-characterized infrared emission lines of Earth's hydroxyl (OH) airglow layer.

Quick Facts

Launch	November 9, 2023
Operations	Two-year observation from the International Space Station
NASA Science Mission Directorate	Heliophysics Division
PI Institution	Utah State University leads the mission, science investigation, science operations, and data analysis
Mission Operations	Space Dynamics Laboratory provides the flight instrument and mission operations center

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ATMOSPHERIC GRAVITY WAVES

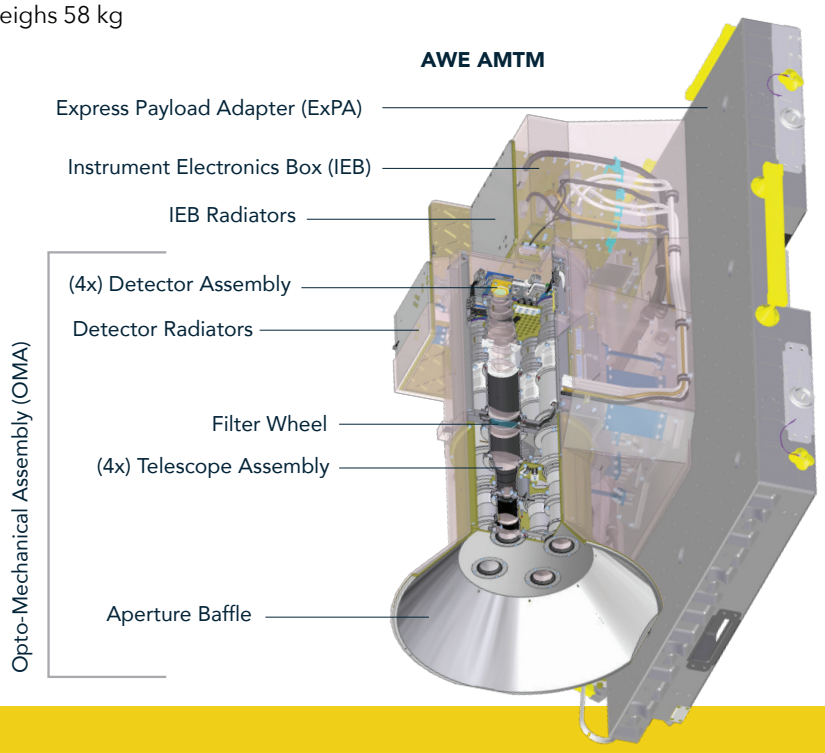
- Often form in the troposphere (surface to ~10–15 km)
- Are created during air displacement, such as severe weather or wind rushing over geographic features
- Carry energy and momentum into the upper atmosphere before breaking
- Affect upper-atmospheric space weather and GPS signals near the edge of space
- Can be detected in Earth's airglow layer using infrared technology
- Are not the same as gravitational waves (ripples in space-time associated with supernovae and black holes)

AWE SCIENCE OBJECTIVES

- Understand how AGWs near the mesopause (~87 km altitude) vary by season and region
- Identify the dominant dynamical processes controlling AGWs
- Estimate how AGWs formed in the troposphere (surface to ~10–15 km) affect the ionosphere-thermosphere-mesosphere (ITM) (50–500 km)
- Focus on small-scale (horizontal wavelength, ~30–300 km) AGWs entering the ITM system from Earth

AWE PAYLOAD

- Wide-field (90°) infrared imaging radiometer
- Four identical telescopes
- Measures the $P_1(2)$ and $P_1(4)$ emission lines of the hydroxyl (3,1) band, or Earth's OH layer
- Measures the infrared background in the OH band
- Captures one nighttime image every second
- Weighs 58 kg



Media Contacts

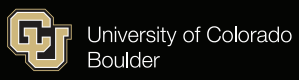
NASA
Denise Hill
(202) 308-2071
denise.hill@nasa.gov

UTAH STATE UNIVERSITY
Mary-Ann Muffoletto
(435) 797-3517
maryann.muffoletto@usu.edu

SPACE DYNAMICS LABORATORY
Eric Warren
(435) 713-3054
eric.warren@sdl.usu.edu

For more information, please visit: https://www.awemission.org/media-resources/media-kit/

Thank you to all the Mission Partners



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