



Libera

Mission: Libera [*lib-er-uh*] will maintain the decades-long data record of Earth's radiation budget

Principal Investigator Institution: The Laboratory for Atmospheric and Space Physics, University of Colorado Boulder

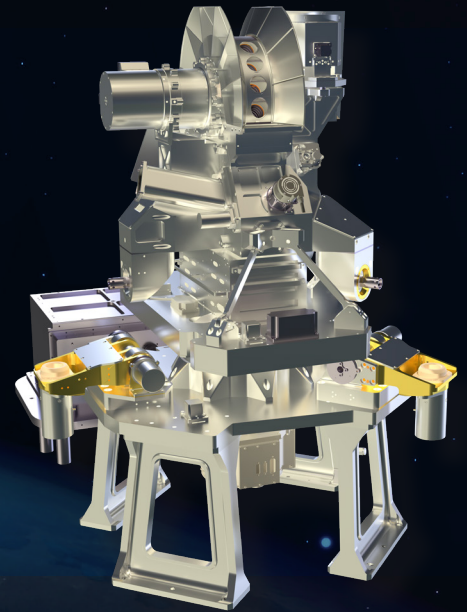
Four Broadband Channels: From 300 nm to 100+ microns using vertically-aligned carbon nanotube detectors with electrical substitution closed-loop control

Radiometric Uncertainty: 0.2%

Resolution: 24 km nadir footprint

Swath: From limb to limb for daily, full global coverage

Average Data Rate: 300 kbps



What is Libera?

Libera, the first NASA Earth Venture Continuity mission, will maintain the decades-long continuous, global data record of Earth's radiation budget from the Clouds and the Earth's Radiation Energy System (CERES) mission that started in 2000.

The Libera instruments will fly on the JPSS-4 satellite (named NOAA-22 once in orbit). Libera will measure Earth's reflected solar radiation and emitted terrestrial radiation. The difference between this outgoing radiation and the incoming radiation from the Sun is a key factor in determining Earth's climate.

The specific wavelength ranges Libera will observe will allow scientists to understand changes to Earth's climate system, including the factors responsible for Earth's energy imbalance—a deficit of outgoing energy—that is driving present day climate change.

Benefits

- Libera provides fundamental climate information about the relationship between incoming radiative energy (measured by NASA's TSIS missions) and outgoing radiative energy from Earth.
- Continuity of Earth's radiation budget climate record over time reveals the signals of climate change, connecting energy flow to temperature trends.
- Libera observations will aid in testing and improving climate models.

Innovations

The Libera instrument package includes a wide-field-of-view camera to provide scene context for interpreting the Libera radiometer measurements.

The Libera state-of-the-art detectors absorb radiative energy at all wavelengths using carbon nanotubes, the blackest material on Earth.