



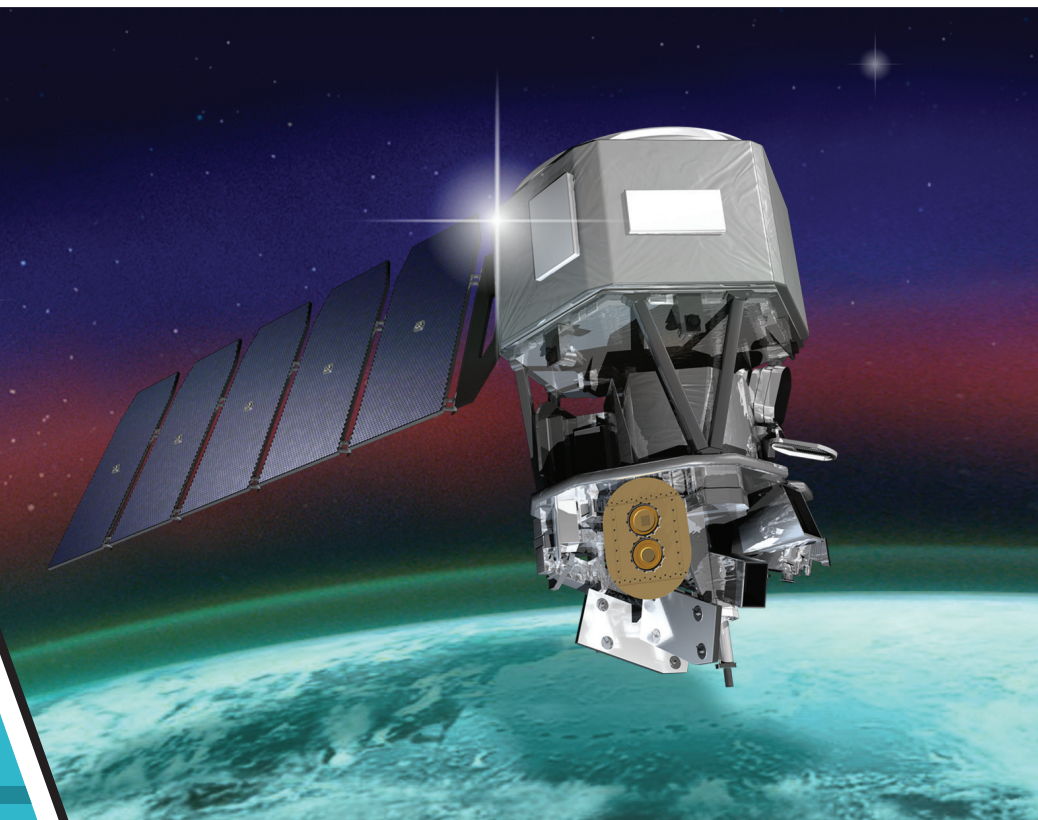
ICON

Ionospheric Connection Explorer

Studying the Frontier of Space

The Ionospheric Connection Explorer, or ICON, studies the frontier of space: the dynamic zone high in our atmosphere where Earth's weather meets space weather. Here, the tenuous gases are anything but quiet, as a mix of neutral and charged particles swirl in giant winds. ICON launches October 2019, providing in-situ measurements of this influential region.

www.nasa.gov



Did You Know?

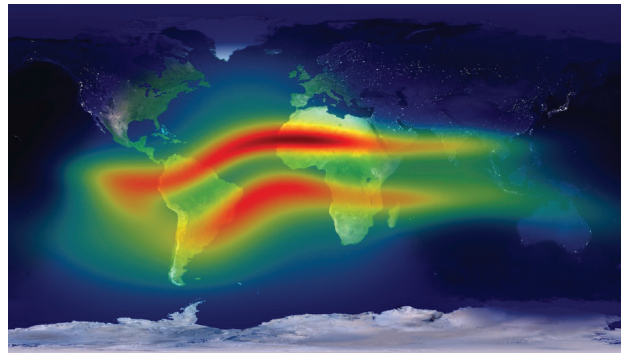
- ICON weighs nearly 650 pounds—about as much as a vending machine.
- In orbit, ICON travels at more than four miles per second. That's almost 30 times faster than a commercial airliner!
- ICON's solar panel is 8 $\frac{1}{3}$ feet long and 2 $\frac{3}{4}$ feet wide, a little bigger than a door.

ICON's Science

The Ionospheric Connection Explorer studies the frontier of space: the dynamic zone high in our atmosphere where terrestrial weather from below meets space weather above. In this region, the tenuous gases are anything but quiet, as a mix of neutral and charged particles travel through in giant winds. These winds can change on a wide variety of time scales due to Earth's seasons, the day's heating and cooling, and incoming bursts of radiation from the sun.

NASA has developed the ICON mission to directly explore a hard-to-reach area that, despite being close to home, remains fairly mysterious. ICON provides in-situ measurements of this complicated region of near-Earth space, called

the ionosphere—which can be difficult to fly through given the variable drag on spacecraft. Better understanding the ionosphere also has practical repercussions, given our ever-increasing reliance on technology. Radio communications and GPS signals travel through the ionosphere, and variations in this region can result in distortions, or even complete disruption, of these signals. As spacecraft travel through this region regularly, improved knowledge will increase our situational awareness to protect satellites and astronauts.



Understanding what drives variability in the ionosphere requires a careful look at a complicated system that is driven by both terrestrial and space weather. ICON helps determine the physics of our space environment and pave the way for mitigating its effects on our technology, communications systems and society.

ICON's Instruments

ICON's four instruments work together to help scientists understand changes in the ionosphere and neutral atmosphere, and track how they affect each other.

MIGHTI

**Michelson Interferometer
for Global High-resolution
Thermospheric Imaging**
Naval Research Laboratory

MIGHTI observes the temperature and speed of particles in the neutral atmosphere. These winds and temperature fluctuations are driven by weather patterns closer to Earth's surface. In turn, the neutral winds drive the motion of charged particles in space.

EUV

Extreme Ultra-Violet instrument
University of California, Berkeley

EUV captures images of glowing oxygen in the upper atmosphere in order to measure the height and density of the daytime ionosphere. This helps scientists track the response of the space environment to weather occurring in the lower atmosphere.

FUV

Far Ultra-Violet instrument
University of California, Berkeley

FUV takes images of the upper atmosphere in wavelengths of far ultraviolet light. At night,

FUV measures the density of the ionosphere, tracking how it responds to weather in the lower atmosphere. During the day, FUV measures changes in the chemical composition of the upper atmosphere, which is the source for the charged gases found higher in space.

IVM

Ion Velocity Meter
University of Texas at Dallas

IVM measures the speed of charged particles, which move in response to the push of high-altitude winds and the electric fields they generate.

For more information, please visit our web sites:

- icon.ssl.berkeley.edu
- www.nasa.gov/icon
- <http://www2.hao.ucar.edu/geogoldicon>

ICON Quick Facts

- Spacecraft: Northrop Grumman LEOSTAR-2
- Launch Vehicle: Northrop Grumman Pegasus XL
- Orbit: Low-Earth orbit, about 360 miles above Earth's surface

