Where does Earth's atmosphere end and space begin?

In a mysterious region of space scientists call the ionosphere - a volatile place where terrestrial weather from below meets space weather from above.

It's also where our astronauts and critical space assets orbit.

Without a proper understanding of this dynamic region in space, the technology and communication we rely so heavily upon could be at risk.

That's why NASA is launching the Ionospheric Connection Explorer, or ICON - to give us answers.

"The primary goal of the mission is to gain an understanding between the weather here in our atmosphere, and the ionosphere in space.

We don't quite have a handle on what's going on up there in the ionosphere, so this will give us an opportunity to understand that."
The ICON spacecraft only weighs 364 pounds so NASA's Launch Services Program chose Northrop Grumman's air-launched Pegasus launch system to deliver it into a 360-mile-high orbit.

"We selected the Pegasus XL launch vehicle. It provided an excellent combination of mission performance and flexibility for the mission design for a spacecraft of the mass of ICON."

"What's unique about the Pegasus rocket is that it is an air-launched vehicle, and that allows us to launch from anywhere in the world."

The challenge with processing Pegasus is that it's a flying solid rocket motor - solid fuel ready to burn as soon as it's ignited.

It requires special attention - an explosion-proof processing facility at Vandenberg Air Force Base in California - where the spacecraft
must be mated to the rocket and sealed inside its protective fairing.

It's one of the few launch systems in the world where the payload is attached to the launch vehicle before it's encapsulated.

Once complete, Pegasus is free to launch from anywhere in the world.

"Once we've established that we're ready, we then transport our entire launch team and hardware to another part of the world so that we can insert ourselves into the proper trajectory."

But to get there, Pegasus still needs to be strapped to the belly of the L-1011 Stargazer.

Strapping 55,000 pounds of solid rocket fuel to the bottom of an airplane is tricky, but these rocket scientists and engineers are up to the task.

Once ICON and Pegasus are locked and loaded, then it's up to the pilots to fly the Stargazer into its drop zone.