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**Spacecraft to Measure Earth Gravity**

By **JOHN IAMS**  
*Associated Press Writer*

MOSCOW (AP)--Two spacecraft that will measure the Earth's gravitational field as part of a joint U.S.-German mission were launched at Russia's Plesetsk Cosmodrome on Sunday.

The twin spacecraft of the Gravity Recovery And Climate Experiment, or Grace, blasted off atop a Russian-made Rokot booster at 12:21 p.m., Russian space forces spokesman Sergei Derevyashkin said. It was the first launch of a NASA spacecraft from a foreign site.

The unmanned spacecraft, nicknamed Tom and Jerry, will fly in tandem to create what scientists expect will be the most accurate map ever of the Earth's gravitational field.

The \$127 million mission is a collaboration between NASA and Germany's German Center for Air and Space Travel. It is being managed by NASA's Jet Propulsion Laboratory in Pasadena, Calif.

The two satellites, each weighing 1,100 pounds, will map the Earth's gravitational field, which is lumpy because of the variations in the density and types of materials that make up the Earth. Grace should reveal just how uneven it is, providing a view 100 times more accurate than that contained in current maps.

During their five-year mission, the spacecraft will also chart large-scale movements of water around the Earth. Those shifts in mass result in measurable differences in the planet's gravitational field.

Scientists expect Grace to track the depletion of large aquifers, the melting of glaciers and flow of currents within the oceans.

The two spacecraft will circle the planet 16 times a day. A precise microwave ranging system will constantly measure the distance between the two satellites. That, coupled with satellite navigation technology, will permit scientists on the ground to monitor changes in the speed and distance between the German-built spacecraft.

Those changes indicate differences in the mass of the Earth's surface below and any corresponding variations in its gravitational pull.

Plesetsk, the site of the launch about 400 miles northeast of St. Petersburg, is a former Soviet intercontinental ballistic missile site.

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