Twin Spacecraft Launched on Mission to Measure Earth's Gravity

By The Associated Press
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MOSCOW (AP) -- Two spacecraft that will measure the Earth's gravitational field were successfully launched from Russia's Plesetsk Cosmodrome on Sunday, a space official said.

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. (0921 GMT), Russian space forces spokesman Sergei Derevyashkin said.

The two unmanned satellites, nicknamed Tom and Jerry, entered Earth Orbit at 1:47 p.m. (10:41 GMT), Derevyashkin said.

``Everything is okay,'' said Vyacheslav Davidenko, another spokesman for the space forces press service.

The $127 million mission's spacecraft will fly in tandem to create what scientists expect will be the most accurate map ever of the Earth's gravitational field.

Due to variations in the density and types of materials that make up the Earth, its resulting gravity field is lumpy. Grace should reveal just how uneven it is, providing a view 100 times more accurate than that contained in current maps.

The mission is a collaboration between NASA and Germany's Deutsches Zentrum fur Luft und Rumfahrt. It is being managed by NASA's Jet Propulsion Laboratory in Pasadena, Calif..

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 will be able to track the depletion of large aquifers, the melting of glaciers and flow of currents within the oceans.

``Grace will provide us with a new view of our home planet and help us to better understand climate change and its global impacts such as changes in sea level and the availability of water resources,'' said Ghassem Asrar, NASA's associate administrator for Earth sciences.

Now in orbit, the two spacecraft will chase each other around the Earth 16 times a day at an altitude of 311 miles (500 kilometers). Separated by 137 miles (220 kilometers), a precise microwave ranging system will constantly

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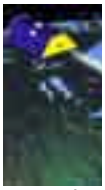
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measure the distance between the two satellites to within the equivalent of one-tenth the width of a human hair.

That ability, coupled with Global Positioning System 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. For example, a region of higher gravity will cause each spacecraft to alternately speed up and slow down as it passes overhead.

Plesetsk, about 400 miles (645 kilometers) northeast of St. Petersburg, is a former intercontinental ballistic missile site. It was one of two locations U.S. pilot Francis Gary Powers was attempting to photograph when his U-2 spy plane was shot down by the Soviets in 1960.

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