PRECISE NAVIGATION ENABLES VERY LARGE AREA REMOTE SENSING SURVEYS

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Scientific remote sensing from airplanes or ships often require precise knowledge of the trajectory of the sensor.
This information is routinely obtained within small or medium-size areas using the Global Positioning System.
But it is becoming possible to obtain decimeter-level precision across very large areas in the oceans, polar caps, deserts, where it is expensive or difficult to operate supporting stations nearby.
Applications include surveying, monitoring, or detecting Tsunami, earthquakes and volcanoes, sea-floor tectonics, coastline changes, snow mass depth and ice structure, etc.
As an example, test results will be shown.

Scientific remote sensing from airplanes or ships often require precise knowledge of the position, velocity, acceleration, or attitude of the sensor at the time of each observation.

This information is routinely obtained within small or medium-size areas, thanks to the use of the Global Positioning System, either alone or combined with inertial navigation.

It is now becoming possible to obtain such precise information cheaply and reliably across very large regions of the world, in oceans, polar caps, deserts, and wherever it may be very expensive or difficult to operate supporting stations nearby.

The reach of precise navigation may have been extended even more by the recent end to the US policy of degrading GPS clock information.

Satellite navigation systems from Japan, the European Union, Russia, and elsewhere, should further improve the situation.

Present and future applications include surveying or monitoring:

-Tsunami in the high seas, for early warning of those at risk;
-Earthquakes and volcanic activity;
-Sea-floor tectonics through acoustic links to a geolocated surface ship;
-Coastal changes due to erosion;
-Snow mass depth and ice structure;
-Gravity;
-Topography and bathymetry.

To support these claims, results from a recent test of large area sub-decimeter positioning with GPS will be shown.