



Height transfer from land to sea using a transponder

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The instability that characterizes the surface of the sea makes difficult to accurately determine its exact height as well as its variation in time. The usual technique used by radar altimetry is to subtract the range measured above the sea surface from the accurate orbit and obtain thus the height of the sea surface above a reference ellipsoid.

If close to the sea surface a special transponder is actively operating within the footprint of an altimeter, it is possible to perform a height transfer from mainland to the sea making use of the calculated distance between the altimeter and the transponder.

A transponder represents an electronic device that receives the signal from the satellite, amplifies it and re-sends it back. Different from the ocean surface, the transponder represents a stable and very precise reflective reference point (few millimeters in height), which allows a very precise determination of the vertical distance between the satellite and the transponder. Provided the range window of the altimeter is set to the appropriate delay, the transponder will appear in the altimeter data with a significant waveform power, making it easily recognizable.

The accuracy of such a height transfer depends mainly on the orbit, the distance between satellite and transponder and the height of the transponder.