

## SeaWinds on QuikSCAT: Overview of Sensor System and Post-Launch Calibration/Verification

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Satellite wind scatterometers are microwave radar instruments designed to measure both global radar backscattering cross section ( $\sigma_0$ ) and near-surface wind speed and direction over the global ocean. NASA has a long term commitment to ocean wind remote sensing, starting with the *Seasat-A Satellite Scatterometer* (SASS), through NASA Scatterometer (NSCAT), *SeaWinds on QuikSCAT* (QSCAT), *SeaWinds on ADEOS-2* (*SeaWinds*) and *Alpha-Scatterometer* on GCOM-1B. QSCAT was launched on June 19, 1999 from Vandenberg Air Force Base, using a Titan II launch vehicle and Ball Aerospace's Quikbird spacecraft. It was turned-on on July 7, 1999 and has operated flawlessly since. The purpose of this paper is to present the QSCAT mission objectives, the spacecraft and instrument design concept, system parameters and performance, and the process and results of an intensive post-launch calibration and verification (Cal/Val) effort of the end-to-end QSCAT sensor system.

QSCAT is the first operational scatterometer to employ a scanning pencil beam design. It uses a scanning dish antenna (with 1-meter diameter) rotating at 18 rpm, and operated at 13.4 GHz. It has the capability of collecting  $\sigma_0$  measurements with radiometric resolution of  $7 \text{ km} \times 25 \text{ km}$  at two constant incidence angles ( $46^\circ$  and  $54^\circ$ ) and at variable azimuth angles. These  $\sigma_0$  measurements can be used to produce ocean surface wind vectors at 25 km resolution (and possibly at 12.5 km resolution), with a swath width up to 1800 km.

The Cal/Val process encompassed the functional and performance verification of the flight instrument the spacecraft attitude determination using startrackers, echo tracking, the  $\sigma_0$  computation algorithms, the science data processing system, and the analysis of the  $\sigma_0$  and wind products. The calibration process included the radiometric calibration of QSCAT using both engineering telemetry and science data, and the radiometric beam balance of both antenna beams using both open ocean and uniform land targets. The key results of this Cal/Val activity will also be presented, including an estimate of QSCAT measurement accuracy.

pencil

this is general  
system description

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