



## Advanced Scatterometer (ASCAT) Calibration Transponder

**The Advanced Scatterometer (ASCAT) is an important instrument on the MetOp satellites. The ASCAT's primary purpose is to measure the radar backscatter from the ocean surface, which enables estimation of the ocean surface roughness and wind velocity for meteorological purposes.**

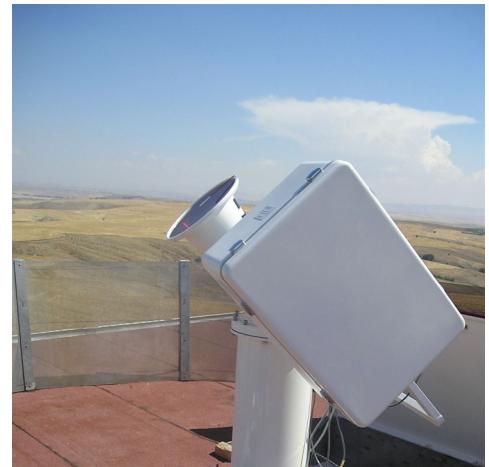
In order to derive accurate information from ASCAT data, it is necessary to perform regular in-flight calibration of the instrument. This will be done (in part) using dedicated ground transponders that provide radar returns with very accurately known amplitudes.

SEA has provided these ground-based Calibration Transponders, installing and commissioning these at three ground stations in Turkey.

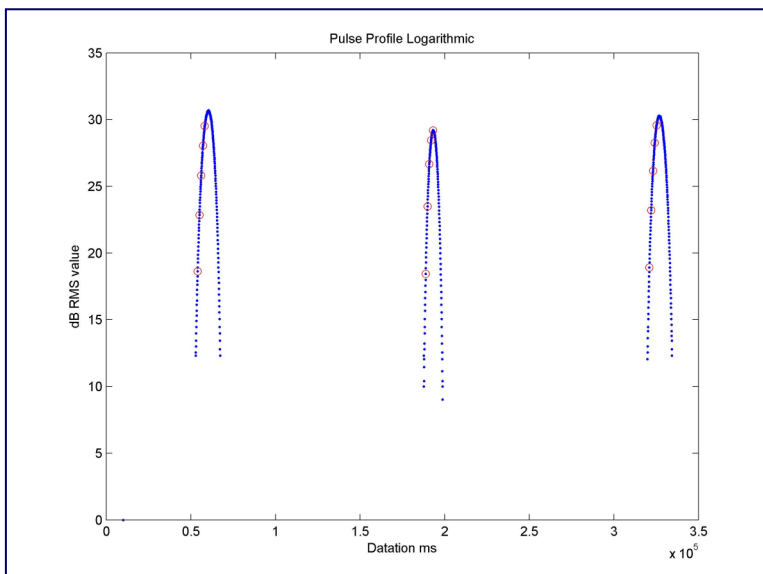
The equipment is operated by Eumetsat to support the operational meteorological satellite programme MetOp 1. The systems are used to calibrate the Advanced Scatterometer instrument while in orbit; the benefits of the data from the Advanced Scatterometer include improved estimates and predictions of wind speeds. The systems have been designed to provide a highly stable echo of the received signal and to operate over a period of 15 years.

The significant elements of the system include the C-Band antenna and RF up/down conversion, two-axes steerable mount and digital electronics for capturing, processing and echoing the signal emitted from the spaceborne instrument. Additional equipment has been provided to enable all of the calibration systems to be remotely monitored and controlled, with routine operations performed autonomously.

As well as providing the transponders SEA, in a related activity, completed a study for EUMETSAT investigating and prototyping the algorithms required to derive the in-flight antenna patterns from the observed transponder measurements. This activity helped to ensure the accuracy of the ASCAT information being provided to the meteorological community.



*ASCAT transponder in position in Turkey*



*The transponder system includes the facility to measure the power of the illuminating radar over a pass, and to capture sample pulses. The image shows the relative power of the three beams of the METOP radar illuminating the transponder as the satellite passed overhead, with circles showing the position of the pulses captured*