

# SAOCOM Calibration and Validation Activities Results and Way Forward

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## Abstract

The SAOCOM mission consists of two identical L-band satellites with advanced space borne Synthetic Aperture Radar instruments designed, produced, tested and operated in Argentina, under the initiative of CONAE within the framework of the National Space Plan and with disaster monitoring and soil moisture derived applications as main driver. The SAR payload operates at a frequency of 1275 MHz (L band) and it is able to produce full polarimetric images (HH, HV, VH and VV polarizations). Thanks to its 3.5m by 10m active phase array antenna it is capable of performing beam forming in range and azimuth, being able of operating in a variety of modes. Combining the different polarimetric modes (Single HH, Single VV, Dual VH/VV, Dual HV/HH, Quad-pol and Compact-pol Right and Left) and swaths (19 stripmap and 6 TOPSAR), 64 Stripmap plus 17 TOPSAR modes are defined.

SAOCOM-1A spacecraft launch has been successfully carried out on October 7th, 2018 from Vandenberg Air Force Base, reaching its' nominal orbit height on December 16th. Its CALVAL commissioning phase has now been finished with very good results. SAOCOM-1B production and pre-launch tests have been finished, and its launch date is planned in February/March 2020.

Demanding requirements from the soil moisture application, particularly on the absolute and polarimetric accuracy, impose a high demand on the mission radiometric calibration and validation. An overview of the SAOCOM CALVAL phases, activities, results and way forward will be discussed, taking into account both pre and post launch measurements. Specific SAOCOM-1A commissioning activities and results will be summarized in relation to onboard radiofrequency components tuning and monitoring supported by internal calibration, pointing calibration based on notch modes and doppler, geolocation and IRF validation over point targets, azimuth antenna pattern validation with ground receivers, relative calibration supported by antenna model and rain forest datatakes, and polarimetric plus absolute radiometric calibration based on corner reflectors and polarimetric active radar transponder datatakes.

**Keywords** - Calibration of future missions