

Precise orbit determination of Altimeter Satellite JASON-1

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Because of the large area-to-mass ratio (0.0066) and low altitude (1300 km) of altimeter satellite JASON-1, the effect of the perturbations (solar radiation pressure, atmospheric drag, and so on) on its orbit is larger than other satellites equipped with corner cube reflectors.

In this work, we implemented several new perturbation models into our orbit analysis software concerto ver.4: Ziebart model (Solar and Earth radiation pressure model optimised to JASON-1), NAO.99b ocean tide model, and a model described lift effect by upper atmosphere. Through the precise orbit determination of JASON-1 based on SLR data, we compared these new models with existing models and examined how much the rms of postfit residuals can be reduced. These procedures can be applied to calibration of high precision accelerometers onboard the satellite for spaceborne gravimetry mission.