

## **AN ABSTRACT OF A THESIS**

### **SURFACE WATER AND OCEAN TOPOGRAPHY (SWOT) MISSION FOR WATER MANAGEMENT IN BANGLADESH**

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The Surface Water and Ocean Topography (SWOT) is a space-borne water level estimation mission proposed by NASA and French Space Agency. With the launch of SWOT in the near future, it is expected that the limitations posed by the lack of basin wide flow measurements for flood and water management around the world will be reduced significantly. Bangladesh, being one such country facing tremendous limitations in real-time flow data availability from upstream nations, was chosen as a case study to investigate the potential of SWOT for water management. A SWOT like analogue – a space-borne altimeter named Envisat – was used as proxy for SWOT water elevation data. A well-calibrated 1-D hydrodynamic model, HEC-RAS, was set up for the major river network of Bangladesh using in-situ bathymetry and gauged stream flow and water level data. HEC-RAS simulated water level data at fine spatial spacing along the river reaches, which then allowed a direct comparison with instantaneous estimation of water level at select reaches by Envisat. Using the well-calibrated HEC-RAS derived water level simulations as reference, error analysis of Envisat was made as a function of season (Monsoon and non-Monsoon), basin type and flow regime (low, medium and high). Overall, it was found that Envisat can be a reasonable predictor of water level for Bangladesh rivers. The study indicated that SWOT, with its anticipated higher level of precision and accuracy, will be more effective than Envisat for water management and flood forecasting in Bangladesh after its launch.