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CubeSat Communication Sub-system Design for Coastal Marine Monitoring Applications

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Abstract: *In this paper, we present a design for a CubeSat communication subsystem for a store-and-forward remote monitoring application that will transfer data which originates from an underwater Acoustic Doppler Current Profiler (ADCP) at a remote coastal location to a central hub for processing. For this design, we determined the bandwidth requirements of the ADCP; performed the LEO (low-earth-orbit) constellation design for different orbital altitudes; determined with the aid of AGI Systems Tool Kit (a simulation tool), the worst-case bit-rate that can be accommodated during the visible period; explored different frequency bands for transmission with the Ultra high frequency (UHF) / Very high frequency (VHF) and the S-band being selected as like candidates; designed the antenna; selected transceivers for the ground station and CubeSat; and performed link budgets for the different altitudes. Additionally, the paper discusses CubeSat design considerations and other terrestrial and non-terrestrial transmission alternatives to CubeSat.*

Keywords: *CubeSat; nano-satellites; Acoustic Doppler Current Profiler; ADCP; communication design*