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3-3 An Advance Full Radiance Transformation System For Spaceborne
Microwave Instrument

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In history, NOAA operational calibration for microwave instruments was derived in radiance. In general, the radiance describes the amount of electromagnetic energy radiated by a blackbody in a thermal equilibrium as a function of its temperature and wavenumber through Planck's function. In the current IDPS, Suomi NPP ATMS calibration is derived in brightness temperature through Rayleigh-Jeans approximation which has biases in cold temperature and high frequencies. For JPSS ATMS TDR processing, a full radiance transformation system (ARTS) is being developed. From the lessons studied from Suomi-NPP ATMS calibration, several major improvements are also made for ARTS, which include FFT-based destriping algorithm for warm and cold calibration counts, scan bias correction for warm target and cold space radiance, and refined lunar contamination correction for cold space calibration counts. Using RDR as inputs to ARTS, TDR and SDR can be generated directly with a high quality for many applications such as radiance assimilation in NWP system.