Abstracts

An S-Band Radiometer Design with High Absolute Precision

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A radiometer for the remote measurement of sea surface temperature is described. Two requirements are necessary for the attainment of an absolute accuracy of 1 or 2 K in molecular temperature. Although the first is inappropriate for discussion here, it is clear that corrections must be developed to account for perturbations caused by surface effects (roughness, foaming, and salinity changes) and for atmospheric effects (absorption and scattering). The second requirement, namely, the development of an instrument capable not only of high relative accuracy (i.e., resolution) but also of high absolute precision, is the subject of this paper. The concepts underlying the design of an instrument capable of an absolute accuracy of a few tenths degrees Kelvin in the measurement of brightness temperature at S band are described. The role of the antenna is discussed and the importance of high ohmic and beam efficiencies is stressed. The hardware itself is fully described, along with an outline on the design of a unique cryogenically cooled termination used to calibrate the whole radiometer, including antenna. Finally, some test results are presented that show that the design goals for the instrument have been closely approached.

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