

IAF SPACE POWER SYMPOSIUM (C3)
Advanced Space Power Technologies (3)

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A NEW METHOD FOR LEO BATTERY AGING EVALUATION BASED ON TELEMETRY ANALYSIS

Abstract

In many spacecrafts, the mission lifetime is limited by battery reliability. Therefore, the state of the battery's health (SOH) assessment and its predictability is critical for spacecraft operation engineers in order to deal with the mission extension planning. A new method for the battery degradation assessment in low earth orbit satellites (LEO) is proposed. The poor connection between the battery internal resistance and the battery SOH is also shown by comparing the already used electrical battery model with a slightly more sophisticated model widely used in literature. The limitations of the actual on-board battery model are also discussed. The expected degradation reported by manufacturer and the degradation evaluated with the proposed method are then compared. The calculations are performed in MATLAB® using more than 6 years of real telemetry data (TM) from the CryoSat-2 mission.