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REENTRY PREDICTION OF LARGE CONSTELLATIONS SATELLITES USING MACHINE  
LEARNING AND BC DYNAMIC FORECASTING

**Abstract**

The reentry of large constellation satellites is being a widely public concerned. IADC has organized three reentry campaigns for starlink satellites reentry time prediction in 2021, 2022 and 2023. In this paper, a reentry time prediction process is presented. When the left lifetime is 10-60 days, the LSTM neural network is used to predict the fall date, and when the left lifetime is less than two weeks, the precision dynamic differential correction and gauss process regression is used to improve and forecast the ballistic coefficient to accurately predict the reentry time. As in IADC 2023-01 reentry campaign, the starlink-1065(2019-074BK, 44770) last 72-hour reentry time prediction error reached 1.77%, and last 12-hour ultimate submission error reached 0.49%.