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An Agent-Based Modelling Simulation Approach to Calculate Processing Delay of GEO Satellite Payload

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Abstract : The global coverage of broadband multimedia and internet-based services in terrestrial-satellite networks demand particular interests for satellite providers in order to enhance services with low latencies and high signal quality to diverse users. In particular, the delay of on-board processing is an inherent source of latency in a satellite communication that sometimes is discarded for the end-to-end delay of the satellite link. The frame work for this paper includes modelling of an on-orbit satellite payload using an agent model that can reproduce the properties of processing delays. In essence, a comparison of different spatial interpolation methods is carried out to evaluate physical data obtained by an GEO satellite in order to define a discretization function for determining that delay. Furthermore, the performance of the proposed agent and the development of a delay discretization function are together validated by simulating an hybrid satellite and terrestrial network. Simulation results show high accuracy according to the characteristics of initial data points of processing delay for Ku bands.

Keywords : terrestrial-satellite networks, latency, on-orbit satellite payload, simulation
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