UNIVERSIDAD COMPLUTENSE MADRID

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Transient Faults in Spaceborne Delay Tolerant Networks: Intrinsic Robustness & Smart Re-routing

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Entrada libre hasta completar el aforo

Resumen:

Internet-based communications have profoundly affected day to day life on Earth, and nothing seems to impede the exploitation of its advantages in near Earth constellations, deep-space missions, and beyond. However, delay and disruption are the rule in space networking. Thus, the underlying protocols for the future space Internet rely on the Delay and Disruption Tolerant Networking (DTN) paradigm, where instantaneous feedback can no longer be assumed. In this talk we argue that by being delay-tolerant, the DTN architecture exhibits an intrinsic fault-tolerant feature. However, fault events need to be properly modeled in the end-to-end DTN routing approach. After revising relevant missions in the domain, we discuss how recent research has treated transient faults as another case of disruptions in DTN. Nonetheless, while disruptions provoked by orbital mechanics are deterministic, transient faults exhibit a probabilistic behavior, and thus, require a different modeling approach at the routing level. Appropriate modeling based on Markov Decision Processes is presented in the context of DTN routing decisions, to finally highlight open research issues in the domain

Sobre Juan Andrés Fraire:

Juan A. Fraire obtained his PhD. in Engineering and Applied Sciences from the National University of Córdoba (UNC), funded by the Argentinian Space Agency (CONAE). Since then, his focus of research is the implementation and optimization of communication algorithms and protocols for space networks. Together with colleagues from JPL (NASA), Juan authored the "Delay-Tolerant Satellite Networks" book and published more than 45 international journals and conferences. He founded the International Space-Terrestrial Internetworking (STINT) workshop, which is held annually since 2014, nucleating researchers and industry in the domain. After completing a postdoctoral stage at a CNRS laboratory in France, Juan was awarded a researcher position at Argentinian Scientific and Technical Research Council (CONICET), from where he develops specialized consultancies with different actors in the space industry. Presently, Juan is also an associate professor in Computing Networks at FAMAF in Argentina, an associate professor in Space Networking at Saarland University in Germany and an invited professor at Politecnico di Torino in Italy.