

SYMPOSIUM ON COMMERCIAL SPACEFLIGHT SAFETY ISSUES (D6)  
Commercial Point-to-Point Safety & Insurance Issues (2-D2.9)

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ALL-ELECTRIC SATELLITES - INSURANCE IMPLICATIONS

**Abstract**

All-electric satellites are expected to become a significant proportion of future geostationary communication satellites orders. The significant mass reduction of an all-electric satellite compared to a chemically propelled satellite with the same payload, or the ability to include a larger payload for the same launch mass will start to reduce transponder prices and ensure satellite solutions remain competitive against terrestrial alternatives. The major disadvantage of all-electric satellites is the time it takes to reach geostationary orbit, which could be a number of months, even under nominal operations.

Traditional space insurance policies include a provision such that a satellite can be declared a total loss if it does not reach geostationary orbit within a predefined number of days. For chemically propelled satellites which require a handful of impulsive burns to complete the transfer to GEO such a loss is relatively easy to determine and for a situation, for example, where a satellite is delivered short of its intended apogee, the quantum of a loss, or whether it is worth proceeding with the orbit raising manoeuvres can be determined with confidence, relatively quickly. The situation for all-electric satellites will be different. For all-electric satellites it may be possible to overcome launch shortfalls or certain propulsion system failure scenarios by increasing the duration of the orbit raising phase.

Satellite insurance policies cover the value of the space asset, which for a newly launched satellite would usual mean the replacement cost of the satellite, the replacement cost of the launch service and the cost of the insurance; the three main costs in any satellite project. Insurance does not usually cover the revenue that the satellite is expected to generate.

Whilst the traditional satellite insurance policies have served satellite operators well there are failure scenarios for all-electric satellites which only reduce the level of redundancy, for example, but which could result in a significant increase in the duration of orbit raising. The increased duration of orbit raising will result in a financial impact for the satellite operator due to the loss of revenue associated with the delayed entry into service, but would not be covered by a traditional satellite insurance policy.

This paper will consider, from an insurance perspective, the implications of moving to all-electric propulsion and suggest ways in which the satellite insurance coverage may need to be adapted to ensure satellite operators continue to be indemnified for the risks they face.