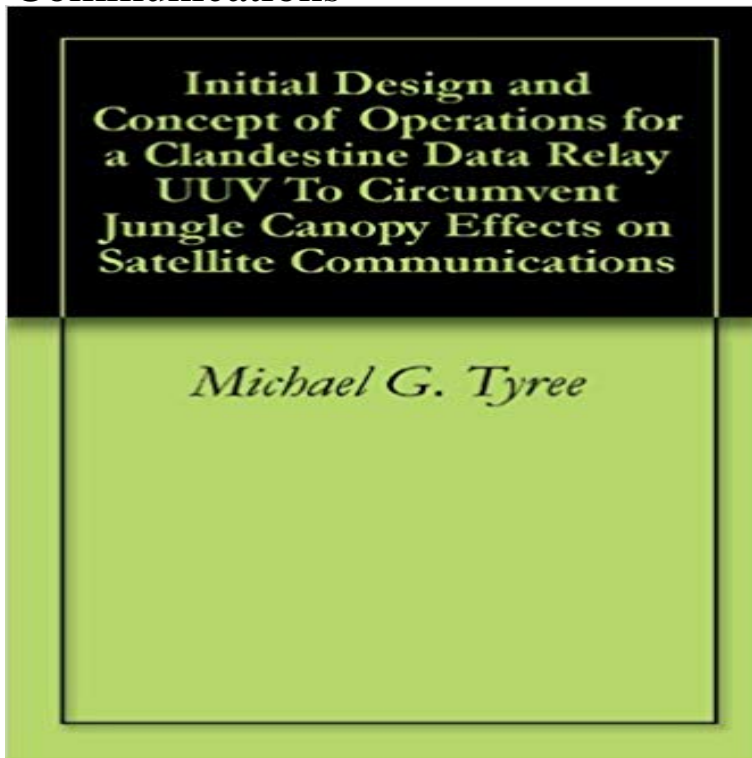


Initial Design and Concept of Operations for a Clandestine Data Relay UUV To Circumvent Jungle Canopy Effects on Satellite Communications



Communications within jungle environments has always been a difficult proposition. This is especially true of collection assets beneath triple canopy jungle that need to communicate with overhead national assets. The traditional methods of countering the negative effects of the canopy on EM signals have been to increase the power to offset the losses, or to utilize new, more canopy transparent portions of the EM spectrum. However, there are complications with both of these methods. Simply increasing transmitted power increases the drain on the systems power supply, thus lowering effective on-station time. Shifting to a different portion of the EM spectrum can negatively affect the transmission rate of the system and requires specialized equipment such as antennas and modulators. This work addresses the issue by designing a semi-autonomous UUV, which will clandestinely relay data from the embedded jungle systems to overhead national assets. Rather than trying to punch through the canopy directly, the proposed UUV will take advantage of the fact that most jungle water ways have, at the very least, a thinner canopy overhead if not a clear view of the sky for less lossy satellite communications. This shifts the primary communications from an Earth-Sky problem to a lateral wave model where the communications travels parallel to the canopy. While the jungle is still not an ideal medium for communications, other methods can be used to address these losses. The proposed UUV will be designed to be cheap and constructed from existing systems. It will also be small, and lightweight, enough to be delivered and deployed in theater via aircraft, boats, and operators on the ground. Additionally it will be capable of long on station times due to the ability recharge on station.

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