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AN ANALYSIS OF THE OPTIMAL TERMINAL PLACEMENT PROBLEM FOR LEO SATELLITE
CONSTELLATIONS IN WARTIME OR POST-DISASTER SITUATIONS**Abstract**

Communication satellite constellations offer flexibility to respond to wartime and post-disaster situations because satellite internet can offer high data rates without the complexity of laying dedicated cables in remote or high-risk areas. We consider the technical challenges involved in re-establishing communication using LEO satellite constellations in areas affected by natural or man-made disasters and briefly survey emergency communication network deployment. We propose and discuss several location-dependent and time-varying performance metrics including network performance (e.g. outage probability, signal-to-interference-plus-noise ratio), utility for the user population, risk, and deployment cost. We formalize the emergency user terminal placement problem for adversarial settings, i.e. choosing the optimal placement for deploying one or more terminals on the ground, and provide a generalized framework for studying this problem. We demonstrate the use of the framework in two case studies motivated by the deployment of Starlink user terminals in Ukraine.