

Battery Design and Orbital Debris Mitigation

C. Ostrom¹, J. Opiela², J. Bacon³, J.-C. Liou³

¹HX5 – Jacobs JETS Contract, NASA Johnson Space Center, Mail Code XI5, Houston, TX 77058, USA

²Jacobs JETS Contract, NASA Johnson Space Center, Mail Code XI5, Houston, TX 77058, USA

³NASA Johnson Space Center, Mail Code XI5, Houston, TX 77058, USA

This presentation reviews four typical spacecraft battery designs and discusses the benefits and drawbacks of each with respect to the NASA Orbital Debris Mitigation Requirements. These requirements address, among other things, accidental explosion probability while on orbit and reentry ground casualty risk. These probabilities, except for post-mission explosion, must be evaluated against quantitative thresholds. Ground casualty risk resulting from reentry can be assessed quantitatively using reentry demisability models. Some missions establish compliance with explosion probability limits using typical component or assembly reliability figures, while others cite more-restrictive certifications or similarity with past successful projects. NASA encourages – and seeks – standards and information exchange to aid end-users in estimating the probability of accidental explosion.