DOI: 10.4172/2090-4886-C1-013

Wireless, Aerospace & Satellite Communications

April 15-16, 2019 | Amsterdam, Netherlands

Timothy Sands
Naval Postgraduate School, USA

Secured SatCom - Command and control communications, USA

To maintain secured communications signal connectivity, spacecraft must maintain orientation. Two objectives dominate consideration of control moment gyroscopes (CMGs) for maintenance of orientation: High torque (or equivalently momentum) and singularity-free operations. Utilizing a 3/4 CMG skewed-pyramid the optimal singularity-free configuration is revealed. Next, this presentation develops a decoupled control strategy to reduce the remaining singular conditions. Analysis and simulation is provided to justify the argument with experimental verification performed on a free-floating satellite simulator. Furthermore, a singularity penetration algorithm is developed, simulated, and experimentally proven to fly through singularities even without singularity reduction.

Biography

Timothy Sands completed his PhD at the Naval Postgraduate School and postdoctoral studies at Stanford University and Columbia University, and is currently Associate Dean of the Naval Postgraduate School's engineering school. He is an International Scholar Laurette of the Golden Key International Honour Society, a Fellow of the Defense Advanced Research Projects Agency (DARPA), and panellist of both the National Science Foundation (NSF) Graduate Research Fellowship program and the National Defense Science and Engineering Graduate (NDSEG) Fellowship. He has published prolifically, and given several plenary, keynote and invitational presentations. He holds one patent in spacecraft attitude control.

dr.timsands@alumni.stanford.edu