Paper ID: 91048
student

IAF EARTH OBSERVATION SYMPOSIUM (B1)
Interactive Presentations - IAF EARTH OBSERVATION SYMPOSIUM (IP)

Author: Mr. Kieron von Buchstab
Carleton University, Canada

Mr. Jeffrey Gao
Carleton University, Canada
Mr. Joshua Milam
Carleton Univeristy, Canada

CUBESAT CONSTELLATIONS FOR USE IN HURRICANE PREDICTION

Abstract

Hurricanes pose immediate threats to equatorial, often developing, countries. The ability to monitor specific areas for hurricane prediction is of utmost importance. Unfortunately, localized hurricane prediction and monitoring is somewhat unavailable for developing countries in these regions. A possible solution is the deployment of a CubeSat constellation of areas of interest. With a network of CubeSats in place over a localized area one would be able to provide targeted atmospheric data to better predict hurricane developments. CubeSats provide many advantages over conventional medium sized satellites. For one, both financial and time costs are much lower than that of a conventional medium sized satellite. Due to this, entire networks of CubeSats could be deployed over a specific area for the same cost as a regular satellite. This makes CubeSats a great option for developing countries and space programs. As well, rather than taking years developing a singular satellite mission, an array of CubeSats could be deployed over that same time frame allowing for earlier data collection. With this lowered price, the cost of failure of a CubeSat is much less detrimental as compared to that of a regular satellite. On top of this, inexpensive satellite development allows for iterative satellite programs and evolutions. If any problems are found they can be quickly mitigated in future deployments.. Besides their cost, CubeSat constellations are beneficial to developing countries as they can cover specific areas in sub-synchronous orbits without the great devotion of resources required for larger CubeSat missions. This means developing countries could get data specific to their region with instruments tuned to that area without having to spend exorbitant funds on a satellite program. With this, having a CubeSat constellation passing over a specific area allows for multiple passes over a period of time as compared to a conventional satellite providing a single pass per orbit. This also allows for quicker transmissions as communicating CubeSat networks don't have to wait for orbit as a singular satellite would. Students at Carleton University have been working on a CubeSat as their final year project. The CubeSat carries instruments capable of reading atmospheric data which could be used in hurricane prediction. The field of hurricane prediction could be greatly improved using dedicated CubeSat networks. This is much more beneficial than large satellite deployment as they cost far less, they take far less time to develop, and they can be improved quickly over multiple generations.