

The data acquisition and download satellite scheduling problem

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Abstract

This work addresses the scheduling problem of gathering and download data for a constellation of satellites and associated ground stations. This problem is related with an effectiveness evaluation for collecting imagery to monitor different locations (targets) with different priorities for a given planning horizon, with several operational constraints. In previous work the proposed mathematical model focused on ensuring that target observations would take place within the available observation time-windows, enforcing precedence constraints between acquisition and download of data as well as the satellites processing time capacities. It also explicitly modeled the revisit time (the time between successive observations of the same target) and the due time (the latest possible moment that the collected imagery is available at the ground station). Improvements to the previous modeling were proposed afterward by incorporating the setup time between two consecutive acquisitions which is required to adjust the sensor to capture the target imagery requests with a certain acquisition mode. Also the current model can cope with satellite storage capacity. In this paper, the practicability of the methodology will be demonstrated in different monitoring contexts such as deforestation, oil spill and border control as well as for updating information on search and rescue scenario. As a result it is expected to increase the situation awareness and enable early detection of disasters and/or mitigation actions.



Biography:

Maria José Pinto is a researcher at Institute of Advanced Studies (IEAv) since 2002. The IEAv is an organization of the Department of Aerospace Science and Technology (DCTA). Her post-doc was developed in partnership with TNO and TU Delft in The Netherlands. She has a PhD degree in Applied Computing (Operational Research) at National Institute for Space Research (INPE), a Master of Science degree in Computer Science and Computational Mathematic (Optimization) at University of São Paulo (USP) and an undergraduate education in Mathematic at Federal University of Viçosa (UFV). Her main research areas are Operations Research and Decision Support Systems.

Speaker Publications:

1. Seleznev V.S., Liseikin A.V., Emanov A.A., Belinskaya A.Yu. The Chelyabinsk meteoroid: a seismologist's view. Doklady Earth Sciences. 2013. T. 452. № 1.976-978.
2. Seleznev V.S., Liseikin A.V., Emanov A.A., Belinskaya A.Y. Geophysical observations during the flight of the Chelyabinsk meteoroid. Russian Geology and Geophysics. 2014. T. 55. № 3. 405-410.
3. Seleznev V.S., Liseikin A.V., Emanov A.A., Belinskaya A.Y. Meteoroid Chelyabinsk (seismologist point of view). In digest: Meteorite Chelyabinsk – a year on Earth. Materials of Russian national academic conference. Compiler: N. A. Antipin. 2014. P. 678-681.

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