

EARTH OBSERVATION SYMPOSIUM (B1)  
Earth Observation Data Management Systems (4)

Author: Mr. Stuart Grey  
University of Glasgow, United Kingdom, sgrey@aero.gla.ac.uk

Prof. Gianmarco Radice  
University of Glasgow, United Kingdom, Gianmarco.Radice@glasgow.ac.uk  
Mr. Quirien Wijnands  
European Space Agency (ESA), The Netherlands, Quirien.Wijnands@esa.int  
Dr. Massimiliano Vasile  
University of Strathclyde, United Kingdom, massimiliano.vasile@strah.ac.uk

## IMAGE SELECTION ALGORITHM FOR GMES MISSION

**Abstract**

This paper outlines the user interface and image selection algorithm developed as part of the multi agent system segment of the Global Monitoring for Environment and Security (GMES) European Space Agency mission. The objective of GMES is to pull together and rationalise all the information obtained by environmental satellites, air and ground stations to provide a comprehensive picture of the "health" of Earth for both environmental and security purposes. A multi-agent system (MAS) is being developed to coordinate and integrate the many types of data sources, specifically the multiple different classes of Earth monitoring satellites including planned missions and satellites currently in operation.

This paper presents the development of an image selection algorithm and associated user interface for requesting images of the Earth from the heterogeneous satellite constellation. When a user request is made it is sent to the image broker agent where bids from the agents responsible for each satellite are received. The image selection algorithm is designed to assess each of these bids and display the best one to the user for their final approval. Another feature of the image comparison algorithm is that if there are no valid bids made then the algorithm suggests to the user where constraints and variables could be relaxed to allow a valid image to be produced. This step is separate from the initial ranking of the images for the user and is carried out using a global optimisation approach.

The user interface and image selection algorithm allow a user to easily request images from the system without any prior knowledge of coverage and satellite capabilities and occurs in near real time, offering a substantial improvement over current systems. This improvement in the response time for requests improves its effectiveness in time critical areas such as disaster response and environmental monitoring. The accessibility of the system will also allow small stake holders access to as little or as much targeted data as they require increasing the uptake and use of the data already gathered.