comprehensive and sophisticated model. The primary output of this model is the flux [#debris/area/time] as a function of debris size and year. ORDEM may be operated in spacecraft mode or telescope mode. In the former case, an analyst defines an orbit for a spacecraft and "flies" the spacecraft through the orbital debris environment. In the latter case, an analyst defines a ground-based sensor (telescope or radar) in terms of latitude, azimuth, and elevation, and the model provides the number of orbital debris traversing the sensor's field of view.

An upgraded graphical user interface (GUI) is integrated with the software. This upgraded GUI uses project-oriented organization and provides the user with graphical representations of numerous output data products. These range from the conventional flux as a function of debris size for chosen analysis orbits (or views), for example, to the more complex color-contoured two-dimensional (2D) directional flux diagrams in local spacecraft elevation and azimuth.

This work was done by Mark Matney of Johnson Space Center; Paula Krisko and Yu-Lin Xu of Jacobs Technology; and Matthew Horstman of ERC. Further information is contained in a TSP (see page 1). MSC-25457-1

Scatter-Reducing Sounding Filtration Using a Genetic Algorithm and Mean Monthly Standard Deviation

Retrieval algorithms like that used by the Orbiting Carbon Observatory (OCO)-2 mission generate massive quantities of data of varying quality and reliability. A computationally efficient, simple method of labeling problematic datapoints or predicting soundings that will fail is required for basic operation, given that only 6% of the retrieved data may be operationally processed. This method automatically obtains a filter designed to reduce scatter based on a small number of input features.

Most machine-learning filter construction algorithms attempt to predict error in the CO_2 value. By using a surrogate goal of Mean Monthly STDEV, the goal is to reduce the retrieved CO_2 scatter rather than solving the harder problem of reducing CO_2 error. This lends itself to improved interpretability and performance.

This software reduces the scatter of retrieved CO_2 values globally based on a minimum number of input features. It can be used as a prefilter to reduce the number of soundings requested, or as a post-filter to label data quality. The use of the MMS (Mean Monthly Standard deviation) provides a much cleaner, clearer filter than the standard $ABS(CO_2\text{-truth})$ metrics previously employed by competitor methods.

The software's main strength lies in a clearer (i.e., fewer features required) filter that more efficiently reduces scatter in retrieved CO_2 rather than focusing on the more complex (and easily removed) bias issues.

This work was done by Lukas Mandrake of Caltech for NASA's Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).

This software is available for commercial licensing. Please contact Dan Broderick at Daniel.F.Broderick@jpl.nasa.gov. Refer to NPO-48255.