EPIC Geolocation Quality Summary

Algorithm Revision 06

Product Version 03

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National Aeronautics and Space Administration

Goddard Space Flight Center
Greenbelt, Maryland

1 EPIC QUALITY SUMMARY

This is a brief summary of known algorithm and software implementation issues in the EPIC L1A/B geolocation. For more information regarding the geolocation algorithm, please refer to the "EPIC Geolocation and Color Imagery" document.

2 GEOLOCATION ERROR

This version of the geolocation resolves a number of issues and features improved absolute geolocation, the relationship between the pixels and their physical locations. These include atmospheric refraction, improved optical model, and correction for star tracker error.

The current solution is within a pixel for most products. There is still occasionally some rotational correction error, usually in images over the Pacific ocean, which can cause as much as a 2 pixel offset at view zenith angles greater than 70 degrees.

3 STAR TRACKER ACCURACY

DSCOVR is in a Lissajou orbit, which has a slow, approximately 6 month period roll. The star tracker is used to determine the z-axis rotational orientation of Earth to the spacecraft, ie, where North is in the image. From analysis, it is apparent that the star tracker accuracy is no better than .5 degrees, which means that the geolocation can have an equivalent roll error.

The current version of the algorithm employs a fix for this which employs comparing against other satellite imagery to determine the correction. This works generally within requirements, but has some weaknesses when imaging over the Pacific ocean, where there is little land mass to compare against.

4 GEOLOCATION WITH MOON

The Moon is occasionally imaged for calibration purposes. In these situations, the geolocation will run and produce an L1A dataset. No L1B will be produced. There is currently no geolocation solution provided for the Moon, but the EPIC Data Format Control Book does contain information on how it would be structure if implemented in the future.

5 NO L1B PRODUCTS WHEN EARTH AND MOON ARE IN VIEW

The geolocation software will not product a L1B product when both the Earth and Moon are in view. This is due to the object centering algorithm (centroiding) being able to handle only one object in the field of view. The color images released during these events are produced using a special imaging sequence to limit effect of Earth's rotation, plus a manual centering and a special statistics-based band registration process.

6 NO L1B PRODUCTS DURING DARK SPACE IMAGING

There are no L1B images produced during dark space imaging. Dark space imaging is defined as imaging of any body other than the Moon or Earth, or during periods of poor attitude solution which may feature partial Earths in the field of view. In this situation, an L1A will be produced with the appropriate metadata indicating a dark space image.