

# LANCE Enhancement Request

## Multi-angle Imaging SpectroRadiometer (MISR)-NRT Products

### Overview

The purpose of the suggested enhancement is to initially generate MISR NRT L2 (winds), with the option of adding MISR NRT L2 Aerosol products (specifically, *RegBestEstimateSpectralOptDepth* and *RegEqRefl*), and distribute them through LANCE and display the products in Worldview and GIBS (Global Imagery Browse Services).

### 1. Identify and summarize the effort

#### 1a. Who is requesting the effort? (User)

Arlindo da Silva (NASA/GSFC).

#### 1b. Who is completing the effort? (Provider)

The Atmospheric Science Data Center (ASDC). MISR production utilizes the EOSDIS Core System (ECS) Ingest, Archive and Distribution system at the ASDC.

#### 1c. Is there a HQ or Science sponsor?

Hal Marning, NASA/HQ Program Manager for NASA's Radiation Sciences Program

### 2. Science Heritage

*Please give a brief description of the corresponding science quality product.*

The Level 2 MISR aerosol optical depth parameter is considered *Stage 3 Validated* maturity level for MISR Version 22. This applies to aerosol optical depth over both water and land, which are produced using different retrieval approaches (Martonchik *et al.* 2009, and references therein.)

A comprehensive statistical approach to assess the quality of MISR aerosol products Version 22 can be found in Kahn *et al.* (2010). Overall, about 70% to 75% of MISR AOD retrievals fall within 0.05 or 20% × AOD of the paired validation data from the Aerosol Robotic Network (AERONET), and about 50% to 55% are within 0.03 or 10% × AERONET AOD, except at sites where dust or mixed dust and smoke are commonly found.

Kahn, R. A., B. J. Gaitley, M. J. Garay, D. J. Diner, T. F. Eck, A. Smirnov, and B. N. Holben (2010), Multiangle 26 Imaging Spectroradiometer global aerosol product

assessment by comparison with the Aerosol Robotic Network, *J. Geophys. Res.*, 115, doi:10.1029/2010JD014601.

Martonchik, J.V., R.A. Kahn, and D.J. Diner, 2009. Retrieval of Aerosol Properties over Land Using MISR Observations. In: Kokhanovsky, A.A. and G. de Leeuw, ed., *Satellite Aerosol Remote Sensing Over Land*. Springer, Berlin, pp.267-293.

### **3. Scientific and/or application objective achieved through enhancement:**

*Please describe the key users and say the MISR-NRT products will enhance a scientific and/or application objective.*

The MISR wind product will complement the MODIS polar winds for operational data assimilation and numerical weather prediction. Likewise, the MODIS L2 aerosol product, along with the corresponding 9 camera reflectances, will be used for operational aerosol data assimilation and forecasting by several of the organizations integrating the International Cooperative for Aerosol Forecasting (ICAP).

### **4. Concept of operations**

#### *4a. Location of functionality*

ASDC. At this time, none of the three ECS systems (ASDC, LP.DAAC, or NSIDC) have implemented a LANCE NRT element. The estimate is for a system that leverages the current ECS architecture and utilizes a fault tolerant approach that is within reason.

#### *4b. Development, integration and testing process*

MISR NRT L2 (winds) product generated by xxx has already been tested and approved by the MISR Science Team. However, test images will be generated including the user-supplied color scale and submitted to Dr Hal Maring??? for approval.

There is the possibility that MISR NRT L2 Aerosol product may be added. These options are not included in the resource, cost, or schedule information provided in Sections 3c, 4, and 5.

#### *4c. Support (FTEs) for development and sustaining engineering*

ECS is not configured as a highly available redundant (dual string) system and is not staffed 7 x 24 at ASDC. We propose a dedicated set of hardware to serve the initial MISR NRT L2 Cloud product (winds) that is extensible to handle a proposed MISR NRT L2 Aerosol product. The hardware will be similar to items bought during the 2012 MISR refresh.

The major pieces of the MISR NRT hardware system include:

- I. 10TB of storage to be added to an existing IBM DS5300. This accommodates the 7.5TB estimate for 14-days of the NRT products.

- II. Managed file system dedicated to the MISR NRT (including the browse images which would be served out to users and GIBS: *cost to be provided by Pam Johnson of EED*).
- III. Processing system that includes additional blades for redundancy/high availability with additional local hard drive storage to improve throughput.
- IV. Dedicated server as a data mover of EDOS and other ancillary data from ECS WYE resources include the SSAI staff to develop the operational concepts, scripts, procedures and perform end-to-end testing of the NRT system. This covers ensuring that rolling stores at the ASDC operate as expected and deletes occur properly. It also covers the installation and initial checkout of the configured NRT system.

Time must be allocated to understand the interface to the GIBS for the MISR NRT browse products that are generated in the PGE chain.

Significant work needs to be done on post 8.2 deliveries of the ECS. At this time, ECS does not handle a class of data that is essentially “transient” or ingested and only archived for 14 days to spinning disk. It is never pushed to the StorNext tape archive system. Additional work may be needed to ensure that metadata granules that were pushed up to ECHO are also deleted within 14 days. It is not clear if such a feature exists in 8.2 or how it would be handled. *To add the EED staff costs, please contact Pam Johnson.*

*4d. What is the plan for approving the work is completed?*

Sample MISR NRT L2 (winds) products will be approved by Hal Maring and possibly to other members and associates of the MISR Science Team prior to distribution. Subject to the approval of the Science Team new versions of the MISR NRT L2 (winds) algorithms will be included as they become available.

## **5. Endorsements**

The following members of the International Cooperative for Aerosol Forecasting (ICAP) are endorsing this request: NCEP (Sarah Lu), NRL (Jeff Reid), and ECMWF (Angela Benedetti).