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HDF-EOS to GeoTIFF Conversion Tool (HEG) User's Guide for Data Pool

Technical Paper

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Preface

The EMD program, under the auspices of NASA's Earth Observing System (EOS), provides a tool for the conversion of HDF-EOS formatted granules to Geographical Information System (GIS) compatible formats, such as GeoTIFF. The initial focus of the tool's development is to provide conversion services for standard HDF-EOS science products produced by the MODIS, MISR and ASTER instruments. The tool is available online through the EOS Data Pools, and is also available as a stand-alone product which can be downloaded to a user workstation.

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Abstract

The HDF-EOS to GeoTIFF Conversion Tool (HEG) has been developed to allow users of EOS data to convert that data from HDF-EOS to GeoTIFF format for use in GIS application tools. The HEG also provides users the ability to convert EOS data from its original map projection to a user-specified map projection, and to request subsets of EOS data products by spatial coordinates or band specification. The tool is available online through the EOS Data Pools, and is also available as a stand-alone product which can be downloaded to a user workstation. This document is a user's guide for the Data Pool version of the HEG tool.

***Keywords**:* HDF-EOS, GeoTIFF, GIS, Subsetter

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1.1 Identification

The HDF-EOS to GeoTIFF Conversion Tool (HEG) Users Guide for Data Pool was prepared under the Earth Observing System Data and Information System (EOSDIS) Maintenance and Development Contract (NAS5-03098).

1.2 Scope

This document is a Users Guide for the Data Pool version of the HDF-EOS to GeoTIFF Conversion Tool (HEG) software.

1.3 Purpose and Objectives

This document provides users of the Data Pool HEG with a description of how to use the Data Pool web interface to place orders for HEG conversion of data in the EOS Data Pools, and how HEG conversion orders are processed and delivered. This document should be used in conjunction with online help text and tutorials available with the Data Pool web interface.

1.4 Document Organization

This document is organized as follows:

Section 1. Introduction

Section 2. Related Documentation

Section 3. Operations Concept

Section 4. Using the HEG through the EOS Data Pools

Appendix A. List of supported data sets

Appendix B. State Plane Zones and Values

Appendix C. Sample Output Metadata

Appendix D. Data Pool HEG Error Codes and Responses

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2. Related Documentation

2.1 Parent Documents

The following documents are the parents from which this document's scope and content are derived:

none

2.2 Related Documents

The following documents are referenced within this technical paper, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this document.

333-EMD-001	Release 7 SCF Toolkit Users Guide for the ECS Project
170-EMD-001	HDF-EOS Library User's Guide Volume 1: Overview and Examples
170-EMD-002	HDF-EOS Library User's Guide Volume 2: Function Reference Guide
515-EMD-001	HDF-EOS to GeoTiff Conversion Tool (HEG) Standalone User's Guide
	HDF User's Guide, V 4.1r5, NCSA, U of Illinois, Campaign, IL, 2001
	HDF Specification and Developer's Guide, V 4.1r5, NCSA, U of Illinois, Campaign, IL, 2001
	HDF Reference Manual, V 4.1r5, NCSA, U of Illinois, Campaign, IL, 2001
none	An Album of Map Projections, USGS Professional Paper 1453, Snyder and Voxland, 1989
none	Map Projections - A Working Manual, USGS Professional Paper 1395, Snyder, 1987

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3. Operations Concept

EOS Terra and Aqua, launched in December 1999 and May 2002 respectively, carry instruments which provide observations of the earth at many wavelengths and spatial resolutions. The data are used to provide scientists, policy makers and others with a continuous record of parameters used to characterize, for example, land use, pollutant transport and climate change.

The standard format for EOS instrument data is HDF-EOS, which is derived from the National Center for Supercomputers (NCSA) HDF format. HDF is a self-describing, portable format for scientific data. HDF-EOS applies standards for attaching geolocation and temporal information to scientific data. Most EOS data products are stored and distributed in this format. HDF-EOS files also contain core and product-specific metadata. The former metadata are also stored in databases for user search and access.

HDF-EOS is not generally usable in common GIS application tools such as ArcInfo, ENVI and ERDAS. The HDF-EOS to GeoTIFF Conversion Tool (HEG) has been developed to allow users of EOS data to convert that data from HDF-EOS to GeoTIFF format for use in GIS application tools. The HEG also provides users the ability to convert EOS data from its original map projection to a user-specified map projection and to request subsets of EOS data products by spatial coordinates or band specification.

The HEG is available as a standalone tool to be run on an end user's workstation against the user's local directory of EOS data products, and is also available publicly online at the EOS Distributed Active Archive Centers (DAACs), where it can be run against EOS data in the DAAC's Data Pool. The Standalone HEG may be run from the command line or via the Standalone HEG GUI. The Data Pool HEG is available through the Data Pool web search and order interface at each DAAC.

This document describes usage of the Data Pool version of the HEG. Refer to 515-EMD-001, HDF-EOS to GeoTiff Conversion Tool (HEG) Standalone User's Guide, for instructions on usage of the Standalone version of the HEG.

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4. Using the HEG through the EOS Data Pools

4.1 Data Pool Overview

The Data Pool is a large disk cache at each EOS Distributed Active Archive Center (DAAC) that contains frequently used data from the DAAC's EOS archive. The contents of this cache are tuned to the needs of each DAAC's user community. The goal of the Data Pool is to increase the distribution capacity of EOS data by significantly reducing the need to access tape archives. Users may access data in the Data Pool directly via FTP, or using a web interface.

The Data Pool web interface employs a simple 'drill-down' paradigm which allows users to continuously refine search criteria until a desired results set is achieved. All data "granules" in the results set are displayed on a results page. Data granules may be downloaded directly from the results page with or without HEG conversion, or may be grouped with other search results in a shopping cart, where ftp or media distribution are available. HEG conversion is available from the shopping cart for ftp distribution.

This chapter describes how to request HEG conversion for granules in a user's Data Pool web interface results set. It will not, however, describe the basic usage of the drill down interface to produce the results set. If the user is not already familiar with how to use the Data Pool web interface to search for data of interest, help text and tutorial text are available online.

4.2 HEG usage overview

HEG conversion options are available for many, but not all, EOS data types. (See Appendix A for a list of data types currently supported by the HEG). If a data type is eligible for HEG conversion, the HEG Converter Icon  will be displayed in the rows for granules of that data type on the search results page.

There are four types of HEG conversion operations which are supported by the Data Pool HEG. These are format conversions, projection conversions, spatial subsetting, and band subsetting. These types of conversions may be selected individually or in combination with each other (e.g., the user may request a format conversion only, or a format conversion combined with a projection conversion, or a format conversion combined with spatial subsetting, etc.) Not all types of conversions and conversion options are available for each data type; only the applicable ones will be presented on the Data Pool web interface.

The Data Pool HEG supports two options for format conversion: HDF-EOS (i.e., the data remains in its original EOS format), and GeoTIFF. GeoTIFF is a TIFF (Tagged Image File Format) based interchange format for georeferenced raster imagery. GeoTIFF formatted data is accepted as input by common GIS applications such as ArcInfo, ENVI and ERDAS.

The Data Pool HEG supports reprojection of input data to the following output projections: Geographic, Sinusoidal, Universal Transverse Mercator (UTM), Transverse Mercator (TM),

Polar Stereographic (PS), Lambert's Equal Area Azimuthal, Lambert's Conformal Conic, and State Plane Coordinate system (See Appendix B for a listing of State Plane Zones and Values). When choosing a reprojection option, users may accept default projection parameter values, or may override the defaults by providing projection parameter information.

Spatial subsetting and/or band subsetting of the input data is also supported by the Data Pool HEG. To perform spatial subsetting, the user must provide bounding box coordinates. To perform band subsetting, the user chooses one or more available bands from a pick list. Note that users are REQUIRED to select spatial and/or band subsetting when performing HEG conversions for granules from certain data types such as MISR data types.

Products of Data Pool HEG conversion requests are stored for a finite time period in an order directory at the host DAAC. The user receives an email indicating that the HEG conversion request is complete. The email provides links to the order directory, from which the user may download the HEG converted products. The email also informs the user of the order expiration date, after which the order directory will no longer be available.

Descriptions of how to submit HEG conversion requests in this chapter assume that the user has already performed a drill down search using the Data Pool web interface. Results of the user's search are displayed on a "Results of Your Search" page (results page). Figure 1 shows an example of this page.

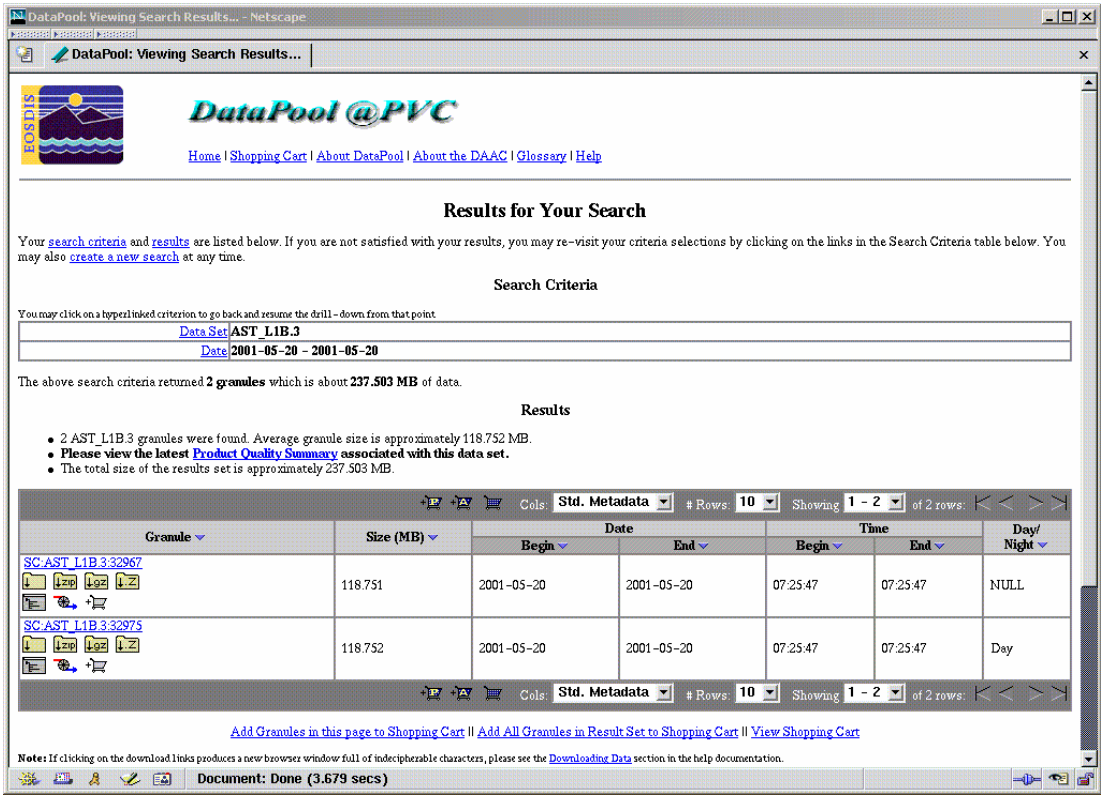

Figure 1. Search results of drill-down

HEG conversions may be requested directly on the search results page for individual granules in the results set (see section 4.3, HEG Conversions via the Results Page), or may be requested for one or more granules after all granules to be ordered have been placed in the shopping cart. (see section 4.4, HEG Conversions via the Shopping Cart).

Note that the XML File icon  displayed in each row on the results page allows the user to examine the metadata associated with the granule, in xml format. This metadata includes spatial coordinates of the granule, which may be helpful when requesting spatial subsetting of the granule with the HEG.

4.3 HEG Conversions via the Results Page

The user initiates a HEG conversion of a single granule by selecting the HEG Converter Icon  in the result row for that granule. When selected, the Converter Dialog is displayed for that granule. (See Figure 2)

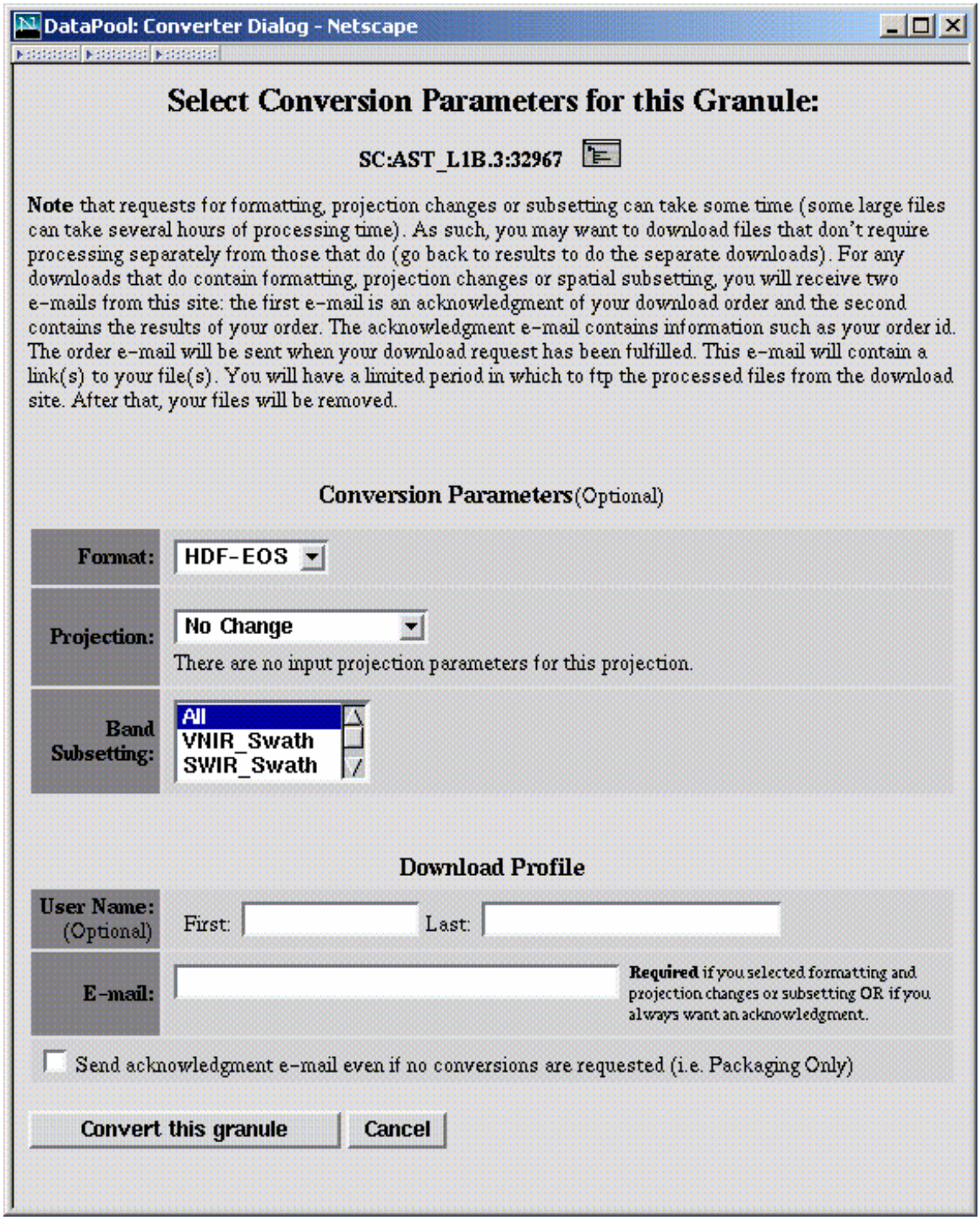

Figure 2. Converter Dialog

To convert the granule using the HEG, the user selects the output format and output projection from the pull-down lists on the dialog. For some choices of output projections, the Converter Dialog page will be redisplayed with additional input blocks allowing the user to enter parameter values associated with that projection. (See Figure 3 for an example of a Converter Dialog showing projection parameter input blocks). If the user does not enter projection parameter values, default values will be used. (Reference Chapter 1.6.4 of the HDF-EOS Library User's Guide Volume 2: Function Reference Guide, for a listing and descriptions of the U.S. Geological Survey General Cartographic Transformation Package (GCTP) Projection Parameters for HEG-supported projections. This document may be found on the SDP Toolkit website at http://newsroom.gsfc.nasa.gov/sdptoolkit/userguide.html.)

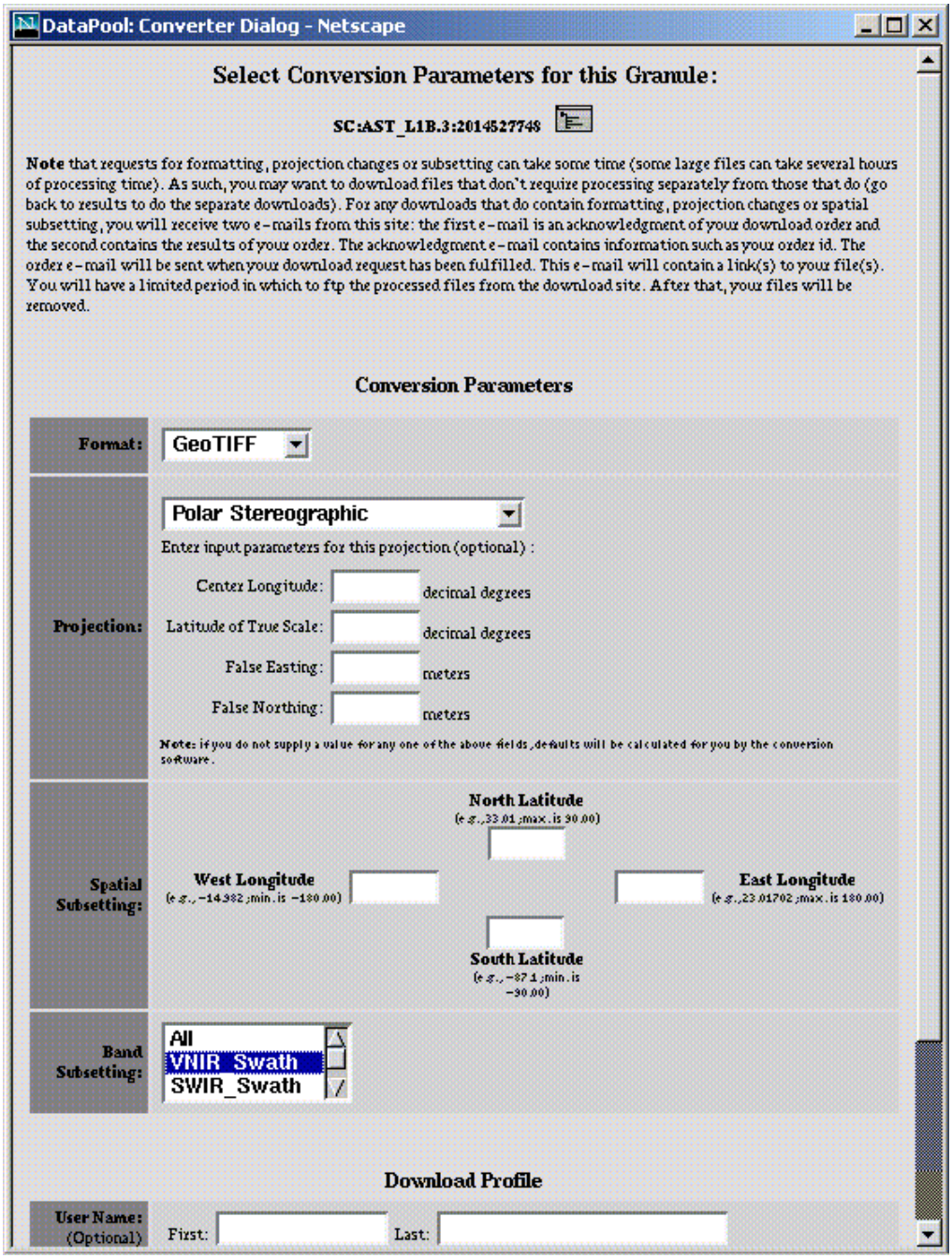

Figure 3. Converter Dialog with Projection Parameters (PS Projection)

Depending on the data type, Band and/or Spatial subsetting may also be presented as options on the Converter Dialog. In Figure 2, band subsetting is offered as an option whereas spatial subsetting is not. To perform band subsetting, the user selects one or more bands from the band pull-down list. (To select a number of consecutively listed bands, the user selects one band and then selects another band while holding down the shift key. All listed bands between and including these bands will be selected from the list. Non-consecutive bands in the list can be

selected by selecting one band at a time while pressing the control key.) The default option of 'All' on the band subsetting pull-down list means that band subsetting will not be performed.

The user then enters download profile information, including a required email address. When all the required information has been entered, the user selects "Convert This Granule". An order acknowledgement is then displayed confirming the acceptance of the HEG conversion request, and showing the details of the user's HEG conversion choices (see Figure 4). In this example, we placed an order for one AST_L1B version 3 science granule with an output format of GeoTIFF, output projection Geographic, no Spatial Subsetting and a Band Subsetting choice of SWIR_Swath only.

Figure 4. Order Acknowledgment Page

The user receives an Order Confirmation email stating that the HEG conversion order was placed. The email text includes the same information that is included in the order acknowledgement page in Figure 4. The order id on the acknowledgment page and in the confirmation email should be referenced in all communications with DAAC User Services about the order.

The user also receives an Order Notification email when the HEG conversion order is completed. (See Figure 5) The email notification contains links to the directory from which the converted products may be downloaded, as well as links for zip or tar files of the packaged order. The email also states when the order directory is scheduled to expire.

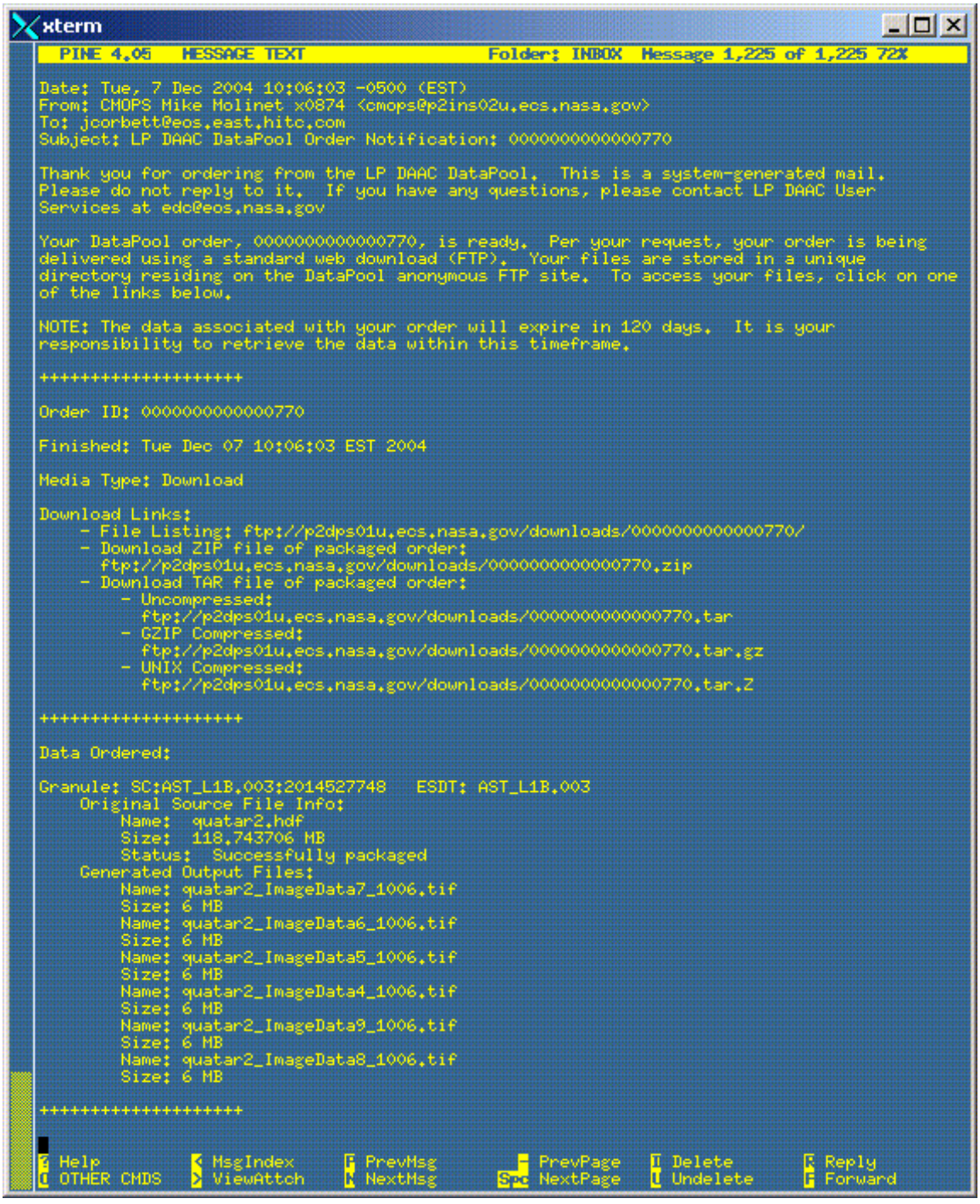

Figure 5. HEG Conversion Order Completion Notification Email

4.4 HEG Conversions via the Shopping Cart

The second method for submitting an order for HEG conversion allows the user to perform HEG conversion for one or more granules at the same time. To do this, the user must use the shopping cart feature of the Data Pool web interface. A single granule can be added to the shopping cart by selecting the "Add to Cart" icon () next to the granule of interest on the "Results of Your Search" page (see Figure 1). The user may also add more than one granule at a time to the shopping cart using either the "Add Granules in this page to Shopping Cart" or "Add All Granules in Result Set to Shopping Cart" links. The user may continue to add granules to the shopping cart from subsequent drill down searches. When a granule is added to the shopping cart, the "Granule in Shopping Cart" icon () is displayed for the granule.

Once all desired granules are placed in the shopping cart, the user may view the shopping cart by clicking on "View Shopping Cart" at the bottom of the results page, or by clicking on "Shopping Cart" in the page header.

To illustrate the conversion of granules in the shopping cart, we add the granules returned in the drill down of the two AST_L1B.3 granules found earlier (See Figure 1) to the shopping cart. Upon entering the shopping cart, the "Your Shopping Cart" screen is displayed (see Figure 6). The XML File icon  allows the user to examine the metadata associated with the science granule in xml format. The user is also presented with two pull down dialog boxes, one for choosing the output format and the other for choosing the output projection. If applicable for this data granule, the Spatial Subsetting  and Band Subsetting  icons are also presented, and may be used to invoke the corresponding subsetting dialogs. For the AST_L1B.3 granules displayed in Figure 6, only the Band Subsetting  icon is available. An example illustrating the use of the Spatial Subsetting  icon will be presented in section 4.4.4.

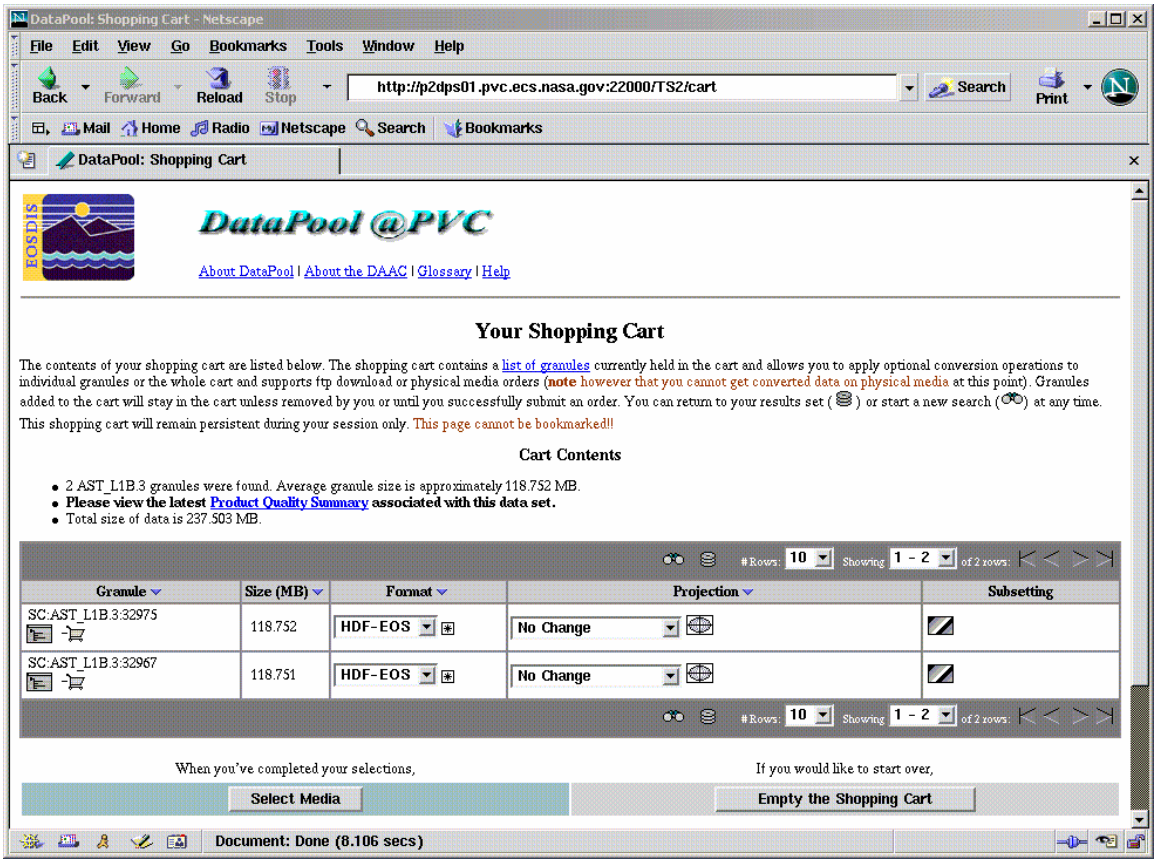

Figure 6. Shopping cart containing two AST_L1B.3 granules

In this example, we will convert both AST_L1B.3 granules to GeoTIFF output format, Geographic output projection and band subset only the VNIR_Swath band. This example will be used to illustrate the "apply to all in shopping cart" feature which allows the user to quickly set output formats, projections, projection parameters and band subsetting parameters for like granules. An example of the "apply to all in shopping cart" for spatial subsetting will be illustrated in a later example.

4.4.1 Choosing an output format

To select the output format for a given granule, the user selects one of the available formats (HDF-EOS, GeoTIFF) on the Format pull-down list for the granule. To make the selected output format apply to all granules in the shopping cart, the user clicks on the "Apply this selection to all granules in the shopping cart" ⊞ icon.

4.4.2 Choosing an output projection

To select the output projection for a given granule, the user selects one of the available projections on the Projection pull-down list for the granule. Output projections supported by the

Data Pool HEG are: Geographic, Sinusoidal, Universal Transverse Mercator (UTM), Transverse Mercator (TM), Polar Stereographic (PS), Lambert's Equal Area Azimuthal, Lambert's Conformal Conic, and State Plane Coordinate system. However, not all projection options are available for all data types. Only projections supported for the relevant data type will be shown on the pull-down list for a particular granule. (See Figure 7 for an example). "No Change" is the default output projection (i.e., the output product will be in the same projection as the input product).

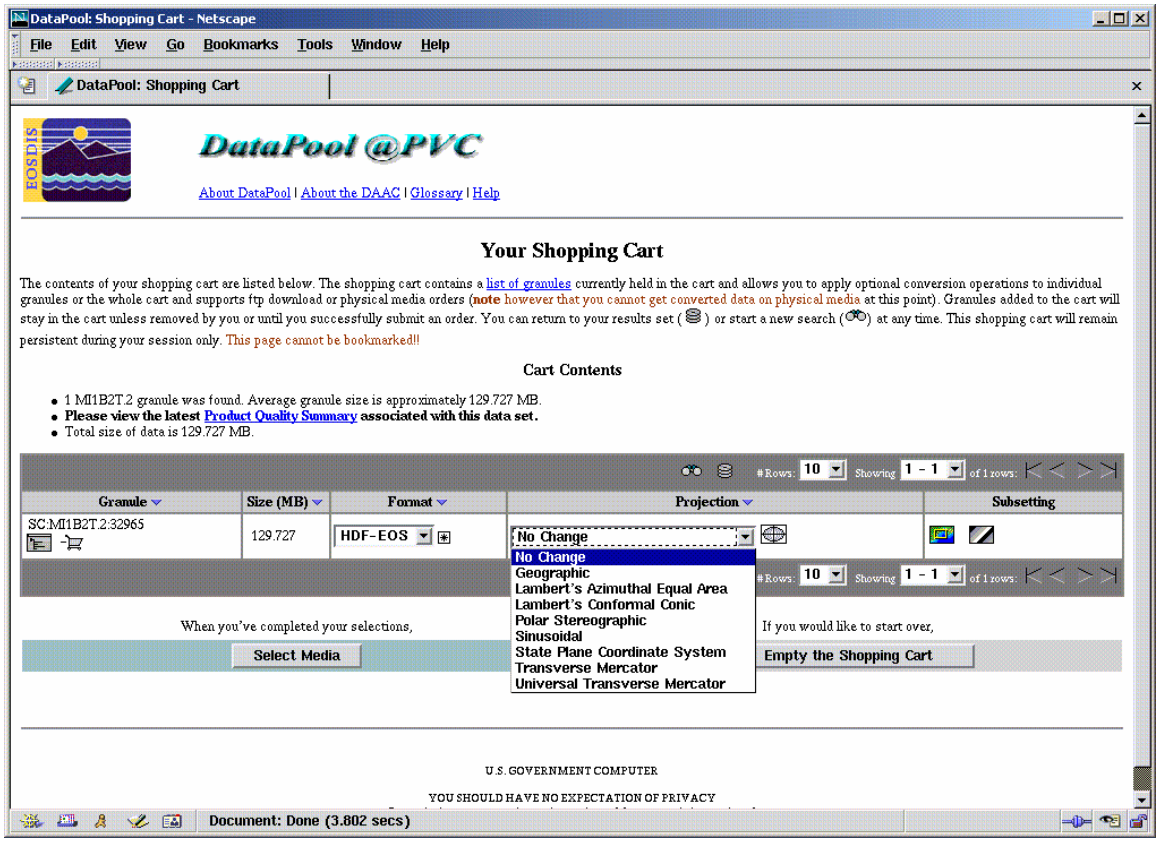

Figure 7. Choosing an output projection

Output projections may be selected one at a time for each granule in the shopping cart. Default projection parameters for the selected projection will be supplied automatically, but the user may override the default projection parameters by clicking on the Projection Input Parameters icon. This will bring up the Projection Input Parameters page. (See Figures 8 and 9 for examples.) (Reference Chapter 1.6.4 of the HDF-EOS Library User's Guide Volume 2: Function Reference Guide, for a listing and descriptions of the U.S. Geological Survey General Cartographic Transformation Package (GCTP) Projection Parameters for HEG-supported projections. This document may be found on the SDP Toolkit website at http://newsroom.gsfc.nasa.gov/sdptoolkit/userguide.html.)

By selecting “Apply these settings to all granules” on the Projection Input Parameters page, and selecting OK, the projection parameters entered by the user will be applied to all granules in the cart for which the same projection is selected. (Note that if the granules populating the shopping cart belong to more than one data type, some of the projections available to one data type may not be available to granules from another data type. The Projection Input Parameters page will recognize this and not present the user with the option to apply the projection universally to the granules in the shopping cart.)

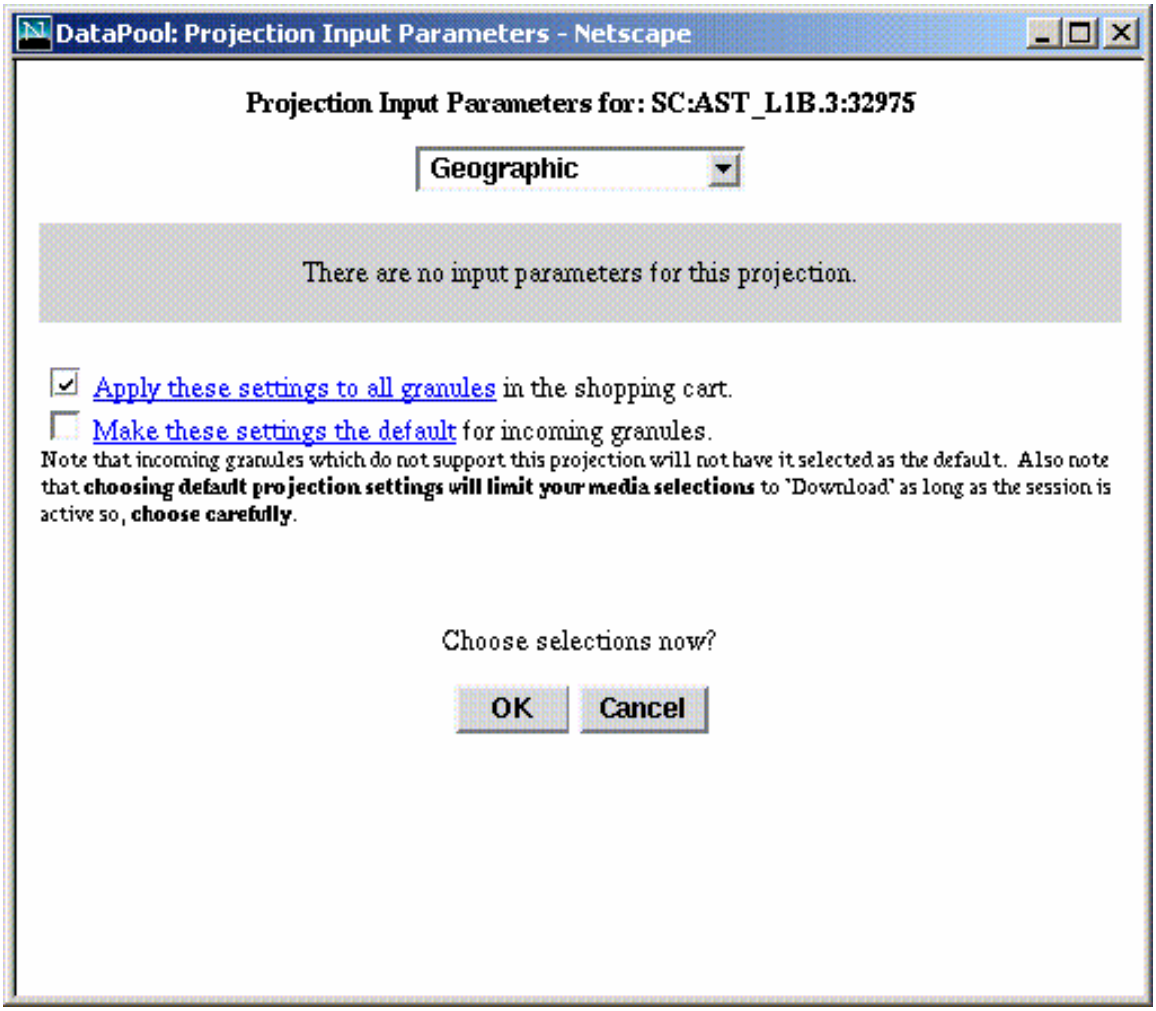

Figure 8. Projection Input Parameter Dialog (Geographic)

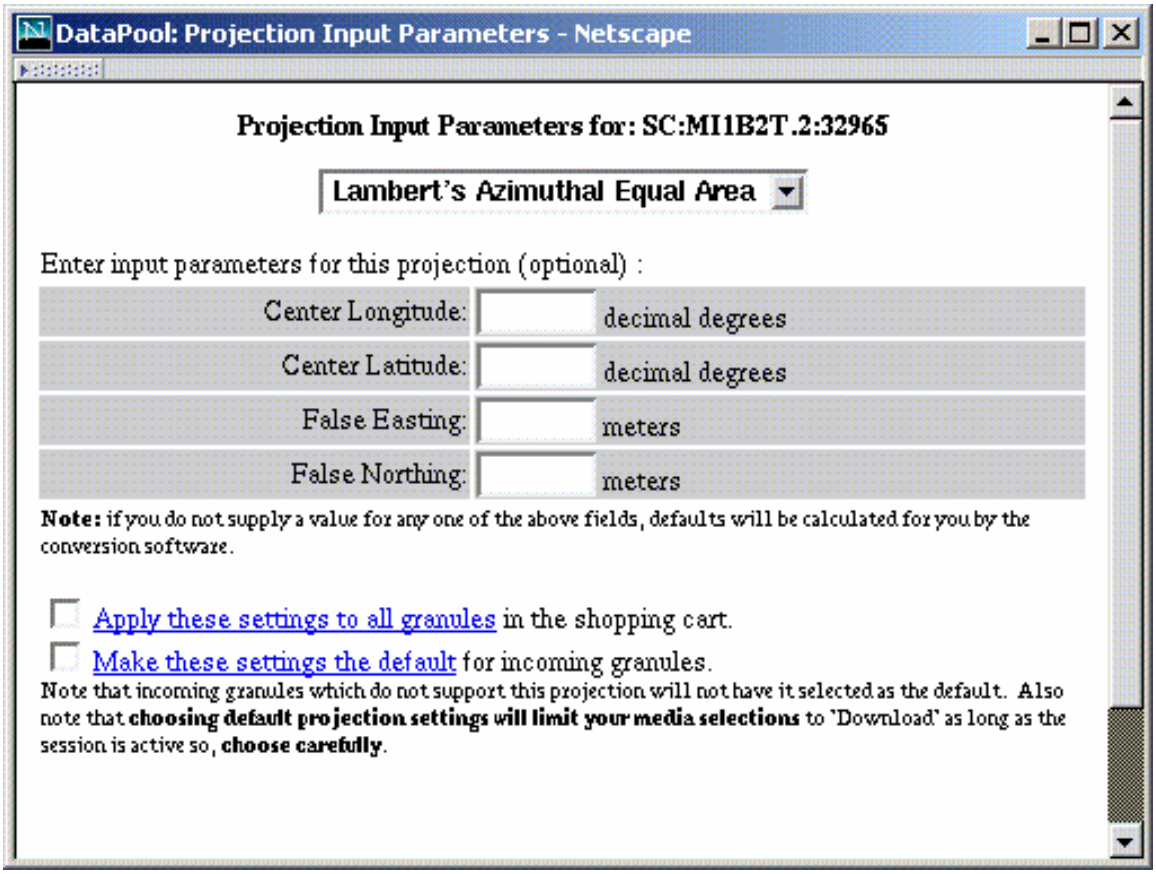

Figure 9. Projection Input Parameter Dialog (Lambert's Equal Area Azimuthal)

4.4.3 Band Subsetting

To perform band subsetting, the user clicks on the Band Subsetting icon for the relevant granule. The Band Subsetting page will be displayed for the granule. (See Figure 10). The user chooses one or more bands from the band pull-down list for this granule. In this example, one band was selected (VNIR_Swath). We have also selected the "Apply common band selections" box. This will apply the same band subsetting selection to all granules in the shopping cart of the same data type.

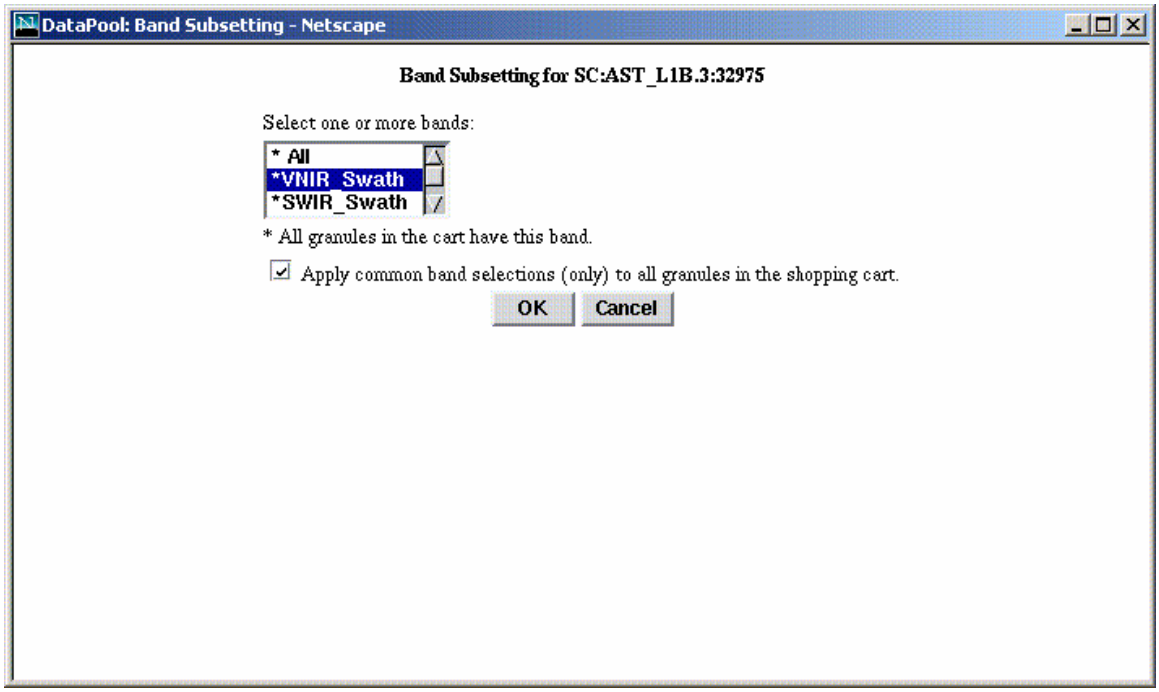

Figure 10. Band Subsetting Dialog (AST_L1B granule)

The user now clicks OK to accept the band selections. This returns the user to the modified shopping cart page shown in Figure 11. Notice the red check mark next to the Band Subsetting icon. This indicates that a selection has been made to perform band subsetting for the granule. (A similar red check mark will appear next to the Spatial Subsetting icon when spatial subsetting values have been selected for granules offering this option.)

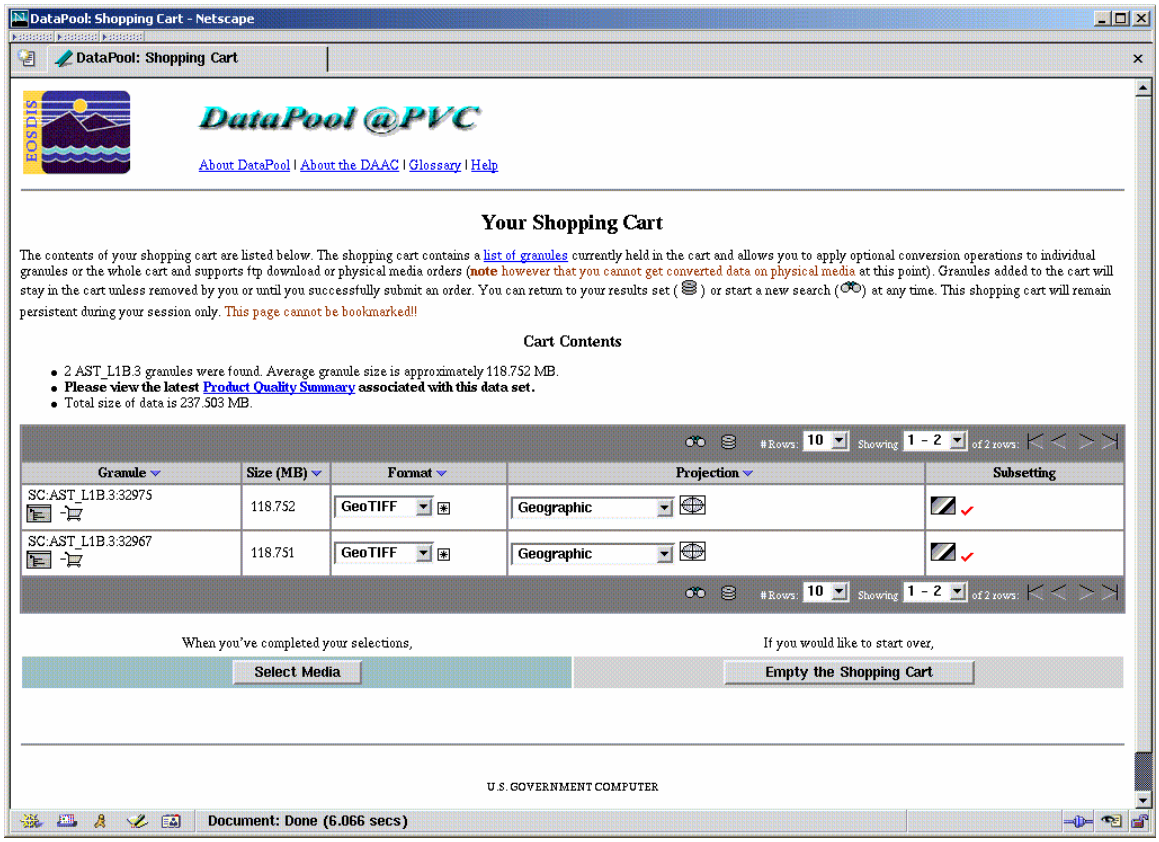

Figure 11. Shopping cart with HEG conversion selections

4.4.4 Spatial Subsetting

Next we will examine the case where several bands are selected and where spatial subsetting is an option. Figure 12 shows a results set containing a single MISR granule from the MI1B2T version 2 data set.

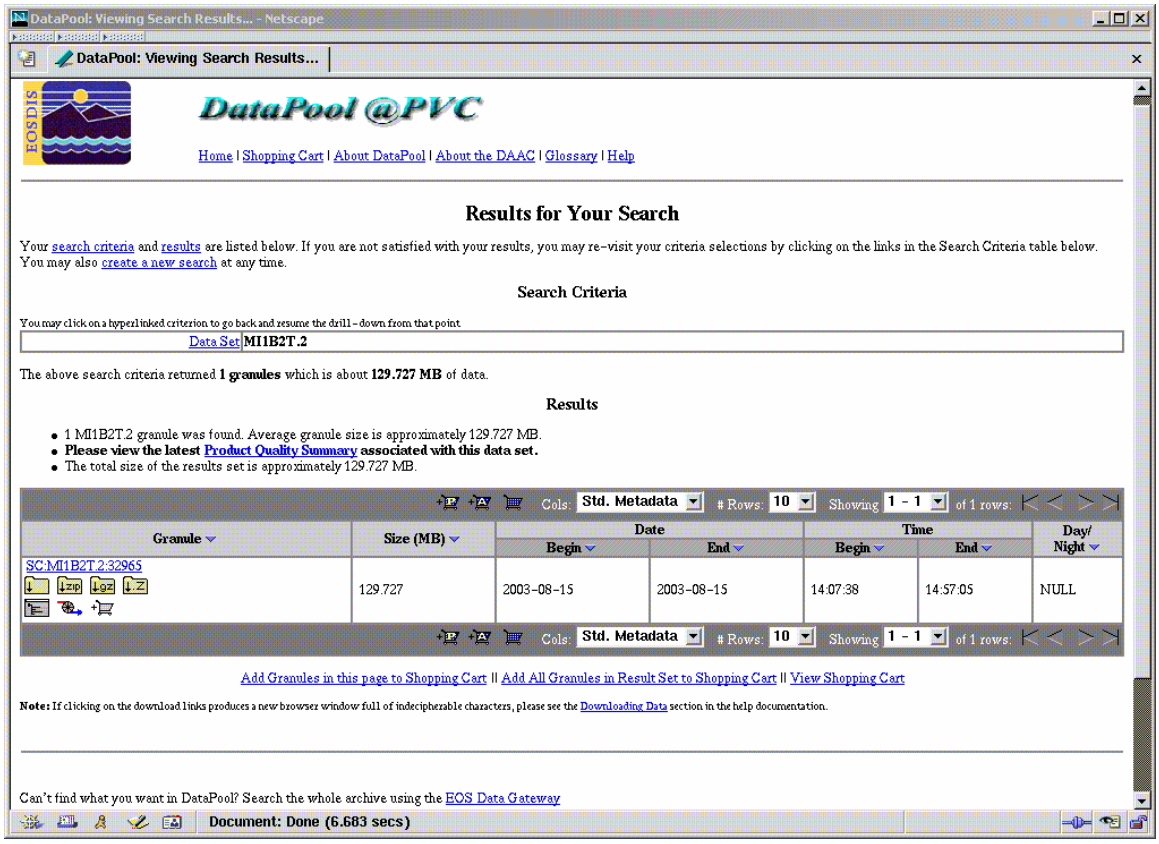

Figure 12. Results page containing a single MI1B2T version 2 granule

Spatial subsetting must be performed with care. Spatial coverage information is contained in the metadata of each granule in the search results set, and may be viewed by clicking on the XML File icon  associated with the granule. Reviewing the spatial coverage metadata of the input granules will assist the user in choosing appropriate values for performing HEG spatial subsetting. Note that the Data Pool implementation of HEG does not verify that the spatial subsetting coordinates entered by the user actually intersect the spatial coverage of the granule when placing the order. If a spatial subsetting order is placed for a granule which lies outside of the spatial subsetting area, processing of the granule will fail.

(Note: For MODIS and ASTER granules, the xml metadata file for the input granule contains a HorizontalSpatialDomainContainer. This container includes either GPolygon point values or BoundingRectangle coordinates, depending on the data type. For MISR granules, spatial metadata is represented in a different way. Due to the irregular shape and large extent of spatial regions contained in the MISR products, a system referred to as NOSE (nominal orbit spatial extent) is used to accommodate finer spatial extent of data products associated with fixed, nominal sets of orbits. MISR data is referenced to 233 fixed orbits; each orbit consists of 180 blocks. The resulting 233 x 180 blocks overlay the entire area on the earth that can be observed by the instrument. MISR data is only collected on the sunlit side of the orbit so there the will be a

start and end block for each granule. The MISR xml metadata file will refer to an orbit number and equator crossing longitude in its OrbitCalculatedSpatialDomainContainer, and will also include three additional spatial attributes in its PSA information: SP_AM_PATH_NO, SP_AM_MISR_StartBlock, and SP_AM_MISR_StopBlock. See Figure 13 for a sample portion of an xml metadata file for a MISR granule.)

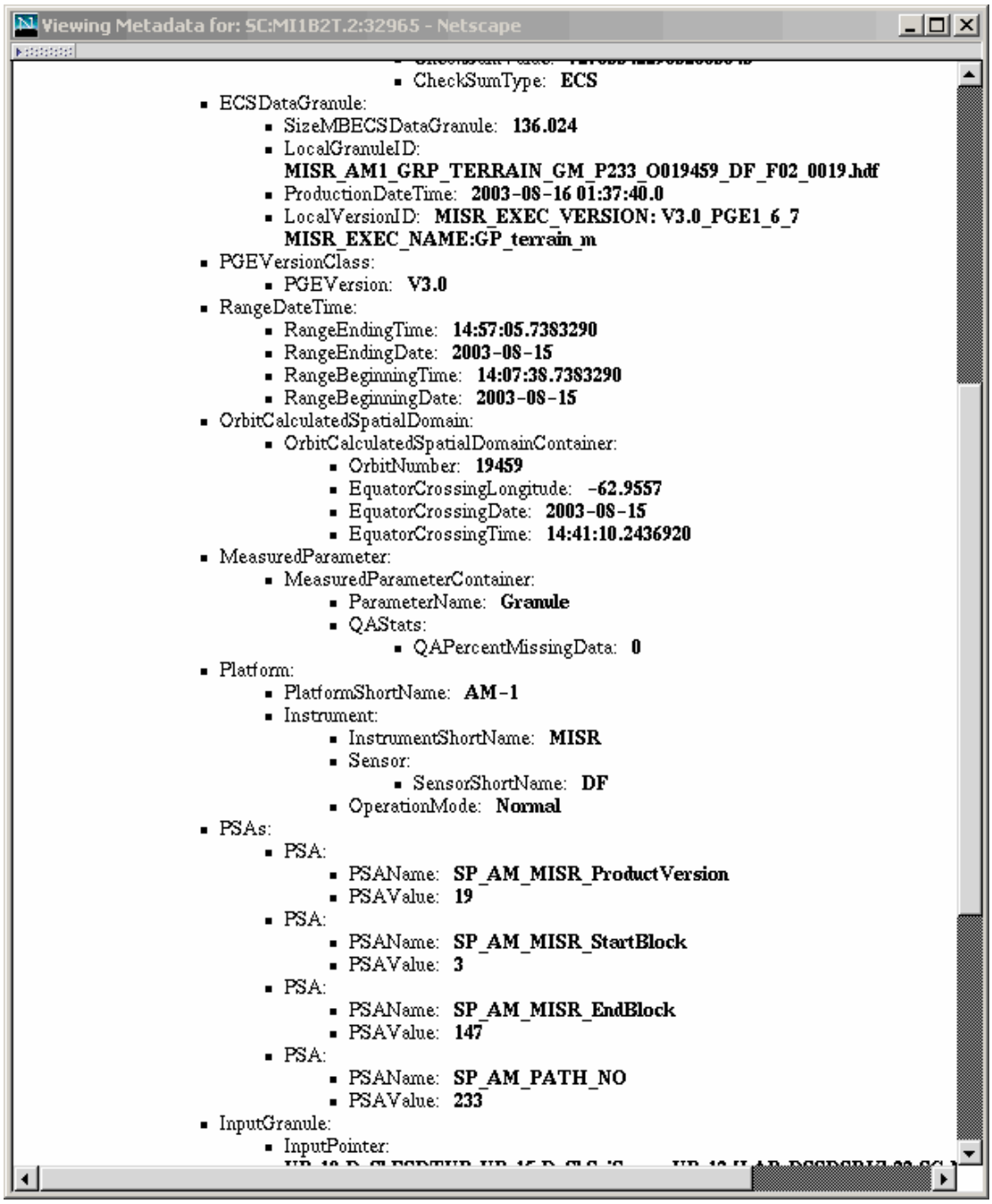

Figure 13. Metadata XML file for MI1B2T.2 granule

Selecting the Spatial Subsetting icon will start the Spatial Subsetting dialog (see Figure 14). The user enters latitude and longitude values defining a bounding rectangle for the spatial subset area. Selecting the option "Apply these settings to all applicable granules" will apply the user's spatial subsetting selections to all granules in the shopping cart that display the Spatial Subsetting icon. Selecting the "Make these settings the default" option will apply these values to any new granules added to the shopping cart that are configured for the spatial subsetting option.

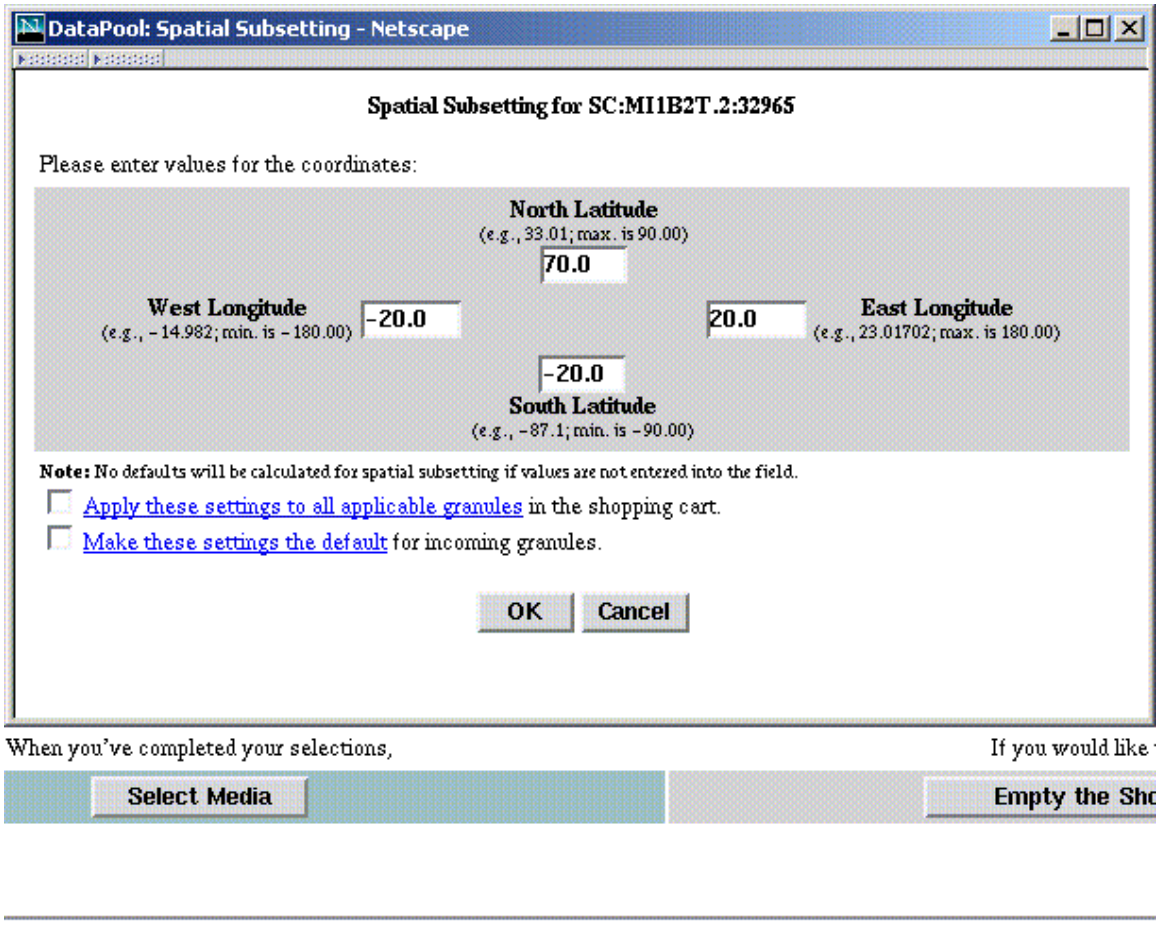

Figure 14. Spatial Subsetting Dialog

Upon returning to the shopping cart, we see check marks next to both the band and spatial subsetting icons, indicating that both band and spatial subsetting have been requested for this granule (See Figure 15).

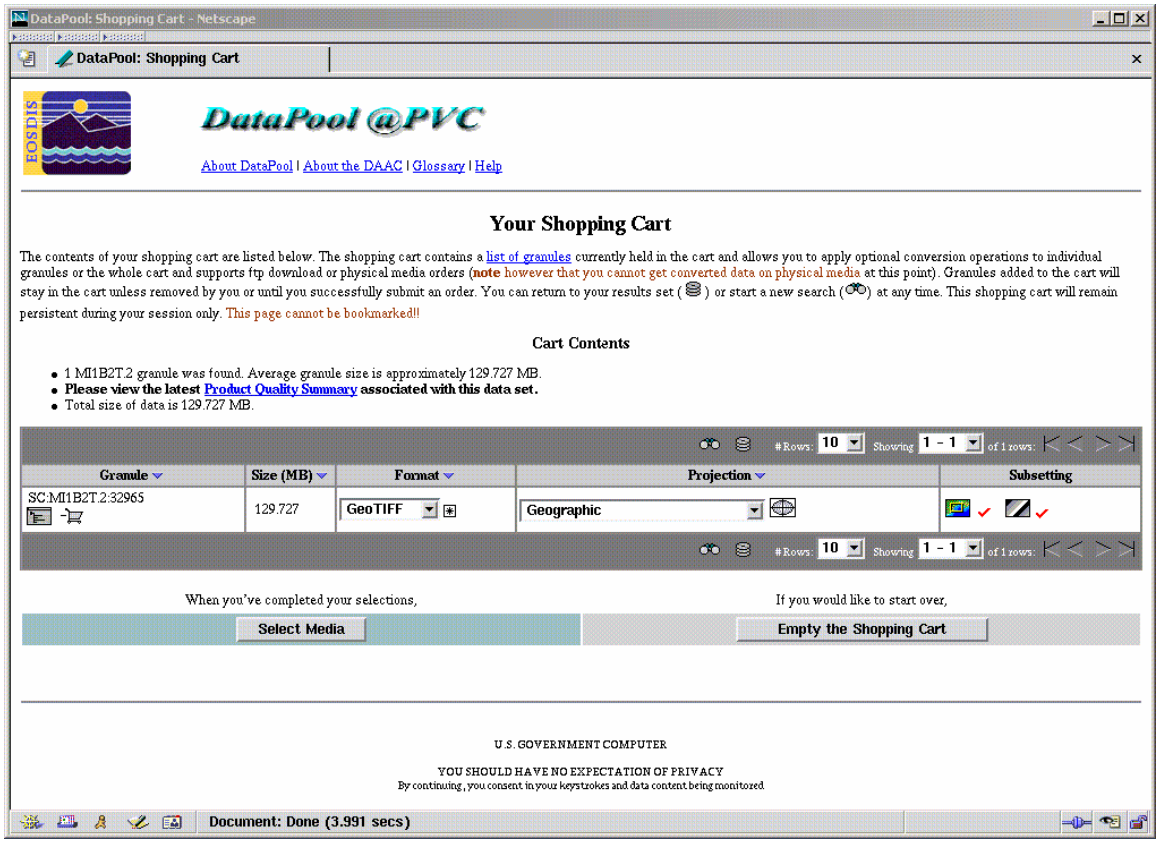

Figure 15. Shopping cart with HEG options selected for MI1B2T.2 granule

4.4.5 Completing the Order

From the Shopping Cart page (see Figure 15), the user clicks on "Select Media" as the next step in submitting the HEG conversion order. The Media Options page is then presented. (See Figure 16).

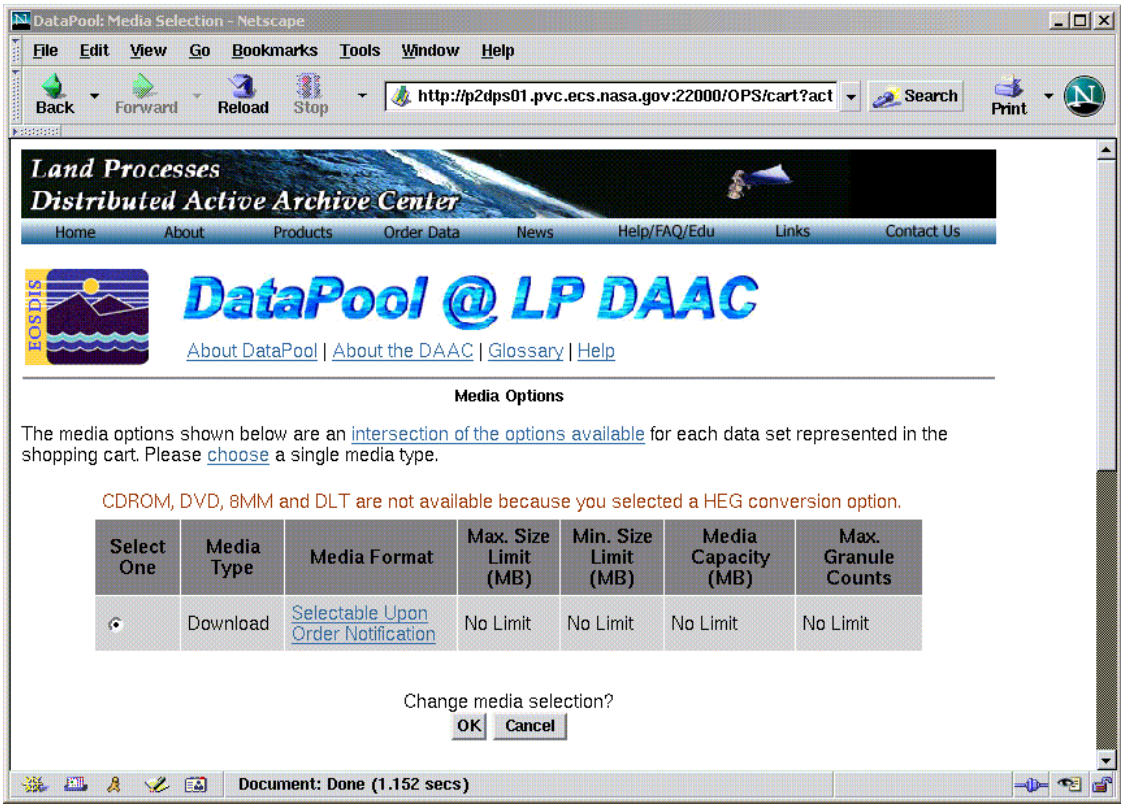

Figure 16. Media Options

On the Media Options page, only the download option is available for HEG conversion orders. The user selects the download option, and then clicks “OK”.

The user must now supply download profile information (see Figure 17), including a valid email address for the order confirmation and completion email messages, and then select “Order the Data”. An Order Acknowledgment page is then displayed (see Figure 18). As discussed in Section 4.3, the user will receive two emails, one acknowledging that the order was placed (Order Confirmation) and the other notifying the success or failure in processing the order (Order Notification).

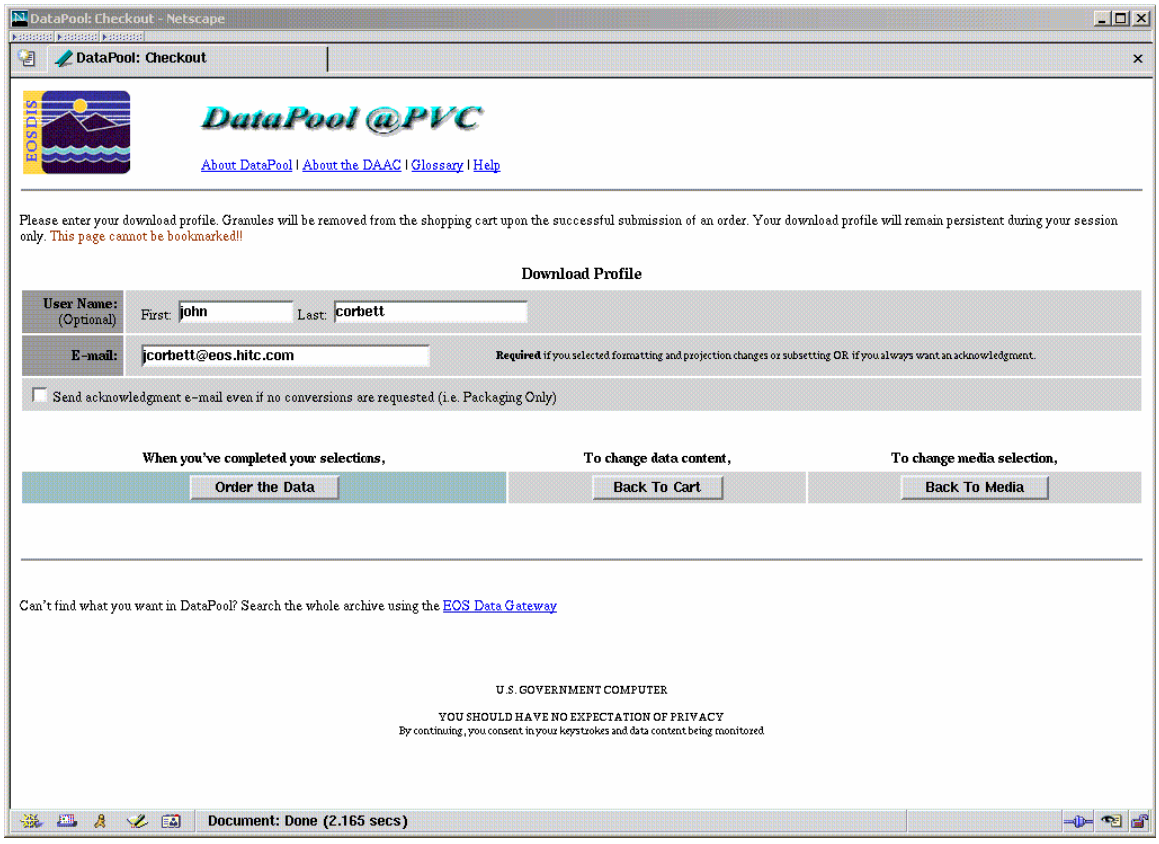

Figure 17. Download Profile

Figure 18. Order Acknowledgment

4.5 Order Output

The Order Notification email text includes links to the output directory where the user's HEG-converted files are placed. (See Figure 19 for a sample output directory listing) This directory contains resulting .hdf files (where the user selected an output format of HDF-EOS) or .tif files (where the user selected an output format of GeoTIFF), and the corresponding ASCII metadata files (.hdf.met or .tif.met). (See Appendix C for an example of an ASCII metadata file produced by the HEG). The naming convention for the science and metadata files in the output directory is:

<inputfilename>_<band/field name>_<internal sequence number>.<hdf|tif>[.met]

The directory also includes an xml metadata file for each input granule (.input.xml), and a single text file containing a summary of the order specifications (ConverterSynopsis.txt). See Figure 20 for an example of a ConverterSynopsis.txt file.

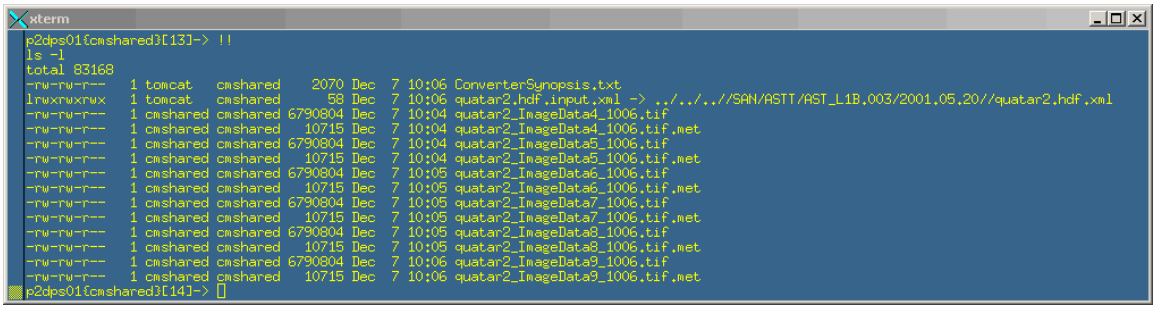

Figure 19. Directory listing for sample HEG order

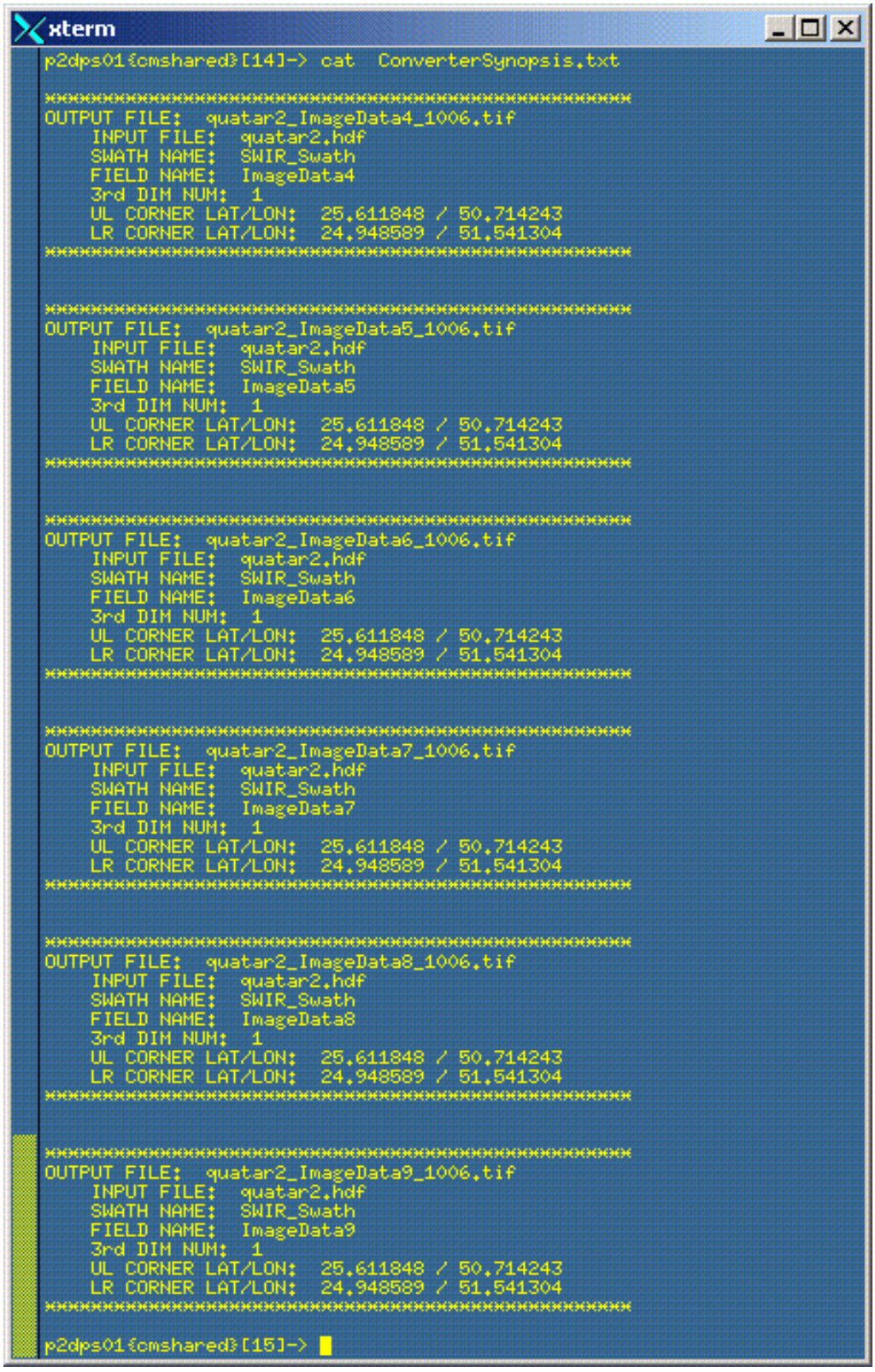

Figure 20. Sample ConverterSynopsis.txt file

4.6 Special Cases

4.6.1 HDF-EOS format, No Change projection

If the user selects HDF-EOS as the output format, “No Change” (or “No Change (HDF-EOS Only)”) as the output projection, and does not select subsetting options, the user is simply ordering the original unconverted granule from the Data Pool. The same result would be accomplished in a simpler way by downloading the granule directly from the results page by clicking on the download icon in the row for that granule.

4.6.2 Automatic Reprojection

In some cases, if the user chooses “No Change” or “No Change (HDF-EOS Only)” as the output projection, the output product will none-the-less be reprojected to the Geographic projection so that the HEG may correctly perform the user-requested reformatting or subsetting operations on the input product. This occurs for GeoTiff format for MODIS swath data, and for HDF-EOS format with Band or Spatial Subsetting. A warning message will be displayed to the user in these cases indicating that the Geographic projection will be automatically applied to the output products.

4.6.3 Conversion of MISR data sets

Because MISR data products are very large, the Data Pool web interface requires that the user select both spatial and band subsetting options for HEG conversion of MISR products.

4.7 HEG Order Submission Errors

4.7.1 Invalid combinations of conversion options

When placing HEG orders, users are presented with a wide range of HEG conversion options. While invalid individual options are not presented to the user (e.g., an invalid projection for a particular data type) and hence cannot be selected, it is possible for the user to select invalid combinations of these conversion options (see section 4.6 above).

To illustrate how invalid combinations are handled by the web interface, we will use the granules listed the shopping cart in Figure 21. This shopping cart contains granules from several data sets. Various options have been selected to illustrate various types of warnings and errors which could be presented to the user.

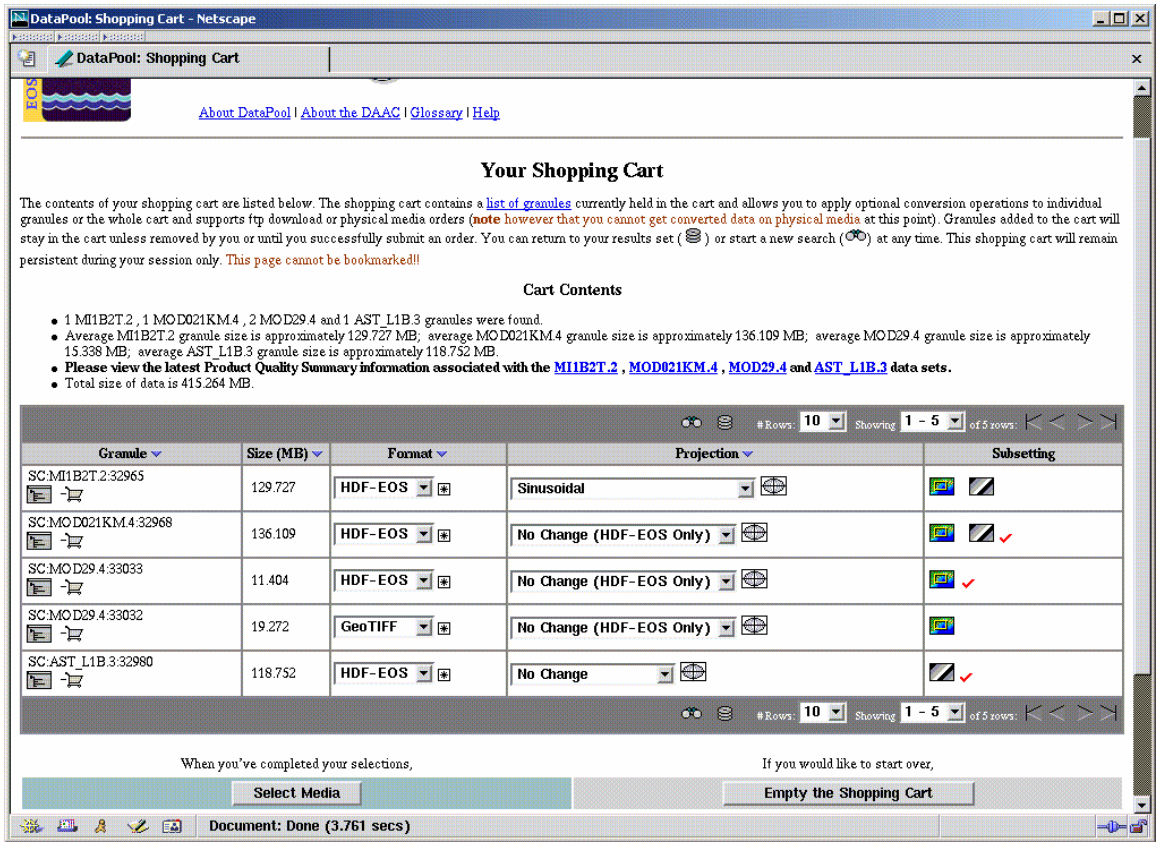

Figure 21. Mixed Shopping with HEG Options Selected

If the user attempts to place the order for the granules and HEG options chosen in Figure 21, the Conversion Selection Alert page in Figure 22 will be displayed. This page indicates that there are two error conditions for the MI1B2T.2 granule and a warning message for each of the four other granules in the order. We will examine the exceptions for each granule in turn. Note that the user is required to return to the shopping cart to correct error conditions. This is done by selecting the "**returning to the shopping cart**" link.

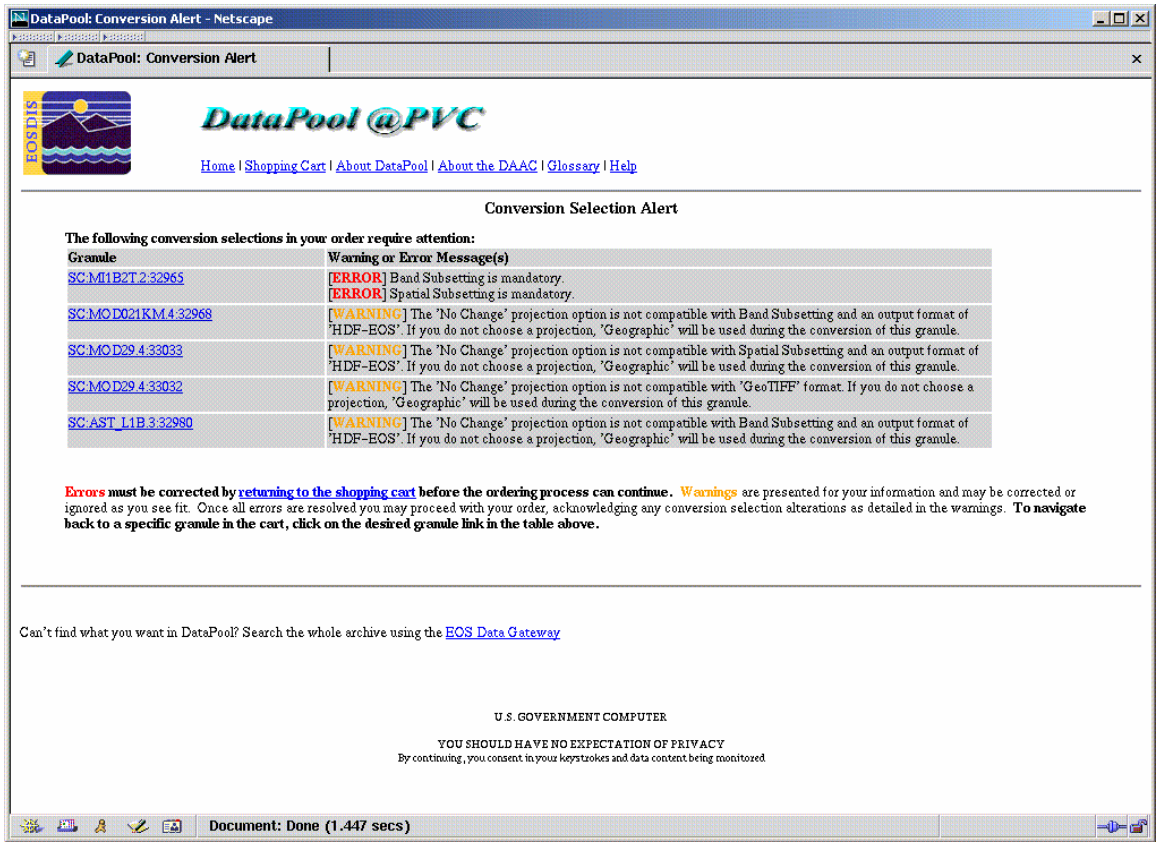

Figure 22. Conversion Selection Alert

Upon returning to the shopping cart, the user will be presented with a modified shopping cart as shown in Figure 23. For each warning and error message on the Conversion Selection Alert page there is a corresponding Flagged Exception icon ! in Figure 23.

The two error conditions triggered for the MI1B2T.2 granule are the result of not meeting the configured requirement that the user must perform band and spatial subsetting for all granules from MISR data sets (see section 4.6.3). The warning for the MOD021KM.4 warns that the user is attempting to initiate a HEG conversion of a MODIS swath granule by band subsetting the granule without selecting an output projection. The warning for the first MOD29.4 granule, warns that the user is attempting to initiate a HEG conversion of a MODIS swath by spatially subsetting the granule without selecting an output projection. The warning for the second MOD29.4, results from the user attempting to initiate a HEG conversion of a MODIS swath granule by changing output format to GeoTIFF without selecting an output projection. Finally, the warning for the AST_L1B.3 granule results from the user attempting to initiate a HEG conversion of an ASTER swath granule by band subsetting the granule while electing to leave the output format as HDF-EOS and No Change for the output projection. All these warnings will result in a default selection of Geographic for the output projection if the order is placed. The

user does not need to make changes to the HEG selections made for the granules with warning if they are satisfied with the default Geographic output projection.

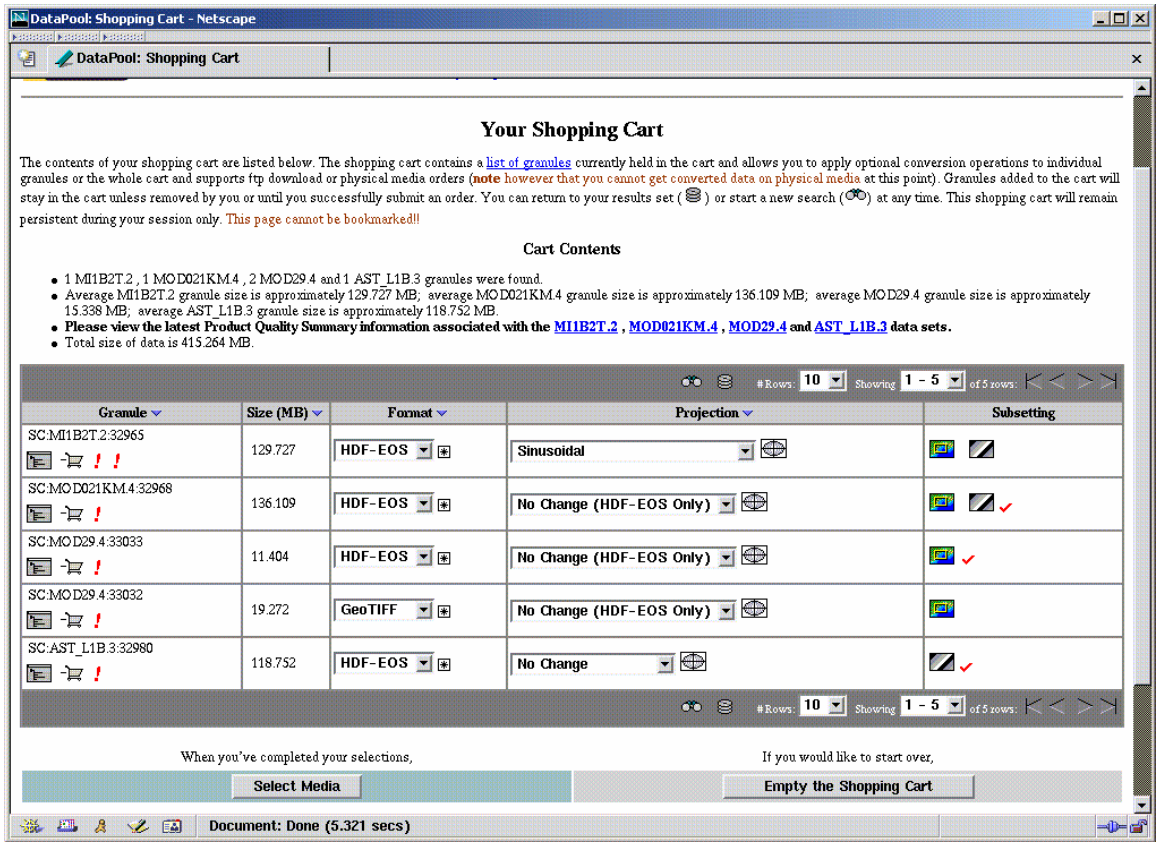

Figure 23. Modified Shopping Cart

If the user selects band and spatial subsetting options for the MI1B2T.2 granules without making changes to the other four granule selections and then resubmits the order (see shopping cart in Figure 24), the Conversion Selection Alert page will now only list the warnings and will allow the user to continue the order. Figure 25 shows the Order Acknowledgement. Note that the output projection listed for the granules with warnings are reported as No Change. They are, in-fact, projected to Geographic, as described in the warning message.

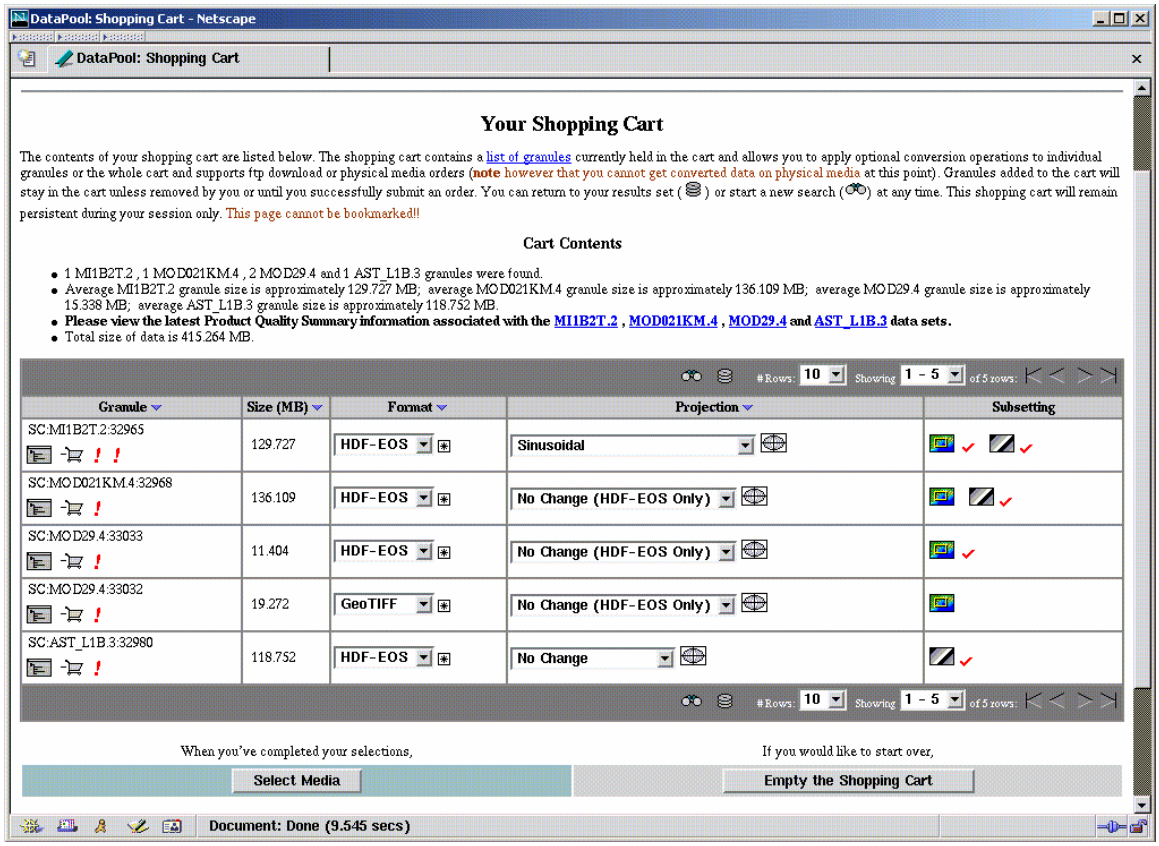

Figure 24. Modified Shopping Cart with Band and Spatial Subsetting Selected for MI1B2T.2 Granule

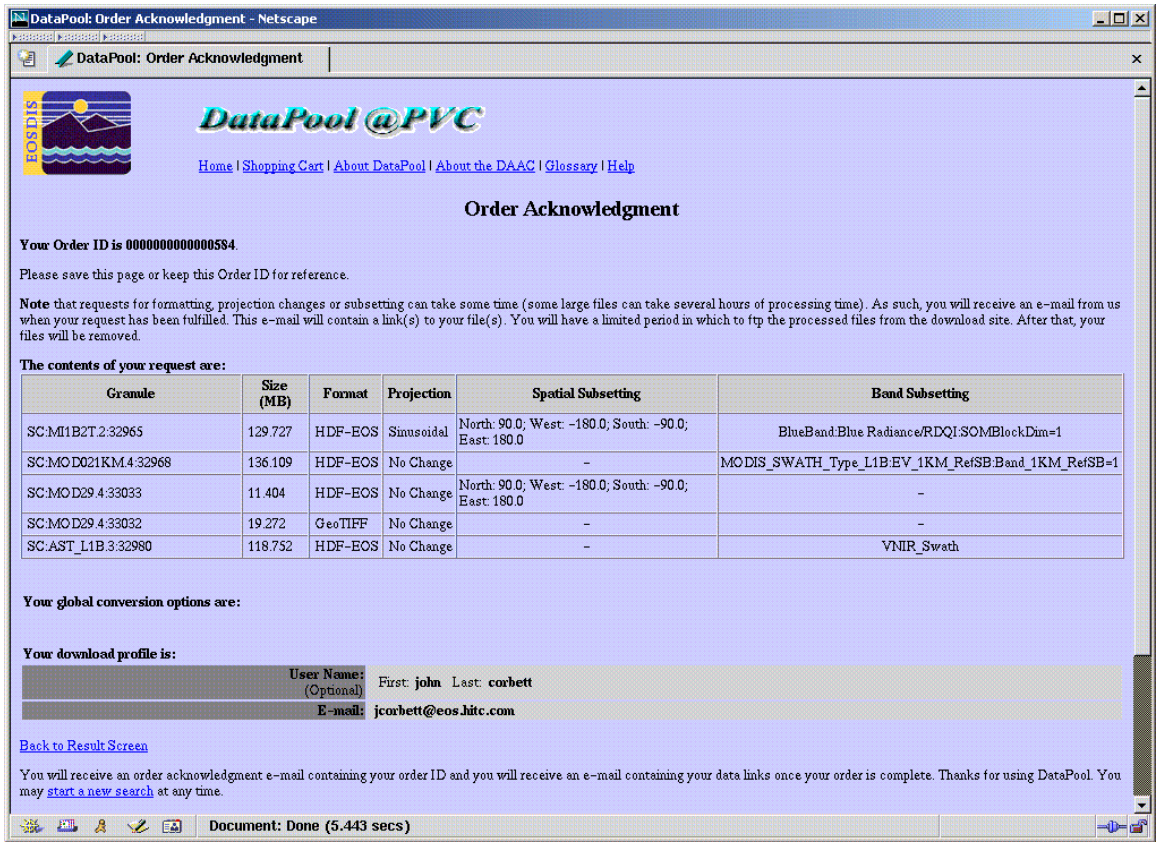

Figure 25. Order Acknowledgment for Mixed Order

4.7.2 Large Orders

Because HEG conversion orders may consume significant system resources while processing, and because it is possible for many users to submit HEG orders simultaneously at a given DAAC, DAACs have the option of limiting the number of granules in a single Data Pool order for which HEG processing is requested, in order to allocate HEG processing resources more fairly among users. This limit on the number of granules per order (shopping cart) for which HEG conversion may be selected is configured independently by each DAAC. If a user attempts to submit an order where more than the configured limit of granules in the order have associated HEG conversion requests, an Order Submission Warning dialog will be presented to the user (See Figure 26).

In the example in Figure 26, the DAAC has set a limit of 10 granules per HEG order (i.e., 10 granules in the shopping cart) for which HEG conversions may be requested. In this example, the user has selected 12 granules for HEG conversion. The Order Submission Warning dialog allows the user to modify the order so that it complies with the DAAC limitation and then resubmit. Each granule for which the user has requested HEG conversion will appear on the Order Submission Warning dialog. The user may view the HEG format, conversion, and

subsetting selections for each granule by clicking on the link for that granule in the granule column. The user must then modify the order by either removing granules entirely from the order (by clicking on the Remove Granule selection in the granule row) or by choosing to order the granule as-is with no HEG conversion (by clicking on the Remove Conversions selection in the granule row), until the number of granules for which HEG conversions are requested is at or below the DAAC limit. The user may then resubmit the order by clicking on the Submit Order button.

Figure 26. Order Submission Warning Dialog

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Appendix A. List of Supported Data Sets

The HDFEOS products listed below have been successfully tested with the HDFEOS to GeoTiff Conversion Tool (HEG). Additional products will be added to this list as they are released to the public and tested.

Note that there may be additional products which have not yet been tested, but which are supported by HEG due to their similarities to products below. Please contact the HEG development team if you encounter problems using HEG with the data products below or with any similar products.

MISR Products: (versions 1 and 2)

Level 1B
MI1B2E = MISR Level 1B2 Ellipsoid Data
MI1B2T = MISR Level 1B2 Terrain Data

Level 2
MIL2ASLS = MISR Level 2 Surface parameters
MIL2ASAE = MISR Level 2 Aerosol parameters
MIL2TCAL = MISR Level 2 TOA/Cloud Albedo parameters

Level 3
MIL3MRD = MISR Level 3 Component Global Radiance Product covering a month
MIL3QRD = MISR Level 3 Component Global Radiance Product covering a quarter (seasonal)
MIL3YRD = MISR Level 3 Component Global Radiance Product covering a year
MIL3MAE = MISR Level 3 Component Global Aerosol Product covering a month
MIL3QAE = MISR Level 3 Component Global Aerosol Product covering a quarter (seasonal)
MIL3YAE = MISR Level 3 Component Global Aerosol Product covering a year
MIL3MLS = MISR Level 3 Component Global Land Product covering a month
MIL3QLS = MISR Level 3 Component Global Land Product covering a quarter (seasonal)
MIL3YLS = MISR Level 3 Component Global Land Product covering a year
MIL3DRD = MISR Level 3 Component Radiance Land Product covering a day
MIL3DAE = MISR Level 3 Component Global Aerosol Product covering a day
MIL3DLS = MISR Level 3 Component Global Land Product covering a day

ASTER Products: (versions 3 and 4)

Level 1B
AST_L1B = ASTER Level 1B Registered Radiance at Sensor

Level 2
AST_04 = ASTER On-Demand L2 Brightness Temperature at the Sensor
AST_05 = ASTER On-Demand L2 Surface Emissivity
AST_06V = ASTER L2 Decorrelation Stretch VNIR
AST_06S = ASTER L2 Decorrelation Stretch SWIR
AST_06T = ASTER L2 Decorrelation Stretch TIR
AST_07 = ASTER On-Demand L2 Surface Reflectance SWIR and VNIR
AST_08 = ASTER On-Demand L2 Surface Kinetic Temperature
AST_09 = ASTER On-Demand L2 Surface Radiance SWIR and VNIR
AST_09T = ASTER On-Demand L2 Surface Radiance TIR

ASTER Level 3 DEM Product
AST14DEM = ASTER Digital Elevation Model

MODIS Products: (versions 3 and 4)
Note: For many MODIS/Terra products shown below (e.g., MOD10A1), the corresponding MODIS/Aqua product (e.g., MYD10A1) has not been formally tested with HEG, but is likely to work. Please contact the HEG development team if you find problems with HEG processing of MODIS/Aqua data products, which are similar to the supported MODIS/Terra products below.

Level 1
MOD021KM = MODIS/Terra Calibrated Radiances 5-Min L1B Swath 1km
MOD02HKM = MODIS/Terra Calibrated Radiances 5-Min L1B Swath 500m
MOD02QKM = MODIS/Terra Calibrated Radiances 5-Min L1B Swath 250m
MOD03 = MODIS/Terra Geolocation Fields 5-Min L1A Swath 1km

Level 2 MODIS Oceans
MODOCL2 = MODIS/Terra Ocean Color Radiance Products 5-Min L2 Swath 1km Day
MODOCL2A = MODIS/Terra Ocean Color Derived Products Group 1 5-Min L2 Swath 1km Day
MODOCL2B = MODIS/Terra Ocean Color Derived Products Group 2 5-Min L2 Swath 1km Day
MODOCQC = MODIS/Terra Ocean Color QC Products 5-Min L2 Swath 1km Day
MOD28L2 = MODIS/Terra Sea Surface Temperature Products 5-Min L2 Swath 1km
MOD28QC = MODIS/Terra Sea Surface Temperature QC Products 5-Min L2 Swath 1km

Level 2 MODIS Atmosphere and Land
MOD04_L2 = MODIS/Terra Aerosol 5-Min L2 Swath 10km
MOD05_L2 = MODIS/Terra Total Precipitable Water Vapor 5-Min L2 Swath 1km and 5km
MOD06_L2 = MODIS/Terra Clouds 5-Min L2 Swath 1km and 5km
MOD07_L2 = MODIS Temperature and Water Vapor Profile Product
MOD09GQK = MODIS/Terra Surface Reflectance Daily L2G Global 250m SIN Grid
MOD09GHK = MODIS/Terra Surface Reflectance Daily L2G Global 500m SIN Grid
MOD09GST = MODIS/Terra Surface Reflectance Quality Daily L2G Global 1km SIN Grid
MOD10_L2 = MODIS/Terra Snow Cover 5-Min L2 Swath 500m
MOD11_L2 = MODIS/Terra Land Surface Temperature/Emissivity 5-Min L2 Swath 1km
MOD29 = MODIS/Terra Sea Ice Extent 5-Min L2 Swath 1km
MOD35 = MODIS/Terra Cloud Mask and Spectral Test Results 5-Min L2 Swath 250m and 1km

Level 3
MOD08_D3 = MODIS/Terra Aerosol Cloud Water Vapor Ozone Daily L3 Global 1Deg CMG
MOD08_E3 = MODIS/Terra Aerosol Cloud Water Vapor Ozone 8-Day L3 Global 1Deg CMG
MOD08_M3 = MODIS/Terra Aerosol Cloud Water Vapor Ozone Monthly L3
Global 1Deg CMG
MOD09A1 = MODIS/Terra Surface Reflectance 8-Day L3 Global 500m SIN Grid
MYD09A1 (version 4 only) = MODIS/Aqua Surface Reflectance 8-Day L3 Global 500m SIN
Grid
MOD09Q1 = MODIS/Terra Surface Reflectance 8-Day L3 Global 250m SIN Grid
MOD10A1 = MODIS/Terra Snow Cover Daily L3 Global 500m SIN Grid
MOD10A2 = MODIS/Terra Snow Cover 8-Day L3 Global 500m SIN Grid
MOD10C1 = MODIS/Terra Snow Cover Daily L3 Global 0.05 Deg CMG
MYD10C1 = MODIS/Aqua Snow Cover Daily L3 Global 0.05 Deg CMG
MOD10C2 = MODIS/Terra Snow Cover 8-Day L3 Global 0.05 Deg CMG
MYD10C2 = MODIS/Aqua Snow Cover 8-Day L3 Global 0.05 Deg CMG
MOD11A1 = MODIS/Terra Land Surface Temperature/Emissivity Daily L3 Global 1km SIN Grid

MYD11A1 (version 4 only) = MODIS/Aqua Land Surface Temperature/Emissivity Daily L3 Global 1km SIN Grid
MOD11A2 = MODIS/Terra Land Surface Temperature/Emissivity 8-Day L3 Global 1km SIN Grid
MOD12Q1 = MODIS/Terra Land Cover Type Yearly L3 Global 1km SIN Grid
MOD13A1 = MODIS/Terra Vegetation Indices 16-Day L3 Global 500m SIN Grid
MYD13A1 (version 4 only) = MODIS/Aqua Vegetation Indices 16-Day L3 Global 500m SIN Grid
MOD13A2 = MODIS/Terra Vegetation Indices 16-Day L3 Global 1km SIN Grid
MYD13A2 (version 4 only) = MODIS/Aqua Vegetation Indices 16-Day L3 Global 1km SIN Grid
MOD13Q1 = MODIS/Terra Vegetation Indices 16-Day L3 Global 250m SIN Grid
MYD13Q1 (version 4 only) = MODIS/Aqua Vegetation Indices 16-Day L3 Global 250m SIN Grid
MOD14A1 = MODIS/Terra Thermal Anomalies/Fire Daily L3 Global 1km SIN Grid
MOD14A2 = MODIS/Terra Thermal Anomalies/Fire 8-Day L3 Global 1km SIN Grid
MOD15A2 = MODIS/Terra Leaf Area Index/FPAR 8-Day L4 Global 1km SIN Grid
MOD17A2 = MODIS/Terra Net Photosynthesis 8-Day L4 Global 1km SIN Grid
MOD29P1D = MODIS/Terra Sea Ice Extent Daily L3 Global 1km EASE-Grid Day
MOD29P1N = MODIS/Terra Sea Ice Extent Daily L3 Global 1km EASE-Grid Night
MOD43B1 = MODIS/Terra BRDF/Albedo Model-1 16-Day L3 Global 1km SIN Grid
MOD43B3 = MODIS/Terra Albedo 16-Day L3 Global 1km SIN Grid
MOD43B4 = MODIS/Terra Nadir BRDF-Adjusted Reflectance 16-Day L3 Global 1km SIN Grid

Level 3 (maps) OCEAN products
MO04MD = MODIS/Terra Ocean Color and SST Mean Maps Daily L3 Global 4km CylEqDis
MO04QD = MODIS/Terra Ocean Color and SST Quality Maps Daily L3 Global 4km CylEqDis
MO04MW = MODIS/Terra Ocean Color and SST Mean Maps 8-Day L3 Global 4km CylEqDis
MO04QW = MODIS/Terra Ocean Color and SST Quality Maps 8-Day L3 Global 4km CylEqDis
MO1DMW = MODIS/Terra Ocean Color and SST Mean Maps 8-Day L3 Global 1Deg CylEqDis
MO1DQW = MODIS/Terra Ocean Color and SST Quality Maps 8-Day L3 Global 1Deg CylEqDis
MO36MD = MODIS/Terra Ocean Color and SST Mean Maps Daily L3 Global 36km CylEqDis
MO36QD = MODIS/Terra Ocean Color and SST Quality Maps Daily L3 Global 36km CylEqDis

Level 3 MODIS Land Products
MOD43C1 = MODIS/Terra Albedo 16-Day L3 Global 0.05Deg CMG
MOD43C2 = MODIS/Terra BRDF/Albedo Parameters 16-Day L3 Global 0.05Deg CMG
MOD43C3 = MODIS/Terra Nadir BRDF-Adjusted Reflectance 16-Day L3 Global 0.05Deg CMG
MCD43C1 = MODIS/Terra+Aqua Albedo 16-Day L3 Global 0.05Deg CMG
MCD43C2 = MODIS/Terra+Aqua BRDF/Albedo Parameters 16-Day L3 Global 0.05Deg CMG
MCD43C3 = MODIS/Terra+Aqua Nadir BRDF-Adjusted Reflectance 16-Day L3 Global 0.05Deg CMG
MOD12C1 = MODIS/Terra Land Cover Type Yearly L3 Global 0.05Deg CMG
MYD12C1 = MODIS/Aqua Land Cover Type Yearly L3 Global 0.05Deg CMG

AMSR-E Products: (version 1)

Level 2
AE_Ocean = AMSR-E/Aqua L2B Global Swath Ocean Products derived from Wentz Algorithm

Level 2A
AE_L2A = AMSR-E/Aqua L2A Global Swath Spatially Resampled Brightness Temperatures (Tb)

Level 3
AE_DyOcn = AMSR-E/Aqua Daily L3 Global Ascending/Descending .25x.25 deg Ocean Grids
AE_DySno = AMSR-E/Aqua Daily L3 Global Snow Water Equivalent EASE-Grids

AE_SI12 = AMSR-E/Aqua Daily L3 12.5 km Tb, Sea Ice Conc., & Snow Depth Polar Grids

AIRS Products: (version 2 and 3)
Note: AIRS products have been tested with some, but not all fields. Please contact the HEG development team if you find problems with HEG processing of AIRS products.

Level 1B
AIRABRAD = AIRS AMSU-A1 & AMSU-A2 combined, geolocated & calibrated brightness temperatures
AIRHBRAD = HSB geolocated & calibrated brightness temperatures
AIRIBRAD = AIRS Level 1B IR geolocated radiances
AIRIBQAP = AIRS Level 1B Quality Assurance Product
AIRVBRAD = AIRS Vis/Near IR geolocated radiances
AIRVBQAP = AISR Vis/Near IR Quality Assurance Product

Level 2
AIRI2CCF = L2 Cloud Cleared Radiance Product (AIRS/AMSU-A/HSB)
AIRX2RET = L2 Standard Retrieval Product (AIRS/AMSU-A/HSB)
AIRX2SUP = L2 Support Product (AIRS/AMSU-A/HSB)

Level 3
AIRXSTD = AIRS Level 3 Daily Standard Physical Retrieval Product1 Km Global DTED

Appendix B. State Plane Zones and Values

NAD83 = North American Datum 1983
NAD27 = North American Datum 1927

NAD83 Alaska Zone 1 = 5001
NAD83 Alaska Zone 2 = 5002
NAD83 Alaska Zone 3 = 5003
NAD83 Alaska Zone 4 = 5004
NAD83 Alaska Zone 5 = 5005
NAD83 Alaska Zone 6 = 5006
NAD83 Alaska Zone 7 = 5007
NAD83 Alaska Zone 8 = 5008
NAD83 Alaska Zone 9 = 5009
NAD83 Alaska Zone 10 = 5010
NAD83 Alabama East = 0101
NAD83 Alabama West = 0102
NAD83 Arizona East = 0201
NAD83 Arizona Central = 0202
NAD83 Arizona West = 0203
NAD83 Arkansas North = 0301
NAD83 Arkansas South = 0302
NAD83 California Zone 1 = 0401
NAD83 California Zone 2 = 0402
NAD83 California Zone 3 = 0403
NAD83 California Zone 4 = 0404
NAD83 California Zone 5 = 0405
NAD83 California Zone 6 = 0406
NAD83 Colorado North = 0501
NAD83 Colorado Central = 0502
NAD83 Colorado South = 0503
NAD83 Connecticut = 0600
NAD83 Delaware = 0700
NAD83 Florida East = 901
NAD83 Florida West = 902
NAD83 Florida North = 903
NAD83 Georgia East = 1001
NAD83 Georgia West = 1002
NAD83 Hawaii Zone 1 = 5101
NAD83 Hawaii Zone 2 = 5102
NAD83 Hawaii Zone 3 = 5103
NAD83 Hawaii Zone 4 = 5104
NAD83 Hawaii Zone 5 = 5105

NAD83 Idaho East = 1101
NAD83 Idaho Central = 1102
NAD83 Idaho West = 1103
NAD83 Illinois East = 1201
NAD83 Illinois West = 1202
NAD83 Indiana East = 1301
NAD83 Indiana West = 1302
NAD83 Iowa North = 1401
NAD83 Iowa South = 1402
NAD83 Kansas North = 1501
NAD83 Kansas South = 1502
NAD83 Kentucky North = 1601
NAD83 Kentucky South = 1602
NAD83 Louisiana North = 1701
NAD83 Louisiana South = 1702
NAD83 Maine East = 1801
NAD83 Maine West = 1802
NAD83 Maryland = 1900
NAD83 Massachusetts = 2001
NAD83 Massachusetts Island = 2002
NAD83 Michigan North = 2111
NAD83 Michigan Central = 2112
NAD83 Michigan South = 2113
NAD83 Minnesota North = 2201
NAD83 Minnesota Central = 2202
NAD83 Minnesota South = 2203
NAD83 Mississippi East = 2301
NAD83 Mississippi West = 2302
NAD83 Missouri East = 2401
NAD83 Missouri Central = 2402
NAD83 Missouri West = 2403
NAD83 Montana = 2500
NAD27 Montana North = 2501
NAD27 Montana Central = 2502
NAD27 Montana South = 2503
NAD83 Nebraska = 2600
NAD27 Nebraska North = 2601
NAD27 Nebraska South = 2602
NAD83 Nevada East = 2701
NAD83 Nevada Central = 2702
NAD83 Nevada West = 2703
NAD83 New Hampshire = 2800
NAD83 New Jersey = 2900
NAD83 New Mexico East = 3001
NAD83 New Mexico Central = 3002

NAD83 New Mexico West = 3003
NAD83 New York East = 3101
NAD83 New York Central = 3102
NAD83 New York West = 3103
NAD83 New York Long Island = 3104
NAD83 North Carolina = 3200
NAD83 North Dakota North = 3301
NAD83 North Dakota South = 3302
NAD83 Ohio North = 3401
NAD83 Ohio South = 3402
NAD83 Oklahoma North = 3501
NAD83 Oklahoma South = 3502
NAD83 Oregon North = 3601
NAD83 Oregon South = 3602
NAD83 Pennsylvania North = 3701
NAD83 Pennsylvania South = 3702
NAD83 Rhode Island = 3800
NAD83 South Carolina = 3900
NAD27 South Carolina North = 3901
NAD27 South Carolina South = 3902
NAD83 South Dakota North = 4001
NAD83 South Dakota South = 4002
NAD83 Tennessee = 4100
NAD83 Texas North = 4201
NAD83 Texas North Central = 4202
NAD83 Texas Central = 4203
NAD83 Texas South Central = 4204
NAD83 Texas South = 4205
NAD83 Utah North = 4301
NAD83 Utah Central = 4302
NAD83 Utah South = 4303
NAD83 Vermont = 4400
NAD83 Virginia North = 4501
NAD83 Virginia South = 4502
NAD83 Washington North = 4601
NAD83 Washington South = 4602
NAD83 West Virginia North = 4701
NAD83 West Virginia South = 4702
NAD83 Wisconsin North = 4801
NAD83 Wisconsin Central = 4802
NAD83 Wisconsin South = 4803
NAD83 Wyoming East = 4901
NAD83 Wyoming East Central = 4902
NAD83 Wyoming West Central = 4903
NAD83 Wyoming West = 4904

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Appendix C. Sample Output Metadata

The following is an example of an ASCII metadata file produced by the HEG for HDF-EOS and GeoTIFF output. One metadata file of this type is placed in the user's order directory for each .hdf or .tif file produced by the HEG conversion order. Metadata files have either a .hdf.met extension (for HDF-EOS output) or a .tif.met extension (for GeoTIFF output).

```
  GROUP                = INVENTORYMETADATA
   GROUPTYPE           = MASTERGROUP

   GROUP               = COLLECTIONDESCRIPTIONCLASS

     OBJECT              = SHORTNAME
       NUM_VAL           = 1
       VALUE             = "ASTL1B"
     END_OBJECT          = SHORTNAME

     OBJECT              = VERSIONID
       NUM_VAL           = 1
       VALUE             = "NOT SET"
     END_OBJECT          = VERSIONID

   END_GROUP           = COLLECTIONDESCRIPTIONCLASS

   GROUP               = ECSDATAGRANULE

     OBJECT              = LOCALGRANULEID
       NUM_VAL           = 1
       VALUE             =
"AST_L1BE_multiband_npr_VNIR_Swath_UTM.tif"
     END_OBJECT          = LOCALGRANULEID

     OBJECT              = PRODUCTIONDATETIME
       NUM_VAL           = 1
       VALUE             = "2004-09-17T19:08:16.000Z"
     END_OBJECT          = PRODUCTIONDATETIME

   END_GROUP           = ECSDATAGRANULE

   GROUP               = PGEVERSIONCLASS

     OBJECT              = PGEVERSION
       NUM_VAL           = 1
```

```
    VALUE                = "03.00R02"
  END_OBJECT             = PGEVERSION

END_GROUP              = PGEVERSIONCLASS

GROUP                  = SINGLEDATETIME

  OBJECT                 = TIMEOFDAY
    NUM_VAL              = 1
    VALUE                = "155308030000Z"
  END_OBJECT             = TIMEOFDAY

  OBJECT                 = CALENDARDATE
    NUM_VAL              = 1
    VALUE                = "20020503"
  END_OBJECT             = CALENDARDATE

END_GROUP              = SINGLEDATETIME

GROUP                  = RANGEDATETIME

  OBJECT                 = RANGEBEGINNINGTIME
    NUM_VAL              = 1
    VALUE                = "NOT SET"
  END_OBJECT             = RANGEBEGINNINGTIME

  OBJECT                 = RANGEBEGINNINGDATE
    NUM_VAL              = 1
    VALUE                = "NOT SET"
  END_OBJECT             = RANGEBEGINNINGDATE

  OBJECT                 = RANGEENDINGTIME
    NUM_VAL              = 1
    VALUE                = "NOT SET"
  END_OBJECT             = RANGEENDINGTIME

  OBJECT                 = RANGEENDINGDATE
    NUM_VAL              = 1
    VALUE                = "NOT SET"
  END_OBJECT             = RANGEENDINGDATE

END_GROUP              = RANGEDATETIME

GROUP                  = SPATIALDOMAINCONTAINER

  GROUP                  = HORIZONTALSPATIALDOMAINCONTAINER
```

```
    GROUP                = BOUNDINGRECTANGLE

      OBJECT               = WESTBOUNDINGCOORDINATE
        NUM_VAL            = 1
        VALIDRULE          = "Range(-180.0,+180.0)"
        VALUE              = -77.488089
      END_OBJECT           = WESTBOUNDINGCOORDINATE

      OBJECT               = NORTHBOUNDINGCOORDINATE
        NUM_VAL            = 1
        VALIDRULE          = "Range(-90.0,+90.0)"
        VALUE              = 39.131487
      END_OBJECT           = NORTHBOUNDINGCOORDINATE

      OBJECT               = EASTBOUNDINGCOORDINATE
        NUM_VAL            = 1
        VALIDRULE          = "Range(-180.0,+180.0)"
        VALUE              = -76.498469
      END_OBJECT           = EASTBOUNDINGCOORDINATE

      OBJECT               = SOUTHBOUNDINGCOORDINATE
        NUM_VAL            = 1
        VALIDRULE          = "Range(-90.0,+90.0)"
        VALUE              = 38.474253
      END_OBJECT           = SOUTHBOUNDINGCOORDINATE

    END_GROUP              = BOUNDINGRECTANGLE

  END_GROUP              = HORIZONTALSPATIALDOMAINCONTAINER

END_GROUP              = SPATIALDOMAINCONTAINER

GROUP                  = INPUTGRANULE

  OBJECT                 = INPUTPOINTER
    NUM_VAL              = 1
    VALUE                = "AST_L1BE_00305032002155308000000"
  END_OBJECT             = INPUTPOINTER

END_GROUP              = INPUTGRANULE

GROUP                  = ADDITIONALATTRIBUTES

  OBJECT                 = ADDITIONALATTRIBUTESCONTAINER
    CLASS                = "1"
```

```
  OBJECT                = ADDITIONALATTRIBUTENAME
    CLASS               = "1"
    NUM_VAL             = 1
    VALUE               = "BANDNUMBER"
  END_OBJECT            = ADDITIONALATTRIBUTENAME

  GROUP                 = INFORMATIONCONTENT
    CLASS               = "1"

    OBJECT                = PARAMETERVALUE
      CLASS               = "1"
      NUM_VAL             = 1
      VALUE               = "1"
    END_OBJECT            = PARAMETERVALUE

  END_GROUP             = INFORMATIONCONTENT

END_OBJECT            = ADDITIONALATTRIBUTESCONTAINER

OBJECT                = ADDITIONALATTRIBUTESCONTAINER
  CLASS               = "2"

  OBJECT                = ADDITIONALATTRIBUTENAME
    CLASS               = "2"
    NUM_VAL             = 1
    VALUE               = "BANDNUMBER"
  END_OBJECT            = ADDITIONALATTRIBUTENAME

  GROUP                 = INFORMATIONCONTENT
    CLASS               = "2"

    OBJECT                = PARAMETERVALUE
      CLASS               = "2"
      NUM_VAL             = 1
      VALUE               = "1"
    END_OBJECT            = PARAMETERVALUE

  END_GROUP             = INFORMATIONCONTENT

END_OBJECT            = ADDITIONALATTRIBUTESCONTAINER

OBJECT                = ADDITIONALATTRIBUTESCONTAINER
  CLASS               = "3"

  OBJECT                = ADDITIONALATTRIBUTENAME
```

```
      CLASS              = "3"
      NUM_VAL            = 1
      VALUE              = "BANDNUMBER"
    END_OBJECT           = ADDITIONALATTRIBUTENAME

    GROUP                = INFORMATIONCONTENT
      CLASS              = "3"

      OBJECT               = PARAMETERVALUE
        CLASS              = "3"
        NUM_VAL            = 1
        VALUE              = "1"
      END_OBJECT           = PARAMETERVALUE

    END_GROUP            = INFORMATIONCONTENT

  END_OBJECT           = ADDITIONALATTRIBUTESCONTAINER

END_GROUP            = ADDITIONALATTRIBUTES

GROUP                = PLATFORMINSTRUMENTSENSOR

  OBJECT               = PLATFORMSHORTNAME
    NUM_VAL            = 1
    VALUE              = "AM-1"
  END_OBJECT           = PLATFORMSHORTNAME

  OBJECT               = INSTRUMENTSHORTNAME
    NUM_VAL            = 1
    VALUE              = "ASTER"
  END_OBJECT           = INSTRUMENTSHORTNAME

END_GROUP            = PLATFORMINSTRUMENTSENSOR

GROUP                = POINTINGANGLES

  OBJECT               = POINTINGANGLESCONTAINER
    CLASS              = "1"

    OBJECT               = SENSORNAME
      CLASS              = "1"
      NUM_VAL            = 1
      VALUE              = "VNIR"
    END_OBJECT           = SENSORNAME

    OBJECT               = POINTINGANGLE
```

```
      CLASS              = "1"
      NUM_VAL            = 1
      VALUE              = -20.654000
    END_OBJECT           = POINTINGANGLE

    OBJECT               = SETTINGTIMEOFPOINTING
      CLASS              = "1"
      NUM_VAL            = 1
      VALUE              = "2002-05-03T15:52:57Z"
    END_OBJECT           = SETTINGTIMEOFPOINTING

  END_OBJECT             = POINTINGANGLESCONTAINER

END_GROUP              = POINTINGANGLES

GROUP                  = PRODUCTSPECIFICMETADATA

  OBJECT                 = MAPORIENTATIONANGLE
    NUM_VAL              = 1
    VALUE                = 9.818777
  END_OBJECT             = MAPORIENTATIONANGLE

  OBJECT                 = SOLAR_AZIMUTH_ANGLE
    NUM_VAL              = 1
    VALUE                = 140.556708
  END_OBJECT             = SOLAR_AZIMUTH_ANGLE

  OBJECT                 = SOLAR_ELEVATION_ANGLE
    NUM_VAL              = 1
    VALUE                = 61.909232
  END_OBJECT             = SOLAR_ELEVATION_ANGLE

END_GROUP              = PRODUCTSPECIFICMETADATA

GROUP                  = GRID_INFO

  GROUP                  = PROJECTION_INFO

    OBJECT               = PROJECTION
      NUM_VAL            = 1
      VALUE              = "UNIVERSAL TRANSVERSE MERCATOR"
    END_OBJECT           = PROJECTION

    OBJECT               = PROJECTIONPARAMETERS
      NUM_VAL            = 13
```

```
        VALUE              = (0.000000, 0.000000, 0.000000,
0.000000, 0.000000, 0.000000, 0.000000, 0.000000, 0.000000,
0.000000, 0.000000, 0.000000, 0.000000)
      END_OBJECT           = PROJECTIONPARAMETERS

      OBJECT               = DATUM
        NUM_VAL            = 1
        VALUE              = "WGS 1984"
      END_OBJECT           = DATUM

      OBJECT               = UTMZONE
        NUM_VAL            = 1
        VALUE              = 18
      END_OBJECT           = UTMZONE

    END_GROUP              = PROJECTION_INFO

    GROUP                  = GRIDSTRUCTUREINFO

      OBJECT               = GRIDRESAMPLINGMETHOD
        NUM_VAL            = 1
        VALUE              = "Nearest neighbor resampling"
      END_OBJECT           = GRIDRESAMPLINGMETHOD

      OBJECT               = DATACOLUMNS
        NUM_VAL            = 1
        VALUE              = 5622
      END_OBJECT           = DATACOLUMNS

      OBJECT               = DATAROWS
        NUM_VAL            = 1
        VALUE              = 4987
      END_OBJECT           = DATAROWS

      OBJECT               = UPPERLEFTCORNER
        NUM_VAL            = 2
        VALUE              = (284937.415469, 4334316.023925)
      END_OBJECT           = UPPERLEFTCORNER

      OBJECT               = LOWERRIGHTCORNER
        NUM_VAL            = 2
        VALUE              = (369286.756930, 4259500.068986)
      END_OBJECT           = LOWERRIGHTCORNER

      OBJECT               = CORNERCOORDINATEUNITS
        NUM_VAL            = 1
```

```
        VALUE                = "Meters"
      END_OBJECT             = CORNERCOORDINATEUNITS

      GROUP                  = RESOLUTION

        OBJECT               = XPIXELSIZE
          NUM_VAL            = 1
          VALUE              = 15.003440
        END_OBJECT           = XPIXELSIZE

        OBJECT               = YPIXELSIZE
          NUM_VAL            = 1
          VALUE              = 15.002197
        END_OBJECT           = YPIXELSIZE

        OBJECT               = XYPIXELSIZEUNIT
          NUM_VAL            = 1
          VALUE              = "Meters"
        END_OBJECT           = XYPIXELSIZEUNIT

      END_GROUP              = RESOLUTION

    END_GROUP              = GRIDSTRUCTUREINFO

  END_GROUP              = GRID_INFO

END_GROUP              = INVENTORYMETADATA

END
```

Appendix D. Data Pool HEG Error Codes and Responses

The table below maps each HEG Server error code to the corresponding error string, and provides recommended operator and end user responses to each error. When an error is encountered in a Data Pool HEG order, the operations staff may investigate the cause of the error using:

1) the HEG Server debug log (/usr/ecs/<MODE>/CUSTOM/logs/HegServer.debug.log). The level of debug messages in this log is determined by the value of the log.debug.level parameter in the HEG server configuration file (a). The log.debug.level is set to INFORMATION during normal operations, but may be set to XVERBOSE or VERBOSE to obtain additional debugging information;

2) the xml file containing the HEG request specifications. This file is contained in the HEG Server debug log if the log.debug.level is set to XVERBOSE. The request xml may also be viewed on the OMS GUI; and

3) the temporary files created by the HEG server and the HEG converters while processing the request. These temporary files are created in the HEG Server working directory (b) during request processing. If the HEG Server debug flag is on (HegServer.application.debugFlag = true in the HEG Server cfg file (a)), the temporary files are saved in a temporary file directory (d) when the request completes. Temporary files include the request parameter file (.prm) and the HEG converter log files.

The items below are referred to by letter through the appendix:

a) HEG Server cfg file - /usr/ecs/<MODE>/CUSTOM/cfg/EcHgServerConfig.properties
b) Default Location of the HEG Server working directory - /datapool/<MODE>/user/<FS#>/HEGWorking
c) Destination Directory for HEG output files - /datapool/<MODE>/user/<FS#>/.orderdata/OUTPUTS<random string>/HEGOUT.001<random string>/HEG/<request id>.<granule id>
d) Default Location of Temp File Directory - /datapool/<MODE>/user/<FS#>/HEGTemp/datapool/<MODE>/user/<FS#>/.orderdata/OUTPUTS<random string>/HEGOUT.001<random string>/HEG/<request id>.<granule id>/tempfiles
e) Location of the HEG Converters - /usr/ecs/<MODE>/CUSTOM/bin/HEG
f) Location of the HEG Server binaries - /usr/ecs/<MODE>/CUSTOM/lib/HEG
g) MTDDATADIR=/usr/ecs/<MODE>/CUSTOM/data/HEG

MRTDATADIR=/usr/ecs/<MODE>/CUSTOM/data/HEG
PGSHOME=/usr/ecs/<MODE>/CUSTOM/data/HEG/TOOLKIT_MTD

Error Code	Error String	Operator Responses	User Responses
-3	ClientDown	Make sure the client is up.	None
-2	Rejected	Make sure that the MAX_NUM_OF_CONCURRENT_HEG_PROCESS value in the OMS Database OmConfigParameter table is configured to be less than the configured value of HegServer.application.maxClientRequests in HEG server configuration file(a). If so and the error still occurs, submit a trouble ticket.	None
-1	Cancelled	None	None
0	HegConversionSuccessful	None	None
200	InputXmlValidationErr	Submit a Trouble Ticket	None
201	ErrCreateWorkingDirectory	Check that cmshared has write permission ("drwxrwxr-x") to the working directory(b). If the write permission is correct, then submit a trouble ticket.	None
202	InvalidInputInBandContainerErr	Submit a Trouble Ticket	None
203	CreateSummaryFileErr	Submit a Trouble Ticket	None
204	MoveOutputErr	Check that there is enough space to move the TIF/HDF/MET files from the working directory(b) to the destination directory(c). Make sure that cmshared has write permission to the destination directory(c) ("drwxrwxr-x"). If so and the error still occurs, submit a trouble ticket.	None
205	CreateTempFilesDirErr	Check that cmshared has write permission ("drwxrwxr-x") to the temp files directory(d). If so and the error still occurs, submit a trouble ticket.	None

Error Code	Error String	Operator Responses	User Responses
206	RunConverterExceptionErr	Check that the HEG converters and jar file (bandtool, swtif, gdtif, resample, hegtool, and HEG.jar) exist in the correct location(e). If so and the error still occurs, submit a trouble ticket.	None
207	OutputDirIsNotADirErr	Check that the output directory(c) is a directory. If so and the error still occurs, submit a trouble ticket.	None
208	OutputDirUnwritableErr	Check that cmshared has write permission ("drwxrwxr-x") to the output directory(c). If so and the error still occurs, submit a trouble ticket.	None
209	OutputDirCreateErr	Check that cmshared has permission ("drwxrwxr-x") to create the output directory(c). If so and the error still occurs, submit a trouble ticket.	None
210	WorkingDirIsNotADirErr	Check that the working directory(b) is a directory. If so and the error still occurs, submit a trouble ticket.	None
211	WorkingDirUnwritableErr	Check that cmshared has write permission ("drwxrwxr-x") in the working directory(b). If so and the error still occurs, submit a trouble ticket.	None
212	ConversionLogCreateErr	Check that cmshared has permission ("drwxrwxr-x") to create/write the EcHgHEGConversion.log file in the working directory(b). If so and the error still occurs, submit a trouble ticket.	None
213	InputHDFEOSFileNotExistErr	Check that the hdfeos file exists in the datapool. If so and the error still occurs, submit a trouble ticket.	None
214	ErrDeleteExistingWorkingDir	Check that cmshared has permission ("drwxrwxr-x") to delete the working directory(b). The debug flag in the HEG Server cfg file(a) needs to be set to false for the server to remove the working directory. If the debug flag isn't set to false than this error won't occur because the working directory will be preserved. If the debug flag is set to false, and cmshared has delete permission, and an error still occurs, submit a trouble ticket.	None

Error Code	Error String	Operator Responses	User Responses
500	CantRunHegtool	Check that the hegtool executable exists in the correct location(e). Check the /usr/ecs/<MODE>/CUSTOM/utilities/EcHgServerStart script to make sure that the environment variables MTDDATADIR, MRTDATADIR, PGSHOME are set correctly(h). If so and the error still occurs, submit a trouble ticket.	None
501	ErrReadingProperties	Check that the HEG Server properties file exists in the correct location(a). If so and the error still occurs, submit a trouble ticket.	None
502	ErrReadingHdfeos	Check that the hdfeos file exists in the datapool. If so and the error still occurs, submit a trouble ticket.	None
503	InputFileNotHdfeos	Check that the input file is an hdfeos file. If so and the error still occurs, submit a trouble ticket.	None
504	ErrLoadingDataInArray	Submit a Trouble Ticket	None
505	ErrWritingParameterFile	Submit a Trouble Ticket	None
506	ConverterExecuteErr	Check that the HEG converters and HEG jar file (bandtool, hegtool, swtif, gdtif, resample, HEG.jar) exist in the correct location(e). If so and the error still occurs, submit a trouble ticket.	None
508	NoParameterFile	Submit a Trouble Ticket	None
509	ErrCopyCompressedFile	Check that the compressed file exists in the datapool and that cmshared has write permission ("drwxrwxr-x") to the destination directory(c). If so and the error still occurs, submit a trouble ticket.	None
510	ErrDecompressingFile	Check that the correct decompression utility is specified in the HEG Server cfg file (a) and that it exists in the operating system. Check that the compressed file exists in the datapool. If so and the error still occurs, submit a trouble ticket.	None
511	DecompressCommandFormatErr	Submit a Trouble Ticket	None

Error Code	Error String	Operator Responses	User Responses
512	SubsetAreaNotInMISRFile	Check that the geographic extent of the spatial subset area entered by the user intersects the granule. If so, and an error still occurs, submit a trouble ticket.	Check that the geographic extent of the spatial subset area intersects the granule. If not, enter a subset area that does so.
600	NO ERROR - SUCCESSFUL		
601	GeneralProcessingErr	Submit a Trouble Ticket	None
602	AssertErr	Submit a Trouble Ticket	None
603	EnvironmentVariableNotFound	Check that the environment variables are set correctly in the EcHgServerStart script which is located at /usr/ecs/<MODE>/CUSTOM/utilities(h). If so and the error still occurs, submit a trouble ticket.	None
604	MemoryAllocationErr	Submit a Trouble Ticket	None
605	ErrWaitingForThreadTermination	Submit a Trouble Ticket	None
606	SemaphoreErr	Submit a Trouble Ticket	None
607	MutexErr	Submit a Trouble Ticket	None
608	ErrSpaceInName	Submit a Trouble Ticket	None
609	ErrCommandLineUsage	Submit a Trouble Ticket	None
610	ErrOpenInputParameterFile	Check the working directory(b) to see if the parameter file (.prm) exists. If so and the error still occurs, submit a trouble ticket.	None
611	ErrReadInputParameterFile	Check the working directory(b) to see if the input parameter file (.prm) is a valid file. If so and the error still occurs, submit a trouble ticket.	None
612	ErrOpenOutputParameterFile	Submit a Trouble Ticket	None
613	ErrWriteOutputParameterFile	Submit a Trouble Ticket	None

Error Code	Error String	Operator Responses	User Responses
614	ErrOpenInputImageFile	Check that the input image file (hdfeos file) exists in the datapool. If so and the error still occurs, submit a trouble ticket.	None
615	ErrReadInputImageFile	Check that the input image file (hdfeos file) read in is valid. If so and the error still occurs, submit a trouble ticket.	None
616	ErrOpenOutputImageFile	Submit a Trouble Ticket	None
617	ErrWriteOutputImageFile	Check that cmshared has write permission ("drwxrwxr-x") and enough space to write the output image file to the working directory(b). If so and the error still occurs, submit a trouble ticket.	None
618	ErrOpenInputHeaderFile	Check that the HegHdr.hdr file exists in the working directory(b). If so and the error still occurs, submit a trouble ticket.	None
619	ErrReadInputHeaderFile	Check that the HegHdr.hdr file is a valid file. The header file should be located in the working directory(b). If so and the error still occurs, submit a trouble ticket.	None
620	ErrOpenOutputHeaderFile	Submit a Trouble Ticket	None
621	ErrWriteOutputHeaderFile	Submit a Trouble Ticket	None
622	NoCommandLineArgument	Submit a Trouble Ticket	None
623	MissingOrBadParameterFile	Submit a Trouble Ticket	None
624	UnknownCommandLineArgument	Submit a Trouble Ticket	None
625	BadOrMissingInputFileNameExtension	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the INPUT_FILENAME field exists and the value contains a hdfeos file with the .hdf extension. If so and the error still occurs, submit a trouble ticket.	None

Error Code	Error String	Operator Responses	User Responses
626	BadOrMissingOutputFileNameExtension	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the OUTPUT_FILENAME exists and the value contains a filename with either a .hdf or .tif extension. If so and the error still occurs, submit a trouble ticket.	None
627	BadOrMissingResampleType	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the RESAMPLING_TYPE field exists and the value is either NN, BI, or CC. If so and the error still occurs, submit a trouble ticket.	None
628	BadOrMissingProjectionType	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the OUTPUT_PROJECTION_TYPE field exists and the value is one that works for that particular hdfeos (granule) file. If so and the error still occurs, submit a trouble ticket.	None
629	BadOrMissingInputFileNameField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the INPUT_FILENAME field exists and the value is specifying a hdfeos file from the datapool. If so and the error still occurs, submit a trouble ticket.	None
630	BadOrMissingSpectralSubsetField	Submit a Trouble Ticket	None
631	BadOrMissingSpatialSubsetField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the SPATIAL_SUBSET_UL_CORNER and SPATIAL_SUBSET_LR_CORNER fields exists. Also, check that the spatial subsetting values are valid. If so and the error still occurs, submit a trouble ticket.	Users should submit spatial subset within the bounds of the granule.
632	BadOrMissingOutputFileNameField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the OUTPUT_FILENAME field exists and the value contains the correct file extension. If so and the error still occurs, submit a trouble ticket.	None

Error Code	Error String	Operator Responses	User Responses
633	BadOrMissingResampleTypeField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the RESAMPLING_TYPE field exists and the value is either NN, BI, or CC. If so and the error still occurs, submit a trouble ticket.	None
634	BadOrMissingOutputProjectionField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the OUTPUT_PROJECTION_TYPE field exists and the value is one that works for that particular hdfeos (granule) file. If so and the error still occurs, submit a trouble ticket.	None
635	BadOrMissingOutputProjectionParametersField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the OUTPUT_PROJECTION_PARAMETERS field exists and the values entered are valid. If so and the error still occurs, submit a trouble ticket.	None
636	BadOrMissingDataTypeField	Submit a Trouble Ticket.	None
637	BadOrMissingProjectionParametersField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the INPUT_FILENAME, OBJECT_NAME, FIELD_NAME, BAND_NUMBER, OUTPUT_PIXEL_SIZE_X, OUTPUT_PIXEL_SIZE_Y, SPATIAL_SUBSET_UL_CORNER, SPATIAL_SUBSET_LR_CORNER, RESAMPLING_TYPE, OUTPUT_PROJECTION_TYPE, OUTPUT_PROJECTION_PARAMETERS, OUTPUT_FILENAME, and OUTPUT_TYPE fields exist. Each set of these fields should be enclosed in a BEGIN and END block. The first line of the parameter file (.prm) should have a field called NUM_RUNS with the value equal to the number of BEGIN and END blocks in the parameter file (.prm). If so and the error still occurs, submit a trouble ticket.	None

Error Code	Error String	Operator Responses	User Responses
638	BadOrMissingProjectionParametersValue	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the INPUT_FILENAME, OBJECT_NAME, FIELD_NAME, BAND_NUMBER, OUTPUT_PIXEL_SIZE_X, OUTPUT_PIXEL_SIZE_Y, SPATIAL_SUBSET_UL_CORNER, SPATIAL_SUBSET_LR_CORNER, RESAMPLING_TYPE, OUTPUT_PROJECTION_TYPE, OUTPUT_PROJECTION_PARAMETERS, OUTPUT_FILENAME, and OUTPUT_TYPE values are valid. If so and the error still occurs, submit a trouble ticket.	None
639	BadOrMissingSpatialExtentsCorner	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the SPATIAL_SUBSET_UL_CORNER and SPATIAL_SUBSET_LR_CORNER fields exist and check that the spatial subsetting values are valid. If so and the error still occurs, submit a trouble ticket.	Check that the geographic extent of the spatial subset area is specified correctly. If not, enter new coordinates for the subset area.
640	BadOrMissingNBANDSField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the BAND_NUMBER field exists. If so and the error still occurs, submit a trouble ticket.	None
641	BadOrMissingNBANDSValue	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the BAND_NUMBER value is valid. If so and the error still occurs, submit a trouble ticket.	None
642	BadOrMissingBANDNAMESField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the BANDNAMES field exists. If so and the error still occurs, submit a trouble ticket.	None

Error Code	Error String	Operator Responses	User Responses
643	BadOrMissingBANDNAMESValue	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the BANDNAMES value is valid. If so and the error still occurs, submit a trouble ticket.	None
644	BadOrMissingDATATYPEField	Submit a Trouble Ticket	None
645	BadOrMissingDATATYPEValue	Submit a Trouble Ticket	None
646	BadOrMissingNLINESField	Submit a Trouble Ticket	None
647	BadOrMissingNLINESValue	Submit a Trouble Ticket	None
648	BadOrMissingNSAMPLESField	Submit a Trouble Ticket	None
649	BadOrMissingNSAMPLESValue	Submit a Trouble Ticket	None
650	BadOrMissingPIXEL_SIZEField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the OUTPUT_PIXEL_SIZE_X and OUTPUT_PIXEL_SIZE_Y fields exist. If so and the error still occurs, submit a trouble ticket.	None
651	BadOrMissingPIXEL_SIZEValue	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the OUTPUT_PIXEL_SIZE_X and OUTPUT_PIXEL_SIZE_Y values are valid. Also, check to make sure that the correct units are specified for these fields (either meters or degree decimal). If Geographic projection is selected, users should enter the pixel sizes in degree decimal (DD) units. For all other projections, users should enter the pixel size in meters. If so and the error still occurs, submit a trouble ticket.	Check the pixel sizes to make sure they are valid values and that the correct units are used (decimal degrees for the Geographic projection, meters otherwise).
652	BadOrMissingMINVALUEField	Submit a Trouble Ticket	None
653	BadOrMissingMINVALUEValue	Submit a Trouble Ticket	None
654	BadOrMissingMAXVALUEField	Submit a Trouble Ticket	None
655	BadOrMissingMAXVALUEValue	Submit a Trouble Ticket	None
656	BadOrMissingBACKGROUND_FILLField	Submit a Trouble Ticket	None

Error Code	Error String	Operator Responses	User Responses
657	BadOrMissingBACKGROUND_FILLValue	Submit a Trouble Ticket	None
658	TotalBandsFoundInconsistantWithNBANDS	Submit a Trouble Ticket	None
659	NoBandsSelectedForOutput	Submit a Trouble Ticket	None
660	BadOrMissingUTMZoneField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the UTM_ZONE field exists. If so and the error still occurs, submit a trouble ticket.	None
661	BadOrMissingUTMZoneValue	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the UTM_ZONE value is valid. If so and the error still occurs, submit a trouble ticket.	User should enter a valid UTM zone value or nothing for the default value.
662	BadOrMissingELLIPSOID_CODEField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the ELLIPSOID_CODE field exists. If so and the error still occurs, submit a trouble ticket.	None
663	BadOrMissingELLIPSOID_CODEValue	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the ELLIPSOID_CODE value is valid. If so and the error still occurs, submit a trouble ticket.	User should enter a valid ELLIPSOID CODE or nothing for the default value.
664	MissingBoundingRectangularCoordinates	Submit a Trouble Ticket	None
665	ErrPixelSizeLessThanMinimum	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the pixel sizes are not less than the minimum value. Also, check to make sure that the correct units are specified for these fields (either meters or degree decimal). If Geographic projection is selected, users should enter the pixel sizes in degree decimal (DD) units. For all other projections, users should enter the pixel size in meters. If so and the error still occurs, submit a trouble ticket.	Check the pixel sizes to make sure they are valid values and that the correct units are used (decimal degrees for the Geographic projection, meters otherwise).

Error Code	Error String	Operator Responses	User Responses
666	ErrPixelSizeGreaterThanMaximum	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the pixel sizes are not greater than the maximum value. Also, check to make sure that the correct units are specified for these fields (either meters or degree decimal). If Geographic projection is selected, users should enter the pixel sizes in degree decimal (DD) units. For all other projections, users should enter the pixel size in meters. If so and the error still occurs, submit a trouble ticket.	Check the pixel sizes to make sure they are valid values and that the correct units are used (decimal degrees for the Geographic projection, meters otherwise).
667	ErrCommandLineUsage	Submit a Trouble Ticket	None
668	ErrOpenLogFile	Submit a Trouble Ticket	None
669	ErrOpenGeoTemp	Submit a Trouble Ticket	None
670	ProjectionProcessingErr	Submit a Trouble Ticket	None
671	OpenDatumFileErr	Submit a Trouble Ticket	None
672	OpenSpheroidFileErr	Submit a Trouble Ticket	None
673	ProjectionMathErr	Submit a Trouble Ticket	None
674	PointLiesInBreakErr	Submit a Trouble Ticket	None
675	OutputFileNameNotSpecifiedErr	Check the parameter file (.prm) which is located in the working directory(b) and make sure the OUTPUT_FILENAME value is specified. If so and the error still occurs, submit a trouble ticket.	None
676	ProjectionTransformationFailed	Submit a Trouble Ticket	None
677	FailedToConvergeAfterManyIterations	Submit a Trouble Ticket	None
678	TooManyIterationsForInverseRobinson	Submit a Trouble Ticket	None
679	TooManyIterationsInInverse	Submit a Trouble Ticket	None
680	InputDataErr	Submit a Trouble Ticket	None
681	IllegalDMSField	Submit a Trouble Ticket	None
682	InconsistentUnitAndSystemCodesForInput	Submit a Trouble Ticket	None
683	IllegalInputSystemCode	Submit a Trouble Ticket	None

Error Code	Error String	Operator Responses	User Responses
684	IllegalInputUnitCode	Submit a Trouble Ticket	None
685	IllegalInputZoneCode	Submit a Trouble Ticket	None
686	PointProjectsIntoInfinity	Submit a Trouble Ticket	None
687	LatitudeFailedToConvergeAfterManyIterations	Submit a Trouble Ticket	None
688	InconsistentUnitAndSystemCodesForOutput	Submit a Trouble Ticket	None
689	IllegalOutputSystemCode	Submit a Trouble Ticket	None
690	IllegalOutputUnitCode	Submit a Trouble Ticket	None
691	IllegalOutputZoneCode	Submit a Trouble Ticket	None
692	TransformationCantBeComputedAtThePoles	Submit a Trouble Ticket	None
693	PointCantBeProjected	Submit a Trouble Ticket	None
694	PointProjectsIntoACircleOfUnacceptableRadius	Submit a Trouble Ticket	None
695	FiftyIterationsPerformedWithoutConversion	Submit a Trouble Ticket	None
696	SpheroidCodeResetToDefault	Submit a Trouble Ticket	None
697	EqualLatitudesForStdParallelsOnOppositeSidesOfEquator	Submit a Trouble Ticket	None
698	IllegalZoneNumber	Submit a Trouble Ticket	None
699	ErrOpenStatePlaneParameterFile	Submit a Trouble Ticket	None
700	IllegalSourceOrTargetUnitCode	Submit a Trouble Ticket	None
701	MissingProjectionParameters	Submit a Trouble Ticket	None
702	InvalidCornerCoordinatesForInputImage	Submit a Trouble Ticket	None
703	OutputWindowFallsOutsideMappingGrid	Submit a Trouble Ticket	None
704	NUM_RUNSFieldIncorrect	Submit a Trouble Ticket	None
705	ErrorWithBEGIN_ENDFields	Submit a Trouble Ticket	None
706	BadOrMissingOBJECT_NAMEField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the OBJECT_NAME field exists and contains a valid value. If so and the error still occurs, submit a trouble ticket.	None

Error Code	Error String	Operator Responses	User Responses
707	BadOrMissingFIELD_NAMEField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the FIELD_NAME field exists and contains a valid value. If so and the error still occurs, submit a trouble ticket.	None
708	BadOrMissingOUTPUT_TYPEField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the OUTPUT_TYPE field exists. If so and the error still occurs, submit a trouble ticket.	None
709	BadOrMissingOUTPUT_TYPEValue	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the OUTPUT_TYPE value is valid. If so and the error still occurs, submit a trouble ticket.	None
710	BadOrMissingBAND_NUMValue	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the BAND_NUMBER value exists and is valid. If so and error still occurs submit a trouble ticket.	None
711	SubsetAreaNotInFile	Check that the geographic extent of the spatial subset area entered by the user intersects the granule. If so, and an error still occurs, submit a trouble ticket.	Check that the geographic extent of the spatial subset area intersects the granule. If not, enter a subset area that does so.
712	BadOrMissingSTPZoneField	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the STP_ZONE field exists. If so and the error still occurs, submit a trouble ticket.	None
713	BadOrMissingSTPZoneValue	Check the parameter file (.prm) which is located in the working directory(b) and make sure that the STP_ZONE the value is valid. If so and the error still occurs, submit a trouble ticket.	Input a valid STP Zone value.
714	UnableToOpenSTPZoneFile	Submit a Trouble Ticket	None
715	GranuleOutsideUSCantFindDefaultStatePlaneZone	Submit a Trouble Ticket	None

Error Code	Error String	Operator Responses	User Responses
716	ErrorGettingAlaskanSTPZone	Submit a Trouble Ticket	None
720	ErrorOpenInputHDFFile	Check to see if the input hdf file (granule) exists in the datapool, make sure that cmshared has read permission on the input hdf file, and check the HEG Server debug log file to see if the hegtool is called correctly. The hegtool call should look like this: /usr/ecs/<MODE>/CUSTOM/utilities/EcHgHEGStart <MODE> hegtool -h <location of the hdf file in the datapool>. If so and the error still occurs, submit a trouble ticket.	None
721	ErrorReadingInputHDFFile	Check to see if the input hdf file being read is in hdfeos format, make sure that cmshared has read permission on the input hdf file, and check the HEG Server debug log file to see if the hegtool is called correctly. The hegtool call should look like this: /usr/ecs/<MODE>/CUSTOM/utilities/EcHgHEGStart <MODE> hegtool -h <location of the hdf file in the datapool>. If so and the error still occurs, submit a trouble ticket.	None
722	UnableToOpenHeaderFile	Check to see if the HegHdr.hdr file is created in the working directory(b). If so and an error sill occurs submit a trouble ticket.	None
723	UnableToFindShortName	Submit a Trouble Ticket	None
724	UnableToOpenGEOFile	Submit a Trouble Ticket	None