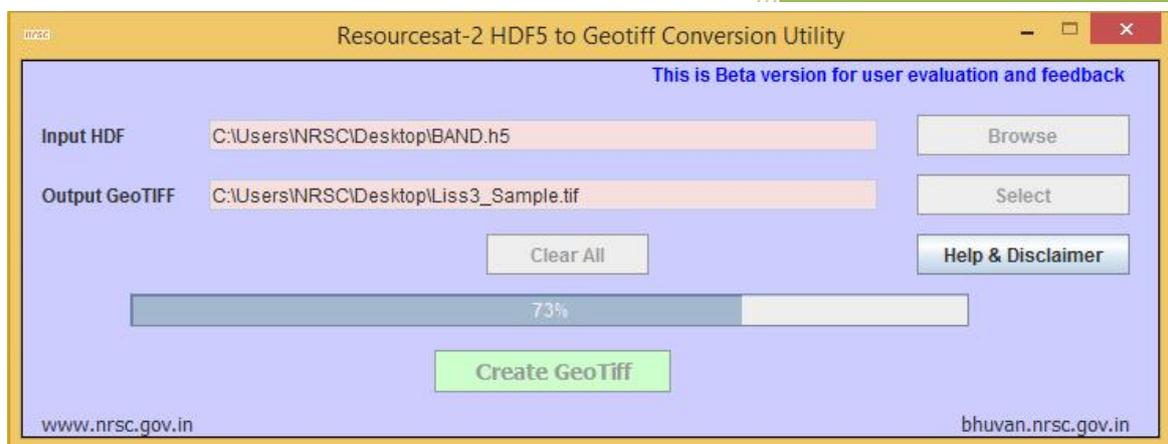


User Manual

Resourcesat-2 HDF to Geotiff conversion (H2G) Tool



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1. Introduction

HDF stands for **Hierarchical Data Format**. HDF5 is a library and multi object file format for storing scientific data. HDF5 is a completely new Hierarchical Data Format product consisting of a data format specification and a supporting library implementation. It is freely available and designed to address some of the limitations of the older HDF product and also to address current and anticipated requirements of modern systems and applications. HDF5 files are organized in a hierarchical structure, with two primary structures: *groups* and *datasets*.

- *HDF5 group*: a grouping structure containing instances of zero or more groups or datasets, together with supporting metadata.
- *HDF5 dataset*: a multidimensional array of data elements, together with supporting metadata.

Working with groups and group members is similar in many ways to working with directories and files in UNIX. As with UNIX directories and files, objects in an HDF5 file are often described by giving their full (or absolute) path names. Any HDF5 group or dataset may have an associated *attribute list*. An HDF5 *attribute* is a user-defined HDF5 structure that provides extra information about an HDF5 object.

H2G is a software utility to convert HDF5 Level 2 GEO to Geotiff data products for Resourcesat-2 AWiFS, LISS3, LISS4 (Mono, Mx modes) sensors.

2. Contents of Resourcesat-2 data products in HDF5

There are Scientific Data Sets in Resourcesat-2 data products that are used for storing and retrieving different types of image information and a fixed number of Virtual Groups under which these Data Sets are arranged. A Resourcesat-2 Product generated in HDF5 format has the very first virtual Group as the File itself containing the Global information for the Product. It contains parameters used for describing the product type and its associated information like Product Name, Generation software, Generation Time, Station Name and Location, Mission characteristics, Sensor characteristics and product Title, Time information of the product, other Product specifications, and complete scene information. RESOURCESAT-2 supports RAW/RAD/GEO Products in HDF5 format. But, RAD and GEO products are only supplied to user.

a. Contents of Radiometrically Corrected Product

Following groups are present in this product:

- HDFSfilename Group (containing Global attributes)
- Geo_Location group (containing ephemeris and navigation information)
- ImageData group (Raw image data for each Band)

- Mission_Parameters Group

b. Contents of Geo referenced Product

Following groups are present in this product:

- HDFFilename Group (containing Global attributes)
- Geo_Location group (containing navigation information)
- ImageData group (Raw image data for each Band)
- Mission_Parameters Group
- Map_Projection_Parameters Group

Image Data Group: This group contains images of different bands for that product. It has images stored as scalar datasets in the group. Number of scalar dataset depends upon the number of bands available for that product. Both individual band image dataset and image data group has attributes associated with it.

Table1. Projections supported in Resourcesat-2 Mission

| Sensor | FullScene/SubScene | Geo Referenced Product |
|------------------|----------------------|------------------------|
| AWiFS | Full scene, Subscene | LCC |
| LISS-3 | Full scene | Polyconic, UTM |
| LISS-4(Mx, Mono) | Full scene | Polyconic, UTM |

* All RAD products will be supported with no projection

With the demand from the users for HDF file to Geotiff format conversion, the present module is developed at NRSC for IRS Resourcesat-2 data products.

Background on Software Utility

The HDF to Geotiff Conversion utility developed to allow a user to reformat HDF image data objects. The output Geotiff file is ingestible into commonly used GIS applications.

3. Hardware and software requirements

Desktop computer system with minimum 2 GB RAM and any operating system with pre-installed Java SE JRE 7 (Build 1.7.0 or higher).

Update Environment Variable Settings:

Add Java Installation directory at the end of 'path' variable inside Environment Variable settings of your system.

- a. **Software Requirements:** Java 1.7 or More
- b. **Hardware Requirements:**
 - Hard Disk** : 3GB and Above
 - RAM** : 2GB and Above

Input and Output requirement:

Input file should be in HDF5 format of Resourcesat-2 predefined structure. Output file format will always be in GeoTiff.

This software utility may also work with any other satellite data provided they meet the structure of Resourcesat-2 satellite. However its functionality is tested only with NRSC supplied Resourcesat-2 data products.

4. Downloading the program

The program and the user manual can be downloaded from the location: http://www.nrsc.gov.in/Satellite_Data_Products_Overview?q=Download_Softwares_1

5. Salient features of the software

- ✓ Format Conversions without reprojection or manipulation of input data.
- ✓ Adding projection information to tiff image which is most useful for all applications.
- ✓ Band wise tiff file, layer stacked tiff file creation.
- ✓ User friendly Java GUI.
- ✓ Separate zip folder for Windows based and Red hat Linux Operating systems (32bit, 64 bit)
- ✓ All Java code built using Java Version jdk1.7 or higher- You will need Java jre7 or higher on your system to run this utility.
- ✓ Does not require any installation as program can run by invoking it through double clicking the run.bat or through command mode.

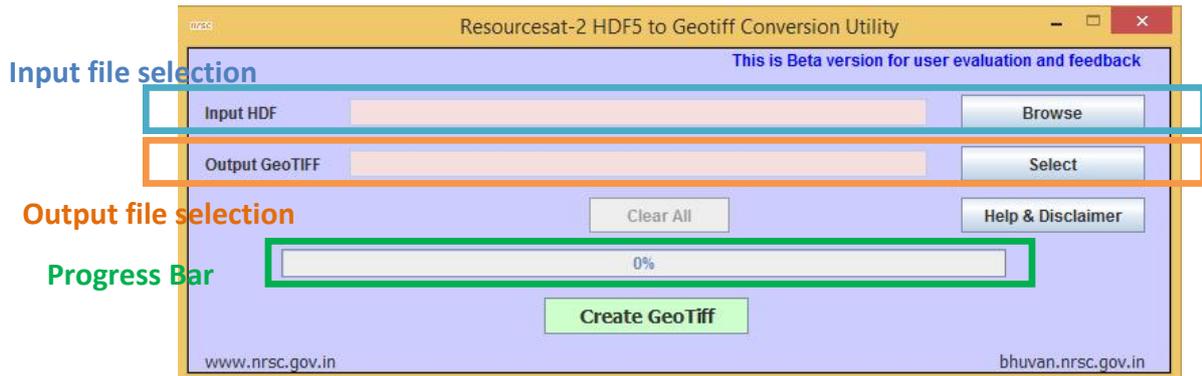
6. Steps in Running the Program

Invoke program by double clicking on "**run.bat**" in windows system or type the following command in the terminal window of your operating system "**run.bat**" the GUI appears (Give full path of Java command and full path of run.bat in case if above command does not work)

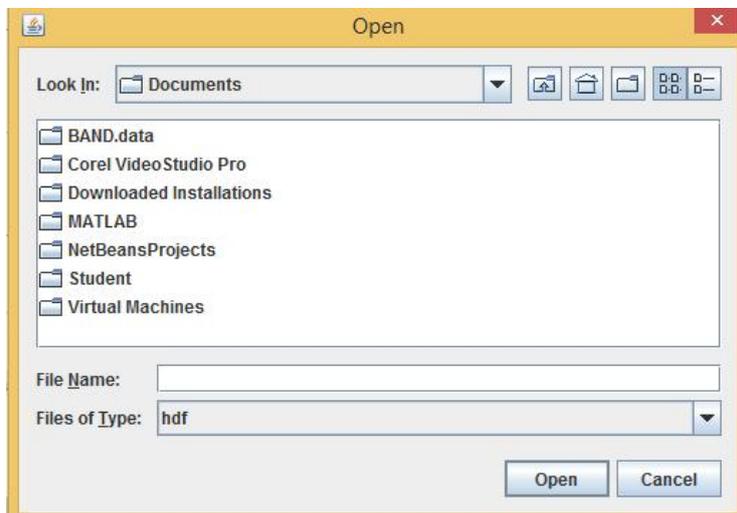
If your system is having more memory try allocating more memory to JVM using `-Xmx` argument in command mode.

(Example: to allocate 4GB of memory: "`-Xmx4096m`")

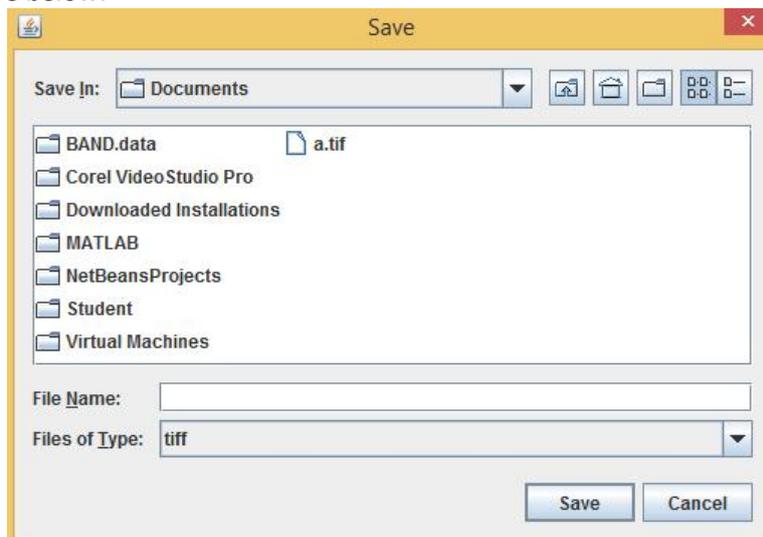
- ❖ **Download JRE:** Java SE JRE can be downloaded and installed from Oracle website (www.oracle.com).



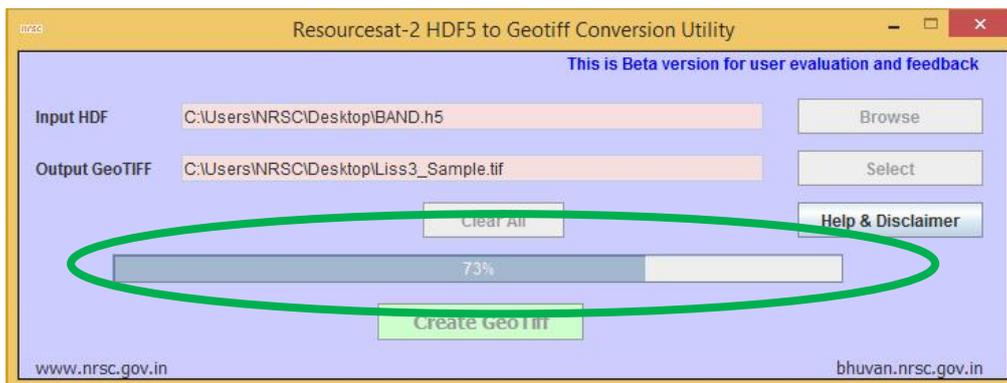
Selection of **“Input File HDF File Name”** as it prompts for entering the locations of the Resourcesat-2 HDF5 data products as shown in the figure below:



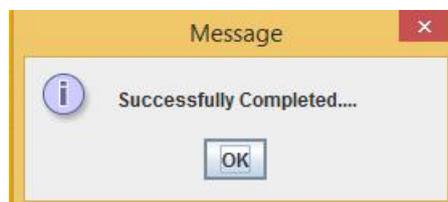
After entering the path of the input HDF file, select the name of the output file to be created as shown in the figure below:



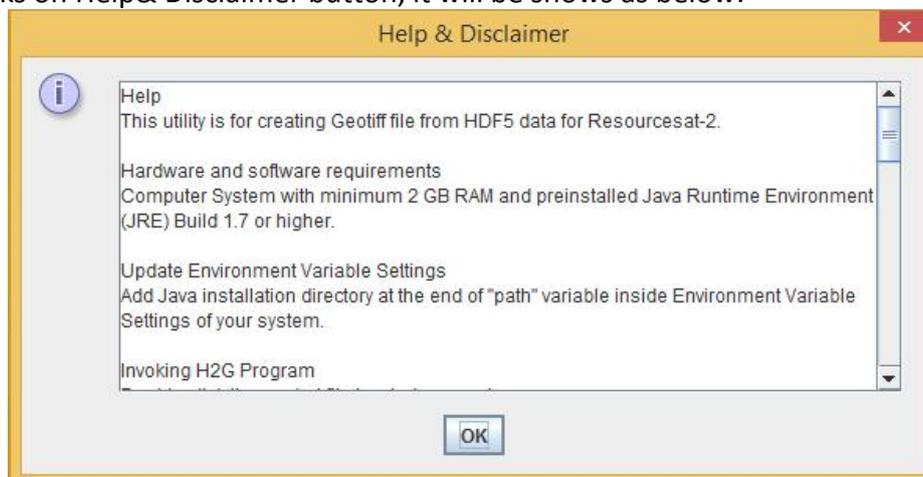
The progress status appears at the bottom of the progress bar as shown below:



After completion of the conversion the completion status is reported as shown in the figure below:



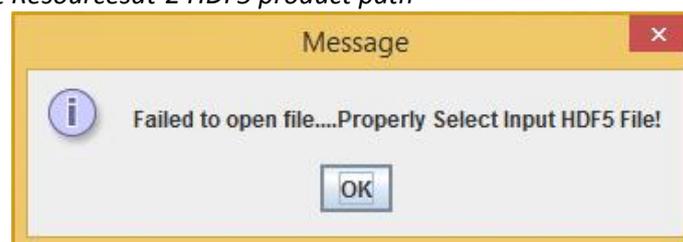
If user clicks on Help& Disclaimer button, it will be shows as below:



7. Error conditions and messages

1. Forgot to enter input HDF file: If one forgets to enter input HDF5 file path, it will give an error message

Solution: Select input Resourcesat-2 HDF5 product path



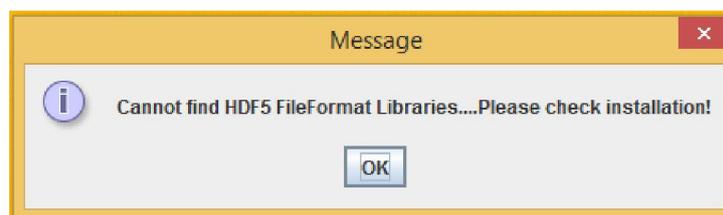
2. Input file does not exists: If one types input HDF5 file name which does not exists, it will give an error message

Solution: Type correct input Resourcesat-2 HDF5 product path



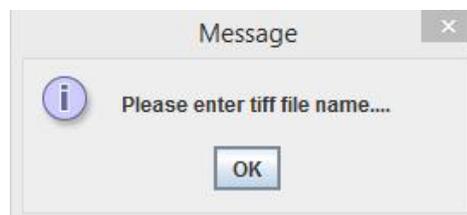
3. Libraries missing: If HDF5 file format library files misses from installation directory, it will give an error message

Solution: Make ensure all installation files are exists as per your operating system configuration or download the files again



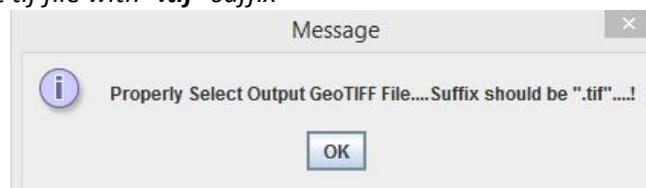
4. Forgot to enter output TIF file: If one forgets to enter output HDF5 file path, it will give an error message

Solution: Select output **tif** file path



5. Improper output Geotiff file name: If one tries to create output geotiff file without ".tif" suffix, it will gives an error message

Solution: Select output tif file with ".tif" suffix



6. Permissions problem in output Geotiff file creation: If utility fails to create output tif file in specified folder such as CD-ROM/DVD-ROM/BD-ROM drive, an error message appears.

Solution: Change output file location to local disk drives.

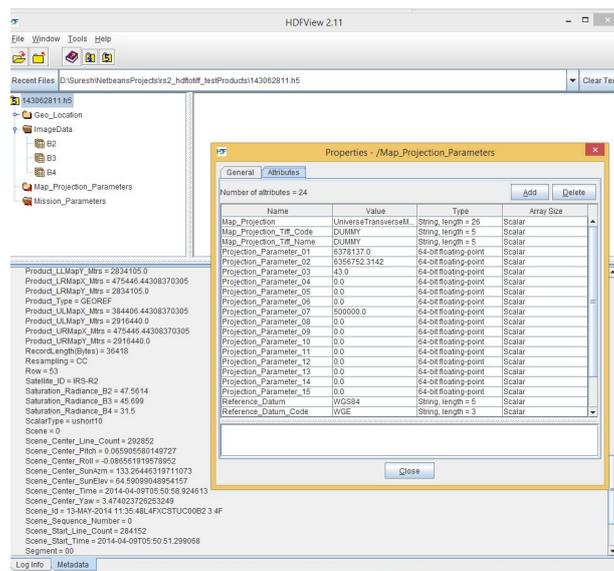


7. Check if output file already exists: The software utility checks whether output tif file already exists or not. If exists, input prompt dialog window appears to user for selecting YES, NO or Cancel. If user selects Yes, the tif file will be deleted.



Sample Resourcesat-2 HDF5 files and Output Geotiff files

1. L4Fx



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2. This software utility is one of the module implemented based upon the Resourcesat-2 HDF5 file structure. Developer does not claim that this utility will be foolproof and replace any other existing module or sensor.