# Radiometry Normalisation and Mosaic Generation tool

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National Remote Sensing Centre January, 2017

# **Radiometry Normalisation and Mosaic Generation tool**

### 1. Introduction

Image mosaicing is an important step in generation of large area radiometrically balanced images for mapping applications as well as in visualisation of large areas in a single view. Mosaicing is the process of joining overlapped georeferenced images together to form a larger image.

Mosaic of multiple images involves two major steps color balancing and stitching. Many color matching techniques are available, but no single color matching technique is suitable for a given set of images.

In this tool, Mosaic Normalization is achieved using statistical based automated tool to color match 'N' number of images and to get seamless mosaic with 'cut line feathering technique' in overlap areas. It assumes both images (to be mosaiced) are geometrically registered and have certain overlap and they are at the same spatial resolution.

#### 2. Hardware and software requirements:

Desktop computer system with minimum 4 GB RAM and any operating system with preinstalled 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
- b. Hardware Requirements:

Hard Disk	:	4GB and Above
RAM	:	4GB and Above

# 3. Input and Output File format: GeoTiff

#### Input requirements:

- All images with same x and y resolution, bands and projection.
- Minimum of 10% overlap to get better radiometry balanced and mosaic.
- First image in the input list is taken as reference.
- Successive images that are adding to the list must have overlap with any one of the previous images that are added to the list.
- It is recommended to use TOA corrected images for better results.

• Data should be cloud free in overlap areas

#### **Input Limitation:**

- Cloud mask to be done outside, when there is cloud in the overlap areas
- Mosaic file that exceeds 4GB size, will not generate.

#### 4. Methodology



# 5. Downloading the program

The program and the user manual can be downloaded from the location: <u>http://www.nrsc.gov.in/Satellite\_Data\_Products\_Overview?q=Download\_Softwares\_1</u>

# 6. Salient features of the software:

- ✓ Handles n number of images at a time
- ✓ Radiometrically balances all images taking first image as reference
- ✓ Generates GainOffset.doc file, gives information about each file, band's gain and offset values.

- ✓ Generates corresponding color balanced images for every scene with \_go as superscript for each file.
- ✓ Seamless mosaic upto the size of 4GB file can be generated.
- ✓ Feathering is done in overlap areas at the time of mosaic
- ✓ Front End validation and corresponding alert and error messages are provided
- ✓ Platform independent, as it is developed using JAVA
- ✓ Does not require any installation as program can run by invoking it through double clicking the MosNor.bat or through command mode.

# 7. Steps in Running the Program:

Invoke program by double clicking on "*mosNor.bat*" in windows system or type the following command in the terminal window of your operating system "*MosNor.bat*" the GUI appears (Give full path of Java command and full path of mosNor.bat in case if above command does not work). If your system is having more memory try allocating more memory to JVM using –Xms argument in command mode.

(Example: to allocate 4GB of memory:"-Xms4096m")

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

(or)

Double click on MosaicNormalization.jar to invoke the program

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

Set JAVA path in Environment Variables.

# 8. Procedure to process the module:

After double clicking on "MosaicNormalization.jar", the Mosaic Normalization frame is shown as below"

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Select Input Files De	lete Delete All	Help & Disclaimer
Output Dir: E:\radhika\radhika_mo	ossaic_tne\inp\OCM_3bands\	Select Output Directory
Mos File Name Without Directory :	08nov2016_reg_e0_e_3bands_e_sameres1_s	sub_mos.tif Start Mosaic Process Close
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# Mosaic Normalization Procedure:

• Click on "Select Input Files" button to add multiple input files into the list.

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11_13_10d	lec2016_reg.tif			
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D				
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11_13_120	"11_13_10dec2016_reg.tif	" "11_13_12dec	2016_reg.tif"	

- To delete a file from the list, select the file from the list and press "Delete" button
- To remove all files, click on "Delete All" button.
- Minimum of Two files to be added to the list
- First image in the list is taken has reference and balances all other images according to reference image (First Image)
- By default reference file directory is taken as output directory, which can be changed
- By default reference filename \_mos.tif is taken as mosaic filename, which can be changed as per user requirement.
- On click of "Start Mosaic Process" button it normalizes all images and generates individual "\_go.tif" files in "Output Dir". It also creates GainOffset.doc file which contains gain and offset of each band for every file.
- Enter mosaic filename with ".tif" as extension. But there is a limitation of the mosaic file size.(upto 4 GB output file can be generated)
- Click on 'Close' button to exit from the module.

#### 9. Following are the frontend validations done:

• Improper input Geotiff file name



• Clicking on Delete button without selecting file in the list



• Entered Wrong Output Directory



• Mosaic filename is not entered - the following message will appear



• Insufficient Number of Inputs

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Images Selected For Normalize and Mos	aic This is Beta ve	rsion for user evaluation and feedback
E:\radhika\radhika_mossaic_tne\inp\OC	M_3bands\9_12_08nov2016_reg_e0_e_3bands_e_sameres	1_sub.tif
		( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )
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Mos File Name Without Directory :	Start Mosaic I	Process Close
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• On pressing Start Mosaic Process, it displays process status by displaying the message "Process is going on....." as shown below:

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Radiometry Normalize Images Selected For Normalize	and Mosaic	This is Beta version for u	ser evaluation and feedback
E:\radhika\radhika_mossaic_tn E:\radhika\radhika_mossaic_tn	evinp/OCM_3bands19_12_08nov2016_reg_e0_e levinp/OCM_3bands19_13_28nov2016_reg_e0_e	_3bands_e_sameres1_sub.tlf _3bands_e_sameres1.tlf	
Select Input Files	Delete All		Help & Disclaimer
Output Dir: E:\radhika\radhi	ka_mossaic_tne\inp\OCM_3bands\		Select Output Directory
Mos File Name Without Direct	ory: mos1.tif	Start Mosaic Process	Close
bhuvan.nrsc.gov.in	Process is going on		www.nrsc.gov.in

• When there is not sufficient memory available, then \_go.tif files cannot be created, mosaic file also cannot be created.

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Mosaic and Radiometry Normaliz	20 -	ic Reta version for user evaluation and feedback
E:\radhika\radhika_mossaic_ti E:\radhika\radhika_mossaic_ti	nelinpil4xlo1646095262-R2-L4-113-053-A-21JAN2015.tif nelinpil4xlo1646095332-R2-L4-113-053-B-28DEC2014.tif	
i Gain, Offset E:\radhika	Message \\radhika_mossaic_tnelinpl/4x\o1646095262-R2-L4-113-053-A	-21JAN2015_go.tif not generated, Out of Memory
	OK	
Select Input Files	Delete Delete All	Help & Disclaimer
Select Input Files	Delete All Ika_mossaic_ine\inp\4x	Help & Disclaimer Select Output Directory
Select Input Files	Delete         Delete All           ika_mossaic_IneVinpV4X	Help & Disclaimer Select Output Directory Start Mosaic Process Close

• Mosaic cannot be created, when corresponding \_go.tif files not generated or not available in the specified directory.

Message	×
Mosaic cannot be created, corresponding 'go.	tif' not exists
ок	
	Message Mosaic cannot be created, corresponding 'go.

• After the Process is Completed, it displays message "Process is Completed"



#### 9. Output Images: (Normalized and Mosaiced Images)

Mosaic without Normalization

# Mosaic with Normalization





#### Disclaimer

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