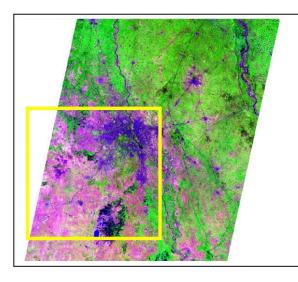
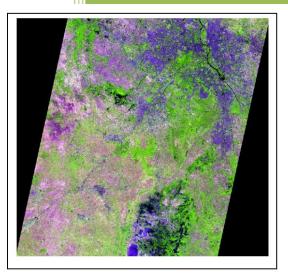
User Manual

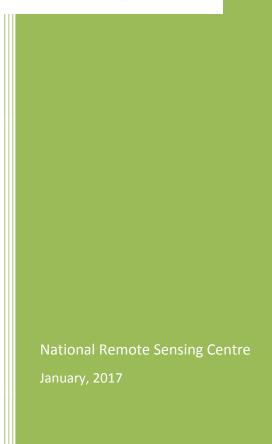
SWIR Band synthesis Utility for IRS RS2 L4Mx Data



Input L3 Image B543



Synthesised L4 Image B543



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Cover Page: Synthesised SWIR band for Resourcesat-2 L4Mx data using Resourcesat-2 L3 SWIR band.

1.Introduction

SWIR band finds its uses in many applications (snow and cloud detection etc.), Resourcesat Series satellites carry LISS-4 sensor which provides data at a spatial resolution of 5.8m in 4, 3, 2 bands. The SWIR band of in LISS-4 is synthesized using the spatial and spectral knowledge from LISS-3.

This module generates synthesised SWIR band at a spatial resolution of LISS-4, by taking the inputs as LISS-3 (Layer stacked as B234), LISS-4 (Layer stacked as B2345) images along with their Meta files. The module accepts inputs in Geo-Tiff format and provides output in Geo-Tiff format.

The S/W module has been developed using the coefficients derived from spectral transformation method to establish a relationship between B234 and B345 of LISS-3 image and applying these coefficients on B234 of LISS-4 Image to derive synthesized SWIR band.

2. 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>

3. Hardware and software requirements:

Desktop computer system with minimum 4 GB RAM and any operating system with 50 GB Hard disk space, preinstalled Java SE JRE 8 (Build 1.8.0_65 or higher) with *GDAL libraries (Ver 2.0 or above)*

Update Environment Variable Settings:

Add Java Installation directory at the end of 'path' variable inside Environment Variable settings of your system. Also add GDAL installation, gdal-data and gdalplugins folder paths to path variable.

Input and Output requirement:

Input file should be in GeoTiff format along with their Meta files. LISS-III, LISS-IV Mx data sets should be layer stacked. LISS-III image should comprise of 2345 bands and LISS-IV data set should comprise of 234 bands stacked in that order. Input LISS-III, LISS-IV Mx data sets should be co registered.

Select appropriate files for generating the synthesized SWIR band by selecting the appropriate inputs. The utility will prompt if the data sets given are not valid data sets.

Resourcsesat-2 LISS-III: 10 Bit Resourcesat-2 LISS-IV: 10 Bit This software utility may also work with any other sensor data provided they meet the above requirement. However its functionality is tested only with NRSC supplied Resourcesat-2 LISS-III, LISS-IV Mx data sets.

4. Salient Features of software

- 1. Platform independent JAVA program and require GDAL library (Ver 2.0 or above).
- 2. Software will take input LISS-III and LISS-IV Mx data sets as stacked layer.
- 3. It does not require any installation as program can run by invoking it through double click or through command mode.
- 4. Software provides option for the user to show the path of the metafile where it is located.

5. Steps in Running the Program : Invoke program by double clicking on "*swir4l4.bat*" in windows system or type the following command in the terminal window of your operating system "*java –Xms4096m –jar swir4l4.jar*" the GUI appears

(Give full path of Java command and full path of swir4l4.jar incase 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: "java –Xms4096m –jar swir4l4.jar")

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

Download GDAL Libraries: Download GDAL libraries from the <u>http://trac.osgeo.org/gdal/wiki/DownloadingGdalBinaries</u> web site

Input Selection		Select
La Dataset		Select
L3 MetaFile		Select
L4 Dataset	Input files Selection	Select
L4 MetaFile		Select
Output Selection Output File	Output file Selection	Select
Output File		Select
		Select
Output File		Select

From "*Input Selection*" panel, using respective "Select" button one can enter the required input files to the module. Each button opens a file selection dialogue for entering the locations of the input files as shown in the figure below:

	taset File	>
Look <u>i</u> n:	Delhi_Ortho	a 🗇 🗂 👷 🚝
01630032	11-R2-L4-096-051-C-29SEP2015_Aster.tif	
ol3_16301	1411_96-51-29sep2015_Aster.tif	
swirtestl4	.tif	
File <u>N</u> ame:	ol3_163011411_96-51-29sep2015_Aster.tif	
File <u>N</u> ame: Files of <u>T</u> ype:	ol3_163011411_96-51-29sep2015_Aster.tif	

select L3 M	eta File	×
Look In:	Delhi_Ortho	• A A C 885
16300321	1-R2-L4-096-051-C-29SEP2015_MET/	A.txt
16301141	1_R2-L3-96-51-29sep2015_META.txt	
		-
	1	
File <u>N</u> ame:	163011411_R2-L3-96-51-29sep201	5_META.txt
Files of <u>Type</u> :	txt	•
		Open Cancel

wsc Select L4 Da	taset File	×
Look In:	Delhi_Ortho	• 6 6 6 8 5
01630032	11-R2-L4-096-051-C-29SEP2015_Aster.ti	
OI3_16301	1411_96-51-29sep2015_Aster.tif	
swirtestl4	tif	
File <u>N</u> ame:	o163003211-R2-L4-096-051-C-29SEP20)15_Aster.tif
Files of <u>Type</u> :	tif	-
		Open Cancel

msc Select L4 Me	ta File	×
Look In:	Delhi_Ortho	• A A A B E
16300321	I-R2-L4-096-051-C-29SEP2015_META.txt	
16301141	_R2-L3-96-51-29sep2015_META.txt	
File <u>N</u> ame:	163003211-R2-L4-096-051-C-29SEP2015	5_META.txt
Files of <u>Type</u> :	txt	-
	E	Open Cancel

After selecting the L3 & L4 Datasets and respective META files, select the name of the output file to be created as shown in the figure below:

wsc Select Outp	ut L4 File		×
Look In:	SWIR4L4	• 66	
📑 build			
🗂 dist			
📑 lib			
🗂 nbproject			
Src Src			
store			
test			
File Memor			
File <u>N</u> ame:	swirtestl4		
Files of <u>Type</u> :	tif		-
		Open	Cancel

Then press "Generate L4 SWIR" button to create a synthesized L4 image from the given set of input image files. Progress of the module is displayed in a progress bar as shown in figure

Input Selectio	n	
L3 Dataset	I3_163011411_96-51-29sep2015_Aster.tif	Select
L3 MetaFile	11411_R2-L3-96-51-29sep2015_META.txt	Select
L4 Dataset	11-R2-L4-096-051-C-29SEP2015_Aster.tif	Select
L4 MetaFile	1-R2-L4-096-051-C-29SEP2015_META.txt	Select
Output Selecti	on	
Output File	E:\Delhi_Ortho\swirtestl4.tif	Select
	Generate L4 SWIR	
Progress		
	80%	
www.nrsc.go	v.in Help & Disclaimer	bhuvan.nrsc.gov.ir

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

Input Selectio	n	
L3 Dataset	I3_163011411_96-51-29sep2015_Aster.tif	Select
L3 MetaFile	11411_R2-L3-96-51-29sep2015_META.bt	Select
L4 Dataset	11-R2-L4-096-051-C-29SEP2015_Aster.tif	Select
L4 MetaFile	4 DOL 4 DOS DE1 O DODEDDD4E META H	Select
Output Selec	(i) Output L4 SWIR FileName : swirtest	
Output Selec Output File	Output L4 SWIR FileName : swirtest Creation Over	
Output Selec	Creation Over	l4.tif
Output Selec Output File	Creation Over	l4.tif

6. Error conditions and messages

 Input files belongs to different Projection: If input files L3 & L4 Datasets does not corresponds to same Projection, an error message will be shown as in the figure

Solution: Select input files that belongs to same Projection



 Forgot to enter L3 Dataset file : After selecting Input Dataset & META files, if one forgets to enter L3 Dataset file it will given an error message

rogress	0%	
Output Selecti	Property Select input L3Dataset File	Select
L4 MetaFile	L3Dataset File is null	Select
L4 Dataset	11-R2-L4-096-051-C-29SEP2015_Aster.tif	Select
L3 MetaFile	11411_R2-L3-96-51-29sep2015_META.txt	Select
L3 Dataset		Select

Solution: Select input L3 Dataset file

3. Forgot to enter L4 Dataset file : While selecting all Input Dataset & META files, if one forgets to enter L4 Dataset file it will given an error message

Solution: Select input L4 Dataset file

L3 Dataset	12 162011411 06 51 000002015 Astartit	Select
Lo Dataset	I3_163011411_96-51-29sep2015_Aster.tif	Select
L3 MetaFile	11411_R2-L3-96-51-29sep2015_META.txt	Select
L4 Dataset		Select
L4 MetaFile	L4D2 L4 006 061 0 2005 D2015 NETAN	Select
Output File	Properly Select input L4Dataset File	Select
Output File	OK	
Output File		

4. Forgot to enter L3 META file : After selecting Input Dataset & META files, if one forgets to enter L3 META file it will given an error message

Solution: Select input L3 META file

	n	
L3 Dataset	13_163011411_96-51-29sep2015_Aster.tif	Select
L3 MetaFile		Select
L4 Dataset	11-R2-L4-096-051-C-29SEP2015_Aster.tif	Select
L4 MetaFile	1 P2 L4 006 061 C 2005 P2015 META M	Select
	OK	
Progress	OK	
Progress	0%	

5. Forgot to enter L4 META file : While selecting all Input Dataset & META files, if one forgets to enter L4 META file it will given an error message

Solution: Select input L4 META file

nput Selectio		
L3 Dataset	I3_163011411_96-51-29sep2015_Aster.tf	Select
L3 MetaFile	11411_R2-L3-96-51-29sep2015_META.txt	Select
L4 Dataset	11-R2-L4-096-051-C-29SEP2015_Aster.tif	Select
L4 MetaFile	14Meta File is null X	Select
output Select Output File	Property Select input L4Meta File	Select
Output File	Properly Select input L4Meta File	Select
	Property Select input L4Meta File	Select
Output File	Properly Select input L4Meta File	Select

6. Forgot to enter output SWIR file : After selecting Input L3 & L4 Dataset and META files, if one forgets to enter output SWIR Dataset file it will given an error message

Solution: Select output Fusion Dataset file

	n	
L3 Dataset	13_163011411_96-51-29sep2015_Aster.tif	Select
L3 MetaFile	11411_R2-L3-96-51-29sep2015_META.txt	Select
L4 Dataset	11-R2-L4-096-051-C-29SEP2015_Aster.tif	Select
L4 MetaFile	1 2014 006 061 C 2000202016 META M	Select
output Selec	Properly Select output SWIR Dataset	File Select
	Properly Select output SWIR Dataset	
Output File		

7. If output SWIR file already exists : if ouput SWIR Dataset filename already exists, program will prompt whether to overwrite the existing output file?

Solution: take appropriate decission whether to overwrite output swir file or not

nput Selectio	n		
L3 Dataset	13_163011411_96-51-29sep2015_A	ster.tif Select	t
L3 MetaFile	11411_R2-L3-96-51-29sep2015_M8	ETA.txt Select	t
L4 Dataset	11-R2-L4-096-051-C-29SEP2015_A	ster.tif Select	t
L4 Metoria	The second secon	Ta tel Calact	t
Output 9	E:IDelhi_Ortho\swirtesti4.tif : File Do you want to replace it? Yes No	e Already Exists.	ı
1 1	Do you want to replace it?		t
Output	Do you want to replace it?		t

8. If selected META file does not corresponds to specific sensor the program gives an error message

Solution: select correct META file corresponding to respective sensor



or ResourceSat-2 L4 using Li

9. If selected input file is having less no of bands than required, program will give an error message

Solution: Select correct input file with specified no of band

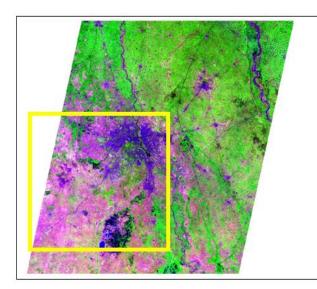


10. If selected input files extents are not matching, program will give an error message

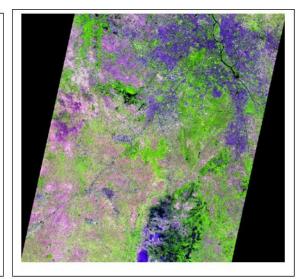
Solution: Select correct file with specified no of band



Sample NCC converted Images from FCC



Input L3 Image B543



Synthesised L4 Image B543

7. Disclaimer

- 1. This software product is provided by NRSC "as is" and conveys no license or title under any patent, copyright, or mask work right to the product. NRSC reserves the right to make changes in the software without notification. NRSC also make no representation or warranty that such application will be suitable for the specified use without further testing or modification. There are inherent risks in the use of any software, and you are solely responsible for determining whether this software product is compatible with your computer and other software installed on your computer. You are also solely responsible for the protection of your system and backup of your data, and NRSC will not be liable for any damages you may suffer in connection with using, modifying, or distributing this software.
- 2. This software utility is implemented based on block based calculation of multiple regression coefficients to synthesise SWIR band. Apart from this, many other techniques may also be available in the literature. User on his sole discretion may adopt this utility for creating SWIR band.
- 3. This software generates synthesized SWIR band, and is not a replacement of originally acquired SWIR band.