

Validation of MAMM Final Coherence Overview Product

A Coherence Overview is a single 8-bit binary image with 200 meter pixel resolution. The extent of each overview will approximate the extent of a Final Tile.

The Final Coherence Product comprises the following:

- README.TXT
- OVERVIEW.IMG
- INDEX.IMG
- INDEX.TBL
- MASTER.TXT
- PROGRAMS.DIR

The following presentation gives a brief introduction and a validation of the Final Coherence Product

README.TXT

The README.TXT is a text file containing pertinent information regarding the final coherence overview product. For Example:

General Information

- Definition of terminology

- Description of the directory structure (what is included with the final product)

General Description

- Final product description and a brief overview of processing steps

File Contents

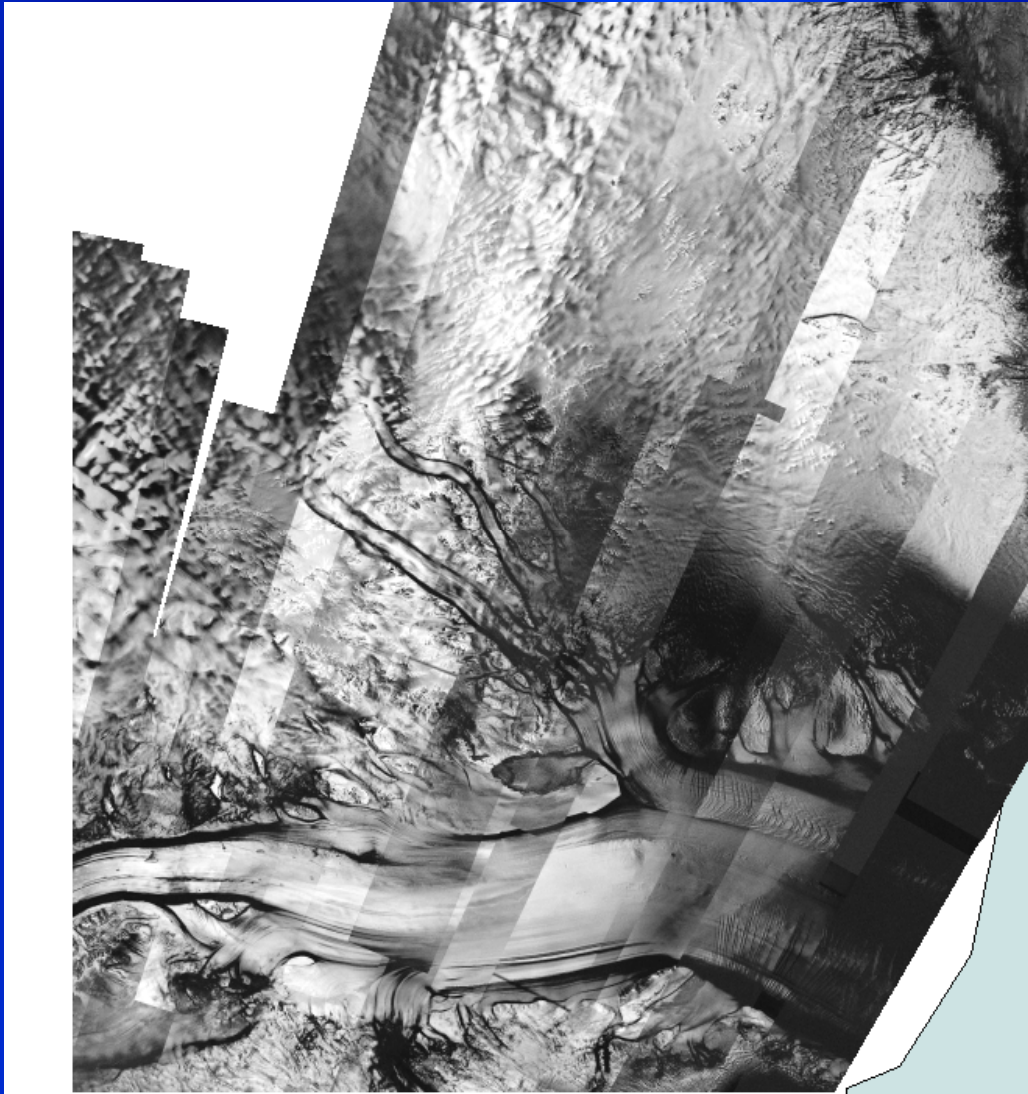
- Brief explanation describing each of the items included with the final product

Programs

- List of C-programs provided with the final coherence products and an example on how to use them.

Getting started

OVERVIEW.IMG



This is an example of a final coherence overview.

This is an 8 bit binary image with 200 meter ground resolution.

MASTER TEXT

This file contains:

- pixel resolution
- number of columns and rows
- map corner coordinates
- projection information of the power image (OVERVIEW.IMG)

PROGRAMS.DIR

The following C programs are provided for the users convenience:

GEO2MAP- Converts latitude and longitude to x, y map coordinates.

Example: GEO2MAP -67.56622 -68.11323
-2289977.407, 919950.849

MAP2GEO- Converts x, y map coordinates to latitude and longitude.

Example: GEO2MAP -2289977 919950
-67.56622 -68.11324

GET_COHERENCE- Extracts metadata information via the INDEX.TBL and INDEX.IMG for a specified location.

Example: GET_COHERENCE 2003200 1132800
Coherence 2003200 1132800: 0.815686
Reference Orbit : 25612
Secondary Orbit : 25955
Reference Date : 2000 274 59820.0000
Secondary Date : 2000 298 59819.0000
Baseline : -4.713606 35.563057 -20.464491
Bandwidth : 829.098389
Along Track Looks : 12
Range Looks : 9
Beam : FN1

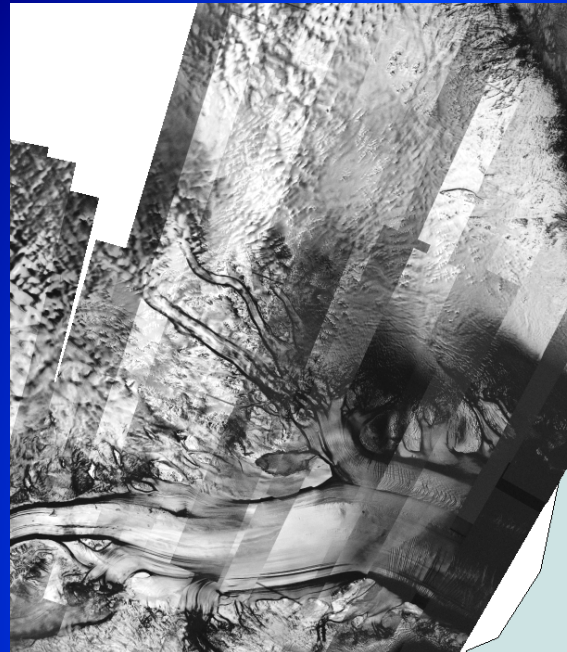
INDEX.IMG & INDEX.TBL

INDEX.IMG - A 16 bit image containing index values relating each pixel to the frame pair used to derive the coherence value. The indices are used to extract the various parameters used to calculate the coherence contained in the index table.

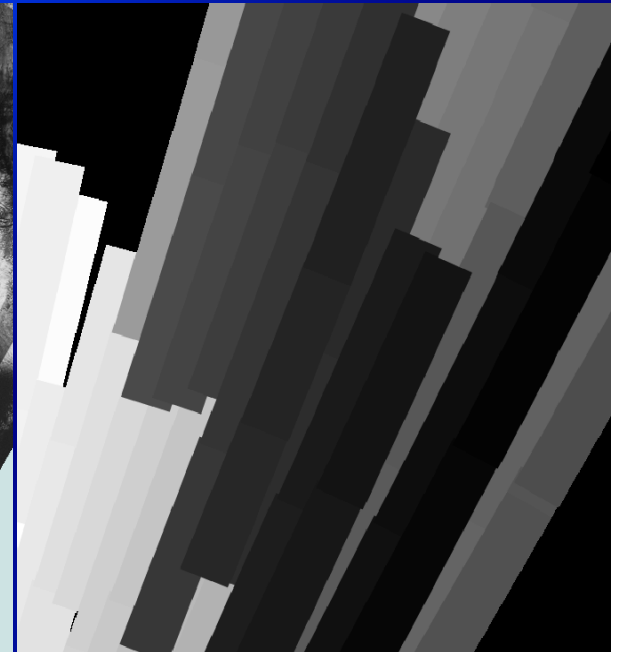
INDEX.TBL – Table containing the parameters used in the coherence calculations for each frame pair contributing to the mosaic. The parameters include:

- map coordinates (defined by user)
- coherence value at specified point
- reference orbit number
- secondary orbit number
- baseline components
- processing bandwidth
- along track looks
- range looks
- beam

Coherence Overview



INDEX.IMG

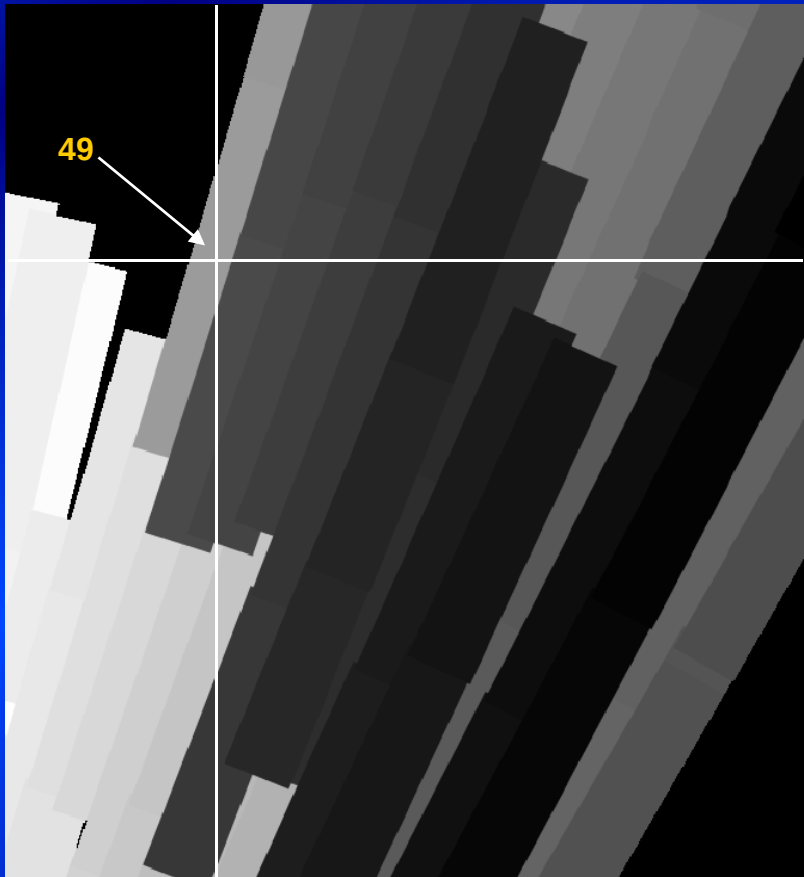


INDEX.IMG & INDEX.TBL (cont)

Example cross referencing the index value
In the INDEX.IMG (gray scale value = 49)
and the coherence parameters contained in
the INDEX.TBL

Map location: 1878500, 1012300

INDEX.IMG



INDEX.TBL

48	25655	25312	2000	277	60568.0	2000	253	60570.0	1.072587	-222.024597	243.099991	298.457764	12	9	FN1
49	25655	25998	2000	277	60535.0	2000	301	6053400	-1.184351	-111.748184	197.627533	940.383911	12	9	FN1
50	25869	25526	2000	292	58332.0	2000	268	5833400	0.255846	-182.469147	217.801361	720.498291	12	9	FN1

Index: ref orb: sec orb: ref orb acquisition: sec orb acquisition: baseline: bandwidth: looks: beam

Product Validation

Example:

GET_COHERENCE 1878500, 1012300

Coherence 1878500.000000 1012300.000000: **0.262745**

Reference Orbit : 25655

Secondary Orbit : 25998

Reference Date : 2000 277 60535.000000

Secondary Date : 2000 301 60534.000000

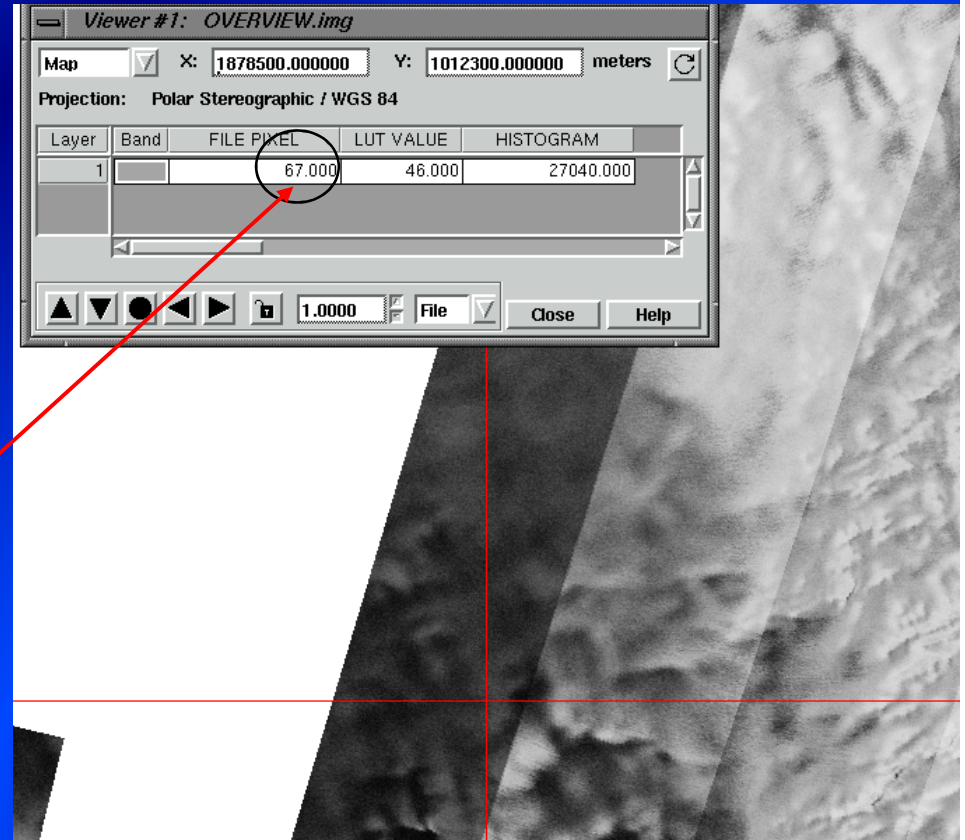
Baseline : -1.184351 -111.748184 197.627533

Bandwidth : 940.383911

Along Track Looks : 12

Range Looks : 9

Beam : FN1



Coherence: Validation of the coherence value is simply the DN value obtained from the OVERVIEW.IMG for a specified point divided by 255

ie: $67/255 = \mathbf{0.262745}$

Product Validation (cont)

Example (cont):

GET_COHERENCE 1878500, 1012300

Coherence 1878500.000000 1012300.000000:
0.262745

Reference Orbit : **25655**

Secondary Orbit : **25998**

Reference Date : 2000 277 60535.000000

Secondary Date : 2000 301 60534.000000

Baseline : -1.184351 -111.748184 197.627533

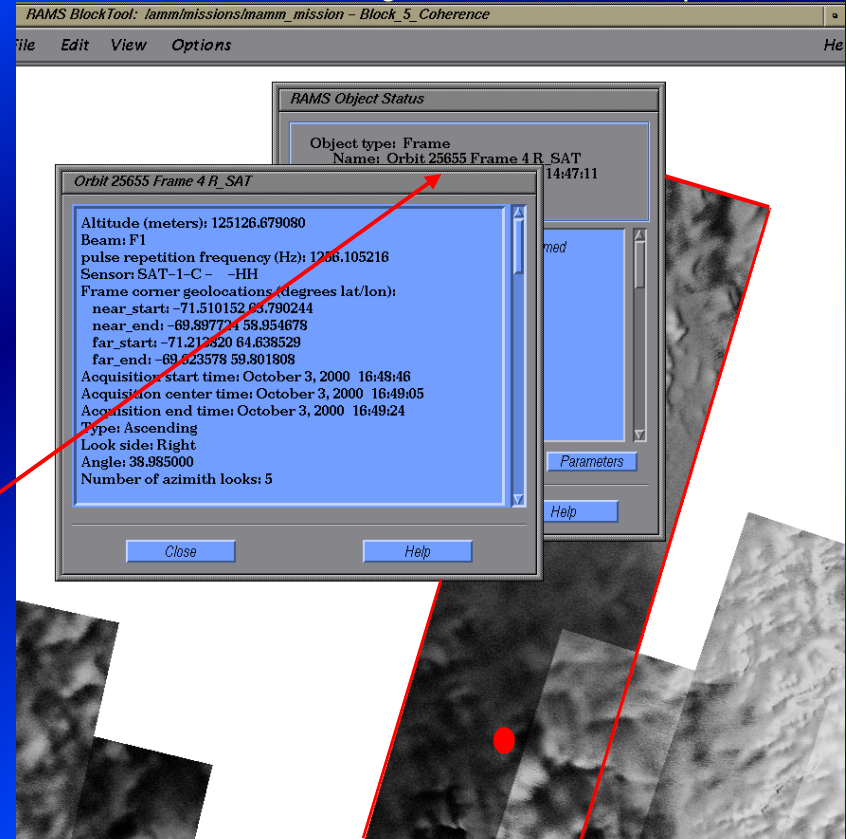
Bandwidth : 940.383911

Along Track Looks : 12

Range Looks : 9

Beam : FN1

RAMS Block Tool showing reference orbit and parameter file



Reference Orbit (25655): The reference orbit is validated using the RAMS BlockTool by viewing all frames used to construct that block and selecting a specified point (red dot). The topmost orbit for that point is the reference orbit.

Secondary Orbit (25998) : The secondary orbit is chosen based on the highest average coherence between a cycle 2-1 pair and a cycle 2-3 pair.

A status bit (RDM_IFR_SEC_COHERENCE THE 0X40000 bit) is set for the pair with the highest coherence and is found in the MAMM database.

Product Validation (cont)

Example (cont):

GET_COHERENCE 1878500, 1012300

Coherence 1878500.000000 1012300.000000:
0.262745

Reference Orbit : 25655

Secondary Orbit : 25998

Reference Date : **2000 277 60535.000000**

Secondary Date : **2000 301 60534.000000**

Baseline : -1.184351 -111.748184 197.627533

Bandwidth : 940.383911

Along Track Looks : 12

Range Looks : 9

Beam : **FN1**

Reference and Secondary Dates: The acquisition date and time for the start, center, and end of the acquisition are available in the Vexcel SAR parameter files found in the MAMM database.

Beam: The beam mode is available in the Vexcel SAR parameter files.

le: reference frame: Vexcel SAR Params
beam **"F1 "**
pulse_rep_rate 1256.105216
sensor_name "SAT-1-C - -HH"
time_start **2000 277 60526.539000**
time_center **2000 277 60545.398000**
time_end **2000 277 60564.257000**

Product Validation (cont)

Example (cont):

GET_COHERENCE 1878500, 1012300

Coherence 1878500.000000 1012300.000000:
0.262745

Reference Orbit : 25655

Secondary Orbit : 25998

Reference Date : 2000 277 60535.000000

Secondary Date : 2000 301 60534.000000

Baseline : **-1.184351 -111.748184 197.627533**

Bandwidth : 940.383911

Along Track Looks : 12

Range Looks : 9

Beam : FN1

Baseline: The baseline information is stored in the Interferogram's parameter file found in the MAMM database:

```
BaseLine {  
  baseline_constant_term: -1.184351 -111.748184 197.627533  
  baseline_linear_term: 0.000149 -0.000254 0.000397
```

Product Validation (cont)

Example (cont):

GET_COHERENCE 1878500, 1012300

Coherence 1878500.000000 1012300.000000:
0.262745

Reference Orbit : 25655

Secondary Orbit : 25998

Reference Date : 2000 277 60535.000000

Secondary Date : 2000 301 60534.000000

Baseline : -1.184351 -111.748184 197.627533

Bandwidth : **940.383911**

Along Track Looks : 12

Range Looks : 9

Beam : FN1

Bandwidth : The common bandwidth is given in the resampled SLC parameter file found in the database.

ResampledSLC {

reference_along_track_bandwidth: **940.383911**

secondary_along_track_bandwidth: **940.383911**

Product Validation (cont)

Example (cont):

GET_COHERENCE 1878500, 1012300

Coherence 1878500.000000 1012300.000000:
0.262745

Reference Orbit : 25655

Secondary Orbit : 25998

Reference Date : 2000 277 60535.000000

Secondary Date : 2000 301 60534.000000

Baseline : -1.184351 -111.748184 197.627533

Bandwidth : 940.383911

Along Track Looks : **12**

Range Looks : **9**

Beam : FN1

Along Track and Range Looks : The look information for the coherence frames are stored in the Coherence Image's parameter file found in the MAMM database:

coherence_map {

nr_lines: 1316

nr_pixels: 224

at_extra_looks: **12**

range_extra_looks: **9**