A Final Tile Product is a series of uniform 16-bit binary sub-tiles with 25 meter pixel resolution.

The Final Tile Product comprises the following:

- **README.TXT**: Comprehensive description of data and procedure
- **ANGLES.DIR**: Incidence Angle Masks
- **DEMS.DIR**: DEMs and DEM Index Values
- **DEMINDEX.DIR**: DEM Index Table and Support Files
- **IMAGES.DIR**: SAR Imagery (subtiles)
- **IMGINDEX.DIR**: SAR Image Index Table and Support Files
- **INDICES.DIR**: SAR Image Indices
- **PROGRAMS.DIR**: Utility Programs
- **MASTER.TXT**: List of all Subtiles in corresponding Tile, resolutions, and projection information

This presentation will give a review of Tiles and Subtiles followed by a brief introduction and validation of the MAMM Final Tile Product.
Final Tile Distribution

Red check marks the final tile of interest
Each Tile is divided into X number of uniform subtiles. The Subtiles are 16-bit binary with 25-meter pixel resolution. Subtiles are 2048x2048 pixels (51.2km X 51.2km)
MAMM Final Tile # SR_41-42: Amery Ice Shelf/Lambert Glacier Area
The Final Tile Product comprises the following:

• README.TXT  Comprehensive description of data and procedure
• ANGLES.DIR  Incidence Angle Masks
• DEMS.DIR    DEMs and DEM Index Values
• DEMINDEX.DIR DEM Index Table and Support Files
• IMAGES.DIR  SAR Imagery (subtiles)
• IMGINDEX.DIR SAR Image Index Table and Support Files
• INDICES.DIR  SAR Image Indices
• PROGRAMS.DIR Utility Programs
• MASTER.TXT  List of all Subtiles in corresponding Tile, resolutions, and projection information
The README.TXT is a text file containing pertinent information regarding the final tile product.

General Information
- Definition of terminology
- Explanation of Block and Tile Processing Steps
- Naming Conventions

File Contents and their Use
- Brief explanation describing each of the items included with the final product
- List of C-programs provided with the final coherence products and an example on how to use them.

Getting started
ANGLES.DIR
• These are shadow/layover/incidence angle sub-tiles
• 100 meter resolution
• 8-bit unsigned integer binary raster images
• Dimension 512x512 pixels

Encoded gray-scale:
   0 : Shadow Region
   1-253 : Incidence Angle = 90 – DN
   254 : Layover Region
   255 : No-Data

Observations:
- Ramp of DN values from near to far range within a frame
- Slight jump in DN values across frame boundaries
- Incidence angles range from 37 to 39 degrees
ANGLES.DIR Validation

Validation was done by subtracting the DN values obtained from the raster images in the ANGLES.DIR directory (gray scale 0-255) from 90 and comparing it with the published incidence angles for Fine Beam data (FN1)

\[
90 - \text{DN} = \begin{cases} 
90 - 51 = 39 \\
90 - 52 = 38 \\
90 - 53 = 37 
\end{cases}
\]

Published incidence angles for FN1 data range between 37-40 degrees

source: RADARSAT ILLUMINATED, Your Guide to Products and Services
DEM.DIR

- This directory contains subtiles of the Digital Elevation Model
- 200 meter resolution
- 16-bit binary raster files
- Dimension 256x256
- Polar Stereographic projection with standard latitude of -71 degrees
- No data areas = -9999

DEM Subtile (E043T016)  Corresponding Image Subtile
DEM.DIR Validation

Validation was done by subsetting the original DEM using the corner point information available in the MASTER.TXT for the subtile shown on the previous slide.

The subsetted original DEM was then subtracted from the RAMS generated DEM Subtile.

The result was all ZEROs. Thus validating that the RAMS generated DEM subtiles was an exact match of the original DEM.
IMAGES.DIR

- This directory contains subtiles of the SAR imagery
- Tiles can contain up to 98 subtiles
- 25 meter resolution
- 16-bit binary raster files
- Dimension 2048x2048
- No data areas = -9999
IMAGES.DIR Validation

Our first validation was applied to the orthorectified images (individual frames that went into the creation of the Final Tile Product) and comprised the following three criteria.

1) Validate locations of GCPs used in block adjustment with the orthorectified images.
2) Check the accuracy of the AMM-1 derived coastline with the coastline of the MAMM orthorectified imagery.
3) Compare like features (stable features like rock outcrop) between the AMM-1 Final Tiles and the MAMM orthorectified imagery.
INDICES.DIR

- This directory contains the index sub-tiles
- 100 meter resolution
- 8-bit unsigned integer binary raster images
- Dimension 512x512
- Encoded gray scale:
  - DN # corresponds to an index number found in the IMGINDEX.DIR/INDEX.TBL file
  - Each Index # corresponds to the Block, Orbit, and Frame that went into creating that portion of the subtile.

Excerpt from INDEX.TBL

<table>
<thead>
<tr>
<th>DN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>&quot;Block 1 Orbit 25912 Frame 3 R_SAT&quot;</td>
</tr>
<tr>
<td>24</td>
<td>&quot;Block 1 Orbit 25726 Frame 4 R_SAT&quot;</td>
</tr>
<tr>
<td>25</td>
<td>&quot;Block 1 Orbit 25826 Frame 12 R_SAT&quot;</td>
</tr>
<tr>
<td>26</td>
<td>&quot;Block 1 Orbit 25583 Frame 7 R_SAT&quot;</td>
</tr>
</tbody>
</table>

E043T016
Validation was done by using the information gleaned from the INDEX.TBL and the information contained in the MAMM database.

INDEX.TBL

<table>
<thead>
<tr>
<th>Index</th>
<th>Frame Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>&quot;Block 1 Orbit 25726 Frame 4 R_SAT&quot;</td>
</tr>
<tr>
<td>25</td>
<td>&quot;Block 1 Orbit 25826 Frame 12 R_SAT&quot;</td>
</tr>
<tr>
<td>26</td>
<td>&quot;Block 1 Orbit 25583 Frame 7 R_SAT&quot;</td>
</tr>
</tbody>
</table>

E043T016
The following C-programs are supplied with the Final Tile Product

**GEO2MAP** – Converts latitude and longitude to x, y map coordinates
   GEO2MAP -68.891640 70.022382
   2179199.975, 792200.007

**MAP2GEO** – Converts x, y map coordinates to latitude and longitude
   MAP2GEO 2179200 792200
   -68.891640, 70.022382

**TILE2MAP** – Converts RAMS tile name, column (line), and row (sample) to map x, y coordinates.
   TILE2MAP E043T016 –l 200 –s 200
   map (x, y) = (2155375.0, 814225.0)

**MAP2TILE** – Converts map x, y coordinates to RAMS tile name, column (line), and row (sample).
   MAP2TILE 2155375 814225
   E043T016 LINE: 200, SAMPLE: 200
**MERGEMAP** – Generates a composite image for all subtiles within an area specified by a center point and size (meters).

```
MERGEMAP -l -68.891, 70.022 -size 60000 60000 -path ../ -fout FILE.OUT -hdr
```

Validation was done by picking a latitude/longitude in the middle of a known subtile (X) (E043T016) and generating a composite image with all the subtiles in a 60km radius of that point (which should be all the surrounding subtiles).
GETSIGMA0 – Generates the ‘original’ pixel value in dB at image location x, y in map coordinates.

Validation was done by comparing Sigma0 values derived from the MAMM Final Tile Product (Fine Beam) with Sigma0 values derived from the AMM-1 Final Tile Product (Standard Beam) for a very dark area (A) and a very bright area (B).

See histograms on next slide
NOTE ON AMM-1 GETSIGMA0

AMM-1 Tiles with Incorrect Get Sigma routine
(DAACs alerted)
- til_40: "SS_19-21"
- til_56: "SR_19-20"
- til_64: "SR_41-42"
- til_8: "SU_01-05"
- til_83: "SQ_49-50"