



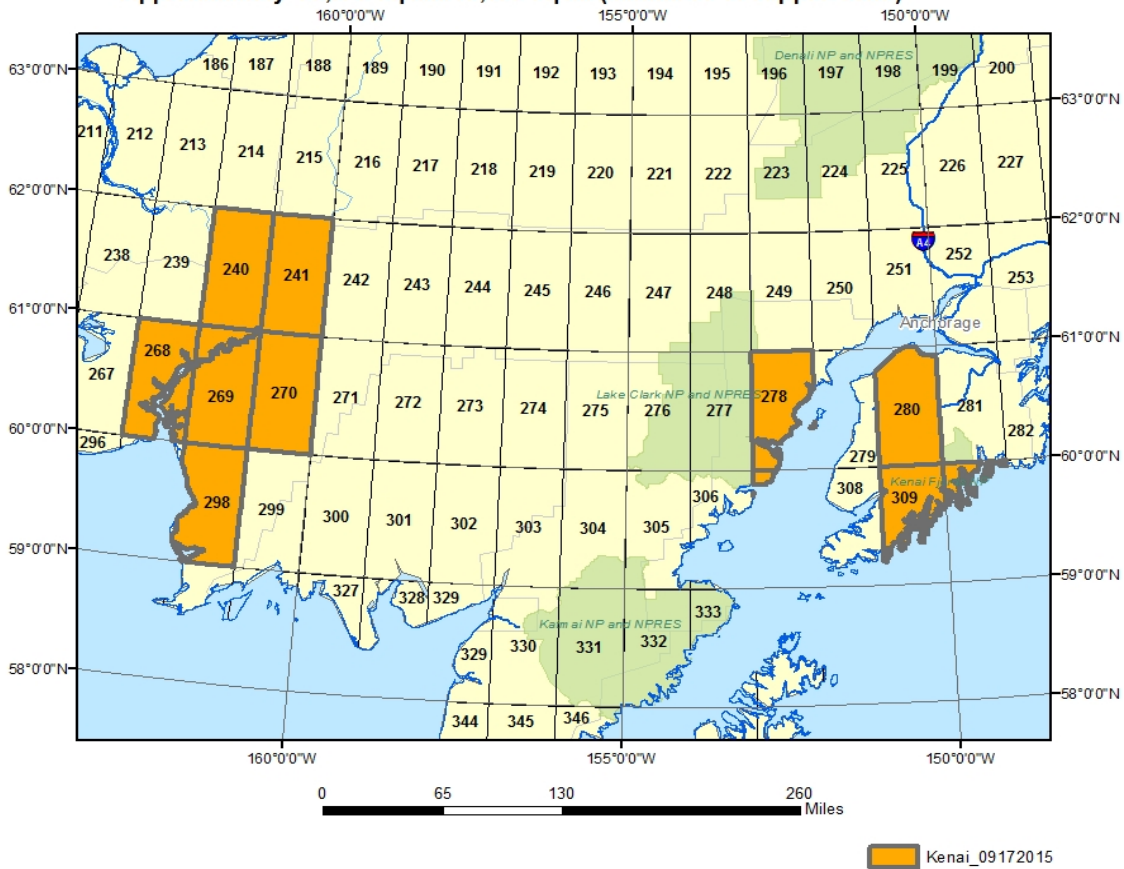
# IFSAR Quality Assessment Report

## Alaska Mid-Accuracy DEM Kenai

NGTOC  
2016-08-15  
Sheila Ruhl



**AK IFSAR Kenai AOI for FY2015**  
Approximately 50,323 sq km/19,430 sq mi (landmass of clipped cells)



# Project Information

Project:

Contractor:

Project Type: GPSC

## Project Points of Contact:

Name:	Type:	Phone:	Email:
Pat Emmett	CPT	573-308-3587	pemmett@usgs.gov

### REPORT QUALIFICATION SUMMARY:

#### Task Order Overall:

meets requirements

#### Metadata:

1 of 1 Reviews Accepted

0 Reviews Not Accepted

#### Vertical Accuracy:

1 of 1 Reviews Accepted

0 Reviews Not Accepted

#### Vertical Offset:

1 of 1 Reviews Accepted

0 Reviews Not Accepted

#### Void Fill:

3 of 3 Reviews Accepted

0 Reviews Not Accepted

#### Breakline:

1 of 1 Reviews Accepted

0 Reviews Not Accepted

#### DEM(s):

1 of 1 Reviews Accepted

0 Reviews Not Accepted

#### DSM(s):

1 of 1 Reviews Accepted

0 Reviews Not Accepted

#### ORI(s):

1 of 1 Reviews Accepted

0 Reviews Not Accepted

#### NED Review:

1 of 1 DEM tile reviews recommended for NED  
1/3rd

0 of 1 DEM tile reviews recommended for NED  
1/9th

Project Subdivision: Cells

#### List Cells:

- 278, 280, 307

#### Dates Collected Range:

Collection Start:

Collection End:

#### Sensor Type:

#### Project Aliases:

#### Licensing:

## Project Description:

This project is for the IfSAR acquisition and processing of several one-degree cells in Alaska. This project is for the IfSAR acquisition, processing, and delivery of a mid-accuracy DEM with 20-foot contour accurate bare earth data for the AOI's depicted in Attachment A, comprising approximately a total of 50,323 square km (19,430 sq mi) of *landmass*. Additionally, the USGS would like Dewberry to include in their technical and cost proposal, the ellipsoid processing (to provide ellipsoid heights) of the

data processed in this task. For all areas, the contractor shall collect and provide a mid-accuracy Digital Elevation Model with a 20' contour accuracy and an Orthorectified RADAR Image (ORI) or similar product at a pixel resolution of 5.0m or better. Reflective Digital Surface Model (DSM) and a bald-earth Digital Terrain Model (DTM) DEM data with regular 5-meter post spacing shall also be provided for all areas. Additionally, HRTe3 data format for the entire area will be provided. FGDC-compliant metadata shall be provided for each data file and an ISO 9001 data-quality certification report shall be provided for each 15-minute tile.

Applicable Specification:

AK Mid Accuracy

## Review Information

Reviewer:

Date

Delivered:

3rd Party QA   
Performed:

Date

Assigned:

Action To Contractor Date:	Issue Description:	Return Date:
----------------------------	--------------------	--------------

	<p style="text-align: center;"><b><u>Metadata Note:</u></b></p> <p><b>DSM and DTM .xml</b> &lt;geoform&gt; should be raster image</p> <p><b>ORI .xmls are missing the vertical datum section.</b></p> <p>&lt;vertdef&gt; &lt;altsys&gt; &lt;altdatum&gt;North American Vertical Datum of 1988, Geoid 2009&lt;/altdatum&gt; &lt;altres&gt;1.0&lt;/altres&gt; &lt;altunits&gt;Meters&lt;/altunits&gt; &lt;altenc&gt;Explicit elevation coordinate included with horizontal coordinates&lt;/altenc&gt;&lt;/altsys&gt;&lt;/vertdef&gt;</p> <p><b>The task order says: on page 4 of 8:</b></p> <p>3. <b><u>Data format:</u></b></p> <p>a. <b>All Data:</b> The nominal area of coverage per data set shall be 15-minute tiles. Datasets shall include not less than 350 meters over-edge data in X and Y. <b>The horizontal datum shall be NAD 83 and the vertical datum shall be NAVD 88.</b> The project area shall be in the Alaska Albers. All units</p>	
--	---	--

shall be meters.

**On page 24 of 25 of AK FEDI Kenai Lot 2 cells 278-307 IFSAR QC report says:**

SPATIAL REFERENCE FRAMEWORK  
4. Vertical Datum  
NAVD 88, processed with Geoid09

\*\*\*The ORI should not be included in "All Data" if the Vertical Datum does not apply\*\*

**Review Complete:**

8/15/2016

**Dates Project Worked:**

Start: 8/10/2016  
End: 8/15/2016

### Project Materials Received

#### METADATA

<i>Deliverables</i>	<i>Delivered</i>	<i>XML Metadata</i>	<i>Required</i>	<i>Format</i>	<i>Quantity</i>	<i>Additional Details</i>
Collection Report:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<u>PDF</u>	2	data is on 2 HDD's
Survey Report:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<u>PDF</u>	2	
Processing Report:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<u>PDF</u>	2	
QA/QC Report:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<u>PDF</u>	2	
Project Level XML Metadata:	<input type="checkbox"/>		<input type="checkbox"/>	XML		
Project Extent:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>.shp</u>	2	
Tile Scheme:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>.shp</u>	2	
Checkpoints:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>.shp</u>	2	

Void Mask:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>.shp</u>	33	
Slope Mask:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>.shp</u>	33	
Fill Source Mask:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>.shp</u>	33	

Additional Comments: data is on 2 hard drives

**NED**

Deliverables	Delivered	XML Metadata	Required	Format	Quantity	Additional Details
DEM Tiles:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	TIF	33	
Breaklines:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>.shp</u>	33	

Additional Comments:

**OTHER**

Deliverables	Delivered	XML Metadata	Required	Format	Quantity	Additional Details
DSM(s):	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	TIF	33	
ORI(s):	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	TIF	33	
Flightline (SBETs):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>.shp</u>		

Additional Comments: xml metadata not required for breakline, checkpoint or void fill .shp files

**Geographic Information**

Area Extent:  Sq. Miles

Tile Size:  Degrees

DEM/DTM Grid Spacing:  Meters

Coordinate Reference System:

NAD83, GRS80

Projection:

Alaska Albers

Horizontal

NAD83

Datum:

CORS96

Meters

U.S. Feet

Int'l Feet

Vertical

NAVD88

Datum:

GEOID 09

Meters

U.S. Feet

Int'l Feet

**THIS PROJECTION COORDINATE REFERENCE SYSTEM IS CONSISTENT ACROSS THE FOLLOWING DELIVERABLES:**

Project Extent

Project Tile Scheme

Checkpoints

Void Mask

Slope Mask

Fill Source Mask

Breakline(s)

DEM(s)

DEM XML Metadata

DSM(s)

DSM XML Metadata

ORI(s)

ORI XML Metadata

Additional  
Comments:

# Project Review

kenai Peninsula Lot 2 - cells 278, 280 and 307

## Metadata Review

Provided metadata files have been parsed using 'mp' metadata parser. Any errors generated by the parser are documented below for reference and/or corrective action.

**The DEM XML Metadata parsed without errors.**

Check if 'Best Use' metadata for NED:  Project Level  Tile Level

**The DSM XML Metadata parsed without errors.**

Check if 'Best Use' metadata for NED:  Project Level  Tile Level

**The ORI XML Metadata parsed without errors.**

Check if 'Best Use' metadata for NED:  Project Level  Tile Level

**Based on this review, the USGS accepts the xml metadata provided.**

Additional

Comments:

End of Metadata Review

## Vertical Accuracy Review

### Required Vertical Accuracy

 Yes  No

#### REQUIRED PRIMARY VERTICAL ACCURACY

Primary Vertical Accuracy Type: Slope 0-10 degree

Confidence Interval Required:  th % CI

Required Unit:

Required # of checkpoints:

Required RMSEz:

Required Vertical Accuracy (RMSEz \* .% CI)

Additional Required  
Vertical Accuracy  
Information:

Required # of checkpoints: 2 checkpoints required per 1 degree cell

### Reported Vertical Accuracy

 Yes  No

#### REPORTED PRIMARY VERTICAL ACCURACY

Primary Vertical Accuracy Type: Slope 0-10 degree

Confidence Interval Reported:  th % CI

Reported Unit:

Reported # of checkpoints:

Reported RMSEz:

Reported Vertical Accuracy (RMSEz \* .% CI)

Additional Reported  
Vertical Accuracy  
Information:

An independent survey was conducted by JOA Surveys, LLC. JOA Surveys acquired three **(3) total checkpoints** within Kenai Lot 2 **Cell 280**. Due to the limited number of checkpoints within a single cell, this cell was combined with the Kenai Lot 2 cells 278 and 307. A total of **(3) points** were used in cells **278 and 307**.

Dewberry buffered all potential checkpoints by the radial RMSE value of 8.035 meters. Only checkpoints whose entire buffered area were completely within the slope category of 0°-10° were used to calculate the vertical accuracy. **All six (6) checkpoints were located on terrain with a slope of 0°-10°** and were used to calculate vertical accuracy statistics for the Kenai Lot 2 Cell 280. No checkpoints

were located on terrain outside of the slope category of 0°-10.

## Reviewed Vertical Accuracy

Yes  No

### REVIEWED PRIMARY VERTICAL ACCURACY

*Primary Vertical Accuracy Type:* Slope 0-10 degree

*Confidence Interval Reviewed:*  th % CI

*Reviewed Unit:*

*Reviewed # of checkpoints:*

*Reviewed RMSEz:*

*Reviewed Vertical Accuracy (RMSEz \* .% CI)*

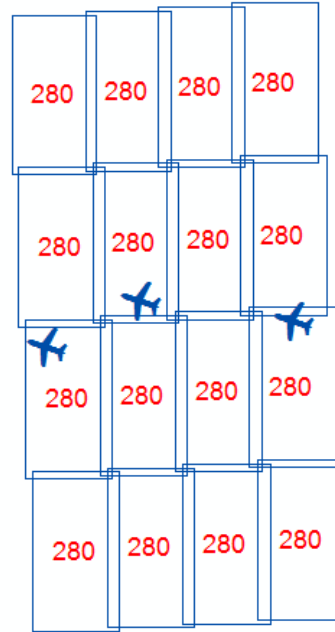
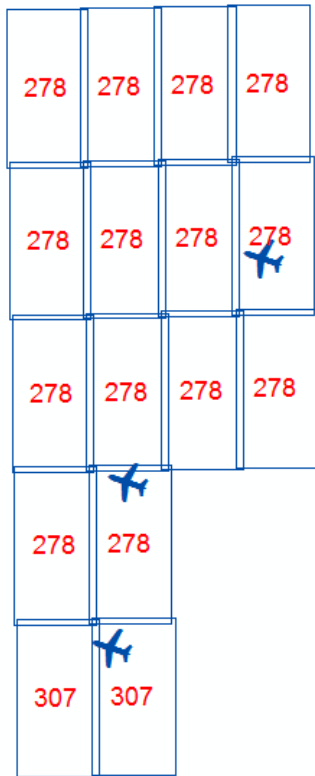
*Checkpoints are well distributed?*

*Enough checkpoints for task order?*

*Enough checkpoints for NED?*

Checkpoint Distribution Image





Vertical Accuracy Results:

Additional Reviewed  
Vertical Accuracy  
Information:

Based on this review, the USGS accepts the vertical accuracy.

End of Vertical Accuracy Review

Vertical Offset Review

cells 278 and 307

Review Required:  Yes  No

Absolute maximum allowed:  Absolute actual Maximum:

Absolute reported maximum:  Unit:

**Based on this review, the USGS accepts the amount of vertical offset.**

Additional comments:

there was 0 offset between cells 278 and 307. There were no other cell joins to assess.

End of cells 278 and 307 Vertical Offset Review

## Void Fill Review

cell 278

Review Required:  Yes  No

### VOID FILL CHARACTERISTICS

Maximum void allowed: (prior to fill)	3 <input type="text"/> %	Maximum void allowed: (after fill)	<input type="text" value="not applicable"/>
Maximum void allowed per tile: (prior to fill)	5 <input type="text"/> %	Maximum void allowed per tile: (after fill)	<input type="text" value="not applicable"/>
Maximum void reported: (prior to fill)	<input type="text" value="not reported"/>	Maximum void reported: (after fill)	<input type="text" value="not reported"/>
Maximum void reported per tile: (prior to fill)	<input type="text" value="not reported"/>	Maximum void reported per tile: (after fill)	<input type="text" value="not reported"/>
Maximum void reviewed: (prior to fill)	0.594586466 <input type="text"/> %	Maximum void reviewed: (after fill)	0 <input type="text"/> %
Maximum void reviewed per tile: (prior to fill)	1.412705371 <input type="text"/> %	Maximum void reviewed per tile: (after fill)	0 <input type="text"/> %

Void Fill Source:

**Based on this review, the USGS accepts the void fill(s).**

Additional comments:

End of cell 278 Void Fill Review

## Void Fill Review

cell 280

Review Required:  Yes  No

### VOID FILL CHARACTERISTICS

Maximum void allowed: (prior to fill)	3 %	Maximum void allowed: (after fill)	not applicable
Maximum void allowed per tile: (prior to fill)	5 %	Maximum void allowed per tile: (after fill)	not applicable
Maximum void reported: (prior to fill)	not reported	Maximum void reported: (after fill)	not reported
Maximum void reported per tile: (prior to fill)	not reported	Maximum void reported per tile: (after fill)	not reported
Maximum void reviewed: (prior to fill)	0.041976490 %	Maximum void reviewed: (after fill)	0 %
Maximum void reviewed per tile: (prior to fill)	0.446794427 %	Maximum void reviewed per tile: (after fill)	0 %

Void Fill Source:

Proprietary

Based on this review, the USGS accepts the void fill(s).

Additional comments:

End of cell 280 Void Fill Review

## Void Fill Review

cell 307

Review Required:  Yes  No

### VOID FILL CHARACTERISTICS

Maximum void allowed: (prior to fill)	3 %	Maximum void allowed: (after fill)	not applicable
Maximum void allowed per tile: (prior to fill)	5 %	Maximum void allowed per tile: (after fill)	not applicable

Maximum void reported: (prior to fill)	not reported	Maximum void reported: (after fill)	not reported
Maximum void reported per tile: (prior to fill)	not reported	Maximum void reported per tile: (after fill)	not reported
Maximum void reviewed: (prior to fill)	0.095136869 %	Maximum void reviewed: (after fill)	0 %
Maximum void reviewed per tile: (prior to fill)	0.279873633 %	Maximum void reviewed per tile: (after fill)	0 %

Void Fill Source:

Proprietary

**Based on this review, the USGS accepts the void fill(s).**

Additional comments:

End of cell 307 Void Fill Review

## Breakline Review

cells 278, 280 and 307

Review Required:  Yes  No

### BREAKLINE FILE CHARACTERISTICS:

- Separate folder for breakline files.
- Breaklines contain elevation values.

Elevation values stored in Select...

Units: Meters

- Waterbody Breaklines.

Polyline  Polygon

- Single elevation value per waterbody feature.

- Required.

Waterbody Elevations were created via Unknown waterbody level techniques.

- Double Line Stream Breaklines (Streams Approximately > 50 ft).

Polyline  Polygon

Downstream DLS Flow is Monotonic

- Required.

- Single Line Breaklines.

- No missing or misplaced breaklines.

**Based on this review, the USGS accepts the breakline files.**

## ADDITIONAL COMMENTS, ERRORS, ANOMALIES, OR OTHER ISSUES:

it is not clear where elevations are stored

End of cells 278, 280 and 307 Breakline Review

## DEM Review

cells 278, 280 and 307

### BARE-EARTH DEM TILE CHARACTERISTICS:

Separate folder for bare-earth DEM files

Raster File Type: TIF

Raster Cell Size: 5 Meters

Tile bit depth/pixel Type: 32\_BIT\_FLOAT

Interpolation or Resampling Technique: Unknown

DEM tiles overlap:  Yes  No

DEM tiles conform to Project Tiling Scheme

Quantity of DEM files conforms to Project Tiling Scheme

DEM tiles are uniform in size

DEM tiles properly edge match and free of edge artifacts

Tiles are free from Spikes and Pits

Tiles are free from Data Holidays

Tiles do not exhibit systematic sensor error or corrowing

DEM tiles are properly Hydro Flattened  Yes  No

Waterbodies 2 Acers or greater are flattened

Streams 50 ft or greater are flattened in a downstream manner

Tidal Boundaries/Shorelines are flattened

No missing islands

Perennial ice/snow treated as terrain

Annual ice/snow not treated as terrain

Bridges/Overpasses are properly removed

Culverts are maintained (Not Hydro Enforced)

Depressions, Sinks, are not filled in (Not Hydro Conditioned)

Vegetation properly removed

Manmade structures properly removed

Tiles meet NED 1/3rd Requirements:  Yes.  No.

Tiles meet NED 1/9th Requirements:  Yes.  No.

**Based on this review, the USGS accepts the DEM tiles.**

End of cells 278, 280 and 307 DEM Review

## DSM Review

cells 278, 280 and 307

Review Required:  Yes  No

### DSM TILE CHARACTERISTICS:

 Separate folder for bare-earth DEM filesRaster File Type: TIFRaster Cell Size: 5 MetersTile bit depth/pixel type: 32\_BIT\_FLOATInterpolation or Resampling Technique: UnknownDSM tiles overlap:  Yes  No DSM tiles conform to Project Tiling Scheme Quantity of DSM files conforms to Project Tiling Scheme DSM tiles are uniform in size DSM tiles properly edge match and free of edge artifacts Tiles are free from Spikes and Pits Tiles are free from Data Holidays Tiles do not exhibit systematic sensor error or corrowingDSM tiles are properly Hydro Flattened  Yes  No Waterbodies 2 Acers or greater are flattened Streams 50 ft or greater are flattened in a downstream manner Tidal Boundaries/Shorelines are flattened No missing islands Perennial ice/snow treated as terrain Annual ice/snow not treated as terrain Culverts are maintained (Not Hydro Enforced) Depressions, Sinks, are not filled in (Not Hydro Conditioned)**Based on this review, the USGS accepts the DSM tiles.**End of cells 278, 280 and 307 DSM Review

## ORI Review

cells 278, 280 and 307

Review Required:  Yes  No

### ORI TILE CHARACTERISTICS:

 Separate folder for ORI filesRaster File Type: TIFRaster Cell Size: 2.5 Meters

Tile bit depth/pixel type:

Interpolation or Resampling Technique: Unknown

ORI tiles overlap:  Yes  No

- ORI tiles conform to Project Tiling Scheme
- Quantity of ORI files conforms to Project Tiling Scheme
- ORI tiles are uniform in size
  
- ORI tiles properly edge match and free of edge artifacts
- Tiles are free from Data Holidays
- Tiles do not exhibit systematic sensor error or cornrowing
  
- ORI tiles validate hydroflattening/breakline placement and quantity

**Based on this review, the USGS accepts the ORI tiles.**

End of cells 278, 280 and 307 ORI Review

Based on this review, the provided delivery meets the Task Order requirements.

### NED Information

Final to NED mosaic created:  Yes  No

Metadata Created:  Yes  No

Additional Comments:

END OF REPORT