

*Please provide the following information, and submit to the NOAA DM Plan Repository.*

### **Reference to Master DM Plan (if applicable)**

*As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.*

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

## **1. General Description of Data to be Managed**

### **1.1. Name of the Data, data collection Project, or data-producing Program:**

Coastal California Digital Imagery

### **1.2. Summary description of the data:**

This digital ortho-imagery dataset is a survey of coastal California. The project area consists of approximately 3774 square miles. The project design of the digital ortho-imagery data acquisition was developed to achieve a 30 cm pixel resolution. Fugro EarthData, Inc. acquired 289 flight lines in 36 lifts from August 26, 2010 through November 29, 2010. Digital ortho-imagery data collection was performed with Conquest and King Air aircrafts, utilizing a Leica ADS40-SH52 sensor. During the time of image acquisition at least two dual frequency GPS receivers are utilized. One receiver, acting as the remote, was operated on board the aircraft with the antenna located over the camera. For differential GPS processing, a second receiver was used on land as the base station. These receivers were in constant operation during the imagery collection and GPS phase data was collected at an epoch rate of at least 1 second. After processing the differential GPS solution by using the remote and master station a final estimated trajectory is generated. The smoothed best estimate trajectory, or sbet, is then in combination with ground surveyed points to strengthen the geospatial accuracy of the imagery. The digital ortho-imagery was cut to tiles measuring 1500 meters by 1500 meters.

Original contact information:

Contact Org: NOAA Office for Coastal Management

Phone: 843-740-1202

Email: coastal.info@noaa.gov

### **1.3. Is this a one-time data collection, or an ongoing series of measurements?**

One-time data collection

### **1.4. Actual or planned temporal coverage of the data:**

2011-09-12

**1.5. Actual or planned geographic coverage of the data:**

W: -124.455747, E: -117.005324, N: 42.042545, S: 32.489401

**1.6. Type(s) of data:**

(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)  
Map (digital)

**1.7. Data collection method(s):**

(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

**1.8. If data are from a NOAA Observing System of Record, indicate name of system:****1.8.1. If data are from another observing system, please specify:****2. Point of Contact for this Data Management Plan (author or maintainer)****2.1. Name:**

NOAA Office for Coastal Management (NOAA/OCM)

**2.2. Title:**

Metadata Contact

**2.3. Affiliation or facility:**

NOAA Office for Coastal Management (NOAA/OCM)

**2.4. E-mail address:**

coastal.info@noaa.gov

**2.5. Phone number:**

(843) 740-1202

**3. Responsible Party for Data Management**

*Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.*

**3.1. Name:****3.2. Title:**

Data Steward

**4. Resources**

*Programs must identify resources within their own budget for managing the data they produce.*

**4.1. Have resources for management of these data been identified?**

#### **4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):**

### **5. Data Lineage and Quality**

*NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.*

#### **5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible**

*(describe or provide URL of description):*

Process Steps:

- 2010-12-01 00:00:00 - All acquired ADS40-SH52 data went through a preliminary review to assure that complete coverage was obtained and that there were no gaps between flight lines before the flight crew left the project site. Once back in the office, the data was brought through a comprehensive quality check to ensure completeness, image quality and resolution. There are essentially three steps to this processing: 1) GPS/IMU Processing - Airborne GPS and IMU data was immediately processed using ground GPS base station data, which is available immediately after collection. 2) Raw ADS40-SH52 Image QC - A technician performed visual inspection of the raw ADS40-SH52 images on selected bands for each collected flight lines. This step ensures proper function of the sensor. 3) Verification of Coverage and Data Quality - The raw RGB images for each collected flight lines were rectified using existing DEM and the GPS/IMU solution in Fugro proprietary software. The technician visually reviewed all rectified images to ensure completeness and resolution of acquisition for all flight lines and to identify any data gaps, clouds, shadows and any un-predicted issues in project area. All issues that did not meet project specifications were rejected and recollected.

- 2011-01-18 00:00:00 - Once the ADS40-SH52 data was collected and accepted, the Aerotriangulation (AT) phase began. Following is a step-by-step description of the AT process: 1) AT was accomplished as a component of Fugro EarthData's exclusive Pixel Factory process. The ground control, GPS, and IMU solution was ingested and tie points between strips were identified. Normally, only five tie points are needed between adjacent flight lines. We used automated tie point selection function in Pixel Factory which allowed us to increase the amount of tie points. 2) The technician performed AT process and applied the bundle adjustment result to the images of each AT block (consisting of multiple lifts or sorties). The results of the adjustment were verified through the generation of the full resolution panchromatic ortho chips over the ground control points for the data sortie. The ortho chips were inspected by the photogrammetric technician to identify any errors in the adjustment to ensure the accuracy meets project specification. The technician also generated and visually reviewed ortho strips covers across all flight lines to ensure edge matching between flight lines. Documentation of the

methodology and AT report containing the RMSE and residual calculations of the tie and ground control points used in block adjustment was prepared and delivered to NOAA OCM.

- 2011-09-06 00:00:00 - The following section describes the Pixel Factory digital image production sequence. This workflow is unique to Fugro EarthData, Inc. and has been developed specifically for push-broom sensors like the ADS40-SH52. This is a mature, stable workflow and incorporates all production components into an integrated series of tools to accomplish elevation model development, ortho production, and finishing. 1) The digital elevation data was correlated using the stereoscopic CCDs that are part of the ADS40 camera system. Using several tools that are part of the Pixel Factory workflow, a digital surface model (DSM) was correlated at an appropriate post spacing for the final accuracy requirement. The Pixel Factory correlation algorithm computed the X,Y,Z value for each DSM post utilizing every stereo angle that was available. A series of DSM files were created for acquisition block, one for each stereo look angle. A mosaic was then created from the separate DSM files where the best vertical value for each posting was selected from all look angles compared against the aerotriangulation adjustment which is incorporated into the mosaic. 2) The digital imagery for each acquisition sortie was differentially rectified to produce 4-band ortho-imagery at the appropriate pixel resolution. The Pixel Factory used the cubic convolution algorithm in its processing to remove image displacement due to topographic relief, tip and tilt of the aircraft at the moment of acquisition. Each individual strip of imagery from each flight line was rectified and radiometrically processed. 3) In order to achieve maximum efficiency in data processing, the digital orthophoto technician produced quicklooks for automated seamline generation and radiometric processing of the imagery. Quicklooks are a rendition of each scale of imagery at 1/64 of the actual resolution of the orthophotography. The goal of the radiometric adjustment is to minimize tonal changes of ground features on adjacent strips of imagery giving a balanced look across the entire project. 4) The results of the radiometric adjustment and seamline generation were used to create a mosaic for each block. The seamlines were then reviewed to ensure that the aesthetic impact on features and the final product was minimized. The data for all blocks was then processed to create a uniform and seamless appearance for the entire area. 5) The final ortho-image tiles were processed to the required projection and datum and are clipped out using the approved tiling grid and naming convention. 6) Fugro EarthData provided NOAA OCM with the pilot ortho-imagery for selected portions of the overflight at full resolution for review and approval of tone (color) and contrast of the imagery. 7) Digital ortho-imagery was then quality controlled internally. Based on the feedback from QC procedures, Fugro EarthData performed final corrections to the orthoimage, depending on the nature of the artifacts to be corrected. Minor artifacts were corrected using Adobe Photoshop in an interactive editing session. 8) Final digital ortho-imagery tiles were written out into GeoTIFF deliverable format with internal corresponding georeferencing and copied to hard drives for delivery.

**5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:**

**5.2. Quality control procedures employed (describe or provide URL of description):**

## **6. Data Documentation**

*The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.*

**6.1. Does metadata comply with EDMC Data Documentation directive?**

No

**6.1.1. If metadata are non-existent or non-compliant, please explain:**

Missing/invalid information:

- 1.7. Data collection method(s)
- 3.1. Responsible Party for Data Management
- 4.1. Have resources for management of these data been identified?
- 4.2. Approximate percentage of the budget for these data devoted to data management
- 5.2. Quality control procedures employed
- 7.1. Do these data comply with the Data Access directive?
  - 7.1.1. If data are not available or has limitations, has a Waiver been filed?
  - 7.1.2. If there are limitations to data access, describe how data are protected
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.3. Approximate delay between data collection and submission to an archive facility
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

**6.2. Name of organization or facility providing metadata hosting:**

NMFS Office of Science and Technology

**6.2.1. If service is needed for metadata hosting, please indicate:**

**6.3. URL of metadata folder or data catalog, if known:**

<https://www.fisheries.noaa.gov/inport/item/48416>

**6.4. Process for producing and maintaining metadata**

*(describe or provide URL of description):*

Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: [https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC\\_PD-](https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-)

Data\_Documentation\_v1.pdf

## 7. Data Access

*NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.*

### 7.1. Do these data comply with the Data Access directive?

**7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?**

**7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:**

### 7.2. Name of organization of facility providing data access:

NOAA Office for Coastal Management (NOAA/OCM)

#### 7.2.1. If data hosting service is needed, please indicate:

#### 7.2.2. URL of data access service, if known:

<https://coast.noaa.gov/dataviewer/#/imagery/search/where:ID=1168>

[https://coastalimagery.blob.core.windows.net/digitalcoast/CoastalCA\\_2009\\_1168/index.html](https://coastalimagery.blob.core.windows.net/digitalcoast/CoastalCA_2009_1168/index.html)

### 7.3. Data access methods or services offered:

<https://coast.noaa.gov/dataviewer>. This data set is dynamically generated based on user-specified parameters.;

### 7.4. Approximate delay between data collection and dissemination:

**7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:**

## 8. Data Preservation and Protection

*The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.*

### 8.1. Actual or planned long-term data archive location:

*(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To*

*Be Determined, Unable to Archive, or No Archiving Intended)*

**8.1.1. If World Data Center or Other, specify:**

**8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:**

**8.2. Data storage facility prior to being sent to an archive facility (if any):**

Office for Coastal Management - Charleston, SC

**8.3. Approximate delay between data collection and submission to an archive facility:**

**8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?**

*Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection*

## **9. Additional Line Office or Staff Office Questions**

*Line and Staff Offices may extend this template by inserting additional questions in this section.*