

# Aircraft Noise Monitoring Study: WORK PLAN

## Study Objective

The objective of this monitoring study is to conduct real-time sound monitoring at Naval Air Station Whidbey Island (NASWI) and Naval Outlying Field (NOLF) Coupeville, WA and Naval Air Station Lemoore (NASL), CA to collect data sufficient to conduct comparisons with previously developed noise contours and analysis. To meet this objective, the sound-monitoring data shall include periods of high, medium, and low flight activity; shall cover a 12-month period; shall include locations along and in the vicinity of departure and arrival flight paths; and shall also include training areas overflowed by tactical fighter aircraft. The monitoring study shall document the results of the monitored sound levels, comparisons with previously modeled noise, and recommendations for revisions and improvements to the noise analysis process and tools, as outlined in the attached Navy Statement of Architect Engineering Services (SAES), *Aircraft Noise Monitoring Study*.

## Key Personnel (Contractor Team)

Program Manager: (b) (6), Leidos  
Project Manager: (b) (6), PhD, Leidos  
Principal Investigator: (b) (6), PhD, Blue Ridge Research and Consulting (BRRC)  
Acoustical Data Collection Lead: (b) (6), BRRC  
Operational Data Collection Lead: (b) (6), Leidos  
Acoustical Data Analysis: (b) (6), BRRC  
Acoustical Modeling: (b) (6), BRRC

## Task 1: Kickoff Brief, Detailed Schedule, and Workplan

This coordination and planning task has been completed, including the development of this Workplan. The project schedule will be updated, as needed, to account for changes in Department of Defense, state, and local travel restrictions.

## Task 2: Develop a Monitoring Plan

BRRC will develop a monitoring plan to cover all aspects of the aircraft noise monitoring study. Different elements will cover the planning approach, methods, data collection, data analyses, and reporting. Because of current travel restriction due to COVID-19, the initial data collection will involve virtual meetings with Navy personnel. The initial data collection will involve the identification of potential Sound Level Meter (SLM) locations, the examination of current noise modeling operational parameters, and the development of real-time operational data collection procedures.

For the SLM locations selection at both NASWI and NASL, the selection process will use current Environmental Impact Statement (EIS) generated noise scenarios. For NASWI, the selected noise scenario is the preferred alternative (Alternative 2A Annual Average) identified in the 2018 EIS for EA-18G "Growler" Airfield Operations.<sup>1</sup> For NASL, the selected noise scenario is the preferred alternative

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<sup>1</sup> Department of the Navy, "Environmental Impact Statement for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex," September 2018.

(Alternative 2) identified in the 2014 EIS for the F-35C West Coast Home Basing.<sup>2</sup> Utilizing an American National Standards Institute (ANSI) standard,<sup>3</sup> a spatial stratification method will be used to ensure the SLM locations provide a variety of flight operations and expected Day-Night Average Sound Levels (DNL) for NASWI and Community Noise Equivalent Level (CNEL) for NASL. Part of this process will involve the engagement of local leaders for their suggested SLM locations. After the suggestions are received, BRRC will analyze the potential SLM locations, and work with the Navy to determine twelve preferred locations and three alternatives for both NASWI and NASL. BRRC and the Navy will finalize the final twelve locations during the logistics site visits discussed under Task 3.

For the noise modelling operational parameters review, BRRC will develop standard operational data validation packages (ODVP) for each air station. The ODVP includes flight tracks, flight profiles, operational number, traffic flow distributions, time of day percentages, and ground maintenance operations. Thus, the ODVP needs to be sent to various knowledgeable operators for their review and confirmation. This distribution of the ODVP will rely on the Community Planning and Liaison Officers (CPOs) for each air station to determine the correct point of contacts (POCs). The ODVP includes instructions on the review parameters, and BRRC will coordinate web conferences with the various operators to summarize the data and answer any questions. After these web conferences, BRRC will coordinate with the operators to verify and validate the operational modeling parameters for current operations. If the operators determine that modifications are required, the modifications will be documented, and the ODVP will be updated. If modifications are required, BRRC will generate a new “updated” scenario for the noise modeling comparison and evaluation under Task 5.

The development of real-time operational data collection procedures is required to support the noise modeling analyses. These procedures need to collect the actual operations at each air station during the sound monitoring data collection. The applicable data include the active runway, aircraft, operation type, expected flight track, time, and maintenance operations. In addition to these data items, the procedures need to capture any variances from expected operations. BRRC and Leidos will work with NASWI and NASL Air Traffic Control (ATC) to determine any automated data that can be leveraged to support this effort. Once all applicable operational parameters and their sources have been identified, BRRC will develop a software application for tablet computers to aid in the real-time operational data collection.

For the acoustical data, BRRC will reference the following ASA/ANSI standards to develop applicable data collection methods, where feasible:

- American National Standards Institute (ANSI) S12.9 Part 2: “Quantities and Procedures for Description and Measurement of Environmental Sound. Part 2: Measurement of Long-term, Wide Area Sound”
- ANSI S12.100 “Methods to Define and Measure the Residual Sound in Protected Natural and Quiet Residential Areas
- ANSI S12.9-1988 (R2003) Part 1, Quantities and Procedures for Description and Measurement of Environmental Sound
- ANSI S1.4-2014, Electroacoustics - Sound Level Meters - Part 1: Specifications

When the data collection parameters have been determined, BRRC will develop a draft Monitoring Plan to document the procedures that will be used for the aircraft noise monitoring study and the ensuing aircraft noise modeling evaluations. The Final Monitoring Plan will be submitted after the logistics site

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<sup>2</sup> Department of the Navy, “Environmental Impact Statement for F-35C West Coast Home Basing,” October 2014.

<sup>3</sup> American National Standards Institute (ANSI) S12.9 Part 2: “Quantities and Procedures for Description and Measurement of Environmental Sound. Part 2: Measurement of Long-term, Wide Area Sound,” June 2018.

visits discussed under Task 3. Also, BRRRC will update the Monitoring Plan, if required, after each monitoring period to address any issues that arise.

*Task Deliverables:* Preliminary Operational Data Validation Packages for NASWI and NASL

Draft Operational Data Collection Procedures

Tablet Software Application of Operational Data Collection

Draft Potential SLM Locations

Draft Monitoring Plan

Final Monitoring Plan

### **Task 3: Pre-Data Collection/Logistics Site Visit**

Before the logistics site visits to NASWI and NASL, BRRRC will prepare an installation Pre-Data Collection/Logistics Brief. This brief will inform installation leadership and stakeholders regarding the Monitoring Plan, discuss the real-time data collection approach and confirm logistics requirements for the individual data collection periods. The brief will also identify and confirm technical POCs for different aspects of the operational data collection. The outcome of the brief will be to ensure everyone is familiar with the data collection requirements and procedures. Any remaining questions after this visit will need to be finalized and documented in the Monitoring Plan developed in Task 2.

BRRRC will also finalize any modifications to the operational noise modeling parameters with the operators at each air station. For the operational data collection procedures and data sources, Leidos and BRRRC will finalize this information with the lead ATC personnel at each air station.

In addition to the brief and data validation, BRRRC will visit each potential SLM location to determine if the site is suitable for the monitoring studies. Some of the factors that may contribute to a potential SLM location not being suitable include local noise sources, reflecting surfaces, nearby unsafe activities, and/or access restrictions.

After the site visits, BRRRC and Leidos will finalize the data collection, which includes the SLM locations, the ODVP, and the operational data collection procedures. BRRRC will also develop a logistics report to document the procedures required to access each SLM location. This report will include the POCs for each location, contact information, any applicable hour restrictions, and any permits (if required).

*Task Deliverables:* Draft Installation Pre-Data Collection/Logistic Brief  
Final Installation Pre-Data Collection/Logistic Brief  
Final Operational Data Validation Packages for NASWI and NASL  
Final Operational Data Collection Procedures

Logistics Report

### **Task 4: Data Collection**

Leidos and BRRRC will deploy teams and sound monitoring equipment to collect acoustic and operational data for four (4) individual monitoring periods per installation, per the Monitoring Plan. The acoustic data collection team will perform scheduled observations at, or near, the monitoring sites. Scheduled observations will be based on expected runway use and operational tempo each day. The data collection

teams will follow the procedures detailed in the Final Monitoring Plan (Task 2). If any issues are found, then the Principal Investigator will be contacted to coordinate issue resolution.

Each individual monitoring period will include seven full days of active data collection. The approach will include deploying all SLMs prior to the start of data collection. The data collection will then officially commence at 12:00:00.0 AM at the beginning of Day 1, and it will end at 11:59:59.9 PM at the end of Day 7. After the seven-day data collection period has ended, the SLMs will be demobilized. In total, the SLMs will be in the field for a minimum of eight days for each monitoring period.

During the data collection period, the acoustic team will perform observations and equipment checks to ensure reliable data are being collected. The observations will be scheduled based on expected aircraft operations. However, the locations may be modified to best capture flight activity. The operational data collection team will coordinate with ATC to maximize observation times in the control tower. At the end of each operational day, the operational team will review their data, add any required additional notes, and upload the data.

Leidos and BRRRC will develop interim briefings to describe the data collection progress and preliminary results.

*Task Deliverables:*           Interim Progress Briefings  
  Acoustical Data Archive  
  Noise Modeling Archive

## **Task 5: Analysis and Reporting of Data**

After each monitoring period, BRRRC and Leidos will perform quality reviews of the data (both acoustical and operational). This review will document any data gaps occurring in the dataset for that monitoring period. After this review step, BRRRC will process the acoustical data to calculate the following noise metrics for each SLM site:

- $L_{\max}$
- SEL
- Duration
- Time Above
- Events Above
- Overall DNL, CNEL, and  $L_{eq,24hr}$
- Aircraft DNL and CNEL
- Hourly  $L_{10}$ ,  $L_{50}$ , and  $L_{90}$

BRRRC will assess the measured variations in all of the above metrics to evaluate the uncertainty in the measured data. BRRRC will also develop an archival database for the sound data to provide easy transmission to the Navy.

In parallel to the acoustical data processing, BRRRC will develop “as-flown” scenarios for NoiseMap. For each monitoring period, these scenarios will include daily and 7-day durations, and will be processed to predict the various listed acoustical metrics. The results will then be compared to the measured data. Additionally, BRRRC will use NoiseCheck II procedures to assess the predicted SELs and DNLs. This assessment will focus on the acoustical aspect of the aircraft noise modelling.

Additionally, BRRRC will compare the “previously-modeled” and “updated” (if required) scenario results with the measured data. This comparison will involve differences due to variations in the actual operations relative to the annual average operations that were previously modeled. NoiseCheck II will also be used

on these scenarios, and this assessment will focus on the operational modeling aspect. BRRC will develop an archival database of the NoiseMap modeling files for use by the Navy.

Leidos and BRRC will develop interim briefings to describe the data analysis progress and preliminary results for the Navy.

At the end of the data collection, all data will be combined to provide an overall comparison. The scenarios will include “as-flown”, “previously modeled”, and “updated” (if required). These results will also be assessed with NoiseCheck II to evaluate the overall consistency of the modeling results. After this step, BRRC will document differences between the measured and modeled data. The differences will mostly fall into two groups: acoustical modeling or operational modeling. BRRC will evaluate the differences and their underlying cause. This process will highlight any required changes in the aircraft noise modeling process.

Once the comparisons are completed, the documentation and reporting of the results will commence. The reporting is expected to be divided into several volumes along with an overall executive summary and technical report. In addition to the report, BRRC will develop and complete data archives for both acoustical and operational data for delivery to the Navy.

The detailed reporting will document the following portions of the monitoring study:

- Approach and SLM Site Selection
- Noise Modeling Data Review and Documentation of Any Required Updates
- Operational Data Collection Procedures and Resources
- Data Collection Procedures
- Measured Sound Data
  - Variation
  - Seasonal
  - Total
- “As-flown” Scenario Comparison
  - Scenario Descriptions
  - Daily
  - Seasonal
  - Total
- “Previously Modeled” Comparison
  - Daily
  - Seasonal
  - Total
- “Updated” Comparison (If Required)
  - Daily
  - Seasonal
  - Total
- Explanation of Differences
- Required Modifications to Aircraft Noise Modeling Process

*Task Deliverables:* Draft Technical Reports, Executive Summary, and Technical Overview

Pre-Final Technical Reports, Executive Summary, and Technical Overview  
Final Technical Reports, Executive Summary, and Technical Overview

## **Task 6: Miscellaneous Deliverables**

BRRC and Leidos will conduct periodic progress meetings with the government to discuss scope of work, methods, data collection, project schedule, etc. Leidos will also submit monthly progress reports to the NAVFAC Atlantic Contracting Officer's Representative (COR). These reports will outline progress of work in the reporting period, plans for future work, financial status, and any technical, scheduling, or financial issues that have arisen along with any potential solutions.

