Technical Report Documentation Page

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Detection of Airplane Cabin Air Quality Events from Engine Bleed Air Contaminants: Data Management Plan	April, 2025
	6. Performing Organization Code AAM-631
7. Author(s) Dr. Susan Jay	8. Performing Organization Report No.
9. Performing Organization Name and Address FAA Civil Aerospace Medical Institute PO Box 25082 Oklahoma City, OK 73125	10. Work Unit No. (TRAIS)
	11. Contract or Grant No. See page 4
12. Sponsoring Agency Name and Address Office of Aerospace Medicine Federal Aviation Administration 800 Independence Ave., S.W. Washington, DC 20591	13. Type of Report and Period Covered Data Management Plan
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15. Supplementary Notes

Author's ORCID: 0000-0002-1331-0396

Data Management Plan DOI: https://doi.org/10.21949/1529690

16. Abstract

The purpose of this multi-year, multi-phase airplane cabin air quality research study was to:

1. Identify and measure levels of engine and auxiliary power unit bleed air contaminants
2. Identify sensor technologies to detect/provide warning(s) of bleed air contaminant events
3. Identify techniques to minimize airplane diversions from smoke, odor, fume events and
4. Assess potential health-related risks of human exposure (i.e., passengers and flight/cabin crew) to chemicals generated during contaminated air events.

Phase 1 work assessed the current state of knowledge of engine bleed air/cabin air contamination events and evaluated the current state of sensor technologies that could be used to detect airplane engine bleed air/cabin air contaminants. Phase 2 work involved static aircraft engine stand tests and ground-based, on-aircraft tests. Phase 2tests assessed the capability of current, commercial off-the-shelf sensors to detect bleed air contaminants resulting from engine oil, hydraulic fluid, and deicing fluid, and included the collection and chemical analysis of engine bleed air contaminants resulting from engine oil, hydraulic fluid, and deicing fluid. Phase 3 work resulted in the toxicological review and interpretation of the chemical sample data to examine the potential health-related risks of human exposure to engine bleed air contaminants resulting from engine oil, hydraulic fluid, and deicing fluid.

The overall study produced multiple data sets and technical reports on sensor technology performance, chemical analyses of engine bleed air contaminants, and a toxicological assessment of the potential health effects of engine bleed air contaminants on passenger and flight/cabin crew.

17. Key Word	18. Distribution Statement
bleed air, cabin air, contaminants, aircraft engine	Document is available to the public through the National Transportation Library: https://ntl.bts.gov/ntl

19. Security Classification (of this report)	20. Security Classification (of this page)	21. No. of Pages
Unclassified	Unclassified	14

Plan Overview

A Data Management Plan created using DMP Tool

DMP ID: https://doi.org/10.48321/D1QS59

Title: Detection of Airplane Cabin Air Quality Events from Engine Bleed Air Contaminants

Creator: Susan Jay - **ORCID:** 0000-0002-1331-0396

Affiliation: United States Department of Transportation (DOT) (transportation.gov)

Principal Investigator: Byron Jones, Richard Fox, Steven Eckels

Data Manager: Steven Eckels

Funder: United States Department of Transportation (DOT) (transportation.gov)

Template: U.S. Department of Transportation: Data Management Plan (DMP)

Project abstract:

The purpose of this multi-year, multi-phase airplane cabin air quality research study was to:

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Phase 1 work assessed the current state of knowledge of engine bleed air/cabin air contamination events and evaluated the current state of sensor technologies that could be used to detect airplane engine bleed air/cabin air contaminants. Phase 2 work involved static aircraft engine stand tests and ground-based, on-aircraft tests. Phase 2 tests assessed the capability of current, commercial off-the-shelf sensors to detect bleed air contaminants resulting from engine oil, hydraulic fluid, and deicing fluid, and included the collection and chemical analysis of engine bleed air contaminants resulting from engine oil, hydraulic fluid, and deicing fluid. Phase 3 work resulted in the toxicological review and interpretation of the chemical sample data to examine the potential health-related risks of human exposure to engine bleed air contaminants resulting from engine oil, hydraulic fluid, and deicing fluid.

The overall study produced multiple data sets and technical reports on sensor technology performance, chemical analyses of engine bleed air contaminants, and a toxicological assessment of the potential health effects of engine bleed air contaminants on passenger and flight/cabin crew.

Start date: 06-30-2020

End date: 01-13-2025

Last modified: 04-21-2025

Detection of Airplane Cabin Air Quality Events from Engine Bleed Air Contaminants

Persistent Link

Include the persistent identifier (PID) that is associated with the dataset.

KSU Phase 1 Technical Report Persistent Link:	https://doi.org/10.21949/1524479
KSU Phase 1 Dataset Persistent Link:	https://doi.org/10.21949/1524480
KSU Phase 2, Volume 1 Technical Report Persistent Link:	https://doi.org/10.21949/1528259
KSU Phase 2, Volume 1 Dataset Persistent Link:	https://doi.org/10.21949/1528260
NAWCAD Phase 2, Volume 1 Technical Report Persistent Link:	https://doi.org/10.21949/1529639
KSU Phase 2, Volume 2 Technical Report Persistent Link:	https://doi.org/10.21949/v5p6-j307
KSU Phase 2, Volume 2 Dataset Persistent Link:	https://doi.org/10.21949/rb92-6j61
NAWCAD Phase 2, Volume 2 Technical Report Persistent Link:	https://doi.org/10.21949/1529671
NAMRU-D Phase 3 Technical Report Persistent Link:	https://doi.org/10.21949/1529676

Recommended Citation

The recommendeded data citation to be used when citing the dataset.

Recommended Citation: Please see each Technical Report and associated dataset listed above or reference this data management plan https://doi.org/10.48321/D1QS59

Change Log

Document the changes that are made to the DMP, any and all changes should be noted to ensure a more complete documentation.

Change Log:
2021-12-30: Initial Data Management Plan (DMP) written

2023-02-10: FAA/CAMI updated DMP to encompass entire research project, not just the KSU-specific Phase 2 data collection activities (e.g., engine stand tests, ground-based, on-aircraft tests)

2025-03-18: FAA contractor updated DMP to contain DOI links to all published reports and datasets associated with this project.

2025-04-04: FAA contractor updated DMP to include contract numbers in section "0. Dataset and Contact Information" below.

2025-04-21: FAA/CAMI performed final "close out" edits on DMP.

CONTENTS

Include a table of contents, in order to better organize the DMP.

CONTENTS:

0. Dataset and Contact Information

Please provide the following information:

- **Name of the dataset or project for which data is being collected**
- **Project number, contract number, or other number used to link this DMP**
- **Name of the person submitting this DMP -ORCiD of the person submitting this DMP**
- **Email and phone number of the person submitting this DMP**
- **Name of the organization for which the person submitting this DMP is working for**
- **Email and phone number for the organization**
- **Link to organization or project website**
- **Date the DMP was written**

0. Dataset and Contact Information:

- Name of the dataset or project for which data is being collected -- Detection of Airplane Cabin Air Quality Events from Engine Bleed Air Contaminants
- Project number, contract numbers, or other number used to link this DMP -- 693KA9-20-P-00033 (KSU, Phase 1 contract number), 693KA9-21-C-00010 (KSU, Phase 2 contract number), 6973GH-22-N-00013 (NAWCAD contract number), 6973GH-23-N-00005 (NAMRU-D contract number).
- Name of the person submitting this DMP / ORCiD of the person submitting this DMP -- Susan M. Jay / ORCiD: 0000-0002-1331-0396
- E-mail and phone number of the person submitting this DMP - susan.m.jay@faa.gov; (405) 954-5500
- Name of the organization for which the person submitting this DMP is working for -- Performing Organization: Civil Aerospace Medical Institute (CAMI)
- E-mail and phone number for the organization -- Mailing Address: Civil Aerospace Medical Institute (CAMI) P.O. Box 25082 Oklahoma City, OK United States 73125
- Link to organization or project website -- https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/cami
- Date the DMP was written -- 30 December 2021

1. Data Description

Name the data, data collection project, or data producing program.

1. Data Description: These data sets and technical reports are derived from the research project "Detection of Airplane Cabin Air Quality Events from Engine Bleed Air Contaminants".

Describe the purpose of your research.

The FAA Reauthorization Act of 2018 (Congress, 2018), Section 326, Aircraft Air Quality, subsection (C)(1), directed the Federal Aviation Administration to commission an airplane cabin air quality study. In response to the Congressional mandate, the FAA initiated a multi-year, multi-phase research project with several academic and Department of the Navy research partners (Kansas State University, Boise State University, Naval Air Warfare Center Aircraft Division [NAWCAD], Naval Medical Research Unit - Dayton [NAMRU-D]).

The purpose of this multi-year, multi-phase airplane cabin air quality research study was to:

1. Identify and measure levels of engine and auxiliary power unit bleed air contaminants
2. Identify sensor technologies to detect/provide warning(s) of bleed air contaminant events
3. Identify techniques to minimize airplane diversions from smoke, odor, fume events, and
4. Assess potential health-related risks of human exposure (i.e., passengers and flight/cabin crew) to chemicals generated during contaminated air events.

Describe the data that will be generated in terms of nature and scale (e.g., numerical data, image data, text sequences, video, audio, database, modeling data, source code, etc.).

Over the course of this project, two extensive experiments were conducted using a test stand turbine engine and an operational, ground-based airliner aircraft. Controlled amounts of various fluid contaminants (e.g., engine oils, hydraulic fluids, and deicing fluids) were injected into engine compressors and the resulting contaminants and marker substances in the engine bleed air under various operating conditions were measured. In the case of the ground-based aircraft, measurements were collected at multiple points in the aircraft bleed air and environmental control system. Multiple real time instruments/sensors (10-20) detected contaminant substances present in the bleed air. Additionally, bleed air samples were collected for laboratory analysis. Each set of experiments were conducted over a period of approximately five days with multiple conditions examined each day. Some sensor instruments were operated by the research team and some instruments were operated by the instrument manufacturer.

For each real time instrument, the data recording and storage process involved four steps:

1. Raw Data: Data collected and recorded in real time by the instrument. In some cases, this data was in a proprietary format and decipherable only through proprietary software associated with the instrument. In other cases, the data were recorded in a readily deciphered format (e.g., ASCII comma delimited).
2. Reduced Data: All data were converted to Excel Worksheet format. The raw data converted into this format are considered reduced data.
3. Cleaned Data: Cleaned data are data that were reviewed and erroneous or otherwise bad data removed (e.g., instrument malfunction). Cleaned data are considered valid for further analysis regarding outcome of the experiment.
4. Archive Data: Archive data are cleaned data that are considered relevant for documentation of experimental results. In general, most cleaned data are considered archive data unless there is some reason to omit them. For example, an experiment during which there was inadequate control of the operating conditions did not meet the standards of archived data.

Bleed air samples collected for chemical analysis were sent to professional, commercial laboratories. These results were returned to the research team in report and tabular format as determined by the individual laboratory. For the chemical sample data, the recording and storage process was similar; however, it entailed a three-step process. The laboratory reports are reduced data in the scheme described above and were used to generate cleaned data and archive data. The laboratory data remained in written tabular format (i.e., Excel Worksheet).

Describe methods for creating the data (e.g., simulated; observed; experimental; software; physical collections; sensors; satellite; enforcement activities; researcher-generated databases, tables, and/or spreadsheets; instrument generated digital data output such as images and video; etc).

The methods used for creating the data included sensor instruments, chemical sampling techniques (e.g., summa canisters, sorbent tubes, cartridges, etc.), commercial laboratory chemical analysis reports, and researcher-generated databases, tables, and spreadsheets.

Discuss the period of time data will be collected and frequency of update.

Data collection for the Phase 2 engine stand tests was completed 16 - 20 MAY 2022; this was a one-time data collection effort. Data collection for the Phase 2 ground-based, on-aircraft tests was completed 15 - 18 MAY 2023; this too was a one-time data collection effort.

If using existing data, describe the relationship between the data you are collecting and existing data.

The lead researchers and research partners used the collected data and results from the Phase 2 engine stand tests to develop and further refine the test plan used to collect the Phase 2 ground-based, on-aircraft data. Bleed air chemical sample data/results from the engine stand tests and the ground-based, on-aircraft tests (data from both KSU-collected samples and Navy/NAWCAD-collected samples) were reviewed and interpreted by the NAMRU-D Senior Toxicologist.

List potential users of the data.

Potential users of this data include regulatory agencies (e.g., the FAA, the European Union Aviation Safety Agency [EASA]), airplane manufacturers, sensor instrument manufacturers, air carriers, airline pilot and flight attendant unions, academic institutions, and the public.

Discuss the potential value of the data have over the long-term for not only your institution, but also for the public.

The potential long-term value of the data will allow regulatory agencies (e.g., the FAA, EASA) to determine the capability and feasibility of using sensors to detect bleed air contamination events, and will provide information to sensor manufacturers to design engine bleed air detection systems. The toxicological review and interpretation of the chemical sampling data will inform regulatory agencies (e.g., the FAA, EASA, OSHA), pilot and flight attendant unions, and the public on the potential health-related risks of human exposure to chemicals generated during contaminated air incidents.

If you request permission not to make data publicly accessible, explain rationale for lack of public access.

These data are publicly available through the National Transportation Library (NTL), as well as through links on the FAA's William J. Hughes Technical Center and Civil Aerospace Medical Institute (CAMI) websites

Indicate the party responsible for managing the data.

Kansas State University (KSU), in collaboration with the FAA, was responsible for data management during the data collection and data analysis phases. Once the research project finished, KSU released the data to the FAA who in turn sent the complete data sets and technical reports to the National Transportation Library for permanent, long-term storage and public access.

Describe how you will check for adherence to this data management plan.

Adherence to this data management plan (DMP) was reviewed at least once per quarter.

2. Standards Employed

List in what format(s) the data will be collected. Indicate if they are open or proprietary.

2. Standards Employed:

Most real time sensor instruments recorded the data in an instrument-specific format defined by the software associated with each instrument (i.e., raw data). Some sensor instruments recorded the raw data using proprietary software. These data were converted into Excel spreadsheets with data recorded in columnar format in temporal order (i.e., reduced data), with at least one column indicating the day and time that the data were collected. Where multiple data were recorded in a single spreadsheet, each column was labeled to identify the sensor and variable for that column. Units were included in the label for each column.

The chemical sample data/results were recorded in report and tabular format that are the "industry standard" for commercial laboratories and thus are considered "open" formats.

If you are using proprietary data formats, discuss your rationale for using those standards and formats.

Some sensor instruments recorded raw data in a format that is only readable by the manufacturer's proprietary software. Recording in this format was the only option for these instruments. However, after data collection, this software was used to create files in other formats that were used to convert the data into Excel Spreadsheet format.

The chemical sample data all used "open reporting" formats.

Describe how versions of data be signified and/or controlled.

During the data collection and data analysis phases, electronic data files/versions were maintained by Kansas State University (KSU; lead academic institution) on an electronic, password secured website, accessible by invitation-only to the researchers, research partners, and select FAA personnel (e.g., project manager).

There were up to four versions of real time sensor instrument data and up to three versions of chemical sample laboratory analysis data. The master data repository was divided into four main folders, one for each of these versions. Within each main folder, there was a sub-folder for each sensor instrument. This sub-folder was further divided into additional sub-folders for different experiments as appropriate. As data were reviewed and cleaned, new files were created for the next higher category (e.g., from raw data to reduced data). Old files were not discarded but remained in the lower category folder.

Once the research project finished, electronic files, data sets, and technical reports were sent to the National Transportation Library to be retained on secured government furnished equipment.

If the file format(s) you are using is(are) not standard to your field, describe how you will document the alternative you are using.

The only non-standard formats used were those associated with sensor instrument recorded raw data. The manufacturer provided software was used to convert the data into standard formats and thus no documentation of non-standard formats was needed.

The file format(s) for the chemical sample data are standard for that industry/field.

List what documentation you will be creating in order to make the data understandable by other researchers.

A text "README" file was created for each sensor instrument that described the generated data, and the spreadsheet format associated with that instrument. A "README" text file was included in each sensor instrument folder.

A detailed log was maintained for each experiment which documented data collection start times, end times, and experimental conditions (e.g., fluid contaminant injection rate, engine temperature, bleed air temperature, etc.). Separate sub-folder for these logs were accessible to all authorized experimenters and research partners. During the experiments, an operator was assigned to each instrument. In some instances, an experimenter may have operated more than one instrument. The instrument operator was responsible for maintaining a log that specified the air source (e.g., inlet air, bleed air) being measured at each time during an experiment and any information about instrument settings and operation that were needed to interpret the recorded data. This log was included as a separate file in the "Reduced Data" folder for that instrument and was carried forward to the higher-level folders for that instrument as the folders were generated.

A "Master Key" spreadsheet accompanied the data set(s) and laboratory reports for each class of chemical sample data (e.g., volatile organic compounds [VOCs], aldehydes and ketones, polycyclic aromatic compounds [PAHs], etc.). The

Master Key included information pertaining to data/time of chemical sample collection, experimental conditions (e.g., air flow rate, air volume, contaminant concentrations, etc.), and how the data were collated and sorted for review and interpretation.

Indicate what metadata schema you are using to describe the data. If the metadata schema is not one standard for your field, discuss your rationale for using that scheme.

The overall research project metadata schema is as follows:

Phase 1 *(assess the current state of knowledge of engine bleed air/cabin air contamination events, sensor technologies to detect airplane engine bleed air/cabin air contaminants)* -- literature review, Working Group Seminar summaries, and final technical report with recommendations.

Phase 2 *(engine stand tests and ground-based, on-aircraft tests)*

- Volume 1 -- engine stand tests; sensor instrument and chemical sample datasets, results, final technical report with recommendations.
- Volume 2 -- ground-based, on-aircraft tests; sensor instrument and chemical sample datasets, results, final technical report with recommendations.

Phase 3 *(assess potential health-related risks)* -- toxicological review and interpretation of chemical sample data from engine stand and on-aircraft tests; chemical analysis results, laboratory reports, data sets, and final technical report with recommendations.

Describe how will the metadata be managed and stored.

The FAA was responsible overall metadata management throughout the entirety of the research project.

During the data collection and data analysis phases, the metadata were maintained and stored by Kansas State University (KSU; lead academic institution) on an electronic, password secured website, accessible by invitation-only to the researchers, research partners, and select FAA personnel (e.g., project manager).

Once the research project finished, electronic files, data sets, and technical reports were sent to the National Transportation Library to be retained on secured government furnished equipment.

Indicate what tools or software is required to read or view the data.

A computer, or other internet-connected electronic device, with Microsoft Office applications (e.g., Word, Excel), Adobe PDF Reader, and zip.file extraction software are required to access the data sets and technical reports.

Describe your quality control measures.

The Federal Aviation Administration (FAA) will ensure that the final datasets and technical reports are maintained and retained on government furnished equipment in accordance with Department of Transportation (DOT) and FAA data accessibility policies. The Kansas State University Data Manager and the FAA's Research Project Manager will ensure that the electronic files open and have retained the entered data.

3. Access Policies

Describe what data will be publicly shared, how data files will be shared, and how others will access them.

3. Access Policies:

The intent in this project was to generate data to be shared with the public. Any data placed in the Kansas State University (KSU) Archive Data folder were shared with the Federal Aviation Administration (FAA) and research

partners. The FAA, in turn, made the final datasets and technical reports accessible to the public via the National Transportation Library (NTL).

Most of the data collected during the experiments have no restrictions. A representative from the sensor instrument manufacturer operated some of their instruments during the experiments. Some sensor instruments were operated by research team members but recorded data to the cloud and required the sensor manufacturer to retrieve and download the data. Some instruments operated by research team members internally recorded the data from individual sensors that are not normally available to the operator, but the sensor manufacturer made these data available to the research team. In all of these cases, there was at least a formal, written agreement between KSU and the sensor manufacturer in place prior to each experiment as to what data could and could not be shared with the FAA and, ultimately, with the public. If the data that could be shared with the FAA for a specific sensor instrument was insufficient to evaluate instrument performance, then the instrument was excluded from the experiment regardless of what other data it generated.

The data/results generated from the chemical (laboratory) analysis of the bleed air samples had no restrictions. All data released outside the research team and the FAA was, and remains, subject to FAA approval.

All final datasets and technical reports were made publicly available through the National Transportation Library, as well as through links on the FAA's William J. Hughes Technical Center and Civil Aerospace Medical Institute (CAMI) websites.

Indicate whether the data contain private or confidential information. If so:

- **Discuss how will you guard against disclosure of identities and/or confidential business information.**
- **List what processes you will follow to provide informed consent to participants.**
- **State the party responsible for protecting the data.**

The data contain no private or confidential information. Proprietary information concerning sensor instrument operation and/or software was addressed by Non-Disclosure Agreements (NDAs) between Kansas State University (KSU) and individual sensor manufacturers.

Describe what, if any, privacy, ethical, or confidentiality concerns are raised due to data sharing.

The data did not raise any privacy, ethical, or confidentiality concerns.

If applicable, describe how you will deidentify your data before sharing. If not:

- **Identify what restrictions on access and use you will place on the data.**
- **Discuss additional steps, if any you will use to protect privacy and confidentiality.**

Non-applicable. There are no identification-related issues associated with the data (i.e., sensor instrument data, chemical sample data/laboratory reports).

4. Re-Use, Redistribution, and Derivative Products Policies

Name who has the right to manage the data.

4. Re-Use, Redistribution, and Derivative Products Policies:

These data are managed by the Department of Transportation, Federal Aviation Administration. The data are in the public domain and may be re-use without restriction. Citation of the data is appreciated. Please use the following recommended citations:

KSU Phase 1 Technical Report Persistent Link:	https://doi.org/10.21949/1524479
KSU Phase 1 Dataset Persistent Link:	https://doi.org/10.21949/1524480
KSU Phase 2, Volume 1 Technical Report Persistent Link:	https://doi.org/10.21949/1528259
KSU Phase 2, Volume 1 Dataset Persistent Link:	https://doi.org/10.21949/1528260
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KSU Phase 2, Volume 2 Technical Report Persistent Link:	https://doi.org/10.21949/v5p6-j307
KSU Phase 2, Volume 2 Dataset Persistent Link:	https://doi.org/10.21949/rb92-6j61
NAWCAD Phase 2, Volume 2 Technical Report Persistent Link:	https://doi.org/10.21949/1529671
NAMRU-D Phase 3 Technical Report Persistent Link:	https://doi.org/10.21949/1529676

Please see each Technical Report and associated dataset listed above or reference this data management plan https://doi.org/10.48321/D1QS59

Indicate who holds the intellectual property rights to the data.

The Federal Aviation Administration (FAA) holds the intellectual property rights to this data.

List any copyrights to the data. If so, indicate who owns them.

The data and technical reports are in the public domain.

Discuss any rights be transferred to a data archive.

There are no rights to be transferred to a data archive. The Federal Aviation Administration (FAA) transferred the technical reports, data sets, and electronic files to the National Transportation Library (NTL) to be accessed and used freely by the public.

Describe how your data will be licensed for reuse, redistribution, and derivative products.

The data are available to the public for reuse, redistribution, and the creation of derivative products in accordance with Department of Transportation and Federal Aviation Administration policy regarding U.S. government funded research products (i.e., the data are in the public domain and may be re-used without restriction, with source citation appreciated).

5. Archiving and Preservation Plans

Discuss how you intend to archive your data and where (include URL).

5. Archiving and Preservation Plans: Data archiving was accomplished through the National Transportation Library (https://ntl.bts.gov/ntl).

Indicate the approximate time period between data collection and submission to the archive.

The time period from completion of data collection and analysis to archive submission was approximately 20 months (May 2023 to January 2025).

Final data collection (ground-based, on-aircraft tests) was completed in May 2023. Analysis of sensor instrument data and chemical sample results from both the engine stand tests and on-aircraft tests was performed from June 2023 - May 2024. Final report writing was performed from May - September 2024 and completed in October 2024. The FAA's final report to Congress was submitted in January 2025.

Identify where data will be stored prior to being sent to an archive.

During the data collection and data analysis phases, the data were temporarily stored by Kansas State University (KSU; lead academic institution) in a Microsoft OneDrive folder (with password-protected access) before being sent to the FAA for review and final submission the National Transportation Library (i.e., final archive).

Describe how back-up, disaster recovery, off-site data storage, and other redundant storage strategies will be used to ensure the data's security and integrity.

A backup copy of the Kansas State University project root folder was backed up via CrashPlan backup services.

Describe how data will be protected from accidental or malicious modification or deletion prior to receipt by the archive.

Access to the Kansas State University (KSU) data storage system was limited to research team personnel, research partners, and select FAA representatives (e.g., research project manager). Separate folders were prepared for each participating sensor instrument company, which included data only from that company's instrument(s). Participating companies did not have access to KSU's main research folders nor to the KSU root folder. All KSU main research folders were automatically backed up via CrashPlan backup services.

Discuss your chosen data archive's policies and practices for back-up, disaster recovery, off-site data storage, and other redundant storage strategies to ensure the data's security and integrity for the long-term.

The data security and integrity will be maintained by the National Transportation Library (NTL) and the data management and protection will be subject to the standards and methodologies used by the NTL.

Indicate how long the chosen archive will retain the data.

The National Transportation Library will retain the data indefinitely.

Indicate if the chosen archive employs, or allows for the recording of, persistent identifiers linked to the data.

The National Transportation Library allows persistent identifiers to be linked to the data.

Discuss how your chosen data repository meets the criteria outlined on the Guidelines for Evaluating Repositories for Conformance with the DOT Public Access Plan page.

It is understood that the National Transportation Library complies with the following attributes:

1. Promotes an explicit mission of digital data archiving;
2. Ensures compliance with legal regulations, and maintains all applicable licenses covering data access and use, including, if applicable, mechanisms
   to protect privacy rights and maintain the confidentiality of respondents;
3. Has a documented plan for long-term preservation of its holdings;
4. Applies documented processes and procedures in managing data storage;
5. Performs archiving according to explicit work flows across the data life cycle;
6. Enables the users to discover and use the data, and refer to them in a persistent way through proper citation;
7. Enables reuse of data, ensuring appropriate formats and application of metadata;
8. Ensures the integrity and authenticity of the data;
9. Is adequately funded and staffed, and has a system of governance in place to support its mission; and
10. Possesses a technical infrastructure that explicitly supports the tasks and functions described in internationally accepted archival standards like Open Archival Information System (OAIS).

6. Policies Affecting this Data Management Plan

Include policies that the data management plan was created to meet, such as the DOT public access plan.

6. Policies Affecting this Data Management Plan:
This data management plan was created to meet the requirements enumerated in the U.S. Department of Transportation's "Plan to Increase Public Access to the Results of Federally-Funded Scientific Research" Version 1.1 << https://doi.org/10.21949/1520559 >> and guidelines suggested by the DOT Public Access website << https://doi.org/10.21949/1503647 >>, in effect and current as of December 30, 2021.

Planned Research Outputs

Data paper - "KSU Phase 1 Technical Report_Aircraft Air Quality and Bleed Air Contamination Detection"

Technical report describing the current state of knowledge of engine bleed air/cabin air contamination events and sensor detection technologies. Includes a literature review, Working Group Seminar summaries, and the final report with recommendations.

Dataset - "KSU Phase 1 Technical Report [supporting datasets]"

Ground-based, on-aircraft engine test data to include sensor instrument data and analysis to accompany KSU's Phase 1 report.

Data paper - "KSU Phase 2, Vol. 1 Technical Report_Aircraft Air Quality and Bleed Air Contamination Detection: Engine Stand Tests, Sensor Technologies and Chemical Sampling "

Technical report describing the engine stand tests. Includes results, analyses, and recommendations based on sensor instrument data and bleed air chemical sample data.

Dataset - "KSU Phase 2, Vol. 1 Supporting Datasets_Aircraft Air Quality and Bleed Air Contamination Detection: Engine Stand Tests, Sensor Technologies and Chemical Sampling"

Airplane engine test stand datasets to include sensor instrument data and analysis, bleed air chemical sample data, laboratory results, and laboratory reports.

Data paper - "NAWCAD Phase 2, Vol.1 Technical Report_Chemical Analysis of Resulting Bleed Air Samples Collected from Simulated Engine Fluid Contamination Events"

Technical report describing the engine stand tests. Includes results, analyses, and recommendations based on bleed air chemical sample data.

Data paper - "KSU Phase 2, Vol. 2 Technical Report_Aircraft Air Quality and Bleed Air Contamination Detection; On-Wing Tests, Sensor Technologies, and Chemical Sampling"

Technical report describing the ground-based, on-aircraft tests. Includes results, analyses, and recommendations based on sensor instrument data and bleed air chemical sample data.

Dataset - "KSU Phase 2, Vol. 2 Supporting Datasets_Aircraft Air Quality and Bleed Air Contamination Detection: Phase 2, Volume 2"

Ground-based, on-aircraft datasets to include sensor instrument data and analysis, bleed air chemical sample data, laboratory results, and laboratory reports.

Data paper - "NAWCAD Phase 2, Vol. 2 Technical Report_Chemical Analysis of Bleed Air Samples from Simulated Contamination Events: Ground-Based Aircraft Test"

Technical report describing the ground-based, on-aircraft tests. Includes results, analyses, and recommendations based on bleed air chemical sample data.

Data paper - "NAMRU-D Phase 3 Technical Report_Toxicological Evaluation of Chemical Compounds Identified in Air Samples Collected from Simulated Engine and Aircraft Contamination Events"

Technical report with recommendations based on the toxicological review and interpretation of the bleed air chemical sample data (both KSU-collected and NAWCAD-collected) from the engine stand tests and the ground-based, on-aircraft tests.

Planned research output details

Title	Type	Anticipated release date	Initial access level	Intended repository(ies)	Anticipated file size	License	Metadata standard(s)	May contain sensitive data?	May contain PII?
KSU Phase 1 Technical Report_Aircraft Air Quality ...	Data paper	2022-05-01	Open	None specified	9 MB	None specified	None specified	No	No
KSU Phase 1 Technical Report [supporting datasets]	Dataset	2022-04-30	Open	None specified		None specified	None specified	No	No
KSU Phase 2, Vol. 1 Technical Report_Aircraft Air ...	Data paper	2023-11-01	Open	None specified		None specified	None specified	No	No
KSU Phase 2, Vol. 1 Supporting Datasets_Aircraft A ...	Dataset	2024-04-18	Open	None specified		None specified	None specified	No	No
NAWCAD Phase 2, Vol.1 Technical Report_Chemical An ...	Data paper	2024-02-23	Open	None specified		None specified	None specified	No	No
KSU Phase 2, Vol. 2 Technical Report_Aircraft Air ...	Data paper	2025-01-01	Open	None specified		None specified	None specified	No	No
KSU Phase 2, Vol. 2 Supporting Datasets_Aircraft A ...	Dataset	2025-02-14	Open	None specified		None specified	None specified	No	No
NAWCAD Phase 2, Vol. 2 Technical Report_Chemical A ...	Data paper	2024-05-28	Open	None specified		None specified	None specified	No	No
NAMRU-D Phase 3 Technical Report_Toxicological Eva ...	Data paper	2024-10-01	Open	None specified		None specified	None specified	No	No