

README for Communicable Disease Transmission in Air Travel: Human Behaviour dataset.

Federal Aviation Administration (FAA), U.S. Department of Transportation (USDOT)

2026-05-29

LINKS TO DATASET

A. Dataset and related files archive link:

Data Management Plan Archive Link: <<https://doi.org/10.48321/D10D9E1D06>>

Phase 1 Report Archive Link: <<https://doi.org/10.21949/1528567>>

Phase 2 Human Behaviour Dataset Archive Link: <<https://doi.org/10.21949/9mcd-qm43>>

Phase 2 Human Behaviour Report Archive Link: <<https://doi.org/10.21949/2nev-k207>>

Phase 2 PCA Ventilation Dataset Archive Link: <<https://doi.org/10.21949/8hk0-ph61>>

Phase 2 PCA Ventilation Report Archive Link: <<https://doi.org/10.21949/ra9s-4d52>>

Phase 2 Jet-bridge Ventilation Dataset Archive Link: <<https://doi.org/10.21949/qqdx-gh59>>

Phase 2 Jet-bridge Ventilation Report Archive Link: <<https://doi.org/10.21949/ac4p-zd78>>

SUMMARY OF DATASET

This dataset captures detailed human behavioural and ventilation data associated with passengers and crew across a gate-to-gate air travel journey. This work is considered a portion of phase 2 of the Aviation Infectious Risk and Safety program. The ventilation data directly relate to the spaces where human behaviour was collected. A reference scenario provided context for data collection and is adaptable to further scenarios, assuming comparable conditions or if applied to specific actions in isolation. The scenario involved a three-hour domestic flight on a single aisle narrowbody airliner with passengers donning

winter clothing and included one food service. The scenario and associated parameters are divided into three location-based dyads: gate, jet bridge and cabin.

Human behaviour parameters include passenger movement, interpersonal distances, facial orientation, speech levels, and touch (objects and people). Ventilation data include basic objective measures such as dry-bulb temperature, dewpoint temperature, air flow rate, barometric pressure, and carbon dioxide concentrations. Data were collected across a number of locations using a variety of methods and a combination of experimental laboratory trials as well as field observations. The laboratory, referred to as the Centre for Air Travel Research (CATR), contains simulated environments and includes a seamless gate-to-gate travel simulation of a terminal gate, jet bridge, and a single-aisle narrowbody air cabin. The combination of field data and the CATR controlled environment allowed the team to collect high-resolution data aligned with the reference scenario. Methods used to collect the data were a combination of video recordings, manual observations, and sensor instrumentation tailored to the specific context (i.e., field or CATR). For instance, sensor instrumentation within the CATR allowed for the collection of data on lavatory fixture interactions, such as faucet touches, which would have been impossible, ethically, to observe by way of video monitoring.

Manual and sensor-derived data were analyzed through behaviour counts, while video data required annotation using either manual methods or computer vision algorithms. Bespoke software was developed to facilitate manual annotation that enhanced efficiency, consistency and accuracy. Advanced machine learning techniques were employed to automate complex tagging tasks such as facial orientation and passenger flow.

The dataset presented here supports the development and validation of the open-source TRIP-X simulation modeling software, designed to estimate disease transmission risks in aviation and related environments.

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A. GENERAL INFORMATION

0. Title of Dataset: Communicable Disease Transmission in Air Travel: Human Behaviour dataset

1. Description of Dataset:

This dataset includes systematically recorded parameters of passenger movements and ventilation. Human behaviour data include queueing, speech, face direction, objects touched, passenger and crew interactions and other behaviours found throughout the air travel journey that relate to disease transmission. Ventilation data include basic objective measures such as dry-bulb temperature, dewpoint temperature, air flow rate, barometric pressure, and carbon dioxide concentrations but exclude hypobaric conditions. The ventilation data were captured in the CATR (simulator) and in the field.

The data are organized by scenario dyad (gate, jet bridge and cabin) with a total of 72 parameters; 20 associated with the gate dyad, 15 from the jet bridge, and 37 from the cabin. These are listed in section C below. The data dictionary contains a list of the parameters and includes associated information such as the name, description, dyad, source and method used to collect the parameter, sample size, category (i.e. touch, movement, time, ventilation), airframe, and notes that modelers may find useful.

The data provided are a basic set of raw data without further processing to preserve detail for modelling use. Each parameter should be treated as temporally independent from each other. The timings provided in the datasheets are specific to each individual parameter, even if from the same trial. The timings associated with the data should not be considered a common time scale and cannot be used to align events from different parameter datasets.

2. Dataset archive link: <<https://doi.org/10.21949/9mcd-qm43>>

3. Authorship Information:

Principal Data Creator or Data Manager Contact Information

Name: Shelley Roberts, Ph.D. <<https://orcid.org/0000-0001-9269-350X>>

Institution: National Research Council of Canada

Address: Centre for Air Travel Research, 1950 Research Private, Building U-72,
Ottawa, Ontario, K1V2B1 Canada

Email: <info@nrc-cnrc.gc.ca>

Associate Data Creator or Data Manager Contact Information

Name: Steve Gwynne, Ph.D. <<https://orcid.org/0000-0002-2758-3897>>

Institution: University of Greenwich

Address: Old Royal Naval College, Park Row, Greenwich, London SE10 9LS

Email: <S.Gwynne@greenwich.ac.uk>

Organizational Contact Information

Name: Anthony Tvaryanas, M.D., Ph.D. <<https://orcid.org/0000-0003-0180-2374>>

Institution: Civil Aerospace Medical Institute, Federal Aviation Administration

Address: Federal Aviation Administration, Civil Aerospace Medical Institute, 6500 S.
MacArthur Boulevard, Oklahoma City, OK 73169

Email: <Anthony.P.Tvaryanas@faa.gov> or <9-AMC-AAM-Research-Division@faa.gov>

4. Date of data collection and update interval: March 2024 through November 2024 (laboratory and field phases)

5. Geographic location of data collection:

Canada <<https://www.geonames.org/6251999/canada.html>>

6. Information about funding sources that supported the collection of the data:

This project was funded by the United States Department of Transportation through the Federal Aviation Administration. The project number is: A11J.AM.19. The agreement number is: NAT-I-8917.

B. SHARING/ACCESS & POLICIES INFORMATION

0. Recommended citation for the data:

Roberts, S., Gwynne, S., Pejemsky, A., Dabkowski, R., Kyrollos, D., Ghinet, S. Kinatinder, M., Lebbin, P., Laengert, S., Jeans, L. (2026). "Communicable Disease Transmission in Air Travel: Human Behaviour Dataset". Civil Aerospace Medical Institute – Federal Aviation Administration. <<https://doi.org/10.21949/9mcd-qm43>>

1. Licenses/restrictions placed on the data:

These data are in the Public Domain. Datasets and corresponding reports are made available in ROSA P <<https://rosap.ntl.bts.gov/>>, the U.S. Department of Transportation Open Science Access Portal. Data is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (CC BY-NC-SA 4.0) (<https://creativecommons.org/licenses/by-nc-sa/4.0/>). This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for the contents thereof.

2. Was data derived from another source?:

No unless explicitly stated otherwise in the associated report
<<https://doi.org/10.21949/2nev-k207>>

3. This dataset and its documentation was created and shared 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://www.transportation.gov/sites/dot.gov/files/docs/Official%20DOT%20Public%20Access%20Plan%20ver%201.1.pdf>) and guidelines suggested by the DOT Public Access website (<https://ntl.bts.gov/publicaccess/>), in effect and current as of April 10, 2019.

C. DATA & RELATED FILE OVERVIEW

1. File List for the All CSVs.zip collection

Filename: Size in kb : MD5 checksum

NTL_Data_Dictionary.csv: 1.3 kb : d574fe129a104866799d6987cfd585b4

Timelines_Field_In_person_Flights.csv: 1 kb :
8ddb278a56989118fbe3ac58b6ef64f5

Gate_BoardQueuePositions_FV1.csv: 2.8 kb :
a85d0b583f15302c08dded51e1e72797

Gate_DeskProcessing_FV5.csv: 4 kb : 97b75dacc6e144f66cf9824e01b31d9c

Gate_DeskQueueLength_FV1.csv: 2.9 kb :
f40e0caa68e2b1638d960284b8d508eb

Gate_DewPoint_Inst_T1.csv: 1071.1 kb :
2c8ae2ef7efd0fd71f4913ef7a648b77

Gate_DryBulb_Inst_T1.csv: 2435.4 kb :
9ca0bcb7d6e02d2f89bfdd4e939b0b16

Gate_Flow_Inst_T1.csv: 14.7 kb : e871b5524f4131b4f7c325fabe378156

Gate_Luggage_FV1.csv: 3.2 kb : cdc7e7d9903214ac64a51eab9f860d7f

Gate_PaxDurationDeskQueue_FV1.csv: 2.8 kb :
35042e7b71fe4afac752f03e5e3c3899
Gate_Pressure_Inst_T1.csv: 4.6 kb : d736b170d676e7bee8805f897c34185f
Gate_QueueFaceDir_T1.csv: 2.1 kb : 78c879bb4c292ba39ce2906812645eb7
Gate_SeatedDuration_FV1.csv: 1689.1 kb :
3d1714ea72123f71b32245722f8abaea
Gate_SeatFaceDir_FV1.csv: 0.4 kb : e561f1e9f93e43e19314f0f7b9450996
Gate_ShareTouch_FV5.csv: 1.5 kb : 325323e93ff29558668097582c6b734d
Gate_SpaceCO2_Inst_T1.csv: 1 kb : 02163046d02050fed7cf55bf0dd1d4c6
Gate_Speech_T3.csv: 1.5 kb : 8df2d5293c3b41df8b753d162dc76a87
Gate_Ventilation_Inst_FV1.csv: 102.6 kb :
3bed82f02b9bfa65f48d6b69aab782dd
Jetbridge_BoardQueueDensity_FV1.csv: 0.2 kb :
83d7f401ba83f2a43aaa853837dc5e1c
Jetbridge_DelayEntrance_T3.csv: 9.4 kb :
dba2919fc1e22fb612ae3d4bd84ce0af
Jetbridge_EnterExit_FV1.csv: 0.6 kb : 7644bea3ace61bf9c73cc014ce922b87
Jetbridge_FuselageTouch_FV1.csv: 2.2 kb :
28c453506326065d3fac22296f617774
Jetbridge_QueueLength_T3.csv: 1118.2 kb :
ca49b8412aa737681d81fcd47d67b4d3
Jetbridge_ShareTouch_FV1.csv: 900.1 kb :
330cb5ccfbe2bffd9e20bc84324b01b1
Jetbridge_Speech_T3.csv: 4.7 kb : eea31c851b612220575bba7880f2ff77
Jetbridge_StandFaceDir_T3.csv: 1.9 kb :
434502ca61b1b85b8bc2c90e30aa41ab
Jetbridge_Ventilation_Inst_FV1.csv: 1.1 kb :
cac860c844917bdc73fce2af608b3297
Cabin_ArmrestTouch_T1.csv: 0.2 kb : 1471f7fdd7be456ddab57c533d22cfd7
Cabin_BarrierTouch_T1.csv: 1.2 kb : 0f46f5b4e10a979b238a7dbbea0de2b6
Cabin_BoardMove_T1.csv: 162.5 kb : 25c9fae525f5a0080969f51343b79985
Cabin_CruiseMove_T1.csv: 4.3 kb : cc6f6c5cf18f11c196518b5a955a0d6d
Cabin_DeboardMove_T1.csv: 1.3 kb : 959c8ddb68345e4469de82b49415ebac
Cabin_DewPoint_Inst_T1.csv: 8.6 kb :
2220cb48209c7520a0a99dbe07c7d877
Cabin_DryBulb_Inst_T1.csv: 9.3 kb : a03d55997bb660f94fddba17766bda93
Cabin_Flow_Inst_T1.csv: 12.6 kb : f928ba7f4b27ffc11eb9bd5cce61d14f
Cabin_LavSensor_Inst_T1.csv: 0.1 kb : 30c1c4cb5a89657de98b04616f9606fe
Cabin_LavUse_inperson.csv: 2.6 kb : 484f56086d2a013b88a1f8ef05af87f5
Cabin_OverheadBinTouch_T1.csv: 7.4 kb :
02e0a822fed4a44d29e67e4197c3e9fa
Cabin_PouchTouch_T3.csv: 0.7 kb : 67277c6f60b88ca5bf23c7498004779e
Cabin_Pressure_Inst_T1.csv: 3.6 kb : 5c59330294cc30c751f0e5c3faf52073

Cabin_PSUTouch_Inst_T1.csv: 2.2 kb : 55edaf72a8cb551c9aa8565704f3c659
Cabin_SeatBelt_T3.csv: 9.6 kb : 7dd51082db3bd006b2feaabe81ef7c0c
Cabin_SeatedDur_T1.csv: 8.8 kb : dc741732f2b7284b0eb5246733aacbc6
Cabin_SeatFaceDir_T1.csv: 351.1 kb :
703b0b0e0397a5e4eede495daf3ee342
Cabin_SeatFaceTouch_T1.csv: 0.6 kb :
67fa273d9737591c06e767e698388209
Cabin_SeatRecline_T1.csv: 79.5 kb : e99c8bd2790b9188a0a963246229672e
Cabin_SeatTopTouch_T1.csv: 0.6 kb : 138aa641f805f3a460e3d63bb4b51d01
Cabin_ShareTouchCabinRow_T1.csv: 2.2 kb :
daff44c2dda7408837c229e60d043944
Cabin_ShareTouch_T1.csv: 0.1 kb : 18da61a5c8cc64945be14d96d90acbcc
Cabin_SpaceCO2_Inst_T1.csv: 1.6 kb :
edae9c752ed3e69f674a5b182c522d32
Cabin_Speech_T3.csv: 0.2 kb : 75eaa1eb293b33eb791c999a436310e9
Cabin_StandFaceDir_T1.csv: 7.9 kb : 48d2ef77f3d47ffba189dca55709d427
Cabin_TrayTableMove_T3.csv: 0.8 kb :
d305b2b15fd20964ee9bc39b47b2c3a9
Cabin_TTableTouch_inperson.csv: 0.7 kb :
3a0e3a163b5f9138e104fa089c288e58
Cabin_WindowMove_T1.csv: 0 kb : 9f8127b8a053eea916956a14f644509a
Cabin_WindowTouch_inperson.csv: 45 kb :
d19158211a0b0dffadc1f7904319e52f

D. METHODOLOGICAL INFORMATION

1. Description of methods used for collection/generation of data: Methodology was informed and refined during initial pilot studies conducted in the field and laboratory. Data were collected through a combination of video recordings, manual observations, and sensor instrumentation tailored to the specific context (Research Ethics Approval #2023-141). Data collection included a combination of: 3 simulated trials (N=113) in the CATR, 4 field in-person observation flights, and 5 flights captured via video at an airport gate and jet bridge. To simplify and ensure quality, only a sub-set of the data collected are shared here, however the remaining data may be available upon request.

Manual and sensor-derived data were analyzed through behaviour counts, while video data required annotation using either manual methods or computer vision algorithms. NRC developed bespoke software to facilitate manual annotation, and advanced machine learning techniques were employed to automate complex tagging tasks such as facial orientation.

2. Instrument- or software-specific information needed to interpret the data: To ensure public access the report was converted from .PPT format to .PDF format and the dataset was converted from .XLSX to .CSV format. Software such as Notepad++ can be used to access .CSV. Most computer machines' web browsers can be used to access the .PDF files (report).

E. DATA-SPECIFIC INFORMATION

Parameters represent three segments of the air travel journey

1. Gate Parameters

- Number of parameters: 20, Please refer to Section C
- Refer to the data dictionary and PDF report for a full description of each dataset
- Data Dictionary/Variable List: NTL_Data_Dictionary.csv
- Missing data codes: N/A = the data is not available either because it cannot be or was not collected. 0 = the value zero, but in some cases 0 may be assigned to a density value where density cannot be calculated as there are less than 2 people present. Unknown = the value is unknown.

2. JetBridge Parameters

- Number of variables (columns): 15, Please refer to Section C
- Refer to the data dictionary and PDF report for a full description of each dataset
- Data Dictionary/Variable List: NTL_Data_Dictionary.csv

- Missing data codes: N/A = the data is not available either because it cannot be or was not collected. 0 = the value zero, but in some cases 0 may be assigned to a density value where density cannot be calculated as there are less than 2 people present. Unknown = the value is unknown.

3. Cabin Parameters

- Number of parameters: 37 Please refer to Section C
- Refer to the data dictionary and PDF report for a full description of each dataset
- Data Dictionary/Variable List: NTL_Data_Dictionary.csv
- Missing data codes: N/A = the data was not collected/unavailable. 0 = the value zero, but in some cases 0 may be assigned to a density value where density cannot be calculated as there are less than 2 people present. Unknown = the value is unknown.

F. UPDATE LOG

This README.txt file was originally created on 2025-06-23 by Amie Simmons (<https://orcid.org/0009-0007-8876-2884>) Research Project Manager, FAA Contractor, Chickasaw Health Consulting, <amie.a-ctr.simmons@faa.gov> with updates by dataset authors (see above), Amie Simmons, and Hilary Uyhelji, FAA Data Scientist, (<https://orcid.org/0000-0002-3433-8320>) <hilary.uyhelji@faa.gov>.

2025-06-23: Original README drafted based on planned dataset and report generation

2026-05-29: README file updated following execution of dataset generation, curation, and report writing