

**CARNATIONS**  
**Year 1 Jump Start Project 6**  
**Multi-Vehicle/Infrastructure Jammer/Spoofers Detection and Localization, Year 1**  
**— Data Management Plan —**

**Recipient/Grant Number:** Illinois Institute of Technology/69A3552348324

**Center Name:** Center for Assured and Resilient Navigation in Advanced Transportation Systems (CARNATIONS)

**Research Priority:** Reducing Transportation Cybersecurity Risks

**Principal Investigators:** Matthew Barth, UC Riverside; Co-PI: Jay Farrell, UC Riverside

**Other Investigator(s):** Co-PIs: Matthew Spenko, Mathieu Joerger

**Reporting period start and end date:** 10/1/2023 – 9/30/2024

### **Data Description**

All Jump Start Project 6 data will be managed according to the generic CARNATIONS Data management Plan (DMP). This project-specific DMP adds a few minor refinements to the generic CARNATIONS plan for a subset of Project 6 data, specifically for a paper that is currently under review for publication in an IEEE conference.

Over Year 1 of this project, the IIT/VT team produced the following data:

- a draft conference paper currently under review for a conference of the IEEE (Institute of Electrical and Electronics Engineers) International Conference on Robotics & Automation (ICRA 2025).

This paper captures the information relevant to CARNATIONS. The focus was on uncertainty evaluation for collaborative navigation in GNSS-denied areas. The small subset of data that was used for performance evaluation is part of a bigger dataset developed under Project 9 (entitled “Comprehensive Testing and Evaluation of Resilient PNT Systems”). It is not included here because it is still under development and is not a major product of Project 6.

1. *Name the data (or data producing program).*  
“The Impact of Sensor Faults on Connected Autonomous Vehicle Localization”
2. *Name the person(s) responsible for managing the data and checking for adherence to the Center and project-specific DMPs.*  
Shinsaku Kuwada, Mathieu Joerger, and Matthew Spenko
3. *Describe the relevance of the data to the research.*  
This draft paper describes the development of a method to perform high-integrity collaborative LiDAR/INS navigation (LiDAR stands for Light Detection And Ranging, INS stands for inertial navigation systems), including position estimation for multiple vehicles, incorrect association fault detection, and positioning error bounding in the presence of nominal errors and undetected faults. The paper outlines two example implementations, which are illustrated using simulated and experimental sensor data.
4. *Describe the nature of the data (e.g., numerical, image, text, video, audio, database, source code, etc.).*  
The nature of the data is text.

5. *Describe the methods for creating the data (e.g., simulated, observed, experimental, software)*  
The method for algorithm derivation is through literature review and analytical derivation.
6. *If requesting permission not to make data publicly accessible, explain the rationale.*  
We request permission to wait for the draft paper to be accepted for publication before releasing it.

### **Data Formats and Standards**

1. *Describe the metadata that will be provided.*  
The metadata will be provided as a DCAT-US Version 1.1 metadata file in the JSON format generated using the tool at the link:  
<https://transportation.libguides.com/researchdatamanagement/datapackages>.
2. *Provide the format(s) for the data to be collected.*  
The format is PDF.
3. *Indicate what tools or software are required to read or view the data.*  
Use a PDF Reader to read the text and visualize figures.
4. *Describe data quality control measures to be implemented.*  
As long as the file is not corrupt, i.e., if it opens, then it is of good quality.

### **Data Access and Sharing**

The data will be released in May 2025, after getting confirmation that it is accepted at the ICRA 2025 conference.

### **Re-use, Redistribution, and Derivative Products**

1. The Illinois Institute of Technology or the home institution(s) of the PI(s) responsible for the research project will hold the IP and copyright for data and other materials created by the project.
2. The US DOT reserves a royalty-free, nonexclusive and irrevocable license to reproduce, publish, or otherwise use and to authorize others to use the work for government purposes.
3. The project data will be uploaded to an open archive as soon as the paper is accepted for publication. However, no change of ownership is implied and no property rights are transferred. All uploaded content will remain the property of the parties listed in item 1 above.
4. The paper will be designated in the archive for reuse and redistribution in compliance with the publishing rights of the IEEE ICRA conference.

### **Archiving and Preservation.**

1. *Archiving Platform Selection:*  
The paper will be uploaded on Zenodo.
2. *DOI Assignment and Management:*

A DOI will be assigned upon upload to Zenodo and we will maintain accurate and up-to-date records of the DOIs for easy referencing.

3. *Metadata Provision:*  
Comprehensive metadata for the paper will be provided as outlined in the “Data Formats and Standards” section. This metadata will facilitate easy discoverability and accessibility of the data on Zenodo.
4. *Backup Procedures:*  
The data will be backed up at the CARNATIONS central facility and at the other participating PI’s home institutions.
5. *Data Security and Integrity:*  
The data will be openly available in compliance with IEEE ICRA requirements and yearly manual checks will be performed to ensure the data has not been corrupted or modified.
6. *Compliance with Zenodo’s Policies:*  
Adherence to Zenodo’s backup, data recovery, retention, security, and integrity policies will be documented.
7. *Long-term Data Retention:*  
We acknowledge the commitment to long-term data retention, in line with Zenodo’s guarantee of a minimum of 20 years.
8. *Review and Update of Archiving Strategies:*  
We plan on reviewing and updating the archiving strategies once a year, or more frequently if changes are needed.