

Plan Overview

A Data Management Plan created using DMP Tool

DMP ID: <https://doi.org/10.48321/D1F723D6D2>

Title: Drone Medical Package Delivery for Improved Transportation and Better Patient Outcomes

Creator: Madeline Alden - **ORCID:** [0009-0002-8653-0389](https://orcid.org/0009-0002-8653-0389)

Affiliation: United States Department of Transportation (DOT) ([transportation.gov](https://www.transportation.gov))

Principal Investigator: Cynthia Williams, David Bowles

Data Manager: Kevin O'Brien , Dr. Yin-Hsuen Chen

Project Administrator: John Costulis, Anne Doyle, Madeline Alden, Joel Davidson

Contributor: Heather Richter, Aaron Koehl, Nick Chuquin, Dr. Yin-Hsuen Chen, Amro El-Adle, Cynthia Coffey, Greg James

Funder: United States Department of Transportation (DOT) ([transportation.gov](https://www.transportation.gov))

Funding opportunity number: 69A3552341006-SMARTFY22N1P1G54

Grant: <https://www.transportation.gov/sites/dot.gov/files/2023-03/FY22%20SMART%20Project%20List.pdf>

Template: SMART Grants Stage 1 Data Management Plan (DMP)

Project abstract:

The project proposes to address for medical and emergency response package delivery for various applications where the use of aerial drone mode of transportation will lead to better patient outcomes and improved safety and emergency response. The project opportunity is the exploration of integrating autonomous unmanned systems in the delivery of medical, public safety and emergency response supplies such as medication to determine if this innovative technology can be leveraged to address regional health disparities and access to care for rural communities. Recent staffing shortages, transportation, and supply chain issues are even more prevalent across the historically disadvantaged Eastern Shore of Virginia, which includes Accomack and Northampton Counties and particularly the very remote community of Tangier

Island. Extended shipping and diagnostic turnaround times due to the geographical and rural make-up of the region pose a challenge for urgent deliveries between hospital facilities, clinics, and pharmacies and can negatively impact patient outcomes. Coupled with the lack of public transportation systems that reach into the areas outside of Route 13, these geographies present unique maritime, road-related delays, and unpredictable congestion which pose an issue for urgent deliveries.

The use of autonomous uncrewed systems (Drones) could revolutionize the transportation of critical medications, medical supplies, public safety and emergency response in rural areas that lack public transportation to improve patient health outcomes, provide needed access to people who cannot drive or depend on others to help get their medications needed for chronic conditions. The project planning, research, and prototyping involves several partners including Riverside Health System, Old Dominion University (ODU), the Accomack-Northampton Planning District Commission, and DroneUp.

This DMP supports the reporting for the proof-of-concept findings, lessons learned and overview of the programs benefits to support at-scale-implementation of operations within the service area of Eastern Shore, Virginia. The project was funded by the Department of Transportation's Strengthening Mobility and Revolutionizing Transportation (SMART) Program Stage 1 grant funding.

Last modified: 07-14-2025

Drone Medical Package Delivery for Improved Transportation and Better Patient Outcomes

Dataset and Contact Information

Please provide as much of the the following information as possible:

1. Name of the project;
 2. Grant number;
 3. Name of the person submitting this DMP;
 4. ORCID of the person submitting this DMP (need an ORCID? Register here: <https://orcid.org/>);
 5. Email and phone number of the person submitting this DMP;
 6. Name of the organization for which the person submitting this DMP is working;
 7. Email and phone number for the organization;
 8. Link to organization or project website, if applicable; and,
 9. Date the DMP was written.
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1. **Name of the project:** Drone Medical Package Delivery for Improved Transportation and Better Patient Outcomes
 2. **Grant number:** 69A3552341006-SMARTFY22N1P1G54
 3. **Name of the person submitting this DMP:** Anne Doyle
 4. **ORCID of the person submitting this DMP:** N/A
 5. **Email and phone number of the person submitting this DMP:** Email - adoyle@a-npdc.org, phone number - 757-787-2936, x115
 6. **Name of the organization for which the person submitting this DMP is working:** Accomack-Northampton Planning District Commission
 7. **Email and phone number for the organization:** adoyle@a-npdc.org, Main Number: (757) 787-2936, Toll Free: (866) 787-3001
 8. **Link to organization or project website:** organization - <https://www.esvaplan.org/>, project website - <https://visaatodu.org/elevating-health-care-access-project/> , project repository: <https://dataverse.harvard.edu/dataverse/DroneDOTSMART>
 9. **Date the DMP was written:** 12/15/2023, updated 10/23/2024

Data Description

Please provide as much information as possible:

1. Provide a description of the data that you will be gathering in the course of your project or data from a third party that you will re-use, if any;
 1. If there will be no data collected or re-used from another source, state that this is case;
2. Address the expected nature, scope, and scale of the data that will be collected, as best as you can at this stage;
3. As best as you can, describe the characteristics of the data, their relationship to other data, and provide sufficient detail so that reviewers will understand any disclosure risks that may apply;
 1. If data might be sensitive, please describe how you will protect privacy and security, if you know that now;
 2. You may need to update your DMP later to add more detail;
4. Discuss the expected value of the data over the long-term.

1. Description of planned data:

Health benefits/business case - population and patient data of Eastern Shore, Virginia (patient health outcomes, health disparity, social vulnerability, access to care, and clinical concerns):

Planned internal data sources: Riverside Health System's electronic health records (Epic, Strata), DroneUp's infrastructure and business costs

Planned external data sources – Virginia Department of Health, US Census, United States Health Resources and Service Administration, VHSPDC, Census Bureau Search, Centers for Medicare and Medicaid Services - Chronic Conditions | Virginia Open Data Portal

Optimized / maximize locations and patients (Route mapping, corridors, and hubs – neighborhoods, environment, elevation, population):

Planned internal data sources – ODU GISHub

Planned external data sources – FFA Advisories Database, ADSB signal data, MIT PEDARS, Dedrone Tracker, Virginia LiDAR Downloads | VGIN, Virginia Building Footprints | VGIN, National Flood Hazard Layer | FEMA.gov, Land Cover Data Overview | U.S. Geological Survey (usgs.gov), Virginia Parcels | VGIN, Social Vulnerability Index for Virginia by Census Tract, 2018 | Virginia Open Data Portal, Socioeconomic Data and Applications Center | SEDAC (columbia.edu), Data Catalog | Planetary Computer (microsoft.com), public use GIS and satellite data and other social and demographic datasets

Third party data used for this project:

- Road centerlines, June 2024, Virginia Geographic Information Network (<https://vgin.vdem.virginia.gov/pages/clearinghouse>)
- Parcel, July 2024, Accomack County GIS Data (<https://accomack-county-virginia-open-data-portal-accomack.hub.arcgis.com/>); June 2024 Virginia Geographic Information Network (<https://vgin.vdem.virginia.gov/pages/clearinghouse>)
- Building footprint, June 2024, Geographic Information Network (<https://vgin.vdem.virginia.gov/pages/clearinghouse>)
- UAS facility map data, July 2024, Federal Aviation Administration (<https://hub.arcgis.com/datasets/faa::faa-uas-facilitymap-data/about>)
- Decennial demographic and housing characteristics data, 2020, Explore Census Data (<https://data.census.gov/>)
- National land cover database, 2021, Earth Resources Observation and Science Center (<https://www.mrlc.gov/data/nlcd-land-cover-conus-all-years>)
- Flood insurance map, 2015 (Accomack County), 2016 (Northampton County), Flood Map Service Center (<https://msc.fema.gov/portal/advanceSearch>)

2. Expected scope and scale of data collection: geographical and demographic data for the Eastern Shore of Virginia by county

3. Data characteristics: Phase 1 data will be mostly publicly accessible, geolocated data on a scale needed for modeling and simulation

Privacy and security protection of data: Restricted access through secure access systems such as a controlled computing environment with authorized trained users complying with secure system protocols, excludes patient data. Patient data will comply with Riverside's privacy, compliance policies and HIPPA regulations

Data Format and Metadata Standards Employed

Please provide as much information as you can:

1. Describe the anticipated file formats of your data and related files;
2. To the maximum extent practicable, your DMP should address how you will use platform-independent and non-proprietary formats to ensure maximum utility of the data in the future;

1. If you are unable to use platform-independent and non-proprietary formats, you should specify the standards and formats that will be used and the rationale for using those standards and formats.
3. Identify the metadata standards you will use to describe the data.
 1. At least one metadata file should be a DCAT-US v1.1 (<https://resources.data.gov/resources/dcat-us/>) .JSON file, the federal standard for data search and discovery.

1. **Anticipated file formats for data and related files:** PDF, csv, jpeg, .pdf, png
2. **Use of platform-independent and non-proprietary formats:** will comply with open standards

Regarding open-access formats vs. proprietary formats, we aim to be as open-access as possible with the release of the data to the public.

3. **Metadata standards planned to be used to describe the data:** will follow conventions for each adopted data type and use at least one metadata file following DCAT-US v1.1 schema

The final data will have a DCAT-US v1.1 .JSON metadata file, which is the federal standard for data search and discovery in compliance with the USDOT Public Access Plan.

Access Policies

In general, data from DOT-funded projects must be made publicly accessible. Exceptions to this policy are: data that contain personally identifiable information (PII) that cannot be anonymized; confidential business information; or classified information. Protecting research participants and guarding against the disclosure of identities and/or confidential business information is an essential norm in scientific research. Your DMP should address these issues and outline the efforts you will take to provide informed consent statements to participants, the steps you will take to protect privacy and confidentiality prior to archiving your data, and any additional concerns. In general, in matters of human subject research, your DMP should describe how your informed consent forms will permit sharing with the research community and whether additional steps, such as an Institutional Review Board (IRB), may be used to protect privacy and confidentiality. Additionally, when working with, or conducting research that includes Indigenous populations or Tribal communities, researcher will adhere to the CARE Principles for Indigenous Data Governance <https://www.gida-global.org/care> and make an explicit statement to that effect in this portion of the DMP.

Please provide as much information as possible:

1. Describe any sensitive data that may be collected or used;
 2. Describe how you will protect PII or other sensitive data, including IRB review, application of CARE Principles guidelines, or other ethical norms and practices;
 1. If you will not be able to deidentify the data in a manner that protects privacy and confidentiality while maintaining the utility of the dataset, you should describe the necessary restrictions on access and use;
 3. Describe any access restrictions that may apply to your data;
 4. If necessary, describe any division of responsibilities for stewarding and protecting the data among Principal Investigators or other project staff.
1. **Describe any sensitive data that may be collected or used:** limited use of PII will be employed and restricted by Riverside Health and project team for internal decision points and planning reasons, no data sharing of PII will be done in Stage 1
 2. **Describe how you will protect PII or other sensitive data, including IRB review, application of CARE Principles guidelines, or other ethical norms and practices:** will comply with company's privacy, compliance policies and HIPAA regulations to ensure sensitive data is secured and confidential

3. Describe any access restrictions that may apply to your data: all personally identifiable information (PII) and company proprietary data will not be shared, access restrictions are outlined in partnership teaming agreements, NDAs, subcontracts and internal company policies

4. If necessary, describe any division of responsibilities for stewarding and protecting the data among Principal Investigators or other project staff: Division of responsibilities are outlined in partnership teaming agreements, NDAs, subcontracts and internal company policies

Re-use, Redistribution, and Derivatives Products Policies

Recipients are reminded:

1. Data, as a collection of facts, cannot be copyrighted under US copyright law;
2. Projects carried out under a US DOT SMART Grants is federally funded; therefore, as stated in grant language:
 1. Recipients must comply with the US DOT Public Access Plan, meaning, among other requirements, project data must be shared with the public, either by the researchers or by US DOT;
 2. That by accepting US DOT funding through this grant, recipients have granted to US DOT a comprehensive non-exclusive, paid-up, royalty-free copyright license for all project outputs (publications, datasets, software, code, etc.). This includes all rights under copyright, including, but not limited to the rights to copy, distribute, prepare derivative works, and the right to display and/or perform a work in public; and,
 3. In accordance with Chapter 18 of Title 35 of the United States Code, also known as the Bayh-Dole Act, where grant recipients elect to retain title to any invention developed under this grant, US DOT retains a statutory nonexclusive, nontransferrable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States any such invention throughout the world.

Please provide as much information as possible:

1. Describe who will hold the intellectual property rights for the data created or used during the project;
 2. Describe whether you will transfer those rights to a data archive, if appropriate;
 3. Identify whether any licenses apply to the data;
 1. If you will be enforcing terms of use or a requirement for data citation through a license, indicate as much in your DMP;
 4. Describe any other legal requirements that might need to be addressed.
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1. **Describe who will hold the intellectual property rights for the data created or used during the project:** intellectual property rights carried out will be consistent with the DOT SMART grant program agreement. By accepting US DOT funding through this grant, the US DOT is granted a comprehensive non-exclusive, paid-up, royalty-free copyright license for all project outputs (publications, datasets, software, code, etc.). This includes all rights under copyright, including, but not limited to the rights to copy, distribute, prepare derivative works, and the right to display and/or perform a work in public.
 2. **Describe whether you will transfer those rights to a data archive, if appropriate:** intellectual property rights carried out will be consistent with the DOT SMART grant program agreement
 3. **Identify whether any licenses apply to the data:** N/A
 4. **Describe any other legal requirements that might need to be addressed:** All flight operations are subject to either compliance or under waiver to Title 14, Code of Federal Regulations (14 CFR) part 107

Archiving and Preservation Plan

Please provide as much information as possible:

- 1. State where you intend to archive your data and why you have chosen that particular option;**
 - 2. Provide a link to the repository;**
 - 3. You must describe the dataset that is being archived with a minimum amount of metadata that ensures its discoverability;**
 - 1. Whatever archive option you choose, that archive should support the capture and provision of the US Federal Government DCAT-US Metadata Schema
<https://resources.data.gov/resources/dcat-us/>**
 - 4. In addition, the archive you choose should support the creation and maintenance of persistent identifiers (e.g., DOIs, handles, etc.) and must provide for maintenance of those identifiers throughout the preservation lifecycle of the data;**
 - 5. Your plan should address how your archiving and preservation choices meet these requirements.**
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1. Archived data will be stored in one of the DOT approved repositories and will comply with 'Plan to Increase Public Access to the Results of Federally-Funded Scientific Research Results, Version 1.1' where ever possible. The repository Harvard Dataverse (<https://dataverse.harvard.edu>) does provide persistent identifiers to their published data and supports the capture and provision of the DCAT-US Metadata Schema.
 2. Project repository: <https://dataverse.harvard.edu/dataverse/DroneDOTSMART>
 3. Data set will comply with the minimum amount of metadata to support DCAT-US Metadata Schema
 4. Identifiers will be created to support and maintain the preservation of the data lifecycle
 5. Appropriate references were reviewed upon creation of this plan to ensure requirements will be met, references consulted include but is not limited to the following:
 1. DCAT-US Schema v1.1 (Project Open Data Metadata Schema),
<https://resources.data.gov/resources/dcat-us/>
 2. <https://ntl.bts.gov/ntl/public-access/data-repositories-conformant-dot-public-access-plan>
 3. Plan to Increase Public Access to the Results of Federally-Funded Scientific Research Results Version 1.1
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Planned Research Outputs

Dataset - "Drone Medical Package Delivery for Improved Transportation and Better Patient Outcomes"

The project proposes to address for medical and emergency response package delivery for various applications where the use of aerial drone mode of transportation will lead to better patient outcomes and improved safety and emergency response. The project opportunity is the exploration of integrating autonomous unmanned systems in the delivery of medical, public safety and emergency response supplies such as medication to determine if this innovative technology can be leveraged to address regional health disparities and access to care for rural communities. Recent staffing shortages, transportation, and supply chain issues are even more prevalent across the historically disadvantaged Eastern Shore of Virginia, which includes Accomack and Northampton Counties and particularly the very remote community of Tangier Island. Extended shipping and diagnostic turnaround times due to the geographical and rural make-up of the region pose a challenge for urgent deliveries between hospital facilities, clinics, and pharmacies and can negatively impact patient outcomes. Coupled with the lack of public transportation systems that reach into the areas outside of Route 13, these geographies present unique maritime, road-related delays, and unpredictable congestion which pose an issue for urgent deliveries.

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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?
Drone Medical Package Delivery for Improved Transp ...	Dataset	2025-07-09	Open	Harvard Dataverse		Creative Commons Attribution 4.0 International	DCAT-US	No	No