

1 APPENDIX D: Data Sets Collected

Data set collection is in setup and final collection will occur in July and August 2025.

1.1.1 General Study Methodology for Data Collection and Analysis

SAP&DC collected the Stage 1 Prototype Evaluation Measures by conducting controlled testing that facilitates controlled data collection that will allow us to compare prototype performance to baseline and also compare prototype performance directly to a paired surface ambulance response in order to control for potential confounding variables. Evaluation and Stage 2 planning data will be collected using one of four collection methods:

1. Paired case control data method, consisting of live flight tests where the dispatch of a drone delivery of emergency medical articles is paired with the dispatch of an ambulance response (e.g., intervention benefit) obtained from the CAD system;
2. Population data method, where paired drone-ambulance interventions are compared to a data set on baseline ambulance interventions in the same service area (e.g., intervention benefit, cost benefit) and data are normalized to estimate potential performance gains; and
3. Descriptive data method, where cost and performance of equipment and sensors are collected and analyzed using descriptive statistics for reporting and comparison to external reference data sources and metrics (e.g., cost and performance metrics, community benefit).

1.1.2 Collection of Data Sets

The goal of ELSa-M3 is to support the Project Objectives and Stage 2 planning requirements by measuring the cost-benefits of ELSa-M3 including: i) drone response times to that of the peered ambulance traveling by surface; ii) differences in resident medical status at arrival of ambulance, post-event hospitalization requirement, and overall morbidity as it relates to speed of service; iii) cost of the UAS operations and infrastructure and per-call cost of service of the program; v) estimated per-call cost benefits of reduced medical transport, reduced hospital stay, and improved quality of life; and (vii) new workforce and job creation impact to ultimately operate a long-term program. These performance measures will be used to evaluate the Stage 1 prototype and develop the revenue-neutral sustainment plan for a Stage 2 capital investment rollout to the SAP&DC region.

These data collection and evaluation activities will be achieved by conducting four sets of data collection activities: i) collecting medical and cost benefit data from conducting paired drone-ambulance interventions (paired case-control method); ii) collecting medical and cost benefit data from paired ambulance-only interventions (paired case-control method); iii) collecting

Emergency Life Saving through Multi-Modal Mobility (ELSa-M3) (Contract 69A3552441031)
Final Implementation Report

design and cost data for the supporting UAS infrastructure (descriptive data method); and iv) collecting general statistics about the SAP&DC region, the region's geography, the region's service needs, and the region's cost structure to support economic sustainability modeling (population data method and descriptive data method).

No Protected Health Information (PHI) will be collected under the ELSa-M3 study protocols, nor will any health or medical data be used outside of the current, normal course of business in the Cambria County dispatch center. Limited Personally Identifying Information (PII) will be transmitted from the dispatch center to DroneUp to facilitate delivery, however this data will not be published as part of the study data sets and shall only be retained during the project for FAA regulatory purposes. Further, pursuant to 45 CFR 46 (HHS Office for Human Research Protections Common Rule) we will seek a determination from the Cambria County Medical Director as to whether the ELSa-M3 project is exempt from Institutional Review Board (IRB) review as a quality improvement activity, or requires expedited IRB review, pursuant to Commonwealth of Pennsylvania and Cambria County emergency services protocols.

Tables 4a-4f below describe the specific data sets that will be collected and published as part of the ELSa-M3 Stage 1 prototype, including collection methods and elements.

Data Set: Intervention Benefit Data Set	
Collection Method	Data collected during subject dispatch interventions (cardiac arrest, anaphylactic or diabetic shock, traumatic bleeding, or opioid overdose) through active drone-ambulance paired intervention or paired baseline ambulance-only intervention
Data Collection Participants	CCES, SCEM
Data Elements Collected	Time to dispatch, time to response, time on scene, distance traveled, adverse events
Measures Supported	Response Time, Intervention Time, Total Travel Distance, Adverse Events
Requirements Supported	Demonstration of Performance Requirements, Cost-Benefit and Sustainment
PII/PHI Considerations	Any PHI collected will be collected under normal Emergency Services protocols and will not be shared with the ELSa-M3 team. Limited PII (address) for dispatch

Emergency Life Saving through Multi-Modal Mobility (ELSa-M3) (Contract 69A3552441031)
Final Implementation Report

Data Set: Intervention Benefit Data Set	
	services will be shared from CCES to DroneUp, which data will be destroyed at the conclusion of Stage 1.
Supporting File(s)	Overall_Stats.csv Input_Completed_Drone_Flight_ExportTable.csv Drone_DroneTelemetry_ExportTable_CompletedDelivery.csv Optimized_Drone_Dispatch.csv

Table 4a: Intervention Benefit Data Set Description

Data Set: Infrastructure Design Data Set	
Collection Method	Descriptive data method
Data Collection Participants	CCES, ATAA
Data Elements Collected	Siting plan (GIS), risk and siting analyses, deployed service volume maps, bill of materials, deployment guides and data
Measures Supported	Infrastructure Cost Measurement, planning
Requirements Supported	Cost of Infrastructure and Time to Deployment
PII/PHI Considerations	This data set contains no PII or PHI
Supporting File(s)	System Design Document – Appendix B of the Final Report

Table 4c: Infrastructure Design Data Set Description

Data Set: Infrastructure Cost and Performance Data Set	
Collection Method	Descriptive data method

Emergency Life Saving through Multi-Modal Mobility (ELSa-M3) (Contract 69A3552441031)
Final Implementation Report

Data Set: Infrastructure Cost and Performance Data Set	
Data Collection Participants	CCES, ATAA
Data Elements Collected	Site costs, sensor and materials costs, deployment costs, sensor detection characterization, sensor accuracy and error, sensor uptime and availability characterization, system and network latency, system uptime and availability, characterized service volume
Measures Supported	Availability, Flight Plan Performance
Requirements Supported	Cost of Infrastructure and Time to Deployment, Demonstration of Cost-Benefit and Sustainment
PII/PHI Considerations	This data set contains no PII or PHI
Supporting File(s)	ELSa-M3 Program Costs.csv ELSa-M3 Costing Model.xlsx

Table 4d: Infrastructure Cost Data Set Description

Data Set: Flight Safety Data Set – UAS Safety	
Collection Method	Descriptive data method
Data Collection Participants	DroneUp, ATAA, Aloft, OneSky
Data Elements Collected	Deidentified flight plans, flight tracks, diversions, reason for diversion, malfunctions or adverse events
Measures Supported	Flight Plan Performance, Air Safety, Adverse Events
Requirements Supported	Safe Integration of Scalable UAS Operations
PII/PHI Considerations	This data set contains no PII or PHI

Data Set: Flight Safety Data Set – UAS Safety	
Supporting File(s)	DroneUpTelem_JohnstownSummary.csv DroneUpTelem_JohnstownTelemetry.csv

Table 4e: Flight Safety Data Set – UAS Safety Description

Data Set: Flight Safety Data Set – Airspace Characterization	
Collection Method	Descriptive data method
Data Collection Participants	ATAA
Data Elements Collected	Flight tracks
Measures Supported	Air Safety
Requirements Supported	Safe Integration of Scalable UAS Operations
PII/PHI Considerations	This data set contains no PII or PHI
Supporting File(s)	OpticalMerge_jtwn6nm_811thru27.csv Converted_ADSB_ConvertedADSB_All_ADSB_jtwn6nm_8XX.csv

Table 4f: Flight Safety Data Set – Airspace Characterization Description