Using Business Analytics to drive Affordable Readiness

DHS's maturation of Asset Management functions through the use of Business Intelligence

Robert King
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Maturation Drivers

- The Asset Management function must evolve from a "Administrative" perceived burden, to a value-added mission support and business driver.
- The data derived from the Asset Management and Logistics functions is integral to mission support and mission-facing decisions.
    - Assets touch everything.
- Information about our facilities and assets (e.g., vehicles) – tied to attributes about our contracts and workforce - can be positioned to drive intelligence on mission performance and business efficiencies.

Total Asset Visibility

U.S Government Warns Chinese-Made Drones May Be Secretly Sharing Data With China

DHS warns of data threat from Chinese-made drones

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Drones/sUAS – Data Analysis

DHS Small UAS Overview

FOUO - Law Enforcement Sensitive

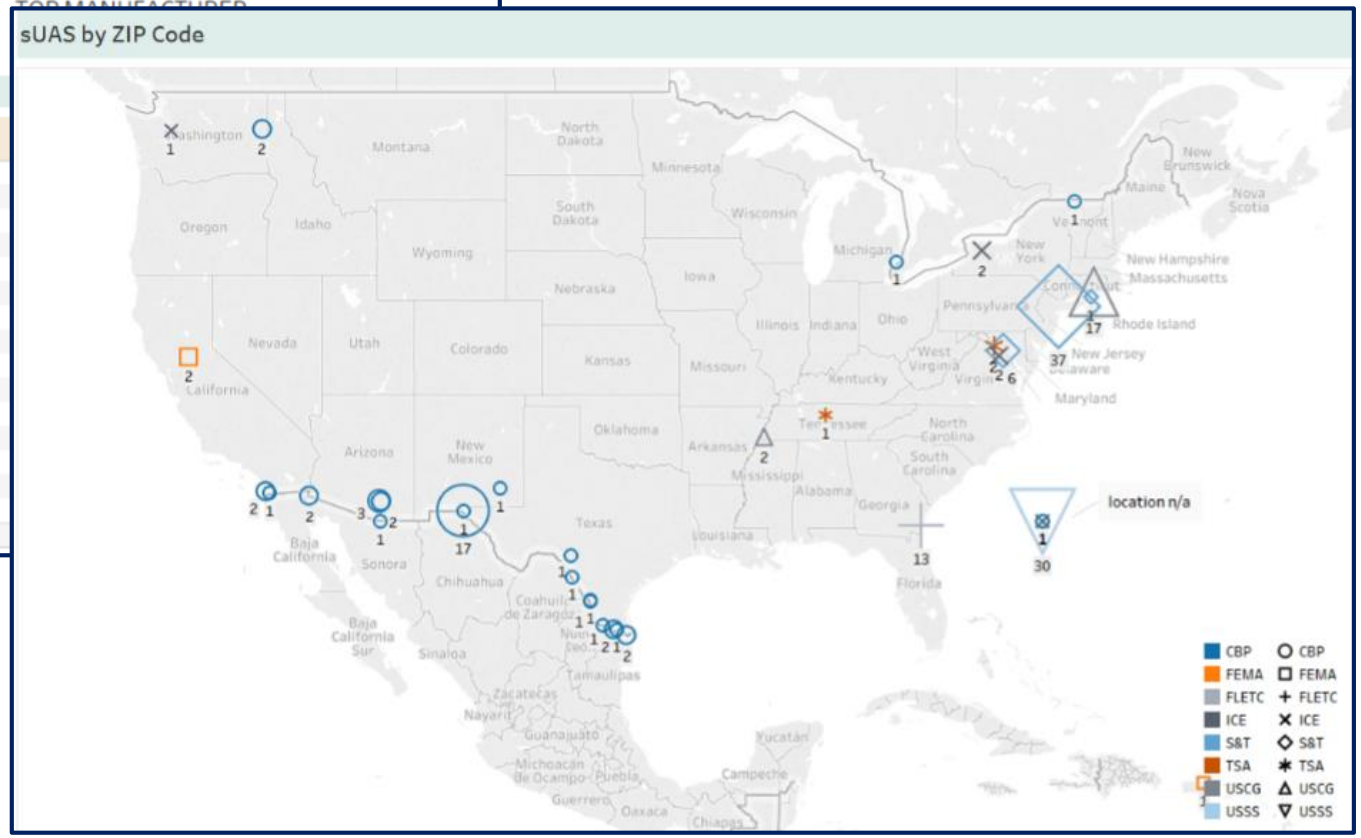
163	1.94M	14	DJI	40%
DRONES	ACQUISITION COST	LOCATIONS		

sUAS by Location

Select component or state to filter →

	CBP	FEMA	FLETC	ICE	S&T	TSA	USCG
AZ	8						
CA	4	2					
CT							17
DC					6		
GA			13				
MI	1						
NM	1						
NY				2	38		
PR		1					
TN						1	2
TX	28						
VA				2		2	
VT	1						
WA	2			1			
Null				1			
Grand Total	45	3	13	6	44	3	19

sUAS by ZIP Code



Note: This is non-production data from a DHS test environment.

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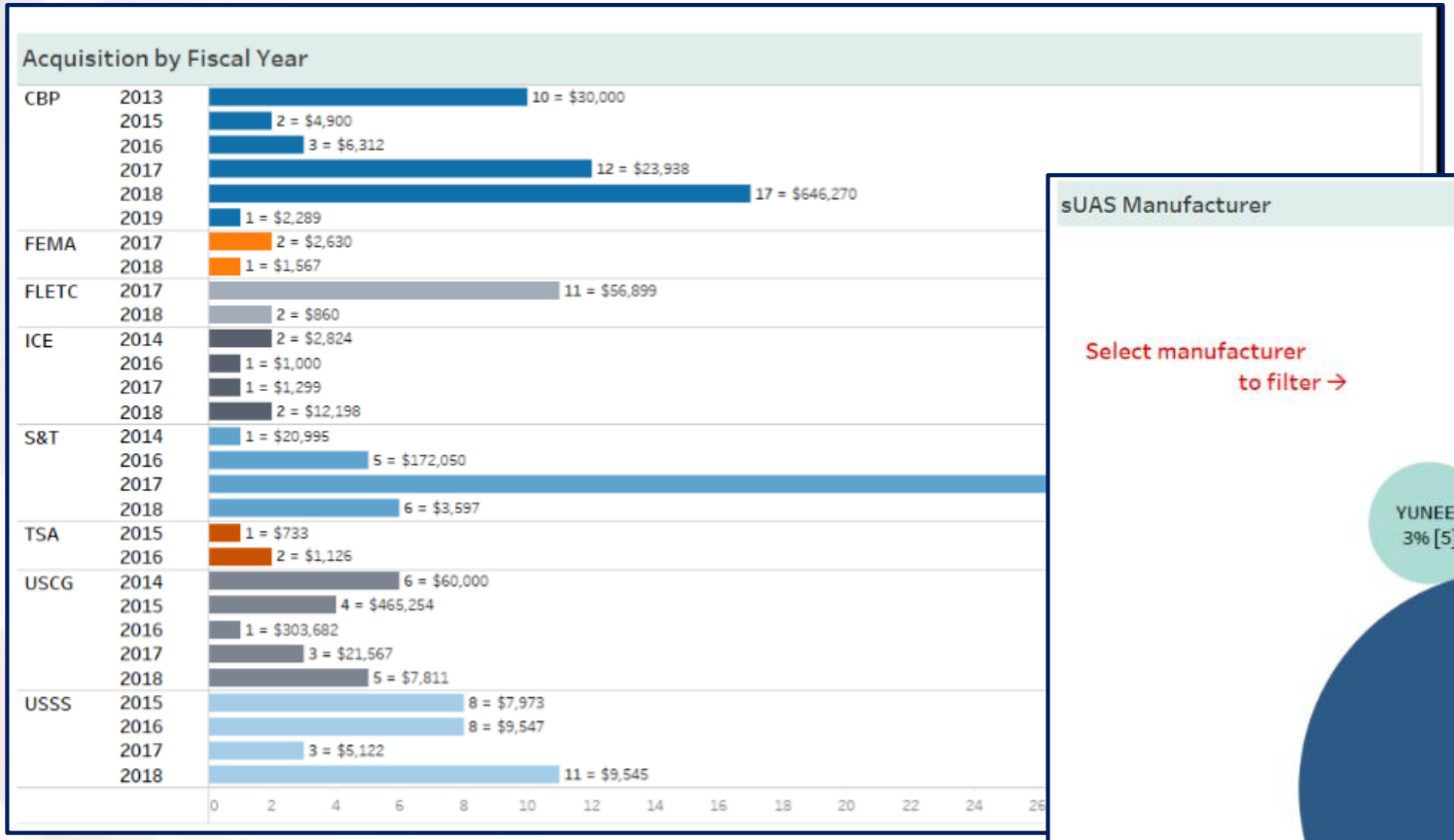
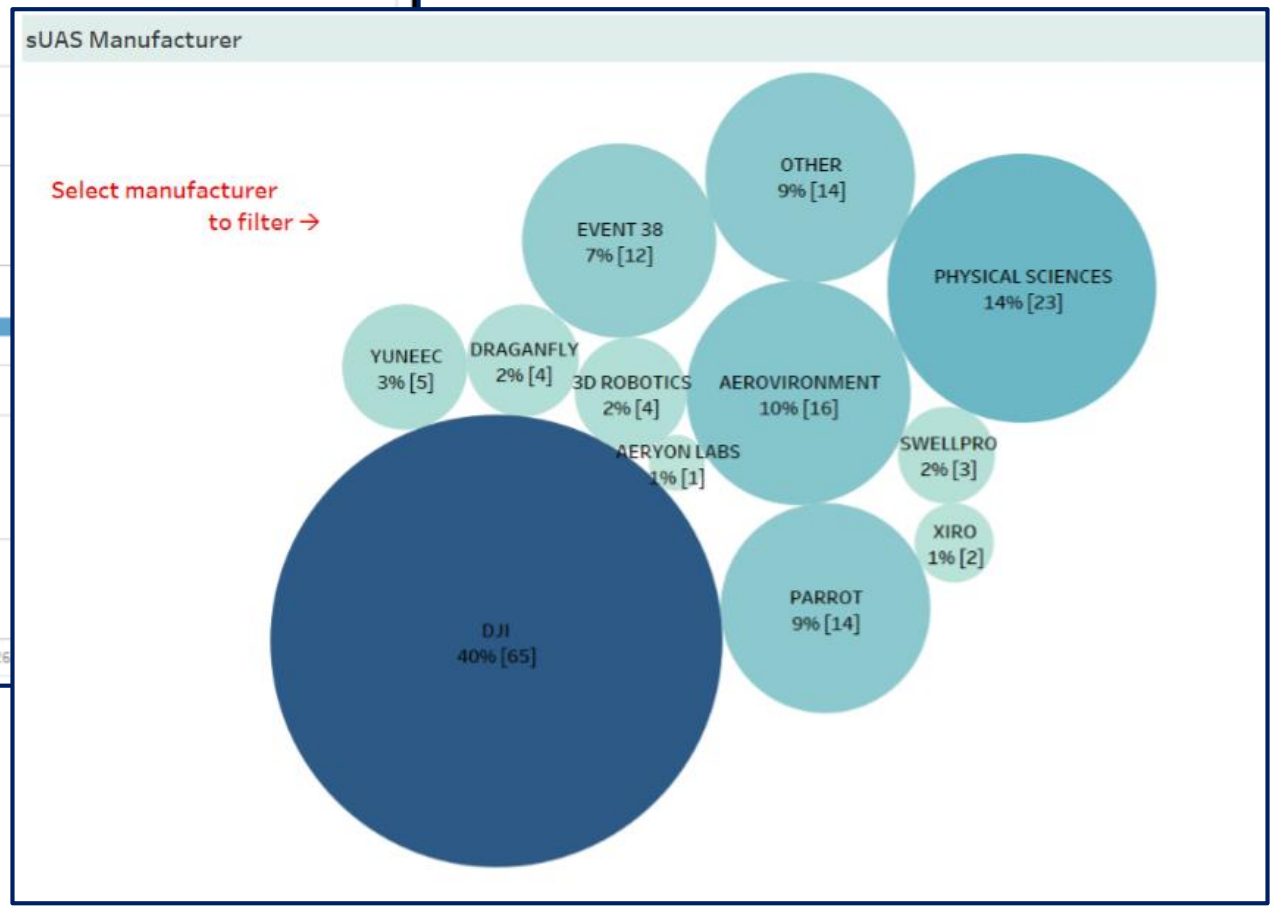
Drones/sUAS – Data Analysis





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Problem Framing – DHS Management Directorate (circa 2013)

12 major / 10 minor DHS Components with no enterprise personal property, mobile asset or facilities management system(s).

- Disparate, inconsistent reporting and analysis, typically operated by data call.
- Collection of standardized information from any one asset management function was challenging; integrating information across business functions (finance, human capital, procurement) was nearly impossible.
- Needed structured data standards, architecture, and systems through which department-wide data could be consolidated, standardized, and analyzed.

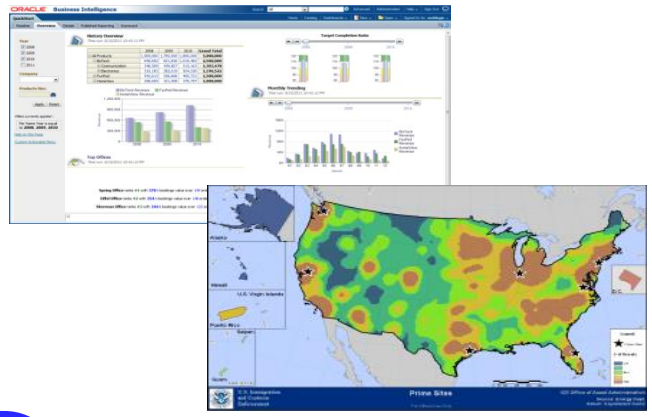
DHS - Integrated Mission Support

Tenants of Integrated Mission Support (Affordable Readiness):

- Shared Services
- Common Business Practices
- Total Asset Visibility
- Data Driven Resource Allocation

What is DHS *Consolidated Asset Portfolio & Sustainability Information System* (CAPSIS)

- DHS-wide centralized data warehousing and business intelligence solution
- Captures, and distills disparate real property, personal property, and sustainability information from all of the DHS Components and Offices in a normalized and integrated manner
- Objectives:



1. **Consolidate Departmental information for reporting and analytical purposes**
2. **Ability to identify assets geographically**
3. **Ability to perform portfolio-level analytics (with asset-level drill-paths)**
4. **Enable fact-based analysis and proactive planning**
5. **Accomplish the above through efficient data collection**

CAPSIS: How it Works

CAPSIS draws upon DHS-wide and related business systems to collect, translate, and harmonize data into decision-support information.

CAPSIS Value Creation

Data Source Feeds	Data Validation	Reporting and Analytical Functionality	Feed to other Systems
Component Source Systems External Source Systems Real Property PP / MA Property CHCO/CPO Energy	Extract Transform Validate Standardize	Single Repository • Standard turn-key reporting • AD hoc query and reporting • GIS visualization	DHS MANAGEMENT CUBE 
Tool Sets DHS Transactional Systems: Sunflower, Oracle FA, Tririgia, SAP AM, etc. External Systems: JPMC Fleet Card, GSA Right Express, DLA, FMLIVE, Unicore EARS, FEMP, etc…	Informatica	Oracle Database OBIEE & Tableau OpenLayer 3 API ESRI Arc Geospatial	Oracle Dashboard DHS Geospatial Management Office (GMO)

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CAPSIS Modules

Three distinct data marts are connected at the data schema and system's layers:

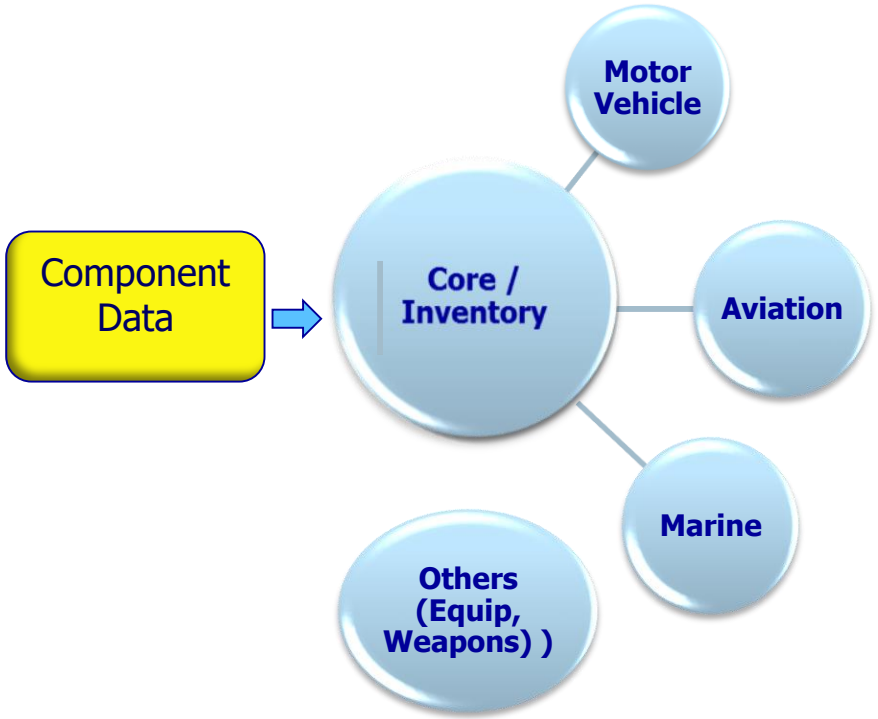
Real Property Data Warehouse (RPDW)	Asset Mgmt. Data Warehouse (AMDW)	Sustainability Performance Management System (SPM)
• Portfolio Management of DHS Buildings, Land, and Structures • Enables OMB/GSA Compliance and FRPP automated reporting for DHS • Freeze the Footprint baseline reporting and changes • 5 Part Composite Key to uniquely identify all physically constructed DHS assets	• Inventory Management of all DHS PP and MA (organized by all major Asset Types) • Operational (e.g., fuel) and Performance (e.g., mission hours) data management • Enables centralized Departmental and GSA/OMB reporting	• Performance and Analysis of Energy Utilities, Greenhouse Gas, and Facility Sustainability • Establishes a system for all regulatory reports • Centralized repository for department-wide facility utilities invoice data

Current Integration: Shared Reference Schema (GIS, Master Address/Location File, RP Unique Identifier); Systems Integration (location sharing)

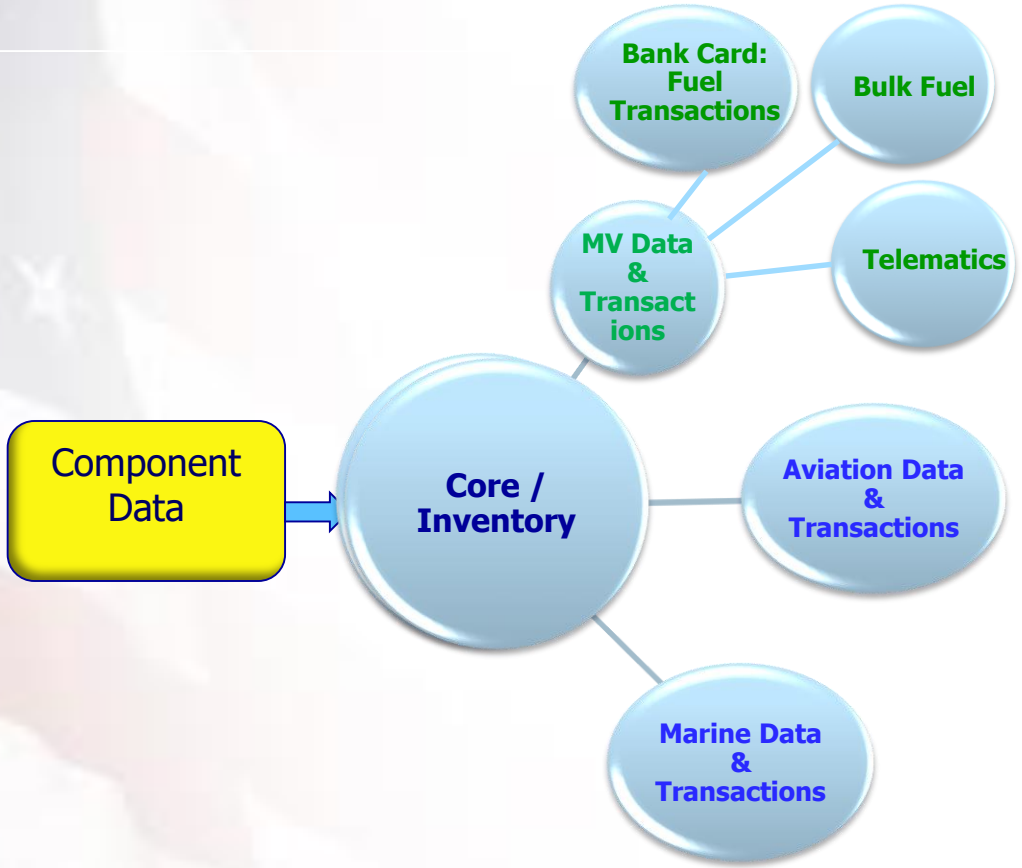
Future Integration: CRSO Shared Reference Schema to include Financial Reporting, Further Source System Integration

Architecture: Asset *Inventory* Attributes

- All asset records are described with a standard set of descriptive "Inventory" attributes
- Inventory records encompass essential inventory accountability and tracking information
  - Location
  - Make and Model
  - Component & Custodial Info.
  - Status
  - Condition
  - Acquisition and Disposition Dates
  - Etc…



Architecture: Operational Transactions



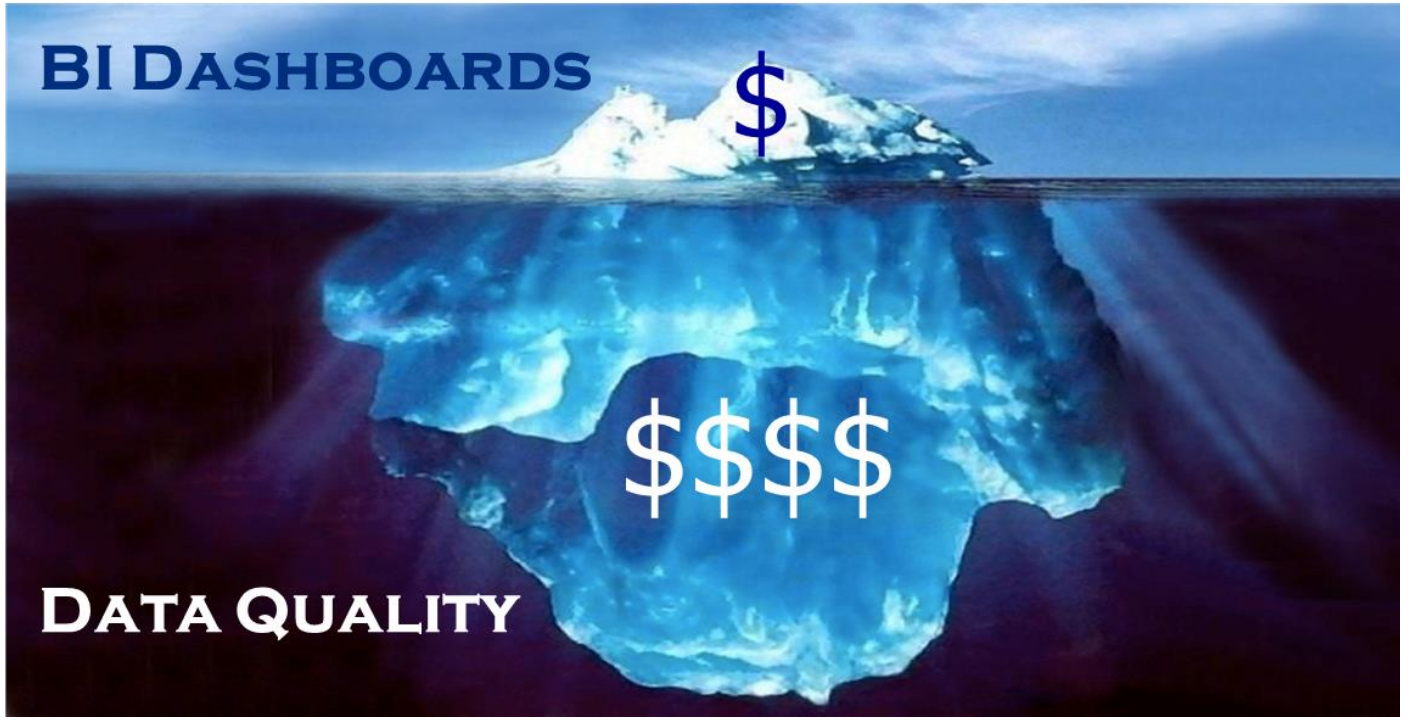
- "Utilization" data are operational details about the asset record or transactions associated with it
- Transactional activities – defined activity elements collected over time that document the operations, performance, and costs of the asset (e.g., fuel usage, odometer readings, Telematics, mission hours, etc.)

Example: Through the collection of Fleet P-Card Transactions, Telematics, Bulk Fuel transactions against owned or leased vehicles, have the ability to mine all fuel and utilization data per vehicle.

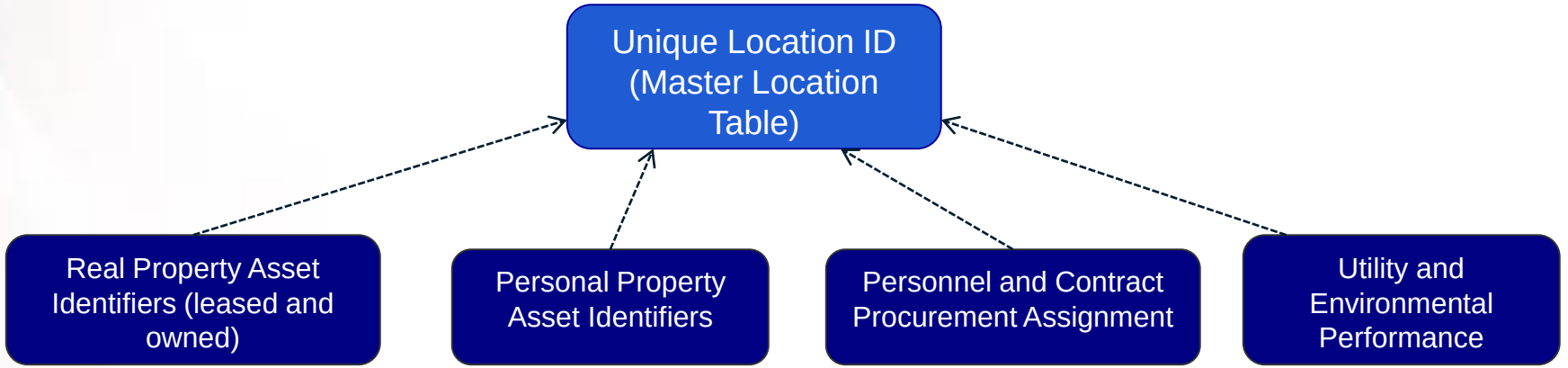
Data Standardization and Governance

Data standardization and data quality is foundational to CAPSIS:

- Asset Types
  - Multi-tiered
- Acquisition Methods
- Activity Status
- Condition
- Disposition Methods
- Locations



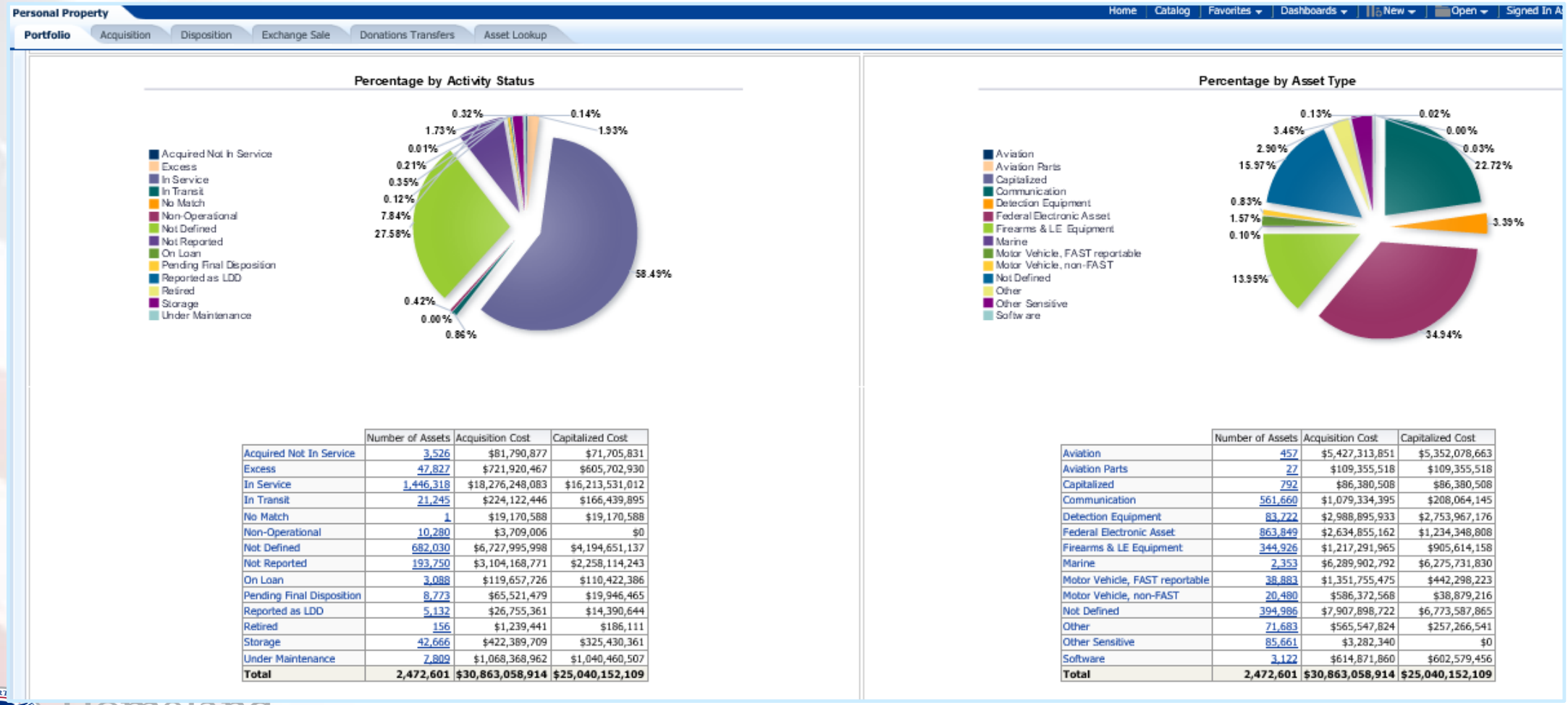
Master Location Solution – Standardized Locations



- Single, master source for housing and identifying each unique DHS location
- Each unique location is given a ML ID. All property records are assigned a ML ID
  - Accounts for abbreviations and spelling variations
- Provides the ability to determine all property records assigned to a unique location
  - Establishes an operations "snapshot" of each unique DHS location
- **Builds a hierarchical relationship establishing profile of each unique DHS location**

Reports Portfolio Overview

All out-of-the-box reports start at high-level aggregates and drill-down to asset-level: details



	Number of Assets	Acquisition Cost	Capitalized Cost
Acquired Not In Service	3,526	$81,790,877	$71,705,831
Excess	47,827	$721,920,467	$605,702,930
In Service	1,446,318	$18,276,248,083	$16,213,531,012
In Transit	21,245	$224,122,446	$166,439,895
No Match	1	$19,170,588	$19,170,588
Non-Operational	10,280	$3,709,006	$0
Not Defined	682,030	$6,727,995,998	$4,194,651,137
Not Reported	193,750	$3,104,168,771	$2,258,114,243
On Loan	3,088	$119,657,726	$110,422,386
Pending Final Disposition	8,773	$65,521,479	$19,946,465
Reported as LDD	5,132	$26,755,361	$14,390,644
Retired	156	$1,239,441	$186,111
Storage	42,666	$422,389,709	$325,430,361
Under Maintenance	7,809	$1,068,368,962	$1,040,460,507
Total	**2,472,601**	**$30,863,058,914**	**$25,040,152,109**

	Number of Assets	Acquisition Cost	Capitalized Cost
Aviation	457	$5,427,313,851	$5,352,078,663
Aviation Parts	27	$109,355,518	$109,355,518
Capitalized	792	$86,380,508	$86,380,508
Communication	561,660	$1,079,334,395	$208,064,145
Detection Equipment	83,722	$2,988,895,933	$2,753,967,176
Federal Electronic Asset	863,849	$2,634,855,162	$1,234,348,808
Firearms & LE Equipment	344,926	$1,217,291,965	$905,614,158
Marine	2,353	$6,289,902,792	$6,275,731,830
Motor Vehicle, FAST reportable	38,883	$1,351,755,475	$442,298,223
Motor Vehicle, non-FAST	20,480	$586,372,568	$38,879,216
Not Defined	394,986	$7,907,898,722	$6,773,587,865
Other	71,683	$565,547,824	$257,266,541
Other Sensitive	85,661	$3,282,340	$0
Software	3,122	$614,871,860	$602,579,456
Total	**2,472,601**	**$30,863,058,914**	**$25,040,152,109**

Note: This is non-production data from a DHS test environment.

AMDW Dashboards and Reports

AMDW Dashboards	
Dashboard Name	**Report Name (Tab)**
Aviation	Aviation Portfolio
	Aviation Small UAS Overview
	Aviation Validation
	Aviation Data Quality
	Aviation Capital Planning
	Aviation Acquisitions
	Aviation Dispositions
	Aviation Exchange/Sales
Aviation Operational	Overview
	Program
	Cost Per Flight Hour
	Hours
	Maintenance
	Fuel
Capital Planning	Aviation Capital Planning
	Aviation Acquisitions
	Aviation Dispositions
	Aviation Exchange/Sales

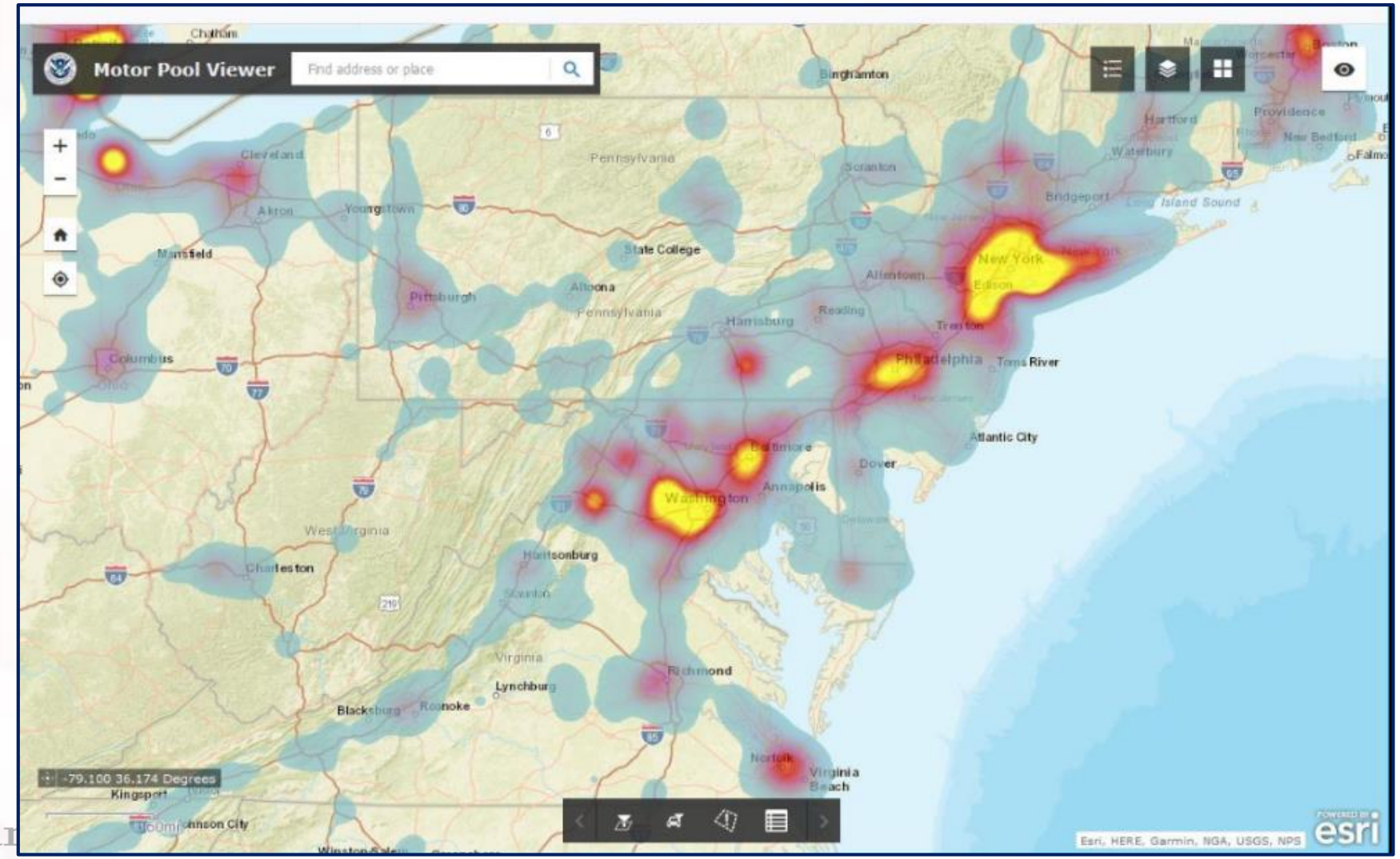
AMDW Dashboards	
Dashboard Name	**Report Name (Tab)**
Data Quality	Data Loads
	Personal Property Validation
	Personal Property Data Quality
	Standard Reference Structure
FMARS	FMARS
Home to Work	Executive Overview
	Home to Work Participation
	Home to Work Mileage/Cost
	Home to Work Validation
	Home to Work Data Quality
	Home to Work Health Measures
Inventory Statistics	Current FY Inventory Statistics
	Prior FY Inventory Statistics
Lost, Damaged, and Destroyed (LDD)	LDD Overview
	LDD Errors
	LDD Events
	PP Scorecard
	LDD Validation

AMDW Dashboards	
Dashboard Name	**Report Name (Tab)**
Marine	Marine Summaries
	Marine Validation
	Marine Data Quality
	Marine Capital Planning
	Marine Acquisitions
	Marine Dispositions
	Marine Exchange/Sales
Motor Vehicles	MV Portfolio
	MV Acquisitions
	MV Dispositions
	MV Exchange/Sales
	MV Donations/Transfers
	MV Validation
	FAST Validation
	MV Data Quality
	Optimal Motor Vehicle Fleet
	MV Tag and VIN Search

AMDW Dashboards	
Dashboard Name	**Report Name (Tab)**
Motor Vehicle Operational	MV Operational Summary
	MV Financial Reporting
	GSA Replacement Summary
	MV Average Age Summary
	MC Acquisitions Trends
Personal Property	Portfolio
	Acquisition
	Disposition
	Exchange/Sales
	Donations/Transfers
	Asset Lookup
PPE Material Module	AMDW PPE - Material Summary
	AMDW PPE - Material Transactions
SAVE Act	SAVE Act Statistics Dashboard
	SAVE Act Dashboard
	SAVE Act Template #1 (Summary)
	SAVE Act Template #2 (Fuel)

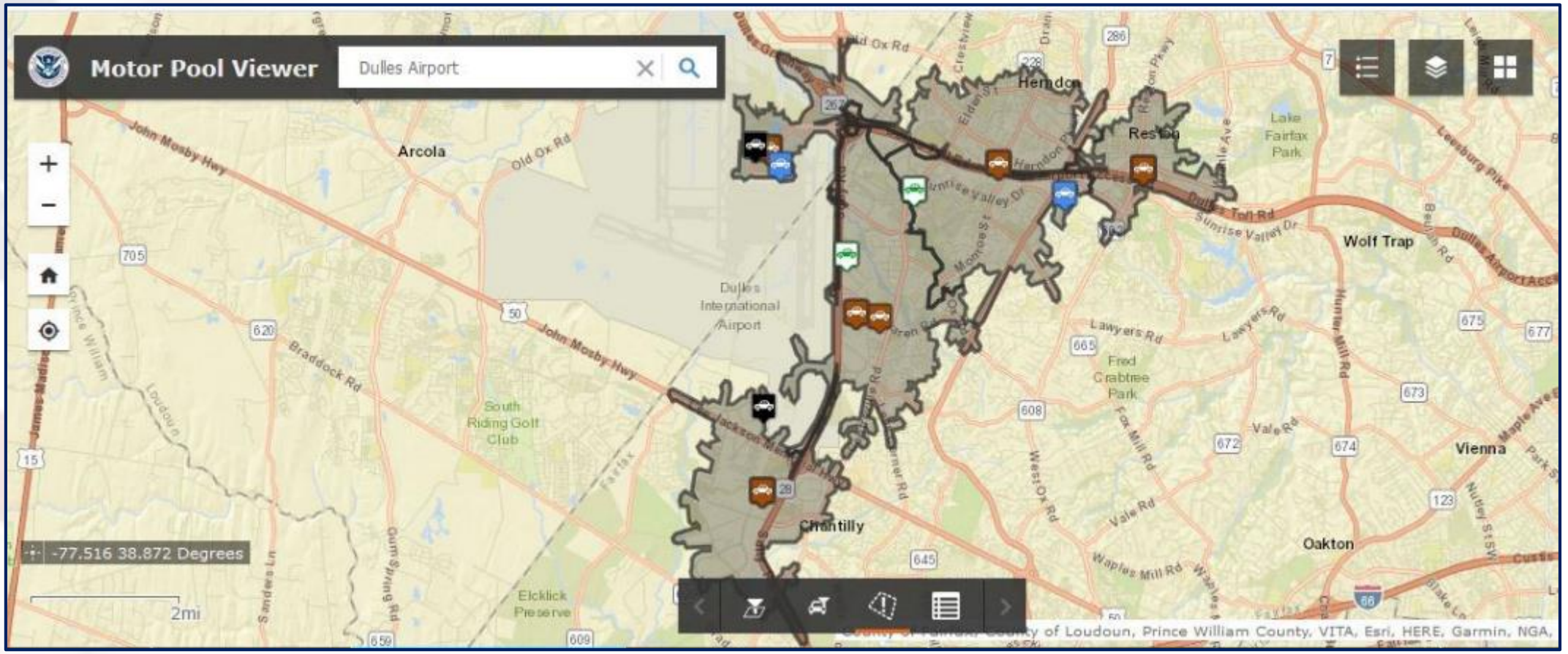
Fuel Management – Commercial Fuel Purchases

Heat Map depicting volume of commercial fuel purchases:



Fuel Management – Driving Change Management

Commercial Fuel Purchases within 5 Miles of DHS Bulk Fuel Station:



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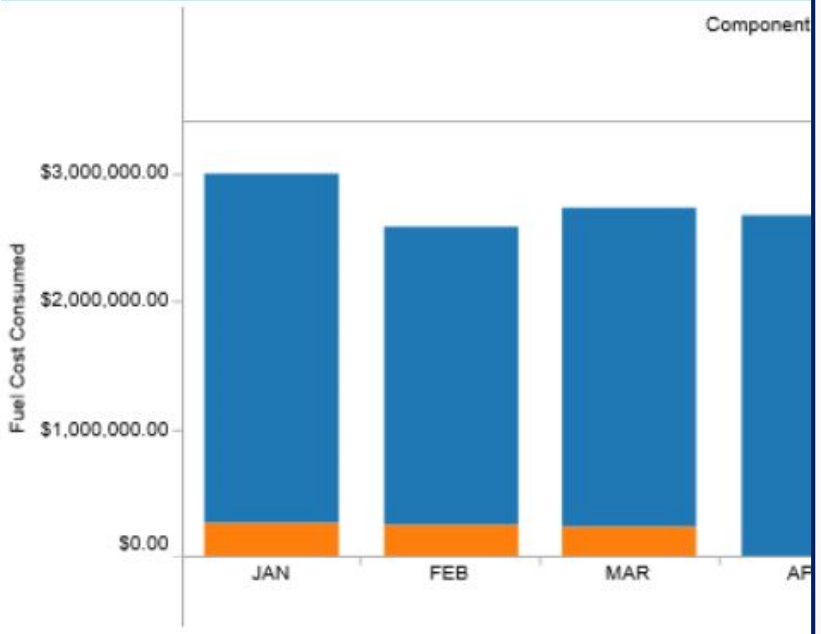
Fuel Management – Fuel Consumption Breakout

Overall DHS Fuel Summary | Fuel Trending | Fuel Savings

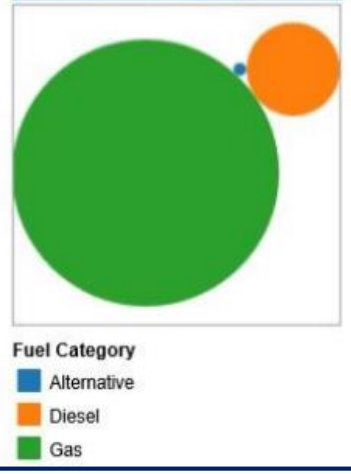
Fueling Trends



Reporting Timeframe

10/1/2018 - 5/16/2019

Percentage by Fuel Category



DHS Fuel Summary

Fuel Source	Fuel Category	Count of Fueling Trns	Count of Vehicles	Fuel Units Consumed	Average Fuel Per Unit Cost	Fuel Cost Consumed
Bulk	Alternative	1,749	216	20,114	$2.18	$43,916.12
	Diesel	29,326	1,108	702,403	$2.78	$1,970,084.05
	Gas	620,143	14,088	6,907,424	$2.53	$17,350,889.11
	Total	651,218	15,225	7,629,941	$2.54	$19,364,889.28
Commercial	Alternative	15	1	284	$2.93	$833.26
	Diesel	4,373	549	105,638	$3.16	$328,384.01
	Gas	28,184	4,644	476,286	$2.98	$1,328,983.03
	Total	32,572	5,110	582,209	$3.01	$1,658,200.30
Grand Total		683,790	17,756	8,212,149	$2.57	$21,023,089.58

DHS Fuel by Component

Component Co..	Fuel Source: Bulk	Fuel Source: Commercial
CBP	$19,364,889.28	$1,658,200.30
Grand Total	$19,364,889.28	$1,658,200.30

Note: This is non-production data from a DHS test environment.

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Fuel Management – Fuel Consumption Breakout

Savings from FY17-FY19

$0.32

savings per gallon

Bulk Fuel vs. **Commercial**

$2.34 $2.66

Savings as of Q3 FY2019: **$11,700,000**

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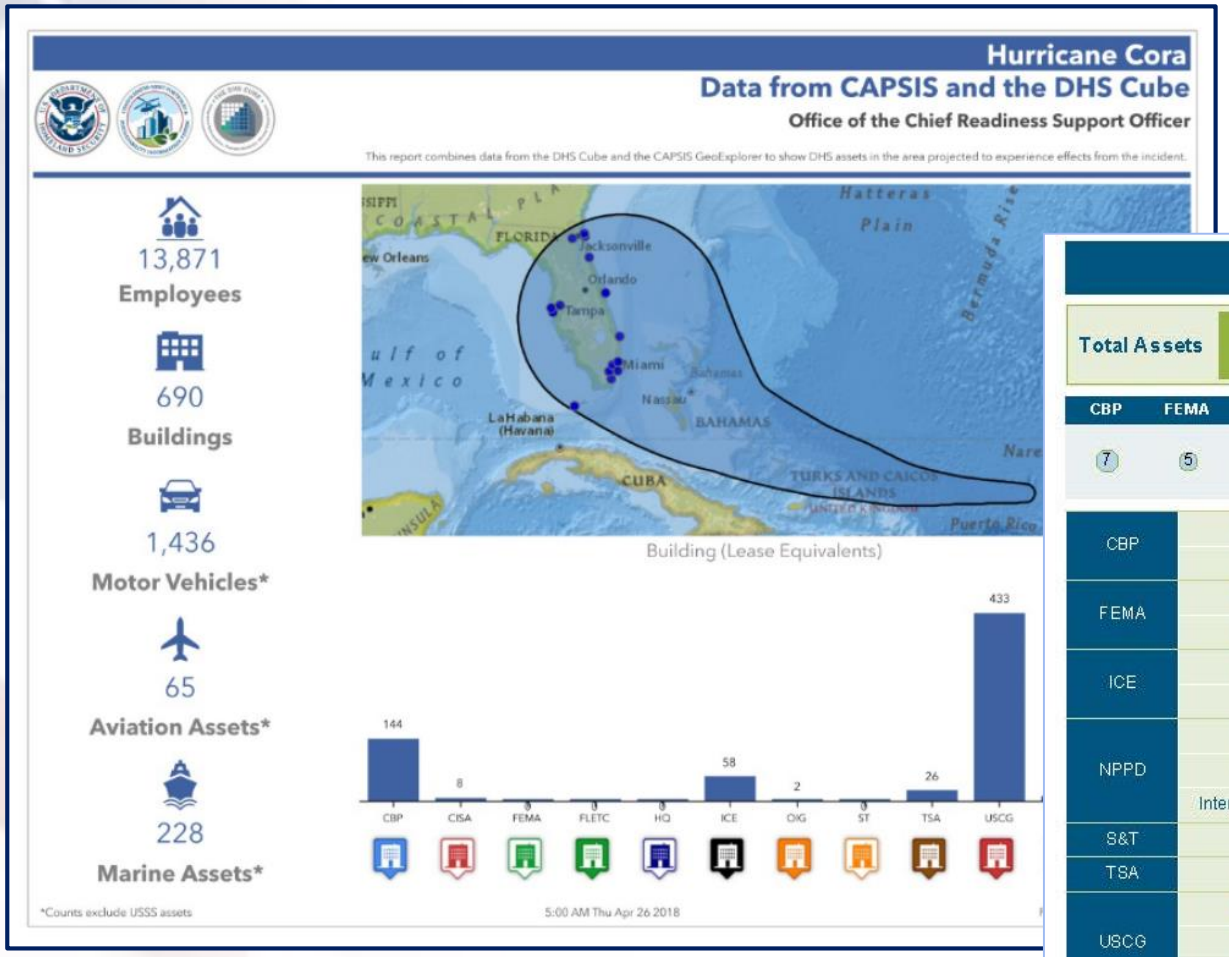
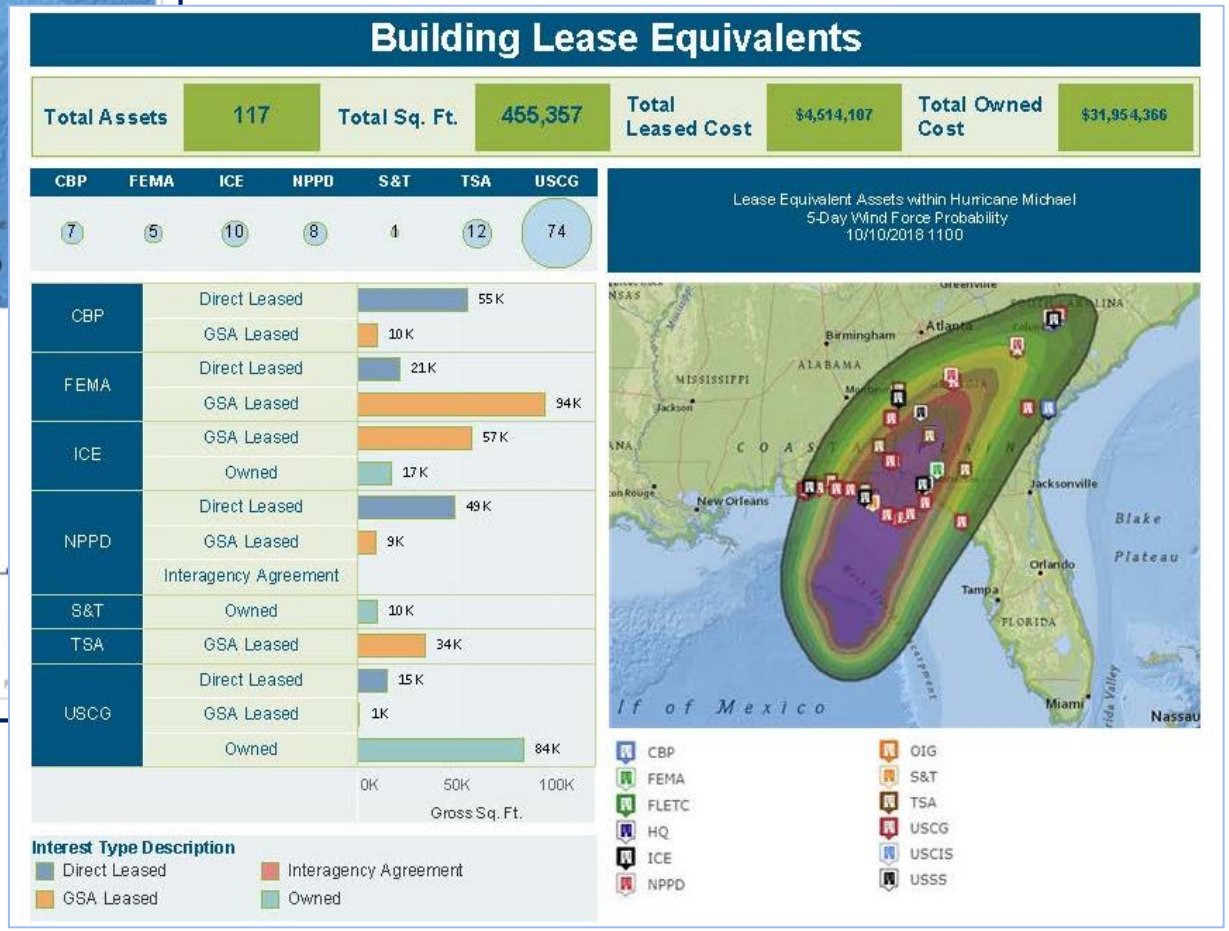
Incident Management & Response





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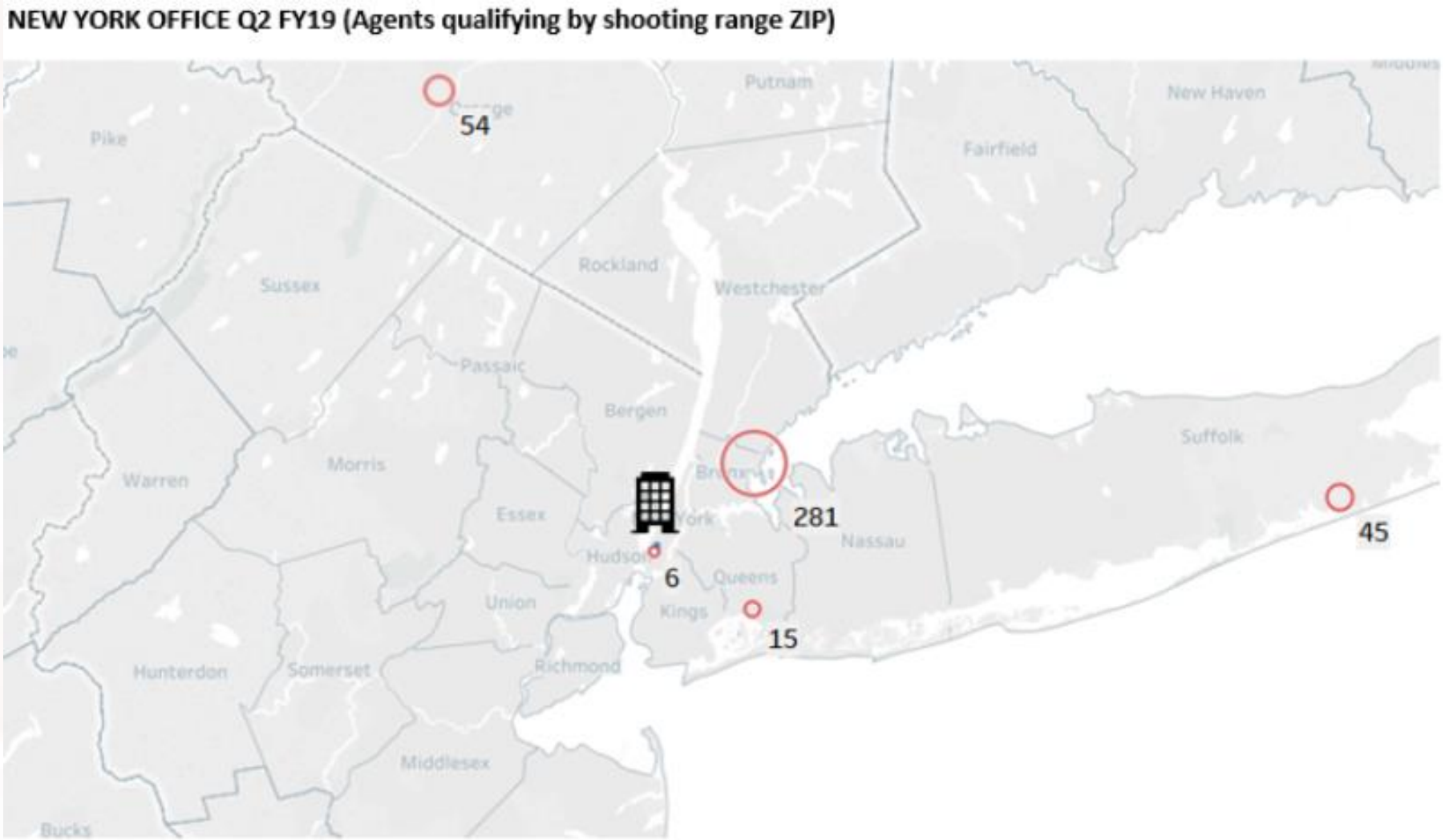
Firearms Certification Qualifications



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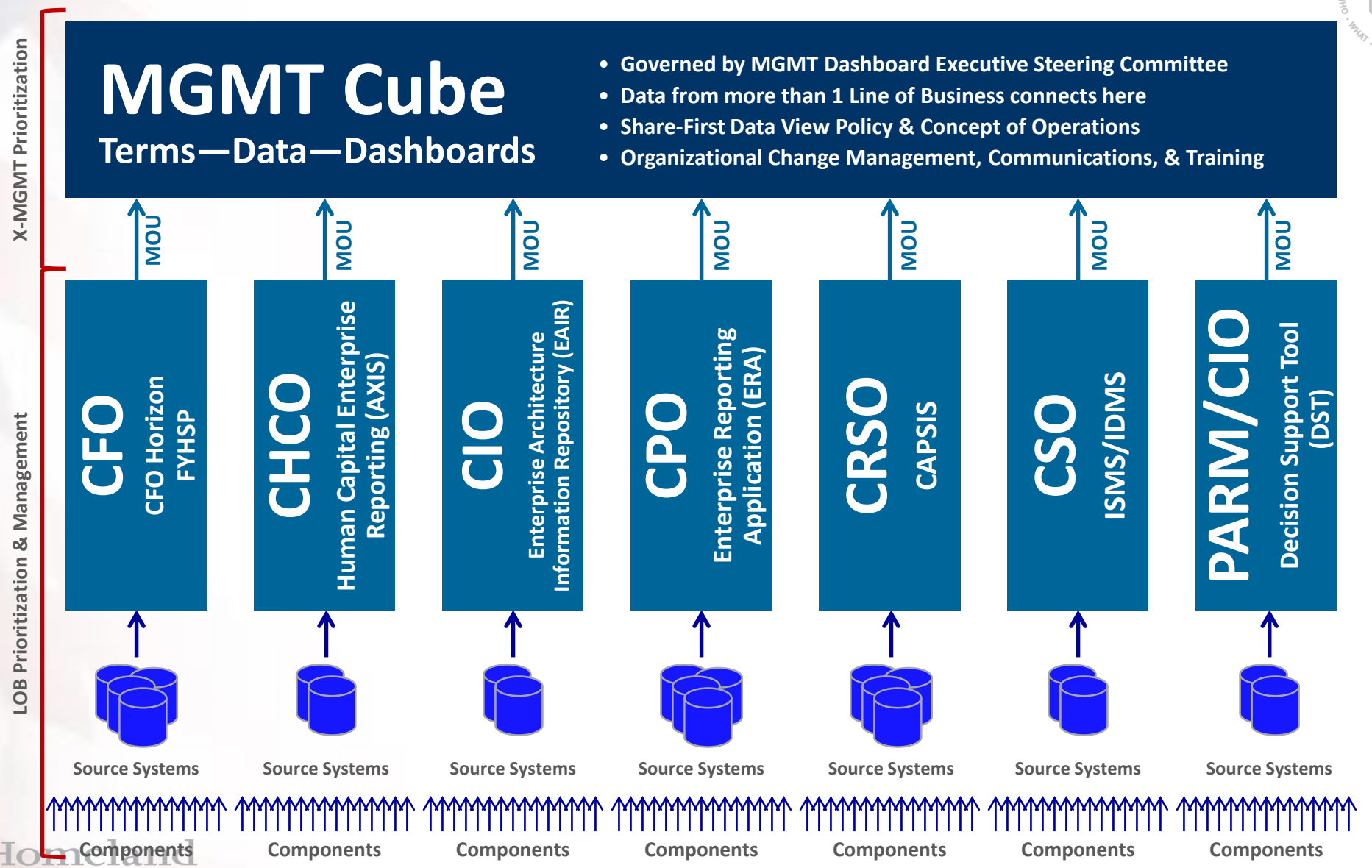
Integrating Business/Mission Support Information



DHS MANAGEMENT CUBE

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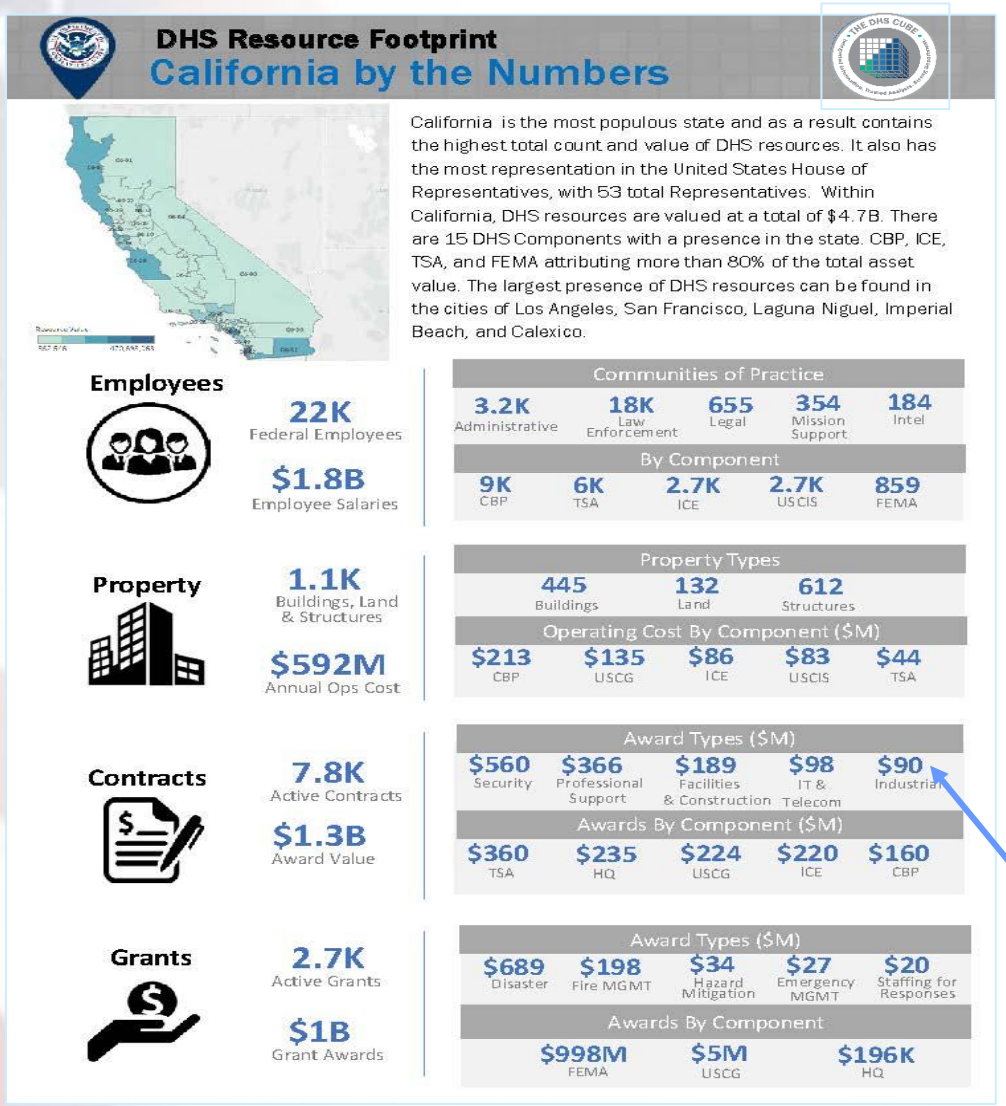
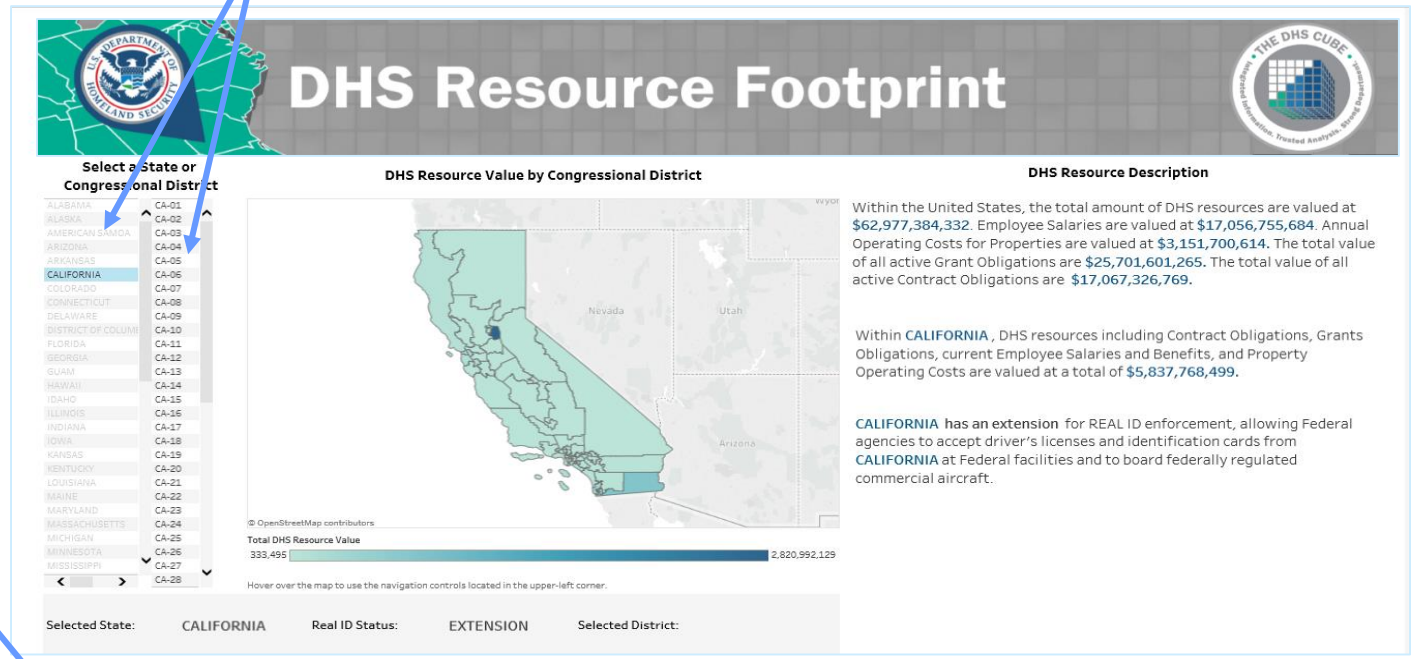
Office of Legislative Affairs: Resource Footprint Dashboard



State to Congressional District Drilldown Capability



Hyperlinked data (blue) with drill-down capability

Note: This is non-production data from a DHS test environment.

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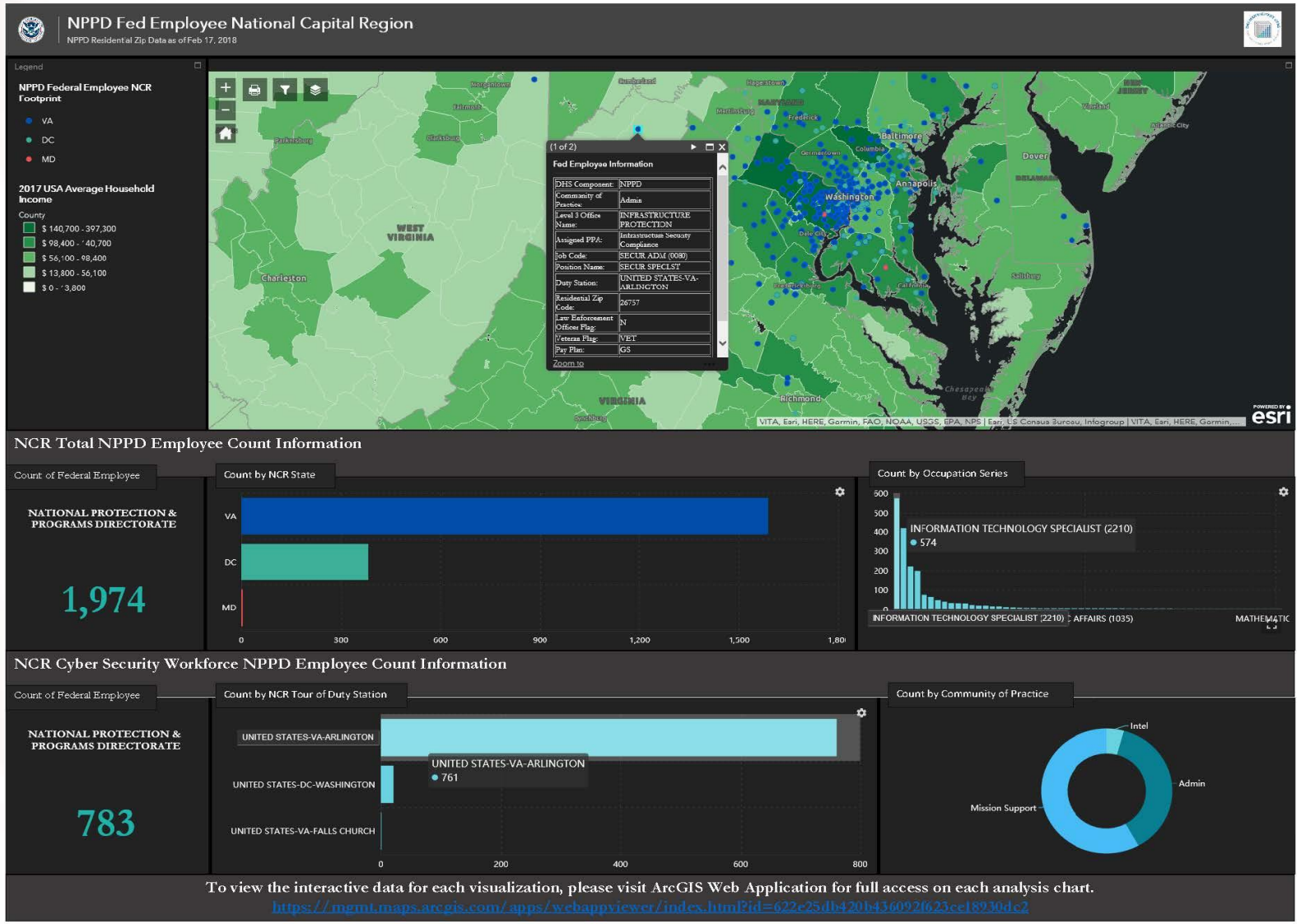
Cube Use Case – Re-location Analysis



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What Next?

- Continue to capture more data – vehicle telematics, buildings utilities, resiliency, commodities' consumption (e.g. Personal Protective Equipment and Ammunition).
- Mature Data Governance and Data Management Practices using authorities of the *Foundations for Evidence-Based Policymaking Act* from January 2019.
    - Align with the Chief Data Officer's policies and authorities – and demonstrate leadership in the "Mission Support" (Business) domain
- Drive Data Standards across complex DHS environment and reporting systems.
- Enhance analytical capabilities – build team of "Data Jedis".
- Continue to drive further cross-functional integration across the business functions – workforce, contracts, capital planning / improvement, facilities, and assets.

Robert King, Director, Systems & Information Integration Office

Rob is responsible for developing and executing MGMT's enterprise-level data management, governance, and integration strategies and associated plans for the Department's mission support functions. His portfolio includes oversight of the full data management lifecycle spanning data governance, integration, visualization, and propagation. Additionally, he leads the DHS senior executive governance board for mission support data management and integration. In this role he reports to the Deputy Chief Information Officer, Deputy Chief Readiness Support Officer, and Deputy Chief Financial Officer.

As part of the larger DHS *Unity of Effort* initiative, Rob's work is focused on transforming disparate data into integrated, harmonized information which is then made available for analysis and executive decision-making. Under Rob's leadership, DHS has made marked improvement on achieving data-driven decision-making, integrated analysis, and advanced data visualization. His efforts provide decision-makers cross functional visibility on Department-wide finance, procurement, human capital, asset, acquisition, program, and investment data. This is redefining how DHS uses information as a strategic asset to plan, coordinate and engage with stakeholders, while also integrating and maturing capabilities used for emergency / incident management and response.

Prior to joining DHS in 2011, Rob spent 12 years as an IT systems architect, implementer, and integrator serving numerous cabinet-level agencies and Fortune 500 companies. During this time, he specialized in modernizing technologies, developing software applications, and integrating business processes and policies across disparate mission functions to achieve strategic objectives for his customers.

Rob was the Vice President of the NPMA Federal Center Chapter from 2007 – 2009 and President from 2009 – 2011. He was a regular presenter at NPMA regional and national events during this timeframe.

Rob holds a bachelor's degree from Stockton University and a master's degree from the Naval Postgraduate School (NPS). He holds multiple professional certifications, including PMP, ITIL and Lifecycle Logistics. In 2018, Rob was honored as one of FCW's "Federal IT 100", which recognizes the leaders across the federal IT community who have the greatest impact.

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