Department of Homeland Security (DHS) Science and Technology (S&T)

Public Safety Analytics Terminal

TECHNOLOGY SCOUTING

RESEARCH SUMMARY

Date: September 2019

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Overview: Subject matter experts, proprietary commercial datasets, and open-source research were utilized to compile a preliminary list of Solution Options. A summary is outlined below, and the **top 17 Solutions** identified thus far are displayed on the following pages.

Problem Description:
This report is seeking technology solution options for Public Safety (PS) professionals to have the ability to analyze various and disparate data streams that are available to PS areas. Real-time analytics are needed without being reliant on a subject matter expert (SME) to conduct analysis. This will enable them to better utilize their data and identify trends/patterns either through directed queries or to automatically alert the analyst about potentially suspicious activity. In particular, this would bring data analytic capabilities to those personnel who are not data analytic professionals. This requires access and experience to best utilize the information. An increase in investigative capability and capacity could be realized with a system that could assist PS personnel in analyzing data to gain insights.

Solution Option Requirements:
This report will focus on highlighting the system performance in each of the following categories: • Identify and alert on patterns and trends • Leverage existing data and SME insights • Works with near-real-time and historical data • Basic usability with limited training necessary • Can run on current technology platforms

Notes:
This report will identify public safety analytics terminal solutions that incorporate multiple of the above requirements through the collection and analysis of numerous data sources, especially those that leverage a jurisdiction's existing records management systems. These techniques and tools can help public safety officials identify and address issues more quickly, efficiently, and effectively. Some of these solutions were developed in coordination with large police departments with the express intent of improving the ability of investigators to make important connections out of the large volumes of data that were contained in their existing records systems. The solutions described below claim to have capabilities that enable enhanced analysis and interrogation of data in order to help law enforcement identify hidden patterns or trends that will allow decision makers to consider how, when and where to best utilize assets for police and response activities. Additionally, this report contains information on solutions that are focused more broadly on delivering video and image analytics. These systems' ability to ingest and analyze live data feeds stand to greatly augment the intelligence gained from the historical data analysis. Additionally, these systems can provide much greater detail about an incident that may not be captured in even the best written incident reports. Many of the solutions contained in this section are also described in a separate Tech Scouting report for Crowd Count and Analysis Systems. When combined, public safety officials have opportunities to leverage critical benefits from advances in these analytic fields and variety of solutions that are currently on the market. Local governments are currently using these systems to collect data, develop crime-related forecasts, and take informed actions for their communities.

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Technology Solutions: Public Safety Data Analytics Solutions

The follow section highlights solutions developed to assist public safety organizations to analyze large volumes of historical and current incidents for the purpose of creating crime and public safety forecasts. These solutions augment current investigation activities by automating the review of incident reports and other data sources contained in a jurisdictions records management system.

#	Solution	Description	Requirements Alignment	
1	Patternizr By NYPD	Patternizr is a software program built in house by the NYPD that searches through the NYPD's databases for patterns, enabling detectives to search from a wide pool of data in the course of an investigation. The solution was launched in 2016 and is based on machine learning. Patternizr was trained using manually identified patterns for burglaries, robberies and grand larcenies in the city to find relationships among them. The final models were incorporated into NYPD's Domain Awareness System (DAS) -- a citywide network of sensors, databases, devices, software and infrastructure. All historical pairs of complaints were then processed in the cloud against 10 years of records of burglaries and robberies, and three years of grand larcenies data. To keep the software up-to-date, similarity scores were calculated and updated for new and revised complaints three times a day, and each was scored against the existing crime data before being incorporated into DAS. NYPD could share the software with other police departments and create their own tailored version on Patternizr.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes
2	Domain Awareness System By Microsoft	The Domain Awareness System (DAS) is a surveillance system developed via a partnership between the New York Police Department (NYPD) and Microsoft to monitor New York City. The surveillance network spans the entire city, including bridges and tunnels. DAS can identify subjects based on visual characteristics: age, weight, clothing, and skin color. Identification then allows DAS to track targets and gain detailed information about them. The surveillance network of more than 18,000 interconnected cameras is coupled with thousands of license plate readers deployed around the city, as well as readers mounted on roving patrol cars.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes

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#	Solution	Description	Requirements Alignment	
3	[PredPol](#) By PredPol	PredPol (Predictive Policing) was developed through a partnership between the Los Angeles Police Department and UCLA. It leverages data from an agency's Records Management System to pull current and historical crime data in order to inform police departments on where and when to patrol. It leverages 5 data points to calculate predictions: incident identifier, crime or event type, location of incident, timestamp, and record modified information. This analysis feeds understanding of offender behavior for repeat victimization, near-repeat victimization (proximity), and local searches. PredPol currently works with many Police Departments and Sheriff's Offices across the US and internationally, including: LAPD, Modesto CA PD, Tacoma WA PD, Jefferson County AL (Birmingham), and Forsyth County GA (Atlanta area).	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes
4	[ArcGIS Geospatial Cloud](#) By ESRI	ArcGIS is a geographic information system (GIS) that analyzes spatial location data and organizes layers of information into visualizations using maps and 3D scenes. With location intelligence from the Esri Geospatial Cloud, ArcGIS enables a deeper understanding of where to focus efforts to prevent, protect against, and mitigate the effects of the complex threats to public safety and hazards found. ArcGIS securely integrates data from Internet of Things (IoT) sensors, business systems, and other partners using the common language of location. It visualizes and analyzes this data to uncover hidden vulnerabilities and patterns that help prioritize efforts and increase the safety and security of a community.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes
5	[Public Safety Analytics](#) By Central Square Technologies	Central Square Technologies provides analytics and location mapping of current crime trends, incident calls and other suspicious incidents. The system leverages local information and national databases for more in-depth analysis. The events can be overlaid on a map and broken out into unit sectors for increased awareness. The platform can identify trends and patterns and use that knowledge to assign patrols or send alerts to staff. The platform is also on a mobile device and can be shared with the public to increase transparency.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes

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#	Solution	Description	Requirements Alignment	
6	Crime Prediction and Prevention By IBM	IBM's crime prediction and prevention solutions combine powerful analytical capabilities with a rich set of integrated data sourced from established applications. Built on an IBM software platform, this solution provides agencies with the means to make the best use of people and information at hand to monitor, measure, and predict crime and crime trends. When various sources of structured and unstructured data are brought together and made available for analysis, situational understanding is improved, making citizens and police officers safer.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes
7	Incident and Emergency Management By IBM	An incident and emergency management solution for daily operations, emergency and crisis situations. This command, control and communication (C3) solution uses data analytic technologies coupled with social and mobile technology to streamline and integrate preparation, response, recovery and mitigation of daily incidents, emergencies and disasters. IBM works with governments and public safety organizations worldwide to implement public safety technology solutions. Proven preparation techniques use the same technology to manage day-to-day community incidents when responding to crises situations. This familiarity helps ensure first responders and C3 staff can engage immediately and naturally in response, recovery and mitigation without needing access to special documentation and systems.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes
8	Cisco Kinetic By Cisco	Cisco Kinetic enables proactive and informed policing by analyzing crime and incident trends using predictive analytics. It encourages interagency collaboration by deploying simple dashboards that embed standard law enforcement work flows and reduce operational complexity across crime and city management verticals (e.g., parking, traffic, safety, security, etc.). Cisco Kinetic has robust capabilities to help law enforcement respond faster with automated alerts from advanced live video feeds for incident detection and management. It uses real-time social media analytics to understand and address citizen sentiment during incidents for better communication.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes

#	Solution	Description	Requirements Alignment	
9	[Intergraph InSight](#) By Hexagon Safety and Infrastructure	Intergraph InSight helps public safety agencies overcome the challenge of reporting and analyzing the large amounts of data created and collected from computer-aided dispatch and other systems. It creates a single data source, which users can explore, analyze, and share through interactive dashboards and reports. It can perform crime analysis, crime mapping, resource allocation, operational improvements and a host of other services. The platform is powerful and offers tailored products for different groups of first responders (police, fire, EMS). For example, it can provide law-enforcement with real-time and historical data for intelligence-led policing, crime mapping, officer deployment, officer history and unit utilization. For Fire and EMS units it can monitor and measure unit response, turn out times, and repeat incident location to provide more targeted interventions.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes
10	[CFS Analytics](#) By RTI International	CFS Analytics was developed by data scientists, criminologists, police, and fire/EMS to help law public safety and emergency services visualize CAD data to gain insight into response times, operational resources and long-term planning. In providing valuable decision making, it helps to better address community needs.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes
11	[SAS Platform for Defense and Security](#) By SAS	SAS makes a data analytics platform specifically designed for security and policing environment. It enables a cohesive, analytics-based approach to tackling threats. SAS Platform is customizable to ensure optimal insights on data, talent and analytic technology. It provides a single platform and unified view for all agencies – across all stages of the intelligence life cycle and allows for preventive policing by analyzing and simulating risks for more targeted, productive investigations and successful crime prevention.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes

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Technology Solutions: Video Analytics and Smart Cities Focused Solutions

There are a wide variety of video and image analytics platforms that are designed to support several use cases including facial recognition, crowd counting, license plate reading, and other Smart Cities applications. Many of the following solutions can analyze video feeds, image libraries, and other audio/visual data. Some of these solutions are limited in terms of analyzing historical case logs and similar databases and are therefore separated in the following section. These tools, however, do have the ability to augment some of the capabilities and solutions listed in the previous section.

#	Solution	Description	Requirements Alignment	
12	Splunk Platform By Splunk	The Splunk Platform provides operational intelligence to enable fast and confident decisions for public safety personnel. The platform uses experience integrated machine learning to provide data visualizations of data logs by creating metrics that are easily searchable for improved monitoring performance as alerting functions. It allows for implementation of predictive and intelligence-led policing initiatives faster and more affordably than with traditional tools. It quickly connects the dots, identifies hidden patterns and discovers trends to proactively detect and combat crimes and other threats to the community.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes
13	savVi by Agent Video Intelligence, Ltd. (Israel)	savVi boasts a set of advanced, automated video analysis tools that provide for the immediate detection and extraction of events and valuable data from surveillance footage, replacing the manual and time-consuming tasks traditionally employed to monitor live video feeds or sift through recorded video. By employing savVi, users can make optimal use of their surveillance systems and allocate their time and attention in a more effective manner, thus increasing the return on investment in the surveillance system, as well as improving overall security, safety and business operations. Users define potential events of interest in advance and receive alerts when such events occur, enabling rapid responses to incidents, as they emerge.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes
14	Rekognition By Amazon	Amazon's Rekognition is a robust video analytics platform that can perform facial recognition, license plate reading, and other video analysis functions using real-time camera feeds. Users provide an image or video to the Rekognition API, and the service can identify the objects / people across a robust database of identity profiles. Rekognition is currently configured to conduct image analyses only.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Partial
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes

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#	Solution	Description	Requirements Alignment	
15	[Sensority 360](#) By Sensority	Sensority develops video analytics technology for sensing and analyzing the physiological parameters of individuals observed in real time via video stream from any camera. Sensority 360 for Large Crowd Events uses Triple Layer Video Analytics Technology to deliver an encompassing security solution and elevates current CCTV infrastructure to operate on a deep sense level, and help security personnel understand with crowd flow management and spectator moods and emotions.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Partial
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Yes
16	[SensorInsight](#) By SensorInsight	SensorInsight solutions provides insights into vehicle and pedestrian movement patterns and trends through efficient monitoring of public and private areas. Providing a number of solutions which result in a combined technology approach to monitoring people and traffic in high volume areas, using video, beacons, and phone detection to provide dynamic estimates of how people are moving through your space. It helps users understand flow, density, direction, and activity. Crowd counting, and pedestrian traffic monitoring are important for detecting congestion points, optimizing for visitor access, and measuring footfall traffic. This technology can also be used for public safety analytics to identify areas of high traffic, identify zones for potential nefarious activity etc.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	Yes
			Can run on current technology platforms	Yes
			Shareable analysis and reports	Unknown
17	[Metropolis](#) By Nvidia	Nvidia Metropolis' AI-based intelligent video analytics allows government and law enforcement agencies to speed up their investigations by capturing and classifying objects such as vehicles, bicycles, pedestrians, and identify interactions in real-time. Deep learning-based video synopsis and analytics solutions are speeding up investigations by intelligently compressing days of camera footage to minutes for quick review.	Identify and alert on patterns and trends	Yes
			Leverage existing data and SME insights	Yes
			Works with near-real-time and historical data	Yes
			Basic usability with limited training necessary	No
			Can run on current technology platforms	No
			Shareable analysis and reports	Yes