



# Crime mapping evolution

The ten trends driving more effective law enforcement.

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**A**ugust Vollmer is a key figure behind present-day crime analysis. As the chief of police in Berkeley, CA in the early 1900s, Vollmer formalised a records management system that relied on coloured pins as a method to visualise, map and analyse crime locations.

Today, crime mapping goes far beyond points on a map. Advanced geocoding and location intelligence tools support complex analysis, real-time problem solving and help improve the quality of service that police departments provide to citizens around the world.

Increasingly, GIS solutions are being designed specifically around the workflow and objectives of crime analysts. Location intelligence technologies provide the necessary insight to identify patterns, deploy personnel, solve cases and prevent crime in ways that would have been unimaginable even a decade or two ago.

## **Strategic, tactical and far more efficient**

Specialised applications do not create new work, they simply help law enforcement teams do their job better, smarter and more efficiently.

Strategically, GIS designed for police work can support planning over an extended period of time, making it easy to visualise trends, identify profiles and assess how changes in resource allocation and strategies can improve overall crime rates. Tactically, such tools can help ana-

lyse an emerging crime series, making the necessary connections to stop mini crime waves in their infancy.

While the concept of crime mapping is as old as crime, today's systems offer a degree of power and sophistication that is changing the way law enforcement agencies look at crime data - from the command post to the beat patrol. In prior years, for example, crime analysts could spend the majority of their time researching, collecting and formatting information and a fraction of the day actually analysing data. With today's technologies, those ratios are reversed. Analysts can now incorporate the same data (and more) in a fraction of the time, and the majority of their energy and expertise on actual analysis and problem solving.

## **Ten innovations that are making a difference today**

August Vollmer's coloured pins served as the standard for nearly a century, but the field of crime mapping is evolving at a rapid pace today. Best-in-class solutions combine geocoding and mapping with location intelligence, predictive analytics, data integration and data quality applications - making it possible to match disparate data sets and make connections in powerful new ways.

**Borderless mapping.** Many analyses today are based on pre-existing boundaries that have nothing to do with real-world behaviour. In practice,

criminals will strike on both sides of a street regardless of whether they are in different towns or postal codes. With hotspot mapping, which is not based on pre-defined zones, analysts can easily identify trends that go beyond standard map borders.

In one case, a police force discovered a pattern of crimes along a rail line that spanned six jurisdictions. In another case, it became evident that a series of offences against school-aged children centred on transportation links, including bus and rail stops. In both instances, location intelligence revealed patterns that appeared as random events when viewed through the lens of traditional boundaries.

**Social landscape.** Geography reveals more than location. Spatial analysis, paired with demographic data, allows crime analysts to easily consider the affluence, buying patterns, age, traffic patterns and demographics of those involved in criminal activity—comparing the relationship between victims and offenders. In big-picture terms, location intelligence adds a quantifiable element to strategic planning. Tactically, it can help prioritise feet-on-the-street decisions.

**Temporal analysis.** The social landscape of certain geographies may change over the course of a day. A financial district may attract a workforce by day and club goers by night, factors that are not captured in traditional map applications. Strategically, understand-

ing how demographics, market conditions and criminal events track over time helps decision makers understand whether police efforts lead to a reduction of crime or simply its relocation to another venue.

**3D mapping.** In some areas, police are looking at criminal activity on a third dimension: height. Such analysis can help identify hotspots and resource requirements in football stadiums, office complexes and apartment buildings. In one instance, planners were able to calculate the effect of lighting on criminal activity by accessing data on the height and location of street lamps.

**Open-source data.** Hundreds of thousands of databases are used in law enforcement's efforts to fight crime. At any point in time, an investigation may turn on the location of certain entities (parks, crematoriums, pubs, etc.), the demographics of a neighbourhood, the ability to cross-reference criminals with known associates in distinct locations, or a host of other readily available data points. Public data sharing can provide a wealth of information to analysts who

have the capacity to access, import and format data efficiently.

**Real-time connectivity.** The ability to link systems through standards provides for real-time data capture, where criminal events are captured and reported via live data connections, eliminating delays that could affect on-the-ground decisions.

**Ubiquitous access.** While geo-analysis was once in the domain of a select group of GIS specialists, today this information can be transformed and used by virtually everyone involved in law enforcement. In some areas, patrolmen can quickly review the exact location of every incident that occurred overnight, prior to hitting the streets. Such access allows them to plan and prepare for the day ahead.

**Community cooperation.** Law enforcement agencies are also relying on location intelligence to connect with local communities. In some instances, the ability to publish data via the internet can facilitate cooperation between police and local civic groups, improving communications and making it easier for communities to participate in crime prevention measures.

**Environmental analysis.** Police are

also using geo-analysis to understand the effects of environmental elements, such as waterways. Location intelligence tools can assess currents and the curvature of rivers, for example, to identify potential points where drowning victims may have entered the water.

**Cloud-based collaboration.** While in its infancy, more organisations are moving to SaaS and on-demand applications. Over time, the movement to shared services will provide for the consolidation of infrastructure, software and data, facilitating collaboration both within and across departments.

Globally, law enforcement agencies have embraced location intelligence, and many departments are actively looking for ways to incorporate new capabilities in both their long-term planning and day-to-day operations. Overall, the field of crime mapping is constantly evolving. Technology has come a long way since the coloured pin, but the possibilities for future advancement are even more impressive. ■

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