Installation Operations Center: Providing a 24/7 Common Operating Picture to Army Installations

A White Paper

Security, Government & Infrastructure, a division of Intergraph

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1. Introduction

An Army installation’s ultimate objective is mission assurance. When an installation is working right, mission units on the installation are facilitated in completing their mission rather than inhibited. To achieve this goal, installations continually seek ways to achieve better situation awareness, make better decisions, and improve public safety. But challenges such as asymmetric threats – both cyber and physical (both man-made and natural) – make this task even more difficult; resulting in an even greater need for fast, secure access to mission-critical systems and data. To achieve their goal, installations must plan, manage, maintain, and operate their assets; increase their efficiency; and effectively respond to day-to-day operations and emergency events.

An Army installation’s goal of mission assurance can be supported through a common operating picture provided by an Installation Operations Center (IOC). An IOC integrates all public service aspects of an installation, providing real-time situational awareness to installation leaders and senior decision makers.

This white paper highlights the advantages of an IOC and discusses approaches based on Intergraph’s solutions and experience that enable IOCs to achieve a common operating picture of their base, allowing them to detect and interdict threats, coordinate, and respond to daily operations and emergency events.

2. Mission Assurance Challenges

Army installations continuously face the challenge of achieving mission assurance. Rapidly changing technologies have given rise to sophisticated computer intruders and increased the likelihood of acts of terrorism – both physical and cyber. In addition, natural disasters can challenge the ability of the organization to complete its missions. Likewise, attacks on the public or private sector and domestic or foreign infrastructures will disrupt U.S. military operations. Despite their best efforts, the Department of Defense (DoD) and law enforcement agencies cannot protect everything, everywhere.

To achieve mission assurance, Army installations must manage their infrastructure and assets for them to perform efficiently and effectively and respond to emergency events quickly. Warfighting operations are ultimately linked to and dependent upon defense and commercial infrastructure assets. Destroying or disrupting a single infrastructure or asset could have a cascading effect that inhibits the mission commander's ability to complete his mission. (See Figure 1.)

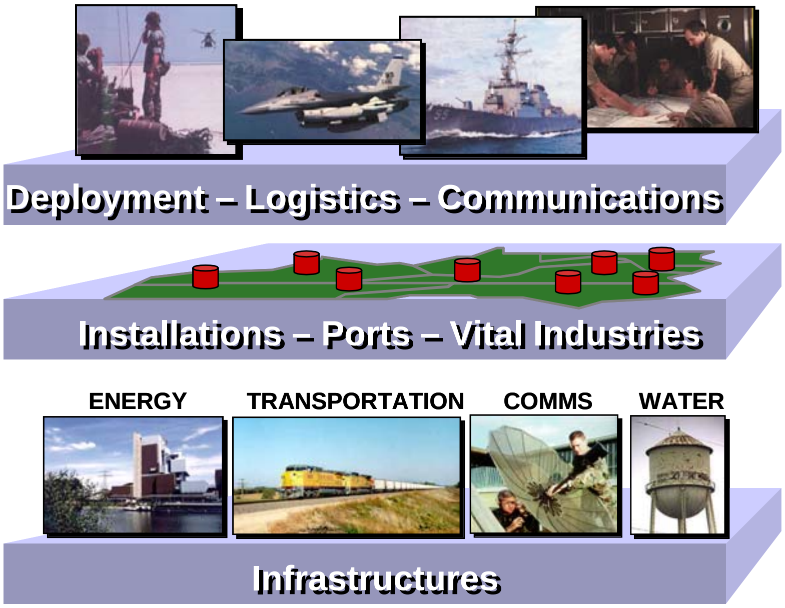

Deployment – Logistics – Communications
Installations – Ports – Vital Industries
ENERGY
TRANSPORTATION
COMMS
WATER
Infrastructures

Figure 1: *What is done at an infrastructure level directly impacts an installation's mission assurance.*

The challenges and threats facing Army installations are not likely to diminish in the near future. Therefore, installations have to be prepared not only to defend against, but also to respond to daily operational needs as well as any emergency event – whether a natural disaster or terrorist attack.

2.1 Coordinating a Response

Coordinating a response to an emergency event on an installation can prove to be quite challenging. An Army base is comprised of many functional areas – environmental, security, fire, HAZMAT, medical/emergency medical services (EMS), public works, and range – making communication between agencies and coordination of daily operations and response to emergency events complex. (See Figure 2.) Most bases supplement these capabilities with off-post support, often through mutual aid agreements. Data is often widely dispersed among disparate systems and equipment – databases, geographic information systems (GIS), video surveillance, alarms, access controls, radios, telephones, and dispatch systems – that make it difficult for garrison decision makers to assess and assimilate information in a timely fashion. Without a common operating picture, no single base organization knows all the necessary requirements – or answers. Additionally, Army installations often lack the support tools necessary to integrate these systems, leaving them with no ability to pass on data to other installations, local municipalities, or the field. Collaboration and consistency is a must.

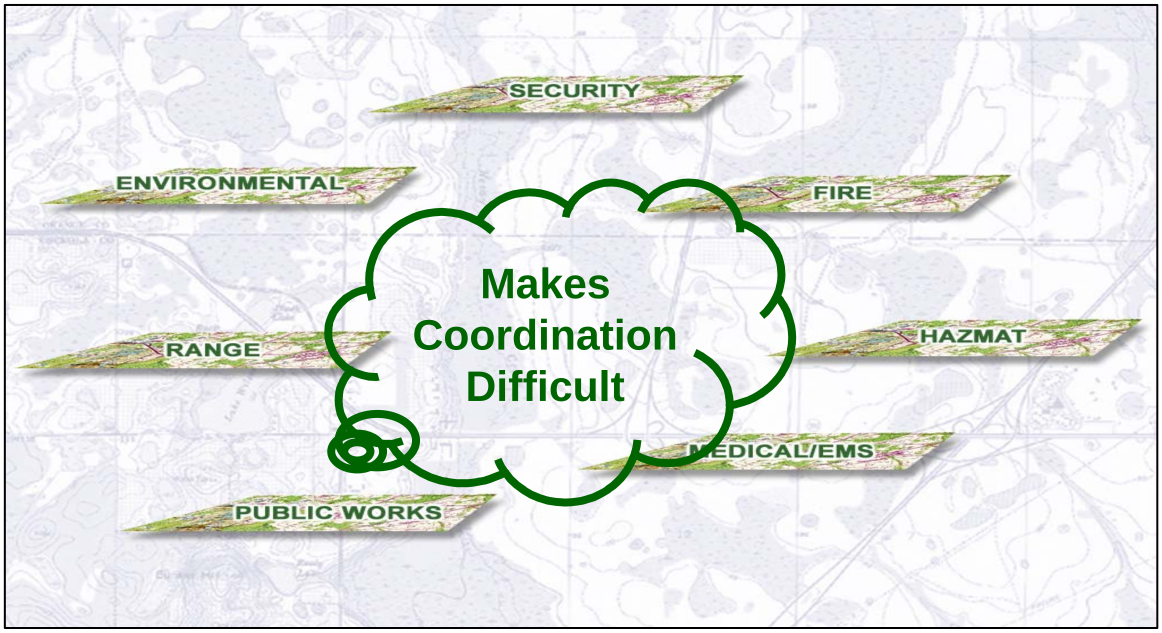


Figure 2: *The many functional areas of an installation make coordination difficult.*

Army transformation initiatives also impact virtually every aspect of Army organizations and operations. Transformation has radically changed mission organizations to meet strategic needs of the nation. Transformation has also substantially changed installations to standardize support. Processes and the ability of the mission commander to provide substantial resources to support the installation's emergency operations have been substantially reduced. These transformation initiatives require a change in the management of installations and related operations.

2.2 Maintaining Situational Awareness

Army installations require up-to-date situational awareness not only during emergency events, but in their daily operations as well. It is imperative that garrison decision makers be aware of the availability of their critical infrastructure and personnel on a day-to-day basis. Maintaining situational awareness only during emergency or disaster situations results in information that is not current, operators and personnel that are not familiar with the proper procedures and protocol, and mission commanders that are not aware of the reasons why their ability to conduct their mission is degraded.

3. Installation Operations Center (IOC)

An Army installation's goal of mission assurance can be supported through a common operating picture in the IOC. (See Figure 3.) The IOC integrates all public service aspects of an installation – such as police, fire, emergency response, environmental, HAZMAT, and medical/EMS – and serve as a platform for force protection. It provides real-time situational awareness to installation leaders and senior decision makers, enabling them to better respond to emergency events or disasters. Additionally, an IOC allows installations to better coordinate with city, state, and federal agencies.

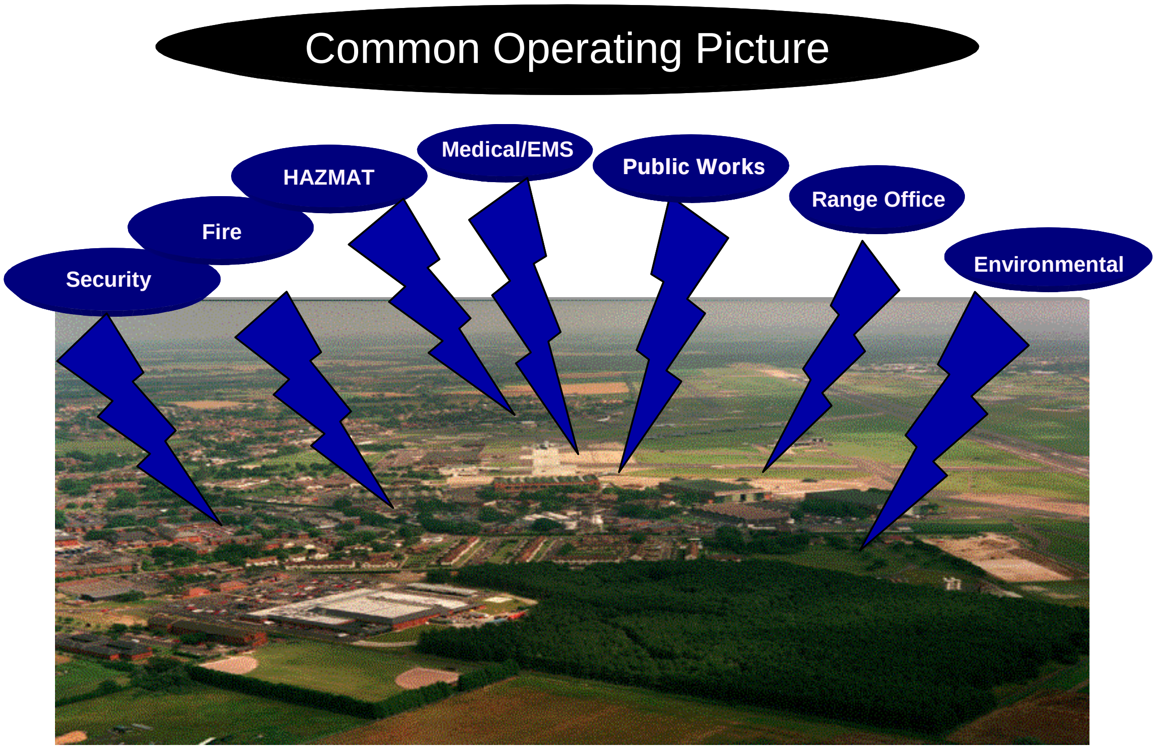


Figure 3: *An IOC provides situational awareness of the events occurring on an installation.*

An IOC helps to eliminate uncoordinated responses to incidents, saving time and money. An IOC can provide the garrison commander and other key decision makers with near real-time situational awareness of any issue that matches the commander's critical information requirements (CCIR). Timely CCIR feeds allow decision makers to focus on decisions that need to be made now, and have adequate information to make them. As a result, garrison personnel are better prepared to respond to emergency events quickly and efficiently.

An IOC collects, processes, and disseminates near real-time reporting of information, ranging from daily infrastructure management to weather to criminal and suspicious activities. For example, if alarms are triggered on an installation, an IOC enables garrison decision makers to track these alarms using a GIS-based map to determine if there is a pattern to the alarms, and what appropriate support is need for the first responders. It also leverages existing data and GIS to improve the identification and visualization of assets that support specific missions. It shows mission dependencies on public works and other assets and illustrates the fusion of these data sources, 3D/GIS visualization, and connectivity/simulation using commercial data sources.

An effective IOC provides much more than just emergency response data. For example, garrison master planners and support personnel use GS on a daily basis to manage and monitor the various networks found on an installation – electric power, road and rail, POL, telecommunications, natural gas, and water. In the event of an emergency or natural disaster, garrison leaders can access this GIS information through an IOC, providing them with a common operating picture, displaying the events as they take place and how they will impact daily operations. This common operating picture helps decision makers establish mission requirements, assess operational impacts, identify infrastructure intra- and inter-dependencies, and ascertain asset vulnerabilities. (See Figure 4.)

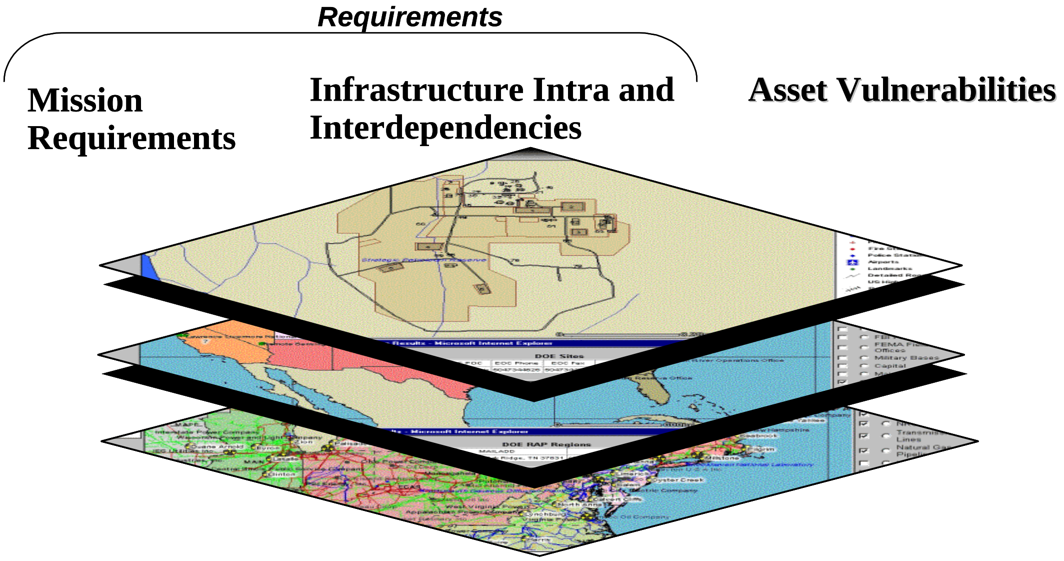


Figure 4: *An IOC acts as a common GIS canvas, displaying events as they take place.*

4. Advantages of an IOC

An IOC reduces the impact of an installation's daily operations as well as disasters through the application of technology and information management expertise. Data collected during an emergency is only useful in combating a disaster if it is relevant, available in real time, and accessible at various levels of command. It is even more valuable if integrated into a complete common operating picture that enhances situational awareness for decision makers by making it easier to understand, and by reducing extraneous data. Serving as a single source of information, the IOC is the focus for these requirements. It supplies a common operating picture of the entire installation, providing 24/7 access to critical infrastructure data and other important information. (See Figure 5.)

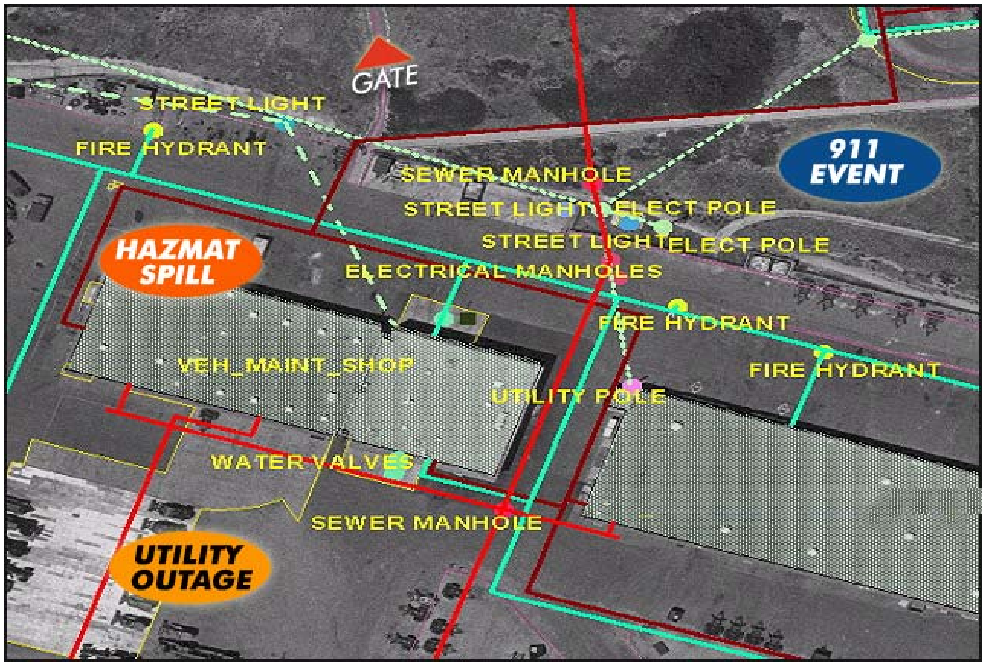


Figure 5: *An IOC provides a common operating picture of an installation.*

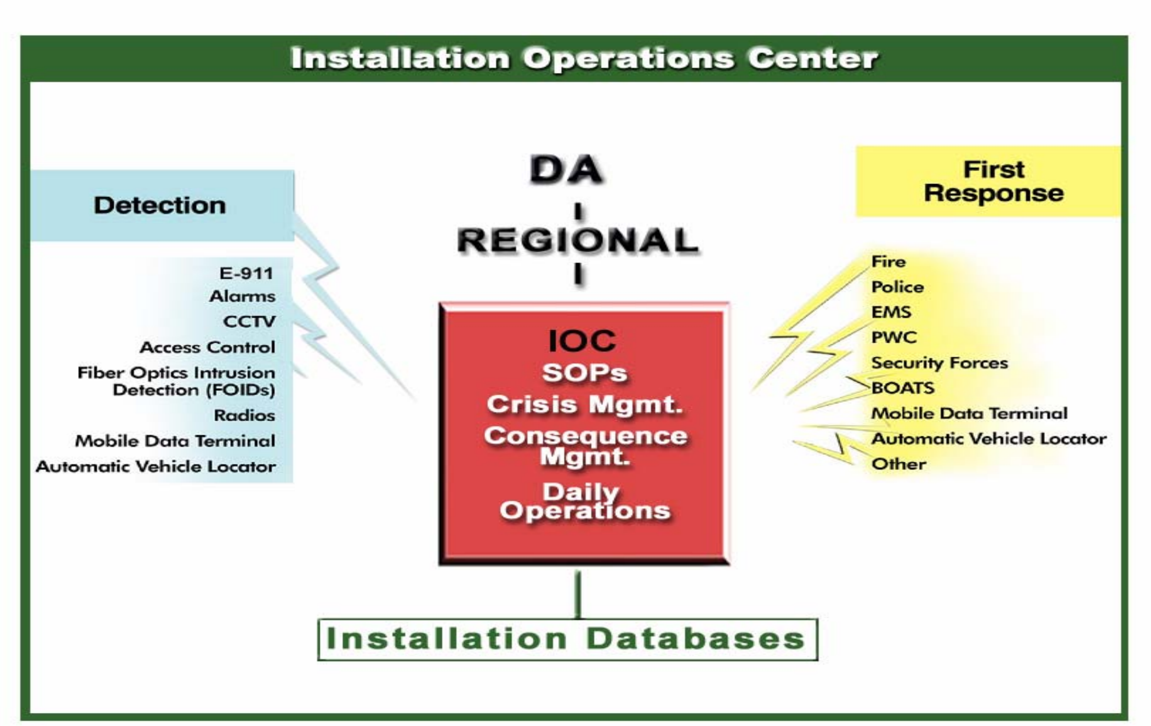
Army installations are continuously growing and changing, and an IOC easily adjusts with these changes. An IOC can expand and adapt as processes transform and technology evolves. It provides bases with the scalability needed to maintain situational awareness on a day-to-day basis.

Moreover, an IOC enables seamless communication interfaces via phone, radio, and digital sources to and from the field. With the tools necessary to control response and emergency assets, critical data and "command and control" are never more than 1-3 mouse-clicks away.

5. IOC Solution Requirements

Based on solutions developed jointly with customers such as the Warfighter Protection Lab, Fort Bragg, NC, Rock Island Arsenal, and Redstone Arsenal, AL, Intergraph has developed a working concept of an IOC that combines the best products and capabilities available to achieve mission assurance. Building on the needs of the installation and a tailored but open common operating picture, Intergraph has developed IOCs that allow commanders to successfully deter and prepare for disasters, conduct daily operations, and respond to emergencies. (See Figure 6.) To be successful, our systems' meet basic requirements, as defined by the user, include commercial off-the-shelf- (COTS) based solutions that reduce cost, comply with open standards, and secure data integration.

***Figure 6:** Intergraph enables IOCs to detect and respond to emergency events.*



5.1 Commercial Off-the-Shelf- (COTS) Based

To maximize value and speed implementation, an IOC must include COTS-based components. Such components are industry-tested, lower cost, and are generally more reliable. For example, Intergraph's solutions can provide comprehensive systems based on the Intergraph Computer-Aided Dispatch (I/CAD) system to facilitate situational awareness and preparedness via a common operating picture. I/CAD includes integrated, intelligent mapping and open system interfaces, as well as system availability of 99.999 percent uptime. With more than 35 years of experience providing and integrating proven COTS hardware and software, this state-of-the-art emergency management system provides exceptional system reliability, ergonomic design to reduce stress associated with dispatching and call processing functions, improved response time, simpler automated reports, and a relational database design. I/CAD supports more than 250 million people worldwide.

Intergraph also provides other capabilities that the system designer should look for in an IOC solution including:

- Integration of command and control functions to ensure real-time situational awareness and response (See Figure 7.)
- Use of standards such as the Association of Public-Safety Communications Officials (APCO), National Emergency Number Association (NENA), National Institute of Standards and Technology (NIST), Open Geospatial Consortium (OGC™), American National Standards Institute (ANSI), Spatial Data Standard for Facilities, Infrastructure, and Environment (SDSFIE), and The Institute of Electrical and Electronics Engineers (IEEE)
- An "intelligent" interactive mapping and data entry system to dispatch, monitor, and manage emergency services utilizing Intergraph expertise in both public safety and GIS
- Capability to view and interact with intelligent mapping, facilities, database, and communications data simultaneously
- Capability to provide context-specific information, detect data trends and patterns, and anticipate future readiness and response requirements
- Exchange of critical information throughout multiple resources and agencies via automated procedures
- Integration of standardized hazard modeling systems, such as the Defense Threat Reduction Agency HPAC, ALOHA, and CAMEO
- Integration of a variety of sensors and the ability to process and enhance video sensor data with a capability developed for NASA and trusted by law enforcement officials worldwide
- Capability to conduct automated vehicle location system (AVLS) and personnel tracking to a reliability that meets the needs of national security special events (NSSE)
- Capability to integrate standardized training and simulation to maintain proficiency of daily operators and emergency specific operators while minimizing time and money expended
- Integration of existing government and contractor best-of-breed tools to reduce cost and support compliance with the National Incident Management System (NIMS), the National Response Plan (NRP), and other government standard practices

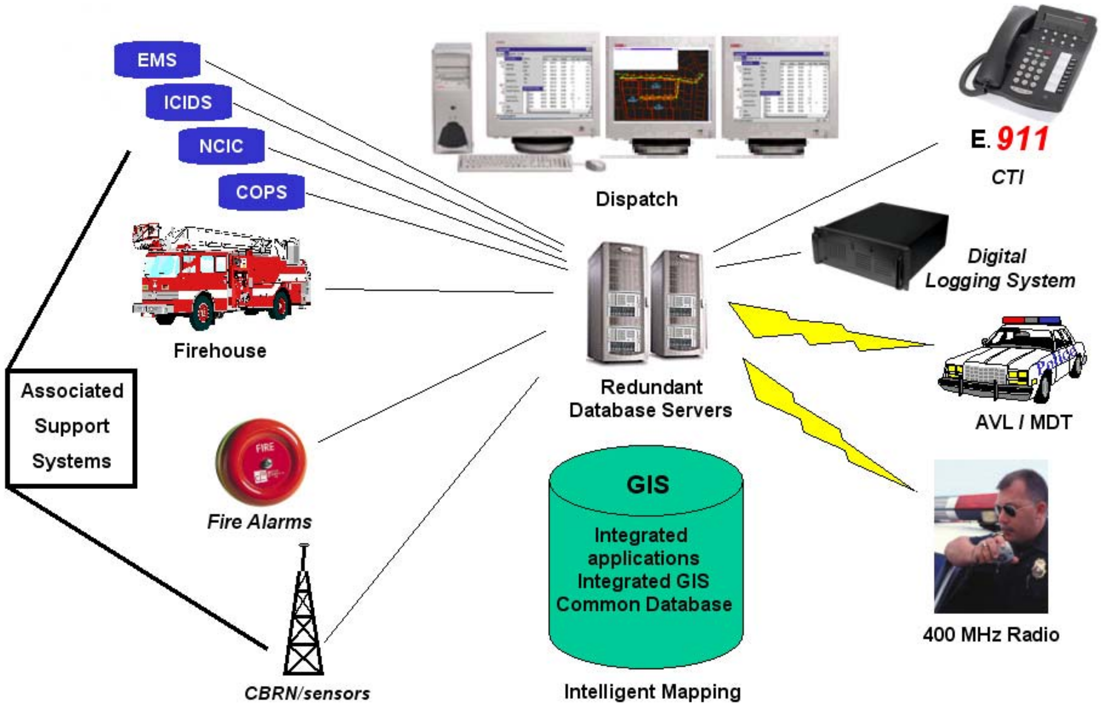


Figure 7: *An IOC solution must provide installations with an integrated incident management center.*

We need to EDIT the picture, adding CCTV, MNS, and taking off some of the words.

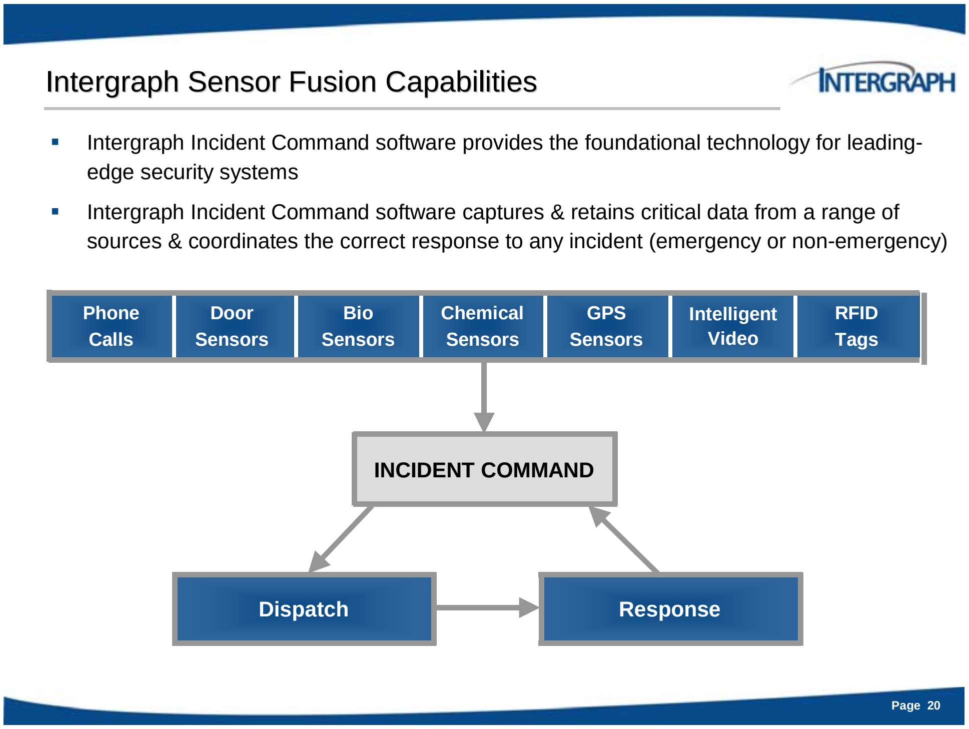
5.2 Open Standards-based

An IOC solution must also be standards-based. This will ensure increased ability to integrate with other technologies and provide a long-term path for expansion. For example, as a founding and principal member of the OGC, Intergraph is the leader in supporting interoperable solutions that “geo-enable” mainstream information technology (IT) and the Web. Intergraph is the first vendor to offer CAD-to-CAD interoperability with third-party dispatch systems. This interoperability allows installations to share incident data, aid requests, and provide coordinated incident response and management across multiple jurisdictional or regional public safety systems. This helps ensure data and information systems work together smoothly so that collective intelligence can be shared and combined to allow for the tracking, analyzing, and understanding of a disaster situation or day-to-day operation, visualized in a form that is intelligent and actionable.

Whichever vendor you select should be committed to and active in establishing industry standards, and those standards should be inherent in their systems. Using a standards and COTS-based system architecture, an IOC can provide a net-centric operational, interoperable decision support system. A standards-based solution and open system architecture emphasizes a common interface design. The common interface design is expandable, extensible, and scalable – accepting new configurations and information as the need arises.

5.3 Data Integration

Finally, an IOC must provide data conveniently through a robust data integration method. (See Figure 8.) As a general principle, all data should be accessible through the common network or data bus. Data should be available in its most basic format for processing by systems and operators. In our approach, all data, including video, audio, telephonic switch, intrusion sensors, infrastructure sensors, perimeter monitoring systems, and more, are readily accessible throughout the system for authorized users.



Intergraph Sensor Fusion Capabilities

INTERGRAPH

- Intergraph Incident Command software provides the foundational technology for leading-edge security systems
- Intergraph Incident Command software captures & retains critical data from a range of sources & coordinates the correct response to any incident (emergency or non-emergency)

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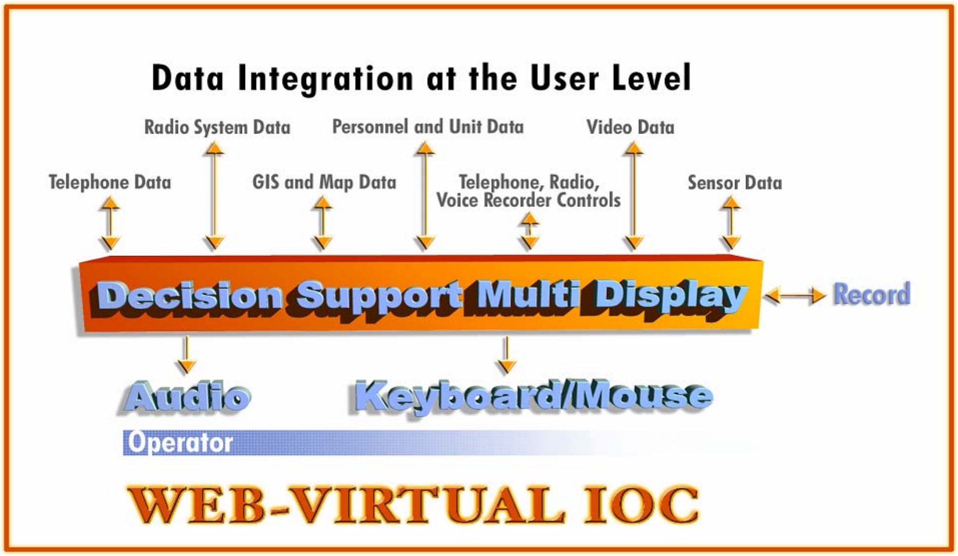
Data Integration at the User Level
Radio System Data
Personnel and Unit Data
Video Data
Telephone Data
GIS and Map Data
Telephone, Radio, Voice Recorder Controls
Sensor Data
Decision Support Multi Display
Record
Audio
Keyboard/Mouse
Operator
WEB-VIRTUAL IOC

6. Summary

Through the use of COTS technology, standards, and a robust integration architecture, an installation can develop an IOC that meets daily and emergency operational needs. Through government-industry partnerships, Intergraph has been at the forefront of developing solutions that meet these criteria. We can help installations develop the right solution using the right approach to an IOC.

- Provide all collected IT data from various sensors into a common display
- Provide recommendations and tools for operators to control emergency assets
- Provide communication via phone, radio, and digital sources to and from the field
- Provide evaluated data to high-level incident commanders

Intergraph Sensor Fusion Capabilities

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For more information about Intergraph DITSCAP solutions, visit our Web site at www.intergraph.com/sgi.