

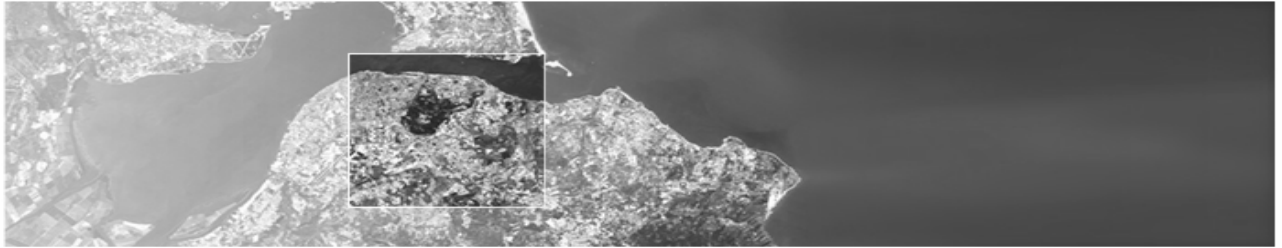


B L A C K
C O R A L

Black Coral White Paper

Black Coral AXIS

Enabling easier, geo-referenced and more efficient information sharing.



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Introduction

If managing, sharing, and obtaining information from external resources presents problems for your organization, a new class of geospatial technology products may be able to provide the solution you are looking for.

This white paper discusses how to enable easier, more efficient information exchange, and the capacity to share geo-referenced data within and across organizations.

Historical Overview

Emergency Services, the Military, Operations Centers, and multi-level organizations of all types are required to exchange information to achieve their goals. Problems with information management exist including:

- TIME CRITICAL SITUATIONS
- INFORMATION OVERLOAD
- INCOMPATIBLE DATA SETS
- OBSOLETE INFORMATION
- SECURITY
- LACK OF GEO-CONTEXT

Time Critical Situations

Sharing information can be a time consuming and complex process. This process is further complicated by the urgency associated with distributing data about critical situations. Critical situations present a unique challenge because these events are almost always associated with a physical location that also must be communicated in order for response teams to effectively observe, assess, and react. Users require instantaneous access to relevant information while maintaining the ability to control the flow of information.

Information overload

Many organizations are hindered by information over-load. Having too much

information can obscure the required operational picture of a situation and prevent responders from reacting appropriately and in a timely manner. Storing vast amounts of information is of no use to team members if they cannot access specific and task-related details when they need them.

During time critical situations, prolonged information searches are not feasible and can have disastrous effects on response efforts.

Incompatible data sets

Disparate collection methods, storage facilities, and data types can make it difficult to share data. Compatibility across standard systems is a requirement for information management.

Obsolete information

Information is only useful if it is received at the appropriate time and is current. During a crisis responders need to communicate in near real time as situations unfold and response requirements change by the minute. Users require a means to establish lines of communication with other groups on an ad hoc basis in addition to their existing sharing relationships.

Security

Some groups may withhold information fearing that it may not be protected due to inconsistent security protocols and sharing practices. Security concerns can be addressed by allowing the information owner to select the users that will have access to the data during the publication process.

Lack of Geo-context

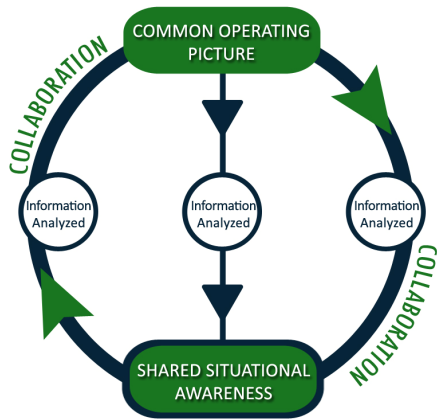
Where an incident or event is taking place is of vital importance to a response effort. Tracking incidents, assets and baseline information requires a geo-context to be useful. Displaying this information on a map presents an invaluable picture that provides users with shared situational awareness. Shared situational awareness means responders have the ability to effectively respond to incidents within multi-departmental/jurisdictional communities.

Collaboration through Situational Awareness

Black Coral AXIS provides Situational Awareness by enabling users to share geo-referenced information in near real time. Geo-referenced information contains details about location and can be displayed on a map. In Black Coral the location attributes have various external sources including real time sensors, GPS devices, and team members in command centers.

Situational Awareness is knowledge of a scenario that is achieved in near real time and that encompasses all the information resources available. Stakeholders can both make and justify their decisions because they are supported in Black Coral AXIS by a map based picture of the known, relevant information about a crisis or scenario. By obtaining many sources of geo-referenced data decision makers have access to corroborated information.

Once groups have achieved a Shared Situational Awareness they are able to effectively collaborate to accomplish common goals.



Some information sharing options fail to provide an adequate solution leaving users with an excess of data. This distorts the situational awareness view and provides only for time consuming and cumbersome communication across organizations. This creates two undesirable scenarios: information that is unusable due to volume and lack of organization and information that is of limited usefulness because it is not geo-referenced. For example knowing there is a cache of medical supplies is of little value unless the location and directions to this asset are also provided.

Particularly in Homeland Security and Defence environments, responders are required to achieve shared situational awareness to make informed and accurate decisions about how to proceed in critical situations. Access to information in a timely manner is a necessity in achieving shared situational awareness and has presented decision makers with problems in the very recent past.

Black Coral AXIS resolves these problems by enabling groups to effectively share and display geo-referenced information on a digital map. By controlling the sharing

process users are provided only with the information relevant to their role and tasking. This prevents irrelevant details from obscuring their required situational awareness.

Communities of Practice

This process is achieved in Black Coral AXIS through establishing Communities of Practice and the feeds and aggregations used to exchange the required information.

Communities of Practice are groups that share a common interest in an issue and collaborate to find a solution. AXIS enables these Communities of Practice to share ideas and information by allowing users to publish and subscribe to data feeds. The level of sharing and the data feed content is determined by the organization when the feed is created. Communities of Practice can be formed as part of a formal response mandate or can be created on an ad-hoc basis as unforeseen and urgent information requests are made during an incident.

A feed is a collection of one or more published items that contains data that the publisher wants to make available to other participants. Users can subscribe to these data feeds to automatically receive information. Different data sources can be integrated into one Feed.

Really Simple Syndication (RSS) is a feed format that delivers regularly changing web content or alert messages to its data feed subscribers. Users can subscribe to RSS feeds including many other standard feed formats such as GeoRSS and KML.

Common Alerting Protocol (CAP) messaging alerts can be processed by Black Coral AXIS. The CAP data interchange format describes hazard emergency alerts and public warnings at the local, regional and national level and can be sent over any network type. This format is becoming

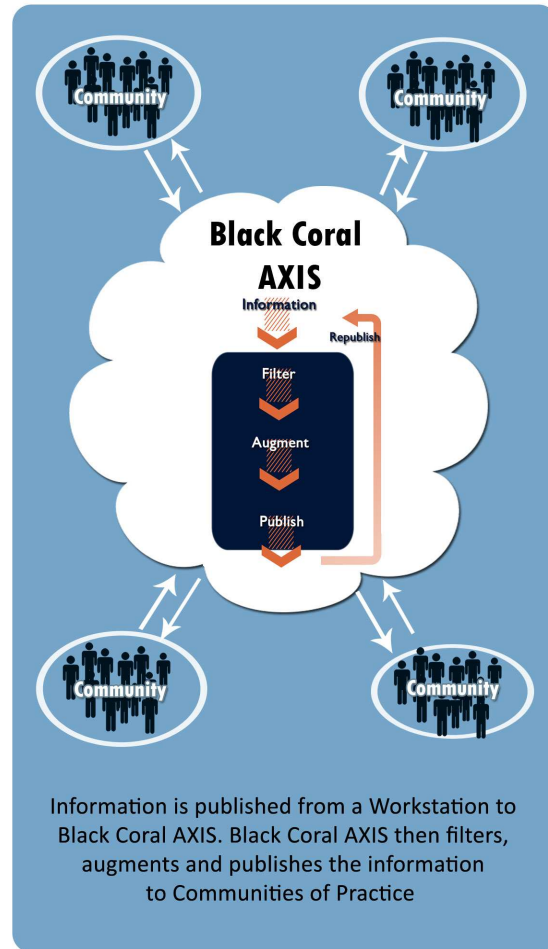
increasingly popular as warning systems become more technically advanced and as responders recognize the importance of collaborating across organizations in achieving successful outcomes.

An Aggregation consists of one or more feeds and is published by encoding the data in a specific format and making it public.

Feeds and Aggregations enable an organization to subscribe to, publish, filter, augment, and republish data. Users can then effectively utilize information to contribute to a current and common operating picture for their organization.

Organizations can create role based Feeds and Aggregations to filter details relevant to specific tasks. This enables users to obtain a level of situational awareness specific to their role that is uncluttered by unnecessary details. Groups that exchange information on a continuous basis can devise sharing groups by syndicating information into data feeds that allow each other instant access to data as it is posted. Other sharing relationships can be created on a one way basis, on as needed basis or as situations and scenarios develop.

Information collected by your team, in the field, or in the operations centre can also be published in separate feeds. Doing so will provide a more consistent means for managing the data flow and will ensure that the latest information relating to a situation is communicated to the relevant participants.



Analysts can use AXIS as a clearing house, allowing them to sort through information as it arrives. AXIS enables analysts to summarize details and to ensure that critical items are prioritized and made available to the appropriate groups via data feeds. These data feeds can also be republished into formats familiar to group.

Emergency Response Cycle

To illustrate the effectiveness of AXIS' sharing capabilities during critical situations its use during the 4 phases of the **Emergency Response Cycle** is described.



Mitigation

During the Mitigation phase Black Coral AXIS can assist groups to collaborate to create vulnerability and risk analysis. As a result of this information exchange and analysis the following sample outcomes can occur:

- STRATEGIC AND POLICY CHANGES
- ALTERNATE ROUTES FOR ROAD CLOSURES CAN BE CREATED
- INFORMATION ABOUT POTENTIAL HAZARDS CAN BE STORED FOR FUTURE REFERENCE.
- GAS LINES TO WATCH IN CASE OF FIRES OR OIL SPILLS
- EMERGENCY RISKS – NUCLEAR PLANTS

Preparedness

Black Coral AXIS allows users to set up feeds to exchange information with groups on a regular basis. Users can also set up information sharing groups on an ad hoc basis. This is of particular significance during critical situations when decision makers require communication with other groups in near real time.

The following are examples of the information Black Coral AXIS can be used to maintain and/or monitor:

- ASSET LOCATIONS
- INFRASTRUCTURE INFORMATION
- HIGH RISK AREAS
- LOCATION AND CONTACT DETAILS FOR EMERGENCY RESPONSES TEAMS
- EARLY WARNING INDICATORS
- COMMUNICATION PROCEDURES TO ALERT EMERGENCY RESPONSE TEAMS ABOUT EARLY SIGNS OF EMERGENCY SITUATIONS
- INFORMATION ABOUT PAST INCIDENTS AND HOW THEY WERE RESOLVED
- INFORMATION ABOUT PLACES TO HOUSE LARGE NUMBERS OF PEOPLE; CHURCHES, SCHOOLS, HOSPITALS, STADIUMS

Response

The response phase occurs when an event begins. The onset of some events is gradual and may overlap with the preparedness phase. It is during the Response phase that Black Coral's communication capabilities become critical tools in ensuring an informed and effective decision making process and ultimately a best case scenario outcome.

The following are examples of the information Black Coral can be used to maintain and/or monitor:

- COORDINATE RESPONSE CROSS JURISDICTION AND ORGANIZATION
- COMMUNICATE WITH FIRE, POLICE, AND AMBULANCE
- COLLABORATE WITH VOLUNTEER RESOURCES
- REDUCE VULNERABILITY OF EMERGENCY RESPONSE WORKERS BY COMMUNICATING DANGERS
- COORDINATE AID RELIEF FOR STRANDED CITIZENS
- COMMUNICATE ACCESS TO AND LOCATION OF FOOD, WATER, SHELTER, CLOTHING

Recovery

Black Coral AXIS ensures that the right people are able to obtain the necessary information to conduct an effective recovery.

Black Coral solutions play an integral role as systems are returned to normal. Communications and asset tracking are essential in directing the recovery process.

The following are examples of the information Black Coral AXIS can be used to maintain and/or monitor:

- STATUS OF RECOVERY AND PROCESSES USED THAT WERE SUCCESSFUL
- COMPILE HISTORICAL DATA FOR USE IN FUTURE INCIDENTS
- COMPILE A LESSONS LEARNED DOCUMENT FOR USE IN INCIDENT PLANNING

The OODA Loop

Black Coral AXIS provides situational awareness as participants apply the principles of the OODA Loop. This is an effective union of strategy and technology that allows decision makers to operate in and respond faster to rapidly changing situations. Tactical operations are inherently time sensitive. When decisions and actions are delayed they lose their effectiveness because the situation has changed before the response was executed. According to the OODA Loop concept time sensitive missions are in fact time competitive. Technology in the modern battlefield is vital to winning the race to cycle through the OODA loop faster and gain tactical advantage.

Black Coral AXIS can facilitate enhanced decision making abilities in time critical missions. AXIS users have a distinct advantage when they orient their acquired information because they benefit from a geo-referenced information exchange

system. This leads to a more effective and faster orientation, decision making, and action cycle. Black Coral AXIS allows participants to get inside their adversary's Loop by achieving situational awareness faster.

Fast, clear and efficient information exchange across tactical units provides agility in reacting to situations. Outthinking and outmaneuvering strategies can even be applied when responding to natural disasters. Being prepared, informed and anticipating the possible outcomes based on historical data and by monitoring various information sources can be a powerful tool in minimizing the impact of an event on people, property, the environment and infrastructure.

Observe

During the Observation phase of the OODA Loop participants collect information about themselves, their physical surroundings, and their adversaries. AXIS can provide this information to stakeholders via data feeds. Data feeds can also be set up to include additional information about relevant details including the location of assets, driving routes, and weather conditions. AXIS allows participants to view information on a map and to share it with other stakeholders in near real time.

Orient

During the Orientation phase participants process the collected information. In AXIS this information can be displayed on a map that can be viewed by stakeholders from various tactical units in disparate physical locations. AXIS is adept at creating a relevant picture of the scenario and can do so, when the data feeds are viewed in Black Coral LIVE, at a task and role based level.

Decide

Obtaining a clear picture and situational awareness via AXIS data feeds is a powerful tool for decision makers. They make faster

and better decisions that can be justified by corroborated information displayed on a digital map.

Act

The Act phase occurs when decision makers implement the decisions they have made. Participants can feed the impending results of their decisions back into AXIS to communicate the location of field operatives and the physical implications of their actions. This in turn feeds the observation phase that is the basis for further action.

Key Benefits of AXIS

AXIS is designed reduce the impact of critical situations on people, property, the environment and infrastructure by providing users with information about a scenario and displaying it on a digital map for analysis.

Black Coral AXIS achieves this goal by managing the sharing of geo-referenced information. Access to information in a timely manner is essential for successful outcomes. Information exchange after a crises has taken place is also vital in setting up the infrastructure to deal with future scenarios in an informed and educated manner.

Reduce Duplication and Redundancy

Black Coral Inc. delivers product support such as software training and professional services to ensure vast innovations in information exchange and shared situational awareness are achieved. This translates into significant cost savings as duplicate and incompatible data sets are eliminated.

Risk Management

Black Coral AXIS is a valuable tool in creating vulnerability and risk metrics so that situations can be better managed and in some cases even prevented. Emergency responders can make preemptive attempts to contain situations when they have access to current geo-referenced information, to historical data, and have details about assets in close proximity to an incident.

Publish and Subscribe to geo-referenced information

Groups can search for and gather information that is of value to their organization. Search results can be re-published in a format easily accessed and familiar to the group.

During the Gathering Process users can filter in required information or filter out irrelevant details. Black Coral AXIS provides enhanced capabilities in this area by allowing users to filter based on geographic location.

Groups can publish information they know will be of use to outside organizations. These outside organizations can also request that information that meets certain criteria is syndicated in a data feed and made directly available to them.

Published information is automatically sent to groups who have signed up to receive updates based on a set of criteria. This information, when possible, contains a geo-context and can be viewed in terms of its location on a map.

Implementation

Black Coral AXIS interacts seamlessly with other technology and is easily incorporated into existing systems. No changes to internal applications are required. When business needs warrant, internal applications can be integrated, but the level of sharing is determined by the organization, not by another application. Organizations can

continue to operate on a business as usual basis while integrating AXIS. The organization can control the pace at which they adopt AXIS technology and their participation in the larger information exchange community.

Summary

Black Coral Inc. specializes in providing a Common Operating Picture or a single identical display of relevant information shared by more than one group. This facilitates collaborative planning and enables all participants to achieve Shared Situational Awareness.

Once groups have achieved this Shared Situational Awareness they are able to effectively collaborate to accomplish common goals.

Black Coral allows disparate groups with various mandates to exchange information by creating and subscribing to geo-referenced data feeds. Organizations can control the flow of information so that they can maintain a clear situational awareness.

AXIS allows for collaboration despite disparate systems, organizations, mandates, and physical locations.

Scenario

The following scenarios describe how AXIS can be used during situations where the exchange of geo-referenced information is essential.

Forest Service Example

In Canada Forest Services are run at the provincial level. Each district is required to maintain up to date information about the status of wild

fires in its area. This information is obtained from forest ranger reports to the province about the hot spots they are monitoring. Forest Services uses this information to compile their own reports detailing the status of the fires and the location and allocation of the available resources.

Local fire departments would also benefit from monitoring information about wild fires. It would enable them to prepare in advance to evacuate people from their homes as wild fires approach urban areas. Fire fighters could also be prepared to allocate further resources to assist Forest Services when wild fires become unmanageable for Forest Services alone.

Using AXIS fire departments could sign up to receive updates about wild fires within specified geographic parameters. Signing up for this information would ensure that they have instant and up to date information about any wild fires that are approaching areas under their watch. Using AXIS to automate this process eliminates the task of sorting through the information about fires in areas that are not of use to them. In situations where time is critical this could be a crucial element in reducing a wild fire's impact on people, property, the environment and infrastructure.

Black Coral AXIS is equipped to provide this service because it stores information with a geographic reference. Only the information relevant to the department's geographic tasking would be requested to ensure that the department is not inundated with irrelevant information. Only relevant information would be routed directly to each department without it having to be sorted and assigned.

Military Example

Military command centres are required to communicate and distribute information. There are entities that exist solely to gather

and appropriately redistribute information from hundreds of sources. They analyze and disseminate information throughout the community. These intelligence organizations exist at both the domestic level and the international level.

Black Coral AXIS is ideally suited to share information amongst the various entities that are required to participate in military operations. Using AXIS participants can set up data feeds to automatically share information with other groups. New feeds can also be created easily. Black Coral AXIS allows the information publisher to control who has access to the information. This is an important element as sensitive and classified materials may be included in the data feeds. All data processed by AXIS can be associated with geo-referenced information that can be displayed on a map.

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