

The Importance of a Strategy to Manage Surveillance Activities in an Oil Spill Response

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Introduction

Situational Awareness is critical to every oil spill response - providing a clear understanding of the evolving scenario and actions being taken. Surveillance is one of the key sources of data that contributes to Situational Awareness. Surveillance is delivered through a wide range of technologies - typically from conventional observers on aircraft, through satellite and airborne remote sensing, to Unmanned Aerial Systems (UAS) and Automated Underwater Vehicles (AUV).

The type of information needed varies depending on the scenario. But it generally comprises a similar mix of updates on oiling conditions, information on sensitive resources, monitored progress of response activities and the capture of data for decision and record purposes. Past experience indicates surveillance is not often planned in a strategic and systematic way and with the rapid rise in newly-available surveillance technologies, it is apparent that the Incident Command could become quickly overwhelmed in the near-future by the sheer volume of activity and data generated, even for modest events.

A clear strategy for surveillance is needed, to maintain focus on acquiring the data that is critical to the response, and to cope with what could otherwise become an avalanche of surveillance activity and data that distracts responders from what is most important. Such a strategy would readily serve the Incident Command, and drive the controlled tasking of chosen surveillance platforms to acquire key data to support good response decisions. To make this happen, it is also vital to understand what data responders critically need, and when, in order to inform a suitable surveillance strategy for a particular scenario.

Situational Awareness

In essence, Situational Awareness is 'knowing what is going on around you'. During the response to an oil spill, there are three features that are associated with good Situational Awareness:

- 1) Good Decision-Making - Responders have the right, accurate and timely information, to make good decisions.
- 2) Effective Information Management - A variety of responders and stakeholders need common and clear information that is readily assimilated and made available in a Common Operating Picture (COP).
- 3) Data Acquisition using optimal surveillance tools – Knowing what data is needed, its frequency, and how to optimally acquire it from the surveillance platforms/tools available.

Within the Incident Management System (IMS), each section (Command, Planning, Operations, etc.) requires a variety of data at different times, with varying detail and for different purposes. Much of this data is delivered through surveillance activities. Past experience indicates a tendency in some cases to 'make do' with tools that happen to be available on the day, in other cases, to mobilise everything feasible to capture as much data as possible, and more recently to take up unsolicited offers of support with little co-ordination or thought to what information is actually needed. These seemingly 'random acts of surveillance' can result in the collection of an abundance of data, often duplicated, sometimes inconsistent or conflicting, causing unnecessary distractions for the response. What is needed, to avoid this, is a clear strategy for surveillance from the outset – and this needs to be planned for in advance.

Surveillance Strategy

The surveillance strategy should be driven by the outcomes needed. In other words, it should be clearly outlined what information is needed by what time and for what purpose. This surveillance strategy should be included explicitly in the contingency planning process, to establish the surveillance platforms needed and to confirm access to appropriate capability. As a simple narrow illustration, it is far better during a response, to manage the

delivery of regular satellite imagery to provide a wide-area coverage of the response arena; than to receive un-asked-for multiple random satellite images without any defined purpose.

Planners and Responders need to define more clearly their requirements for surveillance, and to develop a surveillance strategy it is helpful to use some guiding questions, for example:

- 1) What is the information that we need?
- 2) When and how often do we need the information?
- 3) How are we getting the information?

What do we need - Information Requirements

For response, the information is typically a mix of strategic and tactical data, the type and detail of which will vary and depends on the target audiences e.g. within Incident Management (Command, Operations, Planning, etc). Typically we need to be informed of the:

- Wide-area picture ie the response arena
- Status of source control
- Validation on oil behaviour and movement
- Oceanographic and weather conditions
- Status of marine, shoreline, inland response activities
- Environmental and socio economic sensitivities
- Predicted impacts

When and How Often do we Need Information

There is an expectation growing in society that data is updated constantly, almost as a 'live feed'. However, while we do want data capture, assimilation and sharing to be rapid and effective, in most cases there is no need for constant updating. It is important in any incident command post, for there to be clarity on when certain data streams will be updated and available in the Situation Unit or Common Operating Picture. Having that clarity and a confident basis for why it is being managed in a particular way, provides a robust position to adjust from and to and satisfy responder/stakeholder needs. It also lessens unhelpful or even unreasonable expectations that could otherwise arise.

There is a natural rhythm and pace of update to be established, which should satisfy most stakeholders – delivered by a surveillance strategy. While this might seem straightforward as a principle, experience indicates the connectivity between a Situation Unit / COP and a surveillance strategy is rarely attended to. This is often compounded in major exercises, by injects from a 'Simulation Cell' being provided entirely at the control of the exercise organisers, and not driven by the responders who should be managing a strategic process of surveillance and information updates.

How do we get Information – Surveillance Tools

It is important to understand what tools/sensors are available for the response and what information they can deliver, by what time and in what format. Not one single tool can provide all the information and a suite of surveillance tools will be needed to provide the required information. The range of surveillance technologies available nowadays is impressive, ranging from the traditional observers on aircraft, through satellite and airborne remote sensing, to Unmanned Aerial Systems (UAS) and Automated Underwater Vehicles (AUV). Each of these tools has their advantages and limitations.

The key point here, is to be clear what each tool can and cannot deliver, when developing the surveillance strategy. For example, Synthetic Aperture Radar (SAR) satellites can provide a good overview of where the oil slicks are day and night, but cannot provide insight on the thickness of the oil slicks. On the other hand observers on aircraft can provide relative quickly an assessment of oil thickness, but are limited to day time operations. Airborne remote sensing can provide detailed oil thickness maps using a suit of sensors (IR/UV), but it takes a relatively long time to produce the maps. Unmanned Aerial Systems are now more commonly used and could access areas that are otherwise inaccessible to human observers, such as high cliffs or salt marshes, which could 'fill in' areas of the response arena in a quick and relatively rapid fashion.

In the early stages of an incident, not all surveillance options will be available due to varying mobilisation times. For example, SAR imagery can take initially between 12 and 24 hrs from request to delivery to Incident Command. On the other hand an aircraft with observer can usually be mobilised within a few hours of

notification. Once a robust incident management team is in place, the surveillance strategy can be optimised in alignment to a preferred frequency of data updates to serve responder and stakeholder needs.

Who Owns the Surveillance Strategy

The surveillance strategy needs to be managed throughout the response to ensure that information remains up to date and is delivered effectively and promptly to the Incident Management teams.

Arguably the most appropriate place for the strategy to be managed from, is in the Planning Section of the IMS. However, experience indicates that this has not been fully explored and there is still some uncertainty as to which specific role or function actually owns such the strategy, from which responders they seek input to establish critical information demands, and how this is coordinated and managed by the Situation Unit and in the COP.

Getting it Right from the Start

Any oil spill incident will evolve rapidly and information requirements will change accordingly. It is well understood that the emergency phase will initially be quite chaotic until Incident Management gets organised and a structured daily operational routine is established. Some surveillance activity will also take time to establish. It is vital for the initial surveillance strategy and first actions to have been thought through carefully in advance, during contingency planning. The more systematic and targeted the approach is at the outset, the more confidence the Incident Management Team and other stakeholders will have in the activities underway, and the control that is place to manage a strategy and provide an information flow adequate to support response decisions and provide Situational Awareness. This is especially important, given the realistic expectation of an avalanche of data and offers of technology to rapidly arise.

Once Incident Management is organised and a more robust daily process is in place, clearer direction can be given and adjustments can be made to tailor the strategy. Information will be required throughout the lifespan of the incident, but the type of information, data needs and frequency will change, from initially information on slick movements offshore, predicted impacts, success of response tactics, shoreline oiling, and damage assessments, through to information for claims and potential restoration efforts. Starting with a clear and robust strategy, which can adapt to the changing needs of the response, sets up the Incident Management team for success - to maintain Situational Awareness.

Concluding Remarks

Situational Awareness is critical to every oil spill response, providing a clear understanding of the evolving scenario and actions being taken to bring the response to a satisfactory end. A robust surveillance strategy is a key component to deliver the required information within acceptable time frames. Such a strategy needs to be planned in advance, and ideally, the surveillance strategy should be owned by the IMS Planning Section, which seems the natural place for it to sit, although some further consideration is needed on precisely how this is managed and controlled.

Greater clarity is needed on how to design and implement a surveillance strategy. There are many good practice guides and reports on individual components - such as aerial visual observation, satellite and airborne remote sensing, and in-water surveillance. However, there are very few guidelines to support planners and responders directly, to design a surveillance strategy and deliver all the components based on what information is needed, how frequently and how is this data acquired optimally.

Without a surveillance strategy, and with the advances in surveillance platforms readily available to a very wide variety of stakeholders, Responders are likely to be overwhelmed in future oil spill events by the sheer volume of uncoordinated surveillance activity and data generated, leading to distractions and potentially getting in the way of an effective response.

Conversely, a surveillance strategy serves the entire Incident Management organisation, supports Situational Awareness and drives the effective use of surveillance tools to acquire high-value data - all of which directly supports good decision-making and a more effective response and better outcomes.