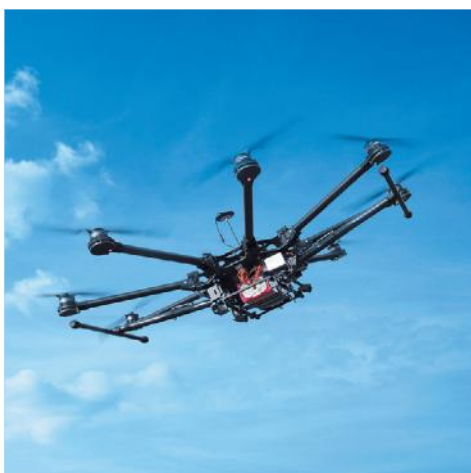
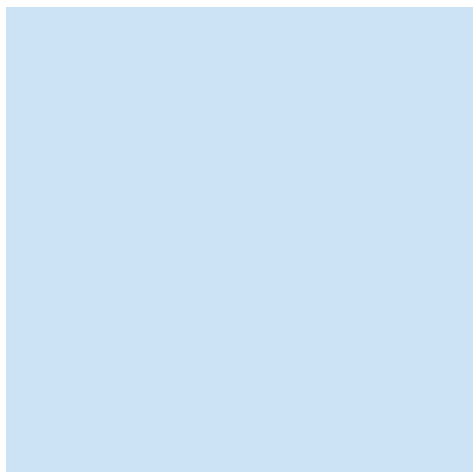


Oil spill surveillance planning guidance

A technical support document to accompany the IPIECA-IOGP guidance on oil spill contingency planning, surveillance and response management

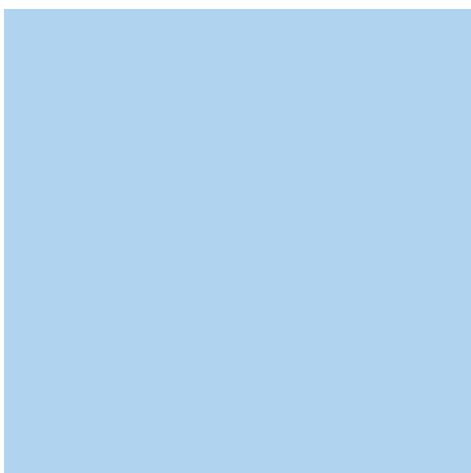


Oil spill
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Advancing environmental
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Oil spill surveillance planning guidance

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Summary

This publication is an addition to the IPIECA-IOGP good practice guide series which summarizes current views on good practice for a range of oil spill preparedness and response topics. The series aims to align industry practices and activities, inform stakeholders, and serve as a communication tool to promote awareness and education. It builds upon experiences gained from spills and draws upon references from a wide range of sources, both from within the IPIECA and IOGP membership and across the wider response community. This technical support document has been developed to help navigate the steps involved in implementing and maintaining a surveillance programme during a response.

The guidance is intended to form the basis of a scalable surveillance strategy for use in a response situation. It describes how a surveillance plan can be developed to support the management of a comprehensive surveillance programme. A structured and coherent plan will enable good situational awareness through the collection of accurate and targeted information in a timely manner. This guidance aims to inform the development of a surveillance plan that is aligned to the response objectives and priorities, anticipates the changing needs for response over time, and ensures that response activities are adapted appropriately to serve a variety of purposes.

The guidance introduces six activity steps which are fundamental in developing and maintaining a surveillance plan regardless of the size of an incident. The guidance also outlines how a surveillance unit can be set up for large or complex responses, demonstrating how the work streams within the six steps may be divided to maintain workloads, good communication and manageable span of control.

The six steps guide the reader through how to gather information requirements, identify and manage appropriate resources, develop tasking, handle the data inputs and communicate the gathered information appropriately. These steps are continually reviewed, resulting in a circular process, ensuring that the resulting surveillance plan meets the ongoing requirements of the response. The document also highlights the varying frequency of surveillance activities, and how to adapt the surveillance work as the response evolves over time.

The guidance also includes a series of templates which are intended to form the basis of a surveillance plan. These can be completed at the time of an incident and can be modified and adapted depending on the incident needs. Finally, a quick reference guide is provided.

Introduction

This section introduces surveillance as an essential component of an oil spill response strategy, and emphasizes the four key principles that characterize a well-managed surveillance programme, namely:

- a focused approach;
- good communications;
- timely and proactive management; and
- the ability to adapt to changing circumstances.



Introduction

In any oil spill event, situational awareness is vital for informing good decision making and for supporting the response activities that are needed. Each spill scenario will be different in scale and complexity, and will have the potential to affect a variety of ecological and socio-economic resources. However, the approach to managing an effective surveillance strategy and delivering good situational awareness generally comprises the same process and activities each time.

The overall response strategy comprises all of the actions deemed necessary to minimize and mitigate the impacts of the spill. Surveillance is an essential component of the overall strategy, providing the critical information needed to support decisions, optimize the response effort, and help to achieve the desired outcomes. Surveillance activities may require the use of a variety of assets and techniques, such as satellites, aerial observation, ground surveys, and autonomous underwater vehicles (AUVs) in water bodies. In some cases, limited surveillance platforms and actions may be adequate to deliver good situational awareness, for example in the case of a small spill contained within a harbour area. However, for more extensive oil spill scenarios, a broad range of surveillance platforms may be needed, potentially in large numbers, to encompass the full geographical scope of the response, serve a variety of purposes, and provide the level of detail needed. It is vital that implementation of surveillance activities includes detailed planning, close management and a clear strategy underpinned by sound incident management processes.

CRITICAL INFORMATION

The term 'critical information' is used to describe requirements that the response leadership has identified to facilitate timely decisions. Information needs are continually reviewed and are likely to change as the response evolves. Critical information should be prioritized for collection, analysis and communication.

Utilizing a comprehensive and scalable strategy to actively manage a surveillance programme from the outset will maximize its value — providing appropriate and timely data aligned to the response objectives and priorities, anticipating the changing needs for the response over time, and adapting the activities necessary to serve a variety of purposes. The following principles characterize and underpin a well-managed approach:

1. **Focused:** A surveillance plan should be focused to serve the overall response objectives and the information needs of key stakeholders. In the initial stages of a response, surveillance resources may be limited, and information needs may therefore require prioritization.
2. **Coordinated:** Surveillance activities need to be integrated and shared across the incident management team (IMT) and planning processes. Good communications and close coordination within the various IMT functions are key to ensuring the effective use of resources and avoiding duplication of effort. This enables the IMT functions to know what information will be gathered, when it will be collected, how it will be communicated, and that it has been assessed by technical experts.
3. **Timely:** To maximize the benefits of surveillance activities, they should be proactively managed from the outset of the incident, as a wide variety of data are typically needed as soon as possible, to inform response objectives and support decisions on response actions and priorities. As the response progresses, it is important that the surveillance strategy is routinely updated to maintain the provision of reliable and regular information to the IMT at the appropriate times.
4. **Adaptable:** Many features of an oil spill scenario and the response to it will change and evolve over time. It is important that the surveillance strategy, plan and all associated activities are managed carefully. The team should continually reassess the overall surveillance programme to ensure that data needs are being met. Activities should be adapted to maintain relevance and value, and to serve the changing needs of responders and other stakeholders involved.



An effective surveillance plan is critical to the success of the surveillance strategy. The plan is developed and maintained using a simple process, which aims to identify the:

- information needed by the IMT;
- surveillance requirements, missions and assets;
- intended outcomes; and
- the process by which data will be shared and presented to serve the various response and stakeholder needs.

This technical support document lays out the key aspects of conducting surveillance during a response. Sections 2 and 3 outline the key principles and steps in planning and defining the roles and responsibilities of a surveillance strategy which, if followed, enables the development and maintenance of a surveillance plan.

Section 4 outlines the steps to be taken when implementing the strategy in a response. Finally, Appendix 1 provides a series of templates to assist with the development of a surveillance plan, while Appendix 2 provides further assistance by way of a quick reference guide to surveillance planning.

This document should be read in conjunction with the IPIECA-IOGP good practice guides on the topics of oil spill contingency planning,¹ aerial observation of oil spills at sea,² satellite remote sensing,³ and the incident management system (IMS),⁴ as well as the IPIECA-IOGP guidance on creating a Common Operating Picture.⁵

¹ IPIECA-IOGP (2015). *Contingency planning for oil spills on water*. <https://www.ipieca.org/resources/good-practice/contingency-planning-for-oil-spills-on-water>

² IPIECA-IOGP (2015). *Aerial observation of oil spills at sea*. <https://www.ipieca.org/resources/good-practice/aerial-observation-of-oil-spills-at-sea>

³ IPIECA-IOGP (2016). *Satellite remote sensing of oil spills at sea*. <https://www.ipieca.org/resources/good-practice/satellite-remote-sensing-of-oil-spills-at-sea>

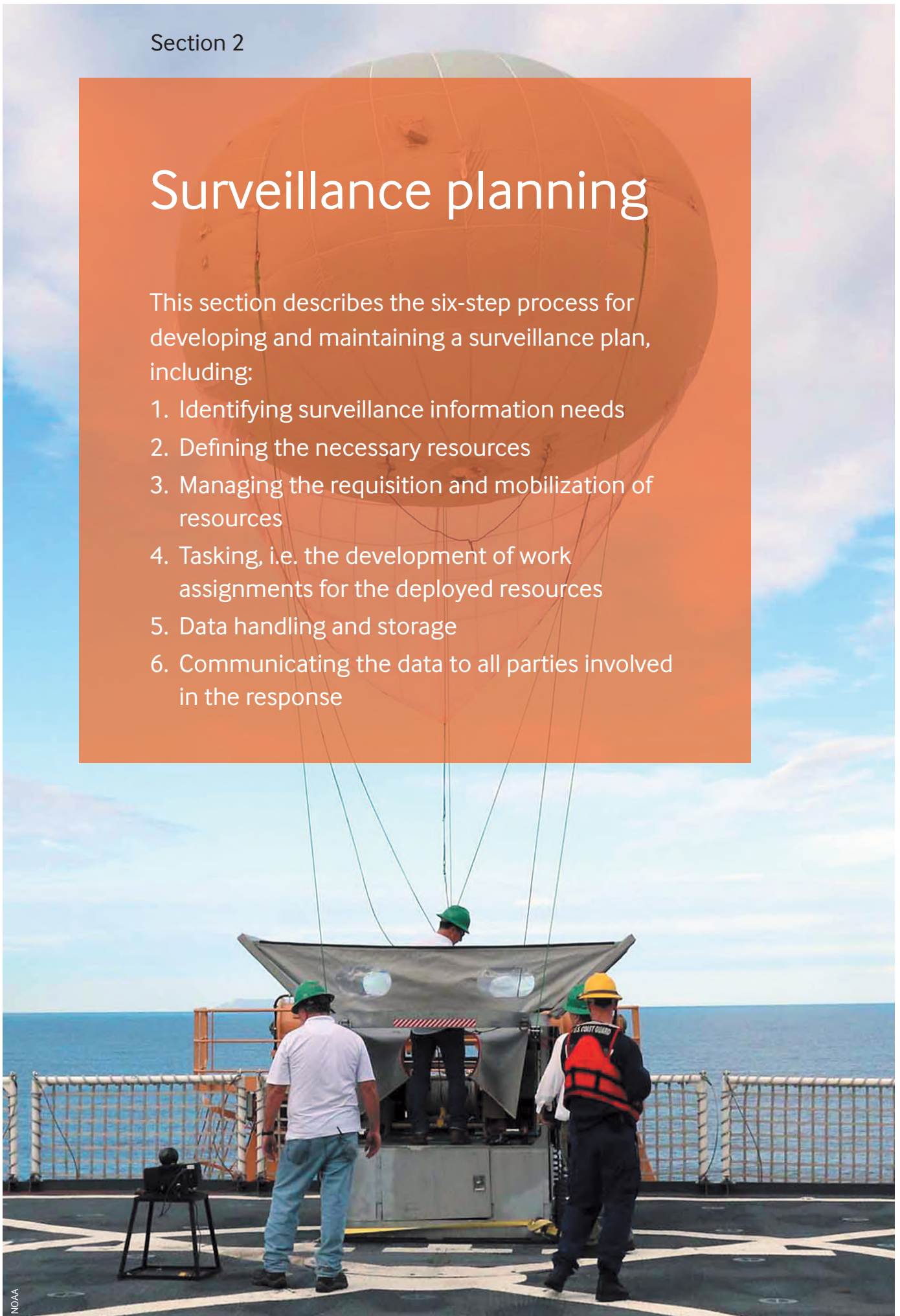
⁴ IPIECA-IOGP (2014). *Incident management system for the oil and gas industry*. <https://www.ipieca.org/resources/good-practice/incident-management-system-ims>

⁵ IPIECA-IOGP (2015). *Work Package 5: Common Operating Picture*. <https://www.ipieca.org/resources/awareness-briefing/common-operating-picture>

Surveillance planning

This section describes the six-step process for developing and maintaining a surveillance plan, including:

1. Identifying surveillance information needs
2. Defining the necessary resources
3. Managing the requisition and mobilization of resources
4. Tasking, i.e. the development of work assignments for the deployed resources
5. Data handling and storage
6. Communicating the data to all parties involved in the response



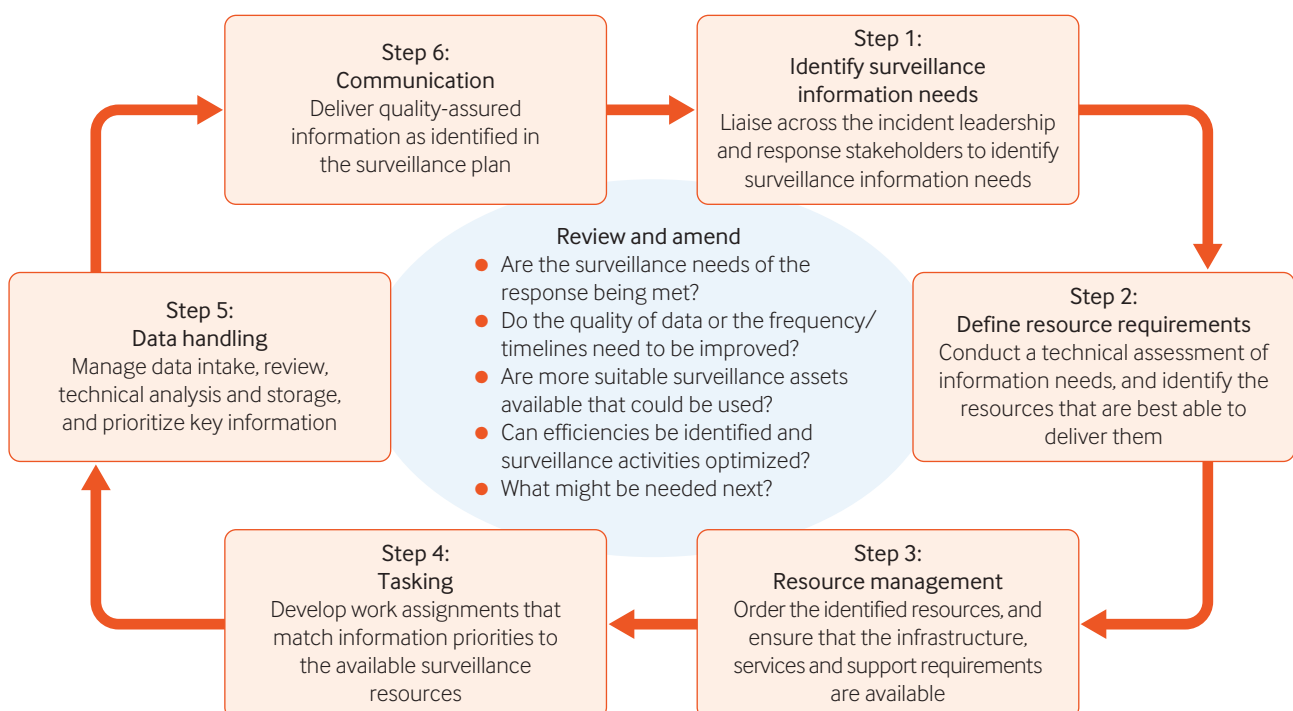
Surveillance planning

Surveillance activities need to be planned and managed robustly. This encompasses the following:

- **Direct engagement and support:** this involves the liaison actions required across the IMT to deliver the immediate and near-term surveillance activities. In IMS terms, this is referred to as planning for the next operational period. For example, this would include identifying equipment, resources and logistical support requirements for surveillance.
- **A surveillance plan:** an output of the surveillance strategy, this defines the planned surveillance activities, how they will be managed and performed, and how the results will be shared to support situational awareness for the IMT and responders.
- **Forward planning:** it is essential to anticipate how the oil spill scenario and response activities may evolve beyond the next operational period, so that data requirements and surveillance demands can be adapted to maintain optimal situational awareness.

Six distinct but overlapping sets of activities are involved in the surveillance planning process. This six-step process is described in detail in this section and is summarized in Figure 1. For smaller spill scenarios involving a limited number of surveillance activities and resources, these activity sets may all be delivered by a single individual or a small group of personnel. For larger incidents, where data requirements are more extensive and a variety of surveillance activities and resources are involved, more people will likely be needed to fulfil these activities. Where needed, these activities can be logically assigned to various roles, in a more formalized organizational structure, as described in Section 3.

Figure 1 The six-step process for developing and maintaining a surveillance plan



STEP 1: IDENTIFY SURVEILLANCE INFORMATION NEEDS

Surveillance should be undertaken as soon as possible after a spill occurs, to facilitate good response decision-making from the outset.

Initial attention will be focused on establishing the spill scenario, and the nature and scale of the incident. The kind of information sought will encompass the spill location, behaviour and trajectory, as well as any potential threats to sensitive resources. This should help to decide upon, or confirm, the first response priorities, develop an initial response strategy, and target the deployment of first response capability.

As the scenario unfolds, the data demands will evolve to serve an increasing variety of purposes; this will involve assessment and decision-making at different levels of the IMT, as necessary to support the ongoing response activities. If more surveillance assets need to be mobilized to deliver information, the surveillance strategy and the accompanying surveillance plan, along with the priority activities, will need to be managed closely to keep pace with the data demands and to maintain effective control of the surveillance operations.

Surveillance information will be requested by a variety of sources within the IMT. Stakeholders, such as government and regulatory authorities, may also require up-to-date information on various aspects of the incident. These requests will be reviewed by the IMT's Situation Unit or Surveillance Unit, to avoid duplication and to evaluate opportunities for combining similar requests into single missions. In accordance with the response data management plan, the requested data formats should be defined to ensure compatibility with the overall response requirements.

While the specific nature of the data requested will vary between different oil spill events, some broad themes can be observed, encompassing:

- the location, trajectory, behaviour and fate of the oil;
- ecological resources and sensitive habitats potentially at risk or affected;
- threats to, or impacts on, wildlife;
- logistical and operational features of the response, e.g. ports/harbours, site access, staging areas, etc.;
- the effectiveness of response measures;
- assessing and prioritizing areas for clean-up at-sea, on shorelines and inland;
- obtaining pre-impact imagery of areas to help establish baseline data;
- validating the extent of the spill area, and conversely, the areas where oil is not present; and
- monitoring environmental, social and economic resources.

STEP 2: DEFINE RESOURCE REQUIREMENTS

Depending on the identified information needs, there may be a variety of surveillance options or platforms that can meet them. This often requires technical expertise to understand how the information can be collected, and to select the best available option to satisfy each surveillance requirement. This expertise may also be required to actively pursue other options to enhance the surveillance activities if needed.

Aerial observation using both fixed-wing aircraft and helicopters has, for decades, been a mainstay feature for delivering good quality surveillance data. These are often the first surveillance assets to be deployed in a response, and are generally widely available. They can also be used to deploy sensors of varying types (e.g. thermal, multispectral) providing capabilities for mapping and quantifying floating oil properties in the marine environment. However, there is considerable variation in the suitability of commercial and other sources of aircraft, and these should be selected carefully.

Satellite imagery has become more readily available and accessible in many parts of the world. Unfortunately, delays of one to several days in obtaining these images is not uncommon due to the need to synchronize the response with satellite overflights, as well as the frequency of overflights and the time required for image downloads and interpretation.

Consequently, satellites may not be appropriate for real-time data collection, or for the surveillance needs and data demands of a relatively fast-moving response, but they can provide a steady supply of wide-area imagery and, in some cases, detailed site-specific imagery on a recurring basis.

Unmanned aerial vehicle (UAV) technology⁶ has advanced dramatically in recent times. In some countries an extensive array of options are available, ranging from sophisticated commercial platforms to low-cost models that are readily available to the public. Their value has been recognized through their potential to offer high levels of utility for different aspects of surveillance and data gathering in an oil spill response. On-board cameras can provide high quality visual or infra-red imagery in real time. However, there are challenges to their use, which include establishing the availability of service providers and addressing regulatory permitting. Similar issues also apply to AUV technology and to more recent developments such as harnessing artificial intelligence (AI) protocols, which could enhance the above-mentioned technology options.

When selecting appropriate surveillance resources, consideration should be given to a range of criteria, including:

- safety aspects;
- geographic area of coverage needed;
- level of detail required in the data;
- frequency of data provisions and updates;
- prevailing weather and other operating parameters/conditions;
- regulatory requirements, constraints and permitting;
- air space jurisdiction, restrictions and military controls;
- operational constraints and any defined management/deconfliction priorities;
- logistical features including airport and landing site locations, refuelling options, etc.; and
- the relative times at which different assets may be available.

STEP 3: RESOURCE MANAGEMENT

Resource management is a feature that is common to all aspects of an incident response. Once the appropriate surveillance platforms have been identified, they need to be requisitioned, acquired, readied for use in the response, and mobilized to the incident site. How this is accomplished will largely depend on how the response is being managed. The IPIECA-IOGP good practice guide entitled *Incident management system for the oil and gas industry*⁷ provides guidance on how the Logistics Section within the IMT function procures and mobilizes all response resources, including those required for surveillance activities. Other emergency response systems will have equivalent approaches.

Once mobilized, assets need to be tracked and managed by the resource owner in accordance with the incident management processes adopted. It should be noted that, under the IMS, aircraft and most other aerial surveillance platforms are managed by the Air Operations Branch (Air Ops), so close coordination will be required between Air Ops and the Surveillance Unit.

These resources need to be managed throughout their operation, with consideration being given to aspects such as:

- the operating base, safety protocols, landing sites and refuelling stations in coordination with the Logistics Section;
- trained pilots, observers and other technical experts needed to operate the asset;
- coordination across the IMT, where the asset is a shared resource; and
- direct management of the service provider, particularly where interim steps such as data handling and expert interpretation are needed to deliver the service requested.

⁶ Also referred to as 'remotely piloted aircraft systems' (RPAS), or more commonly 'drones'.

⁷ IPIECA-IOGP (2014). *Incident management system for the oil and gas industry*. <https://www.ipieca.org/resources/good-practice/incident-management-system-ims>

STEP 4: TASKING

Tasking is the step where the information needs, priorities and available resources are combined into the surveillance plan for the next operational period. This ensures that resources are used appropriately, and that priority needs are met. The surveillance plan is incorporated into the incident action plan (IAP) and communicates what surveillance activities are being undertaken and by whom, as well as how data will be managed and when it will be available.

Tasking involves developing individual work assignments for the deployed resources. In large responses this can be done using a formal process, such as in the IMS, where incident objectives are used to guide the development of strategic response options. Those options can then be used to create individual work assignments. In smaller responses, a less formal or ad hoc method can be used. Whatever the approach, the general surveillance strategy and associated actions should be captured in an overall surveillance plan, and recorded in detailed work or tactical assignments as part of the daily IAP.

The surveillance plan should include the prioritization of individual tasking assignments, and should identify the required resources (personnel and equipment) and who is responsible for implementing each one.

Some equipment, such as aircraft, may be owned and managed by third parties and the assignments must be coordinated to ensure efficient deployment.

When developing tactical assignments, it is essential to include sufficient information to enable the effective delivery of the expected outputs. This information should include:

- safety requirements;
- location — areas of operation or flight paths;
- personnel and equipment to be used;
- departure and return locations, if applicable;
- special equipment or sensors required;
- data types/information sought;
- frequency of missions;
- methods of data capture and transmission; and
- legal/permitting requirements.

Standardization of taskings will help to ensure consistent technical content and provide clarity on how data are being gathered. The high-level details of surveillance missions will be recorded in the surveillance plan (see Appendix 1), showing what information will be generated and when it will be delivered.



STEP 5: DATA HANDLING

Data may be received from a variety of surveillance activities and will need to be processed before being released to the wider IMT. This step ensures that data are captured, assessed, stored and shared properly, in accordance with any policies, response data management plans and regulatory requirements. These requirements should be confirmed with the Legal Officer before data handling decisions are made. In addition to the management and administrative aspects of data handling, this step will often involve a technical specialist's assessment of data quality and significance, and of how best to share the data within the IMT.

There are four key aspects of surveillance data handling:

1. **Intake and receipt of information:** Data are received from the field or provider in raw form. This may be in the form of e-mails, video feeds, written reports, memory sticks, shared server directories, or other formats and sources. It will need to be accommodated in the data management system that is being utilized by the IMT.
2. **Triage:** Collected information is reviewed and sorted. This includes ensuring that the data are in the appropriate formats and are readable, and that any unnecessary or duplicate information is identified and handled appropriately. Information should be forwarded to the appropriate specialist for review and technical analysis, with priority given to defined critical information.
3. **Review and technical analysis:** The triaged information is reviewed by appropriate technical experts. They process the data, assess for quality, check that it meets the requirements of the surveillance plan, identify any anomalies, and provide interpretation where necessary.
4. **Data housekeeping:** While the development of a separate data management plan is not within the remit of surveillance planning, the final part of the surveillance data handling step includes the storage, distribution and communication of the information collected. Data should then be distributed (Step 6) as per the surveillance plan, and stored in line with the company policy or incident data management plan which should include considerations such as wider sharing, security, access and permissions.

STEP 6: COMMUNICATION

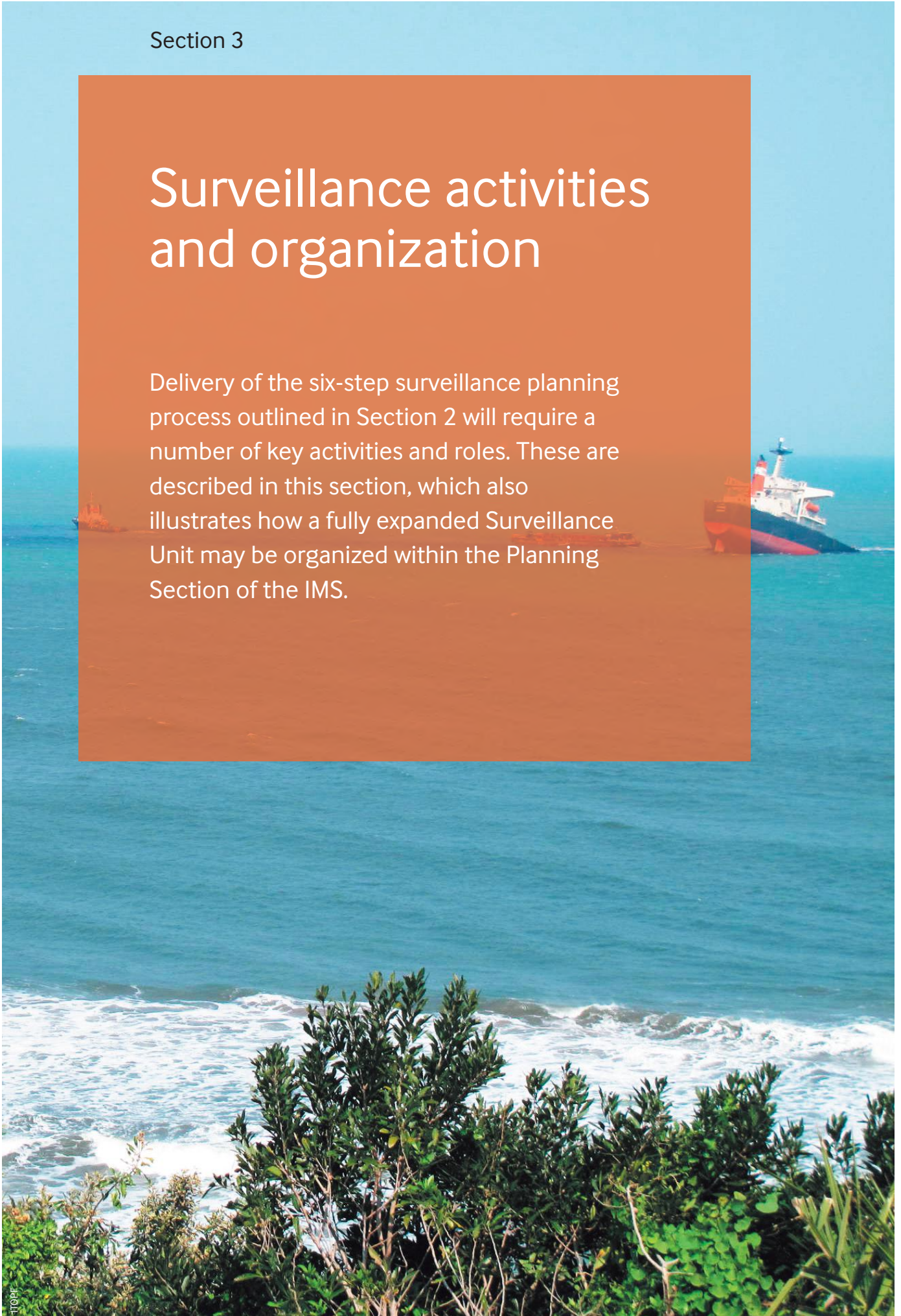
The culmination of the process is to communicate the data needed by the IMT to maintain situational awareness and support good response decision-making. If there is a need to report on defined critical information, this should be passed directly to those that require it as soon as possible.

The data required, the frequency of provision, and the manner of sharing and distribution should all be presented clearly in the surveillance plan. This should be coordinated with the other IMT functions and their activities when preparing the response tactics for the next operational period.

The primary means of information sharing and distribution will commonly be achieved through the Situation Unit and defined display areas, a Common Operating Picture (COP) if one is being utilized, and direct distribution to specific end users (IMT members, field personnel, stakeholders, etc.) where the data requirements are highly detailed and specialized for their response needs.

Surveillance activities and organization

Delivery of the six-step surveillance planning process outlined in Section 2 will require a number of key activities and roles. These are described in this section, which also illustrates how a fully expanded Surveillance Unit may be organized within the Planning Section of the IMS.



Surveillance activities and organization

To deliver the six steps described in Section 2, a range of activities and roles will be needed. The amount of work involved will depend on the incident scenario; however, the nature of the work will generally fall into the following five main themes or workstreams:

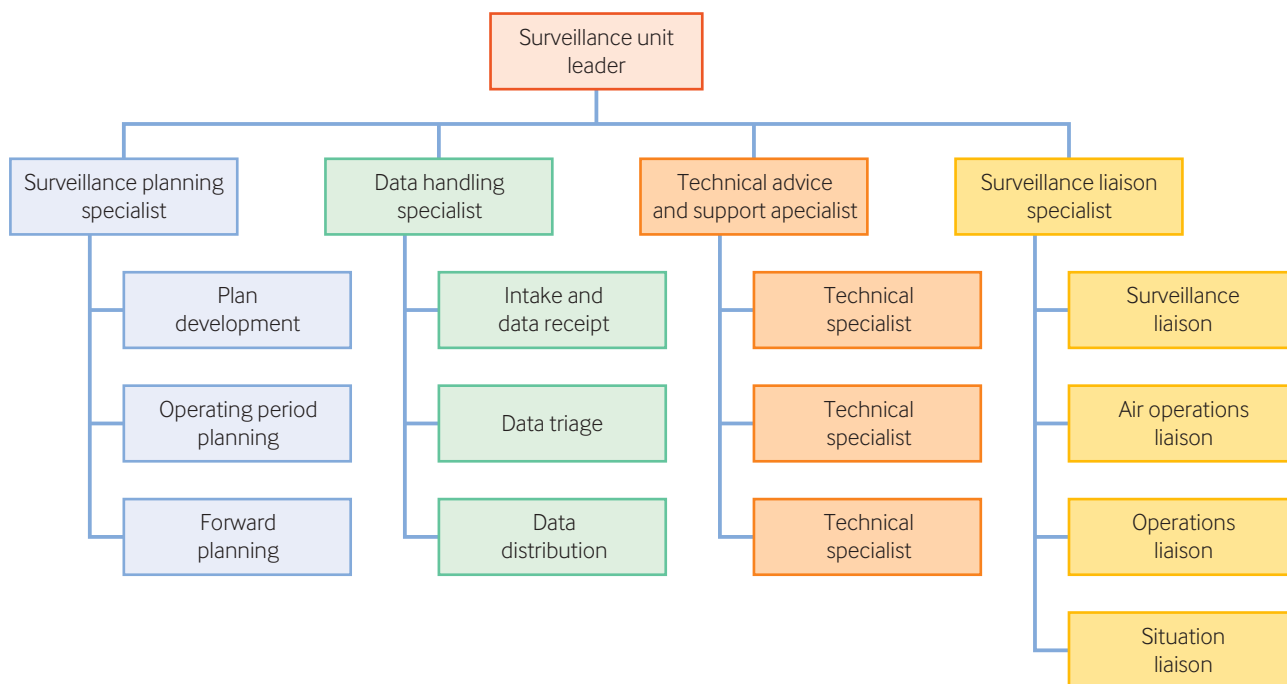
- Overall leadership.
- Planning.
- Data management.
- Technical advice and support.
- Liaison and coordination.

For a small-scale response these may all be achieved by one person. However, for larger oil spill scenarios and a larger-scale response with more complexity, these work activities may need to be organized into discrete

workstreams under a designated lead, so that the volume of activity being undertaken can be managed effectively and an appropriate span of control maintained. For most small to moderate spill scenarios, these activities are typically the responsibility of one or more surveillance specialists within the Situation Unit. This may be expanded in line with standard IMS principles, to become a separate Surveillance Unit reporting to the Planning Section chief. Figure 2 illustrates a fully expanded Surveillance Unit.

The various activities required to deliver the surveillance plan, each of which may potentially constitute a formal work stream, are described further in this section.

Figure 2 Example of a fully expanded Surveillance Unit within the Planning Section



OVERALL LEADERSHIP: Surveillance unit leader

- Ensures that surveillance activities serve the overall incident objectives and priority information requirements.
- Ensures that all aspects of the six steps described in Section 2 are managed and achieved.
- Ensures that designated critical information and all priority surveillance data are delivered in accordance with the surveillance plan.
- Ensures that data are communicated in accordance with the surveillance plan and managed per company policy, regulatory requirements and the incident data management plan.
- Provides updates on surveillance activities and outputs at key meetings as required.
- Delivers the activities within a suitable organization that is adequately resourced, and manages the personnel assigned to this activity.
- Liaises with the IMT's Planning Section chief and Incident Command as required.
- Liaises with the legal officer to understand data handling requirements.



Spillconsult

PLANNING: Surveillance planning specialist

Surveillance plan development

- Creates and updates the overall surveillance plan.
- Ensures that the surveillance plan aligns with the incident objectives and priorities.
- Looks beyond the next operational period, to consider how the scenario, issues, challenges and priorities might evolve.
- Liaises with key response functions on their future data needs.
- Liaises with the legal officer/relevant regulatory bodies to ensure planned surveillance is permissible.

Operating period planning

- Manages the surveillance activities that are being delivered in the current operational period.
- Engages with operational, logistics and other response teams to ensure that resources are identified and available to meet the planned surveillance activities for current and future operational periods.
- Captures and reports the detailed work assignments for all the activities and resources being managed by the Surveillance Unit.
- Uses the surveillance plan to ensure that priorities are met, resources are properly tasked and any constraints or conflicts in the demand for surveillance assets are addressed.
- Looks for efficiencies of resource use to meet multiple surveillance needs with single sorties/data collection to avoid replication of data collection, analysis, handling and communication.

Forward planning

- Responsible for long-term forward planning.
- Identifies and prepares for future strategic requirements.
- Develops contingency plans for predictable disruptive events (e.g. hurricanes, major seasonal change, demobilization).

MANAGING THE SURVEILLANCE DATA: Data handling specialist

During an incident, large amounts of data can be generated by the surveillance missions. These data need to be handled effectively and efficiently in accordance with the data management protocols established across the IMT.

Before the analysed data can be shared across the response, the data handling process ensures that quality assurance and technical analysis is performed within the Surveillance Unit so that only accurate and relevant data are shared.

This activity coordinates the intake, triage and forwarding of surveillance-generated information into the larger response organization in accordance with the surveillance plan. Other sections and units have responsibility for displaying and storing the final data products.

Intake and data receipt

- Receives data from the field.
- Sorts data by type.
- Prepares data for triage.

Data triage

- Filters duplicate or non-essential information.
- Formats data so that it is consistent with company policy or with the incident data management plan.
- Prioritizes critical information for immediate review by the technical specialists.
- Passes data to the technical specialists for analysis, interpretation and quality assurance/quality control.

Data distribution

- Ensures that all critical information is transferred immediately.
- Distributes surveillance information and data as described in the surveillance plan.
- Distributes data as required under data-sharing plans.

TECHNICAL ADVICE AND SUPPORT: Technical specialists

Surveillance can involve a variety of activities, assets and technologies which may need the knowledge and experience of a technical specialist to enable them to be managed properly. This encompasses an understanding of different surveillance platforms and sensors, their capabilities and limitations, and suitability for the surveillance missions under consideration. Importantly, there is also a need for technical expertise to assess and interpret the data being generated, and to confirm its value for the intended purpose. For an incident utilizing a variety of different platforms and assets, a technical specialist or team of specialists may be needed to undertake the actions below.

Technical specialist activities as required

- Offers technical advice on the selection of platforms and sensors during the development of surveillance activity tactics and the surveillance plan.
- Engages with service providers for satellite imagery, commercial, government and military aircraft, AUVs, UAVs, aerostats, etc. and for innovative techniques that may offer novel opportunities.
- Recommends mission-specific technical details that need to be included in the operational tasking of surveillance activities.
- Supports regulatory requirements, authorizations, permits and licences for import and use for each platform.
- Analyses and interprets information from images and data.



Petronia Consulting Ltd

LIAISON: Surveillance liaison specialist

Liaising with all parts of the IMT is an essential function. It provides the means to engage with response personnel to confirm the overall incident objectives, establish the data needs of different response functions, and coordinate the mobilization and control of surveillance platforms to deliver the plan. While the surveillance plan provides clarity of what will be done, when and how, the liaison function provides the 'glue' to develop the plan and make it happen. Where activities are performed by multiple groups (e.g. wildlife overflights, SCAT (shoreline clean-up assessment technique) activities) the Liaison function is key to clarifying the division of labour. Irrespective of the scale of a response, the liaison activities outlined below will need to be accomplished.

Surveillance liaison

- Engages with the Incident Command and other key IMT functions to understand their surveillance data needs, e.g. the types of data required, when the data will be needed, the frequency of data required, and other aspects necessary for the development of the surveillance plan.
- Understands and communicates any surveillance-related critical information reporting requirements as determined by the Incident Command.
- Liaises with the Logistics Section and Procurement Unit to ensure that all contracts, logistics and support resources for surveillance platforms have been identified and established.
- Works with appropriate IMT sections to facilitate efficient deployment and demobilization of surveillance assets.
- Identifies and manages any ongoing supporting resources needed for surveillance.
- Coordinates with other IMT sections for shared surveillance resources.
- Manages expectations on the technical capabilities/limitations of surveillance assets.



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Air operations liaison

- Works with the Air Operations Branch to ensure coordination between surveillance needs and other air asset requirements (i.e. simultaneous operations, or SIMOPS).
- Ensures that appropriate aircraft and trained observers are available to meet current and future needs.
- Coordinates with aerial observers to ensure that proper equipment is available for assigned missions.
- Assists with the receipt of surveillance data coming in from the field, and ensures the timely delivery of data to the surveillance data handling personnel.

Operations liaison

- Works with the IMT Operations Section to understand and coordinate with their specific needs.
- Coordinates surveillance requirements to support tactical operations.
- Engages with the Wildlife Branch to understand constraints for operating near wildlife or nesting areas, or when there are seasonal restrictions.

Situation/COP liaison

- Liaises with the Situation Unit to ensure that surveillance information collected for the COP meets their needs.
- Passes information to the Situation Unit in a timely manner.
- Assists with updating the COP as new surveillance data become available.

Implementation

This section describes how the surveillance activities relate to the three temporal aspects of a surveillance programme:

1. The IMS planning cycle — the daily, or short-term cycle.
2. The six-step process for developing and maintaining the surveillance plan — enduring programme activity and adaptation.
3. The strategy for forward planning — the longer-term perspective.

Implementation

As early as possible in a response, the leadership and wider IMT need to review the scenario and the incident potential to understand the likely nature, scope and possible duration of response measures. A critical part of this assessment is to determine and immediately implement the priority surveillance activities to provide situational awareness of the initial scenario, and to plan for what is needed to maintain it, through development of a proactive surveillance plan.

Many incidents will be completed in a relatively short time and may not require long-term strategic planning. Surveillance for these responses may only require a limited number of activities before completion, without the need to plan for ongoing operational periods. However, for other and more enduring events, there are a variety of activities that need to keep evolving as the scenario and response progresses.

From the outset, the various functions of planning, technical expertise and advice, liaison and data handling play an important part in facilitating this activity. Getting it right from the start is vital for ensuring that the activities are appropriately resourced to cope with the nature and volume of the required tasks. The demands of each incident will vary, and there is no prescriptive formula to dictate which functionality will either require most attention or generate the most demands. However, it can reasonably be anticipated that aspects of planning and technical support will be needed quickly, and the demands of the surveillance programme will grow as the incident response expands.

Dependent on the incident potential, the Planning Section chief will need to determine whether the scope of surveillance should be handled within the Situation Unit or whether a separate Surveillance Unit should be activated. This decision needs to be made as quickly as possible, and it is vital to recognize that, if not addressed promptly, surveillance activity could be delayed and the effective delivery of key information to the IMT compromised.

In these situations, the person in charge of surveillance activities should undertake the following activities without delay:

- Determine the potential demands—in terms of technical specialists and the capacity to deliver.
- Establish the need for an initial surveillance organization and confirm its location within the Planning and Situation functions of the incident management organization.
- Identify and mobilize suitable personnel for the activities and/or discrete roles needed.
- Initiate surveillance stakeholder identification and engagement across the response, including any critical stakeholders such as regulatory authorities.
- Develop and implement the surveillance plan incorporated within the overall IAP.

CADENCE OF SURVEILLANCE ACTIVITIES

There are three key temporal aspects of the surveillance programme, as summarized below. The first aspect relates to the IMS planning cycle, or 'planning P', for the next operational period, while the second is the cadence of the surveillance planning activities; the third aspect has a longer-term strategic focus:

1. **Activities within the 'planning P' cycle:**
These are work items that need to be fed into, or developed during, the prearranged meeting schedule and working periods. The meetings and working periods where surveillance activities (shown in Figure 3) intersect are:
 - i. Command objectives meeting—collect the incident objectives issued by the Incident Command, and identify those that relate to surveillance activities.
 - ii. Command and general staff meeting—identify critical information priorities.
 - iii. Preparing for the tactics meeting—liaise with the various teams involved in the incident to ensure that all required activities are captured in the plan, and develop specific work assignments for the next operational period.

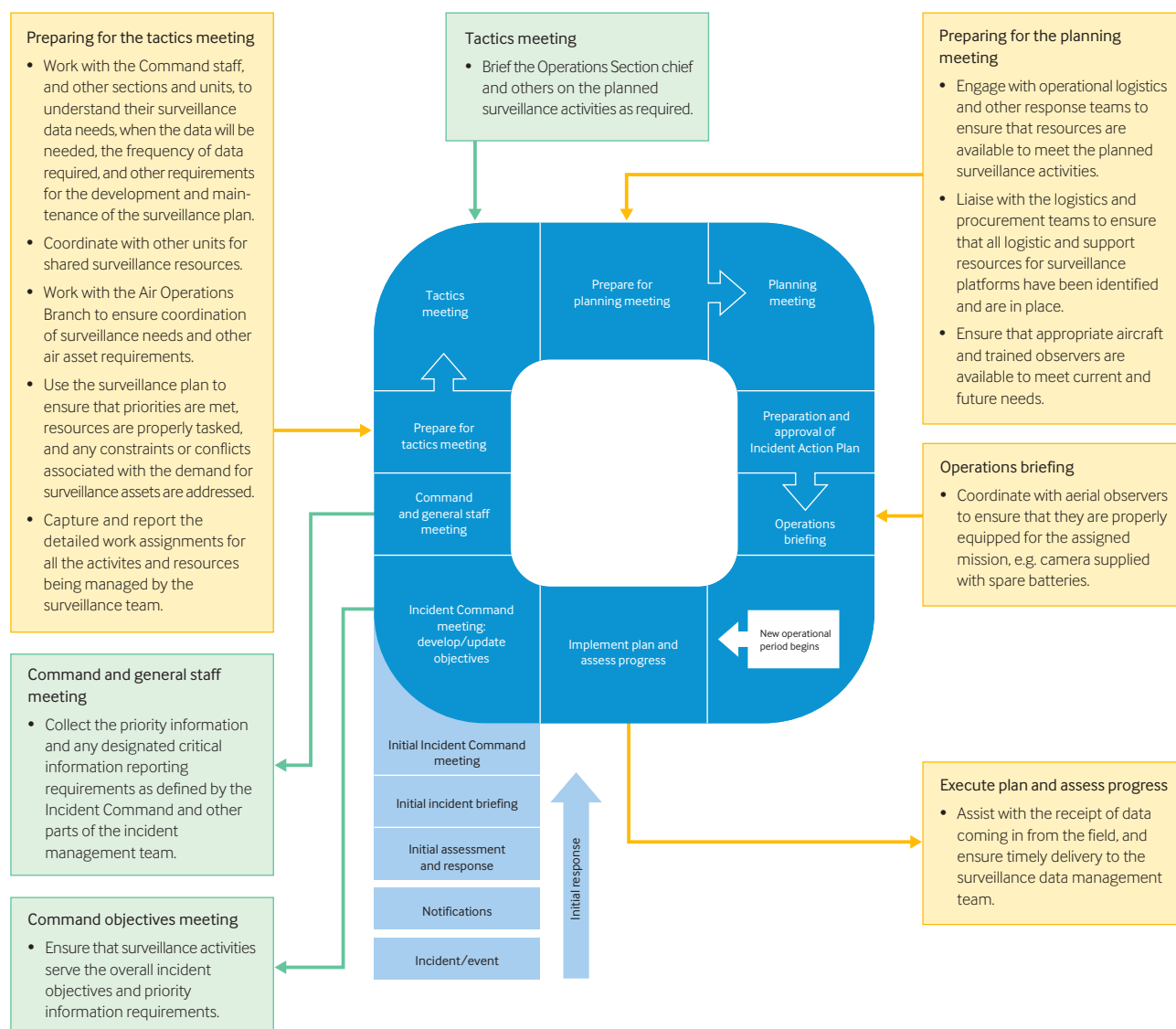
- iv. Tactics meeting — brief the meeting on the surveillance activities that are being undertaken.
- v. Preparing for the planning meeting — work with the various teams to ensure that all surveillance activities can be undertaken as planned.
- vi. Operations briefing — ensure that all staff undertaking surveillance activities are prepared for the activity that they are involved with.
- vii. Execute the plan and assess progress — collect, assess and report data to ensure that the IMT are kept abreast of the latest surveillance information.

2. Implementation of the surveillance plan and the six-step process:

Activities undertaken by the surveillance function may operate on a different timescale from the specific 'planning P' cycle meeting/activity commitments.

Most of the work undertaken is likely to fall into this category. All of these activities are essentially captured in the surveillance plan and, as the response evolves, so too does the plan.

Figure 3 Surveillance activities within the 'planning P' cycle



The six steps defined in Section 2 are revisited regularly to ensure that the information needs of the IMT are reconfirmed, the surveillance platforms and assets remain appropriate to fulfil the data needs, the operations continue to deliver in an effective and efficient manner, and the information is managed and shared in a timely fashion to the response stakeholders. This activity endures for as long as surveillance is needed, and is harnessed, as appropriate, into the 'planning P' cycle.

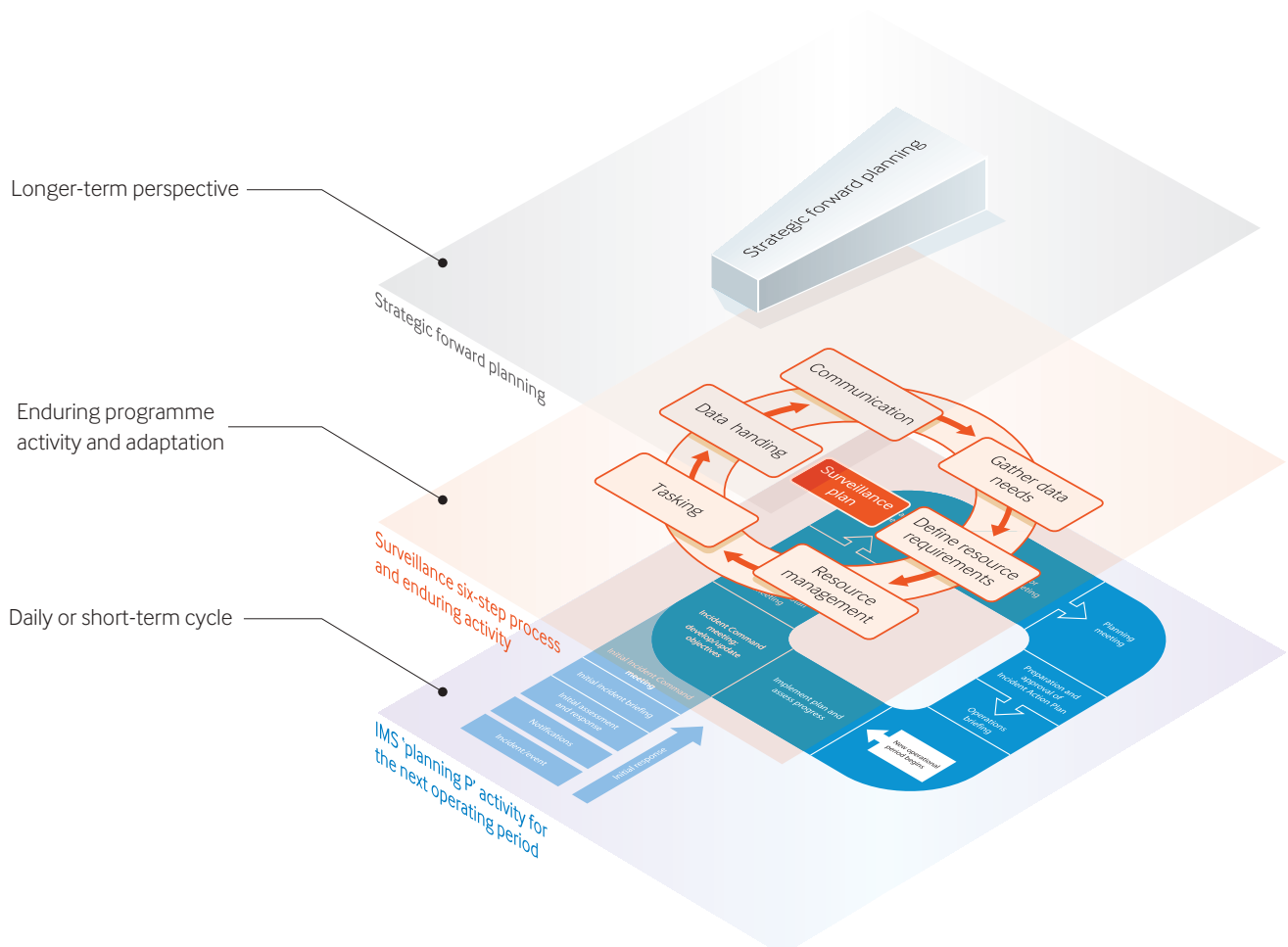
3. Strategic forward planning:

In addition to the activities that directly serve the next operational period and the work that ensures that the near-term response needs continue to be anticipated (the six-step process), an additional strategic component of work may need to be undertaken, particularly for a response that endures for a substantial period.

This component is likely to have a longer-term strategic focus aligned to the direction being set by the incident response leadership team, and could include, for example:

- an expansion of the liaison activities across wider groups of stakeholders;
- building a longer-term perspective on socio-economic and environmental indicators;
- the development of transition plans from the emergency phase response to the maintenance of longer-term ongoing operations; and
- the development of surveillance-specific contingency plans for potential disruptive events (such as severe weather).

Figure 4 Temporal aspects of activity for the IMS 'planning P', the six-step surveillance process and strategic forward planning



Appendices

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Appendix 1: Surveillance plan

PURPOSE

The purpose of the surveillance plan is to document the approach to the management of surveillance resources, information and data.

Table 1 summarizes the three sets of key surveillance-related information that will be required to develop the surveillance plan:

Item 1: Information needs;

Item 2: Surveillance plan — operational period; and

Item 3: Surveillance plan — future operational period.

A template is provided for each item on pages 27, 28 and 29, respectively, to assist the reader in compiling the information required to develop the plan. Note that these are examples only, and the columns in each template can be modified as needed for each incident.

PREPARATION

The template is completed by the Surveillance Unit or equivalent, and should be submitted as part of the overall incident action plan (IAP), or as a stand-alone, supplementary plan.

Table 1 The three sets of surveillance-related information required for the surveillance plan

ITEM	INSTRUCTIONS/GUIDANCE
Item 1: Information needs	<p>Key to an overall surveillance strategy will be the identification of surveillance needs. This section of the plan will be used to record these needs for both current and future operational periods. It should be based on:</p> <ul style="list-style-type: none"> ● surveillance-related activities associated with selected incident objectives and critical information requirements; ● discussion with key IMT functions (Command staff and the Operations, Planning and Logistics Sections); and ● the experience of technical specialists. <p>The template provided on page 27 can be used as a working document to review and subsequently prioritize needs as they are identified.</p>
Item 2: Surveillance plan — operational period	<p>Necessary surveillance activities will be identified and worked into planning for the next operational period. This section of the plan will be used to record the missions and expected outputs, including their expected frequency (see page 28).</p>
Item 3: Surveillance plan — future operational period	<p>A strategic approach to surveillance planning must have a forward planning element. This section of the plan should be used to record planned surveillance activities where the resources have been identified and requisitioned but are designated for anticipated surveillance needs beyond the next operational period (see page 29).</p>

ITEM 1: INFORMATION REQUIREMENTS

1. Incident name:			Surveillance information requests						
2. Date:			No. 1234						
3. Prepared by:			Approved by:						
Name/position:			Name/position:						
Date:			Date:						
Surveillance information requests									
Ref #	Task/mission	Requestor	Frequency	Resource type	Data handling/communications	Not yet scheduled (not resourced)	Future OP (date) (resources en route)	In operation (date)	Completed (date)
001	Initial shoreline impacts / trained aerial observer / 35 km of coast from New beach (Div A) to Key inlet (Div C) as indicated by trajectory model output	John Smith / phone no. / Situation Unit Tech Specialist	2x/day (morning and late afternoon)	Rotary aircraft with good visibility for observer	Map with sketch of shoreline impacts & photographs / verbal (phone) followed by hardcopy / SIT Unit, Env Unit (SCAT), OPS (Shoreline Recovery)			1 June	
002	Surface oiling distribution & verification of trajectory modelling / optical satellite imagery / 50 km radius area around source	Jane Doe / phone no. / Remote Sensing Tech Specialist	Daily as often as orbit and viewing conditions allow	Contracted satellite service provider / name of contractor	Raw and processed imagery plus shapefiles of oil location / secure web access for COP / SIT Unit / chain of custody rules for data handling apply	Date of soonest acquisition, satellite tasked under existing contract			
003	Wildlife impacts and presence / trained wildlife observer / 35 km of coastline from location name to location name out to 2 km offshore	Sue Bird / phone no. / Wildlife Branch Specialist	1x/day (morning or afternoon)	Fixed (high) wing aircraft, twin engine, good visibility for observer	Map with notes and sketch of presence, numbers & type of wildlife, any impacts or threats of impact noted / verbal (phone) followed by hardcopy / SIT Unit, Wildlife Branch (OPS)			1 June	

ITEM 2: SURVEILLANCE PLAN — OPERATIONAL PERIOD

Ref	Task/mission	Frequency	Resources	Data handling	Communication
	Requested information, method of collection, and area of operations	Frequency of flights/deployments	Resources required — see the Operational Planning Worksheet	Outputs expected — data types/transmission	Distribution of information
001	Map sketch and photographs of initial shoreline impacts of coastline from Div A (New beach) to Div C (Key Inlet)	07:00 & 15:30 Daily	Bell 407/ Tail No. xxxxx Helicopters, Inc Pilot - Frank Huey Observer - Carla McFarland	Verbal report to SITL on landing. Photographs (JPEG & RAW) and map with sketch of shoreline impacts to Data Handling Team	Data handling team distributes to SIT Unit (COP & ICS 209), Env Unit (SCAT & RAR), and OPS (Shoreline Recovery)
003	Document presence of birds on 35 km of coastline from Div A (New beach) to Div C (Key inlet) out to 2 km offshore. Record numbers & locations of observed species. Photograph and note locations on map	08:00 Daily	Cessna 172, Tail No. xxxxx, Airplanes, Inc. Pilot - Karri May Observer - Jasmin Devon	Verbal report to SITL if oiled wildlife observed. Photographs (JPEG & RAW) and map sketch to Data Handling Team	Relay information to SIT Unit (COP, ICS 209, Critical Info Reporting), OPS (Wildlife Branch) and Env Unit (RAR)

ITEM 3: SURVEILLANCE PLAN — FUTURE OPERATIONAL PERIODS — SURVEILLANCE RESOURCES REQUISITIONED BUT NOT DEPLOYED

Ref	Task/mission	Frequency	Requisition #	Expected deployment	Data handling	Communication	Additional comments
Information requirement ref #	Requested information, method of collection, and area of operations	Frequency of flights/deployments	Specific requisition #(s) for resources required	Expected deployment date	Outputs expected — data types/transmission	Distribution of information	May include support requirements (helibase, permits, fuelling, etc.) required for operation
002	Optical satellite imagery 50 km radius area around source for verification of surface oiling and trajectory modelling	Daily (as orbit and viewing conditions allow)	Req # 123; Satellite – Bigeye 1 Satellites, Inc.	3 June	Raw and processed imagery plus shapefiles of oil location compatible with the incident COP	Data delivered to Data Handling team. Distributed via secure web access and in accordance with all data-sharing agreements and chain of custody rules	Earliest suitable weather window expected 3 June

Appendix 2:

Surveillance planning quick reference guide

This section can be used for quick reference by those responsible for the development of a surveillance plan.

When developing the plan, it is essential to bear in mind the four principles described on page 6 of this guidance to ensure that the plan is *focused, timely, coordinated* and *adaptable*.

STEP 1: GATHER INFORMATION NEEDS AND REQUIREMENTS

Focus on understanding the spill scenario and the scale of the incident.

Populate surveillance information needs (Appendix 1, Item 1) by identifying and liaising with key stakeholders to gather surveillance requirements.

Ensure that the following aspects have been considered (stakeholders may have been missed):

- The location, movement, behaviour and fate of the oil.
- Natural resources and sensitive habitats potentially at risk.
- Prevalence of wildlife in the area and potential impacts from the spill.
- Operational aspects of the response — e.g. site access, logistics and staging areas.
- Effectiveness of response measures being undertaken.
- Assessing and prioritizing areas for clean-up at sea, along the coast and inland.
- Monitoring a variety of environmental and social indicators.

Review completed surveillance information needs:

- To prioritize surveillance needs in alignment with Incident Command objectives.
- With the Operations Section chief, to ensure alignment of surveillance requirements.
- With the Planning Section chief, to confirm priorities and agreement with surveillance requests.

STEP 2: DEFINE RESOURCE REQUIREMENTS

Match surveillance information requests with specific assets/platforms.

Consider the following criteria when selecting the necessary resources:

- Technical specialist input.
- Safety aspects.
- Geographic area of coverage needed.
- Specific level of detail required in the data.
- Frequency of data provisions and updates.
- Prevailing weather and other operating parameters/conditions.
- Regulatory requirements, constraints and permitting.
- Air-space jurisdiction, restrictions and military controls.
- Logistical features including airport and landing site locations, and refuelling options.

STEP 3: RESOURCE MANAGEMENT

Focus on the acquisition, making ready and mobilization of resources.

Requisition and make ready the resources to be used:

- Once the most appropriate platforms have been established to meet data requirements, work with logistics and procurement personnel to requisition the necessary resources, support personnel and infrastructure.
- Ensure that assets are ready for deployment (maintenance/fuelling/crew).
- Consider customs, immigration and transportation issues relating to the mobilization of resources to the spill site.

Track surveillance resources:

- Track deployed resources, including those en route.

Manage surveillance-related support requirements, including the following:

- Operating base, landing sites and refuelling stations.
- Maintenance schedules and safety checks.
- Trained pilots, observers and other technical experts needed for the operation of the asset and equipment.
- Coordination with other parts of the incident management team, where the surveillance asset is a shared resource.
- Direct management of the service provider, particularly where there are interim steps such as data handling and expert interpretation, as needed to deliver the service requested.

STEP 4: TASKING

After matching the surveillance information needs (Appendix 1, Item 1) with the available resources, populate the surveillance plan for the operational period (Appendix 1, Item 2) with complete tasking information.

Tasking considerations should include the following:

- Location — areas of operation or flight paths.
- Resources to be used.
- Departure and return locations if applicable.
- Frequency of missions.
- Data types and information to be gathered.
- Legal/permitting requirements, e.g. flight permissions or drone licences.
- Technical expertise — this should always be sought to ensure quality taskings.
- Where possible a resource may receive multiple taskings to make best use of each mission or sortie.
- Use standard tasking wording if appropriate or available.

STEP 5: DATA HANDLING

All data should be transmitted and stored in line with the incident or company data management plan. The Surveillance Planning Unit should receive all data and information generated as soon as possible.

Data handling tasks should include the following:

- Intake of raw data.
- Triage of data — review and sort data; ensure that the data are readable and in the required format; delete unnecessary/duplicate data; identify critical information and fast track to the technical specialist.
- Quality and technical analysis — undertake technical interpretation and quality assessment, ensure that data meets the requirements of the surveillance plan, and identify any anomalies or false positives.
- Data housekeeping — data management, preservation, retention and access; ensure that data are stored appropriately and securely.

STEP 6: COMMUNICATION

Focus on the clear and concise communication of data in a timely manner.

Communication considerations include the following:

- Critical information — ensure that all critical information data are passed on immediately.
- Other data — distribute other data as per the surveillance plan (Appendix 1, Item 2 —communication column).
- Utilize the Situation Unit for information distribution to the extent possible to avoid duplication of effort.



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