AUSTRALIAN NATIONAL OPERATIONAL GUIDELINES ON DECISION MAKING

Part B: The Handbook of Decision Making in Incident and Emergency Management – guidance for Australian fire and emergency services

Greg Drummond[1,4,9], Chris Bearman[1,2,3], Peter Hayes[1,2], Don Gyles[2], Jim McLennan[1,5], Phil Butler[1,6,7], and Rhona Flin[1,8]

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Foreword

Making effective decisions during incident and emergency management (IEM) can be incredibly challenging. Incidents and emergencies can regularly present situations characterised by ambiguity, complexity, dynamism, and time constraints. Extreme events with cascading sets of issues that cause large scale losses are also occurring with increasing regularity. IEM decision making can be subject to intense scrutiny after the event and many post-event inquiries and Royal Commissions have highlighted sub-optimal decisions made during IEM[1].

To both better support IEM personnel and to improve operational outcomes it is critical that we build organisational training, doctrine, and processes on a sound understanding of decision-making processes based on the science of how the brain works. How we make decisions is fundamentally shaped and limited by human cognition. In this report we propose an industry standard model of expert decision making for incident and emergency management based on more than 70 years of peer-reviewed empirical research in cognitive psychology. This model both explains the process of decision making and provides an overarching framework to understand other models of decision making that are in use in incident and emergency management. By proposing this model, we hope to improve the alignment and consistency of how organisations in the sector approach operational decision making, create more consistent doctrine and training resources, and support a common language to describe, discuss, and review decision making practices.

This handbook is written for all personnel that operate in tactical, operational, strategic, and executive roles within fire and emergency services. However, the guidance may be equally as applicable in policing, ambulance, and other contexts. The processes by which humans make and evaluate decisions spans service and jurisdictional boundaries. As a practitioner's handbook, references and further readings supporting each section are provided as footnotes so as not to interrupt the narrative or make the guide 'too academic'. In writing this guide we hope that it assists emergency services to teach and support effective decision-making; improves the review of decisions made during incidents, disasters and crises; and helps emergency service personnel improve their own decision making.

1. McLeod (2003); Pollock (2013); Schapel (2007); Teague et al. (2010).

What is decision making?

It is important to acknowledge that various definitions of the term 'decision' are present throughout emergency service operations, doctrine, and even the research literature. A common definition of decision-making is 'a choice you make about something after thinking about it'[2]. However, this definition of decision making is very limited when considering the complex, dynamic situations that occur in incident and emergency management. Another way of thinking about decision making is to consider it in terms of its purpose. From this perspective decision making is an ongoing process that intervenes in a stream of events to exert or maintain control of a system[3]. For each intervention, a decision is considered to have been made when there is 'a mental commitment to a course of action at a point in time, even if that course of action is not to change a previous decision'[4]. In the IEM Decision Making (IEM-DM) Model described in Part A and below, a decision occurs at the point when there is commitment to a plan.

For example, a decision is made the moment a firefighter selects a plan of offensively fighting a fire (which meets the goals of efficiently extinguishing the fire, crew safety, community safety, protecting assets, environmental concerns, etc.). Five minutes later if the same firefighter chooses to continue the plan of offensively fighting the fire (based on feedback and feedforward from their review), then that is another decision. Alternatively, if one of the goals is not going to be met by the current plan (e.g. crew safety), then the firefighter might decide to switch to a plan of defensive firefighting strategy or a plan to stand-by and monitor the situation.

2. Britannica Dictionary (2024).

3. Gyles & Bearman (2026); Gyles & Bearman (2025b)

4. Penney et al. (2024a).

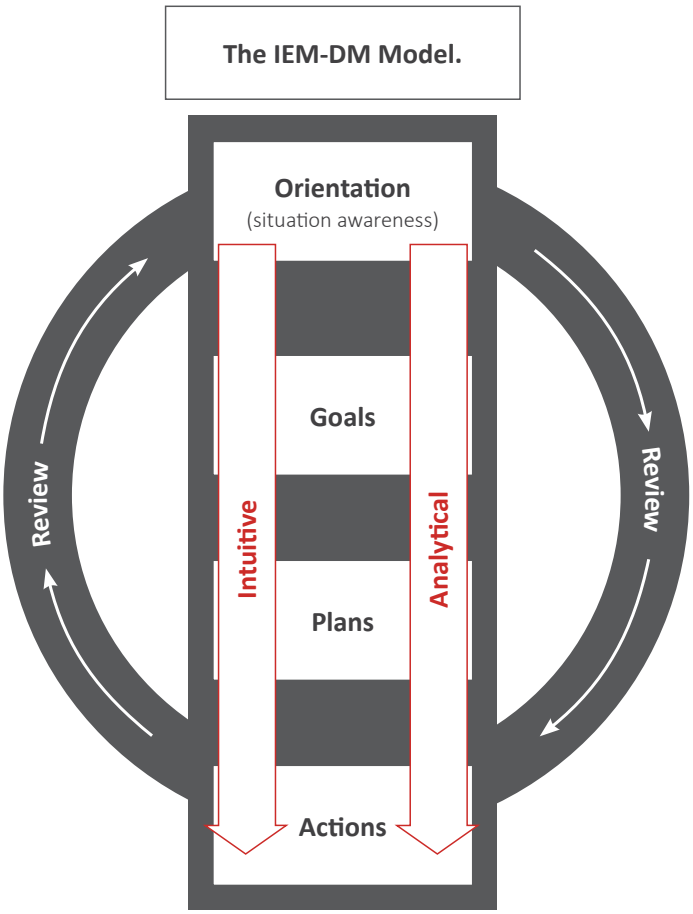

Figure 1. The IEM Decision-Making Model. Bearman, Drummond, Hayes, Gyles, McLennan, Butler, & Flin (2026). Natural Hazards Research Australia (NHRA).

How do we make decisions?

The IEM-DM Model describes the process of how we make decisions (see Figure 1). This model is predominantly based on the expert model of decision making proposed by Gyles and Bearman[3] and the S(CD)PAR framework[5].

Orientation and situation awareness

The first stage of decision making is orientation, which helps us to develop a coherent story about what is happening, what has happened, and what will happen[6]. This is our situation awareness. During orientation the environment we are in (or focused on) is interpreted in light of the organisational context, our values, our job roles and tasks, our work cultures and our knowledge of how the world works (stored in our heads in the form of mental models). Environmental constraints (such as time and available resources) are considered as part of the orientation process. Practitioners' previous experiences and memories of similar events and their level of expertise play an important role in orientation. Mental models provide default values for our situation awareness that are then updated with information from the environment[7]. Thus, people search for and interpret information in their environment based on information contained in mental models. This means that situation awareness is always highly individualised. It is also the case that situation awareness is only ever a sub-set of information that is in the environment. What we see is based on our individual perspective and the goals that we are trying to achieve. This means that we will have 'blind-spots' in our situation awareness, and even obvious information that should indicate a problem is developing can be missed[9]. Situation awareness is not a one-off event but must be regularly validated and updated.

Goals

Once formed, situation awareness primes goals, plans and actions. Often called 'objectives' within the context of incident and emergency management, goals are an important part of decision making. Goals anticipate a future outcome and motivate us towards something we want to achieve. They act as reference points that can be used to measure progress. Committing to a goal is the critical step in moving from a broad wish or intent to a concrete action. Goals focus our attention and concentration towards the achievement of something we desire. This influences situation awareness so what we perceive is shaped by the goals we are trying to achieve. Goals can be identified rapidly using default values from the mental models or they can be formed more slowly through deliberate analysis. In incident and emergency management there are multiple goals (a goal set) that we need to achieve (e.g. efficiency, crew safety, community safety, environmental considerations). Typically, one of these goals acts as the driver of behaviour and the other goals form constraints that must be met to a minimum level[8]. Generally, organisations provide guidance on how to balance the relative importance of goals in the goal set. For example, many organisations prioritise goals relating to the protection of life, property, and the environment (in that order). However, in certain situations we may accept a lower level of goal achievement for some goals (e.g. crew safety) in order to maximise other goals (e.g. rescuing people in need). The relative balance of the extent to which each goal in a goal set should be achieved can be different for different people in different contexts. A further challenge of complex incidents is that goals may need to be aligned with the respective goals of participating agencies to form collective multi-agency goals.

Plans

The establishment of a goal set primes plans. Plans are sequences of steps that specify how goals should be achieved. Constraints (such as time and available resources) will influence which plans are selected to meet the goals. Once there is commitment to a plan, a decision has effectively been made. Plans may be simple or they may form hierarchies of interrelated plans. If plans are hierarchical, some plans may need to be completed in a particular sequence before other plans can be activated. Plans are usually reasonably developed before they are executed through actions but they need not be fully developed. For an expert, a plan may be nothing more than a collection of sub-plan identifiers that trigger actions in real time. Like goals, plans can be identified rapidly using default values from the mental models or they can be formed more slowly through deliberate analysis. In incident and emergency management multiple plans may be required to address different problems that are encountered across different technical or functional areas, geographic locations, and contexts. Where this occurs it is important that the plans cascade down from the highest incident plan (commonly referred to as the Incident Action Plan[9]) to the various divisional and sectorised plans. This ensures all teams are working towards the same ultimate goal.

Note of caution:

Incident management teams need to exercise caution when using the terms 'strategy', 'plans', 'tactics', 'offensive' and 'defensive' as misuse of the terms can lead to confusion and disrupt response operations. In incident and emergency management, the Incident Action Plan is the highest operational plan, while strategies are the subsequent plans

5. Launder & Penney (2023a)
6. Endsley (1995)
7. Gyles & Bearman (2026).
8. Gyles & Bearman (2025).
9. AFAC (2017).

to achieve specific goals. Tactics are the frontline actions that collectively execute a strategy that will achieve the relevant goal. The terms 'offensive' and 'defensive' are used to broadly differentiate between actions that are proactive, aggressive, or risky, and those that are more passive. For example, a firefighting crew undertaking internal structural firefighting is an offensive tactic while stopping the fire from spreading to adjacent buildings by using external water curtains is a defensive tactic. At times concurrent offensive and defensive tactics may be necessary even within a geographically constrained incident, but these need to be supported by careful oversight and the maintenance of an incident-wide common operating picture.

Actions

Once the plans are formed, actions are identified that can execute the plans. When sets of actions need to be performed to execute a plan or multiple plans are being executed then actions need to be appropriately sequenced. This can be done either concurrently (both actions at once), sequentially (all of one set of actions then another set) or alternatively (interleaved actions). If an action cannot be carried our immediately then an implementation intention is formed that will trigger the action when particular cues or events occur in the environment. Like goals and plans, actions can be identified rapidly using default values from the mental models or they can be formed more slowly through deliberate analysis.

Review

As actions are being performed a review of the accuracy of situation awareness and the extent to which plans and actions are meeting goals should be carried out using feedback and feedforward processes[10]. This is represented in the model using a review loop[11]. Feedback is where information in the environment is used to determine progress of actions and the extent to which they are meeting plans and goals. Feedforward is where expectations are generated about what should happen in the future if everything is working as it should. Effective review is critical in detecting faulty situation awareness and identifying errors in goals, plans, and actions. Reviews should be carried out at suitable intervals that are not too short or too long and should be formalised in operational timelines where possible. Significant events that occur in the environment can also be pre-identified and used to trigger a review. For example, an incident controller could state that when a fire gets to a particular location they will review. Review generally uses cognitive resources. When people are busy, the cognitive resources required to conduct a thorough ongoing review may not be available. This may lead to errors remaining undetected. When conducting a review caution should be exercised to not allow confirmation bias to distort the review processes. Confirmation bias can lead us to preference information that supports our current situation awareness and the effectiveness of selected goals, plans, and actions, while disconfirming evidence is inappropriately explained away.

Analytical and intuitive decision processes

In the IEM-DM Model, situation awareness, goals, plans, and actions are typically formed using intuitive decision processes. This is consistent with research that shows that as much as 80% of decision making in the emergency services is intuitive[12]. When our current situation matches information in our mental models we can populate situation awareness, goals, plans, and actions based on default values held in our mental models. This pattern recognition process allows us to use our prior experience to quickly move from situation awareness to actions. When we recognise a situation as familiar we can apply what has been done in the past directly to the current situation. While this allows us to make fast decisions, this process can lead to errors if the situation is not what we think it is or if the situation changes. Once underway, intuitive processes will run to completion unless there is an intervention by analytical processes. Analytical processes are slower, more conscious processes that allow us to deliberately analyse the situation, goals, plans, actions and review. While analytical processes are effective, they require time and cognitive resources. Cognitive resources are limited and they get used up very quickly, so they need to be used effectively in incident and emergency management. The hallmark of expertise is using analytical processes to effectively supplement intuitive processes[13].

Heuristics and biases (not depicted in the diagram)

Humans use a variety of rules-of-thumb and mental shortcuts to help them understand and interact with the world[14]. These are termed heuristics and enable a person to more quickly perceive or consider the world using less cognitive effort. A simple example is 'fight the fire you have, not the fire you might have'. This simple heuristic orients a firefighter to focusing on the more immediate rather than looking too far ahead. This heuristic can be helpful in simplifying a complex situation and can be effective in many situations. However, it is not effective in all situations and can cause bias in decision making.

10. Brehmer (1990, 1992).
11. The review loop is not intended to imply a direct connection between orientation and actions only. The review loop applies to orientation, goals, plans and actions in an ongoing cycle of review.
12. Cohen-Hatton et al. (2015); McLennan et al. (2001/2003); Taynor et al. (1990).
13. Evans & Stanovich (2013); Evans (2019); Stanovich & West, (2000); Steigenberger et al. (2017).
14. Kahneman (2011).

Table 1. Common biases in incident and emergency management[15]

Confirmation bias	People tend to seek information to confirm their ideas and resist disconfirming evidence
Anchoring bias	Initial judgements tend to limit people's scope of decision making
Availability bias	Information that can be accessed more easily from memory is more influential
Picture superiority effect	Pictures and images are more influential than written sources of information
Mere exposure bias	People have a preference for things that are familiar
Authority bias	People tend to defer to people in authority
Curse of knowledge	People who know information falsely assume that other people also know this information
Planning fallacy	People underestimate the time it will take to complete a task
Bandwagon effect	People tend to follow others
Goal seduction/sunk cost bias	Persisting with a course of action because of the effort and resources already committed

There has been considerable research conducted on heuristics and biases. For incident and emergency management the most important heuristics and biases are outlined in Table 1. The use of heuristics and the resulting biases influence how practitioners' build an understanding of the situation, what they tend to pay attention to, the relative strength of goals in the goal set, and the plans that are selected.

Two biases that have shown to be a particular challenge for decision making in incident and emergency management are goal seduction[16] and confirmation bias[17]. Goal seduction occurs when a practitioner becomes overly focused on achieving a particular outcome and they fail to consider the contra indicators or evidence that this is likely to be hazardous. A strong situation that is likely to create goal seduction pressures for emergency management personnel is rescuing someone. In 2006, 2 United States ski-patrollers on Mammoth Mountain fell through heavy new snow into a volcanic vent and succumbed to toxic gas[18]. Rescue efforts by other team members led to a further ski-patroller dying from asphyxiation due to the toxic gases and a fourth rescuer had to be rescued after becoming unconscious. According to the IEM-DM Model we have a tendency to persevere with goals and low openness to information once a goal set is committed to. This helps keep us focused and avoids debilitating oscillation between other potential goals. In extreme cases of goal seduction, one goal in the goal set assumes primacy (e.g. efficiently putting out a fire) with other relevant goals potentially being sacrificed (e.g. crew safety, environmental issues, etc.)[19]. Where goals such as crew safety are comprised, this can lead to serious problems.

Confirmation bias is relatively common[20]. It occurs when a person looks for evidence that confirms their situation awareness and dismisses information that is not consistent with their situation awareness[21]. In essence, this means that people often see what they expect to see. There are many examples of confirmation bias, where people don't see obvious information because it is not consistent with their expectations[7]. For example, a fire crew who misidentify a spot fire as the main fire may be much less likely to correctly perceive information that indicates they have made an error (e.g. information about fire size and location). Because confirmation bias influences how we interpret external information, it has two main influences on the decision process according to the IEM-DM Model. First, confirmation bias influences how default values from the mental models that initially populate situation awareness are updated based on information in the environment. Second, confirmation bias influences the review process where situation awareness is validated and updated based on feedback and feedforward processes.

Ethics and morals (not depicted in the diagram)

For the purposes of this guide, ethics are defined as the 'moral standards set by a group or organisation' while morals are considered to be 'the highly personal standards of an individual'. Ethics and morals are encapsulated by an individual in mental models. According to the IEM-DM Model these mental models influence how information from the environment is perceived, how situation awareness is formed, the selection of goals, the relative importance of

15. Source: Brooks et al. (2020).
16. Bearman et al. (2009).
17. Brooks et al. (2020); Alison & Shortland (2021).
18. Covarrubias & Smith (2006); Mammoth Mountain (2025).
19. Gyles & Bearman (2025b)
20. Nickerson (1998); Poletiek (2001); Wason (1968).
21. Wickens et al. (2022).

each goal in a goal set, and the selection of plans that meet the goal set. Often ethics and morals inform our decision making in an automatic intuitive way but on occasions we may need to consider ethics and morals in a more deliberate analytical manner[22].

While it may seem counterintuitive, the guidance around making ethical decisions in the disaster and emergency management environment is limited[23]. Further, in environments where emergency services are responding to disasters with the sole aim to help those in need, the tensions surrounding what is ethical can require additional consideration. The reasons for this are varied but are generally driven by a lack of resourcing and time compared to the amounts required to help everyone. Other reasons can include:

- Clash of philosophy. For example, do you try to do the greatest good for the greatest number of people at the expense of a few, or do you do everything you can for a fewer number of more 'deserving' or 'valuable' people (for example children) at the expense of a larger number of 'less deserving' or 'less valuable' people?
- Clash of goals, objectives, or priorities. For example:
  - In the case of an active-shooter scenario, police services may be required to literally step over casualties that need life-saving assistance in order to stop further harm being caused by the perpetrator, even if doing so may result in worse outcomes for existing casualties.
  - In the case of a large bushfire, control lines may need to be established through environmentally or culturally sensitive areas, even if doing so may result in worse outcomes for certain stakeholders.
- Clash of perspective. For example, in the event of a major fire where there is a high risk of serious injury or death to responders and a limited chance of saving casualties, a senior officer may prioritise the safety of their crews. At the same time the individual crew members themselves may feel honour-bound to attempt the rescue, prioritising the casualty before their own safety, and be willing to disobey orders to the contrary.
- A lack of organisational guidance as to what ethical decision making is or the values that apply in a disaster context.

The resolution of differences in ethical perspectives can be a highly emotive and time-consuming process. In many instances it is suggested that mid-disaster with high time pressures is not the time to attempt it, and differences may need to be addressed through defaulting to chain of command. Where time does permit however, dedicating time to establish a clear common understanding between all parties and validating the various perspectives can resolve many issues. In practice this may involve including Indigenous Elders or other key stakeholders as part of the Incident Management Team. In an attempt to address this issue from a national perspective, the Australian Department of Home Affairs (DHA) provides the prioritised list of objectives as the protection of life, property, and the environment[24] (described earlier in the section on goals).

22. McNeil (2020).
23. Cuthbertson & Penney (2023).
24. Department of Home Affairs (2025).

What external factors affect decision making?

Time

Time is often a critical factor in incident and emergency management and is an important influence on the decision-making process. The assessment of available time (which is part of situation awareness) will strongly influence plan selection. For example, in a road crash rescue, knowing how much time is available based on the patient's condition will dictate which extraction plan is selected.

The amount of time available also determines whether analytical processes will be engaged to support intuitive decision making. Where the time available to make a decision is judged to be extremely limited, then situation awareness, goals, plans, and actions are likely to be populated with default values from the mental models, with minimal updating from information in the environment. These default values may be inappropriate in novel situations. The inability to appropriately engage analytical processes will lead people to feel rushed and not in complete control. The stress that this causes is exacerbated as the uncertainty that would normally lead to analytical review is unable to be reduced. Lack of time will also make it harder to synchronise plans and actions, so that plans are not fully completed or actions not carried out effectively. The review process is likely to drop out, as limited cognitive resources are used to do other things (e.g. synchronising plans and actions) meaning that errors are less likely to be detected. Once more time is available at an incident, then it is important that an effective review is conducted to ensure that situation awareness is reliable and that actions are achieving goals and plans. This can be done using feedback and feedforward processes.

In the context of large scale and complex emergency management, the National Emergency Management Agency (NEMA) introduces the concept of the 'time wedge'[25] (Figure 2) to explain the relationship between time and decision-making. At the broad end of the wedge, the greatest amount of time is available to undertake analysis and consider options. At the narrowest point of the wedge, time has run out and the impact will occur. NEMA recommends that for the purposes of strategic planning, decision-makers should work backwards and allocate time for each part of the implementation and planning process to ensure the required lines of effort can be accomplished within the estimated overall time available. Importantly, no more than one-third of all available time should be used for analysis and planning, with two-thirds of all available time allocated for implementation of required actions.

25. See the Crisis Appreciation and Strategic Planning Handbook – NEMA (2024).

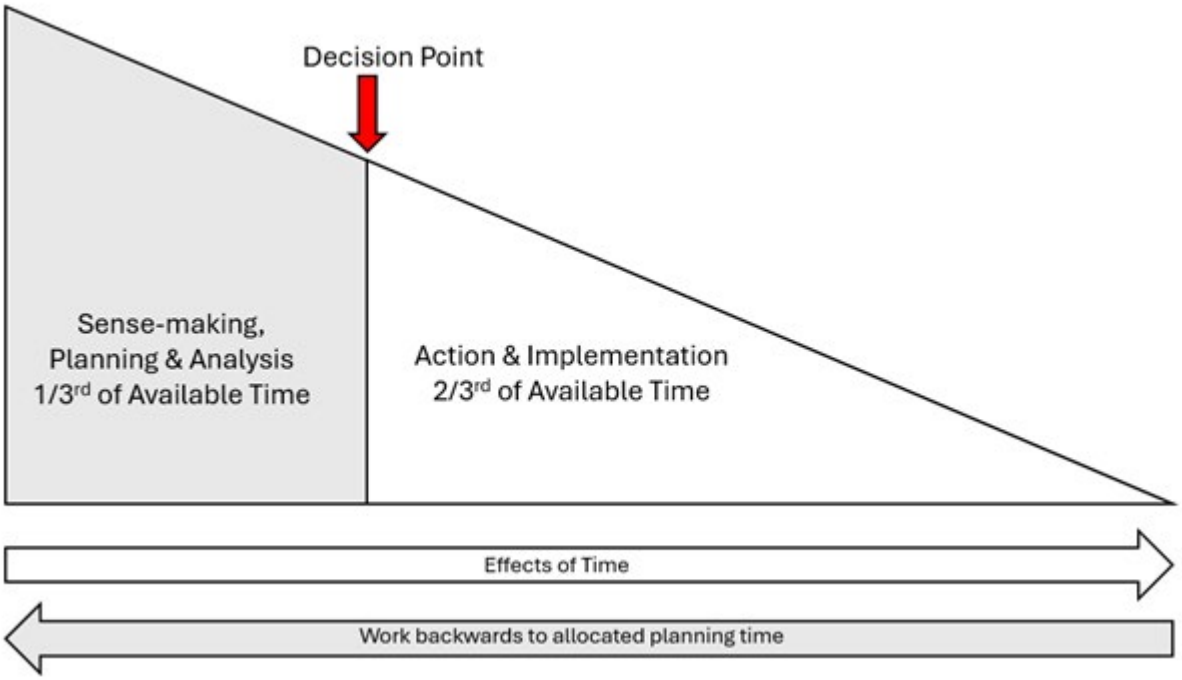

Figure 2. Amended time wedge (NEMA, 2024), updated to incorporate S(CD)PAR elements.

Resources

An important external constraint that influences incident and emergency decision making is available resources. Resources include things like response vehicles, crews, IMT personnel, aircraft, information gatherers, water points, equipment, etc. According to the IEM-DM Model, consideration of resources occurs during the orientation process and forms part of situation awareness. Available resources are also considered at the plan selection and action stages. An increase or a decrease in resources should (but does not always) trigger a review to ensure that current goals and plans are still appropriate and achievable. For example, with an increase in resources, it may be possible to achieve more effective goals and plans.

Complexity

Context is the set of circumstances that form the setting for an incident or event and affect the way it can be understood. In incident and emergency management, events become more complex as the number of actors and component parts increases, the relationships between those actors and parts becomes more involved, and actions or events have increasingly impactful and far reaching consequences. Within incident and emergency management this can be effectively explained through the lens of complexity using the Cynefin® Framework[26] illustrated in Figure 3. The Cynefin® Framework considers reality as a series of closely related domains, being Clear, Complicated, Complex, and Chaotic. Two additional states of Chaos and Aporia also exist. These are discussed in turn.

Clear

Incidents and emergencies within the Clear domain are the most common and simple to address. They generally only occur at the lowest level of incident such as a false alarm or mistaken report of smoke. At these incidents, the cause (e.g. steam being mistaken as smoke) and effect (e.g. fire services being called) can be immediately recognised and simple corrective actions (e.g. investigating and reporting a false alarm) can be taken. However, care must be taken to ensure incident controllers do not mistake a complex problem for one in the Clear domain. For example, incident controllers must take care not to incorrectly assume a report of fire is false simply because the previous fire in that location was false. When this happens a problem in the Clear domain can quickly descend into Chaos (described later). At the same time failure to identify that the situation is changing for the worse will most certainly result in a sudden and catastrophic move into Chaos which may be unrecoverable. For example, the failure to act on an observed gradual wind change which subsequently results in an under control prescribed hazard reduction burn changing direction, escaping containment lines, and becoming an uncontrolled wildfire.

Complicated

Problems that can be addressed by following a sequential task list are Complicated in nature. Cause and effect relationships are recognised by proficient operators but will likely be missed by novices or people completely unfamiliar with the problem.

26. Snowden (2002).

Figure 3. The Cynefin® Framework as of February 2021 – reproduced under Creative Commons Attribution 4.0 International licence from Cynefin.io (2021).

For example, the operation of a fire appliance hose reel and the operation of a drone require the sequential completion of a series of tasks in order to achieve a specific outcome. In the context of IEM, the use of task-based checklists or operational procedures may aid responders and decision makers[27] by artificially reducing the perceived complexity of an incident. For example, when responding to a domestic house fire the acronym of RECEO, standing for Rescue (of persons trapped), Exposures (other buildings or assets that may catch fire), Containment (of the fire), Extinguishment (of the fire), and Overhaul (of the incident) provides a useful mental checklist of sequential operational priorities that can be used to guide the operational lines of effort required to resolve the technical problem of the fire.

Complex

Large incidents where the consequences extend beyond the immediate incident area and into broader society fall within the Complex domain. Complex environments occur during catastrophic, large scale, low frequency events where communication and information sharing platforms are severely disrupted, and the results of decisions and actions by incident controllers may not be known for some time. Examples include (after some structure and organised response is imposed on the initial chaos), the 2005 London bombings, the response to the Fukushima Daiichi Accident, New York September 11 attacks and the 2021 Tropical Cyclone Seroja in Western Australia. In these situations, understanding cause and effect relationships required to successfully resolve the incident is difficult and these are unlikely to be readily discernible from the outset. An accurate understanding and situation awareness can take time to develop. Lines of effort should focus on a 'probe-sense-respond' approach, where operational discretion and a cautious deviation from standard procedures may be required. In other words, the essence becomes 'adapt and overcome' in an effort to nudge the environment towards the complicated domain which is more readily resolved.

Chaotic

The Chaotic domain encompasses those incidents that are occurring at such a fast pace that situation awareness is difficult to establish, and where decision-making is overwhelmingly intuitive by necessity (the initial stages of the incidents including the New York September 11 attacks, 2005 London bombings, November 2015 Paris attack, 2017 Grenfell Towers fire). When incidents and emergencies sit within the Chaotic domain care must be taken to prevent responders acting without thought of subsequent hazards. For example, at a tactical level firefighters may die without any chance of rescuing the victim if they rush to rescue a patient in an oxygen deficient environment without first donning breathing apparatus. At a strategic level rushed staging or command location may lead to significant resources and even the strategic controller being exposed to secondary explosions in the event of a terrorist attack. At an executive level the urge to over commit resources to an obvious emerging hazard or escalating incidents may leave a service critically short of resources in the event of additional incidents occurring.

Chaos and Aporia

Chaos occurs when there is a complete breakdown of the decision-making process, resulting in objectives not being achieved and potentially catastrophic consequences. It can occur through people being overwhelmed, analysis-paralysis, or disobedience (intentional or accidental) with otherwise appropriate plans. By comparison Aporia is a state of altered perspectives, different viewpoints, and diversity of thought. It is a state that can enable understanding, the development of meaningful orientation and the subsequent development of appropriate plans.

It is important to acknowledge the potential differences in the reality of environmental complexity between the tactical, operational, and strategic levels of incident command[28]. This is known as the 'complexity dichotomy'. The tactical commander may consider the relative environment to be chaotic while at the same time the strategic commander may perceive their environment to be complex or complicated. For example, while the pace of an unfolding crisis may be overwhelming from a perceptual, sensemaking and resourcing context for the first arriving commanding officer at the scene, in the far-removed strategic operations centre the pace may appear agonisingly slow with limited information available and seemingly significant delays between strategic decisions and operational changes. Differences may occur depending on the level of experience of the people involved, for example, a chaotic environment for an inexperienced decision maker may be considered complicated or even clear to an experienced and capable veteran.

In the IEM-DM Model, context is included in the orientation phase, where a person's understanding of the context based on their underlying mental models shapes situation awareness, which primes goals, plans, and actions. In complex and complicated situations it is important to ensure that there is an effective review of situation awareness, goals, plans, and actions to ensure they are updated in light of new information and enhanced understanding. This also facilitates a strategy of incremental progress, where a cycle of short-term decisions are made and reviewed to allow progress when it is not immediately clear how to resolve a situation.

27. Penney et al. (2024b).

28. Drummond et al (2025)

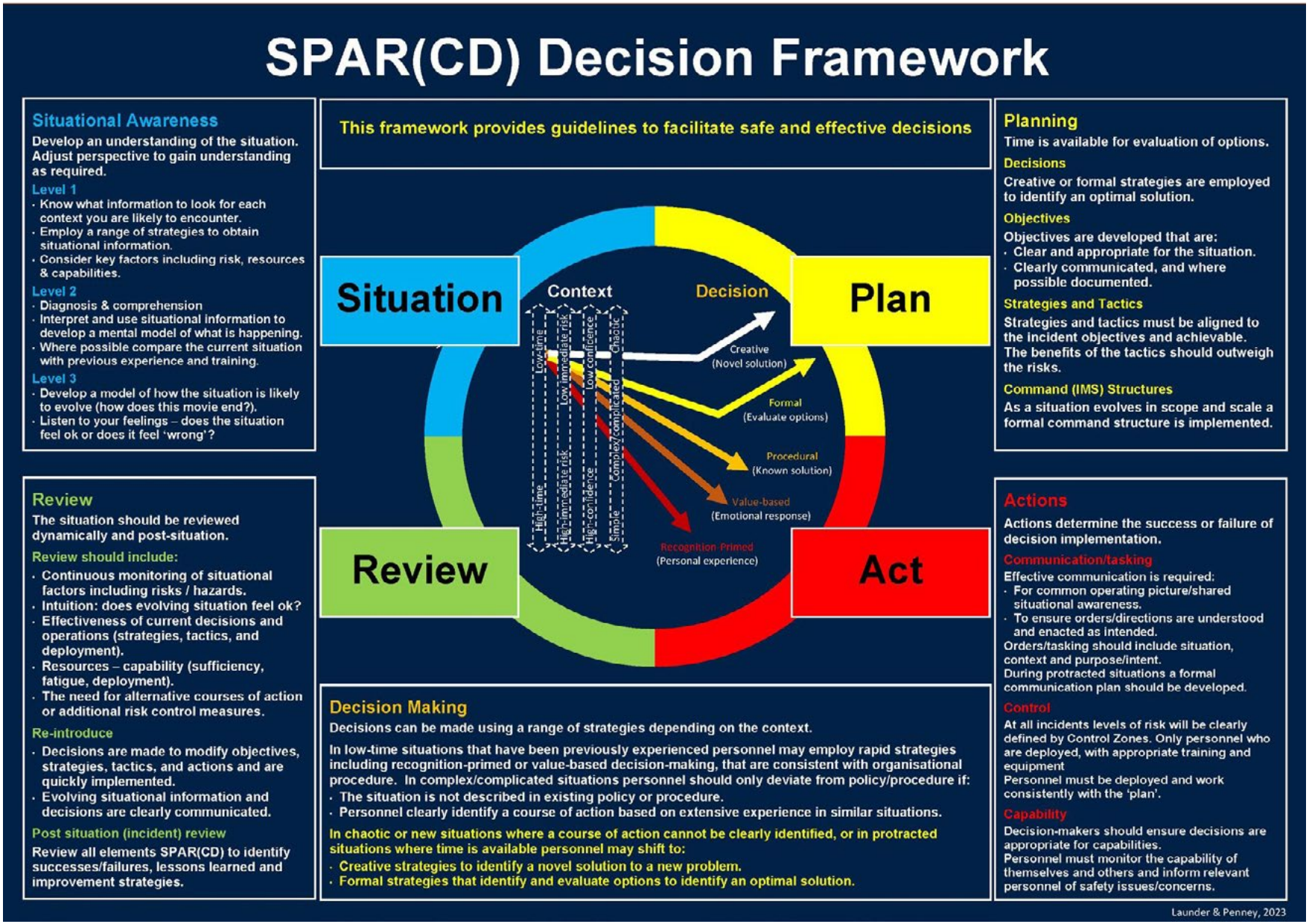

Figure 4. The operational all-hazards SPAR(CD) Decision Model in an end-user version of the S(CD)PAR Framework[29].

29. Source: Launder & Penney (2023b), p. 60.

What other models and frameworks of decision making are used in incident and emergency management?

There are many different decision models, and many of these models are the subject of multiple research papers, books, and internet articles. In this section we will provide an overview of the key models that are applied in the sector. While many more decision models have been published, the ones discussed in this document are those that are suitable in the context of incident and emergency management. We acknowledge that each of the models discussed often have high levels of support in various industries and emergency services where they have been applied as improvements to previous practices. As we will discuss in this review, we do not so much argue against these other models, as identify how they fit into a broad model of decision making (the IEM-DM Model) that is strongly grounded in the extensive research on how our cognitive processes actually work.

SPAR(CD)

The SPAR(CD) model is the operational translation of the theoretical and more detailed S(CD)PAR framework[7] that has been utilised by the South Australian Metropolitan Fire Service for more than a decade. S(CD)PAR stands for Situation, Context, Decision, Plan, Act, and Review. It is both hazard and service agnostic, incorporates complexity analysis and contextual factors, and is applicable to the full spectrum of emergency management operations. SPAR(CD)[30] and its predecessor SPAR[31] is one of the models that provides the foundation of the IEM-DM Model. As such many of the same concepts that were explained above are also relevant to the SPAR(CD) model. For example, the IEM-DM Model includes the processes of situation awareness, plans, actions, and review. Intuitive and analytical processes are also included in SPAR(CD) but in a different way to the IEM-DM Model. Figure 4 depicts the main ideas in the SPAR(CD) model. We provide a summary of the main components of the SPAR(CD) model and how it differs from the IEM-DM Model below.

Situation Awareness

The initial phase of decision-making involves the decision-maker comprehending their surroundings by gathering and interpreting important information. Situation awareness is separated by levels based on perception, comprehension, and prediction of information in the environment[8].

Context

Contextual factors include time and risk factors, decision-maker confidence (and expertise), and complexity domains as defined in the Cynefin® Framework (discussed in the earlier section on Factors that influence decision making).

Decision Making

The S(CD)PAR framework and SPAR(CD) model present a spectrum of decision approaches ranging from fast and intuitive to analytical strategies. It suggests that only a single approach, either intuitive or analytical, is applied at any time. In contrast the IEM-DM Model includes the 2 pathways of intuitive and analytical decision-making that work together in a default interventionist manner to dictate how orientation, goals, plans, actions, and review are conducted. This is based on the latest research on dual pathway models of decision making[32]. These two processes are able to fully explain both creative decision making and rule-based decision making included in the S(CD)PAR framework.

Plan

In the S(CD)PAR framework, a plan is defined as a formalised course of action resulting from conscious consideration of options through formal decision-making. Planning includes behaviours such as objective setting and the establishment of aligned strategies and objectives, which are fundamental elements in operational doctrine and practice for the emergency management sector. Both SPAR(CD) and the IEM-DM Model identify that a plan can be formed analytically. However, the SPAR(CD) model suggests the planning stage is skipped during intuitive decision-making, while the IEM-DM Model states that plans can formed intuitively based on pattern recognition. In SPAR(CD) objectives (goals) are considered to be formed during the development of plans. In contrast, the IEM-DM Model, which is more strongly grounded in the literature on cognitive psychology, states that relevant goals (the goal set) must be established prior to the formation of plans, with the plan acting to implement the goal set.

Act

Actions are the behaviours used to carry out decisions by the decision-maker or those directed by them. Explicitly, four actions are identified that determine the success or failure of decision implementation: communication, coordination, control, and capability. This also features in the IEM-DM Model.

30. Note: SPAR(CD) was planned for implementation into Fire & Rescue NSW but is succeeded by the IEM-DM.

31. Launder & Perry (2014).

32. Evans & Stanovich (2013); Evans (2019); Stanovich & West, 2000; Steigenberger et al. (2017).

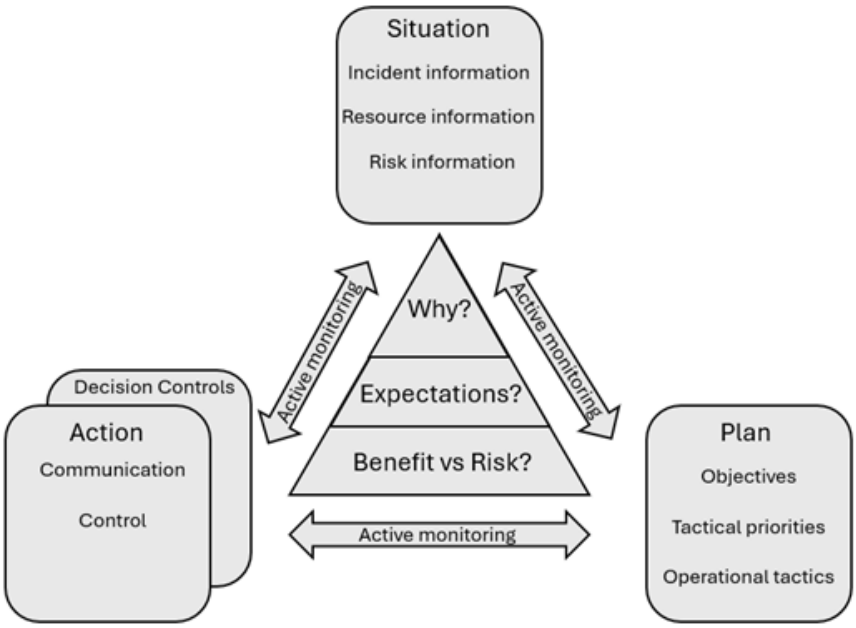

Figure 5. The Decision Control Process[33].

Review

Personnel first deployed to high-risk environments may dynamically and intuitively review their initial situation awareness, decisions, and their effectiveness. As situations become larger, more complex and higher risk, there is a need to shift towards formalisation of planning, communication, coordination, and control and potentially the involvement of higher-ranking personnel. In declared emergencies and military operations, regular and structured reviews are conducted through situation reports and briefings. These formal reviews allow for the confirmation, disconfirmation, or overriding of initial intuitive decisions or decisions implemented by personnel acting on orders from senior officers through deliberative and analytical thinking. In longer incidents where decisions are made in a series, the review process enables decision-makers to implement a decision, learn from the outcome and make corrections before making new decisions.

In the IEM-DM Model, review is described in terms of the processes of feedback and feedforward. Feedback and feedforward can be done intuitively using expectations and environmental triggers, or they can be done analytically using deliberate consideration. The IEM-DM Model also identifies some of the cognitive biases that can derail the process of review (such as confirmation bias). The IEM-DM Model thus focuses more on the processes of decision making but doesn't disagree with the application of review outlined in the SPAR(CD) model.

UK National Fire Chiefs Council Decision Control Process

The United Kingdom's (UK) National Fire Chiefs Council co-produced research[34] which found that incident commanders were more likely to use a deliberative decision-making process when trained in the use of goal-oriented decision controls. The controls are 3 questions to be asked by incident commanders prior to making a decision:

1. Why are we doing this?
2. What do we think will happen?
3. Is the benefit worth the risk?

Importantly, the research demonstrated that the time to make a decision by incident commanders was unaffected and so the decision controls did not reduce the capacity of commanders to respond quickly to unfolding events. The findings of this research resulted in the National Fire Chiefs Council adapting their decision-making model into the Decision Control Process or DCP (shown in Figure 5) to improve incident commander decision making and firefighter safety.

The impact of the research subsequently led to the Joint Emergency Services Interoperability Principles (JESIP) program, which was established in the UK in 2012 to improve interoperability between emergency services. The Interoperability Framework used an expanded version of the DCP (as shown in Figure 6)[35].

33. As detailed in the UK's National Operational Guidance and from the work of Dr Sabrina Cohen-Hatton.

34. Cohen-Hatton & Honey (2015).

35. Version 3.1 (April 2024), available from https://www.jesip.org.uk/.

Figure 6. Decision Controls[36].

36. Sourced from: https://www.jesip.org.uk/downloads/decision-controls/

Superficially, the DCP has a similar structure to the IEM-DM Model, in that it includes (implicitly or explicitly) situation awareness, goals, plans, actions, review, and analytical/intuitive decision processes. However, the IEM-DM Model provides a much more sophisticated account of decision-making based on the research literature on cognitive psychology to explain how decision making actually works. Essentially DCP helps people to critically review their intended decision, which engages analytical processes, into an otherwise intuitive decision process. This can allow previously undetected threats to be identified and may assist in avoiding adverse outcomes. This is helpful in getting people to more effectively engage analytical decision processes to supplement intuitive decision processes in complex, dynamic, and stressful situations. However, we need to be careful in using the DCP that we don't over-emphasise the importance of analytical processes. Analytical processes need to appropriately supplement our intuitive decision processes so that we can make effective decisions in a timely manner without overloading our limited cognitive resources.

Situational Decision Model

The Situational Decision Model[37] (Figure 7) or SDM is designed to provide police decision makers in Queensland with a structured and multi-layered process that can assist in both the thought processes behind making a decision and justifying the decision after-the-fact. Figure 7 outlines the components and application of the Situational Decision Model.

The SDM is designed to replicate the cyclical nature of deliberate decision making, particularly its requirement for continual review and avoidance of inertia. It consists of 5 states (being the outer blue layer), 5 phases (being the inner orange layer), and a central core. The core considerations are located in the centre, not in the action loops, because they are the context within which the decision maker operates, and they also apply to all parts of the model. The key considerations are:

- role (inclusive of rank or authority) of the decision maker
- current intelligence (in other words the situation awareness and current state of sense-making)

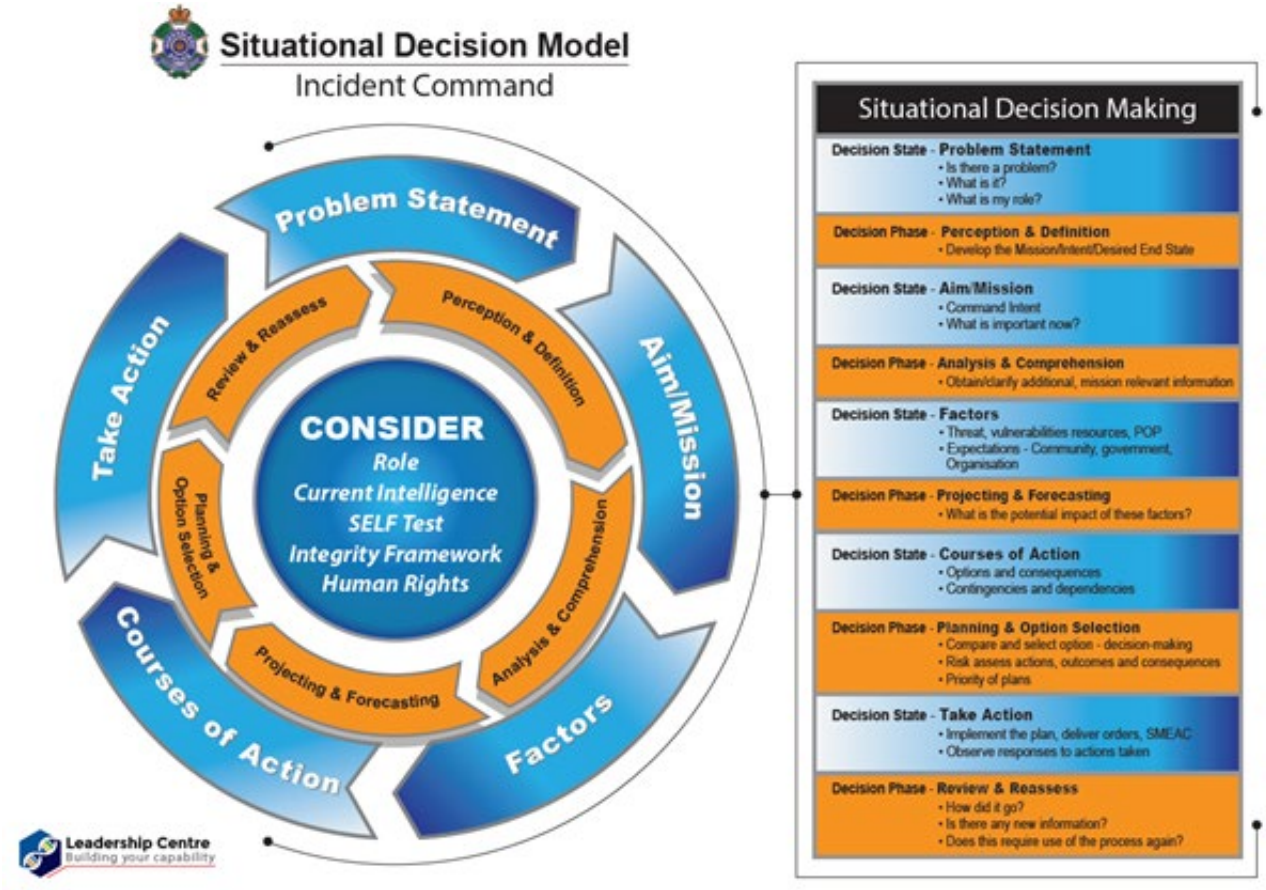

Figure 7. The Situational Decision Model[38].

37. Wright (2023).

38. QPS (2025).

- applying the SELF test, which stands for:
  - will the decision withstand scrutiny?
  - is my decision ethical? (see the next section for a discussion on ethics)
  - is my decision lawful?
  - is my decision fair?
- applying the Integrity Framework of the organisation (this may also be called the code of conduct)
- have the human rights of those impacted by my decision been considered?

The 5 (blue) states of problem statement, aim/mission, factors, courses of action, and take action are intended to occur in that order and represent achievement of components of understanding or knowledge relevant to a problem. These states are key points in time or stages of the decision-making process and are almost static in that the decision maker can pause and outline 'my aim is…', 'the factors I am currently considering are…', 'the possible courses of action of the threat are…', and 'the courses of action available to me are…'.

Phases (orange) are active and involve the information gathering, assessment and processing, and thinking stages that move the decision maker between states. The 5 phases of perception and definition, analysis and comprehension, projection and forecasting, planning and option selection, and review and reassess align in the graphic with the state they move from and to, that is, the perception and definition phase moves the decision maker from problem statement to aim/mission.

Use of the concepts of states and phases is designed to provide a logical system that allows all persons involved in a decision process to understand where they are within that process and what is required to move forward. Such a process supports the concepts of shared decision making, mental models, and mental simulations, and it seeks to mitigate cognitive biases, most notably inertia, avoidance, fixation, and anchoring.

The SDM has as its basis the same core processes of orientation, goals, plans, actions, and review that also underpin the IEM-DM Model. However, the SDM advocates that the stages and phases should be done in a deliberate way using analytical decision processes without recognising the importance of intuitive decision processes. While the SDM provides a sound and considered approach to decision making (particularly within the policing context), extensive research has shown that intuitive decision processes are important, run all the time, and form the large majority of decisions[39]. Trying to make all decision making deliberate and analytical will quickly overcome our limited cognitive resources. In such cases decision making will proceed using the unacknowledged intuitive pathways and there will be post-hoc rationalisation that reinterprets how a decision was made in terms of SDM using some information that made it into conscious awareness and default values from our knowledge of how things usually work. The IEM-DM Model shows how intuitive and analytical decision-making processes work together to create decision making.

Crisis Appreciation and Strategic Planning

For large and complex incidents where extended timeframes enable its application, the National Emergency Management Agency's (NEMA) Crisis Appreciation and Strategic Planning framework[40] provides an analytical tool that can be particularly beneficial for shifting perspectives, completing detailed analysis and developing appropriate plans.

The Crisis Appreciation and Strategic Planning (CASP)[41] framework is a repeatable and strategic-level planning method developed utilising elements of the Joint Military Appreciation Process (JMAP)[42], human-design thinking, and the Australasian

39. Cohen-Hatton et al. (2015); McLennan et al. (2001/2003); Taynor et al. (1990).
40. See National Emergency Management Agency (2024) Crisis Appreciation and Strategic Planning (CASP) Guidebook.
41. National Emergency Management Agency (NEMA) (2024).
42. Australian Defence Force (2019).

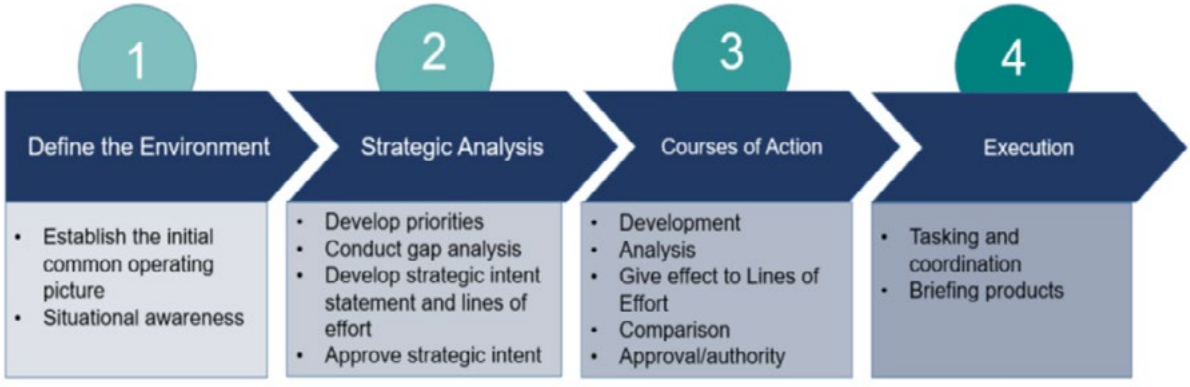

Figure 8. The CASP methodology flows from defining the environment to executing tasks.

(Source: NEMA, 2024, p. 20. Reproduced under Creative Commons Attribution 4.0 International (CC by 4.0) licence).

Inter-service Incident Management System (AIIMS)[43]. In 2023 CASP was recognised as the principle emergency management strategic planning tool for the Australian Government. Using the CASP process, decision makers evaluate and categorise risk to ensure appropriate priority of the values at risk at a strategic level for complex incidents of state and national significance. It consists of 4 major steps as illustrated in Figure 8.

CASP is based on conscious analytical decision processes. These processes are also acknowledged in the IEM-DM Model, however, the IEM-DM Model outlines a more detailed model of decision making in terms of situation awareness, goals, plans and actions. In contrast to CASP, the IEM-DM Model advocates the importance of the review process and shows how deliberate analytical processes supplement underlying automatic intuitive processes that are also important in decision making.

Procedural decision making

Procedural decision making is based on standard operating procedures (SOPs) or standard operating guidelines (SOGs) that are produced by organisations to direct their employees' decision making. SOPs are documented rules and steps that must be followed when a specific incident is encountered[44]. SOGs are not prescriptive, can be applied more flexibly and provide principle-based guidance on how to proceed[45]. Procedural decision-making results in an almost-algorithmic approach to resolving a situation. In other words, the amount of decisions required to be made are reduced as the operator follows a series of actions or steps based on a protocol. In a recent survey of incident and emergency management personnel in Australia, participants were asked about the tools they used to help them make decisions[46]. The study found that 44% of the tools used were SOPs and 19% were SOGs.

While it is clear that many people in incident and emergency management are relying on SOPs and SOGs, they do not form a particularly effective way of managing decision making. The problem is that SOPs and SOGs are not grounded in a model of how decision making works and so they do not integrate processes that we know are important for decision making (e.g. orientation, goals, plans, actions, review). They are also wholly focused on a deliberate analytical processes, without any acknowledgement of the importance of intuition in making decisions. Because they are focused on analytical processes they are slow, clunky to use in operational situations and can quickly overwhelm cognitive resources in complex, dynamic situations. Rigid adherence to SOPs and SOGs is also a problem and can be catastrophic. Inappropriate adherence to SOPS and SOGS has contributed to multiple deaths[47] and exposed organisations to significant criticism. If SOPs and SOGs are used then they need to have been developed based on a model of decision making (such as the IEM-DM Model) so that they appropriately supplement decision making. They should provide clear expectations regarding goals and values to be prioritised, and clearly identify mandatory and prohibited actions or restrictions on operations, yet facilitate flexibility in the way an emergency is responded to.

Recognition primed decision making

The majority of decisions made by first responding fire officers are intuitive[48], and more specifically recognition-primed, including up to 80% of initial fire ground decisions[49]. Recognition Primed Decision Making or RPDM[50] is a decision model whereby actors rapidly perceive patterns in the environment around them and apply a satisfactory solution based on previous experience. This allows people to move quickly from situation awareness to actions based on familiarity. If the person making a decision doesn't recognise the situation as familiar they will need to go through a process of story building to attempt to build effective situation awareness. If the person making the decision is unsure about the effectiveness of a plan that is suggested by pattern recognition then they will engage in a process of mental simulation to ensure that the plan will work before they implement it. While RPDM is often considered a model of intuitive decision making, it is clear that both the process of story building and mental simulation are actually analytical in nature.

While RPDM is a fast and effective way of making decisions when used by experts, it should be relied on with caution by less experienced decision makers[51]. It is also the case that experienced personnel may make poor decisions through overconfidence or in areas outside their own field of expertise[52]. If the situation isn't what the decision maker thinks it is, or if this situation changes then the plans and actions that follow will be erroneous. This means that intuitive decision making needs to be appropriately supplemented by more analytical processes. The IEM-DM Model adopts a dual process approach, where the RPDM intuitive decision-making process is integrated with analytical processes within the structure of orientation, goals, plans, actions, and review.

How is decision making evaluated?

Decisions can be judged in multiple ways[53], and these ways will vary between organisations and between individuals. The two primary ways a decision can be judged are based on the outcome of the event and the process by which a decision is made.

43. AFAC (2017).
44. Butler et al. (2021).
45. Weinschenk et al. (2008).
46. Bearman et al. (2025).
47. See for example the Grenfell Inquiry by Moore-Bick (2019).
48. Cohen-Hatton et al. (2015); Cohen-Hatton & Honey (2015).
49. Klein et al. (2010).
50. Klein (1999).
51. Bang & Liwång (2016).
52. Kahneman & Klein (2009).
53. Penney et al., (2024a); Vlek et al., (1984); Higgins (2000); Elwyn et al., (2009); Yates et al., (2003).

Often decisions are judged by peers, media, communities, and politicians based on outcomes (e.g. how many houses were lost in a fire). However, just focusing on outcomes does not adequately address how that decision was made, communicated and executed. It doesn't consider the situation or context at the time, or whether the decision itself may have been appropriate but was impacted by other factors (e.g. uncontrollable environmental factors, such as wind changes that were not forecast). Generally, there are 5 ways of judging a decision based on the process:

1. Whether the decision was correct or incorrect; right or wrong; compliant or non-compliant when measured against doctrine, process, procedure, code, legislation, or similar. Typically, this is a binary measure, in other words, there is no grey area only black and white.
2. Whether the decision was good or bad; when measured against any number of highly individualised factors including but not limited to timeliness, morality, efficiency, or other measures of quality. As opposed to binary measures, each factor is assessed on a sliding scale of 'goodness' or 'badness' which varies greatly according to individual[54].
3. Similar to No. 2 above, based on the IEM-DM Model a decision can be evaluated based on the extent to which it met all the relevant goals. For example, a good decision is one that maximised one goal (e.g. putting out the fire quickly), while meeting all other relevant goals to a minimum threshold (crew safety, community safety, environmental considerations). Relevant goals and thresholds for prototypical situations need to be agreed in advance to provide consensus.
4. Using a cost versus benefit approach. While research[55] has shown that it is not well accepted as a process for post-event evaluation of decision quality in the context of emergency services, it can retain its value as an analytical process undertaken prior to the decision itself[56].
5. Using a behavioural marker systems such as EMNoTS[57] or THINCS[58]. Behavioural marker systems provide a set of observable criteria against which the process of decision making by individuals and teams can be evaluated. This can be done either during the incident or post-hoc in after action reviews.

It is important to note that a decision that inappropriately follows doctrine (in other words, a decision that is technically 'correct' because it adheres to the doctrine) may actually lead to adverse outcomes and be evaluated as a bad decision. A particularly relevant example of this occurred during the 2017 Grenfell Tower Fire where the decision to follow 'stay put' policy and shelter occupants in place during a catastrophic high rise building fire was found to be a bad decision that contributed to multiple deaths. During the same incident, a later decision to contradict the 'stay put' policy and evacuate occupants made by a senior fire service officer was evaluated by the inquiry as a good decision[59].

Various research studies and post-incident inquiries highlight important points that need to be considered when evaluating decisions:

1. Decisions are evaluated by the media, politicians, and the community based on outcomes, rather than the process of decision making.
2. Just because a decision is correct or right according to doctrine, policy, law etc., it does not mean that it will be judged to be a good decision. At the same time, just because a decision is technically incorrect or wrong according to doctrine, policy, law etc., it does not mean that it will be judged to be a bad decision.
3. Different people will use different criteria to evaluate decisions, with surprisingly little consensus in what constitutes a 'good' or 'bad' decision.

Because of the different ways a decision can be evaluated, and because different terms can be used to describe decision quality, this guide adopts the term 'effective' to describe the ideal decision and decision-making process. The term effective means 'successful in producing the desired or intended result'. In the context of decision making in emergency management this means:

- An effective decision is a mental commitment to a course of action at a point in time, following an appropriate decision-making process for that context. It is separate to the ultimate outcome of an emergency incident or situation.
- An effective decision-making process does not necessarily result in a good outcome, but rather an improvement in outcome compared to a state of no intervention or an avoidance of a worse outcome.
- An effective decision can be undone by poor action execution or review.
- A good outcome without an effective decision-making process being implemented is known as luck.

54. Penney et al. (2024a).
55. Penney et al. (2024a).
56. Penney et al. (2022b).
57. EMNoTS, Hayes et al. (2021).
58. THINCS, Butler et al. (2020).
59. Moore-Bick (2019).

What tools are available to support decision making?

There are numerous tools available to support decision making and often these are referred to as 'cognitive aids'. Broadly cognitive aids aim to support the operational performance of individuals and teams working under pressure. Cognitive aids include decision models, frameworks, and systems; checklists, aide memoires, standard operating procedures, and standard operating guidelines. As several of these have already been addressed in this guide, this section focuses on those not already discussed. Cognitive aids that seek to extend and support the cognitive limitations of individuals and teams to facilitate skilled performance in demanding conditions are a critical but often under-used resource for decision making. While cognitive aids can be extremely useful, they are not a silver bullet. The correct tool (that is correctly designed) must be correctly applied by trained and competent users[60].

Checklists and aide memoires

Checklists are commonly used in emergency and crisis management in Australia[61]. Most frequently used are the suite of AIIMS and Emergency Management Professionalisation Scheme functional role aid memoires. Other checklists in emergency management identify key tasks for regional and state coordination centres and seek to reduce biases[62]. While not directly assisting with the decision-making process, these and related checklists may be effective in improving team adherence to critical steps, increasing standardisation of performance, reducing mental workload and assisting fault-finding and trouble-shooting[63]. We provide a brief discussion of checklists here in relation to decision making.

Characteristics of good checklists are:

- they are simple
- they provide the potential for measurement when reviewing performance
- they are beneficial for training purposes, especially when the task is complex or requires extensive or detailed sequences of actions.

Characteristics of poor checklists include:

- duplicating or contradicting other existing guidance
- being too complex, too prescriptive, too long or inappropriate for the task at hand, leading to reduced performance (rather than improved performance)
- reducing people's ability to use operational discretion to adjust decision making in complex environments.

Even good checklists, if they are poorly implemented, not supported by appropriate training, or poorly integrated with existing processes can result in poor outcomes and user rejection. Individuals and teams must also take care to ensure that simply completing checklists does not provide a false impression that work is well done and the associated tasks are well understood by people completing them.

Tools to support analysis

NEMA's Crisis Appreciation and Strategic Planning framework (previously discussed) is specifically designed to assist analysis of complex incidents and clusters of concurrent incidents at a strategic level. Other simplistic, yet equally important tools such as the SWOT analysis (Strengths, Weaknesses, Opportunities, Threats)[64] and PESTLE (Political, Economic, Social, Technical, Environmental, Legal)[65] are commonly applied[66]. Tools such as SWOT and PESTLE provide predetermined and structured categories to assist users focus on relevant themes and categorise information, while continuing to allow freedom of analysis and interpretation within those categories. These tools can help decision makers to better engage analytical decision-making processes, although care must be taken not to force decision making into an overly prescriptive analytical approach, that does not take due account of intuitive decision-making.

Cues and alarms

Cues are signals or triggers that prompt personnel to execute a specific action. Within the emergency management context they include establishing operational and reporting timelines and rhythms where key events, trigger points, decision-points and deliverables are clearly identified. By comparison, alarms are audible or visual (or a combination of both) warnings used to alert people to critical changes to their environment. Common fire service examples at a tactical level include the low-pressure warning whistle on a self-contained breathing apparatus set, the motion sensitive personal distress alarm carried by search crews, and the atmospheric or chemical alarms of chemical and gas detection equipment. At the broader emergency management level, examples include community warnings involving threat levels and required responses. Cues and alarms can be important in triggering the switch from intuitive to analytical decision processes.

60. Penney et al. (2024b).
61. Bearman et al. (2025)
62. e.g. Hayes et al. (2020).
63. Penney et al. (2024b).
64. See Whittington et al. (2020) for an overview of SWOT.
65. See Whittington et al. (2020) for an overview of PESTLE.
66. Penney et al. (2022a, 2024b); Sarwar et al. (2016); van Houts (1996).

How are decisions made in teams?

Teams have some important characteristics that shape how decision making occurs. Teams are made up of 'a distinguishable set of two or more people who interact, dynamically, interdependently, and adaptively toward a common and valued goal/objective/mission, who have each been assigned specific roles or functions to perform, and who have a limited life span of membership'[67]. This definition has several important elements central to decision making in teams. Teams are complex in that they bring together individuals who each have a unique past, and as a team evolves, it generates its own history and sense of future. Team members are interdependent on each other, influence the team, and are influenced by the team. Teams of any appreciable size usually adopt a hierarchical authority structure with a multitude of formal and informal relationships between members, and with the wider environment including the employing agency, other organisations, community, and wider stakeholders. Teams are inherently dynamic systems, responding and adapting to changing conditions, both within the environment in which they operate and internally with ongoing changes in personnel, processes, and structure.

Decision making and non-technical skills

Effective decision making and its implementation is an important function of teams and is supported by other key non-technical skills. The Emergency Management Non-Technical Skills (EMNoTS) framework identifies a cluster of seven skills central to incident and emergency management. These are communication, cooperation, coordination, leadership, situation awareness, decision making, and managing stress and fatigue[68]. Figure 9 depicts these seven non-technical skills and highlights some important inter-relationships between these skills. IEM practitioners and teams rely on non-technical skills to successfully apply their core technical knowledge to make and enact effective and coordinated decisions.

The first of the relationships indicated in Figure 9 is the centrality of communication in supporting and enabling all aspects of incident and emergency management. Good communication is critical in building and maintaining situation awareness, formulating and enacting decisions, coordinating information and actions, cooperating and collaborating with others, enabling leadership through the provision of direction, and managing the adverse effects of stress and fatigue. Reviews, public inquiries, and research into many high-profile incidents and emergencies highlight the central role that poor or ineffective communication has played in undermining effective decision making[70].

67. Salas et al. (1992), p. 4.

68. Hayes et al. (2021).

69. Source: Hayes et al. (2022), p.41.

70. For example, Bearman et al. (2015); Pollock (2013); Teague et al. (2010).

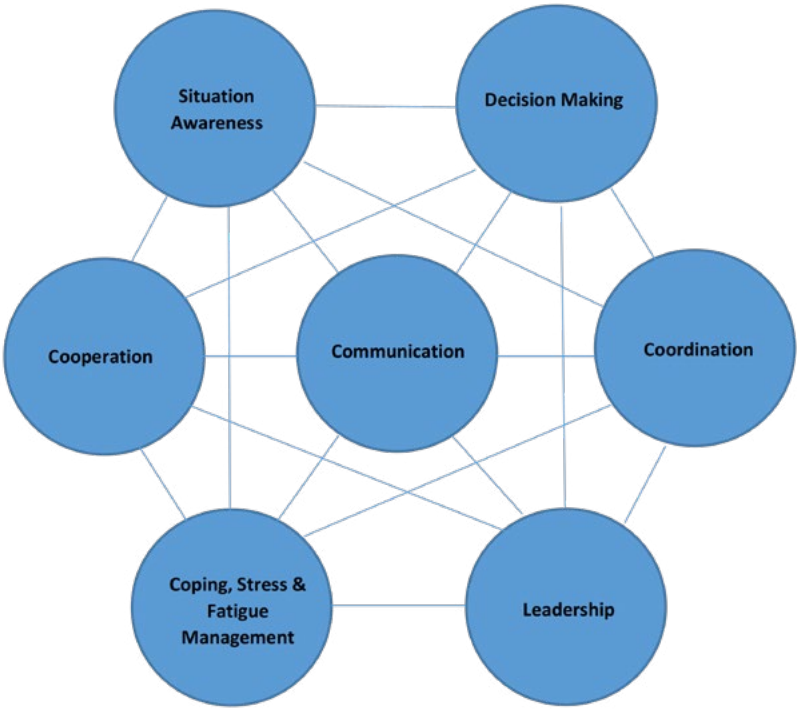

Figure 9. Conceptual relationship between the EMNoTS non-technical skills[69].

The common operating picture

It is important that all team members have a sufficient level of shared situation awareness to be able to communicate, coordinate, cooperate, and make decisions. This is also known as possessing a common operating picture. Taking a different approach, the concept of 'distributed situation awareness'[71] suggests that rather than the single truth established through a common operating picture, situation awareness is a network of information that emerges from the interaction between human and non-human systems. As a result different team members tend to have different perspectives of the same event or situation, and safe operation simply requires those members to have compatible levels of understanding. An example of this is approaching a traffic intersection where drivers in different vehicles have unique views of the road and communicate through systems like indicators, while non-human elements like traffic lights provide additional critical information[72]. The drivers only need enough shared information and compatible understanding to avoid a crash. However, this approach may not be suitable for complex and dynamic incidents where a true common operating picture is required[73].

The appropriate application and use of incident management systems such as AIIMS[74], and the Incident Command and Control System Plus (ICCS Plus)[75], can assist with establishing and maintaining a common operating picture. Another useful tool is the Maaloop Framework[76]. While a separate guide is required to explain the Maaloop Framework in detail, it can be summarised as an approach to enhancing development of a common operating picture in complex emergency management scenarios. The framework is designed to offer trained observers (typically experienced decision makers or intelligence officers within each command realm) an instant, point-in-time snapshot of the emergency response landscape. The purpose of the framework is to improve both individual and collective understanding across command hierarchies and agency jurisdictions, enabling a true common operating picture to be established. It does not introduce new concepts; rather, it synthesises and organises common constructs and concepts identified in existing decision-making literature. It is a tool to assist analytical decision making at complex incidents by facilitating enhanced communication and understanding across hierarchical command structures by providing a consistent terminology and conceptual framework for describing complex emergency management scenarios. Importantly, it is not an alternate or adjunct to situation awareness or sense-making, but it may assist in the development of both. It can also be utilised as a teaching aid to assist novices work through a deliberate process to undertake sense-making and establish (and maintain) situation awareness until they are sufficiently experienced to undertake these practices in an intuitive manner.

Decision making in multi-team systems and interoperability

A further point to consider is that teams themselves may form part of a larger multi-team system[77]. This requires teams to coordinate information, decisions, and actions effectively with other teams up and down the chain of command as well as laterally with other organisations[78]. Multi-team systems are described as 'a network of component teams working to achieve separate, but related objectives within a framework of overarching goals'[79]. These environments create a range of decision making and teamwork challenges such as competing priorities, ensuring an adequate shared understanding of the situation, and maintaining effective communication, coordination, and cooperation. There are plenty of well-documented examples of these challenges (including the 2009 Black Saturday fires[80], Hurricane Katrina emergency response[81], and the 2019/20 Black Summer Bushfires[82]). More recently major incidents in the UK, such as the 2017 Manchester Arena Bombing, 2017 Grenfell Tower Fire, and 2019 London Bridge Attack, have led to a renewed focus on multi-team system coordination and interoperability, and how this can be difficult to achieve in practice[83]. To better understand the factors shaping multi-team system coordination and interoperability, University of Liverpool researchers undertook an extensive systematic review of the literature[84]. The two key structural principles of interoperability identified were (i) being able to communicate and exchange information effectively, and (ii) having a decentralised and flexible team network. The 3 key psychological principles identified were (i) establishing trust between team members, (ii) developing secure team identities, and (iii) building cohesive goals. More recently, the Liverpool research team has published research evaluating organisational change and specific training developed to achieve interoperability between UK emergency services[85].

71. Salmon et al. (2009, 2018); Salmon & Plant (2022).
72. Salmon et al. (2018).
73. Steen-Tveit & Munkvold (2021).
74. AFAC (2017).
75. ANZPAA (2022).
76. Drummond et al. (2025, p1).
77. Mathieu et al. (2001); Shuffler et al. (2015).
78. Bearman et al., (2023).
79. Brown et al. (2021), pp.591-592.
80. Bearman et al. (2015).
81. Olejarski & Garnett (2010); Cooper & Block (2006); Garnett & Kouzmin (2007).
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Concluding comments

This guide has provided a contemporary account of incident and emergency management decision making. We have explained what decision making is and how people make decisions according to the IEM-DM Model (which is grounded in the science of human cognition). We have discussed other models of decision making that are used in incident and emergency management and explained how they fit into the broader IEM-DM Model. We have considered how decisions are evaluated, what tools are available to support decision making, and how decisions are made in teams.

The IEM-DM Model (as outlined in Part A and Part B) provides a common decision-making model for the IEM sector. The IEM-DM should be complementary to IEM organisations' current practices. However, looking ahead the model will provide the opportunity to further consider and refine doctrine for training and operational decision making across all fire and emergency services under AFAC. The model improves on previous models and frameworks, in that it:

- provides a clear, simple account of decision making that can help people explain how they made operational decisions
- grounds the model in the latest research on human cognition to explain behaviour in terms of how the brain works
- explains how deliberate analytical thinking supplements more automatic intuitive processes
- provides a framework that explains and integrates other models of decision making
- clearly highlights pitfalls and potential safeguards in decision making
- explains common decision-making problems, such as decision inertia, confirmation bias, goal seduction, faulty situation awareness, lack of appropriate review
- enables easy operational application through the provision of ready-to-insert doctrine.

Development of a common decision-making model provides opportunities to:

- improve the alignment and consistency of how IEM sector organisations approach operational decision making
- create more consistent doctrine and training resources
- support a common language to describe, discuss, and review decision-making practices.

Another important goal of the handbook is to strengthen the IEM sector's knowledge and understanding of decision-making processes. This helps us to have conversations about decision making based on a solid understanding of how human cognition actually works and provides the foundation for us to move forward together as an industry to better support operational decision making in the time critical, dynamic, and complex situations often faced in incident and emergency management.

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