

FireFront

TRAINER MANUAL



FireFront Project:

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1.0 THE *FIREFRONT* PROJECT

This manual is intended to support the use of *FireFront* within Fire and Rescue training programmes. *FireFront* is a digital tool for enhancing and supporting decision-making in Fire and Rescue personnel. The tool was developed and tested within the *FireFront* project funded by an *Erasmus Plus* European Union project from 2018-2021. The project team was comprised of partners from Belgium, Denmark, Estonia, Netherlands, Spain and U.K from the following organizations:

- PLOT (Provincial Centre for Education & Training) (Fire School) (Belgium):
Thoelen, F., Vastmans, J.
- University College Copenhagen (Department of Technology, Emergency and Risk Management) (Denmark): *Blom Andersen, N., Bøhm, M., Holm, L.O.C.N.*
- East Jutland Fire Service (Denmark): *Arendtsen, B.*
- Estonian Academy of Security Services (Estonia): *Polikarpus, S., Taukar, M., Kütt, T.*
- IFV Institute for Safety (Netherlands): *Fikke, R.C., Geertsema, T., Hazebroek, J.C., Tonnaer, C., Weewer, R.*
- Institute for Public Security of Catalonia (Firefighters and Civil Protection School) (Spain): *Figueras Masip, A., Fuste Castella, R.*
- University of Gloucestershire (CRACKLE) (U.K.): *Baker, S., Brookes, D., Catherwood, D., Edgar, G.K., Naughtie, C., Sallis, G., Silcock, G., Walker, S.*

2.0 THE BACKGROUND TO THE FIREFRONT TOOL

2.1 THE PURPOSE OF FIREFRONT.

The *FireFront* tool is intended to support effective and safe decision-making in Fire and Rescue operations. The tool is an important extension to its successful predecessor *FireMind*. As for the latter, *FireFront* employs an interactive software package to present simulations of Fire and Rescue incidents and record an individual's answers to questions that can reveal personal decision-making tendencies regarding the incident.

The core idea behind the tool is that effective Fire and Rescue operations do not only involve expertise, but also the ability to actually deploy that expertise effectively under pressure. Errors can occur even for well-trained and experienced personnel due to natural tendencies of the human brain, especially under pressure. The tool is intended for use within training programmes, with the goal being to enhance individual awareness of personal decision-making tendencies that may potentially lead to risk in Fire and Rescue operations and incidents. By providing feedback on such tendencies during the *FireFront* exercises, the aim is to encourage habitual or automatic self-monitoring and attention to potential strengths and weaknesses during actual incident decision-making.

(For further background, see suggested reading in section 9.0.)

2.2 THE SIX ASPECTS OF PERFORMANCE MEASURED BY FIREFRONT:

The scenarios used with the tool are presented digitally as a sequence of images, videos, texts (etc.) and at intervals the respondent is required to use the keyboard to answer probe questions about the incident. At the end of the exercise, the tool uses a method called QASA (*Quantitative Assessment of Situation Awareness*) previously developed and tested by team members to analyse the responses (Catherwood, et al., 2014; Edgar & Edgar, 2007; Edgar et al., 2018; Sallis, et al., 2013). This provides feedback on SIX key aspects of an individual's response as follows.

(1.) ACTUAL SITUATION AWARENESS (ASA): The first aspect concerns an individual's *Actual Situation Awareness* (ASA) about the incident. ASA reflects the person's mental representation of the incident and shows how well the person has understood the situation in the exercise and can tell true from false information about the incident. Effective decision-making requires good ASA, so it is critical to know how well a person has built their

understanding of the scenario in this way. This requires effective attention and memory for the incident. Poor ASA reflects an incomplete or even inaccurate mental impression about the situation that provides ineffective or wrong information for making decisions.

(2.) ACTUAL SITUATION UNDERSTANDING (ASU): The tool also provides measurement of *Actual Situation Understanding* (ASU) about an incident. While ASA shows a person's attention to and memory for the incident, ASU reflects the individual's understanding or judgment of the *importance or relevance* of that information in regard to the incident (Durso and Alexander, 2010). ASU involves more complex thinking than for ASA, requiring deeper understanding of the situation and how it could develop. This may involve making connections between the current situation and previous experiences and knowledge and judging the usefulness of that past information for the incident operations.

As well as ASA and ASU, the tool also offers feedback on another key tendency that can affect and distort decision-making even for those with good ASA or good ASU. This is the person's "Bias". Two measures of Bias are provided by the tool, one relevant to ASA and the other to ASU.

(3.) INFORMATION BIAS (IBias): The first Bias measure is that of *Information Bias (IB)*. This refers to the way a person selects from the information they have about the incident in order to make decisions. A person can actually have good ASA with good and appropriate information, but in the end they may not actually use this or could use it ineffectively and may make errors when making decisions, due to their Information Bias.

Bias can be considered as a type of "mental zoom lens" that can "zoom in" (a narrow focus) or "zoom out" (a broad focus) on selected parts of the information that has been mentally gathered by the person about the incident. This is revealed in the tendency to either reject or accept the available information as "true" for making actual decisions. This idea is formalised in "Signal Detection" models such as QASA (Quantitative Analysis of Situation Awareness) (Edgar & Edgar, 2007; Edgar, et al., 2018; Stanislaw & Todorov, 1999), but basically the idea is that people may have similar amounts of information available about an incident, but they can vary in how much of that they will personally judge as "true" for making an actual decision, ranging from a very narrow to a very broad range of acceptance. This reflects their Information Bias.

It is important to note Bias is a natural tendency of the human brain. It does not reflect personal inadequacies. *Any* human brain has only a limited or finite amount of processing power to deal with information at any one point in time. Especially if the brain is overloaded, its processing power may either “zoom in” or concentrated on a limited amount of information or it may “zoom out”, spreading its power more widely but also inevitably processing the information more thinly and superficially. This is the basis for Bias. Bias can involve a range of focus or scope - from narrow to broad, but people tend to go in one direction or the other and either Bias tendency is associated with errors that can carry risks for operations (see Table 3). A person’s Bias can vary with the circumstances, but people may show a tendency to revert to their customary Bias patterns when under pressure (Sallis, 2016).

A *narrow Bias* is like “zooming in” on only a limited amount of the available information to choose as being true or useful for decisions and rejecting the rest. A person with a narrow Bias could in fact have good ASA, having accumulated good information about the incident, but when it comes to actual decision-making, that person will mentally “zoom in” or focus on only a limited amount of the available information to guide a particular decision. In this case, the person shows a conservative, cautious approach and will accept only a small amount of the potentially available information as being true for the particular decision involved. If this narrow mental focus is appropriate then there is no harm, but if the focus is too narrow and especially if it is on wrong or inappropriate information, there is a strong risk of making "miss" errors that overlook or reject key aspects of the incident during decision-making (see Table 3).

In contrast, the person may have a *broad Bias* with a “zoomed out” mental focus that encompasses a wider span of the available information. This is a more liberal or lax approach that allows more of the available information to be in the focus for making decisions. Again if this happens to involve correct information, there is no harm, but a very broad Bias carries the risk of spreading the brain’s mental resources too thinly, producing shallow or superficial processing of the information. This can lead to very liberal choices with poor filtering of information, so that good information isn’t really being distinguished from bad. This may result in use of inappropriate or even untrue information when making decisions. Again a person may in fact have good ASA and have accumulated a lot of good information, but when

it comes to actually making decisions, a broad or “zoomed-out” Bias can lead to making poor choices from that available information for the particular decision involved. This type of Bias can result in making “false alarm” errors when false or irrelevant information is chosen for decisions (see Table 3).

(4.) RELEVANCE BIAS (RBias): The *FireFront* tool also allows feedback on a person’s Bias in regard to deciding whether something is *relevant* to a particular decision about the incident: namely, “Relevance Bias” (RBias). While Information Bias (IBias) shows a person’s Bias in regard to acceptance of information as being true or false when making decisions, Relevance Bias shows their Bias in regard to the extent of acceptance that information as *relevant to the incident*. As for Information Bias, Relevance Bias can also reflect whether individuals “zoom in” or “zoom out” on the available information, but in this case about how *relevant or important* they think that information actually is for making decisions about the incident.

So a person who accepts only a small amount of the available information as being relevant will show a *narrow* Relevance Bias. This person therefore has a conservative, cautious approach, judging that very little of the available information is relevant to making decisions about the incident and rejecting the rest as irrelevant. This tendency can carry the risk of making “miss” errors that wrongly reject relevant information, disregarding useful information (see Table 3).

Alternately, someone who accepts a broad span of information as relevant, will have a *broad* Relevance Bias. A tendency in this direction can carry the risk of making “false alarm” errors during actual operations, with the possibility of devoting resources and time to aspects of the situation that are not actually of any importance (see Table 3).

Bias involves internal mental or brain processes, but it is related to and affects external behaviour, such as how individuals examine and attend to particular aspects of an incident. For example, a firefighter may not *look at* certain physical spaces or items in an incident (e.g., the smouldering washing on a clothes-line outside a ground-floor room in a building on fire in the higher floors), either because these are overlooked mentally (due to narrow Information Bias) or judged to be irrelevant to the operation (due to narrow Relevance Bias). So Bias can have serious consequences and lead to operational errors and risks.

It should also be noted that in an actual incident, a person’s mental (and behavioural) focus will vary in a dynamic way and it may be entirely necessary and appropriate to focus narrowly or broadly at varying points in an incident. However when it comes to making decisions, an inappropriate narrow or broad Bias will involve the errors described above, with “misses” for a narrow focus and “false alarms” for a broad one. These can have serious operational consequences but as noted, can occur even for well-trained professionals who have good ASA or ASU. The *FireFront* tool can reveal these Bias tendencies in the chosen exercises and may thus give crucial insights into a person’s mental tendencies regarding use of information in decision-making. (See Figure 1.)

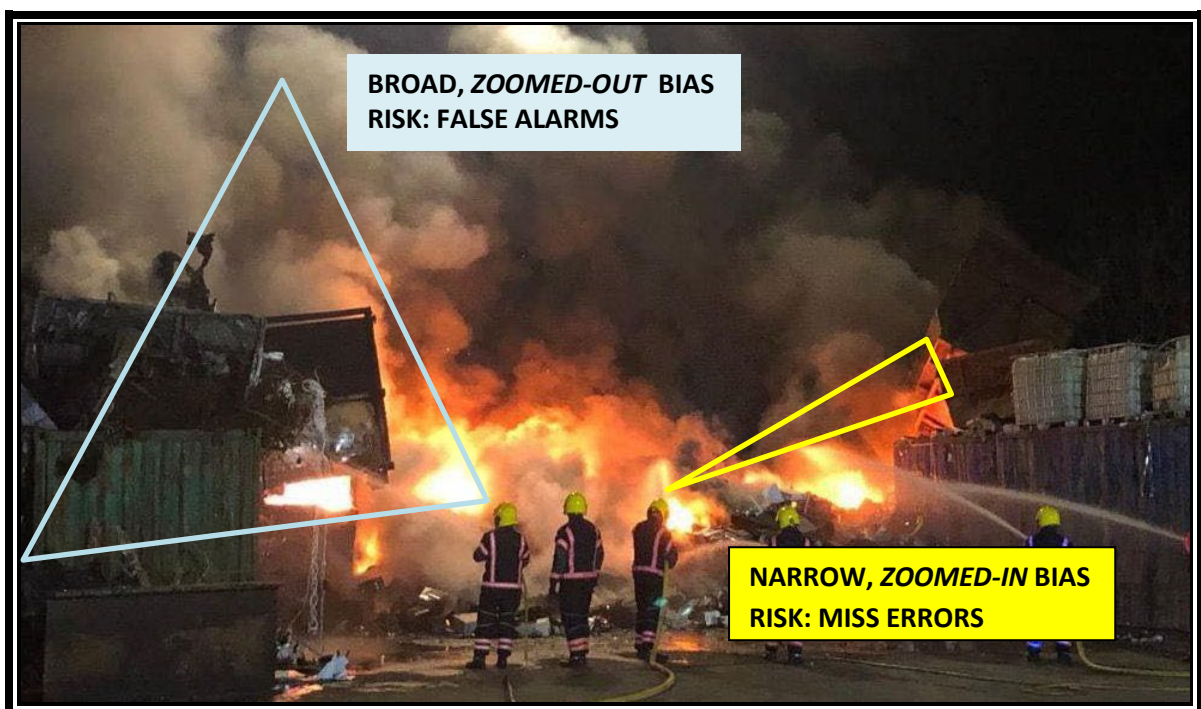


Figure 1. Bias in Fireground operations.

(5.) & (6.) PERCEIVED SITUATION AWARENESS: MEASURING CONFIDENCE IN SA AND SU .

FireFront will also require individuals to rate how *confident* they are that their SA and SU responses are correct. This will provide estimates of their Perceived Situation Awareness (PSA) and Perceived Situation Understanding (PSU). Research by the team has shown that there may be a gap between actual and perceived scores – for example between ASA and PSA (Sallis et al., 2013).

Any such mismatch may be risky in actual operations. For example, an individual may be very confident and perceive their own SA and SU to be good (so having high PSA and PSU scores),

but in fact may have poor actual SA and SU (so having low ASA and ASU scores), possibly leading to hasty or unchecked decisions based on faulty information. Alternately a person may actually have good SA and SU but have low confidence in both, possibly leading to unnecessarily hesitant and ineffectual decisions. Such discrepancies between confidence and awareness or understanding may thus lead to judgment errors or lapses and hence may be important in the overall profile of an individual’s performance.

2.3 THE OVERALL PROFILE PROVIDED BY FIREFRONT.

The *FireFront* tool can therefore show a pattern or profile of responses, not only about a person’s knowledge and understanding about the incident but also about their confidence in their responses and importantly about any Bias that may cause errors in response. For example, an individual may be aware of a large amount of information (good ASA) and correctly acknowledge it to be relevant (good ASU), but s/he could have very conservative or narrow Information and Relevance Biases that reject most of that information as irrelevant when making decisions leading to many “miss” errors and s/he may also have low confidence (PSA and PSU). So in this instance, the tool could indicate a person who actually is competent in terms of knowledge, but with a tendency to be overly conservative and hesitant when making decisions (See Tables 1 and 2 for more examples of possible patterns.)

IT SHOULD BE STRESSED that the *FireFront* tool is not meant to be employed for recruitment or evaluation of personnel, but is best used in a supportive training programme that builds on and explains the feedback about performance. It is also important to understand that an individual’s responses may vary with the circumstances involved especially with the degree of stress or demand. Nonetheless the tool can reveal potential or possible patterns of behaviour or response for the individual and so can provide important personal awareness of these possible tendencies.

Table 1

Some Examples of Possible Profiles for individuals with both Good SA *and* Good SU

<i>INDIVIDUALS WITH GOOD SA AND GOOD SU AND ALSO SHOWING...</i>		
	Narrow, Zoom-in Information Bias (IB)	Broad, Zoom-out Information Bias (IB)

CONFIDENCE EXAMPLES:	Narrow, zoom-in Relevance Bias (RB)	Broad, zoom-out Relevance Bias (RB)	Narrow Zoom-in Relevance Bias (RB)	Broad, zoom-out Relevance Bias (RB)
LOW CONFIDENCE FOR BOTH SA & SU	<p>Good awareness & understanding but conservative in accepting information as true or relevant and low in confidence for both SA and SU:</p> <p><i>since there is good SA and SU, low confidence is unwarranted, though possibly hesitant decision-making with risk of miss errors for both SA and SU</i></p>	<p>Good awareness & understanding, conservative in accepting information as true but liberal in accepting it as relevant and low in confidence for both SA and SU:</p> <p><i>since there is good SA and SU, low confidence is unwarranted, though possibly hesitant decision-making with risk of miss errors for SA and false alarms for SU</i></p>	<p>Good awareness & understanding, liberal in accepting information as true, but conservative in accepting it as relevant and low in confidence for both SA and SU:</p> <p><i>since there is good SA and SU, low confidence is unwarranted, though possibly hesitant decision-making with risk of false alarms for SA and miss errors for SU</i></p>	<p>Good awareness & understanding, liberal in accepting information as true or relevant and low in confidence for both SA and SU:</p> <p><i>since there is good SA and SU, low confidence is unwarranted, though possible hesitant decision-making with risk of false alarm errors for both SA and SU</i></p>
HIGH CONFIDENCE FOR BOTH SA & SU	<p>Good awareness & understanding, conservative in accepting information as true or relevant and high in confidence in both SA and SU:</p> <p><i>since there is good SA and SU, confidence is warranted but may have risk of miss errors, for both SA and SU</i></p>	<p>Good awareness & understanding, conservative in accepting information as true, but liberal in accepting it as relevant and high confidence in both SA and SU:</p> <p><i>since there is good SA and SU, confidence is warranted, though may have risk of miss errors for SA and false alarms for SU</i></p>	<p>Good awareness & understanding, liberal in accepting information as true, but conservative in accepting it as relevant and high confidence in both SA and SU:</p> <p><i>since there is good SA and SU, confidence is warranted, though may have risk of false alarms for SA and miss errors for SU</i></p>	<p>Good awareness & understanding, liberal in accepting information as true or relevant and high in confidence in both SA and SU:</p> <p><i>since there is good SA and SU, confidence is warranted but may have risk of false alarms for both SA and SU</i></p>

Table 2

Some Examples of Possible Profiles for individuals with both Poor SA and Poor SU

INDIVIDUALS WITH POOR SA AND POOR SU AND ALSO SHOWING...

CONFIDENCE EXAMPLES:	Narrow, Zoom-in Information Bias (IB)		Broad, Zoom-out Information Bias (IB)	
	Narrow, zoom-in Relevance Bias (RB)	Broad, zoom-out Relevance Bias (RB)	Narrow Zoom-in Relevance Bias (RB)	Broad, zoom-out Relevance Bias (RB)
LOW CONFIDENCE FOR BOTH SA & SU	<p>Poor awareness and understanding and conservative in accepting information as true or relevant and low in confidence about SA and SU:</p> <p><i>with poor SA and SU, low confidence is justified, with risk of miss errors for both SA and SU</i></p>	<p>Poor awareness and understanding, but conservative in accepting information as true and liberal in accepting it as relevant and low in confidence about SA and SU:</p> <p><i>with poor SA and SU, low confidence is justified, with risk of miss errors for SA and false alarms for SU</i></p>	<p>Poor awareness and understanding, but liberal in accepting information as true and conservative in accepting it as relevant and low in confidence about SA and SU:</p> <p><i>with poor SA and SU, low confidence is justified, with risk of false alarm errors for SA and miss errors for SU</i></p>	<p>Poor awareness and understanding and liberal in accepting information as true or relevant and low in confidence about SA and SU:</p> <p><i>with poor SA and SU, low confidence is justified, with risk of false alarms for both SA and SU</i></p>
HIGH CONFIDENCE FOR BOTH SA & SU	<p>Poor awareness and understanding and conservative in accepting information as true or relevant and high confidence in SA and SU:</p> <p><i>with poor SA and SU, unwarranted confidence may lead to poor monitoring of decisions, with risk of miss errors for both SA and SU</i></p>	<p>Poor awareness and understanding, but conservative in accepting information as true and liberal in accepting it as relevant and high confidence in SA and SU:</p> <p><i>with poor SA and SU, unwarranted confidence may lead to poor monitoring of decisions, with risk of miss errors for SA and false alarms for SU</i></p>	<p>Poor awareness and understanding, but liberal in accepting information as true and conservative in accepting it as relevant and high confidence in SA and SU:</p> <p><i>with poor SA and SU, unwarranted confidence may lead to poor monitoring of decisions, with risk of false alarm errors for SA and miss errors for SU</i></p>	<p>Poor awareness and understanding and liberal in accepting information as true or relevant and high confidence in SA and SU:</p> <p><i>with poor SA and SU, unwarranted confidence may lead to poor monitoring of decisions, with risk of false alarms for both SA and SU</i></p>

3.0 The Scores from the FireFront Tool

3.1 HOW DOES THE FIREFRONT TOOL CALCULATE THE SIX SCORES?

The tool presents probe questions or statements about the incident. For questions or statements pertaining to ASA and IBias, the person must choose whether the statement is *True or False*. For questions or statements regarding ASU and RBias, the choice is between *Relevant or Irrelevant*. For the confidence ratings (PSA and PSU), the answer to each question must also be rated on a 4-point scale from 1 (guess) to 4 (certain).

An example statement for the SA items would be: *There were four fire engines at the incident: True/False*. An example statement for the SU items would be: *Knowing how many appliances are at a road traffic incident is: Relevant/Irrelevant*.

The tool sorts the person's responses into four types (see Table 3):

- Hits (saying "true" to correct statements or "relevant" to relevant statements),
- Correct Rejections (saying "false" to false statements or "irrelevant" to irrelevant statements),
- Misses (saying "false" to correct statements or "irrelevant" to relevant statements)
- False Alarms (saying "true" to false statements or "relevant" to irrelevant statements).

Table 3.
***The four types of decision and possible operational consequences
for the probe statements for SA and SU***

	Actual situation: Information is TRUE or RELEVANT:	Actual situation: Information is FALSE or IRRELEVANT:
DECISION / RESPONSE: TRUE or RELEVANT	HIT: Effective operation	FALSE ALARM: Wasteful operation
DECISION / RESPONSE: FALSE or IRRELEVANT	MISS: Risky or ineffective operation	CORRECT REJECTION: Lean operation

For ASA and ASU, the tool will calculate the correct responses (hits or correct rejections) while the tool uses any errors to calculate the tendency towards narrow or broad bias. The QASA method firstly calculates the six scores for ASA, PSA and IBias and for ASU, PSU and RBias and then re-scales each of them on a range from -100 to +100. **(See Table 4 below.)**

For further details on the exact manner of calculations by QASA see the Further Reading section. At the end of the exercise, the tool will produce the Results on ASA, PSA and IBias as well as on ASU, PSU and RBias in the form of the 6 scores shown, along with some basic verbal feedback which is intended only as a starting point for your further training programme and approaches.

3.2 WHAT DO THE SCORES MEAN?

For ASA, the higher the score is above zero, the better the Situation Awareness or knowledge about the situation. A score of zero shows the person had no accurate knowledge or understanding of the situation and may have been guessing in their replies to the questions. A score below zero shows they were fundamentally misguided about the situation and the lower the score is below zero, the more misguided or wrong the SA.

For PSA, the higher the score (towards +100) the more sure or confident the person is of their SA, while the lower the score (towards -100), the less confident or sure the person is about their SA. As already discussed, the important factor for PSA is not whether it is high or low, but that whatever it is, it matches ASA.

For IBias, the higher the score above zero, the more narrow or “zoomed-in” is the Bias, with greater risk of miss errors (judging something is false when it is in fact true). The lower the score is below zero, the broader or more “zoomed out” is the Bias with greater risk of false alarm errors (judging something is true when it is in fact false). Zero reflects no Bias either way. It is important to note that a person can have very few errors and show only a low bias score, but it is still useful to know that when errors *are* made, a person will tend one way or the other in Bias.

For ASU, the higher the score above zero, the better the understanding of what was relevant in the situation. A score of zero shows the person had no accurate understanding of what was relevant to the situation and may have been guessing in their replies to the questions. A score below zero shows they were fundamentally misguided about what was relevant for the situation and the lower the score below zero the more misguided or wrong the SU.

For PSU, the higher the score, the more sure or confident the person is of their SU, while the lower the score, the more unsure the person is about their SU. Again, the important factor for PSU is not whether it is high or low, but that whatever it is, it matches ASU.

For RBias, the higher the score above zero, the more narrow or “zoomed-in” is the Bias, with greater risk of miss errors (judging something is irrelevant when it is in fact relevant) . The lower the score is below zero, the broader or more “zoomed out” is the Bias with greater risk of false alarm errors (judging something is relevant when it is in fact irrelevant). Zero reflects no Bias either way. Again, it is important to note that a person can have very few errors and show only a low bias score, but this tells us that when errors *are* made, the person will tend one way or the other in Bias.

Table 4
The Six Scores produced by the *FireFront* tool

SCORE	ASA Actual Situation Awareness	IBias Information Bias	PSA Perceived Situation Awareness	ASU Actual Situation Understanding	RBias Relevance Bias	PSU Perceived Situation Understanding
0 to +100	Good SA: distinguishes true from false information: higher score, better SA	Narrow zoomed-in Bias, tending to reject information as true: higher score = more narrow	Believes SA to be good: higher score, more confident	Good SU: distinguishes relevant from irrelevant information: higher score, better SU	Narrow zoomed-in Bias, tending to reject information as relevant: higher score = more narrow	Believes SU to be good: higher score, more confident
zero	No SA: Cannot distinguish true from false information. Guessing?	No Bias	Neutral: not over- or under-confident	No SU: Cannot distinguish relevant from irrelevant information. Guessing?	No Bias	Neutral: not over- or under-confident
0 to -100	Poor or Misguided SA: can't distinguish true from false information and may believe true information is false and <i>vice versa</i> : lower score (towards -100) poorer SA	Broad zoomed-out Bias tending to accept information as true: lower the score (towards -100) = more broad	Believes SA to be poor: lower score (towards -100) = less confident	Poor or Misguided SU: can't distinguish relevant from irrelevant information and may believe relevant information is irrelevant and <i>vice versa</i> : lower score (towards -100) poorer SU	Broad zoomed-out Bias tending to accept information as relevant: lower the score (towards -100) = more broad	Believes SU to be poor: lower score (towards -100) = less confident

4.0 THE FEEDBACK PROVIDED WITHIN THE *FIREFRONT* TOOL.

The tool generates and shows brief verbal feedback as well as the scores for the user. This feedback will vary depending on the scores. **THIS IS ONLY MEANT TO BE A STARTING POINT FOR THE TRAINER** who should then discuss the scores further as suggested below (see *Further Feedback* below).

FEEDBACK ON ACTUAL SITUATION AWARENESS (ASA) WITHIN THE TOOL VARIES WITH THE SCORE AS FOLLOWS:

- **Your ASA score is[in band 67-100].** This shows that you had a good awareness or knowledge of the situation in this exercise. You were able to distinguish true from false information and make correct choices based on this awareness. This doesn't mean your ASA will always be like this. In a different situation you may have had a different score. ASA may differ from one situation to the next and may change over time during an incident but self-monitoring of our mental picture or our ASA in any situation is important to reducing risk.

- **Your ASA score is..... [in band 34-66].** This shows that you had a reasonably good awareness or knowledge of the situation in this exercise. You were generally able to distinguish true from false information and make correct choices based on this awareness. This doesn't mean your ASA will always be like this. In a different situation you may have had a different score. ASA may differ from one situation to the next and may change over time during an incident but self-monitoring of our mental picture or our ASA in any situation is important to reducing risk.

- **Your ASA score is..... [in the band 1-33].** This shows that you had a basic awareness or knowledge of the situation in this exercise. You were able to distinguish some true from false information and make some correct choices based on this awareness. This doesn't mean your ASA will always be like this. In a different situation you may have had a different score. ASA may differ from one situation to the next and may change over time during an incident but it is important to know that anyone's ASA can be a little misguided. Self-monitoring of our mental picture or our ASA in any situation is important to reducing risk.

- **Your ASA score is..... [0].** This suggests that you did not have a really clear awareness of which information was true or false in this exercise. You didn't seem to be able to clearly distinguish true from false information and make correct choices based on this awareness. This doesn't mean your ASA will always be like this. In a different situation you may have had a different score. ASA may differ from one situation to the next and may change over time during an incident but it is important to know that anyone's

ASA can be a little misguided. Self-monitoring of our mental picture or our ASA in any situation is important to reducing risk.

➤ **Your ASA score is ... [in band -1 to -33].**

This shows that you were a little misguided about some aspects of the situation in this exercise. At times you did not distinguish true from false information and so you made some incorrect choices. You may have made a mental picture of this incident that was not completely correct. This doesn't mean your ASA will always be like this. In a different situation you may have had a totally different score. ASA may differ from one situation to the next and may change over time during an incident but it is important to know that anyone's ASA can be a little misguided. Self-monitoring of our mental picture or our ASA in any situation is important to reducing risk.

➤ **Your ASA score is ... [in band- 34 to -66].** This shows that you were generally misguided about some aspects of the situation in this exercise. At times you did not distinguish true from false information and so you made some incorrect choices. You may have made a mental picture of this particular incident that was not completely correct. This doesn't mean your ASA will always be like this. In a different situation you may have had a totally different score. ASA may differ from one situation to the next and may change over time during an incident but it is important to know that anyone's ASA can be misguided. Self-monitoring of our mental picture or our ASA in any situation is important to reducing risk.

➤ **Your ASA score is ... [in band- 67 to -100].** This shows that you were misguided about the situation in this exercise and had difficulty in distinguishing true from false information and so you made quite a few incorrect choices. You may have made a mental picture of this particular incident that was not completely correct. This doesn't mean your ASA will always be like this. In a different situation you may have a totally different score. ASA may differ from one situation to the next and may change over time during an incident but it is important to know that anyone's ASA can be

misguided. Self-monitoring of our mental picture or our ASA in any situation is important to reducing risk.

FEEDBACK ON PERCEIVED SITUATION AWARENESS (PSA) WITHIN THE TOOL VARIES WITH THE SCORE AS FOLLOWS:

- **Your PSA score is.... [in band 67-100].** You showed very high confidence in your SA answers on this exercise. You perceived your situation awareness to be very good. Confidence is important but it is also important to check that your Perceived SA (PSA) and Actual SA (ASA) are similar. A mismatch could have risks. For example: High PSA but low ASA could carry the risk of making decisions that may not be based on good understanding about the situation. On the other hand, low PSA with higher ASA may lead to unnecessary restraints and hesitation in your decision-making.
- **Your PSA score is.... [in band 34-66].** You showed confidence in your SA answers on this exercise. You perceived your situation awareness to be good. Confidence is important but it is also important to check that your Perceived SA (PSA) and Actual SA (ASA) are similar. A mismatch could have risks. For example: High PSA but low ASA could carry the risk of making decisions that may not be based on good understanding about the situation. On the other hand, low PSA with higher ASA may lead to unnecessary restraints and hesitation in your decision-making.
- **Your PSA score is.... [in band 1-33].** You showed a fairly low level of confidence in your SA answers on this exercise. You perceived your situation awareness to be low. Confidence is important but it is also important to check that your Perceived SA (PSA) and Actual SA (ASA) are similar. A mismatch could have risks. For example: High PSA but low ASA could carry the risk of making decisions that may not be based on good understanding about the situation. On the other hand, low PSA with higher ASA may lead to unnecessary restraints and hesitation in your decision-making.
- **Your PSA score is.... zero.** You showed neither a high, nor a low, level of confidence in your SA answers on this exercise. You generally thought your answers were just as

likely to be right as wrong. Confidence is important but it is also important to check that your Perceived SA (PSA) and Actual SA (ASA) are similar. A mismatch could have risks. For example: High PSA but low ASA could carry the risk of making decisions that may not be based on good understanding about the situation. On the other hand, low PSA with higher ASA may lead to unnecessary restraints and hesitation in your decision-making.

- **Your PSA score is.... [in band -1 to -33]:** You showed a fairly low level of confidence in your SA answers on this exercise. You perceived your situation awareness to be fairly low and had low confidence in your answers. Confidence is important but it is also important to check that your Perceived SA (PSA) and Actual SA are similar. A mismatch could have risks. For example: Low PSA with higher ASA may lead to unnecessary restraints and hesitation in decision-making. On the other hand, High PSA but low ASA could carry the risk of making decisions that may not be based on good understanding about the situation.

- **Your PSA score is.... [in band -34 to -66]:** You showed a low level of confidence in your SA answers on this exercise. You perceived your situation awareness to be low and had low confidence in your answers. Confidence is important but it is also important to check that your Perceived SA (PSA) and Actual SA (ASA) are similar. A mismatch could have risks. For example: Low PSA with higher ASA may lead to unnecessary restraints and hesitation in decision-making. On the other hand, High PSA but low ASA could carry the risk of making decisions that may not be based on good understanding about the situation.

- **Your PSA score is....[in band -67 to -100]:** You showed a very low level of confidence in your SA answers on this exercise. You perceived your situation awareness to be very low and had very little confidence in your answers. Confidence is important but it is also important to check that your Perceived SA (PSA) and Actual SA (ASA) are similar. A mismatch could have risks. For example: Low PSA with higher ASA may lead to unnecessary restraints and hesitation in decision-making. On the other hand, High PSA

but low ASA could carry the risk of making decisions that may not be based on good understanding about the situation.

FEEDBACK ON IBIAS WITHIN THE TOOL VARIES WITH THE SCORE AS FOLLOWS:

- **Your IBias score is [in band 67-100]. This is a strong narrow (zoom-in) IBias:** In this exercise, you were very cautious about accepting or judging information as true You tended to “zoom in” or focus on certain details about the incident as being true and useful. When you made mistakes, they were of the “miss” type: you said that an item was false when it was in fact true. This means that you rejected or missed some information that was actually true and could have been potentially useful. This is a very common and natural tendency especially under pressure. But it can carry the risk of making “miss” errors: you may overlook or ignore a detail that is of value. IBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of IBias. Self-monitoring of our IBias in any situation may therefore be important to reducing risk.

- **Your IBias score is [in band 34-66]. This is a moderately narrow (zoom-in) IBias.** In this exercise, you were moderately cautious about accepting or judging information as true. You tended to “zoom in” or focus on certain details about the incident as being true and useful. When you made mistakes, they were of the “miss” type: you said that an item was false when it was in fact true. This means that you rejected or missed some information that was actually true and could have been potentially useful. This is a very common and natural tendency especially under pressure. But it can carry the risk of making “miss” errors: you may overlook or ignore a detail that is of value. IBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of IBias. Self-monitoring of our IBias in any situation may therefore be important to reducing risk.

- **Your IBias score is [in band 1-33]. This is a slightly narrow (zoom-in) IBias:** In this exercise, you tended to be a little cautious about accepting or judging information as true. You showed a slight tendency to “zoom in” or focus on certain details about the incident as being true and useful. When you made mistakes, they were of the “miss” type: you said that an item was false when it was in fact true. This means that you rejected or missed some information that was actually true and could have been potentially useful. This is a very common and natural tendency especially under pressure. But even a slight tendency in this direction can carry the risk of making “miss” errors: you may overlook or ignore a detail that is of value. IBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of IBias. Self-monitoring of our IBias in any situation may therefore be important to reducing risk.

- **Your IBias score is [zero]. This is zero IBias.** In this exercise, you did not show a tendency to either ‘zoom in’ or focus on certain details or ‘zoom out’. You haven’t shown a bias either way. If you made any mistakes, they were unlikely to be consistently of one type. They could be of the “miss” type: you said that an item was false when it was in fact true, or “false alarms” when you accepted as true material that was, in fact false. IBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of IBias. Self-monitoring of our IBias in any situation may therefore be important to reducing risk.

- **Your IBias score is [in band -1 to -33]. This is a slightly broad (zoom-out) IBias.** In this exercise, you showed a slight tendency towards accepting or judging information as true. When you did make mistakes, they tended to be “false alarms”: you said or accepted that an item was true when it was in fact false. This means that you accepted some information that was actually incorrect. This is a very common and natural tendency especially under pressure. But even a slight tendency in this direction can carry the risk of making “false alarm” errors: you may devote resources and time to aspects of the situation that are not actually of any importance. IBias may differ from

one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of IBias. Self-monitoring of our IBias in any situation may therefore be important to reducing risk.

- **Your IBias score is ... [in band -34 to -66]. This is a moderately broad (zoom-out) IBias.** In this exercise, you showed a moderate tendency towards accepting or judging information as true. When you made mistakes, they tended to be “false alarms”: you said or accepted that that an item was true when it was in fact false. This means that you accepted some information that was actually incorrect. This is a very common and natural tendency especially under pressure. But even a moderate tendency in this direction can carry the risk of making “false alarm” errors: you may devote resources and time to aspects of the situation that are not actually of any importance. IBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of IBias. Self-monitoring of our IBias in any situation may therefore be important to reducing risk.

- **Your IBias score is ... [in band -67 to -100]. This is a strong broad (zoom-out) IBias.** In this exercise, you showed a strong tendency towards accepting or judging information as true. When you made mistakes, they tended to be “false alarms”: you said or accepted that that an item was true when it was in fact false. This means that you accepted some information that was actually incorrect. This is a very common and natural tendency especially under pressure. But a tendency in this direction can carry the risk of making “false alarm” errors: you may devote resources and time to aspects of the situation that are not actually of any importance. IBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of IBias. Self-monitoring of our IBias in any situation may therefore be important to reducing risk.

FEEDBACK ON ACTUAL SITUATION UNDERSTANDING (ASU) WITHIN THE TOOL VARIES WITH THE SCORE AS FOLLOWS:

- **Your ASU score is[in band 67-100].** This shows that you were able to readily distinguish relevant from irrelevant information for this task and so ‘make sense’ of the situation and make correct choices based on this understanding. This shows very good understanding of the situation and how it was likely to develop. This doesn’t mean your ASU will always be like this. In a different situation, you may have had a different score. ASU may differ from one situation to the next, and may change over time during an incident, but self-monitoring of the information being considered to be relevant or irrelevant to a situation is important to full understanding of the situation and so to reducing risk during decision-making.

- **Your ASU score is..... [in band 34-66].** This shows that you were generally able to distinguish relevant from irrelevant information for this task and so generally ‘make sense’ of the situation and make correct choices based on this understanding. This shows reasonably good understanding of the situation and how it was likely to develop, although some of your judgments about the relevance of information were not on target for this particular exercise. This doesn’t mean your ASU will always be like this. In a different situation, you may have had a different score. ASU may differ from one situation to the next, and may change over time during an incident, but self-monitoring of the information being considered to be relevant or irrelevant to a situation is important to correct understanding of the situation and so reducing risk during decision-making.

- **Your ASU score is..... [in the band 1-33].** This shows that you had a very basic understanding about which information was relevant for this exercise, but could not always distinguish the relevant from the irrelevant information. This could have impaired your ability to “make sense” of the situation and to understand how it might develop and this could have affected your decision-making. This doesn’t mean your ASU will always be like this. In a different situation you may have had a very different score. ASU may differ from one situation to the next, and may change over time during

an incident. In fact, it is important to know that anyone's ASU can be misguided in any particular situation depending on the mental picture built up of the situation. For this reason, self-monitoring of our mental picture and of the information we are judging to be relevant or irrelevant to the situation is important to correct understanding of the situation and so to reducing risk during decision-making.

- **Your ASU score is..... [0].** This suggests that you did not have a clear understanding of which information was relevant for this exercise. You were not able to clearly distinguish the relevant from the irrelevant information. This could have impaired your ability to “make sense” of the situation and to understand how it might develop and this could have affected your decision-making. This doesn't mean your ASU will always be like this. In a different situation you may have had a very different score. ASU may differ from one situation to the next, and may change over time during an incident. In fact, it is important to know that anyone's ASU can be misguided in any particular situation depending on the mental picture built up of the situation. For this reason, self-monitoring of our mental picture and of the information we are judging to be relevant or irrelevant to the situation is important to correct understanding of the situation and so to reducing risk during decision-making.

- **Your ASU score is ... [in band -1 to -33].** This shows that your understanding about what was relevant information for the situation in this exercise was somewhat misguided. At times you did not distinguish relevant from irrelevant information clearly and so you made some incorrect choices. You may have had a mental understanding of this incident that was not completely correct and so you were not always accurate in deciding what was relevant information. You may have decided some information was relevant when it was not – and also the other way around. This would have impaired your ability to “make sense” of the situation and to understand how it might develop and this could have affected your decision-making. This doesn't mean your ASU will always be like this. In a different situation you may have had a totally different score. ASU may differ from one situation to the next, and may change over time during an incident. In fact, it is important to know that anyone's ASU can be misguided in any particular situation depending on the mental picture built up of the situation. For this reason, self-monitoring of our mental picture and of the information

we are judging to be relevant or irrelevant to the situation is important to correct understanding of the situation and so to reducing risk during decision-making.

➤ **Your ASU score is ... [in band- 34 to -66].** This shows that your understanding about what was relevant information for the situation was misguided for this particular exercise. You did not always show that you could distinguish relevant from irrelevant information clearly and so you made incorrect choices. You may well have had a mental understanding of this incident that was not completely correct and so you were not always accurate in deciding what was relevant information. You may have decided some information was relevant when it was not – and also the other way around. This would have impaired your ability to “make sense” of the situation and to understand how it might develop and this could have affected your decision-making. This doesn’t mean your ASU will always be like this. In a different situation you may have had a totally different score. ASU may differ from one situation to the next, and may change over time during an incident. In fact, it is important to know that anyone’s ASU can be misguided in any particular situation depending on the mental picture built up of the situation. For this reason, self-monitoring of our mental picture and of the information we are judging to be relevant or irrelevant to the situation is important to correct understanding of the situation and so to reducing risk during decision-making.

➤ **Your ASU score is ... [in band- 67 to -100].** This shows that your understanding about what was relevant information for the situation was unfortunately misguided for this particular exercise. You did not show that you could distinguish relevant from irrelevant information clearly and so you did make quite a few incorrect choices about the relevance of items. You may well have had a mental understanding that did not reflect the situation well and this affected your ability in this case to decide what was relevant information. You may have decided a lot of information was relevant when it was not – and also the other way around. This would have impaired your ability to “make sense” of the situation and to understand how it might develop and this would most likely have affected your decision-making. This doesn’t mean your ASU will always be like this. In a different situation you may have had a totally different score. ASU may differ from one situation to the next, and may change over time during an

incident. In fact, it is important to know that anyone's ASU can be misguided in any particular situation, depending on the mental picture built up of the situation. For this reason, self-monitoring of our mental picture and of the information we are judging to be relevant or irrelevant to the situation is important to correct understanding of the situation and so to reducing risk during decision-making.

FEEDBACK ON PERCEIVED SITUATION UNDERSTANDING (PSU) WITHIN THE TOOL VARIES WITH THE SCORE AS FOLLOWS:

- **Your PSU score is.... [in band 67-100].** You showed very high confidence in your SU answers on this exercise. You perceived your Actual Situation Understanding (ASU) to be good. Confidence is important but it is also important to check that your Perceived Situation Understanding (PSU) and Actual Situation Understanding (ASU) are similar. A mismatch could have risks. For example: High PSU but low ASU could carry the risk of making decisions that may not be based on a good understanding about the situation. On the other hand, low PSU with higher ASU may lead to unnecessary restraints and hesitation in your decision-making.

- **Your PSU score is.... [in band 34-66].** You showed confidence in your SU answers on this exercise. You perceived your Actual Situation Understanding (ASU) to be generally good. Confidence is important but it is also important to check that your Perceived Situation Understanding (PSU) and Actual Situation Understanding (ASU) are similar. A mismatch could have risks. For example: High PSU but low ASU could carry the risk of making decisions that may not be based on a good understanding about the situation. On the other hand, low PSU with higher ASU may lead to unnecessary restraints and hesitation in your decision-making.

- **Your PSU score is.... [in band 1-33].** You showed a reasonable level of confidence in your SU answers on this exercise. You perceived your Actual Situation Understanding (ASU) to be fairly good. Confidence is important but it is also important to check that your Perceived Situation Understanding (PSU) and Actual Situation Understanding

(ASU) are similar. A mismatch could have risks. For example: High PSU but low ASU could carry the risk of making decisions that may not be based on a good understanding about the situation. On the other hand, low PSU with higher ASU may lead to unnecessary restraints and hesitation in your decision-making.

- **Your PSU score is.... zero.** You showed neither a high nor a low level of confidence in your SU answers on this exercise. You generally thought your answers were just as likely to be right as wrong. Confidence is important but it is also important to check that your Perceived Situation Understanding (PSU) and Actual Situation Understanding (ASU) are similar. A mismatch could have risks. For example: High PSU but low ASU could carry the risk of making decisions that may not be based on a good understanding about the situation. On the other hand, low PSU with higher ASU may lead to unnecessary restraints and hesitation in your decision-making.

- **Your PSU score is.... [in band -1 to -33]:** You showed a fairly low level of confidence in your SU answers on this exercise. You perceived your Actual Situation Understanding (ASU) to be low and had low confidence in your answers. Confidence is important but it is also important to check that your Perceived Situation Understanding (PSU) and Actual Situation Understanding (ASU) are similar. A mismatch could have risks. For example: Low PSU with higher ASU may lead to unnecessary restraints and hesitation in decision-making. On the other hand, high PSU but low ASU could carry the risk of making decisions that may not be based on a good understanding about the situation.

- **Your PSU score is.... [in band -34 to -66]:** You showed a low level of confidence in your SU answers on this exercise. You perceived your Actual Situation Understanding (ASU) to be low and had low confidence in your answers. Confidence is important but it is also important to check that your Perceived Situation Understanding (PSU) and Actual Situation Understanding (ASU) are similar. A mismatch could have risks. For example: Low PSU with higher ASU may lead to unnecessary restraints and hesitation in decision-making. On the other hand, high PSU but low ASU could carry the risk of making decisions that may not be based on a good understanding about the situation.

- **Your PSU score is....[in band -67 to -100]:** You showed a very low level of confidence in your SU answers on this exercise. You perceived your Actual Situation Understanding (ASU) to be low and had low confidence in your answers. Confidence is important but it is also important to check that your Perceived Situation Understanding (PSU) and Actual Situation Understanding (ASU) are similar. A mismatch could have risks. For example: Low PSU with higher ASU may lead to unnecessary restraints and hesitation in decision-making. On the other hand, high PSU but low ASU could carry the risk of making decisions that may not be based on a good understanding about the situation.

FEEDBACK ON RELEVANCE BIAS (RBias) WITHIN THE TOOL VARIES WITH THE SCORE AS FOLLOWS:

- **Your RBias score is [in band 67-100]. This is a strong narrow (zoom-in) RBias.** In this exercise, you were quite cautious about accepting or judging information as important or relevant. You tended to “zoom in” or focus on certain details about the incident as being important and useful. When you made mistakes, they were of the “miss” type: you said that an item was not important when it was in fact judged as important to this exercise. This means that you rejected or missed some information that could have been potentially useful. This is a very common and natural tendency especially under pressure. While this approach can reduce the risk of being overloaded with too much information, it can carry the risk of making “miss” errors: you may overlook or ignore a detail that is actually of value. RBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of Bias. Self-monitoring of our RBias or of what we are judging to be important in any situation may therefore be important to reducing risk.
- **Your RBias score is [in band 34-66]. . This is a moderately narrow (zoom-in) RBias.** In this exercise, you were moderately cautious about accepting or judging information as being important or relevant. You tended to “zoom in” or focus on certain details about the incident as being useful. When you made mistakes, they were of the “miss”

type: you said that an item was not important when it was judged to be important to this exercise. This means that you rejected or missed some information that could have been potentially useful. This is a very common and natural tendency especially under pressure. While this approach can reduce the risk of being overloaded with too much information, it can carry the risk of making “miss” errors: you may overlook or ignore a detail that is actually of value. RBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of Bias. Self-monitoring of our RBias or of what we are judging to be important in any situation may therefore be important to reducing risk.

- **Your RBias score is [in band 1-33]. This is a slightly narrow (zoom-in) RBias.** In this exercise, you were cautious about accepting or judging information as being important or relevant. You showed a slight tendency to “zoom in” or focus on certain details about the incident as being important or useful. When you made mistakes, they were of the “miss” type: you said that an item was unimportant when it was in fact judged as important to this exercise. This means that you rejected or missed some information that could have been potentially useful. This is a very common and natural tendency especially under pressure. While this approach can reduce the risk of being overloaded with too much information, even a slight tendency in this direction can carry the risk of making “miss” errors: you may overlook or ignore a detail that is actually of value. RBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of Bias. Self-monitoring of our RBias or of what we are judging to be important in any situation may therefore be important to reducing risk.

- **Your RBias score is [zero]. This is zero RBias.** In this exercise, you did not show a tendency to either ‘zoom in’ or focus on certain details about the incident as being important or useful or ‘zoom out’ and accept a larger amount of information as important. This can be helpful but when you made mistakes, they were unlikely to be consistently of one type. They could be of the “miss” type: you said that an item was

irrelevant when it was in fact relevant, or “false alarms” when you accepted as relevant material that was, in fact irrelevant. RBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of Bias. Self-monitoring of our RBias in any situation may therefore be important to reducing risk.

➤ **Your RBias score is [in band -1 to -33]. This is a slightly broad (zoom-out) RBias.**

In this exercise, you showed a slight tendency towards accepting information as being important. When you did make mistakes, they tended to be “false alarms”: you said or accepted that that an item was important when it was not in fact judged to be important to this exercise. This is a very common and natural tendency especially under pressure. While this approach means that you are less likely to miss important information, even a slight tendency in this direction can carry the risk of making “false alarm” errors: you may devote resources and time to aspects of the situation that are not actually of any importance. RBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of Bias. Self-monitoring of our RBias or of what we are judging to be important in any situation may therefore be important to reducing risk.

➤ **Your RBias score is ... [in band -34 to -66]. This is a moderately broad (zoom-out) RBias.**

In this exercise, you showed a moderate tendency towards accepting information as being important to this exercise. When you made mistakes, they tended to be “false alarms”: you said or accepted that that an item was important when it was not judged to be important to this exercise. This is a very common and natural tendency especially under pressure. While this approach means that you are less likely to miss important information, even a moderate tendency in this direction can carry the risk of making “false alarm” errors: you may devote resources and time to aspects of the situation that are not actually of any importance. RBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of Bias. Self-

monitoring of our RBias or of what we are judging to be important in any situation may therefore be important to reducing risk.

➤ **Your RBias score is ... [in band -67 to -100]. This is a strong broad (zoom-out) RBias.**

In this exercise, you showed a strong tendency towards accepting information as being important to the exercise. When you made mistakes, they tended to be “false alarms”: you said or accepted that that an item was important when it was judged not to be important to this exercise. This is a very common and natural tendency especially under pressure. While this approach means that you are less likely to miss important information, a tendency in this direction can carry the risk of making “false alarm” errors: you may devote resources and time to aspects of the situation that are not actually of any importance. RBias may differ from one situation to the next and may change over time during an incident. But research has shown that under pressure, people tend to show their own type of Bias. Self-monitoring of our Bias or of what we are judging to be important in any situation may therefore be important to reducing risk.

5.0 Using the *FireFront* Tool in a training programme

5.1 PROVISOS ON USING THE TOOL.

The *FireFront* tool is intended for use by Fire and Rescue or Fire and Emergency personnel within an authorised training programme or environment. While it can be used by individuals or within a group context, it is ethically and professionally essential that any use of the tool is within an environment that enables informed and helpful guidance and feedback on the background, aims and results of the tool for the user. Feedback on the results from the tool exercises should be provided with a view to enhancing awareness in regard to the tool measures and this requires trainers informed in the aim and use of the tool.

5.2 CONTEXTS FOR USE OF THE TOOL.

The digital format of the *FireFront* tool provides flexibility of usage for training. It can be used either by an individual or by individuals within a group in training environments. By providing immediate feedback, it can be readily integrated into a wide range of training environments

and provide a basis for further development of an individual's personal awareness of the mental aspects of their professional roles. The tool is also adaptable for different types of training platforms, content and media. The trainer or user can either access the available versions or scenarios online or otherwise can upload their own material into the basic tool and adapt this for their own training needs and objectives (see next sections for guidance on this).

5.3 SUGGESTIONS FOR WAYS TO OFFER FURTHER FEEDBACK AND GUIDANCE

Once the user has completed the exercise and received the scores and feedback from the *FireFront* tool, s/he can download or receive a copy of the results and feedback.

IT IS STRONGLY RECOMMENDED that these results be first discussed individually and privately with the user and that the background explanation and material in this guide be provided in some way. **IT IS IMPORTANT THAT THE RESULTS ARE FRAMED IN A HELPFUL WAY AND NOT IN A "JUDGMENTAL" MANNER.**

It should be strongly stressed that ALL human minds in all avenues of life and all occupations show similar reactions and that any Biases or errors are the normal pattern and not the exception. The results should be discussed with a view to enhancing personal understanding and improving self-awareness of the core mental aspects of decision-making shown in the tool.

The user should be offered the opportunity to provide their own view and impression of how they performed in the exercise and be encouraged to comment on the results and suggest ways forward to strengthen any insights gained from the exercise. It may be helpful to review the actual questions and responses given. The tool allows this information to be shown.

The precise form of any further training in regard to the use of the *FireFront* tool and results is a matter for the training facility and programme, but possible activities could be:

- The individual consultations could be followed up with a more general group discussion about these mental factors in the exercises and in Fire and Rescue/Emergency decision-making in general
- Examples from operational incidents could be provided by the trainer that illustrate (a.) good and poor examples of ASA and ASU, (b.) matched and mis-matched ASA and

PSA or ASU and PSU and (c.) narrow (zoom-in) and wide (zoom-out) Bias that may lead to miss errors or false alarms, respectively

- Personnel could share examples from their own or others' experience of how different Biases may have affected operational decisions
- If individuals are interested, some of the papers in the Further Reading list may be of use for such discussions.

Any feedback from the users of the tool on the value or validity of the exercises could also be encouraged as it could benefit the ongoing development of the *FireFront* tool.

It must be stressed in any discussions or feedback that the *FireFront* tool does not necessarily reflect how a person will always react or how they will inevitably react in actual operations. They can be told that their reactions and scores may change with the situation or the extent of pressure. Nevertheless they should also be advised that prior research on Bias has shown that under high pressure, individuals appear to show the same bias tendency across situations so that if they tend to “zoom in” in one context they will do likewise in another or if they tend to “zoom out” in one incident then they will tend to do so in another (Sallis, 2016). So Bias tendencies under high pressure may be consistent for the person.

The *FireFront* exercises are however not real-world operations and people may not experience any high pressure in performing the exercises. The main value of the *FireFront* tool is in showing how someone *could* react and in increasing the awareness of the important mental elements in Fire and Rescue operations. **It is especially critical to understand that Bias – of any type - can operate at all.** Such understanding will hopefully increase a person's self-awareness and understanding that such tendencies *can* operate and *can* influence decisions and performance. Likewise it is critical to know that there are often gaps or mismatches between a person's actual SA or SU and their self-perception or confidence in their SA or SU and that this may affect performance in real-world operations.

At the very least, the *FireFront* exercises can be used to emphasise that the human mind is a core piece of apparatus in actual operations. The rationale underlying the use of the *FireFront* tool is that good self-knowledge of these mental elements is critical to safe and

effective operations. Group discussion following the exercise will also help to show how different fire fighters can take a different approach (Narrow or Broad Bias) to the gathering of incident related information and how understanding Bias can assist the decision making process to produce the right outcome. If training can enhance a person's self-checking or monitoring of any Bias tendencies for example, this could offer a valuable and crucial addition to regular skill-based training and further improve safety in Fire and Rescue operations.

6.0 Further details and contacts

The tool is managed by the partners and is available to them for modification and usage. It is anticipated that there will be ongoing refinements and developments beyond the end of the Erasmus project. If you are associated with the partners then contact them for the access to the tool. If you are not associated with one of the partners and wish to use the tool this may be possible but at the discretion and with the guidance of the partners.

Enquiries can be directed to any of the Partner organizations or to Professor Graham Edgar at the University of Gloucestershire : gedgar@glos.ac.uk.

9.0 Further Reading

Arendtsen, B., Baker, S., Bertels, M., Brookes, D., Catherwood, D., Christiansen, K., Cuypers, W., Edgar, G.K., Krawczynska, S., Maes, V., Sallis, G., Stegienko, K., Thoelen, F., Van Craybex, G., Vastmans, J., Vorenkamp, F., Weewer, R., Wenarski, G. (*in submission*). FireMind: Trialling a new Tool for Training Fire and Rescue Service Decision-making (draft available on request: see above for contacts).

Catherwood, D., Edgar, G.K., Nikolla, D., Alford, C., Brookes, D., Baker, S., & White, S. (2014). Mapping brain activity during loss of Situation Awareness: an EEG investigation of a basis for top-down influence on perception. *Human Factors*, 56(8):1428-52.

Catherwood, D., Edgar, G. K., Sallis, G., & Medley, A. & Brookes D. (2012). Fire Alarm or False Alarm?! Decision-making "Bias" of Firefighters in Training Exercises. *International Journal Emergency Services*, 1 (2), 135-158.

Catherwood, D., Sallis, G., Edgar, G., & Medley, A. (2011). Scoping and Bias in the Fireground: A new approach to understanding fireground "situation awareness". *Fire, January*, 27-29.

Edgar, G., & Edgar, H. (2007). Using Signal Detection Theory to Measure Situation Awareness: The Technique, The Tool (QUASA™), the TEST, the Way Forward. In M. Cook, J. Noyes & Y. Masakowski (Eds.), *Decision making in complex environments* (pp. 373-385). Aldershot, UK: Ashgate.

Edgar, G., Catherwood, D., Sallis, G., Brookes, D., & Medley, A. (2012). "I always know what's going on." Assessing the Relationship between Perceived and Actual Situation Awareness across Different Scenarios. *World Academy of Science, Engineering and Technology*, 71, 1480-1481.

FireFront Team (2020). *FireFront: a New Tool to support training in Fireground Situation Awareness, Situation Understanding and Bias. International Fire Professional*, 34 (November), 30-35.

Sallis, G. (2016). *How does bias / scope influence the operational outcome of pressurised fire incident command decisions?* Unpublished Ph.D. thesis, University of Gloucestershire.

Sallis, G., Catherwood, D., Edgar, G., Brookes, D., Medley, A. (2013). The human brain: trustworthy fire-fighting equipment? *International Fire Professional*, 5, 21-24.

10.0 *FIREFRONT* USER INFORMATION SHEET



Safe Fire and Rescue operations do not only involve expertise, but also the ability to actually use that expertise effectively under pressure. Errors can occur even for well-trained and experienced personnel due to natural tendencies of the human brain, especially under pressure (highly stressful events). The *FireFront* tool is aimed at increasing personal awareness of such tendencies in order to support safe decision-making in Fire and Rescue operations. It uses interactive software to present simulations of Fire and Rescue incidents and record an individual's responses to questions asked about the incident. These questions allow the tool to calculate feedback on 6 important aspects of your performance:

- **Actual Situation Awareness (ASA):** this shows if you had an accurate mental impression or knowledge of the situation and so reveals how well you could tell true from false information about the incident (an incomplete or misguided mental model or picture of the incident carries risk for decision-making)
- **Perceived Situation Awareness (PSA):** this shows how confident you were about your awareness or knowledge of the situation and your ability to tell true from false information about the incident (confidence should be closely matched to actual awareness or else errors can occur through either overconfidence or underconfidence)
- **Actual Situation Understanding (ASU):** this reflects your understanding of what is relevant or important in response to the incident and this may involve past experiences and knowledge (poor understanding of what is important or relevant may lead to risky decisions)
- **Perceived Situation Understanding (PSU):** this shows how confident you were in deciding what was important or relevant to the situation (again, confidence should be closely matched to actual understanding or else errors can occur).

As well as this, there are two measures of your "Bias" when making decisions.

What is Bias?

Even if people have a good knowledge and understanding potentially available to them about an incident, they don't always *actually use* that knowledge or understanding or use it well when making decisions. This is due to Bias. Bias is a natural tendency of the human brain especially under pressure. The brain can only handle a limited amount of information at any one time. To cope with information, it may either (a.) "zoom in" and only accept or mentally focus on a narrow amount of information as useful, rejecting or ignoring the rest *or* instead it may (b.) "zoom out" allowing a broader amount of information to be used or allowing more information into mental focus (but as a result, having to spread its resources more thinly and so not able to process this information well). There is risk in either tendency. "Zooming in" (narrow Bias) carries a risk of overlooking true or important information and so making "miss" errors in decision-making. On the other hand, "zooming out" (broad Bias) has the risk of using false or irrelevant information and so making "false alarm" errors. The *FireFront* tool measured two aspects of your Bias:

- **Information Bias (IB):** this is your Bias *when you were deciding if something was either true or false*. This shows if you tended towards either (a.) a narrow "zoom-in" Bias, being more conservative or cautious and deciding that only a limited amount of information was true (with greater risk of "miss" errors) or (b.) a broad "zoom-out" Bias, being more liberal and deciding that a wider span of information was true (with greater risk of "false alarm" errors). People can show varying degrees of either a narrow or broad bias and the tool calculates how strong any such bias was for you.

And the tool also calculated:

- **Relevance Bias (RB):** this is your Bias *when you were deciding if something was either relevant or irrelevant*. This shows if you tended towards either: (a.) a narrow "zoom-in" Bias, being more conservative or cautious and deciding that only a limited amount of information was relevant or important (with greater risk of "miss" errors) or (b.) a broad "zoom-out" Bias, being more liberal and deciding that a wider span of information was relevant or important (with greater risk of "false alarm" errors).

Either Bias tendency can occur for any human brain even for people with a high degree of experience and expertise, but *under pressure* there is evidence that people tend to show their customary type of Bias: some will go narrow and others will go broad. Very few people show no Bias tendency at all. Bias is a “mental” activity but it affects how people behave in incident events and operations. For example a very narrow Information or Relevance Bias may result in someone visually ignoring (not looking at or investigating) some aspect of an incident that could nevertheless potentially cause subsequent problems for managing the incident (e.g., a sudden change in direction of the wind at a wildfire).

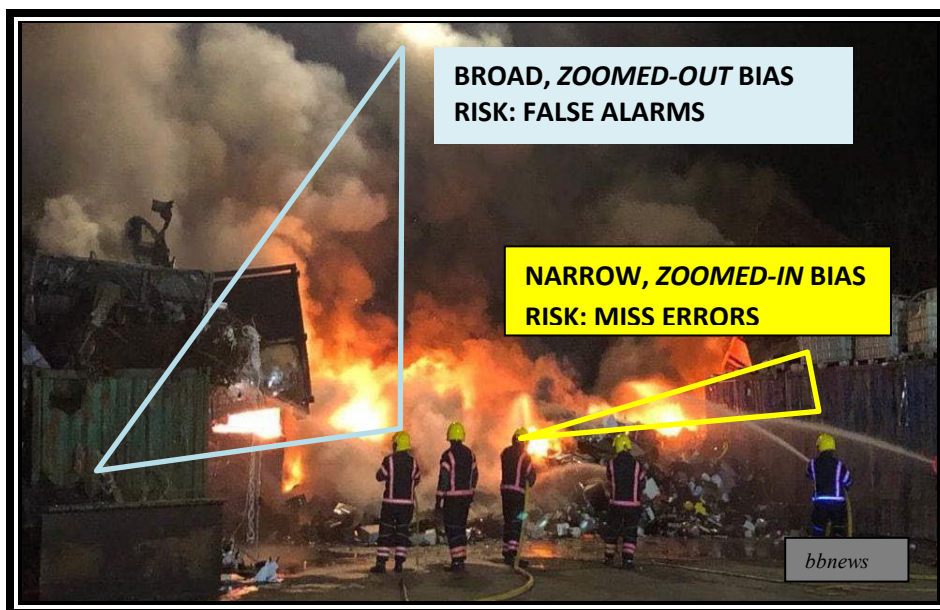
The tool has provided your results and some feedback on each of these 6 important aspects of your performance in the exercise and a summary of these scores and what they mean is provided below:

SCORE	ASA Actual Situation Awareness	IBias Information Bias	PSA Perceived Situation Awareness	ASU Actual Situation Understanding	RBias Relevance Bias	PSU Perceived Situation Understanding
0 to +100	Good SA: distinguishes true from false information: higher score, better SA	Narrow zoomed-in Bias, tending to reject information as true: higher score = more narrow	Believes SA to be good: higher score, more confident	Good SU: distinguishes relevant from irrelevant information: higher score, better SU	Narrow zoomed-in Bias, tending to reject information as relevant: higher score = more narrow	Believes SU to be good: higher score, more confident
zero	No SA: Cannot distinguish true from false information. Guessing?	No Bias	Neutral: not over- or under-confident	No SU: Cannot distinguish relevant from irrelevant information. Guessing?	No Bias	Neutral: not over- or under-confident
0 to -100	Poor or Misguided SA: can't distinguish true from false information and may believe true information is false and <i>vice versa</i> : lower score (towards -100) poorer SA	Broad zoomed-out Bias tending to accept information as true: lower the score (towards -100) = more broad	Believes SA to be poor: lower score (towards -100) = less confident	Poor or Misguided SU: can't distinguish relevant from irrelevant information and may believe relevant information is irrelevant and <i>vice versa</i> : lower score (towards -100) poorer SU	Broad zoomed-out Bias tending to accept information as relevant: lower the score (towards -100) = more broad	Believes SU to be poor: lower score (towards -100) = less confident



It is important to note that the feedback is not meant to be judgmental or critical in any way. Instead, it is intended to support personal awareness or insights into tendencies that may carry risk in actual operations.

It may be that in another exercise you could show a different pattern of results, but the research evidence indicates that under pressure we do tend to revert to our usual patterns of response. But in any case, the main lesson from the tool is to encourage awareness that such mental aspects of performance may be just as critical in avoiding risk as other aspects of expertise and can explain why even highly-trained people can make mistakes in all professions. The aim of using *FireFront* in training then is to encourage a “habit” of self-monitoring or personal checking and attention to these aspects of performance in order to improve safety in actual incident decision-making.



A Representation of Bias in Fire and Rescue operations.