Reframing Situational Awareness within the Fire Service Culture

Literature Review Inspired by the Surrey Fire Service, British Columbia

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Executive Summary

1. There is increasing attention being paid to better understanding and consequently decreasing the incidence of on-the-job injuries and deaths within the fire service across North America. Traditional orientations toward training are being challenged as firefighter safety is increasingly being associated with enhanced *situational awareness*.

2. *Situational awareness* is traditionally defined as "understanding the current environment and being able to accurately anticipate future problems to enable effective action."

3. Heightening *situational awareness* is being explored as the most critical factor in maintaining the safety of participants in high risk, low frequency events. In order for firefighters' *situational awareness* to be developed, it must be understood within the culture of the fire service.

4. There is some evidence to indicate that some of the more foundational aspects of the fire service culture may in fact impede the development of *situational awareness*. In particular, it is critical to explore how the following four dimensions support a more meaningful understanding of *situational awareness*: high-reliability context, hyper-masculine orientation, hero orientation and veteran-centric milieu.

5. Within this contextualized discussion of *situational awareness* there is an opportunity to develop and evaluate a training and educational model focused on enhancing effective decision-making in high-risk events within and outside the fire service.

Purpose of the Project

The purpose of this project was to examine the literature related to *situational awareness* (SA) with a view to understanding how the fire service might better position itself to improve the SA of all of its members. The literature is consistent and explicit in its assertion that SA and its relationship to decision-making are critical components within the fire service context. What is less clear is how the SA of firefighters can be strengthened. This review explores the context within which this question must be posed.

This project provides a thematic review of some of the key aspects of the literature exploring SA and the culture within which SA is learned and practised. Most importantly, this review lays the foundation for further research that would operationalize this relationship and ultimately utilize an evidenced-based approach to develop a training and organizational learning model. This enhanced model would strengthen the SA competencies of the members of the Surrey Fire Service within a rubric of cultural change.

Background

An examination of Canadian and indeed North American trends with respect to firefighter injuries and fatalities indicates that the numbers are increasing and that perceived gains in safety made in the 1970s and 1980s continue to be pulled back. Contributing factors to these shifts include "under resourcing, inadequate preparation for/anticipation of adverse events, incomplete adoption of incident command procedures, and sub optimal personnel readiness."[1] Examinations of after-action reports identify factors such as medical/fitness, training, staffing, risk assessment, accountability/rescue, role maintenance, and standard operating procedures, and also "point to deficiencies at the supervisory and organizational levels."[2] Additionally, any exploration of how to improve decision-making must be framed within a context characterized by fewer fires and consequently fewer on-the-job training opportunities.[3] In the face of these trends, the literature exploring factors that are critical to stemming this tide of higher risk of injury consistently intricately connects the processes of situational awareness and decision-making.

While the specifics vary by scholar and practitioner, situational awareness is traditionally defined as "understanding the current environment and being able to accurately anticipate future problems to enable effective action."[4] Situational awareness is cited as a critical factor in most research exploring safety in fire suppression activities and in many cases is the "No. 1 factor identified by

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[1]Kunadharaju, K., Smith, T.D. and Dejoy, D.M. (2011). "Line-of-Duty Deaths Among U.S. Firefighters: An Analysis of Fatality Investigations." 43, 1179.
[2]Kunadharaju, K., Smith, T.D. and Dejoy, D.M. (2011), 1179.
[3] Brennan, C. (2011a). "Fireground Tactical Decision Making." *Fire Engineering.164*(4).
[4]"Situational Awareness: What is situational Awareness?" Retrieved from http://eioc.pnnl.gov/research/ sitawareness.stm

firefighters filing near-miss reports."[5] An analysis of 955 near-miss reports highlights that 91% of those reports identified SA as a contributing factor in the near-miss event.[6]

Even in specialized circumstances such as violence on the scene, SA is noted as the most critical factor in maintaining firefighter safety, as the event is responded to in a purposive and effective manner.[7] Further, non-firefighting high-reliability contexts also point to the importance of better understanding the role of SA in maintaining the safety of all those involved in a fire suppression event, with "research from the Australian Transportation Safety Board indicate[ing] that human factors is a contributing cause in around 70 percent of all incidents and accidents. Approximately 85 percent of incident reports include a mention of loss of situational awareness" as a key contributing factor.[8] It is abundantly clear that more research is needed to develop a better understanding of situational awareness and consequently develop more robust training and operational strategies that are grounded in this understanding.

Review of the Literature

There is a growing body of literature exploring the behaviour of fires, structural changes that contribute to fire dynamics, and various strategies aimed at improving fire literacy. There are some initial research efforts exploring how more robust leadership processes in high-reliability contexts are challenged and sometimes thwarted by the very culture of firefighting; however, this merging of technical proficiency with cultural norms (both formal and informal) is a very thin thread at best. It is fair to say that the literature with respect to firefighting has a strong immediately practical thread (e.g. SA, tactics, leadership) in both the professional and academic literature, and a major health (both mental and physical) orientation in the academic literature. In particular regard to SA, there is an overwhelming emphasis on definitional and training statements highlighting its importance in fire suppression activities.

Situational Awareness and Decision-Making

As noted above, SA in the firefighting context is a dynamic process that is characterized by fluidity, rapidly changing circumstances, peril, and high stress. SA has been described as "being aware of everything that's happening and could happen during your arrival on scene, initial and ongoing size-up, operational period and overhaul and rehab period."[9] Brennan (2011b) proposes three key components of SA as perception, comprehension and prediction, all of which are impacted by the particular context of *high-reliability* professions such as firefighting. The Boyd Loop or OODA Loop

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[5]Dubé, R. (2008, January 31). "Situational Awareness Ensures a Safe Operation." Retrieved from FirefighterNation.

[6]Pegram, S. (2008).Near-Miss Reports. "A Common Theme: Situational Awareness Often Listed As a Contributing Factor In Near-Miss Reports." *FireRescue Magazine. 26*(12).

[7]Hamilton, S. C. (2012). "Responding to Scenes of Violence." *Fire Engineering. 165*(9).

[8]Flight Operations Briefing Notes: "Human Performance, Enhancing Situational Awareness." (2007) *Airbus,* 2.

[9]Dubé, R. (2008, January 31). "Situational Awareness Ensures a Safe Operation." Retrieved from FirefighterNation.

is increasingly referenced in terms of the cyclical model of informed decision-making that challenges more conventional settings where linearity is permissible. The OODA Loop refers to the need to gather (*observe)* and synthesize (*orient*) information prior to *deciding* and *acting*. Additionally, it has been argued that SA needs to be understood as an individual experience and skill as well as a collective orientation experienced through *team cognition,* which refers to complementary communication as well as clear and widely understood roles and responsibilities grounded in past experiences.[10] Critical to attaining this heightened SA for all members on scene is the development and implementation of reliable and robust communication protocols.

One of the pioneers with respect to the concept of SA defines it as "the perception of the elements in the environment within a volume of space and time, the comprehension of their meaning, the projection of their status into the near future, and the prediction of how various actions will affect the fulfillment of one's goals."[11] Some of the key factors viewed as impacting SA within the firefighting milieu include communication processes,[12] continual size-up,[13] and auditory distractions.[14]

The importance of SA is undisputed, as most research and professional competencies note its critical nature.[15] Given the foundational agreement in the academic and professional literature, the design and implementation of training opportunities has become the next step in the development and application of this concept and the fire services' response to the development of SA within its members. Training is viewed as critical to enhancing the likelihood that SA will be effectively employed and regained where necessary, in highly fluid, dangerous, and stressful situations.[16] However, in discussions of training for SA, various researchers have pointed to the need to better understand the context of *high-reliability* contexts.

It is critical that training is constructed in a manner that provides for increasing complexity and speed, and the insertion of unexpected dimensions in the scenarios.[17] This more nuanced approach explores how training might lessen stress levels to enable better decision-making. Importantly, it has been found that while the stress related to the scenario being practised was lessened, this stress reduction was not generalized to other scenarios.[18] Repetition of the same static training

[10]Brennan, C. (2011b). "The Link Between Disorientation and Situational Awareness." *Fire Engineering, 164*(6), 79-88.

[11]Endsley, M.R. (1995). "Toward a Theory of Situational Awareness." *Human Factors*, 37(1), 36.

[12]Dugan, M. (2007b, August). "What's Happening? Maintain Situational Awareness to Ensure the Safety of You and Your Crew." *FireRescue Magazine. 25*(8).

[13]These ideas have been explored by both Gustin (2009) and Rice and Gonzalez (2011).

[14]Houtkamp, J., Toet, A., Bos, F. (2012, December)."Task-Relevant Sound and User Experience in Computer-Mediated Firefighter Training." *Simulation and Gaming. 43*(6).

[15]The following authors` work supports this statement: Bachman (2009), Baran and Scott (2010), Brennan (2011a), Dubé (2008), Useem, Cook and Sutton (2005).

[16]Several authors have explored these issues, including Baumann, Gohm, and Bonner (2011), Brennan (2011a), Brennan (2011b), Crawford (2008), Dugan (2007a), and Useem, Cook and Sutton (2005).

[17]Brennan, C. (2011a).

[18]Baumann, M., Gohm, C., and Bonner, B. (2011). "Phased Training for High-Reliability Occupations: Live-Fire Exercises for Civilian Firefighters." *Human Factors.* 53(5), 548-557.

scenario increases the proficiency of specific task completion; however, it does not necessarily enhance SA. This finding sheds light on the assertion that I/C firefighters may assume knowledge based on similar but not relatable circumstances, and act on that knowledge – potentially putting their colleagues at increased risk.

The use of challenge scenarios, simulators and other technology-based and reality-driven training tools is becoming increasingly critical as real call structural fires are decreasing.[19] While this is an important avenue to explore, there needs to be a critical review of the unquestioning celebration of repetition that is often associated with technology-based approaches. What is most important in understanding the use of props, simulators, and mockups is the realism of the scenarios introduced to the trainee.[20] There is a clear and robust relationship between the retention (both in terms of content and length of time information is retained) of the training accrued in these sessions and the level of realism embodied in the scenarios. It is the retention of key information that must be maximized to provide points of reference in future fire calls.

There is no debate that the leadership dimension is critically important in understanding how to improve levels of SA;[21] however, the most effective strategies available to shape a leadership orientation to support SA in the fire services are less clear. To move this conversation forward, one must first recognize the layers of leadership, from the senior executive, to the battalion chiefs in charge of specific events, to the fire suppression specialists operating at the front-line. There is a relative dearth of research exploring leadership within *high-reliability* contexts and asking "what actions or processes characterize and contribute to leadership within dangerous, highly ambiguous, and time-sensitive operations?"[22] There is consensus that "fire ground tactical decision-making is a complex process that is a synthesis of your experience, your training, your SA, and your comfort level."[23] Strategies to achieve this synthesis and consequently improved states of SA are less clear, in part because of the challenges presented by the culture of the fire services.

Culture of the Fire Service

Based on a review of the literature, there are a number of aspects of the conversation about SA that need to be explicitly framed within a more critical discussion of the culture of fire services. There are obvious hazards in speaking about a culture of the fire service as a singular, uniform entity; however, there are a number of key themes that support what is framed as a porous construct for the purpose of this review. It is argued that some of the overarching causal themes associated with injuries and deaths "may actually be tapping the basic culture of firefighting." Just as a strong SA helps to avoid the tunnel vision that all too quickly can characterize a high-risk event, it is suggested

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[19]Diehl, D. N. (2008). "Improving Situational Awareness in a Fire Structure." *Fire Engineering, 161*(4).
[20]Hollins, L. T. (2003). "Using Props, Simulators, and Mockups for More Realistic Training." *Fire Engineering. 156*(3).
[21]Stehman, P. (2012). "How Firefighter Bravado Contributes to Injuries, LODDs." *Fire Chief*.
[22]Baran, B. E., and Scott, C. W. (2010).Organizing Ambiguity: A Grounded Theory of Leadership and Sense Making Within Dangerous Contexts.*Military Psychology, 22*(1), s42-s69.
[23]Brennan, C. (2011a), 88.

that "a strong cultural paradigm can be equivalent to a set of blinders"[24] and contribute to the direct opposite of SA. This review will explore this culture through the lens of four key dimensions: high-reliability context, hyper-masculine orientation, hero orientation, and veteran-centric milieu.

High-Reliability Context

Firefighting as a *high-reliability* context is a critical piece of the puzzle in discussing situational awareness within the culture of the fire service. Within this context, "two key elements are situational unpredictability and situational danger."[25] Important to understanding the response of firefighters to these event-based realities is the cultural construction of risk as well as the other dimensions identified in this review (hyper-masculine context, hero orientation).

The high threshold of risk that characterizes these communities of service "may be reinforced both externally and internally: externally through the positive public image of firefighters and firefighting and internally through the fire service's own traditions and member socialization Processes."[26] In partial recognition of these socialization processes, there is a need to strengthen the internal policies and procedures that support safety in relation to the establishment and maintenance of SA, sound decision-making and grounded risk/gain assessment.[27] Yet, these discussions are too readily undermined by an experience discourse that "both (a) discounts technical knowledge learned in fire training and (b) shuts down opposition by suggesting that common sense … is enough to achieve mastery" (p. 20).

An interesting aspect of the discussion of *high-reliability* contexts is the experience of trust as a critical element impacting both task completion and levels of personal stress in that task completion. Some authors argue that *trust* has "both cognitive and affective sources" (p. 1001) and "firefighters do distinguish between trust referenced to typical task and trust referenced to high-reliability tasks" (p. 1011). It would be important to examine how the processes of trust, sense-making and mindfulness (to be discussed later) might be interwoven in the fire service culture to support a more nuanced understanding and development of SA.

Hyper-Masculine Orientation

The intersection of a *hyper-masculine* orientation with a *high-reliability* context results in a *normalization of deviance,* where "certain risks become so commonplace that their significance is diminished to the point that they are accepted as normal and essentially immutable…. A perilous trajectory."[28] This relationship between risk assessment and engagement and masculinity is critical to understanding the culture within which the firefighter operates.

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[24]Kunadharaju, K., Smith, T.D. and Dejoy, D.M. (2011), 1179.
[25]Colquitt, J.A., Lepine, J.A., Zapata, C.P. and Wild, R.E. (2012). Trust in Typical and High-Reliability Contexts: Building and Reacting to Trust Among Firefighters. *Academy of Management Journal*, 54(5), 1000.
[26]Kunadharaju, K., Smith, T.D. and Dejoy, D.M. (2011), 1179.
[27]Stehman, P. (2012).
[28]Kunadharaju, K., Smith, T.D. and Dejoy, D.M. (2011), 1179.

In exploring this relationship between competence and masculinity, it has been asserted that "it is primarily through the construction of physical, technical and emotional competence that self-worth is asserted"[29] within the fire service. This distinction is further exemplified by the internalization of an action/idea dichotomy whereby firefighters "valu[e] manual over mental labour,"[30] magnifying the challenges presented in the face of demands for organizational change through more progressive approaches to training that are grounded in theory and advancement in the firefighting profession. While "a 'can-do' attitude on the part of firefighters was essential for their daunting challenges, but unless disciplined through explicit leadership development, it may result in overconfidence that a given strategy will be effective and safe".[31] It is important to understand how risk assessment is operationalized in a setting that merges concepts of masculinity and risk-taking, and in its most extreme form is exemplified by this excerpt from the Firefighter's Prayer: "And if according to Your will I have to lose my life, please bless with your Protecting hand, My children and my wife."

Hero Orientation

It is argued that a key challenge faced by more progressive conceptions of firefighting is to "defeat the hero culture and replace it with one that is safety-centric."[32] Intrinsic to this challenge is the reality that, "operating with too few resources, compromising certain roles and functions, skipping or short-changing certain operational steps and safeguards, and relying on extreme individual efforts and heroics may reflect the cultural paradigm of firefighting."[33] This cultural construction of *the way we do things* is a critical component in developing a more complex framing of SA in highly volatile situations. Various authors have examined the role of socializing forces related to the construction of the firefighter identity as hero. In a study that utilized scenario-based assessments of risk orientations, it was found that those firefighters that were *primed* as heroes within the context of the study were more likely to express higher risk intentions than those who were *primed* within a public servant orientation. [34] The socialization processes operate as generalized, anticipatory mechanisms for young people aspiring to become firefighters and further condition community members' expectations of firefighters. As well, these processes are profoundly important in the recruitment, training and integration of new members by the more experienced and/or veteran members. While provocative to ask, there are many from within and outside the walls of the fire service that query as to how some of the language, symbols and customs that

[29]Thurnell-Read, T. and Parker, A. (2008). "Men, Masculinities and Firefighting: Occupational Identity, Shop-Floor Culture and Organizational Change." *Emotion, Space and Society*. 1, 133.

[30]Thurnell-Read, T. and Parker, A. (2008), 133.

[31]Useem, M., Cook, J. and Sutton, L. (2005). "Developing Leaders for Decision Making Under Stress: Wildland Firefighters in the South Canyon Fire and Its Aftermath." *Academy of Management Learning and Education*. 4(4), 466.

[32]Stehman, P. (2012), 74.

[33]Kunadharaju, K., Smith, T.D. and Dejoy, D.M. (2011), 1179.

[34]Reinhardt-Klein, J. (2011). "Firefighters: Attitudes, Beliefs, and Behaviours that Contribute to High-Risk Behaviours." *Dissertation Abstracts International: Section B: Sciences and Engineering*. 71.

ground the hero culture of the fire service contribute to the construction of death and injury as an accepted aspect of the profession.[35]

Veteran-Centric Milieu

The *veteran-centric* milieu is collaterally and importantly shaped by the expertise orientation and the paramilitary and hierarchical structure of the fire service. The professional literature's emphasis on equating experience with expertise is exemplified by the following statement: "there is no question that experience is the best way to master the art and science of sizing up a situation and making tactical decisions."[36] It is argued that "by valuing members with greater experience, other ways of knowing are subtly undervalued and a cultural assumption that experience leads to expertise is reinforced."[37] It becomes critical to understand how this characterization of expertise impacts SA in high-risk events when "being considered expert often goes hand in hand with having power – influence that some may be unwilling to relinquish even in events where they have no special knowledge, insight, or understanding of the situation (i.e., expertise)."[38] It is one thing for this type of *epistemic denial* to occur in a controlled setting employed in various studies, but it is entirely different for that denial to become an element of a high-risk situation where SA is potentially shaped by the *expertise* of others.

In a culture characterized by this orientation, how do firefighters interrupt an error chain in an environment that idealizes hierarchically reinforced tenure-based expertise? Some authors respond that "in moments of crisis and danger… leadership may involve more emphasis on questioning and enabling members' interpretations of volatile situations and less on directing and controlling."[39] While this would be the preferred approach in a sense-making process, there are important questions to be asked with respect to the cultural norms regarding the offering and receiving of advice in a hierarchical setting that places such a premium on expertise and consequently tenure.

It is important to educate all stakeholders regarding this dynamic and consequently deconstruct the juxtaposition of the two key forms of knowing within the fire service (experience versus technical knowledge).[40] It has been proposed that "high-reliability teams be trained (a) to recognize the development of epistemic denial in after action reviews in order, (b) to affirm the value of multiple perspectives from team members, and (c) to suppress team tendencies to simplify decisional inputs".[41] Having said that, most authors agree that progressive training strategies for existing

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[35]Stehman, P. (2012).
[36]Brennan, C. (2011a), 81.
[37]Minei, E. and Bisel, R. (2013). "Negotiating the Meaning of Team Expertise: A Firefighter Team's Epistemic Denial." 44(1), 19.
[38]Minei, E. and Bisel, R. (2013), 11.
[39]Baran, B. E., and Scott, C. W. (2010). "Organizing Ambiguity: A Grounded Theory of Leadership and Sense Making Within Dangerous Contexts." *Military Psychology, 22*(1), s45.
[40]Minei, E. and Bisel, R. (2013).
[41]Minei, E. and Bisel, R. (2013), 27.

members, who are in many cases long-term members, is often met with resistance.[42] This resistance is often passive and characterized by stepping aside during training sessions to provide room for the junior officers. More research needs to be conducted to explore the complex web of factors that might explain this pattern of engagement.

While "fewer than 10% of the calls firefighters receive may call for an emergency response,"[43] it is impossible to eliminate – and in many cases even reduce – the ambiguity present in these emergency circumstances. Instead, what is needed is a leadership structure and personnel that are highly and reliably skilled at organizing the ambiguity that is necessarily present in these situations. It is argued that leadership within this firefighting milieu is "the social process of reducing contextual ambiguity through interaction to achieve goals"[44] and that successful negotiation of these challenges is largely dependent upon the leader's ability to engage in the processes of *framing, adjusting*, and *heedful interrelating.* It is the conceptual understanding of *framing* that is particularly relevant for a discussion of SA within the fire service culture. If *framing* "requires leaders to draw on lessons retained from prior equivocal experiences, using past successes and failures to contextualize what type of situation the group faces"[45] then how might the acknowledgement and then gradual dismantling of the *veteran-centric* and consequently hierarchical nature of the fire service serve to strengthen this process?

Conclusion

Clearly, the high-reliability context of firefighting, which is further characterized by a culture that is hyper-masculine, veteran-centric, and celebrates a hero orientation, shapes the milieu of safety within which SA is understood, trained and practised. This cultural reality has to be used more explicitly to frame the discussion of SA as a critical feature of safety as a "general principle [that] has been demonstrated in more than 200 studies across a multitude of countries and industries that have concluded that safety climate is a robust predictor of safety outcomes, such as injuries."[46] Despite these consistent findings, there appears to be persistent incongruence between the conversations about safety, the precursors to that safety, and the actual practice that is so entangled with the cultural imperatives of the fire service.

It is within this discussion of the importance of SA, the challenges in maintaining SA in high stress situations, and ultimately the obstacles and opportunities for more complex discussions of these challenges in relation to the fire service culture, that we posit the inclusion of mindfulness as yet another layer to incorporate in our investigative lens. The concept of "mindfulness refers to the

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[42]Brennan, C. (2011a).
[43]Colquitt, J.A., Lepine, J.A., Zapata, C.P. and Wild, R.E. (2012). "Trust in Typical and High-Reliability Contexts: Building and Reacting to Trust Among Firefighters." *Academy of Management Journal*, 54(5), 1000.
[44]Baran, B. E., and Scott, C. W. (2010), s46.
[45]Baran, B. E., and Scott, C. W. (2010), s55.
[46]"Preventing Firefighter Injuries and Casualities by Examining the Culture of Safety." (2012). Retrieved from www.drexel.edu/now/newsmedia/releases/archive/2012/october/ firefighter-safety-culture-research/

ability to experience the given situation in a non-judgmental way, in a state of consciousness that allows an individual to be fully present and aware of arising emotions and feelings, conflicting memories and disturbing worries, which could distract the conscious awareness and concentration."[47] Mindfulness has been used to explore other *high-reliability* contexts such as the military, and the consistent observation is that acknowledgement of this additional dimension enhances the utilization of SA.[48] Further, an examination of the relationships between negative health consequences and mindfulness found increased states of mindfulness associated with more positive health outcomes.[49] It would be interesting to explore how the emotional element of mindfulness might be integrated into the work on risk perception[50] to provide a more complex and meaningful discussion of SA within the context of fire services.

Heedful interrelating is defined as the dynamic whereby "people working together in dangerous contexts are able to continually make sense of their environment through communication while simultaneously having the foresight to keep the potentially dangerous unintended consequences of their actions in mind."[51] Some researchers argue that in *high-reliability* contexts, "leadership and decision-making necessarily involve continual sense making within organization cultures that are sensitive to frontline operations and defer authority to those with the most expertise."[52] How might the concept of mindfulness and its emotive component strengthen the mental and physical SA training for firefighters?

The purpose of this review was to frame the current and most influential literature related to SA to provide the foundation for the delivery and ultimately evaluation of a competency-based program to enhance the SA of firefighters in the high-risk, low-frequency events that characterize their work. This literature review frames the conversation within the fire service culture and it is this contextualization that has the potential to contribute to the segmented nature of many of these discussions in a manner that supports the goals of the fire service.

The fire service's training program for both *new learners* and *skills maintenance* is designed to provide its members with the best technical knowledge required to engage in their day-to-day duties. The *challenge scenario or* simulation has been developed within a learning organization model and there is an understanding of both the power and limitations of simulations, and attentiveness to increasing the complexity and unpredictability of tasks that are embedded in this training tool. The overall goal of this work is, in partnership with the fire service, to develop and

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[47]Bussing, A., Walach, H., Kohls, N., Zimmerman, F. and Trousselard, M. (2013). "Conscious Presence and Self Control as a Measure of Situational Awareness in Soldiers: A Validation Study." *International Journal of Mental Health Systems*, 7(1), 1-9.

[48]Stanley, E.A., Schaldach, J.M., Kiyonaga, A., Jha, A.P. (2011). "Mindfulness-based Mind Fitness Training: A Case Study of a High-Stress Predeployment Military Cohort." *Cognitive Behavioural Practice*, 18(4), 566–576.

[49]Smith, B.W., Ortiz, J.A., Steffen, L.E., Tooley, E.M., Wiggins, K.T. and Yeater, E.A. (2011). "Mindfulness Is Associated With Fewer PTSD Symptoms, Depressive Symptoms, Physical Symptoms, and Alcohol Problems in Urban Firefighters." *Journal of Consulting and Clinical Psychology*, 79(5), 613-617.

[50]Prati, G., Pietrantoni, L., Saccinto, E., Kehl, D., Knuth, D. and Schmidt, S. (2013). 45(1), 87-96.

[51]Baran, B. E., and Scott, C. W. (2010), 558.

[52]Ibid, 546.

evaluate a program of training and educational opportunities focused on effective decision-making in high-risk events.

The fire service's goals and objectives include the provision of "a timely response for all services through a highly trained, skilled, and efficient force" and the reduction of "the incidence of injury, loss of life, and property damage by providing public education programs, fire cause investigation, and prevention services to secure public safety and code compliance."

It is our contention that using this review as the foundation for future research and professional development would contribute to ensuring that the fire service is at the cutting edge with respect to SA training and consequently the fostering of a culture that exalts safety as the department's organizing principle.

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