

# Understanding awareness barriers



**WL Gore & Associates** is totally committed to supporting the continued development of new ideas and innovation in the emergency services, as shown by the winner of the *Gore/Fire Magazine* annual award

**T**HE COMPANY HAS BUILT ITS success on the quality of research it undertakes to ensure that every product meets a specific need and performs to the highest standard. In the UK, Gore supports the UK Fire Service Research event that showcases research papers every year at the Fire Service College.

## SITUATION AWARENESS

At the 2008 event, Fire Chief Richard B Gasaway PhD, of Roseville, Minnesota, was the winner of the *Gore/Fire Magazine* Research Excellence Award. His research project involved identifying potential barriers that affect fireground commander situation awareness (SA). These barriers were identified through an extensive evaluation of existing research on SA of decision-makers working in high-stress, high-risk domains similar to fireground commanders (eg battleground commanders, airline pilots, surgical teams, tank commanders, submarine commanders).

Issues with SA have been implicated recently by two prominent and trusted sources. Firstly, the 2007 annual report of the National Firefighter Near-Miss Reporting System identified situation awareness as the leading factor contributing to firefighter near-miss events. Second, in 2008 the International Association of Fire Fighters (IAFF) published a study titled *Contributing Factors to Firefighter Line-of-Duty Injury in Metropolitan Fire Departments in the United States*. This study evaluated 3,450 cases and concluded the main factor in firefighter line-of-duty injuries was a lack of situation awareness. These findings are supported by numerous line-of-duty death investigations conducted by the National Institute of Occupational Safety and Health (NIOSH).

While these sources have identified flawed SA, research to understand the barriers creating the greatest challenges for commanders has not been explored. This study was designed to improve the understanding of the barriers that

challenge commander SA, to understand how commanders overcome their most challenging barriers, and to identify best practices commanders use to manage SA barriers.

Drawing on existing research focused on similar naturalistic decision-making domains (ie aviation, military, and emergency medicine) where environmental factors are similar to those faced by fireground commanders (eg high stress, ever-changing, high risk, and high consequence), this project identified 93 potential barriers that could affect a commander's SA. These barriers were parsed into 12 thematic categories.

Expert-level commanders then participated in a multiple card sort exercise that identified their top three most challenging SA barriers, followed by retrospective interviews to understand: How commanders were affected by their most challenging SA barriers; how commanders overcame their most challenging SA barriers; and the identification of best practices employed to manage challenging SA barriers.

This study resulted in a finding previously unidentified in the existing literature. Of the 12 thematic categories of SA barriers,

understand how fireground commanders lose their situation awareness on the fireground and how commanders overcome their most challenging barriers. The foundation for this study included an evaluation of 175 book chapters, dissertations, research reports, investigative reports and scholarly journals on decision-making under stress and SA in dynamic decision making environments.

The study identified the following barriers: Attention management; human factors; data/information management; physical/mental stress; communication; workload management; mental model; command location; staffing-related barriers; mission/goal; team/crew performance; and command support barriers. The study also provided 61 suggestions for reducing the effect of commanders' most challenging SA barriers and produced ten best practice recommendations to help fireground commanders develop and maintain their SA.

## ADDITIONAL RESEARCH

The findings of this study also raised several important questions, creating opportunities for additional research, including: Seeking additional understanding and explanation

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staffing-related issues were identified as the most challenging for fireground commanders. These included issues with under staffing, unpredictable/inexperienced staffing, staffing quality, response time delays, and inadequate levels of training. Based on the author's extensive evaluation of the existing body of research, this finding may be unique to the fire service.

The findings of this research will have a substantial effect on fire and rescue services. This study was an original design, seeking to

for the effects of staffing-related issues on commander SA; seeking to understand causal relationships among SA barriers; and exploring the role of organisational demographics (eg population served, geographic region, setting, staffing, etc). This study was limited to the SA of fireground commanders operating at residential dwelling fires. Thus, there are opportunities to evaluate other fireground positions and other types of emergency incidents.



■ For more information Richard Gasaway PhD can be contacted at: [RBG3100@aol.com](mailto:RBG3100@aol.com)