Chapter 9
Mariners or Machines:
Who's at the Helm? Shifting Roles and Responsibilities on Navy Warships

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ABSTRACT

Building in layers of safety and sharpening the warfighting edge does not necessarily mean using technology more, but rather using it more effectively. Deftly applied automation can buy back time and cognitive resources for operators, decreasing the chances of human error, but technology also has the potential to become less of a tool and more of a crutch if operational fundamentals and basic seafaring skills are forsaken to automation. Operators must be able to rely on their own "sea sense," developed through experience and mentoring, and use technology to accomplish specific objectives rather than defer to automation as the default decision-maker. Maintaining the competitive warfighting edge requires cultivating skilled mariners who know how to fight a well-equipped ship; adding complexity to the system without accounting for the human element creates added risk and cutting-edge failure modes. Technology alone cannot make the ship safe, but when the operator lacks fundamental knowledge and experience, it can make the ship unsafe.

INTRODUCTION

The Navy mission is rich in inherent complexity due to the nature of operations and the extreme environments and conditions in which work is performed. High-stakes, high-demand, high-tempo operations in a challenging maritime environment

provide various opportunities for errors and undesirable outcomes, which can manifest themselves in many different ways—but the driving forces behind these incidents are rarely unique. We can think of error as a consequence—not a cause. This is a major reform in the conceptualization and treatment of human error in Naval operations. Error is a result of some causal factor, or more likely factors, which impeded human performance; these could be environmental, like fog that degraded visual perception or a noisy workspace that muddled communication; cultural, like informal watchstanding standards or a lack of regard for crew fatigue; or systems related, like poor ergonomics or ineffective implementation of technology (Reason, 1990). A confluence of factors produces an error, which in turn may have consequences in the form of a near miss event or major mishap.

In a well-defined and well-guarded system, most errors are likely to have a short-lived impact, though the outcome may be of some consequence. However, as the margin to safety degrades—due to factors such as ineffective operational fundamentals or poor implementation of technology—the results can be disastrous. This may not be evident immediately, however, which can create a false sense of security while unknowingly accumulating risk.

Leading up to some untoward events, some watchteams seemed comfortable allowing the upper levels of their chain of command to monopolize decision making, due in part to an inability to leverage high end technological systems. Watchteams demonstrated a tendency to cede critical thinking to the Commanding Officer or designated officer in charge, relieving themselves of the responsibility to provide sound recommendations and forceful backup to the team and team leaders even when reality did not meet expectations. This may be due in part to limited opportunities to develop a sense of expertise and a true feel for the sea, exacerbated at times by superficial understanding of and overreliance on automated or semi-automated systems (Parasuraman & Manzey, 2010).

The fundamentals of seafaring have not changed per se, but they have become blanketed under many layers of technology. The lost experiential knowledge in the areas of operational fundamentals and basic seafaring is compensated for with increased technology. However, this adds risk, as junior personnel cannot engage in recognition-primed decision making and lack the ability to act intuitively. There is not enough time in each job to "experience experience." This contributes to an over-reliance on automation or complex technology at the expense of disregarding one's own instincts and decision-making brain (Lee & See, 2004). It has been said that "Machines have many qualities, but common sense isn't one of them." The inherent limitations on junior personnel developing their own sea sense bounds their ability to operate independently from automation and fosters a dependence on technology in the absence of basic seafaring fundamentals.

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