White paper: clarity and flexibility in maritime operations

Designing an operator-centric maritime command center

The lack of integration and consistency among command center systems may cause unnecessary difficulties and delays for operators. Completing even a simple task often requires the operator to know and execute a precise sequence of commands within multiple different interfaces, wasting precious time and increasing stress in emergency situations.

To put operators back in control, Frequentis proposes a design approach for command center solutions that prioritizes the user experience. This operator-focused approach calls for a unified graphical interface complete with optimized workflows that make it easy for operators to understand events, make decisions, and follow organizational procedures and best practices.

From the architectural perspective, the need for openness and flexibility demands a modular approach based on micro services. A solution built on these principles is easy to adapt to future requirements and to integrate with legacy internal and third-party systems.

By adopting an open, flexible, operator-centric solution, command centers can further enhance operator performance, while protecting today's investments in technology as a foundation for future demands.

Maritime

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Today's challenges

Most maritime command centers have a diverse array of old and new systems for managing communications and cases. Even where legacy systems have been phased out, command center solutions are typically composed of heterogeneous modules that are only loosely integrated, if at all. This approach increases costs and limits the ability to adapt to new requirements. More importantly, it means that operators have neither a consistent user interface nor a clear, standardized way of managing tasks.

To complete even a relatively simple task, operators typically need to have a complex 'mental map' of how to navigate through several distinct systems. The lack of interface commonality and limited integration between systems increases the learning curve for new user qualification and proficiency. Even for experienced users, the requirement to continually switch between systems introduces unwanted latency at every step, raising operator stress levels, increasing potential distractions, and hindering accurate and timely decision-making.

During complex and stressful emergency scenarios, the accumulated seconds spent refocusing on each system in the chain could make the difference between a successful outcome and a disaster. During standard operations, operators may feel that it is their job to serve the tools and processes, rather than vice versa.

Equally, with multiple disparate systems in the command center, it may be difficult for managers to allocate workload across teams, to assess team performance, and to ensure safe and efficient collaboration with other commands and units. IT professionals are also challenged to manage integration and security across all systems, and functional upgrades are likely to be slow and costly.

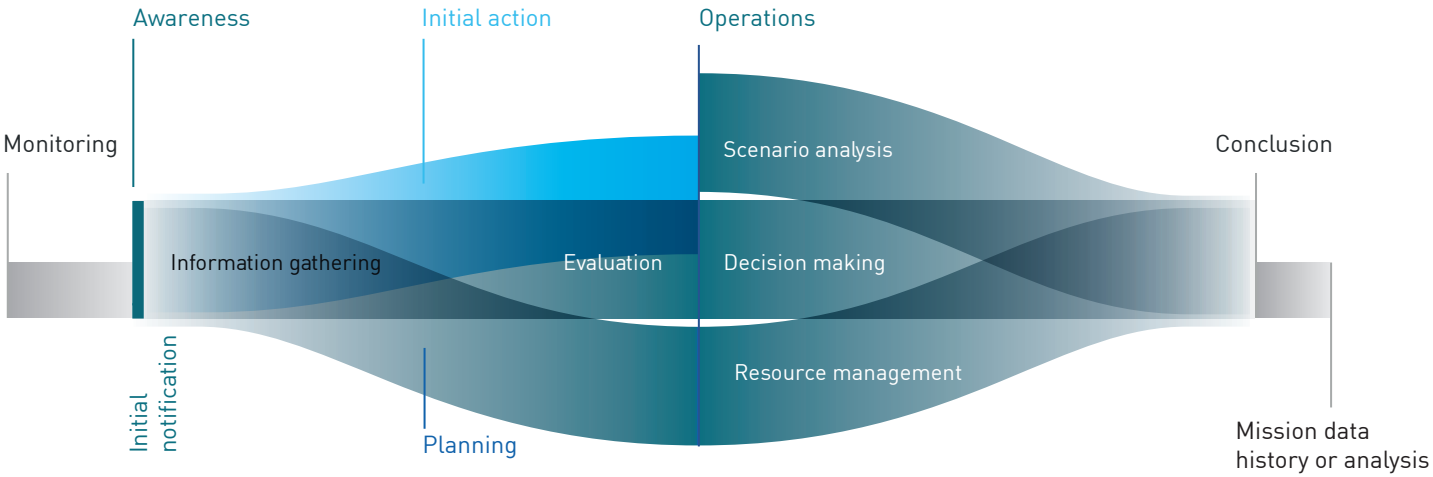

Figure 1: Achieving workflow clarity and control for the operator

Putting the operator in control

Based on extensive operational analysis conducted with multiple clients, Frequentis believes that command center solutions should focus on the needs of operators. The goal is to create a unified user experience and interface, in which functionality is not compromised by any perceived technological challenges.

The operator-centric solution concept should provide an intuitive interface and optimized workflows, making it easy for both new and experienced operators to rapidly grasp the situational picture, make the correct decisions, and take the required actions. Watchstanders can work on their own, or in collaboration with local or remote operators from other networked command centers from different geographical areas, or partner agencies.

A graphical interface provides relevant information and tools, giving operators immediate access to what they need to know and what they need to do at each natural decision point at each step of the workflow. Rather than requiring operators to memorize complex paths through multiple systems, the solution should provide an intuitive working environment that enables users to focus on the outcomes they want to achieve.

Open for interoperability and innovation

Beyond user-focus, the second core design principle is architectural openness. Organizations should be able to start by deploying whichever module or modules they require alongside their existing command center systems. The interfaces that connect the new functional modules with each other should be exactly the same as those that connect them to other solutions. This agnostic, open API approach to extending functionality will significantly extend the lifespan of the solution, while also securing its seamless integration with any existing technologies in the command center. Open architecture will also enable organizations to deploy the technology at their own pace and according to their own requirements.

An architecture based on micro services will provide modularity from the ground up, making the new solution easy to tailor to specific requirements, and highly adaptable to future functional demands or the addition of new modules. The use of micro services will also reduce the cost of tailoring and extension, enabling new functions to be deployed once and used by many different workflows and modules.

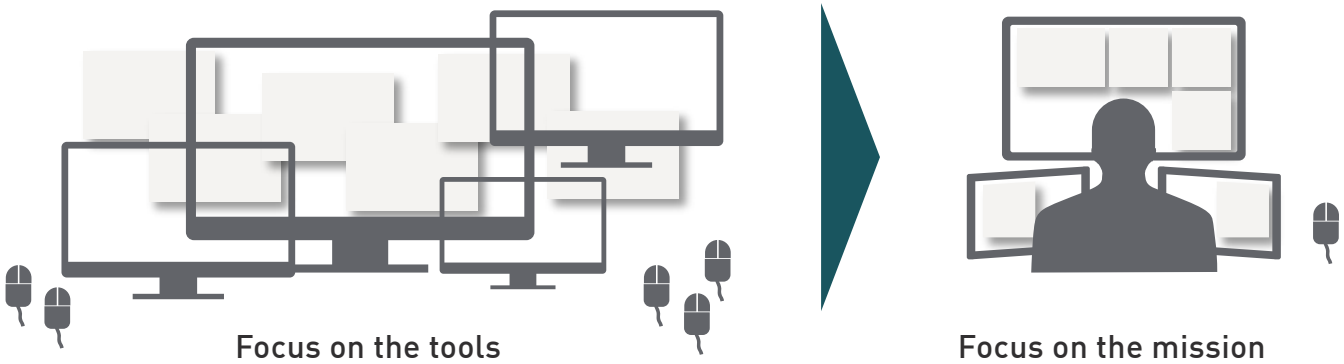

Figure 2: User-centric, intuitive working environment

A key requirement is that the new solution be flexible at all levels: operators should have the ability to tailor the interface and workflows to their individual needs, and command centers should be able to adapt the entire solution to support their precise requirements. By integrating communication capabilities that enable operators to interact with local and remote stakeholders from anywhere and anytime within the solution, support for seamless decentralized and multi-agency operations will be assured.

The modular nature of the solution also means that it could be tailored to satisfy the particular needs of the different maritime market segments, such as search and rescue, vessel traffic services and coastal surveillance systems.

Creating a comprehensive solution

Frequentis proposes that solutions for command centers fully integrate voice and data communication capabilities to give operators everything they need for rapid decision-making and collaboration.

With a user interface designed free from technological or architectural limitations, operators are put back in command. By using system intelligence to promote the most likely functions without limiting what operators can do, such a solution will optimize the workflow and user experience.

Providing critical information and tools via a unified graphical interface will help operators focus on the most important tasks during high-pressure situations, enabling watchstanders to prioritize their activities, avoid stress, and make sensible decisions. The overall impact will be to improve the speed, quality and efficiency of operator workflows.

For managers, system-wide KPIs will make it easier to monitor performance within and across teams, and to gain insight into the effectiveness of mulit-unit/agency coordination. Extensive tailoring options—both through user-defined parameters and through the open and modular architecture—will enable the rapid, cost-effective adaptation of the solution to local requirements. The use of thin-client technology that works on any standard device, from smartphones to workstations, will help keep the total cost of ownership low.

Perhaps most importantly, the skills of highly trained professionals are put to best use, focusing on managing operations and saving lives rather than managing administrative overhead. Giving professionals better tools has positive impacts on job satisfaction and retention.

Command center managers interested in improving the efficiency and effectiveness of operations are invited to speak with Frequentis about modular architecture and practical first steps towards implementing it.

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