



# SENIOR DESIGN PROJECT IN ELECTRICAL ENGINEERING



# SEAWATCH

## GRAPHICAL USER INTERFACE - SYSTEM MONITORING - HEARTBEAT

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### PROJECT BACKGROUND



SeaWatch is a command and control system that integrates electronic navigation and situational awareness designed and maintained by Command, Control and Communications Engineering Center (C3CEN). The system was originally developed for the Fast Response Cutter and is currently installed on 378', 270', 210', and 110' cutters. SeaWatch is also the chosen system for the new Offshore Patrol Cutter. C3CEN is currently undergoing a major update, developing SeaWatch v2.0. This is a strategic opportunity to address the current system shortcomings. C3CEN requests a lockdown on user accessibility within client machines, an upgrade in the System Monitoring application, and a software component that shares client system status information useful for troubleshooting by C3CEN. These needs will be satisfied by the team's proposed software modules; Graphical User Interface (GUI), System Monitoring Application, and Heartbeat Application.



SeaWatch was originally developed to support FRCs, pictured above, but is now installed on a variety of white hull cutters and is the chosen system for the new OPC.

C3CEN is the System Design Agent (SDA) and the System Support Agent (SSA) for SeaWatch, and SeaWatch 2.0 is currently being developed.

### GRAPHICAL USER INTERFACE

#### MARKETING REQUIREMENTS

Software must:

- Provide information about SeaWatch and user data
- Restrict general user access to unnecessary computer operations
- Ensure access to only SeaWatch applications authorized by their user profile
- Support existing workstations.
- Be user friendly

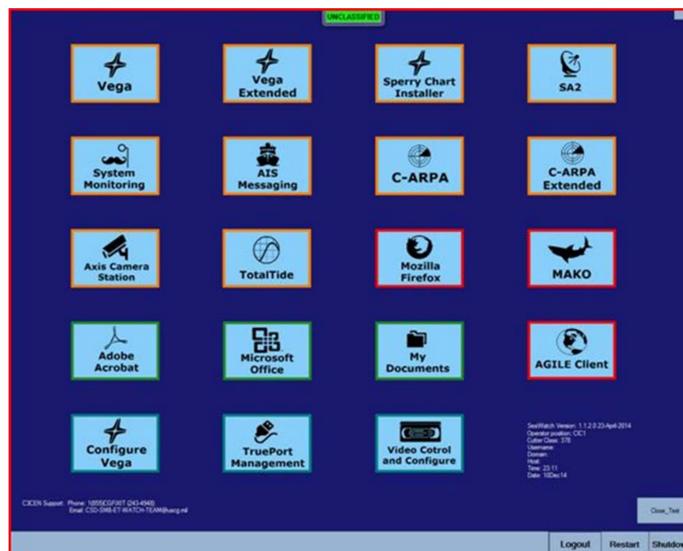
#### DELIVERABLES

The following is complete:

- Approved Requirements Specification and Software Design
- Deliver GUI v1.0 to C3CEN

#### RESULTS

The team has delivered GUI v1.0 to C3CEN and it has been approved by the C3CEN sponsor. The GUI meets the final requirements specification and it is scheduled to be incorporated in SeaWatch v2.1.1.0, which is set to be fielded in April 2016.



Above is the prototype SeaWatch GUI with available application icons.

### SYSTEM MONITORING

#### MARKETING REQUIREMENTS

Software must:

- Be easy to use
- Eliminate false-positives
- Clearly indicate the nature of the problem
- Monitor all major sensors and systems
- Implemented on open-source software that supports existing workstations

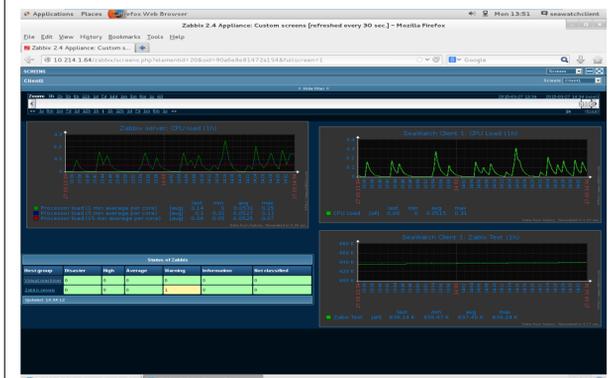
#### DELIVERABLES

The following is complete:

- Approved Requirements Specification and Functional Design
- Deliver Open-Source Software Proposal and Evaluation to C3CEN

#### RESULTS

After extensive market research and consideration of the requirements specification, the team chose to propose the implementation of Zabbix as the System Monitoring software. The team has submitted a report stating confidence and outlining the observed and reported capabilities of Zabbix.



Above is our prototype implementation of System Monitoring using Zabbix.

#### MARKETING REQUIREMENTS

Software must:

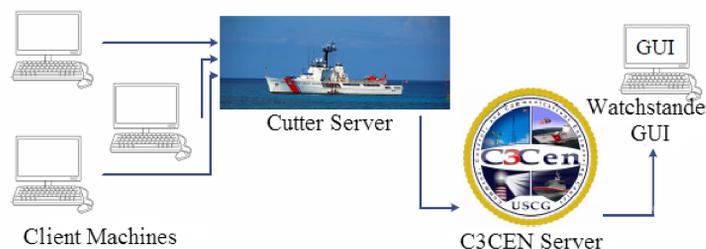
- Send system health information to C3CEN
- Visualize collected data for users at C3CEN
- Be user friendly

#### DELIVERABLES

The following is complete:

- Approved Requirements Specification, Functional Design, and Software Design
- Approved Network Infrastructure Document and Four-Phase Prototyping Plan
- Prototyping Phase 2 of 4 complete

### HEARTBEAT



Above is a diagram showing how the Heartbeat Application will operate across the different system components.

#### RESULTS

The success in the first two phases of the prototyping plan demonstrate the capability of our design for the Heartbeat application. The team has created enough documentation and proven with our prototype implementation that our design is a viable option for C3CEN to fully implement in the future.