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Going to Sea, without Going to Sea:

Development of a Naval C2 Capability Evaluation Facility

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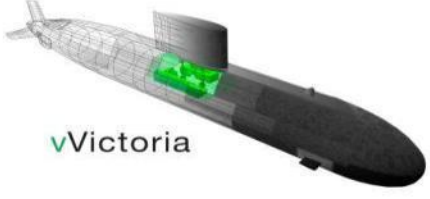

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Naval C2 Capability Development

- What is the problem? *[Going to sea is too late for evaluation]*
- The Maritime Capability Evaluation Laboratory (MCEL) project
- DRDC Program? [what technologies we have investigated]
- Conclusions

What is the problem?

- How can decision makers know what performance effect a new C2 system capability proposal will have before incurring acquisition and engineering integration costs?
- How do you de-risk or conduct options analysis on SOPs, SORs, or new tech prior to commitment… *are you sure it's worth the cost before you spend?*
- Capability development is mostly done at the sub-system level, … *and system level evaluation occurs at project close when the money's gone and requirements are set in concrete.*
- Unable to understand and appreciate those capabilities in a complete maritime platform context… *until you go to sea*.

You can't go to sea, without going to sea…
…or can you?

Solution Requirements

- Cheap
  - Low barrier to usage so most/all projects can take advantage
  - Readily available to operators so they can be part of the evaluation process
- Reconfigurable/Adaptable
  - Needs to be able to support range of concepts (SOPS to Kit)
- Ability to measure change in Warfighting performance
  - Need to have measures of baseline performance
  - Human performance data capture

Maritime Capability Evaluation Lab (MCEL)

- ADM(S&T) Capital Project
  - Heading for Options Analysis
- To provide an enduring shore-based infrastructure to support capability evaluation for naval C2 systems.
- Two re-configurable stages driven by a common simulated naval combat environment
- Integrated HF data collection and analysis facilities.
- Provide the capability to cheaply test the impact on mission performance of changes to C2 systems prior to system integration/implementation costs.
- Networked with warfare and training centres.

DRDC Program – Victoria Capability Evaluation Lab (VCEL)

- Part of Victoria Class HSI Optimization study – originally vVictoria
- Provide an experimental facility for the project and prototype technologies for C2 capability evaluation.
  - Realistic Physical constraints
  - Interpersonal modalities
  - All expected sensor/information stimuli
  - Full data capture
- Exploration of low cost technologies

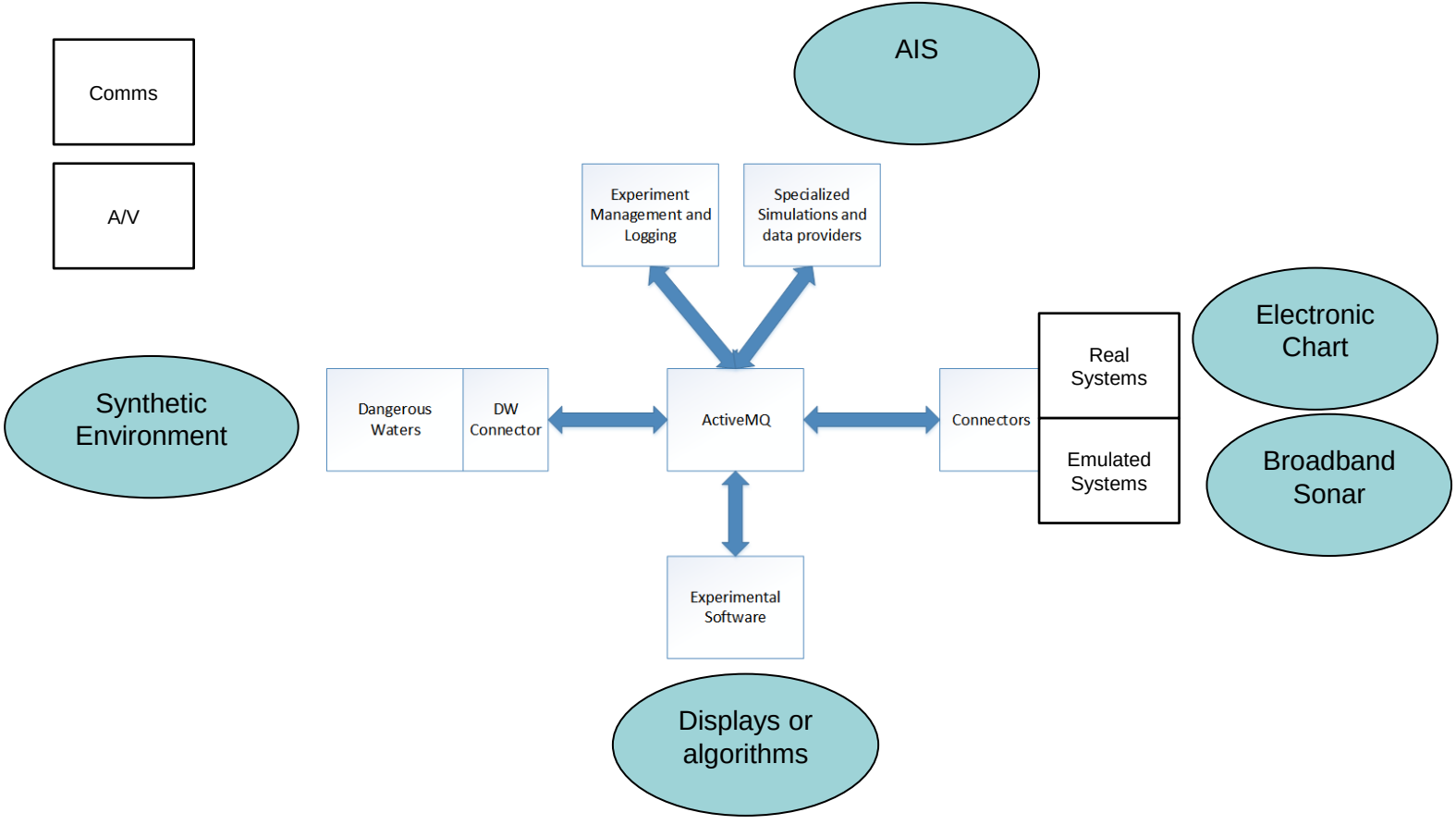
Technologies Investigated

- Theatre/Television set design
- Simulation Architecture
- COTS gaming technology
- COTS data collection technology
- Rapid interface prototyping

Theatre/TV Set Design

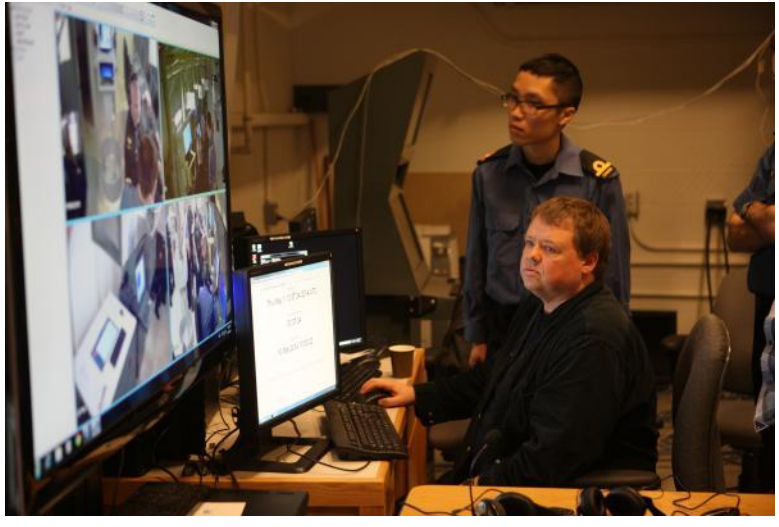
- Use of theatre style staging to enable under floor access
  - 50cm off floor
- Plywood walls and ceilings
- Plywood, mobile consoles for flexibility

Software System Design

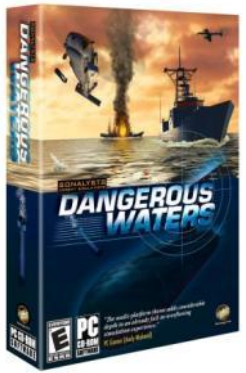


Synthetic Environment Control

- Virtual Machines and Thin Clients
  - Reduction in number of computers to maintain
  - Single place for configuration control
- STAF/STAX software to automate startup/shutdown



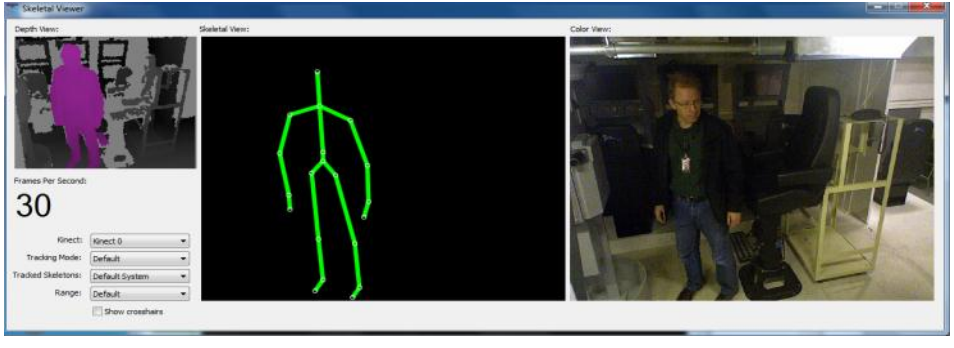
COTS Gaming Technology



- Using Dangerous Waters by Sonalysts as main simulation
  - Multi-player mode emulating major operations centre consoles
  - Provides good scenario generation and control interfaces
  - Provides good scenario elements (maps, units, red tactics …)
- Worked with Sonalysts to open the game to integration with other simulation components and real equipment.
- Evaluated a range of periscope simulations

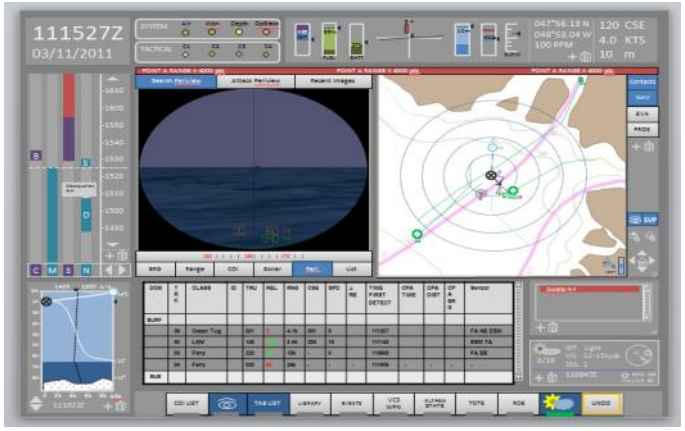
COTS Data Collection

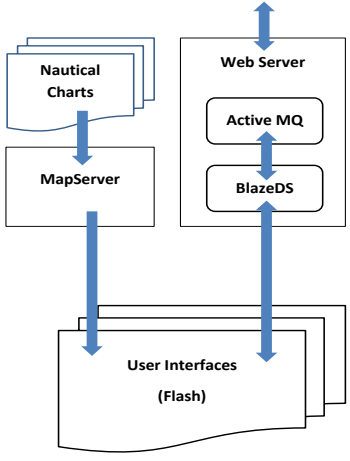
- SMi Eye tracking glasses
- Low light surveillance cameras
- MP3 audio recording
- Kinect tracking of participant position and posture



Rapid Prototyping

- Use of FLASH to mock-up
  - Actual console screens as needed
  - Prototype user interfaces for new concepts
- Open Source software
  - Map Servers
  - Message handling (ActiveMQ) between applications





Conclusions

- Theatre set design technologies useful – cheap and can be done in house.
- Gaming Technology can cover ~80% of needs
  - Will always need some in-house expertise to cover the integration and other 20%
- Flash – good technology but took more in-house development of interface objects than expected
- COTS products
  - Overall they are good quality and relatively cheap
  - But, in-house understanding of their strengths and weaknesses is required to make effective use of them. There are always gotchas!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