

Executive Summary

Next Generation Computer Resources

The Goal and the Problem

Naval weapons systems are critically dependent on both ordinary and sophisticated computing resources. Accordingly, US strength in computer technology should give the Navy a major technical advantage relative to potential adversaries. Today, however, mission-critical shipboard computers are not as powerful as ordinary commercial computers. Accordingly, the Navy must alter the way it manages its computer resources on order to achieve its goal: **deployment of effective computational resources at reasonable cost.**

Findings

To manage computer resources better, the Panel found that several factors, some surprising, must be kept in mind:

- Embedded microprocessors are proliferating
- Reliability is up; logistics problems down
- Ruggedized and militarized versions of commercial computers exist
- Valuable, encapsulated software exists
- Much productivity enhancing computer technology is currently available and reliable
- The Navy can influence but not dictate commercial developments
- The computer industry is now maturing to the point of adopting standards
- Industry arrives at standards at a pace that assures their widespread use
- A small number of de facto standards dominate the market
- Commercial pressure ensures stability
- Data Rights issues can be resolved
- Navy programs such as AN/BSY-2 and AEGIS are departing from Navy standards
- Many shipboard mission-critical computers are in protected environments
- Navy shipboard personnel are aggressively computer literate
- Navy policy of Instruction Set Architecture standards is no longer appropriate
- The Navy is falling behind

Recommendations

In view of the findings, the Panel makes the following recommendations, each of which is explained in detail in the body of this report:

- The Navy should mandate *widely used, commercial* standards for its computing resources. The Navy should resist the temptation to have its own unique standards.

- The Navy should encourage the use of ruggedized equipment. Many mission critical systems operate in protected environments where full militarization is too much of a price to pay for up-to-date performance.
- The Navy should move toward rapid elimination of Government Furnished Equipment (GFE) status for the UYK computers. Similarly, the Navy should move toward rapid transfer of upgrade budgets into project offices to force careful cost-benefit tradeoff. Rewriting existing UYK software in Ada should be considered seriously.
- The Navy should mandate standards at the *system level* (i.e., communications protocols, applications interfaces, and environmental survival) only. Mandating Navy-wide standards at a lower level can be counterproductive.
- The Navy should reorient its planned prototyping effort. The purpose should be to demonstrate commercial standards at work and to support the upgrading of computing capability on current ships.

Implementation

OP-098 should promulgate a revised operational requirement (see draft in Appendix IV). OP-945 should rewrite OPNAVINST 5200.28 to move toward elimination of the GFE status of the UYKs, to invert the waiver process in favor of commercialized and ruggedized equipment, and to require the use of widely used commercial standards.

SPAWAR-32 should revise the NGCR technical approach.