ARCHIVED REPORT

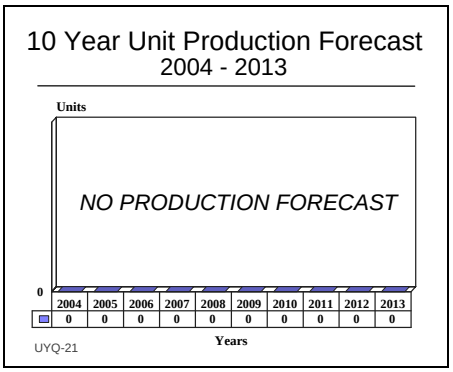
For data and forecasts on current programs please visit

www.forecastinternational.com or call +1 203.426.0800

UYQ-21(V) - Archived 4/2005

Outlook

- New business going to more advanced systems like UYQ-70
- Barring any future activity, this report will be archived next year



Orientation

Description. Computer display system for surface ships.

Sponsor
U.S. Navy
Naval Sea Systems Command
Washington, DC
USA
Fax: +1 714 732 0286
Web site: http://www.raytheon.com
(Prime contractor, development and production)

Status. Possible production for spares and replacements.

Total Produced. An estimated 3,593 consoles were produced through 2002.

Application. Used with the Naval Tactical Data System command computers. UYQ-21(V) is the standard Navy display system for surface ships.

Price Range. Last publicized contract suggests a price of about US$650,000 per console, in 2001 dollars.

Contractors

Raytheon Company, http://www.raytheon.com, 870 Winter St, Waltham, MA 02451-1449 United States, Tel: 1 (781) 522-3000, Fax: 1 (781) 860-2520, Prime

Technical Data

Design Features. There are three basic display configurations available in the UYQ-21(V) family. The PT-525 liquid-crystal projector is a large-screen display whose applications can include such high-level uses as group viewing in command and control situations. Operating in real time and driven from a digital TV generator, the 1,000-line resolution PT-525 can display computer-generated tactical scenarios with annotation and full graphics.

The OJ-451 and OJ-452 high-resolution, stroke-writing consoles are aimed at fulfilling the requirements of applications such as radar and sonar where format flexibility is paramount. The OJ-535 series desktop-type digital TV terminals are aimed at tactical and command and control applications, including radar display. These terminals are high-resolution raster systems that can be custom-configured to provide the required quality and type of cathode ray tube (CRT) displays as well as operator-interactive devices.

The modular architecture of the system allows up to 20 displays to be used together in a system. The UYQ-21(V) features a variety of modular support functions which can be housed in standard equipment cabinets.

Operational Characteristics. The UYQ-21(V) provides computer-generated data from sonars such as the SQR-18(V) and SQR-19, as well as information from surveillance, tracking, and fire control radars. The UYQ-21(V), along with automatic data processing equipment and acoustic analysis subsystems, makes up the Carrier anti-submarine warfare (ASW) module of the Carrier Combat Direction System. The AEGIS air defense combat system uses 20 to 25 UYQ-21(V) displays, including four PT-525s.

The system has shown excellent reliability figures. The PT-525 large screen display, which provides commanders of AEGIS class cruisers with a large format display of tactical data, has demonstrated a mean time between failures (MTBF) rate of 1,500 hours – twice the minimum requirement. The newer, full-color display console, the OJ-663 (described in the **Variants/ Upgrades** section, below), has demonstrated even more dramatic results: an MTBF of 194,523 hours, whereas an 800-hour rate was specified.

Variants/Upgrades

OJ-663 Full-Color Display Console. At the 1991 U.S. Navy League Show in Washington, DC, Hughes (now Raytheon) unveiled its full-color display console, the OJ-663, which would replace its monochromatic display console, the OJ-451/452, and display terminal, the OJ-535. The system entered U.S. Navy service in FY96. Hughes (now Raytheon) also built these displays for Japan's navy under the Foreign Military Sales (FMS) program.

Program Review

Background. The UYQ-21(V) began its career as a replacement for the Hughes UYA-4 display console and has gone on to become the standard U.S. Naval Tactical Display System (NTDS) console for many of the U.S. Navy's surface vessels. System development began in 1980, with initial procurements for the U.S. Navy commencing in 1982. In August 1984, Hughes (now Raytheon) was awarded a US$360 million contract for 196 units. Two years later, Hughes received US$117 million in additional funding for the equipment, including some for Spain under the FMS program.

Second-Sourcing of UYQ-21(V). As a result of the U.S. Navy's emphasis on second-sourcing as many of its systems as possible, Hughes' (now Raytheon) virtual monopoly of the UYQ-21 program came to an end when Raytheon was selected in October 1987 to begin competition with Hughes for annual production contracts beginning in 1990. The U.S. Navy awarded Raytheon's Equipment Division a US$1.4 million contract for familiarization with existing documentation and production practices (Phase 1), a US$8.3 million contract for the Qualification Phase (Phase II), and long-lead material for the Pilot Production Phase (Phase III).

Procurement Activity – 1990s. Procurement of the UYQ-21(V) at the start of the 1990s was carried out under an FY90/92 contract to Hughes (now Raytheon) for US$400.4 million, covering 586 consoles and 40 projectors. The year 1994 saw two FMS deals to provide production of the UYQ-21(V) for the U.S. Navy and Japan through mid-1997: one for US$66.6 million and one for US$232.6 million. Hughes was awarded a long-lead contract for US$9.4 million in September 1995.

Hughes was awarded another big contract – for US$44.6 million – in September 1996. This firm fixed-price contract called for the production of UYQ-21(V) naval tactical display systems for various ships in FY95/96. Later in 1996, the Applied Physics Laboratory of the University of Washington was awarded a US$14.6 million contract to deliver UYQ-21 equipment until March 1998. This equipment was for CG-47, DDG-51, LHD, and CV/CVN class ships.

The last contract to be signed in 1997 entailed production in FY97/98 of UYQ-21(V) naval tactical display equipment through September 1999, again for both the U.S. Navy and Spain.

Ship Classes. U.S. ship classes that have been equipped with the UYQ-21(V) include the CG-47 Ticonderoga class AEGIS cruisers; DDG-51 Arleigh Burke class AEGIS destroyers; FFG-7 Oliver Hazard Perry class frigates; DD-963 Spruance class destroyers; LHD-1 Wasp class amphibious assault ships; and CVN-68 Nimitz and CV-62 Forrestal class aircraft carriers. Also equipped with the UYQ-21(V) are the CGN-41 Virginia class cruiser *Arkansas* and the remaining Arleigh Burke, Spruance, Nimitz, and Wasp class ships.

Non-U.S. naval ships using the system include Spain's Santa Maria class (U.S.-built FFG) frigates and Japan's Kongou class AEGIS destroyers. Spain's F-100 class frigates commissioned between 2002 and 2004 are also equipped.

AEGIS Support. The U.S. Navy program's goal is to integrate computer/weapons technology modifications into the AEGIS Combat System so that battle effectiveness will be retained against the evolving air, surface, and subsurface threats.

In terms of the UYQ-21, the OJ-663 color tactical graphics display has been integrated into the combat system (Baseline 5, Phase III of the project). Procurement of the OJ-663 had been steady and assured the UYQ-21's position in the U.S. Navy's standard combat display system through the end of the 1990s. The U.S. Navy first ordered OJ-663(V)1 consoles for ships appropriated in FY90 and FY91 (DDG-59 through DDG-67) under contract N00024-92-C-5220.

The project is also working toward the eventual integration of the UYQ-70 Advanced Display System (ADS) offered by Lockheed Martin (formerly Unisys), Hughes Aircraft (now Raytheon), and Diagnostic Retrieval Systems, under Baseline 6. This was the first acquisition under the U.S. Navy's Computer Open Systems Implementation Program (COSIP). This activity is to result in the procurement of a system that will be compatible with existing U.S. Navy display systems, yet be more cost-effective and versatile. The UYQ-70 supports U.S. Navy programs using the UYQ-21 OJ-194 and OJ-451.

Replacements for the UYQ-21. The UYQ-70 Advanced Display System (ADS) figures prominently in another U.S. Navy program as well: PE#0603382N, Advanced Combat System Technology. The goal of this program is to replace the current AEGIS Combat System architecture with an open, distributed architecture, less dependent on Navy standard computers, incorporating distributed processing advances. These advanced technologies are candidate systems for future baseline upgrades.

The ADS also has a role in PE#0604755N, Ship Self-Defense, under Project U0173, NATO SeaSparrow, and in PE#0604574N, Navy Tactical Computer Resources, under Project S1353, Standard Hardware. Critical studies are being conducted and top-level requirements developed for use of the UYQ-70 common display workstations and distributed computer processing. The groundwork has thus been laid for the eventual replacement of the U.S. Navy's standard UYQ-21 system in most applications.

Another new system, the UYQ-65 Data Processing and Display Set, is a completely COTS-based workstation packaged to comply with the environmental requirements of the AEGIS shipbuilding program. It is a high-performance, high-resolution, dual-monitor multiprocessor system capable of supporting both tactical and acoustic sensor display formats. Under development by Diagnostic Retrieval Systems, the UYQ-65 is part of a major SQQ-89 ASW Combat System upgrade being implemented by the Navy.

New production of the UYQ-21 most likely ended around 2000.

Note: A separate report on the UYQ-70 is available in the *C^4I* Forecast and the *AN Equipment* Forecast.

Funding

U.S. funding for UYQ-21 RDT&E has been completed.

Recent Contracts

No recent contracts have been identified.

Timetable

Month	Year	Major Development
	1980	System development
	1982	Initial procurements
Aug	1984	US$360 million contract for 196 units
	FY85	System test on UYQ-21(V) for use in all Combat Direction System upgrades
	1986	Hughes receives US$117 million additional funding for UYQ-21(V)s
Aug	1987	Diagnostic/Retrieval awarded contract for development of Acoustic Video Processor Integrated Display
Oct	1987	Raytheon selected as second source for UYQ-21(V) production
	1990	Raytheon begins competing with Hughes for UYQ-21(V) contracts
	1991	Full-color OJ-653 display introduced
	FY96	OJ-653 enters U.S. Navy service

Month	Year	Major Development
	1997	Hughes acquired by Raytheon
	2000	End of last known contract

Worldwide Distribution

In addition to the **U.S. Navy**, foreign customers include **Spain** (Oliver Hazard Perry and F-100 class frigates) and **Japan** (Kongo class destroyers).

Forecast Rationale

It is believed that production of the UYQ-21 computer display system for the U.S. has ended. The system's part in the service's Baseline 3, CG-59 through CG-64 class upgrade program (the last new U.S. Navy program to be associated with UYQ-21) was most likely completed by the end of 2000.

Over 3,000 of the UYQ-21 systems have been distributed among the navies of the U.S., Spain, and Japan. The CG-47 Ticonderoga class AEGIS cruisers, DDG-51 Arleigh Burke class AEGIS destroyers, and FFG-7 Oliver Hazard Perry class frigates are just some of the U.S. surface vessels equipped with the system.

While the UYQ-21 will most likely remain the U.S. Navy's standard surface ship display console for several more years, next-generation systems such as the UYQ-70 are likely to continue to take over this role in the years ahead. Barring any future activity, this report will be archived next year.

Ten-Year Outlook

No further production is forecast, thus the production chart has been omitted.

* * *