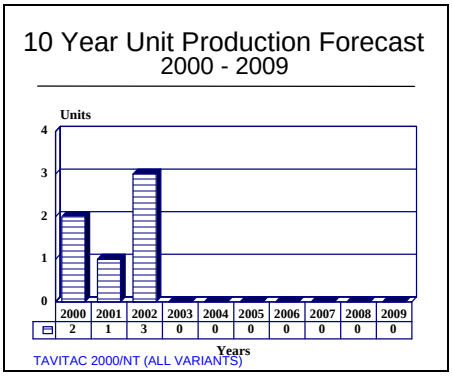
# TAVITAC 2000/NT - Archived 8/2000

## Outlook

- TAVITAC NT near-term market good
- More exploitation of COTS
- Licensed production in China




## Orientation

**Description.** The "Traitement Automatique et Visualisation Tactique" or TAVITAC is a family of centralized integrated naval command and control systems for various warship classes, as well as coastal surveillance batteries.

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**Status.** Several variants in production and operational service.

**Total Produced.** An estimated 52 systems (all variants) are expected to be produced and by the end of year 2000.

**Application.** The TAVITAC series is designed to provide integrated command and control facilities for small frigates and corvettes where cost is a primary consideration.

**Price Range.** Analysis of original Thomson-CSF statements suggests that the TAVITAC 2000 command system may have a unit cost of US$5.5 million.

# Technical Data

**Design Features.** The TAVITAC 2000 command control system integrates all sensors and data transmission links on board a warship. Operating in real time, it evaluates and displays the tactical situation, analyzes aircraft and missile threats, and operates air defense systems including weapons and electronic countermeasures. TAVITAC 2000 also provides for the navigation and guidance of the ship.

The system data processing architecture is based on a duplicated 10 MB Ethernet databus. It has two MLX tactical computers based on a chain of Motorola 68030 microprocessors driving up to 15 display consoles and network interface units which provide information exchange between the different systems on the ship. The software is written in Ada and the MLX computer system was validated by the US Ada Joint Program Office early in 1992.

The network interface units can receive different in-service link standards such as analogue and Naval Tactical Data System datalinks, making TAVITAC 2000 compatible with all types of sensor and weapons systems. The system is modular, allowing it to be re-configured for specific user requirements or to conform to the size parameters of the ship to be so equipped.

The Vista display consoles also utilize Motorola 68030 microprocessors as a central processing unit or as a graphic processor. The raw radar video is processed by a high-resolution (1,024 line by 1,024 pixel) radar scan converter. Both raw video (with superimposed IFF video) and synthetic video are displayed on a 20 inch, high-definition (1,024 lines by 1,280 pixel with non-interleaved frequency of 60 Hz) TV monitor. Up to eight windows are available to the operator, including one with variable positioning and dimensions. Images are displayed in eight colors with two tones for each color.

The console is capable of processing 128 k fixed characters and 16 k variable characters (256 symbols and different types of character available in four sizes). It can process 800 tracks and display 300 tracks, 30 circles, 30 ellipses, 500 vectors and 2,000 shoreline vectors, of which up to 1,000 may be displayed simultaneously. These capabilities allow digitized naval charts to be displayed by the system. The console design is modular, allowing it to be reconfigured for different operational uses. Options available include the addition of a second TV monitor of any size; the addition of a second radar scan converter for window display of another raw radar video; and the addition of other man-machine interface (MMI) equipment.

**Operational Characteristics.** TAVITAC 2000 is distinguished by its use of hardened civilian standard equipment rather than dedicated military equivalents. This is claimed to result in substantial cost savings.

The TAVITAC 2000 system installed on the French La Fayette frigates has five terminals with space provided for a sixth. The Taiwanese La Fayette class frigates have the sixth terminal fitted, reflecting the higher equipment standards of those ships. Each of the three anti-air frigates in the Saudi Arabia Sawari II program employs nine terminals.

# Variants/Upgrades

TAVITAC. An older version of TAVITAC 2000 using less capable processors (15M/125F with 128 k capacity) and terminals. The standard design used four terminals plus a summary console for the operations officer.

TAVITAC NT. Derived from the TAVITAC 2000, this system is the latest in Thomson-CSF's TAVITAC series. It introduces "new technology"; hence the NT. It is said to be a fully distributed system based on low-risk, commercial off-the-shelf (COTS) equipment to enhance reliability and reduce cost.

Tacticos. A merger of Thomson-CSF TAVITAC 2000 and Signaal Stacos/Sewaco technology to produce a state-of-the-art naval command system. Tacticos is mostly Stacos with some TAVITAC display technology. It is the equivalent proprietary combat management system from Dutch affiliate Signaal.

SEWACO FD. A combination of Signaal's Stacos/ Sewaco and Thomson-CSF's Tacticos. Currently in service with Qatar.

ECIC-1. TAVITAC-2000 built under license in China.

SENIT S. An older version of TAVITAC 2000 using less capable processors (15M/125F with 128 k capacity) and terminals. The standard design used four terminals plus a summary console for the operations officer.

VLX. A 14 inch or 19 inch console with a color or monochromatic raster display (2,000 lines by 2,000 pixels) supplemented by 9 inch, 12 inch or 15 inch plasma, liquid crystal or electroluminescent screens. VLX screens are available to replace Vista terminals.

# Program Review

**Background.** The origin of TAVITAC goes back to the original Vega system of which Thomson-CSF sold more than 100 units. In its original form, TAVITAC was sold to Colombia as equipment for the FS-1500 corvettes and Saudi Arabia for the Al Madinah class frigates. Additional systems were sold to China for installation in Luda class frigates then in the process of modernization.

By the end of the 1980s, the original TAVITAC design was dated. A fundamental revision of the system was initiated which saw the original military-standard system components replaced by hardened civilian equipment. This resulted in substantial cost savings. The highly centralized structure of the system was retained. In this configuration, the TAVITAC 2000 system, with VLX consoles, was specified for use on the French La Fayette class frigates and subsequently for exported derivatives of that design. Six ships of this class were ordered by Taiwan and two by Saudi Arabia.

In early 1992, France's Marine Nationale (navy) proposed that TAVITAC 2000 be used as a basis for the command system to be installed on the proposed Anglo-French Air Defense Frigate. This proposal was allegedly rejected by the UK Royal Navy on grounds that the TAVITAC system was totally incapable of meeting the specifications required by the proposed designs. The French project definition proposal for the Air Defense Frigate is now believed to be a derivative of the Signaal Sewaco XI system.

During 1992, visitors to the Shanghai naval construction yard noted a Luda class frigate under construction, equipped with the TAVITAC 2000 command system, DR-2000 ESM and Jupiter radars. Forecast International subsequently obtained a translation of an address by a senior Chinese admiral to naval cadets. This revealed that these ships, the first of the Luda III class, are the latest variant of the basic Luda design. The hull and superstructure are now fully sealed to provide NBC operating capability. The open command station on the bridge has been removed and a combat information center (CHIC) installed deep inside the ship. This houses a TAVITAC 2000 command system produced in China under the designation ECIC-1. A trial installation using a TAVITAC 2000 system imported from France was originally made using the frigate *Jinan*.

The extent of Chinese production is emphasized by the Luhu class frigates which are equipped with the ECIC-1. Also, an analysis of the operational characteristics of the Jiangwei class frigates suggests that these, too, may be equipped with the ECIC-1. This means that possibly all three of China's current surface ship construction program have been equipped with French-designed command systems of the TAVITAC 2000 type.

By early 1996, it was evident that Chinese warships were not leaving the construction yards at anywhere near the projected rate. Work on a number of ships seemed to have slowed to a virtual standstill and delays of one to two years in completion were likely inevitable. The reason for this was unknown but the most plausible reports suggest the new electronic systems for these ships hit production difficulties. This was likely a factor known to have affected other electronics-intensive Chinese programs.

In May 1997, *NAVINT* reported Taiwan's new frigate *Wu Chang* was undergoing integration upgrade to the TAVITAC 2000 system.

According to information supplied by manufacturer Thomson-CSF, sales for the TAVITAC NT variant are increasing, with the system also being used for coastal battery surveillance. Some recent orders reportedly have come from Estonia and an unidentified Far Eastern country. A more specific breakout is reported in the **Worldwide Distribution** section of this report.

# Funding

TAVITAC, TAVITAC 2000, and TAVITAC NT were developed by Thomson-CSF as private ventures using corporate funding. Thomson-CSF is a private enterprise.

## Recent Contracts

This is not an all-inclusive contract list. Where possible, countries and the number of units have been identified.

| Contractor | Award ($ millions) | Date/Description |
|---|---|---|
| Thomson-CSF | N/A | Mar 1990 – French Navy contract for TAVITAC 2000 command systems for the La Fayette class frigates. |
| Thomson-CSF | N/A | 1994 – Contract from Saudi Arabia for two TAVITAC 2000/NT units for that country's La Fayette class frigates. |
| Thomson-CSF | N/A | 1995 – Contract from Kuwait for eight TAVITAC 2000/NT units for that country's new P37-BRL Fast Attack Craft (FAC). Contract completed by end of year 2000. |
| Thomson-CSF | N/A | 1997 – Contract extension from Saudi Arabia for one additional TAVITAC 2000/NT unit for its third La Fayette class frigate. |

## Timetable

| Month | Year | Major Development |
|---|---|---|
| | 1968 | Vega I introduced |
| | 1976 | SENIT-5 introduced |
| | 1978 | Vega II introduced |
| | 1980 | Vega II (upgraded to TAVITAC) ordered by Colombia for Padilla frigates |
| | | SENIT S ordered by Saudi Arabia for Al Madinah frigates |
| | 1981 | Vega II (upgraded to TAVITAC) ordered by Tunisia for FAC |
| | 1986 | Vega II (upgraded to TAVITAC) ordered by China for 2 Luda frigates |
| Mar | 1991 | TAVITAC 2000 ordered by France for La Fayette frigates |
| | | China commissions first Luda III frigate |
| | 1995 | Saudi Arabia ordered two TAVITAC 2000/NT systems for La Fayette class frigates |
| | 1995 | Kuwait ordered eight TAVITAC 2000/NT systems for its P37-BRL fast attack craft |
| | 1997 | Saudi Arabia ordered one additional TAVITAC 2000/NT |

## Worldwide Distribution

| | |
|---|---|
| **China.** | 2 license-built TAVITAC 2000 on Luda III destroyer (modernization)<br>2 license-built TAVITAC 2000 on Luhu class destroyer<br>4 license-built TAVITAC 2000 on Luda I/II destroyer (possible but no confirmation) |
| **Colombia.** | 4 TAVITAC (originally Vega II) systems on type FS 1500 (FSG) Padilla class corvette |
| **Cyprus.** | 3 TAVITAC 2000/NT Coastal Batteries Surveillance |
| **Estonia.** | 1 TAVITAC 2000/NT ordered for Coastal Surveillance |
| **France.** | 5 TAVITAC 2000 on La Fayette class frigate<br>1 TAVITAC 2000 Monge class frigate |
| **Kuwait**. | 8 TAVITAC 2000/NT ordered for P37-BRL Patrol Craft |
| **Qatar.** | 4 Sewaco FD with Tacticos on Barzan (Vita) class Patrol Craft |

**Saudi Arabia.** 4 TAVITAC (originally SENIT S) on Al Madinah class frigates
2 TAVITAC 2000 ordered for La Fayette class frigate
1 TAVITAC 2000 ordered for shore-based training

**Taiwan.** 6 TAVITAC 2000 on Kang Ding (La Fayette) frigates
2 TAVITAC 2000 shore-based training

**Tunisia.** 3 TAVITAC on La Galite class FAC

**Unidentified Far East Country.** 3 TAVITAC 2000/NT ordered for Coastal Surveillance

# Forecast Rationale

The TAVITAC NT ("new technology") is Thomson-CSF's current model of "Traitement Automatique et Visualisation Tactique" (TAVITAC) series of centralized integrated naval command and control system and was introduced as an upgraded TAVITAC 2000 system.

When the TAVITAC 2000 appeared to be falling into a narrow market niche – supplying an integrated command and control system for light frigates, corvettes, and other various patrol craft not having the tactical requirements of larger craft – Thomson-CSF decided to optimize commercial-off-the-shelf (COTS) components to the greatest extent possible which resulted in the development of the TAVITAC NT variant employing COTS technology to improve reliability and reduce costs. The company reportedly claims the cost of a TAVITAC system has been cut in half by this approach, and the TAVITAC 2000/NT command system installed on the La Fayette class frigates now accounts for less than 5 percent of the total cost of the ship. This places the cost of a TAVITAC 2000/NT system at an estimated US$5.5 million.

This bold strategic market move by Thomson-CSF has apparently paid off, at least for the near term, with about a dozen TAVITAC NT systems currently undergoing procurement, including its use as a coastal battery surveillance system in addition to its original platform application. Current market trends for TAVITAC 2000/NT indicate a concentration on smaller nations which might not be able to afford big ticket items or have the requirements for such a system.

However, this current sales pitch on the part of Thomson-CSF could become a little dicey as TAVITAC 2000/NT competes on the export market with the Nautis command/control system which exploits fully distributed technology and a seven-screen Nautis-F system, said by some in the industry to be superior in capability to TAVITAC 2000, and which can be procured for around US$2.5 million. Thus, it is not surprising that TAVITAC 2000/NT lost out somewhat to Nautis in parts of the market, except where the command control system has been sold as part of a package with a La Fayette class frigate hull.

The following forecast is based on the commissioning dates of platforms, shore-based training units, and known coastal battery procurement for the TAVITAC 2000/NT system.

# Ten-Year Outlook

**ESTIMATED CALENDAR YEAR PRODUCTION**

| | | | High Confidence Level | | | | Good Confidence Level | | | Speculative | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Designation | Application | Thru 99 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | Total 00-09 |
| SEWACO FD/TACICOS | Prior Prod'n: | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TAVITAC | Prior Prod'n: | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TAVITAC 2000/NT | COASTAL SURVEILLANCE (ESTONIA) | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TAVITAC 2000/NT | COASTAL SURVEILLANCE (FAR EAST COUNTRY) | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| TAVITAC 2000/NT | TACTICAL DATA SYSTEM (FRANCE) | 5 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TAVITAC 2000/NT | TACTICAL DATA SYSTEM (KUWAIT) | 8 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TAVITAC 2000/NT | TACTICAL DATA SYSTEM (SAUDI ARABIA) | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TAVITAC 2000/NT | Prior Prod'n: | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Production | | 50 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |