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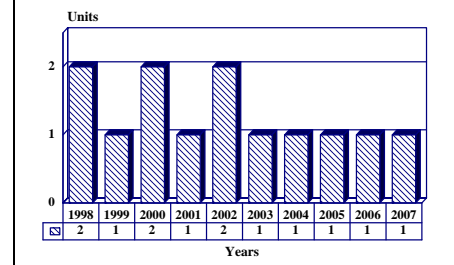
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Nettuno/Newton - Archived 6/99

Outlook

- In production and operational service
- A very low but steady production run for export still expected
- Unknown quantities (license) produced in China
- Widely used in Italian and Spanish navies
- Probable ECM system of choice on F-100s

10 Year Unit Production Forecast
1998 - 2007



Orientation

Description. Newton Beta, Newton Gamma, Newton Lambda, and Nettuno are modular multi-mode integrated electronic warfare systems with multi-target handling capability.

Sponsor

Ministero Della Difesa
Office for Military Production
Via XX Settembre 123
Pal Eserceto
I-00100 Rome, Italy

Contractors

Elettronica SpA
Elettronica Comunicaziana
Via Tiburtina Valeria Km 13,700
I-00131 Rome, Italy
Tel: +396 43641
Telex: 611024

Licensees. The Newton Beta system is being offered for installation on Chinese-built warships and is believed to be in licensed production within China. The most likely producer is:

China National Electronics Import & Export Corporation
49 Fuxing Road
Beijing, China
Tel: +861 810910
Telex: 22475

The Newton Alpha system is produced under license in Israel as the MN-53 by:

ELTA Electronics Industries Limited
 PO Box 330
 77102 Ashdod
 Israel
 Tel: +972 8 57 23 33
 Fax: +972 8 56 59 14
 Telex: 381807 elta il

Status. Production and service.

Total Produced. About 100 systems overall had been manufactured by the early 1998. These numbers also include equipment produced under license. Many older Newton installations have been withdrawn from service and are being replaced.

Application. Nettuno/Newton systems are tasked with radar detection and analysis, identification and jamming as part of a comprehensive EW family of modules.

Platform. Newton is configured for vessels of various sizes from 100 tons upwards; Nettuno is only for major warships, i.e., aircraft carriers, destroyers and large frigates.

Price Range. The unit cost of a Newton Beta system is estimated at US\$4.5 million, a Newton Gamma system around US\$6 million, and a Newton Lambda around US\$7.5 million. The unit cost of Nettuno is estimated at US\$11 million.

Technical Data

Design Features. The Newton Beta, Gamma and Lambda, and the Nettuno integrated electronic warfare systems comprise the ELT-318 continuous wave noise jammer, the ELT-521 deception jammer and the ELT-211 ESM equipment. Newton uses ELT-814 omnidirectional and ELT-828 stabilized mushroom antennas.

The differences between Newton and Nettuno relate to the central processing unit and the interface between the EW system and the ship's action information system (AIS). Nettuno and its Spanish equivalent, Nettunel, also use new-generation phased-array antennas. Beta, Gamma and Lambda are configuration variants of Newton. All of these systems are modular, and the numbers of ELT-318, ELT-521 jammers and the related antenna sets can vary according to the configuration selected.

The ELT-318 is a dual-band Continuous Wave (CW) noise jammer using advanced power management and covering recognized threat bands (C through K-bands). Medium or high gain antenna fits are available, enabling the system to be fitted even in small naval vessels such as FAC, as well as to major units. ELT-318 features variable modulation techniques and built-in flexibility to counter new types of threats. The potential for a high level of availability, reliability and maintainability is enhanced by the use of in-house manufactured sub-systems, well-proven components and BITE. The ELT-318 consists of six major subsystems: an operator console and processing unit,

transmitter, RF switch, control unit, RX antenna and TX antenna. The antennas are mounted in two spherical bubble protective domes.

The ELT-521 is a dual-band Continuous Wave (CW) deception jammer using advanced power management and covering recognized threat bands (C through K-bands). Medium or high gain antenna fits, again, are available, enabling the system to be fitted in small naval vessels such as FAC, as well as to major units. ELT-521 features variable modulation techniques and built-in flexibility to counter new types of threats. The potential for a high level of availability, reliability and maintainability is enhanced by the use of in-house manufactured subsystems, well-proven components and BITE. The ELT-521 consists of the following major subsystems: operator console and processing unit, transmitter, RF switch and control unit.

ELT-521 is available with either omnidirectional or directional antennas. When supplied with the former, completely autonomous operation is catered. When operating with directional antennas, bearing data are required from a direction-finding receiver. ELT-521 has the additional features of programmable deception routines and multiple target engagement.

The ELT-211 ESM system is the main driving unit of the Newton, Beta, Gamma, Lambda and Nettuno systems. It was derived by combining the ELT-123 preprocessor and ELT-261 IFM/Library units within a single unit incorporating a de-interleaver. The arrays of ELT-211 comprise two cone and two omnidirectional

antennas and a doughnut D/F antenna. In the Nettuno system, these are replaced by one cone and three omnidirectional antennas, two phased array D/F antennas and the doughnut D/F array. Both variants have one RF reception unit, a service module, a processing unit, a threat library and the operator's console. In Nettuno, the operator console interfaces

with the INS-10 or SADO 2 command system. This requires the inclusion of an additional module within the system. Nettuno also includes the ELT-311 version of ELT-211. This features an additional ELINT console providing a more extensive and capable threat identification library and an additional SHR capability.

Variants/Upgrades

Elettronica offers a range of integrated EW systems combining the ELT-318 continuous wave noise jammer, the ELT-521 deception jammer and the ELT-211 ESM system. These are claimed to have 80 percent commonality with Elettronica airborne and land-based EW systems.

The following Newton variants have been revealed:

Newton Alpha is intended for use on fast-attack craft of up to 600 tons and including one ELT-211, one ELT-318 or ELT-521, and one ELT-828. This system is believed to be produced by the Israeli Elta company under the designation MN-53.

Newton Beta is intended for use on ships up to 1,500 tons and including one ELT-211, one ELT-318, one ELT-521, one ELT-814 and one ELT-828.

Newton Gamma is intended for use on ships up to 3,000 tons and including one ELT-211, one ELT-318, two ELT-521s and three ELT-828s.

Newton Lambda is intended for ships over 2,500 tons and including one ELT-211, one ELT-318, three ELT-521s and four ELT-828s.

Newton Epsilon is a provisional designation for an Italian navy system based on Newton Lambda but with one ELT-211, two ELT-318s, three ELT-521s and five ELT-828s. Newton Epsilon is probably an intermediate stage in the development of Nettuno.

Nettuno is believed to have one ELT-211, two ELT-318s and two ELT-521s with the modernized antenna arrays and central processing system described above.

Nettuno 4000. Elettronica is believed to be developing a number of products that are based on the use of a phased-array antenna and solid-state, receive-transmit modules. The Nettuno 4000 shipboard jammer is being developed with the Italian navy, and will presumably evolve to an integrated ECM/ESM system.

The ESM components of the system are already available; the planar-array suite was scheduled for testing by the middle of 1995, but no confirmation of such testing is available.

Nettunel is the Spanish license-built version of Nettuno. The ELT-318 and ELT-521 jammers are integrated into a single unit named Canopus, while the associated ELT-211 ESM system is designated Deneb.

Aldebaran is a new Spanish system based on Nettunel technology.

SLR-3. Italian navy designation for ELT-211.

SLR-4. Italian navy designation for ELT-311.

SLQ-A. Italian navy designation for Newton Alpha.

SLQ-B. Italian navy designation for Newton Beta.

SLQ-C. Italian navy designation for Newton Gamma.

SLQ-D. Italian navy designation for Newton Delta.

SLQ-01. Dutch navy designation for Newton Gamma.

SLQ-732. Italian navy designation for Nettuno.

Program Review

Background. Information on the development of Newton with the related ELT-318 and ELT-521

jammers and the ELT-211 ESM system is sparse. They were first announced in 1981 as replacements for the

earlier Elettronica range of EW systems. Four variants — Alpha, Beta, Gamma and Lambda — were announced, forming the Newton family of integrated EW suites. By 1985 Newton was itself being replaced by the Nettuno integrated EW system, which incorporates more advanced sensor and control technology.

The Netherlands Navy purchased the Newton Gamma system in 1980 for its *Kortenaer* class frigates. In the Netherlands service, the system was designated SLQ-01 and was intended as an interim fit until the SLQ-02 Ramses system entered service. In fact, the *Kortenaer* class retained the SLQ-01 until modernization, and the three ships sold to Greece that were being unmodified still retain their SLQ-01 systems.

The Royal Spanish Navy has selected the Nettuno EW system for installation on the aircraft carrier *Principe de Asturias* and the *Santa Maria* class frigates. The system is also likely to be installed on the projected F-100 class destroyers. A recent photograph of the Singaporean Sea Dragon class FACs suggests ELT-828 antennas for the Newton system on the mast. This remains to be confirmed and may simply reflect the Italian ancestry of much of the Israeli EW equipment.

The Chinese navy is also receiving Newton Beta as equipment for some of its recent warships. China appears to have acquired licenses for the production of both the French DR-2000S/Alligator system and the Italian Newton Beta equipment. The former is being fitted to new construction *Luda* class frigates, while the Italian equipment is being installed on the smaller *Jianghu* and *Jiangwei* class ships. The Chinese derivative of Newton Beta is also being offered for export and has been supplied to Thailand as equipment for its four *Jianghu* class ships.

The last Nettunel systems for Spanish warships were delivered in March 1995 when the *ARE Canarias* entered service. Future ships will receive Spanish-designed equipment, which, nonetheless, draws heavily on Italian design practice. Later in 1995, two of the six Iraqi corvettes laid up in Italian shipyards were also sold to Malaysia.

Elettronica appears to be in the fortunate position of having a steady home market for its latest generation Nettuno integrated EW system, while also having a reliable income from the licensed production of the older Newton. The Italian navy will be using Nettuno on all of its major combatants, including aircraft carriers, destroyers and the improved *Maestrals* frigates. The *Minerva* class corvettes will not initially mount the integrated system, but their fully integrated command systems will accommodate the installation of Nettuno as a backfit if deemed necessary.

The primary tactical difference between Newton and Nettuno is that Newton only gives six degrees angular resolution (insufficient for passive targeting), while Nettuno gives two degrees (marginally adequate for passive over-the-horizon targeting).

This marginal capability for over-the-horizon targeting is a major reason why older Newton systems are being replaced by later technology equipment when ships come in for upgrade and modernization. Peru and Venezuela have both replaced the Italian equipment on their *Lupo* class frigates with more recent systems (ARGO AC-700 for Peru and Guardian Star for Venezuela). Spain is developing an enhanced version of Nettunel with sufficient bearing accuracy to permit OTHT attacks with Harpoon missiles. Newton Beta remains, however, an entirely adequate system apart from this one aspect.

Funding

Elettronica SpA has developed these systems under contract to the Italian Ministry of Defense in conjunction with the Italian Defense Technical Scientific Committee.

Recent Contracts

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
ELT SA	N/A	Nov 1992 — Spanish MoD contract for the modernization of Nettunel systems installed on Spanish warships and for the in-service support of those systems.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1980	Newton system first announced
	1981	Gamma ordered for Iraqi Walid corvettes
	1982	Gamma in service on Ecuadorian corvettes
	1983	Nettuno system ordered for <i>Giuseppe Garibaldi</i>
Nov	1986	Elettronica Comunicazioni SpA formed
Feb	1987	Elettronica established Spanish subsidiary
		Nettuno ordered for <i>Animoso</i> class destroyers
Nov	1988	Nettuno system ordered for Spanish warships
	1992	Spain modernizing its Nettunel systems in use
	1995	Nettuno 4000 planar-array ready for testings

Worldwide Distribution

Newton

Australia. (2 Newton Betas on *Leander* FF)

China. (2 Newton Betas on *Jianghu* 053HT FF, 4 Newton Betas on *Jiangwei* FF, 1 Newton Beta on *Luhu* FF)

Ecuador. (6 Newton Gammas on *Fincantieri* FFL)

Egypt. (2 Newton Betas on *Descubierta* FFL, 2 Newton Betas on *Jianghu* 053H(E) FF)

Greece. (5 Newton Gamma systems on ex-Netherlands *Kortenaer* class)

Indonesia. (6 Newton Betas on *Leander* FF)

Italy. (4 Newton Gammas on *Lupo* FF, 8 Newton Lambdas on *Maestrale* FF, 1 Newton Epsilon on *Vittorio Veneto* CVHL)

Malaysia. (2 Newton Gammas on ex-Iraqi *Fincantieri* FFL)

Morocco. (1 Newton Beta on *Descubierta* FFL, 4 Newton Alphas on *Lazaga* FAC-M)

Spain. (6 Newton Betas on *Descubierta* FFL, 6 Newton Alphas on *Lazaga* FAC-M)

Thailand. (2 Newton Betas on *Jianghu* 053HT FF, 2 Newton Betas on *Jianghu* 053HT(H) FF, 3 Newton Betas on *Ratcharit* FFL, 2 Newton Betas on *Rattanakosin* FFL)

Nettuno

Italy. (2 Nettunos on *Mimbelli* DD, 2 Nettunos on *Audace* DD, 1 Nettuno on *Etna* AOR, 1 Nettuno on *Giuseppe Garibaldi* CVH, 3 Nettunos on *San Giorgio* LPD, 2 Nettunos on *Stromboli* AOR)

Spain. (5 Nettunels on *Baleares* DD, 4 Nettunels planned for F-100 DD, 6 Nettunels on *Oliver Hazard Perry* DD, 1 Nettunel on *Poolster* AOR, 1 Nettunel on *Principe de Asturias* CVH)

MN-53

Chile. (2 MN-53s on Saar-3 FAC-M, 2 MN-53s on Saar-4 FAC-M)

Israel. (6 MN-53s on Saar-2 FAC-M, 1 MN-53 on Saar-3 FAC-M, 8 MN-53s on Saar-4 FAC-M, 4 MN-53s on Saar-4.5 FAC-M)

Malaysia. (4 MN-53s on Spica-M FAC-M)

South Africa. (9 MN-53s on Saar-4 FAC-M, some may have been replaced in upgrades)

Forecast Rationale

Exports of both Newton and Nettuno continue, with a growing list of licensed producers for the equipment. These include Spain (producing Nettuno as Nettunel), Israel (producing Newton-Alpha under the designation MN-53), and China (where Newton Beta ELT-designations are replaced with a Type name while retaining the same numbers). The equipment offers users a robust and reliable integrated electronic warfare system that will fulfill the majority of their needs at a reasonable price.

The following forecast reflects the delivery of known platforms. The production run of Chinese *Jianghu IV*

and *Jiangwei* class frigates equipped with a license-built derivative of Newton Beta has been slowed, reflecting delays in Chinese shipbuilding. Two of the Iraqi Newton Gamma systems have now been sold to Malaysia as equipment on corvettes and have thus reappeared.

Under Italy are included the systems for the Anglo-Italian-French air defense frigates (CNGF Project Horizon) planned for the mid-2000s. Divergences in requirements between the partners developing these ships suggest that the EW system will be user-specified rather than common.