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# EUROPEAN DEFENSE BUSINESS

## NATO's Naval Tactical Data Systems+

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VIP CLUB

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# Legacy of Business in Europe

## The Naval Tactical Data System Foreign Military Sales were our entry into NATO.

### Introduction

This document contains a series of articles written by Richard F. Lundgren for the VIP Club newsletter during 2007. The articles highlight the international business legacy of LM-Eagan and its predecessors in the Twin Cities (i.e. Remington Rand UNIVAC, UNISYS, etc.). The European articles have been collated and formatted into this paper by Lowell A. Benson. Featured herein are Norway, Netherlands, France, and Germany. We've also sold some systems to Greece, Spain, Turkey and others, but have yet to put them together for an article.

### Norway

Why start with Norway? The reasons are provided at the end of this section.

Norway was one of the twelve founding members of **NATO** (North Atlantic Treaty Organization) which marks its 40th anniversary in 2007. **SHAPE** (Supreme Headquarters Allied Powers Europe) is the military wing of NATO, and Norway is the strategic northern anchor of SHAPE's command structure. LM-Eagan has had a significant business relationship with Norway for more than 20 years.

Our legacy of Norwegian business began in 1986 with the sale of the **Maritime Air Support Center (MASC)** to the **Royal Norwegian Air Force** (RNoAF). The RNoAF assigned **Major Hans Joakimsen** to oversee the 2-year MASC development in Eagan. His presence in Eagan was engaging and masterful - he was a delight to all who knew him. The MASC was a ground support center similar to the US Navy's ASWOC (Anti-Submarine Warfare Operations Center) used for P3-C

operations. The RNoAF did not yet have the (Lockheed-built) P3-C Orion aircraft, but their arrival was imminent. The RNoAF did have five P-3B aircraft, and in fact they had had them since 1969 when Norway, because of its strategic monitoring location for Soviet submarines, became the first European P-3 operator. The MASC was delivered to the RNoAF P-3C 333 Squadron at Andøya Air Station in the Lofoten Islands (70º north latitude). Company people involved in the MASC program from conceptual development to delivery and on-site support included **Keith Myhre**, **Art Francis**, **Denny Drake**, and **Gary Reetz**. RNoAF Captain **Sverre Aastorp** was also later assigned to LM-Eagan following Major Joakimsen.

Four Norwegian P-3Cs, with avionics built around the Univac CP-901 computer (AN/ASQ-114), arrived in Norway in 1989 to replace the P-3Bs. They operated mostly in the as-delivered condition until 1996 when Lockheed Martin received a contract for the Upgrade Improvement Program (UIP) to "add capability and increase service life." From 1997 to 2000, the four Orion aircraft were modified at the LM-Greenville, SC facility including the CP-2044 processors then returned to Norway with the "P-3C UIP" designation.

Another facet of Norway's commitment to NATO has been the order by the **Royal Norwegian Navy** (RNoN) of five new frigates. The lead frigate, delivered in 2006, is the **Fridtjof Nansen**, named, of course, for Norway's 1922 Nobel Peace Prize winner, an outstanding explorer, scientist, and diplomat. The Nansen class ships are being built by a consortium that includes the Spanish shipyard Navantia (Ferol, Spain), Lockheed Martin Maritime Systems and Sensors (MS2 - Moorestown, NJ and Eagan, MN), and Bath Iron Works (Bath, Maine). MS2 is the maker of the Aegis system and Legacy Eagan equipment on board these Frigates includes UYK-43 computers and UYQ-70 display processors.

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**Status, Control, Alerting and Reporting System (SCARS)** is a program that emerged on the Eagan consciousness about the time that Burroughs acquired Sperry to become Unisys. SCARS, actually SCARS II, was not a Norwegian program, but it involved Norway. The customer for SCARS was **SHAPE** with its headquarters in Mons, Belgium. SCARS was a long overdue replacement for a pretty archaic command and reporting system used throughout the SHAPE commands in all NATO countries. Communications stretched from northern Norway, through the UK and west central Europe, and down to Turkey. **Mark Swanson** was our on-site lead at SHAPE (1987-89).

So why begin our international business legacy newsletter articles with Norway? Consider the following: Norway was the unchallenged master of the seas from the 8th to the 11th century and is still pre-eminent is keeping the northern sea lanes secure as well as keeping the southern seas pleasurable (think Norwegian cruise lines). Norway is consistently at the top of the world's countries with the highest standard of living, and Norway is the host country for the annual Nobel Peace Prize award. Norwegian-American relations have always been very strong. The US was among the first to recognize Norway after the peaceful dissolution of its union with Sweden in 1905. And needless to say, Minnesota-Norway connections are very vigorous and thriving. Note that the Eagan based LMCO and predecessors also have an annual celebration of Syttende Mai coordinated by our own Richard 'Ole' Olson for almost 30 years.

## Legacy with Norway Continues

In June, 2007 the governments of Norway and the United States signed a Letter of Offer and Acceptance (LOA) for the sale of four Lockheed Martin C-130J Super

Hercules aircraft to Norway. The aircraft will be built by LM Aeronautics Co. in Marietta, GA.

## Netherlands

This article is the second in a series of articles highlighting the legacy of LM-Eagan in international business. The focus is the Netherlands, but it also loosely extends to Belgium and Luxemburg (all collectively known as the Benelux countries). All Benelux countries were founding members of NATO and have participated to varying degrees in NATO activities over time. LM-Eagan has only had a direct business history with the Netherlands, but other divisions of Lockheed Martin have established a presence both in the Netherlands and in Belgium.

Our legacy of business with the Netherlands began in 1970 with the sale of Univac equipment to Hollandse Signaal Apparaten (known as HSA and as Signaal) in Hengelo. The Dutch were not the end user, but they were our customer. The end user was the West German Navy with the equipment becoming the core of the combat system for German S-143 Fast Patrol Boats (GFPB) in the North Sea and the Baltic Sea. The equipments involved were the 1830B Computer (a modification of the highly reliable CP-901/1830A Computer used in the USN P-3C aircraft), the 1840 Magnetic Tape Unit, and the 1532 I/O Console. The Dutch were not too pleased with the selection of Univac equipment since they had their own SMR computer as a candidate for the GFPBs, but the Germans had made their decision and so Signaal became our customer. Signaal in turn sold the subsystem to AEG Telefunken who in turn passed it on to BWB (the procurement agency for the German armed forces) for shipboard installation. Our portion of the business was not only hardware. There was initial training for hardware and software onsite in Hengelo and significant software development as well. The initial onsite personnel in Hengelo were **Ernie Lantto,** site manager; **Lowell**

**Benson,** installation engineer; **Al Rudman,** field service engineer; and programmers **Bill Rogers**, **Tom Kratz**, **John Rachac**, and **Jim Gannon**. Part timers in Hengelo were instructors **Dick Lundgren**, **Dick Denson**, and **Ron Trowbridge**. The program manager was the well known, well liked, and energetic **Fred Billingsley**. The software development team at Signaal also included four French programmers, eight German Navy programmers, and about two dozen Dutch programmers. For more stories on GFPB and the early days in Hengelo, check out the contributions of Lowell Benson, Ernie Lantto, and **Tom Kratz** to the Legacy website – http://vipclubmn.org, people section.

In 1978 some interesting software training took place in Hengelo under contract to HSA. The 8-week course, by lead instructor **Tom Dunn** and co-instructor **Peter Dress,** had to address some logistic concerns that would be unknown today. The course content was a mix of low level AS-1 assembler language and the high level CS-1 compiler, normally presented in that order. However, the students were to do the coding using 30-bit coding sheets in Hengelo, these sheets were then key-punched at a different HSA facility in Hengelo, the card decks were then carried by "personal courier" over the border from Holland to Germany and shipped off by train (Bundesbahn) to the German Navy programming center in Wilhelmshaven for processing, and the results (listings, error printouts, program numerical results, etc.) were returned to Hengelo. Needless to say, this process was not instantaneous, with 7-10 days turn-around time being typical. Against the initial judgment of the Signaal representative, Mr. Dunn insistently reworked the schedule from day one to interweave the low and high level languages using alternating instructors to devise a real-time solution that accommodated the logistic concerns and ultimately satisfied all the concerned parties. The happy students were a mix of two Dutch Signaal employees and about a dozen Germans, from Radarleit (a unit of Phillips), German industry, German civil service and German Navy.

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In 1981 Signaal contracted for some more software training for which the goal was to qualify their employees and position themselves as a company to win the Canadian Patrol Frigate (CPF) business. The CPF was destined to use 16-bit processors, the AN/UYK-20 and the AN/UYK-502, both Sperry products with the UYK-502 a product of our Winnipeg facility. Two instructors, **Steve Kloner** and **John Henrikson**, were sent to Hengelo to present four weeks of training on the suite of standard 16-bit software products, namely ULTRA-16, CMS-2M, MTASS/M, and SDEX-20. The goals of the training were accomplished admirably, but the higher aspiration of HSA to win CPF was not successful. For more stories on CPF, check out the contributions of **Gene McCarthy** to the Legacy website.

The Royal Netherlands Navy (RNLN) operated the Lockheed-built P-3C Orion maritime patrol aircraft from 1981 to 2006. During this time the RNLN acquired 13 Orion aircraft whose normal missions found an extension in airborne reconnaissance over land during the NATO "Eagle Eye" operation over Kosovo. From August 2001 to June 2006 ten RNLN P-3Cs were significantly improved in the Capabilities Upkeep Program (CUP). LM-Eagan was the prime contractor for this effort, replacing the aging CP-901 computer with the advanced CP-2044 computer, purchasing advanced sensors and other avionics, and integrating the whole hardware suite with Eagan-developed software at the LM facility in Greenville, SC. In the course of events, the Dutch parliament decided to discontinue P-3C operations, and the 10 RNLN P-3Cs were sold to the Germans. **Tom Rougier** was the program manager for CUP and **Rollie Schwitters** was the project engineer. For more stories on CUP, check out the Rollie's contribution to the Legacy website, People section.

The Netherlands has been a challenging customer and a challenging competitor over the past decades. No surprise. Their naval expertise at the world level

goes back no less than five centuries. They have done battle with the sea and on the sea, and they have won most. Not bad for a country one-fifth the size of Minnesota with one-fourth of the land below sea level, and in direct competition with larger European powers. Other divisions of Lockheed also have a significant presence in the Royal Netherlands Air Force. Current equipment includes the F-16 Fighting Falcons and the C-130H Hercules. The Belgian Air Force is also a showcase for Lockheed aircraft. In the past it has had the T-33A 'Shooting Star' and the 104G Star Fighter, and currently it has the C130-H Hercules and the F-16. The "Lux" of the Benelux does not have an air force.

## France

In 1964 the French Navy purchased CP-642B computers and peripherals to begin integration of their fleet with the U.S. Navy's Naval Tactical Data System. UNIVAC helped the French develop a programming center CPM (Centre de Programmation de la Marine) in Paris near the Eiffel-Tower for software and hardware training (1966/67). The on site Program Manager was **Bob Fischer** who reported to **Leon Finley** in St. Paul. The French Navy, a NATO member at that time, put together SENIT (Systeme d'Exploitation Navale des Informations Tactiques, read early French NTDS) system built on the USN/Univac USQ-20 computer and peripherals. The long time on site Marketing representative even after Bob returned stateside was Ray Costello. The French really wanted to do it themselves so we didn't do much more business with them.

Although in 1977 a fleeting flicker of French romance was rekindled with Thompson-CSF and realized by **W. S. Howe** on a 3-month assignment in Paris (direct quote: "That may have been one of the best jobs I ever had!"). The product sold to Thompson, which included installation and training support, was a software generation system based on the AN/UYK-20 computer and commercial peripherals. The Mini Systems group, under **Bob Potter** at that time, was the

responsible organization. The greater potential of this relatively minor business with France was never realized and the ember died out and remains cold until today.

## Germany

"Germany" was officially the Federal Republic of Germany (FRG) or just West Germany for the majority of years in which we had significant business there. The reunification of the FRG and the DDR (German Democratic Republic) occurred on October 3, 1990, from which point on "Buy European" became the modus operandi.

The FRG Navy started in the early 60s with the order of three Adams (Charles Adams) Class destroyers (F-DDGs) in 1964. These ships (the Lütjens, Mölders, and Rommel), all named after prominent German figures, were not originally intended to be NTDS ships, but progress with NTDS in U.S. and French ships convinced the FRGN to develop those ships with NTDS capability. To prepare for the receipt and subsequent support of the three Adams Class destroyers, the FRGN sent personnel to the French programming center CPM (Centre de Programmation de la Marine) in Paris near the Eiffel-Tower for initial hardware training (1966/67). At the same time other FRGN personnel were sent to San Diego for software training. These FRGN personnel then returned to Wilhelmshaven, Germany with knowledge and experience in the early Univac 30-bit systems (hardware installation/maintenance and software generation). This was to be the launching pad for a long legacy of business with Germany.

The first three West German destroyers (the Lütjens, Mölders, and Rommel) introduced NTDS to the West German Navy (FRGN). These ships, of the class Z-103B (Z for Zerstörer, = Destroyer), carried the USQ-20/642B computer as the core of the FüWES/SATIR (Führungs- und WaffenEinsatzSystem/System zur

Auswertung Taktischer Informationen auf Rechnerschiffen) combat system. It was complemented by display equipment from Hughes and communications equipment from Collins. FüWES/SATIR translates roughly as Guidance Control and Weapon Delivery System/System for the Evaluation of Tactical Data on Computerized Ships.

The next project for the FRGN was the acquisition of the S-143 class Fast Patrol Boats (GFPB) to patrol the North Sea (bounded by West-friendly Denmark, Sweden, Norway, the Netherlands, and the UK) and the Baltic Sea (bounded by East-friendly Poland, the German Democratic Republic, the three Baltic nations, and Russia itself). The GFPB program for UNIVAC started in 1970 with deliveries of 1830B computers, 1840 magnetic tape units, 1532 I/O consoles, a 9300 printer/card processor and 1299 switches. Ten FPBs of the S143 Albatross class and later ten more of the S143A Gepard class were built. The S143A equipment had modifications to the 1830B computer with the addition of Externally Specified Index I/O channels, a 100 Khz real time clock, and expansion of main memory to 96K. For the GFPB program hardware integration started at Signaal (later Thompson CSF and now Thales) in Hengelo, Holland, and company involvement for shipboard integration soon moved to Wilhelmshaven, West Germany. Software development continued in Wilhelmshaven, supported by many company expatriates as well as many German nationals who had developed expertise in 30-bit software in the Z-103B program. The land-based software test and development site in Wilhemshaven was known as the EZ/AZ (Erprobungszentrum/Ausbildungszentrum or Development/Training Center), a practice that continued for all subsequent ship systems. The combat system for the German Fast Boats (Schnellboote) was known as AGIS (Automatisches Gefechts- und Informations System, or Automatic Combat and Information System).

In the late 1970s, West Germany, as part of a NATO commitment, began the development of the F-122 (F for Fregatte, = Frigate) class of ships. By this time, the US Navy had advanced the NTDS to the 32-bit AN/UYK-7 hardware base plus contemporary peripherals. Eight F-122 class ships (lead ship Bremen) would be built, to be followed later by four F-123 class ships (lead ship Brandenburg), based on the AN/UYK-43 computer (UYK-7 replacement in the USN). Another ship system used on ships of several classes was the PALIS (PAssiveLInkSystem) which used either the AN/UYK-20 or later the AN/UYK-44 computers. The use of German/American training and development teams was a precedent set with the early S-143 systems and followed in subsequent systems efforts. The spin-offs from these German Navy activities were numerous. The accumulated technical experience expanded the talent base for many future foreign and domestic programs, and the management experience advanced many careers. World perspectives were broadened and lives were enriched. Of a personal nature, many multicultural lifelong friendships were established and even a few marital involvements were sparked. Efforts by Unisys/LM for follow-on German Navy developments (e.g. F-124/125) were not successful.

However, in the non-Navy area, the company had some other notable business accomplishments, specifically for the German equivalent of the FAA. In 1976 Sperry Univac-Eagan and Sperry Univac-Germany jointly performed on a contract called ZKSD with the German Air Traffic Control Agency (BFS) to develop a central Flight Data Processing (FDP) system that would distribute and print flight strips at all civilian airports in West Germany. ZKSD stands for Zentraler KontrollStreifenDruck (literally, Central Control Strip Printing, or more descriptively, Central Flight Plan Data Processing and Strip Printing System). BFS is the Bundesanstalt für FlugSicherung (Federal Institute for Flight Safety). The initial architecture utilized multi-IOP computers from the US-FAA programs but as

the architecture matured, main frame commercial 1100 series processors were used. Unisys Germany continued to support this system including a major upgrade called UKD into the late 1990s.

Another program was the German Short Term Conflict Alert (STCA). As a direct result of an STCA product demonstration at the annual Air Traffic Control Association Conference in 1990, Unisys was awarded a contract with the German BFS, later called DFS (Deutsche Flugsicherung, German Flight Safety/Air Traffic Control) to integrate the aircraft conflict avoidance safety feature into the existing German air traffic control system. The STCA product was based on the safety algorithm used in the Micro EARTS program. Unisys Eagan was responsible for design and system development with Unisys Germany responsible for hardware procurement and system installation. The system was installed at 11 air traffic control centers throughout reunified Germany. In 1997 Lockheed Martin – Air Traffic Management received a follow-on contract for system upgrades.

An interesting non-governmental customer was the Otto Versand Inc., Germany's largest catalog ordering company. Otto Versand in the mid-1970s was already a huge customer for the Univac 1100 series main frames, but they wanted new technology to give them a competitive edge. They threatened to switch to IBM unless Sperry could come up with the "technical advantage." Enter the Voice Response Unit (VRU) developed by the Speech Research group of Sperry Univac Defense Systems. This unit could streamline the handling of multiple customer phone orders and smooth out the peaks and valleys of customer calls. The synthetic German speech worked perfectly with many customers mistaking the "voice" for a well known German TV announcer. Not only did the technical solution satisfy the customer, but the reliability was unbelievable. The customer

engineers had no experience in repairing the VRUs because they never failed. Credit the VRU's "ancestors." The VRU product was a derivative of the ruggedized, mil-spec UYK-20 and the Canadian (Winnipeg) UYK-502 computers. With component selection and hardware construction aimed at functioning in a tough environment, the VRUs thrived in the benign conditions at Otto Versand. *If the ancestors are strong, so too the descendants*.

David P. Andersen's paper about "The invention of Voice Mail' contains more information about the VRU – available for down loading from the Legacy web site.

It should be pointed out too that we also had many non-German customers in Germany. The U.S. Army is one example, but this article only focuses of the German customers.

## Biographies

Richard F. Lundgren was an employee of UNIVAC/UNISYS/LMCO from 1967 to 2004. He was a computer and peripheral hardware maintenance instructor for most of his career. Dick was also in the Field Service organization for a few years and worked as a technical writer for a bit. He has been active with the VIP club Legacy committee for two years, serving as liaison with the Charles Babbage Institute and as the principal Legacy reporter for the VIP Club's newsletters.

Lowell A. Benson was an employee of UNIVAC/UNISYS from 1960 to 1994. During those 33.5 years he progressively was a clerk, technician, tech writer, computer operator, design engineer, installation engineer, instructor, engineering supervisor, project engineer, marketing support engineer, engineering manager, program manager, technical director, and senior staff engineer. He is presently the VIP Club treasurer and co-chair of the Legacy committee.