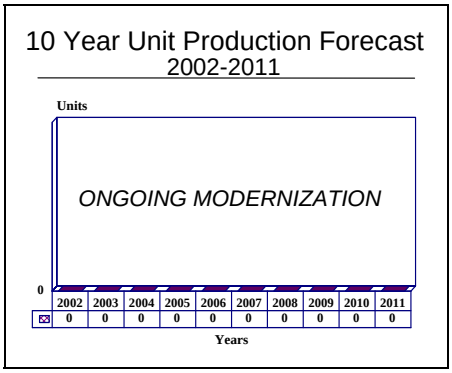
Roland - Archived 5/2003

Outlook

- Production concluded
- All French and German Rolands to be retired by 2015
- Surplus fire units to be offered for sale
- Slovenia could procure an undetermined number of Roland SAMs in 2003
- Other nations that may be interested in procuring used Roland fire units include Austria, the Czech Republic, Hungary, and Romania



Orientation

Description. Short-range, surface-to-air missile system for defense against low-level attack aircraft.

Sponsors. The French and the Federal Republic of Germany's Ministries of Defense and the US Department of Defense through the French, German, and United States armies. Management, sales, and responsibility for production and marketing: Euro-missile, Fontenay-Aux-Roses, France. The United States Army, Missile Research & Development Command (MIRADCOM), Huntsville, AL, was the executive for US coproduction.

Contractors. Roland I (clear-weather), Roland II (all-weather) were developed and are produced by Euromissile, Fontenay-Aux-Roses, France. Euromissile (formed by Aerospatiale and Messerschmitt-Bolkow-Blohm) is program prime contractor for Roland and also has the responsibility of integrating the missiles and launch systems at its facility at the Thyssen Henschel factory, Kassell.

Major Subcontractors. Aerospatiale, AEG, Eltro, Giat, Messerschmitt-Bolkow-Blohm, Microturbo, Rheinstahl, Siemens Societe D'Applications Generales d'Electricite Mecanique (SAGEM), Societe D'Applications des Machines Motrices (SAMM), Societe Nationale des Poudres et Explosifs (SNPE), Standard Elektrik Lorenz (SEL), Telecommunications Radioelectriques et Telephoniques (TRT), and Thomson-CSF.

Licensees. A coproduction contract for Roland II was awarded to Hughes Aircraft Company Missiles Systems Group, Canoga Park, CA, and Boeing Aerospace, Seattle, Washington (WA), in 1976. After minimal production, the US Roland (MIM-115) program was canceled. Some licensed production of the Roland missile or Roland system components has been undertaken by an unknown firm in Brazil. Spain is also a partner in the production of Roland (see **Worldwide Distribution**: Spanish Roland program).

Status. Production completed. Full-scale development of a new hypervelocity version of Roland, RM-5, was not begun. The US Roland (MIM-115) production program has long since been concluded. The French and German armed forces are expected to keep their Roland systems in active service at least through 2010 (Germany may extend this date to 2015).

Total Produced. Approximately 28,930 Roland missiles (of all types) had been completed or were in production by the end of 1998. Production of the Roland II missile was concluded in 1989, and superseded by the fabrication of the Roland III. By late 1988, orders for Roland systems totaled 644 firing systems and more than 25,600 missiles sold to 10 countries (including four NATO alliance members), of which over 23,897 missiles had been produced. Euromissile has recorded sales of Roland firing posts as 231 on AMX 30, 148 on SPz Marder, 234 Sheltered,

and 31 pallet-mounted for the US Army. Germany will reduce the number of Roland systems deployed as part of an overall reorganization of its armed forces. The number of air defense units operating Patriot, HAWK, and Roland systems will decline from 18 to six. The German Navy will also forgo modernization of its Roland systems.

Application. Low-altitude air defense system to defend fixed installations and airbases and various mobile fighting units. Roland is land based and fired from mobile platforms: France (AMX 30R), Germany (SPz Marder), United States (M812A1).

Price Range. A Euromissile-produced Roland II costs approximately $138,700 in Fiscal 1989 dollars. A fire unit, based on the Marder chassis, is stated to cost $4,495,000. The Roland III is projected to cost $152,000 in Fiscal 1996 dollars. Estimated unit price of the Roland RM-5 had been FRF700,000 ($126,580).

Technical Data

Design Features. The missile in the container, which doubles as a launcher, has the following specifications: length, 260 cm (8.53 ft); diameter, 27 cm (10.63 in); and weight, 85 kg (187 lb). These specifications are for the Roland I; the Roland II figures are the same except that the weight is 1.3 kg (2.86 lb) greater. Not all the technical data on Roland III are available (indicated by the NA entry). Warhead weight for the Roland III is 9 kg; that for the RM-5 is 11 kg.

	Metric Roland I/II	**Metric** Roland III	**Metric** RM-5	**US** Roland I/II	**US** Roland III	**US** RM-5
Dimensions						
Length	240 cm	240 cm	240 cm	7.87 ft	7.87 ft	7.87 ft
Diameter	16 cm	16 cm	16 cm	6.29 in	6.29 in	6.29 in
Wingspan	50 cm	50 cm	50 cm	1.64 ft	1.64 ft	1.64 ft
Weight	66.5/67.8 kg	75 kg	82 kg	146/149 lb	165 lb	180.4 lb
Performance						
Speed	500 m/s	Mach 1.8	Mach 5	971.93 kt	Mach 1.8	Mach 5
Altitude (max)	4,500/6,000 m	6,000 m	8,000 m	14,760/19,680 ft	19,680 ft	26,240 ft
Range	6/7 km	8 km	16 km	3.7/4.4 miles	4.97 miles	9.9 miles
Range Radar	16 km	16 km	NA	9.94 miles	9.94 miles	NA
Kill Prob.	95%	95%	NA	95%	95%	NA

Propulsion. Two-stage (booster and sustainer) solid-propellant rocket motor. The boost motor is provided by Societe Nationale des Poudres et Explosifs and is designated Roubaix; it is a star-shaped internal burning grain type of 14.5 kg (32 lb) extruded double-base propellant. The motor is rated at 16.75 kN (3,722.2 lb) thrust with a burn time of 1.7 seconds. The sustainer, designated Lampyre, is provided by the same contractor. It is also star-shaped, and weighs 15.2 kg (33 lb); it is rated at 19.9 kN (4,422.2 lb) thrust with a burn time of 13 seconds. Roland III has a new sustainer motor of unknown designation.

Control & Guidance. Jet vane missile control by command microwave radio link. The target is acquired on the Siemens L (D)-band search radar by the commander. The aimer then searches in elevation to acquire the target. An optical sight locks on automatically, in azimuth, upon initial target acquisition. After launch, the tracker maintains the target and the missile is guided to the target by infrared techniques. Roland II utilizes the Domino 30 monopulse UHF (B/C)-band tracking radar in lieu of the periscope sight of the Roland I; it is manufactured by Thomson-CSF, Paris, France. Identification/interrogation equipment is standard.

Launcher Mode. Roland I is employed by the French Army on the AMX 30R tracked vehicle. Roland II is employed by Germany and Norway on SPz Marder and M975 tracked vehicle chassis. The US Army originally intended to mount Roland on the M975 self-propelled tracked vehicle in its primary configuration, although the helicopter-transportable unit can be fired from a fixed ground emplacement. In early 1983, the US Army decided not to mount Roland on the M975 tracked vehicle but to deploy it on standard M812A1 6x6 trucks. As a result, a C-130 or C-141 aircraft is able to carry both the fire unit and the truck, which means that Roland is immediately available for use when disembarked. This immediate availability is a real asset, since the 27 Roland systems are deployed with the National Guard component of the United States' rapid deployment force.

The fire unit consists of twin missile launch tubes mounted on a revolving turret with dual magazines (four missiles each) located under each launch arm. Weights of the various fire units (complete with active and reserve missiles) are as follows: SPz Marder, 25 tonnes (27.55 tons); AMX 30, 32 tonnes (35.27 tons); and the M812A1, 26 tonnes (28.65 tons). In late 1982, Krupp, Blohm + Voss, and Euromissile announced that the Roland system had been integrated with the chassis of the Leopard 1 tank. This configuration weighs 37.85 tonnes.

Most countries use different launcher vehicles: France uses the AMX 30 MBT chassis; Germany and Brazil use the Marder SPz chassis; Argentina, the trailer-mounted shelter; Iraq, the MAN 8x8 10-ton truck; NATO bases also use the MAN 8x8 10-ton truck; Nigeria, the AMX 30 MBT chassis; Qatar, the Qatari AMX 30s; Spain, the AMX 30s; US, the M109R chassis; and Venezuela, the AMX 30s. Additional launch vehicle configurations include the FMC Corporation M993 chassis for Paladin A2 and the M1 Abrams main battle tank for A3.

Warhead. Electromagnetic continuous-wave radar proximity- and contact-fused high-explosive shaped charged warhead of 6.5 kg (14 lb) weight with an explosive weight of 3.5 kg (7.7 lb). The lethal radius is approximately 5.7 m (19 ft). The Roland III warhead weighs 9.1 kg (20.02 lb) and contains the more powerful Octolite explosive; fusing in both missiles is provided by Telecommunications Radioelectriques et Telephoniques. Upon detonation, the warhead projects fragments (62 - Roland I/II or 84 - Roland III) slightly forward over a lethal radius of 6-7 m (19.7-23 feet). The proximity fuse can be armed in flight, or disarmed if the target is at extremely low level (to avoid detonation by terrain), in which case the warhead is detonated by the impact fuse. The RM-5 was to carry a dual-purpose warhead that produced dense, heavy high-kinetic energy fragments against hardened targets, plus a proximity fuse for very-low-altitude firings and the destruction of small targets.

ROLAND

Source: US Army

Variants/Upgrades

The major variants of Roland include the Roland I, Roland II, and Roland III. The United States designated the Roland II as the MIM-115, and the Roland III has also been known as Super Roland. The Roland is being modernized by both France and Germany.

Euromissile offered its Roland M3 S, which incorporates much of what was included in the Roland RM-5 system but with the notable exception of the RM-5 missile. For France, this upgrade package includes the Glaive multisensor sight (incorporating a thermal imaging camera, laser rangefinder, television, and goniometer), developed by SAGEM and originally part of the Roland RM-5 program. The optronic sight provides a multisensor capability giving the M3 S three target acquisition modes: two using the Glaive sight (passive infrared and television) for surveillance, and one using tracking radar.

The Roland M3 S also makes use of the BKS (Bedien-und-Kontroll-System), a central command, control, and coordination unit. Using the BKS, the crew can employ optronic and radar fire-control systems, either alternatively or simultaneously.

The German program is very similar and includes the following: digitization of the fire-control system; a new control indicator for the commander; installation of built-in test equipment to enhance maintenance; a link to the HFLaAFuSys command and control system; upgrade of the training and testing equipment and logistics; and preparation of the system to use the Roland III missile.

France plans to fit 54 AMX30-based fire units and 20 shelter units with this new equipment. Germany has a requirement for upgrading 84 Army and 40 Luftwaffe fire units. The German program will extend the operational life of the Roland to 2015. Production of upgraded systems for Germany could begin in 2003.

For additional information, please see the pertinent entries in the **Program Review** section.

Program Review

Background. The first design study of the missiles that would lead to Roland was made in 1962 by Nord Aviation (now part of Aerospatiale) with the SABA program, and Bolkow Aviation (now a component of Messerschmitt-Bolkow-Blohm) with the P-250. Within 18 months, the essential development of the system became a joint program between the new firms of Messerschmitt-Bolkow-Blohm and Aerospatiale. This Franco-German agreement was the forerunner of the present Euromissile consortium. This company was set up as an economic self-interest group, headquartered at Fontenay-Aux-Roses near Paris. It is directly responsible for the marketing and industrial management of the three Franco-German cooperatively developed guided missile systems, HOT, MILAN, and Roland (see separate reports in Tab F for HOT and MILAN). Following ballistic trials with inert rounds, the first guided firing was carried out in June 1968 and, although no warhead was carried, a direct hit was achieved on a CT.20 target drone.

The French were ready to accept Roland I in 1972 after the evaluation tests were completed. However, the Germans opted to wait for the all-weather Roland II. Brazil decided to adopt the system in late 1972, but vacillated on definite procurement until 1975. The French Army received the first production model of Roland in early 1976. France ordered 170 Roland I and 82 Roland II systems. The Federal Republic of Germany procured the Roland II only, ordering 394. However, this production was overshadowed by the precedent-establishing decision of the US Army to procure Roland II in 1975 and to award contracts for coproduction to Hughes Aircraft and Boeing Aerospace Corporation in June 1976. This was the first instance of the United States buying and agreeing to licensed coproduction of a major overseas weapon system. Obviously, this contributed to the credibility of the Roland program. Shortly thereafter, Norway allotted NOK 600 ($263 million) in its Fiscal 1979 defense budget for acquisition of the Roland. Belgium has also shown an interest in a special site-defense version of the Roland.

Roland Loses Out on FAADS. On January 21, 1985, the US Army asked the Federal Republic of Germany to provide five Roland systems for evaluation as a possible replacement for the canceled M247 Sgt. York anti-aircraft artillery system. The proposal, which was not followed up, touched off an uproar in Congress, while the Germans could not understand why the US Army wanted the five German fire units when 27 were already operational in New Mexico.

In late 1984 and early 1985, it was learned that the United States, through the urging of Germany, would sell the 27 US Roland fire units and 595 missiles to Turkey. The systems would have to be designed to

European standards at a total cost of about $60 million. This plan died when Turkey opted for Rapier (see separate report in Tab C).

Euromissile and Hughes Aircraft Company had proposed a version of Roland mounted on an M1 tank chassis, called Paladin, for the US Army's FAADS Light-of-Sight-Forward-Heavy requirement. However, in December 1987 the US decided to go with the Martin Marietta and Oerlikon-Buhrle team's ADATS for this requirement.

Missile Models. Roland is a compact, mobile, all-weather system. Originally designed for the French and German armies, it is a superior weapon for the close support of fixed installations and troops against low-level, high-speed air offensive actions.

Roland I/II. The Roland I, with the acquisition-only radar and the optical-based tracking and guidance fire-control system, can be employed only in daylight and clear weather. The tracking and guidance radar-equipped Roland II can be utilized day and night and in poor weather conditions. It incorporates all of the capabilities of Roland I, and can be operated in optical or radar mode. The Roland III and Roland RM-5 are described under separate entries.

Target detection is carried out by the Siemens MPDR-16 D-band pulse Doppler surveillance radar, which has a scanner revolution rate of 60 revolutions per minute (rpm), ensuring high data renewal. An audio tone warns the operator when a target has been detected, although stationary echoes can be deleted. The radar can detect targets at speeds of 30 to 450 m/sec (57-862 kt) out to ranges of 18 km (11.2 miles) and is able to operate even when the vehicle is mobile. French vehicles are fitted with the LMT NRAI-6A IFF, while the Federal German Armed Forces use a Siemens MSR-400/5 system. Coverage area is semi-ellipsoid, measuring 6.3 km (3.9 miles) long by 5.5 km (3.4 miles) wide, with a maximum engagement height of 5.5 km (3.4 miles).

Target tracking can be either radar, using a Thomson-CSF Domino 30 monopulse radar, or optical mode, using the operator's sight equipment, and it is possible to switch from one mode to the other during engagement. Optical mode is optimized for favorable daylight weather conditions or during periods of heavy electronic countermeasures (ECM), while the radar mode is optimized for foul weather conditions or darkness. In the presence of electronic countermeasures, however, it also is possible to track the enemy's jamming source.

There are two modes of operation for Roland: optical and radar guidance.

In the optical mode (Roland I), the target is detected by radar, interrogated by identification friend or foe (IFF) equipment, and acquired. The commander then delegates fire control to the gunner. The operator tracks the target visually, while the missile is steered by the fire-control system into his line of sight. An infrared goniometer measures the deviation of the missile from the sight line by tracking flares on the rear of the missile, and steering corrections are transmitted from the fire control computer to the missile. These commands are converted into the required movements of the nozzle deflectors, which alter the vector equation to produce instantaneous interception.

In the radar mode (Roland II), the tracking radar fulfills the role of the optical sight and follows the target with its receiver/transmitter beam. The tracking radar tracks both target and missile, relaying course correction information via a beacon on the rear of the missile, with steering instructions transmitted as before. Missile course correction is automatic. Roland II can be switched from optical to radar mode of operation or reverse even after the missile is airborne, an advantage in an ECM environment. The high power and directional transmission of the beacon also ensure good resistance to electronic countermeasures. As the missile intercepts its target, a contact or proximity fuse initiates detonation of the warhead.

The missile is roll-stabilized in flight by four fins mounted on the center-body, while changes to the center of gravity caused by propellant depletion are countered by four small nose fins which extend gradually during flight. Steering instructions are carried out by the movement of vanes inside the motor efflux.

The Roland missile is accelerated out of its launch tube by an SNPE Roubaix solid-propellant rocket motor producing a thrust of 1,600 kg (994.24 lb) for 1.7 seconds, followed 0.3 seconds later by ignition of the sustainer motor, by which time the missile has reached a speed of 500 m/sec (1,641 ft/sec). The SNPE Lamprey solid-propellant sustainer motor produces a thrust of 200 kg (124.3 lb) for 13.2 seconds, maintaining the speed of 500 m/sec (958 kt) and giving a range of 6.2 km (3.85 miles).

Roland III. In December 1982, Euromissile announced that work on a Super Roland was well in hand and that the missile would be available in 1985. Performance, especially speed and range, was to be significantly increased. Both France and the Federal Republic of Germany stated their desire to purchase this missile for their existing Roland systems. Production of Super Roland, also known as Roland III, commenced in 1988.

Each Roland III consists of a self-contained firing vehicle made up of a watch radar, tracking system,

firing radar and sighting telescope/IR direction finder, missile ready to be fired, control and indicator system, and computer-coordinator. The watch radar can detect hostile aircraft to a distance of 16 km. The Roland III launcher system is able to fire up to four missiles without reloading, and each vehicle has storage capacity of 12 missiles instead of 10.

The Roland III missile has a 9.1 kg warhead with 84 hollow charges. Its detonation is triggered by impact or by its electromagnetic proximity fuse, which is equipped with a minicomputer. Euromissile officials claim that Roland III can meet any current threat, and that there is sufficient growth potential for the system to be able to meet projected threats.

Roland RM-5. Aerospatiale, Matra, and Messerschmitt-Bolkow-Blohm had commenced a joint development program aimed at the design and production of a hypervelocity missile as part of a wide-ranging upgrade for the Roland air defense system. Development and production of the new missile, designated Roland RM-5, was expected to cost FRF1 billion ($180 million) over the next five years. Aerospatiale and MBB invited Matra to join their team based on the market studies that Matra had undertaken in 1988 regarding the feasibility of developing/producing a hypervelocity missile.

The program's costs were to be evenly divided among the three companies, as were the development work, production, and profits. Aerospatiale was to have acted as the general coordinator of the program, but a steering committee, comprising executives from the three partners, was to supervise the program. The partners were committed to the preliminary design phase only. This phase continued until mid-1991, at an estimated cost of FRF150 million ($25.95 million). The next key decision, on whether to launch full-scale development, came in late 1991 when Germany and France decided not to pursue this option.

The RM-5 was to be equipped with a dual-purpose warhead that produced dense, heavy, high-kinetic energy fragments effective against hardened targets, plus a proximity fuse for very-low-altitude firings and the destruction of small targets. In addition, the agility of the missile (70 G at 8 km) was to have allowed it to intercept fast aircraft making evasive maneuvers at 6 G or turns at 9 G. With a maximum range of 16 km, an effective range of 12 km, and maximum altitude of 8 km, the RM-5 was to provide the ability to engage aircraft carrying stand-off missiles before these weapons could be released.

The RM-5 was intended primarily for use with the new Glaive version of the Roland fire unit, which Aerospatiale and MBB were developing through the joint venture firm Euromissile. The Glaive fire unit consisted of an improved sight, with a new infrared optical sensor in addition to the radar and optronic sensors of current versions. Its development, estimated at FRF600 million ($108.5 million), was being funded by the French and Federal German governments under a 1989 joint contract. The Glaive fire unit was scheduled to enter service in 1996.

Roland HFK Upgrade. BGT is offering an alternative to the VT-1 missile for the Roland air defense system known as the HFK-KV. This hypervelocity missile is a variant of the HFK-L2 demonstrator. The hypervelocity missile would carry a kinetic kill vehicle equipped with an infrared seeker, inertial reference unit, aerodynamic control system, and directed-effect warhead. Maximum speed would be Mach 5.

Funding

In 1982, French Army funding for future requirements totaled FRF433 million for missiles and FRF1.1 billion for batteries, with payments against work done totaling FRF192 million for missiles and FRF724 million for batteries. Development funding totaled FRF15 million. Euromissile announced that turnover for 1985 included Roland sales worth FRF5.5 billion, and that over the 1974-1985 period, total sales had been worth FRF20.8 billion (FRF11.16 million exports). Funding is still being provided by France and Germany for both development and production of the Roland. However, Germany may have to forgo further improvements to its Roland air defense systems due to shortfalls in its defense budget.

Recent Contracts

In 2000, Germany awarded a $17 million contract to LFK GmbH to complete development work on the Roland NDV service life extension program. This work could be completed by 2003.

No specific production contract award quantities or values have been released by Euromissile. However, in September 1992, the French government did award Euromissile a contract to upgrade part of its Roland air defense system inventory. Some 20 of its Roland fire units will be shelterized. This will be followed by the installation of the new multisensor Glaive sight and BKS function management system. The shelter can be mounted on wheeled or tracked vehicles. Of the 180 Roland fire units in French inventory, 40 will be shelter-mounted. These systems were to begin entering service in 1994.

Timetable

Month	Year	Major Development
	1962	Conceptual design initiated
	1964	Joint Franco-German Roland selection
Jun	1968	First guided firing of Roland
	1972	Full-scale engineering completed
	1973	Initial Operating Capability (French Army)
	1975	US Army selects Roland II
Jun	1976	Coproduction contracts awarded to Boeing/Hughes
Oct	1977	Army accepts first US-produced Roland II
Dec	1978	First production Roland IIs to German Army
Jul	1981	Boeing delivers first US Roland II missile
Sep	1981	US Roland program canceled
Apr	1984	Spain announces procurement of Roland
	1987	Qatar purchases Roland
	1989[(a)]	First Roland III production units come off assembly line
	2003-2004[(a)]	Roland M3 S upgrade enters production
	2010-15[(a)]	Roland replacement to be available

[(a)]Estimated

Worldwide Distribution

Sales of Roland amounted to 25,600 missiles (not including follow-on operational test and evaluation missiles) and 640+ launchers worldwide to 10 countries (figures good as of late 1988). No recent sales of this system to new users have been announced. Both the Czech Republic and Slovenia have mentioned an interest in the Roland SAM. As systems leave the French and German inventory, they are expected to be offered for sale overseas. Other countries that could be interested in the Roland include Austria, the Baltic states, Hungary, Poland, and Romania.

User Country(s). At present, over 600 Roland units are in service with 11 countries. Total Roland orders are believed to amount to 664 launchers (231 on the AMX 30, 168 on the SPz Marder, 234 on cabs, and 31 for the US Army) and over 25,500 missiles. In February 1988, it was reported that the 20,000th Roland missile left the assembly plant at Aerospatiale at the end of 1987. This was a Roland II missile, of which some 200 were expected to be produced each month prior to the switch-over to the Roland III in 1989. So far, the identified customers of Roland I/II include **Argentina** (five shelter-mounted units; some are believed to have been lost during the Falklands War), **Federal Republic of Germany** (Roland II on board Marders: German Army, 140; German Navy, 20; German Air Force, 68), **Brazil** (four Roland I deployed on board Marders; may have been replaced with Roland II), **France** (six regiments using AMX 30 chassis: 176 Roland I/II), **Iraq** (deployed on board MAN 8x8s and AMX 30

chassis: 127 Rolands), **Jordan** (20 fire units, unconfirmed), **Nigeria** (16 on AMX 30 chassis), **Qatar**, **Spain** (18 on AMX 30 chassis), the **United States** (54 on palletized system – deactivated in September 1988), and **Venezuela** (eight shelter units).

The **United Arab Emirates** was reported to have purchased Roland, although there has been no confirmation of this sale. The sale reportedly took place at the same time Qatar made its last Roland purchase.

Forecast Rationale

Despite the cessation of its production, Roland could find a new market for itself among new members of NATO and those petitioning to join the alliance. Both France and Germany plan to keep their Rolands in service through the end of the decade, but some units are expected to be made available for export. These systems would be modernized before being offered for sale.

Slovenia is the most likely near-term customer for the Roland. This missile would be procured as part of a larger buy of foreign military equipment. Other items that could be procured include light armored vehicles, anti-tank missiles, transport helicopters, and short-range air defense radars. A Roland procurement contract could be awarded as early as next year (2003). Other potential near-term customers for the Roland include the Czech Republic and Romania. Austria, the Baltic states, Hungary, and Poland have also mentioned an interest in the Roland.

In the meantime, the French and German upgrade program will help to extend the Roland's service life to 2015. This program will not include the manufacture of new missiles. Germany has awarded LFK a contract to complete work on the Roland NDV modernization package. Production of upgraded systems could start in 2003. This modernization effort, coupled with the resale of existing Roland fire units, could generate a sizable amount of money for the contractors involved over the next 10 years.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

			High Confidence Level				Good Confidence Level			Speculative			
Missile	**(Engine)**	**thru 01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**Total 02-11**
EUROMISSILE													
ROLAND I/II	LAMPYRE	24641	0	0	0	0	0	0	0	0	0	0	0
ROLAND III	UNSPECIFIED	3626	0	0	0	0	0	0	0	0	0	0	0
Subtotal - EUROMISSILE		28267	0	0	0	0	0	0	0	0	0	0	0
BOEING/HUGHES (Licensee)													
MIM-115A	LAMPYRE	663	0	0	0	0	0	0	0	0	0	0	0
Subtotal - BOEING/HUGHES (Licensee)		663	0	0	0	0	0	0	0	0	0	0	0
Total Production		28930	0	0	0	0	0	0	0	0	0	0	0