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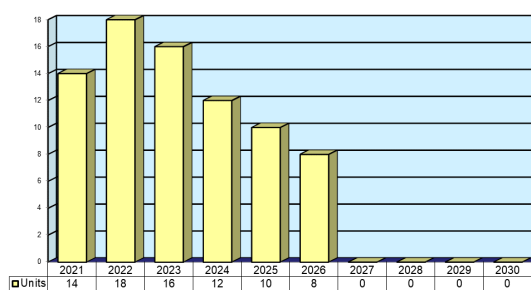
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EL/M-2129 (ARSS-1)

Outlook

- The ELM-2129 is no longer marketed by IAI Elta; being replaced by the ELM-2112 surveillance radar family
- After the cancellation of the U.S. CBP's RaVEN-M border security vehicle contract, Telephonics was left without a major customer
- The ARSS production forecast is speculative, because the company and its customers rarely release relevant sales information

Unit Production Forecast
2021-2030



Orientation

Description. The ELM-2129 (ARSS) (formerly known as the EL/M-2129) is a man-portable, mobile or fixed installation, high-pulse-compression-ratio ground surveillance radar.

Status. In production and service.

Total Produced. An Elta Systems company representative said in May 2010 that approximately 1,800 EL/M-2129 units were operational worldwide.

Application. The ELM-2129 MDSR (Movement Detection and Security Radar) system is utilized in military, paramilitary, and security situations to detect moving targets such as people, vehicles, and low-flying objects (e.g., helicopters and gliders). The ELM-2129 can also support artillery fire correction by detecting the location of shell impact. Telephonics manufactures the system as the ARSS-1 (Advanced Radar Surveillance System).

Telephonics has incorporated the ARSS on board its Radar and Video Enforcement Network-Mobile (RaVEN-M) border patrol vehicle, also known as the Mobile Surveillance Capability (MSC) vehicle.

Price Range. The ELM-2129 (ARSS-1) ranges in cost from \$150,000 to \$300,000, depending on quantity. This range was derived from a \$30 million contract from an Asian country for 180 systems (\$167,000 each).

In 2012, the U.S. General Services Administration (GSA) signed an agreement with Telephonics setting the price of an ARSS at \$156,266. Considering that this price included a 3 percent discount, the market price of a base ARSS at that time was \$161,099. In man-portable configuration, the total came to \$176,716, and in mobile configuration, \$172,585.

Prices are higher for smaller-quantity buys and if options are included, such as logistics support, spares, training, and manuals.

In December 2010, the U.S. Department of Homeland Security awarded Telephonics a \$45.3 million contract to supply electronics in support of a potential 215 MSC systems, presumably for the vehicle's ground surveillance radar. Extrapolating the unit cost for an MSC system's radar gives a price of \$210,600.

EL/M-2129 (ARSS-1)**Contractors****Prime**

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Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Technical Data

Design Features. Designed for military, paramilitary, and security applications, the ELM-2129 (ARSS-1) radar system uses coherent pulse compression to automatically detect moving ground and low-flying targets (e.g., gliders and helicopters) at ranges up to 30 kilometers. Adding a power amplifier or increasing the antenna size achieves higher detection ranges.

The man-portable ELM-2129 (ARSS-1) is capable of being deployed in less than five minutes and can operate in a -30°C to 55°C temperature range.

The ELM-2129 (ARSS-1) can be deployed as a man-portable, fixed, or vehicle-mounted radar system. In addition to detecting ground and low-flying targets, the ELM-2129 can detect the locations of shell impact to assist in correcting artillery fire. Areas of interest can be defined, and when a target is detected in these areas, an alarm will sound. Targets in areas of non-interest will not sound the alarm. Digital background maps in 2-D and 3-D formats can be prepared.

Specifications	<u>Metric</u>	<u>U.S.</u>
Frequency Band	I-/J-band	X-band
Antenna Dimensions	60 cm x 40 cm	23.6 in x 15.75 in
Antenna Gain	31 dB	
Processing	FFT, CFAR, TWS	
Weight	19 kg (ARSS), 30 kg (ELM-2129)	42 lb (ARSS), 66 lb (ELM-2129)
Performance		
Range Accuracy	25 m	82 ft
Azimuth Accuracy	0.5°	
Sector Search (operator selected)	10° to 360°	
Scan Speeds	1.3, 2.6, and 3.8 RPM	
Minimum Detection Velocity	0.5 m/s	1.6 ft/s
Number of Tracked Targets	300 (ARSS) >100 (ELM-2129)	
Temperature Range	-30°C to 55°C	-22°F to 131°F
MTBF	20,000 hr	
MTTR	<20 minutes	
<u>Tx=5W</u>		
Detection Range		
Walking Person	8 km	4.3 nm
Helicopter	15 km	8.1 nm
Heavy Vehicle	24 km	13.0 nm
Artillery Shell Impact (155mm)	10 km	5.4 nm
Transmitted Peak Power	5 W	
Power Consumption	90 W@18-30 VDC	

EL/M-2129 (ARSS-1)**Tx=25W**

	<u>Metric</u>	<u>U.S.</u>
Detection Range		
Walking Person	10 km	5.4 nm
Helicopter	16 km	8.6 nm
Heavy Vehicle	30 km	16.2 nm
Artillery Shell Impact (155mm)	12 km	6.5 nm
Transmitted Peak Power	25 W	
Power Consumption	110 W@18-30 VDC	



The ARSS-Equipped RaVEN-M Border Patrol Vehicle

Source: Telephonics

EL/M-2129 (ARSS-1)

Variants/Upgrades

ARSS-1. Telephonics is marketing the ELM-2129 as the Advanced Radar Surveillance System (ARSS-1). This is the man-portable version.

ARSS-2. This version can be integrated into any mobile surveillance vehicle or supplied complete as required with an air-conditioned shelter containing an electro-optical director, a TV camera, an infrared camera, monitors, a mast, and level sensors.

ELI-3300 – Integrated Border Protection System. Elta's ELI-3300 Integrated Border Protection System is a user-customizable border protection solution. It can integrate a wide variety of sensors, including the ELM-2226 Coastal Surveillance Radar, the ELM-2128 Miniature Movement Detection Radar,

the ELM-2129 Movement Detection and Security Radar, the ELM-2140 Long-Range Movement Detection Radar, the ELM-2106 Point Defense Air Surveillance Radar, and many E/O payloads. The sensors can be mixed and matched to provide whatever degree of coverage is needed for the situation. Some installations include the ELM-2129, while others do not.

ELI-3389 – Long-Range Combo Pole. The Elta ELI-3389 Long-Range Combo Pole mounts the ELM-2129 Movement Detection and Security Radar in combination with a mid-range E/O payload on an elevated pole. The combo poles can be combined to provide a network of sensors for critical infrastructure protection. Each pole provides 360° of coverage.

Program Review

Note: In the *Program Review*, the ELM-2129 is sometimes referred to as the EL/M-2129. This is a reflection of the system's historical nomenclature.

Background. Israel Aerospace Industries (IAI) introduced the EL/M-2129 Movement Detection and Security Radar (MDSR) in 1996. A year later, the IDF (Israel Defense Forces) selected the EL/M-2129 for its Solid Mirror Border Surveillance System. Under a teaming agreement with IAI, Telephonics began producing the radar in 1998. The Telephonics version is marketed as the Advanced Radar Surveillance System (ARSS-1). More than 125 ARSS-1 units were shipped to Israel for the program. The ARSS-1 is believed to be fitted to the Stalker II mobile surveillance system as a component of Solid Mirror, which runs along the entire length of the Israeli-Lebanese border. Solid Mirror was first deployed in 1999.

International Sales

Telephonics and Ericsson (now Saab) teamed up to produce the ARSS for the Norwegian Army for deployment along the Russian border and for use by NATO forces. In addition, Norway has deployed the ARSS to Afghanistan. To date, Norway has acquired 14 units. In 2004, Ericsson and Telephonics agreed to pursue selected international programs using the ARSS-1 as part of an overall border surveillance system. Telephonics also has agreements with other companies, such as L3 Communications Government Services and 4D Security Solutions.

It was announced in 1999 that India had ordered 56 EL/M-2129 radars, along with 200 man-portable radar systems, under a \$14.28 million contract. The other

system was assumed to be the EL/M-2129 companion system, the EL/M-2128. At that time, the Indian Army had plans to acquire between 120 and 140 vehicle-mounted radars and 450 to 500 man-portable systems. Shortly afterward, an Asian country placed a \$30 million order for 180 EL/M-2129 systems.

Northrop Grumman Picks ARSS

Telephonics' success continued when Northrop Grumman placed a \$37 million order for 330 ARSS-1 units in 2003 to support the U.S. Air Force's Integrated Base Defense Security System (IBDSS) program. The Air Force uses these systems in various configurations at 175 bases worldwide. Four additional systems were sold to L-3 Communications (now L3 Technologies) for USAF support.

In spring 2004, Telephonics deployed the ARSS-1 in a homeland security application for critical infrastructure protection for an unidentified agency.

Northrop Grumman received a \$69 million delivery order in August 2008 to support forward-operating bases throughout U.S. Central Command (CENTCOM)—its 69th order under the IBDSS contract. No mention has been made as to whether a subcontract was awarded for ARSS units.

USAF Security Projects

In April 2005, FedBizOpps (FBO) issued a solicitation notice for the purchase of two Mobile Detection and Assessment Systems (MDAS) for test and evaluation. MDAS is being developed under a USAF project to enhance long- and short-range force protection levels without costly infrastructure requirements. MDAS is

EL/M-2129 (ARSS-1)

composed of three major components: the Perimeter Surveillance Radar System (PSRS), the Man-portable Surveillance and Target Acquisition Radar (MSTAR), and the ARSS. In early 2006, MDAS underwent approximately 20 days of successful testing at Lackland AFB, Texas. MDAS was then scheduled to undergo formal testing at Eglin AFB, Florida, prior to Air Force-wide implementation. It is unknown if formal testing or implementation has taken place.

***U.S. Homeland Security – SBInet &
U.S. Customs and Border Protection – MSS***

In September 2006, the U.S. Department of Homeland Security (DHS) awarded a contract to Boeing to implement a Secure Border Initiative Net. SBInet is an integrated surveillance system that contains the ARSS, aimed at curbing illegal immigration.

The Obama administration canceled the SBInet project in January 2011. Then-Homeland Security Secretary Janet Napolitano stated that the department was redirecting SBInet resources to other, proven technologies.

In January 2008, Telephonics announced that it had received a \$14.5 million contract from the U.S. Customs and Border Protection (CBP) service in support of the Mobile Surveillance System. The MSS integrates a ground surveillance radar, EO/IR sensors, and GPS location data. Although the ground radar was not mentioned by name, Forecast International believes this sale included the ARSS. A second contract was awarded for four additional systems that were delivered in 2009.

Telephonics reported in April 2009 that the company had completed upgrades to 30 MSS platforms as part of its contract with CBP. The upgrades incorporate mechanical, electrical, and software improvements developed from field experience.

In September 2009, *Defense Daily* quoted then-CBP service SBI Executive Director Mark Borkowski as saying that the agency currently operates 44 MSSs, in addition to some from ICx Technologies. Forecast International notes that the ICx units do not contain the ARSS radar.

Elta Marketing Moves: IBPS and eBOSS

In order to increase sales, Elta has bundled the EL/M-2129 with a mix of complementary radars, as discussed below. Some of these systems are part of Elta's eBOSS (electronic border security system) family.

EL/I-3300 Integrated Border Protection System (IBPS). Elta has paired the EL/M-2129 with the EL/M-2226 (Coastal Radar), the EL/M-2128 (Miniature

Movement Radar), the EL/M-2140NG (Long-Range Movement Detection Radar), and the EL/M-2106NG (Point Defense Surveillance Radar), as well as unmanned air vehicles (UAVs) and a command and control center, to form its EL/I-3300 Integrated Border Protection System (IBPS).

Perimeter Protection System (PPS). Elta has also integrated the EL/M-2129 with its EL/M-2127 (Smart Miniature Detection Radar) and EL/M-2107 (Miniature Movement Detection Radar) as a Perimeter Protection System (PPS). The EL/M-2129 provides ground protection around aircraft landings and takeoff routes, the EL/M-2127 provides perimeter (outside the fence) coverage and protection against hostile penetration, and the EL/M-2107 acts as a gapfiller. Elta announced in June 2006 that it had won a contract to provide a PPS for Ben Gurion International Airport. Elta has also received a contract to provide a PPS for an unidentified international airport.

Integrated Battlefield Surveillance System (IBSS). Elta also produces the Integrated Battlefield Surveillance System (IBSS), which incorporates fixed and mobile sensor stations with movement detection radars and day/night electro-optic sensors as well as a command and control station for receiving and integrating the sensors' information and disseminating it to law enforcement personnel. This system might include the EL/M-2129 radar.

EL/I-3389 Long-Range Combo Pole. The EL/I-3389 Integrated Radar and Electro-Optics Combo Pole is a family of poles with a surveillance radar and an electro-optical subsystem connected through software. The EL/I-3389 Long-Range Combo Pole is fitted with one EL/M-2129 radar and mid-range day and night cameras. The other members of the Combo Pole family are equipped with other radars.

TGM Mobile Surveillance Vehicle. TGM Defense Integrated Technological Solutions of Israel offers a mobile surveillance vehicle for border and battlefield observations. The unit has an EL/M-2129 radar, a POP-200 thermal imager, a CCD camera, a video recorder, and a control and display unit.

Elta Receives Awards, but Details Are Scarce

Elta Systems reported in May 2008 that approximately 116 EL/M-2129 units had been delivered in FY07. At the same time, Elta stated that the company was under contract to deliver approximately 125 EL/M-2125 systems in FY08.

In June 2008, IAI announced the award of three contracts totaling \$15.4 million for border protection systems from European and South American countries. Included in the announcement was a photo of the

EL/M-2129 (ARSS-1)

Elta IBPS, which is known to contain the EL/M-2129 radar.

Eight months later, in February 2009, IAI reported the award of \$65 million in contracts for homeland security systems in 2008 from various customers worldwide. No further information was provided.

An Elta Systems company representative disclosed in May 2010 that approximately 100 EL/M-2129 systems were delivered in 2009.

Boeing and ARSS

In March 2012, the U.S. Federal Communications Commission reported that The Boeing Company had applied for experimental rights to operate ARSS in the 8,750.55-8,950.55-MHz band. The rights were granted during the period from November 2011 to February 2012 for integrated functional system testing.

The ultimate application of this testing is unclear. However, Boeing was the lead contractor on the canceled SBInet program, and this activity could be related.

MSC Deliveries

In January 2011, Telephonics' Electronic Systems division signed a \$12.8 million contract with the U.S. Customs and Border Protection service for production of a Mobile Surveillance Capability (MSC) system. The contract has an incremental value of \$45 million if all four of its option years are exercised, totaling 215 units.

Telephonics reports that the MSC system is a significant improvement over the company's MSS, adding significant amounts of automation and increased detection and identification capabilities. Although its exact components are unknown at this time, it is believed that the MSC system incorporates the ARSS ground surveillance radar.

The CBP gave the go-ahead for Telephonics to begin MSC system deliveries in May 2011. In an interview at the Border Security Awards 2013, Telephonics' Vice President of Marketing, Bobby Brown, revealed that the first two MSC systems had been delivered in March 2013. He went on to state that the company had earlier delivered 44 MSS vehicle/ARSS packages.

In January 2016, Telephonics said in a statement that it had won the MSC award and would fulfill the contract with its Radar and Video Enforcement Network-Mobile (RaVEN-M) border patrol vehicle. The statement revealed that two RaVEN-M-based MSC vehicles had begun operational testing over nine months prior to the contract, calling into question the 2013 statements by Brown.

The most likely scenario is that the MSC project had been delayed due to ongoing development difficulties following the cancellation of the SBInet program. Development of a new integrated border control network would have taken a considerable amount of time, leading to delays that could have pushed the award of the MSC contract back to late 2015/early 2016.

Contracts/Orders & Options

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Telephonics	37	Oct 2003 – Northrop Grumman placed an order for 330 ARSS-1 units in support of the U.S. Air Force's IBDSS program.
IAI-Elta Systems	Undisclosed	Contract to provide PPS for a foreign international airport. EL/M-2129 is one component of PPS.
Elta Systems	Undisclosed	Jun 2006 – Contract to provide PPS for Ben Gurion Airport.
Telephonics	14.5	Jan 2008 – Contract to provide MSS for the U.S. border. The MSS includes ground surveillance radar, EO/IR sensors, and GPS data. The contract was awarded by the U.S. GSA on behalf of the U.S. Customs and Border Protection service.
Telephonics	Undisclosed	2008 – Contract to provide four additional MSSs for the U.S. border. Delivery was expected in 2009.

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<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Elta Systems	15.4	Jun 2008 – Three contracts were awarded by the border protection services of Europe and South America. The total value of these contracts was \$15.4 million. The contract announcement included a photo of the Elta IBPS, which is known to contain the EL/M-2129 radar.
Telephonics	12.8	Jan 2011 – Contract to provide MSC systems and integrated logistics support for the U.S. border. The award includes options of up to four additional years, with an estimated incremental value in excess of \$45 million.
Telephonics	13.5	Jan 2016 – USCBP contract for RaVEN-M-based MSC border patrol vehicles. The contract award is for a base-level year but includes allowances for additional option years.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Jan	1996	EL/M-2129 introduced
	1997	Israel Defense Forces selects EL/M-2129 for Solid Mirror
Oct	1998	Telephonics and Elta sign a teaming agreement to brand/produce the EL/M-2129 (ARSS-1) for North America and FMS/FMF programs
Feb	1999	ARSS-1 units deployed as part of Solid Mirror
		India orders 56 EL/M-2129 radar systems
	1999	Unidentified Asian country orders 180 EL/M-2129 systems
Jul	2002	Norwegian Army deploys 14 ARSS units for border surveillance
		EL/M-2129 included in a sensor suite mounted on the Sabiex Iguana 4x4 light armored vehicle unveiled at the Eurosatory show
Oct	2003	330 ARSS-1 units ordered for U.S. Air Force
		PPS ordered for an unidentified international airport – EL/M-2129 is a part of PPS
Jun	2006	PPS ordered for Ben Gurion International Airport
Jan	2008	Telephonics awarded \$14.5 million contract to produce MSS for use on U.S. border (ARSS is believed to be a part of the MSS suite)
Spring	2009	Three MSS units moved from southern U.S. border to northern border for evaluation
Mar	2010	Freeze on SBInet spending beyond Block 1 Tucson and Ajo regions
Jan	2011	SBInet canceled in favor of proven technologies
		Telephonics awarded contract from CBP for MSC systems for U.S./Mexico border
Apr (approx.)	2015	Operational testing of two MSC vehicles begins
Dec	2015	U.S. CBP awards Telephonics an MSC contract for RaVEN-M vehicles
Jun	2018	U.S. CBP MSC contract canceled
	2021	Production continues

Worldwide Distribution/Inventories

Customers of the ELM-2129 include **India, Israel, Norway**, and the **United States**. Elta Systems reports that it has also sold the system to customers (which it did not identify) located in **Africa, Asia**, and **Eastern Europe**.

ARSS-1 customers include **Israel, Norway, Poland**, and **Romania**, as well as the **U.S. Air Force, U.S. Army**, and **U.S. Customs and Border Protection (CBP)** service.

EL/M-2129 (ARSS-1)**Forecast Rationale**

The versatile IAI Elta Systems ELM-2129 Movement Detection and Security Radar enjoyed a stream of orders throughout the 2000s and 2010s. However, as of 2020, IAI has ceased marketing the system and is focusing its sales efforts on its ELM-2112 family of surveillance radars.

American company Telephonics is currently marketing a radar that was originally based on the ELM-2129, the ARSS. Since the ARSS' launch, though, Telephonics has made the radar "its own," and the current system is thought to be quite different from the IAI Elta original. The U.S. Customs and Border Protection service is the Telephonics ARSS's primary customer.

In the past, the CBP acquired the radar for 44 of its MSS vehicles. More recently, the CBP has taken

delivery of the ARSS for its RaVEN-M (also known as Mobile Surveillance Capability, or MSC) vehicles. The latest MSC contract was awarded in December 2015, but the program contract lapsed in June 2018.

While some of the ARSS production forecast was ensured through the RaVEN-M project, the remainder is purely speculative. Telephonics and its customers rarely release sales information about the radar, leaving much of the forecast figures an educated guess, based on past performance.

Because procurement of RaVEN-Ms under the MSC contract has ended, all forecast production should be considered speculative.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program		High Confidence				Good Confidence			Speculative			
	Thru 2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Telephonics Corp												
ARSS <> Worldwide												
Note: Speculative												
	76	14	18	16	12	10	8	0	0	0	0	78
Total	76	14	18	16	12	10	8	0	0	0	0	78