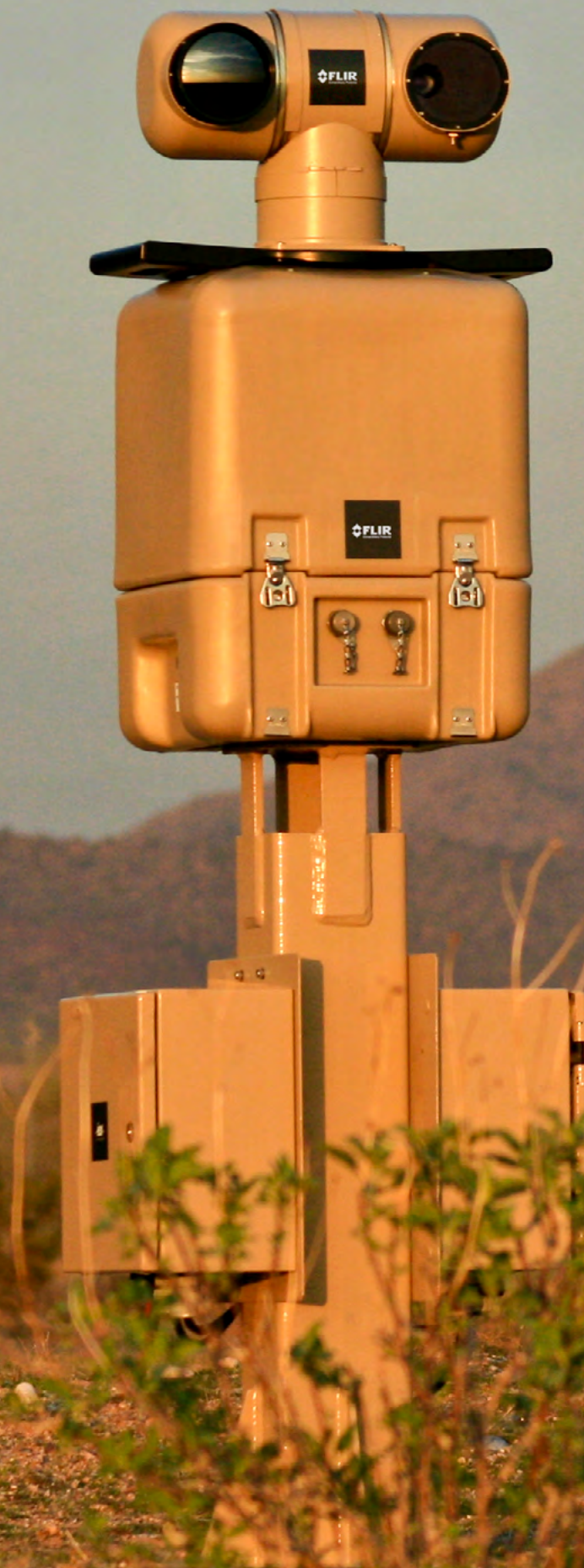




# Ranger Family of EO/IR Imaging & Radar Systems

ASSESSMENT BEYOND THE FENCE



With more than 40 years of experience delivering extraordinary protection for land-based, man-portable, maritime and airborne applications, FLIR Systems continues to develop technologies that fulfill customer needs. From long range detection to wide area surveillance, using millimeter-wave radar, short-, mid-, and long-wave infrared, cooled and uncooled technologies, FLIR Systems offers a full spectrum of solutions for any mission. The Ranger family of multi-sensor EO/IR imaging systems and the latest in ground-surveillance radar provides a full spectrum of solutions for force protection and homeland security operations.

## **RANGER FAMILY: PERIMETER SURVEILLANCE THAT GOES BEYOND THE FENCE**

The Ranger family of systems provides beyond the fence perimeter surveillance to detect, assess, and identify threats. Thousands of wide area surveillance radars and multi-sensor imaging systems are deployed worldwide to provide beyond the fence surveillance for military, border, and critical facility security applications. With all the technological and development capabilities in-house, FLIR has the ability to integrate these systems into comprehensive surveillance solutions.

With the Ranger product suite, FLIR continues to develop and deliver reliable multi-sensor systems to tackle extreme temperature and other harsh environmental conditions, such as those found in the Middle East. Together, the Ranger family of radars provides the capabilities necessary to address the emerging challenges of our time.

# LAYERED SECURITY APPROACH

At FLIR, we believe a layered approach to wide area surveillance and perimeter intrusion detection is necessary to provide advanced warning of potential threats – before they cross a perimeter. Security must extend beyond the fence to sense, detect, and identify threats while allowing security operators sufficient response time to protect people and facilities. A combination of ground surveillance radars and multi-sensor imaging systems working together can provide a significantly “hardened” perimeter that will serve to enhance overall security.

## RANGER SERIES IMAGERS

The Ranger® family of imaging systems provides beyond the fence perimeter surveillance to detect, assess, and identify threats. With all the technological and development capabilities in-house, FLIR has the ability to integrate these systems into comprehensive surveillance solutions.

Multi-sensor systems for surveillance, security and force protection are available in each range and performance class. All of these systems may be operated independently or in a fully integrated radar/sensor network. These systems tackle extreme temperatures and other harsh environmental conditions and are in operational use worldwide. Together, the Ranger product suite provides the capabilities necessary to address the emerging challenges of our time.



### Ranger® HRC Series

The Ranger HRC Series is a family of ultra long-range, midwave and longwave multi-sensor imaging systems with a wide choice of telescopes, TV cameras, lasers and payload sizes. Operators can field Ranger HRC as a standalone, environmentally hardened sensor package, or integrate it into a sensor network via FLIR's CommandSpace® suite of integration tools.



### Ranger® MS-UC DefendIR™

The DefendIR is an industry leading mid-range imaging system that offers user-controlled, customized real time blending of the two visual sources – a visible light (CCD) camera and a longwave, uncooled infrared camera. The VisionSense™ blending technology generates the ability to penetrate glare, and to see what is not readily apparent with either sensor alone.



### Ranger® MS Illuminator™

The Ranger® MS Illuminator is a unique deterrence system that utilizes a day / low-light CCD camera with a high-power, focusable spotlight to detect, deter and immobilize intruders. When paired with an FLIR millimeter wave radar; the Ranger MS Illuminator can be a powerful addition to detect and visibly illuminate intruders, showing security forces where to respond.



### Ranger® MS-UC EnforcIR™

The Ranger MS-UC EnforcIR™ is a unique deterrence system that builds on the impressive capabilities of the Ranger MS-UC EnforcIR™. Utilizing a day/low-light CCD camera and cooled InSb thermal imager, the Ranger MS-UC EnforcIR Tau adds a high power spotlight to detect, deter and temporarily disorient



### Ranger® MS-LRTI

The MS-LRTI builds on the impressive capabilities of the DefendIR. Utilizing a day/low-light CCD camera and thermal imager, the MS-LRTI adds a high power spotlight to detect, deter, and temporarily disorient intruders within a one-mile radius.



### Ranger® HDC

The Ranger HDC is a RealHD thermal imager with a 1280x720 cooled detector. The system provides exceptional long range thermal imaging performance and provides 22x continuous optical zoom to maintain situational awareness for effective target assessment and features the new FLIR Image Processing Engine.



### Ranger® T3000 UC

The Ranger T3000 UC is our most powerful mid-range uncooled dual field of view system. With its large-format uncooled thermal camera, a powerful daylight sensor, optional laser rangefinder and other Ranger T3000 features, this system starts quickly, operates quietly, and is nearly maintenance free.



### Ranger® T3000

Integrates a long-range, longwave thermal imaging system with a powerful daylight sensor, GPS, advanced mapping software, and optional laser rangefinder for a capable target geolocation system. The large-format, cooled thermal camera provides excellent image quality through battlefield smoke and dust.



## RANGER R SERIES RADARS

Understanding the nature of a threat is critical to intercepting and defeating it. Knowing where the threat is coming from, its current location and where it is going is a key requirement of any effective security system. Ranger ground surveillance radars (detection), paired with slew-to-cue Ranger EO/IR sensors (assessment), enable security personnel to monitor and control the security zone by intercepting threats before they can complete their mission.

Ground-based radar provides a passive detection system to continuously monitor a perimeter and other designated areas using rules-based detection methods; eliminating the need for constant human monitoring of video screens. Upon detection of an intrusion attempt, multi-sensor imaging systems will slew-to-cue to provide target assessment and visual tracking. Once a threat gets too close, it is often too late. With integrated camera and radar systems, security can truly begin beyond the fence.



### FMCW Radars

FMCW radar technology provides the highest fidelity for target detection, tracking and assessment. FLIR's line of FMCW radars provides automated perimeter security for encampments, bases, facilities, and other high value permanent and temporary sites. These radars have all weather, all light-level capability and detect either moving or stationary targets, providing slew-to-cue functionality for the Ranger high resolution imaging systems.



### Dual Mode Radars

FLIR's line of dual mode, high resolution radars accurately detect and track vehicles, people, and crawlers in virtually any climate, weather, or lighting condition to provide slew-to-cue functionality with the entire line of Ranger imaging systems. These radars possess a dual mode configuration to leverage the advantages of both advanced FMCW and traditional Doppler radar technology in a single, compact package.



### Solid State Radars

The Ranger family of long range solid state, electronic scanning radars from FLIR provide next generation “track while scan” capabilities in a ruggedized, mil-spec design. These ground surveillance radars have an exceptionally fast, 2Hz refresh rate with class leading target detection and acquisition performance. As solid state radars, these systems have highly reliable system performance and 24/7 persistent surveillance, both within and beyond the fence.



### Motion Detection

Ranger® GRIDS provides a low cost system designed to fill coverage gaps resulting from dense foliage and rough terrain. Ranger GRIDS system sensors can be buried, leaving only a small camouflaged antenna above ground – a virtually undetectable electronic sensor system. Intruders are detected when they pass between adjacent sensors and multiple systems can be implemented to form a sensor barrier of any length.

# EO/IR IMAGERS



THERMAL IMAGER	RANGER MS SERIES*	RANGER HDC	RANGER MS-LRTI	RANGER T3000
Sensor type	640p x 480p InSb focal plane array	1280p x 720p InSb focal plane array	Cooled 640p x 512p InSb 15 μm	640p x 480p QWIP
FOVs	14° to 1.1° continuous 25° to 2° continuous**	30° x 17°	2° to 30° FOV with continuous optical zoom	25° to 1.3° continuous zoom
Narrow FOV		1.4° x 0.8°		0.99 x 0.74°
Spectral band	3-5 μm		MWIR (3-5μm)	8-9.2 μm
Automated features	Auto Focus, Auto Adjust Focus Memory, Tunable STACE digital imae enhancement	22x Continuous Optical Zoom	Integrated precision position system Real time overlay of thermal and visible imagery through continuous zoom 12 MCP spotlight FOV is slave to the visible FOV	
<b>STANDARD COLOR CCD-TV CAMERA</b>				
Type	Color CCD		Color CCD	Color CCD
FOVs	Standard Range, 26x (42° to 1.6°) Long Range, 25x (0.48° to 28.7°) Ultra Long Range (0.5° to 11.8°)		3.5mm (Wide FOV 42°) 91mm (Narrow FOV 1.6°)	42° to 1.6° continuous
<b>LASER PAYLOAD</b>				
Rangefinder	Optional			Optional
Type	Erbium-glass			Erbium-glass
Max range	20km			10km
Classification	Class 1 (eyesafe)			Class 1 (eyesafe)
<b>SYSTEM INTERFACES</b>				
Analog video	NTSC/PAL		RS-170 (NTSC) or CCIR (PAL)	NTSC/PAL
Digital video	MPEG 4 (option)	HD SDI, GigE, IP: MPEG4, MJPEG		
Command & Control	Point-to-point serial or Ethernet 10/100 (single user) Pelco Endura D (option) Nexus Networking Suite (option)	TCP/IP, Gigabit Ethernet 1000 BASE-T, Nexus, and multiple standard protocols	RS-422 and 10/100 Ethernet CommandSpace Adaptive C2	RS 232, 485, Ethernet TCP/IP
<b>DIMENSIONS &amp; WEIGHT</b>				
Size	18.6" x 7.6" x 8.6" (474mm x 194mm x 225mm)	24.8" x 10.2" x 12.4" (630mm x 260mm x 315mm)		
Weight (varies w/options)	System configuration dependent	39.7 lbs (18 kg)	33 lbs (15kg)	5

\*Ranger HRC-X configuration shown. Many other options available.

# RADARS

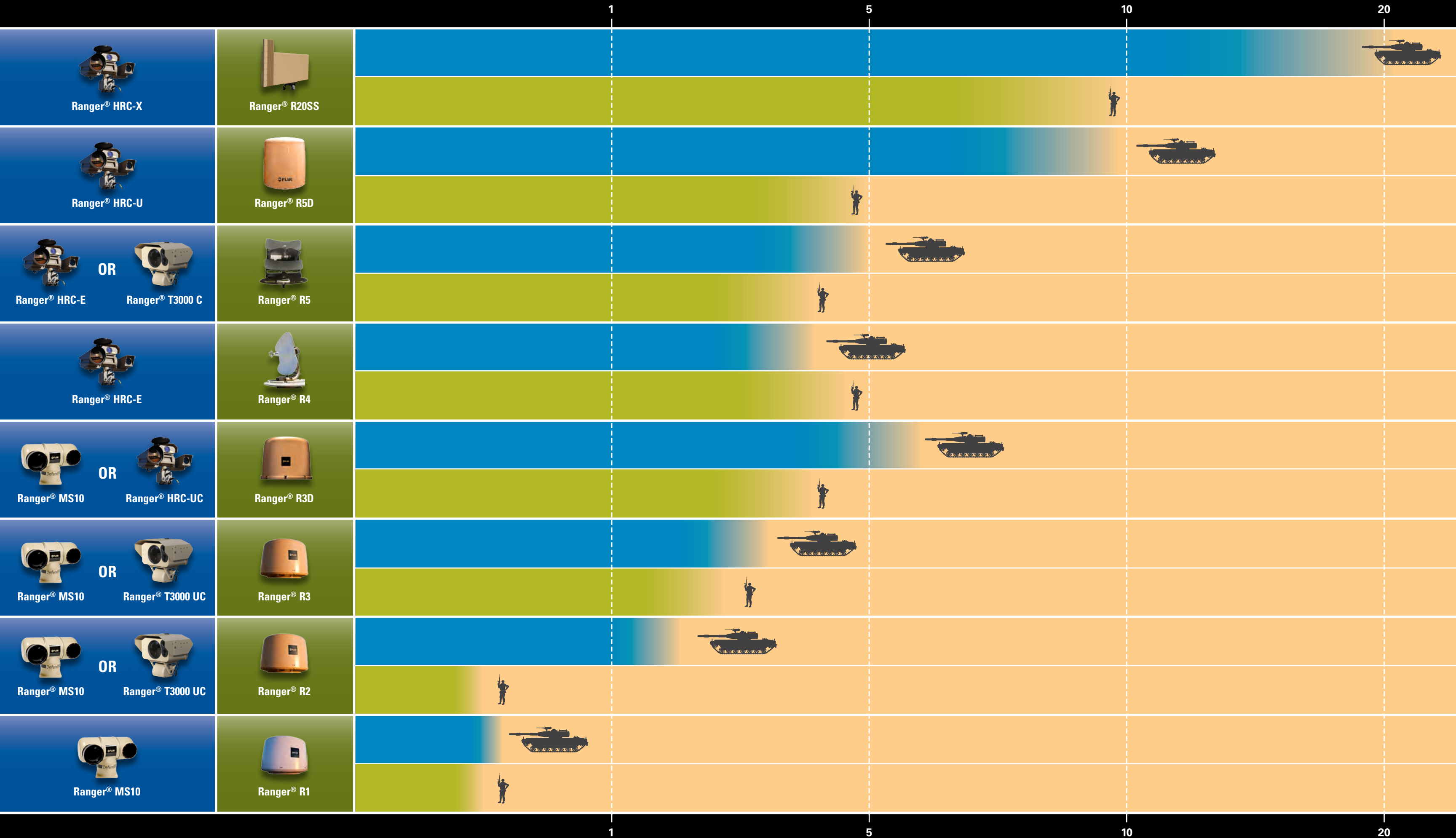


RADAR	RANGER R2	RANGER R3D	RANGER R5D	RANGER R20SS
Radar Type	FMCW	Dual Mode: FMCW/Doppler	Dual Mode: FMCW/Doppler	Solid State
Target Types	Moving, Greater than 0.1 m/s min, Vehicles and personnel	Moving, Less than 0.1 m/s min, Vehicles and personnel	Moving, Less than 0.1 m/s min, Vehicles and personnel	Moving, Less than 0.1 m/s min, Vehicles and personnel
Target Velocity	0.1 to 50 m/s	0.1 to 50 m/s	0.1 to 50 m/s	0.1 to 44 m/s
Communications	Ethernet, wireless, fiber	Ethernet, wireless, fiber	Ethernet, wireless, fiber	Ethernet, wireless, fiber
False Alarm Rates	<1 per 24 hours	<1 per 24 hours (Fast Scan)	<1 per 24 hours (Fast Scan)	<1 per 24 hours
Mask Zone(s)	Two selectable angular blank sectors Unlimited polygon detection zones	One angular detection zone (Doppler), Two selectable angular detection zones (Fast Scan) Unlimited polygon detection zones	One angular detection zone (Doppler), Two selectable angular detection zones (Fast Scan) Unlimited polygon detection zones	Unlimited Polygons
Detection Range	5 to 500 m, crawler/swimmer 5 to 1400 m, personnel 5 to 1400 m, vehicles	5 to 3,700 m, personnel walking 5 to 6,000 m, vehicles and watercrafts	5 to 5,500 m, personnel walking 5 to 9,400 m, vehicles and watercrafts	10 to 8,000 m, personnel walking 10 to 15,000 m, light vehicles 10 to 20,000 m, large vehicles
Coverage Area	6.16 km <sup>2</sup> (2.41 mi <sup>2</sup> )	133 km <sup>2</sup> (52 mi <sup>2</sup> )	346 km <sup>2</sup> (135 mi <sup>2</sup> )	
<b>ENVIRONMENTAL</b>				
Temperature	-30°C to +60°C (operating) -40°C to +70°C (storage)	-30° to +60°C (operating) -40° to +70° (storage)	-30° to +60°C (operating) -40° to +70° (storage)	-30° to +60°C (operating) -40° to +70° (storage)
Weather Sealing	Weather resistant (rain, snow, dust, sand, salt spray)	IP 65 Rating	IP 65 Rating	IP 66 Rating
Vibration	MIL-STD-810F	MIL-STD-810F	n/a	MIL-STD-810 and MIL-STD-461
<b>DIMENSIONS &amp; WEIGHT</b>				
Size	13 in h x 17 in diameter	15 in h x 18 in diameter	21.3 in h x 22.5 in diameter	18.1 in h x 30.1 w x 4.1 in diameter
Weight	24 lbs (11 kg)	29 lbs (13.2 kg)	37 lbs (17 kg)	41 lbs (18.6 kg)

\*Selected radars shown. Other products available.



# ASSESSMENT COMPARISON



# WORLDWIDE DEPLOYMENT



# ADAPTIVE SECURITY SOLUTIONS

From our first security product, FLIR has proven itself as a force protection and security products leader around the world. Our customers trust and rely on our innovative solutions, knowing that we value their input and incorporate their needs into solutions that help them do their job.

The FLIR concept of layered security involves deploying multiple cameras, radars, or other sensors with a tailored range and field of view to meet the needs of a specific deployment scenario. Our CommandSpace® Adaptive C2 ties together FLIR cameras and radars to provide a total networking and integration solution.

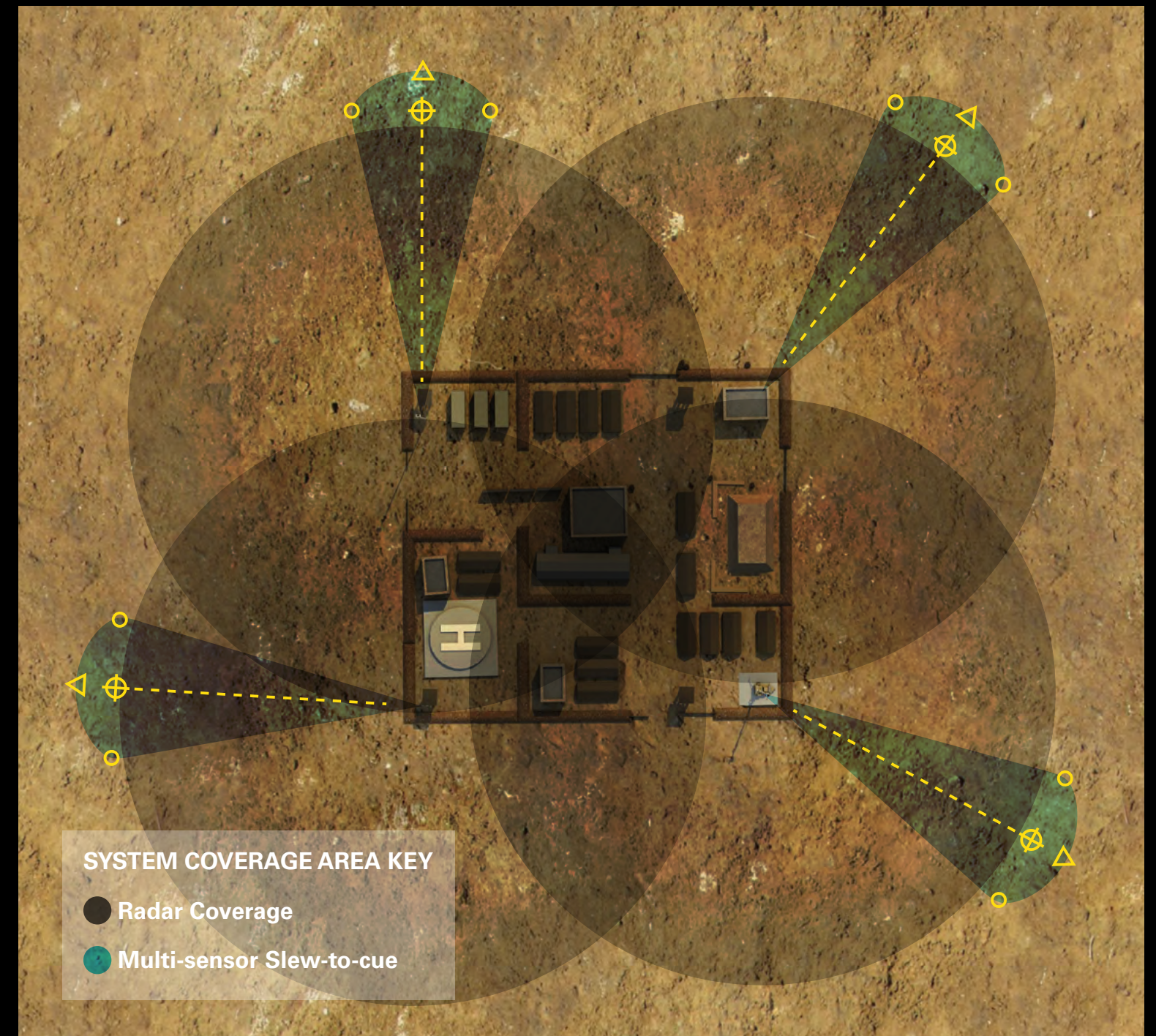
The application of proven surveillance technologies, paired with the appropriate data fusion, infrastructure and concept of operations, are required to provide the necessary situational awareness and actionable intelligence. The result is a series of flexible and scalable solutions that mitigate intrusion and trespasser threats.

## Our Customers Are Our Credentials

FLIR Systems is the world's largest supplier of sensors for Force Protection, Border and Security missions, on land and at sea. Thousands of systems have been delivered and deployed worldwide, providing 24/7 surveillance and protection for personnel and facilities which span the range from strategic air bases to forward observation posts, borders and port facilities. Installations run the gamut from fixed and mobile towers, to aerostats, vehicles and individual ships. FLIR provides a full range of Force Protection multi-sensor systems, from close range, wide area perimeter surveillance to long range threat identification and location systems. These systems are integrated into a variety of C4I, blue force tracker and data-linked networks for situational awareness from the TOC, BDOC or CIC, to theater intelligence levels.

## FLIR systems deployed

Major US Government Programs	Service	Products deployed
GBOSS	USMC	Star SAFIRE III, Ranger T3000
GBOSS LITE	USMC	Cerberus, Recon III
BETSS-C	US Army	Cerberus, Ranger III, Star SAFIRE III
CERBERUS	US Army	Star SAFIRE III, Ranger III XR+
RAID	US Army	Star SAFIRE III, Star SAFIRE HD
RAID-Eagle Eye	US Army	Star SAFIRE III
CRAM	US Army	Star SAFIRE III, Sentry II, Ranger T3000
JFPASS	US Army	CommandSpace Adaptive C2, DefendIR, Ranger R2
IBDSS	USAF	Sentry II, Ranger T3000
TASS	USAF	Sentry
SPS/EOS	US Navy	Star SAFIRE III
MSC	US CBP	Cerberus BP, Ranger HRC-X
DR-SKO/JNBCRS 2	JPEO-CBD	Fido XT, indentiFINDER
JBTDS	JPEO-CBD	IBAC, C-100
DFoS	JPEO-CBD	Agentase Disclosure Spray
Pentagon Shield	PFFPA	Griffin 460, AirSentinel
HaMMER	DTRA	Agentase Disclosure Spray
Secure Cities	DNDO	indentiFINDER, STRIDE
Detect-to-Protect (D2P)	DHS	RapidPlex
International	Various	Ranger III XR+, ThermoVision 3000





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