MIRION
TECHNOLOGIES

Radiation Tolerant Cameras for Nuclear Applications

Radiation Tolerant Cameras

CCTV monitoring is of vital importance in nuclear facilities. Surveillance systems used within nuclear applications, whether permanently located within the plant or used in portable or temporary configuration, are required to meet rigorous specifications to withstand high levels of radiation and resist its harmful effects. Mirion's radiation tolerant cameras are encased in stainless steel and designed to survive the hostile environments frequently encountered in nuclear environments – both in-air or underwater (i.e. fuel ponds).

Our specialist team of System Design Engineers and Project Managers have significant experience in CCTV projects from initial concept to final on-site commissioning. We have the ability to re-package our imaging systems to fit through legacy penetrations and cell/tank access paths not previously used for cameras, while leveraging the latest IP (Internet Protocol) technologies for data storage and remote/wireless viewing.

Our comprehensive range of cameras are supported with a selection of lens options and lighting attachments, allowing operators to carry out a variety of inspection tasks for both low and high radiation environments with a total gamma dose between 100 Gy – 2M Gy. Additionally, we can provide customised CCTV systems which comprise not only of cameras, but also IP and analogue control solutions, depending on your operational requirements.

C911 Dotcam

RC913 Mini-PTZ

C981

C983

RC720 HD-RAD

RC911 Dotcam - HR

SC985

R985

R981 Compact

Hyperion Compact

R93

R941

R942

	C911 Dotcam	RC913 Mini-PTZ	C981/C983	RC720 HD-RAD		RC911 Dotcam - HR	SC985	R985	R981 Compact	Hyperion Compact	R93	R941	R942
													
Total Dose	100 Gy (1 x 10^4 rad)	100 Gy (1 x 10^4 rad)	100 Gy (1 x 10^4 rad)	500 Gy (5 x 10^4 rad)	500 Gy (5 x 10^4 rad)	1k Gy (1 x 10^5 rad)	10kGy (1 Mrad) [^{137}Cs]	100k Gy (1 x 10^7 rad)	1 MGy (1 x 10^8 rad)	1 MGy (1 x 10^8 rad) Cobalt-60	2 MGy [^{60}Co] (2 x 10^8 rads) Cobalt-60	2 MGy [^{60}Co] (2 x 10^8 rads) Cobalt-60	2 MGy [^{60}Co] (2 x 10^8 rads) Cobalt-60
Dose Rate	100 Gy/h (1 x 10^4 rad/h)	100 Gy/h (1 x 10^4 rad/h)	100 Gy/h (1 x 10^4 rad/h)	100 Gy/h (1 x 10^4 rad/h)	100 Gy/h (1 x 10^4 rad/h)	300 Gy/h (3 x 10^4 rad/h)	1kGy/h (100k rad/h)	1kGy/h (1 x 10^5 rad/h)	1 kGy/h (1 x 10^5 rad/h) Chalnicon	1 kGy/h (1 x 10^5 rad/h)	1 kGy/h (1 x 10^5 rad/h) Chalnicon	1 kGy/h (1 x 10^5 rad/h) Chalnicon	1 kGy/h (1 x 10^5 rad/h) Chalnicon
On-Board Lighting	6 x LED Ring (internal)	LED - 4 x Wide & 4 x Spot (internal)	Optional (external)	4 x LED (internal)	2 x LED (external)	6 x LED Ring (internal)	Optional (external)	No	Optional (external)	Optional (external)	Optional	No	No
Key Options	Optional variable lighting	• 1 x 20 W (in air) • 1 x 50 W (underwater) • 19" rack or pelicase controller	• 100 W (in air) • 300 W (underwater) • High Power LED • Microphone • 19" rack controller	19" rack or pelicase controller	19" rack or pelicase controller	Optional variable lighting	• Optional variable LED lighting • 19" rack controller • HR variant available: 50 kGy (5 Mrad)	• Simple cable 11.5-15 VDC in, video out • C-mount, D-mount, or CS-mount lenses • Integrates with existing pan/tilt units • Auto-iris support	• 100 W (in air) • 300 W (underwater) • High Power LED • Microphone • 19" rack controller	• 2 x 50 W • 19" rack controller	• Optional lighting heads • 19" rack controller	19" rack controller	19" rack controller
Operating U/W Depth	60 m (200 feet)	60 m (200 feet)	60 m (200 feet)	60 m (200 feet)	60 m (200 feet)	60 m (200 feet)	60 m (200 feet)	In-air only; optional custom underwater	60 m (200 feet)	60 m (200 feet)	60 m (200 feet)	50 m (165 feet)	50 m (165 feet)
Max Temperature	• 50 °C (122 °F) underwater • 40 °C (104 °F) in air	• 50 °C (122 °F) underwater • 40 °C (104 °F) in air	• 50 °C (122 °F) underwater • 40 °C (104 °F) in air	40 °C (104 °F) underwater only	• 45 °C (113 °F) in air • 50 °C (122 °F) underwater	• 60 °C (140 °F) underwater • 50 °C (122 °F) in air	55 °C (131 °F)	50 °C (122 °F)	• 70 °C (158 °F) underwater • 50 °C (122 °F) in air	• 0-62.5 °C (without lights) • 0-55 °C (with lights)	• 70 °C (158 °F) underwater • 55 °C (131 °F) in air	• 70 °C (158 °F) underwater • 55 °C (131 °F) in air	• 70 °C (158 °F) underwater • 55 °C (131 °F) in air
CCD/Solid State	Yes	Yes	Yes	Yes	Yes	Yes	Yes - PAL only	No	No	Yes	No	No	No
Pan & Tilt	No	Yes	Optional	Yes	Yes	No	Yes	Optional	Optional	Optional	No	No	Compatible with pan and tilt unit
Lens Options	• 1.9 mm (no LED lights) • 3 mm, 3.7 mm, 4.3 mm • 8 mm, 12 mm, 16 mm	10 x Optical Zoom (4 x Digital Zoom)	18 x Optical Zoom (4 x Digital Zoom)	10 x Optical Zoom (4 x Digital Zoom)	10 x Optical Zoom (4 x Digital Zoom)	• 3.9 mm f/2.8 • 3.0 mm f/2 • 6 mm f/2.8	6.5 - 65 mm f/2 Non-browning zoom	Fixed and zoom available (2/3" format)	• 12-72 mm f/1.8 Non-browning zoom • 24-144 mm f/3.6 Non-browning zoom	17.5 - 105 mm f/2.4-f/16 Non-browning zoom	• 6 mm, 9 mm, 25 mm Fixed Non-browning • 8-24 mm f/2.8 Non-browning zoom	8 - 24 mm f/2.8 Non-browning zoom	• 12 - 72 mm f/1.8 Non-browning zoom • 24 - 144 mm f/3.6 Non-browning zoom
Overall Size	29 mm diameter x 109 mm long (1.14 x 4.3 inches)	63.5 mm diameter x 371 mm long (2.50 x 14.6 inches)	160 mm wide x 221 mm high x 162 mm long (6.3 x 8.8 x 6.5 inches)	110 mm wide x 280 mm high x 307 long (4.3 x 11 x 12 ins)	155 mm wide x 280 mm high x 311 mm long (6.1 x 11 x 12.1 ins)	29 mm diameter x 79 mm long (1.14 x 3.1 inches)	206 mm wide x 292 mm high x 224 mm long (8.1 x 11.5 x 8.8 inches)	72 mm diameter x 165 mm long (2.83 x 6.5 inches)	160 mm wide x 221 mm high x 162 mm long (6.3 x 8.8 x 6.5 inches)	With lights: 242 mm wide x 340 mm high x 311 mm long (9.5 x 13.4 x 12.3 inches)	40.5 mm diameter x 250 mm long (1.6 x 9.8 inches)	55 mm diameter x 269 mm long (2.16 x 10.6 inches)	76.2 mm diameter x 390 mm long (3 x 15.4 inches)
Weight Range	192 g (6.8 oz)	2.4 kg (5.3 lbs)	3.2 kg (7 lbs) without lights or microphone	3.4 kg (7.5 lbs)	4.8 kg (10.5 lbs)	95 g (3.4 oz)	10 kg (22 lbs)	1 kg (2.2lbs)	4.7 kg (10.4 lbs) without lights or microphone	3.5 kg (7.7 lbs) fixed, no lights 7.5 kg (16.6 lbs) pan/tilt, lights	1.3 kg (2.8 lbs)	1.8 kg (4 lbs)	3.7 kg (8.2 lbs)
Radiation Tolerance Level:	**LOW**			**MEDIUM**					**HIGH**				

Each site is unique. To that end, we **offer a range of options** to ensure the most applicable, cost-effective camera for your operations.

Mirion radiation tolerant cameras offer:

Dose rates range between 100 Gy (1 x 10^4 rad) and 2 MGy (2 x 10^8 rad)
Lighting can be a standard component or optional, depending on the camera
Some cameras offer variable lighting options, audio, and/or portable controller options
Underwater operating depths are typically 60 m (200 ft)
Maximum operating temperatures range between 40 °C (104° F) and 70 °C (158 °F)
The majority of our cameras are solid-state
Many of our cameras have pan and tilt functions
A variety of lens options available
Each of our cameras has its own, unique dimensions
Weight varies between camera types

Visit our website to learn more: **mirion.com/products/radiation-tolerant-cameras**

Protect What's Next™

MIRION
TECHNOLOGIES

OPS-6191 - 11/2023

MIRION.COM