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attendance for today's
(Thursday, June 18th)
breakout session**





Annual Users' Conference

**ADVANCING RADIATION SAFETY.
EMPOWERING PROGRESS.**

M Resort, Henderson, NV | June 15 – June 18



MIRION
TECHNOLOGIES

*Advancing Radiation Safety.
Empowering Progress.*

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Advances in High-Temperature Cameras: Performance in Extreme Environments

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Business Development Manager

Mirion Connect | Annual Users' Conference 2026

Henderson, NV

High Temperature Cameras



High Temperature Cameras in Industrial Applications

- *Over the last decade customers are asked to better control their process due to cost savings, process efficiency for better product yield and from an environmental factor of energy use and carbon emission goals.*
- *To achieve this technology advancements are required to help better control the processes and give real time feedback to operators that help them take corrective action at an earlier stage in the process saving downtime, improved process efficiency and provide cost benefits.*

Agenda



Industry
Served



High
Temperature
Portfolio



Customer
Challenges



New
Developments

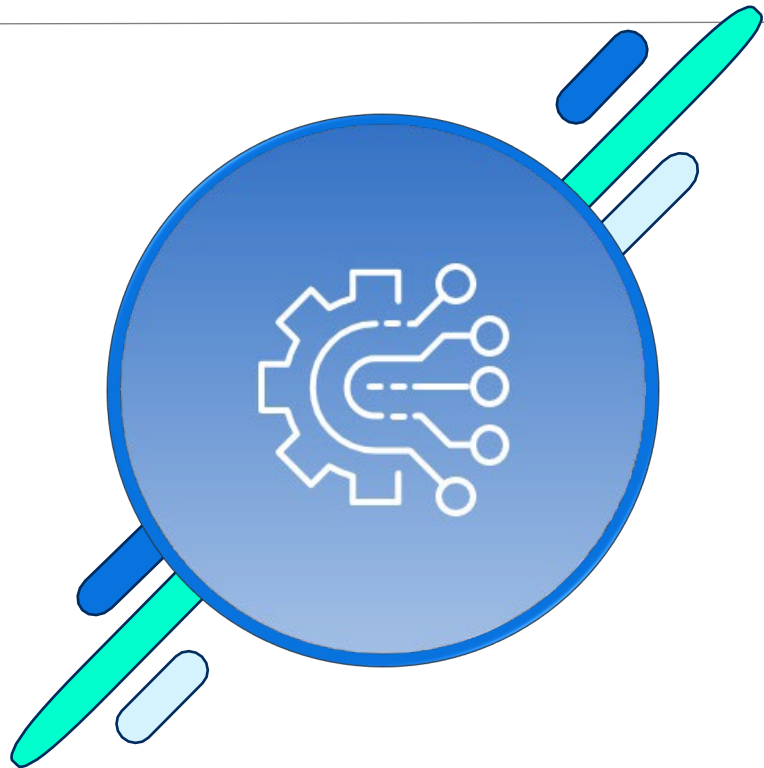


Key
Applications



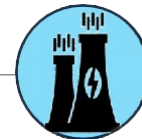
Discussion

Industry Served



Cement Industry

- Rotary Kilns - Monitor cement & lime kiln product & temperatures.
- Cement Clinker Coolers - Monitor the cooler for red rivers & upset conditions.



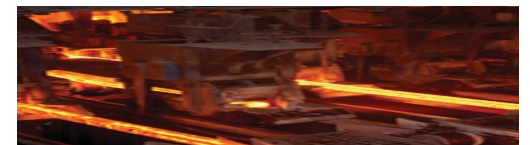
Fossil Utility Boilers

- Observe flame shape & temperature of each burner.
- Aid in controlling NOx levels.

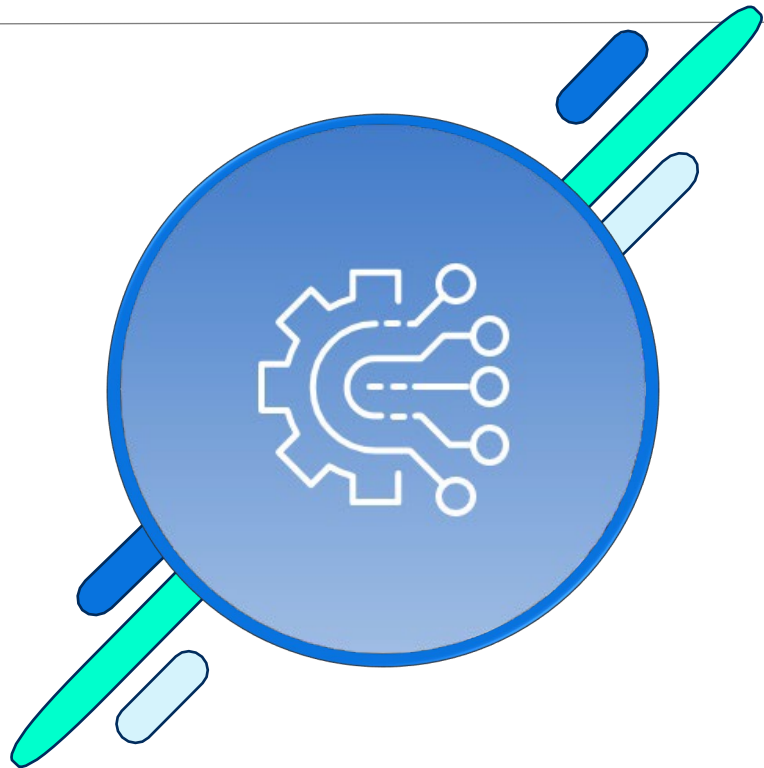


Steel & Aluminium Furnaces

- See areas of non-uniform heating & adjust product speed or combustion accordingly.



Industry Served



Waste to Energy Plants

- Live monitoring of burning processes, anticipate maintenance requirements ahead of time



Glass Furnaces

- View for flame impingement & product flow. Accurately measure refractory temperatures.

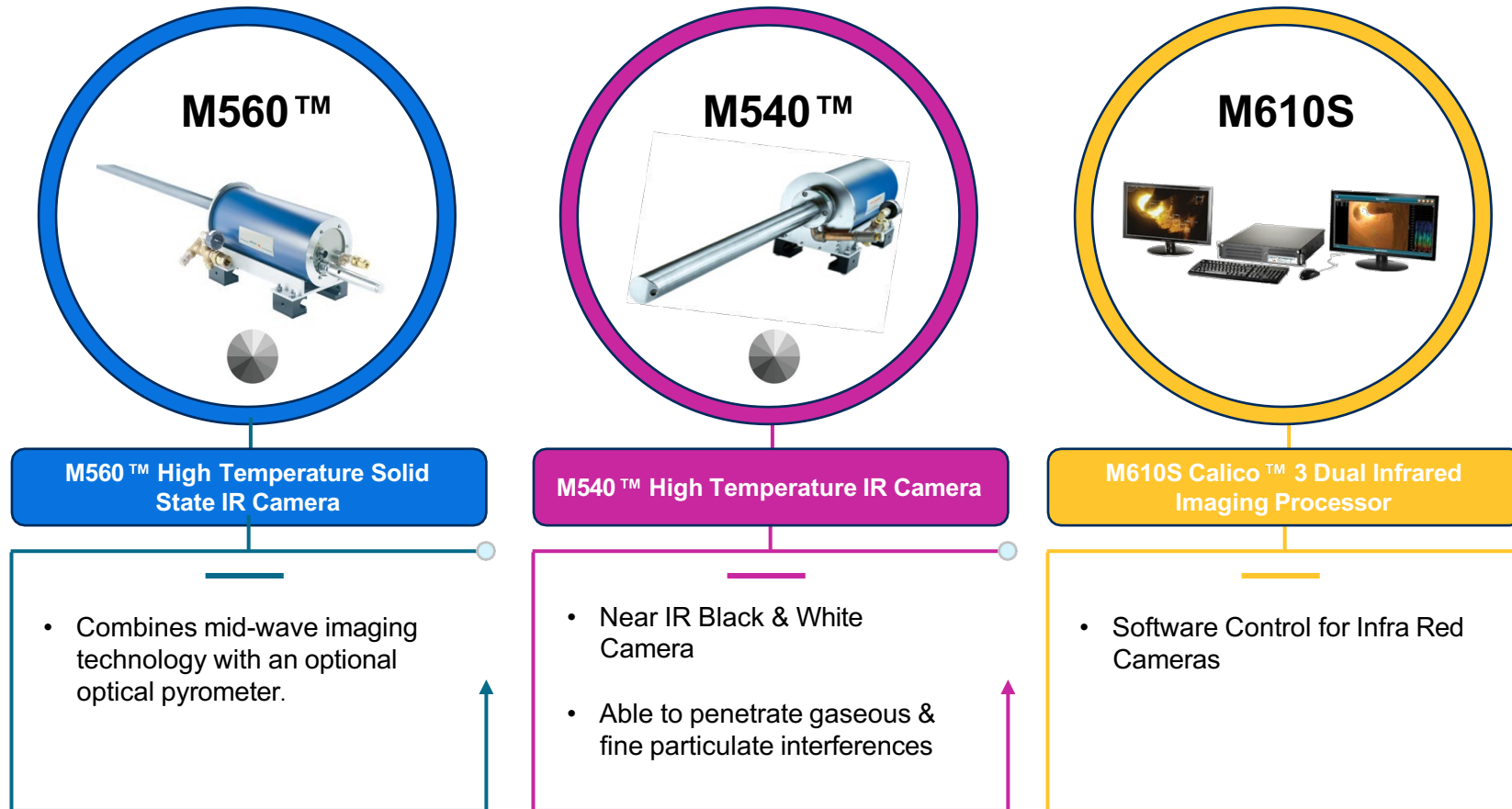


Pulp & Paper Processing

- Monitor smelt bed & check for blockages in ports without having to shut down operations
- Pyrometers monitors product & prevent burning so product meets the quality standards.



Camera Portfolio: Infrared



Camera Portfolio: Visible

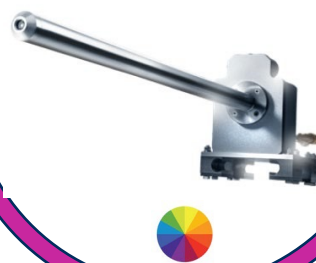
M555™



**M555™ High Temperature
Spyrometer® Camera**

- Patented color video camera & scanning pyrometer; monitors process while measuring the temp of any area in the field of view

M535™



**M535™ Lynx® High Temperature
Color Camera**

- Visible Light Color Camera

M530™



**M530™ Lynx® High Temperature
Color Camera**

- Visible Light Color Camera
- Straight, oblique, or right angle lens tube options available

M215S™



**M610S Calico™ 3 Dual Infrared
Imaging Processor**

- Supports 1 or 2 Mirion cameras, providing both imagery & precise temp measurement

Camera Portfolio: Accessories



M356™

M356™ Retract

- Retracts camera from severe heat where the plant supply of air pressure, water or electricity has been interrupted.



M408™

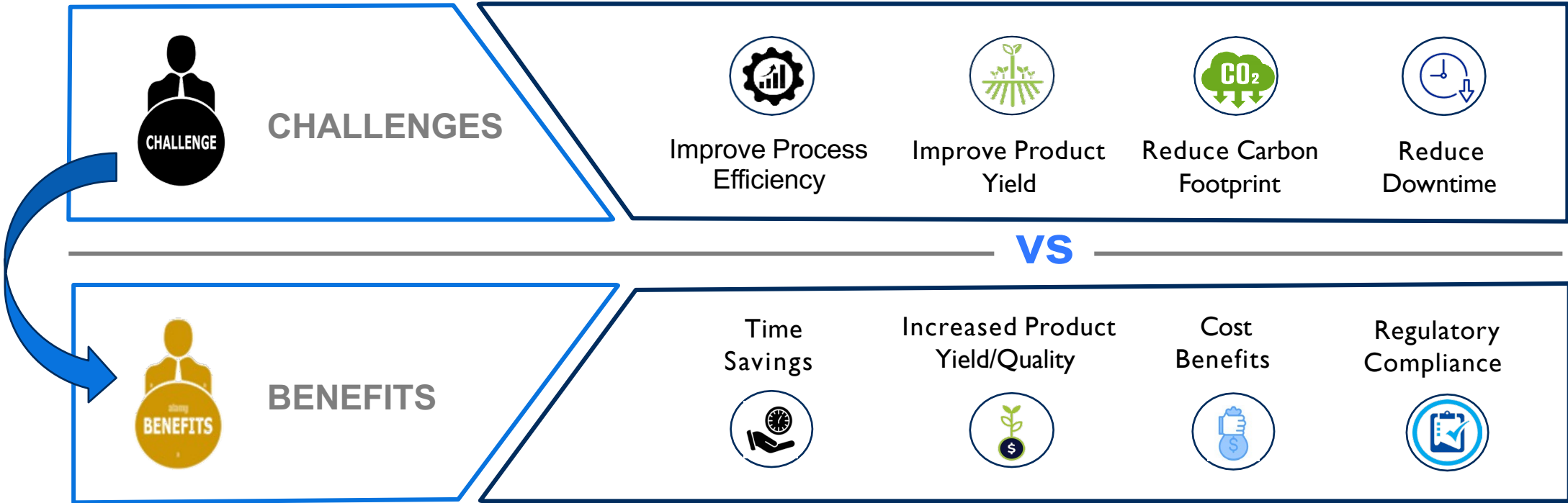
M408™ Two Stage Air Filter

- Provides clean air in industrial environments

High Temperature Cameras New Developments



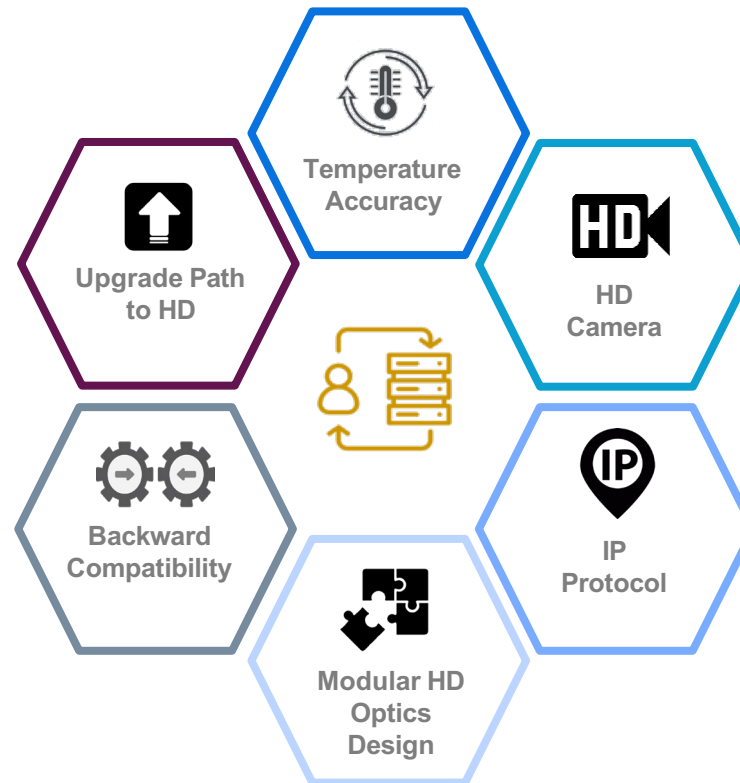
Customer Business Challenges vs Benefits



Need for High Quality Image & Temperature Accuracy to take corrective action earlier in the process

Product Requirements

- Highest [Temperature Accuracy](#) to maximize efficiency of Process

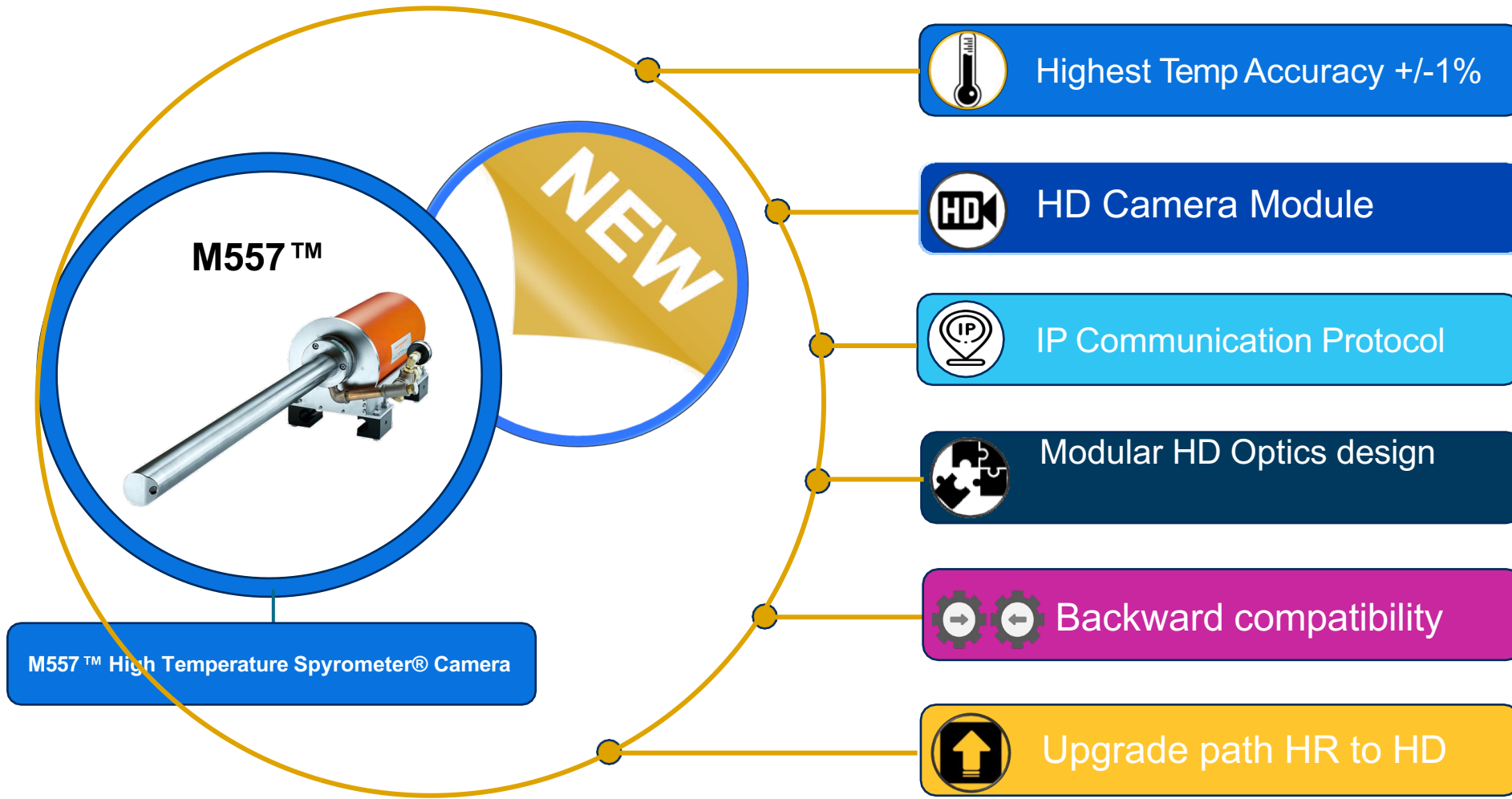


- [Future Upgrade Path](#) of platform for future proofing
- [Backward compatibility](#) to existing infrastructure for simplified upgradeability

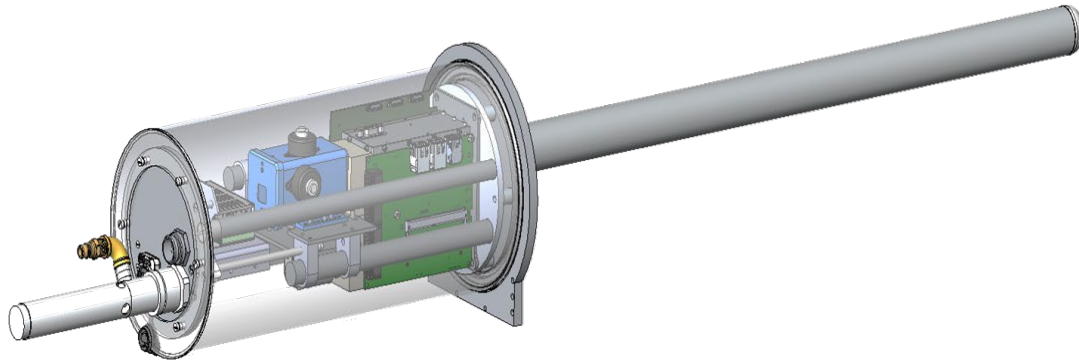
- Customers looking for [Higher Definition Color Image](#) to improve process efficiency
 - Differentiate critical vs noncritical maintenance
 - Increase yield & quality of their product
 - Efficient fuel burn & usage – Lowering Carbon footprint
- Simplified data & image transfer using [Standard Communication Protocols](#) lowering barrier to adoption

- Greater [Modularity in Design of Optics](#) for easier maintenance & greater uptime

New HD M557™ Spyrometer



New HD M557™ Spyrometer



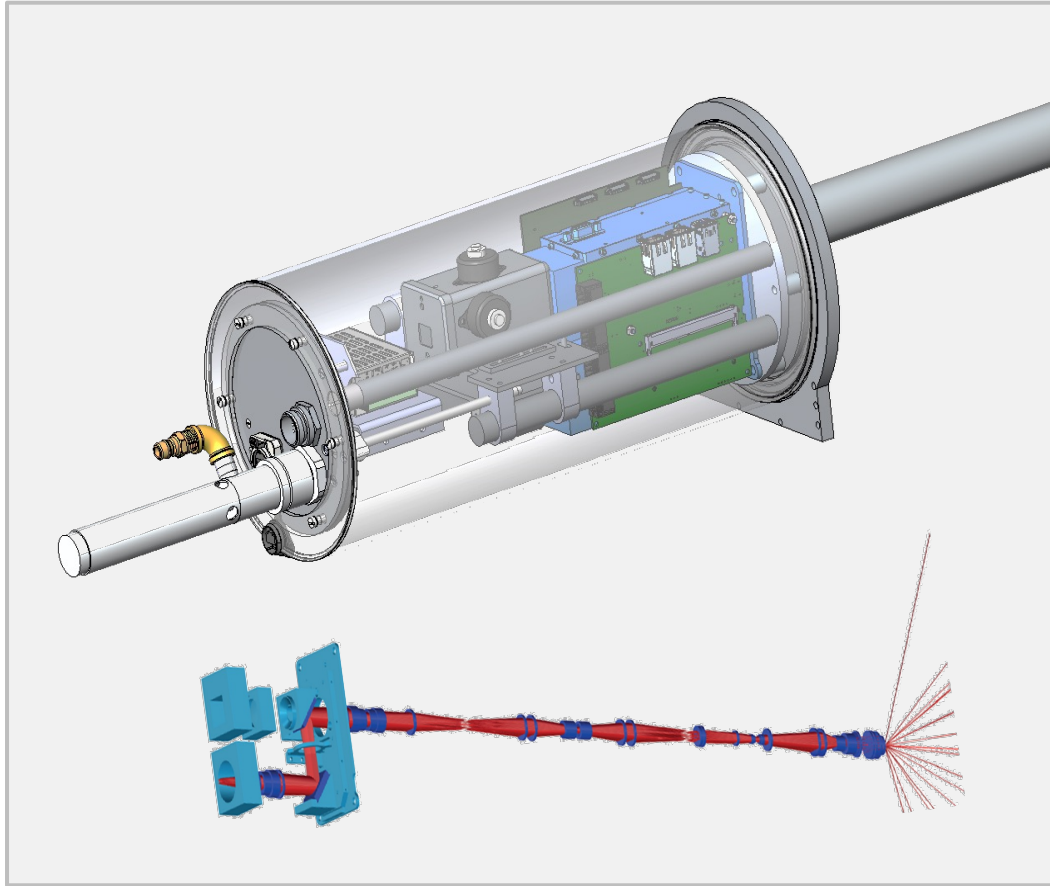
Highest Temp Accuracy +/-1%

- Dual wavelength best suited for kiln, boiler & furnace applications requiring high-quality, color images & multi-point temp measurements
- Single wavelength best suited for clinker coolers & other lower temp applications that require high-quality, color images & temp measurements

Spyrometer has several temperature measurement options that allows it to be customized to suit application

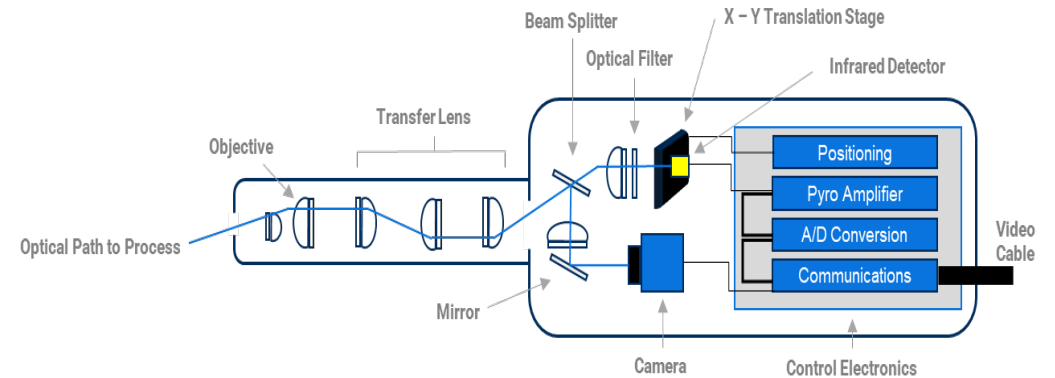
Pyrometer Type & Wavelength	Temperature Range °F	Temperature Range °C
Dual: 800nm & 1600nm	1225 - 2991	663 - 1255
Dual: 800nm & 1600nm	1558 - 3301	848 - 1816
Dual: 800nm & 1600nm	1382 - 2650	750 - 1450
Single 1600nm	800 - 2500	427 - 1371

New HD M557™ Spyrometer

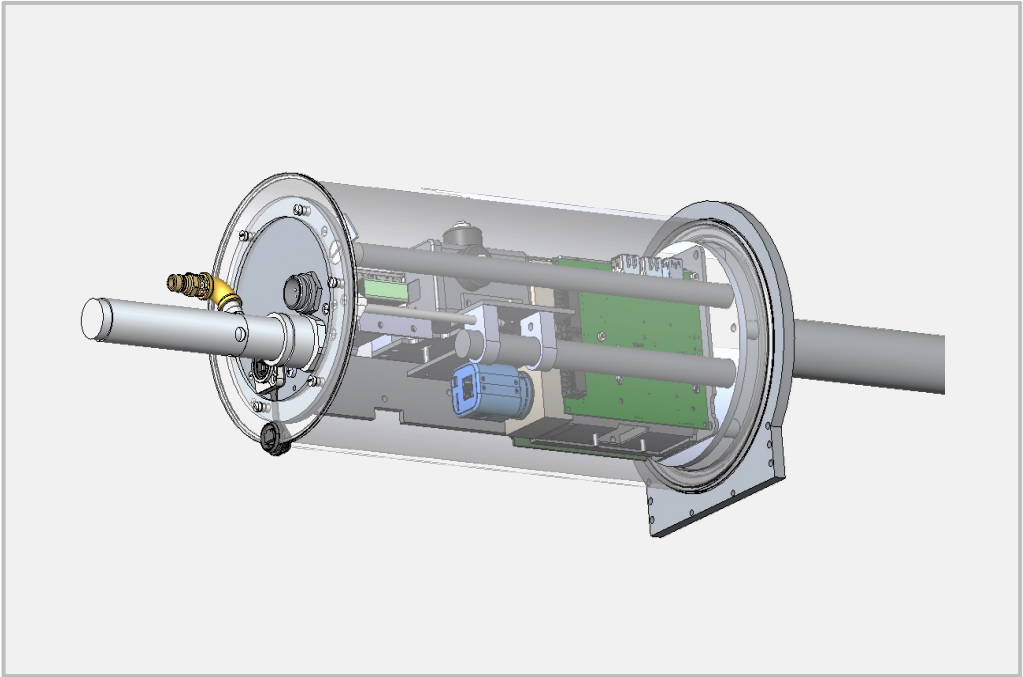


Highest Temp Accuracy +/-1%

- Optical signal is divided in two by beam splitter
- One part goes to a video camera, other to the pyrometer



New HD M557™ Spyrometer

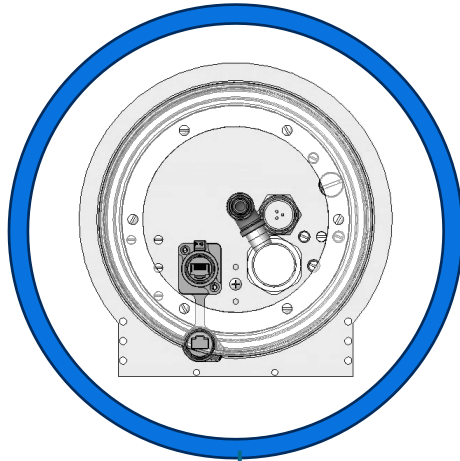


HD Camera Module

Camera

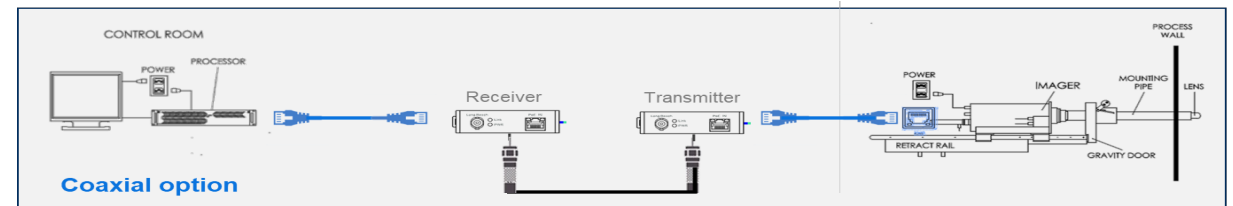
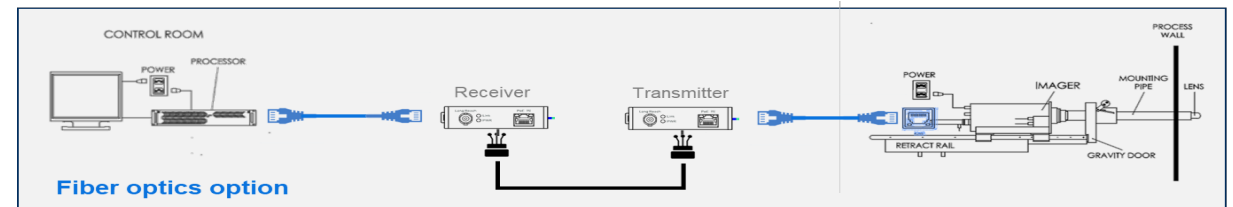
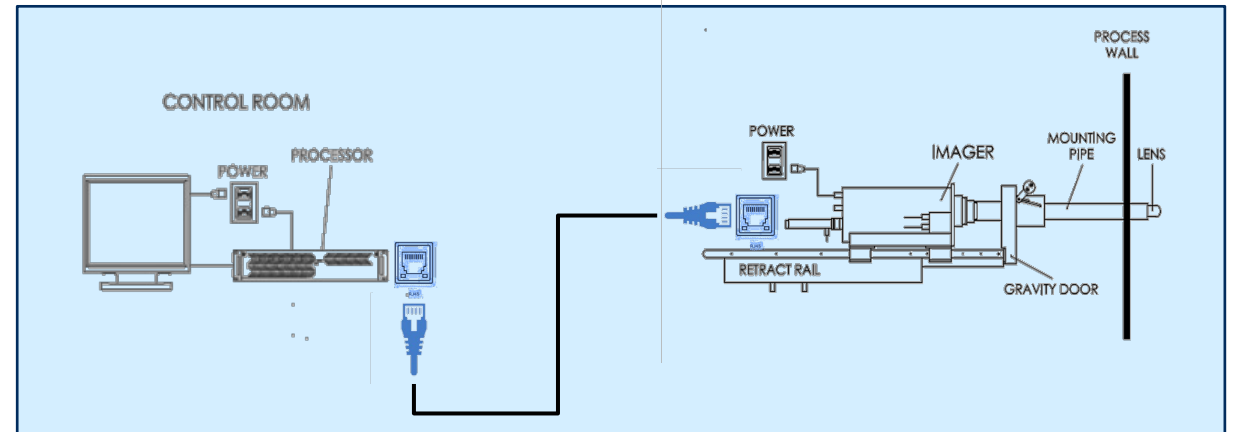
Detector	• Solid state color image sensor
System Resolution	• 1080p (1920x1080)
Video	• Video Compression H.264 30 FPS • ONVIF Compliant
Transmission	• IP Video
Control	• Iris adjustment on rear of unit; remote iris adjustment from the processor
Application Filter	• Filters provided to match process & maximize performance

New HD M557™ Spyrometer



IP Communication Protocol

- Key Benefits and value
- Simple implementation into existing IP infrastructure lowering cost of implementation
- Kits available to connect to existing coaxial / Fibre Optic cabling lowering barrier to adoption



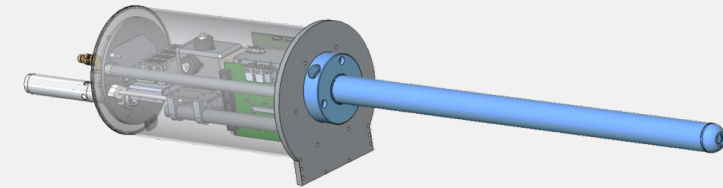
New HD M557™ Spyrometer



Modular HD Optics design

Lens: Resolution is stated at 1080p					
Construction	Air or water-cooled 304 stainless steel outer shroud; sapphire window for max. environmental protection.	Length	Straight Lens	45° OAL Lens	Water Cooled Lens
Diameter	38 mm (1.5 in.)	18 in.	✓		
Cooling Requirements	Instrument quality air	24 in.	✓	✓	✓
Thermocouple	- TJ: Type J thermocouple option; - TK: Type K thermocouple option	30 in.	✓	✓	✓
Front Objective Field of View	90° HFOV, 75° HFOV, 50° HFOV, 35° HFOV	36 in.	✓	✓	✓
		42 in.	✓	✓	
		48 in.	✓		✓

Optics designed so that the 4 FOV's & 6 lengths all utilize the same elements but in different configurations



Preassembled Calibrated Lens Tube



Modular Design



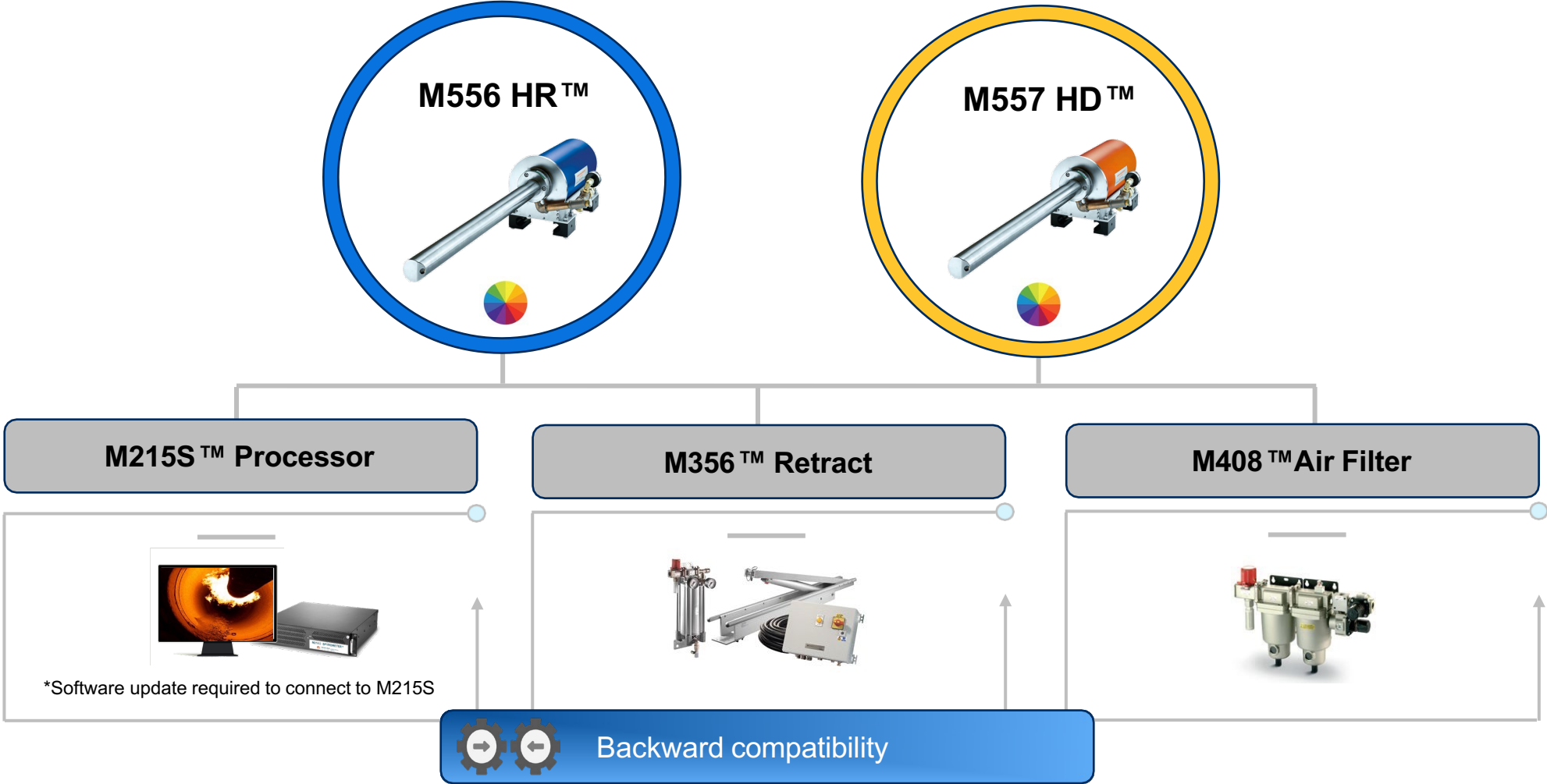
Module



Preassembled Objective



New HD M557™ Spyrometer



New HD M557™ Spyrometer



Upgrade path HR to HD

M555™
SD



M555 SD™



M556™
HR



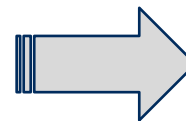
M556 HR™



M557™
HD



M557 HD™

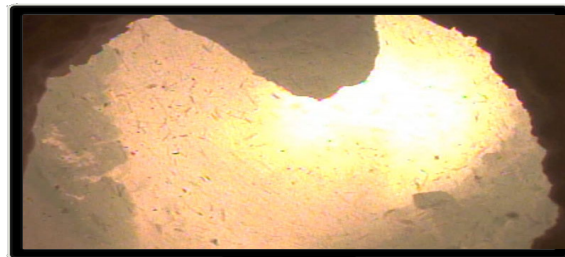


New HD M557™ Spyrometer

M555
SD



M555 SD™



M555
HD



M557 HD™



Spyrometer Platform Matrix Chart



Spyrometer® Platform System Matrix

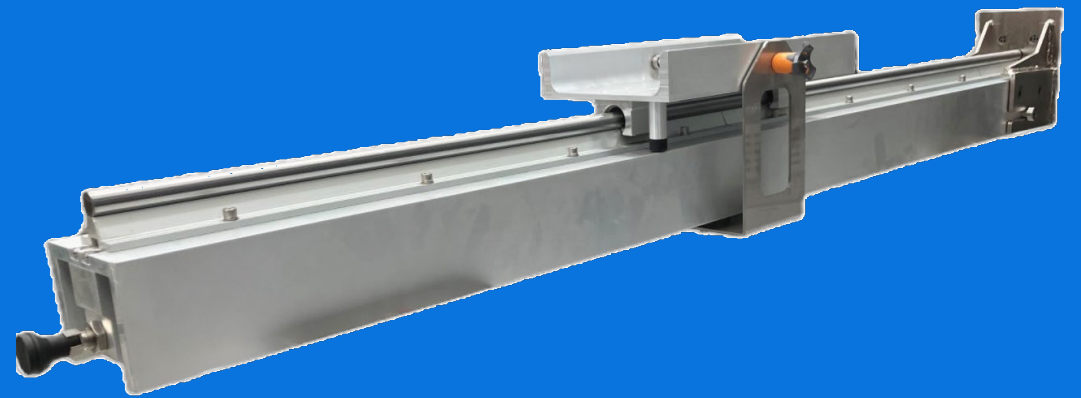


Visit our website to learn more: hightemp.mirion.com

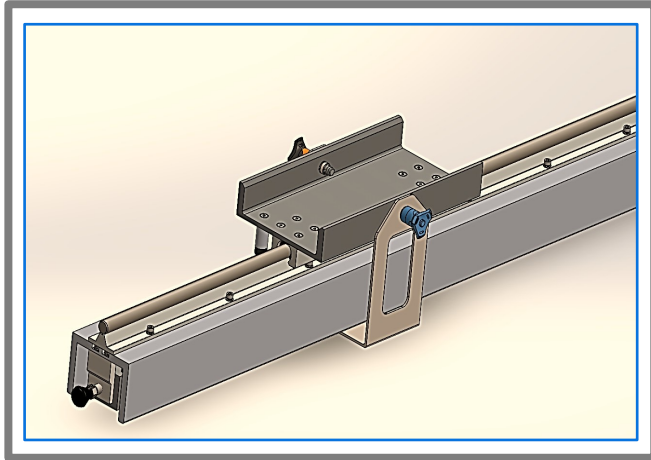


Cameras	Processors		Accessories		Key Features					
	 M215 S™ Spyrometer® Processor (REQUIRED) Supports one or two Mirion cameras, providing both imagery and precise temperature measurement of up to 32 overlaid temperature measurement zones per camera, fully adjustable for size and measurement mode.	 M220 S™ Spyrometer® Processor (REQUIRED) Supports one or two Mirion cameras, providing both imagery and precise temperature measurement of up to 32 overlaid temperature measurement zones per camera, fully adjustable for size and measurement mode.	 M357™ Retract Retracts the camera from the most severe heat where the plant supply of air pressure, water or electricity has been interrupted. Includes ruggedized safety air reservoir and additional options.	 M408™ Air Filter System Provides clean air in industrial environments where there is a higher contaminate content level and where local control and regulation of the air supply to the camera is required.	 Highest Temp Accuracy +/-1%	 HD Camera Module	 IP Protocol	 Modular HD Optics design	 Upgrade path HR to HD	
	 M555™ SD Spyrometer® Temperature Measurement 									
	 M556™ HR Spyrometer® Temperature Measurement 	 *								
	 M557™ HD Spyrometer® Temperature Measurement 	 *								

Rod Less Retract New Developments



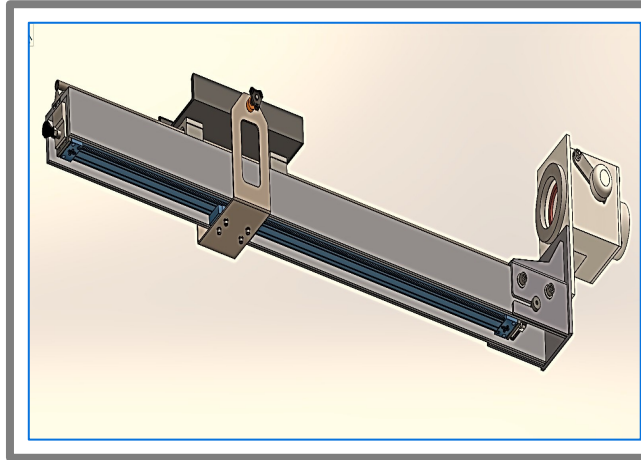
M357™ Rodless Retract



Quick Release Locking Pin

Locking quick release pins (Shown in blue)

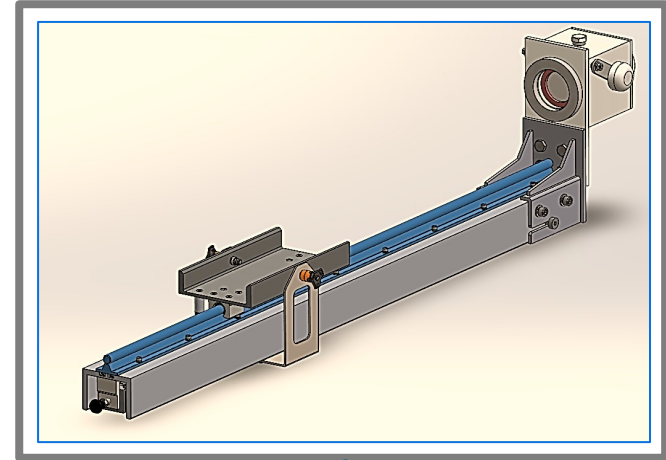
- Allows camera to be removed from retract quickly



Rodless Cylinder

Rodless cylinder (Shown in blue)

- Saves on space
- Provides added safety, moving components do not protrude from the assembly's footprint

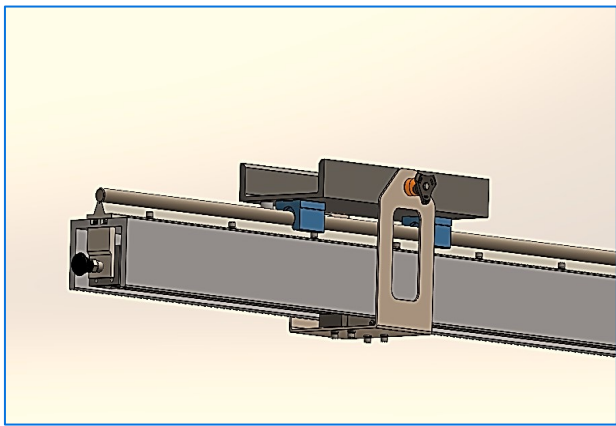


Monorail

Monorail (Shown in blue)

- Easier to service:
- Greater Uptime: Less moving parts
- Improved Cost of Ownership

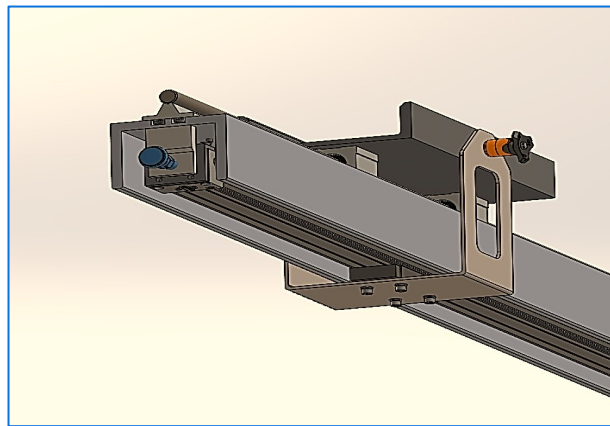
M357™ Rod less Retract



Linear Bearings

Linear bearings (Shown in blue)

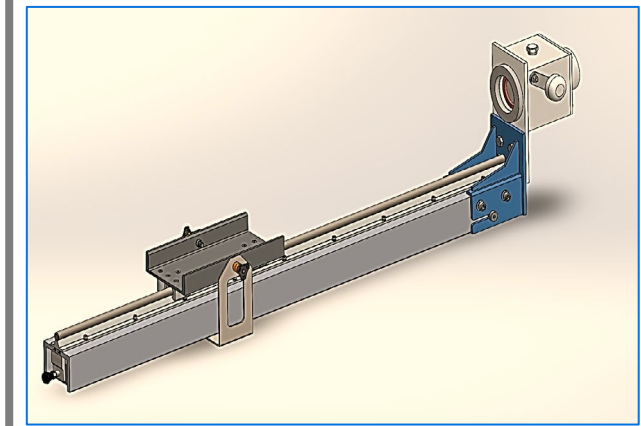
- Greater Uptime: Allows for a smoother delivery of the camera in turn having a
- Better cost of ownership



Quick Release Rear Pin

Rear quick release pin (Shown in blue)

- Allows the cylinder to be released & locked into place with ease
- Easier & quicker to service & carry out maintenance

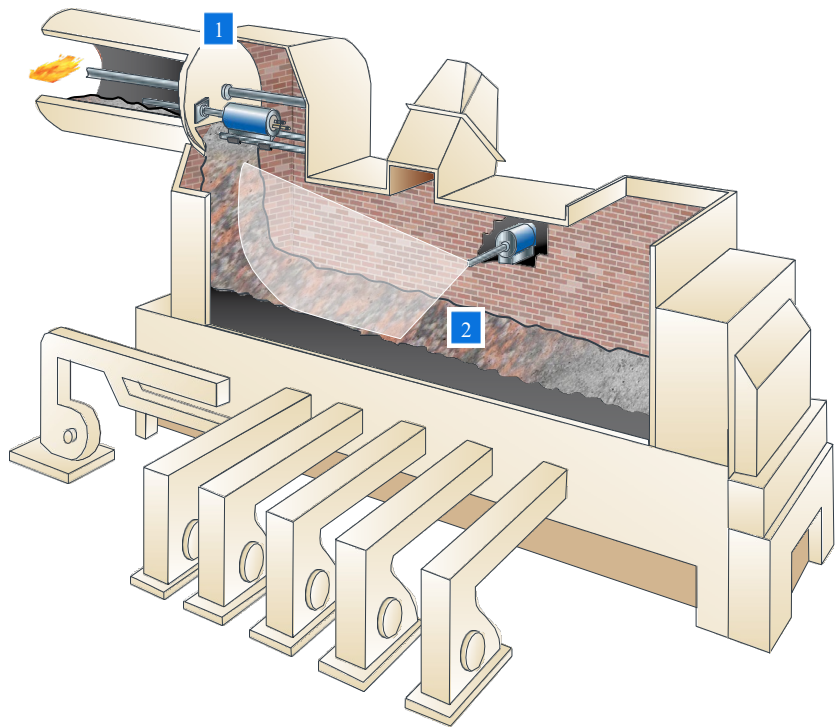


Mount Design

New mount design (Shown in Blue)

- Attach to current gravity door or flange mount. Slot locates onto shoulder bolt, allowing one person installation

Cement Plant Camera Uses



1 ROTARY KILN

Cameras



M530™ Lynx® Color Camera



M535™ Lynx Viewing Camera System



M555™ Spyrometer® Temperature Measurement

Common Accessories



M356™ Retract



M408™ Air Filter System

2 CLINKER COOLER

Cameras



M535 Lynx Viewing Camera System



M555 Spyrometer® Temperature Measurement

Common Accessories



M356 Retract



M408 Air Filter System

3 CONTROL ROOM

Processors



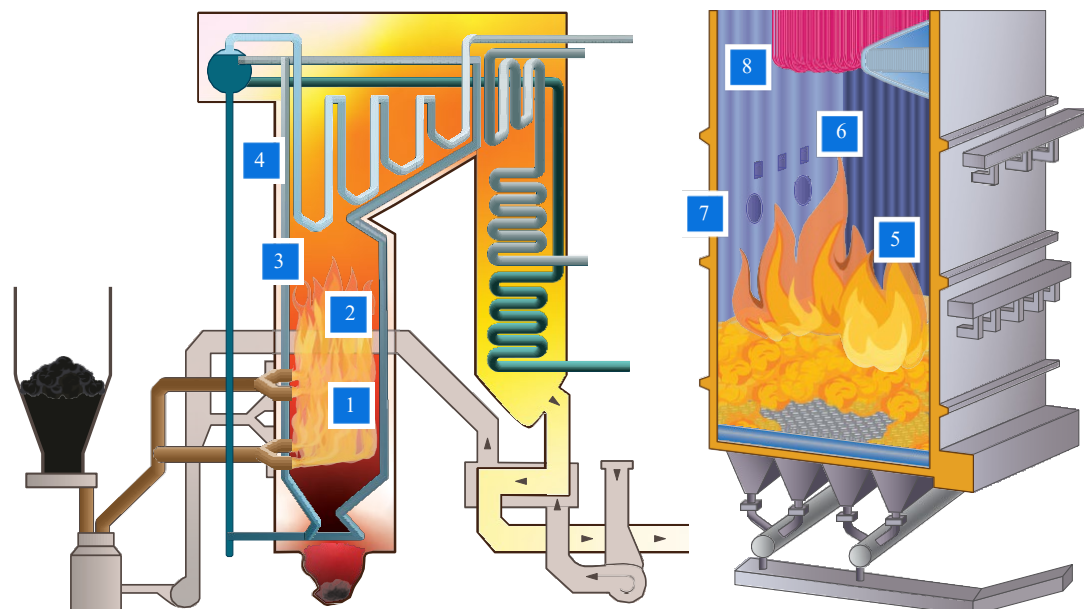
M215 S™ Spyrometer Processor

Output Module



Interface control modules for customer expert control system

Thermal Boiler Camera Uses



Wall-Fired
Boiler

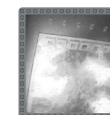
Fluidized
Bed Boiler

WALL-FIRED BOILER INSPECTION		EQUIPMENT
1	Burner Start-Up Ensure even burner lighting and changeover	M535 Camera
2	Fireball Observation Observe shape and color of flame	M535 Camera
3	Water-Wall Slagging View through fireball and identify build-up	M540 Camera M560 Camera
4	Superheater Tube Slagging View through flame/particulate to identify problems	M540 Camera M560 Camera
FLUIDIZED BED BOILER INSPECTION		EQUIPMENT
5	Boiler Startup Ensure even burner lighting and changeover	M535 Camera
6	Bed Observation Optimize Efficiency/Identify Instability	M535 Camera M560 Camera
7	Water-Wall Slagging View through fireball and identify build-up	M540 Camera M560 Camera
8	Superheater Tube Slagging View through flame/particulate to identify problems	M540 Camera M560 Camera

MIRION HIGH-TEMPERATURE CAMERAS M535™ Lynx® High Temperature Color Camera Series



M540™ Lynx High Temperature Black and White IR Camera Series



M560™ High Temperature Solid State IR Camera



CAMERA ACCESSORIES M610S Calico™ 3 Dual Infrared Imaging Processor



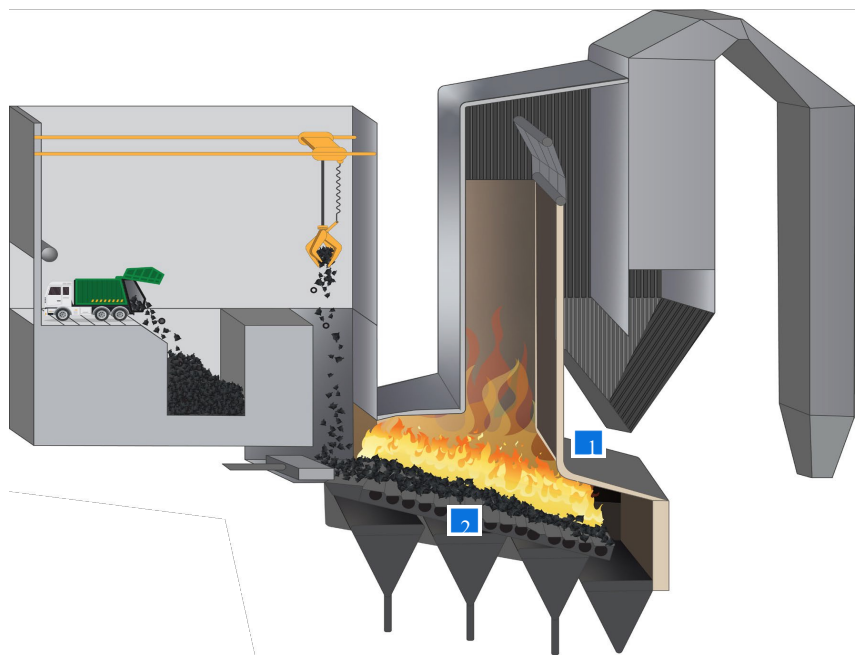
M356™ Automatic Retraction System



M408™ Two Stage Air Filter



Energy from Waste Plant Camera Uses



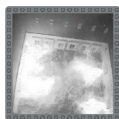
AREA OF OPERATION		EQUIPMENT
1	CHUTE	
Identify build-up of bottom ash or obstruction in the chute or trough		M540 IR Camera
2	GRATE	
Monitoring grate distribution and combustion		M535 Camera

MIRION HIGH-TEMPERATURE CAMERAS

M535™ Lynx® High Temperature Color Camera Series



M540™ Lynx High Temperature Black and White IR Camera Series



CAMERA ACCESSORIES

M610S Calico 3 Dual Infrared Imaging Processor



M356™ Automatic Retraction System



M408™ Two Stage Air Filter



Supporting Material



Cameras for Extreme Environments

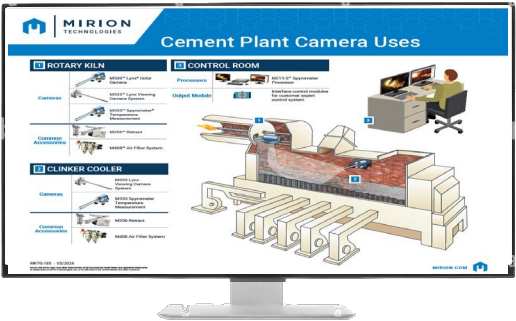
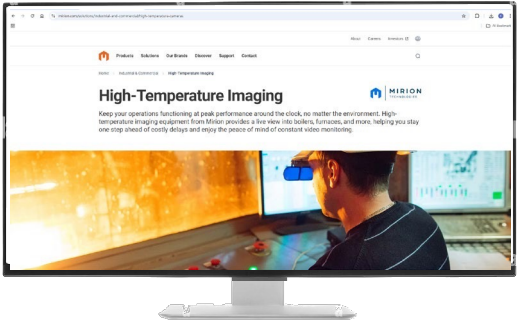


High Temperature Cameras for Industrial Applications



Datasheets

Website



Infographics



Webinars

Thank you



Survey for:

Advances in High-Temperature Cameras: Performance in Extreme Environments



*Please take a moment
to fill out a short survey
on this session.*