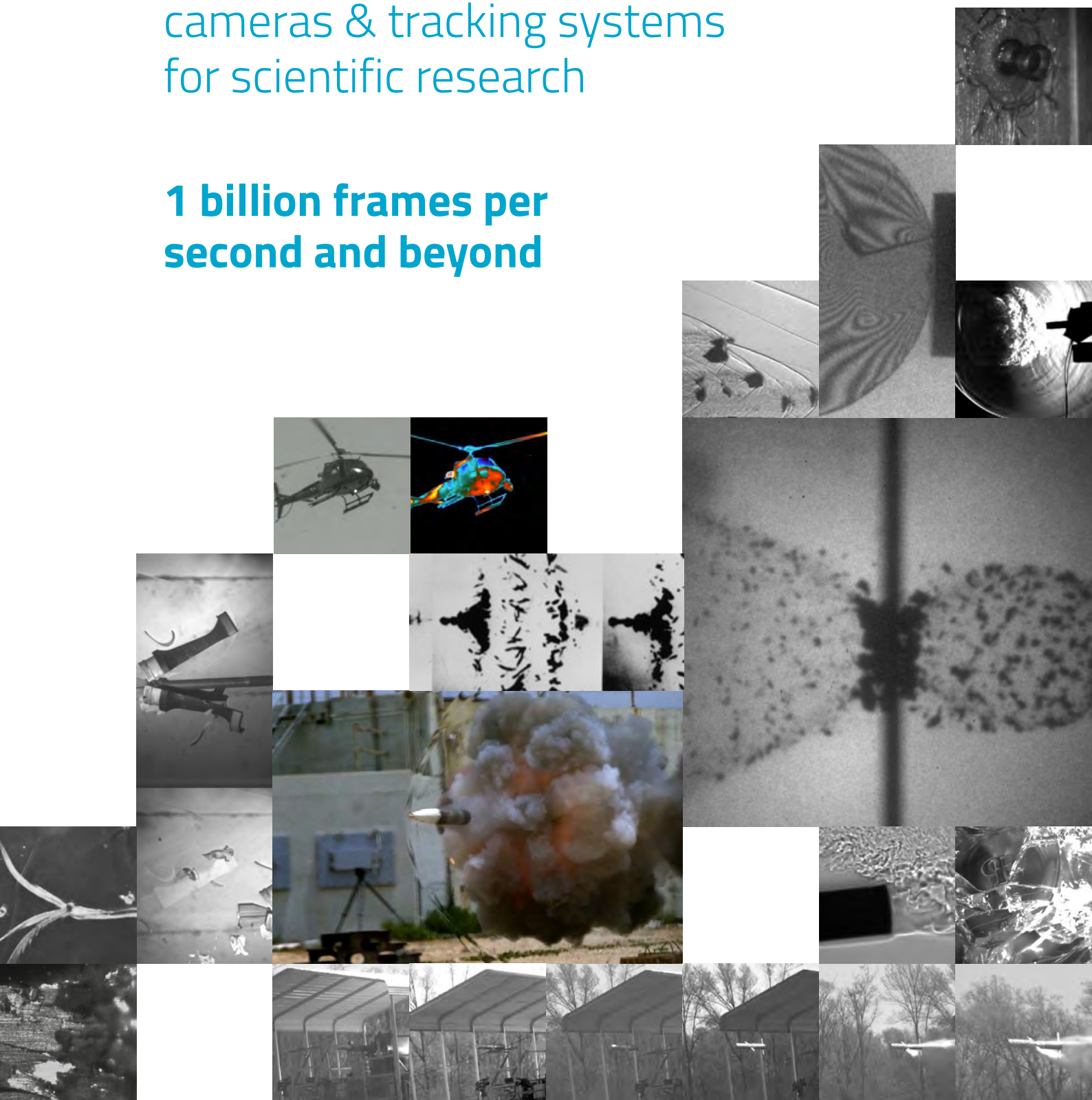
SPECIALISED IMAGING

Ultra high speed framing cameras & tracking systems for scientific research

1 billion frames per second and beyond



SPECIALISED IMAGING

Delivering individual, specific ultra high-speed solutions that meet our clients needs exactly, whatever the application.

That's our commitment.

Our company

THE QUEEN'S AWARDS FOR ENTERPRISE: INNOVATION 2016

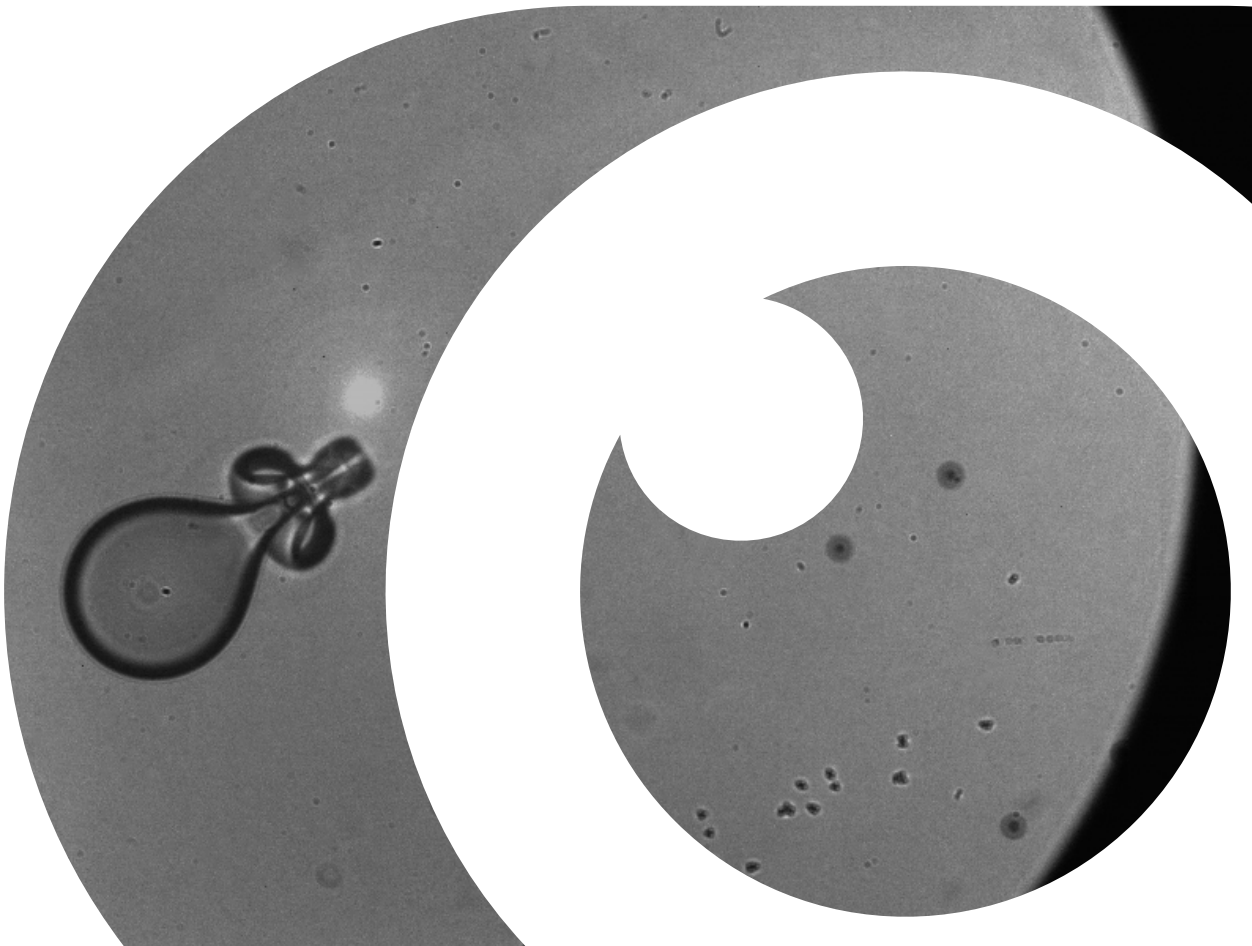
Specialised Imaging is an internationally renowned company that focuses on the design and manufacture of ultra-high-speed imaging cameras for industrial, scientific and defence research applications.

The company was formed in 2003, its founder members having previously worked together in the high-speed imaging field and bringing over 80 years' combined experience to the venture.

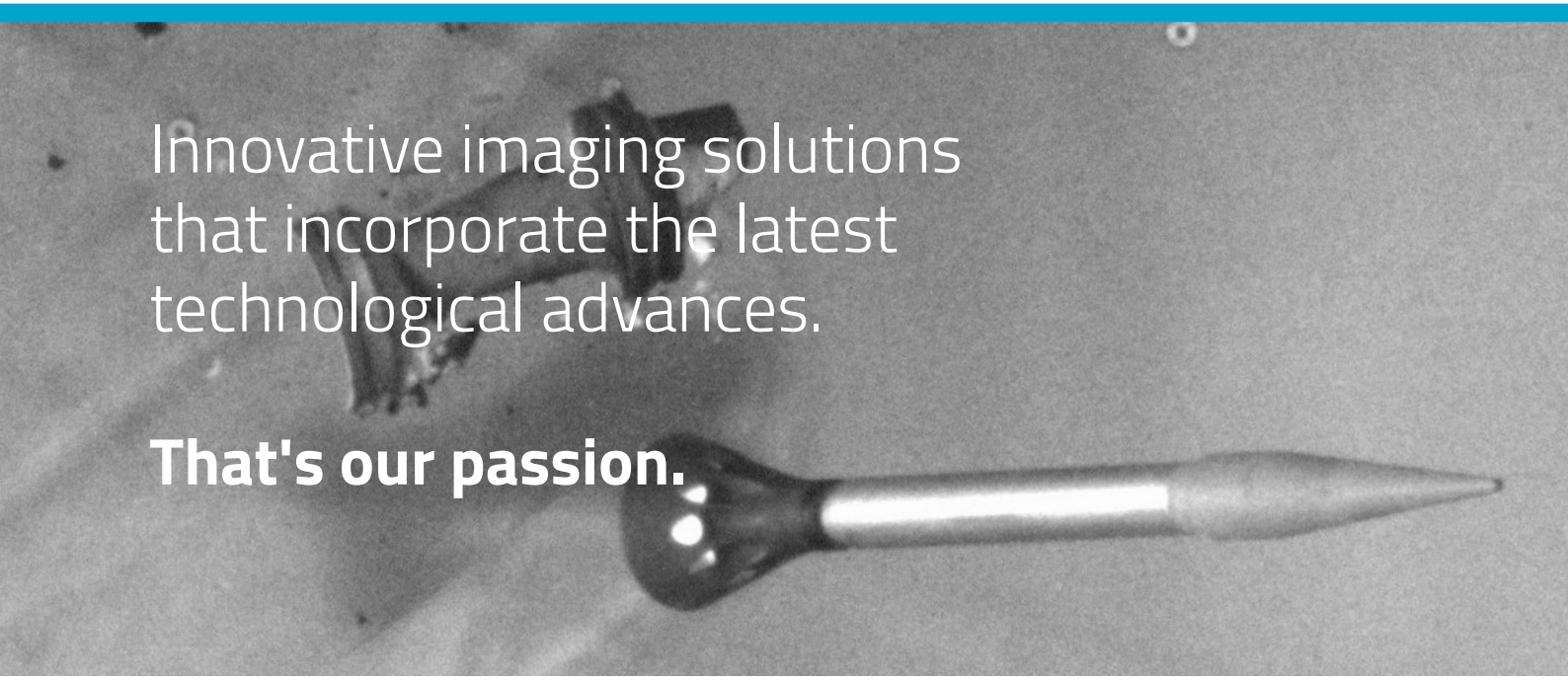
Specialised Imaging has successfully launched many new and innovative ultra-high-speed imaging systems.

The company is at the forefront of world-wide innovation in the high-speed imaging field, having won the BEEA's Small Company of the Year award in 2009, the Queen's Award for Enterprise in 2011 and 2016.

This commitment to development has enabled the company to establish a reputation as an exciting and creative player in the high-speed camera market.



SPECIALISED IMAGING



Innovative imaging solutions that incorporate the latest technological advances.

That's our passion.

Supporting you... and your camera

At Specialised Imaging we relish new technological challenges, and we enjoy creating effective solutions. Producing a system that exactly meets your requirements, demands a company prepared and able to create specific optimised solutions.

Specialised Imaging has a strong track record in working with clients to design and develop new functions and facilities that fulfil their requirements.

This level of commitment and support continues throughout the life of your product – on-going advice, problem-solving and the design and reconfiguration of software are all part of our after-sales service.

World-wide partnerships

To provide you with a total ultra-high-speed imaging solution, we have formed strong, strategic relationships with manufacturers in a variety of related fields. These strategic partnerships enable us to offer fully optimised imaging systems that include illumination, optical components, supports and triggering devices.

Close cooperation with our major suppliers also allows us to access and incorporate custom-designed components to specifically enhance the performance of our systems

Our reputation today extends worldwide with customers in North America, Asia-Pacific, Europe and the Middle East regions.

SIMD

SPECIALISED IMAGING

Duplex multi channel framing camera

Up to 1 Billion frames per second capture speed

36lp/mm system resolution

1360 x 1024 pixel, 12-bit sensor resolution

Up to 16 discrete intensified optical channels

MULTI-SPECTRAL

The Specialised Imaging SIMD Framing Camera offers up to 32 images without creating shading, or parallax. Highly accurate timing and fully flexible intensified CCD sensors provide almost infinite control over interframe time, gain and exposure to capture even the most difficult ultra-fast phenomena.

Comprehensive triggering adjustment and a wide range of output signals are controlled using the custom software package which also includes measurement and image enhancement functions.

The SIMD has an optional port for the addition of a high-speed video camera to allow longer duration and simultaneous image capture. The Duplex camera configuration allows the number of images captured to be twice the number of channels.

FEATURES

- ☐ Fully adjustable interframe time to 1ns
- ☐ Fully adjustable exposure down to 3ns
- ☐ Gain adjustment up to 7,000X
- ☐ Adjustable output triggers
- ☐ Nikon lens mount fitting
- ☐ Ethernet communications
- ☐ Duplex configuration camera

International sales +44 (0) 1442 827728 **USA & Canada +1 951-296-6406** **specialised-imaging.com**

SIMD

Duplex multi channel framing camera

SPECIALISED IMAGING

MODELS

	SIMD4	SIMD8	SIMD16	SIMD24	SIMD32
Number of Channels	2	4	8	12	16
Number of images	4	8	16	24	32

OPTICAL

Optics	Single input beam splitting optics Channels can be fitted with individual filters
Lenses	Nikon F-Mount
Internal electro-mechanical iris	f2.8 - f22
Shutter	Electro-mechanical
Distortion	Nominally zero
Channel Registration	Within one pixel after software correction
Intensity Variation	Better than 5% across the image
Auxiliary Optical Channel Interface	Nikon F-mount bayonet (Optional)

INTENSIFIER / SENSOR

Image Sensor	ICX285AL (Intensified)
Active CCD Pixel	1360 (H) x 1024 (V)
Pixel Size	6.45 µm (H) x 6.45 µm (V)
Dynamic Range	12 bits
Intensifier	18mm High resolution MCP Input window Fused Silica Output window Fibre Optic Photocathode S25, others on request Phosphor screen P46
Gain	Variable up to 7,000
System resolution	>36 lp/mm

MECHANICAL

Dimension cm (w/d/h)	22.5 x 63.0 x 53.0 (8CH, without lens)
Mount	3/8-16 UNC Female
Weight	24Kg (8CH without lens)

TIMING PARAMETERS

System Clock	1GHz quartz crystal controlled
Exposure Mode (each image)	Single exposure or multiple exposures (Max. 8) per channel
Exposure Time	3ns - 10ms in 1ns steps independently variable
Separation Time (multiple exposure mode)	30ns - 20ms in 1ns steps independently variable
Interframe Time	0ns - 20ms in 1ns steps independently variable
Delay to 1st exposure	65ns to 10ms in 1ns steps, independently variable
Flash Outputs	5ns - 1ms in 1ns steps independently variable
Framing rates	up to 1 Billion fps

INPUT / OUTPUT SIGNALS

Trigger 1	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Trigger 2	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Timing Monitor Pulses	Pulse width (min. 3ns) and position user programmable TTL into 50Ω
Flash Trigger Outputs	Pulse width (min. 5ns) and position user programmable TTL into 50Ω
Camera control	Data and command transfer via 100Mbps ethernet cable length 10m (standard), other lengths up to 100m
Software	Custom software compatible with Microsoft Windows Operating Systems for camera control, image data archiving in various file formats.
Power Requirements	100-240V AC 2A, 50-60Hz

ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5°C to +40°C
Humidity	10 - 90% RH non condensing
Vibration shock	10 - 40 Hz Max. 10g in any direction
EMC	Meets all EC harmonized standards

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SIMX

SPECIALISED IMAGING

High resolution multi channel framing camera

Up to 1 Billion frames per second capture speed

50lp/mm system resolution

1360 x 1024 pixel, 12-bit sensor resolution

Up to 16 discrete intensified optical channels

The Specialised Imaging SIMX Framing Camera offers up to 16 high resolution images without creating shading, or parallax. Highly accurate timing and fully flexible intensified CCD sensors provide almost infinite control over interframe time, gain and exposure to capture even the most difficult ultra-fast phenomena.

Comprehensive triggering adjustment and a wide range of output signals are controlled using the custom software package which also includes measurement and image enhancement functions.

The SIMX has an optional port for the addition of a high-speed video, or streak camera to allow either simultaneous long duration or ultra high temporal resolution capture. A multi-spectral configuration SIMX camera can provide up to 16 different multi-spectral images with 5 colour and 1 monochrome images.

FEATURES

- ☐ Fully adjustable interframe time to 1ns
- ☐ Fully adjustable exposure down to 3ns
- ☐ Gain adjustment up to 10,000X
- ☐ Adjustable output triggers
- ☐ Nikon lens mount fitting
- ☐ Ethernet communications
- ☐ Multi-Spectral configuration camera option

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SIMX

High resolution multi channel framing camera

SPECIALISED IMAGING

MODELS

	SIMX4	SIMX8	SIMX16
Number of Channels	4	8	16

OPTICAL

Optics	Single input beam splitting optics Channels can be fitted with individual filters
Lenses	Nikon F-Mount
Internal electro-mechanical iris	f2.8 - f22
Shutter	Electro-mechanical
Distortion	Nominally zero
Channel Registration	Within one pixel after software correction
Intensity Variation	Better than 5% across the image
Auxiliary Optical Channel Interface	Nikon F-mount bayonet (Optional)

INTENSIFIER / SENSOR

Image Sensor	ICX285AL (Intensified)
Active CCD Pixel	1360 (H) x 1024 (V)
Pixel Size	6.45 µm (H) x 6.45 µm (V)
Dynamic Range	12 bits
Intensifier	18mm High resolution MCP Input window Fused Silica Output window Fibre Optic Photocathode S25, others on request Phosphor screen P43
Gain	Variable up to 10,000
System resolution	50 lp/mm

MECHANICAL

Dimension cm (w/d/h)	22.5 x 63.0 x 53.0 (8CH, without lens)
Mount	3/8-16 UNC Female
Weight	24Kg (8CH without lens)

TIMING PARAMETERS

System Clock	1GHz quartz crystal controlled
Exposure Mode (each image)	Single exposure or multiple exposures (Max. 8) per channel
Exposure Time	3ns - 10ms in 1ns steps independently variable
Interframe Time	0ns - 20ms in 1ns steps independently variable
Delay to 1st exposure	65ns to 10ms in 1ns steps, independently variable
Flash Outputs	5ns - 1ms in 1ns steps independently variable
Framing rates	up to 1 Billion fps

INPUT / OUTPUT SIGNALS

Trigger 1	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Trigger 2	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Timing Monitor Pulses	Pulse width (min. 3ns) and position user programmable TTL into 50Ω
Flash Trigger Outputs	Pulse width (min. 5ns) and position user programmable TTL into 50Ω
Camera control	Data and command transfer via 100Mbps ethernet cable length 10m (standard), other lengths up to 100m available 100FX fibre optic ethernet link (up to 2Km) - optional
Software	Custom software compatible with Microsoft Windows Operating Systems for camera control, image data archiving in various file formats.
Power Requirements	100-240V AC 2A, 50-60Hz

ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5°C to +40°C
Humidity	10 - 90% RH non condensing
Vibration shock	10 - 40 Hz Max. 10g in any direction
EMC	Meets all EC harmonized standards

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Kirana

SPECIALISED IMAGING

The Ultimate High-Speed Video Camera

Up to 5 Million images/ second capture speed

924 x 768 pixel, 10-bit sensor resolution

180 images

100ns minimum shutter

The Specialised Imaging KIRANA is a true Ultra high-speed video camera that combines the flexibility of a video camera with the speed/resolutions approaching those only available with Framing cameras.

The unique custom design sensor offers 180 images at capture speeds up to 5 Million Images/second at full resolution.

In line with high-speed video cameras the KIRANA can be Frame synchronised with an external device such as another KIRANA or laser.

The KIRANA can also be recording prior to the event and triggered before, during or after the event.

FEATURES

- ☐ Up to 5 Million images/second
- ☐ Adjustable exposure down to 100ns
- ☐ Pre & Post event triggering
- ☐ External synchronisation
- ☐ Nikon lens mount fitting
- ☐ Gigabit ethernet communications
- ☐ Compact and rugged design

Kirana1M Up to 1 Mfps

Kirana5M Up to 5 Mfps

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Kirana

The Ultimate High-Speed Video Camera

SPECIALISED IMAGING

MODEL SPECIFICATION

	Kirana1M	Kirana5M
Frame Rate (Frames per second)	Up to 1 Mfps	Up to 5 Mfps
Exposure Time (minimum)	1µs 10ns step	100ns 10ns step
Trigger Mode	Start, End and Center	

OPTICAL

Lenses	Nikon F-Mount
Shutter	Electro-mechanical
Distortion	Zero

INTENSIFIER / SENSOR

Sensor	µCMOS (Non-intensified)
Number of Active Pixels	924 (W) x 768 (H)
Pixel Size	30µm
Digitisation	10bits Monochrome
Number of Frames	180

MECHANICAL

Dimension mm (w/d/h)	**Head:** 22.8cm x 42cm x 19cm (without lens) **Power supply:** 19.5cm x 39.5cm x 19.5cm (inc. handle)
Weights	**Head:** 10.6Kg (23lbs) without lens. **Power Supply:** 4.8Kg (10.5lbs)
Head Mounting	3/8-16 UNC Female in head base.

TIMING PARAMETERS

System Clock	200MHz quartz crystal controlled
Exposure time	100ns - 1/Frame rate
Framing rates	1000fps - 1Mfps or 5Mfps

INPUT / OUTPUT SIGNALS

Trigger (2 off)	Electrical signal (BNC connector) Threshold variable from ± 25V Maximum Input level 50V Integral Velocity measurement system Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Video Out	XVGA
Aux Out	FSync or user programmable pulse width and position for strobe/laser illumination sources. TTL into 50Ω
Sync In	Input to allow the synchronisation of multiple cameras in Master-Slave configuration
Camera Control	Remote control via Standard 1Gbps Ethernet
Software	Custom software compatible with Microsoft Windows Operating Systems for control and data archiving in various file formats
Power Requirements	100-240V AC 2A, 50-60Hz
Saved Image Format	TIFF, JPEG, AVI or RAW

ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5°C to +40°C
Humidity	10—90% RH non condensing
Vibration shock	10—40 Hz Max. 10g in any direction
EMC	Meets all EC harmonised standards

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Tracker²

SPECIALISED IMAGING

Comprehensive High-Speed Linear Tracker System

Award winning flight follower system

Multiple tracking modes

Remote control motorised adjustment

Multiple high-speed camera options

The Specialised Imaging Tracker² is the next generation of projectile tracking platforms for high-speed video and measurement.

Full motorised remote control of three axis rotation and multiple inputs for real-time velocity adjustment contribute to the evolution of this award-winning system.

Built on a sturdy mount, the fully weatherproofed mirror and camera housings allow a large range of high-speed video cameras and long focal length lens options.

Custom software controls the Tracker system and provides calculators for Tracker placement, camera fields-of-view and velocities.

FEATURES

- ☐ Full remote control operation
- ☐ Multiple operating modes allow capture of decelerating, accelerating, user defined velocity profiled projectiles
- ☐ Scan ratio range from 0.1 to 100
- ☐ Scanning accuracy of ± 0.2°
- ☐ Gigabit ethernet communications
- ☐ Built in camera power, communications and trigger
- ☐ No calibration required

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Tracker²

Comprehensive High-Speed Linear Tracker System

SPECIALISED IMAGING

OPERATING MODES

Fixed Velocity	Single trigger using known velocity
Velocity	The scan is corrected using the measured velocity from at least 2 of the 8 available detector inputs.
Position	The scan position is corrected from the detector inputs. Known velocity is assumed.
Drag / Acceleration	The scan is corrected using the measured velocity and drag / acceleration from at least 3 of the 8 available detector inputs.
Pre-defined profile	Programmable Velocity Vs Time curve. Triggered using single trigger. Used for non-linear projectile trajectories.
Advanced User Functions	Specialised Imaging is prepared to customise modes of operation to user requirements.
Skewed Geometry	Allows non perpendicular operation

ENVIRONMENTAL

Storage temperature	-10°C to +74°C
Operating temperature	-5°C to +50°C
Warmup Period	Not Required
Humidity	10 - 90% RH non-condensing
Operational vibration	10G, 10-40Hz Max, any direction
EMC	Meets all EC harmonized standards

MECHANICAL

Dimensions mm (w/d/h)	1340 x 670 x 590 (without tripod)
Mount	Tripod Included

MIRROR

Type	Optical flat elliptical Silicon Carbide Mirror
Size (HxW) mm	135 x 85 x 2

OPERATING PARAMETERS

Scan Ratio (SR)	0.1 to 100 (defined as the ratio of projectile velocity/ stand-off distance)
Scanning range (Max.)	-60° to +60 °
Scanning Distance	>=2x standoff distance (distance from the line of flight to Tracker2)
Scanning Accuracy	±0.2°
Positional Accuracy	±0.018°
Calibration	Not required
Projectile Velocity	SR x Standoff distance
Projectile Drag	0 to 100 m/s/m
Acceleration Angle	1° - 5° depending on scan rate (defined as the angle required to accelerate the mirror from rest to full scanning speed)

INPUT / OUTPUT SIGNALS

Detector In	BNC
Number of inputs	8
Trigger In	Rising or Falling Edge pulse Make/break
Camera Trigger	TTL positive pulse
Communication Interface	Data and command transfer via 1Gbps ethernet cable length 100m (standard). Other lenths available 1000FX fibre optic ethernet link (up to 2Km) - optional
Software	Custom software compatible with Microsoft Windows Operating Systems for control and data archiving in various file formats

CONTROL UNIT

System Clock	10MHz quartz crystal controlled
Trigger Jitter	<1us

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TrackerLite

SPECIALISED IMAGING

Compact High-Speed Linear Tracker System

Built on award winning flight follower system

Multiple tracking modes

Manual positional adjustment

Integrated high-speed camera options

The Specialised Imaging Tracker[Lite] is a smaller, lighter system that retains the core functions of the Award winning Tracker[2] system.

Manual adjustment of three axis rotation and a single input for real-time velocity adjustment contribute to the simplification of the system.

Built on a standard tripod, the fully weatherproofed mirror and camera housing allow a dual line of high-speed video cameras and long focal length lens options.

Custom software controls the Tracker system and provides calculators for Tracker placement, camera fields-of-view and velocities.

FEATURES

- ☐ Multiple operating modes allow capture of decelerating, accelerating, user defined velocity profiled projectiles
- ☐ Scan ratio range from 1 to 40
- ☐ Scanning accuracy of ± 0.2°.
- ☐ Gigabit ethernet communications
- ☐ Built in camera power, communications and trigger
- ☐ No calibration required

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Tracker Lite

Compact High-Speed Linear Tracker System

SPECIALISED IMAGING

OPERATING MODES

Fixed Velocity	Single trigger using known velocity
Velocity	The scan is corrected using the measured velocity from at least 2 of the 3 available detector inputs.
Position	The scan position is corrected from the detector inputs. Known velocity is assumed.
Drag	The scan is corrected using the measured velocity and drag from 3 detector inputs.
Pre-defined profile	Programmable Velocity Vs Time curve. Triggered using single trigger. Used for non-linear projectile trajectories.
Advanced User Functions	Specialised Imaging is prepared to customise modes of operation to user requirements.
Skewed Geometry	Allows non perpendicular operation

ENVIRONMENTAL

Storage temperature	-10°C to +74°C
Operating temperature	-5°C to +45°C
Warmup Period	Not Required
Humidity	10 - 90% RH non-condensing
Operational vibration	10G, 10-40Hz Max, any direction
EMC	Meets all EC harmonized standards

MECHANICAL

Dimensions mm (w/d/h)	650 x 230 x 310 (without tripod)
Weight	16kg / 35lbs (without camera and lens)
Mount	3/8-16 UNC Female

MIRROR

Type	Optical flat elliptical surface silvered
Size (HxW) mm	135 x 85

OPERATING PARAMETERS

Scan Ratio (SR)	1 to 40 (defined as the ratio of projectile velocity/ stand-off distance)
Scanning range (Max.)	-50° to +50 °
Scanning Distance	>=2x standoff distance (distance from the line of flight to Tracker2)
Scanning Accuracy	±0.2°
Calibration	Not required
Projectile Velocity	SR x Standoff distance
Projectile Drag	0 to 100 m/s/m
Acceleration Angle	1° - 5° depending on scan rate (defined as the angle required to accelerate the mirror from rest to full scanning speed)

INPUT / OUTPUT SIGNALS

Detector In	BNC
Number of inputs	3
Trigger In	Rising or Falling Edge pulse Make/break
Camera Trigger	TTL positive pulse
Communication Interface	Data and command transfer via 1Gbps ethernet cable
Software	Custom software compatible with Microsoft Windows Operating Systems for control and data archiving in various file formats

CONTROL UNIT

System Clock	10MHz quartz crystal controlled
Trigger Jitter	<1us

INTEGRATED CAMERA OPTIONS

Tracker Lite -A	Photron FASTCAM Mini AX100 – 1024x1024 @ 4,000pps
Tracker Lite -V	Phantom VEO410L 1280x800 @ 5,200pps

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LOMA

SPECIALISED IMAGING

Lightweight Optical Motion Analysis System

Compact Optical Tracking Pedestal mount

Multiple Tracking Modes

Up to 150KG Payload

Multiple Tracking and Payload Camera Options

The Specialised Imaging LOMA system is the next generation of long range projectile tracking systems.

The system consists of an Azimuth module, Elevation module and payload platform, each constructed from stainless steel or aluminium to ensure rigidity and precision tracking.

The advanced servo control provided accurate (±100 micro-radians) movement of payloads up to 150Kg.

The LOMA system can be used in Manual, Slave or Optical tracking modes. IRIG-B timecode provided by existing range receiver or own receiver.

FEATURES

- ☐ ±100 micro-radians angular accuracy
- ☐ Unlimited Azimuth rotation
- ☐ Elevation -20° to +190°
- ☐ Turn and Plunge capable
- ☐ Ethernet communications
- ☐ Built in camera power, communications and trigger
- ☐ IR and Visible spectrum tracking options
- ☐ Customised Platforms

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LOMA

Lightweight Optical Motion Analysis System

SPECIALISED IMAGING

OPERATING MODES

Manual	Joystick control for emplacement and maintenance purposes
Slave	External input of Longitude, Latitude & Elevation
Optical	Onboard camera tracking (Visible or IR)

INPUT / OUTPUT SIGNALS

Command interface	RS232 (Controller to Pedestal)
Control interface	Gigabit Ethernet
Payload interface	Gigabit Ethernet, Coaxial.
Tracking interface	Video (tracking camera to Controller)
Azimuth/Elevation transfer	RS232
Timecode interface	IRIG-B from existing generator
Software	Custom software compatible with Microsoft Windows Operating Systems for Control of Pedestal and Tracking cameras
Electrical Power	AC: 110-240V AC 50/60Hz or DC: 24-48V 30A

MECHANICAL

Dimension (w/d/h)	**Basic Pedestal:** 41cm x 39cm x 78.6cm (16.1" x 15.4" x 30.9") **Control Unit:** 72xm x 60cm x 50cm (28.3" x 23.6" x 19.7")
Weight	**Basic Pedestal:** 70Kg (154lbs) without base or Payload **Control Unit:** 35Kg (77lbs)
Transit Locks	Locking stow pins in Azimuth & Elevation

OPERATING PARAMETERS

System Accuracy	± 100 micro-radians, 2σ
Travel	Azimuth: Continuous (360°) Elevation: -20° to +190°
Torque (azimuth & elevation)	27Nm continuous (40Nm peak)
Nominal Payload	150Kg (at rated payload MoI)
Angular Velocity (nominal payload)	Azimuth: 90° / second Elevation: 90° / second
Angular Acceleration (nominal payload)	Azimuth: 90° / second^2 Elevation: 90° / second^2
Non-Orthogonality	± 10 arc seconds
Drive System	Direct drive
Encoders	25-bit absolute, both axis

ENVIRONMENTAL

Storage Temperature	-120°C to +70°C
Operating Temperature	-10C to +60°C
Humidity	20-80% RH non condensing
Vibration Shock	10-40 Hz Max. 10g in any direction
EMC	Meets all EC harmonised standards

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Cerberus

SPECIALISED IMAGING

Multi-head Intensified Camera System

Up to 8 camera heads per control module

1360 x 1024 pixel, 12-bit sensor resolution

Single or double image capture

5ns minimum shutter

The Specialised Imaging CERBERUS camera system offers framing camera image capture performance with the addition of multiple camera control.

Each camera head can capture either one or two 1.4 MegaPixel 12-bit images with exposure times down to 5ns.

A maximum of 8 Control modules can be connected to allow a total of 64 cameras controlled from a single PC.

The CERBERUS system is flexible enough to allow multiple 3D/Stereoscopic image pairs or sequential images with a 5ns interframe time, equating to 200 Million Frames/second.

FEATURES

- ☐ Control up to 64 camera heads
- ☐ Adjustable exposure down to 5ns
- ☐ Head to Head adjustable interframe time down to 5ns
- ☐ Nikon lens mount fitting
- ☐ Ethernet communications
- ☐ Compact and rugged design

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Cerberus

Multi-head Intensified Camera System

SPECIALISED IMAGING

OPTICAL

Lenses	Nikon F-mount (ruggedized mounting system)
Shutter	Electro-mechanical
Distortion	Nominally zero
Intensity variation	Better than 5% across the image

INTENSIFIER / SENSOR

	CE-01 HEAD	CE-02 HEAD
Image Sensor	ICX285AL (Intensified)	
Active CCD Pixel	1360 (H) x 1024 (V) pixels	
Pixel Size	6.45 µm (H) x 6.45 µm (V)	
Dynamic Range	12 bits	
Intensifier	8mm High resolution MCP Input window Fused Silica Output window Fibre Optic Photocathode S25, others on request Phosphor screen P43	
Gain	Up to 7,000	Up to 4,000
Dynamic resolution	>50lp/mm	>36lp/mm
Images	Single	Two (550ns interframe time)

MECHANICAL

Dimension mm (w/d/h)	**Head (without lens)** 9.4cm x 21cm x 9.4cm (3.7" 8.2" x 3.7") **Controller** 19" rack mount 3U case
Weights	**Head** 3kg (6.6lbs) **Controller** 7kg (15.4lbs)
Head Mounting	3/8-16 UNC Female in head base

TIMING PARAMETERS

System Clock	200MHz quartz crystal control
Inherent Delay	500ns
Exposure Mode (each head)	Single exposure or multiple exposures (Max. 8) per head
Exposure Time	5ns – 10ms in 5ns steps
Interframe Time (head-to-head)	5ns – 20ms in 5ns steps
Delay to 1st exposure	500ns – 10ms in 5ns steps
Flash Outputs	5ns to 1ms in 5ns steps
Separation Time	30ns – 20ms in 5ns steps (multiple exposures on same channel)

INPUT / OUTPUT SIGNALS

Trigger 1	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Trigger 2	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Timing Monitor Pulse	Pulse width (min. 5ns) and position user programmable TTL into 50Ω
Flash Trigger Outputs	Pulse width (min. 5ns) and position user programmable TTL into 50Ω
Remote Camera Interface	Data and command transfer via custom 10m cable.
Camera head control	Data and command transfer via 100Mbps Ethernet cable length 10m (standard), other lengths up to 100m available 100FX Fibre optic Ethernet link (up to 2Km) - optional
Software	Custom software compatible with Microsoft Windows Operating Systems for cameracontrol, image data archiving in various file formats.
Power Requirements	100-240V AC 2A, 50-60Hz

ENVIRONMENTAL

Housing	19" Rack Mount 2U case
Storage temperature	-10°C to +50°C
Operating Temperature	-5°C to +40°C
Humidity	10 - 90% RH non condensing
Vibration shock	10 - 40 Hz Max. 10g in any direction
EMC	Meets all EC harmonized standards

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T-Cam

SPECIALISED IMAGING

High Resolution non-intensified camera

Single image capture

Up to 11 MegaPixel 12-bit images

Compact and rugged construction

The Specialised Imaging T-Cam Camera offers single high resolution images for ambient or low light capture.

Comprehensive triggering adjustment and a wide range of output signals are controlled using the custom software package which includes measurement and image enhancement functions.

FEATURES

- ☐ Fully adjustable exposure from 1µs to 10ms
- ☐ Adjustable output triggers
- ☐ Nikon lens mount fitting
- ☐ Gigabit ethernet communications

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T-Cam

High Resolution non-intensified camera

SPECIALISED IMAGING

OPTICAL

Lenses	Nikon F-mount
System Aperture	Limited by lens
Distortion	Nominally zero

INTENSIFIER / SENSOR

	T-Cam 43100	T-Cam 22100
Image Sensor	KAI11002M (Non intensified)	KAI4021M (Non intensified)
Active CCD Pixel	4008 (H) x 2688 (V)	2048 (H) x 2048 (V)
Pixel Size	9µm (H) x 9µm (V)	7.4 µm (H) x 7.4 µm (V)
Dynamic Range	12 bits	12 bits

MECHANICAL

Dimension mm (w/d/h)	17.8cm x 18.5cm x 19.7cm (7.0" x 7.3" x 7.8") without lenses
Mount	1/4-20 UNC Female (standard tripod)
Weight	6Kg (13.2lbs) without lens.

INPUT / OUTPUT SIGNALS

Trigger 1	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Trigger 2	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Flash Trigger Output	Pulse width (min. 10ns) and position user programmable. TTL into 50Ω
Camera Control	Data and command transfer via Gigabit Ethernet. Cable length 10m (standard), other lengths up to 100m available 1000FX fibre optic Ethernet link (up to 2Km) - optional
Software	Custom software compatible with Microsoft Windows Operating Systems for camera control, image data archiving in various file formats.
Power Requirements	100-240V AC 2A, 50-60Hz

ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5°C to +40°C
Humidity	10—90% RH non condensing
Vibration shock	10—40 Hz Max. 10g in any direction
EMC	Meets all EC harmonised standards

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SIL3

SPECIALISED IMAGING

Compact image intensifier/converter

Range of Intensifier tube options

Up to 40lp/mm resolution

Gate times down to 50ns

Comprehensive triggering for High-speed video and Standard cameras

The Specialised Imaging SIL3 image intensifier is the latest generation of intensifier that can be synchronised to almost any high-speed video, conventional video or stills camera.

Maximum equivalent frame rates ranging from 100,000fps to 1,000,000fps and minimum gate (exposure) time of 50ns.

The range of Intensifier tube options include output window diameters, Phosphor decay times and Wavelength responses (inc. UV) provide a unique enhancement to any camera.

Intuitive custom control software allows gain, gate/exposure and delay adjustment via Ethernet.

FEATURES

- ☐ 25mm and 40mm Intensifier tube options
- ☐ Fully adjustable gating time down to 50ns
- ☐ Gain adjustment up to 500,000X
- ☐ Nikon lens mount fitting
- ☐ Optical camera coupling
- ☐ Ethernet communications
- ☐ UV wavelength conversion option

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SIL3

Compact image intensifier/converter

SPECIALISED IMAGING

INTENSIFIER /SENSOR

	SIL40HG50	SIL40NG50	SIL25HG50	SIL25NG50	SIL25HG50-X	SIL25HG50-D
Front Window	Fused Silica	Fused Silica	Fused Silica	Fused Silica	Fused Silica	Quartz
Output Window	Glass	Glass	Glass	Glass	Glass	Glass
Photocathode	S20	S20	S20	S20	S20	UV Enhanced S20
Output Phosphor	FS/10µs decay	FS/10µs decay	FS/10µs decay	FS/10µs decay	P46/300ns decay	P46/300ns decay
Input Area (diameter)	40mm	40mm	25mm	25mm	25mm	25mm
Spectral response (minimum)	15mA/W @ 214nm	17mA/W @ 214nm	15mA/W @ 214nm	20mA/W @ 214nm	20mA/W @ 214nm	20mA/W @ 220nm
	55mA/W @ 450 nm	55mA/W @ 450 nm	48mA/W @ 450 nm	53mA/W @ 450nm	53mA/W @ 450nm	53mA/W @ 450nm
	17mA/W @ 800 nm	10mA/W @ 800 nm	17mA/W @ 800 nm	17mA/W @ 800 nm	17mA/W @ 800 nm	17mA/W @ 800 nm
Gain (W/W @ 500nm)	100,000	10,000	100,000	10,000	100,000	500,000
Limiting resolution (Typical)	22 lp/mm	30 lp/mm	27 lp/mm	40 lp/mm	27 lp/mm	28 lp/mm
Frame Rate (Max. Fps)	100,000	100,000	100,000	100,000	1,000,000	1,000,000

OPTICAL

Front Lens mount	F-mount
Optical Coupling	F-mount

MECHANICAL

Dimension mm (w/d/h)	17.8cm x 18.5cm x 19.7cm (7.0" x 7.3" x 7.8") without lenses
Mount	3/8-16UNC Female (standard tripod)
Weight	4.8Kg (10.6lbs) without lenses
Lens/Camera Support	Option available

ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5° to +40°C
Humidity	10 - 90% RH non condensing
Vibration shock	10 - 40Hz Max. 10g in any direction
EMC	Meets all EC harmonized standards

TIMING PARAMETERS

System Clock	200MHz, quartz crystal controlled.
Inherent Delay (5ns jitter)	60ns
Exposure Time	50ns—DC in 5ns steps independently variable
Inter Exposure Time	50ns—25ms in 5ns steps independently variable
Number of exposures	Up to 64 in pulsed mode. Unlimited in REP (synchronous) mode

INPUT / OUTPUT SIGNALS

Triggers	Electrical signal (BNC connector) Maximum Input level 50V Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Aux Outputs	Pulse width and position user programmable (min. 5ns) TTL into 50Ω
Control Interface	Remote control via Standard 100Mbps Ethernet
Inhibit Input	5V TTL (user input brightness protection
Software	Custom software compatible with Microsoft Windows Operating Systems for control
Power Requirements	100-240V AC 2A, 50-60Hz

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SIR3

SPECIALISED IMAGING

High Resolution Dual Image Intensified camera

Single or Double image capture

Up to 10.7 MegaPixel 12-bit images

Lightweight and Rugged construction

The Specialised Imaging SIR3 Framing Camera offers up to 2 high resolution images, 100µs apart. Fully flexible intensified CCD sensor provides control over interframe time, gain and exposure.

Comprehensive triggering adjustment and a wide range of output signals are controlled using the custom software package which also includes measurement and image enhancement functions.

FEATURES

- ☐ Fully adjustable interframe time to 100µs
- ☐ Fully adjustable exposure down to 10ns
- ☐ Gain adjustment up to 10,000X
- ☐ Adjustable output triggers
- ☐ Nikon lens mount fitting
- ☐ Gigabit ethernet communications

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SIR3

Compact range camera

SPECIALISED IMAGING

OPTICAL

Lenses	Nikon F-mount (ruggedized mounting system)
System Aperture	f 2
Shutter	Electro-mechanical
Distortion	Nominally zero
Coupling	CCD to MCP via FO
Vignetting	<3%
Intensity variation	Better than 5% across the image
Optical Viewfinder	Optional

INTENSIFIER / SENSOR

	SIR3-18D	SIR3-25D	SIR3-40D
Image Sensor	ICX285AL	KAI4021M	KAI11002M
Active CCD Pixel	1360 (H) x 1024 (V)	2048 (H) x 2048 (V)	4008 (H) x 2688 (V)
Pixel Size	6.45 µm (H) x 6.45 µm (V)	7.4 µm (H) x 7.4 µm (V)	9 µm (H) x 9 µm (V)
Dynamic Range	12 bits	12 bits	12 bits
Intensifier diameter	18mm MCP	25mm MCP	40mm MCP
Photocathode	All models: S25		
Phosphor / decay	P46/300ns	FS/10µs	FS/10µs
Input / Output windows	All models: Glass / Fibre		
Gain	Variable up to 10,000 all models		

MECHANICAL

Dimension mm (w/d/h)	17.0cm x 48.5cm x 19.3cm (without lens)
Mount	1/4 - 20 UNC and 3/8 - 16 UNC female
Weight	15Kg (33lbs) without lens

ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5°C to +40°C
Humidity	10—90% RH non condensing
Vibration shock	10—40 Hz Max. 10g in any direction
EMC	Meets all EC harmonised standards

TIMING PARAMETERS

System Clock	200MHz quartz crystal controlled
Inherent Delay	<130ns
Imaging Mode	Single or Double image
Exposure Modes (each image)	Single exposure or multiple exposures (Max. 16 - subject to imaging conditions).
Exposure Times	10ns – 10ms in 5ns steps independently variable
Delay to 2nd exposure	100µS – 10mS in 5ns steps.
Flash output	20ns to 1ms in 5ns steps independently variable
Separation	30ns to 20ms in 5ns steps independently variable

INPUT / OUTPUT SIGNALS

Trigger 1	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Trigger 2	Electrical signal (BNC connector) Threshold variable from ± 25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Flash Trigger Output	Pulse width (min. 10ns) and position user programmable. TTL into 50Ω
Camera Control	Data and command transfer via Gigabit Ethernet Cable length 100m (standard) 1000FX fibre optic Ethernet link (up to 2Km) - optional
Software	Custom software compatible with Microsoft Windows Operating Systems for camera control, image data archiving in various file formats.
Power Requirements	100-240V AC 2A, 50-60Hz

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SI-VT

SPECIALISED IMAGING

Ballistic Velocity Measurement System

3,330 measurements / second

Up to 15,000 measurements storage

5ns Resolution

3 independent input channels

4 independent output channels

The Specialised Imaging VT system performs time of flight and/or velocity measurements using 3 input channels.

Capture rates up to 3,330 measurements per second (200,000 rounds per minute) can be measured and up to 15,000 measurements can be stored locally in the Unit head.

The four independent Output channels can be used as a trigger adjustment unit for ballistic events to ensure correct triggering of framing, ultra high-speed and high speed video cameras.

FEATURES

- ☐ Velocity measurement
- ☐ Time of flight measurement
- ☐ Ethernet communication

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SI-VT

Ballistic Velocity Measurement System

SPECIALISED IMAGING

OPERATING PARAMETERS

Measurements	Time of flight or Velocity
Max. rate of capture/fire	200,000 measurements/minute (3,330 Hz)
Max. storage	15,000 measurements (velocity or time of flight)

INPUT / OUTPUT SIGNALS

Input/trigger channels	3 (independent) Electrical signal (BNC connector) Threshold variable from ±25V Positive or Negative polarity, Make/Break 50Ω or 1KΩ termination
Output channels	4 (independent) +ve TTL (BNC connector) Pulse width user programmable 50Ω termination
Control interface	100Mbps Ethernet
Software	Custom software compatible with Microsoft Windows Operating Systems for Control and data archiving.
Electrical power	AC: 110-240V AC 50/60Hz or DC: 24V DC – Battery power

TIMING PARAMETERS

System Clock	200MHz, quartz crystal controlled
Inherent Delay	50ns
Range	5ns to 1s in 5ns steps independently variable
Jitter (trigger)	<=5ns
Jitter (channel to channel)	0ns

MECHANICAL

Dimension mm (w/d/h) Inc. handles	23cm x 23 cm x 17cm (9.1" x 9.1" x 6.7")
IP rating	IP65
Weight	4Kg (8.8lbs)

ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating Temperature	-5°C to +40°C
Humidity	10 - 90% RH non condensing
Vibration shock	10 - 40 Hz Max. 10g in any direction
EMC	Meets all EC harmonized standards

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SI-LUX640

SPECIALISED IMAGING

Laser illumination system

Up to 400W lighting power

640nm wavelength

Flexible triggering/ synchronisation

The Specialised Imaging LUX640 laser illumination system provides up to 400W of lighting power at pulse frequencies up to 10MHz or single pulses up to 30µS.

Simple triggering allows the SI-LUX640 to interface with most high-speed cameras ranging from High-speed video to Ultra highspeed framing cameras.

The 2m laser output light guide includes user interchangeable low coherence beam expanders.

FEATURES

- ☐ Low coherence
- ☐ Pulse width from 10ns – 30µs
- ☐ Pulse frequency range from single to 10MHz
- ☐ Compact design

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SI-LUX640

Laser illumination system

SPECIALISED IMAGING

OPTICAL

Beam Expanders	ϕ25mm and ϕ50mm versions
Wavelength	640nm ± 6nm
Output power	200W (-10/ + 30%) or 400W (-10/ + 20%)
Power drop	~ 0.2% / µS for pulses less than 5µS

INPUT / OUTPUT SIGNALS

Sync. Input	5V TTL (BNC socket connector) (laser pulse duration = duration of +5V state)
Indicators	Green LED – Laser is powered & ready
Software	Custom software compatible with Microsoft Windows Operating Systems for Control.
Electrical Power	100-240V AC 2A 50-60Hz

HEALTH & SAFETY

Laser rating	Class 3b
Safety features	Key operated master control power on/off Connector for remote Interlock
Visual indicator	Green LED = Laser is powered & ready Red LED = interlock indicator Health & Safety on laser body

ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5°C to +40°C
Humidity	10—90% RH non condensing
Vibration shock	10—40 Hz Max. 10g in any direction
EMC	Meets all EC harmonised standards

TIMING PARAMETERS

Max pulse rate	10MHz
Min. single pulse duration	~10ns
Max. single pulse duration	30µS (max. power drop 20%)
Rise time	~10ns (10%...90%)
Fall time	~5ns
Delay	70ns between input to start of light pulse (incl. control cable delay)
Jitter	<5ns
Operating limits	Max. 0.03% duty cycle for unlimited operation Max. 100% duty cycle for 30µS laser operation

MECHANICAL

Dimension (w/d/h)	**Laser:** 6.2cm x 15cm x 3.6cm (6" x 2.4" x 1.4") **Master control box:** 12cm x 6cm x 12cm (4.7" x 2.4" x 4.7")
Weight	**Laser:** 0.5Kg (1.1lbs) **Master control box:** 0.5Kg (1.1lbs)
Light guide	2m
Control cable	2m between control/safety box & laser

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SI-OT3

SPECIALISED IMAGING

Optical Trigger Unit

Rugged Design

Battery Powered

Shadow and IR Flash Detector

High / Low pass filtering

The Specialised Imaging OT3 provides a reliable optical trigger for either projectile "shadow" detection or IR flash detection

Battery powered, with a rugged enclosure allow the OT3 to be used outside in all weathers and independent of mains power.

Battery unit includes mains charger and can power the OT3 for up to 8 hours.

FEATURES

- ☐ Small and lightweight
- ☐ Battery powered for up to 8 hours
- ☐ Nikon lens mount fitting
- ☐ User adjustable sensitivity

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SI-OT3

Optical Trigger Unit

SPECIALISED IMAGING

OPTICAL

Lenses	Nikon F-Mount
Alignment	Optical viewport

INTENSIFIER / SENSOR

Sensor	Multi-Segment Photodiode array. 300nm – 700nm range (Non-intensfied)

INPUT / OUTPUT SIGNALS

Output	Positive 5V TTL (BNC socket connector) 50Ω termination
Trigger indicator	LED
Software	Custom software compatible with Microsoft Windows Operating Systems for Control and data archiving.
Electrical Power	DC: 18-34V DC Battery powered: Sealed lead acid Built in battery charger

MECHANICAL

Dimension mm (w/d/h)	**Sensor head (without lens)** 9cm x 17cm x 9cm (3.5" 6.7" x 3.5") **Battery** 15cm x 9.5cm x 17cm (6" x 3.7" x 6.7")
Weights	**Sensor head** 1Kg (2.2lbs) **Battery** 4Kg (8.8lbs)
Sensor head mounting	1/4 -20 UNC UNC Tripod Female in base & top

ENVIRONMENTAL

Storage temperature	-10°C to +50°C
Operating temperature	-5°C to +40°C
Humidity	10—90% RH non condensing
Vibration shock	10—40 Hz Max. 10g in any direction
EMC	Meets all EC harmonised standards

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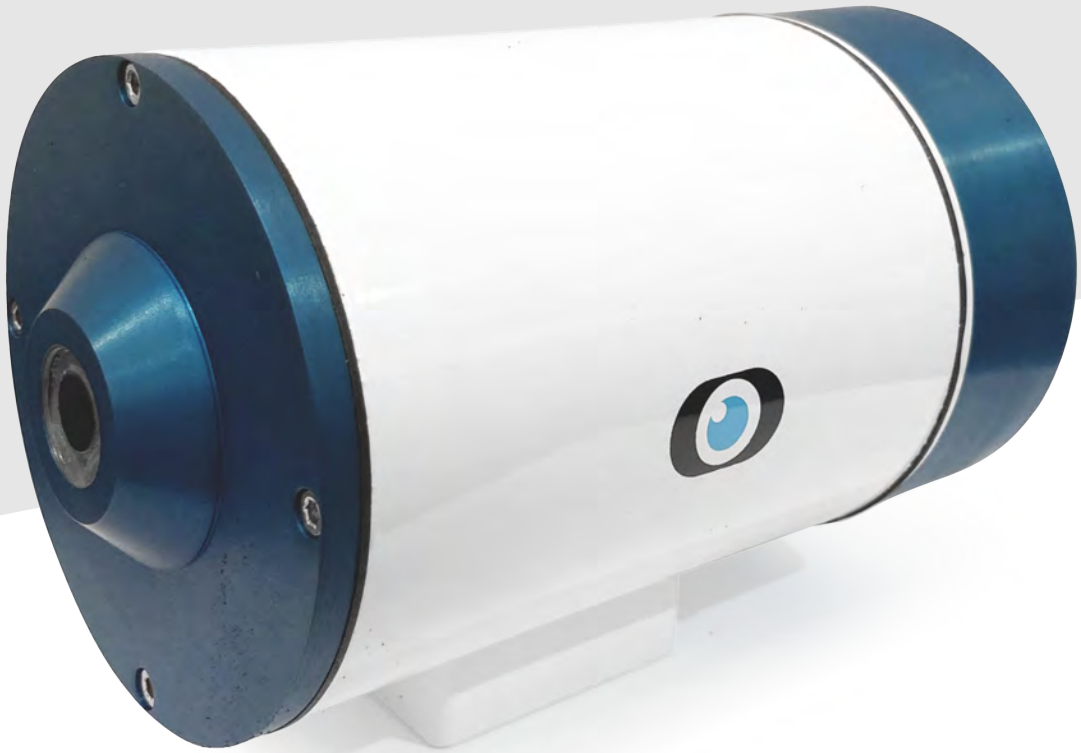
SI-AT1

SPECIALISED IMAGING

Acoustic trigger Unit



Built in battery power

Compact size

User selectable sensitivity settings

TTL trigger output

The Specialised Imaging SI-AT1 provides a reliable acoustic trigger for blast or shockwave detection.

Built in battery power within a compact, rugged enclosure allows the AT1 to be used outside in all weathers and independent of mains power for up to 8 hours.

FEATURES

- ☐ Small and rugged
- ☐ Battery powered for up to 8 hours
- ☐ User adjustable sensitivity
- ☐ Standard tripod mounting threads

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SI-AT1

Acoustic trigger unit

SPECIALISED IMAGING

SENSOR

Sensor	Piezoelectric acoustic sensor

INPUT / OUTPUT SIGNALS

Output	Positive 5V TTL (BNC socket connector) 50Ω termination
Pulse width	10mS
Trigger indicator	LED
Electrical power	Battery powered Built in battery charger 12VDC - 500mA (from charger)
Lower power indicator	LED

MECHANICAL

Dimension mm (w/d/h)	**Unit** 152mm x 88mm (5.9" x 3.46") **Tripod mount block** 16mm high (0.62")
Weight	1Kg (2.2lbs)
Tripod mount	1 x 1/4-20UNC 1 x 3/8-16UNC

ENVIRONMENTAL

Storage temperature	-20°C to +50°C
Operating temperature	-15°C to +50°C
Charging temperature	0°C to +40°C
Humidity	10—90% RH non condensing
Vibration shock	10—40 Hz Max. 10g in any direction
EMC	Meets all EC harmonised standards

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AD-500

SPECIALISED IMAGING

Single or mulitple head high intensity flash system

500J Flash head with 2ms duration

Up to four independent flash heads

40s recycle time

Standard trigger

The Specialised Imaging AD500 Flash system offers the flexibility of four controllable high intensity flash light for used in scientific and industrial environments.

CONTROL UNIT

Signal Input	Four independent Channels
Trigger Mode	1. Independently 2. Simultaneous - all four channels triggered via channel 1
Trigger Source	Short Circuit 5-100V positive edge
Input Impedance	50Ω per channel
Mains Input	IEC socket
Input Voltage	90-240V 50-50Hz AC
Dimensions mm	(LxWxH) 220mm x 110mm x 128mm
Weight	3.7kg
Lamp cable length	2.5m

FLASH HEAD

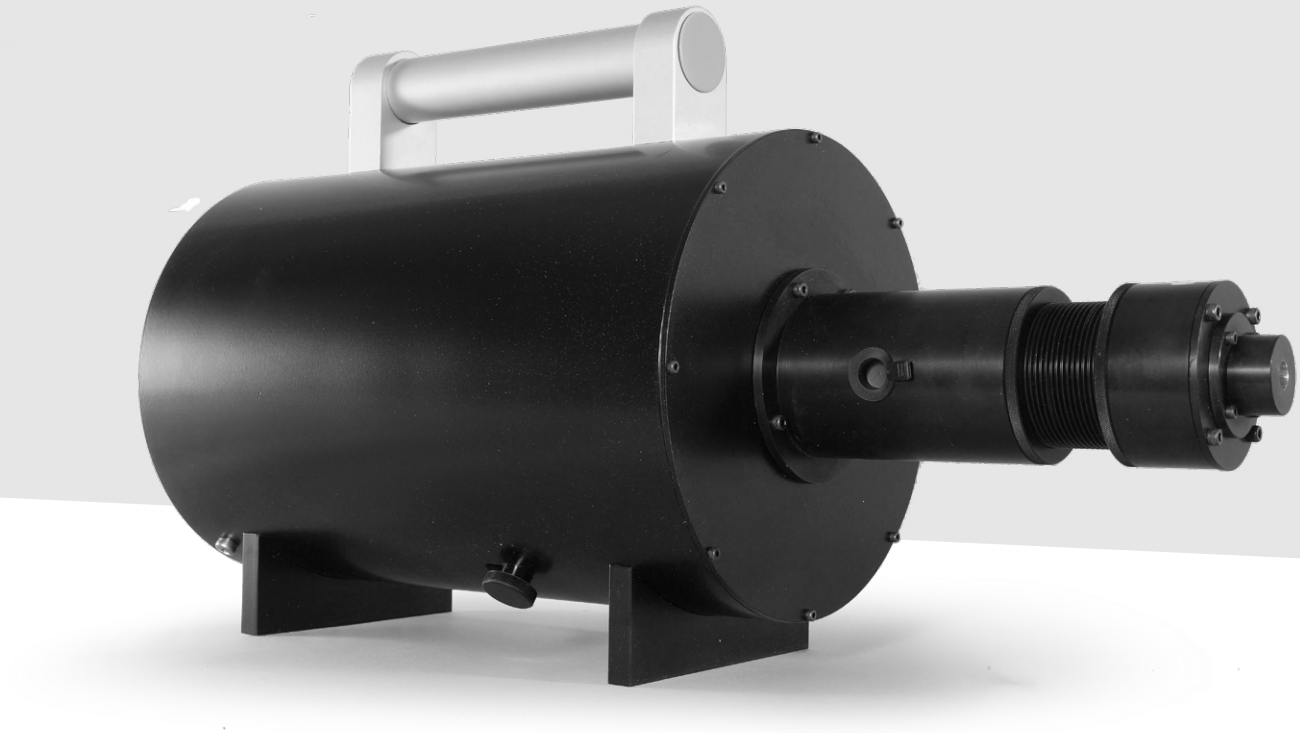
Light Duration (Typ)	2ms measured to 50% of peak output
Stored Charge (max)	500J
Charge Voltage	340V
Light Source	U-Shape Xenon flashtube
Rise Time	50µs
Delay (typ)	30µs
Recycling TIme (typ)	40 seconds
Dimensions	(LxDia) 270mm x 170mm
Weight (Kg)	5.25kg

International sales +44 (0) 1442 827728 **USA & Canada +1 951-296-6406** **specialised-imaging.com**

MSFH-370

SPECIALISED IMAGING

High intensity flash with dedicated fibre optic output



370J Flash head with 750µs duration

Up to four independent flash heads

40s recycle time

Standard trigger

The Specialised Imaging MSFH-370 Flash system offers the flexibility of four controllable high intensity flash light for used in scientific and industrial environments. 5mm diameter FO output.

CONTROL UNIT

Signal Input	Four independent Channels
Trigger Mode	1. Independently 2. Simultaneous - all four channels triggered via channel 1
Trigger Source	Short Circuit 5-100V positive edge
Input Impedance	50Ω per channel
Mains Input	IEC socket
Input Voltage	90-240V 50-50Hz AC
Dimensions mm	(LxWxH) 220 x 120 x 90 mm
Weight	4.5 kg

FLASH HEAD

Light Duration (Typ)	750µs measured to 50% of peak output
Stored Charge (max)	370J
Charge Voltage	340V
Light Source	Linear spark source flashtube
Rise Time	50µs
Delay (typ)	30µs
Recycling TIme (typ)	40 seconds
Dimensions	(LxDia) 270 x 170 mm
Weight (Kg)	5.25 kg (without handle, legs, FO mounting)

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