Multispectral Polarized Scene Projector (MPSP)

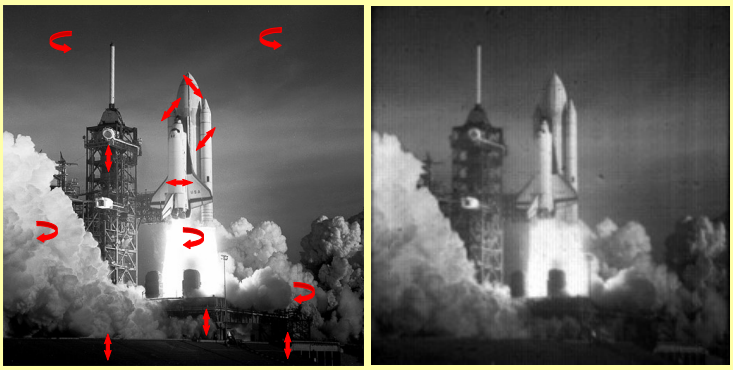
The ***MPSP 371S-HD Multispectral Polarized Scene Projector (MPSP)***, originally developed by Kent Optronics under US government sponsorship, represents the latest advancement in high-definition format infrared scene simulation. It generates both static and dynamic (video) images in Short Wave Infrared (SWIR) with adjustable spectral wavelength and bandwidth; and active spatial and polarization modulation controlled at the image pixel level.

With the wide use of multispectral polarimetric sensors for detection, identification and discrimination of man-made objects and other obscured targets of strategic interest in high clutter backgrounds, the ***MPSP 371S-HD*** is an ideal scene representor to simulate natural or camouflaged targets for test & evaluation (T&E) of spectro-polarimetric sensors.

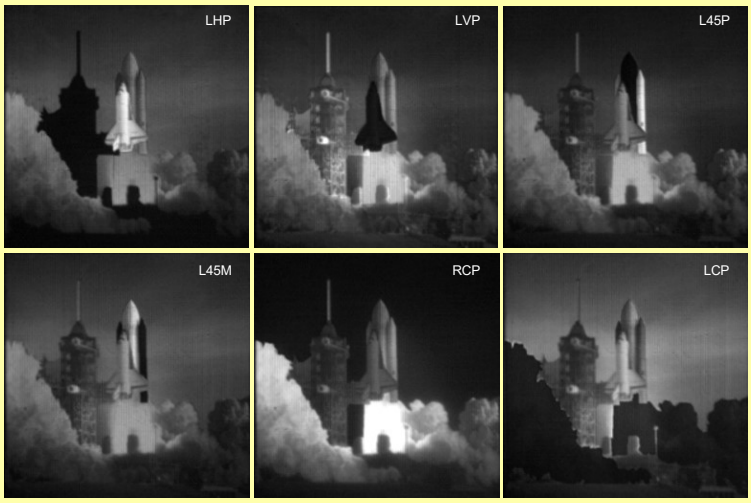
The MPSP 371S-HD is a stand-alone turnkey instrument for users in remote sensor test and evaluation (T&E) and hardware-in-the-loop (HWIL) testing. It displays scenes from stored memory or accepts polarization coded SWIR motion images from a rendering computer or IR spectro-polarimetric sensor to simulate the multispectral polarized IR pictures, and presents them to the user sensor.

Superior to current state-of-the-art IR scene projectors that lack of image polarization information as well as the spectral band and bandwidth controllability, the ***MPSP 371S*** projects input SWIR radiance scenes with user selectable:

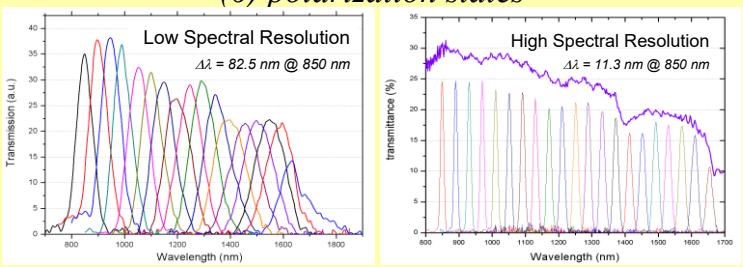
- ❖Spectrum scan coverage: 850 − 1650 nm
- ❖Spectrum resolution: 12 − 100 nm
- ❖On-pixel polarization: all six polarizations.



Input (left) artificial polarization to show capability & output (right) polarimetric image from MPSP



Captured spectropolarimetric images of six (6) polarization states



Spectral band and bandwidth controllability of the projected spectropolarimetric images

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KentOptronics

MPSP 371S-HD Multispectral Polarized Scene Projector

The instrument consists of a high-power light illumination engine, high speed Liquid Crystal on Silicon (LCoS) display engines, and a variable aperture variable focal length optical projection engine (OPE). Scenes to be projected are pre-loaded into the system memory for playback, or can be integrated with a real-time scene generator.

Polarimetric imagery is generated from LCoS panels. Each LCoS has 1920 x1152 pixels. The polarization manipulation is created by electro-optically modulating the optical phase of individual LCoS pixels such that both the exiting light energy as well as the polarization state is dynamically modulated to form polarimetric video images that are then coupled to the optical projection engine (OPE).

The OPE is built with reflective components to avoid refractive aberrations. It features variable aperture operation up to 15 cm (6″) in diameter and variable image size up to 10 cm (4″). It projects the imaging beam directly onto the sensor under test.

The instrument enables lab test & evaluation of spectro-polarimetric sensors and simulates polarized multispectral images of military scenes/targets for hardware-in-the loop (HIL) testing.

In addition to the ***MPSP 371S-HD***, we also offer a series of **IR Scene Projector** products for different IR regions and blackbody apparent temperatures, such as single/Multi-color display in VNIR, SWIR, MWIR & LWIR.

MPSP 371S-HD Specifications

Parameter	Specification	Parameter	Specification
Spectral range	850 – 1650 nm	**Clear aperture**	Up to 15 cm (variable)
Spectral image bandwidth	12 – 100 nm (discretely variable)	**Optical power per pixel**	(nW) bandwidth dependent
Image pixel format (pixel pitch size)	1920 × 1152 pixels (9.2 µm)	**Polarization contrast**	10 : 1 (correct : wrong)
Pixel effective fill factor	~92.5%	**Selectable polarizations**	LHP, LVP, +45, -45, RHC, and LHC
Pixel operability	>99.99%	**Projected image beam**	Collimated or customer demanded FOV
NUC (Non-uniformity correction)	c.v. <5% (Coefficient of variation)	**Projected image size**	Up to 10 cm × 10 cm (variable)
Dynamic range	12 bits	**Input electric power**	120 V (60 Hz), 20 A
Frame rate	Selectable 30 – up to 200 Hz	**Cooling**	LCoS (chilled water) Rest: air cooled
Minimum 12-bit Integration time	~0.8 ms	**Dimension**	102 (L) × 102 (W) × 55 (H)
Response time	Spectrally dependent	**Weight**	~ 90 kg
Maximum duty factor	Up to 100%		