

# SaturnSW

## Very Large, High Performance IR Detectors for Short Wave Infrared Imaging 1000x256 HgCdTe SWIR (30µm Pitch)

- Very High Resolution Format
- Available in 0.4-2.5µm and 0.8-2.5µm versions
- High Sensitivity

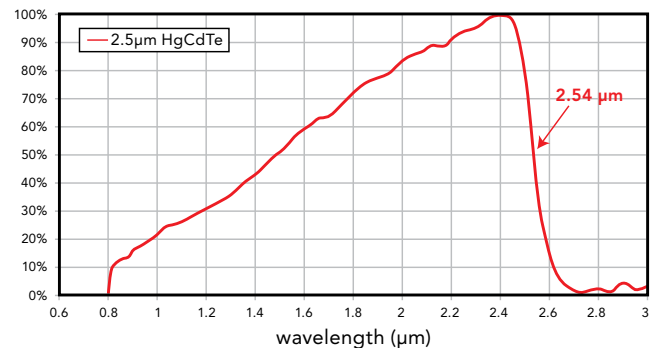


The Sofradir 1000x256 Short Wave Infrared (SWIR) focal plane assembly is offered in the 0.8-2.5µm band for airborne and space applications (including hyperspectral missions, 2-D spectrometry). This detector takes advantage of the Sofradir high performance, stable, low defect density photo-voltaic HgCdTe technology, hybridized on a state-of-the-art CMOS Read-Out Integrated Circuit (ROIC). It is specially adapted for hyperspectral needs (high spectral resolution, large dynamic range and low noise, large format). This detector can be packaged in a long vacuum-life dewar in order to meet the different mechanical and cooling needs of the systems for which they are intended.

**AVAILABLE CONFIGURATIONS:**

- Integrated Detector Dewar Cooler Assembly (IDDCA) with 1W Stirling-cycle cooler
- IDDCA with highly reliable 1.5W linear split Stirling-cycle cooler

Normalized Spectral Response



**ARRAY FEATURES**

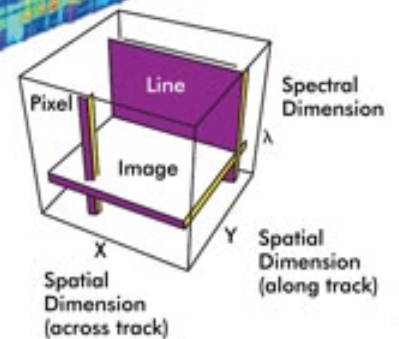
|                            |               |
|----------------------------|---------------|
| Format                     | 1000x256      |
| Pixel Pitch                | 30µm x 30µm   |
| Detector Spectral Response | 0.8µm - 2.5µm |
| FPA Operating Temperature  | up to 200K    |

**ROIC FEATURES**

|                          |   |
|--------------------------|---|
| Modes                    | Snapshot operation, integrate-while-read mode, programmable integration time, programmable gain, anti-blooming system |
| Input Stage              | Capacitance TransImpedance Amplifier (CTIA)   |
| Charge Handling Capacity | 0.5x10 <sup>6</sup> / 2.5x10 <sup>6</sup> e <sup>-</sup> (for 100% well fill)   |
| Electrical Dynamic Range | > 3V (> 79 dB)  |
| Readout Noise            | < 149 e <sup>-</sup> (for 0.5 Me <sup>-</sup> gain) and < 339 e <sup>-</sup> (for 2.5 Me <sup>-</sup> gain)           |
| Signal Outputs           | 4 or 8 analog (user selectable)   |
| Pixel Output Rate        | up to 8MHz per output   |
| Windowing                | selectable lines to be read (user configurable)   |
| Gain Selection           | selectable by lines (user configurable)   |
| Frame Rate               | up to 250Hz full frame rate   |



Imaging Spectroscopy: Data Cube



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### TYPICAL PERFORMANCE

|                                 |   |
|---------------------------------|---|
| Signal-to-noise Ratio (average) | > 1000 (for 2.5 Me gain, 50% well fill, 50Hz)       |
| Signal Response Uniformity      | < 7%  |
| Linearity                       | > 99.5%   |
| Array Operability               | > 99.5% typical (SNR < 0.5*SNR <sub>average</sub> ) |
| Quantum Efficiency              | > 60% without anti-reflective coating               |
| MTF                             | maximized   |

### Proven FPA Architecture

- More than 1000 thermal cycles demonstrated
- FPA flatness < 10µm over 3cm demonstrated

### OPTIONS

|                    |  |
|--------------------|--|
| SW Engine          | Proximity Driving Electronics (including ADC)  |
| Complete SW Camera | Configuration available with 1.5W split cooler with higher reliability (Saturn SW-LSF) |

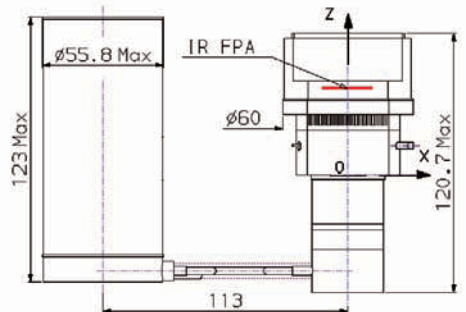
### STANDARD CONFIGURATION

#### Saturn SW-LS

#### Split Cooler



Weight: < 3 kg (6.55 lb)  
 Operating Temperature: -40°C / +71°C  
 Typical Characteristics at 20°C, 150 K:  
 Cooldown input power: < 40 W<sub>DC</sub> (\*)  
 Regulated input power: < 10 W<sub>DC</sub>  
 Cooldown time: < 8 min.  
 (\*) W<sub>DC</sub> - at cooler regulation inputs

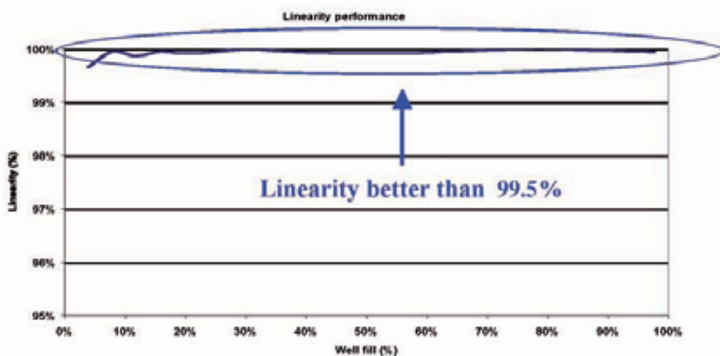


### OPTIONAL CONFIGURATION

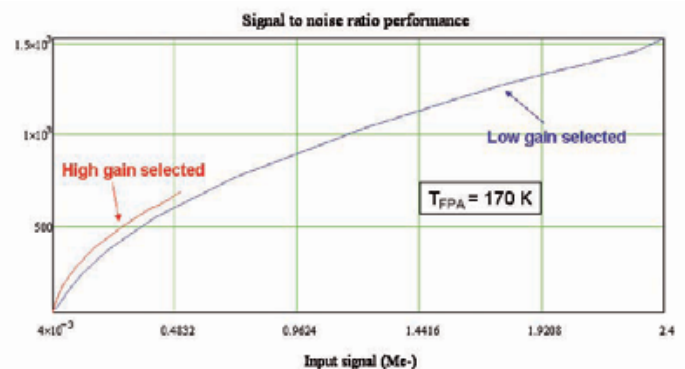
#### Saturn SW-LSF

Configuration using a 1.5W split cooler with higher reliability

### Outstanding Linearity



### Low Readout Noise



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