



Overview SWIR camera families: current product range

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Outline

- SWIR
 - InGaAs 900 (500) – 1700 nm
 - Extended up to 2350 and 2500 nm
- Scientific and Industrial
- 5 families
 - Xeva
 - Cheetah
 - Bobcat
 - Low light scientific
 - Lynx

Scientific and industrial

- Scientific
 - Commercial components
 - Temp range 0 - 50°C
 - Heatsink and fan for TE cooled cameras
 - *Camera allows for flexible use of the SWIR detector*
- Industrial
 - Industrial components
 - Temp range -40 - 70°C
 - No fan
 - Small camera size and weight
 - *Application range limited*

Xeva

- **Scientific** – general purpose
- 320x256 & 640x512
 - Visible enhanced version for 320x256
 - Extended versions for 320x256 – 2.35 and 2.5 μm cut-off
 - Uncooled XS 320x256 model
- TE1 (single stage TEC for sensor cooling)
 - Heatsink and fan
 - Allows for long exposures
- TE4 (four-stage TEC for Extended versions)
- Commercial components (0 – 50°C)



Xeva applications

- Hyperspectral imaging (spectrograph)
 - Food sorting, agriculture, mining...
- Multispectral imaging (tunable filters)
 - Chemical analysis, art inspection
- Laser beam analysis
- Art inspection
- Waveguide on chip
- Xeva extended 2.35 and 2.5
 - Applications that require the wavelengths beyond $1.7 \mu\text{m}$
 - Examples: hyp spec imaging, lasers at $2.x \mu\text{m}$, ...



Cheetah

- **Scientific** – high-speed (high-frame rate)
 - 400 – 800 – 1700 Hz versions
- 640x512
 - Visible enhanced version available
- TE1 (single stage TEC for sensor cooling)
 - Heatsink and fan
- Commercial components (0 – 50°C)



Cheetah applications

- Adaptive optics – wavefront sensing
 - Free space laser communication
 - Laser guide star
- Oil electro-coalescence research
 - Remove water from crude oil
 - SWIR can see through oil
- High speed tracking



Bobcat

- **Industrial** – general purpose
- 320x256 & 640x512
 - Visible enhanced version for 640x512
 - Also XSW available
- TE1 (single stage TEC for sensor stabilization)
 - No fan
 - Max exposure time limited to video rate applications (~25Hz or more)
- Industrial components (-40 – 70°C)



Bobcat applications

- Microscopy (semiconductor)
 - Wafer/chip/die inspection
- Alignment applications (semiconductor)
 - Flip chip
 - Wafer dicing
- Laser beam analysis & laser spot detection
 - Range finder and designator laser spots
- Leakage/moisture detection
- Hyperspectral and multispectral imaging
- Active illumination imaging



Low light scientific

- **Scientific** – low light level imaging
 - VERY long exposures (> 1 sec)
 - High sensitivity – low noise
 - Low dark current (sensor cooled to very low)
- Cameras (ascending performance sequence)
 - Xeva 1.7 320 TE3 (320x256)
 - Cheetah CL TE3 (640x512)
 - Cougar LN₂ (640x512 and high sensitivity and extra low dark current)



Low light scientific applications

- Photon emission microscopy
 - Optical fault localization
- Fluorescence imaging
 - Medical – cancer research
- Raman spectroscopy 1064 nm
- Astronomy



Lynx

- **Industrial** – linescan
 - Also XSL available
- Industrial components (-40 – 70°C)
- Uncooled
- 512, 1024 or 2048 pixels
- Pixel shape
 - Square pixels for imaging applications
 - Rectangular pixels for spectroscopy applications



Lynx applications

- Sorting (foreign object detection)
 - Food, fruits, vegetables
 - Water content based
- Semiconductor
 - Wafer inspection (solar cell)
 - Solar ingot/brick inspection

