Technical Application Note TAN2008008

FL2G-50S5M and GRAS-50S5M: A Comparison of Imaging Performance Measures
Revised September 22, 2008

1.1.   Subject

FL2G-50S5M and GRAS-50S5M: A Comparison of Imaging Performance Measures

1.2.   Applicable Product(s)

- **Flea2 imaging camera model FL2G-50S5M**
- **Grasshopper imaging camera model GRAS-50S5M**

1.3.   Application Note Description

The purpose of this Technical Application Note is to compare imaging performance measures of the 50S5M models of the Flea2 and Grasshopper imaging cameras. For potential customers who may have narrowed their decision to one of these two models, we hope this comparison helps in the decision-making process.

1.4.   Overview

This Technical Application Note discusses the difference between the dual-tap sensor of the GRAS-50S5M camera and the single-tap sensor of the FL2G-50S5M imaging camera. Following this discussion, the sensor response performance is compared between the two cameras, along with other image acquisition measurements, including pixel clock frequency, dynamic range, full well depth, dark noise and dark current.

As indicated by the results, while the dual-tap sensor of the GRAS-50S5 results in faster frame rates, this may come at the expense of spectral sensitivity and higher dark noise and dark current measurements.
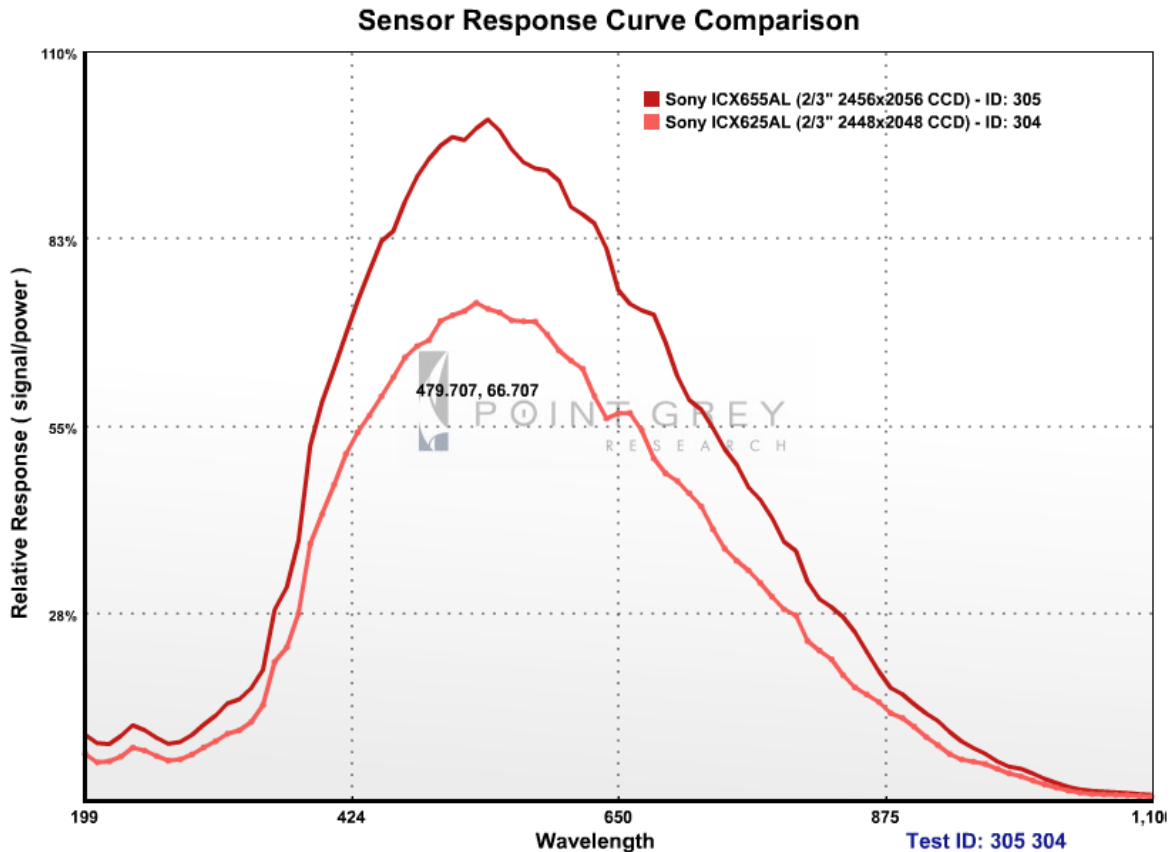
1.5.   Dual-tap Versus Single-tap Sensor

The 50S5M models of the Flea2 and Grasshopper imaging cameras feature imaging sensors that share a very similar architecture. Both sensors are Sony® 5-megapixel, 2/3-inch SuperHAD™ CCDs. The GRAS-50S5M, however, is equipped with an ICX625 dual-tap sensor. A dual-tap effectively splits the image in half. The voltage signals in each half are processed by separate A/D converters, essentially doubling the speed of the overall conversion. The Sony ICX655, featured in the FL2G-50S5M, does not use dual-tap technology.

The primary reason for using a dual-tap architecture is to double the frame rate capability of the camera. The maximum frame rate, at maximum resolution, of the GRAS-50S5M is 15 FPS, while the FL2G-50S5M, at the same resolution, outputs 7.5 FPS. Another less desirable result of the dual-tap

sensor may be a channel mismatch, which at maximum gain and frame rate combinations, may be visible as a difference in offset, linearity or sensitivity of the two image halves.

1.6.   Sensor Response Comparison

The FL2G-50S5M and GRAS-50S5M cameras were used to measure the spectral response of their respective imaging sensors—the Sony® ICX655 and ICX625 sensors. The results indicate a greater luminance sensitivity of the ICX655 across the spectrum.

Sensor Response Curve Comparison

■ Sony ICX655AL (2/3" 2456x2056 CCD) - ID: 305
■ Sony ICX625AL (2/3" 2448x2048 CCD) - ID: 304

479.707, 66.707

Relative Response (signal/power)

Wavelength

Test ID: 305 304

1.7.   Other Image Acquisition Measurements

Camera	Pixel Clock Frequency (MHz)	Dynamic Range (dB)	Full Well Depth (e-)	Dark Noise (e-/second)	Dark Current (e-/second)
FL2G-50S5M	49.15	53	6000	3	28
GRAS-50S5M	60.00	57	8000	6	53

1.8. Related Knowledge Base Articles

Article	Title	Address
276	Configuring Grasshopper GRAS-50S5 to output 5MP images at 15 FPS	http://www.ptgrey.com/support/kb/index.asp?a=4&q=276
279	Maximum possible image size of color 5.0MP Grasshopper varies with pixel format	http://www.ptgrey.com/support/kb/index.asp?a=4&q=279
198	Increasing Dynamic Range of PGR Cameras	http://www.ptgrey.com/support/kb/index.asp?a=4&q=198
192	CCD Imaging Sensor Well Depth Capacity	http://www.ptgrey.com/support/kb/index.asp?a=4&q=192

1.9.   Additional Downloads and Support

Access more Technical Application Notes on the web at www.ptgrey.com/support/downloads.

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The first step in accessing our technical support resources is to obtain a Customer Login Account. This requires a valid name, e-mail address, and camera serial number. To apply for a Customer Login Account go to www.ptgrey.com/support/downloads/.

Knowledge Base

Our on-line knowledge base at www.ptgrey.com/support/kb/ contains answers to some of the most common support questions. It is constantly updated, expanded, and refined to ensure that our customers have access to the latest information.

Product Downloads

Customers with a Customer Login Account can access the latest software and firmware for their cameras from our downloads site at www.ptgrey.com/support/downloads. We encourage our customers to keep their software and firmware up-to-date by downloading and installing the latest versions.

Contacting Technical Support

Before contacting Technical Support, have you:

1. *Read the product documentation and user manual?*
2. *Searched the Knowledge Base?*
3. *Downloaded and installed the latest version of software and/or firmware?*

If you have done all the above and still can't find an answer to your question, contact our Technical Support team at www.ptgrey.com/support/contact/.