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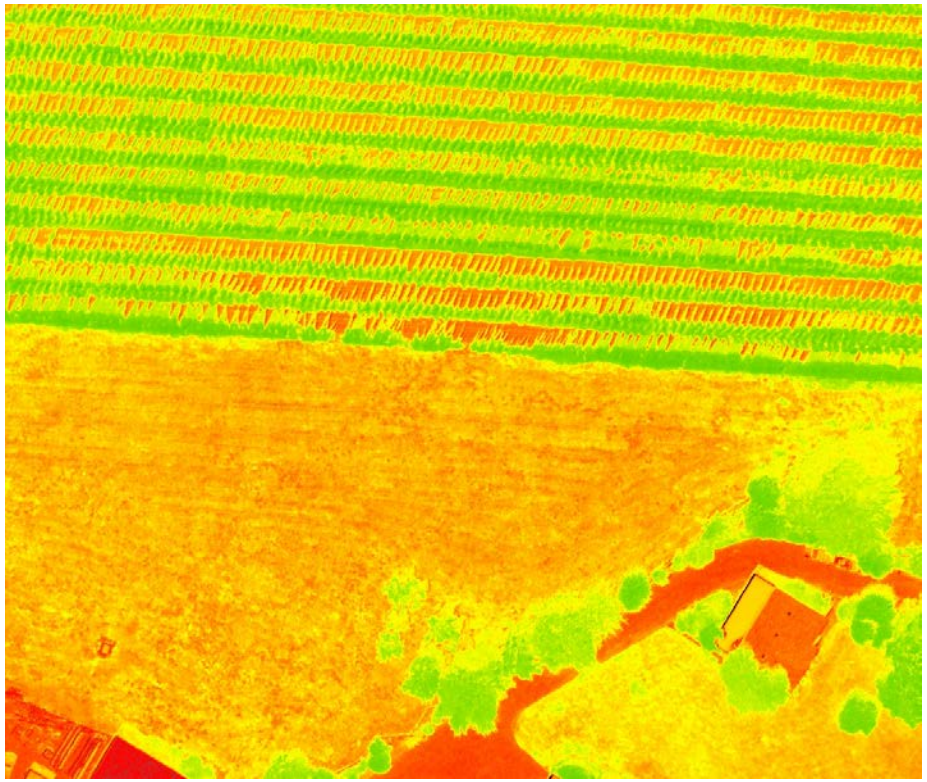
Camera Systems for Mapping

AUVSI Future Robotics Forum

October 2016



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Lucint Systems Background

- Formed by former defense contractors to address need for low cost, high capability cameras
- Experience in telemetry, image sensors, cluster computing, and end-to-end photogrammetric systems
- Applications in agriculture, utility inspection, wide area mapping, 3D reconstruction
- All engineering and manufacturing in USA
- Our mission: **To provide modular, easy integrated, customizable camera and storage systems for manned and unmanned vehicles.**

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Building Mapping Systems

Visible + Near IR + Longwave IR Payload

?

Yakima Valley Farm Land

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Basic Breakdown

- What goes into a mapping system?
  - Platform
  - Camera(s)
  - Imagery storage
  - Telemetry
  - Processing Software
- Not necessarily aerial – could be ground, underwater

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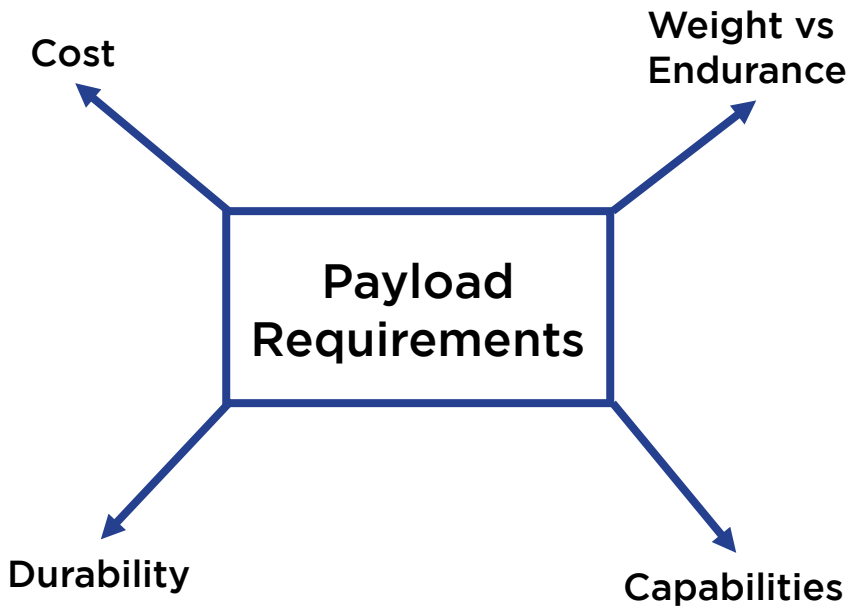
Selecting Cameras for Mapping

- First: Key questions to ask?
  - Identify what you're trying to accomplish?
  - Required resolution, spectral bands?
  - How much weight can your platform handle?
  - Is this a one off system, or is there a need to form a service around this capability?



Myriad of Camera Options

- Consumer Cameras ⇨
  - + Cheap, Includes everything
  - - Inconsistent supply, product EOL?
  - - Inconsistent focus behavior, Image timing problems

- Industrial Cameras ⇨
  - + Rugged, reliable, but just a camera
  - - Typically no lens control
  - - Have to build entire system around the camera, big NRE

- Purpose Build Cameras
  - For example, multispectral Parrot Seqoia
  - + Great for a single limited application
  - - Inflexible, can't change resolution, spectral bands, etc
- Product Plug: Lucint8, hybrid of consumer and industrial

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Common Camera Problems

- Rolling shutter artifacts / “Jello” imagery, can make imagery stitching impossible
- Inconsistent focus in consumer cameras. Fly over a low text area, and images could be blurry
- Mounting a consumer handheld form factor
- Color only without extensive modifications
- Poor timing accuracy resulting in no or poor telemetry. More on that…

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Timing and Telemetry

- Each image needs a precise GPS location *and* orientation
- Why is this important?
  - Off the shelf software can process most imagery without it
  - Essentially, the worse the timing, the longer it will take to process
  - Problem is amplified with multi-camera systems and large image collects (thousands+)

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Questions? Payload or camera assistance?

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