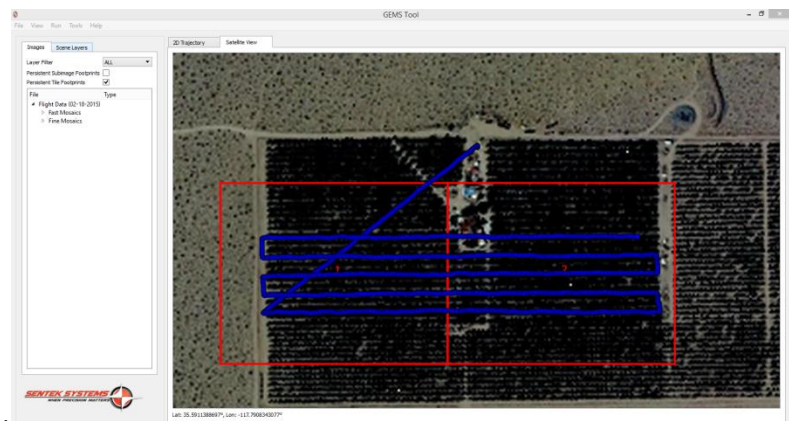
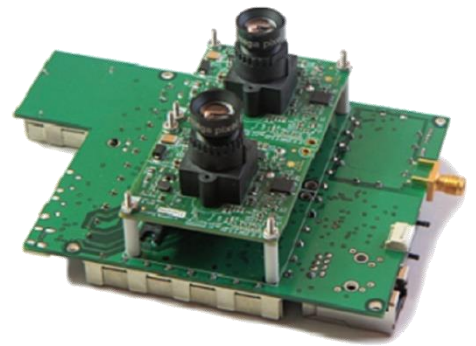


## Precision Agriculture Multispectral Payload

**GEMS is a standalone multispectral camera payload and software package for remote sensing on any small UAV.**

**GEMS Kit Includes:**

- ✓ **Camera payload**
  - Includes Dual 1.3MP global shutter time synchronized imaging sensors: RGB & NIR
  - Carrier phase GPS receiver
  - Inertial sensors
  - Onboard processor
- ✓ **Remote LED Cable**
- ✓ **Power Cable**
- ✓ **GPS Antenna**
- ✓ **USB interface cable**
- ✓ **Highspeed Jumpdrive**
- ✓ **GEMS Software**
  - 2D Flight trajectory on satellite imagery
  - Graphical User Interface for viewing RGB, NIR, and NDVI images
  - Sub-pixel level alignment spectral processing is performed in GEMS software
  - Geo-location information and viewing for all Imagery, computes WGS84 coordinates of each image pixel
  - 2D orthomosaicing for RGB, NIR, & NDVI imagery
  - Export to geo-tiff and CSV supported



## HARDWARE PERFORMANCE SPECIFICATIONS

Parameter	Description
<b>Wavelengths</b>	Red centered at 615nm bandwidth FWHM = 114nm, Green centered 553nm FWHM = 101nm, Blue centered 450nm FWHM = 101nm, NIR centered at 810nm FWHM = 135nm  (Custom filters available upon request)
<b>Linear Acceleration</b>	+/- 4g
<b>Heading Accuracy*</b>	0.15 degrees
<b>Yaw, Pitch, Roll Accuracy</b>	Yaw: 2 degrees, Pitch & Roll: 1.5 degrees
<b>Camera Resolution</b>	1.3MP RGB, 1.3MP Mono (1280x960)
<b>Ground Sampling Distance (GSD)</b>	5.1cm @400ft, 2.5cm @200ft
<b>Field of View</b>	30 degrees
<b>Frame Rate</b>	1.4 (0.7 seconds between images)
<b>Time Synchronization</b>	Images time synched (<1ms) with GPS & inertial data
<b>Pixel Geo-location Accuracy</b>	3-5m** (without field markers), 1.5cm*** (with field markers)
<b>GPS Time To First Fix (TTFF)</b>	<35 seconds
<b>Camera-to-camera Alignment</b>	Spectral band aligned to sub-pixel accuracy
<b>Power Input</b>	9-40 V DC
<b>Power Consumption</b>	0.4 Amps@12V, 4.8 Watts
<b>Dimensions</b>	3.5"x5" (with 4 mounting holes)
<b>Weight</b>	170grams (including shields)
<b>Storage Media</b>	SanDisk Extreme 32GB USB jump drive provided with the GEMS kit.
<b>GPS Antenna</b>	GPS active antenna provided with GEMS kit. Min requirements 28dBi gain active antenna with SMA-male connector
<b>GPIO Connector</b>	7 pin picoblade designed for external LED extension cable (Included with GEMS Kit)
<b>USB Connectors</b>	2 micro type A USB connectors for external storage media to plug into
<b>Power Connector</b>	Molex single row 3mm pitch Micro-Fit 3.0 rated up to 5.0A with 600V AC

\*\*Heading accuracy is velocity dependent 0.15 degrees is at approximately 15m/sec.

\*\*Altitude dependent; ~ 3-5m at 50-100ft

\*\*\*Assumes field markers have been surveyed in to 1.5cm accuracy relative to a GPS RTK base station. The absolute position error of the base station must be added to the 1.5cm relative error to obtain the absolute position error of a pixel location. If field markers have been surveyed in with precise point positioning (PPP) GPS receivers absolute WGS84 pixel position accuracies of 10-20cm (single frequency PPP) or 1-5cm (dual frequency PPP receiver) are achievable. Achievable accuracy is GSD dependent. Release 1 GEMS Tool allows measurement through the GUI to 1-2 GSD.