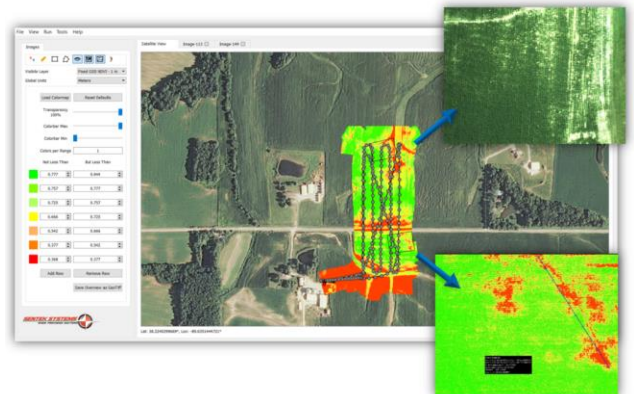


Precision Agriculture Multispectral Payload

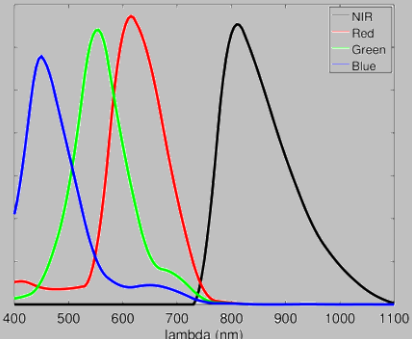
GEMS is a standalone multispectral camera payload and software package for remote sensing on any small UAV.

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**
- ✓ **Active GPS Antenna IP67 rated**
- ✓ **USB interface cable**
- ✓ **Highspeed USB 3.0 Jumpdrive 32GB**
- ✓ **GEMS Software – includes free updates and features**
 - 2D Flight trajectory on satellite imagery
 - Easily view RGB, NIR, and RNDVI images with geolocation
 - 2D mosaics for RGB, NIR, & RNDVI imagery
 - Area tool with statistics, GPS markers, & distance tool
 - Computes Relative RNDVI and Absolute RNDVI using ILS sensor
 - Export to geo-tiffs, shapefiles, CSV, and metadata to several supported 3rd party tools (ESRI, Pix4D, 3DFlow)



HARDWARE PERFORMANCE SPECIFICATIONS

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

**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.