Intelligence, Surveillance, and Reconnaissance (ISR) Missions

Sightline has deep experience in supporting ISR applications, with over 1-million hours logged in Mil UAV ISR service. This experience is valuable to a wide range of applications:

- Military surveillance
- Law Enforcement
- Wildlife and Fishery Management
- Fire Observation
- Search and Rescue

Inspection

SightLine combines detection modes, multi-spectral functions, and snapshot/video recording to create solutions for a growing number of inspection uses:

- Infrastructure
- Construction
- Insurance

Security

Whether integrated on a tower, vehicle/robot, or UAS, functions are available that directly support security applications for:

- Border Observation
- Industrial / Site Protection
Typical Camera System Integration

Camera System Control Board

- Motor Control
- Pan and Tilt Motors
- Inertial Sensors

HD Video

- Video
- Video (Analog or H.264)

Video Radio Link

Operator Interface

Camera 1
- Daylight HD

Camera 2
- Infrared SD

SightLine Video Processing Board

C2 Ethernet or Serial

Camera System Control Pass-Through

Video Track Telemetry RS232
Real Benefits to Onboard Integration

- Tight integration with camera systems
- Low-latency feedback
  - Fast gimbal pointing
  - Best operator situational awareness
  - Advanced landing guidance
- Enables FULL-DIGITAL video path
  - Best video quality for processing and operator
  - Easy compatibility with IP radios, rovers, etc.
- Continuous processing with interrupted radio-link (onboard tracker still tracks!)
- Low Size, Weight, and Power (SWaP)
SightLine Experience Matters

- Over 5,000 installations in both air and ground vehicles
- More than 1 Million hours real-world experience and over 75 integrating customers
- Proven algorithms
- More than 100 man years ISR processing experience and team dedicated to just these functions
- Agile development methodologies

Customer Support

- True engineering integration support
- Design support for customer interface board(s)
System integrators configure the video processor to meet their needs.
<table>
<thead>
<tr>
<th>Configuration Options to Meet Customer Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hardware Only</strong></td>
</tr>
<tr>
<td>Hardware-Only option for lower cost of inventory</td>
</tr>
<tr>
<td>Selected independently of software configuration</td>
</tr>
<tr>
<td>Easy software license upgrades allow customers to upgrade to add any features</td>
</tr>
</tbody>
</table>
SOFTWARE OPTIONS

- **Stabilization**
- **Object Tracking**
- **Autonomous Landing Aid**
- **IP Video Encoding**

- **KLV Metadata**
- **Detection Base / Detection Advanced**
- **Telemetry Data**
- **Snapshot and Video Recording**

- **Enhancement**
- **Autofocus Telemetry**
- **Multi-Camera Blending**
- **HD-Input/HD-output**
### HARDWARE OPTIONS IN PRODUCTION

**3000-OEM**
- Max Performance
- Multi-Channel FULL HD
- All processing functions available

**1500-OEM**
- Very Small
- Single Channel Processor (SD to 720p)
- Multiple Video Inputs w/ mux – Switched input

**1500-SOM**
- Smallest Option
- Customer Board Integration
- 1500-OEM performance

[Compare these options]
1550-EAB
- 4 port Ethernet Switch
- 3 Serial Pass-Thru RS232
- 2 Analog Video IN + FFC digital
- 1.6 x 3.0 in, 3W

1500-RAB
- Adaptor board to Microhard Radios
- IPnDDL and pDDL (on adaptor board)
- 1 Analog Video IN + FFC digital
- 1.6 x 2.03 in

1500-ENC
- Enclosure Option
- Standard interface connectors
- 1 Analog Video IN + FFC digital
- 2.4 x 2.1 x 1.0 in

Bench Interface Boards
Growing number of digital interface boards include:

Camera Adaptors
Ribbon to Tau/Quark/Tamarisk
Hitachi Block
Sony-Tamron Block
HDMI

Not pictured: POE interface, CameraLink, Airborne Innovations GS/720
Bench / System Interface Boards

- RJ45 Ethernet
- Alt Output Video (HDMI or analog or digital)
- Two input video slots
- DC in / RS232
- SD Card

Camera Adaptors

Growing number of digital interface boards include:

- Sony / Tamron Block
- Hitachi Block
- HDSDI Out
- HDSDI In
- Dual Analog In
- Ribbon to Tau/Quark/Tamarisk

Not pictured: Camera Link, Sony, HDMI

SLA-3000-IO
- Common bench connectors
- 2.4 x 3.5 in

SLA-3000-mIO
- Size optimized system interface board
- 1.0 x 1.75 in

ACCESSORIES 3000
Contact Us

- Email us at sales@sightlineapplications.com
- Call our technical sales team at +1 (541) 716-5137

Reference Materials

- Our website: www.sightlineapplications.com provides information, video samples and documentation downloads (application notes, ICDs, drawings, etc.)
- Watch sample videos on our YouTube page
Video Stabilization and Roll Correction

The starting point for all video processing improvements. Frame to frame registration provides corrections that dramatically improve video and the user experience.

Functions

- Remove high frequency jitter (frame to frame movement). Excellent for removing jitter (¼ FOV per frame in extreme conditions).
- Absolutely critical for camera systems on moving vehicles (air, ground, sea) and when system has an optical zoom to < 10 degree HFOV.
- For applications where correction of platform roll motion is desired (aerostats, mast/tower mounted, UAS).
- Integrators can feed video roll commands to counteract known platform rotation.

Commonly Paired With:

- Encoding
- Tracking
- Detection
- Recording

Applications:

- Small aerial craft dynamics
- Narrow FOV stabilized gimbals
- Ground Vehicles – High Vibration Environment
- Sway/Shake in tower mounts

Software Options
**Scene and Object Tracking**

Robust hands-free tracking of scene and designated objects. Onboard tracker provides low latency solution needed for nimble pointing control systems.

**Functions**
- Scene tracking provides a powerful, intuitive gimbal feedback based on the entire scene.
- Advanced image analysis and motion estimation isolate tracked objects from background for robust tracks.
- Persistent tracking when view of tracked object is temporarily blocked.
- Acquisition Assist and Intelligent Assist update track boxes for improved tracking.
- Tracker-Only options on 1500 hardware provide full tracker functionality at a lower price point (with limitations on other functions possible).

**Commonly Paired With:**
- Telemetry (Required)
- Stabilization (Required)
- Detection
- Encoding

**Applications:**
- Airborne Surveillance
- Security
- Search and Rescue

---

**Telemetry Data**

Tracker functions and MTI provide low latency track location data needed for gimble pointing.

**Functions**
- Telemetry rates up to 30 HZ.
- Pixel space feedback for accurate gimble pointing.
- Data from object tracking, scene steering, and detection.
- Enables gimbal control for all applications where scene and object tracking are required.

**Commonly Paired With:**
- Detection
- Object Tracking
- Telemetry
- Encoding

**Applications:**
- Airborne Surveillance
- Security
- Search and Rescue

---

**Software Options**
Landing Aid

Robust hands-free tracking of scene and designated objects. Onboard tracker provides low latency solution needed for nimble pointing control systems.

Functions

• Provides range, angle, yaw, offsets as telemetry for autopilot inputs.

• Independent of GPS – adds value in GPS degraded/denied env.

• Natively compatible with MicroPilot. Sample Pixhawk Autopilot interface code provided to facilitate implementation.

• Optional detection of objects in landing zone aids landing phase safety.

• A small camera and 1500-OEM – Makes a compact auto-landing assembly.

Commonly Paired With:

- Recording
- Stabilization
- HD-Input

Applications:

• Autonomous Operations
• Reduce Pilot Training Requirements
• Landing Phase Safety Enhancement
• Drone Delivery

Software Options
**Video Snapshot Recording**

Onboard recording on 1500-OEM. Interface board SD card for 3000-OEM.

**Autofocus Telemetry**

*Telemetric focus function available independent of tracking telemetry.*

**Functions**
- Focus telemetry for autofocus implementations.
- Full autofocus functionality for a range of IR lens assemblies and EO black cameras.

**Applications:**
- Pan/Tilt/Zoom Systems
- Site Surveillance

**Commonly Paired With:**
- Stabilization
- Enhancement
- HD-Input
- HD-Output

**Software Options**

**Video Snapshot Recording**

Onboard recording on 1500-OEM. Interface board SD card for 3000-OEM.

**Functions**
- H.264 video to local SD card or remote FTP.
- Full resolution snapshot recording. JPEG snapshots with EXIF data.
- Full pixel depth data PNG snapshots with metadata (for radiometric data access).
- Telemetry data recording.

**Applications:**
- Infrastructure Inspection
- Airborne Surveillance (Military, Law Enforcement, Border, Etc.)
- Agriculture

**Commonly Paired With:**
- Encoding (Required)
- Stabilization
- HD-Input
- HD-Output
**Encoding Functions**

- Controllable video compression frame rate, and down sampling to meet bandwidth requirements with best possible imagery and system flexibility.
- Connectivity: UDP, TCP, and RTSP connectivity, unicast, multicast, and broadcast.

**KLV Functions**

- KLV metadata is generated in accordance with MISB standards.
- Insert pre-formatted (or custom) KLV data into video stream, or direct from NMEA output of GPS receivers.
- Metadata on VBI lines for KLV over analog links.

**Commonly Paired With:**

- KLV
- Telemetry
- Object Tracking

**Common Applications:**

- Airborne Surveillance (Military, Law Enforcement, Border, Etc.)
- Inspection

**Commonly Paired With:**

- Encoding (Required)
- Telemetry
- Object Tracking

**Common Applications:**

- Airborne Surveillance (Military, Law Enforcement, Border, Etc.)
Multiple detection modes provide important situational awareness information and provide fast feedback essential for effective track initialization on moving objects.

**Functions**

**Vehicle (Pictured)**
- Detect up to 5 moving objects.
- Works well from a moving platform.
- Finds objects that are typically 10 to 100 pixels long.

**Drone**
- Detect up to 5 objects.
- Unlike vehicle mode, this is more capable of tracking slow and erratically moving objects.

**Radiometric**
- Detect up to 100 objects.
- Finds objects within a specific temperature range.

**Anomaly**
- Detect up to 100 objects.
- Doesn’t require the objects to be moving.
- Finds objects that are unique in the scene based on color and intensity.

**Staring = ST Mode**
- Detect up to 100 objects.
- Best from a ground camera (stationary or stares for an extended period at a fixed scene).

**Blob**
- Detects up to 100 objects.
- Finds objects that are light or dark compared to their surroundings.

**Commonly Paired With:**
- Telemetry
- Tracking
- On Screen Display (OSD)

**Applications:**
- Surveillance
- Counter-UAS operations
- Security
- Search and Rescue

**Software Options**
Detection Advanced

Advanced MTI Detection requires base MTI. These features are used in a wide variety of applications adding situational awareness and value.

Functions

**Aerial = SA Mode**
- Detect up to 100 objects
- The only moving target mode capable of handling frame-to-frame perspective changes which makes it ideally suited for airborne applications.

**Marine (Beta)**
- Detect up to 100 objects
- Moving or stationary platform finds objects in maritime environment (ships, lifejackets, etc.)
- Does not require objects to be moving

Commonly Paired With:
- Telemetry
- Tracking
- Stabilization
- Enhancement
- Full HD Video Recording

Applications:
- Surveillance
- Search and Rescue
- Public Safety
- Maritime

Software Options
Video Enhancement

A range of functions are provided to enable enhancement options to optimize video for the needs of each application.

Functions

- Contrast Limited Adaptive Histogram Equalization (CLAHE) and Local Area Processing (LAP) brings out hard to see (low contrast) features.
- De-Noising of video and edge shaping.
- OSD support to add text, shapes, and custom reticle overlays.
- Customer logo watermark placement.
- False color schemes.
- Extended 14 bit-depth processing.
- Digital pan, Tilt, Zoom, and Rotation.
- Temperature data from radiometric cameras.

Commonly Paired With:

- Encoding
- Detection
- Telemetry

Applications:

- Airborne Surveillance
- Security
- Search and Rescue
- Inspection

Software Options
Multi-Camera Video Presentation

3000 Only. Flexible display options for optimized presentation, transmission and display of multiple video streams.

**Displays**
- Full screen (switch video)
- Picture in Picture (selectable PiP window location)
- Two Up
- Detection Multi PiP

**Image Blending**
- Multi-spectral inputs can be blended into a single image with false color to bring out the best of each spectral image.

**Commonly Paired With**
- Detection
- Telemetry
- Encoding
- Recording

**Software Options**
<table>
<thead>
<tr>
<th>Criteria</th>
<th>1500 OEM and SOM</th>
<th>3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-camera</td>
<td>Switching between inputs</td>
<td>Can process both, stream both, Picture in Picture, switching</td>
</tr>
<tr>
<td>Full Width Parallel Digital Inputs</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Analog Inputs (NTSC/PAL)</td>
<td>2</td>
<td>3 With analog to digital input adaptor boards</td>
</tr>
<tr>
<td>Frame size and rate out</td>
<td>SD @ 30fps</td>
<td>1080p @ 30fps + SD @ 30fps</td>
</tr>
<tr>
<td></td>
<td>720p @ 15-30 fps with most processing</td>
<td>2 x 720p @ 30 fps</td>
</tr>
<tr>
<td>Serial Ports Available</td>
<td>3 (3.3V)</td>
<td>5 (3.3V)</td>
</tr>
<tr>
<td>Ethernet</td>
<td>10/100 BASE-T Ethernet PHY with capacitive loading. UDP, TCP, and RTSP connectivity, unicast, multicast</td>
<td></td>
</tr>
<tr>
<td>Analog Output</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>HDSDI Output</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>HDMI Output</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Digital Input - Cameras Supported (with adaptor boards)</td>
<td>HDMI, Sony FCB-EH6xxx, EH31xx, EV7xxx, Hitachi DI-SC120R, Tamron 10x, Airborne 720p GS, Camera Link, FLIR Tau, FLIR Quark, FLIR Boson, DRS Tamarisk</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>1.04 x 1.48 inches (26.5 x 37.7 mm) 0.27 ounces (7.6 grams)</td>
<td>3.47 x 1.97 inches (88 x 50 mm) 1.4 ounces (39 grams)</td>
</tr>
<tr>
<td>Voltage In / Power consumption</td>
<td>4.5 - 6.5 VDC (5 VDC nom) 3 W (max) 2.5W (typical)</td>
<td>8 - 15 VDC (12 VDC nom) 10 W (typical, Rev B and Rev C full) 6 W (typical, Rev C in 8148 only mode)</td>
</tr>
</tbody>
</table>