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| SIGHTLINE CAPSTONE PROJECT |
| STATEMENT OF WORK |
| UAV PLUG AND PLAY PRECISION LANDING AID |

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| 1-4-2019 |

PROJECT OVERVIEW

### **BACKGROUND:**

SightLine Applications has developed a precision visual landing algorithm that provides an excellent set of benefits:

* Works in degraded and denied GPS environments – Safety and reliability.
* Reduces operator training and landing phase complexity.
* Provides detection functions for landing zone safety - detect people, animals, or objects from entering the landing zone
* Provides a rich set of telemetry for flight controllers. 30 Hz data with range, XY offsets, relative azimuth, etc.
* Supports landing on moving platforms - ground vehicles, marine.
* Is not impacted by bright sun or low light conditions.
* Can be used with Thermal (IR) cameras as well as visible (EO) cameras
* Effective range of operation (distance to target) only limited by the size of the landing pattern used

### **PROBLEM:**

Integration of the SightLine Landing Aid for end users is problematic. Often drone operators want to just “plug in” a component and fly their mission. Installing software components is acceptable, but any requirement for programming is a barrier to entry or a complete show stopper. Various cables, power, and other electrical connectivity issues are also difficult for vehicle integrators. Rugged or at least robust mechanical enclosures, easy mounting, and environmental reliability are equally important. Lastly, choice of optical system (camera) for the greatest range has cause adoption delays in that it has been a decision left to the integrator.

### **PROJECT REQUIREMENTS:**

* Develop **a set** of electrical sub-assemblies that will allow integration of the SightLine Precision Landing Aid (1500-OEM + Camera + accessories) for [PX4](http://px4.io/) running on [Pixhawk](https://docs.px4.io/en/flight_controller/pixhawk4.html) autopilot.
  + Define required connections to the vehicle including power and communication interfaces to the flight controller
* Design and produce a prototype enclosure for electronics and camera
  + Should be smaller than 3” x 2” x 2” (or smaller)
  + Optional interfaces could be video output and ethernet for command and control and video streaming
* Develop documentation and software installers to meet plug and play expectations.
* SightLine will support with existing source code and technical support throughout the process as well as hardware and other materiel support.

### **PROJECT DELIVERABLES:**

* A working prototype including circuit boards and enclosure
* Demonstration of landing aid with off-the-shelf quadcopter (provided by SightLine)
* Schematics, 3D models, and other related documentation

LEVEL 0 BLOCK DIAGRAMS 

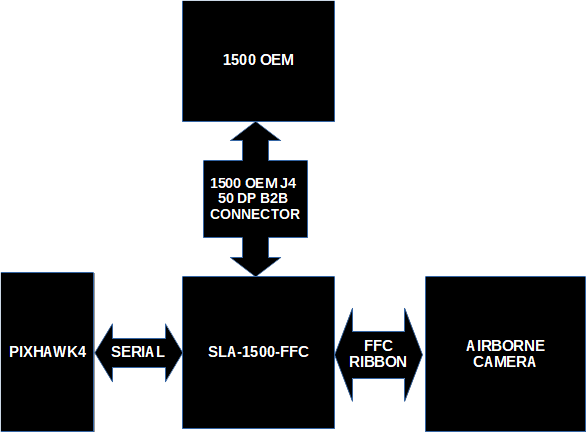


Figure 1: Level 0 diagram of current configuration

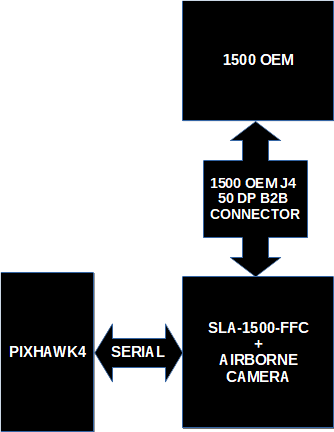


Figure 2: Level 0 diagram of desired configuration

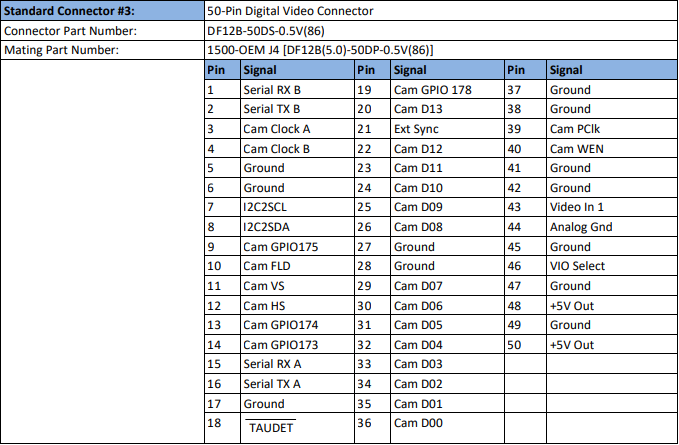


Figure 3: 1500 OEM J4 PINOUT

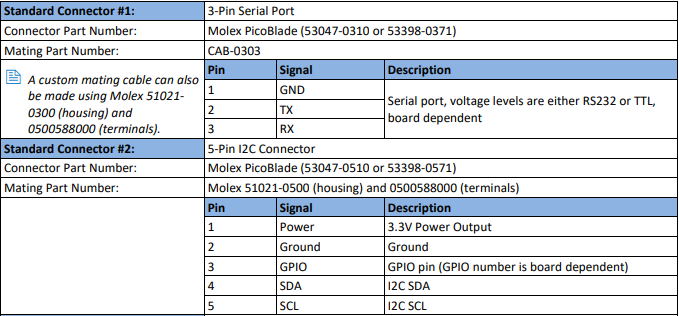


Figure 4: STANDARD CONNNECTOR PINOUT FOR SERIAL AND I2C CONNECTIONS

HARDWARE REQUIREMENTS

SOFTWARE

TIMELINE AND MILESTONES

FIRST ORDER COST ESTIMATE