



Aerostar LIDAR processor technology demonstrator



AEROSTAR INTRODUCES ITS FIRST SENSOR PLATFORM BASED ON AN EXCLUSIVE LIDAR PROCESSING ARCHITECTURE

Originally designed for the automotive industry to address the stringent requirements of autonomous emergency braking (AEB) and adaptive cruise control (AAC) applications, this unique compact and wide field of view LIDAR can be adapted to a number of detection scenarios.

Multi sensor

The platform covers two independent fields of view, giving it a better adaptability at all ranges.

The short range coverage (up to 10 meters) is assured by a 20° wide sensor array, which covers more than a lane wide. Then a narrow 10° wide sensor array provides the optical capability to seek vehicles at distances exceeding 20 meters.

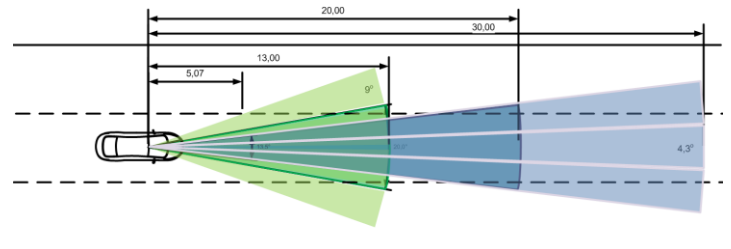


Figure 1: Top view of typical application FOV

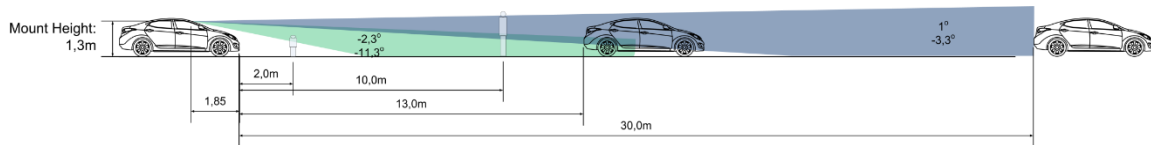


Figure 2: Side view of a typical application FOV

Fast

The system can report data and commands with a refresh rate up to 100Hz. Combined with a latency of 3 frames (30ms), the system is capable of handling demanding real-time applications, such as EURO-NCAP testing scenarios for the automotive industry. The computation performance is achievable regardless of the number of sensors used or range of the obstacles.

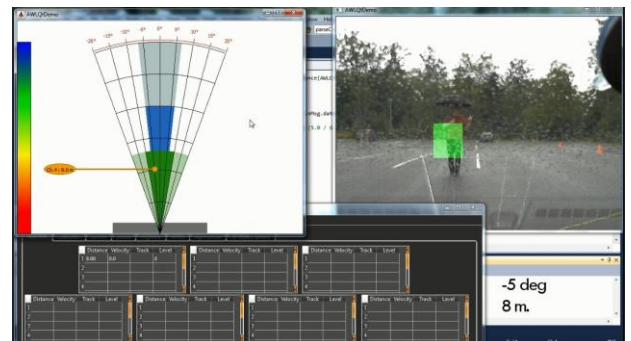


Figure 3: Demonstration software showing sectorial view and an overlay of obstacle detections

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Configurable

Since modularity was one of the basic system design goals, the platform can easily be adapted to specific application requirements.

For example, lensing and the layout of the detector array can be modified to extend the range or cover a different field of view.

Using Aerostar's modular LIDAR processor architecture, application specific processing can be integrated within the system, reducing the number of external components required.

A vision system can be added to integrate a new level of cognitive processing, using the fusion of LIDAR and video information.

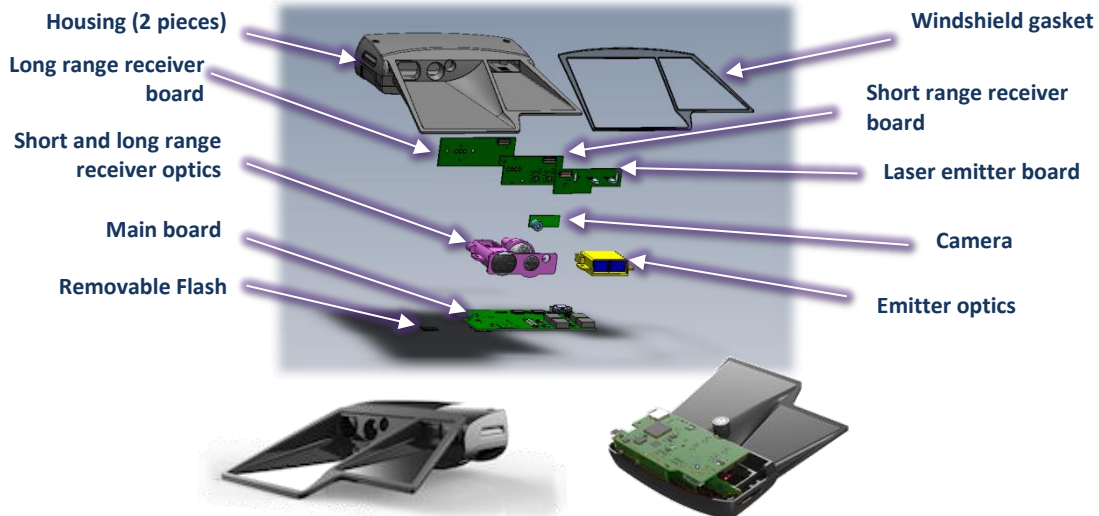
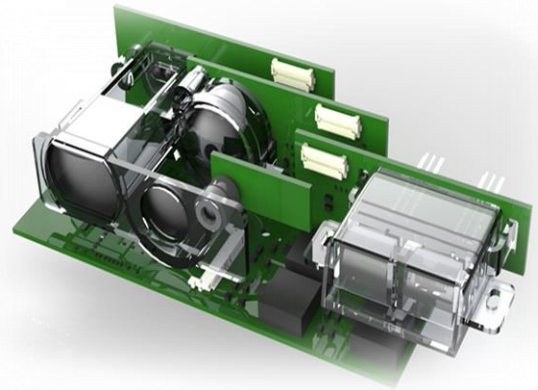


Figure 4: assembly view of a typical application

| | value | unit |
|---------------------|------------------------|---------|
| FOV (vertical) | 12.3 | degrees |
| FOV (horizontal) | 25 | degrees |
| Distance | 30 | meters |
| Laser source | 2 x 70 | watts |
| Number of detectors | 7 | |
| Communication ports | USB, RS232, CAN-HS (2) | |
| Frame rate | 100 | Hz |

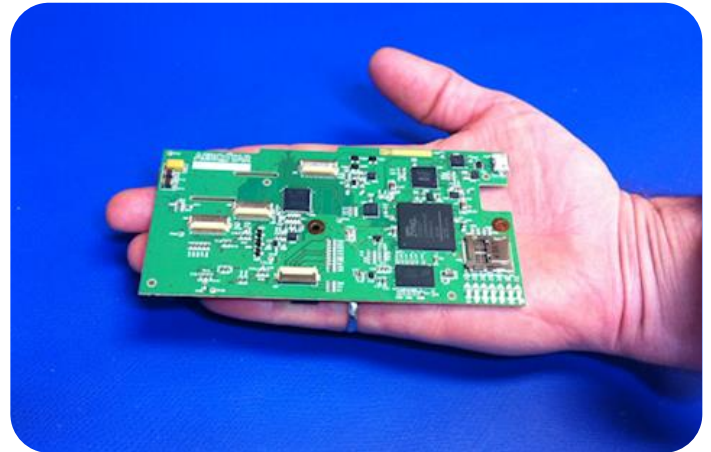
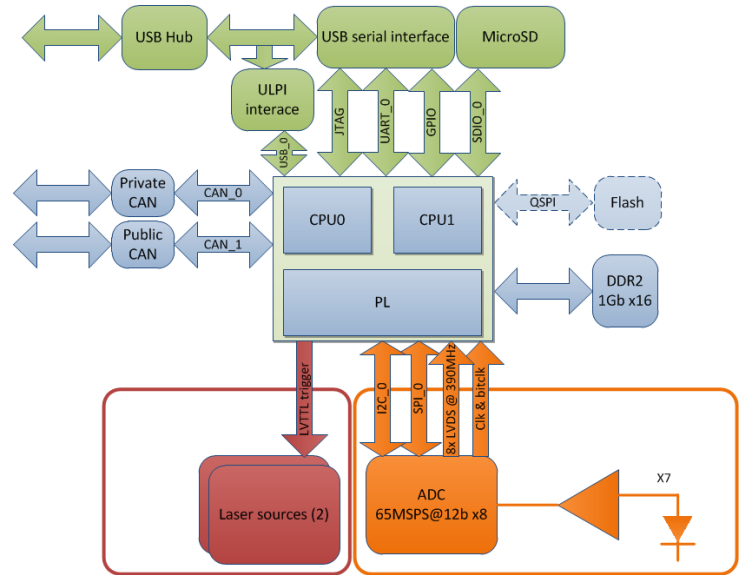
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Processing core

The processing core is included as a silicon system on a chip (SOC) that includes multiple processing unit and custom logic to perform all the required processing. A Linux OS is installed to facilitate the integration of client software in the DSP.

The processing architecture allows for clustering of the sensors with multiple lasers. This gives flexibility and allows for fewer ADCs to be used to sample more signal (signal can be multiplexed).



| | | value | unit |
|------------|-------|-------|------|
| Sensors | Up to | 16 | |
| Lasers | Up to | 2 | |
| Frame rate | Up to | 100 | Hz |
| Resolution | | 10 | cm |
| Accuracy | | 10 | cm |
| Distance | max | 300 | m |

| | peripherals |
|---------|-------------------------------|
| Comm | CAN-HS(2), USB2, RS-232, JTAG |
| Memory | 2Gb DDR3 |
| Storage | 256 Mb Flash QSPI, micro-SD |