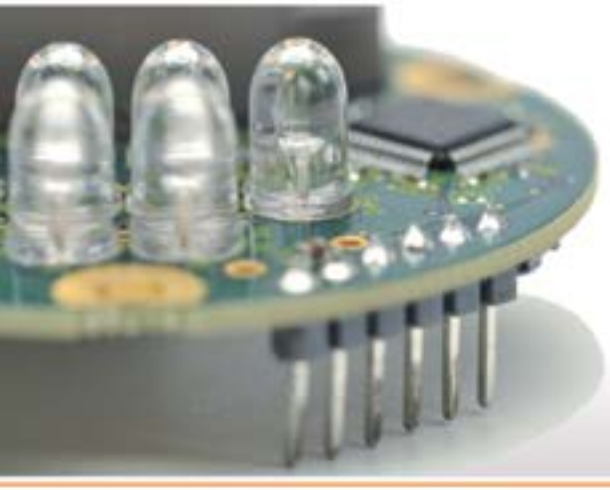

Leddar® technology

SENSING SIMPLIFIED

High-performance, cost-effective, detection and ranging for any environment

What is Leddar technology?

Leddar is a light-based, no-contact, distance measurement sensing technology that comes in many forms, for countless applications.

What does it do?

Through time-of-flight measurements using pulses from infrared light, Leddar provides continuous, rapid and accurate detection and ranging, covering narrow and wide beams, without any moving parts. The diffused light beam, processed through innovative algorithms, allows for the detection of a wide range of objects under various environmental conditions.

Why is it better?

When compared to competing detection technologies, such as laser scanners, radar, video, thermal imaging, ultrasonic and passive infrared, Leddar excels in the widest range of criteria (detection range, ruggedness, speed, accuracy, cost, etc.), providing excellent overall performance for the price for numerous applications.

Exceptional adaptability

Leddar is specially designed to cater to a wide range of industries and purposes and is available in the form of modules. Different models and optics options can be selected to best fit each application. Moreover, numerous operating parameters can then be adjusted to further optimize performance for particular uses.

Ultimate ease of integration

Brand owners, developers and integrators will find our sensing modules highly appealing, as they can be easily and rapidly integrated into almost any system. The dedicated configuration software (Leddar Configurator), as well as a software development kit (Leddar Enabler SDK), with libraries and sample code, greatly simplify both hardware integration and software development.

Different platforms for different needs

In order to effectively accommodate a variety of industries and needs, Leddar technology uses a platform-based approach:

- The single-element platform is ideal for applications requiring a 0 to 20 m range, such as level sensing, security and surveillance, and proximity detection. Various beam options are also available.
- The multi-element platform (typically containing a photodetector with 16 elements) is excellent for almost any application requiring 0 to 50 meter sensing capabilities. Among other benefits, this platform offers:
  - • lateral discrimination of objects
  - • simultaneous acquisition capabilities in its 16 independent segments
  - • various beam options
- The platforms provide a base design to quickly offer modules tailored to the needs of specific applications (beam geometry, wavelength, range, etc.).

Main features

- Rugged technology
- Robust detection and ranging
- Rapid acquisition rate
- Large illumination area
- No moving parts
- Short, diffused pulses from infrared light

Benefits for developers and integrators

- Low cost
- Lateral discrimination, for multiple object detection (multi-element platform)
- Long detection range with low-power light source
- Real-time object tracking capabilities
- Detection in adverse weather conditions
- Reliability
- Ocular safety

How does Leddar technology work?

The following figure illustrates the main components of a Leddar sensing module.

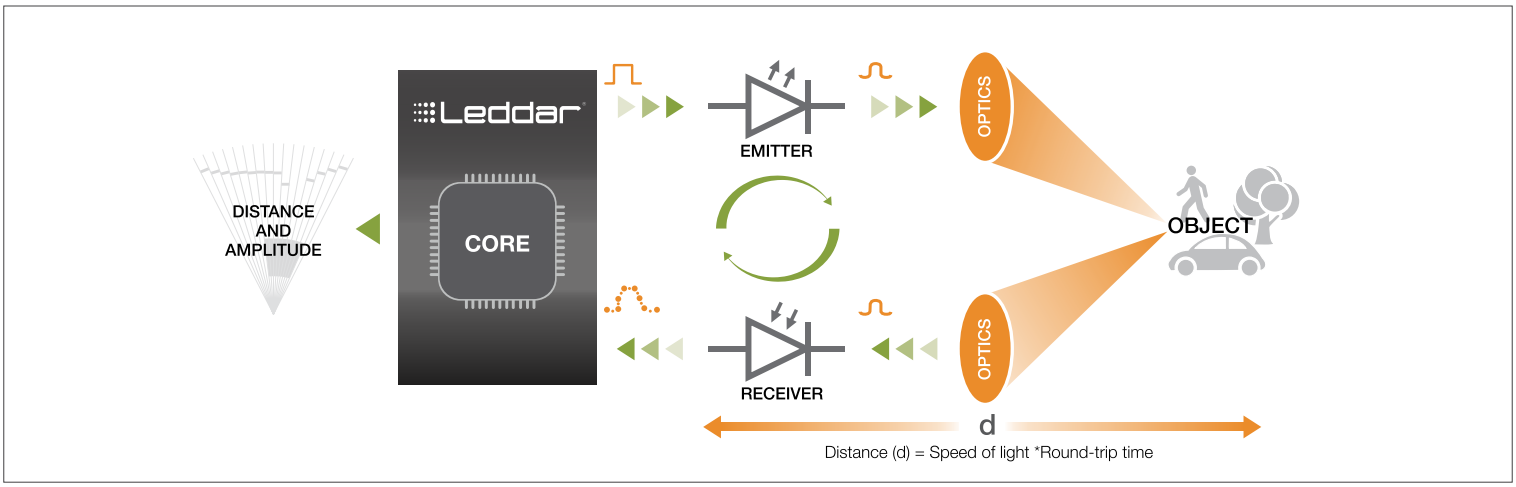

Figure 1. Signal travelling through the main components of a Leddar sensing module.

The emitter contains a light source. This light source is pulsed at a high rate (typically 100,000 pulses per second) and with a very short pulse width. Optical components may be used to shape the illumination beam.

The light pulses propagate through the detection area and the backscatter of reflected light is captured by the receiver optics and a photodetector. The photodetector may be a single-element component or contain multiple elements, providing several detection and ranging segments in the light beam (suited for profiling or object-tracking functions). The receiver also includes signal amplification and digitization.

The LeddarCore synchronizes and drives the emitter and receiver functions and additionally provides patented signal processing to increase the signal-to-noise ratio and the resolution of the digitized signal.

The detection and distance measurement is accomplished on the acquired signals. The following figure illustrates an example of an input signal. The pulse in this figure corresponds to a reflection of the emitted pulse off an object. The presence of the pulse provides the detection function, whereas its location in the signal is used to calculate the distance of the object.

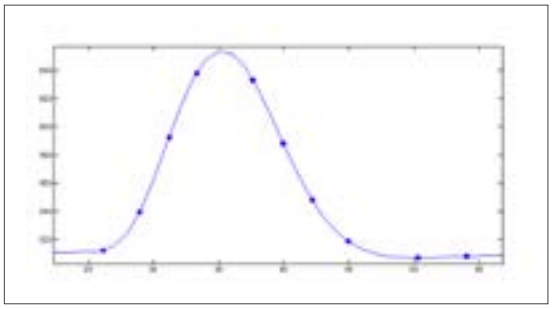

Figure 2. Sample trace, where the x-axis is a time axis, scaled to distance, and the y-axis is the light amplitude.

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