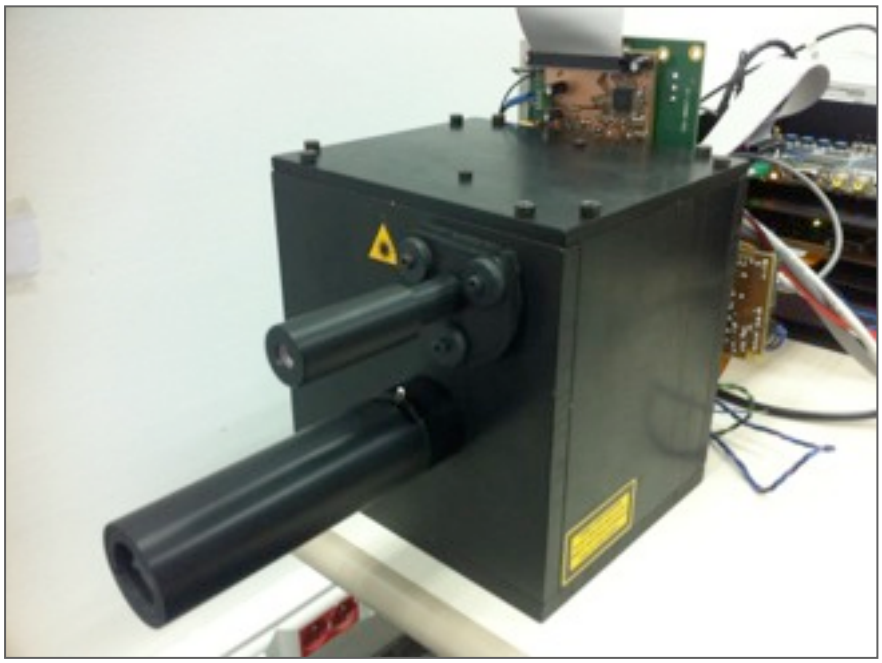
LASER OPTRONIX

FLADAR 3D Single image grabbing laser radar



Laseroptronix Fladar system (Flash laser radar) is a new device under development and soon ready for production. This paper describes what we work on and what we plan to raise interest from users that see a need for a device like this. Delivery planned late 2013 for smaller volumes.

Design is different to what others offers and we have a very long range and good performance at high speed and realistic costs.

Fladar system features

* Grabs a distance image over all pixels in a single shot at up to 10Hz in speed
* Resolution from 160x190 to 480 x270 Voxels depending on design and components used
* 3D voxel speed up to over 1 MHz with cm accuracy pert voxel (Volume Pixel)
* Each voxel can include up to 4 points if reflexes are split up by vegetation etc.
* Range from short range up to 1000 meter to a 5% dark surface
* Resolution and accuracy is only a few cm all over range and in single shot definition
* Good weather penetration as we have a 1550 nm laser source in laser safety class 2

Applications that are suitable for Fladar systems

* Surveillance and detection of people
* High speed 3D mapping in geomatic and airborne/car/boat applications
* 3D CAD / CAM works
* Robotics and auto navigation applications
* 3D identification applications in security area
* Personal security zones in industry and transport

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Applications and users can be many but here we look for contacts to get partners and users into the process form early start up. Pls. do not hesitate to contact us for your new application

This is a cooperation work with the Polytechnical University of Catalonia Spain.

Some special features of the system

* 1550 nm near IR lasers penetrate bad weather very good and this get operation at long range in bad wether possible. Snow , rain and fog problems are far smaller in this spectral area.

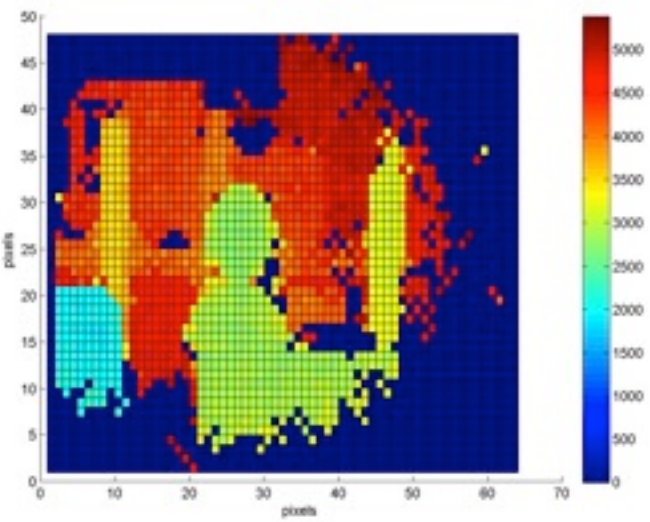
* Special patented scanning system gives improved performance to other flash laser radar systems.

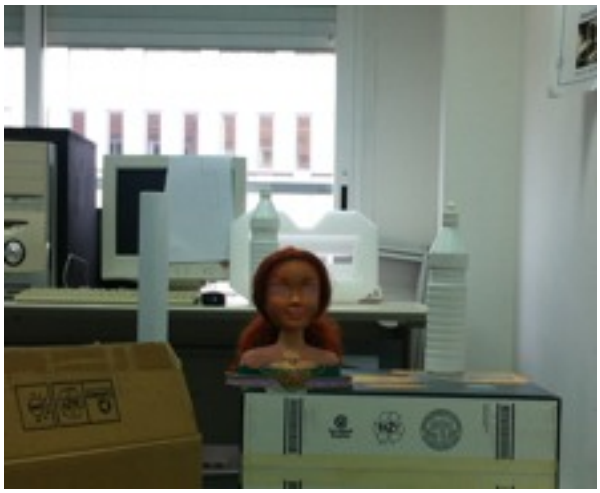
* Up to over 2 MHz possible in voxel 3D data collection speed make system very fast compared to standard scanning laser radar systems and still we keep cm accuracy on each voxels

* Adapt on the fly control capabilities makes dynamic adjustments possible.

* 1550 nm nm laser is eye safe class 1 and far better than 905 nm in this point and also far better in bad weather as spectral transmission is much better. In fog it is a extra large difference in penetration.

Test set up of system in lab





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Here we show distance as a color scale at left image. Each pixel here have a depth 3D coordinate. By changing laser power and optics we can operate from short range from a few meter up to 1000 meter in max distance. This is also calculated to a dark 5% reflective target. At 1550 nm the variations in grayscale on natural targets are less than in visible area of spectra. This makes operation very reliable compared to shorter wavelengths.

GENERAL SPECIFICATIONS*

PARAMETER	VALUE	COMMENT
Technology	Pulsed time-of-flight	
Wavelength	1550 nm	Eye safe wavelength
Laser type	Pulsed fiber laser	Nanosecond pulses
Aperture diameter	25mm…150mm	Objective or small telescope, depending on FOV and range
Dimensions (WxDxH)	170x170x220mm	Depends on type of main aperture
Output data	100 Mbit Ethernet	Raw data
Weight	1.2Kg	
Bad weather measurement capability	4 measurements per laser pulse	Allows measurement through atmospheric clutter like rain, fog dust or snow
Power supply	24V	
Power consumption	40W	
Case material	Aluminum	Black anodized or painted
Cooling	Passive, no fan	

* These specifications are preliminary and may have small changes depending on final design.

ABSOLUTE MAXIMUM RATINGS

These parameters can **not** be achieved in a single setup at the same time. However they can be accomplished separately or in given combinations.

PARAMETER	VALUE	COMMENT
Range	1000m	Range and FOV are inversely proportional
Field-of-view (FOV)	70º	
Spatial Resolution	640x360px	Image spatial resolution and frame rate are inversely proportional
Frame Rate	40 Hz	
Angular resolution	0.01º (azimuth) 0.01º (elevation)	Angular resolution depends on FOV and image spatial resolution
Distance resolution	±1.5 cm	

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Short range optimized for high spatial resolution

PARAMETER	VALUE	COMMENT
Range	100 m	With 5% of target reflectance
Field-of-view	70º	Objective lens
Spatial Resolution	640x350 px	
Frame rate	0.5 Hz	
FOV @ max range	140x140 m	
Angular resolution	0.11º (azimuth) 0.11º (elevation)	
Distance resolution	±1.5 cm	

Mid range optimized for high spatial resolution

PARAMETER	VALUE	COMMENT
Range	500 m	With 5% of target reflectance
Field-of-view	10º	Objective lens
Spatial Resolution	320x180	
Frame rate	1.7 Hz	
FOV @ max range	87.5x87.5 m	
Angular resolution	0.03º (azimuth) 0.03º (elevation)	
Distance resolution	±1.5 cm	

Long range with balanced frame rate and spatial resolution

PARAMETER	VALUE	COMMENT
Range	1200m	With 5% of target reflectance
Field-of-view	3º	Small telescope
Spatial Resolution	160x90 px	
Frame rate	7Hz	
FOV @ max range	62x62 m	
Angular resolution	0.018º (azimuth) 0.018º (elevation)	
Distance resolution	±1.5 cm	

To what is explained here we have many options and system components to make system as a pan and tilt scanner but also to be airborne and carried by cars and boats.

These are preliminary papers about what we do just now. Now we look for possible partners and customers so we can make what the demands are at these specific applications. This is to open the door for future cooperation with possible colleagues.

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