Geolux

Non-contact instruments for environmental monitoring

About Us

Founded in 2007, Geolux specializes in research, development and manufacturing of sensors and instruments based on radar technology. Geolux products are used in industrial sensing applications, for environmental monitoring, in perimeter security and in traffic monitoring systems. Radar-based sensors allow precise measurement of velocity, distance, vibrations and material density. Installation of radar sensors is very simple, and maintenance is minimal because there is no contact required between the sensor and the object being observed. The fact that the radar sensor provides contactless measurements is very important when working under harsh operating conditions that are typically found in industrial and environmental monitoring applications. Contactless operation greatly reduces maintenance and enables more precise and reliable measurement due to the lack of sensor-material interface and all problems related with it. In addition to manufacturing radar-based instruments, Geolux also develops and manufactures all equipment required for successful integration of radar sensors, such as data loggers and cloud-based software for real-time data collection and analysis.

Geolux has over 10 years of experience in microwave electronics development, software-defined radio, advanced signal processing, sensor development and instrument calibration. Our team of engineers is focused on building reliable and accurate instruments, with specific emphasis on ease of use, simple maintenance and robustness. Very low power consumption of all our instruments makes them ideal for use on locations where only battery power is available. Extensive know-how and experience acquired over many successful projects have enabled Geolux to provide the best service to all our clients, regardless of application type or specific requirements.

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Tomislav Grubeša, co-founder

Over a decade ago, when founding Geolux, we have realized that there is an enormous potential for application of contactless measuring methods in industrial and environmental sensing. Instruments that can measure various properties from a certain distance, without contact between the sensor and the object, have huge benefits over sensors that are in contact with the object. Installation is much simpler and maintenance is minimal, which is extremely important in industrial and environmental monitoring applications. One of the downsides of using radar technology has been high cost of such instruments, which we have been able to overcome by using software-defined radio approach and by investing in development of advanced signal processing algorithms. Our vision for the future is to bring radar technology to new areas and applications, where the ability to provide non-contact measurements will result in improved efficiency, decreased energy use and enhanced safety.

Nikša Orlić, co-founder

Coming from a family of geophysicists, I remember watching my father and grand-father analyze various environmental data collected by all kinds of scientific instruments. Sometimes they were frustrated when the data was not accurate enough, or even worse, when the instrument malfunctioned and they were not able to record useful measurements for their scientific research. But I can also remember their excitement when a rare phenomenon occurred, and they had all instruments in place to record valuable data. With this in mind, our mission at Geolux is providing our customers with dependable instruments and tools to help them excel in their area of expertise.

Environmental Monitoring

Instruments based on radar technology offer highest accuracy in hydrological measurements of water level and surface velocity. These instruments are installed above the water surface, typically on existing structures such as bridges. Installation is fast and simple, and installing a single hydrology monitoring site can be done by a single person in less than one hour. As there is no contact between the instrument and water, maintenance is minimal, and there is no concern that mud, sediments or floating debris may damage the instrument or reduce the accuracy of measured data.

Geolux offers complete solution for monitoring water level, flow and discharge of rivers, channels and lakes. The product line includes instruments for water level measurement, surface velocity measurement, data logger and cloud-based software for real time data collection and analysis. These products are available separately, or as highly integrated compact hydrological station that also has solar panel and battery included.

Geolux HydroView software makes setup of hydrological station easy and straightforward, and offers advanced features such as discharge calculation based on Q-H measurements or, for better precision, on combined measurements from water level and one or more surface velocity sensors.

In addition to water level monitoring, Geolux radar level instruments can be used for snow level monitoring, drinking water reservoirs monitoring, wastewater process measurements, groundwater level measurement, ice height measurement, landslide monitoring and many more environmental applications. Operating range from -40°C allows these instruments to reliably operate on extremely low temperatures, and measure the distance between the instrument and the surface of snow or ice layer. IP68 sensor enclosures are very resilient to harsh chemical atmospheres so sensors can be used in all environmental applications where other methods are not suitable.

Products

Water level measurement, snow level measurement

LX-80-15

- Maximum range: 15 m
- Suitable for water level monitoring in lakes, rivers and channels, and for snow level measurement

LX-80-30

- Maximum range: 30 m
- Suitable for water level monitoring in lakes, rivers and channels, and for snow level measurement

Surface velocity measurement

RSS-2-300 W

- Maximum detected velocity: 15 m/s
- Accuracy: 1%
- Suitable for flow and discharge measurement; it is possible to determine total discharge when RSS-2-300 W is paired with LX-80 level sensor

Non-contact temperature measurement and ice detection

TS-19K

- Water temperature measurement from above the water surface
- Automatic ice buildup and floating ice detection

Discharge measurement

RSS-2-300 WL

- Combined water level and surface velocity measurement
- Integrated module for discharge calculation based on level and surface velocity measurements

Data logging, storing and analysis

SmartObserver

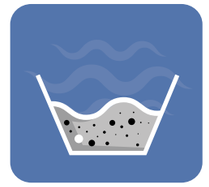
- Datalogger with integrated wireless connectivity and MPPT battery charger

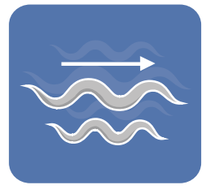
HydroStation

- Rugged compact station consisting of IP68-rated enclosure with SmartObserver datalogger, battery and solar panel

HydroView

- Cloud-based software for real-time hydrological data monitoring, analysis and reporting, with advanced features such as discharge calculation from water level and surface velocity measurements





Hydrological monitoring of water level and discharge in rivers and channels

Geolux offers turnkey solution for monitoring of water level and discharge in rivers and channels. The solution consists of one LX-80 water level sensor, one or more RSS-2-300 W surface velocity sensors and HydroStation unit with SmartObserver datalogger, solar panel and battery. The station measures and sends the data to HydroView server and the data can be accessed and analyzed in real time. Backup local storage on the datalogger keeps data until the transfer to HydroView server is confirmed. HydroView server includes the module for calculation of river discharge based on measured water level and one or more surface velocities. The discharge calculation module is based on hydraulic mathematical model. For improved accuracy, it is possible to calibrate the model by measuring the discharge at different water levels.

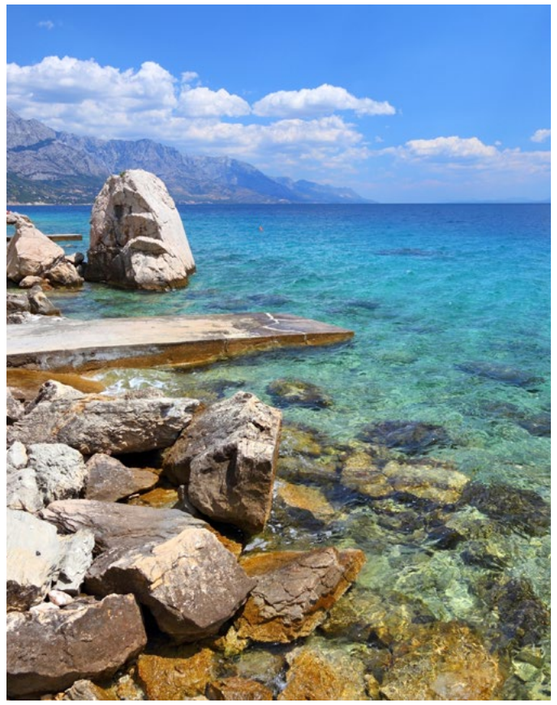
Geolux products for level and discharge measurement are used for flood prevention, in hydro-power plant control systems, in sewage processing facilities, irrigation channel supervision and many other applications.

Snow level monitoring

Non-contact level sensor LX-80 measures the distance between the sensor and the closest surface. For snow monitoring applications, LX-80 sensor is mounted on a pole above the ground, and the zero point is preset. As the snow falls, the distance measured by the sensor is shorter, and the height of snow buildup is reported. Geolux has developed a special software algorithms so that LX-80 can reliably detect snow height, regardless of the snow density and surface structure. LX-80 supports several industry-standard protocols such as MODBUS, SDI-12 and analog 4-20 mA interface, so it can easily be integrated with existing infrastructure.

Wastewater processing

Geolux sensors are commonly used in wastewater processing plants, replacing traditionally used sensors for level and flow measurement. Radar technology allows better precision of the measurement, and the ability to make measurements from above the water surface makes installation and maintenance easy. The sensors are enclosed in aviation grade anodized IP68 aluminum enclosure. All these factors make sensors perfect for operation in harsh environments, with expected operational lifetime much longer than it is with traditionally used contact sensors.



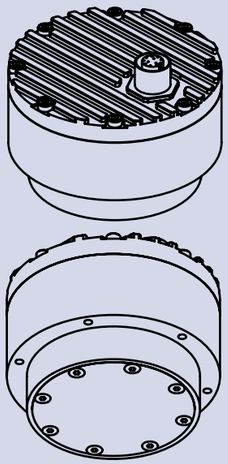
Sea level measurement

LX-80 products are suitable for precise sea level measurements. Aviation grade anodized IP68 enclosure is resistant to sea corrosion, and optional stainless steel enclosure is available on request. High sampling rate of the instrument allows measurement of average water level (tide monitoring) and discards effects of sea waves on measurements.

LX-80 Level Sensor

RADAR LEVEL SENSOR FOR WATER AND SNOW LEVEL MONITORING

- Contactless measurement of distance from the sensor to the surface
- Works on water, ground, most fluids and solids
- Ultra-precise 80 GHz radar technology
- Measurement accuracy +/-3 mm
- Measurement quality not affected by changes in air temperature or density
- Simple installation
- IP-68 rated enclosure
- Supports variety of communication interfaces
- Configurable range of interest
- Easy mounting
- Compatible with Geolux SmartObserver datalogger and Geolux HydroView cloud-based software for real-time remote monitoring
- Low power consumption



Radar Type	W-band 77-81 GHz FMCW radar
Beam Angle	12° both axes
Detection Distance	15 m / 30 m
Blind Zone	0,2 m
Resolution	0,5 mm
Accuracy	+/-3 mm
IP Rating	IP68
Serial Interface	1x serial RS-485 half-duplex 1x serial RS-232 (two wire interface)
Serial Baud Rate	1200 bps to 115200 bps
Serial Protocols	Modbus, GLX-NMEA
CAN Interface	Up to 1Mbps CAN2.0
Analog Interface	4-20 mA
Other Interfaces	SDI-12
Connector	M12 circular 12-pin
Power Input	9 to 27 VDC
Power Consumption	< 5 W (typical 4,1 W)
Maximal Current	< 500 mA
Temperature Range	-40°C to +85°C (without heating or coolers)
Enclosure Dimensions	Φ 65 mm x H 55 mm

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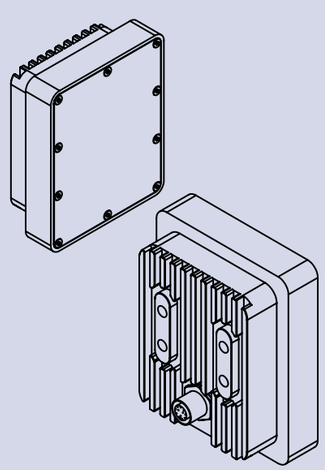
RSS-2-300 W Surface Velocity Radar

HIGH-PRECISION NON-CONTACT OPEN CHANNEL SURFACE VELOCITY METER

- Contactless, above the water, flow measurement
- Built on robust radar technology
- Wide measurement range from 0,02 m/s to 15 m/s
- Long range operation up to 50 m
- Compact, low-power design
- Wide input voltage range, suitable for solar applications
- Supports variety of communication interfaces
- IP68-rated enclosure
  (for outdoor applications and harsh environments)
- Automatic mounting angle compensation
  (cosine correction)
- Configurable direction of the flow measurement
- PC application for radar setup and live flow monitoring
- Simple integration with existing SCADA or telemetry systems
- Easy pole, wall or enclosure mounting
- GeoluxHydroview cloud-based software for real-time remote monitoring



Radar Type	K-band 24.125 GHz Doppler radar, 21 dBm EIRP
Beam Angle	12° Azimuth, 24° Elevation
Detection Distance	50 m
Speed Range	0,02 m/s to 15 m/s
Resolution	0,001 m/s
Accuracy	1%
IP Rating	IP68
Serial Interface	1x serial RS-485 half-duplex 1x serial RS-232 (two wire interface)
Serial Baud Rate	1200 bps to 115200 bps
Serial Protocols	ASCII-S, GLX-NMEA
CAN Interface	Up to 1Mbps CAN2.0
Alarm Outputs	2 x open collector, max 50V 200mA
Connector	M12 circular 12-pin
Power Input	9 to 27 VDC
Power Consumption	< 1,35 W (typical 1,0 W)
Maximal Current	< 250 mA
Temperature Range	-40°C to +85°C (without heating or coolers)
Enclosure Dimensions	110 mm x 90 mm x 50 mm

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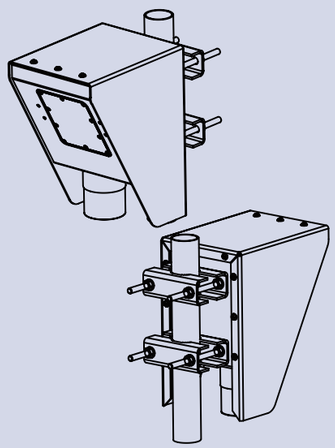
RSS-2-300 WL Flow Meter

HIGH-PRECISION NON-CONTACT OPEN CHANNEL FLOW VELOCITY & LEVEL METER

- Contactless, above the water, flow measurement
- Surface flow velocity measured with radar sensor
- Wide velocity measurement range from 0,02 m/s to 15 m/s
- Compact, low-power design
- Wide input voltage range, suitable for solar applications
- Supports variety of communication interfaces
- IP68-rated enclosure (for outdoor applications and harsh environments)
- Automatic mounting angle compensation (cosine correction)
- Configurable direction of the flow measurement
- PC application for radar setup and live flow monitoring
- Simple integration with existing telemetry systems
- Easy pole, wall or enclosure mounting
- Compatible with Geolux SmartObserver datalogger and GeoluxHydroview cloud-based software for real-time remote monitoring



Detection Distance	15 m / 30 m
Speed Range	0,02 m/s to 15 m/s
Speed Resolution	0,001 m/s
Speed Accuracy	1%
Level Resolution	0,5 mm
Level Accuracy	+/-3 mm
IP Rating	IP68
Serial Interface	1 x serial RS-485 half-duplex 1 x serial RS-232 (two wire interface)
Serial Baud Rate	1200 bps to 115200 bps
Serial Protocols	ASCII-S, GLX-NMEA, Modbus
Digital Outputs	1x open collector, max 50 V 200 mA (supports pulse and alarm mode)
Analog Output	(optional) 4-20mA, programmable velocity, level or flow
Connector	M12 circular 12-pin
Power Input	9 to 27 VDC
Power Consumption	< 6,5 W (typical 5,2 W)
Maximal Current	< 750 mA
Temperature range	-40°C to +85°C (without heating or coolers)
Enclosure Dimensions	150 mm x 200 mm x 250 mm

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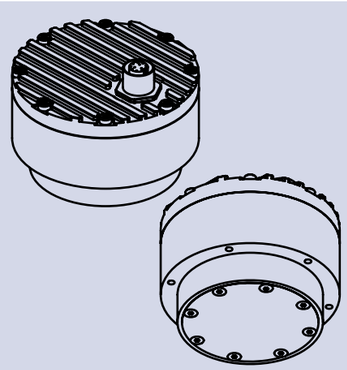
TS-19K Temperature Sensor

CONTACTLESS TEMPERATURE AND ICE DETECTION SENSOR

- Contactless measurement of water temperature from above the water surface
- Automatic detection of ice buildup and floating ice on water
- Readings not affected by changes in ambient air temperature or relative humidity
- Works up to 10 meters above the water surface
- Reports water temperature
- Simple installation
- Optimized for low power consumption
- Supports variety of communication interfaces for simple integration into existing systems
- Compatible with Geolux SmartObserver datalogger and GeoluxHydroview cloud-based software for real-time remote monitoring



Sensor Type	Uncooled bolometer 8-12 µm
Field of View	50°
Detection Distance	10 m
Resolution	0,1 °C
Accuracy	+/- 1 °C
Serial Interface	1x serial RS-485 half duplex 1x serial RS-232 (two wire interface)
Serial Baud Rate	1200 bps to 115200 bps
Serial Protocols	Modbus, GLX-NMEA
CAN Interface	Up to 1MBps CAN2.0
Connector	M12 circular 12-pin
Power Input	9 to 27 VDC
Power Consumption	< 1 W (typical 0,6 W)
Maximal Current	< 75 mA
Temperature Range	-40°C to +85°C
Enclosure Dimensions	ϕ 65 mm x H 55 mm

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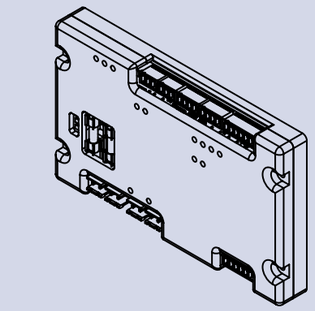
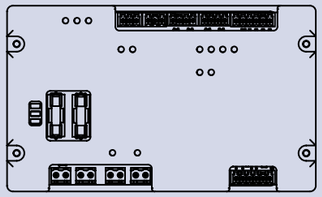
SmartObserver Datalogger

ROBUST DATALOGGER WITH INTEGRATED MPPT BATTERY CHARGER

- Versatile communication interfaces support various sensors
- Multiple communication protocol supported:
  Modbus, CAN, ASCII, and more available on request
- Digital inputs and outputs for tamper detection, customized alarms or auxiliary digital input support
- Analog inputs and outputs support older-generation sensors
- Compact, robust, low-power design for field operation
- Pluggable terminal block connectors for easy installation
- Integrated battery charger supports different battery types
- Digitally controlled power management system
- Buck & boost system power operation and battery charging mode
- MPPT integrated control for plug-and-play solar and wind generator integration
- Two SSR switches for two separate sensor power banks
- Remote system power monitoring and configuration
- Remote sensor configuration
- Wide operational temperature range (-40°C to +85°C)





Wireless Communication	GPRS, LoRaWAN, WiFi or RF modem (other available on request)
Sensor Interfaces	2x RS-232, 2x RS-485 (Modbus) 2x CAN2.0, 1x SDI-12 2x voltage input (0-10 V) 1x current input (4-20 mA)
Analog Output	1x voltage output (0-5 V)
Digital IO	2x GP inputs, 2x GP outputs
System Monitoring	Voltage and current measurements for Input, Battery and System
Sensors Power Control	2x SSR current-limited 2.0A controlled power outputs
Battery Charger Type	MPPT digitally controlled multi-chemistry high efficiency charger with Buck & Boost mode support
Battery Chemistry	Li+, LiFePO4, NiCd, NiMH, Lead Acid
Battery Configuration	1S to 4S
Input Power Generator	Solar, Wind, DC mains
Input Voltage	3 V to 26 V
Input Current Limit	3,6 A for 65 W
Battery Voltage	0 to 19,2 V
Standby Current	< 10 mA
Operating Current	< 100 mA
Temperature Range	-40°C to +85°C (without heating or coolers)
Enclosure Dimensions	161 mm x 97 mm x 20 mm
Enclosure Material	Machined aluminum, anodized

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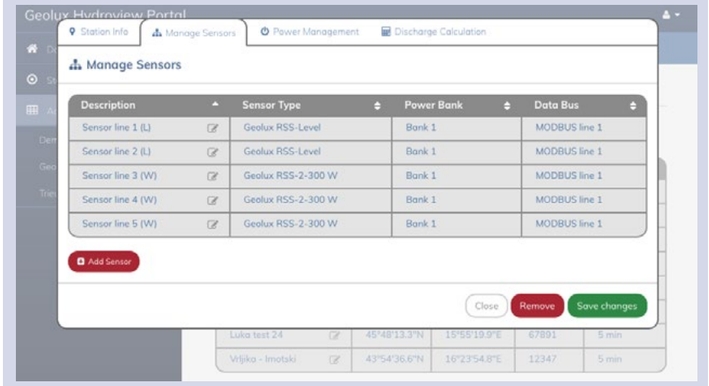
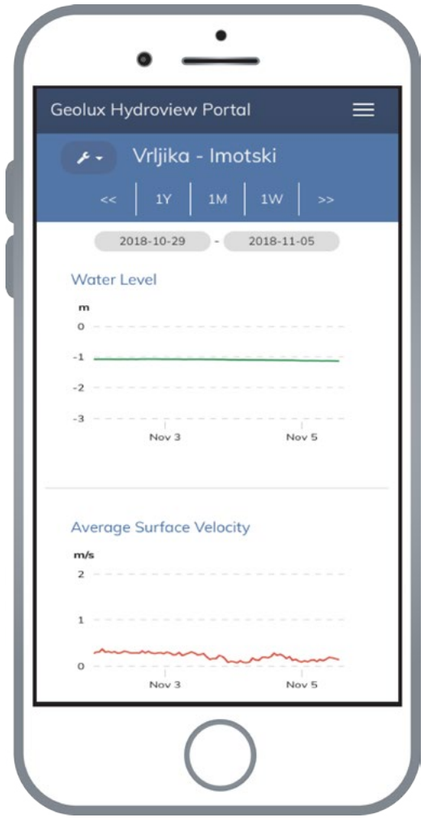
HydroView

CLOUD-BASED SOLUTION FOR REAL-TIME HYDROLOGICAL MONITORING

- Real-time data collection from remote hydrological stations
- Works with Geolux SmartObserver dataloggers
- Supports remote re-configuration of datalogger parameters
- Monitor hydrological data and equipment status (battery level, solar charging, ...)
- Supports exporting raw data
- Discharge calculation based on Q-H curves or combination of level measurement and one or more surface velocity measurements
- Easy hydrological site management, multiple organization units
- Various alarms and warnings
- Web-based interface compatible with Windows, MacOS and Linux
- Mobile friendly





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