



Cellocator Division
Pointer Telocation Ltd.

CELLOCATOR CELLO-IQ



High-end Driver / Fleet Safety and Eco-driving

Cello-IQ is a driver safety and Eco driving application, designed to improve fleet safety and reduce fleet operating costs. It is one of very few systems on the market that provides a fleet safety and Eco driving solution, while being simultaneously ready for integration with any TSP's SW platform with minimal integration and development effort.

The Cello-IQ device processes and interprets vehicle dynamics and vehicle operation patterns into driver safety and Eco scores, reflecting the driver's relative level of risk, fuel consumption and emission footprint within the scope of a given population and/or a vehicle category. It is available in two variants, Cello-IQ 50, the premium solution, and Cello-IQ 40 – the entry level solution.

The system fulfills the following main functions:

Driving Behavior Management - Detects, processes, logs and reports a wide set of events and/or raw data concerned with hazardous or aggressive driving behavior ("Safety" features).

E-Call & Emergency Data Recording (EDR) - Detects, logs, reports and uploads accident events and accident raw data for later crash event reconstruction on the server side.

Eco Driving Management - Detects and reports events which feature uneconomical and environment-unfriendly driving in terms of fuel consumption, emission and accelerated wear and tear (brakes, axles, engine, etc. – "Eco" features).

On-board Trip Level Scoring - Provides trip statistics information, which includes Eco scoring and Safety scoring based on the information gathered and processed on-board during a trip.

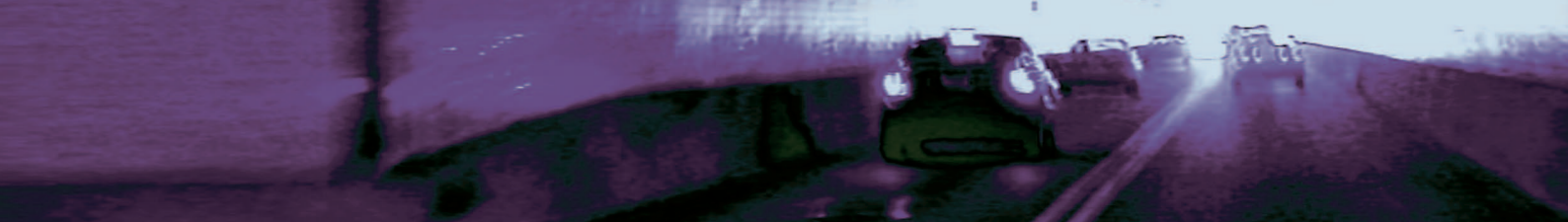
Driver Coaching - Provides continuous real time, visual and/or audible feedback to the driver, via a dedicated "Driver Feedback Display", regarding the risk level of the driver's driving and hazardous/uneconomical event identification.

CELLO-IQ APPLICABLE MARKET SEGMENTS:

- Fleet Operators
- Vehicle Insurers
- Public Transportation
- Vehicle Owners (For teen monitoring)
- Leased / Rental Car Companies



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CELLO-IQ SYSTEM FEATURES

- **Driver Behavior and Eco Driving Management** - the detection, onboard processing, logging, scoring and reporting of a wide set of maneuvers representing hazardous and/or wasteful driving:
 - Wide set of managed driving maneuvers: accelerations, turns, braking, over speeding, idling, unsafe lane change, wrong gear handling, off-road driving and more.
 - In-vehicle maneuver analysis across multiple parameters such as length, maximum and average accelerations and speeds, speed delta, etc.
 - On-board classification of a detected maneuver into 3 configurable risk levels: Green, Yellow and Red.
 - On-board trip safety - scoring taking into account a weighted influence of all the detected maneuvers on the trip.
 - On-board trip Eco-driving - involving parameters which highly affect fuel consumption, emission and wear and tear factors.
 - Real time driver feedback, including visual (LEDs, icons) and audible (buzzer or recorded voice) options for coaching and mentoring purposes.
 - Flexible and configurable maneuver and trip scoring logic (severity levels, relative contribution of various maneuver types, switchable detection, logging, raw data aggregation and transmission of each maneuver type independently).
 - On-board scoring calculation includes presets for various vehicle types (Private ,LCV, MCV/Bus, HCV).
 - Compliance with ongoing fine tuning of thresholds and dynamic ranges of the scoring algorithms over time.
- **Crash Detection** - emergency data recording and reconstruction, including:
 - Configurable length of pre and post accident buffers.
 - Up to 100Hz 3D Acceleration sampling rate ($\pm 8g$) + 1PPS GPS stamp.
 - Proven survivability in up to 50g impact conditions

- **Proprietary e-Call** - with In-band compliance (infrastructure).
- **Self automatic calibration** - resulting in an easy installation.
- **Extended memory capacity** - enables more than 2 weeks of operation outside coverage.
- **Independent communication socket for the CSA** - allowing modular design of the backend.
- **Modular CSA protocol** - for best message-structure definition flexibility and easy integration.

Driver Feedback Display (DFD)

Cellocator's DFD is a **Driver Feedback Display**, available as an accessory connecting to the Cello-IQ product. The DFD provides visual and vocal notifications intended for friendly Eco-driving coaching and real-time assistance to help improve the driver's safety level. The DFD's bright colourful LEDs and icons are visible even in a daylight environment. The audible interface is a combination of human voice and tones (fully configurable) for maximum flexibility. It offers a selection of programmable languages and can support additional languages, dialects or a male/female voice upon request.

The DFD supports also the following functionalities:

- Driver identification reminder
- In-vehicle installed tracking device reminder (for non-identified drivers)
- System operation / health status indication

The real-time notifications to the driver are generated based on the Cello-IQ embedded 3D accelerometer, GPS/VSS speed data, the vehicle's RPM signal (optional), and executed maneuver detection algorithms running on the CSA.

The DFD is designed to support and coach fleet drivers rather than to punish or preach to them. It is meant to be used as the driver's mentor for safety and Eco driving, and continuous improvement. As such, it can serve, while powered by the Cello-IQ, as a stand-alone driver safety & Eco driving system, even without sending driver behavior reports to the fleet manager on top of the standard Fleet management reports.



CELLO-IQ 50 VS. CELLO-IQ 40:

Feature	Sub Feature	Cello-IQ	
		Cello-IQ 40	Cello-IQ 50
Accelerometer based Engine sense		V	V
Crash Notification		V	V
Maneuvers	Speeding	V - GPS profile as raw data only	V
	Harsh Acceleration		V
	Harsh Brake		V
	Harsh Turn		V
	Turn & Acceleration	-	V
	Turn & Brake	-	V
	Off road	-	V
	Excessive RPM		V
	Slalom	-	V
	Crash	V - GPS profile as raw data only	V
E-Call		V	V
EDR		-	V
DFD		V - supported maneuvers only	V

TECHNICAL SPECIFICATIONS

Communication

GSM Modes	GPRS class 10, PDU SMS
Bands	Quad band: 850, 900, 1800, 1900MHz
Power Output	2W, 1W
SIM	Internal, replaceable, remote PIN code management
Antenna	Internal, quad band GSM antenna
Packet Data	TCP/IP, UDP/IP
SMS	PDU, text SMS for data forwarding

GPS

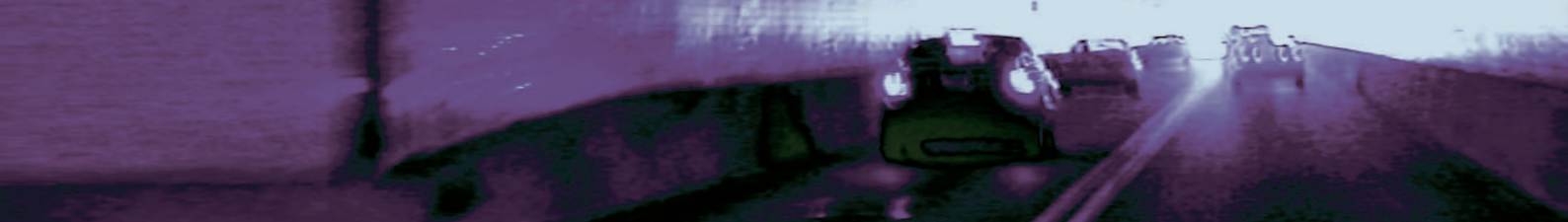
Technology	Chipset: SiRFIII GSC3F/LP single chipset (sirfstar IV upcoming)
Sensitivity (tracking)	-159dBm
Acquisition (normal)	Cold <42Sec, Warm<35Sec, Hot<1Sec
Antenna	On board, internal patch antenna Optional external Active antenna (2.85V ± 0.5%), automatic switching, standard SMA connector

Inputs and Outputs

Inputs	<p>1 internally pulled down input dedicated for ignition switch</p> <p>3 internally pulled up Discrete Dry inputs with assignable functionality and configurable threshold for logical high and low states.</p> <p>2 configurable inputs capable to serve as:</p> <p>Frequency counters - Configurable resolution; Up to 5kHz input signal; Signal level (3V < Vin ≤ 30V) Accuracy ±2%</p> <p>Analog inputs with variable resolution - 8bit, adapted to 0-2.5V signal, resolution 20mV, accuracy ±20mV; 8bits, adapted to 0-30V signal, resolution 100mV, accuracy ±100mV</p> <p>Discrete Dry – configurable threshold for logical high and low states.</p> <p>Discrete wet - configurable threshold for logical high and low states.</p>
Outputs	5 general purpose open drain outputs (250mA max) with assignable functionality

Interfaces

Voice Interface	<p>Cellocator HF compliant</p> <p>Full duplex</p> <p>Echo cancelation</p> <p>Noise suppression</p> <p>Spy listening option</p> <p>Auto-answer option</p> <p>Volume control by single button or two buttons</p> <p>Distress voice call and plain call generation</p>
COM (RS232) port	<p>Selectable baud rate (9600 or 115000bps)</p> <p>True RS232 levels;</p> <p>8 bit; 1 Stop Bit; No Parity</p> <p>MDT Interface</p> <p>Garmin™ Interface</p> <p>PSP™ (Car Alarm) Interface</p> <p>Cellocator Serial Protocol</p> <p>Transparent data mode</p> <p>Configuration</p> <p>Firmware upgrade</p>
Debug port (RS232 out)	<p>External Monitoring of Modem-CPU dialog</p> <p>115000bps</p> <p>True RS232 levels</p> <p>8 bit, 1 Stop Bit, No Parity</p>
1-Wire™ (Dallas port)	<p>DS1990A compliant</p> <p>Driver management</p> <p>Car Alarm Authorization</p>
Accelerometer	3D, 2g/8g range, <70mg resolution, I2C interface
Connectors	20-pin Molex, Automotive SMA switch for optional external GPS Antenna



Power

Input Voltage	7-32VDC
Average Current consumption	Normal: 40mA Economic: 23mA Hibernation: <2mA Shipment (Off): <20uA (Internal Battery)
Internal Battery	Li-Ion Polymer, 3.7V, 900mAh, rechargeable Embedded NTC for temperature controlled charging. Operating Temperature: -20 (65% charge) to 60°C.
Internal Battery	Battery Monitoring: Temperature (NTC) & voltage Autonomy: Up to 200 Tx @ 1Msg/min @ 25°C Protections: over current, overcharge and over discharge

Vehicle environment immunity

Immunity	Compliant with ISO 7637 test level #4 (in accordance with e-mark directive)
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Environment

Temp, operating	-30°C to +70°C full performance -40°C to +85°C – degraded communication
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Temp, storage	-40°C to +85°C
Humidity	95% non-condensing
Protection	IP40
Vibration, Impact	ISO 16750
Mounting	Tie-wraps and/or two-sided adhesive

Certifications

FCC	Part 15 Subpart B, part 22/24 compliant
CE	CE EMC & R&TTE according to 89/336/EEC or 1999/5/EC CE Safety EN60950-1:2001+A11:2004 Automotive Directive 2004/104/EC (E-Mark)
IC	Industrial Canada
PTCRB	TRP, TIS, Spurious and harmonics emission

Dimensions & Weight

Dimensions	91x73x23mm
Weight	110gr

FOR MORE INFORMATION

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