

## VisLab History and Main Milestones

**1994** **The Mob-Lab vehicle:** after 4 years of research activities together with the main European car makers, the first vision system for intelligent road perception is demonstrated on board of MobLab (MOBILE LABORATORY) at the final meeting of the PROMETHEUS European Project.

**1998** **ARGO completes the MilleMiglia in Automati-co:** completely designed and implemented by VisLab, the ARGO prototype vehicle is the first autonomous passenger car exhaustively tested for more than 2000 km (94% of which in autonomous mode) on Italian highways, together with regular traffic. ARGO is considered one of the milestones of vehicular robotics worldwide.

**2001** **VisLab eyes in the South Pole:** RAS (Surface Antarctic Robot) is equipped by VisLab with cameras that provide vision-based sensing of the South Pole icy environment. It demonstrates to be able to provide a leader-follower functionality in extreme off-road conditions.

**2004** **IEEE Trans on ITS is edited by Alberto Broggi:** for the term 2004-2009, VisLab's director serves as the Editor-in-Chief to the major IEEE publication in the field of Intelligent Transportation Systems.

**2004** **VisLab hosts the IEEE Intelligent Vehicles Symposium:** the IEEE IV 2004 Symposium is organized by VisLab in Parma, Italy; researchers, practitioners, and managers reach Parma to attend the conference and the related vehicles' demonstrations.

**2005** **VisLab's vision systems drive TerraMax to the finishing line of the DARPA Grand Challenge:** in total autonomy, TerraMax completes the DARPA Grand Challenge: a 132 miles long unknown off-road course, traversing mountains and deserts. TerraMax is the only vehicle completing the race using vision as main perception technology.

**2005** **VisLab at the Pentagon:** thanks to the outstanding results obtained at the DARPA Grand Challenge, in December 2005 VisLab presents the results of its activities at the Pentagon, in Washington, DC, USA.

**2007** **TerraMax is qualified for the DARPA Urban Challenge:** TerraMax is one of 11 vehicles to pass the qualifications and attend the DARPA Urban Challenge; TerraMax perceives the 3D world thanks to 11 cameras, providing all-round vision in a urban environment.

**2008** **VisLab spin-off company:** after 18 years of worldwide renowned activities, the research team decides to mark its presence in the industrial market: the VisLab spin-off company focuses on enhancing automotive safety.

## Company Profile

After being for many years one of the key laboratories worldwide providing top-notch theoretical and applied research on Intelligent Vehicles, in 2008 the University of Parma started a spin-off company named VisLab.

VisLab is specialized in vehicular applications involving both environmental perception and intelligent control, and offers its expertise in the field of perception for vehicular robotics. Thanks to its tight cooperation with top level companies in Europe, America, and Asia, VisLab has developed its own vision on products for the automotive market and offers a wide variety of perception and safety systems.

Thanks to the presence of Faculty members and PhDs, VisLab researchers also provide training and education.

## Expertise

One of the most distinctive features that explains VisLab's continuous and proactive presence in projects with car manufacturers, automotive suppliers, and vehicle-based companies is the very specific experience developed throughout the years.

The application of vision systems on board of vehicles not only requires to fully dominate the latest vision technologies, but also to have a deep knowledge of the key issues of this environment, such as calibration, illumination, noise, temperature, power consumption, as well as cost and installation requirements.

Besides its renowned expertise, the key to VisLab's quick application prototyping is the proprietary software that has been developed in the last 10+ years and that constitutes the basis of each application developed by VisLab.

VisLab was one of the first laboratories to invest on vision technologies on board of vehicles, and its efforts are still contributing to shape the history of vehicular robotics.

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A Spinoff Company of the University of Parma, Italy

# VIDA

## VISLAB INTELLIGENT DRIVER ASSISTANT

• INTELLIGENT HEADLIGHTS

• VISIBILITY WARNING

• STOP AND GO

• SMART CRUISE CONTROL

• LANE DEPARTURE WARNING



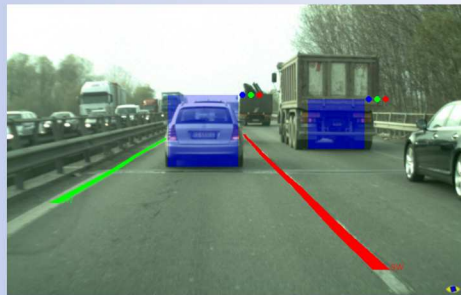


### Product

Originating from specific requirements of future Advanced Driving Assistance Systems, the VIDA system offers both basic functionalities -readily available also for aftermarket installations- and advanced applications.

Functionalities such as Lane Departure Warning and Safety Distance Warning are provided by the basic VIDA-W. On the same hardware platform and with the same sensing device, additional features can be added as plug-ins directly interfaced to the vehicle network and offering vision-based Stop-and-Go, ACC, and other intelligent functions.

VIDA's ultra compact size and quick installation procedure make it the perfect add-on for low-cost vehicular safety enhancements.



### Functionalities:

**Lane Departure Warning:** if driving at speeds higher than 50 km/h, when the vehicle is about to leave the driving lane, VIDA provides acoustical and optical warnings. Such warnings are made available also on the CAN bus for additional and/or alternative actions (e.g. haptic).

**Safety Distance Warning:** once specified the driver's attitude (from relaxed to sport driving), the system warns when running too close to the vehicle in front.

**Stop and Go:** in highly congested areas, for speeds lower than 15 km/h, VIDA provides controls to keep a safe distance from the vehicle in front. Actuation on gas and brake is required for this function, which can also be enhanced by steer control via visual servoing.

**Smart Cruise Control:** VIDA detects the presence of a preceding vehicle and measures its distance -as well as its relative speed,- and automatically adjusts the vehicle speed to maintain a safe distance.

### Hardware and Integration

The VIDA system perceives information about the surrounding environment thanks to a single monocular microcamera installed on the top of the windshield, inside the car cockpit. The installation of the camera is completely hassle-free, thanks to the system's ability to periodically autocalibrate itself. The processing fits completely on a low-cost and low-power DSP,



which can also run additional functions available as separate plug-ins. VIDA features a CAN interface which is used to read vehicle data, manage the HMI, and provide feedback to the vehicle itself. Optionally VIDA provides enhanced images on an on-board monitor.

### Human Machine Interface:

The **Lane Departure Warning** system is active when travelling over 50 km/h. It provides a warning signal when the vehicle is about to depart from the current lane and no turn

indicator has been activated; it also provides visual indication when limited visibility of the lane does not allow safe operations.

When approaching a vehicle in the same lane, the **Safety Distance Warning** provides an acoustical signal when the distance from the preceding vehicle is too short according to self speed. This function can be manually adjusted to match the driver's attitude.

**Stop and Go** is offered when driving at slow speeds close to vehicle in front: once engaged, gas and brake control are taken by VIDA; any other driver's action on pedals will disengage the automatic system. Autonomous steering can also be employed to enhance driver's comfort.

Info on availability and development timeline: [info@vislab.it](mailto:info@vislab.it)

Plugins	Additional functions	Working range and environment	Installation requirements	Output	
VIDA-VW Visibility Warning	Warning when self speed is too high with respect to visibility	Speed > 50 km/h	CAN data access	Acoustic and visual warning	Warning only
VIDA-IH Intelligent Headlights	Automatic on/off switch of high beams in correspondence to crossing traffic	Speed > 50 km/h night driving	CAN data access, headlight switch via CAN	Automatic switching of high beams	Basic actuation
VIDA-HS High Speed	Input signal to smart cruise control when approaching slower vehicles	Speed > 50 km/h highway-like environment	CAN data access, interface to ACC	Speed adjustment for smart cruise control	Speed control
VIDA-LS Low Speed	Autonomous stop-and-go for queue driving	Speed < 15 km/h urban-like environment	CAN data access, autonomous gas, brake and steering; use of radar	Stop and go	Full automation