

## Vehicle-mounted optical sensor for anticipating pavement condition and grip coefficient

### Summary/Characteristics

A researcher from the Carlos III University of Madrid has developed an optical sensor that allows the determination of pavement condition. By employing pulsed dual-comb optical sources, sensitivity is increased; the device can operate from a moving vehicle, enables the detection of ice, water, snow, etc., at a distance of 25 meters, and estimates the surface's slip resistance. This sensor can be implemented in Advanced Driver Assistance Systems (ADAS) and autonomous vehicles.

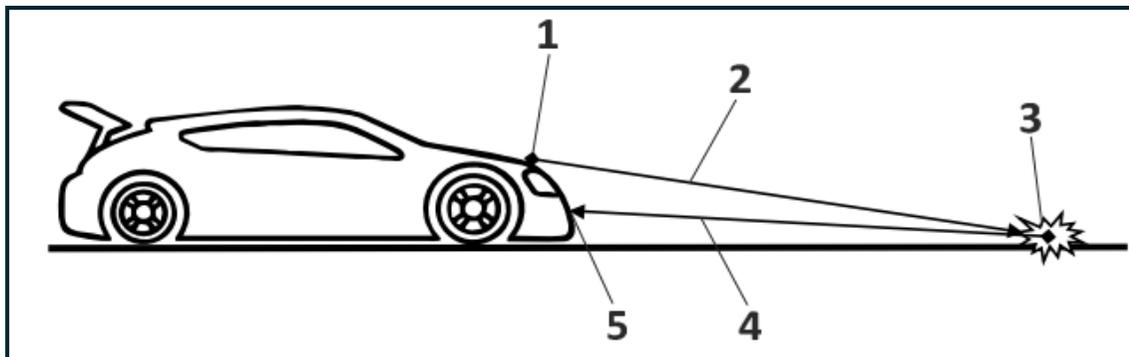
Potential licensees from the vehicle manufacturing sector are sought to continue developing the technology and add it to the company's product catalog.

### Innovative Aspects

- Sensor with a pulsed dual-comb optical source and an extended discrete (multimode) optical spectrum in a frequency band (optical frequency comb).
- Pavemente condition determination based on the obtained spectral information.
- Detection of water, ice, snow, and other substances at a distance of 25 meters.
- Operation from the moving vehicle itself.

### Competitive Advantages

- Integration. Operates installed on the vehicle itself.
- Increased sensitivity and speed, coverage, and functional on moving vehicles.
- Multifunctionality. Detects a wide variety of scenarios: presence of water, snow, ice and other substances.
- Anticipation. Determines road condition and slippage at a distance of 25 meters.



Representation of the sensor operation: Light source (1) on the vehicle that emits a light beam (2) whose optical spectrum corresponds to a dual optical frequency comb, which upon hitting the pavement (3) is partially reflected (4) and is captured by a receiver system (5).

### Technology readiness level:

In development phase – Laboratory tests completed. TRL 4.

### Intellectual and Industrial Property Status:

European IPR granted. Title: "Road condition sensor and method for detecting the state condition of the roadway".

### Type of collaboration sought:

License Agreements are sought from companies dedicated to vehicle manufacturing or vehicle – related electronics systems.