**SECURITY PRECAUTIONS**

Self-driving cars are likely to be the future of transportation, but safety concerns are hurdles researchers have to overcome to make completely independent vehicles become a reality.

We may also encounter internal threats that would be directly related to a failure of the system itself, whether at the hardware or software level.

1. **SECURITY HARDWARE**

Internal threats thus include all the failures that can be generated by a system due to poor design or maintainability. So, we are going devote to the operational safety of a system, whether at the software level or material.

Today, the lifespan of a vehicle exceeds twenty years, so the electronic components must adapt to this durability of existence despite an environment subject to highly divergent climatic constraints, shocks and tremors or extreme temperature. The material used in the manufacture of these components must therefore be able to meet all these constraints in order to guarantee certain reliability without which the risk of short circuit may arise.

**SIGNAL LIGHTS + STOP LAMPS**

The headlights were content until now to illuminate the best at night, in order to offer maximum safety. But lighting is becoming an increasingly broad field, combining design, technology and even artificial intelligence.

new lighting technologies open up new perspectives for designers in terms of light staging. This is particularly the case with OLED diodes which, unlike current LEDs, are not point light sources, but very thin luminous surfaces capable of matching the relief of a bodywork. It thus becomes possible to cover entire portions of the car with luminescent zones. From then on, we can imagine anything: that the car greets its owner by displaying “Hello Mathieu! on its door, whether it indicates the charge level of its battery, or whether it warns the following vehicle that it is about to park or that it is stopping to let a pedestrian pass.

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Your vehicle must have brake, right and left turn signal lights. The diameter of the reflection surface of these lights cannot be less than 7 cm and the amount of light cannot be less than 500 lumens.

C. ELECTRICAL SAFETY

All these components communicate with each other by means of electronic beams allowing the sending and receiving of information. This same system can communicate with other systems via the CAN bus which itself also consists of cables and its data centralization system. Thus, all these components of communication represent a risk since only one element is enough to put the whole faulty electronic system.

It is important to specify that this part will address the risks and threats of embedded systems but not the solutions and countermeasures put in place to avoid them.

The technological evolution of on-board systems in the automobile makes these systems increasingly vulnerable to any threat that could render them unusable but above all dangerous. Added to this is the strong constraint of real time which requires an obligation of result for certain systems.

1. INGRESS PROTECTION (IP)

Many vehicle safety solutions operate outside of the vehicle, exposed to the elements and vulnerable to penetrative dust and water. Ingress protection is vital in instances where safety solutions need to work to protect drivers and vulnerable road users. Use our IP rating chart to fully understand how your product will perform.

An IP protection index is defined by 2 figures which characterize:

* Protection against the penetration of solid bodies
* Protection against ingress of liquids

2. LOW CURRENT EMERGENCY DISCONNECT SWITCH

Many motorists would probably be happy to install a device in their car, without any effort and without removing the battery terminals, it would be possible to disconnect the mass from the car.

In this project we will focus on such a device, or rather, on a power switch.

There is nothing difficult in installing this device, since you can buy this switch at any car store and easily fix it under the hood of your car.

There are also type of ground switches, type **RAD1**, with remote control. With this type of switches, you can cut off the car's electrical network directly from the passenger compartment, without opening the car's bonnet again. True, this device itself remains energized and is slightly different from installing a conventional switch. To install it, you will need a long cable with a negative charge, which should be laid directly from the ground to the passenger compartment, having previously drilled a small hole near the engine compartment flap.

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3. HIGH CURRENT EMERGENCY DISCONNECT SWITCH

4. EMERGENCY STOP BOTTON (CIRCUIT BREAKER)

5. OVER CURRENT BREAKRES

6. REMOTE EMERGENCY RESPONSE SYSTEM

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D. SOFTWARE SYSTEM

**SAFETY FOR SOFTWARE-DEFINED AUTONOMY**

Our safety approach is architected for software-defined autonomy. Compared to safety approaches for traditional systems, NVIDIA’s safety strategy is:

– Designed for dynamic system configurations

– A flexible platform for hardware and software richness

– Optimized for a growing number of functions

– Ecosystem-friendly with open system boundaries

– Designed for AI hardware, software, and tools

– Expandable with new algorithms

– Supporting of decomposable safety concepts

– Compatible with millions of lines of code

– Easily updatable

– Continuously and over-the-air upgradeable

– Function-aware, data-oriented, and validated end-to-end

– Hardware-firmware-software harmonized

https://www.youtube.com/watch?v=F3lx1vLk8B4

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