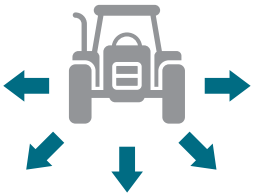
Classification of tractor automation solutions

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This study aims to **establish a classification of tractor automation solutions** based on an operational approach.



This classification applies to farming tractors, **excluding farming robots,** which are generally subject to specific regulations and follow distinct deployment conditions.

In France, the concept of tractor is defined in Article 3, point 8 of Regulation (EU) No 167/2013 of the European Parliament and of the Council of 5 February 2013 on the approval and market surveillance of agricultural and forestry vehicles: https://bit.ly/45hDUBr

Classification of solutions

Scope

LEVEL 1 – AUTOSTEERING



- Steering automation
- With driver on board

An infographic produced by the Observatoire in 2024 **explores autosteering in agriculture in France.** https://bit.ly/45lpQXu

LEVEL 2 – AUTOMATED DRIVING



- Steering **AND** speed control automation
- With driver on board

Headland sequences are automated, including gear changes, power take-off engagement or disengagement, raising and lowering of implements at the right place and time, and more.

LEVEL 3 – INTERACTIVE AUTOMATED DRIVING



- Steering and speed control automation **BASED ON** the operation performed
- With driver on board

Tractor operation is automated using external information from an implement (seeder, slurry tanker, baler, self-loading trailer, potato harvester, etc.), a lead machine, or data imported via the tractor's console.

Examples:



Lead machine (tractor or combine harvester) controlling the driving of the following tractor (with driver).



Baler supporting windrow centering of the tractor, ensuring consistent forage feeding, and triggering automatic stopping for bale ejection.

The development of intelligent implements, capable of making real-time operational adjustment, is essential for the large-scale deployment of automation levels 3 and higher:

- Detection of failures, blockages, or breakdowns
- Monitoring of component wear and tear
- Dynamic adaptation to the working environment
- Work quality optimization based on conditions and goals

LEVEL 4 – SUPERVISED AUTONOMY



- Autonomous tractor, **WITH** active and continuous field supervision
- No driver on board

Two types of supervision are possible:
either by a human operator present on the field, or by a lead machine.
In the latter case, the lead machine controls the driving of the following tractor (without any driver).
NOT CURRENTLY AUTHORIZED UNDER EU REGULATIONS.

LEVEL 5 – FULL AUTONOMY



- Autonomous tractor, **WITHOUT** active supervision
- No driver on board

Occasional, remote, or no supervision.
NOT CURRENTLY AUTHORIZED UNDER EU REGULATIONS.

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