Design of electrical steering wheel system for tractor auto-guidance (LeadENG project)

# Background

There is a great motivation to introduce electrical steering systems to tractors in agriculture. Equipped with auto-piloting and real-time position feedback using GPS, the tractor can be remotely controlled to perform various functions on pre-planned tracks, achieving:

* reduced skips and overlaps
* lower operator fatigue
* ability to work in poor visibility conditions
* ease of use

This LeadENG project aims to develop a demonstration and test system for such an electrical steering system. An example of such a system and its application can be found here:

A picture containing plastic, tractor

Description automatically generated

<https://www.fjdynamics.com/en/product/autosteeringkit.html?utm_source=google&utm_campaign=ATK-UK-product&utm_medium=cpc&gclid=CjwKCAiA24SPBhB0EiwAjBgkhgdreMjB2U6SauDsQGm1DrMfDCU_QE3KC1zU7mZxXQ0PXvOmqVX_kxoCZoMQAvD_BwE>

# Objectives

The main objective of this project is to design, construct and test an electrical steering system suitable for tractor auto-guidance. It is expected that the proposed system is compact and can be installed on the existing tractors easily without too many modifications.

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* Collaborate with the student group from the other department, find out the requirements for a typical steering wheel used in a tractor, i.e., required steering torque, rotational speed, load torque reflecting different road conditions.
* The initial electrical steering system will be using an existing electrical motor with (or without) a gear.
* Investigate the possibility to integrate the electrical motor and the steering wheel.
* Develop a control scheme suitable to the electrical steering wheel system.
* Build the test setup and demonstrate its electrical steering function.

# Resources

* Electrical motor and inverter / controller.

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