Thieu Berkers (Farmertronics Engineering)
Johan van Uden (ICT Eindhoven)
High Tech Systems Eindhoven
March 24th 2016
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Biography Thieu Berkers

1988 – 1998
Manager hard- and software engineering semiconductor back end equipment (ASM-Fico / Solid System Integrators)

1999 – 2002
Mechanical equipment engineer semiconductor front end equipment (Reticle Handler project - ASML)

2002 – 2007
Teacher physics

2007 – 2014
Software equipment engineer semiconductor front end equipment (Litho Computing Platform - ASML)

I did see all the high peaks and deep valleys....it was time for a change and I switched from my head to my heart...
With the founding of Farmertronics I returned to my roots

Passion #1
Technology

Passion #2
Farming
I used the standard tractor as a baseline and starting point

My conclusion; the standard tractor is outdated in a number of ways:
• heavy weight resulting in soil compaction
• a huge investment is required for the farmer
• dependant on limited fossil fuels
• emission of green house gases and fine dust
• propulsion requires a lot of mechanical rotating and moving parts
• steering isn’t ideal for unmanned operations
• no need for a cabin with unmanned operations
• not really maneuverable
Soil compaction is a serious issue caused by heavy machinery.

The university of Wageningen compared soil compaction between 1980 and 2010.

Soil compaction is resulting in less yield up to 50%.
Identified workarounds to reduce soil compaction

Using wider tires with less tire pressure

Using a tracklaying tractor
Controlled Traffic Farming (CTF)

By applying Controlled Traffic Farming the farmer loses a part of his land as the lanes can’t be used anymore for growing but overall the yield is still higher compared to non-Controlled Traffic Farming.

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The MultiToolTrac is the first Dutch CTF electric tractor

A group of 7 Dutch farmers developed this completely redesigned tractor:
• 4 electric hub motors are driving this tractor
• a diesel generator fills the battery pack during operation
• multiple tools can be attached to this tractor
• variable track width up to 3.25 meters for Controlled Traffic Farming
• Sales price: 350.000 euro

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The eTrac-20 will be the first Dutch full electric tractor

- light weight (< 1.000 kilogram) to prevent soil compaction
- no usage of limited fossil fuels
- no emission of green house gases or fine dust
- propulsion accomplished by just a few rotating parts
- maximum high torque during acceleration
- scalable concept
- steering done by torque vectoring like any other robot
- no expensive cabin required
- really maneuverable as a trike
- prepared to apply a hydrogen fuel cell for range extension
- sales price 80.000 euro
Cost of ownership of the eTrac-20

The Cost of ownership of the eTrac-20 is really low:
• **nearly no personal costs** due to the unmanned character of the vehicle
• **less costs for fuel** as in the future hydrogen will be produced locally at the farm from solar and wind energy
• **much more yield** by preventing soil compaction due to the lightweight design
• **less usage of seed and means for crop protection** as the eTrac-20 is prepared for precision farming
• **less maintenance costs** as there are nearly no moving or rotating mechanical parts.
After the proof of concept phase more functionality will be added

**First proof of concept:** manual operation with a radio joy stick and completely electrically driven from a 30 kWh battery pack

**Proto type #1:** GPS-RTK unmanned functionality will be added

**Proto type #2:** Hydrogen fuel cell and tanks will be added for range extension

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The ICT Motar platform to steer the eTrac-20
From Coding to Modeling
A new development approach to decrease the TTM

current situation

prototype development production

Control Model

Motar way of working

remain in control production

Control Model Reduced development time Motar-platform
Motar workflow

MATLAB/Simulink MBD

Automatic Code Generation

External Mode

Compiler

Executable

Hardware (ECU)

AUTOSAR (Application + RTE + BSW)

Motar-toolbox

Farmertronics
Visit us at stand 48
The eTrac-20 is designed to attach light weight tooling

Fertiliser sprayer

Crop sensors

Light weight mower
Prototype #1: GPS-RTK unmanned functionality will be added

The eTrac-20 is prepared for GPS-RTK for unmanned navigation with an accuracy of 2 centimeters for precision farming applications.
Prototype #2: Hydrogen fuel cell and tanks will be added

The eTrac-20 is prepared to run on hydrogen. A hydrogen fuel cell and hydrogen tanks will be added with prototype #2 for range extension.
Business case #1: Unmanned spraying at night

As the eTrac-20 is making nearly no noise spraying or any other operation can be completed at night time.
Business case #2: The All Electric Farm is planned in Utrecht for 2017
The Farmertronics Engineering team
Please join us!

By becoming a shareholder you will contribute to the worldwide success of this ambitious project: Farmertronics.com/crowdfunding

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Questions?