COMBINED POWERS

Combined Powers

Together for the next Level in Agriculture Process Automation

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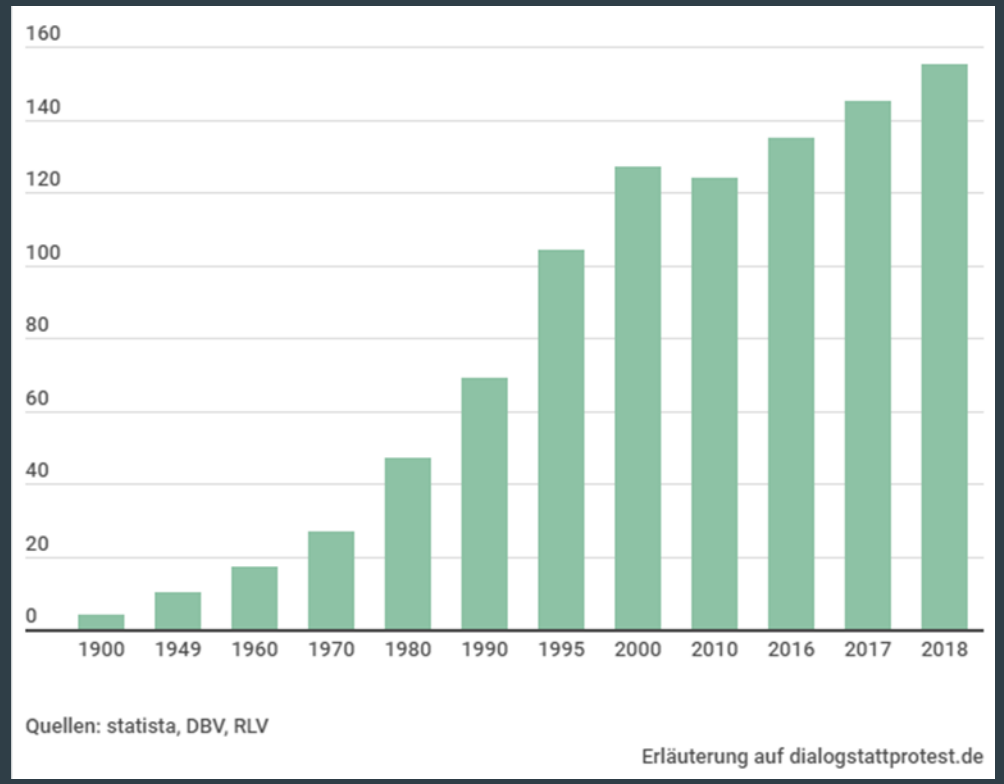
Success stories: Innovating into the robotic agri-food domain

agROBOfood

Agriculture “Past & Now”

- 1 farmer feeds 150 people today
- 30 years ago there were 75 people
- 60 years ago 15 people

➢ Every 20-30 years the efficiency in agriculture doubles



Why LEMKEN & KRONE together?

- The basis for growing efficiency are automation systems
- Development specialists in the field of grassland and agriculture have combined their forces and competences in this project

➢ „Combined Powers“ – together for „The Next Level in Agriculture Automation“

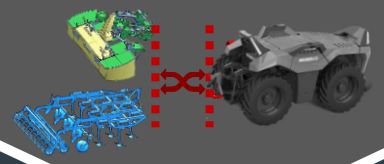
Steps to automization

	controlled	assisted	automated	autonomous
operator:	**controls** the towing vehicle and implement with help of **experience** and **user manual**	**controls** the towing vehicle and implement with help of **experience** and/or **dialog-guided assistance system**	**controls/supervises** the towing vehicle and implement with help of **dialog-guided assistance system, subfunctions are automated**	**monitors the self-optimizing autonomous machine system**

today → tomorrow → future

Combined Powers focus

Process Automation
+ Interface



Navigation/
Obstacle detection

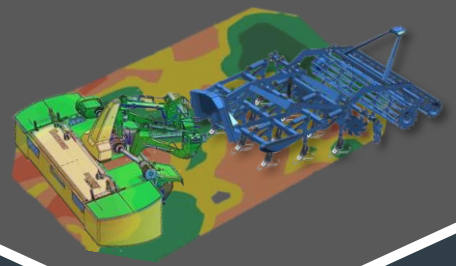
Communication

Communication
Unit

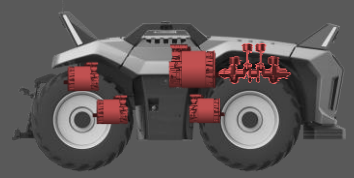
Server

HMI
control

Process Intelligence



Drive train



implement-
Knowhow

Autonomous working process

Track guidance

Environment Monitoring

Traction drive & Engine management

Adaptation of the driving strategy to the work process

TIM extended

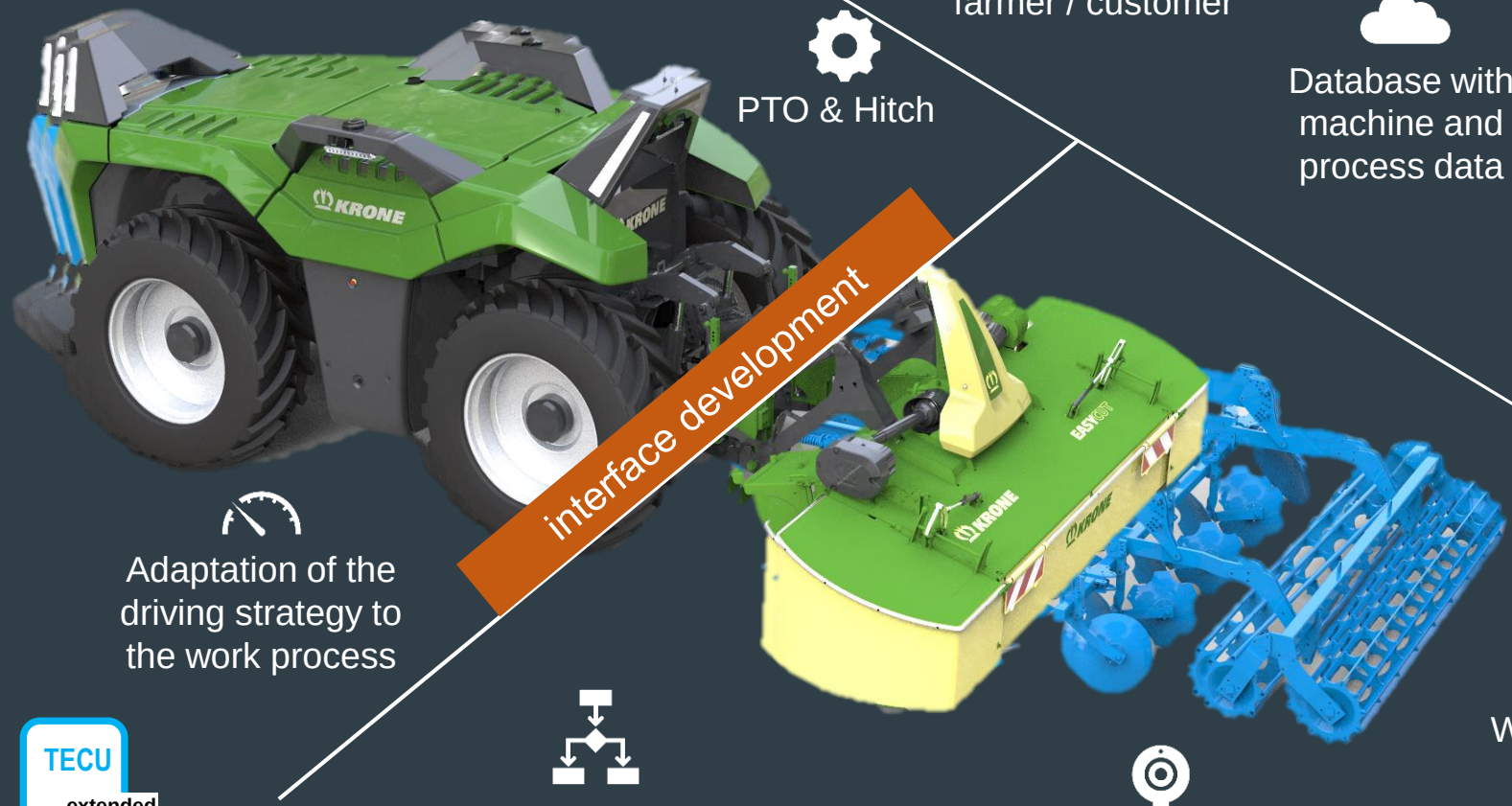
TIM Server

TC-GEO

TC Server

TECU extended

TECU



Optimizing the working process

Work process monitoring

Work process control

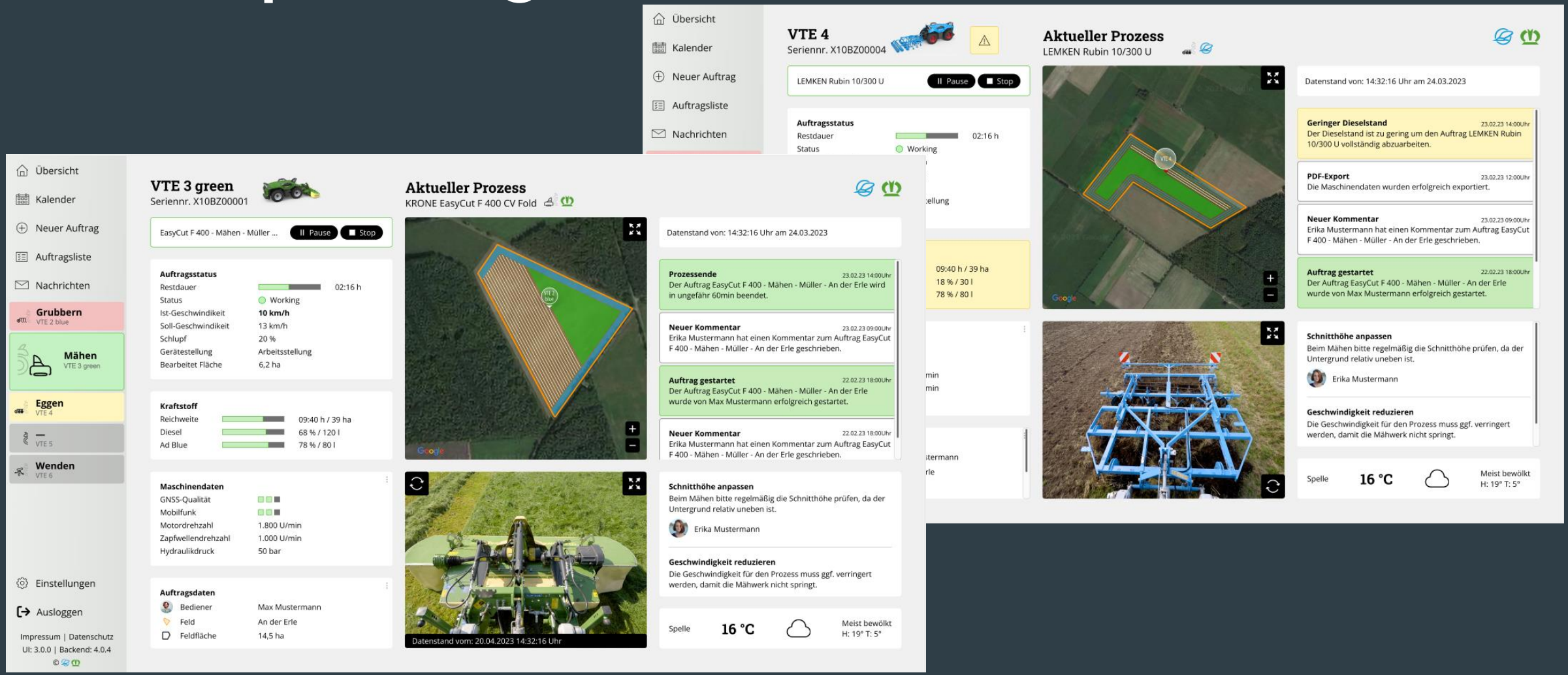
Drive lane and work process planning

Database with machine and process data

PTO & Hitch

Planning, operation, monitoring by the farmer / customer

HMI - planning tool



Summary and outlook

- What is needed:
  - Definition of interface (TIM extended / 2.0, Highspeed ISOBUS…)
  - Enabling communication between implements of different manufacturers
  - Norms and standards for autonomous processes
  - Legal framework and regulation

➢Application-oriented solutions for quick uptake on farms

➢Ecosystems like agROBOfood support innovation and facilitate networking

- Important environmentally friendly practices: avoid compaction, store carbon, future of fuel
- Robotics: Do we need a system transformation or are they helping to deal with existing challenges?

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THANK YOU VERY MUCH!