

Intelligent machinery research

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AGRIForward



FLEXIGROBOTS

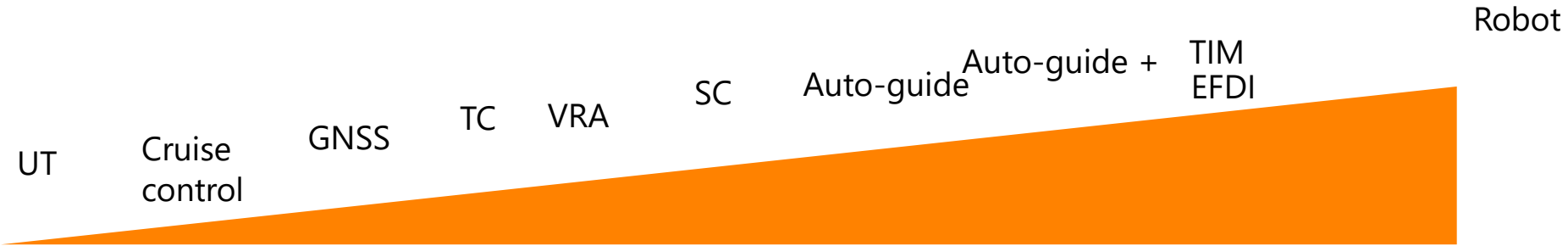


Why Intelligent Machines?

- Why we do things in a bad way?
 - Limits to time, limits to workforce, limits to complexity, cost.
 - We need technology that allows us to do things in a proper way
 - Automatization of smart or intelligent functionality
- Intelligent machinery research seeks to find ways where we can by utilizing intelligent machines, enable new methods (for farming/working) and solve problems**

Objectives of intelligent machine research

1 Increase the level of automation and autonomy



- **Compatibility**
- **Interoperability**
- **Standardization**

Objectives of intelligent machine research

2 Transforming farming plan to robot mission

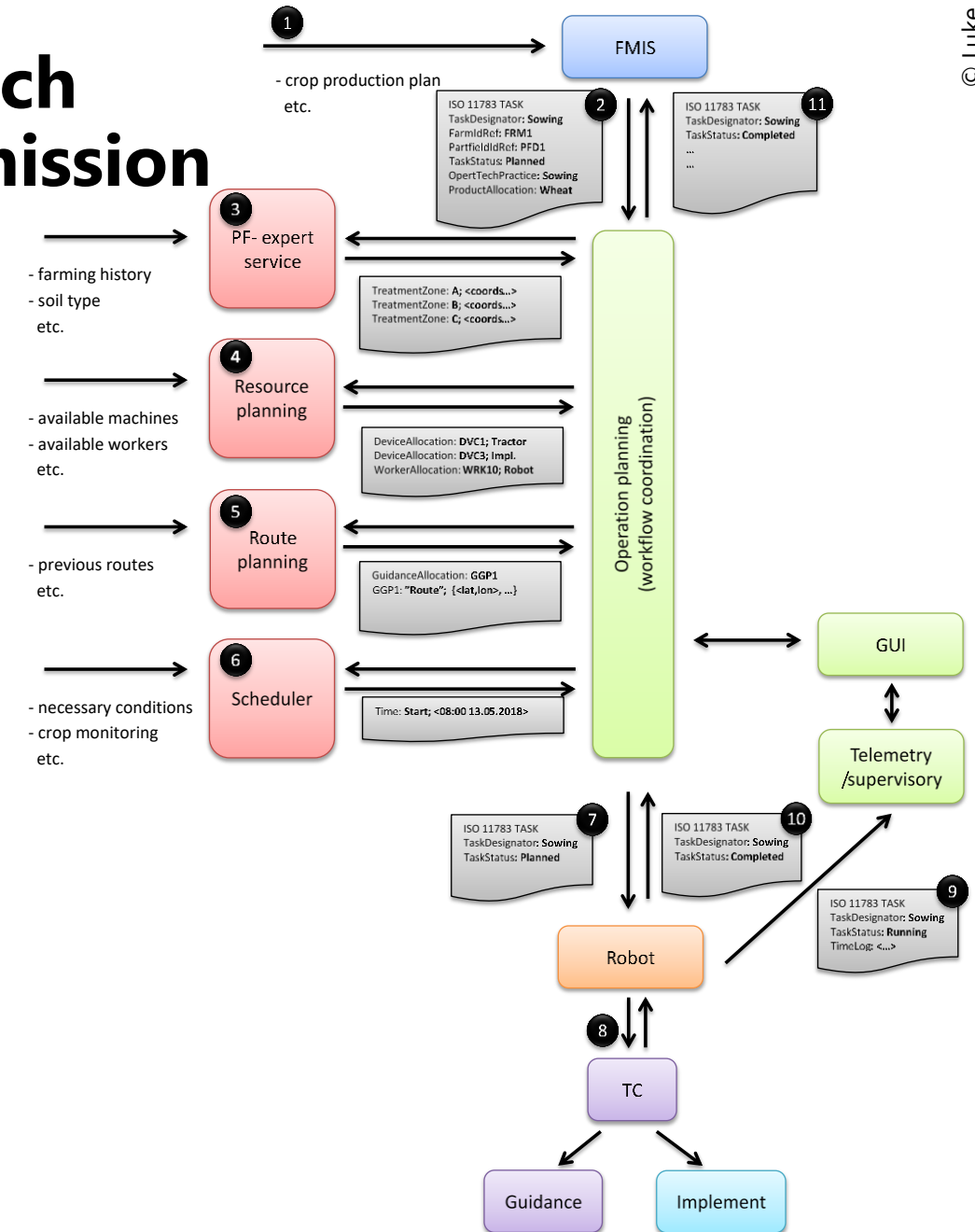
A generic crop production plan needs to be transformed into something that a robot or human operator can do.

The process needs to take into account

- Precision farming principles
- Available equipment
- Environment
- Time constraints

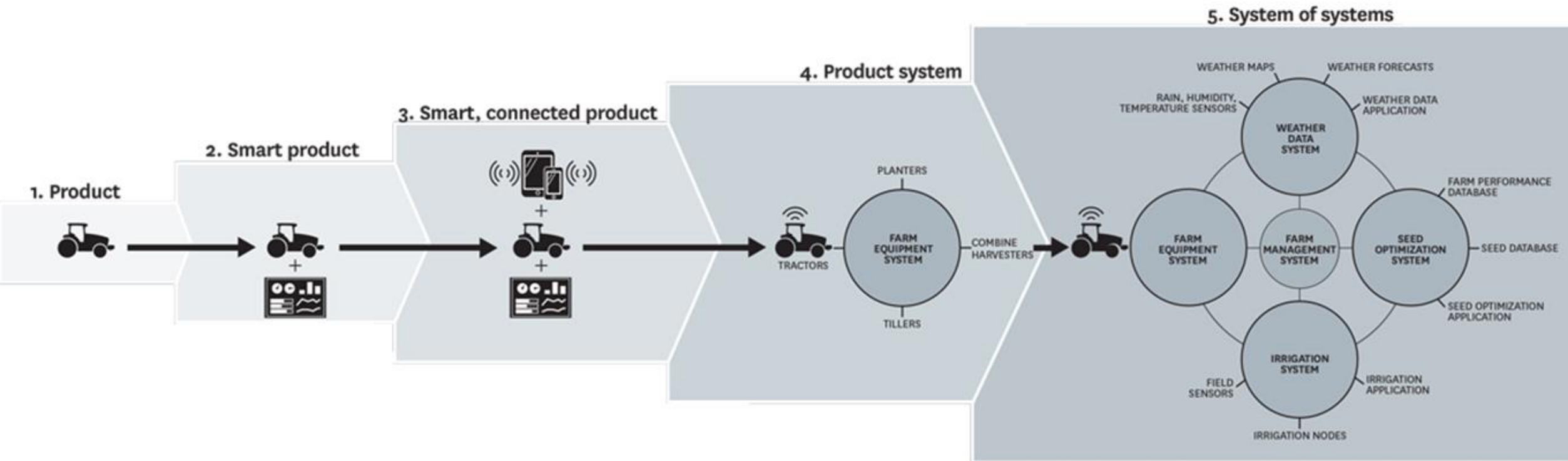
Many farming practices have regional variations.

I might be sensible to build a flexible modular system.



Objectives of intelligent machine research

3 Intelligent machine as a part of farming system



Porter, Michael E., and James E. Heppelmann. "How smart, connected products are transforming competition." *Harvard Business Review* 92.11 (2014): 11-64.

Robot platforms



Walker – robot tractor

- Autonomous tractor modified from Valtra N135D
- Equipped with external sensors (2x 3D Lidar, stereo-camera) for obstacle detection etc.
- Utilizes ISO 11783 (ISOBUS) and ISO 5231 (EFDI) standards for task description and communication internally and externally
- Sensor package updated in 2025-2026



Video: <https://youtu.be/5kC69fpIN5k>

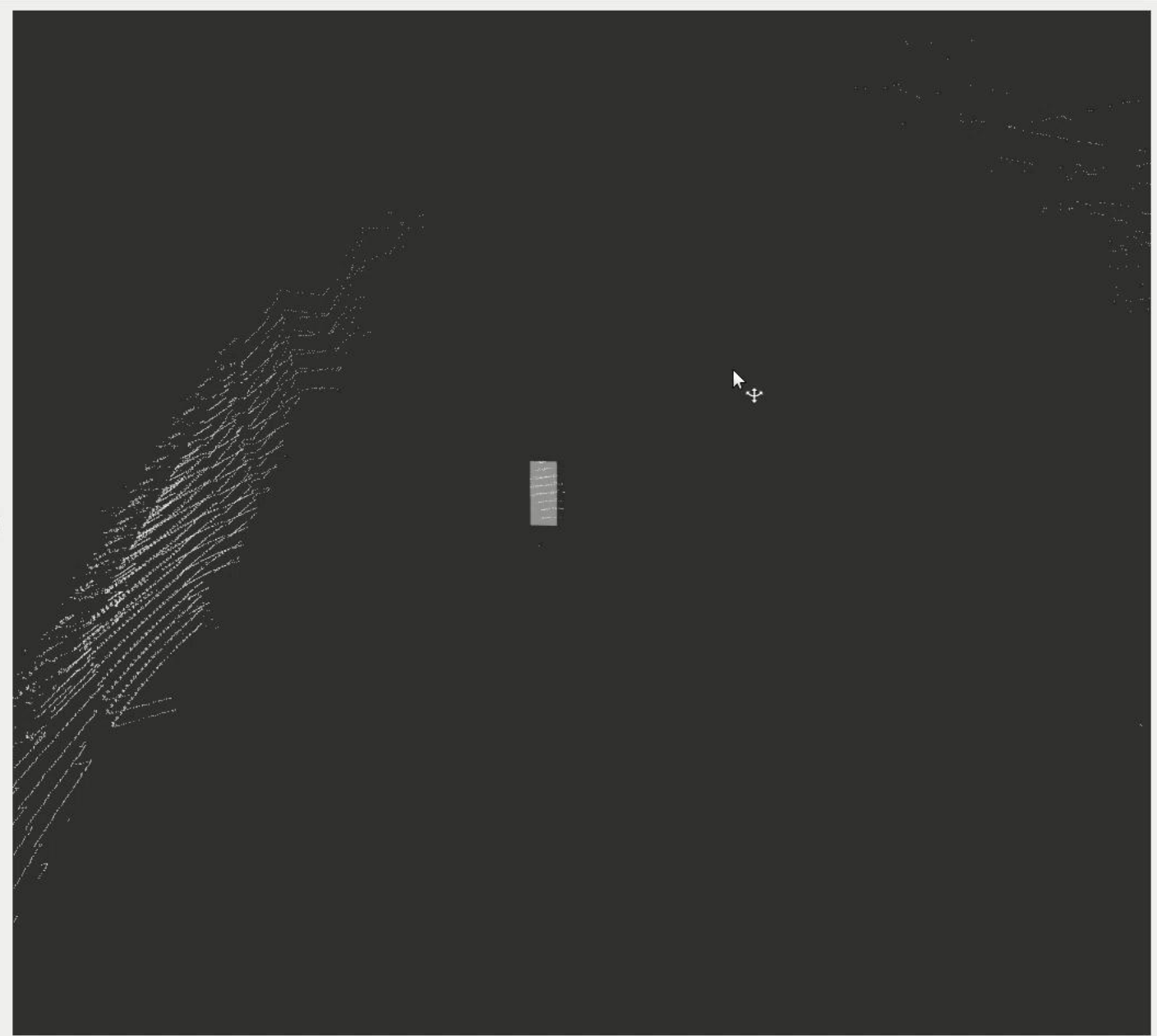
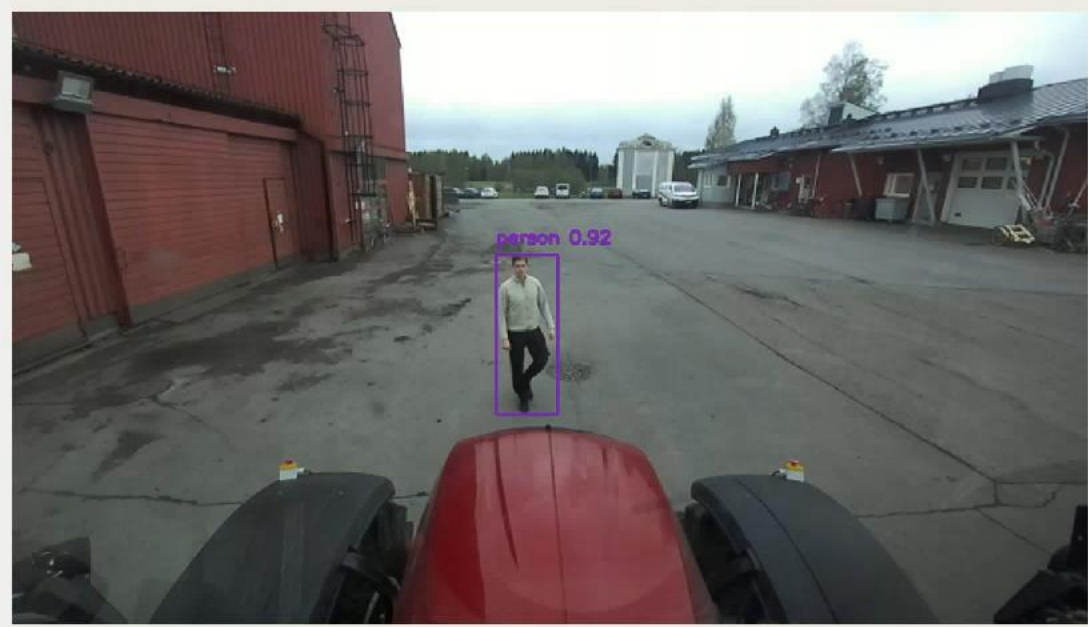


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TURO – mid size robot platform

- Electric powered modular robot platform for various field operations made by Luke
- Utilizes ISO 11783 (ISOBUS) and 5231 (EFDI) standard for task description and communication internally and externally
- Utilized as a base for specialized robots
 - Spreading
 - Strawberry picker





Strawberry picking



Full video: <https://youtu.be/CLv2w71e8lA>

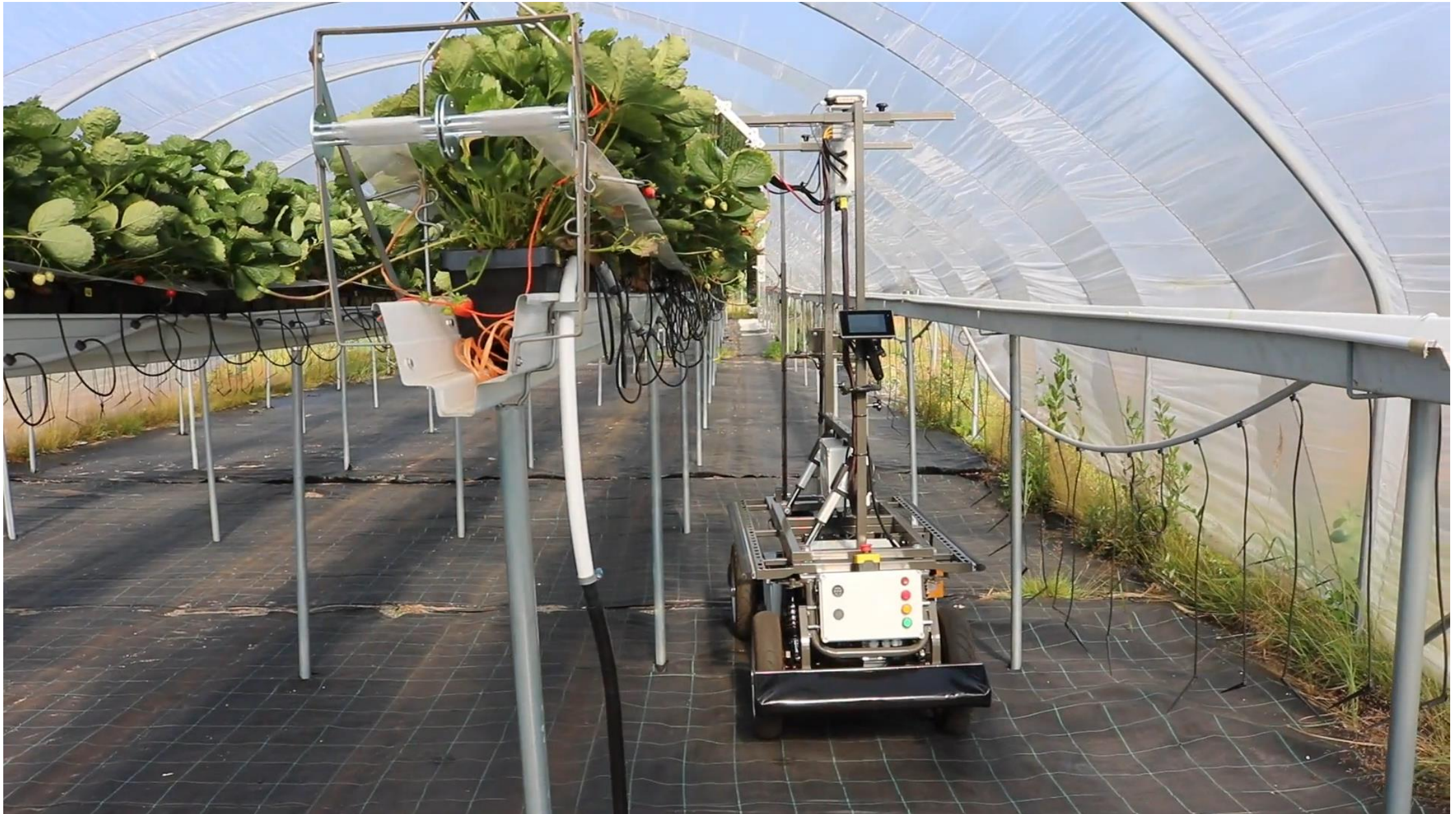
AKI – small size robot platform

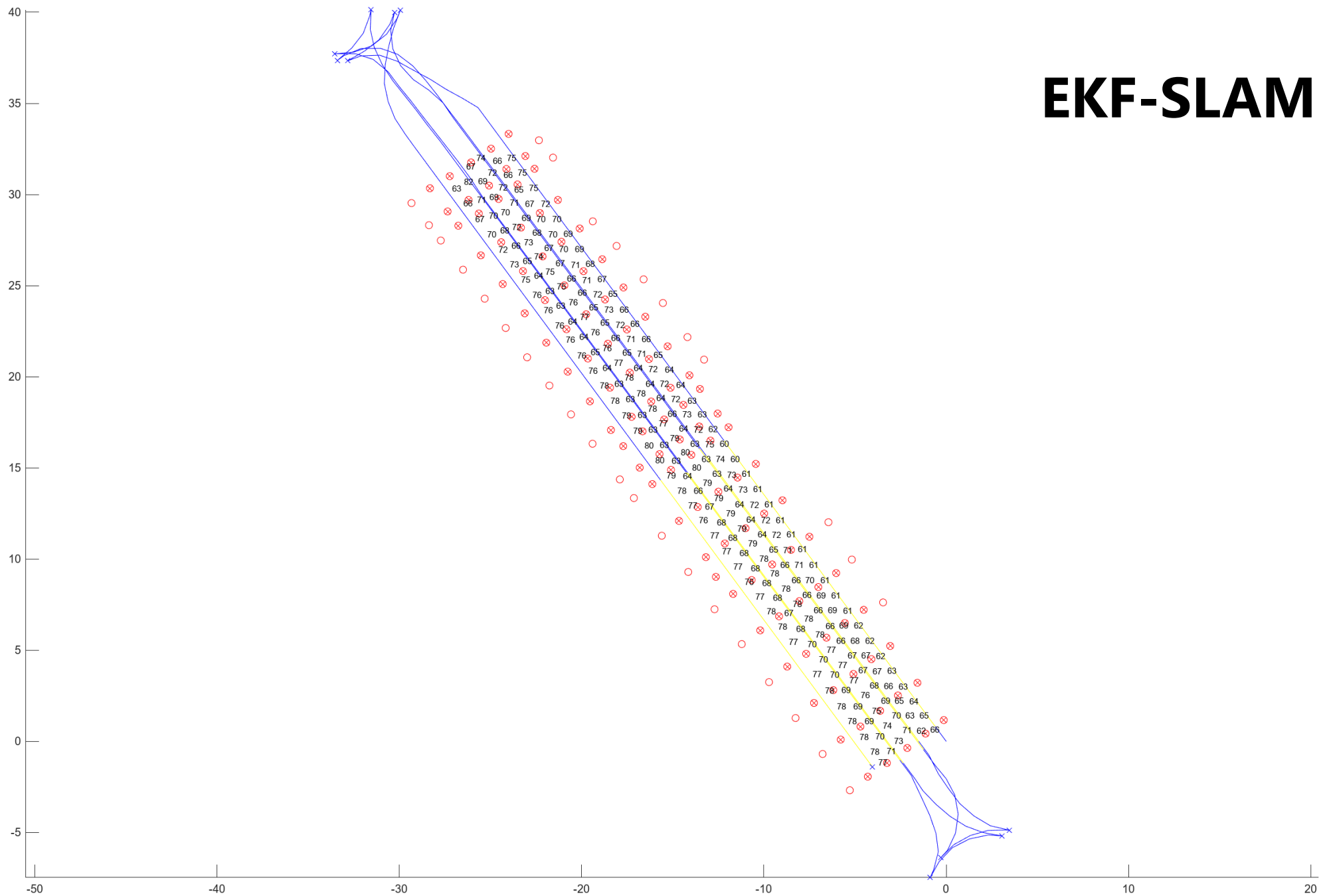
- Similar to TURO but smaller physical size
- Used as a base for operations in small and confined spaces
 - Produce transport
 - UVC treatments for strawberry growing in tunnels



UVC-treatment

Full video: <https://vimeo.com/865526964>





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