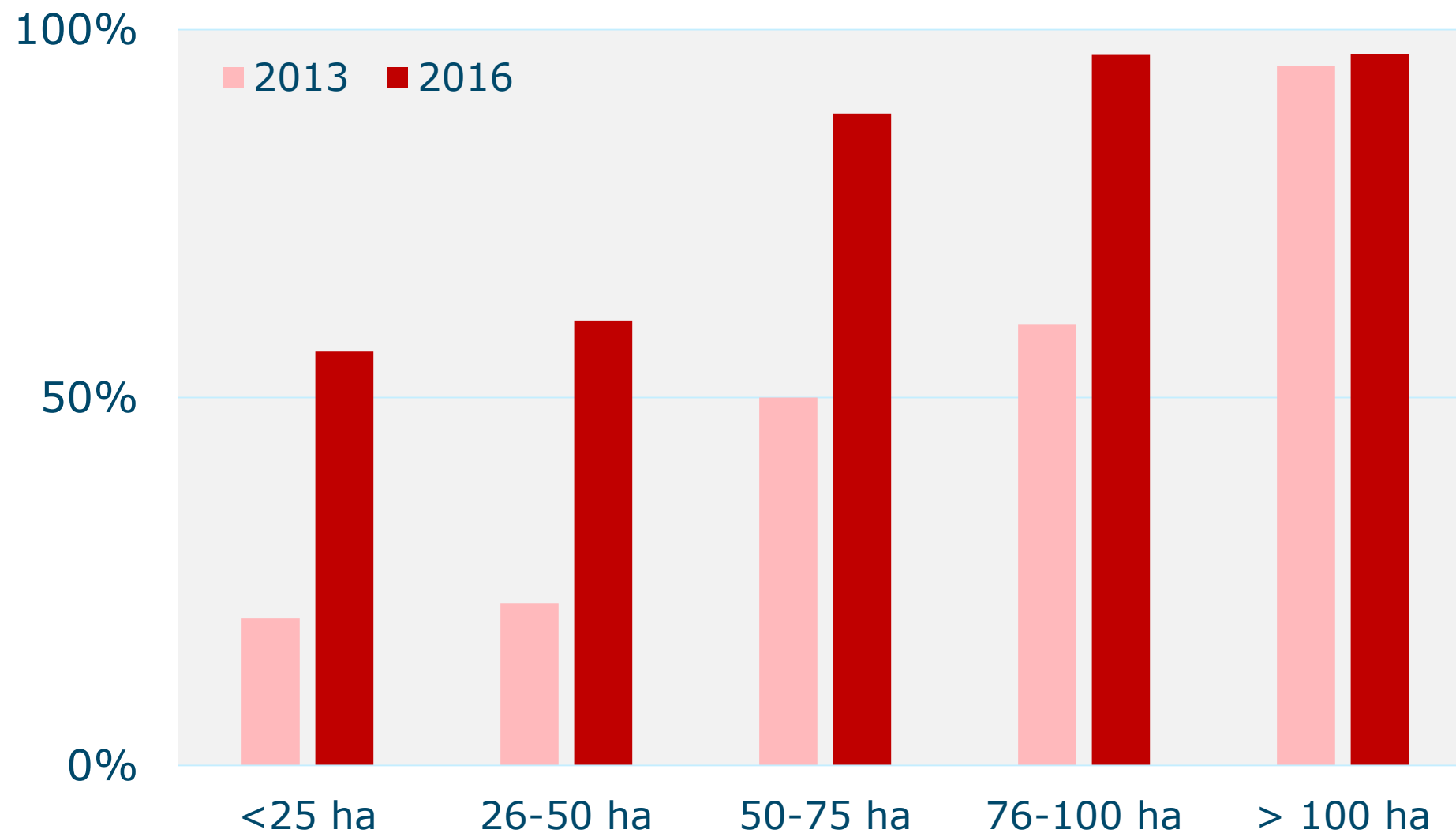


# Agriculture Panel Discussions Results Summary

## EGNSS User Consultation Platform Plenary

4<sup>th</sup> December 2018



## MACHINE GUIDANCE ADOPTION IN NL

# Agenda

- Highlights of Main Trends in the Market
- Recommended Refinements of User Requirements
- User Requirements for New/Emerging Applications
- Research and Innovation Priorities
- Discussion on Enhanced EGNSS Services
- Feedback on Back-up PNT Solutions

# Highlights of Main Trends in the Market

- **Agriculture 4.0: GNSS an integral part of the new digital agri era**
  - Connectivity between different sensors, machinery
  - Big Data, robots, integration with EO, IoT context, ...
  - Key challenge: Integration of the different data together and translation of this “data package” into actionable information
- **Use of UAVs in Agriculture**
  - Long-endurance units have the potential to transform mapping in agri
  - HAPS
  - Exploitation of 5G in agri-solutions will likely be important in the near future
- **Vertical Farming and inter-cropping**
  - Increasing tendency

# Agriculture 4.0





# UAVs in agriculture







# Vertical farming // Intercropping





# Recommended Refinements of User Requirements

- Lively discussion on « **terminology** » requirement
  - For example,  $10^{-3}$  integrity requirement does not resonate with users
  - Speak more the language of the user
- **Repeatability** needs to be included
- **Accuracy** to be considered as absolute values on average of 95%
- **Vulnerability** to spoofing and jamming needs to be better reflected
  - **Authentication** of position discussed in specific contexts (e.g. geotagged photos)



# ***WHAT IS THE MEANING OF THE TERM integrity***

**... and how to pronounce it ?**



An aerial photograph showing a large flock of white birds, likely sheep, gathered in a field. A red tractor is visible in the lower right corner, moving through the field. The field is divided into two sections by a dark line, possibly a fence or a path. The text "PASS TO PASS ACCURACY (within 15 minutes)" is overlaid on the bottom of the image.

**PASS TO PASS ACCURACY (within 15 minutes)**





**REPEATABILITY in ACCURACY**





**VULNERABILITY for JAMMING/SPOOFING**







# User Requirements for New/Emerging Applications

- **Geotagged photos**
  - Authentication
  - High-accuracy (sub-metre)
- **Internet of Things related applications**
  - Data has to be translated into information
- **Farm Management Tools**
  - Task Management → interoperability / fusion of heterogeneous multiple data
  - Logbooks → evidence for compliance (reliability)
- **UAV applications**
  - High-accuracy (dependent on the case)



GEOTAGGED PHOTO





INTERNET OF THINGS

# Research and Innovation Priorities

- **Synergies with other initiatives**

- Public-Private-Partnerships: e.g. EITs, JTIs, JPIs
- Copernicus
- Partnership for Research and Innovation in Mediterranean Area

- **Cross-project coordination**

- Cross-fertilisation / lessons learned sharing

- **EGNSS Differentiators**

- Authentication
- High-Accuracy

- Focus on **awareness-raising**

- Educate the educators/train the trainers



# Discussion on Enhanced EGNSS Services

## **ARAIM**

- No awareness in the agriculture sector

## **High Accuracy Service**

- Attractive option in the context of agriculture
- Available solutions for free via NTRIP
- Cost not a driver. Performance much more important.

# Discussion on Enhanced EGNSS Services

## Ionospheric Prediction Service

- Farmers are already monitoring weather related data and forecasts
- If offered within “combined information package” (i.e. through API) it would be useful for agriculture in specific contexts
  - Potential, for example, to join forces with CAMS
- Directly tied to solar activity – i.e. more relevant during peaks
- Examples of applicability: Auto-guidance stopping when certain thresholds exceeded
- Less applicable if you are working on tight schedules, e.g. Paying Agency controls will shift to RTK options



# Feedback on Back-up PNT Solutions

- Not feasible to get same level of accuracy with back-up solutions
- Low awareness on vulnerability
- High-value crops – farmers would stand still until problem fixed



# Precision agriculture without GNSS





# Thank you !