

## Space Data Milking Advanced Application of SAW IDENT in Livestock Farming



With support from



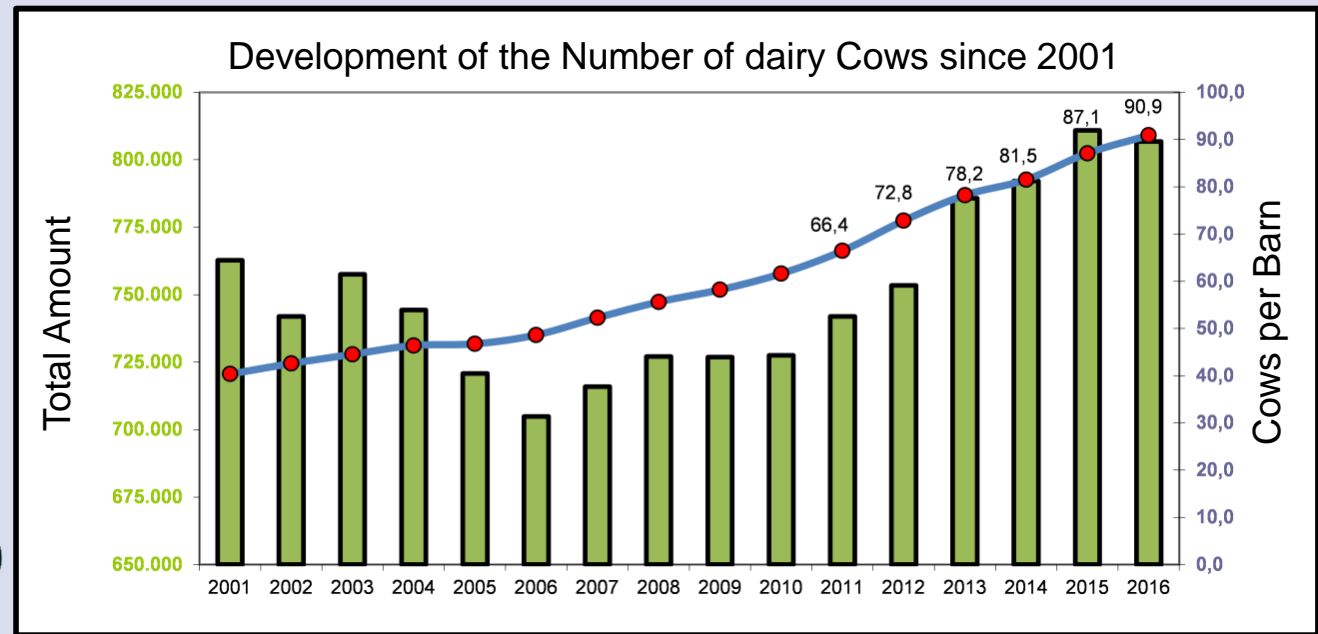
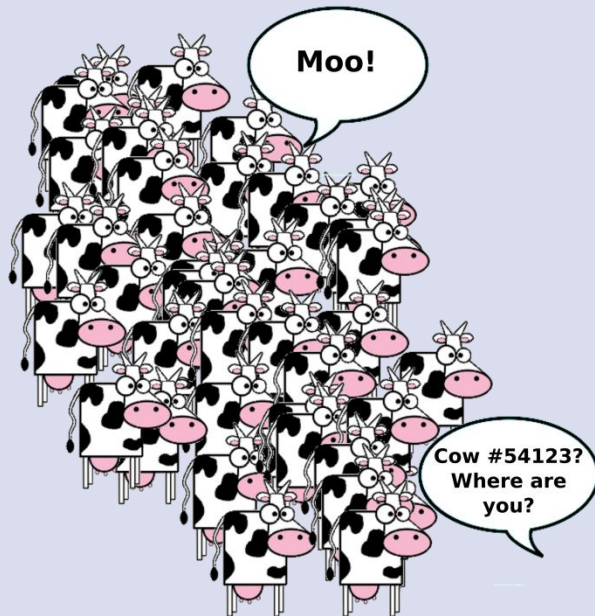
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German Bundestag



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LANDWIRTSCHAFT  
UND GEOLOGIE



## Introduction



Source: Landesvereinigung der Milchwirtschaft Niedersachsen e.V.

- Increasing Milk Request = Enlarged Herd Size
- How to Farm Economical and Care About Welfare of Individuals?

➔ COW IDENTIFICATION AND POSITIONING SYSTEM

## ***Challenges in Agriculture***

- Dirty and Dusty Environment
- Curious and Playful Cows
- Ammoniated Atmosphere
- High Humidity

## History: SAW Animal Location

- 2008 – 2011 **Agro-SAW Ident (ASI)**
- 2012 – 2015 **SAW Animal Location (STO)**
- 2016 – 2019 **Space Data Milking (SDM)**



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## SAW Transponder



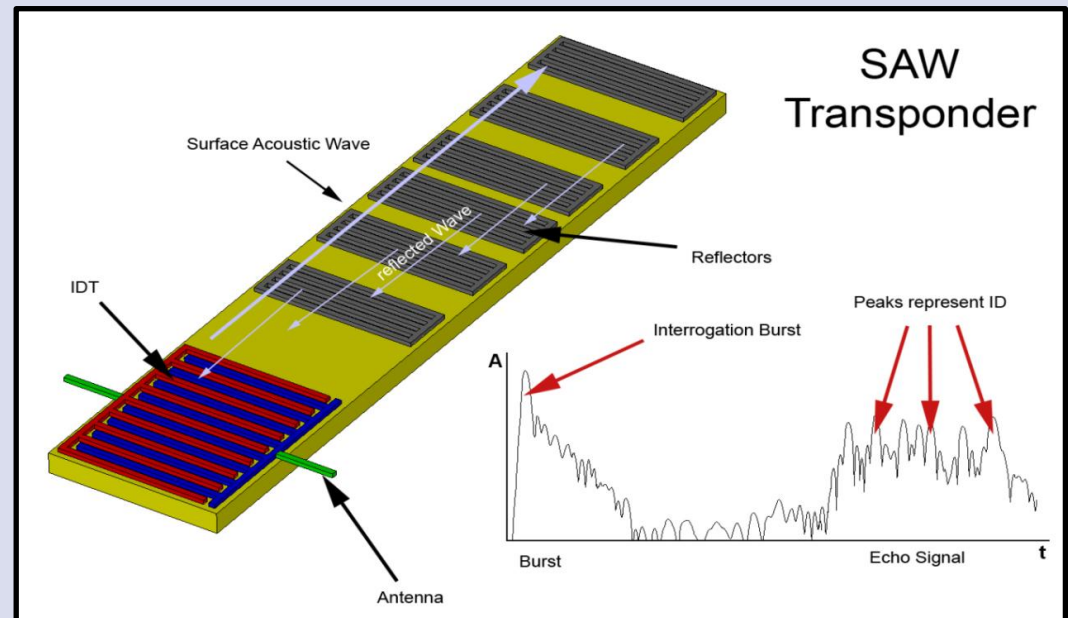
Passive SAW Transponder



ISM Band 2.4 GHz



Coded Delay Line



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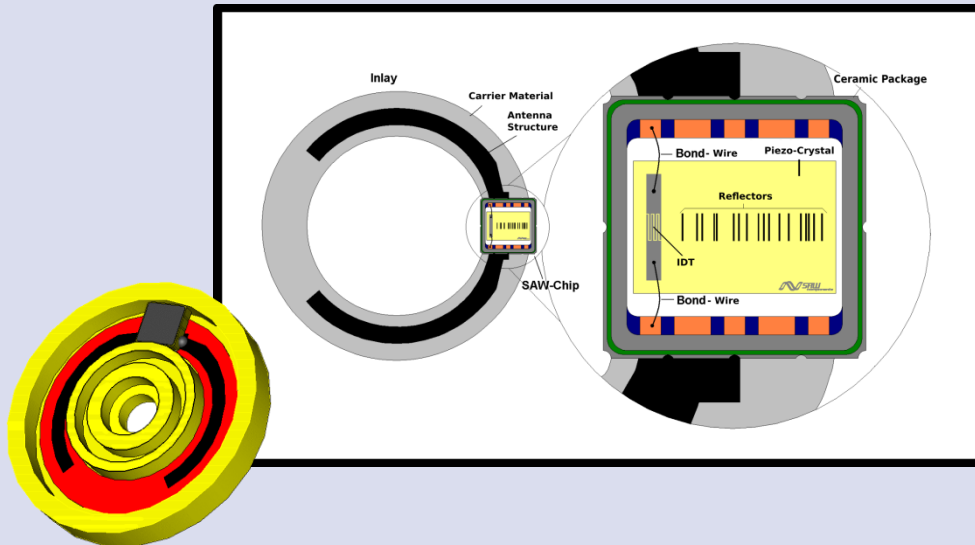
## ***Agro SAW Ident - Motivation***

- Low Detection Rate of Existing Animal Identification Systems
- Animals Need to Stop at Gates
- Short Reading Distance  $\leq 30$  cm



## Agro SAW Ident

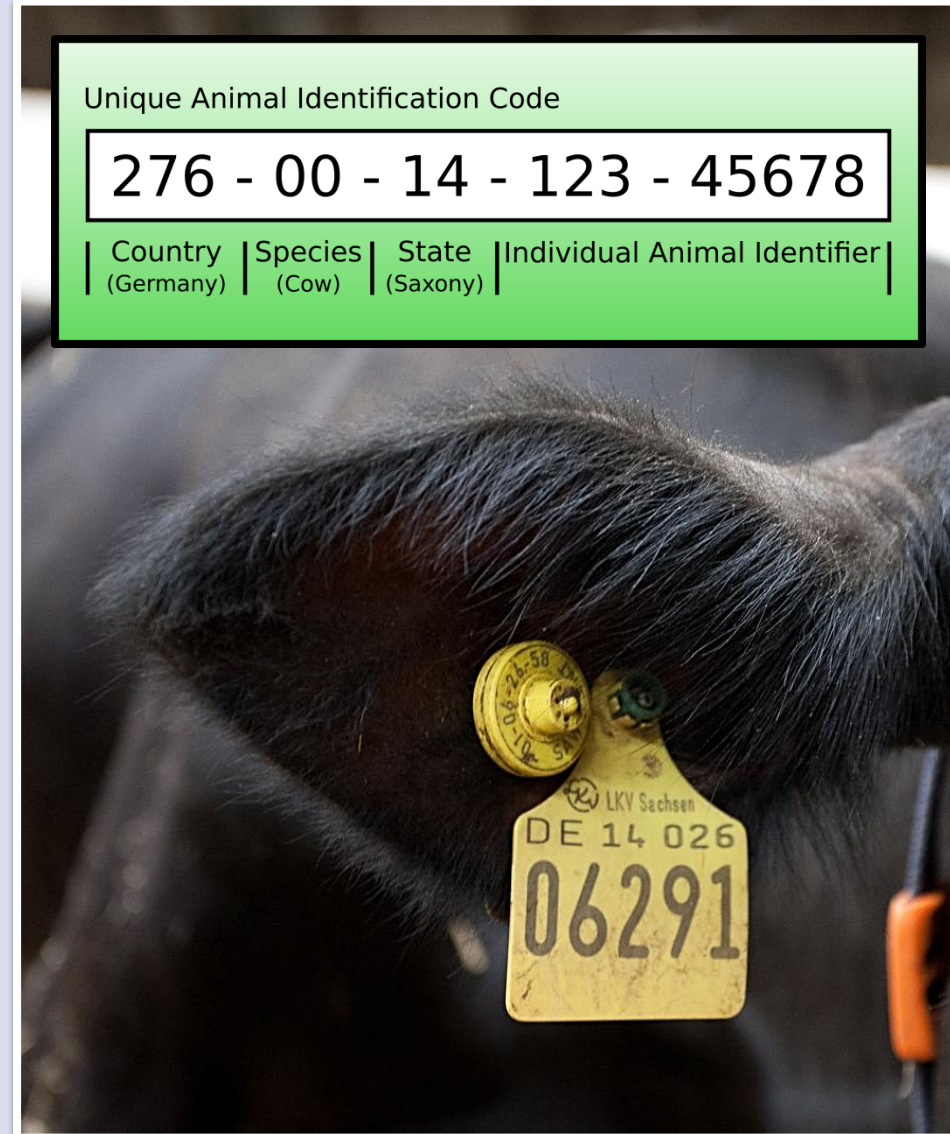
- International Unique Animal Identification Code
- 50-Bit SAW Transponder



Unique Animal Identification Code

276 - 00 - 14 - 123 - 45678

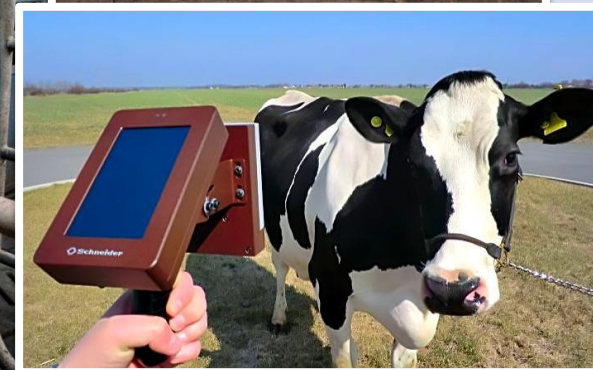
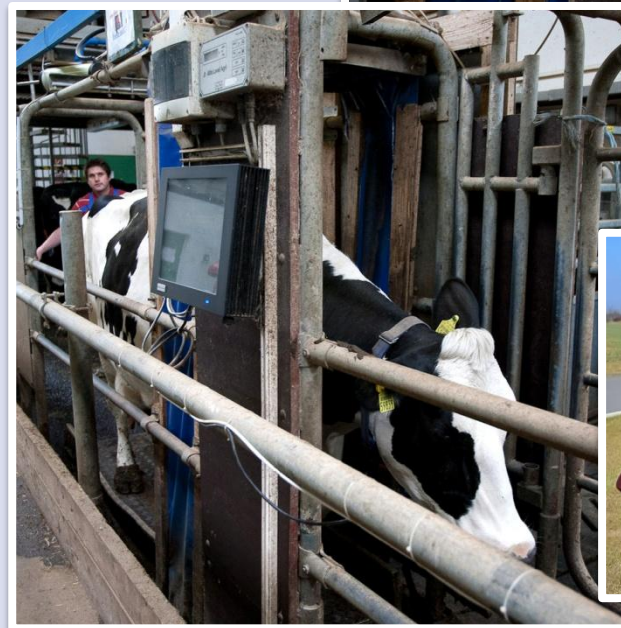
Country (Germany)	Species (Cow)	State (Saxony)	Individual Animal Identifier
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## Agro SAW Ident

- Local Tracking Key Positions  
e.g. Gates
- Reading in Movement –  
No Need To Stop the Cow
- Mobile Reading for  
Personnel



## Agro SAW Ident - Conclusion

- Successfully included SAW Transponder into Ear Mark
- Enhancement of Reading Distance ~ 3 Meters
- Restricted Access to Market due to Legal Frequency Regulations



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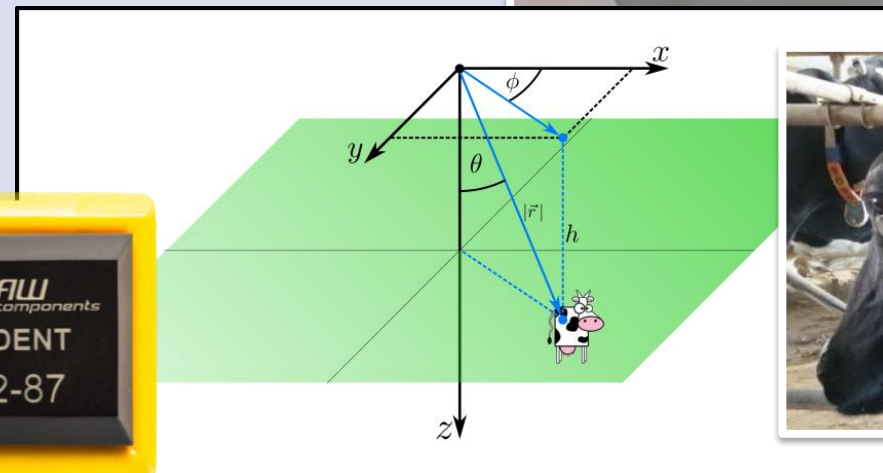
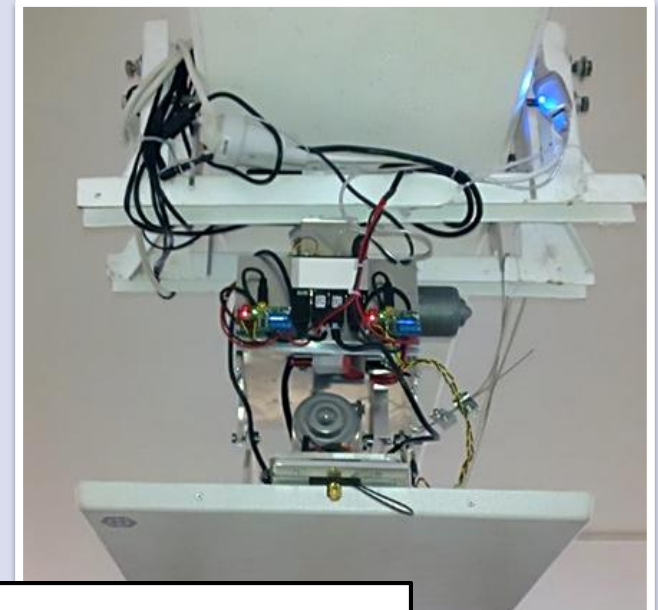
## *SAW Animal Location (STO) - Motivation*

- Animal Location System for Indoor Tracking
- Not Restricted by Law
- Finding and Tracking of Cows – Individuals and Herds
- Creating Motion Profiles for Individual Cows

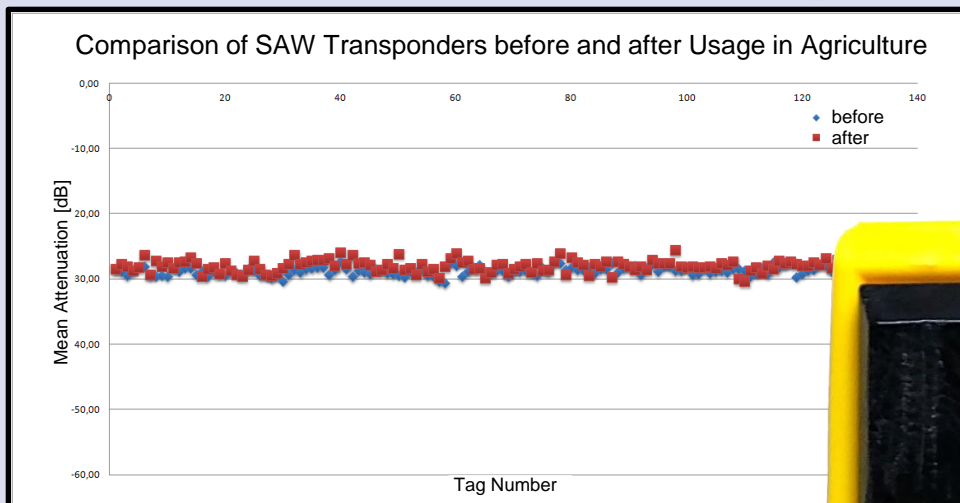


## SAW Animal Location (STO)

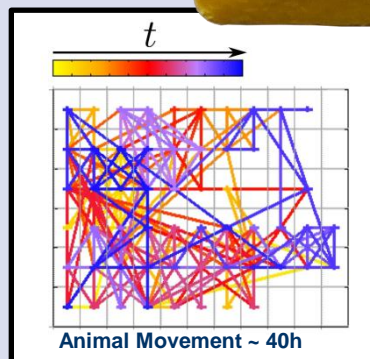
- Mechanically Movable Antenna
- Localization of Animals within a Spherical Coordinate System
- New Impact-Resistant TAG for Neck-Mount



## SAW Animal Location (STO)

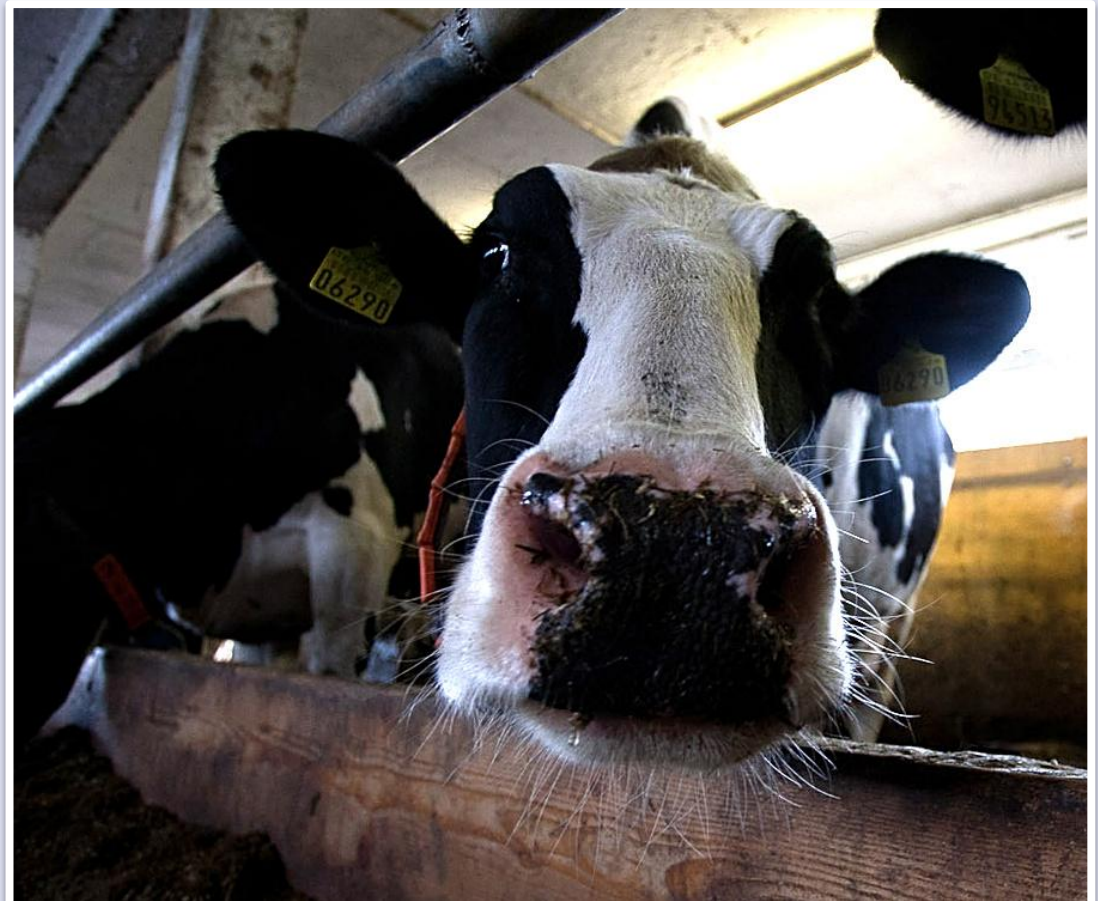


- No Degradation after Multiple Years of Field Testing



## ***SAW Animal Location (STO) - Conclusion***

- High Reading Distance  
~ 15 Meters
- Limitations by  
Mechanical Antenna
- Time and Space Data  
Requires Further Evaluation



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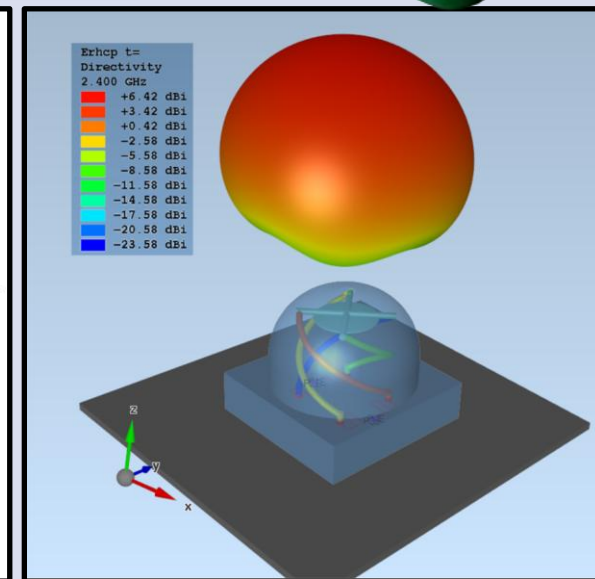
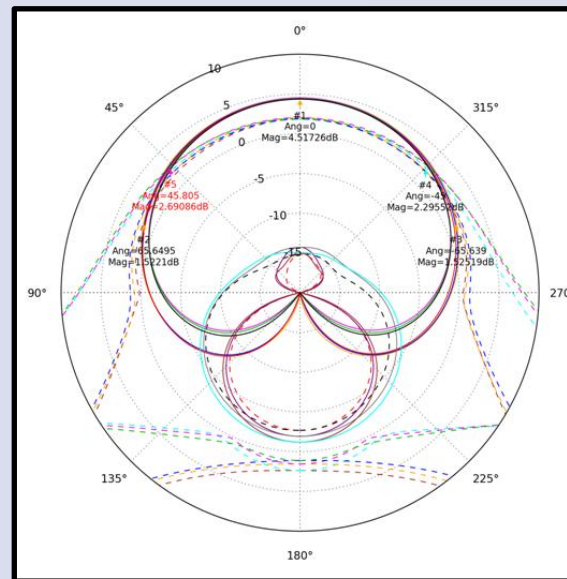
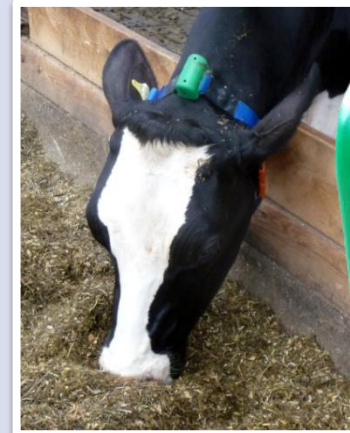
## ***Space Data Milking (SDM) - Motivation***

- Big Data Approach
- Detecting Fitness and Heat
- Integration in Cattle Management Software (HERDE)
- Extention to Machinery and Staff
- Combination with Sensors



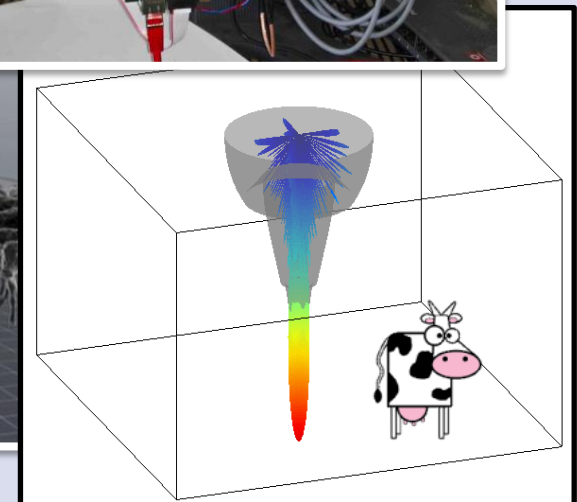
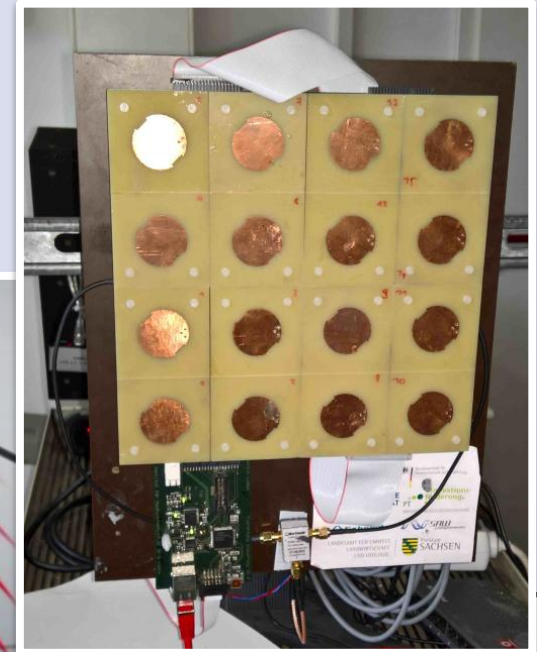
## Space Data Milking (SDM)

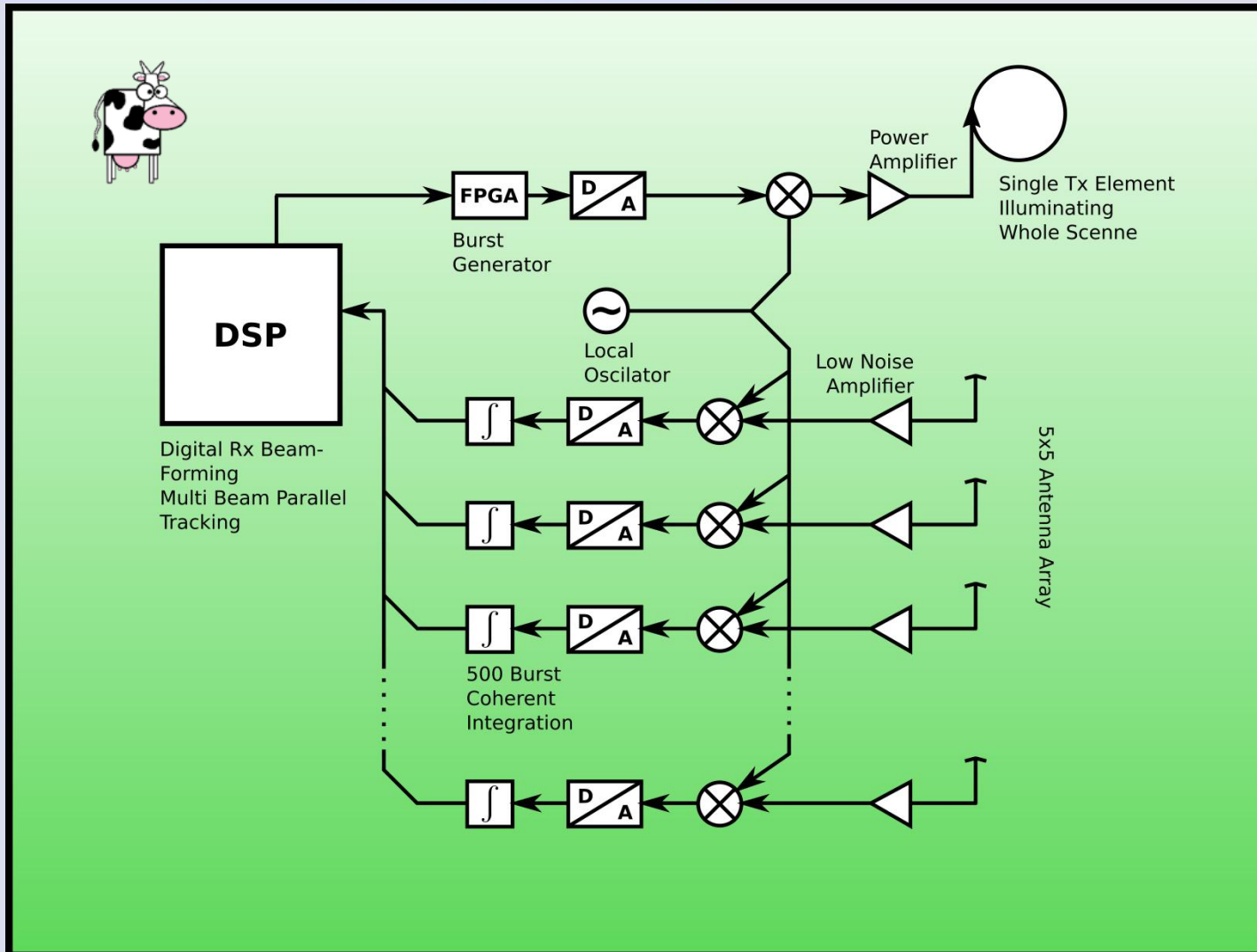
- Developement of a Helical Circular Polarized Antenna
- Less Angular Dependency
- Higher Range Expected
- Use of only one Tag per Cow



## Space Data Milking (SDM)

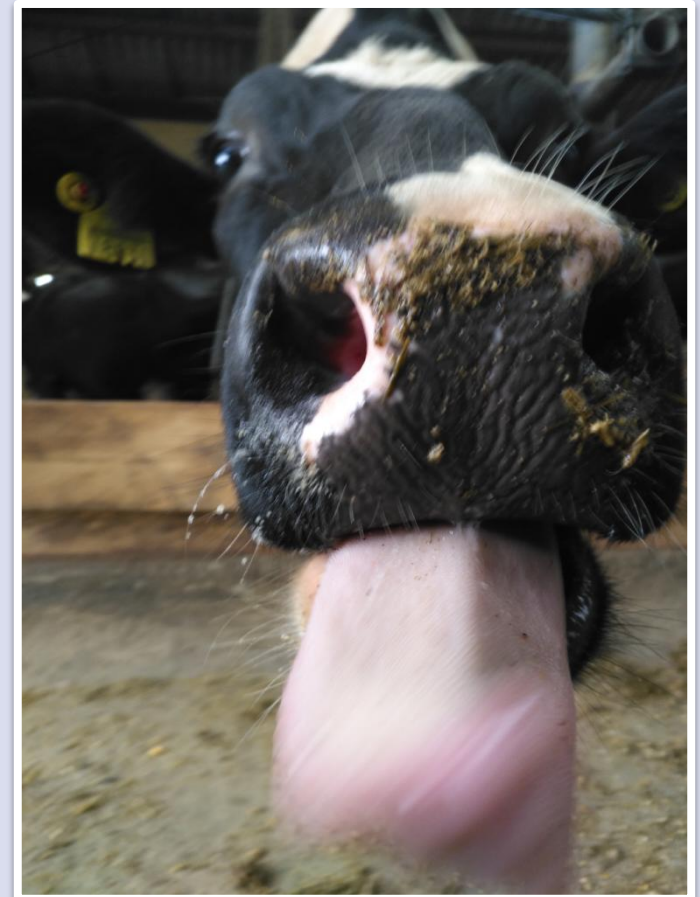
- Phased Array Electronic Movable Beam Steering Antenna
- Fast Scanning
- No Mechanical Moving Parts





## *Space Data Milking (SDM) - Conclusion*

- SDM Addresses Evaluation and Utilization of Data for Farmers
- Improved Scanning Speed  
→ Real Time Tracking
- Integration Into Cattle Management Software → Online Surveillance





**Thank You for Your Attention!**

Gefördert durch:



Bundeministerium  
für Ernährung  
und Landwirtschaft



Projekträger Bundesanstalt  
für Landwirtschaft und Ernährung

aufgrund eines Beschlusses  
des Deutschen Bundestages

The project is supported by funds of the Federal Ministry of Food and Agriculture (BMEL) based on a decision of the Parliament of the Federal Republic of Germany via the Federal Office for Agriculture and Food (BLE) under the innovation support programme.

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Gefördert durch:



Bundesministerium  
für Ernährung  
und Landwirtschaft



Projektträger Bundesanstalt  
für Landwirtschaft und Ernährung

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des Deutschen Bundestages



**RSSI GmbH**  
Radio Sensor Solutions

