

# Unleashing Benefits of Satcom for Agriculture



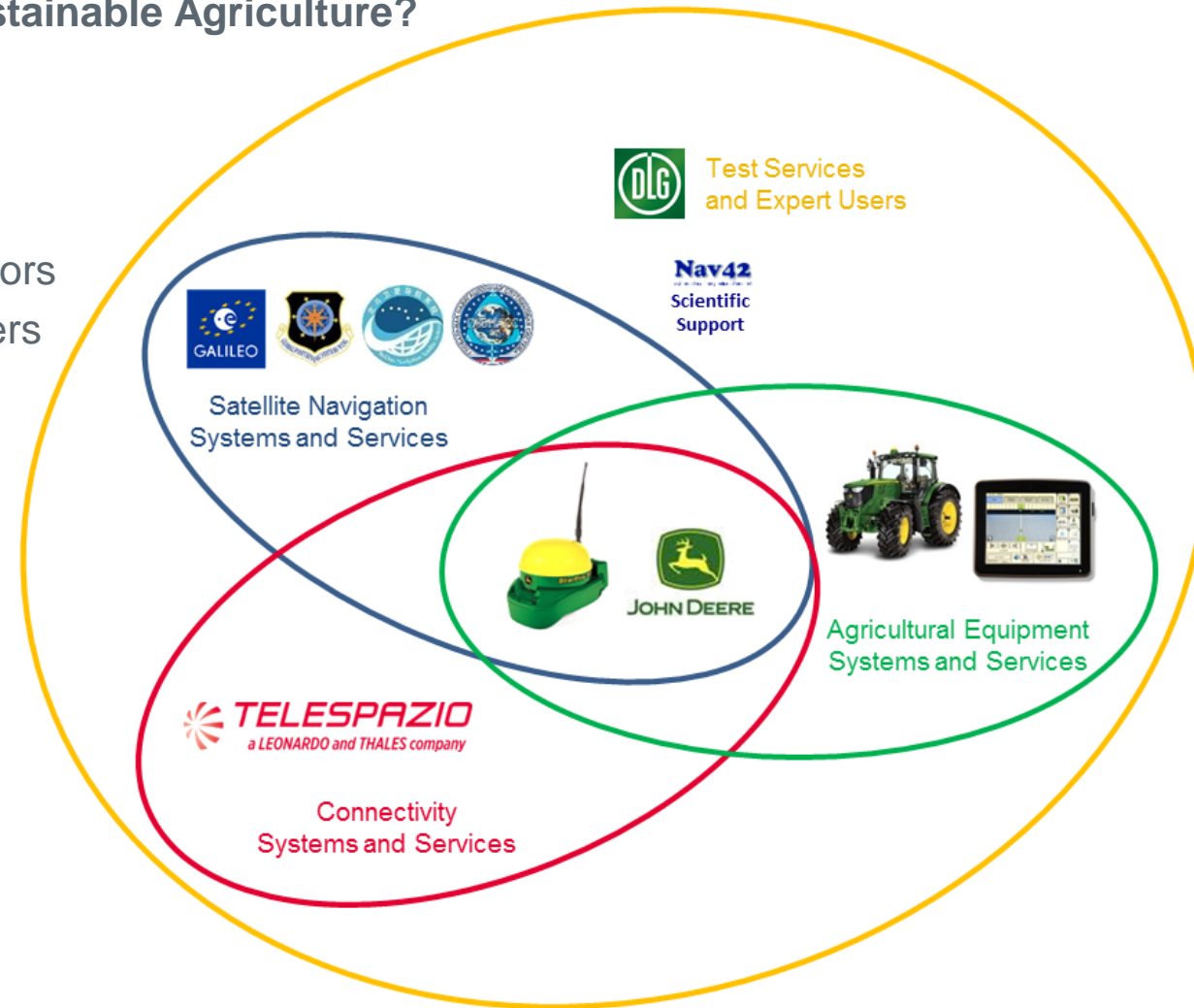
Space Solutions for Sustainable Agriculture, Berlin, 25. January 2023

Osman Kalden

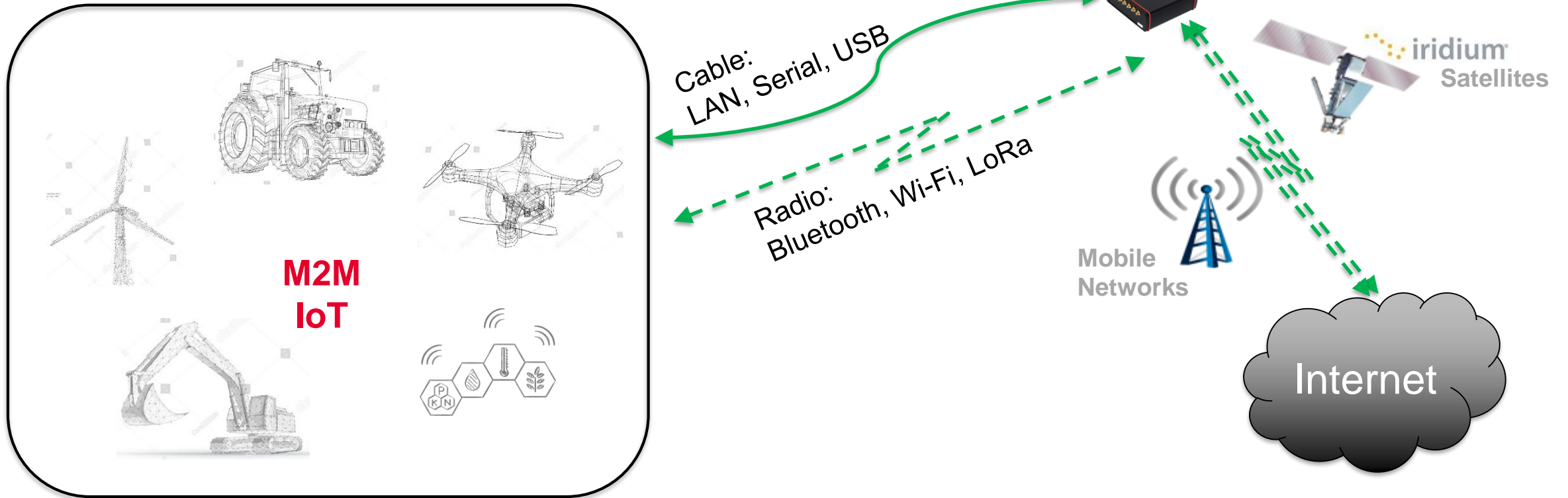
## Question: how can Telecommunication Satellites support sustainable Agriculture?

### ESA Business Applications Programme (former IAP)

- Telespazio Germany, German Agricultural Society, John Deere
- 2014 – 2015 Feasibility Study “agriloc”
  - **Yes:** Hybrid SAT/LTE Modem, for Machinery and Field Sensors
  - **Yes:** Broadband Internet connection via Satellites, for Farmers
- 2016 – 2018 Demonstration Project “agriloc”
- 2018 on Telespazio Germany product development



# Intelligent Hybrid Modem (IHM)



## New Telespazio SPA Products



### TPZ-Air, TPZ-IoT

Messaging  
Modules: Satcom, GNSS, LTE, IMU  
Interfaces: USB, Wi-Fi, Bluetooth  
Battery

### TPZ-Air100, TPZ-IoT100

Two way IP-Data, 22/88 kbps up/down  
Satcom, GNSS, LTE, IMU, LoRa  
Interfaces: USB, Wi-Fi, Bluetooth, CAN, Serial

### TPZ-Avio100

Two way IP-Data, 22/88 kbps up/down  
Modules: Satcom  
Interfaces: USB, Wi-Fi, Bluetooth, Serial  
RTCA DO-160G



## Potential of Satcom; benefits and applications in food production

- Broadband Internet connection via Satellites, for Farmers
  - Where cable and mobile coverage is insufficient or not available but agriculture is at home (rural regions, in the field)
  - Speeds comparable to cable Internet
  - Costs comparable to a smartphone
- Giving farmers access to resource-saving, environment-friendly, productivity-increasing technologies such as
  - Precision Farming
  - Farm Management Systems
  - Online Consultancy, Field Analysis Services



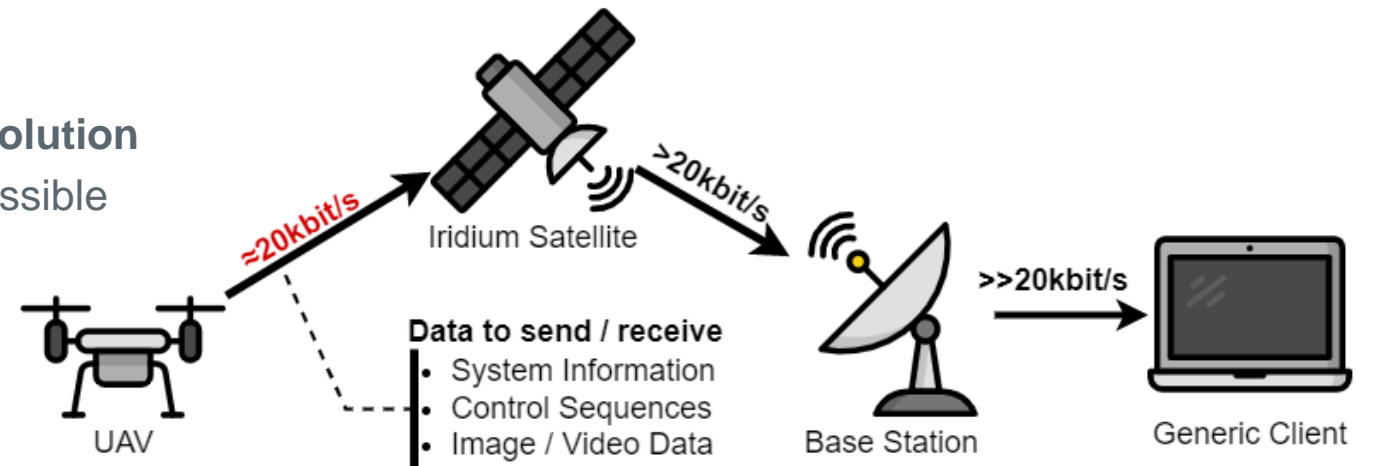
## Ultra-Low-Band Video Streaming

- **Why Ultra-Low-Bandwidth**

- Typical HD home movie streams use data rates of about 5 Mbps
- Easily done via Satellite, with a static terminal and 1 m parabolic antenna
- But, the data rate limited to a fraction of this, with small, light, low-power Satcom devices, in motion

- **Benefits of the Ultra-Low-Band Video Streaming Solution**

- Video streaming in motion via satellite becomes possible
- Even if no mobile network is available
- The Satcom device, can be small, low-cost
- More data can be transmitted at less cost



- **Use Case Examples**

- Autonomous / Remotely Piloted Agricultural Machinery, Drones
- Remote inspection, support, maintenance, data collection, field survey
- Drone operation beyond mobile network reach, beyond visual line of sight

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## We are getting 5G, do we still need Satcom?

- Satcom is not a replacement for 5G
- 5G is not a replacement for Satcom
  
- Where 5G is not available, Satcom is still available
- Satcom coverage is global, covers fields, rural areas, not dependent on local base stations
  
- 5G's strengths are high bandwidth, low latency, and low cost
- Satcom's strength is its immediate global availability and no need for long-term infrastructure deployments and investments

**Hybrid Communication**, combining 5G, Satcom, local networks (e.g. LoRaWAN), ground infrastructure is the only way to meet the intensive telecommunication needs of digitalization, automation, remote and autonomous operations

- Precision Agriculture, Digital Farming
- Digitalisation of the whole food chain
- Autonomous agricultural machinery and drones
- Environment protection targets





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## Benefits of Satcom as part of a global telecommunication ecosystem for a more sustainable food production

### Satcom

- Extends availability of broadband Internet and mobile networks
- For farmers, field sensors, machinery, and drones in the field, in rural, remote regions
- Enabling sustainable food production globally
- By making all farmers, worldwide, technologies for sustainable food production accessible
  - Precision Agriculture
    - Precision seeding, spraying, manuring
    - Using farm inputs only so much as needed, where it is needed
    - Saving resources, farm inputs, increasing productivity and product quality, minimizing impact on the environment
  - Autonomous and remotely piloted agricultural machinery and drones
    - Reducing stress on farmers, making food production an attractive working environment
    - Enabling use of drones, robots, autonomous vehicles in farming, saving fuel, reducing emissions



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## Video Streaming in Motion / in Flight via Satellite at 22 kbps

Original  
HD  
2.000 kbps



Ultra-Low-Band  
320 x 180  
22 kbps



Reference: Gabriel Posch, "Landwirtschaft in der Steiermark 2021 / Dji Mavic Mini Drohne", youtube

# CONTACTS

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THANK YOU  
FOR YOUR ATTENTION

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