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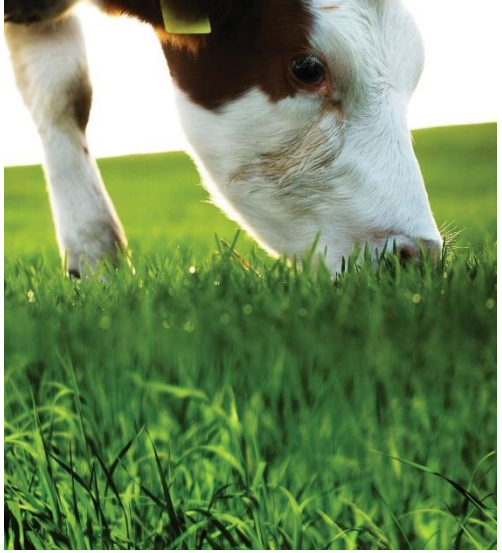
DEMETER Open Call Topics



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Topics

- Topic #1: Soil workability and humidity monitoring
- Topic #2: Interoperable Geo Tagged Photo APP
- Topic #3: ISOBUS Enabler
- Topic #4: Blockchain-based solution for agriculture applications
- Topic #5 DEMETER Business process integration (BPM)

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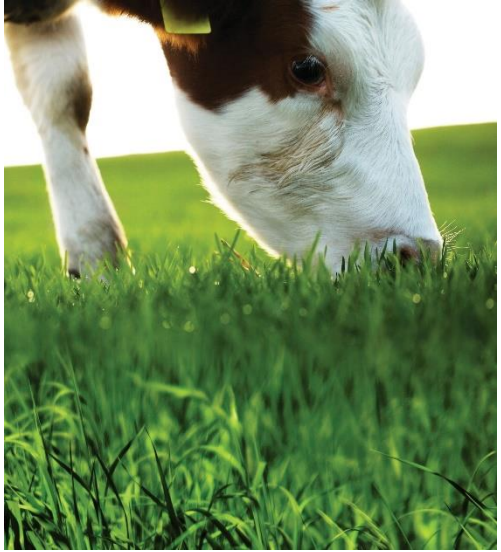
Topic #1
Soil workability and humidity monitoring



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Challenge (Topic #1): Problem description

- **Soil workability:** To be able to enter a field to do a work, machine need to find a ground strong enough to support the weight of them.
    - Otherwise, farmers are going to fields and have to come back to farm because the ground is still too wet and therefore increasing the cost and the environmental impact.

Challenge (Topic #1): Problem description

- **Soil humidity:**
  - Predict possibility of work in fields.
  - Enable better planting, application and harvest but also reduce cost of machinery.

Challenge (Topic #1)

Expected outcome

- Increase the precision of soil humidity:
  - Improve uptime for machinery
  - Minimize soil compaction.
  - Improve efficiency of pesticide and nutrient application.
- Deliverables:
  - Presentation (M2)
  - Feasibility test (M4)
  - Proof of concept (M6)

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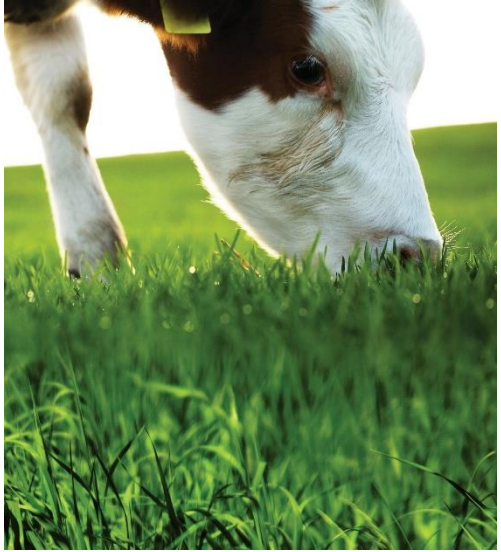
Topic #2
Interoperable Geo Tagged Photo APP



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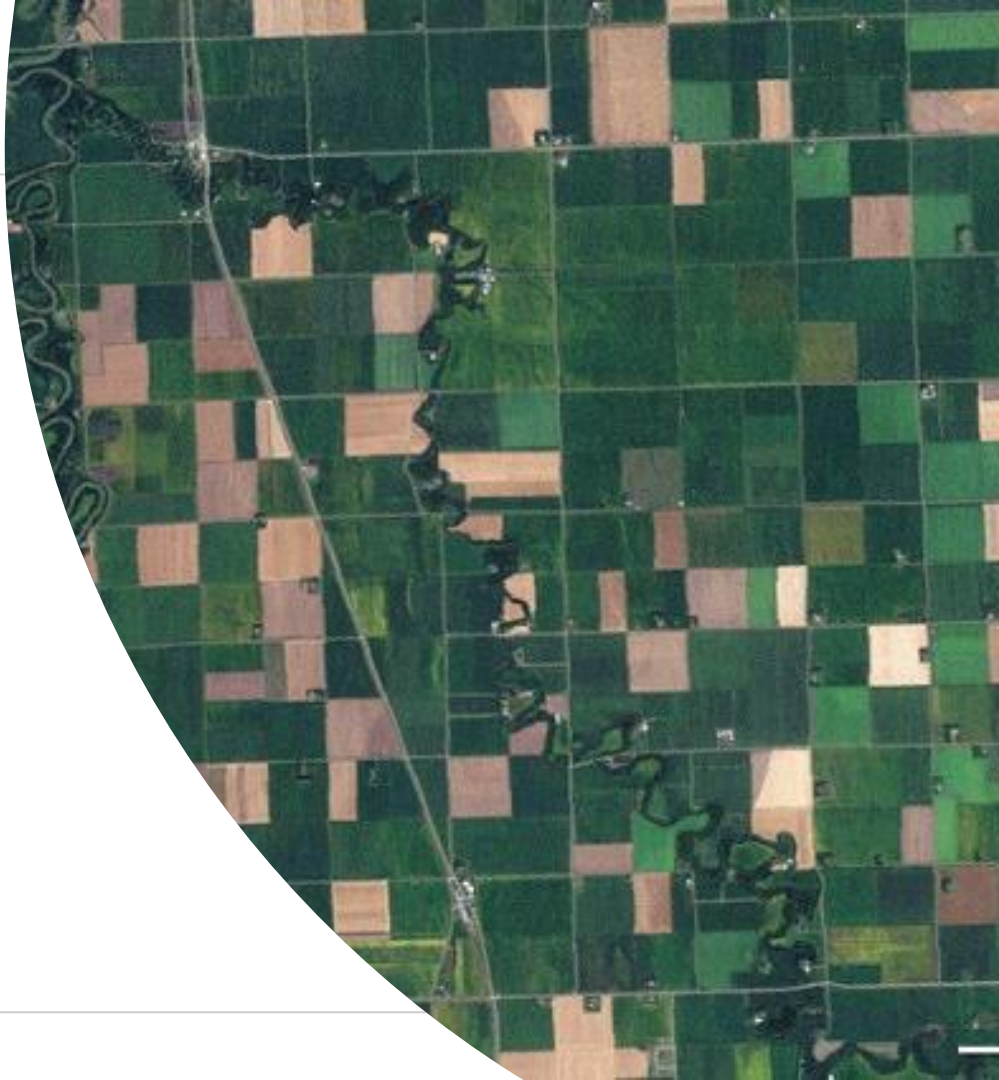
Challenge (Topic #2): Problem description

- Farmers needs to provide certain information to public administrations for several reasons:
  - Common agricultural policy – CAP funds request many information from them in order to pay the subsidies.
  - CAP post 2020 forces paying agencies to monitor the entire territory for agro-environmental and CAP performance checks where Sentinel images are not enough.
- EU Member States are most certainly going to request from farmers Geo tagged photos with specific metadata to conclude the monitoring phase for the whole territory, including small parcels, or crops difficult to being identified by satellite images.



Challenge (Topic #2): Requirements

- **TRL**: 7 or higher
  Source code availability: Open source
  Standards: API REST
  Programming language: Android, IOS, or multi mobile Platforms (Cordoba, Xamarin).
- **Security:** Considering GDPR and authentication mechanisms
  Minimum geographical coverage: Spain and Ireland
  Other: multi-lingual application infographics, without specific language menus (to be used by farmers all over Europe)

Challenge (Topic #2)

Minimum deliverables

- 1st Sprint (M2): Presentation. Requirements, UML definitions. Multi Actor Approach sessions participation for co-creation and requirements definition
- 2nd Sprint (M4): Operational test of Geotagged Photos APP with FMIS prototype provided by DEMETER partners.
- 3rd sprint (M6): Deployment of an integration test.

Challenge (Topic #2)

- Resources to be provided by DEMETER
  - 1) Webinar about DEMETER Architecture and FMIS Framework
  - 2) Webinar about Farmers needs and Data Sharing Legal Requirements
  - 3) SW Component definition with harmonized API description for REST

Challenge (Topic #2)

- Expected outcome
  - Geotagged Photos APP with API interoperate with DEMETER Field Book, FMIS interfaces, Integrated Administration and Control System (IACS) post 2020
  - Geographical coverage: EU Member States
  - App to facilitate decreasing time for delivery information requested from public administration.
  - App to increase the content and quality of data for decision support system (DSS) in FMIS.

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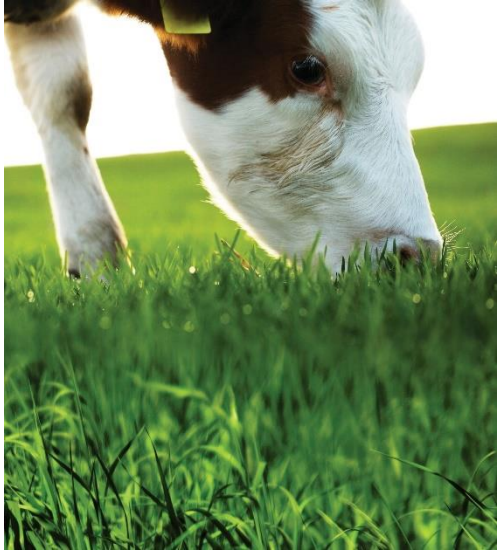
Topic #3
ISOBUS Enabler



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Challenge (Topic #3): Problem description

- Interoperability is one of the key challenges in agriculture, where interconnection between heterogeneous hardware and software systems plays a key role.
- The farmers are using machinery coming from different vendors, with their internal systems from another vendor (or multiple vendors covering different processes)

Challenge (Topic #3): Goal

- The goal is to enable different protocols and standards in the agri-food domain, talk to each other, by enabling machinery to interoperate with other machines and platforms.
- This would be possible if existing state of the art protocols for machinery (ISOBUS protocol stack) are analysed and appropriate software mapping mechanisms developed to enable collection and communication over ISOBUS protocol stack.

Challenge (Topic #3): Problem description

- The final outcome Gateway software component implements ISOBUS protocol
- The proposed technology should enable interoperability between different agriculture hardware, tools, and systems without any deep knowledge about the ISOBUS protocol.

Challenge (Topic #3): Requirements

- Technology readiness level: 6 or higher Source code availability:
- Open source Standards:
- ISOBUS stack:
  - ISO 11783-3: Data Link Layer with PGN handling
  - ISO 11783-5: Network Management with any amount of working sets -ISO 11783-6: UT Working Set with AUX-N, Multilanguage and multi-mask support
  - ISO 11783-7: Application Layer with the data-handling
  - ISO 11783-10: Task controller client (TC-BAS, TC-GEO and TC-SC)
  - ISO 11783-12: Diagnostic Services with Level-1 data
  - ISO 11783-13: File Server client
- Programming language: .NET, JAVA
- Data management: ISO 11783-10 ISOXML Tag
- Intellectual property rights: General Public License (GPL)
- Other: Experience in the transport domain, software development (API, edge)

Challenge (Topic #3)

- Minimum deliverables
  - 1st Sprint (M2): Specification of the requirements and the interoperability architecture for new DEMETER building block
  - 2nd Sprint (M4): Component implemented and validated.
  - 3rd sprint (M6): Final report.

Challenge (Topic #3)

- Resources to be provided by DEMETER
  - 1) Webinar about DEMETER Architecture
  - 2) Technical support, infrastructure access
  - 3) In-site evaluation in one pilot during 2nd stage
  - 4) Mentoring
- Expected outcome
  - Improved interoperability between different equipment and systems.
  - Improved communication efficiency for legacy machinery.

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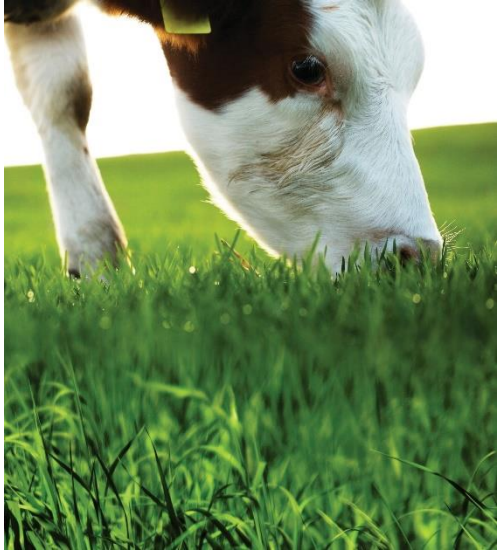
Topic #4
Blockchain-based solution for agriculture applications





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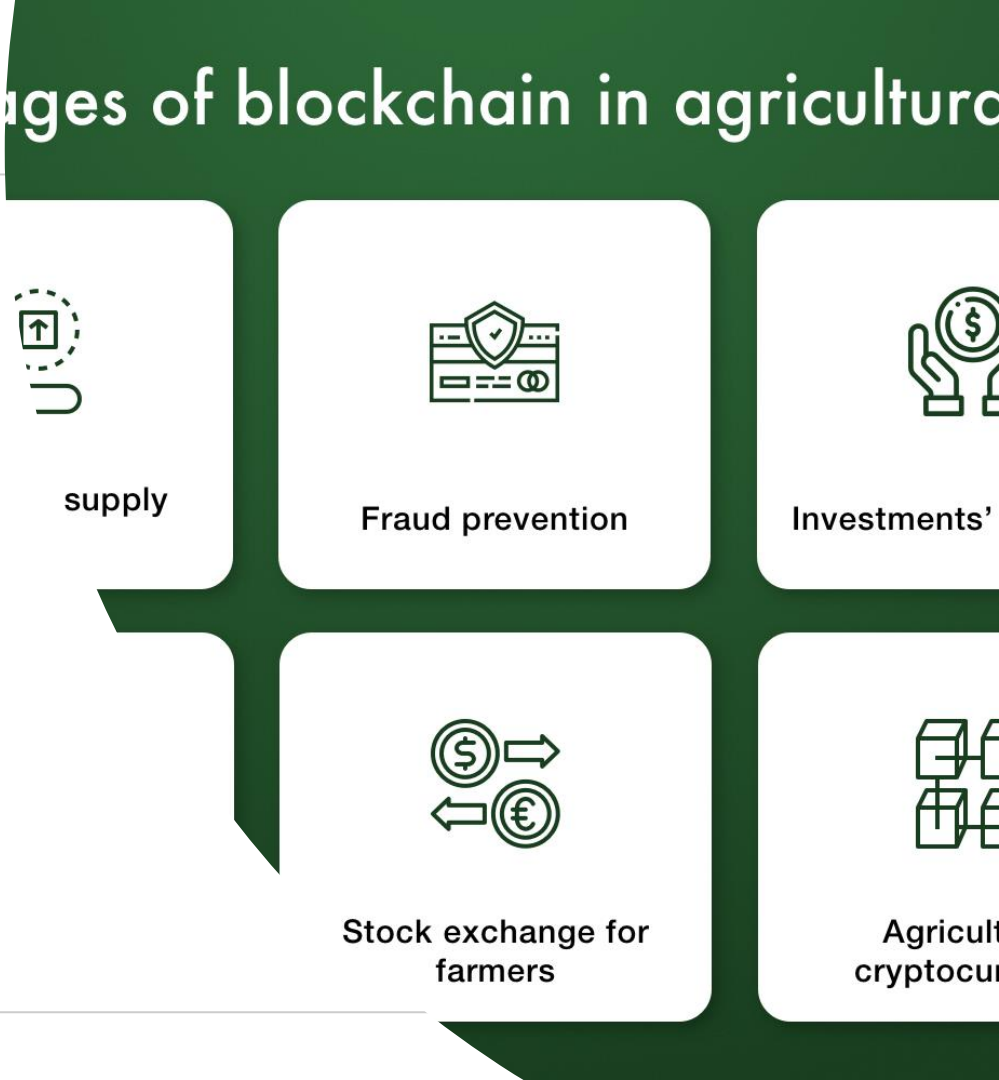
Challenge (Topic #4): Problem description

- The need of traceability in agriculture domain: from simple supply chain monitoring, procurement tracking, crop and food production, insurance, to land registration and payment of services.
- The main challenge of the existing blockchain-based implementations is that they still suffer from traditional challenges such as a lack of or poor infrastructure, failures of interoperability, and what is most important the ability to easily integrate in an existing farmer system.



Challenge (Topic #4): Problem description

- The interoperability and traceability challenge should be addressed by providing the high TRL Systematic traceability blockchain component
- Tested and used in commercial services.
- The component should implement DEMETER defined AIM data model, documented step-by-step integration manual and expose service online which in few steps could lead to integration of the component with any agri-food vertical.

Challenge (Topic #4):Requirements

- Technology readiness level: 6 or higher
- Source code availability: Open Source blockchain platform
- Standards: Standards for document creation and management, electronic signature etc. (PaDES/XaDES/eIDAS etc..)
- Programming language: Open API required, along with Software
- Development Kits / Libraries for at least 3 of the most popular programming languages: JavaScript, Python, C#, Java, React, Angular, Swift.
- Security: Banking-grade
- Geographical: Based in Europe
- Data management: Built-in data storage and querying features
- Other: REST API interfaces. Possibility to deploy private blockchain if needed, with no scalability issues.

Challenge (Topic #4)

- Minimum deliverables
  - 1st Sprint (M2): Requirements definition
  - 2nd Sprint (M4): Integration test
  - 3rd sprint (M6): Deployment and evaluation in pilot

Challenge (Topic #4)

- Resources to be provided by DEMETER

  1) Webinar about DEMETER Architecture
  2) Technical support
  3) Infrastructure access

- Expected outcome
  - At least 1 functional prototype of a blockchain-based solution for agricultural applications developed

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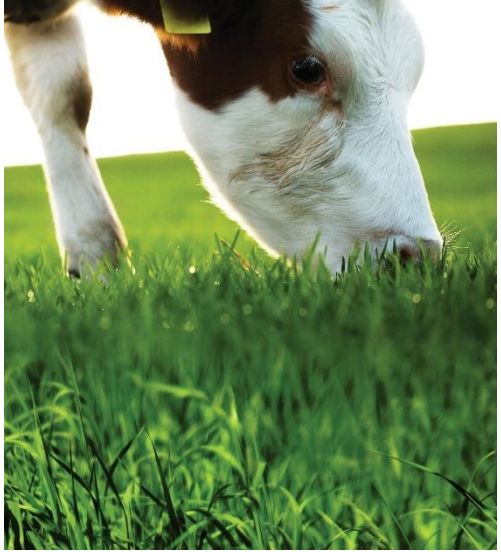
Topic #5
DEMETER Business process integration (BPM)



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Challenge (Topic #5): Problem description

- Farm management implies using a range of data sources and creating actions based on the analysis of the collected data.
- A coherent and streamlined creation of actions and monitoring of their execution is of great importance to agriculture companies
- There is need to ensure efficient utilization of the work force and the company assets while contributing positively to overall success of the company.

Challenge (Topic #5): Problem description

- Ensure efficient sharing of data between business processes in real time with business processes integration.
- This integration allows setting a basis for planning each step of production process, optimal usage of all resources, defining work orders, defining products shipping plan, setting a marketing budget etc.

Challenge (Topic #5): Requirements

- Technology readiness level: 6 or higher
- Standards: REST interfaces, Data integrations standards.
- Programming language: Java, Python, .NET. or other widely used languages could be used.
- Data management: NGSI-LD
- Intellectual property rights: GPL licence is most welcomed, but other proprietary licenses could be also proposed.

Challenge (Topic #5)

- Minimum deliverables
  - 1st Sprint (M2): Analysis of business processes to be integrated. -Business process modelling.
  - 2nd Sprint (M4): Integration plan for a few selected business processes defined.
  - 3rd sprint (M6): Implementation and validation of a few selected business processes with integration to DEMETER framework.

Challenge (Topic #5)

- Resources to be provided by DEMETER
  1) Webinar about DEMETER Architecture
  2) Pilot site
  3) Technical details for business integration

- Expected outcome
  - Improve workforce utilization
  - Improve operation efficiency
  - Resource usage optimization

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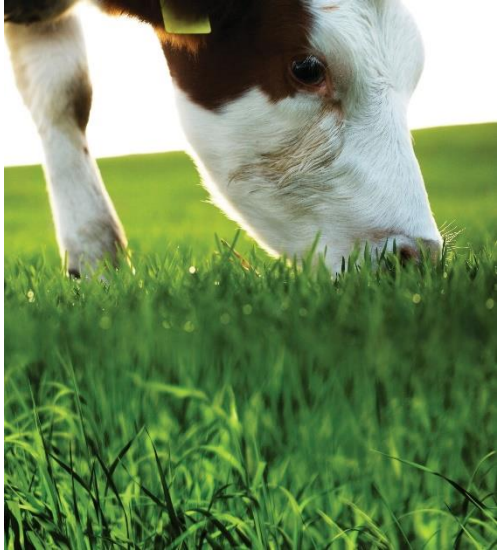
For more information visit:

www.h2020-demeter.eu

or Email us at :

info@h2020-demeter.eu



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