European Agricultural Machinery

CEMA position – answering open questions on a Common European Agricultural Data Space

For the expert workshop on 8 September 2020

General comments

There are some general concerns in our industry that might not fit within the specific questions but that we like to bring forward.

- We like to reiterate the importance to preserve the build up legacy. As a sector to ensure compatibility with the past decade developments, no effort was spared to make safe and secure vehicle connections through ISOBUS standards. This includes the development of dedicated data formats. It is critical that compliant products today remain valid for more than 10 years, which is the average system change- over period for agricultural machinery.
- The impact of the GDPR on any data space development can not be underestimated. In particular, for reasons of interoperability and data flow, the granting of automatic consent might become important for both data originators and users. Currently the GDPR only allows a one-to-one consent. It needs to be investigated if e.g. fail-safe data traceability solutions can be accepted.
- A lot of data originates from mobile machinery and some of that data is also related to the safety and security of these mobile machinery.
- Besides the pure setting up of an ecosystem for data exchange it is also an exercise of mitigating risks involved and to ensure compliance to jointly agreed conditions by proper working parties. The resulting requirements should not be such that it is difficult to implement by any stakeholder. A data space and the impact on the connected vehicles and services will be a fast-evolving area. In order to keep up with this evolution, and to make sure that the products adhere to digital standards allowing this data space to become fruitful, our preference for regulatory tool goes to the New Legislative Framework, with a combination of self-certification and third party involvement and compliance through the use of standards. Working with standards is the best approach to meet the specifics of the business while ensuring compatibility and security.
- This European assessment must acknowledge that our industry always works towards global solutions. This also means that many technologies are used that do not originate from Europe. Technology neutrality and involvement of **international** Standardisation Organisations is key for us.

1. Is the federation of some of the Farm Management System (FMS) platforms and other data platforms feasible?

Definitely! There are still some hurdles to overcome, and it will take time to reach the next level of connectivity, but **now is the right moment to start** talking about it. Many equipment manufacturers

have connected their products and have added digital services to enhance their functionalities. Software providers have made the step to the cloud. New data management solutions and services have been born. Data sharing is in its infancy but is growing.

The industry is working towards interoperability, although **over-arching frameworks are still missing**. The existing cloud architectures need some sort of convergence to the outer world, while dealing with the heritage of existing functionality and data internally. At this point cloud federation is still a concept with little inter-linking of platforms available in practice.

From the **supplier** point of view, we made it to the tipping point where most value chain players agree that the data space will not be ruled by all-encompassing products. This has resulted in increased participation in standardisation activities. We need to start talking about the building blocks to support cloud federation, as many solution providers in agriculture are working on APIs and system links anyway.

All major CEMA company members have teamed up in the Horizon 2020 project "ATLAS" under the umbrella of the Agricultural industry Electronics Foundation **AEF**, a global organisation. The project aims to develop an open digital Network, through which information and services become available to the end-user in an **easy, protected and automated** manner. The ATLAS Network will overcome existing interoperability hurdles by enabling data sharing between agricultural machinery, sensor systems and data analysis tools with the aim to make field operations more insight-driven, and potentially more productive and efficient. AEF's engagement in the ATLAS Project, not only continues the **legacy** of safe and secure connected machines, but also ensures **global** availability of the solutions to avoid parallel approaches between different regions.

From the **customer** point of view, the level of adoption of digital technologies is still low (only an estimated 10% of farmers is using an FMIS), but this means there is an opportunity for the next level of interoperable digital solutions to avoid the user having to resort to a multiplicity of systems, models, interfaces. Enhanced flexibility translates to more user-friendliness, and hopefully more appetite to start the digital journey. This is the industry's aim, through the ATLAS project with the development of a blueprint of an interoperability ecosystem for the ag sector.

2. Assuming that the implementation option for the Common European Agricultural Data Space for agriculture is based on a federated distributed system of existing data platforms, what is needed to implement a European data space from a technical point of view (definition of the interoperability mechanisms)?

Many suppliers are offering some sort of connectivity, but building a Common Data Space is something different and requires another level of competence. Current solutions are built on one-to-one relationships, both in the technical and legal dimension. A Common Data Space needs to support many-to-many relationships. An inherent consequence is that no single player can build this alone. It is **collaborative work** where many opinions and strategies will have to be accommodated. A Data Space needs to support different functions and architectures.

A **good eco-system architecture** is essential, but does not need to be completely flushed out to be workable. It is more important to be flexible and support different methodologies with many connectors. For the implementation we would focus on modules, which can become the **building blocks** for the final Common Data Space later on. A non-exhaustive list can be found below. Something often forgotten is that in agriculture (and especially operations), **real-time data streams** will gain importance. Today we are relying on the cloud to transfer data, which is often processed off-line. In the future we will see operations based on real-time data flows. The cloud will be bypassed and services will run on the edge, somewhere in a data centre close to the operations or directly on the equipment in a dedicated and safe environment.

👤	**e-ID**	Needs to support single sign on (SSO) and data governance, cross industries
🚗	**Digital ID for Vehicle**	Each machine should be provisioned with a Digital ID (VIN) that will identify all the data sources originating from the machine that cannot be repudiated
📦	**Object and Data Identification**	Need to allow shared identification of data from other sources, including processed data.
🕸	**Distributed Ledger Technologies**	Needs to support data governance for e.g. allowing to visualise data while avoiding storing data under control of the data owner
🗪	**System translators / interconnectors**	Support the translation of proprietary data formats into a common data format that can be leveraged by the industry
📖	**Semantics and ontologies**	Define a Common Data Model to support the rapid development and deployment of AG Tech Products and Services
((•))	**Real Time HD Ag Data Streaming Protocol**	While performing field operations (planting, tilling, spraying, etc), the machine can publish a real time HD agronomic data stream that can be consumed by a device or machine or to the cloud to visualize, draw insights and take actions from the data.
5G	**Impact of 5G on AgTech**	The next release of 5G 3GPP Rel 16 will provide a number of innovations especially for edge computing and low latency communications.

3. How can we reach an agreement on a set of interoperability mechanisms (avoiding locking into existing platform architectures)?

We believe it will require a combination of different approaches, tailored towards the building blocks of the overarching architecture.

- **Market harvesting:** Recuperate existing data models and APIs which have proven to be useful in an economic environment. Make a list with available standards and practices, and its market penetration. Look at open-source solutions, work from standards organisations and private technologies. Analyse how they could fit certain modules of the architecture. If there is IP involved, negotiate with the developers to make it open source. It may be more beneficial for the company who developed the API to make it open source than to implement an additional method originating from the government. Potentially financial compensation needs to be foreseen. The standardisation discussions shall then be moved to a Standards Development Organisation.
- **Stimulation:**
  - Subsidise collaboration between industry players (vertical and horizontal) to develop solution for gaps, or to align methodologies. Bring major players together around

specific modules of the architecture. Create a balanced group of participants and reach a critical mass to help the implementation.
  - o Support the companies to implement standardised modules, e.g. for single-sign-on based on e-ID, or for object identification
- **Lead by example:** Define standards for common modules and communication to be used by the government (e.g. digital identity, object identification, geographic information). If this is working, then it will be a source of inspiration for the industry to adopt.
- **Enforcement:** As a last resort, and hopefully only for the safety critical items, define and require security levels and certification schemes.

4. Are the suppliers of FMS ready to share their data? And willing to federate their data platform with other suppliers?

The **code of conduct** for data sharing based on contractual agreements has been widely accepted. The base is that the "data originator" controls the data flow.

When there is reluctance with players to share data, we believe it has more to do with internal limitations (**low digital maturity)**, than with corporate strategies.
- FMSs are mostly **SMEs** with little bandwidth. They cannot afford to make a lot of wrong choices regarding technologies to use. It needs to be the right from the start. The FMSs don't have the power to build a large federated architecture. Nonetheless most are supporting APIs to share data.
- The **large equipment manufacturers** have concluded that the usability of their machines depends on the flexibility to use the generated data in external services. Any perceived reluctance is mainly due to the digital readiness level of the OEM.
- **Small market players** fear that the data from their products will be abused by the large platforms in the market. They fear to get an in unfavourable situation compared to the ever growing large ecosystem participants. Despite this, most of them are mentally ready to engage in the next level of data sharing, as they consider this the only way forward. New distributed ledger technologies with protected data access rights should help alleviate their fear.

5. Which existing platforms supported by ecosystems (at regional or national level) are already sharing data? In which sub-sectors are they sharing the data?

There are some data hubs that function as traffic controllers. While they will have an important role in the future, they cannot be scaled up to become a data space. They are independent micro eco-systems, not necessarily part of the same universe. They have their own standards, APIs, sign-on procedures, etc. Examples of these platforms are:

- DataConnect (CNH Industrial, John Deere, Claas)
- DKE agrirouter
- JoinData
- DJustConnect

As already indicated under question 1, within the AEF and under the EU project ATLAS an interface is under development to connect the existing solutions. This interface will be available as an international standard. Main goal is to share data in a secure way.

6. Which public data sets would be of particular relevance for increasing the effectiveness of the Common European Agriculture Data Space?

Any, mostly geographical, info which is applicable to agriculture will have to be linked into the eco-system: topological information, cadastral information, satellite imaging, field objects (like pylons), weather forecasts from national institutes, master databases (crops, registration of agrochemicals), road information, etc.

7. Are their experiences with taking public data sets as input to FMS, farmers` applications or agricultural data spaces?

At this point CEMA industry members are not or very limited using any public data in its platforms. We hope that one day there is the possibility to pull all information from the different public data sources with one standardised API.

ABOUT CEMA

CEMA (www.cema-agri.org) is the association representing the European agricultural machinery industry. With 11 national member associations, the CEMA network represents both large multinational companies and numerous European SMEs active in this sector.

The industry includes about 7,000 manufacturers, producing more than 450 different machine types and generating an aggregated annual turnover of about EUR 40 billion. 150,000 people are directly employed in the sector, with a further 125,000 people working in distribution and maintenance.

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