

D4.6 Description of the Financial Benefits and Reasonable Business Models for Monetising OS Data and Technologies

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Description	This document describes the current summary of the OpenSense achievements, the current status, and future plans with respect to industry stake-holders benefits of using OS data and technologies in their business models - Mainly the initialization of CIG20136
Key words	OS Data, OS Technologies, Business, Monetization, Industry

About OPENSENSE (COST Action CA20136). OPENSENSE brings together scientists investigating different opportunistic sensors (e.g. microwave links, citizen science), experts from weather services, and end-users of rainfall products to build a worldwide reference opportunistic sensing community. The overarching goals of the COST are to overcome key barriers preventing data exchange and acceptance as hydrometeorological observations, define standards to allow for large-scale benchmarking of opportunistic sensing precipitation products and develop new methods for precipitation retrieval, coordinate integration of the opportunistic observations into traditional monitoring networks, and identify potential new sources of precipitation observations. Further details can be found [here](#):

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Glossary

WG	Working Group
OS	Opportunistic Sensors
GMDI	Global Microwave link Data collection Initiative
SetGMDI	Setting up The Global Microwave link Data collection Initiative
MNO	Microwave Network Management
CML	Commercial Microwave Link
NMHS	National Meteorological and Hydrological Services
CIG	Cost Innovators Grant
CAP	Data Collection, Archiving, and Processing
DAQ	Data Acquisition
WMO	World Meteorological Organization
ITU	International Telecommunication Union

1. Background and Past Activities

During COST Action OPENSENSE round table discussions with stakeholders hosted by the International Telecommunication Union we have identified that a significant obstacle to commercial microwave link data collection for hydrometeorological use is a missing scalable solution for data acquisition, archiving, sharing and usage. Achieving this path is critical in order for any industry-oriented partner to create a sustainable business model surrounding OS technologies.

During the hosted meetings we agreed on the following concepts, and set a path for establishing a solution:

1. Initiate an ITU recommendation that should be used as a reference to the NMOs, making them more positive in giving and sharing data. It should reflect the simplicity of the process and the positive cost-effectiveness of sharing the data, and the low threshold of risks associated with it. In addition, a complementary WMO technical document should be established, demonstrating the potential benefit of such data in different use-cases.
2. Vendors and network microwave network management (MNO) business models incentives:
 - a. Incentives:
 - i. key is the benefit of having the data for operation and saving money in maintenance when buying new equipment (use cases needed)
 - ii. perspective of selling the service in a form of rainfall data is important (use cases are needed)
 - iii. potential for having a small revenue stream by selling attenuation data to GDMI (as by airlines data) counts
 - iv. a good story to tell about a humanitarian aspect is important but not enough alone
 - b. Minimizing cost related to DAQ:
 - i. have a clear idea about the effort needed by an operator (hours per month or days per month)
 - ii. provide an expert to set up a system.
 - c. Supporting collaboration between governmental organisations and MNOs to address humanitarian challenges (it is not only about MNOs)
3. Vendors and MNO technical challenges: Find solutions for how vendors can make it easier for MNOs to collect and share CML data. We first discussed a potential update of NMSs because that is much easier for MNOs to work with than installing a custom new DAQ software that extracts CML data. We then discussed ways to archive and transfer the data. Noteworthy points include passive or active communication networks, how to archive the data, privacy and secured transfer of the data, - all with tolerable costs to the MNO and vendors.

Together we have agreed on the concept for a solution, establishing the Global Microwave link Data collection Initiative (GMDI), which we will set up within the proposed CIG project.

2. Current Status

We initiated an ITU recommendation - submitted in May 2025, aiming to be enforced by early 2026. This ITU recommendation set the required background, importance, and low resources required by the MNO, in order to collect and share OS Data.

Furthermore, we submitted a COST Innovators Grant (CIG) application which was approved - starting from October 2025 for a year - named SetGMDI (Setting up the Global Microwave link Data collection Initiative for hydrometeorological applications). The SetGMDI project will establish the Global Microwave link Data collection Initiative (GMDI) as a consortium facilitating and sustaining secure and scalable access to Commercial Microwave Link (CML) data from mobile network operators (MNO) worldwide to exploit them for application in hydrometeorology. GMDI will overcome the barriers that have prevented scaling up CML rainfall observation beyond individual national research projects.

The consortium of SetGMDI consists of MNOs and hardware vendors supplying CML data, and of national meteorological and hydrological services (NMHS) and their umbrella organizations supported by CML researchers from academia. The synergies emerging from this consortium are essential for the scalable and sustainable solution that SetGMDI will develop. NMHSs gain access to a new source of rainfall data for hydrometeorological applications, MNOs and hardware vendors retain full control over their data while benefiting from tools for analyzing long-term archives of CML data to optimize network management and maintenance, enhanced by meteorological observations.

As a result of the organizational and technical implementations of SetGMDI the global availability of CML rainfall data will increase significantly. This will enhance rainfall observation capabilities and thus enable better addressing rainfall-related challenges like early warning of floods, water management and climate adaptation.

3. Future Plan

SetGMDI kickoff meeting will take place on Nov. 26th, 2025. During the duration of it, we will have two pillars with the following foci:

Pillar 1 - Legal and business framework: The CIG will establish GMDI as an organizational entity, driven by the consortium of this CIG, which is capable of handling all legal tasks related to data sharing. In parallel the CIG will develop a plan for the financial sustainability of GMDI, including future integration of the GMDI software system into NMHS infrastructure for operational services, and business opportunities for MNOs to further incentivise data sharing.

Pillar 2 - Technical implementation: The CIG will develop and operate a first version of the central and

scalable **GMDI-CAP** system to **Collect, Archive and Process** CML data provided by existing network management systems of MNOs. In addition, the CIG will work on enhancing the network management systems to provide CML data with increased quality for hydrometeorological applications.

At the end of the CIG we will have a first version of the GMDI-CAP system with example data flow, a plan for financial sustainability and a consortium to drive GMDI. This will allow us to directly continue with the operation of the GMDI-CAP system at the end of the CIG, transfer it into continuous operation at a NMHS infrastructure and scale it up further by adding more MNOs. This final state at the end of the CIG will be reached via completing the individual objectives listed in the next section, where details of the proposed activities are described.

3.3 OBJECTIVES OF THE CIG

The objectives are grouped according to the two pillars of the SetGMDI, which are written below in detail and within the given estimated time-frame:

Pillar 1 - Legal and business framework:

- 1.1: Set up organizational structure of GMDI (month 1): At the first f2f meeting the CIG will implement the organizational structure of GMDI, with an elected core team and a steering committee consisting of the main proposers of the CIG.
- 1.2: Provide templates of legal documents for agreement on data sharing (month 6): To simplify the administrative process for a data provider to become part of GMDI and connect a data stream, the CIG will develop and provide template documents for a NDA and a data sharing contract.
- 1.3: Review business concepts for third-party data in meteorology (month 6): The CIG will review existing business models of private-public partnerships regarding data sharing in meteorology, e.g. AMDAR, TAHMO and Netatmo, as well as global data collection initiatives like GPCC and examples from the WMO Unified Data Policy Resolution. In addition the CIG will identify use cases demonstrating potential cost savings in network optimization and business opportunities for MNOs that create additional incentives for data sharing. The results of this review will be summarized as an internal written report.
- 1.4: Summarize final business plan (month 12): Based on the review report from O1.3 and the insights gained from running a first version of the GMDI-CAP system from O2.1, the CIG will develop a business plan, delivered as internal written report, for continuous operation of GMDI and its GMDI-CAP system after the CIG.
- 1.5: Integrate GMDI into an existing legal entity (month 12): GMDI will be integrated as a partner of the EUMETNET IoT activities which have already put into practice a centralized data collection of personal weather station data.

Pillar 2 - Technical implementation:

- 2.1: Submit an ITU recommendation on CML data acquisition (month 3): The CIG will develop and submit an ITU recommendation that summarizes the value of CML data for meteorological applications, the ways of sharing the data and requirements on data collected by network

management systems to be used for hydrometeorological applications (latency, temporal resolution, metadata).

- 2.2: Build prototype of GMDI-CAP system with demo data flow (month 6): Based on initial discussion at the first f2f meeting the CIG will implement a first version of the central GMDI-CAP (data collection, archiving and processing) system. The CIG will connect at least three different CML data streams, two from Europe and one from the global South. This first implementation will allow us to identify required improvements for the next iteration of the system. In addition this first version of the GMDI system will showcase the benefits for MNOs by providing insights into network performance via long-term statistics in combination with rainfall information, e.g. network outages due to heavy rainfall.
- 2.3: Proof-of-concept for improving data acquisition via network management systems (month 9): Hardware vendors and MNOs will jointly implement at least one proof-of-concept for improved CML data acquisition and data sharing via an updated network management system of a MNO providing data with 5-minute resolution and minimum latency.
- 2.4: Define requirements for next iteration of the GMDI-CAP system (month 12): Based on the insights from building and operating the first GMDI-CAP system, the CIG will derive a requirement document for the next major iteration of the GMDI software and IT infrastructure to provide a trusted and scalable solution.

4. Summary

During the OpenSense Action timeline, we conducted a number of joint activities with partners from the industry and stake-holders. In summary, although stake-holders that can benefit from the OS technology for improving weather and environmental monitoring (such as state meteorological services and weather companies) are majorly in favor of incorporating our technology, there are two main obstacles. The first and the main one is the data sharing procedures - which require the collaboration and cooperation of the MNO and hardware vendors, which are driven by a different business model (mainly communication based, and data sharing for weather products is not their main business), and the second - encouragement from the WMO.

We conducted a number of roundtables and activities with representatives from MNO, vendors, ITU, WMO, and the OpenSense members, to close this gap. Our progress is advancing, but still on-going. The progress made in the OpenSense in this matter are the basis for the new CIG20136 Action, which is set leverage on our up-to-date achievements and close the gap needed to allow for a full use OS by all of the involved parties.