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MOBILITY SERVICES ENHANCED BY GALILEO & BLOCKCHAIN

Mobility Data Spaces and Blockchain Use Cases Co-creation Workshop

Talent Garden Madrid, 25.05.2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004275

Web:
moliere-project.eu

LinkedIn:
Molière

Agenda for today

1000-1030	Objectives, background & introductions
1030-1100	Methodology & Identified Opportunities
1100-1200	New Use Cases Ideation
1200-1220	Coffee Break
1220-1340	Joint Discussion
1340-1400	Highlights & Closure

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Why are we here?

In-person blockchain & mobility data spaces use cases co-creation workshop

Objectives

- To share experiences and opinions on data governance and the use of DS and blockchain for mobility
- To co-create mobility solutions by combining Mobility Data Spaces with Blockchain technology
- To co-create real use cases for the Molière MDM – combining Galileo and other technologies
- To network and collaborate with other experts of the mobility industry
- To exchange and create best practices

Previously on Molière..

- Online warm-up session presented Molière and developed Use Cases
- Provided an initial understanding of the MDM, Data Spaces and blockchain concept and their relationship, existing gaps
- Initial exchange of ideas to gain valuable insights for today's workshop
- Provided some of the partner's experiences with the project

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Creating a **Mobility Data Marketplace (MDM)** underpinned by blockchain **to optimise the visibility, availability, and utility of geolocation data from Galileo.**

Objective:

Open Data Commons for mobility services
i.e. governments, operators, users and the overall public

EUSPA

Vision & Ambition

VISION

A new mobility paradigm is needed - from disconnected to complementing:

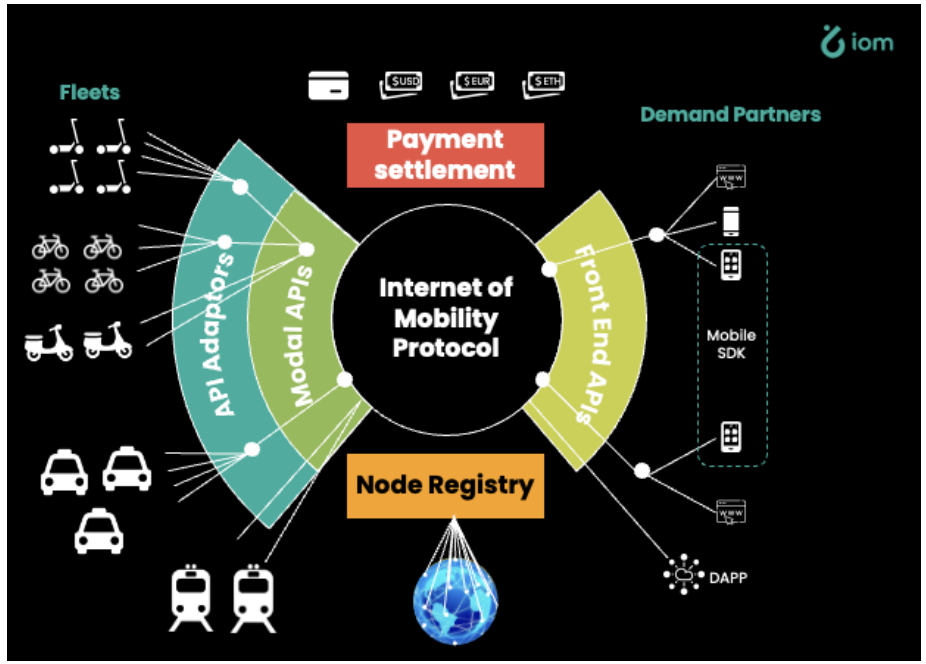
- Promoting more sustainable, affordable, equitable, and accessible mobility, where micromobility and shared mobility services increasingly complement public transport
- With the goal to reduce dependence on single occupancy private vehicles

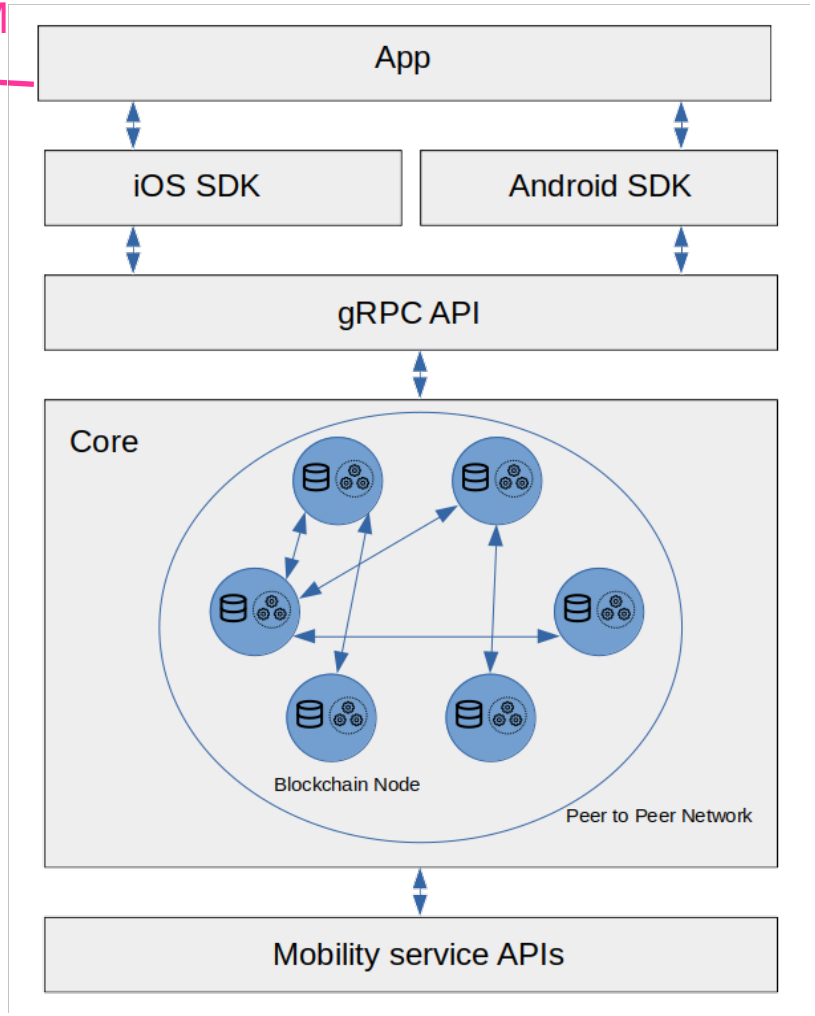
AMBITION

MOLIERE has built a *Mobility Data Marketplace (MDM)* underpinned by blockchain technology, raising the profile, visibility, availability, and utility of geo-location data from GALILEO, and will test it to fuel and demonstrate a diverse set of concrete, highly relevant mobility scenarios and use cases where geo-location data is key, addressing the needs of cities, public transport authorities, mobility service providers, and end-users.

Molière's Blockchain Architecture

Demo app connected to the MDM





Galileo's Key Features

Europe's own Global Navigation Satellite System (GNSS)

- **Open Service** (**OS**) for positioning, navigation and timing
- **Accuracy**: Freely accessible **global** high accuracy positioning service (**HAS**). Resolves GPS and GLONASS **geo-positioning error at street level** resolution → measures error reduced to **less than 20 cm**
- **Continuity**: very high ability to **function without interruption**
- **Authentication & Integrity**: Galileo is exclusive in **authenticating** and **encrypting** its satellite signals. This makes reliable geo-traceability possible, and users' trust levels increase as attack or interferences are easier to mitigate

Already defined use cases

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keita mobility factory

dott

Micro-incentives, geofencing

keita mobility factory

cyclemap

Lane Patrol

OCTO

iomob

Proof of Mobility Service (PoMS)

ne—mi

keita mobility factory

iomob

Decentralised mobility data sharing for flexible transport

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

CARNET FUTURE MOBILITY RESEARCH HUB

Bus travel prediction tool

EUSPA

Introductions

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ATM Area of Barcelona Metropolitan Transport Authority

CARNET FUTURE MOBILITY RESEARCH HUB

CIT UPC TECHNOLOGY CENTI UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

dott

FACTUAL

iomob.

KEITA

ne—mi

OCTO

Osborne Clarke

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EUSPA European Union Agency for the Space Programme

HORIZON 2020

Introductions

01. GSC
02. INECO
03. EIT Urban Mobility
04. MITMA
05. i2CAT
06. Madrid City Council
07. Independent experts
08. UPM – Transyt
09. Meep
10. Openvia
11. Astara
12. BloxMove
13. Superpedestrian

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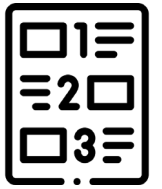
Today’s methodology

1) **Presentation of new use cases as brainstormed by Molière’s consortium**



2) **Definition of new use cases – one per table**

3) **New use cases exposure (one member of each table)**

4) **Multi-criteria analysis – joint discussion & rating: numbers don’t lie!**

5) **List of use cases, ordered by defined rates**

Additional identified opportunities

Use Case	Short Description
Smart parking system	Provide a secure and transparent way for drivers to find parking spots The data space can be used to store parking availability data in real-time, and Galileo services can be used to track the location of vehicles and guide drivers to available parking spots The blockchain can be used to secure the transactions and payments made between drivers and parking lot owners Also applicable to supply chain and last-mile logistics
App-less mobility services	Use of existing apps, non-mobility related, to provide information about mobility services E.g. *Booking* to use our MDM and provide their users with information and means to travel from airport to hotel

Additional identified opportunities

Use Case	Short Description
Public transport autovalidation & demand tracking	Ticketing autovalidation based on GALILEO geopositioning from users' phones from an activated app If combined with Public Transport Authorities efforts, there can be a way of combining these two sets of data & tracking PT demand on real time to: 1) Help micromobility fleet management 2) Support multi-modal combination (e.g. park & ride facilities)
Emergency vehicles real time management	Emergency vehicles should be granted space in our roads at all times Sharing traffic data with the data space, and using it for emergency vehicles management, we can make it easier for other data retrievers to handle emergency vehicles route management, thereby increasing the chances of saving lives

Additional identified opportunities

Use Case	Short Description
Real time pollution model	Models to understand pollution levels on targeted areas / roads on real time Through accurate positioning coordinates of vehicles and information concerning vehicle type from various data providers
Comparative safety analysis	A mobility data space can facilitate comparative safety analysis by integrating data from different cycling infrastructure projects or interventions. By comparing accident rates, near-miss incidents, and user feedback before and after specific infrastructure improvements, planners can assess the effectiveness of different design elements or interventions and make data-driven decisions to enhance the safety of infrastructure

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Today’s new opportunities

11:00 – 11:30 It’s time for each table to come up with one new use case!

REMEMBER

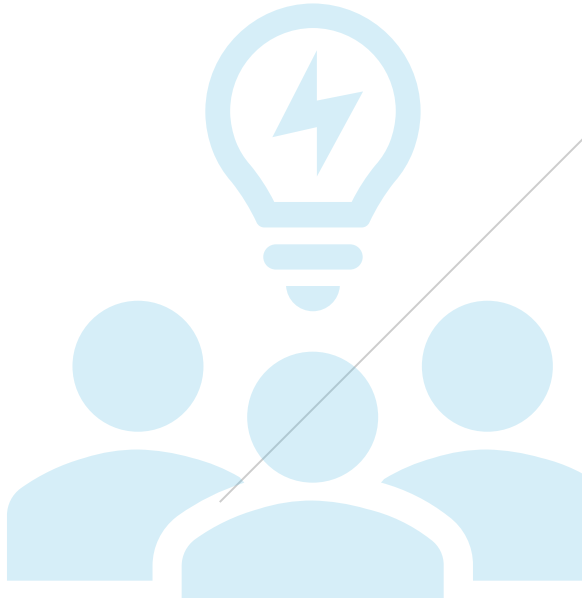
GALILEO’S BENEFITS

BLOCKCHAIN OPPORTUNITIES

DATA SPACES POSSIBILITIES

OVERALL FEASIBILITY

11:30 – 12:00 Time for sharing



Newly identified opportunities

Use Case	Short Description
Democratising use and explotation of travellers' data	Use Galileo connection from users' phones in an open and transparent way, to be available to governments and service providers for the benefit of all. Incentivisation would be required, easy from blockchain systems but also bonification or other methods. Privacy to be considered. Democracy made by all stakeholders, including users and companies / bodies participating (incl. What the data can be used for and defining limits and rules) A specific app is not needed, data may be taken from existing apps in the market by users agreeing.
Inside your f* lane	Current conflicts for rigid space. Anonymised drivers' behaviour tracking and promotion of best practices when using public space (safety, sustainability, etc) linked to bonification. Installation of hardware in vehicles - use of GALILEO positioning and speed analysis, IGNS, speed tracking through already existing cameras. Applicable to cycles first, but potentially scalable to other vehicles (cars first) – market for insurance providers

Newly identified opportunities

Use Case	Short Description
Travel behaviour prediction & sust. mobility encouragement model	Data from different sources (incl. Shared services, transport, space, parking, weather, etc) to understand people's behaviour and travel choices Levels of pollution also reported in real time as part of the MDM Co-relation of data Will support policy making and measures (which are not necessarily permanente, can be aplicable depending on days and specific conditions) Sensors in vehicles & infrastructure – bonifications & collaboration from all stakeholders . RESULT: detection of issues which hadn't been noticed previously
Street parking finder	Shortage of parking spaces and difficulty to know availability in real time. Use of galileo and existing technology viable, but legal limitations. Vehicles that are already in circuation may track spaces as they drive, and sending data to MDM

Newly identified opportunities

Use Case	Short Description
Inherit the rain forest	Simple, cost-effective, robust, secure solution aplicable to areas where there's no communication Copernicus to analyse risk of deforestation and estimation of production (which helps estimating max. sales & movement of goods expected) Galileo to trace products from the farm to final destination (authentication of positioning) Blockchain for storage and processing of data (images cannot be stored, but a record where the graphic information is). Ensuring not double selling, management & control. Not-synch transaction to ensure remote can use this technology. Plus incentivation – scoring system to feed the trust cycle. No legal constraints assumed as EU is already asking for it Decentralised enough to be scaled up to Australia, Canada and USA.
Complete travel behaviour mapping	Map travel behaviours of people who don't seem to be taken care of by anyone else. Vulnerable people who're not "vulnerable enough": Make them visible to operators and all other stakeholders. Includes behaviours of private delivery companies (in this case, it's them that want to be Anonymous..!). Device in delivery vehicles which can also identify pollution levels Fusion data from different sources to do the mapping, and enable decisions that have Access to the full map of behaviours, not just the typical ones, detecting all patterns and not just the ones that are on the focus at the moment.

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Multi-criteria analysis time

Decision-making based on agreed rating

Criteria = FEASIBILITY (50%) & IMPACT (50%)

- **Legal:** are there any legal considerations that BLOCK the use case?
- **Technical:** is the basic technology required for this use case ready to be reconsidered? Or is new technology needed?
- **Commercial:** is there a existing need that mobility stakeholders are already willing to invest in? Is it aligned with current strategic objectives (e.g. 2030 Agenda)?
- **Stakeholders:** do we already have the right stakeholders involved? (incl. data providers & technology developers)

- **Scalability or level of impact:** would this use case cover needs that only impact one sector of population, or local needs? Or it solves an European need?

Workshop Results

FEASIBILITY PRIORITIES	1 is minimum priority & 4 is maximum priority	
Legal readiness	2	As agreed, when talking about innovation, solutions that cover existing needs of population & market will be prioritised over those who have all stakeholders support, thereafter those within the existing legal framework, and thereafter those technologically ready
Technical readiness	1	
Commercial readiness (incl. real need & alignment with strategic objectives)	4	
Stakeholder involvement	3	
IMPACT & BENEFITS	**1 is local impact & 4 is European impact**	
Local	1	Solutions that reach an European impact will be prioritised vs those just covering local, specific needs
Regional	2	
National	3	
European	4	

Multi-criteria analysis time

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Use Case		Feasibility of the use case by criteria (where 1 means "non-feasible on a short-term basis" & 5 means "ready to go!")				FEASIBILITY	Impact level (where 1 means "no impact" & 5 means "high impact")				IMPACT
		Legal readiness	Technical readiness	Commercial readiness	Stakeholder involvement		Local	Regional	National	European	
1	Smart parking system	5	3	5	4	88%	5	2	2	4	53%
2	App-less mobility services	5	5	4	2	68%	5	4	4	4	78%
3	PT autovalidation & demand tracking	3	4	3	3	53%	5	3	2	3	48%
4	Emergency vehicles RT management	5	5	4	4	83%	5	4	3	3	60%
5	RT pollution models	4	4	3	2	50%	5	3	4	5	83%
6	Comparative safety analysis	5	5	3	3	65%	5	3	3	3	55%
7	Democratising use and explotaition of travellers' data	4	5	3	2	53%	4	4	4	4	75%
8	Inside your lane	5	5	3	3	65%	5	1	3	2	35%
9	Travel behaviour prediction & sust. mobility encouragement model	5	3	3	3	60%	5	4	4	5	88%
10	On-street parking Finder	4	4	5	4	85%	5	3	2	3	48%
11	Inherit the rain forest	5	4	2	2	45%	2	4	4	5	80%
12	Complete travel behaviour mapping	2	5	3	2	43%	4	3	3	4	63%

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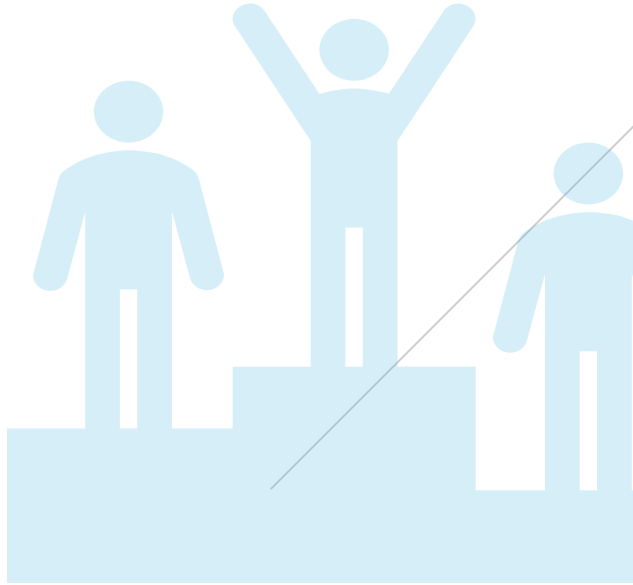
Use Cases Ranking

	USE CASE	Rate	Final Ranking
9	Travel behaviour prediction & sust. Mobility encouragement model	74%	1
2	App-less mobility services	73%	2
4	Emergency vehicles RT management	71%	3
1	Smart parking system	70%	4
5	RT pollution models	66%	5
10	On-street parking Finder	66%	5
7	Democratising use and explotaition of travellers' data	64%	7
11	Inherit the rain forest	63%	8
6	Comparative safety análisis	60%	9
12	Complete travel behaviour mapping	53%	10
3	PT autovalidation & demand tracking	50%	11
8	Inside your lane	50%	11



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Thank you ALL
for your dynamic, committed collaboration!

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See you soon!

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