EXPLORING DIGITAL DATA MARKETPLACES

Researching data sharing principles in aviation maintenance context
An outline

ARINC INDUSTRY ACTIVITIES
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EXAMPLE EPIC
UNLOCKING VALUE THAT I CAN NOT CREATE ON MY OWN

- As Airline MRO, I must be able to use Aircraft Health Monitoring data from as many aircraft as possible;

- so that I can develop the most valuable and competitive algorithms, which I cannot develop if I use only data from the fleet I operate.

- The goal is to **create value together.**

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RESEARCH QUESTION
RECOGNIZING DATA IS AN ECONOMIC ASSET THAT CAN BE TRADED

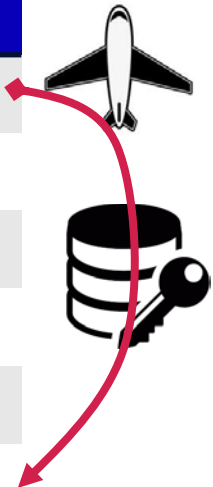**Given a common benefit:**
How can Aircraft Health Monitoring data be shared amongst Airline Operators and
Algorithm Developers in a 1) FAIR and ECONOMIC way,
whilst providing adequate 2) means to REDUCE RISK?

PROBLEM WITH MARKET DEVELOPMENT

1) FAIR AND ECONOMIC WAY: MONOPOLISM VS OPEN MARKET DEVELOPMENT

As in seen in the beginning of the oil industry: control of the transport platform enabled monopolism. Open marketplace mechanisms will enable trade, innovation and fair competition

Oil Economy	Concept	Data Economy
Crude Oil	Resource	Raw Data
Land / well owner	Ownership	Operator of data generator ?
Oil price	Value	Data price ?
Barrel, rail, pipeline, tanker ..	Transport	Future Internet ?
Oil market	Trade	Data Market ?
Petrochemical industry	Value Creation	Data science algorithms
Fuel, lubricants, plastics, detergents,..	Products	Efficiency, predictions, planning, recognition, behavior,..

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DIGITAL DATA MARKETPLACE CONCEPTS
AREA CONSIDERED BY OUR RESEARCH EFFORT

Concept	Data Economy
Resource	Raw Data
Ownership	Operator of data generator ?
Value	Data price ?
Transport	**Future** Internet ?
Trade	Data Market ?
Value Creation	Data science algorithms
Products	Efficiency, predictions, planning, recognition, behavior,..

FLAGSHIP RESEARCH EFFORT

Amsterdam Economic Board and University of Amsterdam coordinate a multi-disciplinary research effort, involving multiple disciplines:

**Law,
Computer Science,
Business School,
Economics,
Social Sciences**

Amsterdam houses one of the largest Internet Exchanges (AMS-IX):
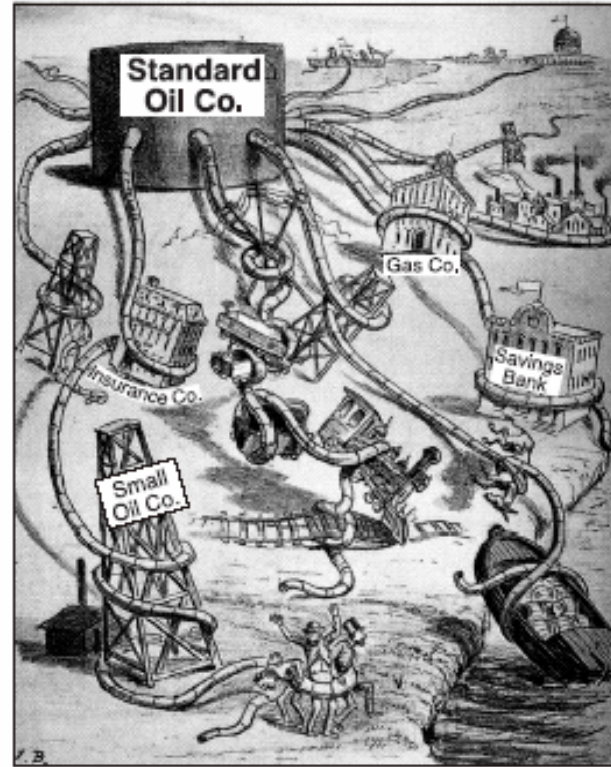*Can it house a Data Exchange that facilitates Data Marketplaces (AMS-DX)?*

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CONSEQUENCES OF MAINTAINING A MONOPOLY
SOCIETY WILL OBJECT DISPROPORTIONATE VALUE CREATION AND ENTANGLEMENT

Standard Oil got named
The Octopus, with many of its
tentacles in society.

US government created antitrust law
to protect the public from the
failure of the market where
unfair conduct tends to destroy
competition itself.

(Sherman Act - 1890)

Source: Herman Viola, *Why We Remember: United*
States History, Scott Foresman–Addison Wesley
Publishing Co. (adapted)

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MANAGING RISK AT DATA MARKETPLACE
2) MEANS TO REDUCE RISK: REQUIRES STEPS AT DIFFERENT LEVELS

COMMON BENEFIT

Define and agree common benefit no single organization can achieve on its own.

GROUP RULES

Define consortium rules considering data use, access and benefit sharing

ORGANIZE TRUST

Organize power and trust as a means to reduce risk for participating members
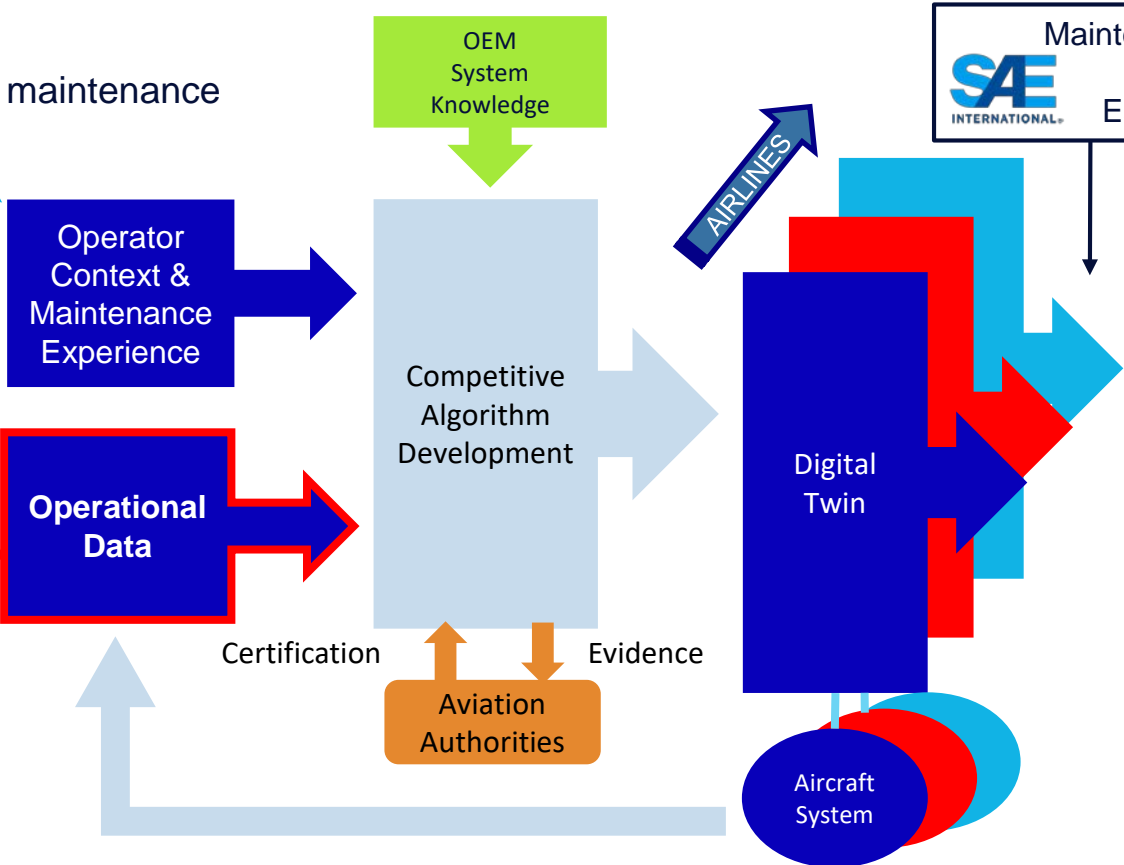
IMPLEMENT INFRASTRUCTURE

Research operationalization of **Digital Data Marketplace & Data Exchange** concepts

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EXAMPLE AIRCRAFT MAINTENANCE USE CASE
DEVELOP A DIGITAL TWIN TO ESTIMATE MAINTENANCE CREDITS

Competitiveness enabled by specific maintenance knowledge

RESEARCH USE CASE:
How can Aircraft Health Monitoring data be shared amongst Airline Operators and Algorithm Developers in a fair and economic way, whilst providing adequate means to reduce risk allowing competition
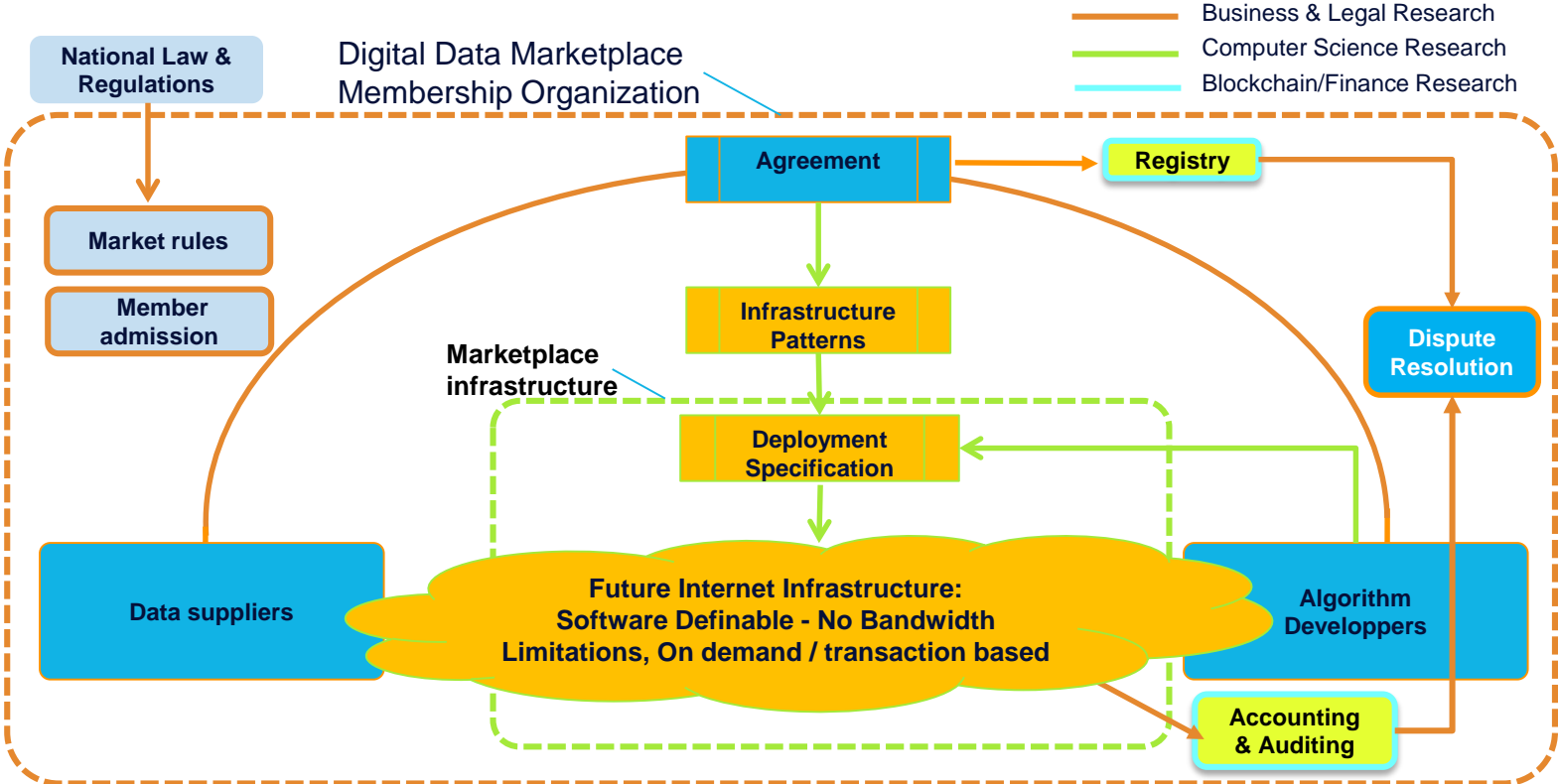
OEM System Knowledge

Operator Context & Maintenance Experience

Operational Data

Competitive Algorithm Development

Certification   Evidence

Aviation Authorities

AIRLINES

Maintenance Credit Estimate

SAE INTERNATIONAL

Digital Twin

Aircraft System

Benefits

Aircraft Airworthiness

Maintenance Scheduling

Aircraft Dispatch

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DIGITAL DATA MARKETPLACE ARCHITECTURE
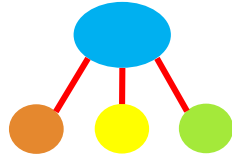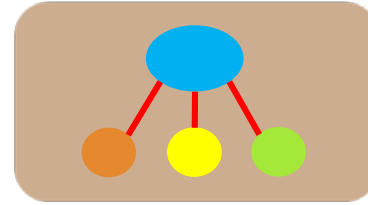
ENABLING COMPETITIVE ALGORITHM DEVELOPMENT

Business & Legal Research
Computer Science Research
Blockchain/Finance Research

National Law & Regulations

Digital Data Marketplace Membership Organization

Agreement

Registry

Market rules

Member admission

Infrastructure Patterns

Marketplace infrastructure

Deployment Specification

Dispute Resolution

Data suppliers

Future Internet Infrastructure:
Software Definable - No Bandwidth Limitations, On demand / transaction based

Algorithm Developpers

Accounting & Auditing

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RESEARCH INFRASTRUCTURE
RESEARCH WORKING ALONGSIDE IT INDUSTRY

NETWORK RESEARCH INFRASTRUCTURES

COMMERCIAL DATACENTER INFRASTRUCTURE AS NEUTRAL GROUND

Data Sharing Infrastructure Model Research using Future Internet capabilites
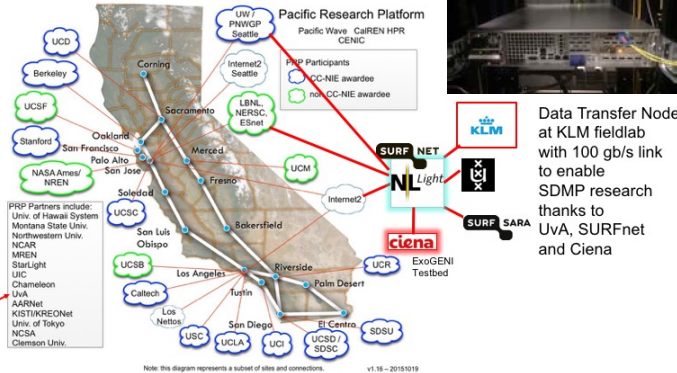

Research collaboration

Goal: How to create a Digital Marketplace Ecosystem

prp.ucsd.edu

As foundation of the National Research Platform

Data Transfer Node at KLM fieldlab with 100 gb/s link to enable SDMP research thanks to UvA, SURFnet and Ciena

AM3 and AM4 Datacenters Science Park Amsterdam

SV10 Datacenter Silicon Valley

CONCLUSION

A DIGITAL MARKET PLACE:

- **Is created and governed by an industry membership organization as a means to reduce risk.**

- **Serves a common benefit no single organization can achieve on its own.**

- **Connects data suppliers and algorithm developers via a software definable, membership organization owned, infrastructure.**

- **Arranges processing as an on-demand infrastructure transactions, where the infrastructure is guaranteed to be cleaned up after execution.**

- **Infrastructure itself is delivered by neutral Data Exchanges across the world, in the same way neutral Internet Exchanges interconnect Internet Service Providers.**

THANK YOU

Want to help our research?

Email me:
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