Researching Data Ownership & Trust
SAE AIR 6904 working group
September 12th , 2017 - Stanford University

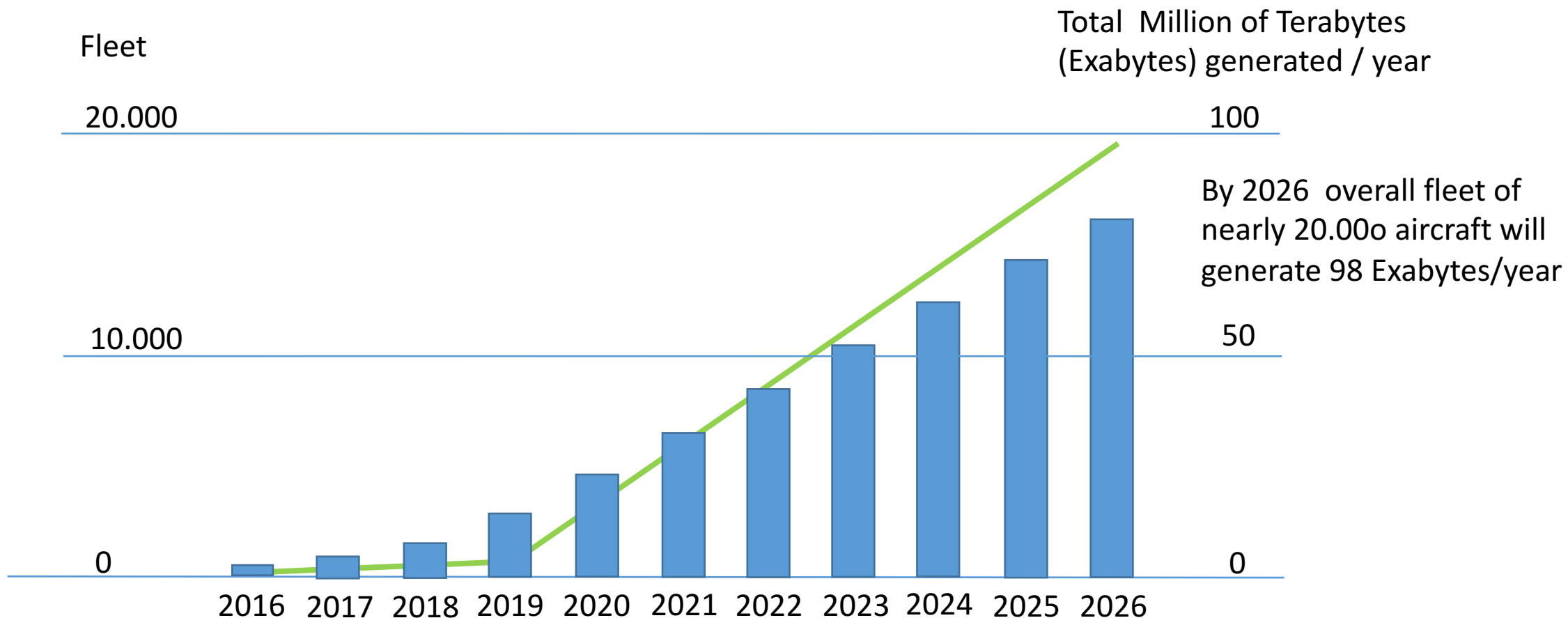Leon Gommans

Science Officer

Air France – KLM Group IT Technology Office R&D

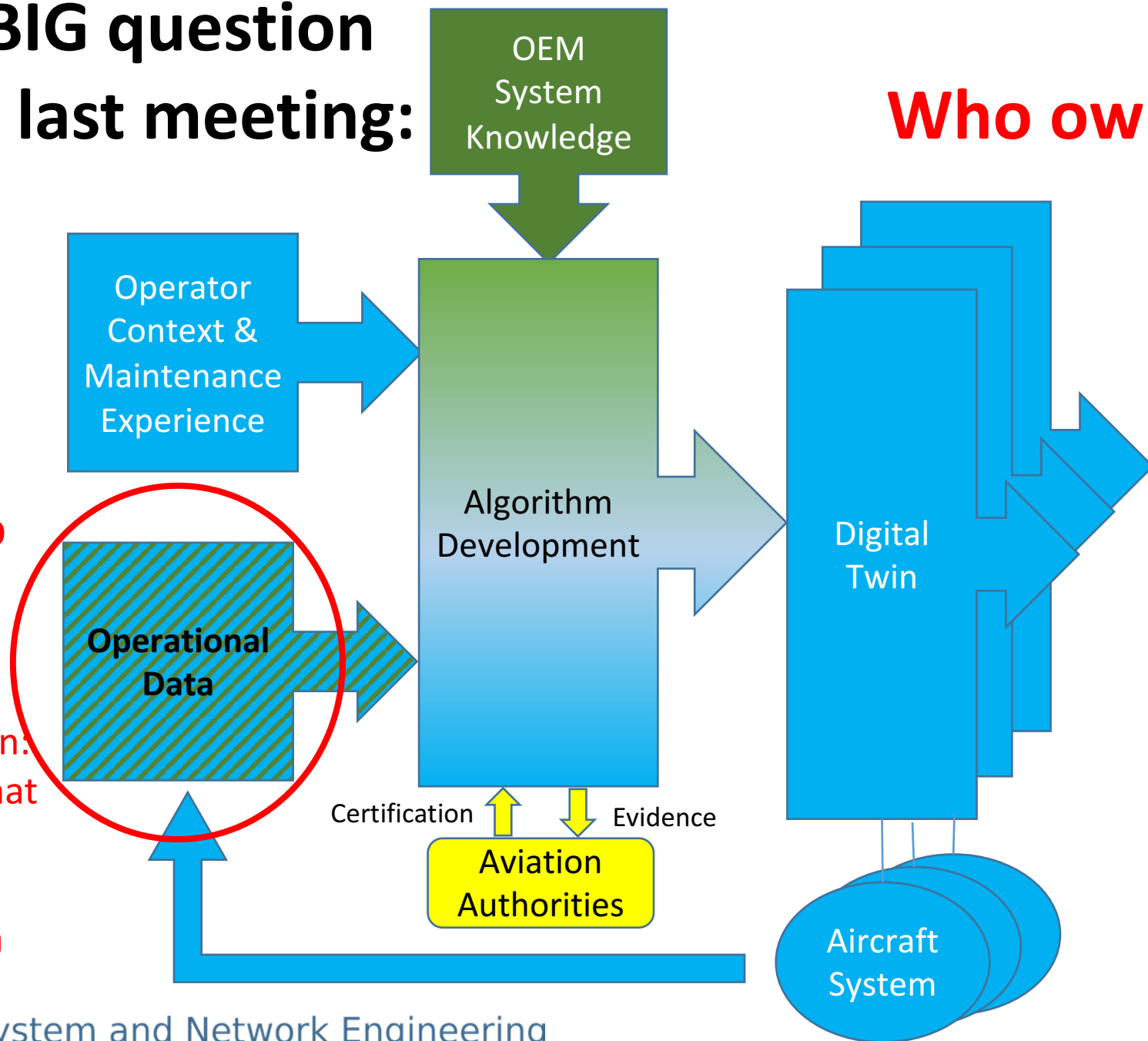Guest Researcher, University of Amsterdam FNWI- SNE group.

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Expected data volumes in aircraft data

Fleet

Total Million of Terabytes (Exabytes) generated / year

20.000

100

By 2026 overall fleet of nearly 20.00o aircraft will generate 98 Exabytes/year

10.000

50

0

0

2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026

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The BIG question from last meeting:

Who owns the data?

OEM System Knowledge

Operator Context & Maintenance Experience

Data Ownership Discussion

Oliver Wyman: Consensus that airline operators own the data

Operational Data

Algorithm Development

Certification → ← Evidence

Aviation Authorities

Digital Twin

Aircraft System

Business Benefits

Maintenance Planning

Aircraft Dispatch Planning

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Sharing data as means to obtain a common benefit

Enabling sharing of data assets between different organizations to achieve a common benefit no single organization can reach on its own will need:

Clearly defined and agreed common **benefit(s)** (defining group identity)

Common group rules governing <u>use</u>, <u>access</u> and <u>benefit</u> sharing.

Organizing trust amongst group members as **means to reduce risk**

Infrastructure supporting **implementation of trust,** whilst ensuring member **autonomy.**

Common benefit: our SAE example

Enable the development of (certified) digital twins, capable of estimating an aircraft systems airworthiness credit:

- Each time when the digital twin obtains the most recent data from its physical twin.
- Airworthiness credit estimates can be obtained from 0 hours onwards.

allowing improvements to air safety, passenger experience and cost reductions by:

- avoiding unplanned maintenance
- increasing maintenance planning flexibility
- moving from fixed interval planning to maintenance when indicated
- less AOG's

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Algorithm development

Algorithm development will need contributions from multiple parties:

- Operational data collected from physical systems, based on aircraft operator agreement (that may inherently require pilot consent*)
- Data & engineering knowledge from manufacturer
- Data & repair experience from certified maintenance organizations
- Data & operational knowledge from operators.
- Flight context (weather, geologic factors, environment,..)
- Etc.

allowing the development of powerful solutions operators can choose from.

Consequently: sharing data, experience and knowledge across multiple organizations to enable such algorithm development will carry risks.

Trust between organizations must therefore be arranged and implemented first

*) The EU General Data Protection Regulation not only applies to organisations located within the EU but it will also apply to organisations located outside of the EU if they offer goods or services to, or **monitor the behaviour** of, EU data subjects (see www.eugdpr.org).

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Trust as a means to reduce risk

Risk:

Compliancy (privacy*, anti-trust,..)
Liability
Unwanted disclosure (competition)
Loss of ownership (value)
Revealing Intellectual Property
Enabling additional oversight (cost)
etc., etc...

Means:

Trust and power are both means capable of reducing risk

How to organize trust and power ? -> **The Secure Digital Market Place concept**

Art. 22 GDPR: The data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her.

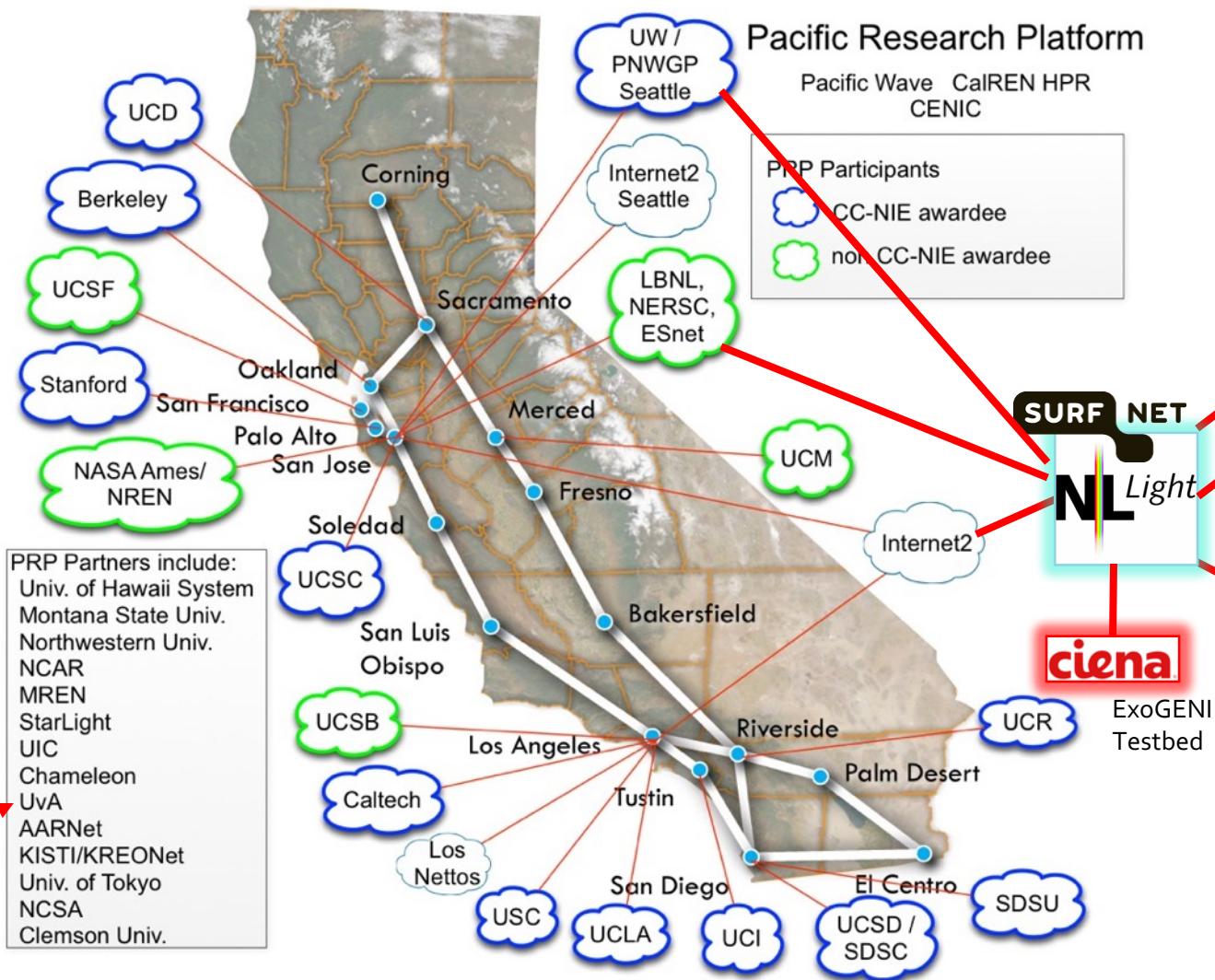# Secure Digital Market Place Research contributing to AIR 6904
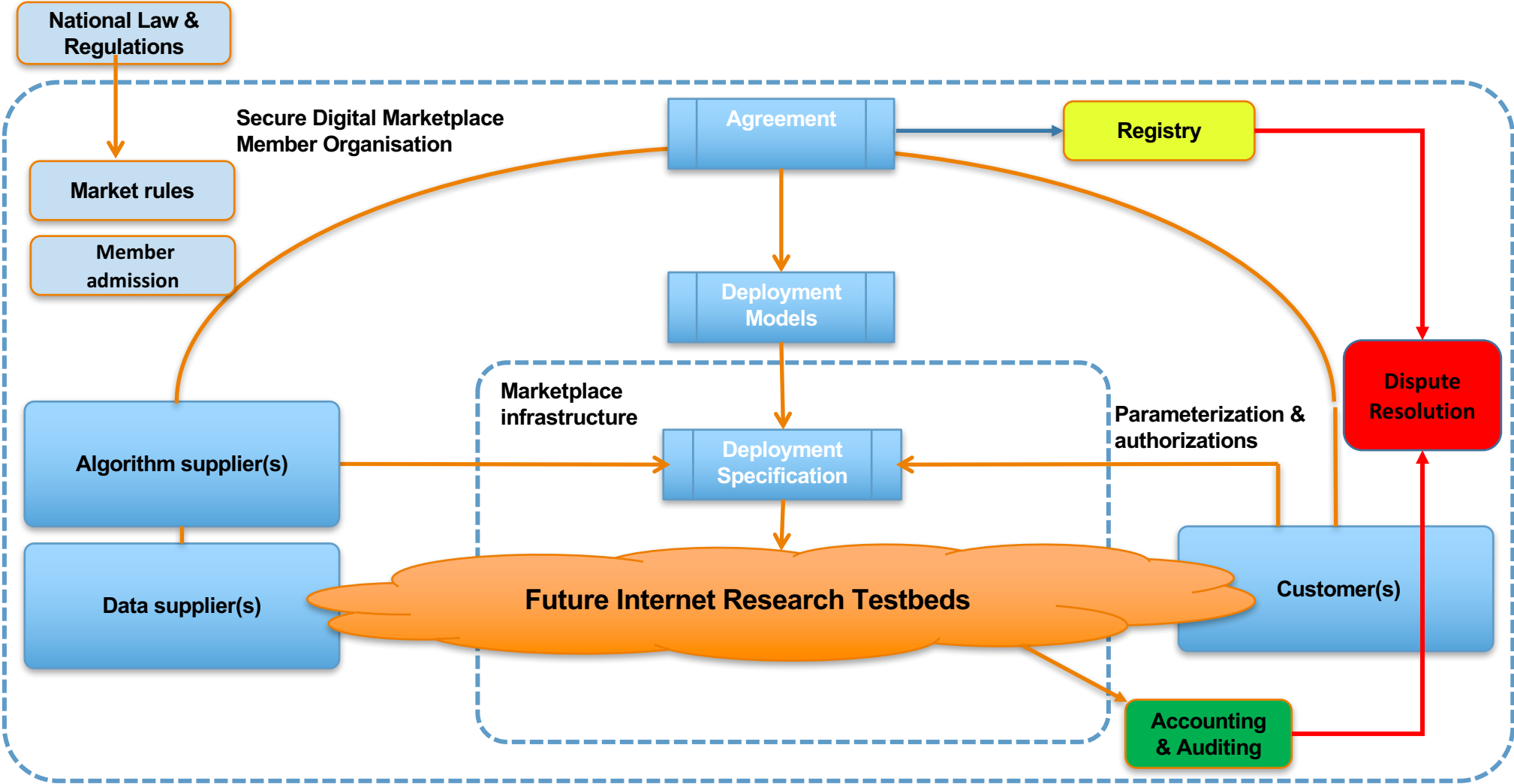
UvA/KLM and NSF Pacific Research Platform Testbed

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

ExoGENI Testbed

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Steps to establish Digital Market Places based on generic principles

Ent A

Ent B

Ent C

Ent D

Evangelizing

Research & Experiment

Requirements

Technology & Service providers

Establish a common benefit

Way of Business based on consensus

Institutiona-lize as Membership Organisation

DMaaS

SAE HM-1
Work on IVHM

SAE HM-1
ARP 6904
Document

Airline
Consortium

Equinix as constructor of digital market place Infrastructures as a service available to any organisation

Operational Market place Owned by Airline Consortium

Current actions in airline context >>

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