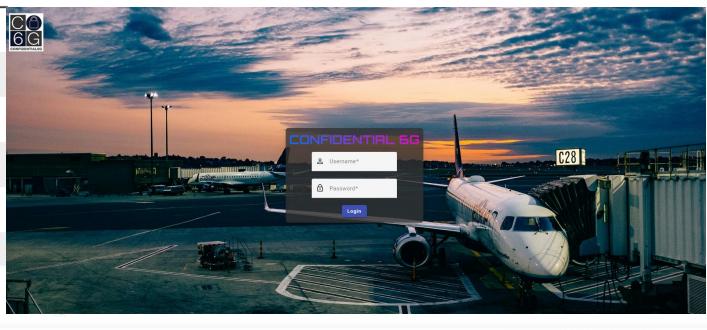**CO6G**
CONFIDENTIAL6G

6GSNS

Confidential Computing and Privacy-preserving Technologies for 6G

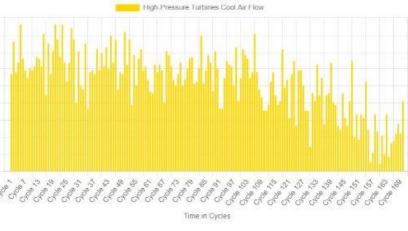## Predictive maintenance for airline consortium

- **Goals:**
  - Implementation of a platform for secure and trackable data sharing between aviation companies, manufacturers, regulation bodies and other relevant organisations.
  - Enable predictive maintenance, driven by AI/ML, on top of shared data.

- **Demo:**
  - Utilisation of NASA C-MAPSS dataset generated by aircraft engine simulation models
    - contains four sub-datasets that correspond to different simulation conditions and engine failure modes
  - Use of Random Forest Classifier for getting results in Classical ML model and Federated Learning

Time in Cycles	Fan Inlet Temperature (°R)	LPC Outlet Temperature (°R)	HPC Outlet Temperature (°R)	LPT Outlet Temperature (°R)	Fan Inlet Pressure (psia)	...
1	518.67	642.39	1586.1	1402.11	14.62	21.
2	518.67	642.43	1592.56	1406.54	14.62	21.
3	518.67	642.5	1587.14	1403.33	14.62	21.
4	518.67	642.5	1594.4	1409.25	14.62	21.
5	518.67	642.81	1584.77	1410.35	14.62	21.

Total temperature at LPC outlet
Total temperature at HPC outlet
Total temperature at LPT outlet
Total pressure at HPC outlet
Physical fan speed
Physical core speed
Static pressure at HPC outlet
Ratio of fuel flow to Ps30
Corrected fan speed
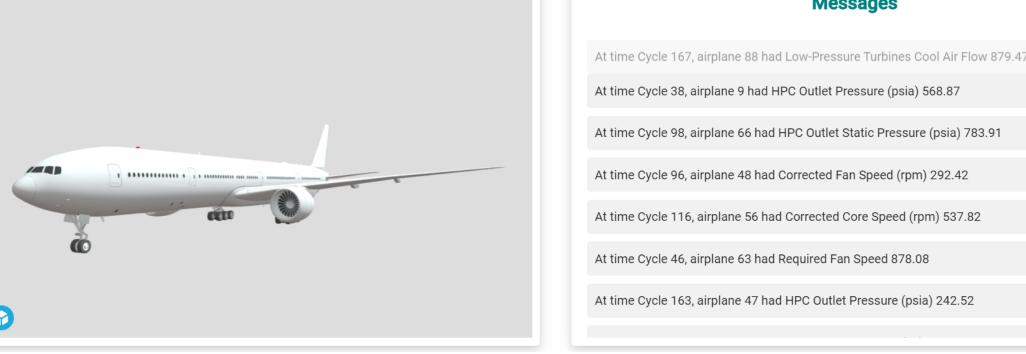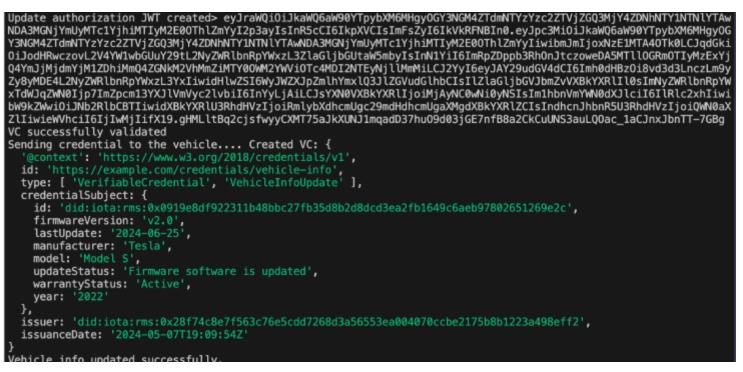Corrected core speed
Bypass ratio
Bleed enthalpy
HPT coolant bleed l

Messages

At time Cycle 167, airplane 88 had Low-Pressure Turbines Cool Air Flow 879.47
At time Cycle 38, airplane 9 had HPC Outlet Pressure (psia) 568.87
At time Cycle 98, airplane 66 had HPC Outlet Static Pressure (psia) 783.91
At time Cycle 96, airplane 48 had Corrected Fan Speed (rpm) 292.42
At time Cycle 116, airplane 56 had Corrected Core Speed (rpm) 537.82
At time Cycle 46, airplane 63 had Required Fan Speed 878.08
At time Cycle 163, airplane 47 had HPC Outlet Pressure (psia) 242.52

Dashboard for predictive maintenance for airline consortium

Intelligent connected vehicles

- **Goals:**
  - provide mission-critical services in the context of secure Vehicle to Infrastructure (V2I) communications, and OTA (over-the-air) vehicle system updates, with distributed learning.
  - Simulation with car modules (e.g., autoPI Raspberry Pi) deployed in vehicles, with SIM 4G/5G interface.

Vehicle OTA updates with Decentralized identities (DIDs) and Verifiable Credentials (VCs)

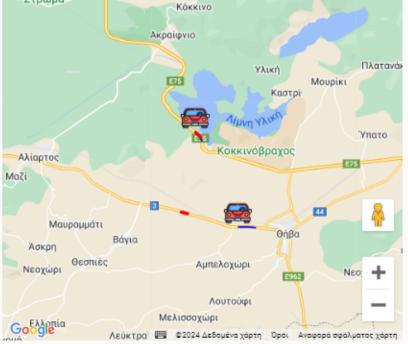 - Collection of data from a number of vehicles to perform AI/ML based on the data shared among the vehicles and the roadside
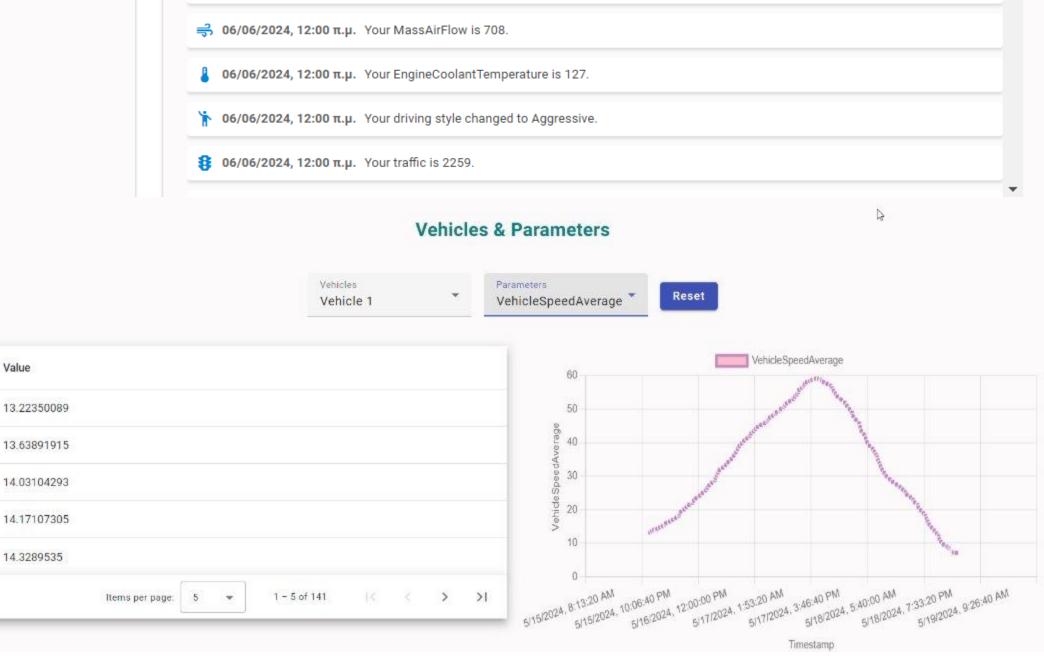
- **Demo:**
  - OTA updates with DIDs and Verifiable credentials
  - Utilisation of open data set from different vehicles on traffic, driving style and road surface condition dataset
  - Use Random Forest Classifier for getting results Classical ML model and Federated Learning

Map

Messages

06/04/2024 11:15 AM Your driving style changed to Aggressive.
06/04/2024 11:30 AM Your EngineRPM is 2104.
06/04/2024 11:45 AM Your driving style changed to EvenPace.
06/06/2024, 12:00 π.μ. Your MassAirFlow is 708.
06/06/2024, 12:00 π.μ. Your EngineCoolantTemperature is 127.
06/06/2024, 12:00 π.μ. Your driving style changed to Aggressive.
06/06/2024, 12:00 π.μ. Your traffic is 2259.

Vehicles & Parameters

Vehicles: Vehicle 1   Parameters: VehicleSpeedAverage   Reset

Value
13.22350089
13.63891915
14.03104293
14.17107305
14.3289515

Dashboard for intelligent connected vehicles