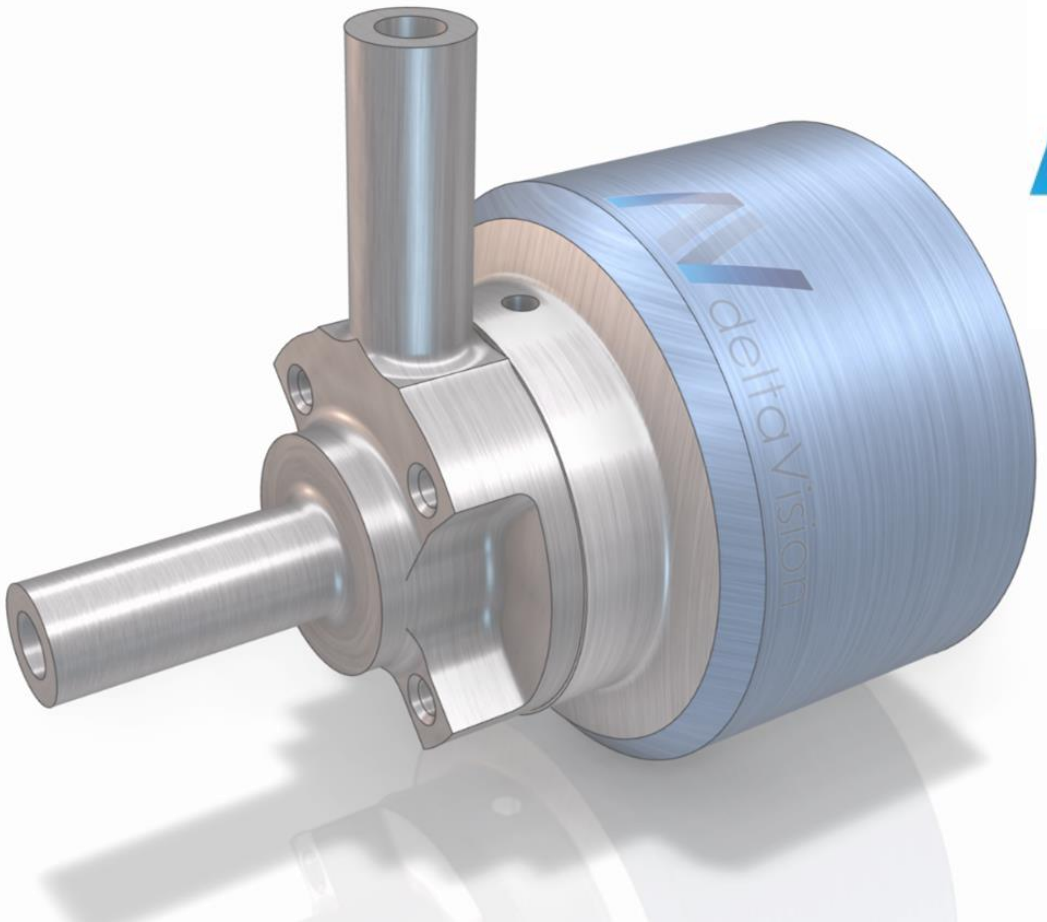


deltaVision

fluid control & aerospace

3DEXPERIENCE Conference

October 2023

Alex Plebuch
Co-Founder & CEO

deltaVision IN A NUTSHELL

GmbH founded on 26th of July 2022

Dr. Denis Kiefel
COO
12y+ in aerospace

SW, HW & Electronics
Site Manager

Airbus

Alex Plebuch
CEO
10y+ in aerospace

Liquid Propulsion
System Engineer

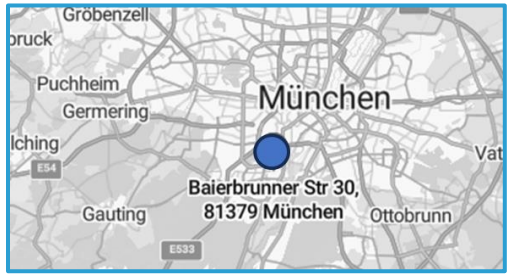
Ariane Group

Matthias Günther
CTO
15y+ in aerospace

Design Engineer
Valve Design Expert

Ariane Group

- Pre-Seed phase
- 14 employees (in 09/23)
- 7 commercial customers
- 630m2 facility



Company Status

1st major commercial contract 12/2022

1st product delivery 04/2023

Production facility 06/2023

Q3/2023 Seed (~1,2M€)

Spaceflight! Q1/2024

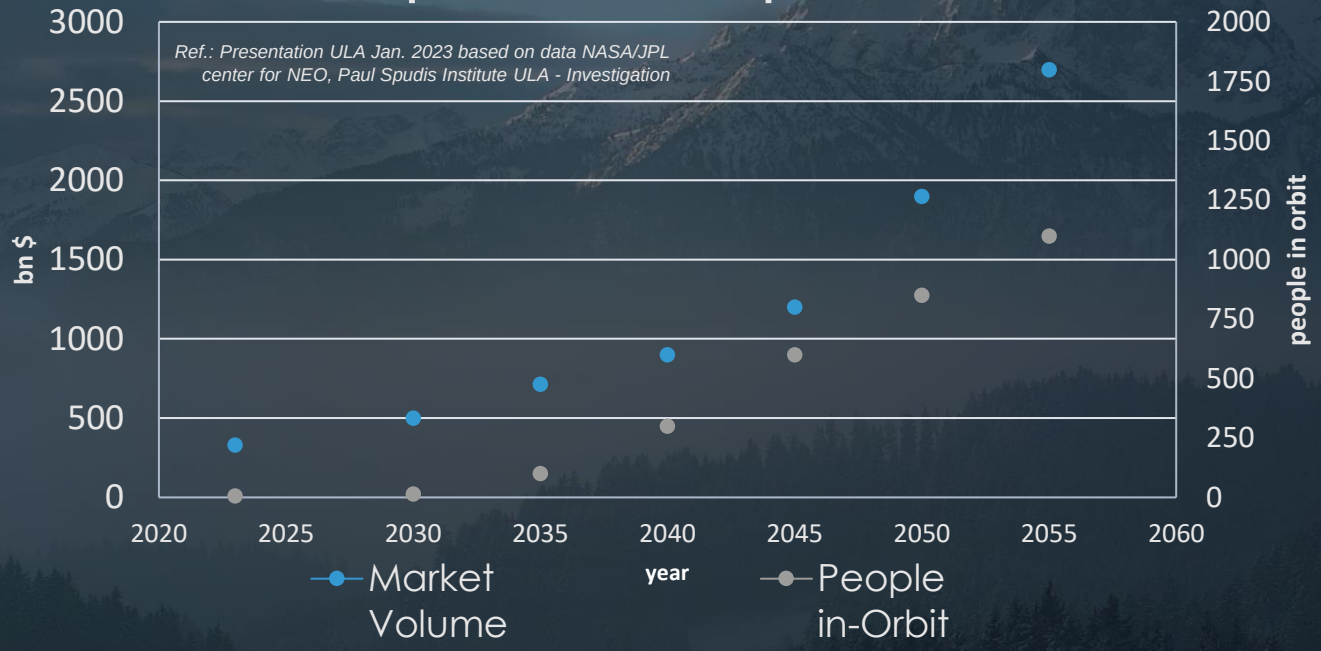
Business/ Operations

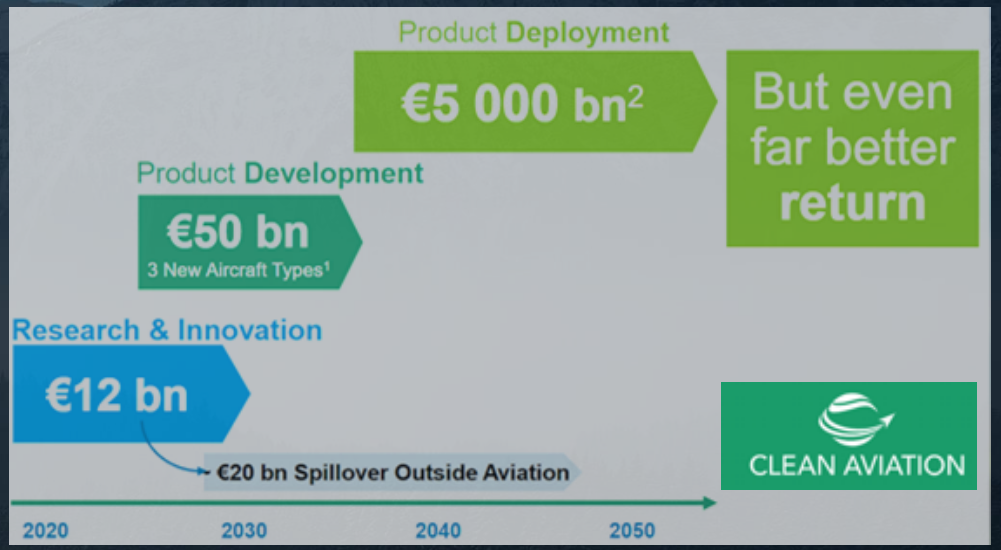
~**1M€** revenues
& **15 FTE**
in **2023**

Funding

Megatrends

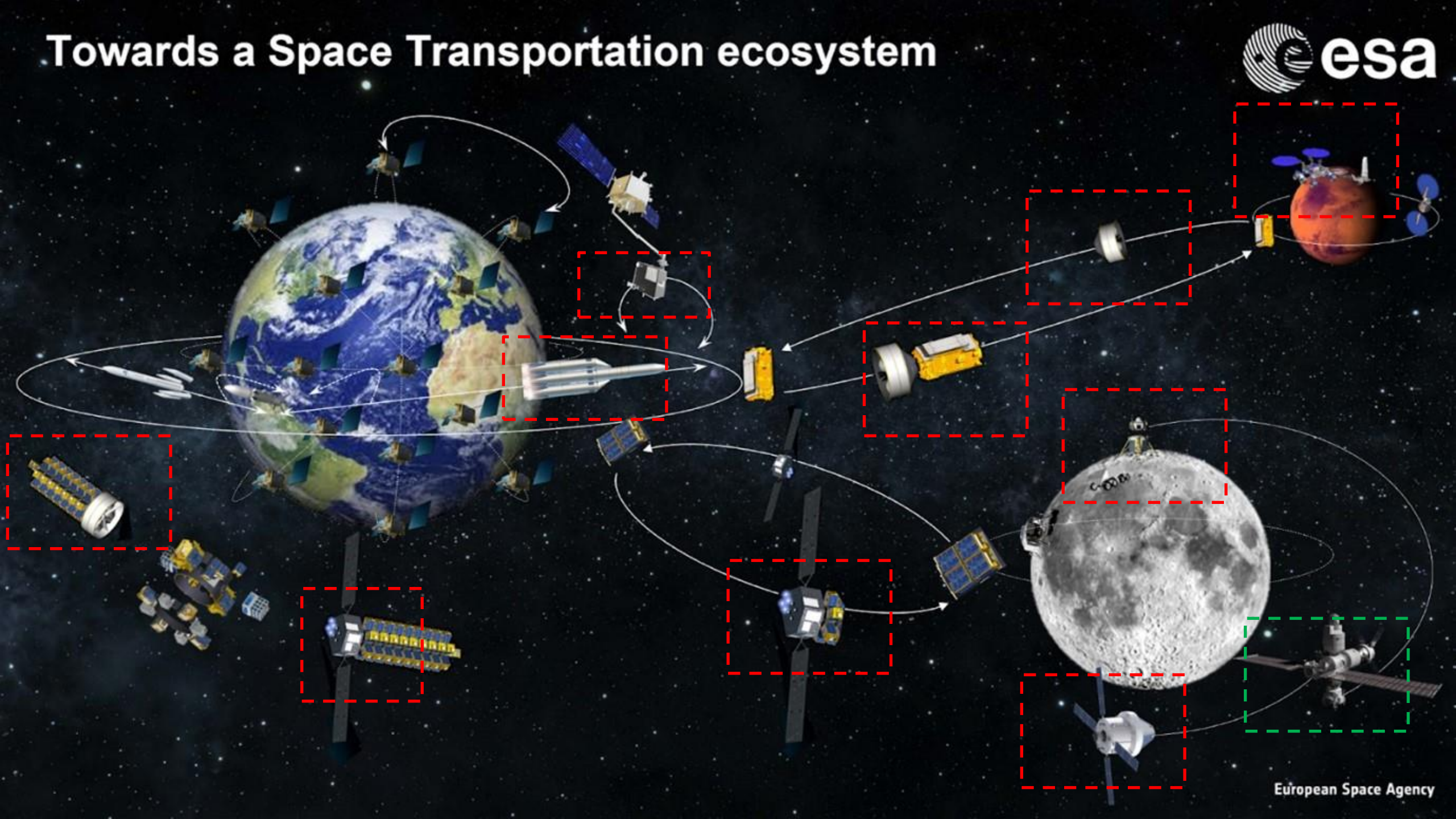
the Prospect in Space & H2 Aeronautics





New Eco-Systems & Use-Cases feed & require **innovation and cost-efficiency on all levels**

Towards a Space Transportation ecosystem



European Space Agency

CLEAN AVIATION

Co-funded by the European Union

deltaVision core know-how

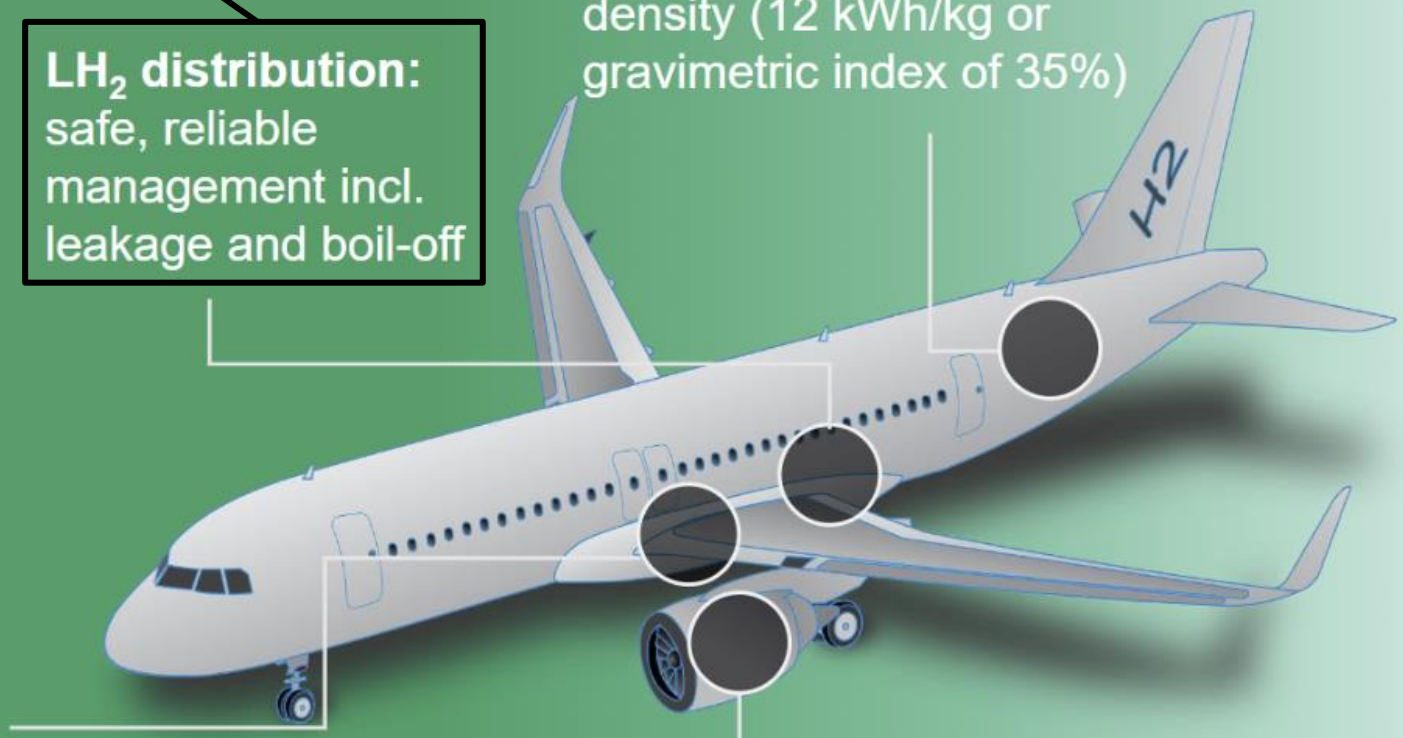
H2 Aircraft design: four technology challenges…

Timeframe 2035

Exemplary picture

LH_2 distribution: safe, reliable management incl. leakage and boil-off

LH_2 tanks: 2x higher energy density (12 kWh/kg or gravimetric index of 35%)



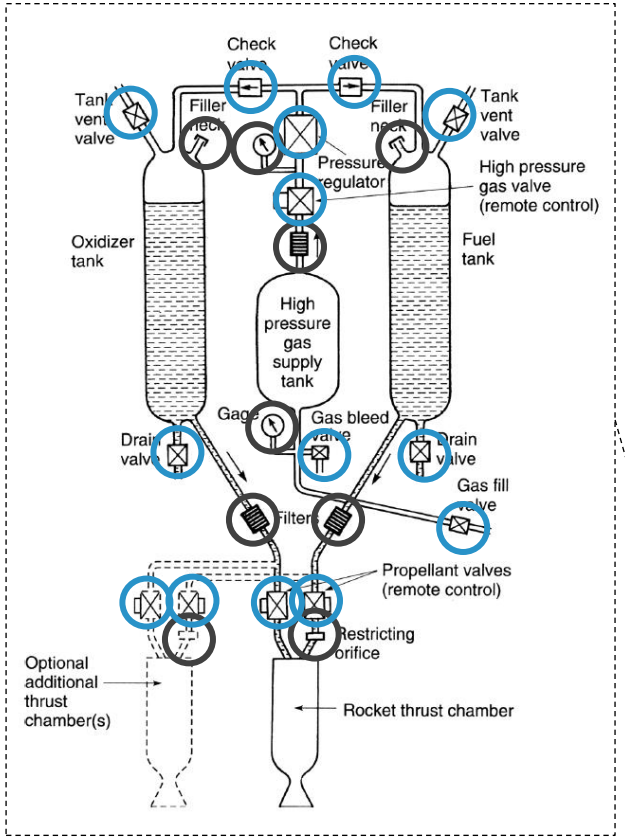
Fuel cell system: 2-3x higher power density (2kW/kg), high life-time

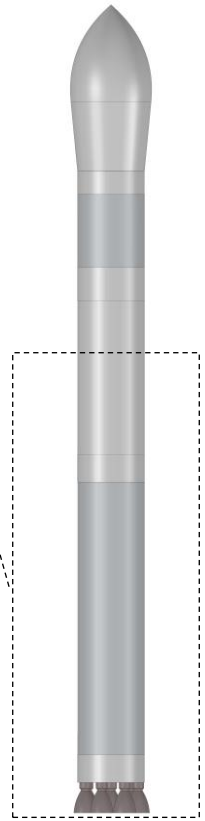
H_2 turbines: high efficiency and low NOx emissions

- Around 5B$ of funding in Europe
- Japan announced around 35B$ of funding
- Several start-ups with Multi-M$ VC

Rising demand in (cryogenic) Fluid Control

FUNCTIONAL PROPULSIVE SYSTEMS = FUEL DISTRUBUTION SYSTEMS





○ valves ○ other equipment

Credits: ESA

Credits: Airbus

Functional propulsive systems make **25-50% of total propulsion system costs**

Problem

Rising demand but lack of suppliers
High prices
Long production
Limited innovation

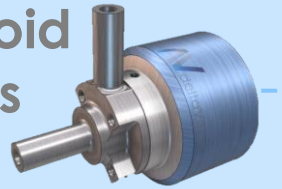
Solution

Specialized Supplier
Embedded Solutions
Low prices & leadtimes
Scalable Products
Feeding New Eco-System

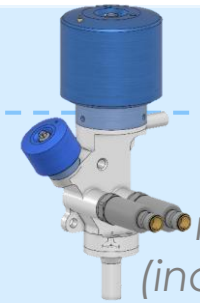
Main Product Families & Roadmap*

deltaVision

Solenoid Valves

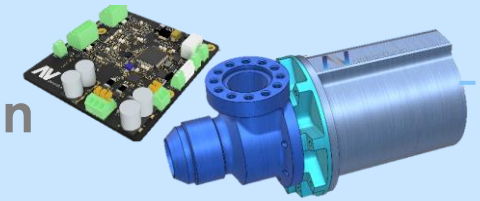


Health Monitoring



Pressure regulators (incl. controller)

E-Motor Regulation Valves



all media

< 1000bar

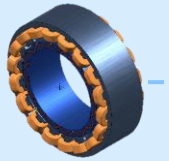
4k – 450K

embedded

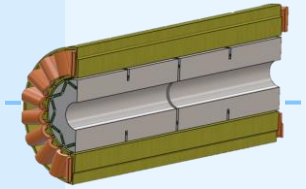
all sizes

environment

(Cryogenic) Space Rated BLDC Motors

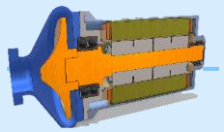


Lower Power Class (0,1-5kW)

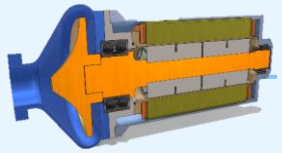


Higher Power Class (>5kW)

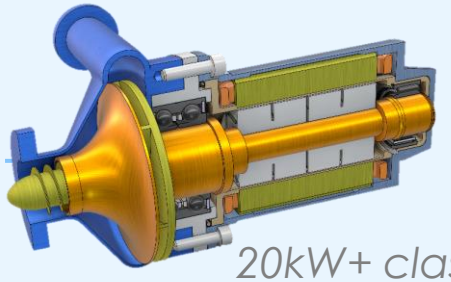
E-Pumps



0,5kW class (storable)



2-10kW class (cryogenic ready)



20kW+ class (cryogenic)

*achievement of **MVP testing** visualized

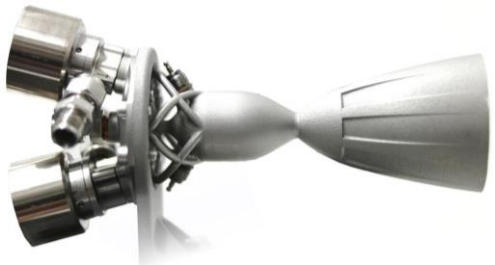
2023 **2024** **2025**

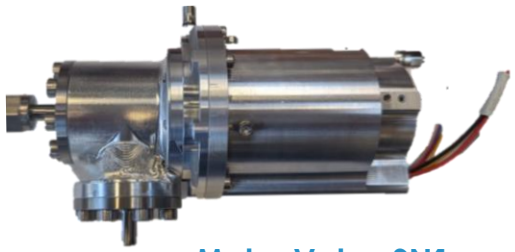
Building Hardware & Electronics

E-Motor Testbench

EV DN4 Cryo Test

Solenoid Valves on customer‘s orbital engine

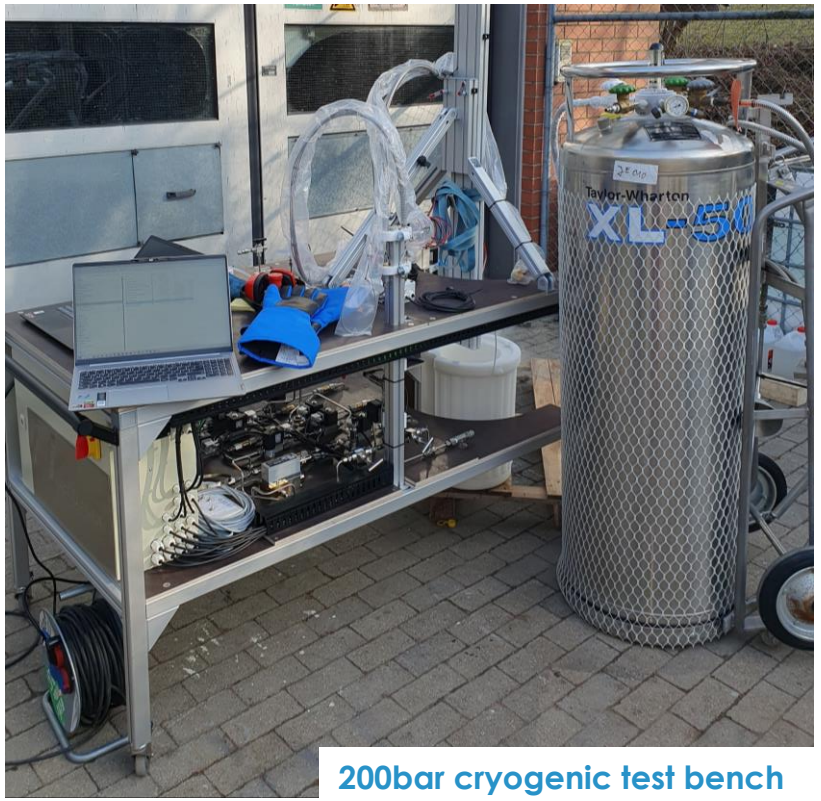




Motor Valve SN1

EV DN2 Cryo Test

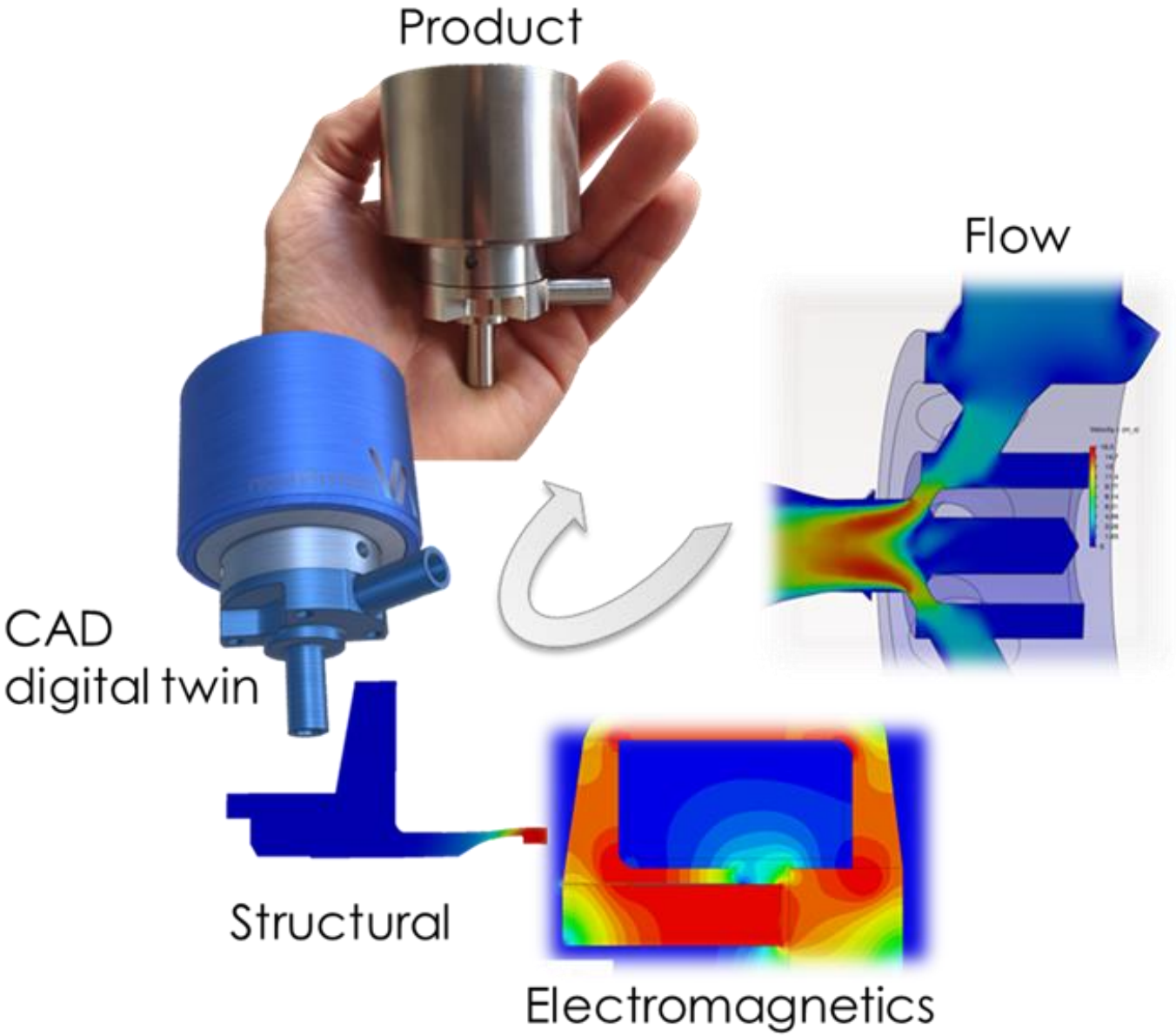
Motor Controller Thermal Peaks



200bar cryogenic test bench

EV DN2 Delivery

Development process



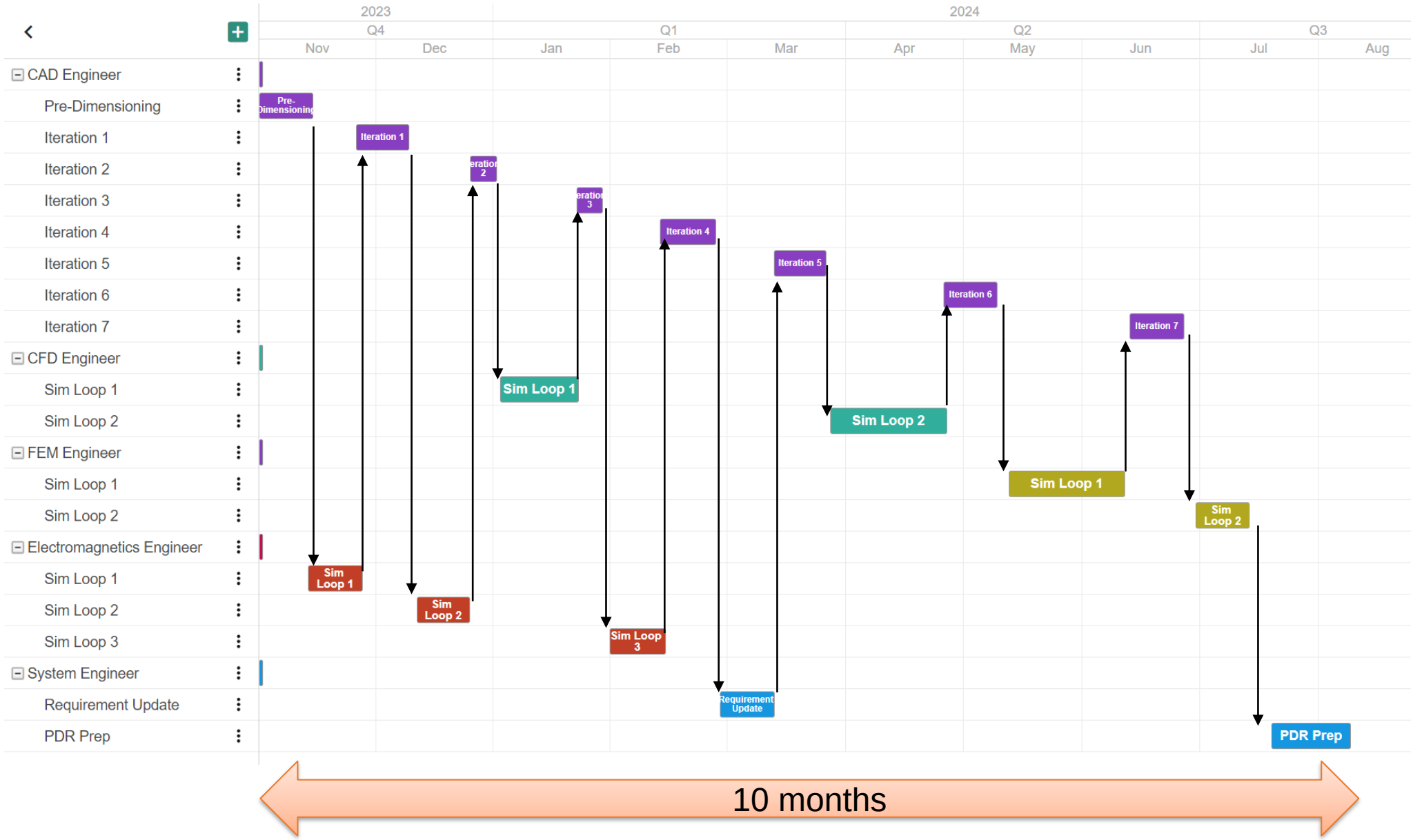
Development process 4real

Specialist 1

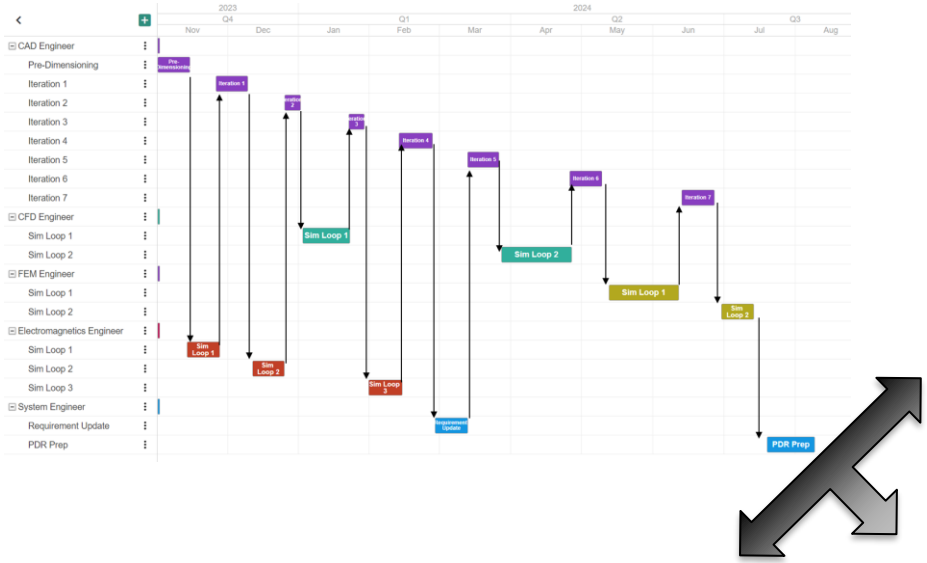
Specialist 2

Specialist 3

Specialist 4



Effects of "*Bunkered Development Cycles*"



Product/ Project

- Low product maturity = High risk
- Waste due to many project interfaces
- Very high chance of delays

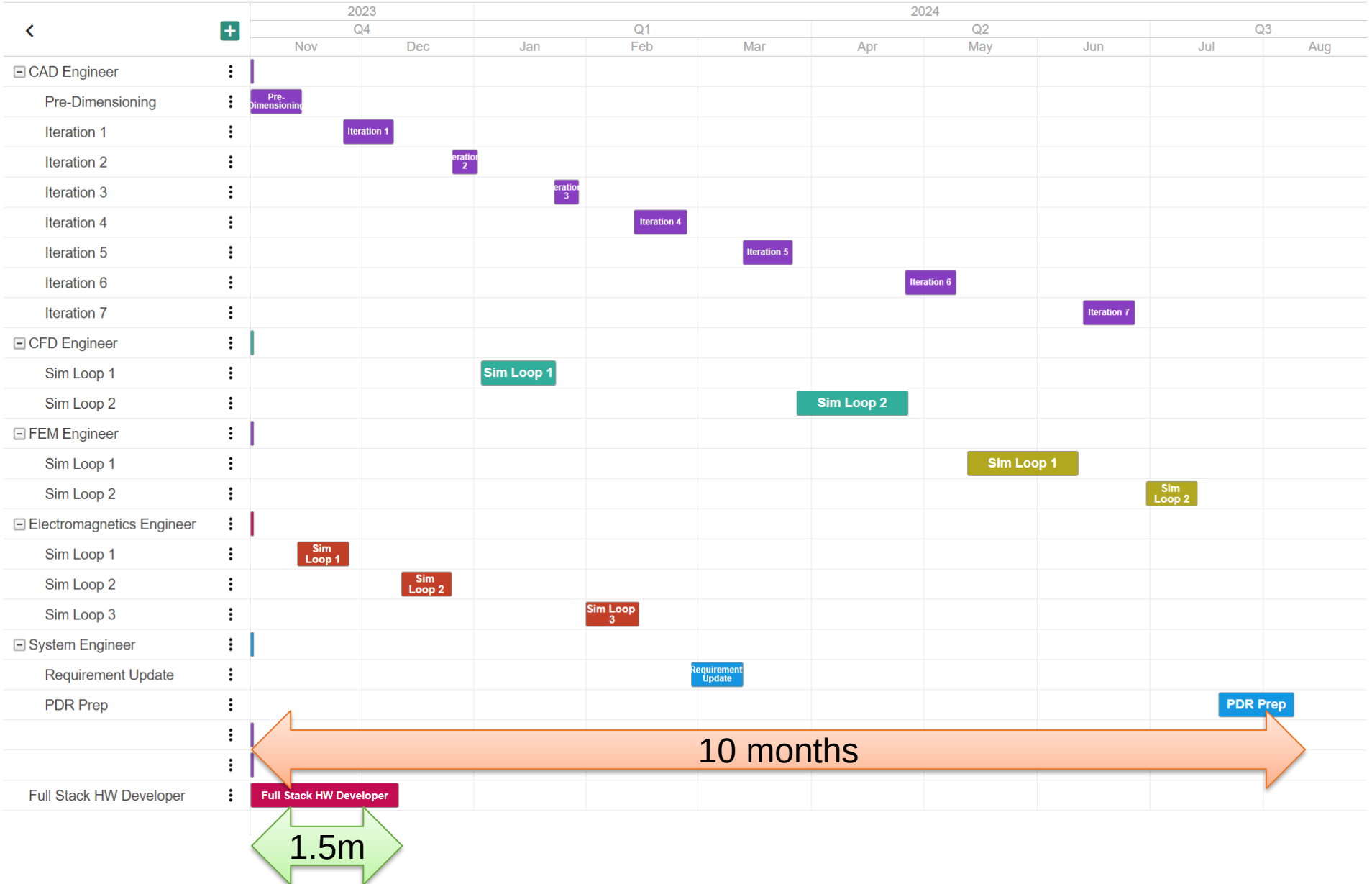
Employees

- Limited product understanding of single engineers
- Low product identification
- Workload unsteadiness
- Limited accountability

Eco-System

- Poor productivity
- High stress level

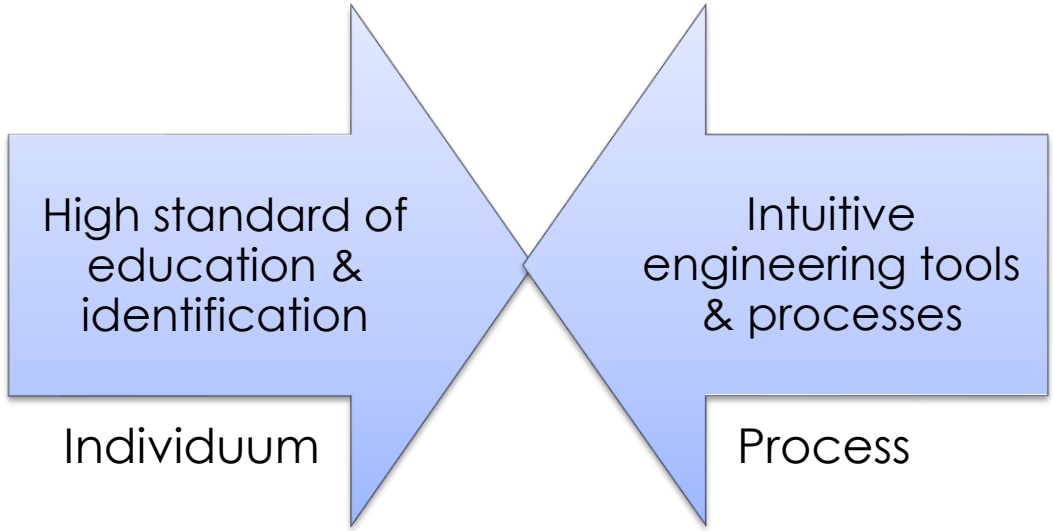
Development Process - Retex

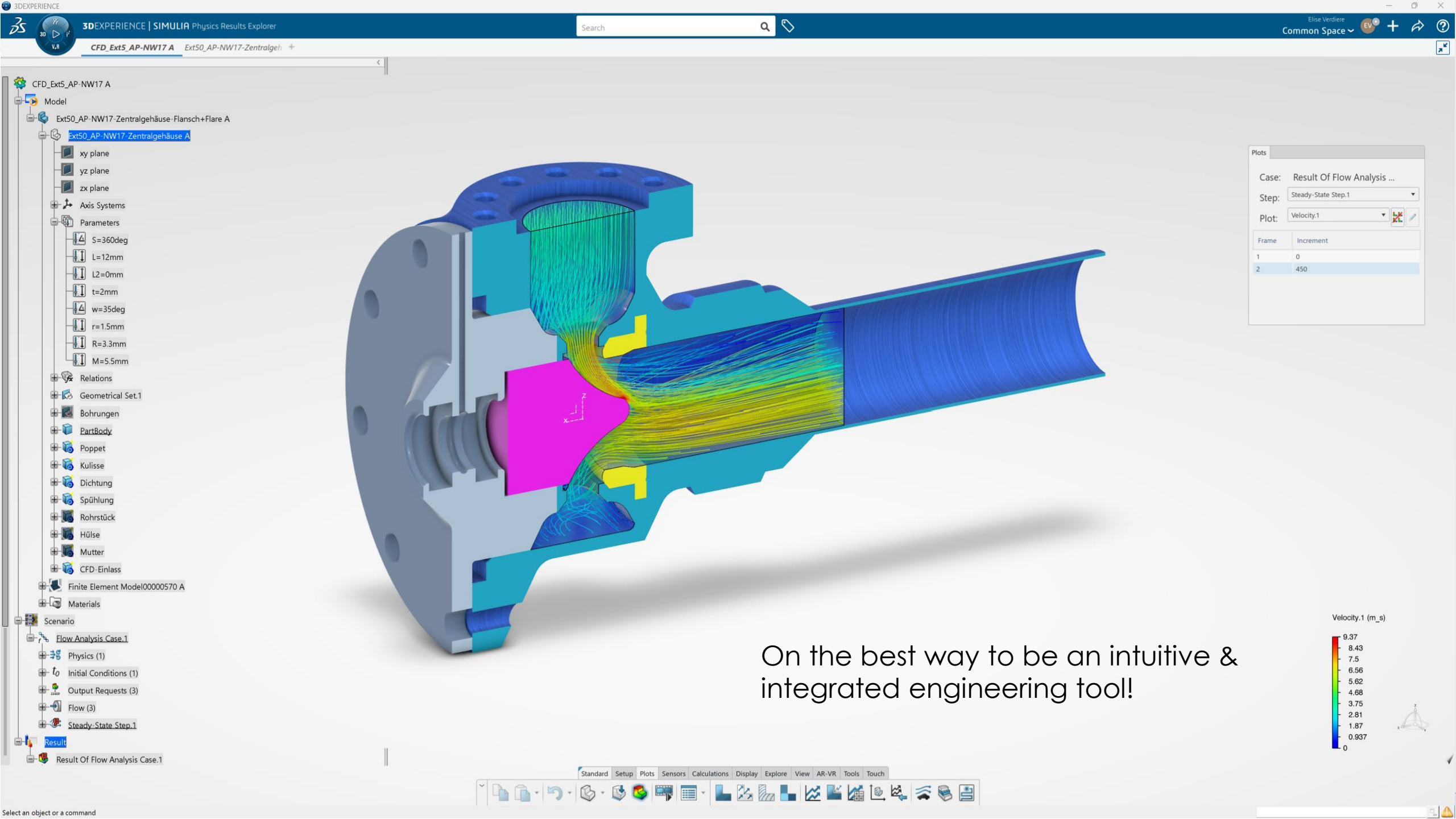


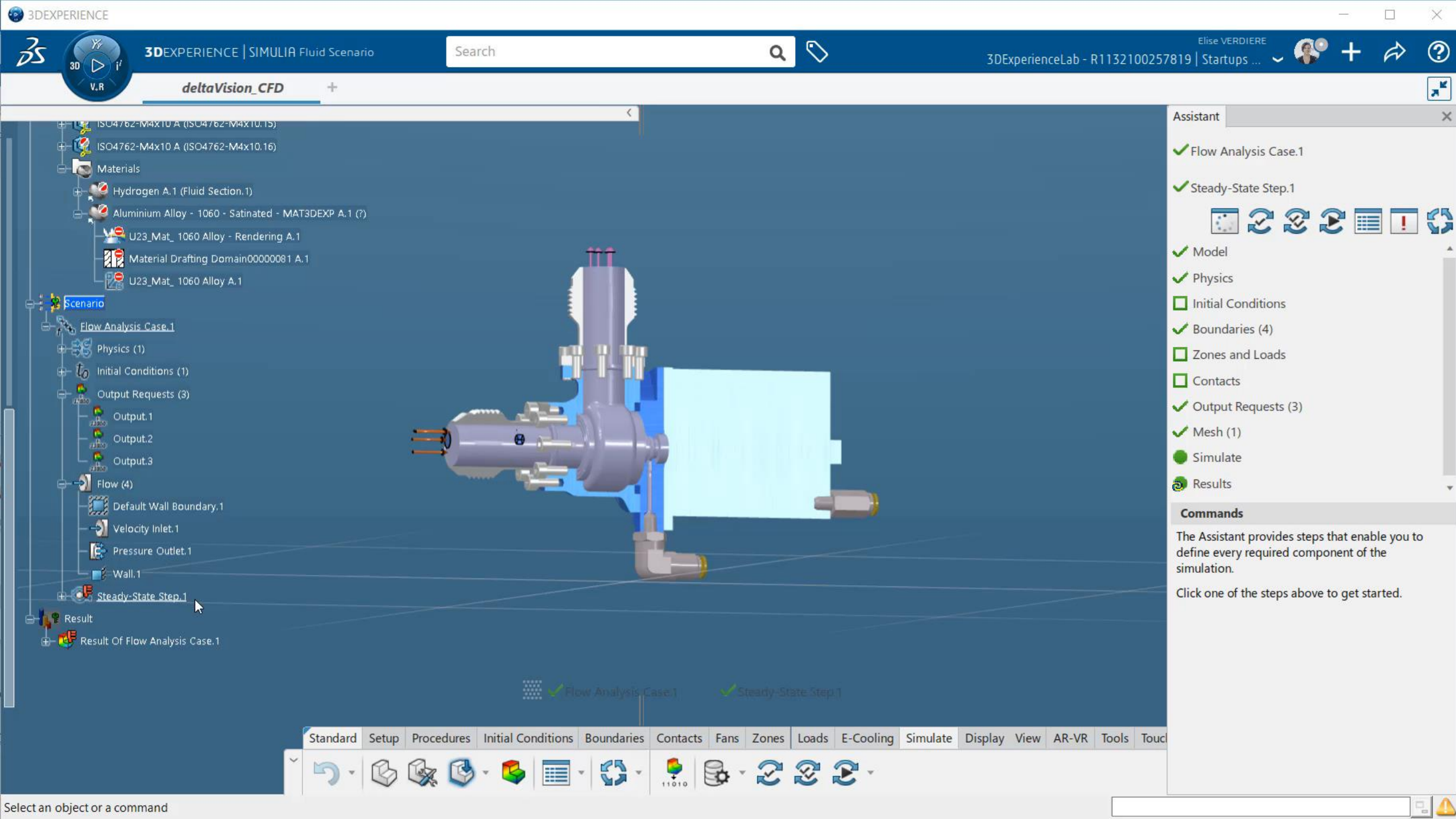
Full Stack HW developers are

- **Knowledgeable** on the product & all relevant engineering disciplines involved
- **Accountable** for the product performance & quality
- **Empowered** by management

How to master such complexity as single Engineer?

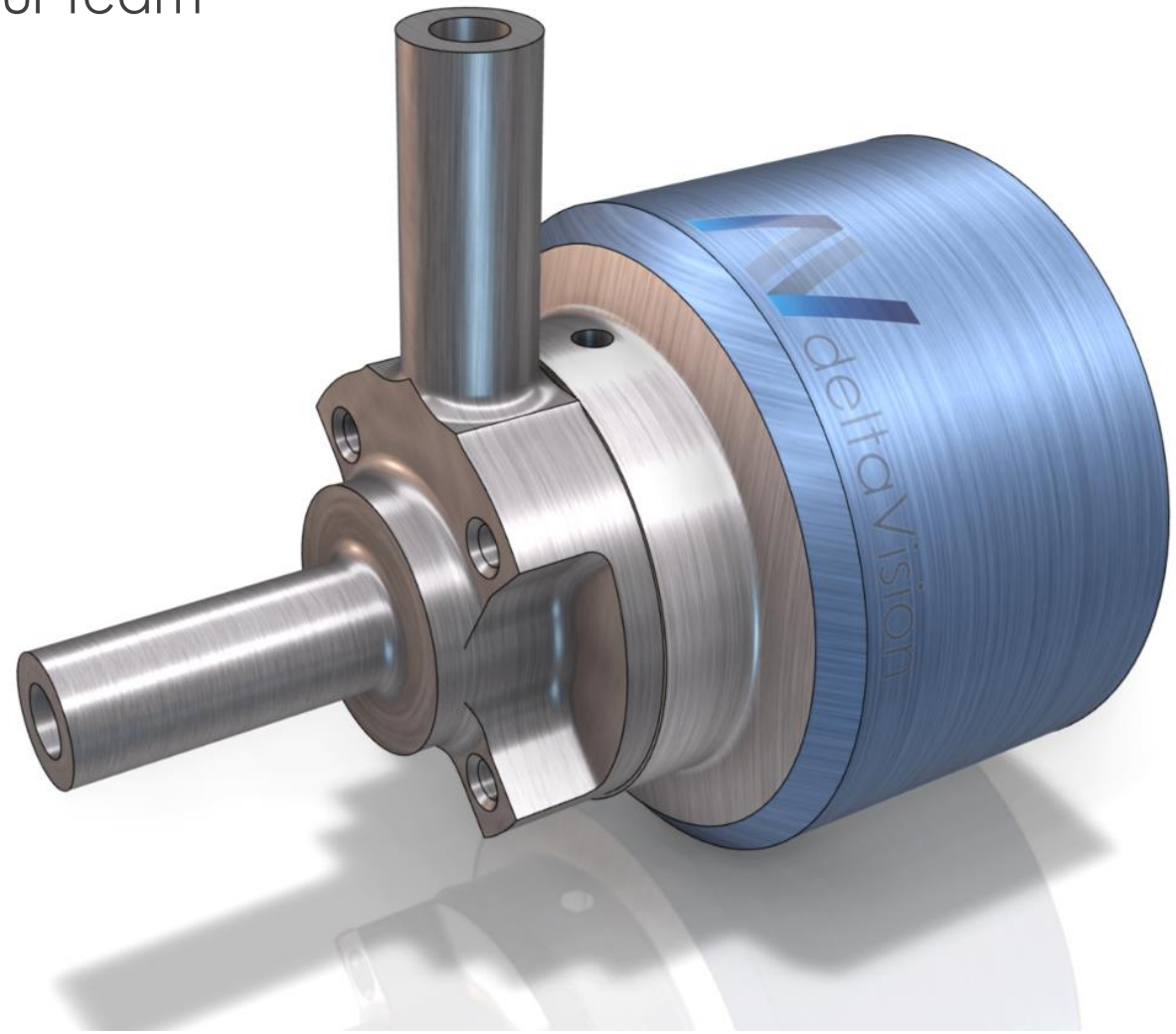



3DEXPERIENCE | SIMULIA Physics Results Explorer
Search
Elise Verdiere
Common Space
CFD_Ext5_AP-NW17 A
Ext50_AP-NW17-Zentralgeh
CFD_Ext5_AP-NW17 A
Model
Ext50_AP-NW17-Zentralgehäuse-Flansch+Flare A
Ext50_AP-NW17-Zentralgehäuse A
xy plane
yz plane
zx plane
Axis Systems
Parameters
S=360deg
L=12mm
L2=0mm
t=2mm
w=35deg
r=1.5mm
R=3.3mm
M=5.5mm
Relations
Geometrical Set.1
Bohrungen
PartBody
Poppet
Kulisse
Dichtung
Spühlung
Rohrstück
Hülse
Mutter
CFD-Einlass
Finite Element Model00000570 A
Materials
Scenario
Flow Analysis Case.1
Physics (1)
Initial Conditions (1)
Output Requests (3)
Flow (3)
Steady-State Step.1
Result
Result Of Flow Analysis Case.1
Plots
Case: Result Of Flow Analysis ...
Step: Steady-State Step.1
Plot: Velocity.1
Frame
Increment
1
0
2
450
Velocity.1 (m_s)
9.37
8.43
7.5
6.56
5.62
4.68
3.75
2.81
1.87
0.937
0
On the best way to be an intuitive & integrated engineering tool!
Standard
Setup
Plots
Sensors
Calculations
Display
Explore
View
AR-VR
Tools
Touch
Select an object or a command


3DEXPERIENCE
3DEXPERIENCE | SIMULIA Fluid Scenario
Search
Elise VERDIERE
3DExperienceLab - R1132100257819 | Startups ...
deltaVision_CFD
ISO4762-M4x10 A (ISO4762-M4x10.16)
Materials
Hydrogen A.1 (Fluid Section.1)
Aluminium Alloy - 1060 - Satinated - MAT3DEXP A.1 (?)
U23_Mat_ 1060 Alloy - Rendering A.1
Material Drafting Domain00000081 A.1
U23_Mat_ 1060 Alloy A.1
Scenario
Flow Analysis Case.1
Physics (1)
Initial Conditions (1)
Output Requests (3)
Output.1
Output.2
Output.3
Flow (4)
Default Wall Boundary.1
Velocity Inlet.1
Pressure Outlet.1
Wall.1
Steady-State Step.1
Result
Result Of Flow Analysis Case.1
Assistant
Flow Analysis Case.1
Steady-State Step.1
Model
Physics
Initial Conditions
Boundaries (4)
Zones and Loads
Contacts
Output Requests (3)
Mesh (1)
Simulate
Results
Commands
The Assistant provides steps that enable you to define every required component of the simulation.
Click one of the steps above to get started.
Standard
Setup
Procedures
Initial Conditions
Boundaries
Contacts
Fans
Zones
Loads
E-Cooling
Simulate
Display
View
AR-VR
Tools
Select an object or a command

When you have full stack HW developers in your team

deltaVision



- 10 weeks from PO to delivery – starting from scratch
- Today: 2-4 weeks for a new product design

Conclusions & Recommendation

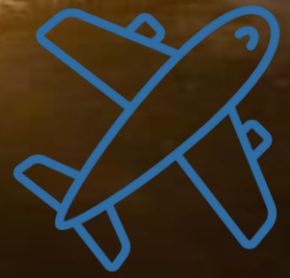
- Full stack HW developers have the power to create much more value than specialists
- For that, intuitive and integrated engineering tools are required

➔ To unleash its full potential, 3Dx needs to create licensing models that match this new way of engineering

deltaVision
fluid control & aerospace

THE FUTURE IS FLUID

AEROSPACE



AVIATION

TRANSPORTATION

Any ideas any time

alex@deltavision.space