

# HPC physics simulation at the heart of industry

June 28, 2016

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200

HIGHLY SKILLED  
EXPERTS

2400

CUSTOMERS

14

FAMOUS  
PARTNERS

50

COUNTRIES

500

LARGEST COMPANIES'  
SUPPLIER

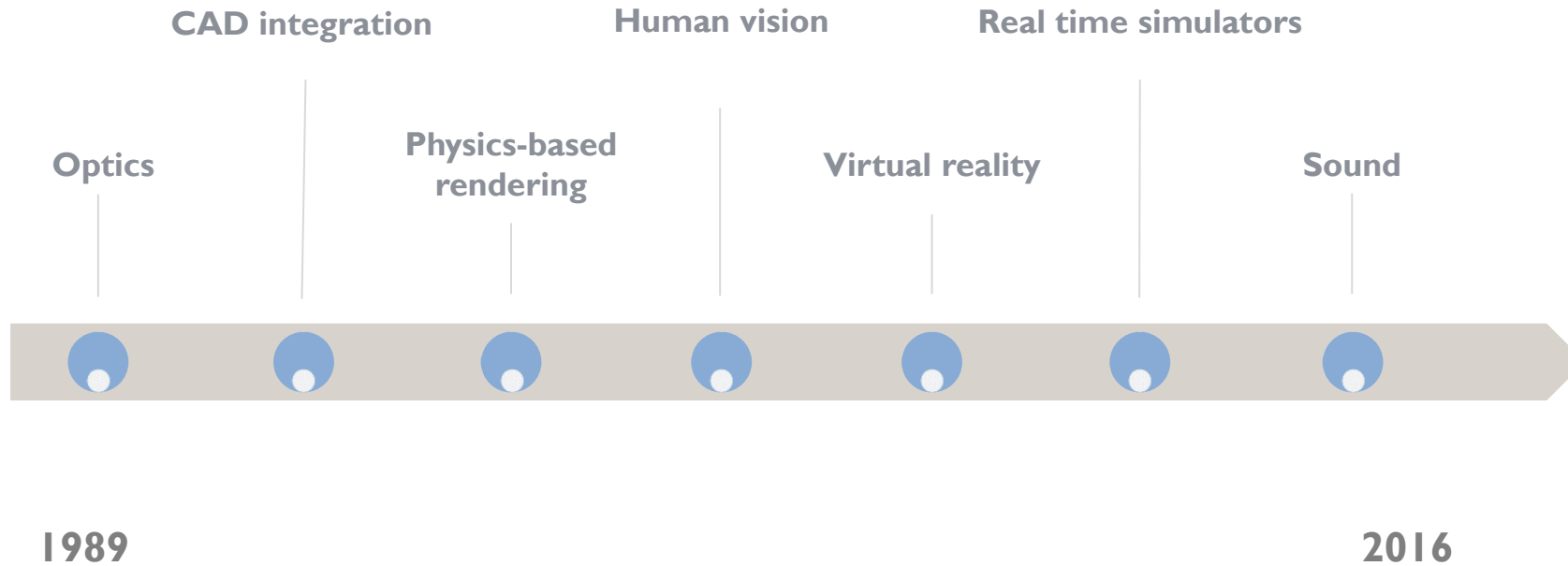
5

RESEARCH &  
DEVELOPMENT CENTERS

8100

LICENSES OVER  
THE WORLD

OPTIS,  
the power of a  
large company with  
the flexibility of a  
small business.



Optics



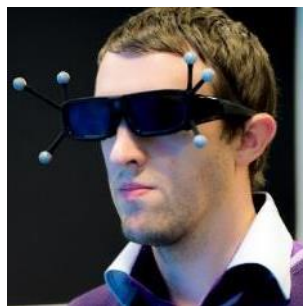
Virtual Reality



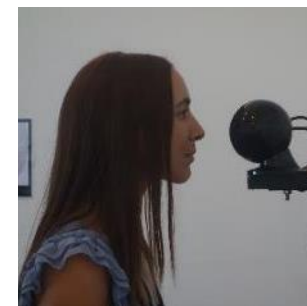
Acoustics



Computing



Simulators



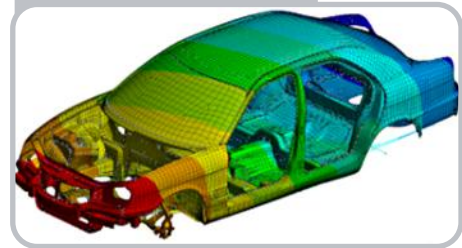
Perceived Quality



# PHYSICS SIMULATION

# What is the result I get if I do that in this situation ?

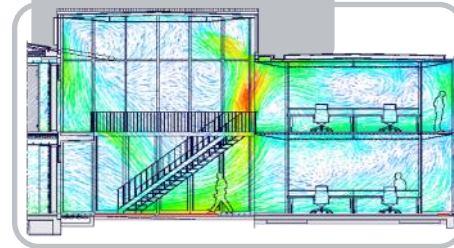
Crash tests



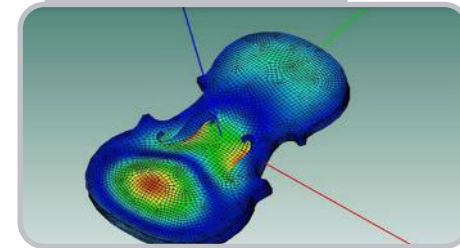
Medical



Thermal



Acoustics

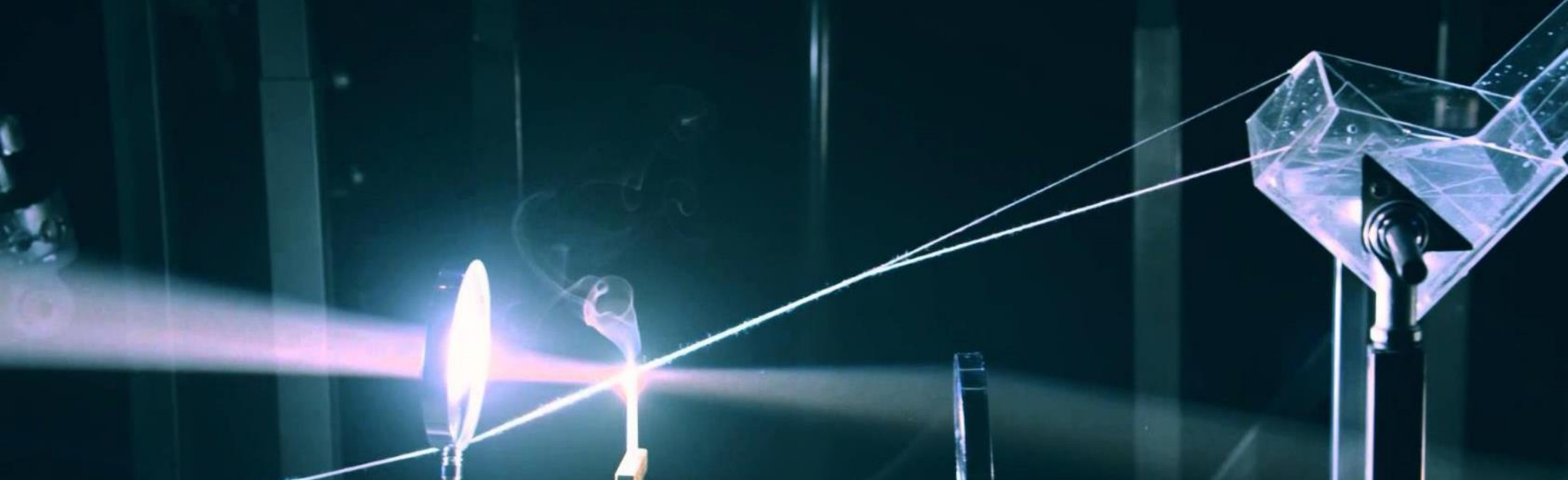


Simulation is necessary to replace real prototypes and experiences



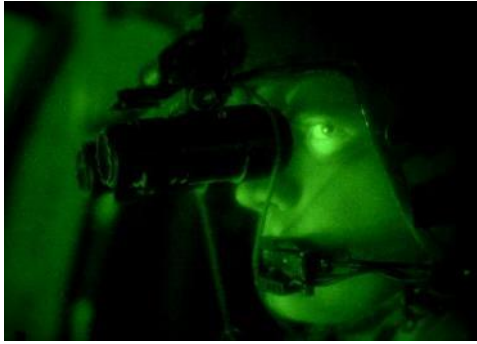
# Why performing numerical simulations?



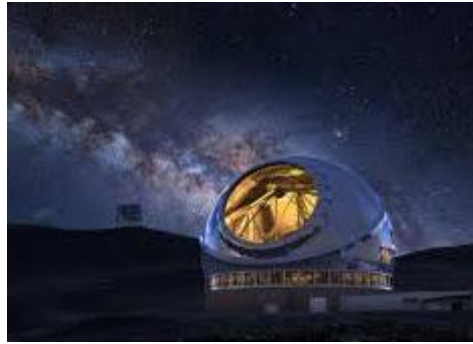


# OPTICAL SIMULATION





Defense



Science



Consumer goods



Lighting

# How does it work ?





# WHAT FOR ?



From **30 days** with real prototype to  
**4 days** with SPEOS



From **4 days** to  
**30 min** with SPEOS HPC (8 640 cores)

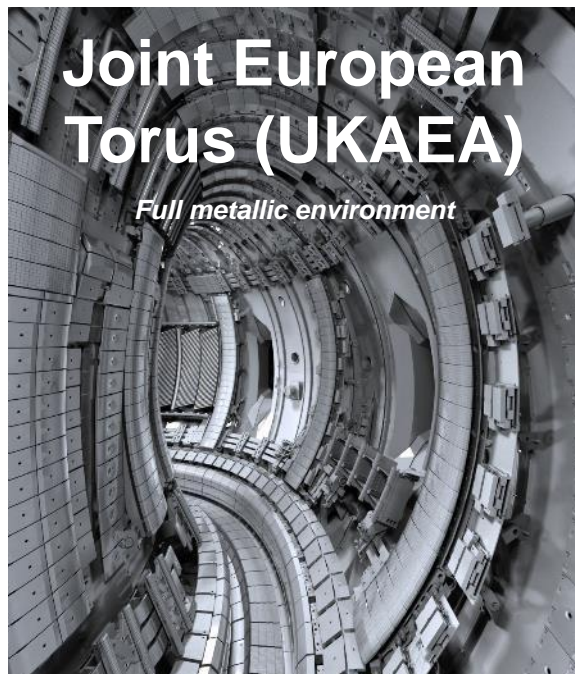
# Significant time savings on lighting simulation



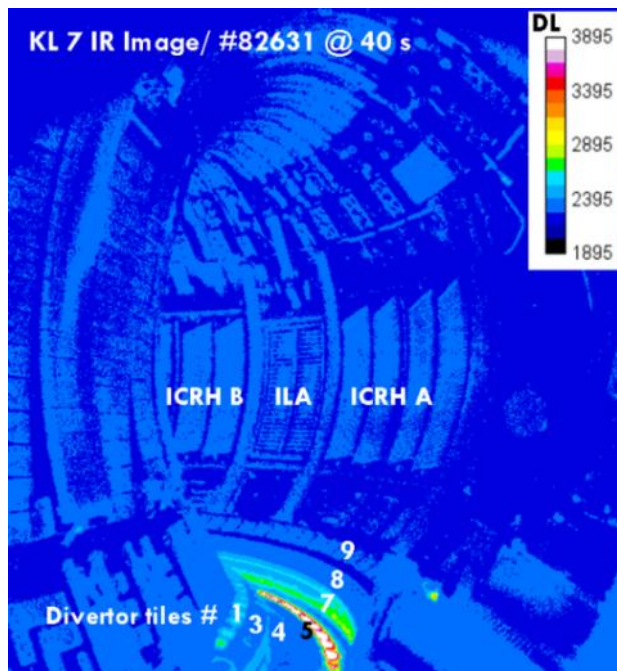
From  
**10 days**  
to  
**4 h**  
with **SPEOS HPC**  
(57 600 core.h)



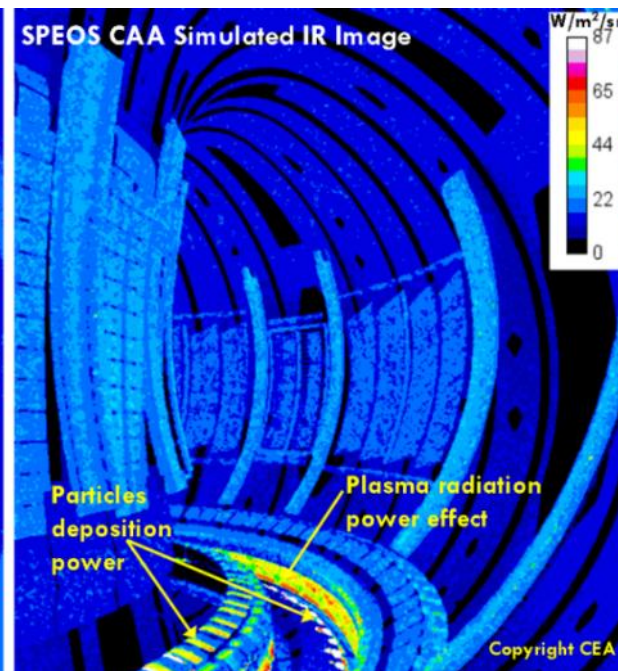
From **24 hours** to  
**1mn** with **SPEOS HPC** (8 640 cores)



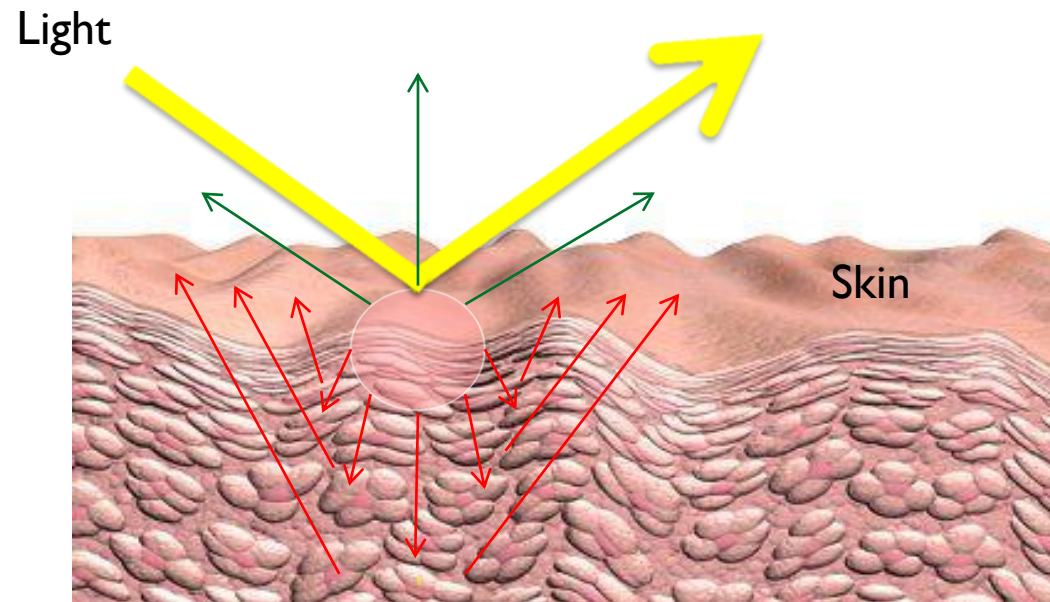
*JET measurement*

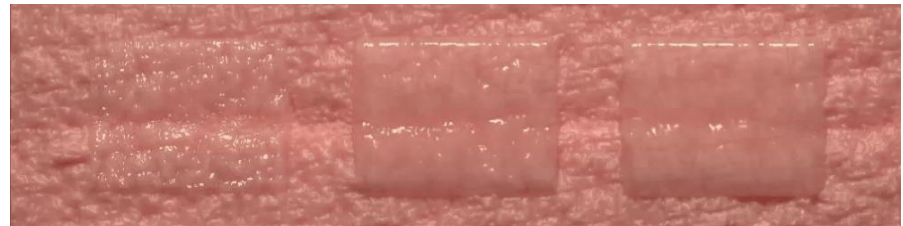
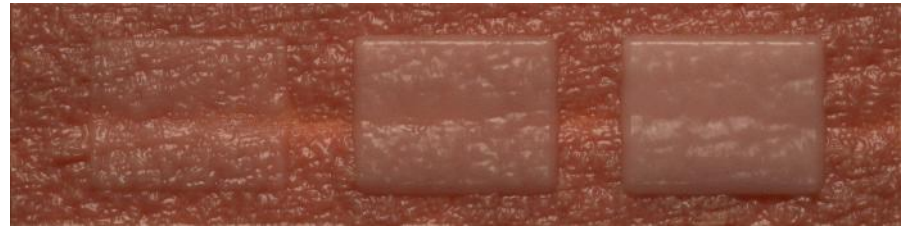


*JET SPEOS Simulation*



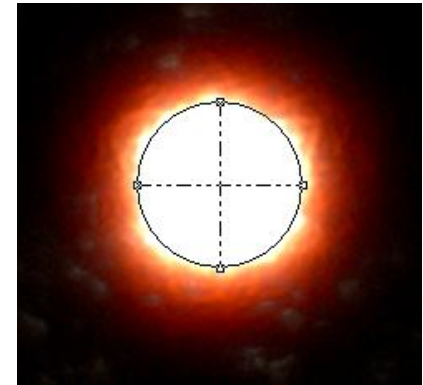
Aumeunier, M.-H et al., *Modeling of the ITER-like wide-angle infrared thermography view of JET*, Rev. Sci. Instruments 83, 10D522 (2012)





**Simulation time: 5H50  
Reduced to 16 mn**





# An example: At Bentley Motors



Simulated by OPTIS  
with the courtesy  
of Bentley Motors





● **FORECASTED**  
Virtual with **4** Physical Prototypes

● **FROM** 12 PHYSICAL PROTO  
+ **USD 2.10** million

● **ACTUAL** gain  
Extended Virtual + **2** Physical Proto  
**USD 0.28** million

**GLOBAL MULSANNE DEVELOPMENT =**

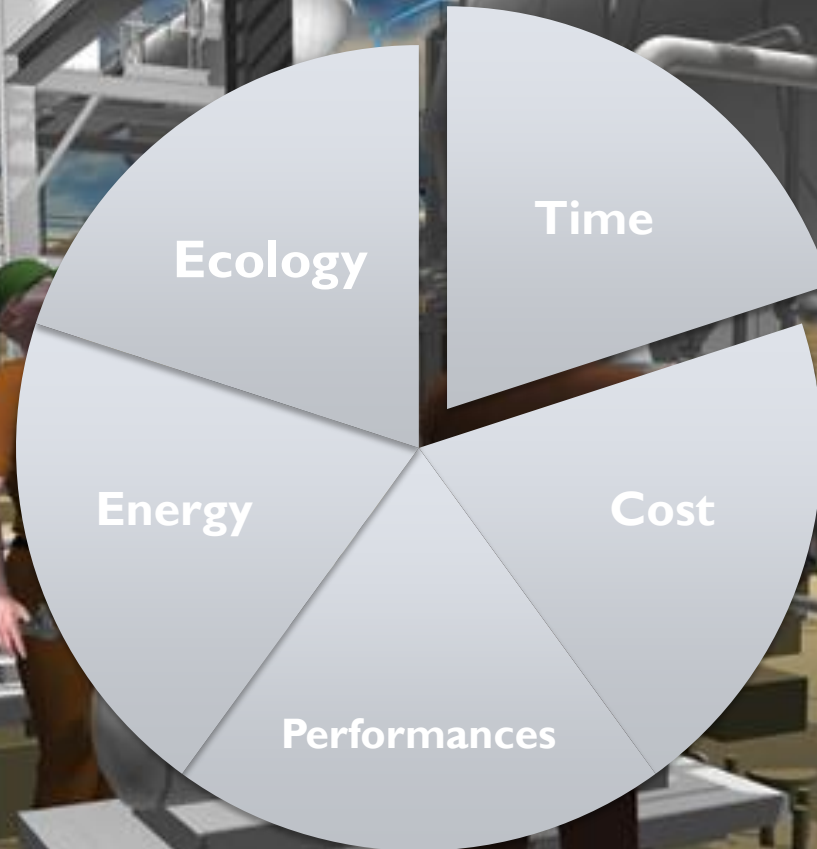
**6 MONTHS SHORTER :  
1.82 Million USD saved**

**HOW MANY MORE CARS SOLD?**

A high-speed photograph of a water droplet falling into a pool of water, creating a series of concentric ripples. The droplet is captured in mid-air, just above the surface, with its reflection visible in the water below. The background is a soft, light blue gradient.

# IMPACTS AND PROSPECTS

# Simulation has many advantages in industrial areas



From 1 prototype a week....



...To 1 prototype an hour



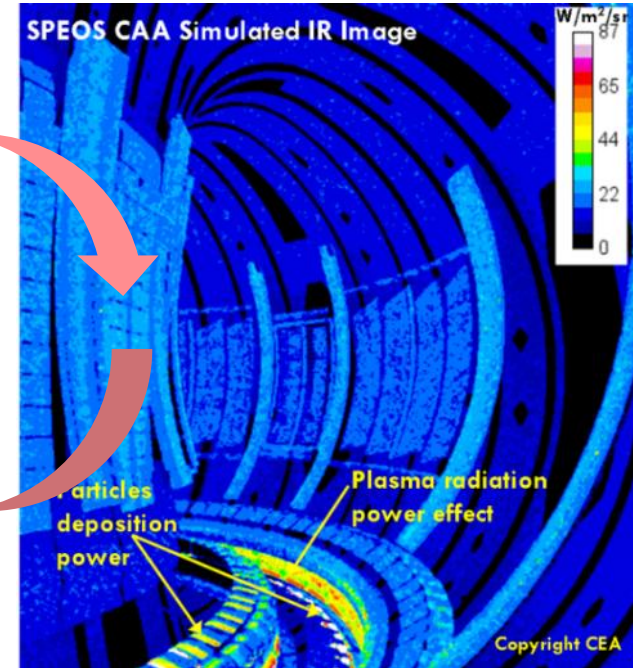
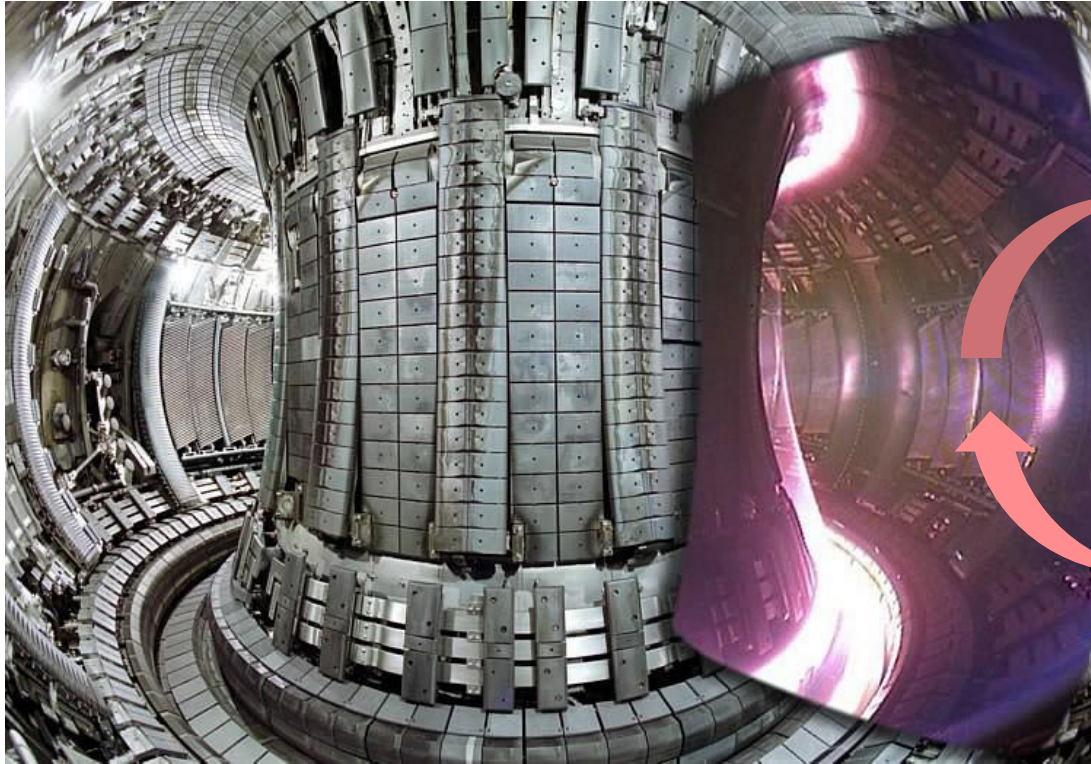
# Learning is experience



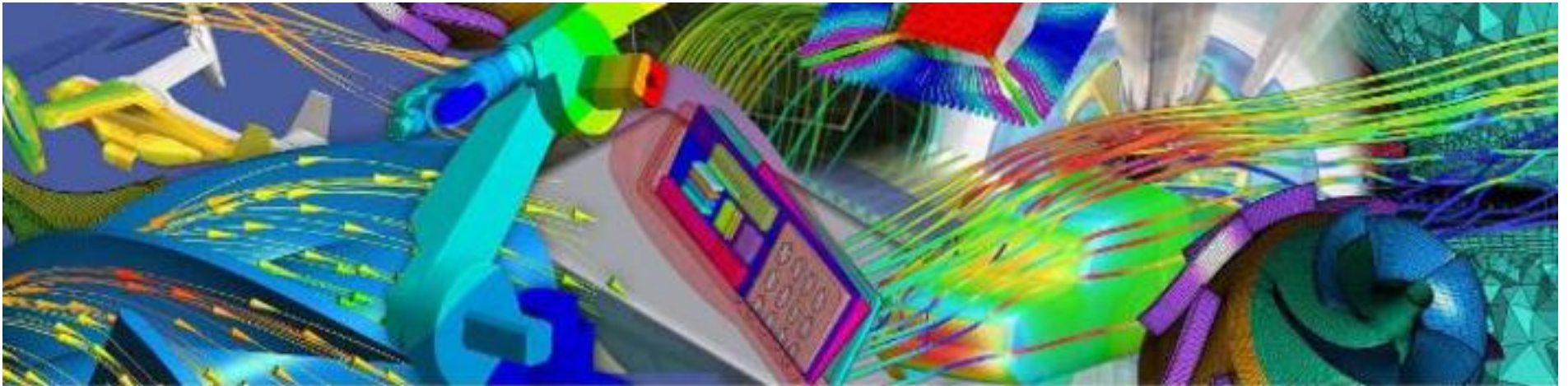
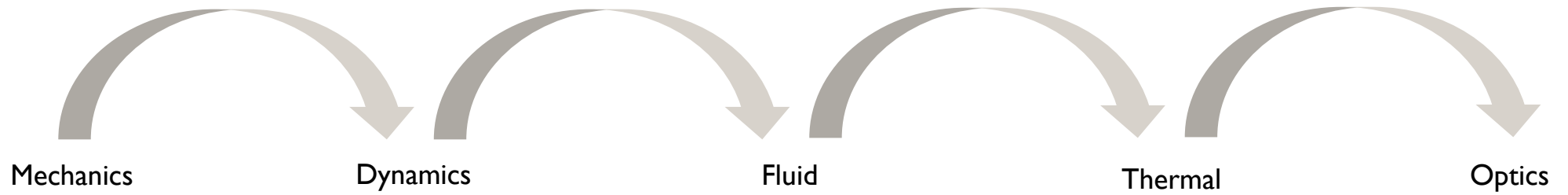
Simulated by OPTIS  
with the courtesy  
of Bentley Motors



# Simulation in the loop: where virtual helps real

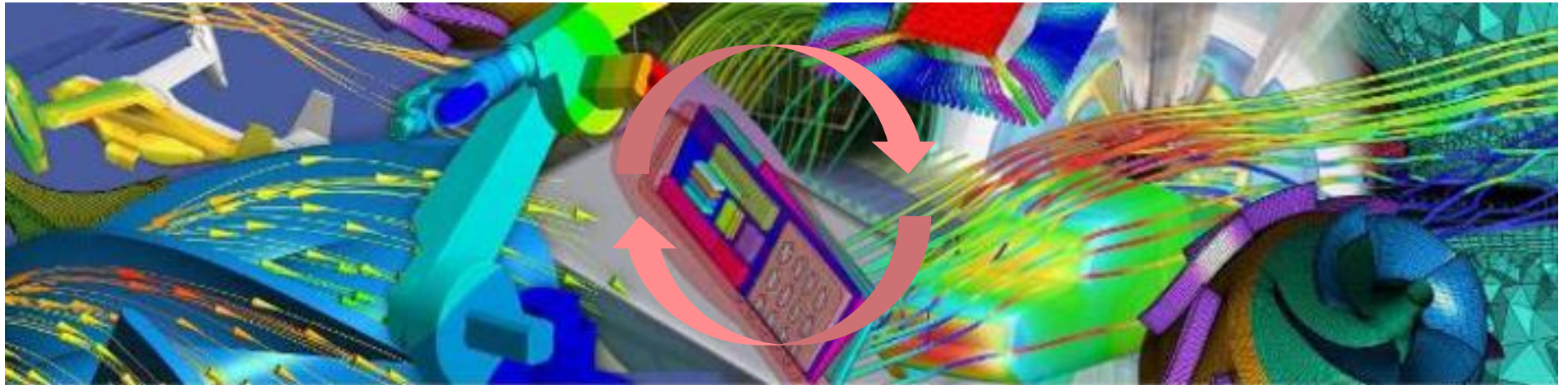
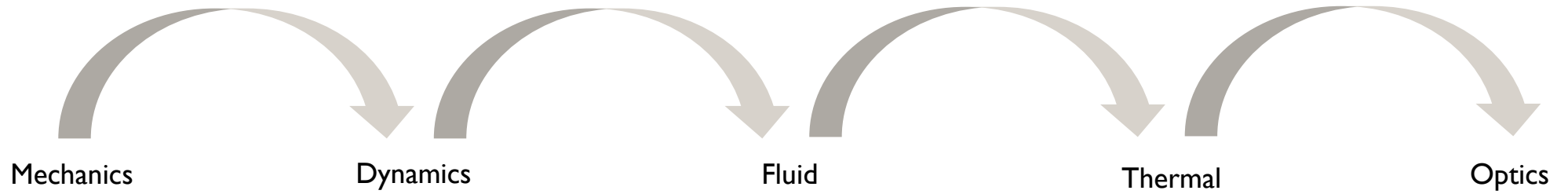


# Fast simulation allows multi-physics

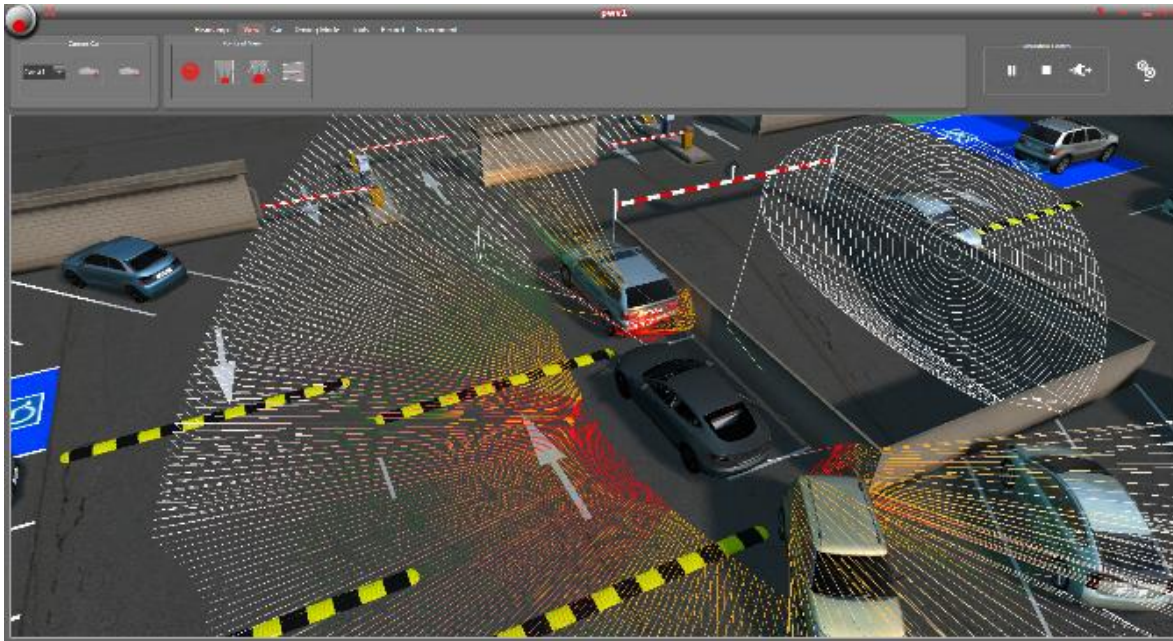




# Fast simulation allows multi-physics



# From products to complex autonomous systems



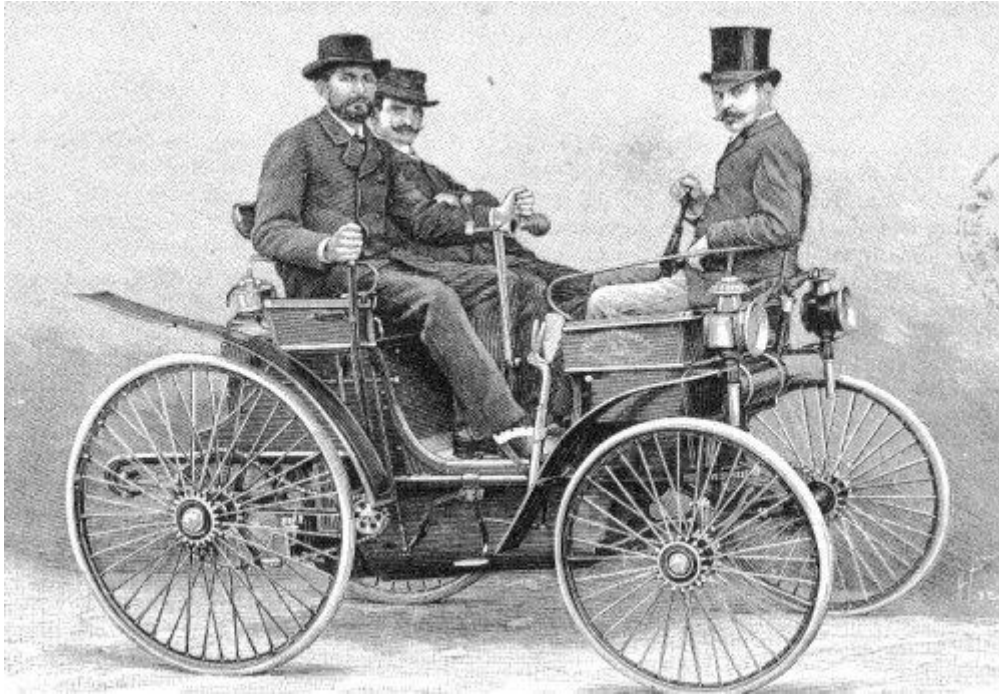




A background image showing a hand holding a microscope. The scene is dimly lit with purple and blue tones, and a bright light source is visible through the microscope's lens, creating a lens flare effect. A semi-transparent white horizontal bar is overlaid on the bottom half of the image.

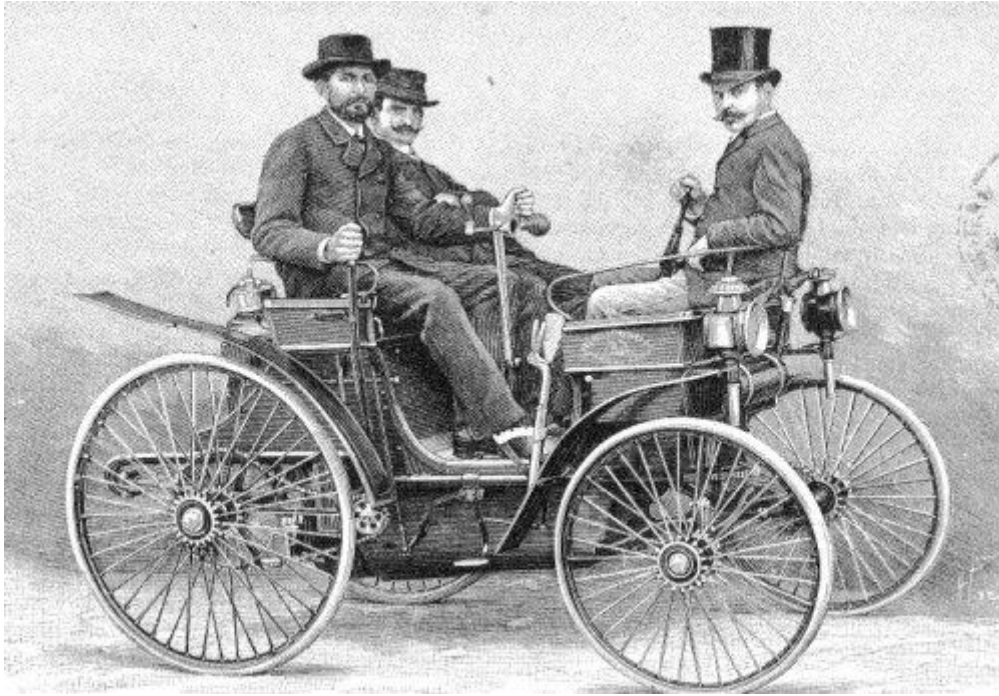
# CONCLUSION

# What happened in 130 years?





# What happened in 130 years?

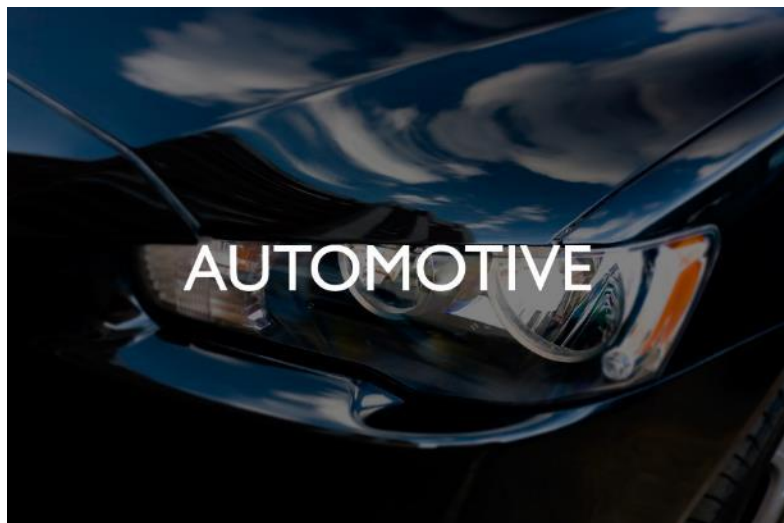


# What will happen in the next century?





# And in other industries?

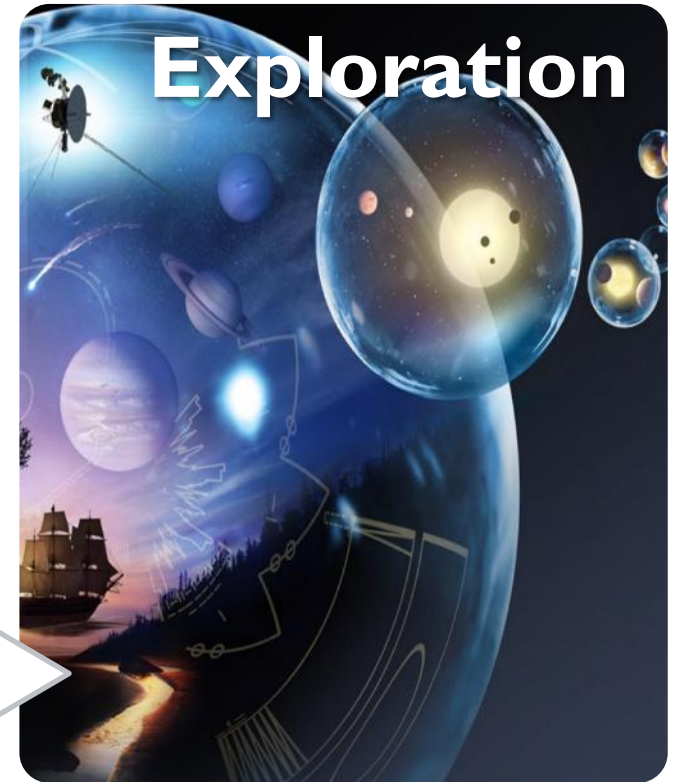


WHITE GOODS MEDICAL



RESEARCH AUTOMATION







OPTIS

MERCI