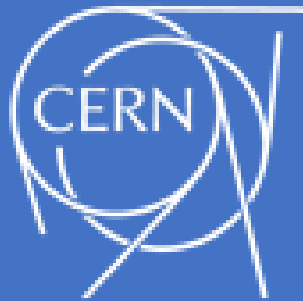


CERN, STFC & UK industry: Innovating Together for a Better Planet

Explore collaboration with CERN around sustainability challenges



Knowledge Transfer
Accelerating Innovation

Enrico Chesta

Aerospace, Energy and Environmental Applications Coordinator

CERN Knowledge Transfer Mission



Maximise the technological and knowledge return to society in particular through Member States industry



Promote CERN as a centre of excellence for technology and innovation



Demonstrate the importance and impact of fundamental research investments

Areas of expertise

Machine Learning and Deep Learning

Industrial Controls and Automation

Data Analytics

Metrology

High and Ultra High Vacuum Systems

Health, Safety and Environment Management

Cryogenics

Optoelectronics and Microelectronics

High Volume Data Management & Storage

Superconducting Magnets

Particle Acceleration and Control

Radiation Protection and Monitoring

Particle Tracking and Calorimetry

Robotics

Sensors

Material Science

Cooling and Ventilation

Collaboration Tools

Radio Frequency Technology

Manufacturing and Mechanical Processes

Please follow this link to explore [CERN KT Detailed Value Proposition](#)

Application Domains

Focus on:

- Medical
- Aerospace
- Energy & Environment
- Digital
- Quantum



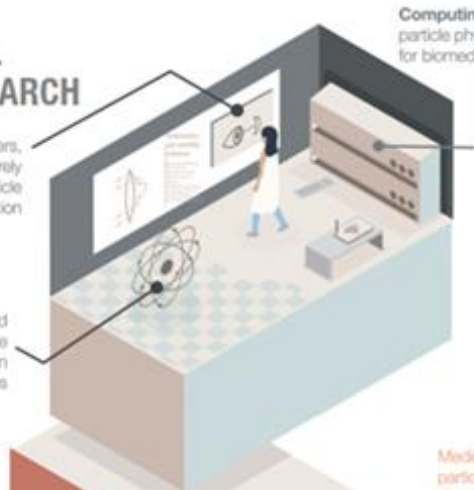


MEDICAL & BIOMEDICAL

MEDICAL & BIOMEDICAL PHYSICS RESEARCH

Medical researchers, clinicians & patients rely on novel **particle detectors** for radiation

Radiobiology studies and innovative radioisotope production can be performed in special **accelerator** facilities



Computing & big data challenges in particle physics can provide solutions for biomedical research

BIOMEDICAL TECHNOLOGIES

Tools and techniques for particle physics find applications in **biomedical technologies**



IMAGING & DIAGNOSIS

Dedicated **accelerators** produce radioisotopes, essential for nuclear medicine and diagnostics



Medical imaging relies on **particle detectors**, some directly resulting from fundamental research

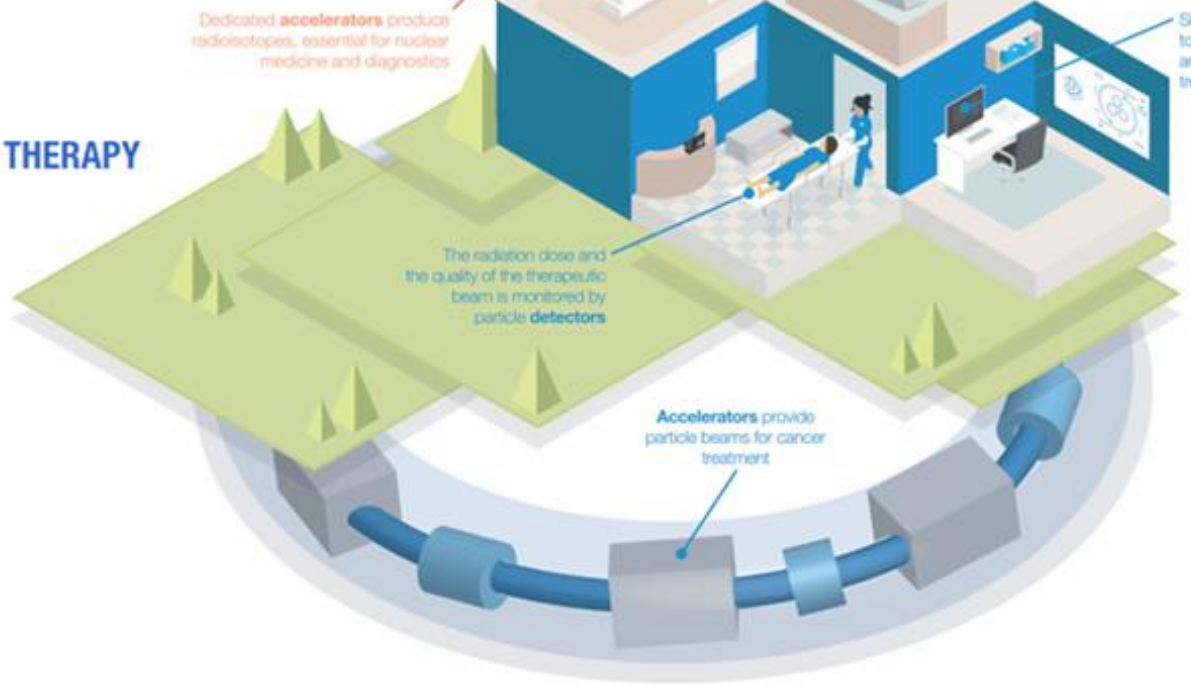
The analysis of medical images requires sophisticated **computing** tools

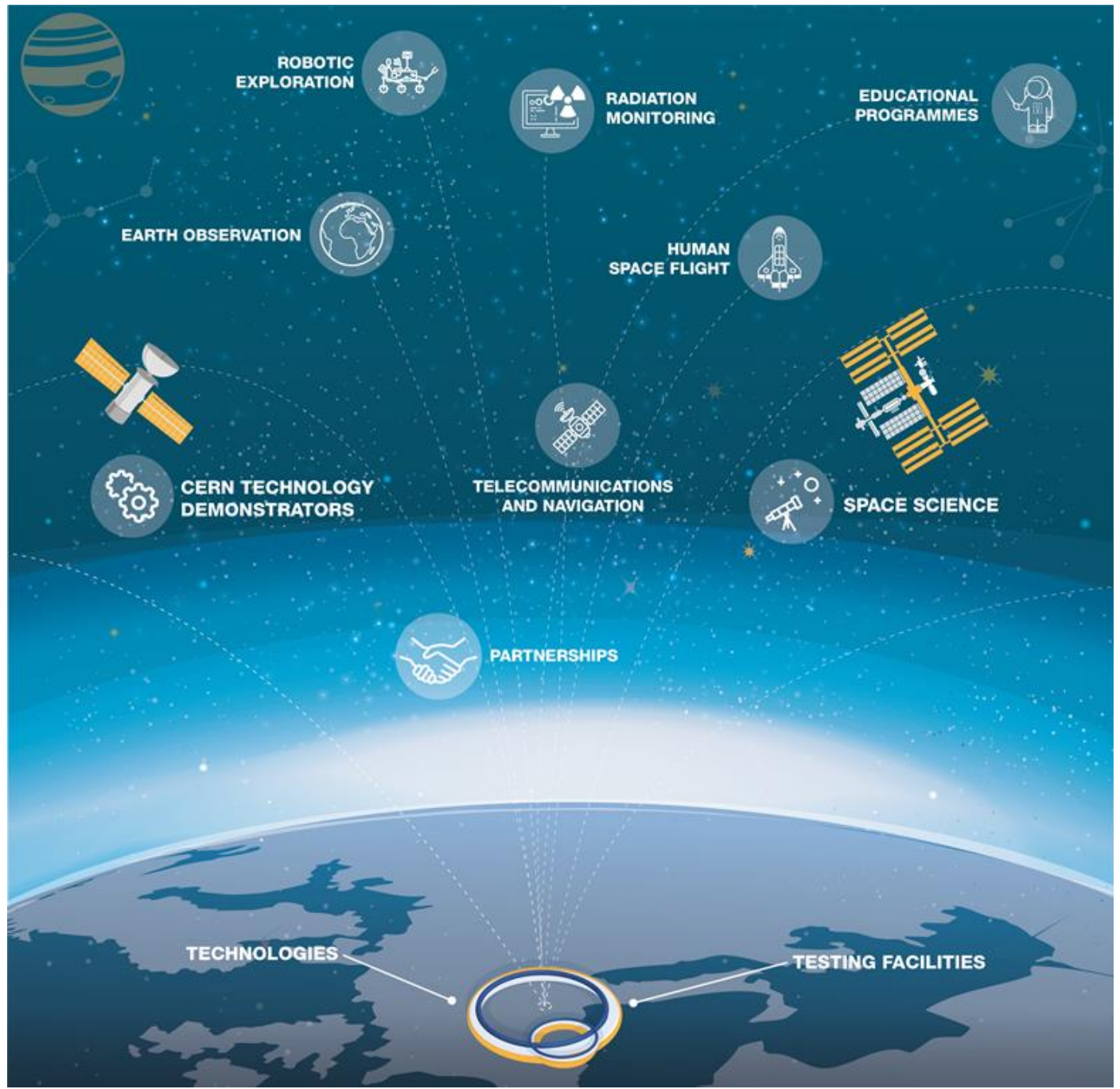
THERAPY

The radiation dose and the quality of the therapeutic beam is monitored by **particle detectors**

Accelerators provide particle beams for cancer treatment

Simulations and **computing** tools are essential to design and adjust patients' treatment plans







Strategy under
definition

Inputs needed!

Some examples



CERN KNOWHOW

.....

Superconductivity

High Field Magnets

High Vacuum

Cryogenics

Materials

Artificial Intelligence

Advanced Sensors

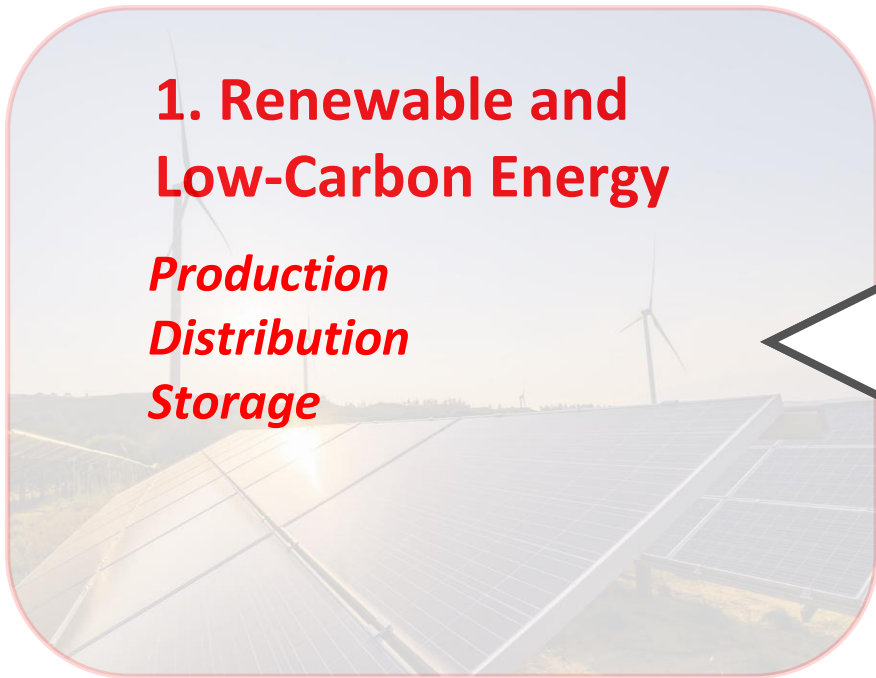
Rad-tol Systems

Thermal Control

Radioprotection

.....





1. Renewable and Low-Carbon Energy

*Production
Distribution
Storage*



2. Clean Transportation and Future Mobility

*Aviation
Shipping
Rail
Automotive*

CERN KNOWHOW

.....

Superconductivity

High Field Magnets

High Vacuum

Cryogenics

Materials

Artificial Intelligence

Advanced Sensors

Rad-tol Systems

Thermal Control

Radioprotection

.....



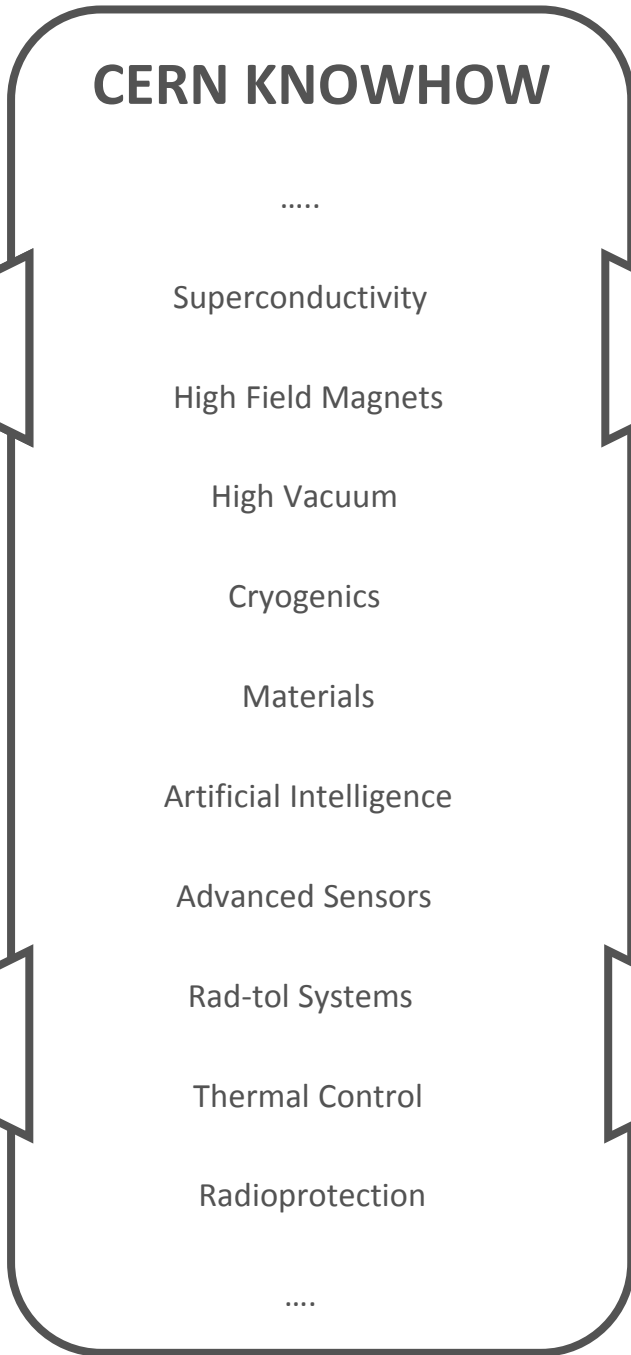
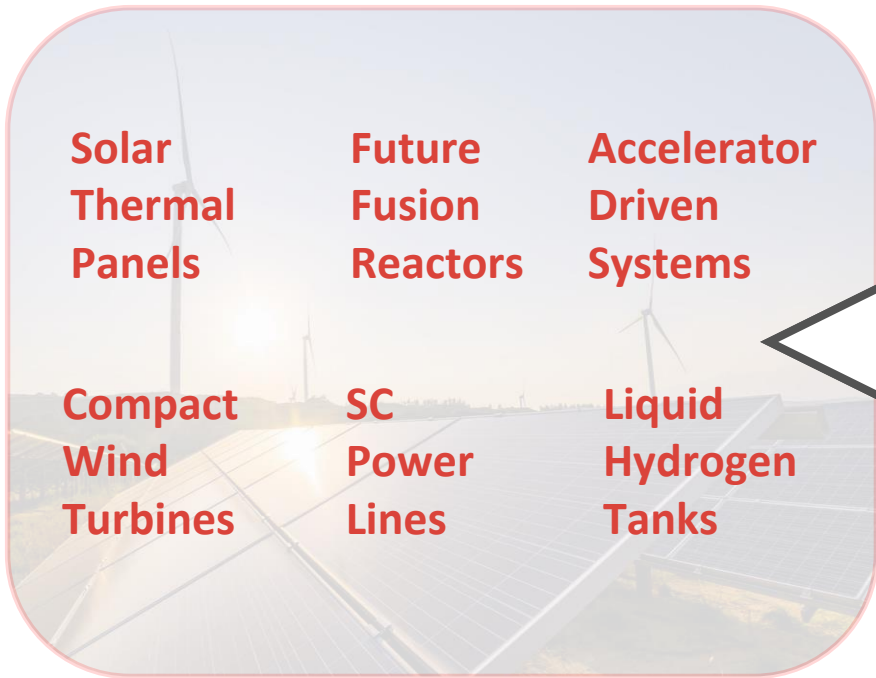
3. Climate Change and Pollutants Control

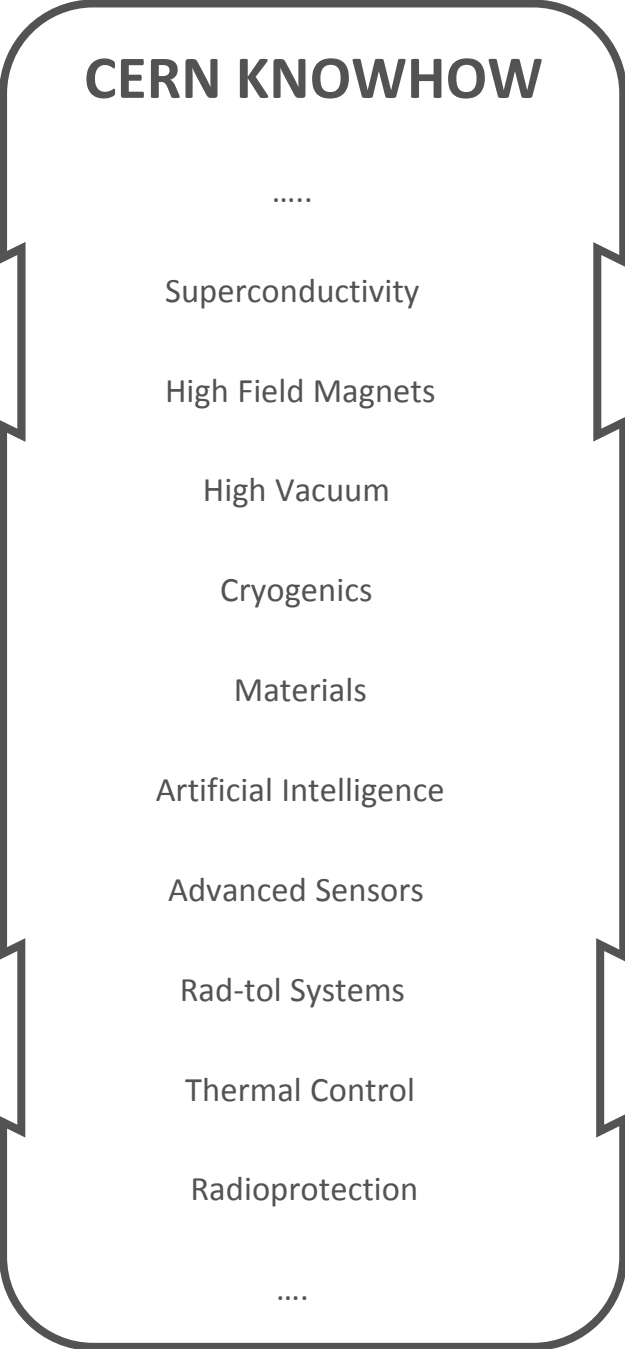
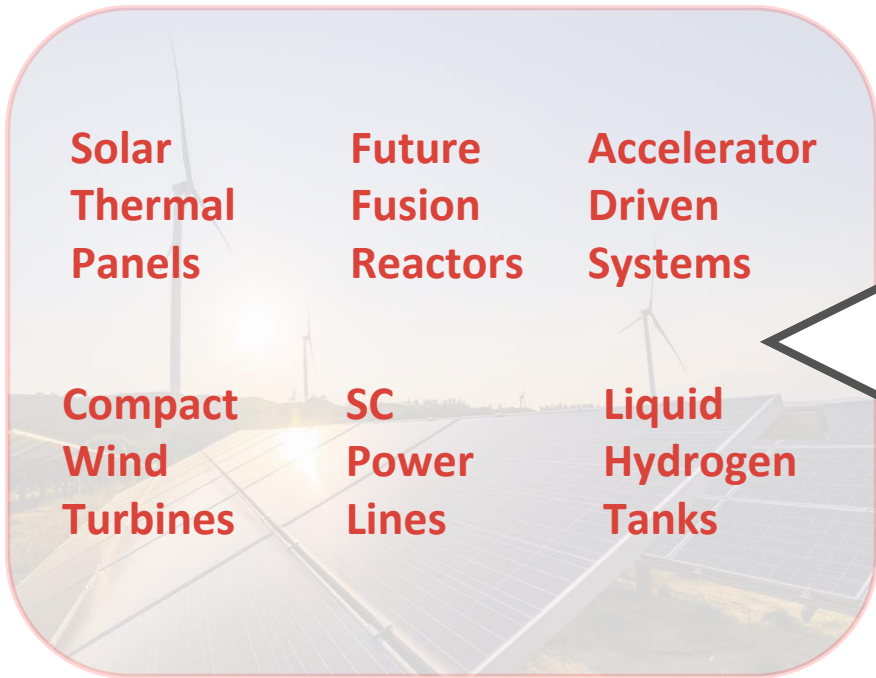
*Monitoring
Modelling
Mitigation*



4. Sustainability and Green Science

*Power Management
Heat management
Industrial Processes*





Solar Thermal Panels

Future Fusion Reactors

Accelerator Driven Systems

Compact Wind Turbines

SC Power Lines

Liquid Hydrogen Tanks

CERN KNOWHOW

.....

Superconductivity

High Field Magnets

High Vacuum

Cryogenics

Materials

Artificial Intelligence

Advanced Sensors

Rad-tol Systems

Thermal Control

Radioprotection

....

Rad-tol Earth Observation Instruments

Distributed Optical Sensors

Radioactive Waste Handling

Exhaust Gas Treatments

Air Pollutants Propagation Simulation

Earth Digital Twins using AI

Long Haul Hydrogen Airplanes

Decarbonized Maritime Vessels

Magnetic Levitation Trains

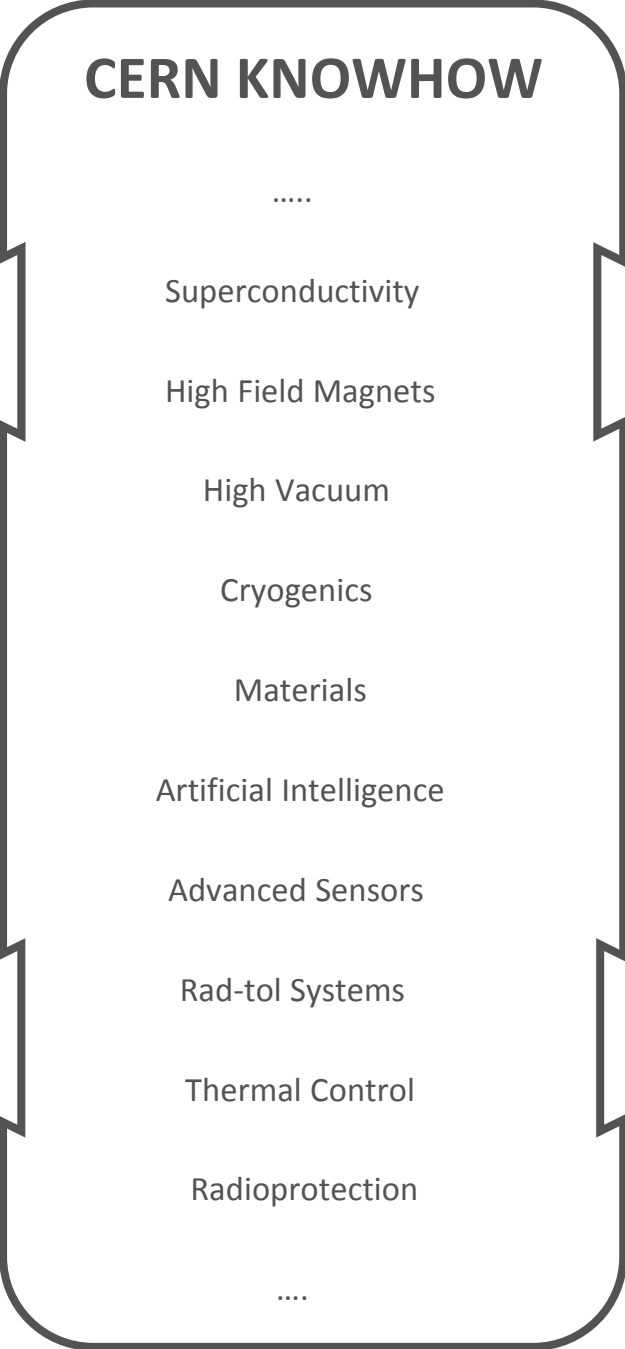
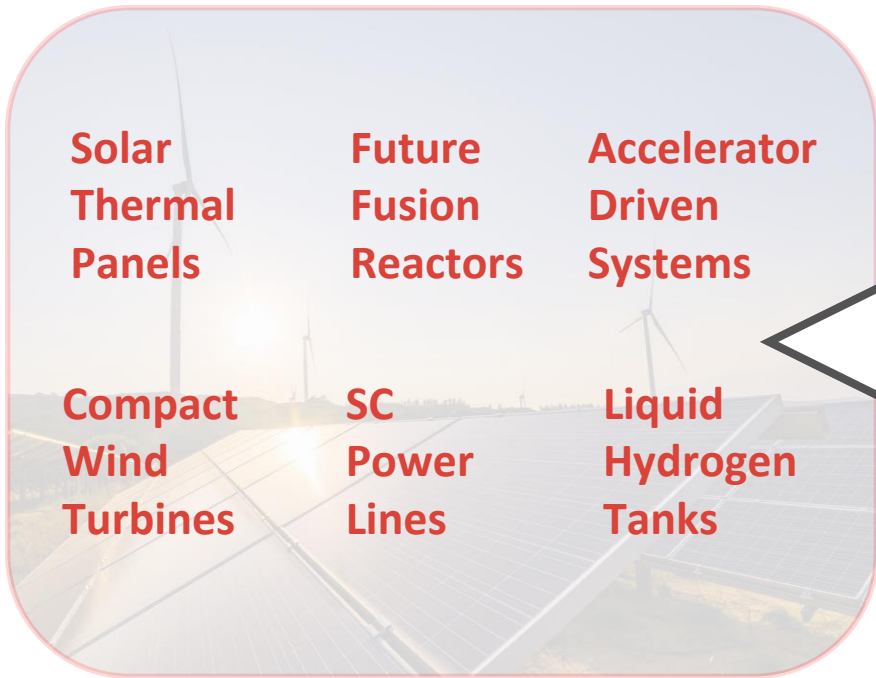
Autonomous Electric Vehicles


4. Sustainability and Green Science

Power Management

Heat management

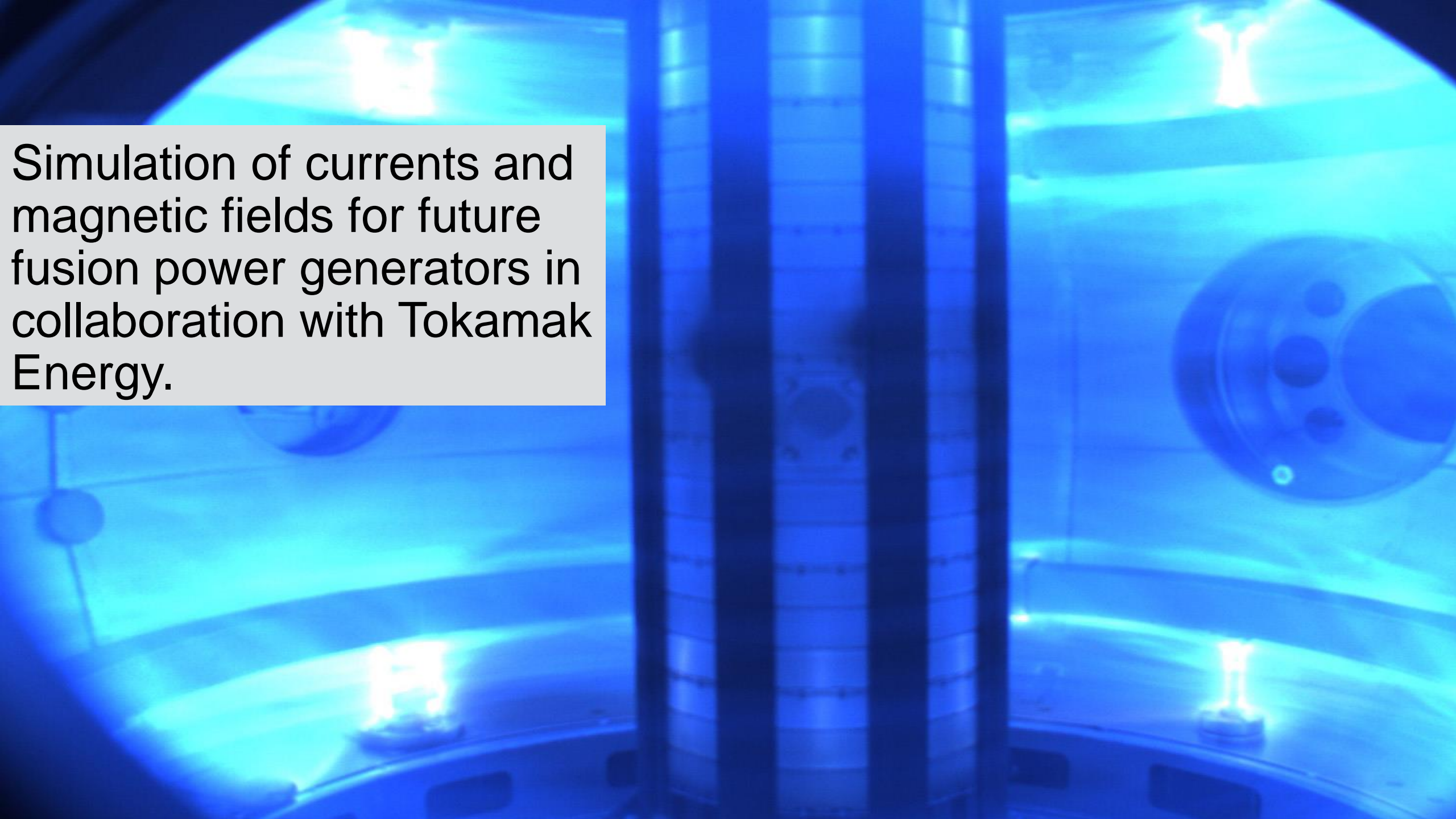
Industrial Processes



An aerial photograph showing a large-scale installation of evacuated solar thermal panels on a flat roof. The panels are arranged in neat, parallel rows. Each panel is supported by a white, trapezoidal concrete or metal structure. In the background, an airport tarmac is visible with several aircraft, including a prominent white plane with a dark tail. The sky is clear and bright, suggesting a sunny day.

Evacuated solar thermal panels with NEG pumps for Geneva Airport in collaboration with SRB Energy.

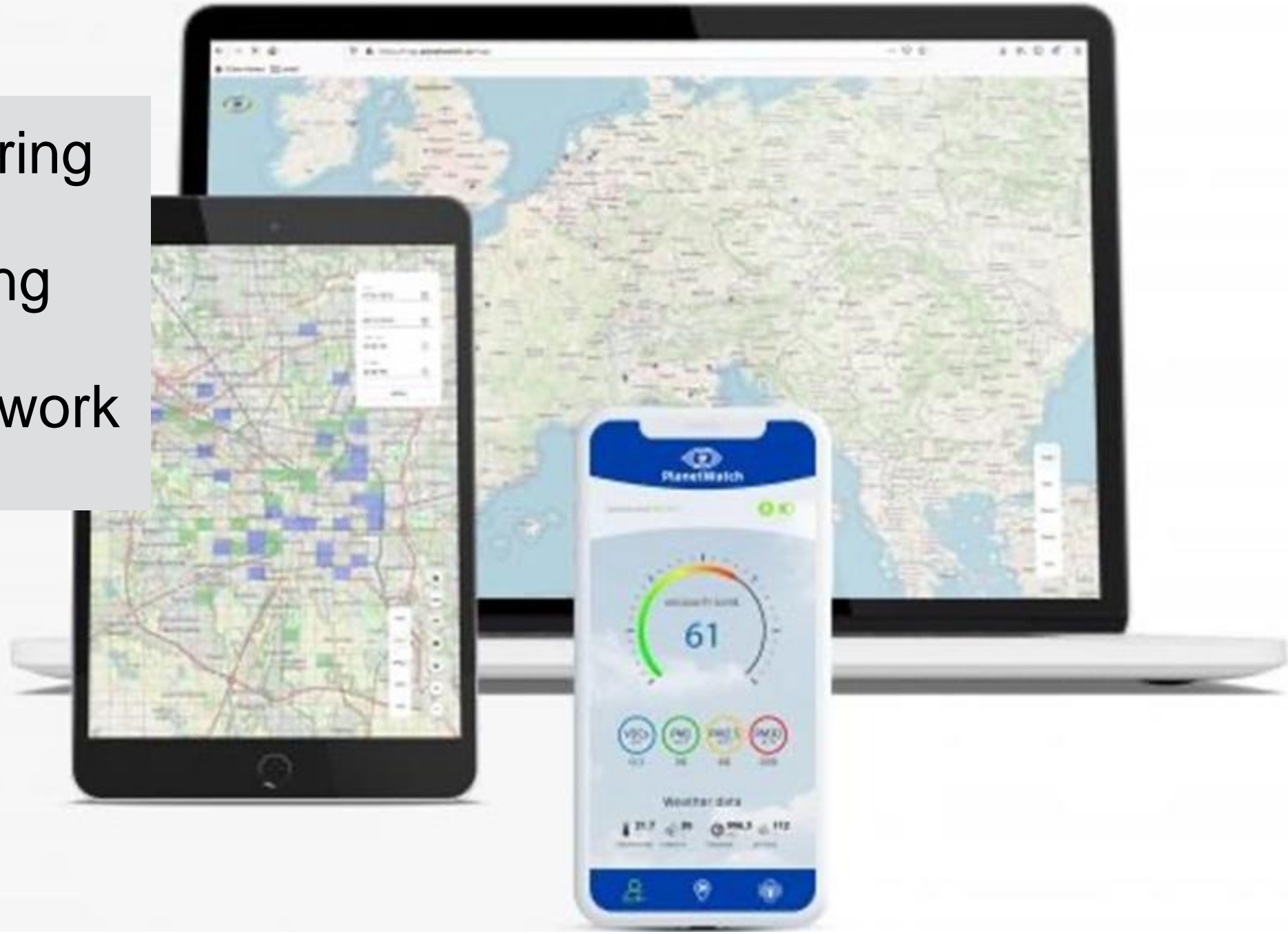
Simulation of currents and magnetic fields for future fusion power generators in collaboration with Tokamak Energy.



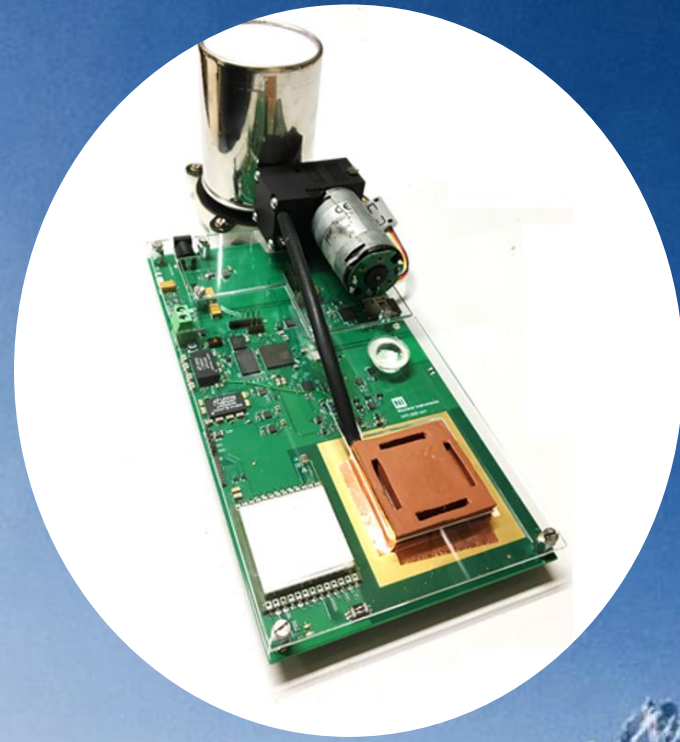
Fast machine learning
using FPGAs for
autonomous vehicles in
collaboration with Volvo.



Global air monitoring network to detect pollution built using CERN data acquisition framework by PlanetWatch.



RaDoM (Radon Dose Monitor) technology used by BAQ (Better Air Quality) to tackle Radon gas issues.





Developing and deploying integrated dual phase CO₂ cooling systems as a green alternative to F-gases

How to collaborate with CERN



R&D Collaborations



Service & Consultancy



Licensing



Start a company based on CERN technology or know-how

Find out more at kt.cern/collaborate

Business Incubation Centre (BIC) Network

1st: STFC-CERN BIC in Daresbury

Total number of startups incubated till date: 11

Innocryst
A20 Innovation
Croft Additive Manufacturing
D-Beam
2D Heat
MAAS Spectrometry

Quantum Detectors
Camstech
Artemis Analytical
Oxford Nanosystems
Ross Robotics

Current year: 5 projects under review



Han Dols



1

CERN Knowledge Transfer in Break-Out Rooms

Giovanni Anelli



2

Nick Ziogas



3

Enrico Chesta



Margherita Marini

