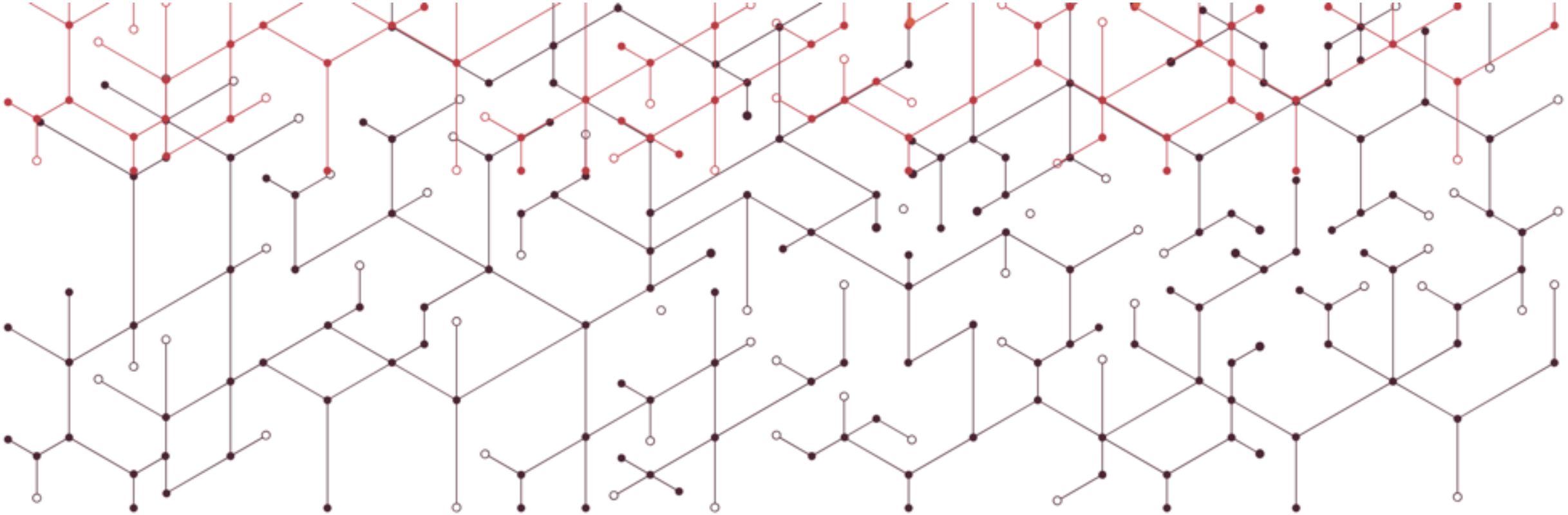
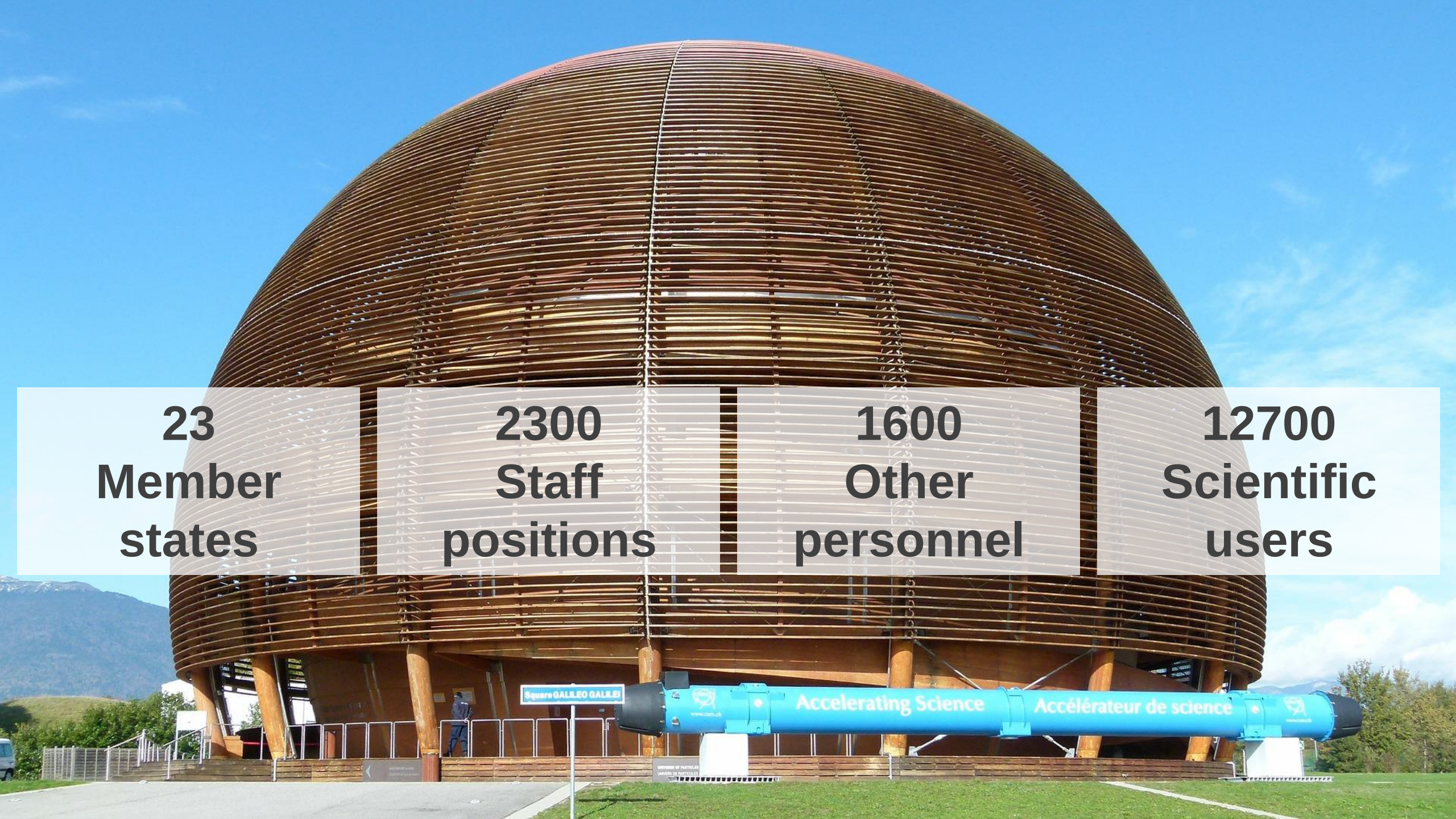


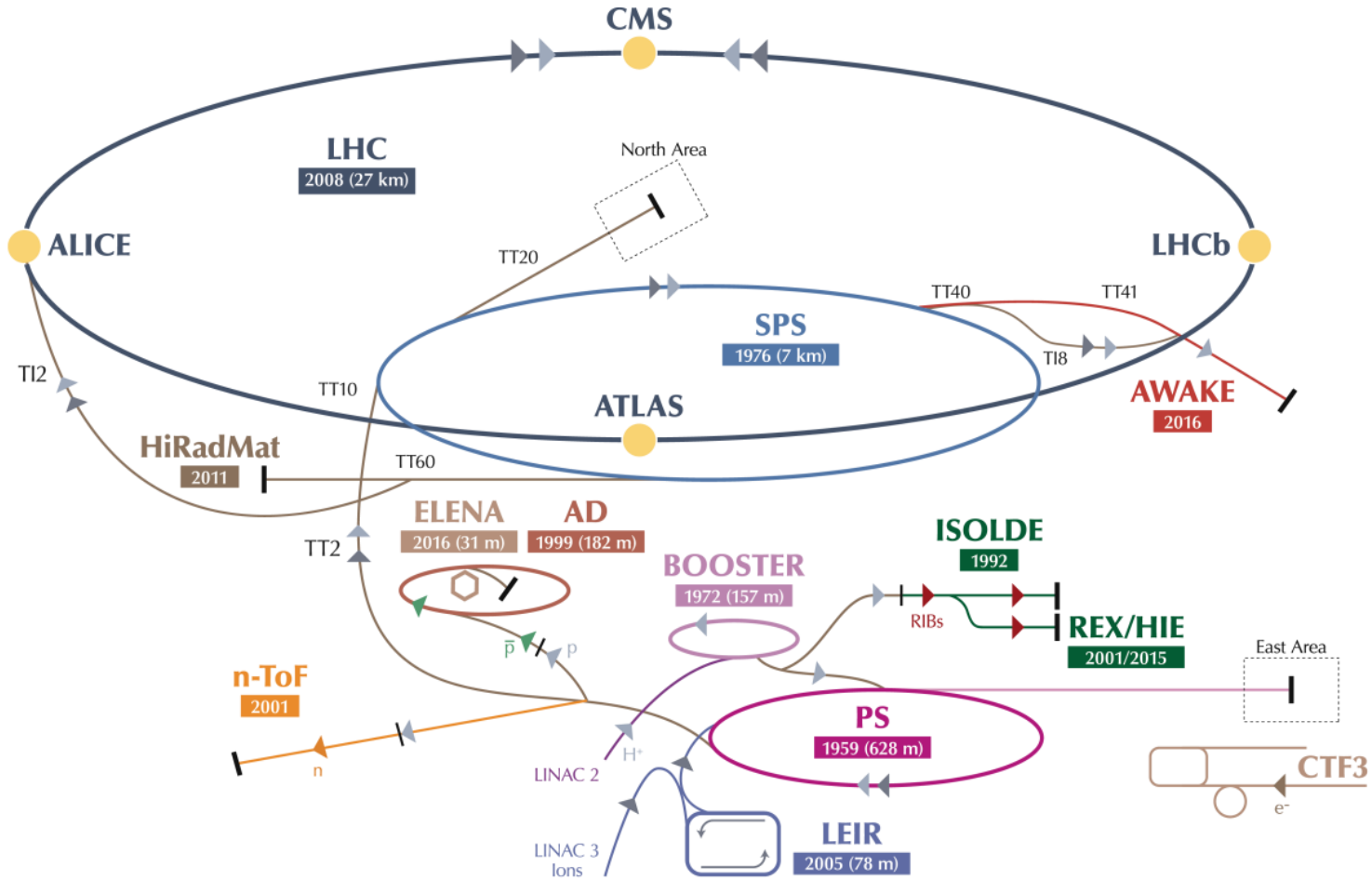
Knowledge Transfer @ CERN

Ash Ravikumar
Entrepreneurship Development Officer

Council meeting in Amsterdam when the CERN convention was signed (1953).



23	2300	1600	12700
Member states	Staff positions	Other personnel	Scientific users



p (protons) ions RIBs (Radioactive Ion Beams) n (neutrons) p̄ (antiprotons) e⁻ (electrons) proton/antiproton conversion proton/RIB conversion

LHC Large Hadron Collider SPS Super Proton Synchrotron PS Proton Synchrotron AD Antiproton Decelerator CTF3 Clic Test Facility

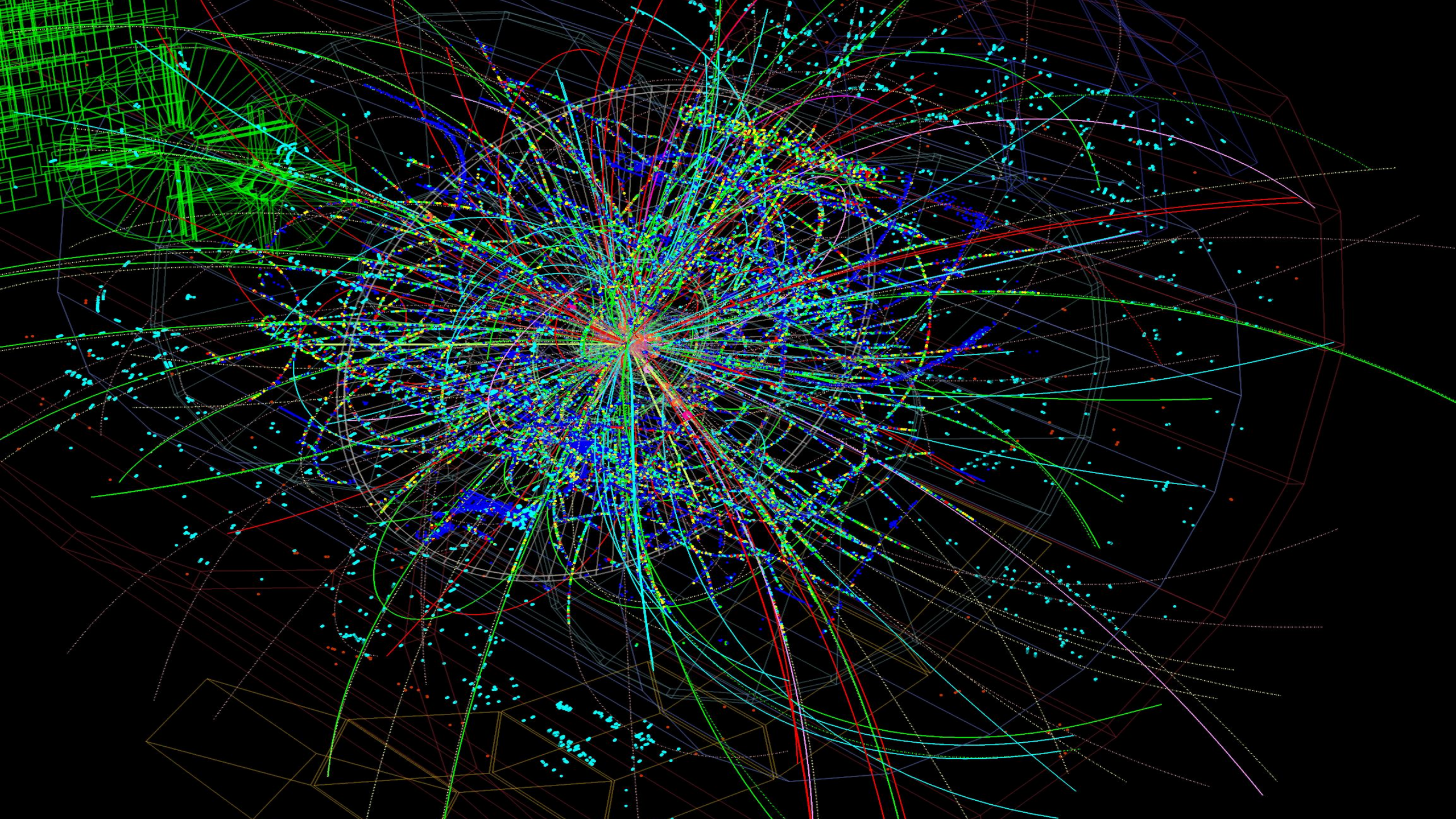
AWAKE Advanced WAKefield Experiment ISOLDE Isotope Separator OnLine REX/HIE Radioactive EXperiment/High Intensity and Energy ISOLDE

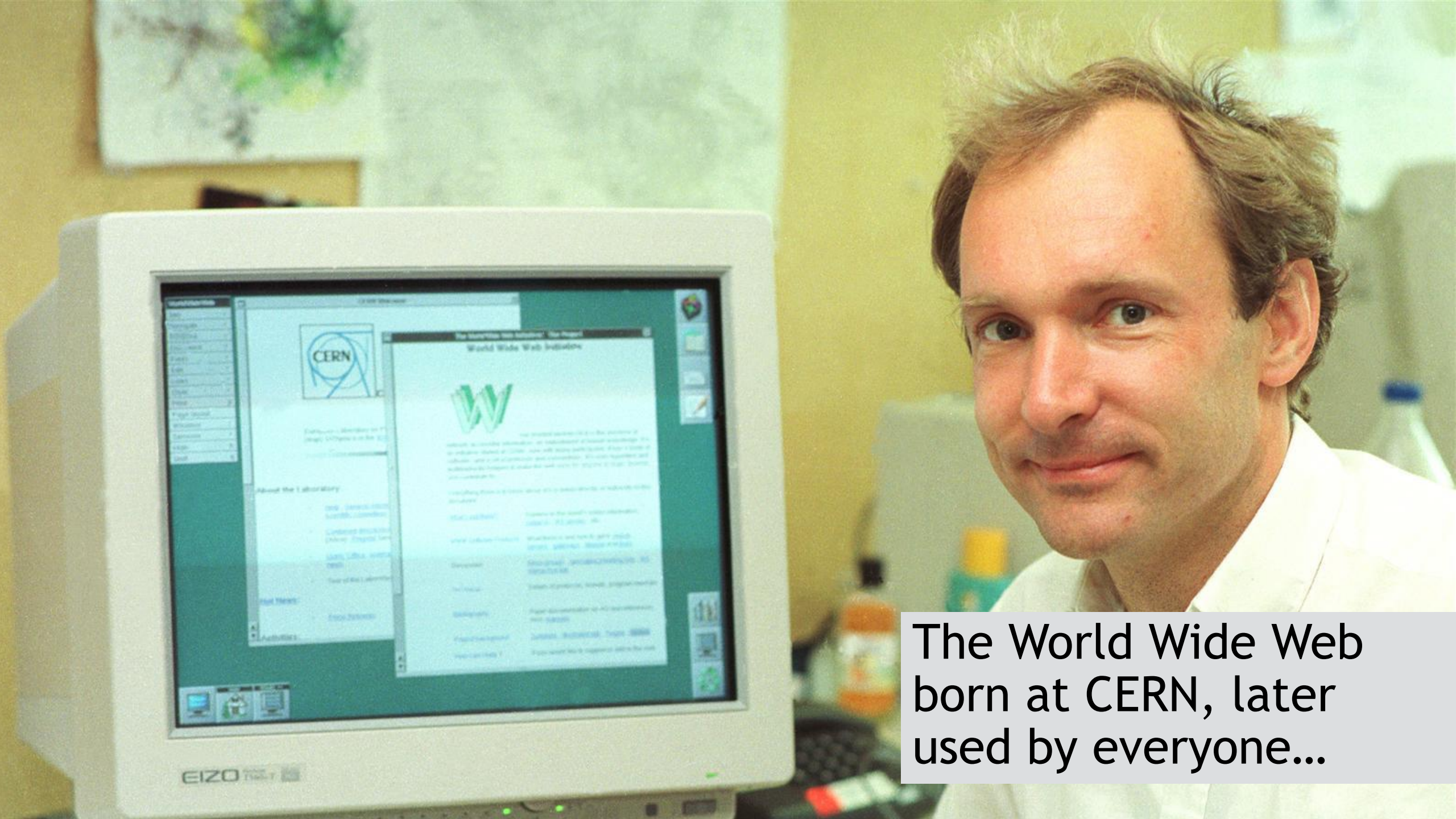
LEIR Low Energy Ion Ring LINAC LINear ACcelerator n-ToF Neutrons Time Of Flight HiRadMat High-Radiation to Materials

CERN's Accelerator Complex - © CERN copyright 2016

The Large Hadron Collider (LHC), 27km long, 100m deep.

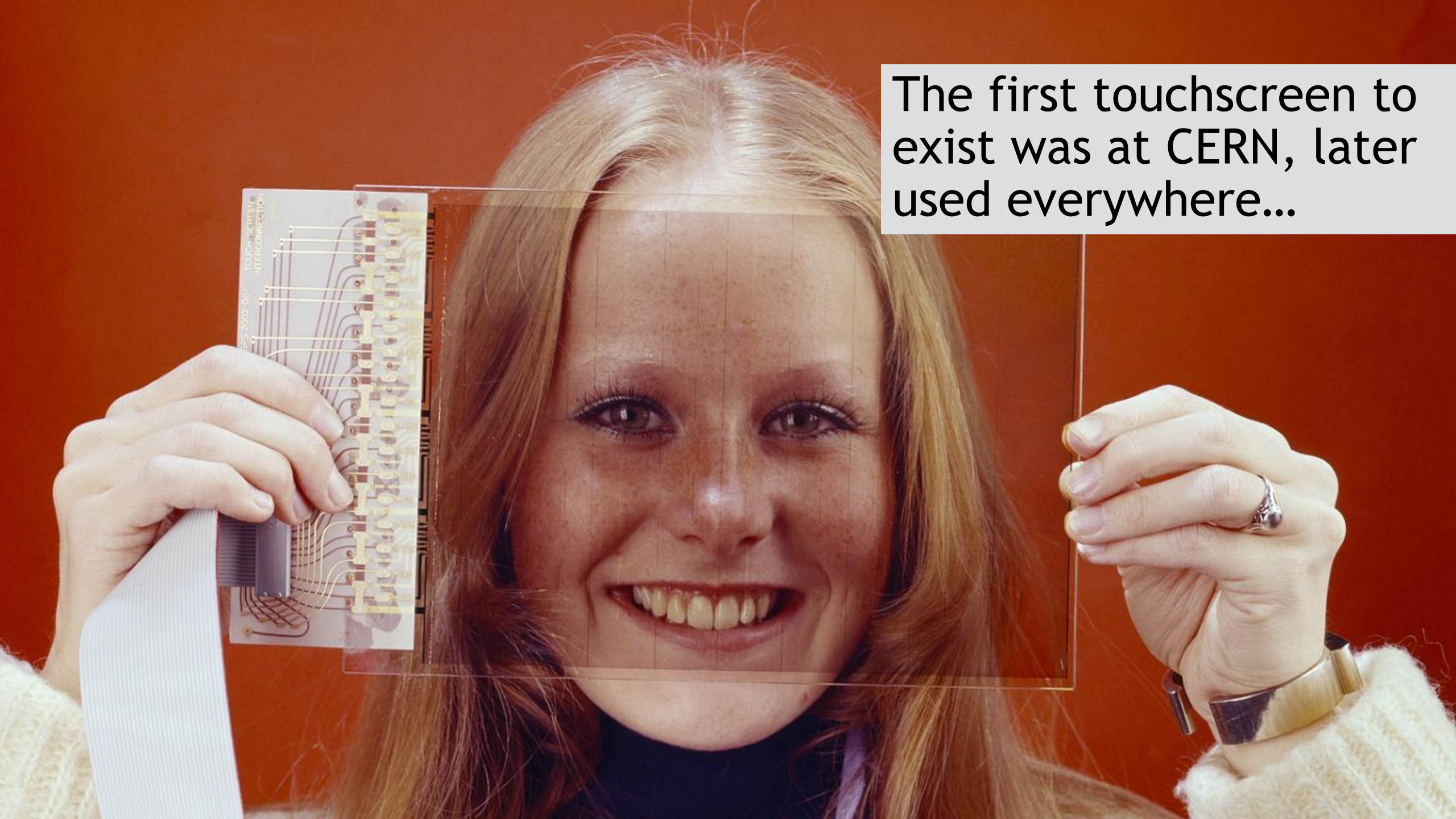

LHCb
ATLAS
CERN Meyrin
CERN Prévessin
SPS 7 km
SUISSE
FRANCE
CMS
ALICE
LHC 27 km

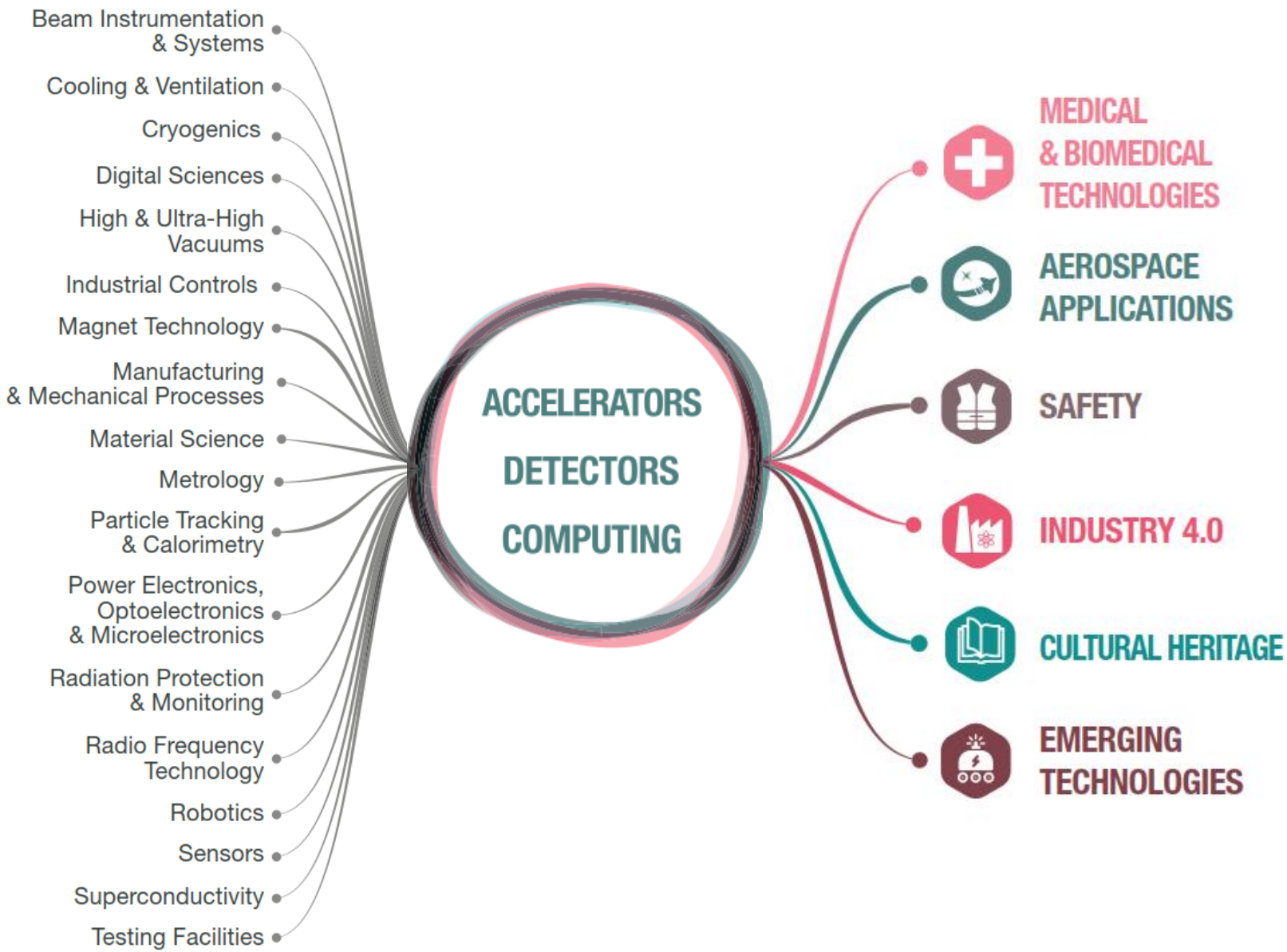




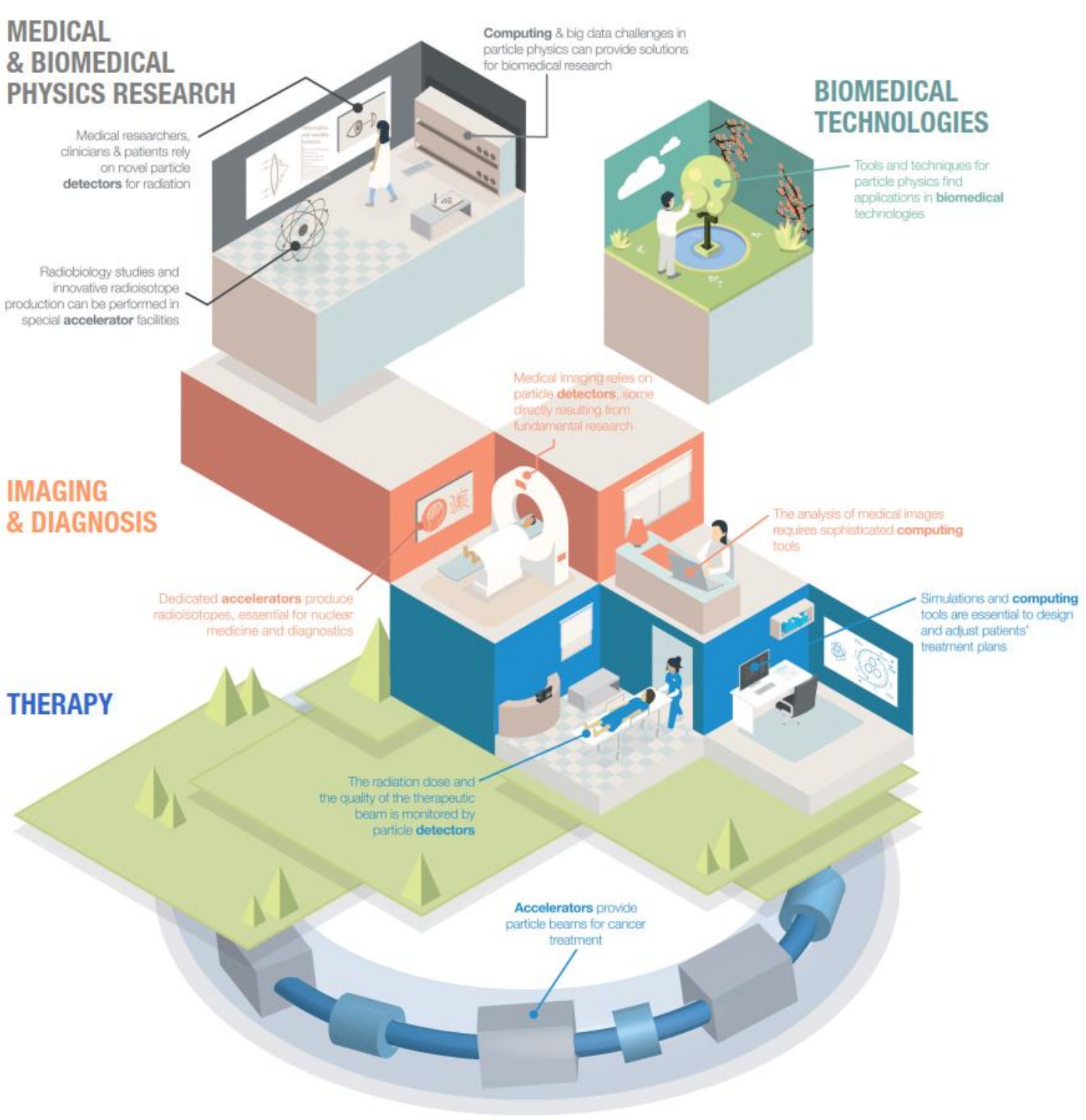
The World Wide Web born at CERN, later used by everyone…

Trackball with optical encoders, used later in the mouse of a PC…

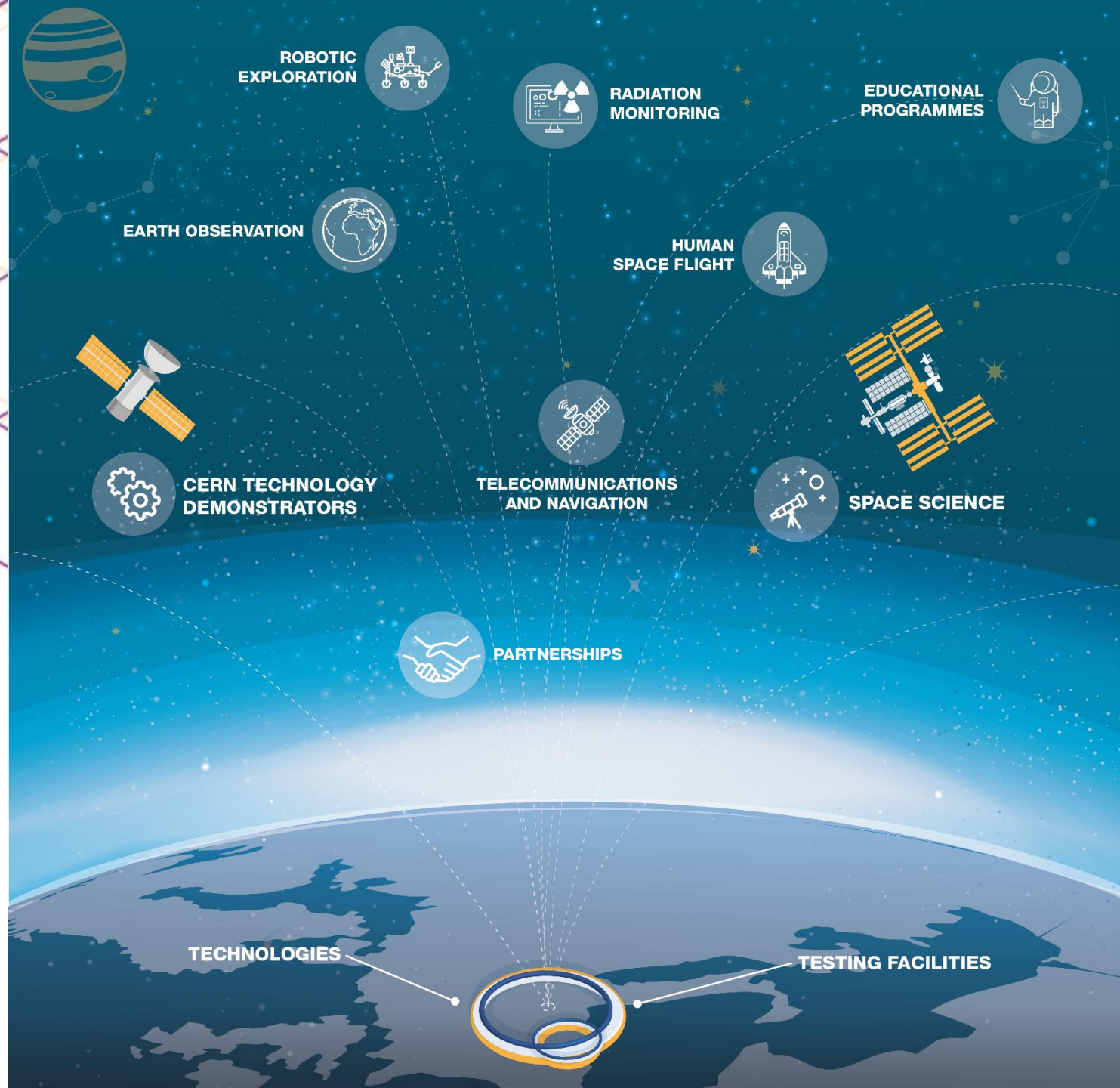

The first touchscreen to exist was at CERN, later used everywhere…

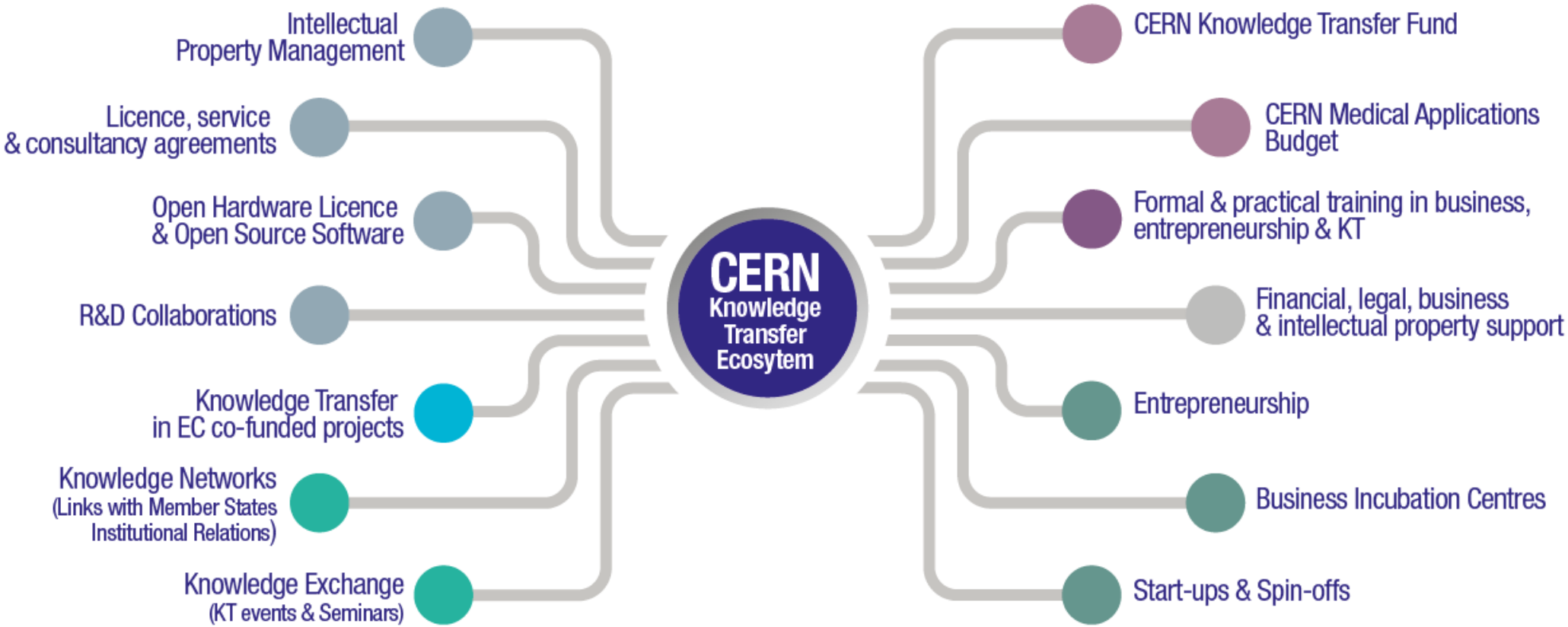

Beam Instrumentation & Systems
Cooling & Ventilation
Cryogenics
Digital Sciences
High & Ultra-High Vacuums
Industrial Controls
Magnet Technology
Manufacturing & Mechanical Processes
Material Science
Metrology
Particle Tracking & Calorimetry
Power Electronics, Optoelectronics & Microelectronics
Radiation Protection & Monitoring
Radio Frequency Technology
Robotics
Sensors
Superconductivity
Testing Facilities
ACCELERATORS
DETECTORS
COMPUTING
MEDICAL & BIOMEDICAL TECHNOLOGIES
AEROSPACE APPLICATIONS
SAFETY
INDUSTRY 4.0
CULTURAL HERITAGE
EMERGING TECHNOLOGIES

Medical & Biomedical Technologies



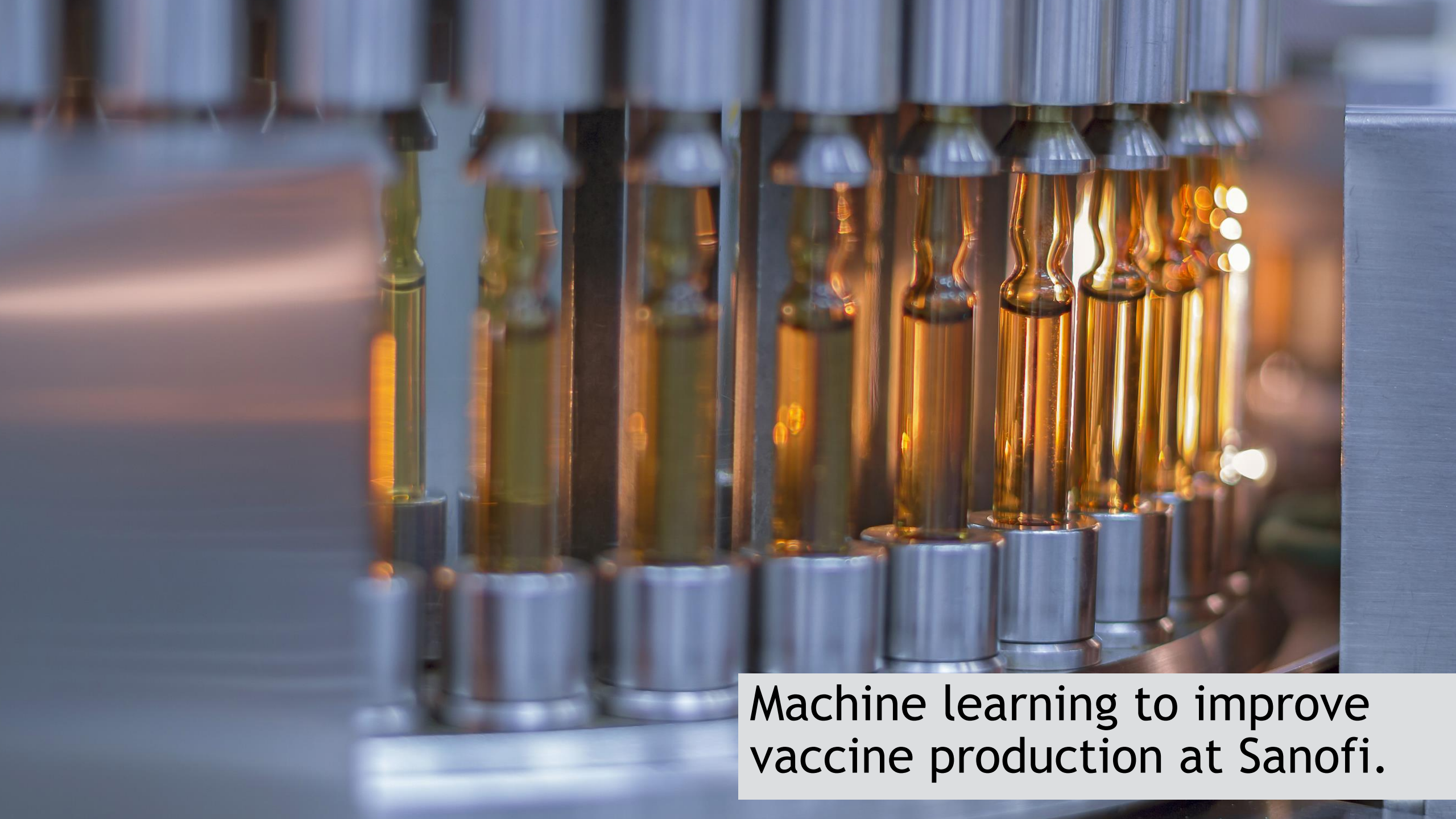
Aerospace Applications




Intellectual Property Management
Licence, service & consultancy agreements
Open Hardware Licence & Open Source Software
R&D Collaborations
Knowledge Transfer in EC co-funded projects
Knowledge Networks (Links with Member States Institutional Relations)
Knowledge Exchange (KT events & Seminars)
CERN Knowledge Transfer Ecosytem
CERN Knowledge Transfer Fund
CERN Medical Applications Budget
Formal & practical training in business, entrepreneurship & KT
Financial, legal, business & intellectual property support
Entrepreneurship
Business Incubation Centres
Start-ups & Spin-offs

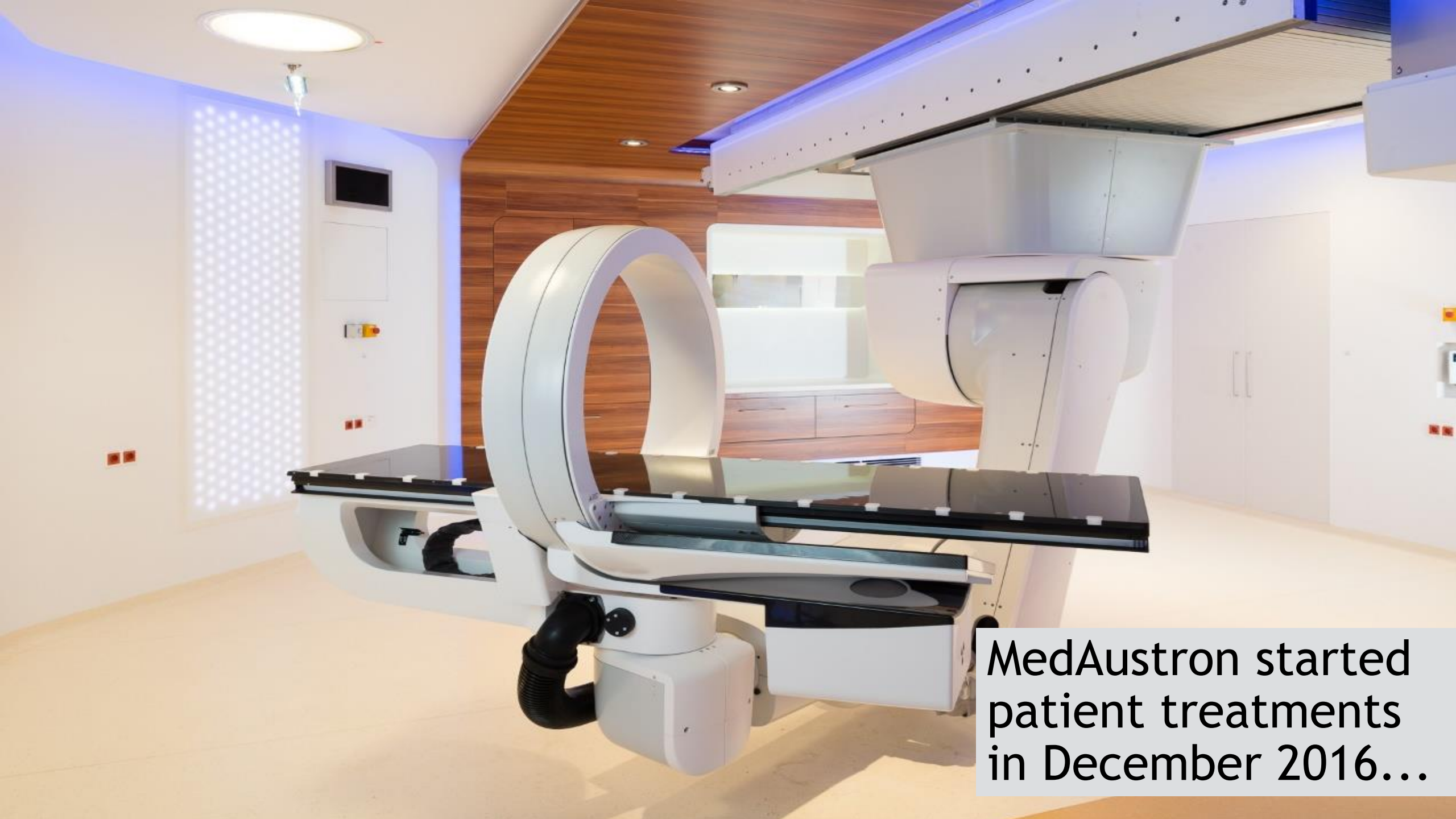
CERN tech used for monitoring radiation levels in space missions (courtesy of NASA ISS)

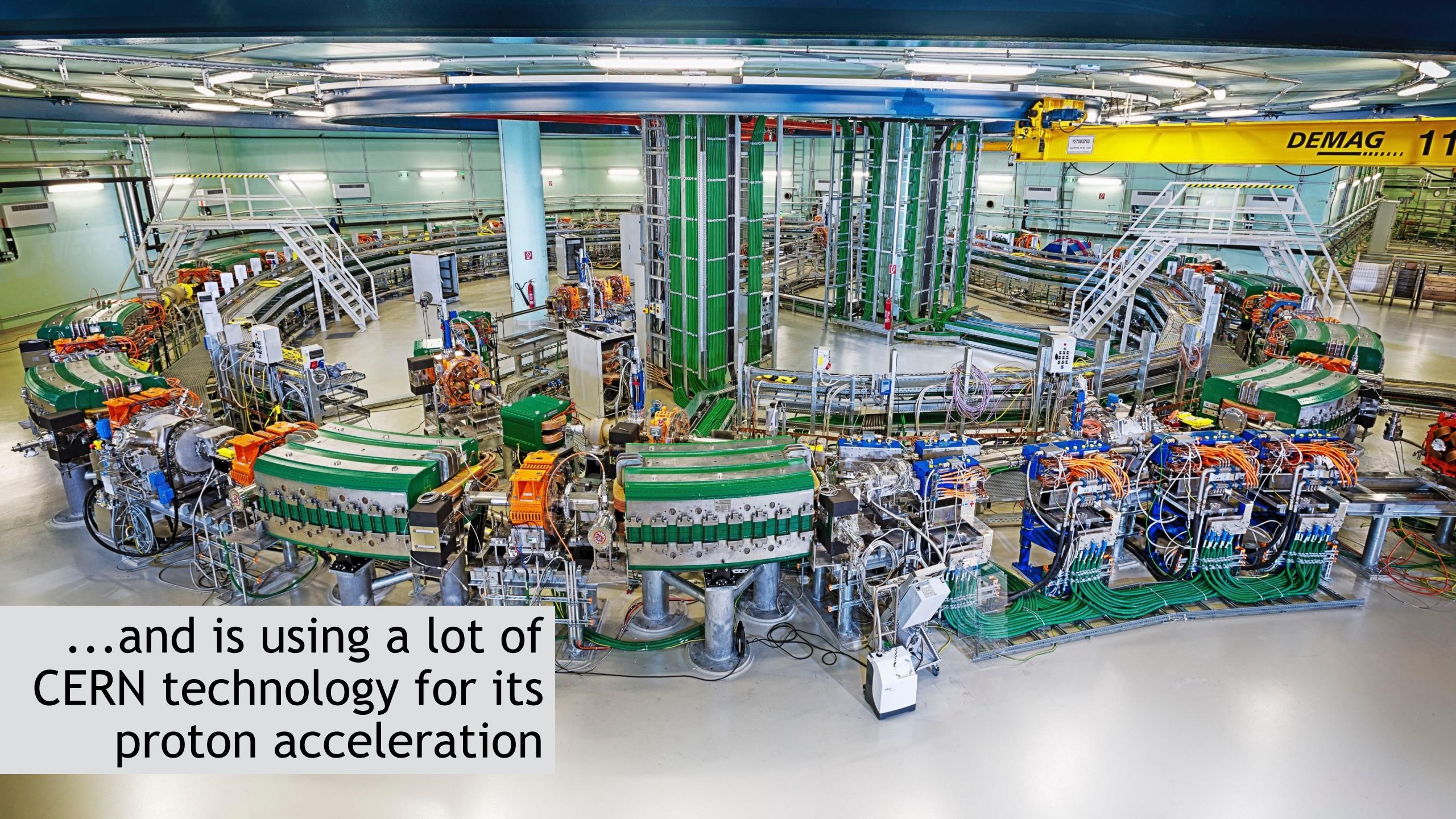
CERN’s Controls middleware software for worldwide factory automation at LG.



Machine learning to improve vaccine production at Sanofi.

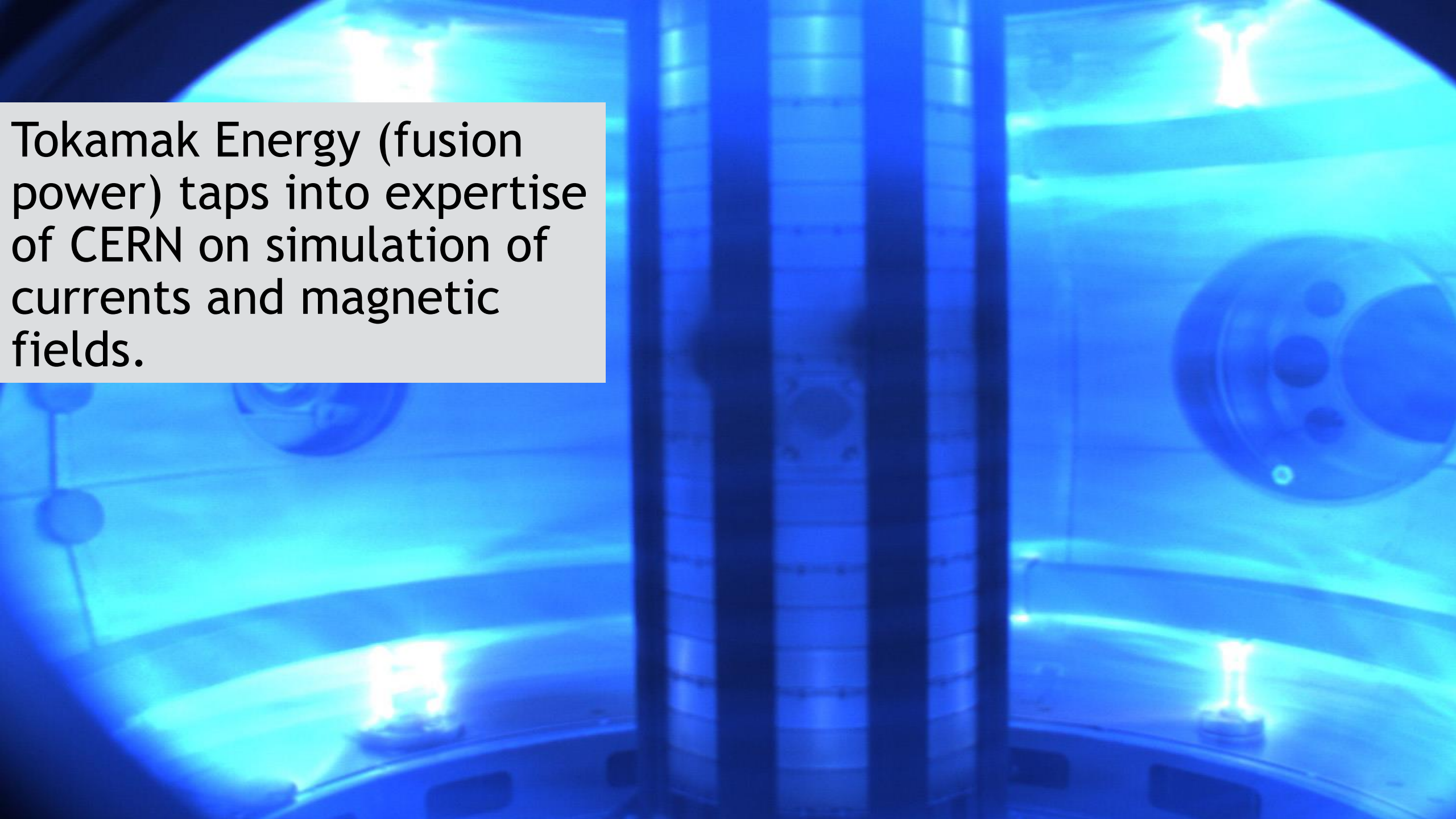
CERN-MEDICIS produces radioisotopes for medical research


MedAustron started
patient treatments
in December 2016...



...and is using a lot of CERN technology for its proton acceleration

Bundesdruckerei (Berlin) works with CERN on next generation ideas for identity management and cryptography



Tokamak Energy (fusion power) taps into expertise of CERN on simulation of currents and magnetic fields.

Zenuity (Volvo Cars / Veoneer) teams up with CERN on fast machine learning using FPGAs .

Entrepreneurship @CERN

Social Entrepreneurship THE PORT

Entrepreneur Mixer

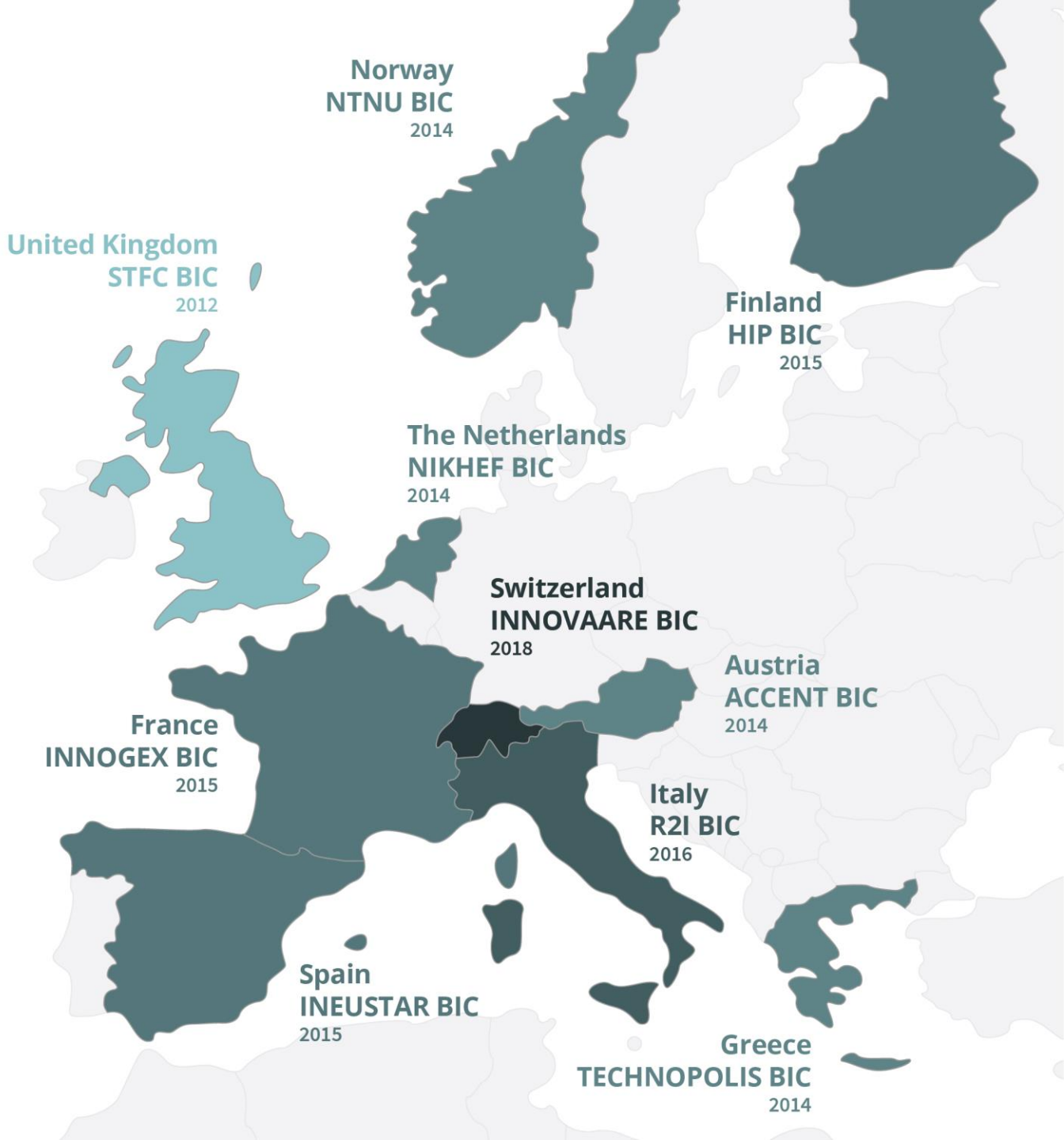
Global Entrepreneurship Week

Entrepreneurship Meet-Ups

CERN-NTNU Screening Week

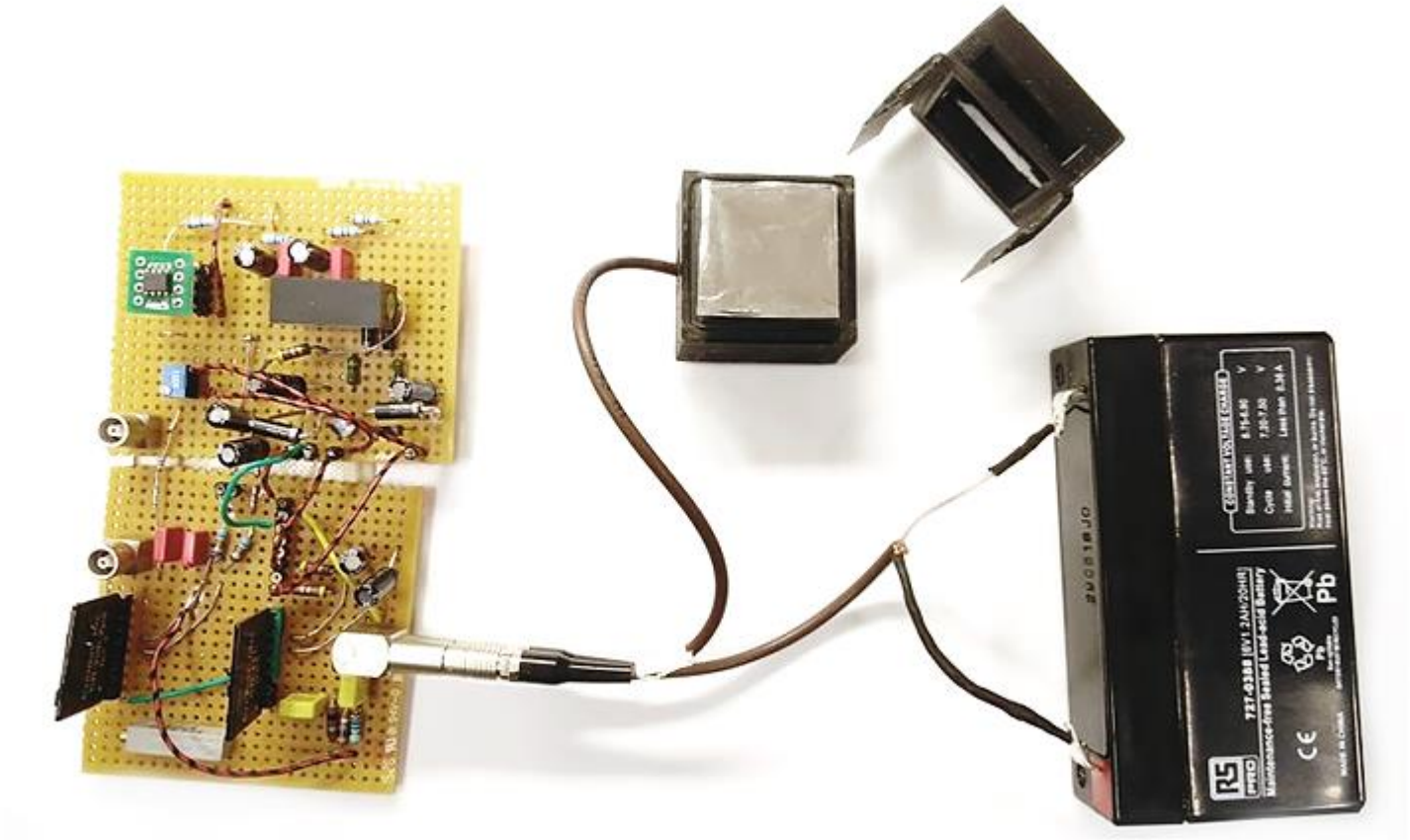
Challenge Based Innovation

Our network of Business Incubation Centers (BICs) help accelerate innovation in the CERN Member States.



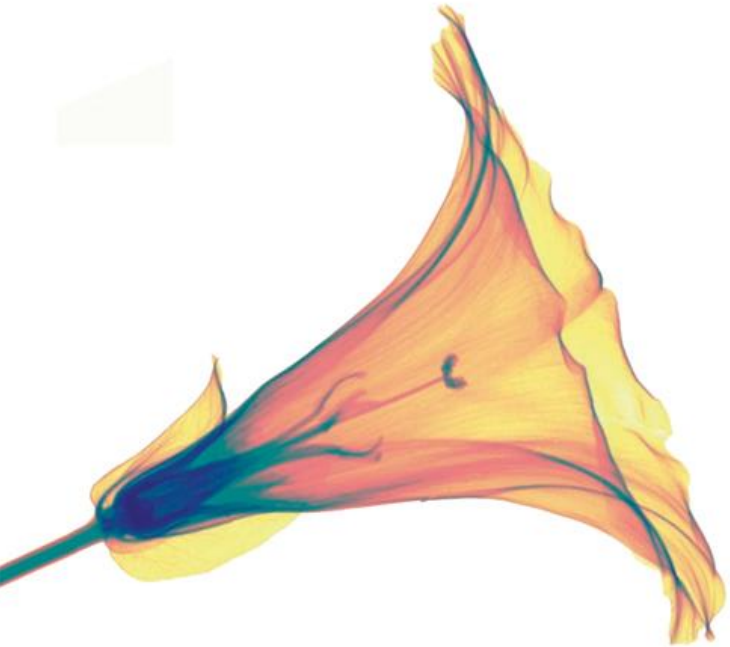
Many local initiatives organized by BICs to help (create) startups with CERN technology

Using CERN Medipix detector to analyse art (InsightART).

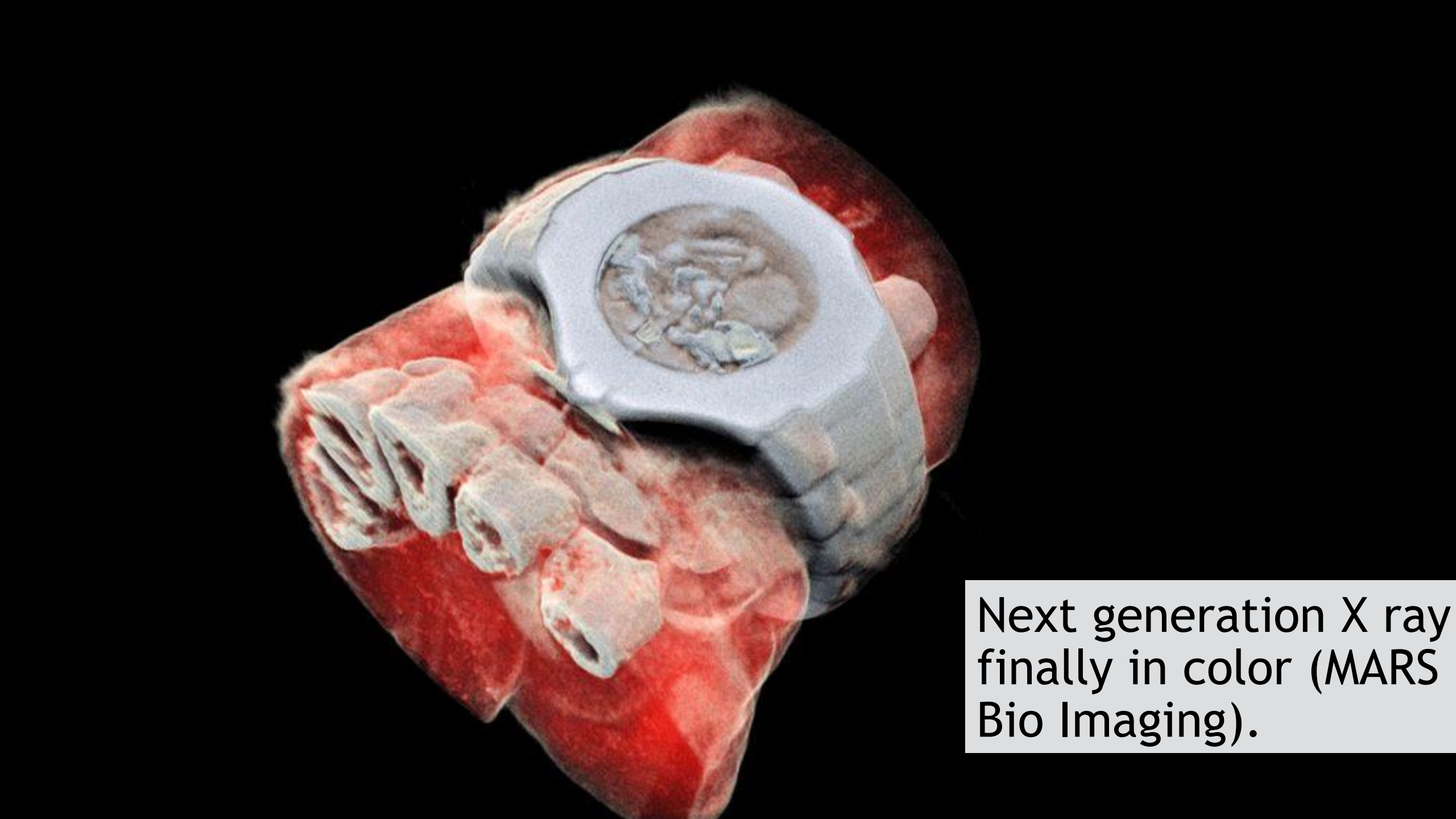


Tackling the risk of radon gas risk (BAQ).

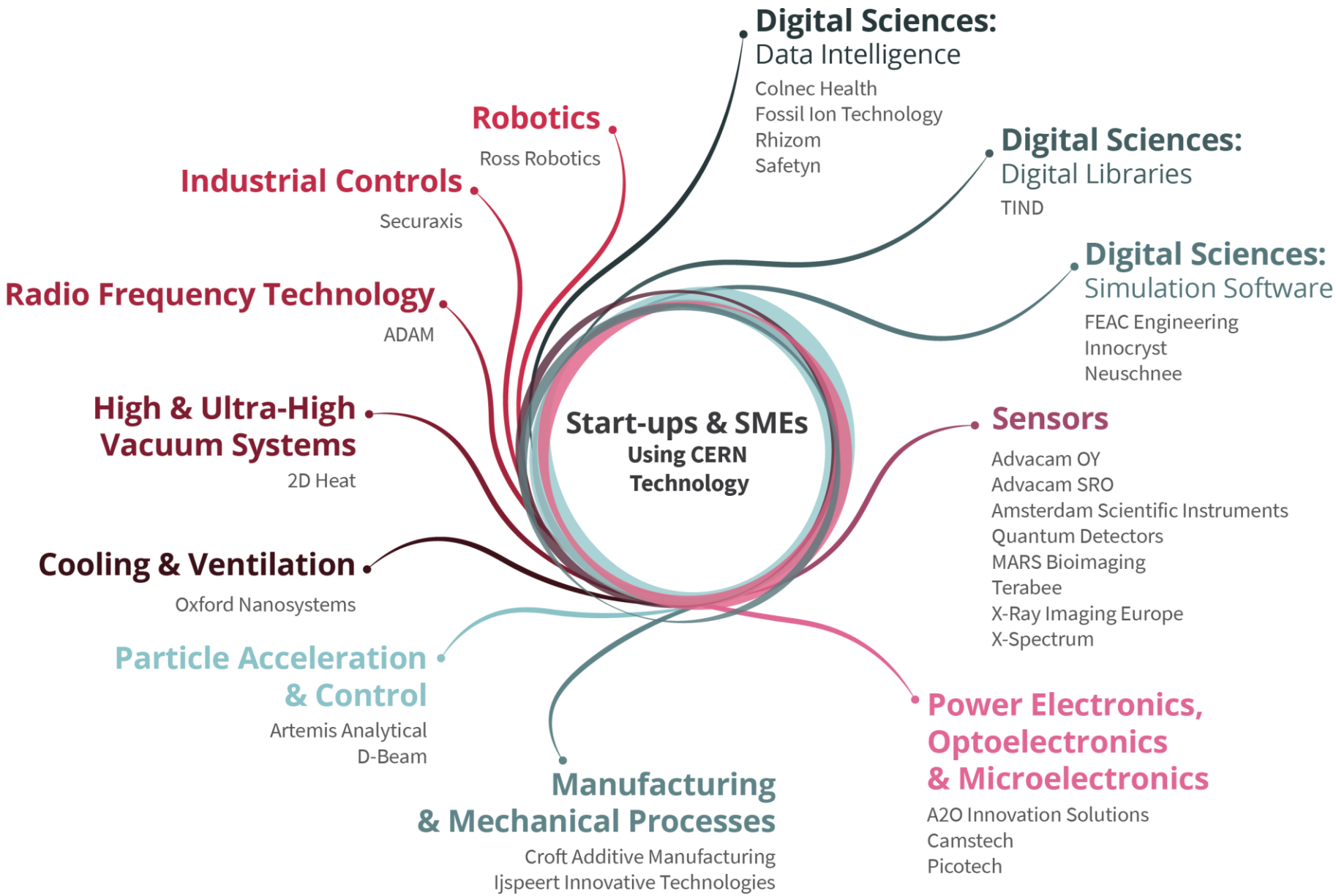
Library management and preservation (TIND).



TPX3Cam fast optical photon camera (ASI)



Next generation X ray finally in color (MARS Bio Imaging).


Start-ups & SMEs
Using CERN
Technology
Digital Sciences:
Data Intelligence
Colnec Health
Fossil Ion Technology
Rhizom
Safetyn
Digital Sciences:
Digital Libraries
TIND
Digital Sciences:
Simulation Software
FEAC Engineering
Innocryst
Neuschnee
Sensors
Advacam OY
Advacam SRO
Amsterdam Scientific Instruments
Quantum Detectors
MARS Bioimaging
Terabee
X-Ray Imaging Europe
X-Spectrum
Power Electronics,
Optoelectronics
& Microelectronics
A2O Innovation Solutions
Camstech
Picotech
Manufacturing
& Mechanical Processes
Croft Additive Manufacturing
Ijspeert Innovative Technologies
Particle Acceleration
& Control
Artemis Analytical
D-Beam
Cooling & Ventilation
Oxford Nanosystems
High & Ultra-High
Vacuum Systems
2D Heat
Radio Frequency Technology
ADAM
Industrial Controls
Securaxis
Robotics
Ross Robotics

THANK YOU!

Ashwin.ravikumar@cern.ch