LEONARDO
TECHNOLOGY FOR A SAFER FUTURE

Breaking HPC Silos

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Paris 7/10/2025

Please avoid printing this colourful slide. Let's save the planet together.

Leonardo

a leader in AS&D Sector

Leonardo is a global industrial group that builds technological capabilities in Aerospace, Defence & Security. The company plays a leading role in major international strategic programmes and is a trusted technological partner of governments, defence agencies, institutions and businesses.

PEOPLE WORLDWIDE

53,566 Total Workforce

62%	15%	14%	5%	4%
33,306	8,106	7,329	2,913	1,912
Italy	United Kingdom	United States	Poland	Rest of the world

4 Domestic markets

111 sites worldwide

150 countries commercial presence

MULTI-DOMAIN PRODUCTS AND SOLUTIONS

MAIN SHAREHOLDINGS AND JOINT VENTURES INTERNATIONAL

Leonardo UK 100%	Kopter 100%	PZL-Świdnik 100%	Leonardo DRS 72.3%	Telespazio 67%	ATR 50%
Elettronica 31.33%	Thales Alenia Space 33%	Avio 29.63%	Hensoldt 22.8%	MBDA 25%	

The silos

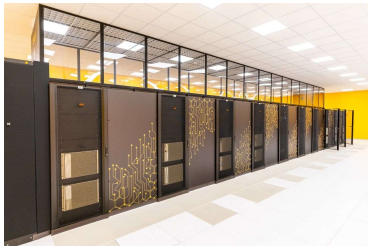
Top500 & BigSience

ChatGPT was made possible thanks to tens of thousands of Nvidia GPUs, which Microsoft is now upgrading

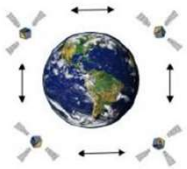
Microsoft used hundreds of millions of dollars worth of Nvidia A100 GPUs and is now upgrading to H100s

By Daniel Sims March 13, 2023 at 4:49 PM | 17 comments

Hyperscalers & CSP



Telco (cloud edge)



Space Cloud & HPC

UAV

robots

mobile

Deep edge

AI is everywhere so it is HPC!

The silos

EuroHPC
Joint Undertaking

EUROPEAN ALLIANCE
FOR INDUSTRIAL DATA,
EDGE AND CLOUD

EUROPEAN
DEFENCE
FUND

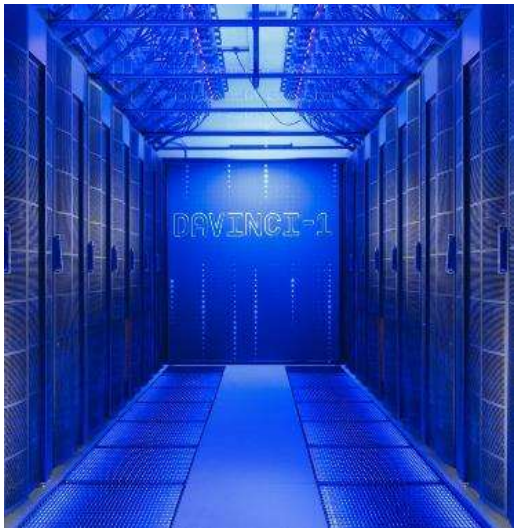
EUROPEAN
UNION

BDV BIG DATA VALUE ASSOCIATION

gaia-x

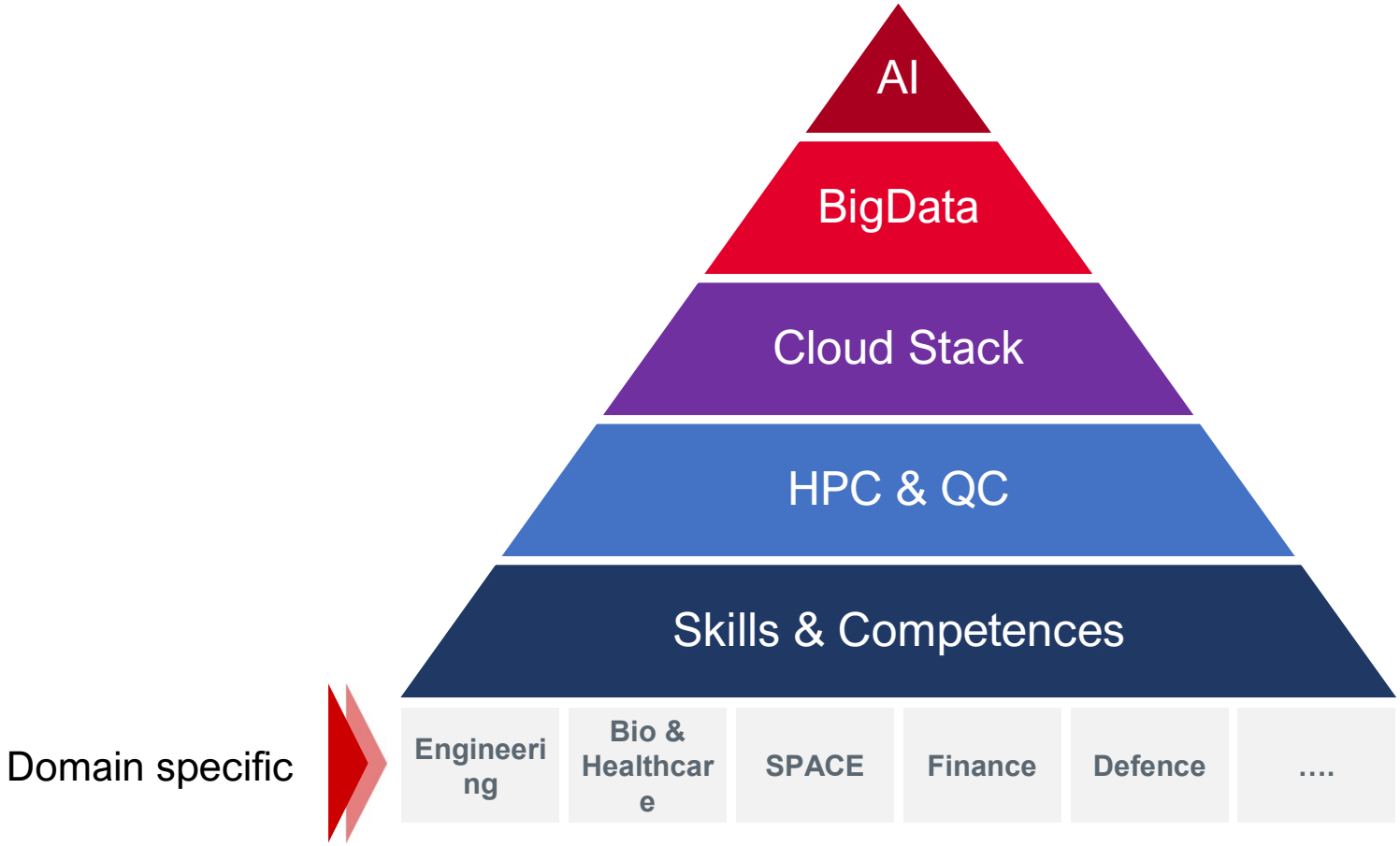
The silos

Research



Industry

Convergence toward AI



Leonardo Hypercomputing Continuum

Among the **most powerful HPCs** in the **A&D industry** worldwide

2.000+

Registered users for HPC computation

200+

Researchers engaged in its operations

Leonardo disruptive digital technologies throughout the entire **value chain**, evolving into a Company working in a **multi-domain environment across Divisions**

Engineering simulations to improve design and performance of next generation **platforms**

GenAI-based **predictive analytics** to anticipate market trends and operative challenges

Satellite image analysis for earth observation and **monitoring**

* from 5 to 13 petaflops (calculating speed), 200 servers installed in Torre Fiumara in Genoa with 120+ CPU and 90+ GPU nodes

Leonardo Hypercomputing Continuum Value Proposition

HPC/Cloud for Space

High-Performance Computing integrated with cloud infrastructure to power **complex space-related tasks**

HPC as-a-service

Provisioning of High-Performance Computing leveraging on HPC Davinci

Private Cognitive Cloud

Provisioning of computing and storage capabilities fit for AI solutions leveraging on HPC Davinci and industry standard private cloud stack

On-premise HPC

On-premise HPC **design and set-up**

On-premise HPC **operational management**

Enabling Cognitive Solutions

Advanced cognitive solutions designed to fully harness HPC

Deep — *Abstraction*

End-to-end competences along the value chain

Advanced Cognitive Solutions Center of Excellence

Key Objectives

Advanced Cognitive Solutions COE is a technological HUB dedicated to support Leonardo in implementing its strategic plan, thus achieving its objectives

Our mission includes enabling technology transfer, and cultivating cutting-edge skills to strengthen the Group's technological evolution and product portfolio in 3 fields:

- **Artificial Intelligence**
- **Deep Digital Technology**
- **Quantum Computing**

We have identified a framework of main strategic areas of focus for our commitments

PROJECT AREAS

Cross-Divisions
Strategic Initiatives

CAPACITY BOOST
Process efficiency

Competitiveness &
Product Innovation

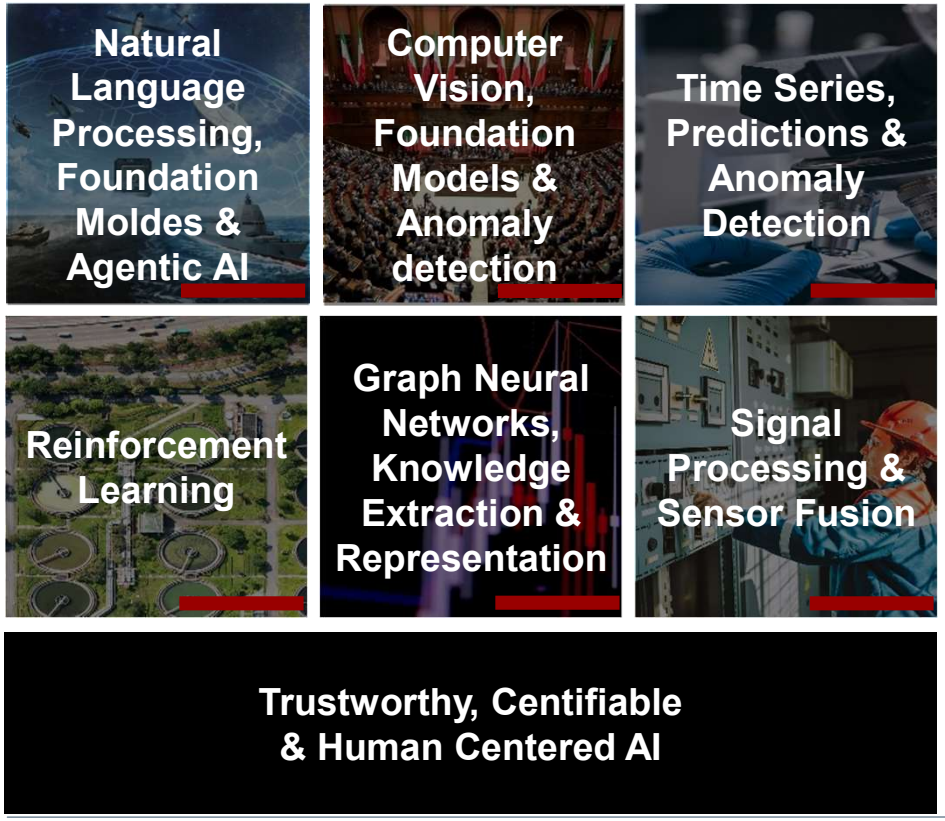
Boost strategic
capabilities: SPACE

Boost strategic
capabilities : HPC

Quantum Emulation
Quantum Hardware
Quantum Inspired

Artificial Intelligence: Skills and applications

Main AI Skills



Activity Clusters

Cross-Division Strategic projects

Situational Awareness fusing multiple sources
AI- enhanced simulation 4 **Decision Support Sys**
Ai powered CGF for **Multidomain Training**
Smart voice command **Assistant**

Space division Growth

Earth Observation **Foundation Models**
Anomaly Detection for **satellite resilience**
Trustworthy & Frugal AI **solutions to run onboard**
New agentic AI solution for **pipeline automation**

Ultra Competitive Products & Services

AI components for safer, easier, better products (Virtual Co-Pilot, Early Anomaly Detection,…)

Value added services (Predictive Maintenance, Smart Training, Supply Chain Optimisation,…)

10 x Capacity Boost

Automated document processing to streamline decision-making and burocracy
Employee onboarding, support and training
Automated quality control and test execution

Company Ger

... / NOT EXHAUSTIVE

Leonardo Hypercomputing Continuum: unmatched competence and experience at your service for personalized sovereign solutions

E2E TURN-KEY SOLUTIONS	**Support along all the value chain, providing end-to-end solutions**, from design to implementation and operation and cognitive solutions development
DATA AND MODELS SOVEREIGNTY	Data and models remain within Italy/EU and are subject to EU regulations, with the possibility of **direct auditing** of models and infrastructures.
TAILORED SOLUTIONS	Tailored solutions with **personalized side-by-side consulting** and a **tech-agnostic** approach
DIRECT INDUSTRIAL EXPERIENCE	Proven **direct experience and industrial credibility** by internal use of HPC and AI, with advanced **sector-specific expertise** in critical domains, and **deep technological knowledge** of latest innovation

Leonardo Hypercomputing Continuum: markets and applications

Target markets

Potential use cases

Defence

Real-time data processing for seamless **multi-domain coordination**

Simulations for aircraft design and battlefield **scenarios** development

Law Enforcement

Predictive models to analyze crime patterns and allocate resources

Real-time surveillance for **public safety**

Government / Institutions

Big data analysis for policy development and public services

Automated document processing to streamline decision-making and burocracy

Environmental and Climate

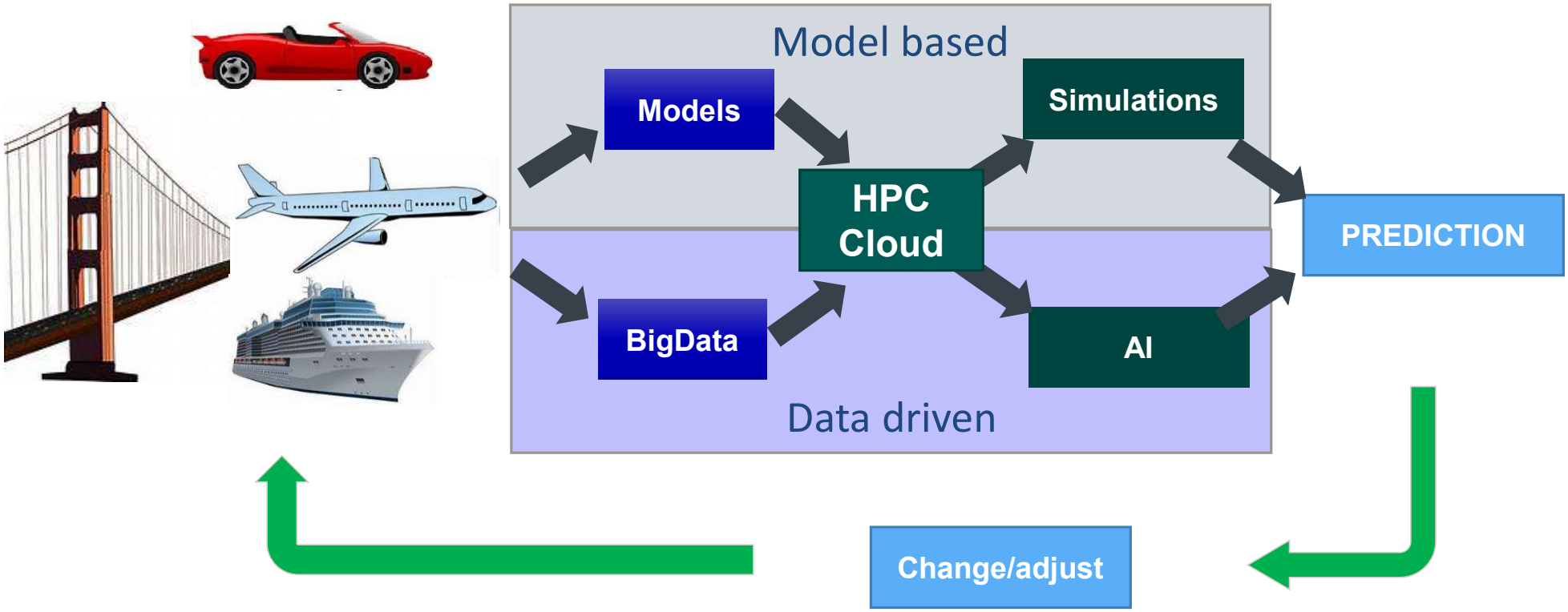
Large-scale computations for climate modeling, nowcasting and forecasting

Predictive models to predict hurricanes, floods, wildfires and respond proactively

Company Ger

... / NOT EXHAUSTIVE

Advanced Digital Twin



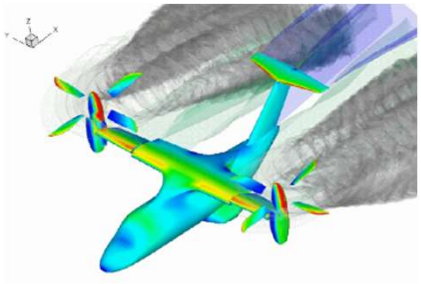
More data & compute capacity ⇒ more accurate predictions

ADT Example

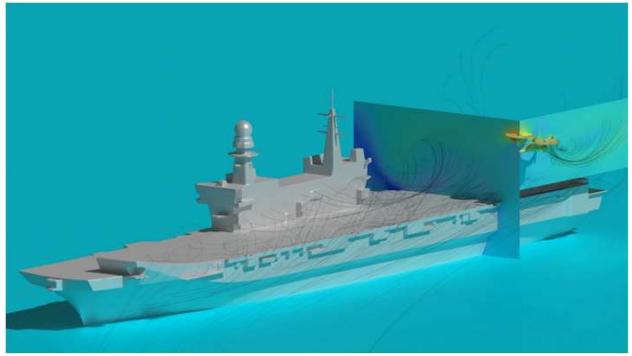
AI

Real time

AI



AI

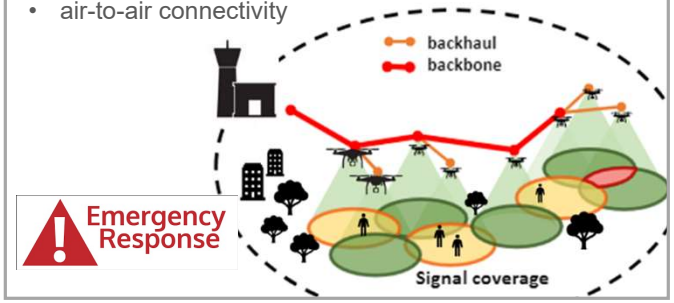


High fidelity simulation

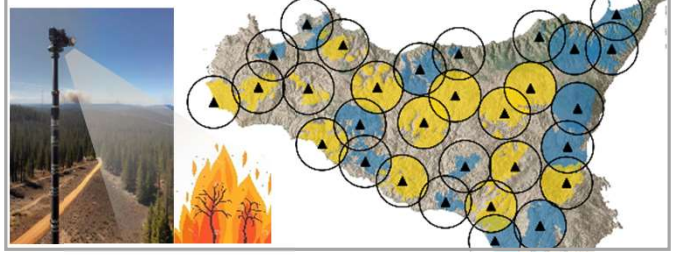
full scale complex scenario

Quantum Computing: Skills and applications

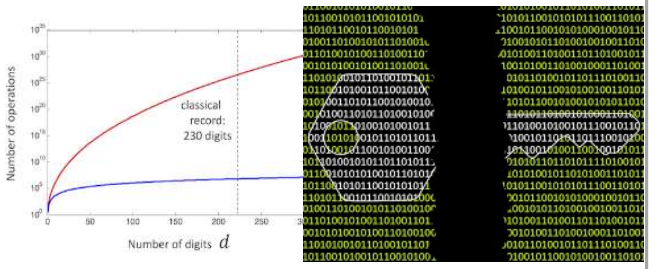
Application Field: Disaster Response, Search & Rescue
Goal: Deployment of UAV-based FANETs:
- maximize 5G signal coverage
- minimize interference
- multiple frequencies
- air-to-air connectivity



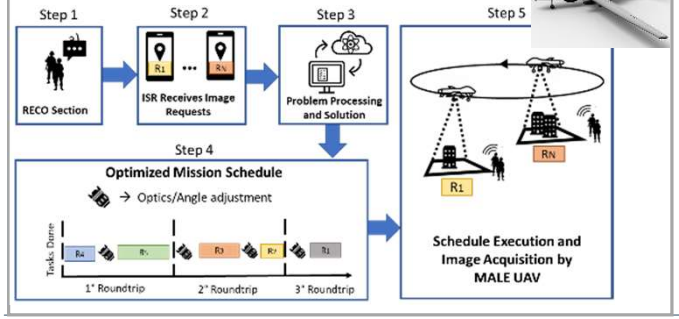
Application Field: Wildfire detection
Goal: Optimize Camera deployment to detect incipient wildfires considering:
- Terrain-obstructed field of vision
- Wildfire Risk maps
- Dynamic reallocation via Drones



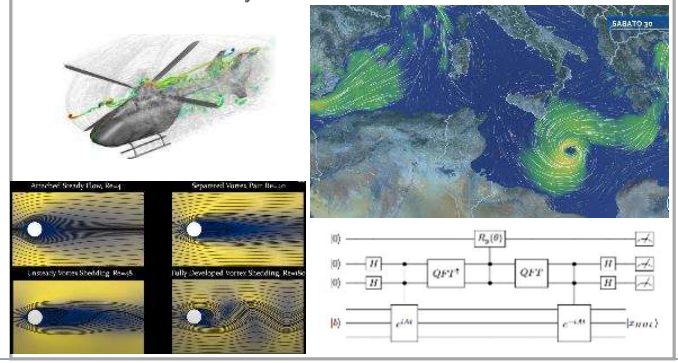
Application Field: Cracking of cryptographic keys
Goal: Monitoring QC capabilities (algorithms and hardware) in breaking RSA keys - Factoring



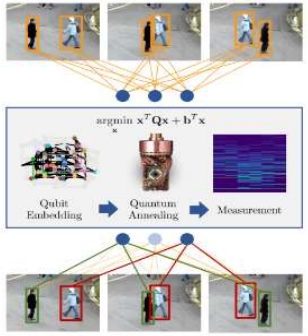
Application Field: Battlefield Intelligence Ops, Security
Goal: Optimize task scheduling (photographs) of MALE UAV hovering above a theatre of operations



Application Field: CFD and Meteorology
Goal: Quantum-enhanced CFD to model Temporal Evolution of Fluid Systems

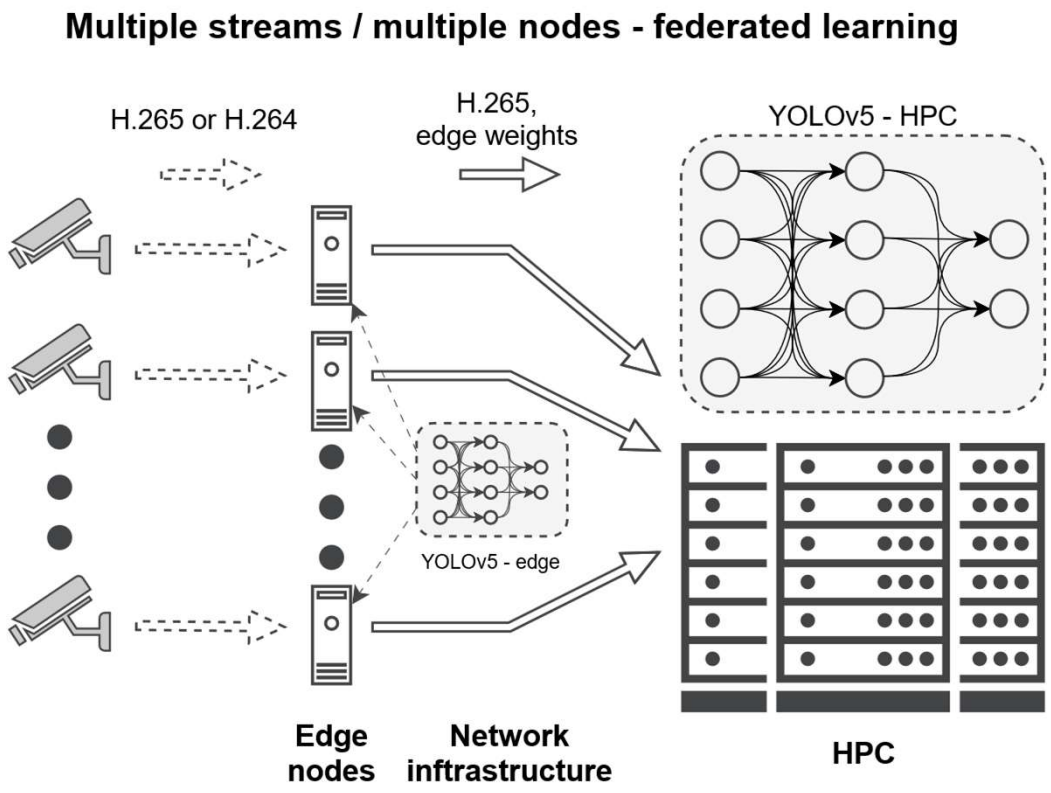


Application Field: Monitoring complex environments
Goal: tracking movements of multiple objects simultaneously in complex environments (camera, radar ..)



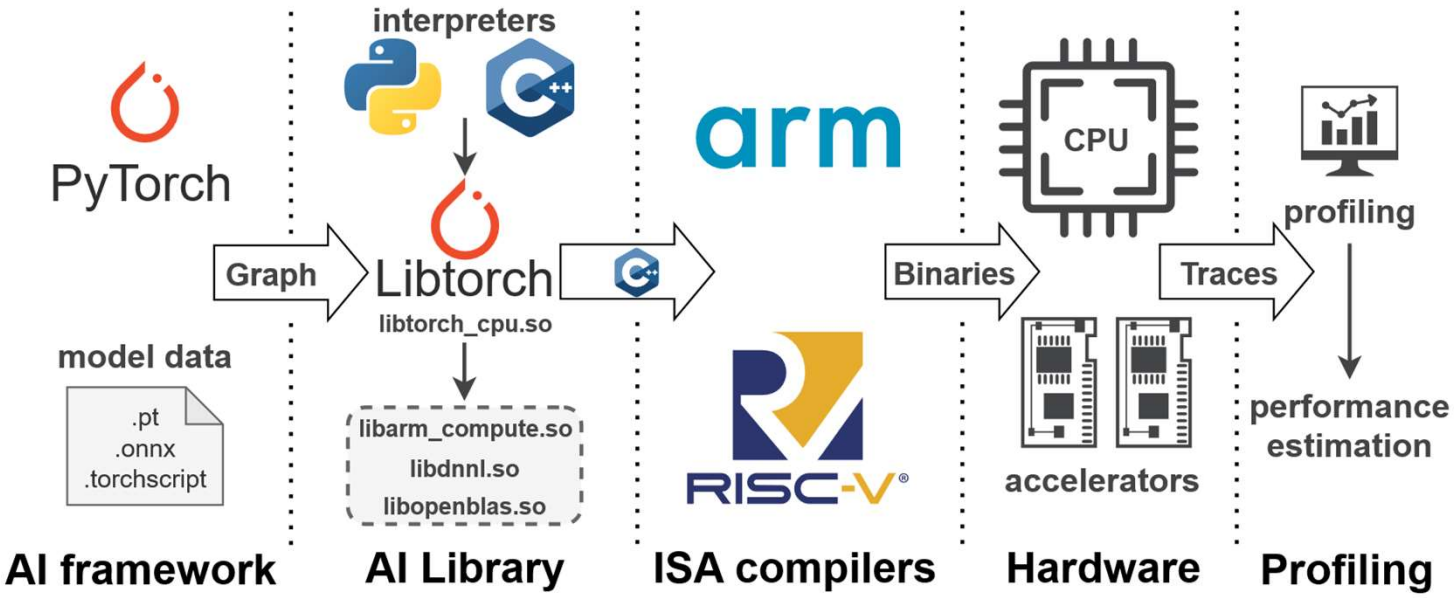
EPI Use LDO case

- LDO is working on a video-surveillance HPC use case powered by RISC-V edge nodes and ARM HPC nodes to assess the output of the EPI project.
- Edge nodes process one or few video streams, whereas the HPC node can process either multiple streams or multiple images while exchanging weights with the edge nodes in a federated learning scenario.



EPI AI Stack

- Supporting a popular and flexible AI framework such as PyTorch is important to enable developers that are unfamiliar with the EPI hardware to harness the computing power offered by EPAC and RHEA.
- Leonardo identified the following software stack to enable the deployment of the video-surveillance application on edge and HPC nodes.

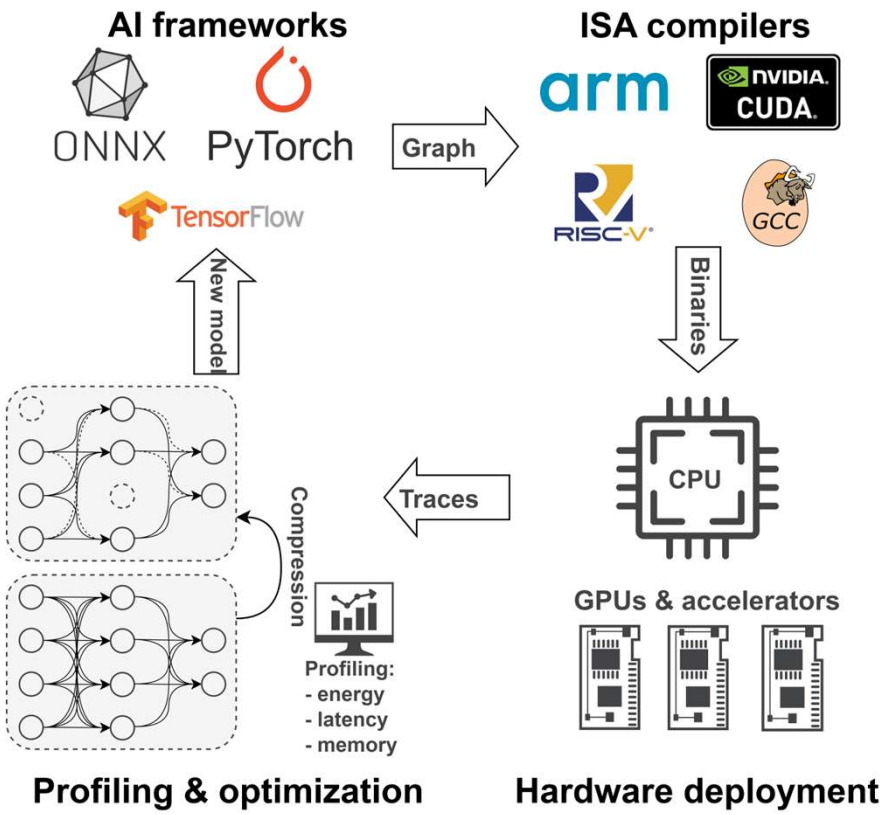


EU RISC-V platforms for general-purpose and AI computing

- The Deep Digital Technologies laboratory is evaluating the next generation of high-performance, low-power and HPC compute platforms powered by RISC-V processors developed in four European projects.
- The objective is to reduce the dependency on US technology (x86, GPUs) and explore more promising and energy efficient alternatives (ARM, RISC-V), prioritizing open-source and open-hardware solutions.
- Three tasks of interest are being evaluated on:
  - Object detection and/or segmentation with 2D Conv-nets and transformers
  - Hyperspectral classification with 3D Conv-nets
  - Natural language processing with LLMs

EU RISC-V platforms for general-purpose and AI computing

- Applications of industrial interest are developed with popular AI framework widely adopted in academia and production environments.
- Commercial SOTA accelerators such as NVIDIA GPUs and x86 CPUs are used as a reference.
- AI applications are compiled with standard or custom compilers and deployed on the target hardware platform. Standard compilers are used for commercial hardware, while custom compilers are used for custom accelerators or EU hardware.
- Profiling is carried out to measure the hardware performance and identify possible bottlenecks, either in the AI model or in the hardware.
- Optimization techniques such as pruning and quantization can be used to reduce the AI models complexity to meet the desired performance target.



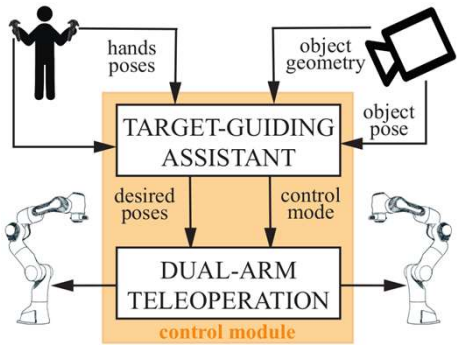
EU chips for embedded – TRISTAN

TRISTAN is the first project devoted to creating European chips for embedded:

- Low-power, medium-performance cores based on RISC-V
- Focus mainly on SoC building blocks and standard peripherals

Leonardo is participating as provider of two use cases:

Industrial Robotics



Unmanned Drones

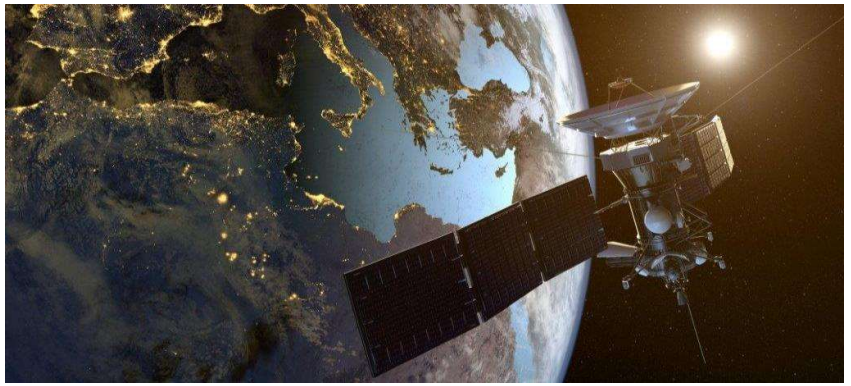
EU chips for embedded – ISOLDE

ISOLDE is the second project devoted to creating European chips for embedded:

- Low-power, high-performance cores based on RISC-V
- Focus mainly on high-performance and/or low power accelerators

Leonardo is participating as use case provider:

AI for Space satellites




THANK YOU
LEONARDO