



CO-VERSATILE

CO-VERSATILE Project

Introduction

Robert Lovas

Project coordinator

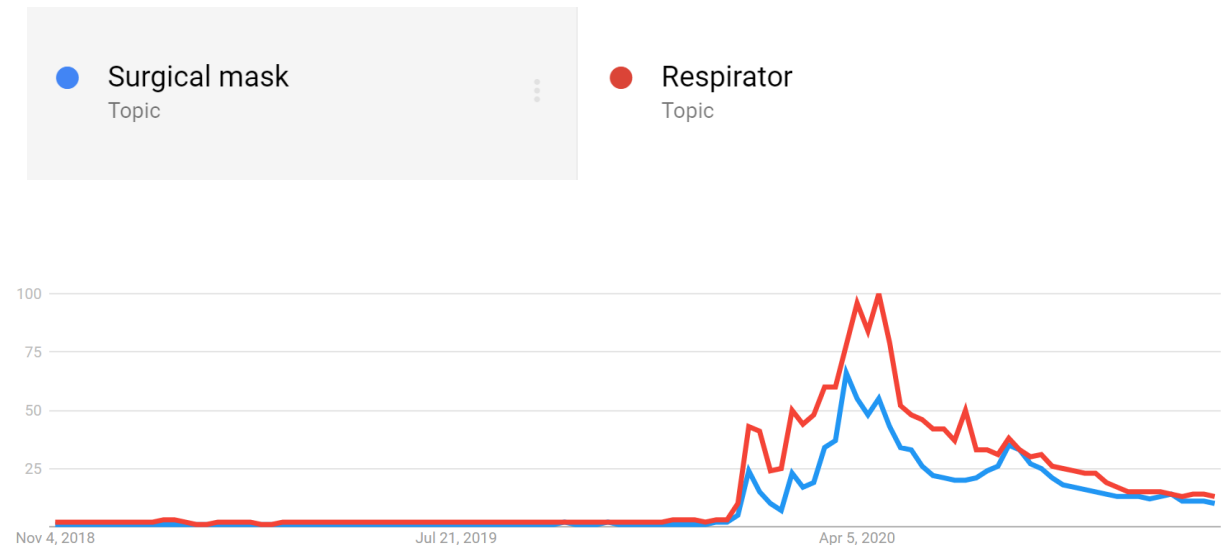
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COVID-19 pandemic: 1st wave

- Closed factories
- Disruptions of supply chains
- Shortage of Personal Protective Equipment, respirators, etc.



Source: Google trends

Extraordinary coronavirus H2020 call



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European
Commission

Funding & tender opportunities
Single Electronic Data Interchange Area (SEDIA)

→ ec.europa.eu/info/funding-tenders/opportunities/portal/screen/covid-19

New call for Coronavirus research launched on 19 May 2020 with €122 million of additional funding (deadline 11 June 2020)

The European Commission has mobilised an additional €122 million from its research and innovation programme, Horizon 2020, for urgently needed research into the coronavirus (see announcement, webinar and presentation). The call addresses the following topics:

SC1-PHE-CORONAVIRUS-2020-2A - Repurposing of manufacturing for vital medical supplies and equipment

SC1-PHE-CORONAVIRUS-2020-2B - Medical technologies, Digital tools and Artificial Intelligence (AI) analytics to improve surveillance and care at high Technology Readiness Levels (TRL)

SC1-PHE-CORONAVIRUS-2020-2C - Behavioural, social and economic impacts of the outbreak response

SC1-PHE-CORONAVIRUS-2020-2D - Pan-European COVID-19 cohorts

SC1-PHE-CORONAVIRUS-2020-2E - Networking of existing EU and international cohorts of relevance to COVID-19



3 weeks to prepare

4 weeks to review

Work starts from Day 0 (11 June)

Duration: 18-24 months

→ 23 supported projects (out of 458 proposals)



CO-VERSATILE: Overall goal

The project aims at increasing the adaptation capacity, resilience and flexibility of the European manufacturing sector,
focusing on vital medical supplies and equipment,
to support Europe in improving its response and preparedness to deal with pandemics.

CO-VERSATILE: Fact sheet



- **Title:** Adaptive and resilient production and supply chain methods and solutions for urgent need of vital medical supplies and equipment
- **Type:** Innovation Action
- **Coordinator:** SZTAKI - Institute for Computer Science and Control (HU)
- **Consortium:** 21 members from AT, CH, DE(4), ES(3), HU(2), IL, IT(5), NL, UK(3)
- **Budget:** 6.27 MEUR
- **EU contribution:** 5.37 MEUR
- **Duration:** 24 (+ 4 months)
- **Official start date:** 1 Nov 2020
- **Website:** <http://co-versatile.eu>



Partners



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Participant organisation name	Country
Institute for Computer Science and Control	HU
STAM S.r.l.	IT
clesgo GmbH	DE
University of Applied Science of Southern Switzerland	CH
Fraunhofer-Institut für Graphische Datenverarbeitung	DE
Fraunhofer-Institut für Materialfluss und Logistik	DE
Innomine Digital Innovation Hub Nonprofit Kft	HU
University of Westminster LBG	UK
Instituto Tecnológico de Aragón	ES
HSSMI Ltd.	UK
EIT Manufacturing Central gGmbH	DE
ML Engraving	IT
Or. P. Stampi Srl	IT
Gottfried Wilhelm Leibniz Universität Hannover	DE
The Manufacturing Technology Center Limited LBG	UK
IE University	ES
SKM Aeronautics LTD	IL
Euro Denker, S.L.	ES
Technische Universität Wien	AT
Deep Blue	IT
Engineering Ingegneria Informatica S.p.A.	IT
DEMCON advanced mechatronics Enschede BV	NL

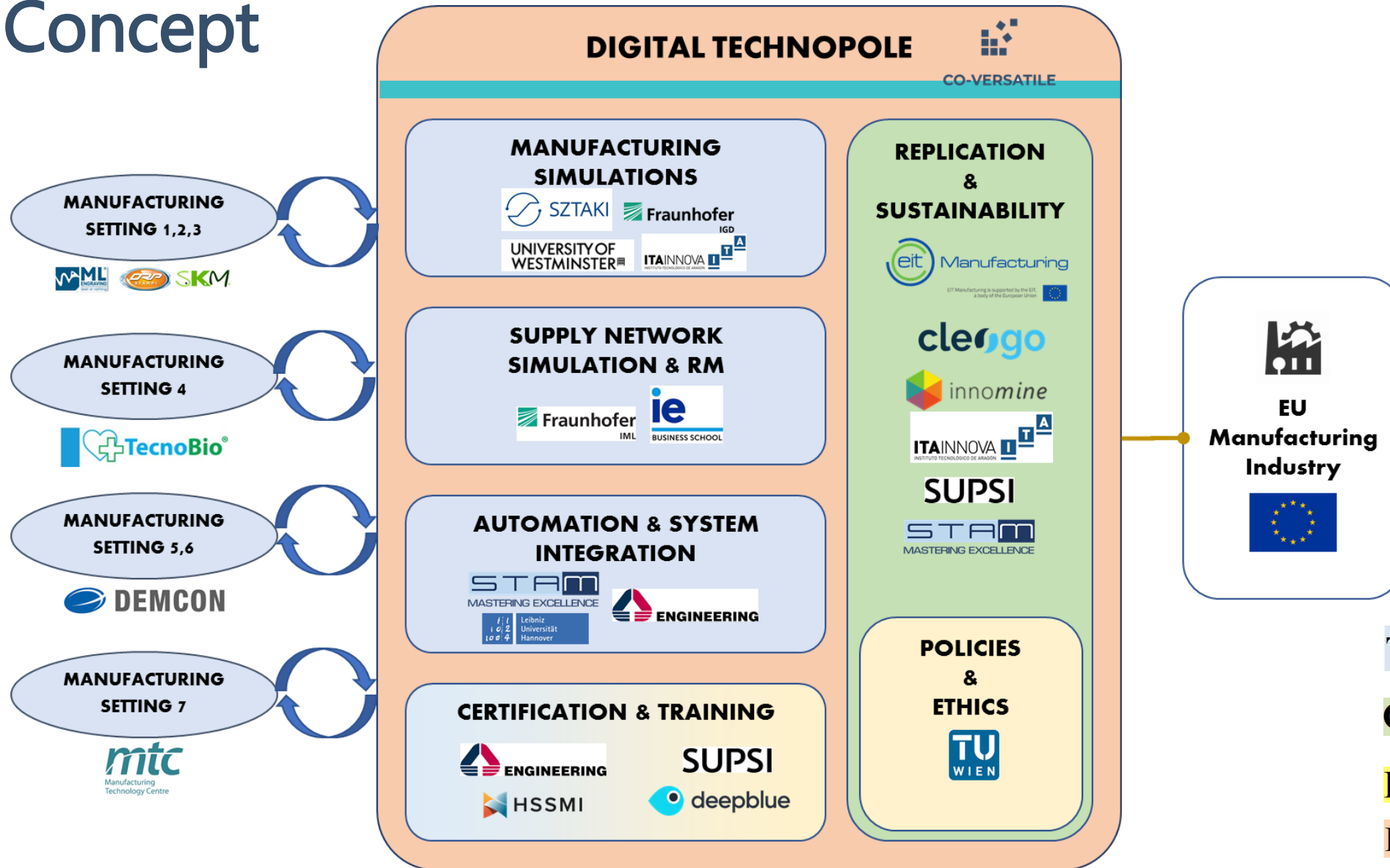


Objectives

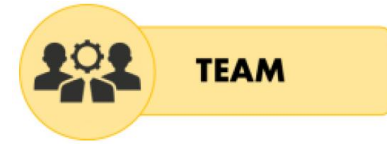
- (O1) Deliver a **rapid** response to the ongoing emergency situation in the **re-orientation and repurposing** of production capacities.
- (O2) **Set up** an accessible and democratic **Digital Technopole** for the re-orientation and repurposing of production capacities to meet the urgent needs of our societies for vital medical supplies and equipment.
- (O3) **Validate** the proper operation of the Digital Technopole on **7 selected Manufacturing Settings** to demonstrate a flexible 48-hour industrial response capability at scale, to ramp up production in response to sudden future spikes in demand of strategic products (for instance medical equipment such as PPE, respirators), for requalification or release of production lines.
- (O4) To assure the **sustainability** of the Digital Technopole and the **multiplication** of the offered services to the **European Manufacturing Industry**.

+ indicators: number of users, demonstrators and events, etc.

Concept



Who?

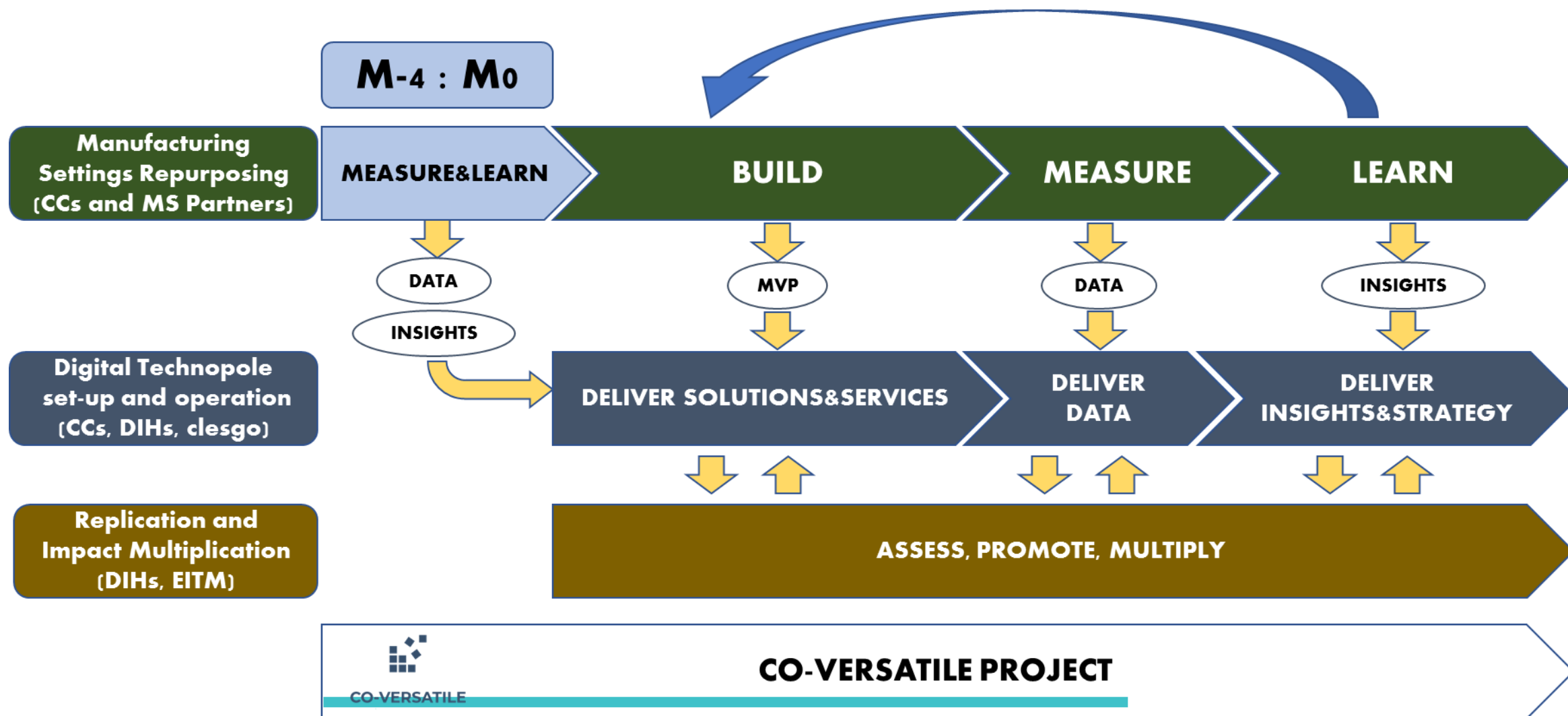


- Competence Centres (CC)
 - Technical capability
- Manufacturing Setting (MS) partners
 - Manufacturing capability
- Digital Innovation Hubs (DIH)
 - Outreach and replication capability
- Further partners with
 - Administrative and coordination capability
 - Training capability
 - ...



How?

... to deliver results within 3-18 months to end-users at scale



Why?

Manufacturing Settings & Ambitions



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	MANUFACTURING SIMULATIONS	SUPPLY NETWORK SIMULATION & RM	AUTOMATION & SYSTEM INTEGRATION	CERTIFICATION & TRAINING
MANUFACTURING SETTING 1,2,3 	Mask material sim. Surface textures sim. Injection process sim.	SC simulation to map potential nearby suppliers	Adaptive injection Control Laser engraving autom. Surface testing automation	Training for new tools to be integrated Testing certification support
MANUFACTURING SETTING 4 	Spraying process sim.	Supply chain RM and simulation based on components analysis	Adaptive process control Testing automation	Training for Quality Control (tools and components inspection and machinery usage)
MANUFACTURING SETTING 5 	Valve sim. Air flow sim.	Supply chain simulation and RM for key components	Automation for Assembly and burn-in Testing Line Configuration optimization	Creation of a protocol for quick traceable implementation for Engineering Change Request
MANUFACTURING SETTING 6 	Material and mask simulation (deformation and air flow)		Adaptive control for FFP _{1,2,3} Automated inspection	Training for engineering etc and creation of virtual training content to spread the knowledge across the new lines
MANUFACTURING SETTING 7 	Components sim. Components visualization		Robot task planning Adaptive control Virtual Commissioning	System certification for CPAP machines



Background: solutions, technologies, etc.



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CloudiFacturing optimising production processes and producibility, using Cloud/HPC-based modelling and simulation	Fraunhofer, clesgo, Innomine, STAM, SZTAKI, SUPSI, UoW
DIGITbrain digital twin with memorising capacity	Fraunhofer clesgo, Innomine, ITAINNOVA, STAM SZTAKI, SUPSI, UoW
KITT4SME Artificial Intelligence for Human-Robot interaction	SUPSI
PULSATE adoption of Laser-Based Advanced and Additive Manufacturing	clesgo

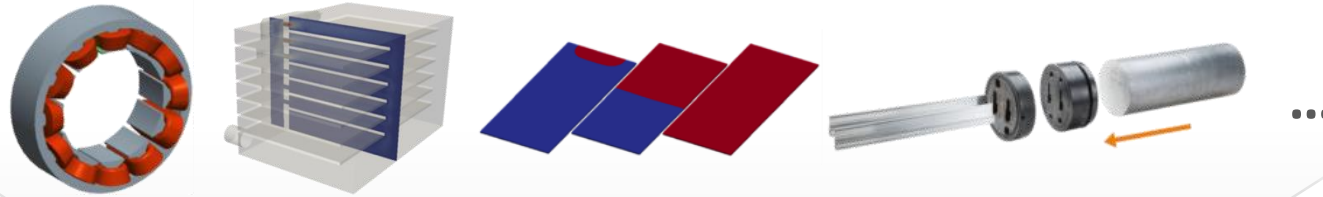
FAST RampUP simulation of supply chain ramp up scenarios for different industries	Fraunhofer
STREAM-0D real-time prediction of KPIs and process adjustment	ITA, STAM
MOULDTEX identification of surface texture patterns and novel laser systems	ITA, LUH, ML, ORP, SKM
NEWSKIN Open Innovation Test Bed	ITA, LUH, ML
SHAREWORK understanding the environment and human actions	STAM

Ventilator Challenge UK	HSSMI
SIPARiO Selfservice Platform AR in Operations	ENG
ASCLEPIOS secure cloud-based solutions for healthcare	UoW
ROBOTT-NET Technology transfer network	MTC
Manufacturing Accelerator Program	MTC



Background: CloudiFacturing approach

Many use cases



&

Cloudi
Facturing



*Develops core technology
for supporting
manufacturing simulation
and*

*implements 21 application
experiments (involving 60+
companies) to demonstrate
and utilize the results.*

Many technologies



CloudBroker

Flowbster

...

CloudiFacturing – a high-level view

Entry point for customers

Digital Marketplace (DM) DM API



Frontends

Execution engine agnostic platform

User Management (EMGUM)

Secret Management Module (EMGSMM)

Central Billing System (EMGBC)

Repository for Executable Artefacts (EMGREPO)

Workflow and Application Mediator (EMGWAM)

Data transfer and browsing system (EMGDATA)

CloudiFacturing platform components

Execution engines

SemWES

CloudBroker

Flowbster

Workflow Executor

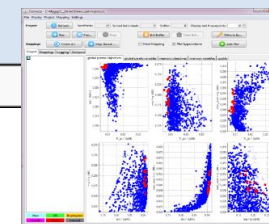
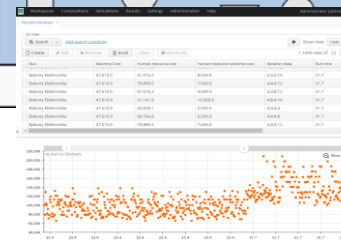
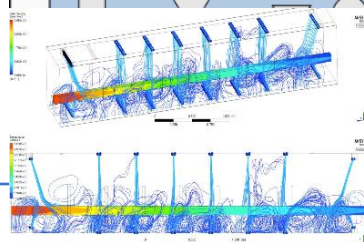
with resources/artefacts

Application Executor

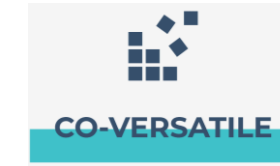
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Integrated artefact execution engines

Executable artefacts

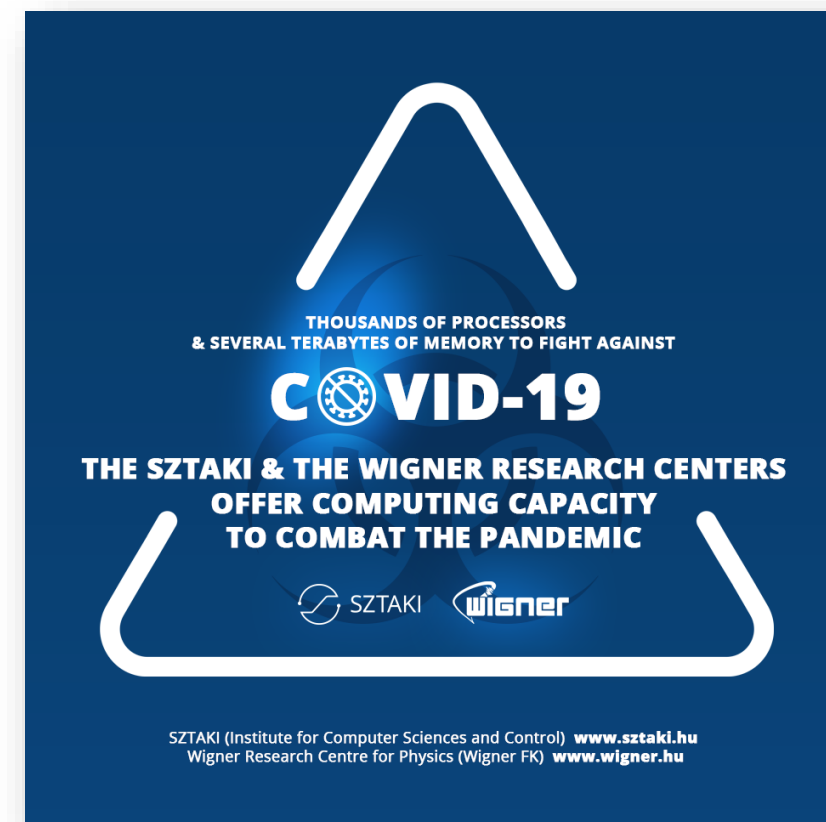


Simulation platform: ELKH Cloud



- Established in 2016 & significant upgrade in 2020/21 (e.g. GPU/SSD)
- Service model: **federated science cloud**
 - operated by SZTAKI and Wigner research centers in Hungary
 - open for Hungarian science community (research institutes, universities, national labs, ...)
 - advanced PaaS solutions, e.g. experimental support for distributed AI with hybrid cloud approach (Microsoft Azure)
- 100+ hosted projects including COVID-19 simulations
- Based on OpenStack middleware
- Integration with new pan-European initiatives as a member of
 - H2020 **EGI-ACE**: EGI Advanced Computing for EOSC
 - H2020 **SLICES-SC**: Scientific Large-scale Infrastructure for

Computing/Communication Experimental Studies – Starting Community



Expected impact ...

CO-VERSATILE will provide a clear and measurable short and medium-term contribution

to the development and deployment of innovative, adaptive, resilient production methods and solutions

that can quickly address immediate needs in the European health and social care provision.

... and a selected measurable impact

Demonstrate a flexible 48-hour industrial response capability for requalification or release of repurposed production lines:

- Shift to the production of silicone grade N95 masks;
- +30% production capacity for disinfectant spray system;
- 10x production capacity for ventilation and blowers modules;
- +200% assembly capacity for CPAP Machines; and
- +100% production capacity of FFP1,2,3 masks.



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Thank you for your attention!

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