

Agility for production in Europe



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825196

The logo for TRINITY features a stylized blue 'T' shape composed of several interlocking geometric blocks. To the right of the 'T' is a cluster of colorful squares in shades of blue, green, orange, and purple. Below these elements, the word 'TRINITY' is written in a large, blue, sans-serif font with a slight 3D effect.

www.trinityrobotics.eu

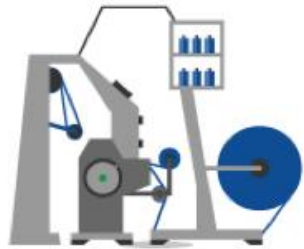
Jyrki Latokartano, Project Manager
Professor Dr. Minna Lanz, Coordinator
Tampere University, Finland

Late 18th century

Beginning of 20th century

1970s–2000s

2010 onward



First industrial revolution: Power generation

- Introduction of the power loom in 1784
- Mechanization of production facilities with water and steam power



Second industrial revolution: Industrialization

- Introduction of the assembly line in slaughterhouses in 1870
- Electrification drives mass production in a variety of industries



Third industrial revolution: Electronic automation

- Development of the first programmable logic controller (PLC) in 1969
- Growing application of electronics and IT to automate production processes



Fourth industrial revolution: Smart automation

- Increasing use of cyber-physical systems (CPS)
- In January 2011, Industry 4.0 was initiated as a “Future Project” by the German federal government
- With the introduction of IPv6 in 2012, virtually unlimited addressing space becomes available
- Governments, private companies, and industry associations have been focusing on Industry 4.0 and making investments since the 2010s

“Making the lot-size-1 economically feasible”



Sources: Germany Trade & Invest, “INDUSTRIE 4.0—Smart manufacturing for the future,” July 1, 2014; National Academy of Science and Engineering, “Securing the future of German manufacturing industry: Recommendations for implementing the strategic initiative Industry 4.0,” April 2013; Deloitte analysis.

What we can do to ensure successful business in Europe?

Increase the product quality and production capacity by robotics

- Mundane tasks for robots (e.g. dirty, dull and dangerous tasks)
- Transform (human) operator to knowledge worker and problem solver (e.g. system supervisor)
- Ensure that the factories can operate with less engineers (since we will lack those)

Shorten the overall production time with ICT and AI

- Digitalisation to increase supply network transparency and reliable real-time data visibility
- AI solutions to predict and prepare for continuous changes

Benefit from industrial ecosystems (e.g. DIHs)

- Life-long learning support
- To share resources (machines) and expertise
- Answer together to the changing customer needs
- Shorten the supply chains

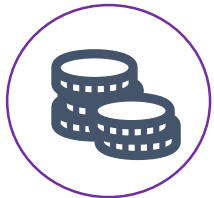
Consortium



Digital Technologies, Advanced Robotics and increased Cyber-security for Agile Production in Future European Manufacturing Ecosystems



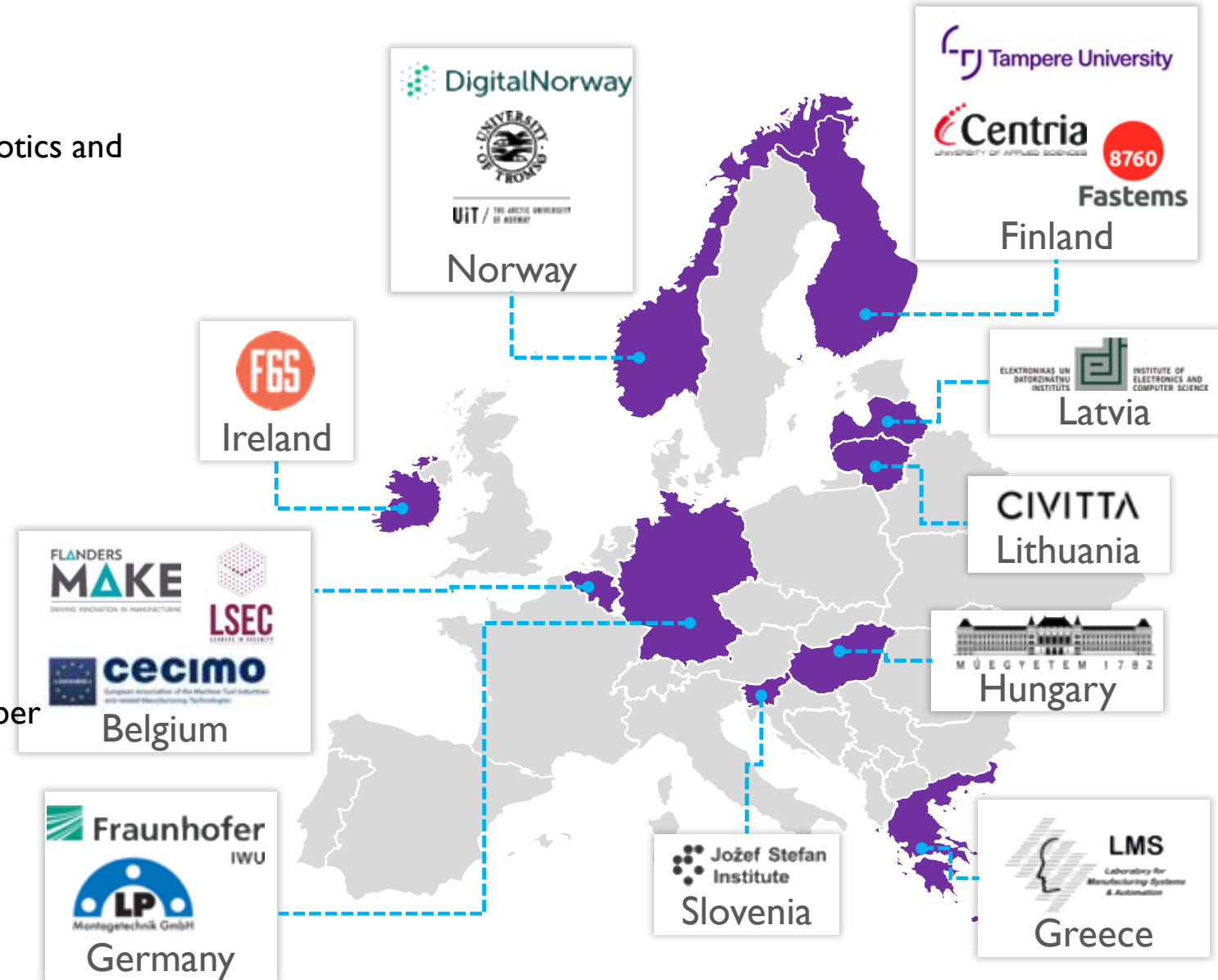
[DT-ICT-02-2018](#) - Robotics - Digital Innovation Hubs (DIH)



Overall budget: ~ € 16 400 000



48 months- January 2019 to December 2022



H2020 TRINITY (2019-2022)

Digital Technologies, Advanced Robotics and increased Cyber- security for Agile Production in Future European Manufacturing Ecosystems.

The main objective of TRINITY is to create a network of digital innovation hubs (DIHs) composed of Research Centers and University Groups specialized in Advanced Robotics and Internet of Things (IoT), supported by a DIH with experts in Robotics Cyber security to contribute to novel robotics solutions that will increase agility in production.

The second objective is to continue this network after the ramp-up phase, by building a sustainable business model throughout the project lifetime.

The third objective is to deliver a critical mass of use case demonstrations in collaboration with industry to support the industrial modernization leading to more agile production and increase the competitiveness of European companies.

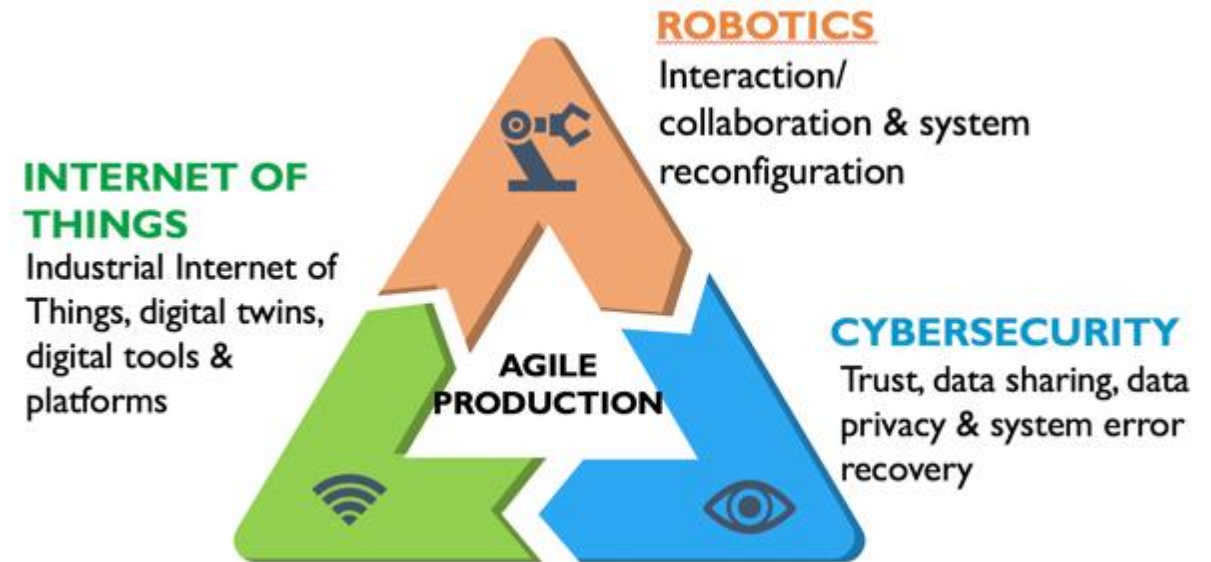
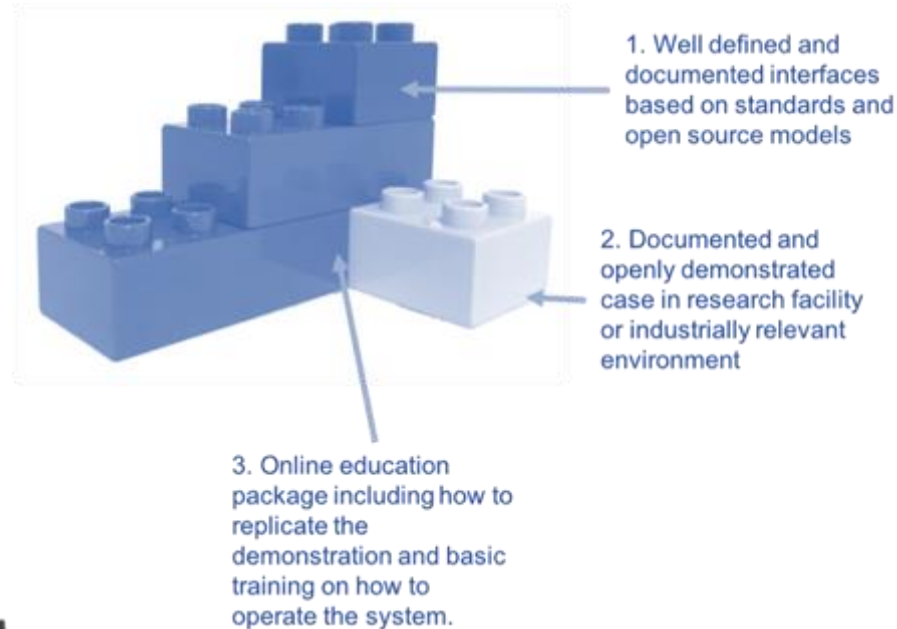
TRINITY approach for DIH networking

- Link existing networks
- Centralised digital point to access knowledge & network
- Access to the solutions via Online Catalog
- Online training materials
- Provision of modules & expertise via Open Calls
- Open DeepDive workshops



Concept and approach for increasing knowledge

TRINITY Target: over 50 modular use case demonstrations, with 150 technical modules by the end of 2022



Two calls; 2019, 2021

- 70% funding
- SMEs and slightly bigger consortiums
- 50-300k€ for 6-12 months demos

Robotics R&D&I DIH-Projects 2019-2022

CSA RODIN (C:euRobotics)



<http://trinityrobotics.eu>

Agile Production - TRINITY (C:TAU),

17 Core Partners + networks

- Up to 50 use-case demonstrations
- Education packages and platform
- Open source codes and open platform
- FSTP management
- Standardization
- Digital training and open days
- TRINITY Digital Access Point

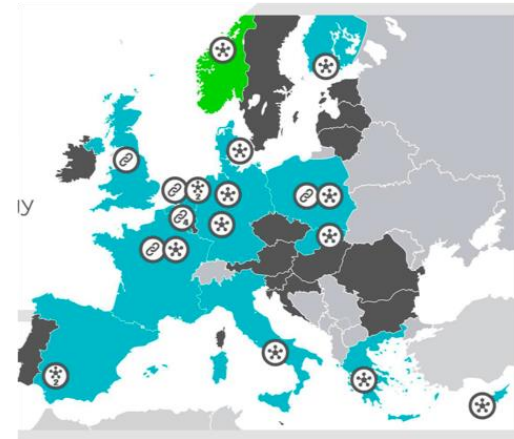


www.DIH-Squared.eu

Agile Production - DIH^2 (C: VTT),

26 DIHs Nodes + 10 Operational Partners

- Marketplace development
- Open platform development
- Standardization
- FSTP management
- Business acceleration
- Digital training
- Dissemination and Branding
- Governance structure



<https://rimanetwork.eu/>

Inspection and Maintenance - RIMA (C: CEA),

13 DIHs Nodes

- 50 demonstrations
- Marketplace development
- Cross-border experiments
- FSTP management
- Educational services
- Technology transfer
- Dissemination and Branding
-

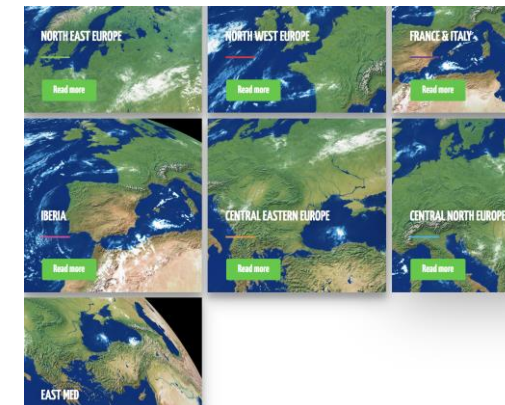


<https://dih-hero.eu/>

Healthcare – HERO (C: UTwente)

17 DIHs & Partners

- Marketplace development
- Open platform development
- Innovation management
- FSTP management
- Stimulating business
- Digital training
- Dissemination and Branding
- Community building



<https://agrobofood.eu/>

Agri-Food (C: SWR)

39 Partners

- Innovation Experiments (12)
- Industrial Challenges (8)
- FSTP management
- Stimulating business
- Dissemination and Branding
- Community building

What is in it for you?



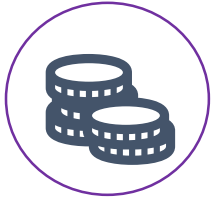
Access to solutions adapted to your needs (modular approach)



Access to wide network, expertise and knowledge through the TRINITY network and digital access point



Speeding up the technology transfer and shorter time to market via community



Funding opportunities through open calls

2. What we offer - use cases and funds



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Professor Dr. Minna Lanz, Coordinator

Tampere University, Finland

With the TRINITY use case demonstrations

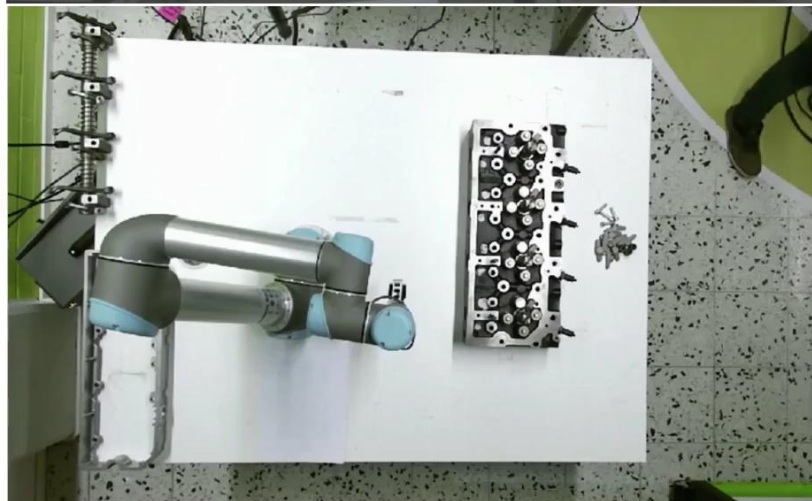
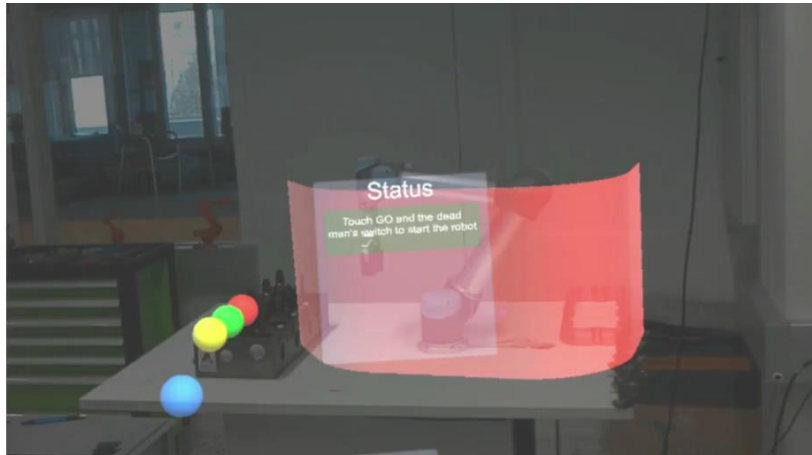
- The overall theme is “Robotics for Agile Production”
- We look forward
 - Novel (for applicant) utilisation of robotics, ICT and cyber-security applications and solutions developed and implemented by or into SMEs
 - Roadmap to success by the applicant
 - Measurable KPIs for outcomes – you decide what these are:
 - Non-value added time is reduced once the development is taken into use
 - Scrap is reduced
 - Quality is increased
 - Productivity is improved
 - New development can be commercialised
 - The company/partners gain new knowledge, competences and sellable items

Modules: 1) UI based on AR, and 2) UI based on depth sensor and projector, and 3) 3D map based Safety-system

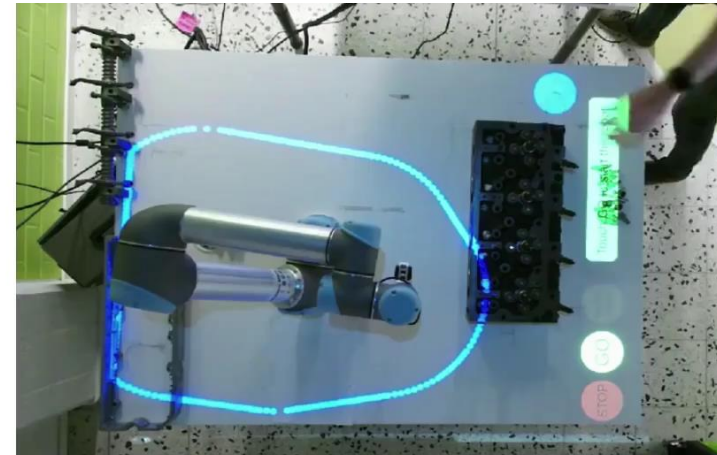
<https://trinityrobotics.eu/modules/>

https://www.youtube.com/playlist?list=PLwBUQDHwE7XuRgge1_kFRaF7l8gU6C-bN

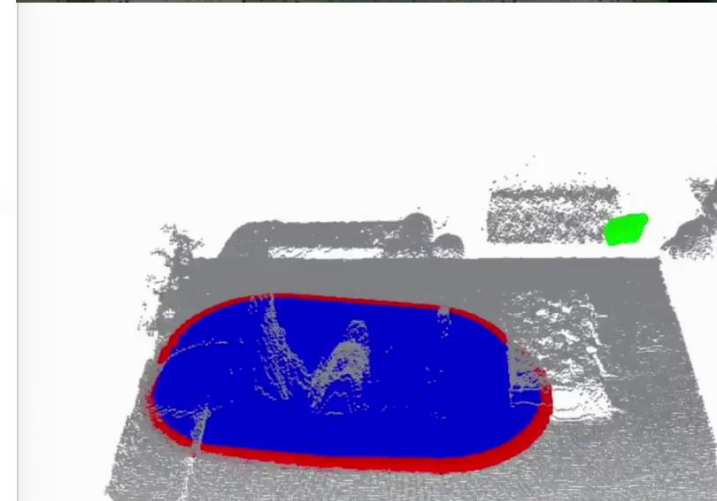
1.



2.



3.



Existing TRINITY use case demonstrations

<https://trinityrobotics.eu/demonstrators/>



ROBOTICS

Demo 7: Robot workcell reconfiguration

Demo 8: Efficient programming of robot tasks by human demonstration

Demo 1: Collaborative assembly with vision-based safety system

Demo 11: Robotized serving of automated warehouse

Demo 17: AI based vision system for object detection, recognition, classification and pick-up by a robotic arm

Demo 13: Deployment of mobile robots in collaborative work cell for assembly of product variants



IoT

Demo 5: Wire arc additive manufacturing with industrial robots

Demo 3: Collaborative robotics in large scale assembly, material handling and processing

Demo 10: HRI framework for operator support in human robot collaborative operations

Demo 2: Collaborative disassembly with augmented reality interaction

Demo 12: User-friendly human-robot collaborative tasks programming

Demo 4: Integrating digital context (e.g. BIM) to the digital twin with AR/VR of the robotized production

Demo 9: Dynamic task planning & work re-organization

Demo 6: Production flow simulation/supervision



CYBER-SECURITY

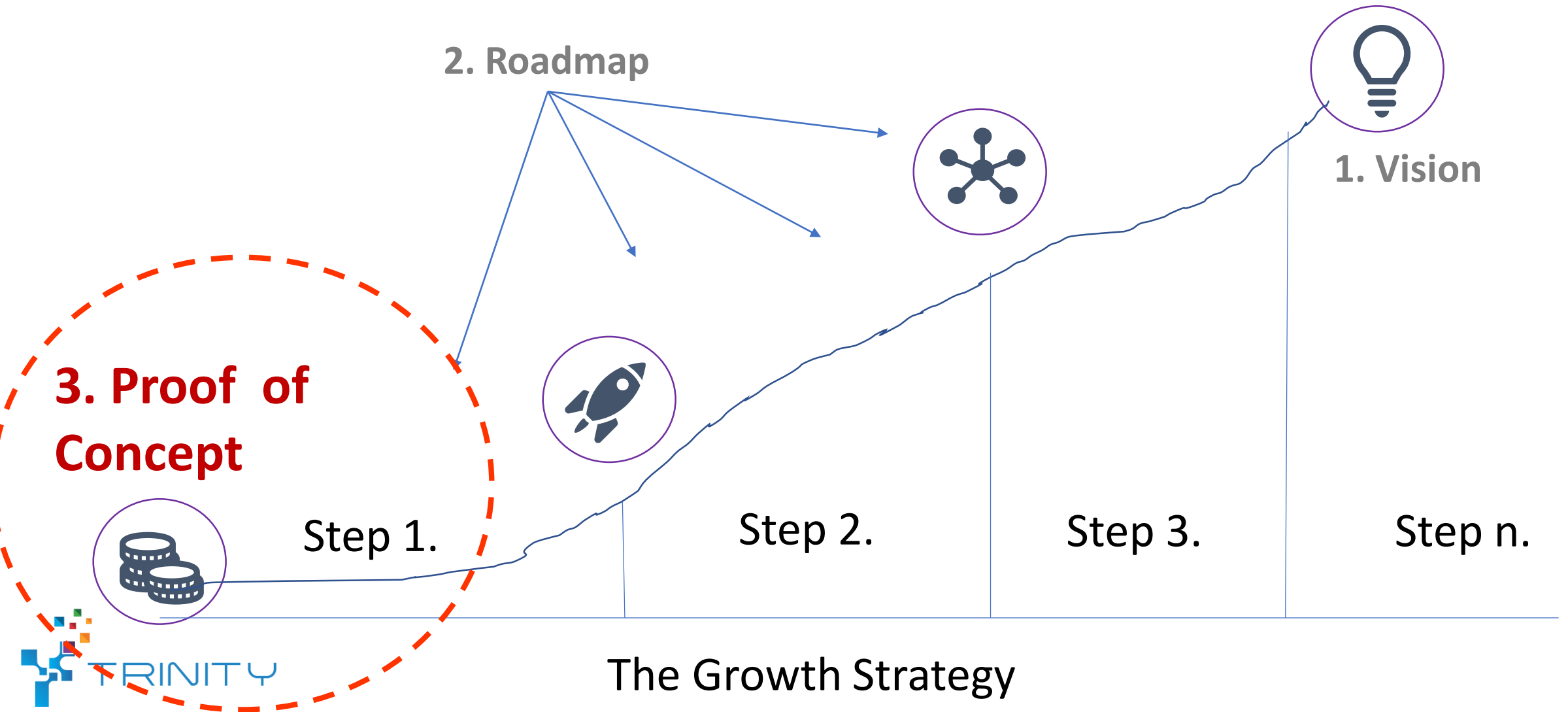
Demo 14: Virtualisation of a robot cell with a real controller

Demo 16: Flexible automation for agile production

Demo 18: Rapid development, testing and validation of large scale wireless sensor networks for production environment

Demo 15: IIoT Robustness Simulation

TRINITY - Open Calls – What we actually fund



Who can apply?

TRINITY ecosystem invites companies or **small consortia** to **plan, implement, and disseminate** ICT technologies incl. robotics, IoT and cybersecurity **to facilitate agile production** in European companies.

Lead applicant is SME or slightly bigger (less than 500 person, 100m€ turnover)

Consortium members:

- **Technology adopters/ end-users:** SMEs and slightly bigger
- **Technology providers:** Technology SMEs, Competence Centres, Research Centres and academia

1st Open Call

€ 4m€ → from €50.000 to €300.000 



Open Call #1 November 20th 2019 GET READY!

Demo TRINITY

Existing technical modules testing & implementation

up to 3 partners

Tech/end-user

Tech Provider

Compet. Centre

Leader

Novel solutions

external use case demonstrators

up to 3 partners

Tech/end-user

Tech Provider

Compet. Centre

Leader

Open Call #1 — Apply by Mar 13th 5:00pm CET

Apply: Win up to €300,000 (equity-free!) per application experiment, along with tailored tech support.

- The budget per application may vary from €50.000 to €300.000,
- The total funding of the non-industry partners (if any) cannot exceed the 40% of the entire proposal budget,
- Funding rate: 70%
- EU or H2020 associated SMEs

** Consortia led by Industry partners (SMEs & slightly bigger)*



TRINITY open call, more info

Open call webinar recording:

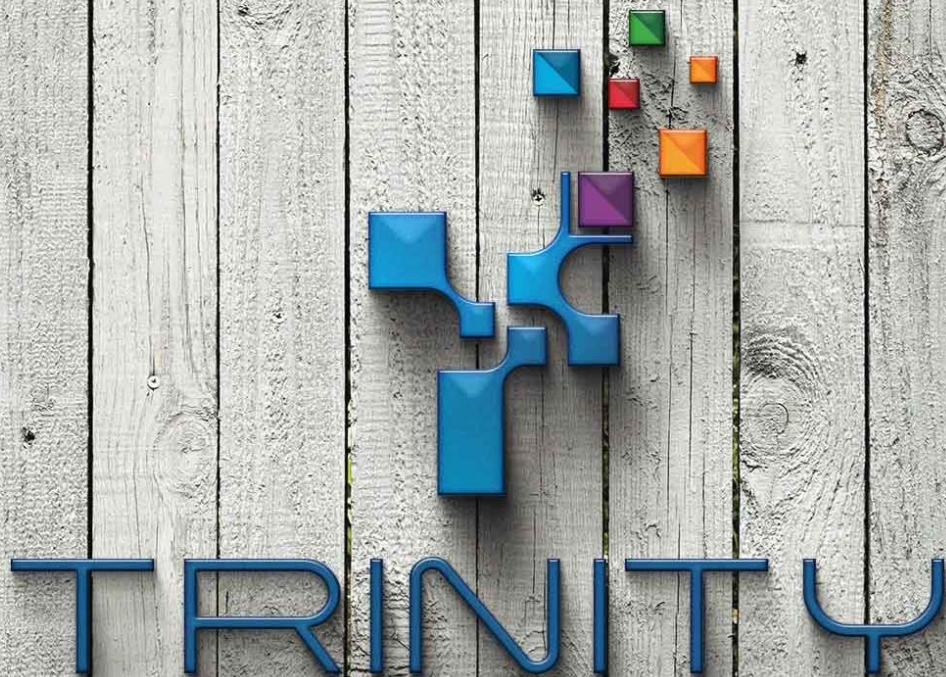
<https://www.youtube.com/channel/UC73uEsurvzyimwjFvh0L5cg>

Open call information

<https://trinityrobotics.eu/calls/trinity-dih-agile-production-open-call-for-up-to-e300000/>

Contact local TRINITY partner

All robotics DIHs <https://rodin-robotics.eu/>



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www.linkedin.com/groups/12177835

