



Presenter name
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CERN Ideasquare

INTRODUCTION



IDEASQUARE IN BRIEF

“Ideasquare is an experiment to bring together physicists, engineers, industrial partners, early-stage researchers and cross-disciplinary teams of students to work together on detector upgrade R&D and related technologies. The purpose is to co-develop new technologies for research purposes, and at the same time, create a fruitful environment for socially and globally relevant new product ideas and innovation.”



IDEASQUARE IS

- Project with a dedicated building, hosting:
 - EU-funded detector upgrade R&D projects
 - Innovation events, workshops, hackathons
 - Multidisciplinary master level student programs
- ...to prototype, test and iterate new forms of collaboration and co-creation in the areas of Research, Education and Technology - **RET**



EXAMPLE: NEUTRINO PLATFORM PROJECT

- Neutrino Platform (CENF) fosters fundamental research in the field of Neutrino Accelerator Physics
- CENF supports generic detector, neutrino beams R&D and large detector prototypes or demonstrators. It gives technical, financial and logistics support to approved projects
- Currently includes seven projects, including significant involvement in (Proto)Dyne
- CERN & IdeaSquare provides a facility for R&D on future technologies (HW and SW) and partner in several neutrino research programs



EXAMPLE: EU-FUNDED ATTRACT PROJECT(S)

- ATTRACT funds 170 breakthrough projects in Detection & Imaging
- Provides funding for developing early-stage ideas and prototypes
- Focuses on high innovation with potential outside research
- Engages with CBI-like student activities, seeking for unforeseen entrepreneurial opportunities for the young
- Purpose is to create a new innovation ecosystem in Europe
- ATTRACT is coordinated by CERN (IdeaSquare)



Challenge
Based
Innovation

EXAMPLE: MASTER-LEVEL STUDENT COURSE

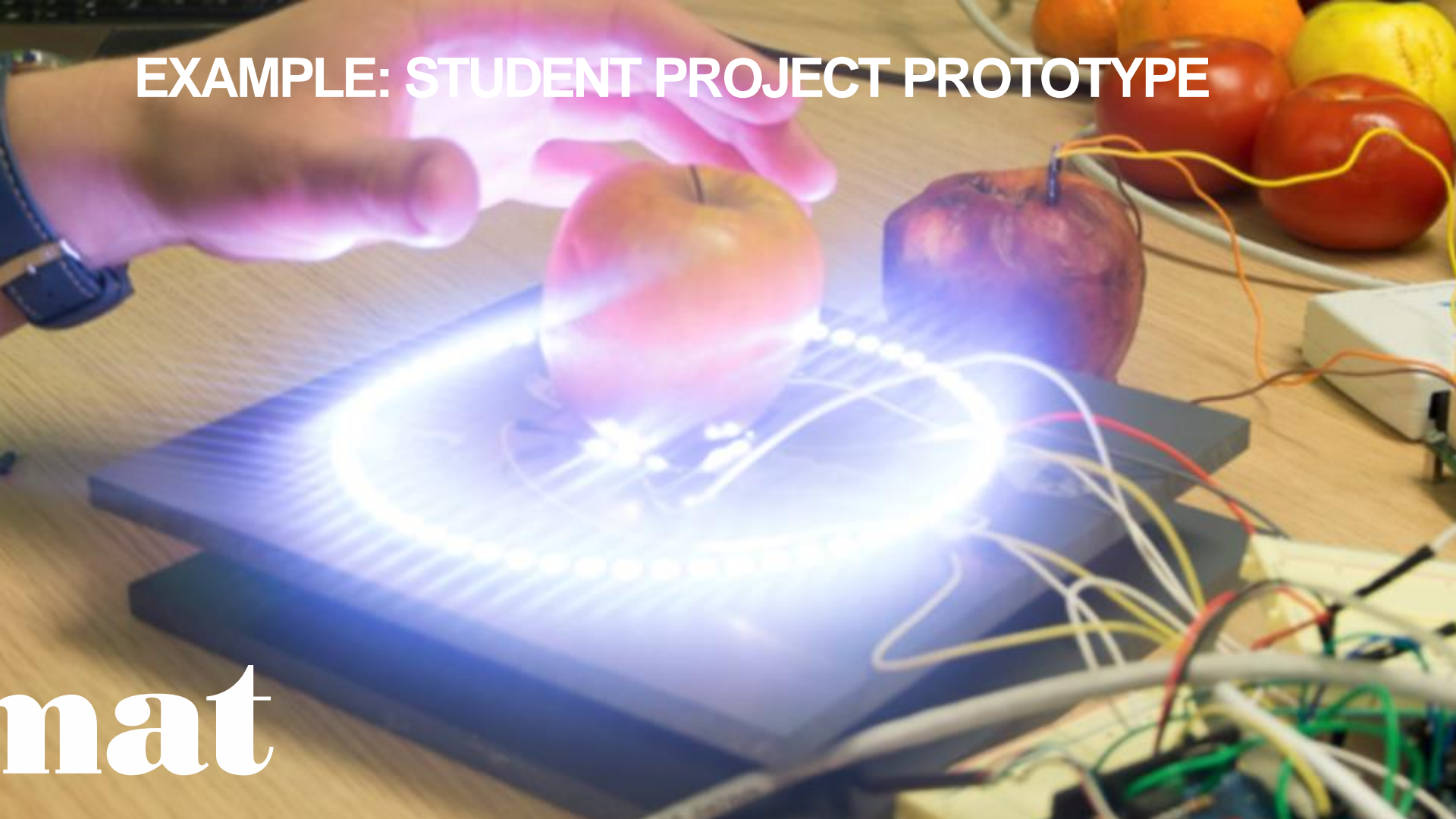
- Challenge Based Innovation (CBI) is 5-6 month MSc-level specialization course for product and service development, run by participating universities from 8 countries around the world
- Over 600 students have participated with more than 100 conceptual prototypes produced, contributing to UN Sustainable Development Goals
- In the course, multidisciplinary student teams learn how to apply Design Thinking – process for new product/service development; engaging with CERN researchers who act as technological coaches in the process
- “Work extremely hard, learn and have fun!”
- “Fail fast and often to succeed sooner”

EXAMPLE: STUDENT PROJECT PROTOTYPE



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IDEASQUARE OUTPUT

- Creating next-generation of young scientists and innovators
- Accelerating flow of ideas and time from discovery to application
- More effective sharing of ideas, spaces and resources across projects at CERN and outside
- New results in socio-economic research about experimental innovation processes (IdeaSquare Journal of Experimental Innovation)
- Making societal value of basic research more visible and tangible
- New insights for ATTRACT (www.attract-eu.com)

CBI STUDENT INNOVATION CHALLENGE ON NANOSATELLITES

Introduction

- IdeaSquare can host max 250 students per year related to Challenge Based Innovation (CBI) program;
- Since 2017, discussions have taken place with several universities in CBI (e.g. UPC, TUT, Swinburne) to combine the idea of their own technical student projects around designing, testing, launching and operating small nanosatellite(s), with the human centric, science-society driven CBI-projects at IdeaSquare and allow a more “virtual” participation basis for students<
- More recently, loose ideas have been exchanged also with UNOSAT and ESA

Project idea

- Such “virtual” project would combine a related physics research aspect (e.g. study of cosmic background radiation distribution, cosmic ray coincidence measurements using multiple satellites etc.), and an initially user-experience & SDG-driven assignment;
- Proposed topics: dedicated sensors for early warning of earthquakes or volcanic eruptions; detecting suitable underground water streams to drill wells for accessing drinking water in remote areas; optimizing use of crop pesticides in remote areas etc.;
- The collaborative principles rely on open science and open innovation.



Current technical challenges in cube/nanosats (non-commercial)

- Limited manoeuvrability (no accurate gyroscopes or complete retrofiring)
- Limited power consumption (limited solar power collection and communication capabilities)
- Limited communication coverage for LEO (Low Orbit) satellites of just a few minutes, unless a dedicated, shared data receiver network is in place
- These constraints impose strong design and testing challenges and require dedicated labs in the universities.

Organizational challenges

- Integrating such a program in universities curriculum
- Integration of student input
- Design, test and operate nanosatellites as part of the university educational programs

Proposed organization

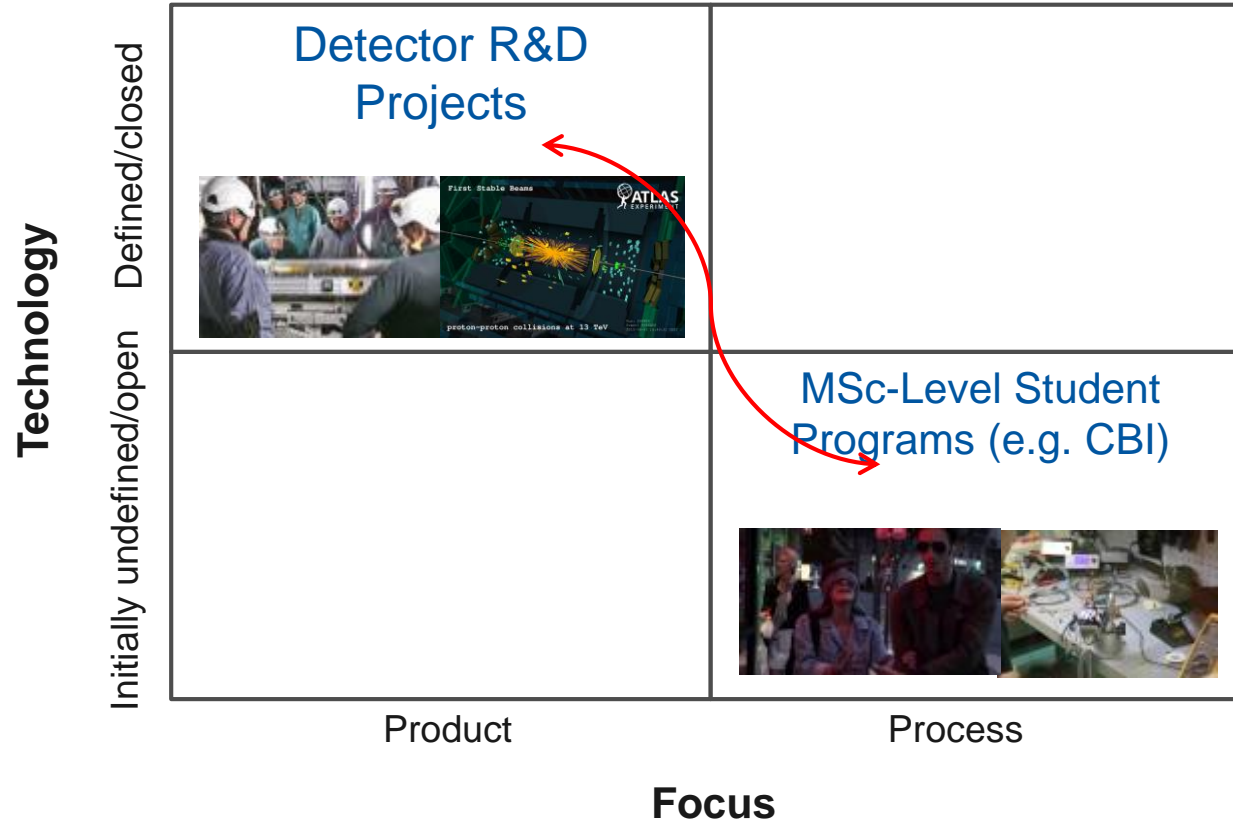
- CERN IdeaSquare – IT platform, collaborative approach, hosting related events
- ESA – Integration (advice)
- UNOSAT – Connection to societal challenges
- TAU – Coordination
- + Participating universities

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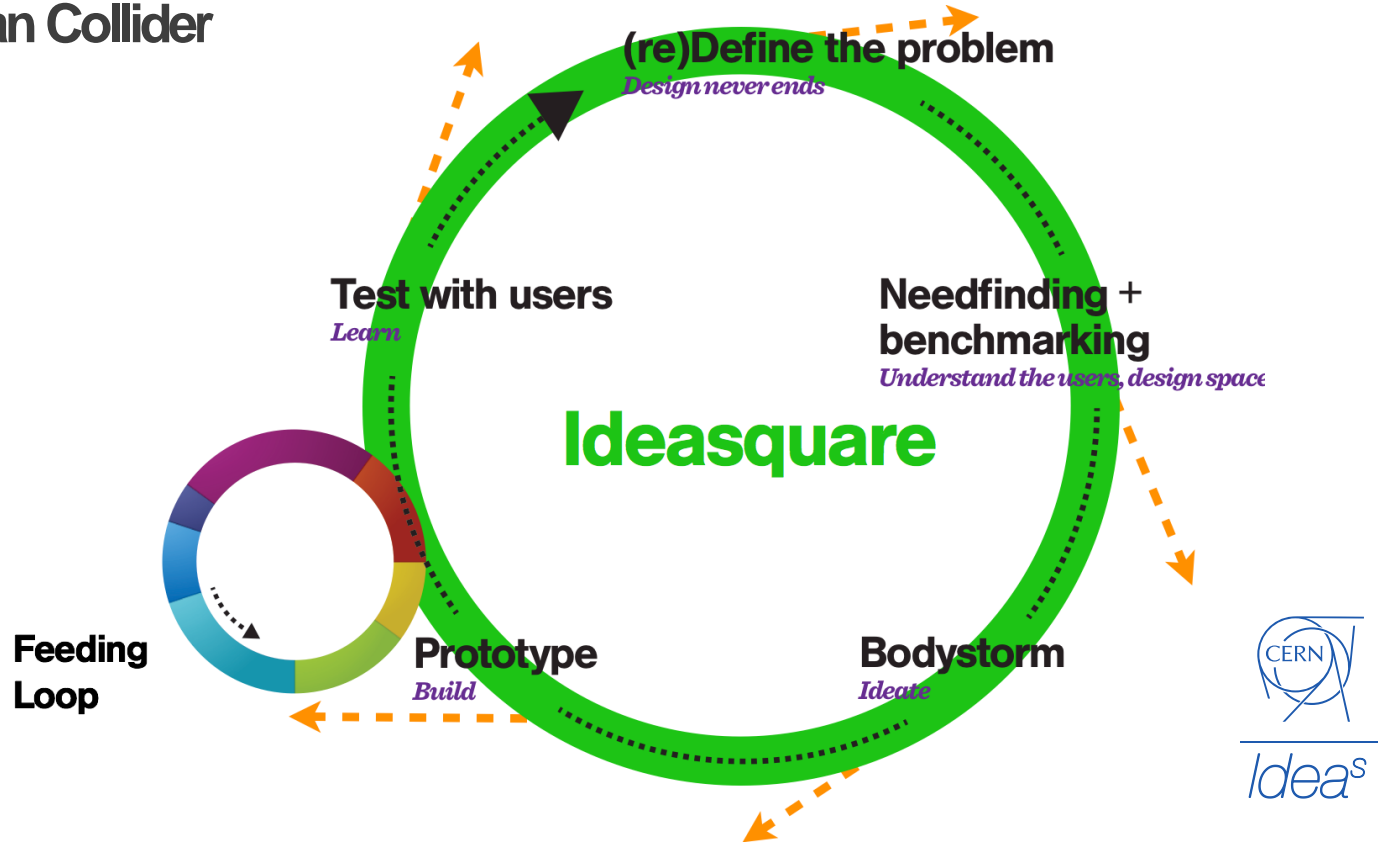
Idea^s

WHAT IS THE MOST INTERESTING LINK FOR NEW INNOVATION?



IDEASQUARE

The Small Human Collider



A green plush hand is holding a blue rectangular sign. The sign has white text on it. The background is a blurred green forest.

All you need is
~~..Love~~ PHYSICS
..Design
..Business
..and Engineering.

Questions? Comments?

Contact information:

Email

Skype

Let's have a cup of coffee and make it happen!



Idea^s