

IDEALAB@CERN

Introduction Nov 20th, 2013

Talent ITN Midterm Review



IdeaLab in brief

“IdeaLab@CERN is a pilot project that brings together physicists, engineers, industrial partners, early-stage researchers and cross-disciplinary teams of students to work together on detector upgrade R&D technologies funded by external parties such as the EU framework programmes. 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.”

IdeaLab in brief

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IdeaLab is

- **Physical location / building**
- **Hosting:**
 - **EU-funded detector upgrade R&D projects**
 - **Events, activities**
 - **Challenge Based Innovation (CBI) - student program**
- **...to prototype, test and iterate new forms of collaboration and co-creation in the areas of research, education and technology - RET**



1
ID
Scale
101
DRAWING

Pilot?

- **Provides facilities for EU funded projects, project partners, special MSc student teams collaborating with the projects, as well as admin support. It will be part of the public visitor itinerary (“innovation in the making”)**
- **Currently, ATLAS has two projects and CMS at least one suitable for these purposes. Later on, ALICE and LHCb may wish also to join. Accelerators are not part of IdeaLab but future developments might allow also projects with them.**

EU Project

Investor

EU

Idea Lab



e.g. TALENT ITN

Young
Researchers

Physicists
Engineers

Industry

Technology

Hosting?



- Physical space to work in
- Workshops & events
- Contacts & marketing
- Administrative support
- MSc level student team collaboration

EU Project

Investor

EU

Idea Lab

Part 1

SALE

Edusafe ITN

Talent ITN

etc

CBI

Events



EU Project

Investor
Idea Lab

EU

Hosting?

Edusafe ITN

Talent ITN

etc

CBI

Events





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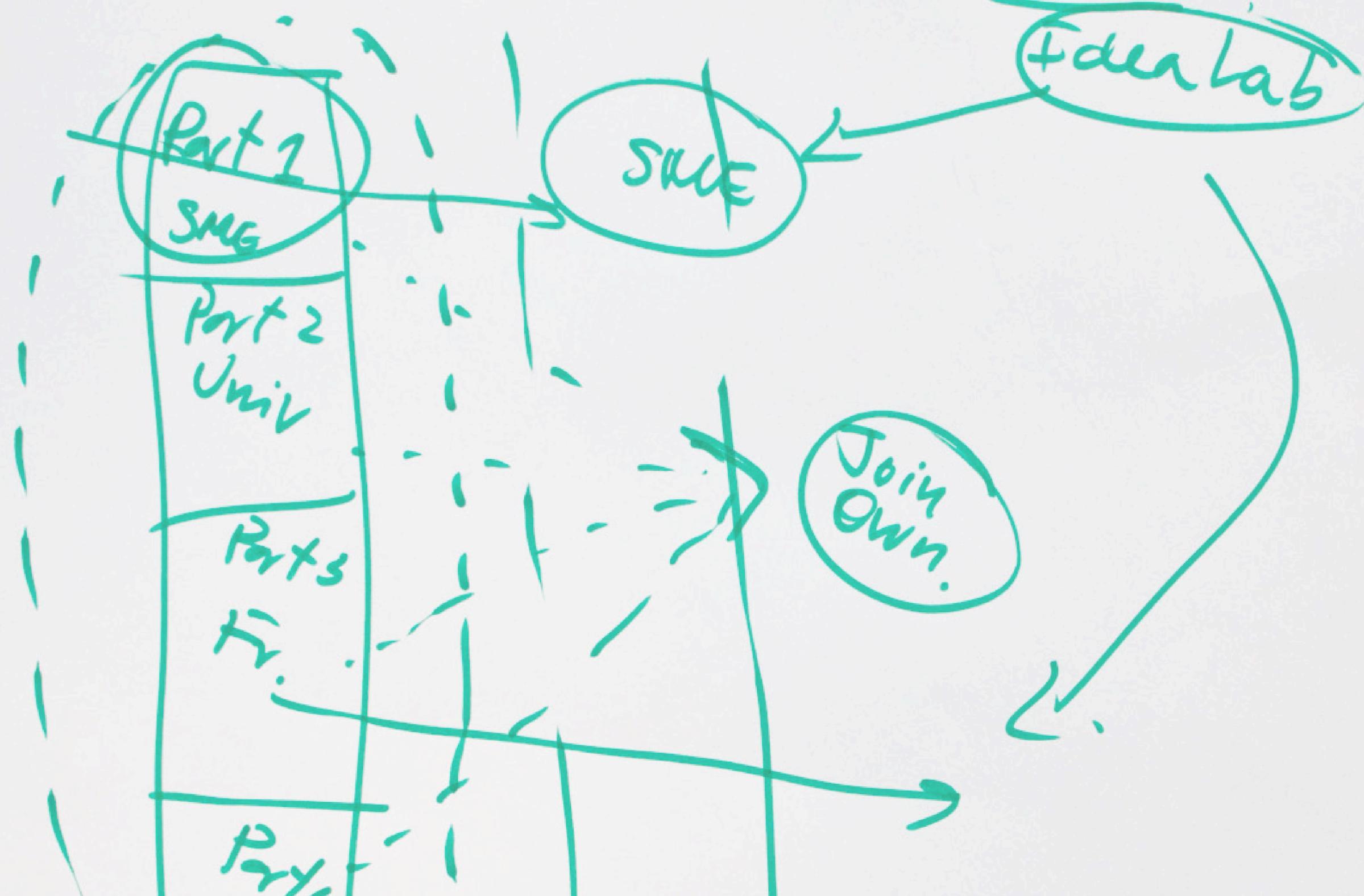
Pilot?

- **The main expected added value of IdeaLab is creating new & useful ideas (prototypes) by project partners and students as well as organizing workshops, events and contacts = we want projects like TALENT to succeed beyond expectations and are here to explore how to help.**
- **Funding for this pilot is set to run until end of 2015 - evaluation and continuation decisions in late 2015**

EU Project

Investor

EU



Hosting?

- EU-funded detector upgrade R&D projects
 - Edusafe ITN
 - Talent ITN
 - CMS project in development
 - (at least) 4 new funding applications in preparation

Why is IdeaLab relevant?

- **General availability of detector R&D and construction money (for LHC detector upgrades) is tight today. Several Funding Agencies wish to first “wait and see” what comes out from the LHC after 2015**
- **This makes concerted or coordinated efforts difficult to engage the entire HEP community in an effective manner, and to keep the R&D engine running while waiting for the upgrade work to start in full steam**
- **The question has been asked whether the new EU R&D framework, Horizon2020, could offer in parallel funding opportunities**
- **The purpose of IdeaLab is to act as a prototype to test the feasibility of a bigger scheme related to Horizon2020**

Why is IdeaLab relevant?

- Development work (in Cern, companies, universities..) is shifting from traditional developer-seller-buyer relationships to collaboration to co-creation
- in order to make quantum leaps in technology, we need to try and find also new and improved ways of working
 - with people, processes, spaces, funding..
- Ideas need an experimentation place (physical/mental) to be developed further
- Hypothesis: Ideas are worth more when they are realized in tangible format (prototypes)

Process

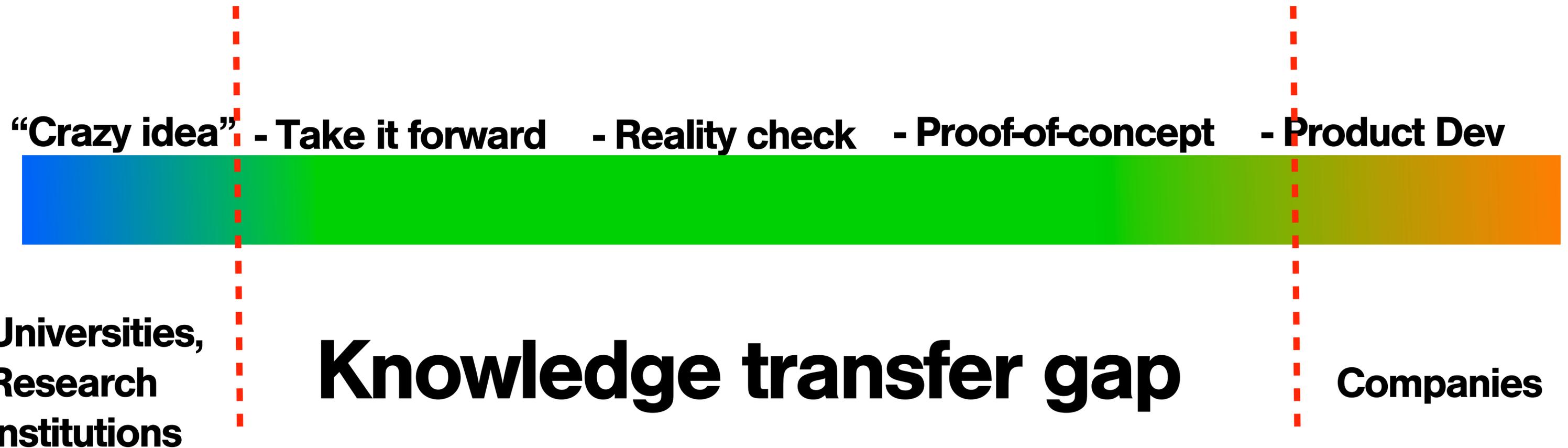
From Ideas to Products

“Crazy idea” - Take it forward - Reality check - Proof-of-concept - Product Dev



Process

From Ideas to Products



Process

From Ideas to Products

“Crazy idea” - Take it forward - Reality check - Proof-of-concept - Product Dev

← ----- Idealab ----- →

**Universities,
Research
institutions**

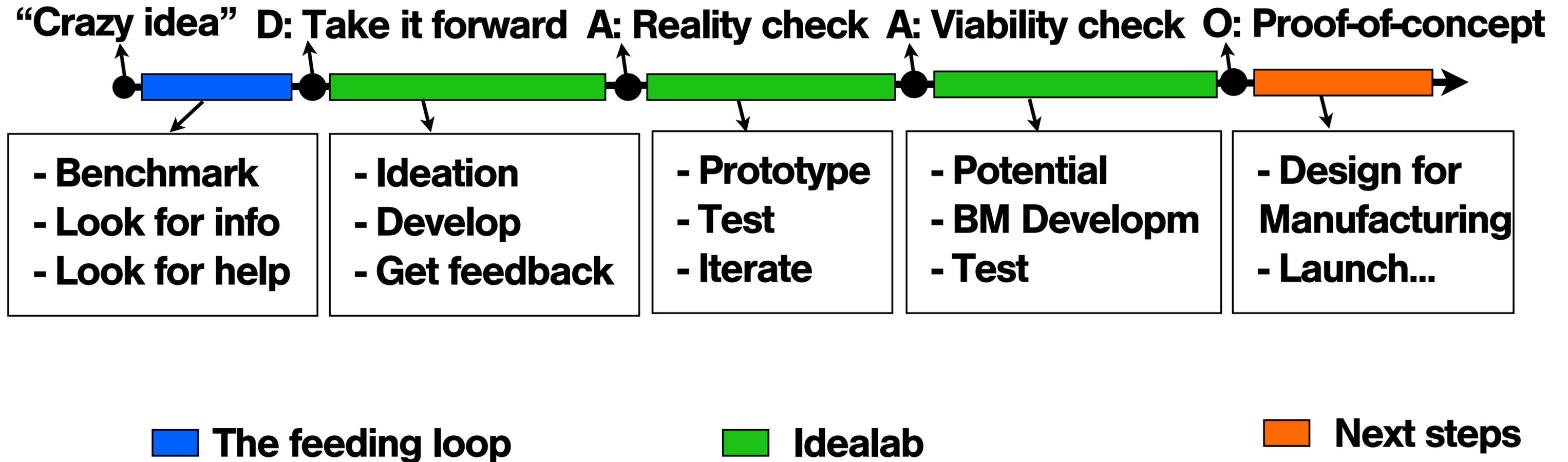


Student teams as catalysts

**Student teams,
companies,
startups**

Process

Breaking down into manageable pieces



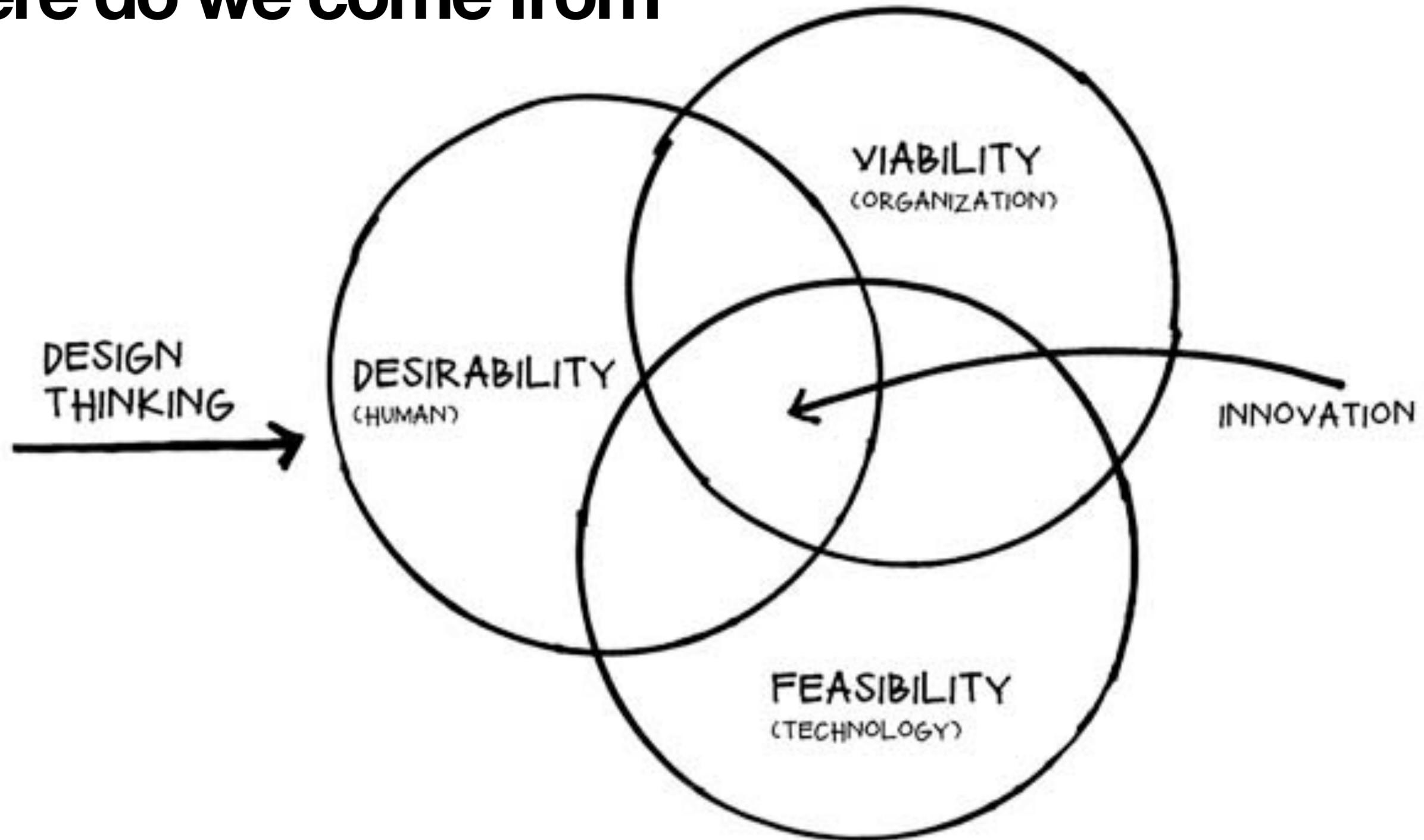
Challenge Based Innovation - CBI

- 5 month MSc level specialization course
- Currently in small scale pilot

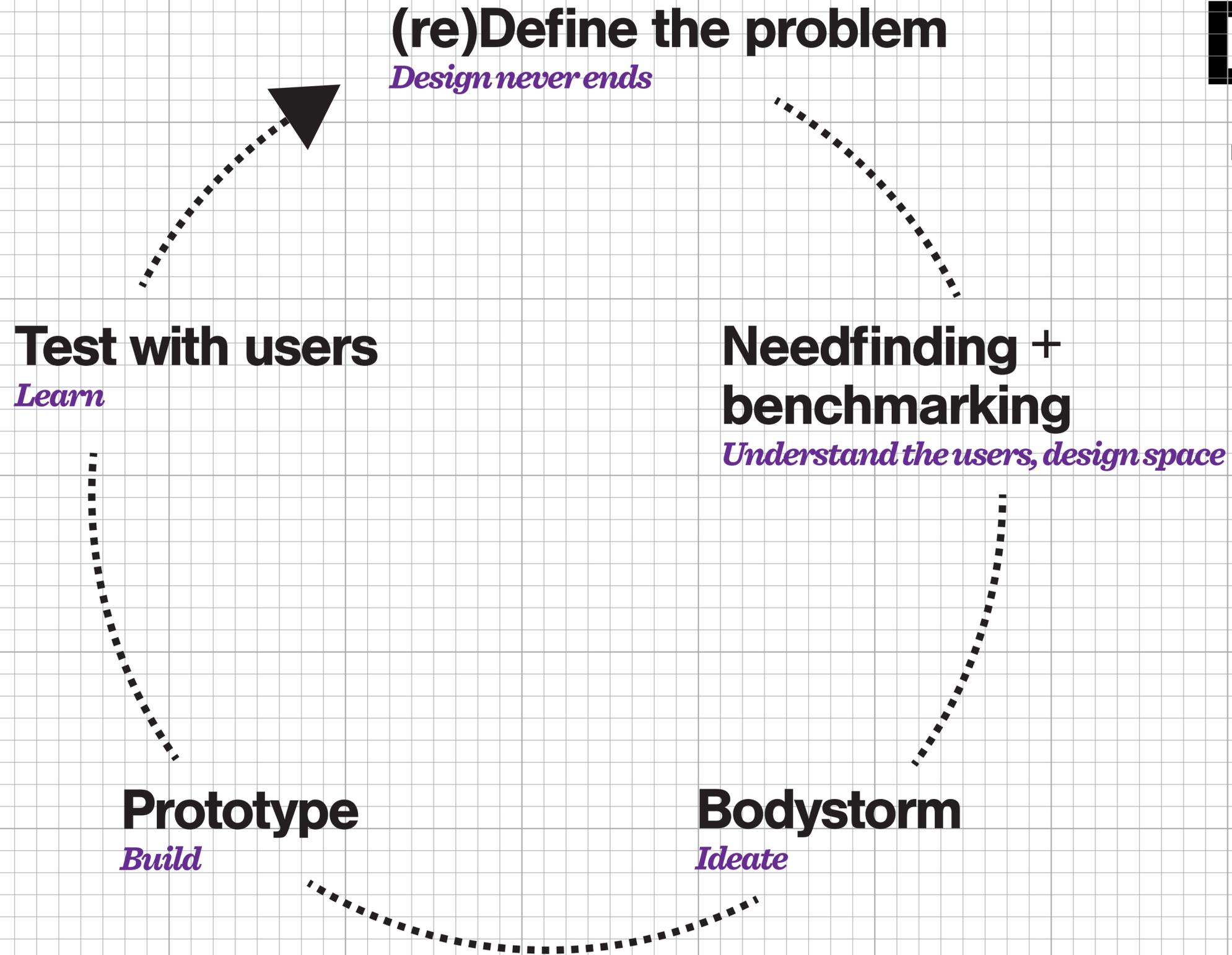
- User Centric Product Development
- PBL
- Design Thinking - process

- “Work extremely hard, learn and have fun!”
- “Fail fast and often to succeed sooner”

Where do we come from

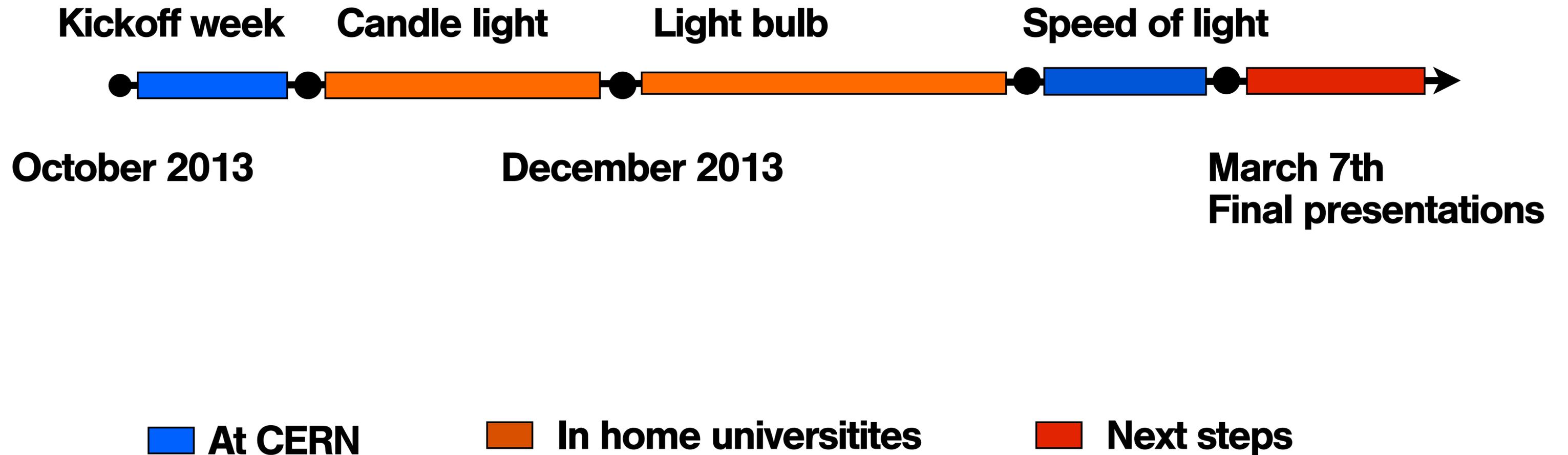


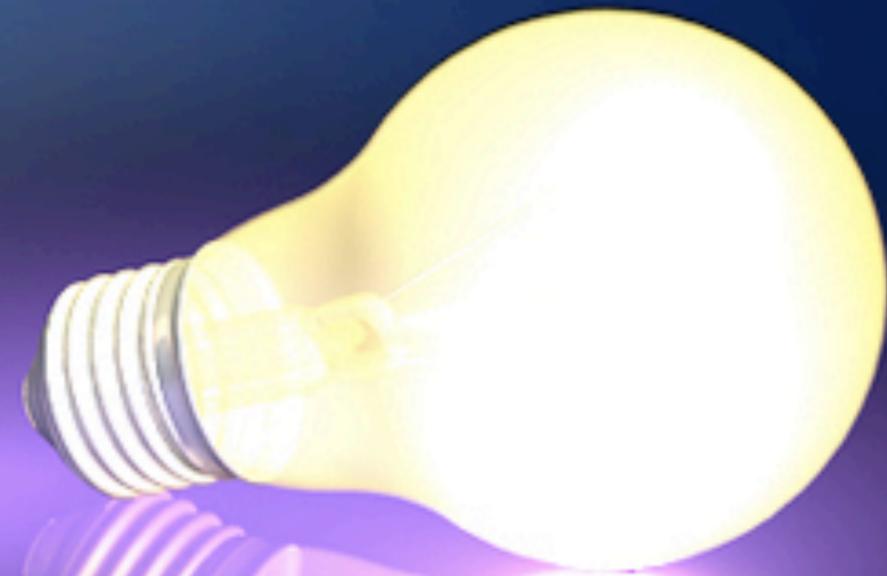
Design Thinking Process



CBI in phases

Accelerating learning





Candle light

Understanding the domain

Product/competitor
analysis



Historical data



People

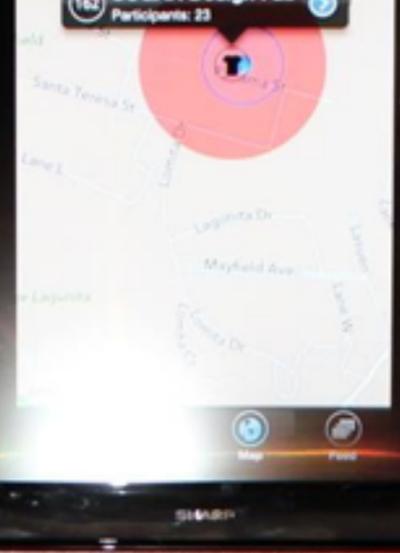
Possible futures



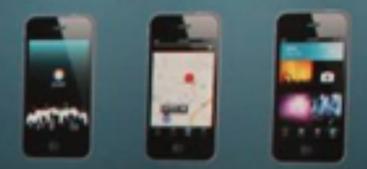
Inspiration from other fields



Bringing Events to Life



Bringing Events to Life



Introducing Pulse: a system for collaboratively creating, experiencing and capturing events; a tool for matching people and brands in a way that is unique every time.

Journey
to use Pulse



Interdisciplinary global student teams

CBI TALENT student team

- **8 students from Aalto University, NTU Athens, UNIMORE**
- **Multidisciplinary**
- **Started working 3 weeks ago**
- **Mar Capeans and Daniel Dobos as technology mentors**
- **Design brief: “Create future learning tools using TALENT technologies.”**

CBI TALENT student team

- **Background**
- **“A variety of novel technologies (advanced radiation sensors, fast and low power consumption read-out and data acquisition electronics, new cooling technologies and ultra light mechanical support structures) are being developed in the TALENT project that have potential to be utilized in fields beyond particle physics. Your mission is to look at how learning occurs and explore how TALENT technologies could be applied to facilitate the creation and sharing of knowledge. You are expected to explore different ways of learning in different environments form elementary schools to joint research projects. After finding inspiration, you are expected to select a specific instance of learning you will focus on.”**

CBI TALENT student team

- **Possible directions for exploration**
 - **How might we build a tool for students to learn how radiation or the ATLAS experiments work? (Elements supporting exploration/accessibility)**
 - **How might we construct a set of ultra light building blocks with cooling and powering elements that can facilitate learning? (Elements supporting learning by experimentation/self discovery)**
 - **How might we create a tool aiding the discovery/sharing of knowledge in a distributed, complex work environment? (Elements supporting shared learning)**

CBI TALENT student team

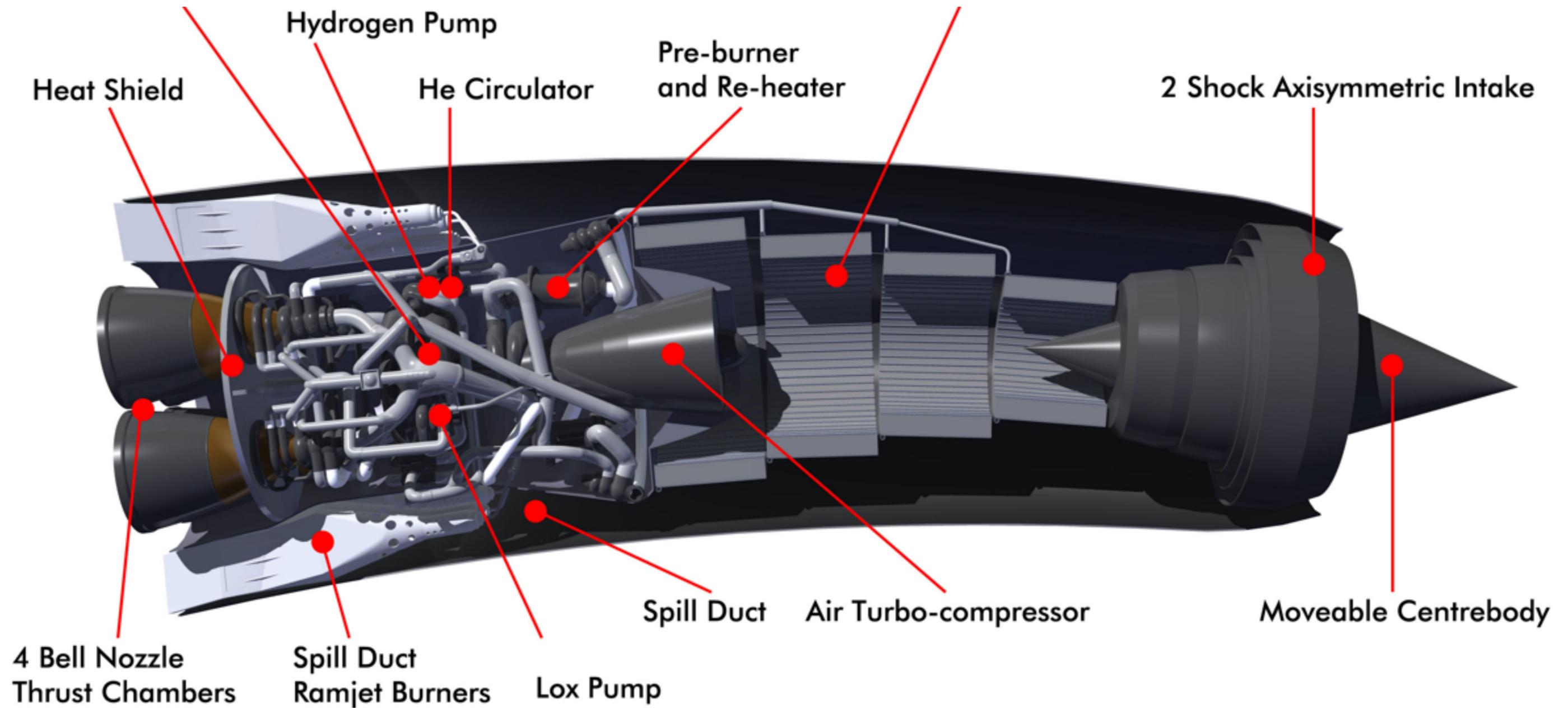
- **Expected outcome:**

- **Proof of concept prototype that demonstrates in a compelling manner how the discovered solution facilitates the learning experience.**

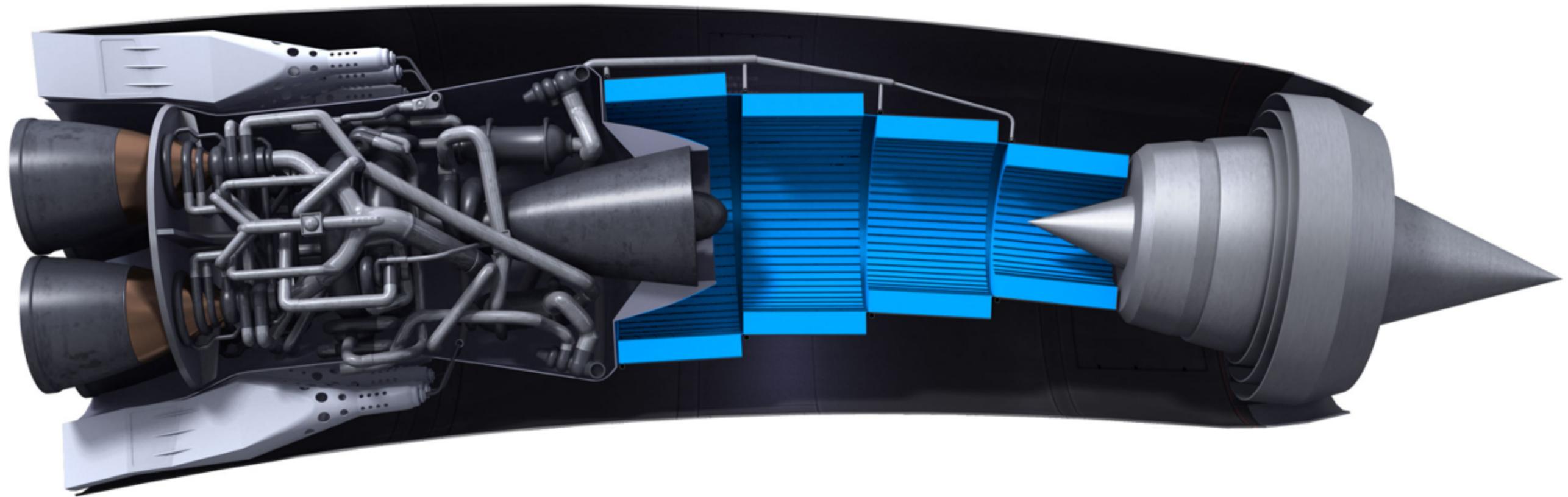
Technology mentor(s)

- **Acts as a technology coach for the students, helps to understand the nature and applicability of technologies developed in TALENT**
- **Meet with the students during the kick off and the end of the project in CERN (Oct and early March 2014)**
- **Prepared to have contact with the students when working in home institutions (e.g. 0,5-1h Skype or phone call per week)**

It is about technology..



..and requires special knowledge



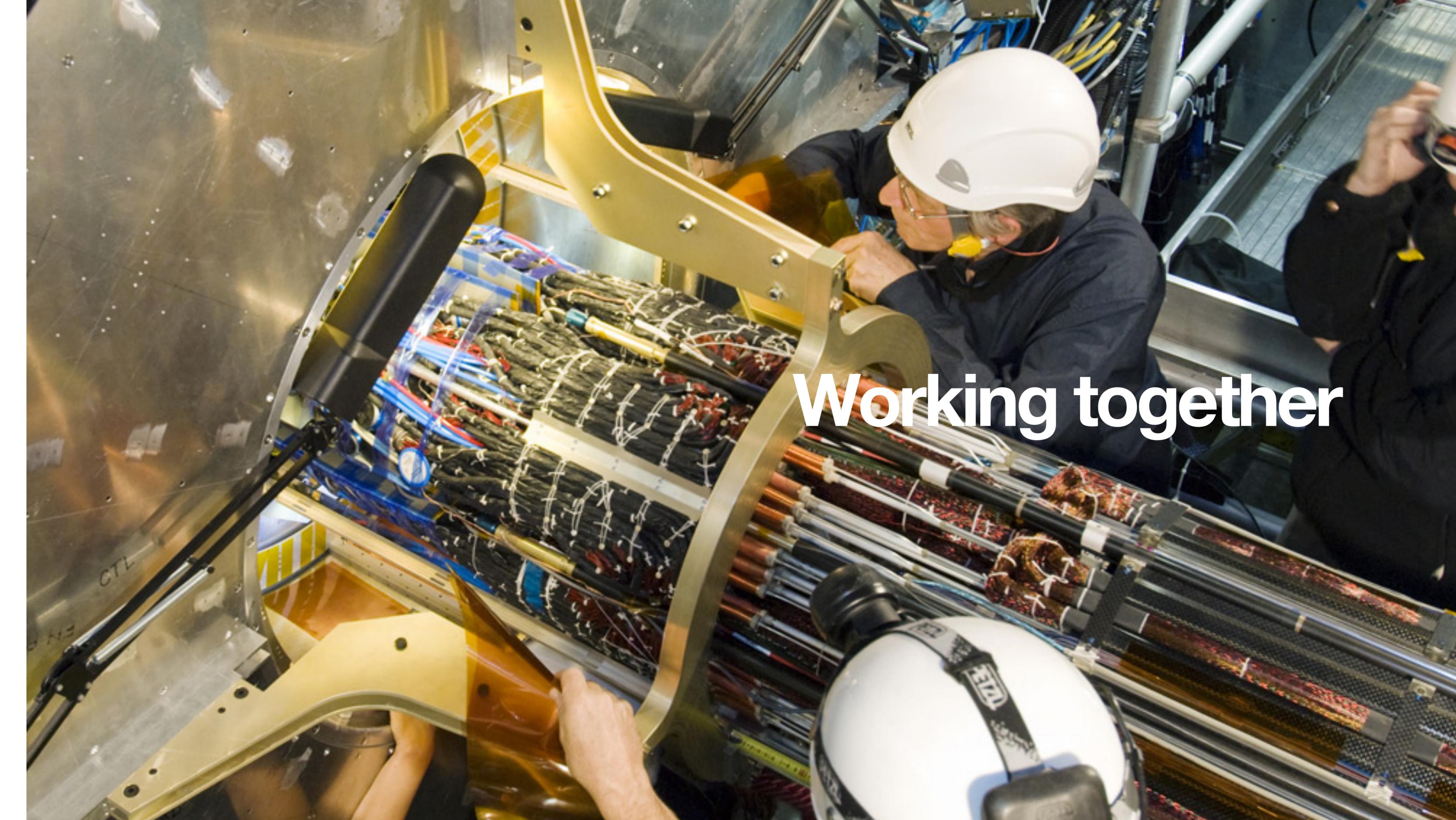
e.g. cryogenics

And abilities to build..





But even more so, it is about *people*



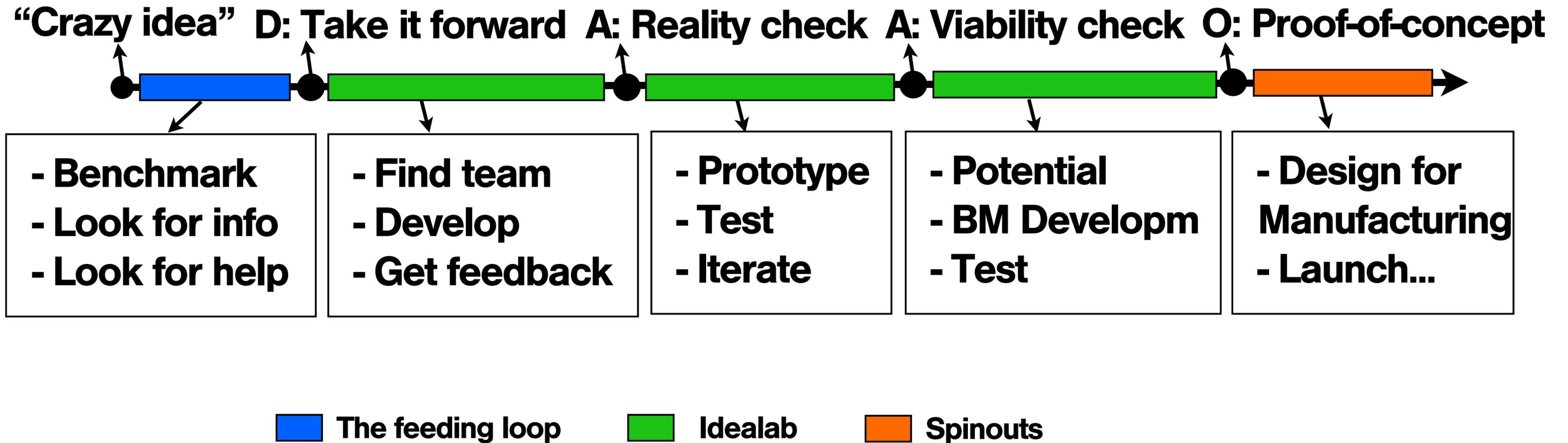
Working together

How does it work?

- **Where is the magic? Bringing different people together. Empowering them. Putting people first.**
 - 1. Information doesn't radiate (communication deprived 4m distance, goes to nearly zero at 20m) (TJ Allen, 1976)**
 - 2. Single disciplinary teams do not radiate (single mindset leads thus far, but not beyond the rainbow)**
- **People from different backgrounds are amazed by each others skills... but only when they see them!**

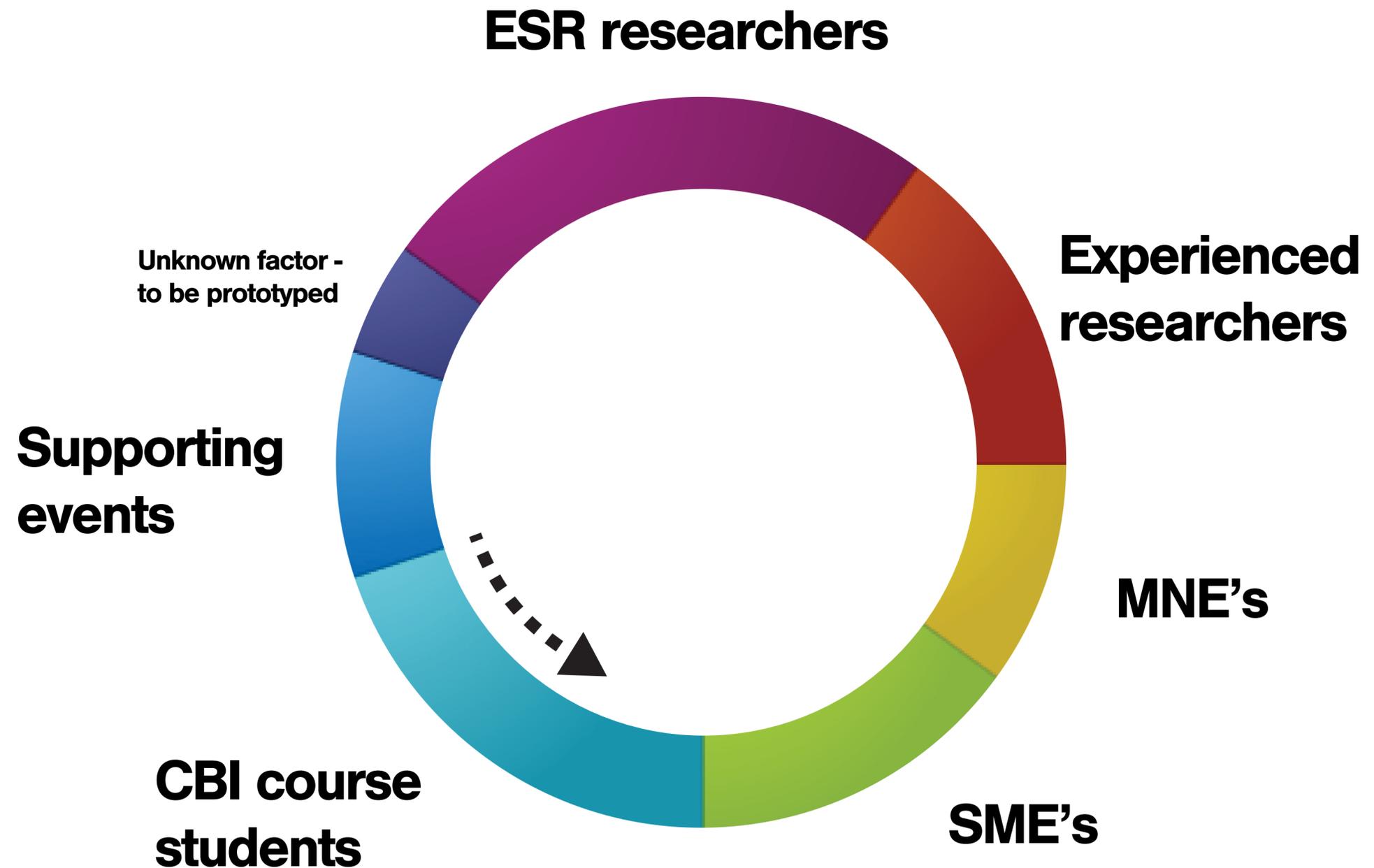
Process

Breaking down into manageable pieces



Feeding Loop

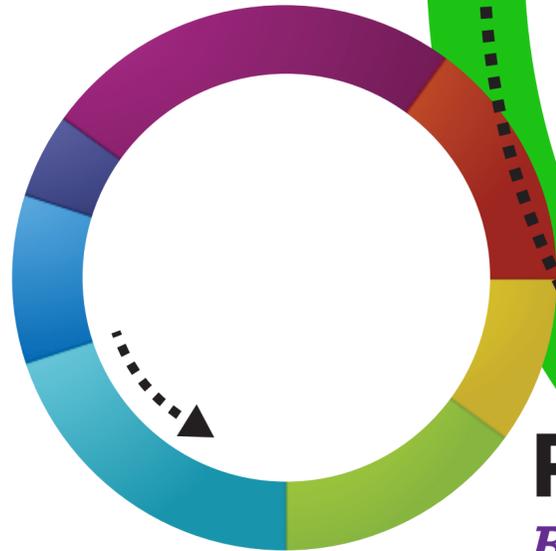
Ingredients for Creative Collaboration



Idealab

The Large Human Collider

Feeding
Loop



Prototype
Build

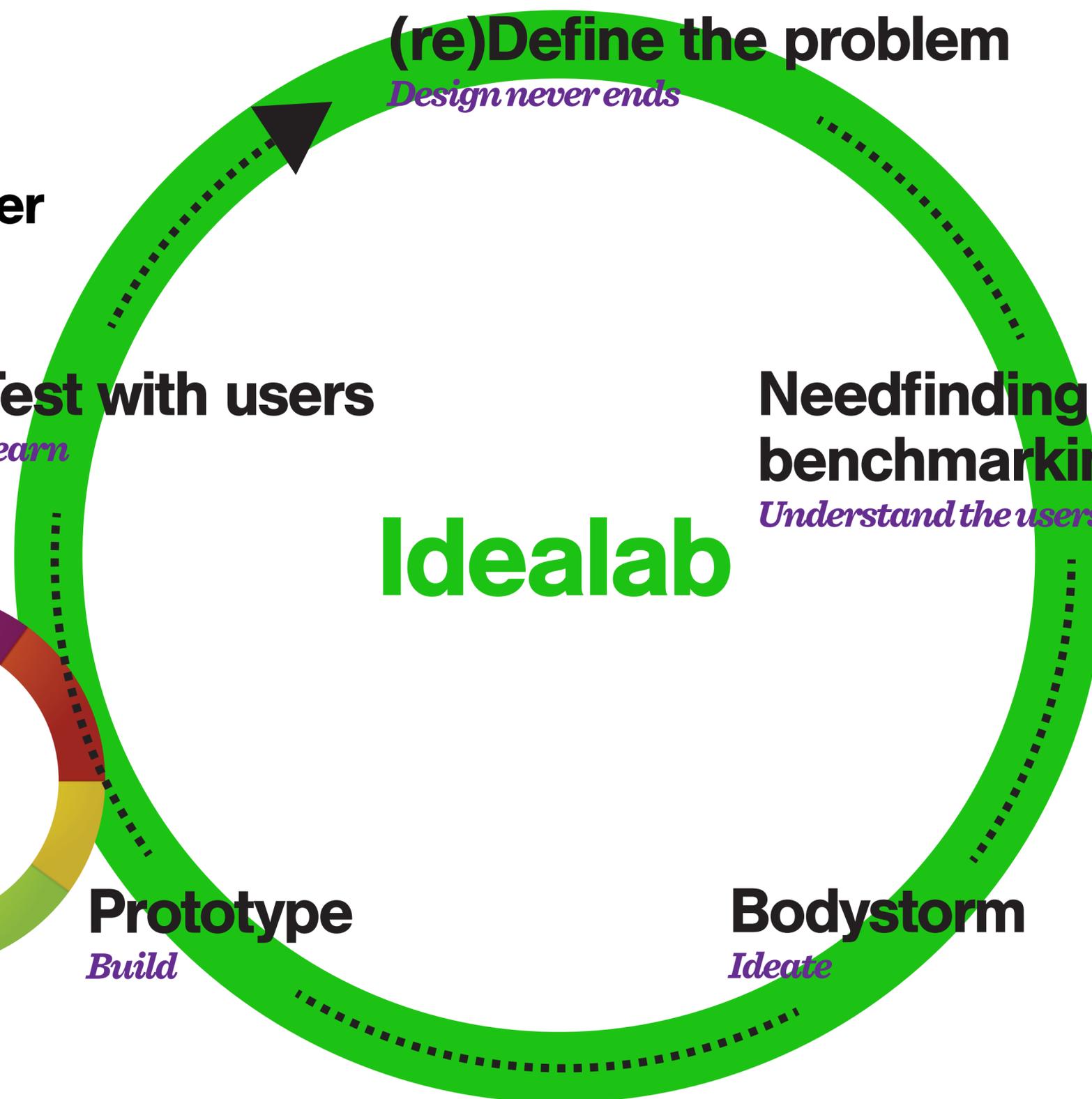
Test with users
Learn

Idealab

Bodystorm
Ideate

Needfinding +
benchmarking
Understand the users, design space

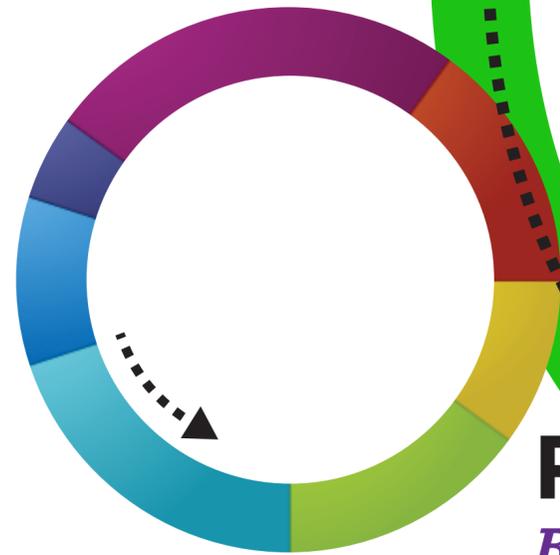
(re)Define the problem
Design never ends



Idealab

The Large Human Collider

Feeding Loop



Prototype
Build

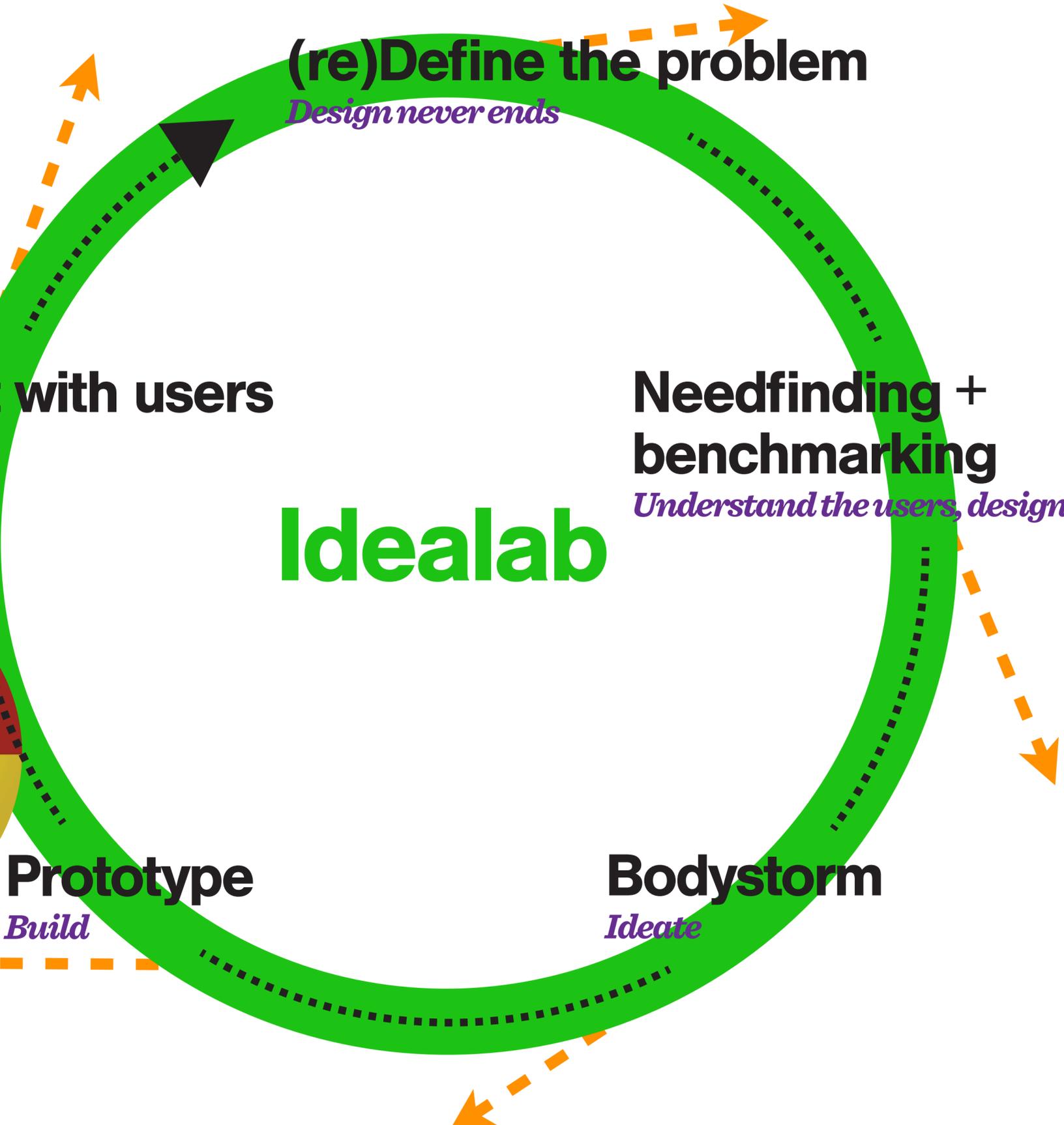
Test with users
Learn

Idealab

Bodystorm
Ideate

Needfinding + benchmarking
Understand the users, design space

(re)Define the problem
Design never ends



IdeaLab

Development



 In progress

 In development

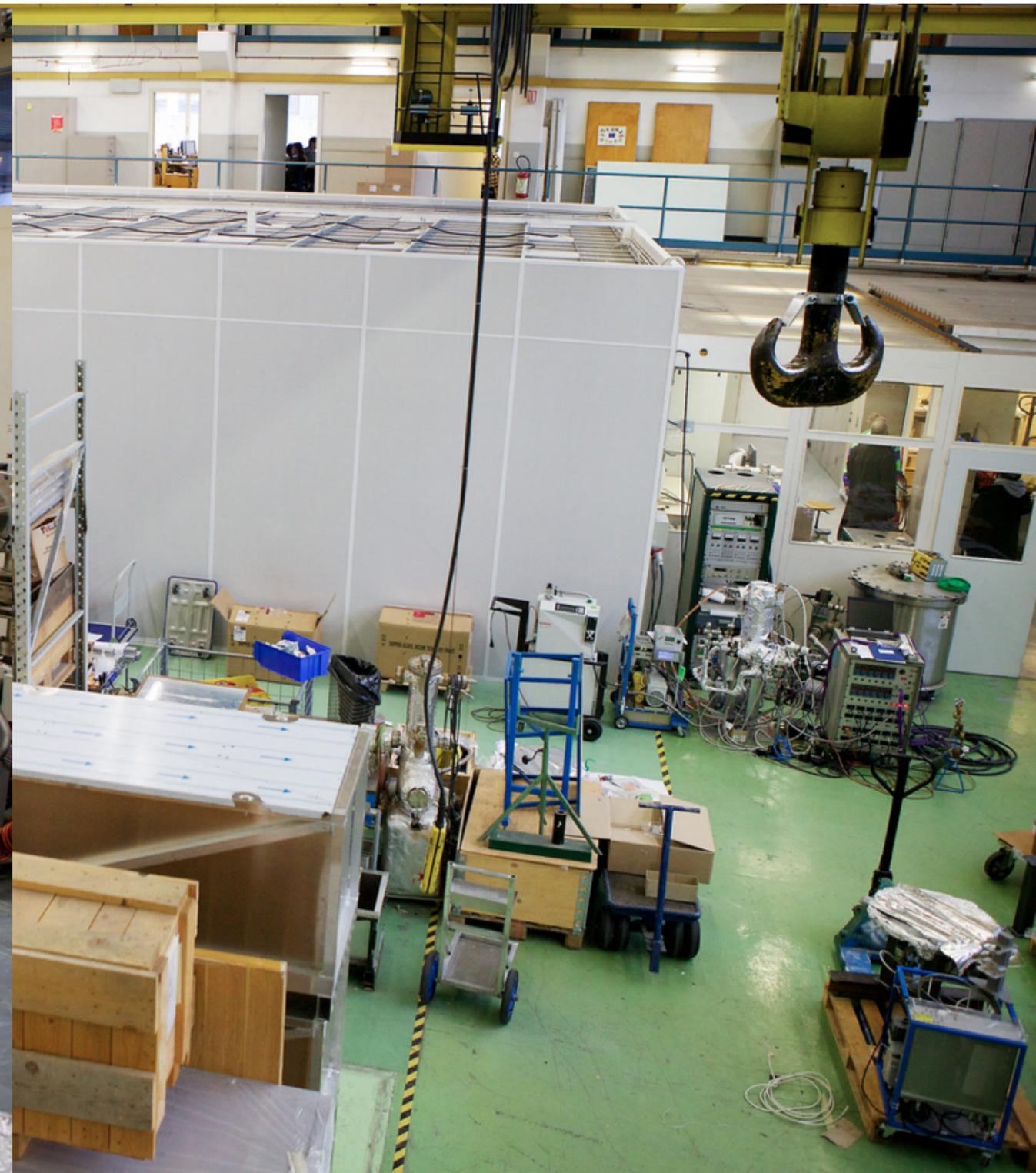
 Long term objectives

Phase 0

October 2013 - March 2014

Building works current stage

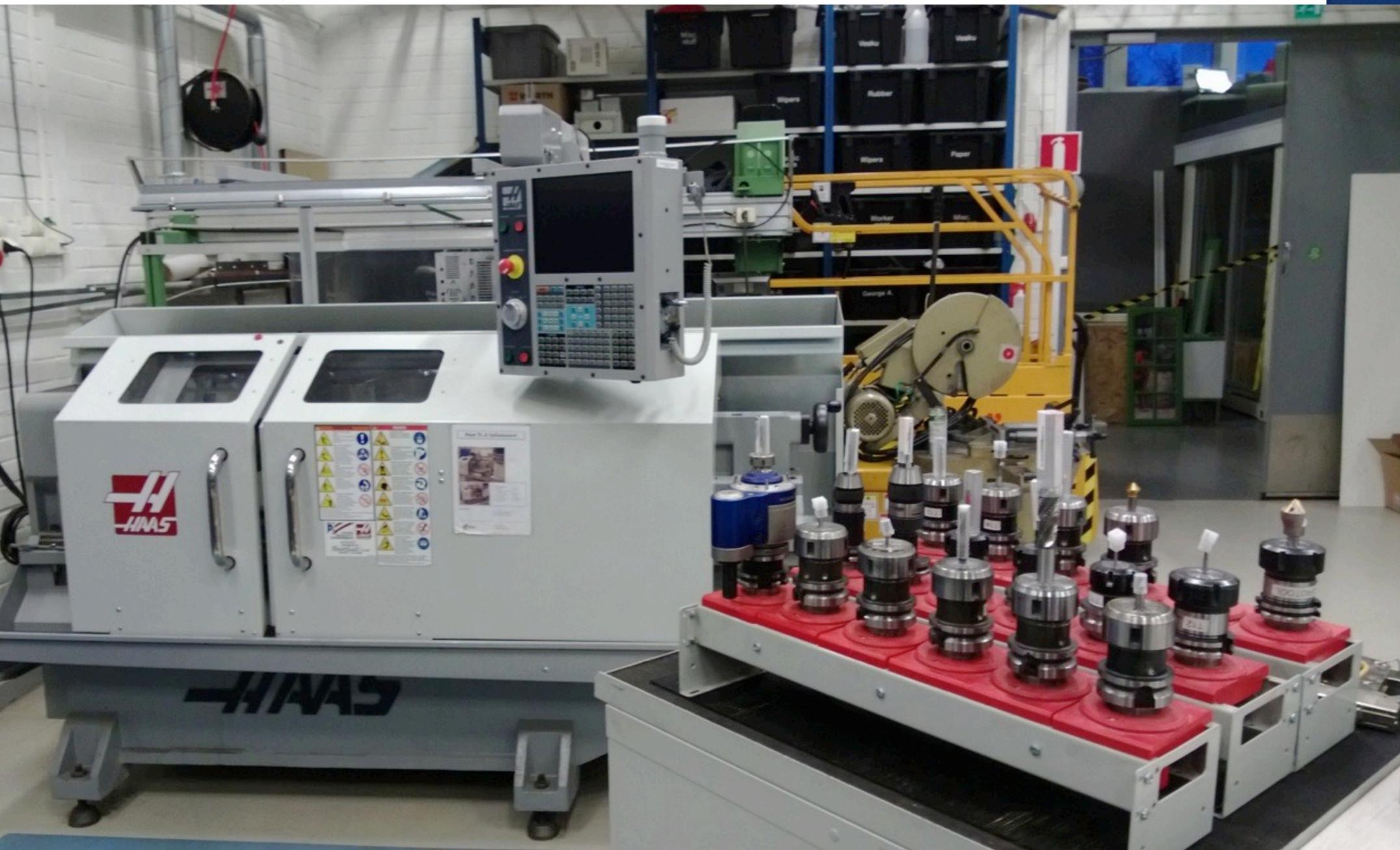
- **Interviews, observations with early stage researchers, experienced researchers, companies, visitors, experts**
- **Based on those we have designed a small scale prototype space in B16 & B153**
- **We have two interdisciplinary student teams working in the space and participating in a small scale CBI pilot from October 2013 to March 2014**



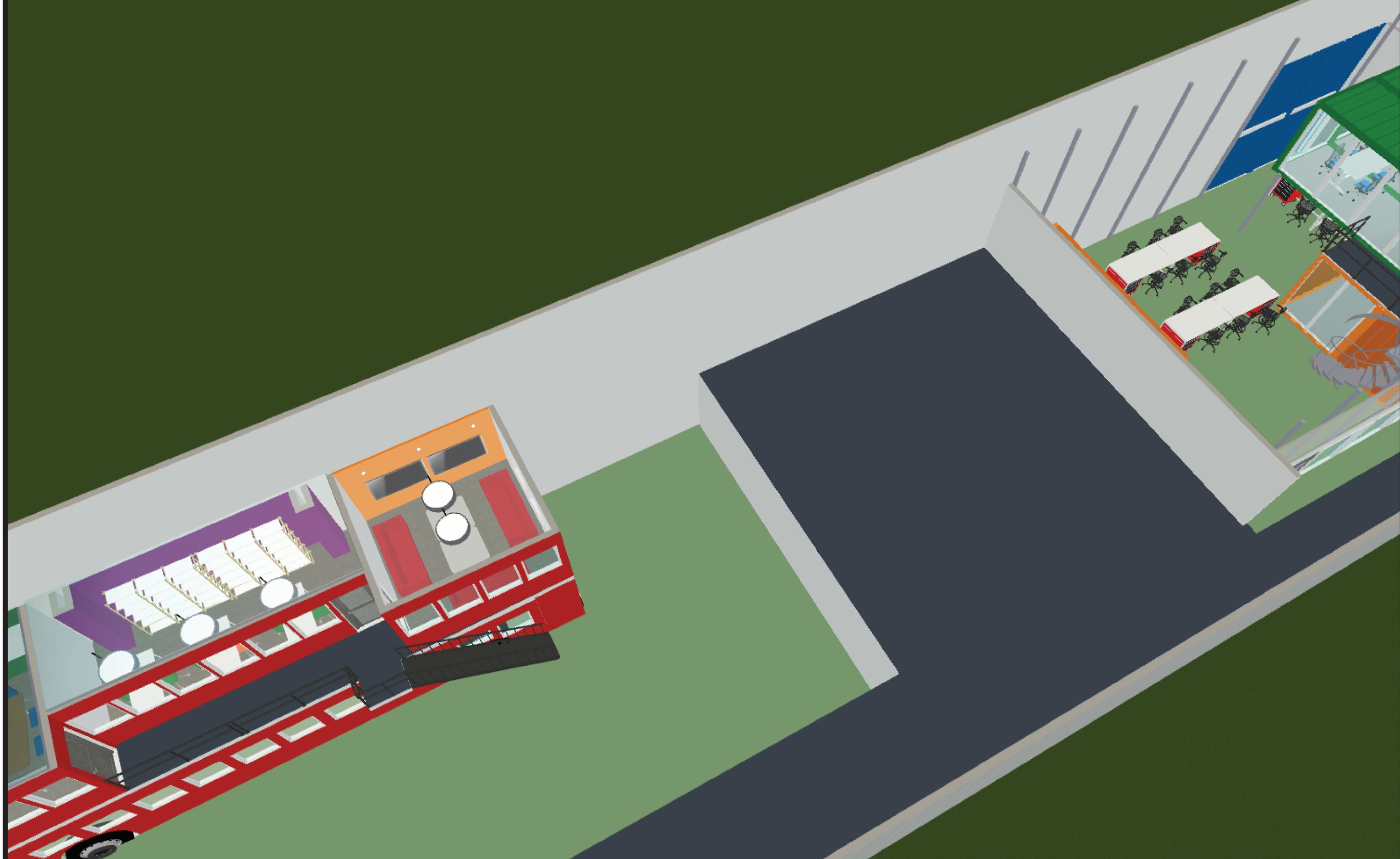
Use a corner (80-120m²) of an existing building / assembly hall - Bat 16+153

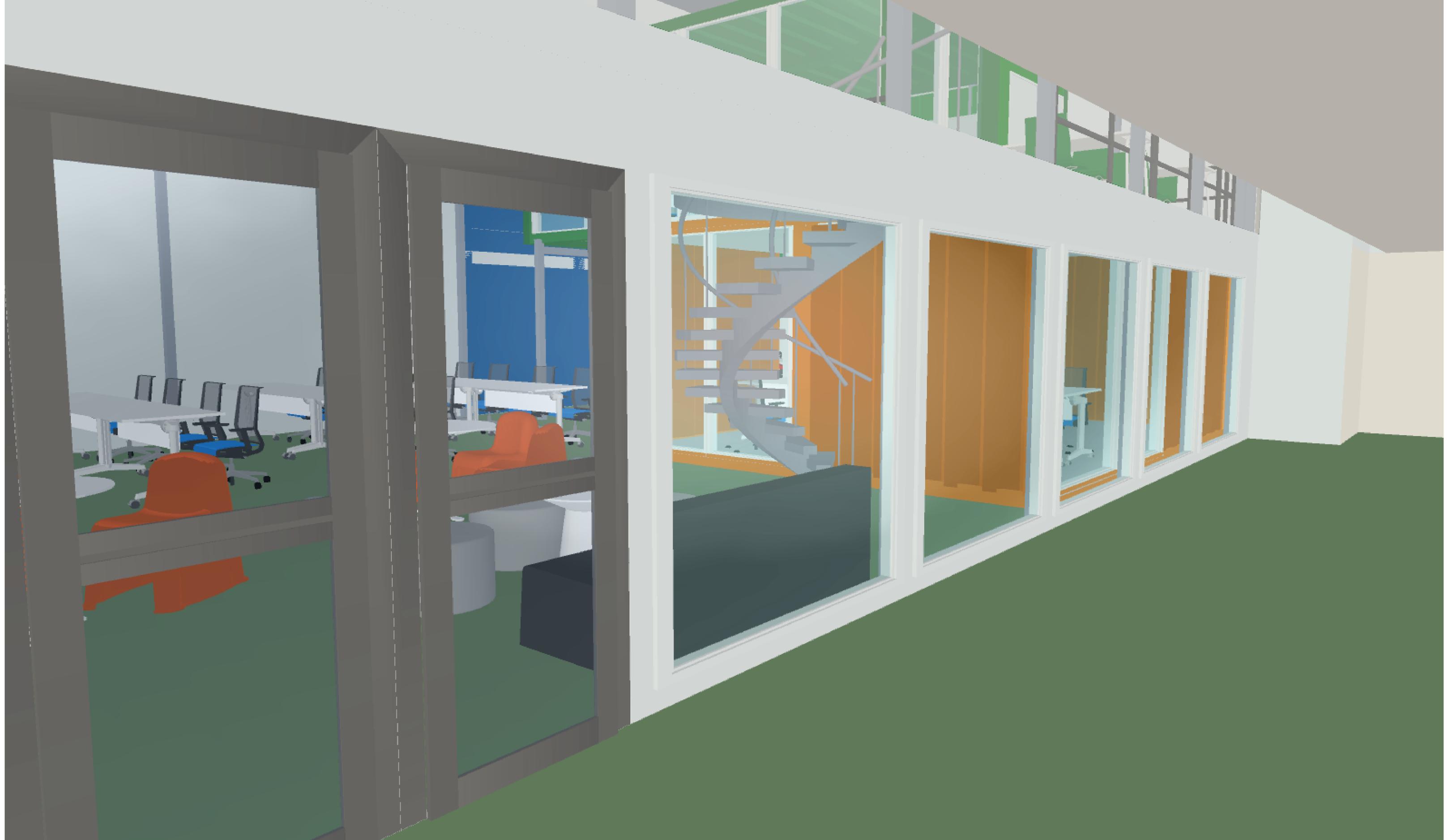


Equip with basic tools and materials

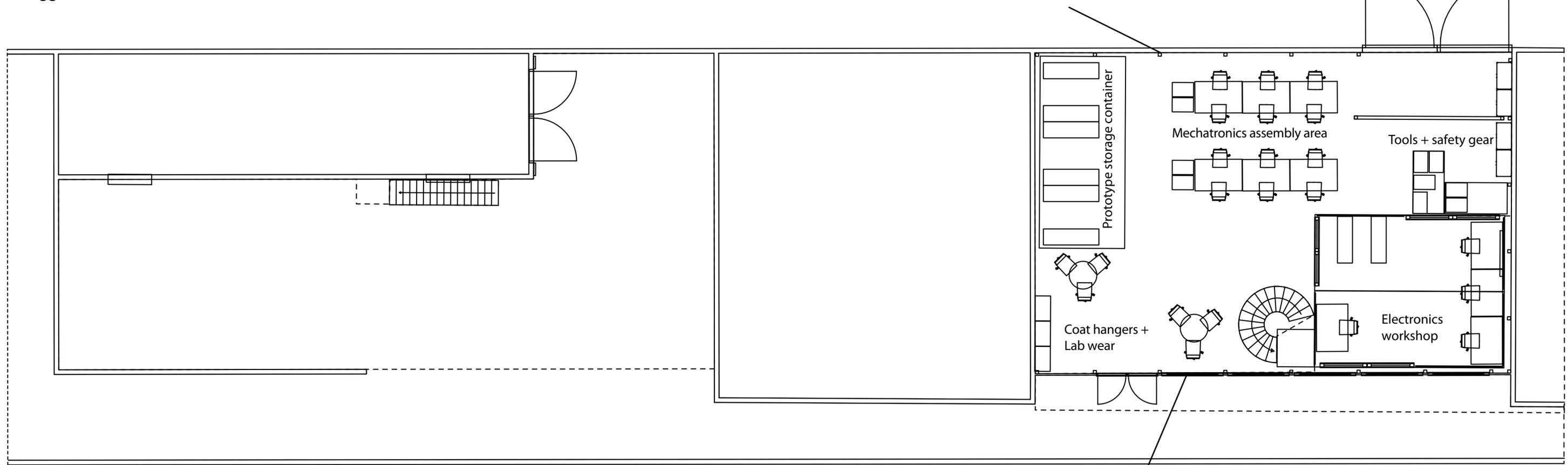


Access to shared workshops machinery



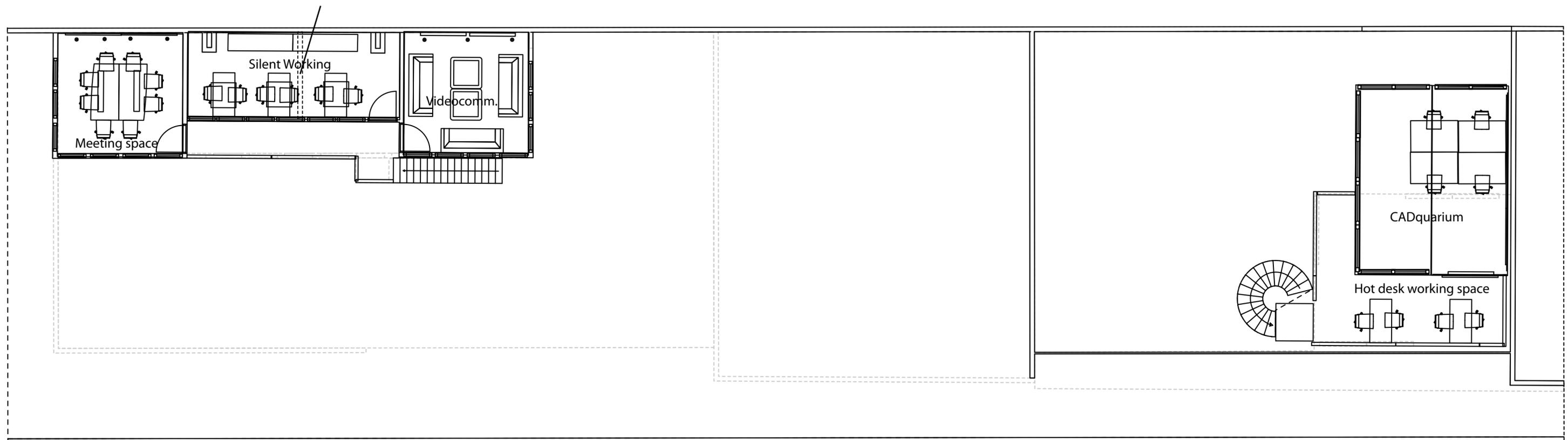






Replace chipboard/particleboard in the lower part with PMMA acrylic, polycarbonate or window for see through, upper part with e.g. Lexan Thermoclear

Existing wall between two smaller rooms removed, door replaced with window

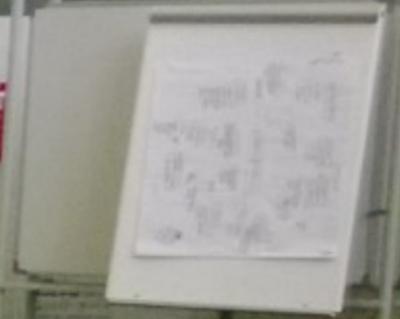








BSJ



Phase 1

March 2014 - December 2015



Building 3179





Truth

Two women are sitting on a black bench inside a soundproof booth, each using a laptop. The woman on the left is wearing a red top, and the woman on the right is wearing a white top and leopard print pants. A small wooden stool is positioned between them.







HYUNDAI

HOMU 215381 8
KE 2210

M. G. W
TARE

NET
QUCAP

709159
GB 2210

EMPEROR

HUNDAI

HDMU
217164
KR 2210

ilc
61

26
8



Events + activities

- **Working group firsts meetings in November/December**
- **Virtual IdeaLab workshop going on right now**
- **Novel 3D printing tech development project negotiations ongoing**
- **Communications courses/workshops planned for 2014**
- **Big Bang event March 7th, 2014**
- **Related activities+ events: Science HackDay, Raspberry Pi, Arduino, Innovation Club (Entrepreneurship), KT workshops**

Working groups

- **IdeaLab developer working groups:**
 - **Communications**
 - **Physical space design**
 - **Workshop tools, needs, linkages to other workshops**
 - **CBI Student program, IdeaLab activities + events**
 - **New EC initiatives**
 - **Virtual IdeaLab**
- **To stay updated you can sign up for IdeaLab-developer in eGroups**

What's next?

If interested in knowing what is happening, sign up for email updates, if interested in doing things description of development groups + how to participate available, contact harri.toivonen@cern.ch

Let's connect,
have a cup of coffee and *make it happen.*



Case Audi

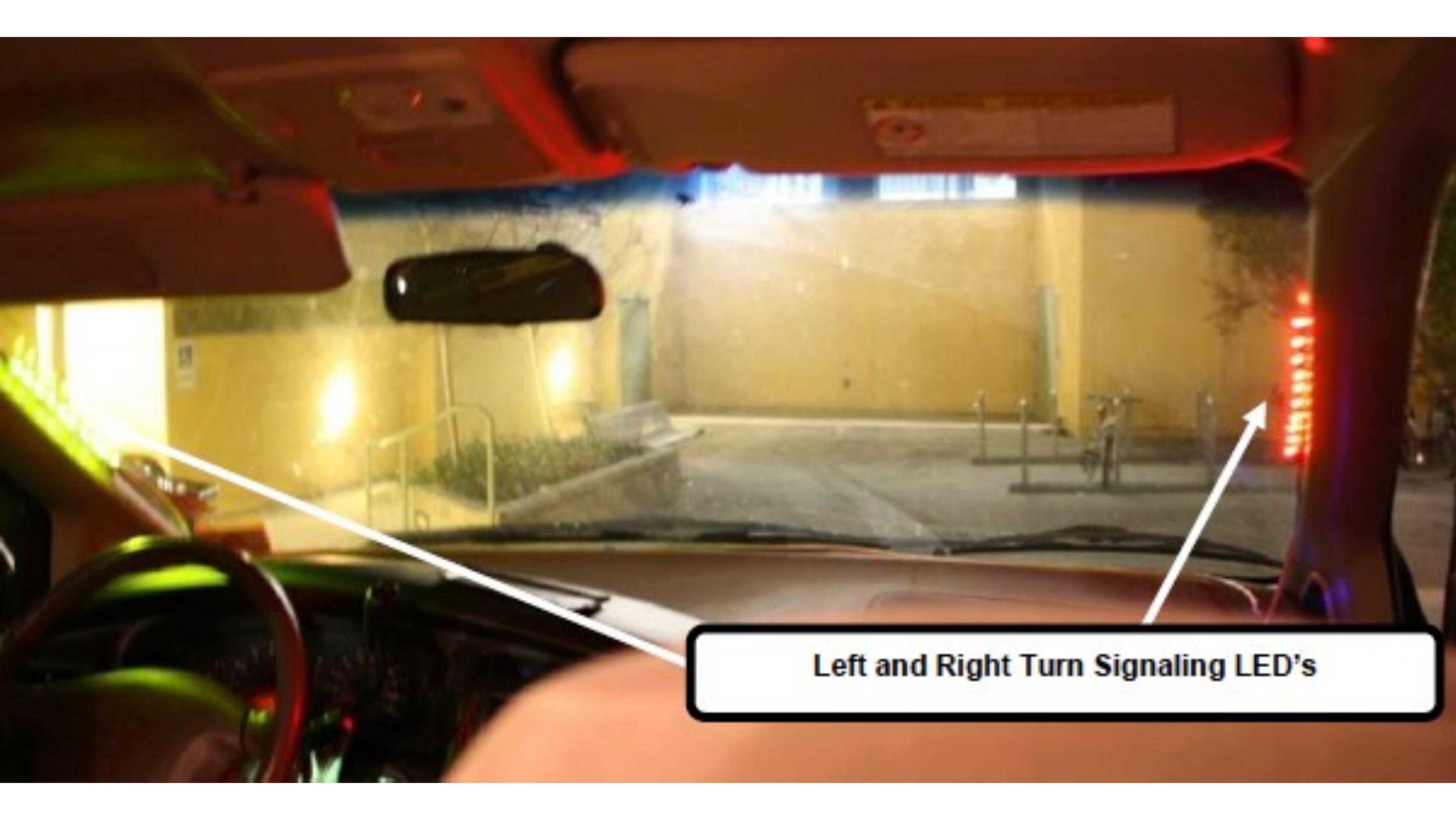
Redesign human-car interaction for 2020



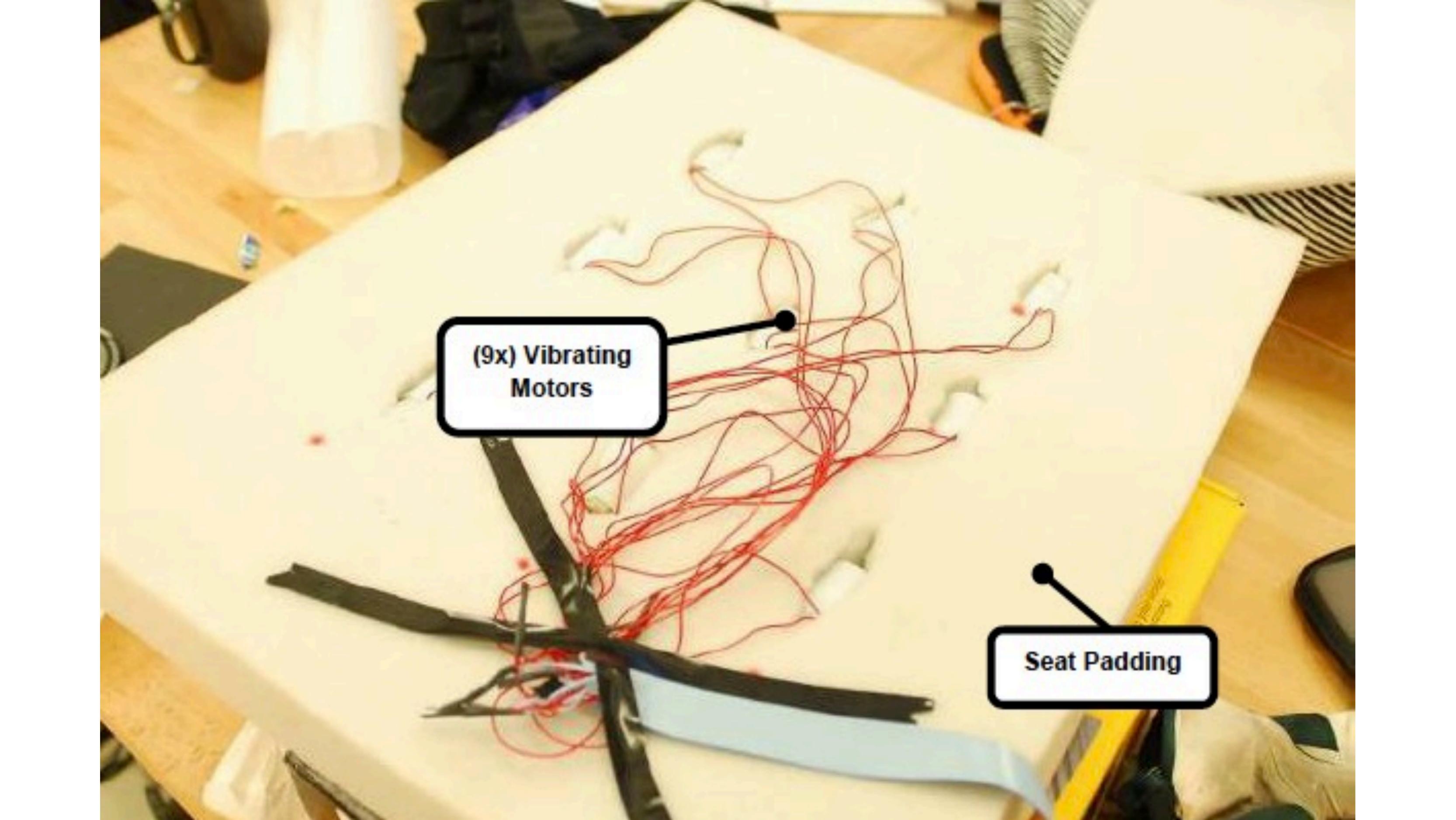
Graphics Tablet

Pen

Camera



Left and Right Turn Signaling LED's



**(9x) Vibrating
Motors**

Seat Padding



LED Arrows

LCD- display

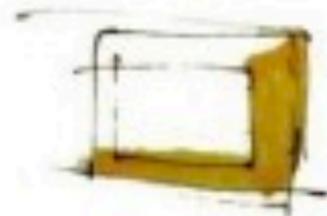
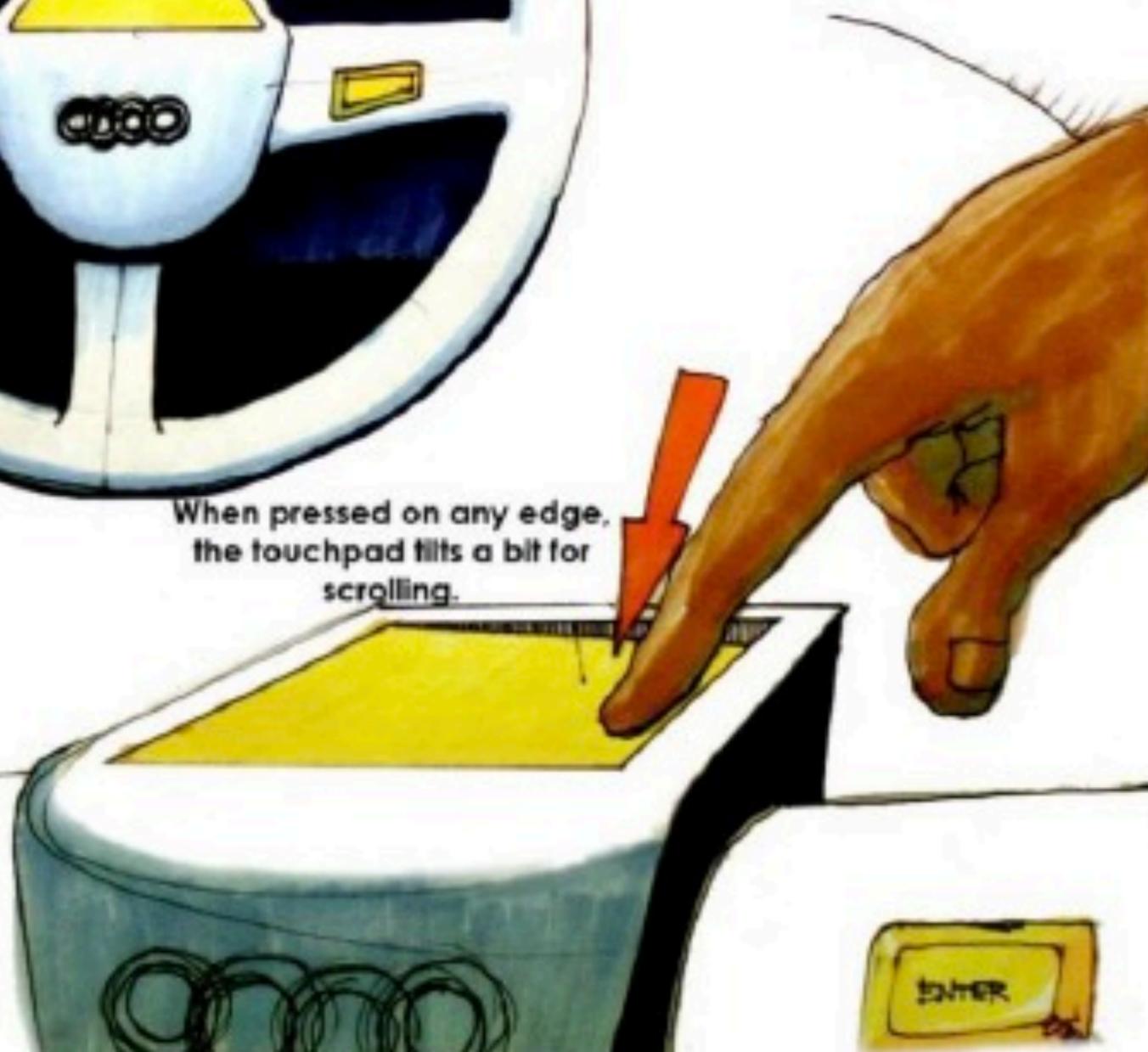
Touchpad

Enter- button



The whole gauge panel can be changed to display other information.

When pressed on any edge, the touchpad tilts a bit for scrolling.



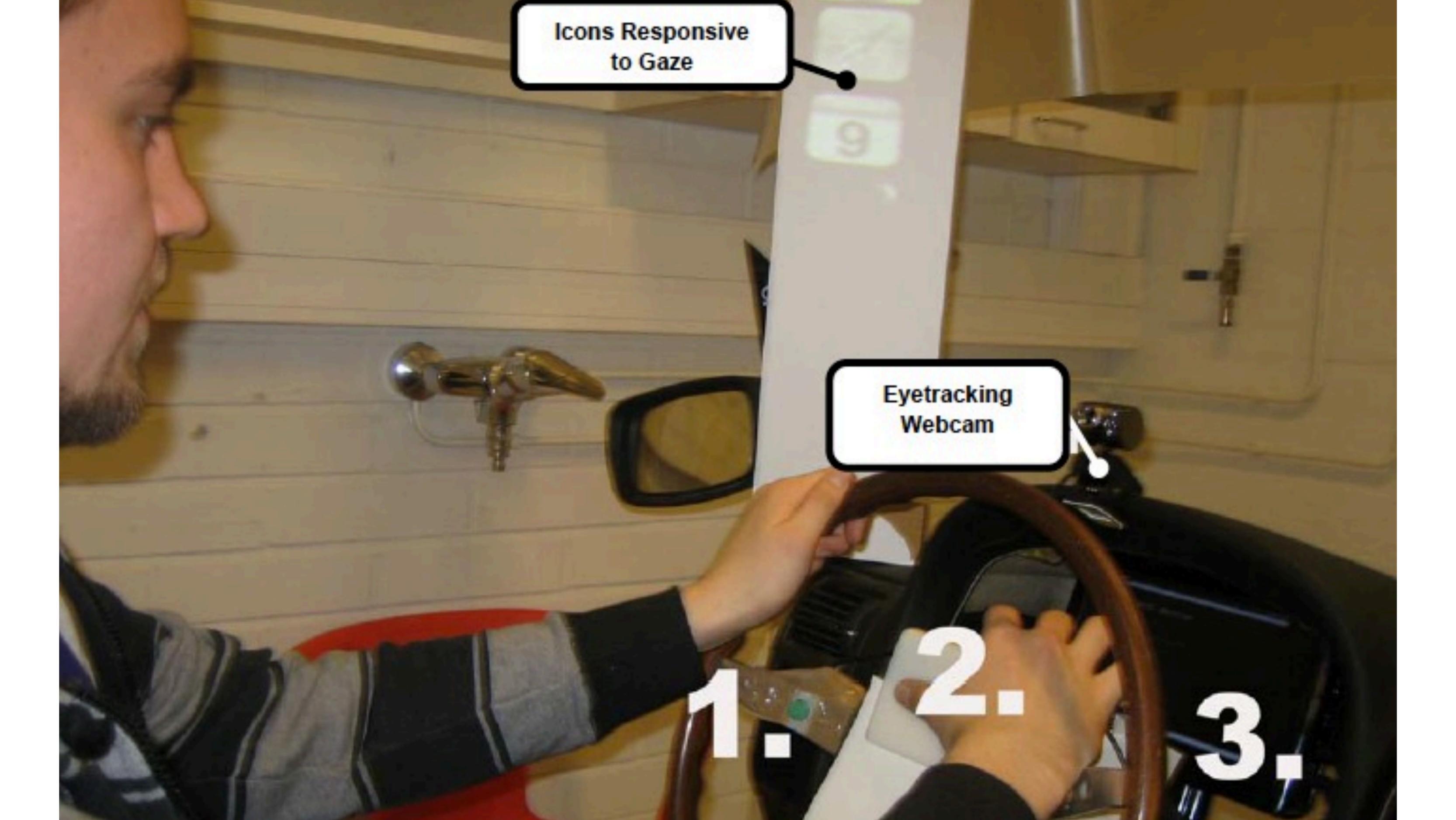
Icons Responsive
to Gaze

Eyetracking
Webcam

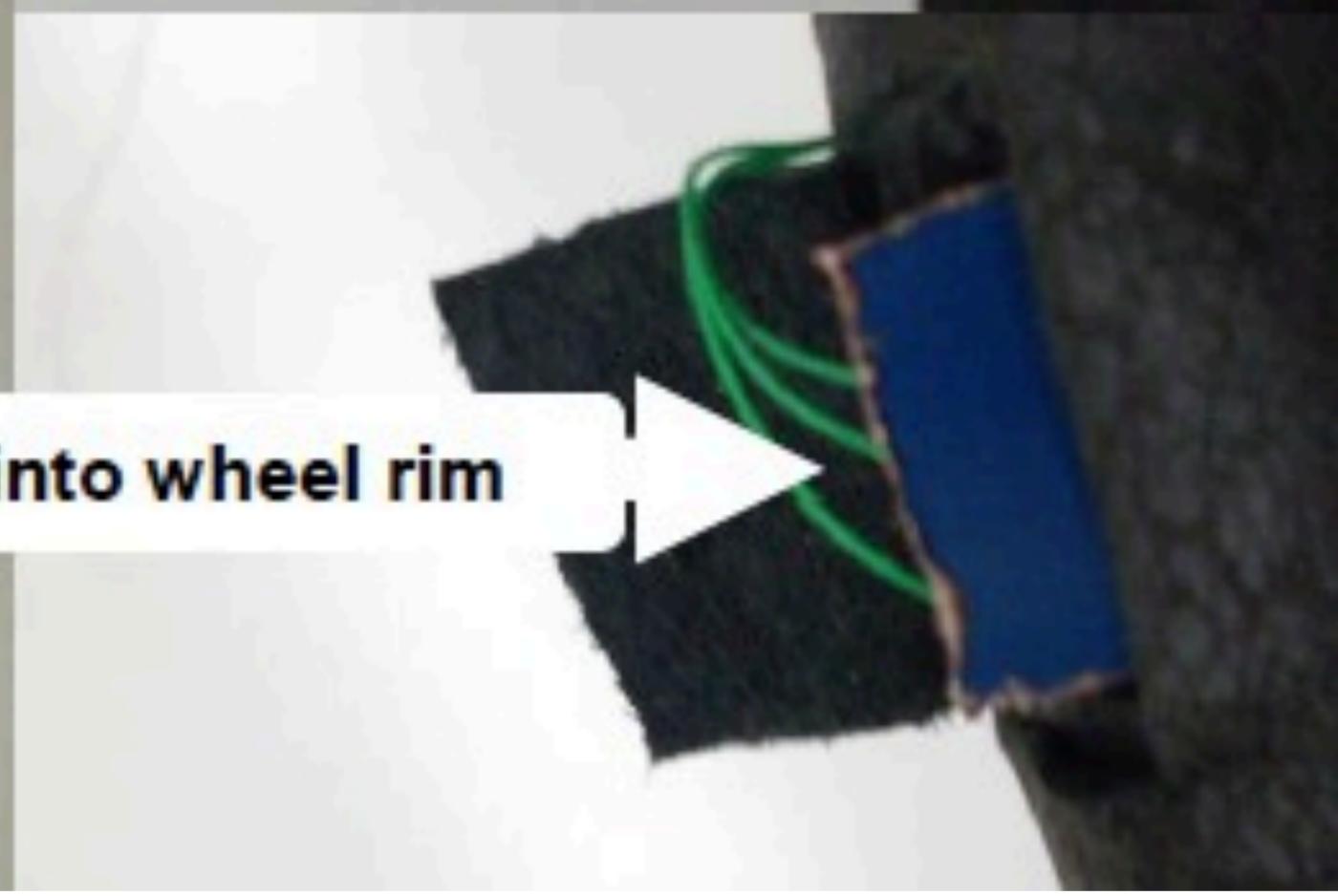
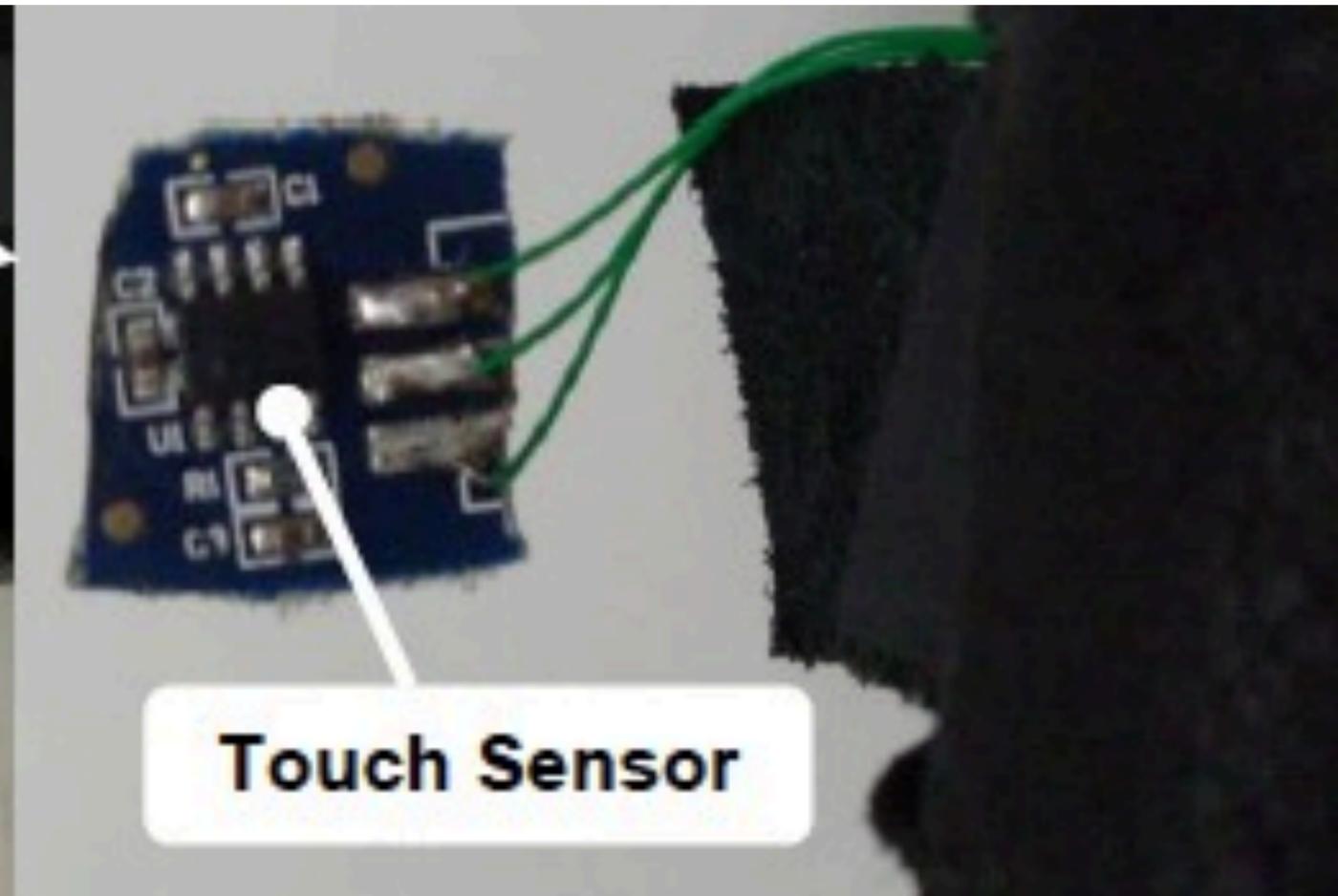
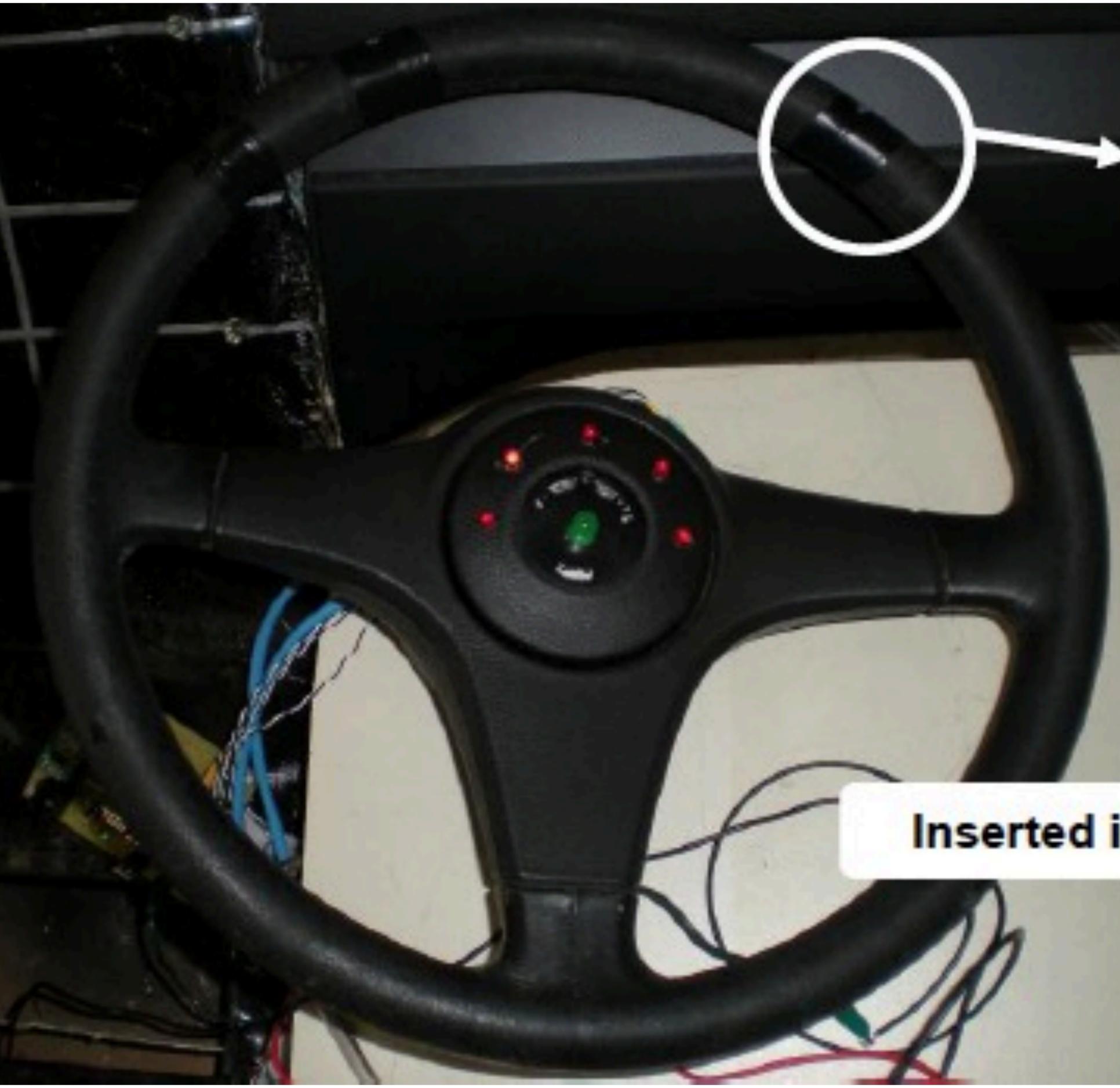
1.

2.

3.







Inserted into wheel rim

