



GAMES FOR HEALTH EUROPE
2025

How to fail multiple times for a shiptest

the development process of medical device training games



(no bunnies were harmed during development)








GETINGE
PASSION FOR LIFE

GETINGE 

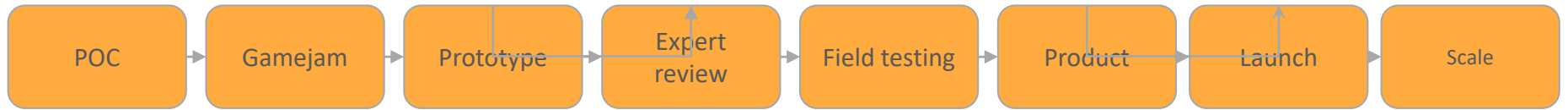


The process



as we know it

Overview





Kickoff

What's it all about

Kickoff

- The goal
- Scope
- The process
- Risks



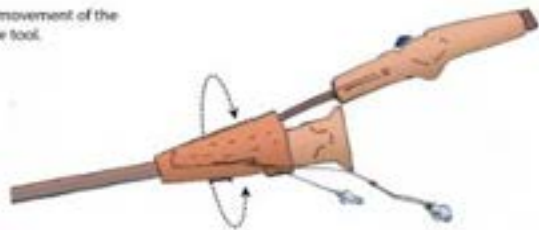
POC Controller



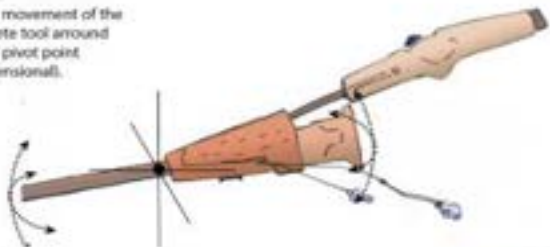
Proof and play -
how and which movements

A_1

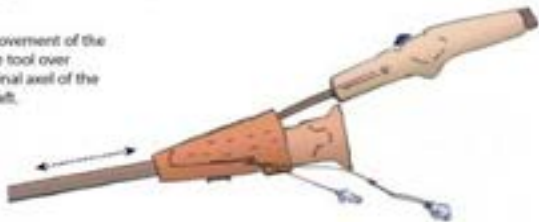
Circular movement of the complete tool.

**A_2**

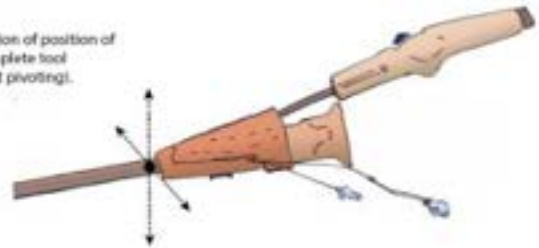
Pivotal movement of the complete tool around central pivot point (2 dimensional).

**A_3**

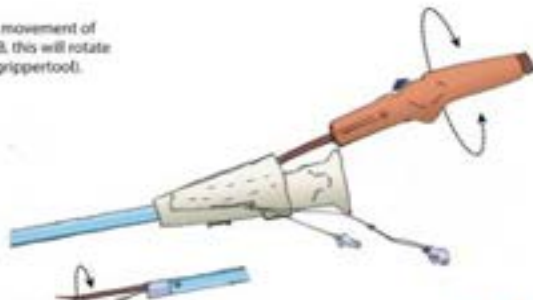
Linear movement of the complete tool over longitudinal axis of the metal shaft.

**A_4**

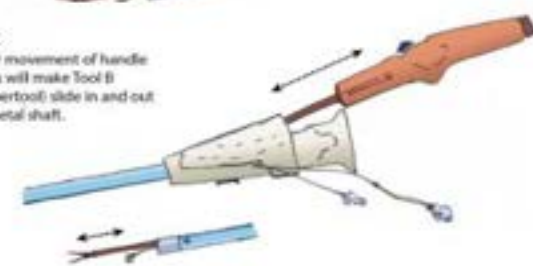
Translation of position of the complete tool (without pivoting).

**B_1**

Circular movement of handle B, this will rotate Tool B (grippertool).

**B_2**

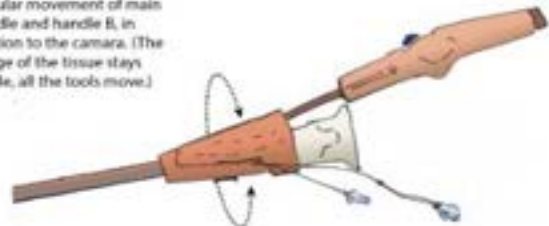
Linear movement of handle B. This will make Tool B (grippertool) slide in and out the metal shaft.

**C_1a**

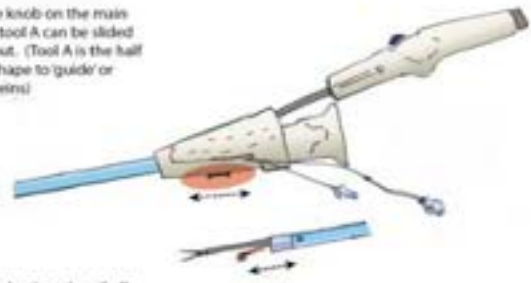
Circular movement of the camera handle, in relation to the main handle. (The image of the camera turns, tissue and tools stay at same location)

**C_1b**

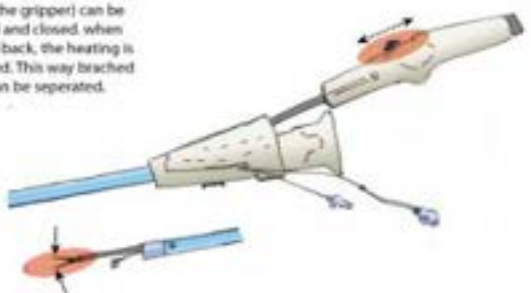
Circular movement of main handle and handle B, in relation to the camera. (The image of the tissue stays stable, all the tools move.)

**D_1**

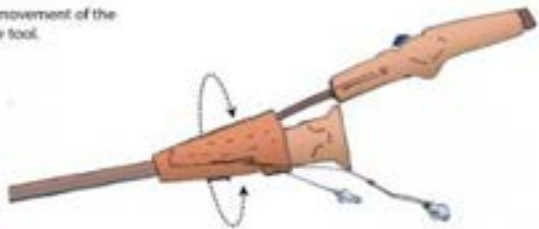
With the knob on the main handle, tool A can be slid in and out. (Tool A is the half circular shape to 'guide' or follow veins)

**D_2**

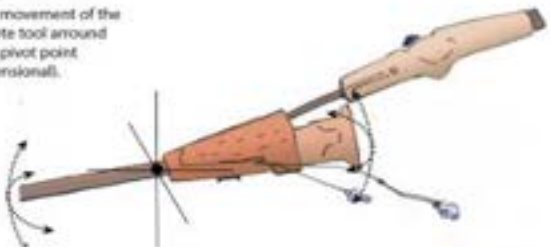
With the knob on handle B, tool B (the gripper) can be opened and closed, when pushed back, the heating is activated. This way branched veins can be separated.



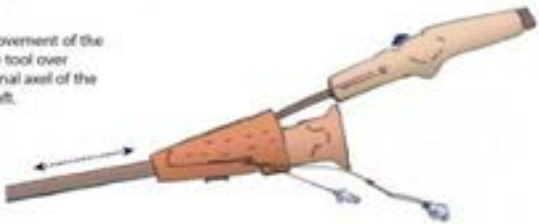
A_1
Circular movement of the complete tool.



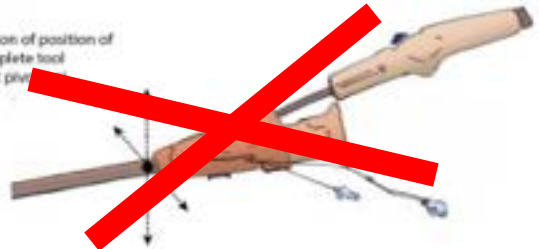
A_2
Pivotal movement of the complete tool around central pivot point (2 dimensional).



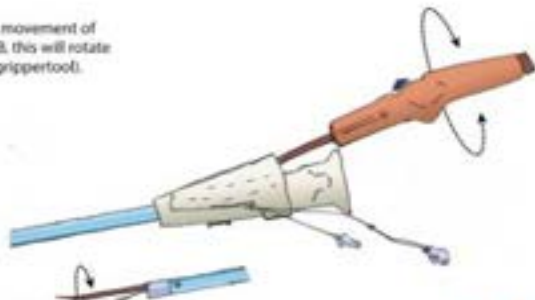
A_3
Linear movement of the complete tool over longitudinal axis of the metal shaft.



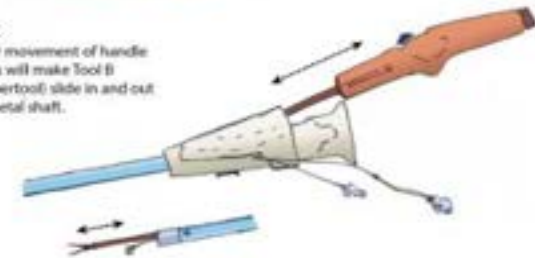
A_4
Translation of position of the complete tool (without piv)



B_1
Circular movement of handle B, this will rotate Tool B (grippertool).



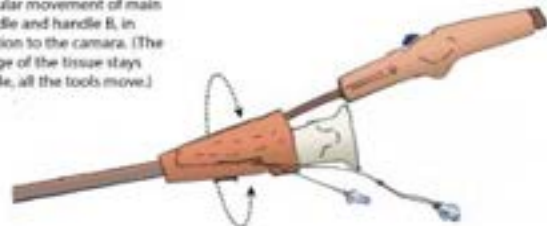
B_2
Linear movement of handle B. This will make Tool B (grippertool) slide in and out the metal shaft.



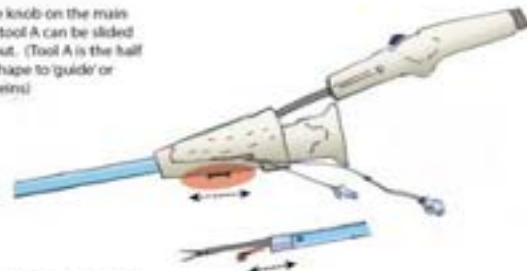
C_1a
Circular movement of the camera handle, in relation to the main handle. (The image of the camera turns, tissue and tools stay at same location)



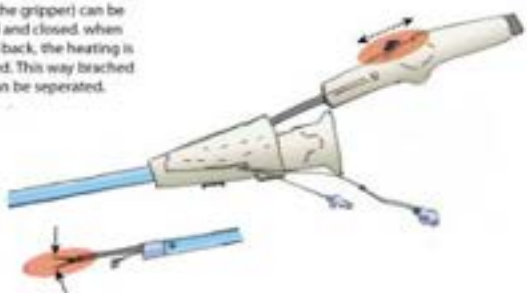
C_1b
Circular movement of main handle and handle B, in relation to the camera. (The image of the tissue stays stable, all the tools move.)

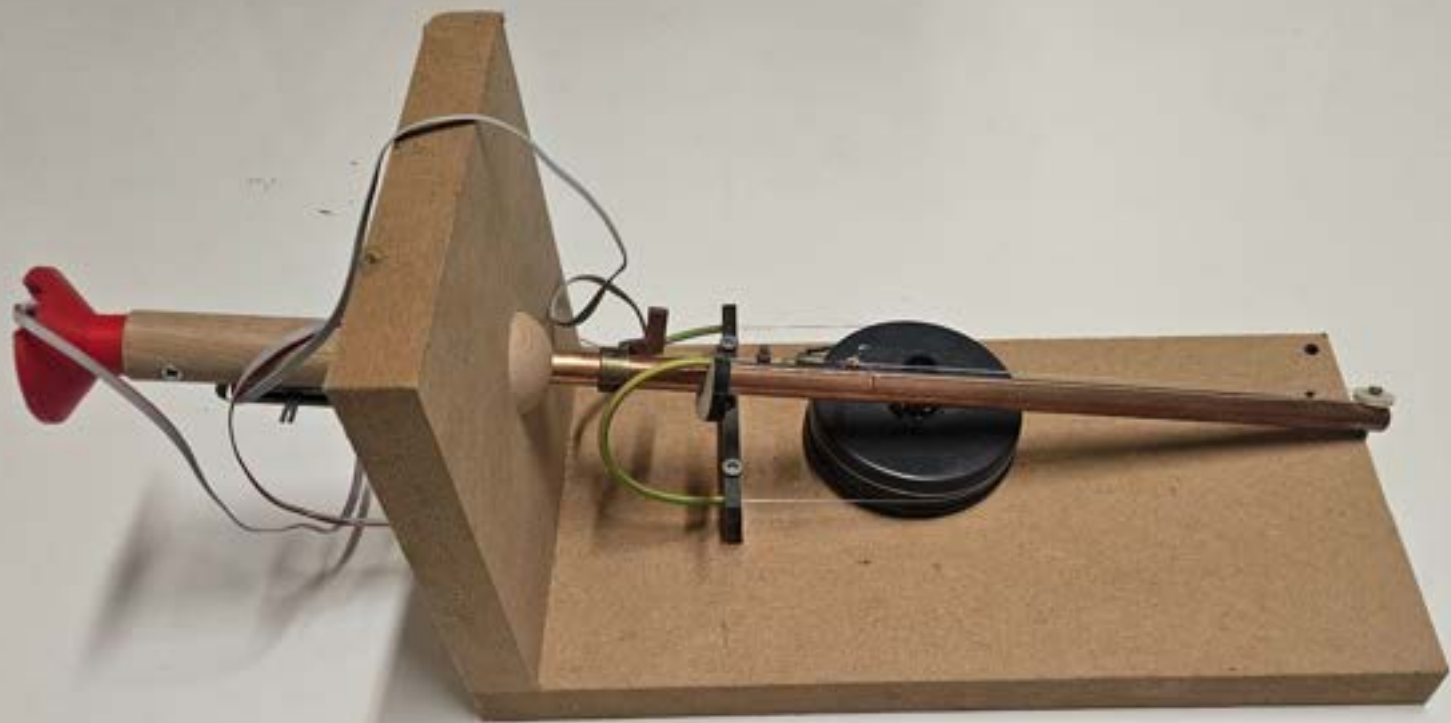


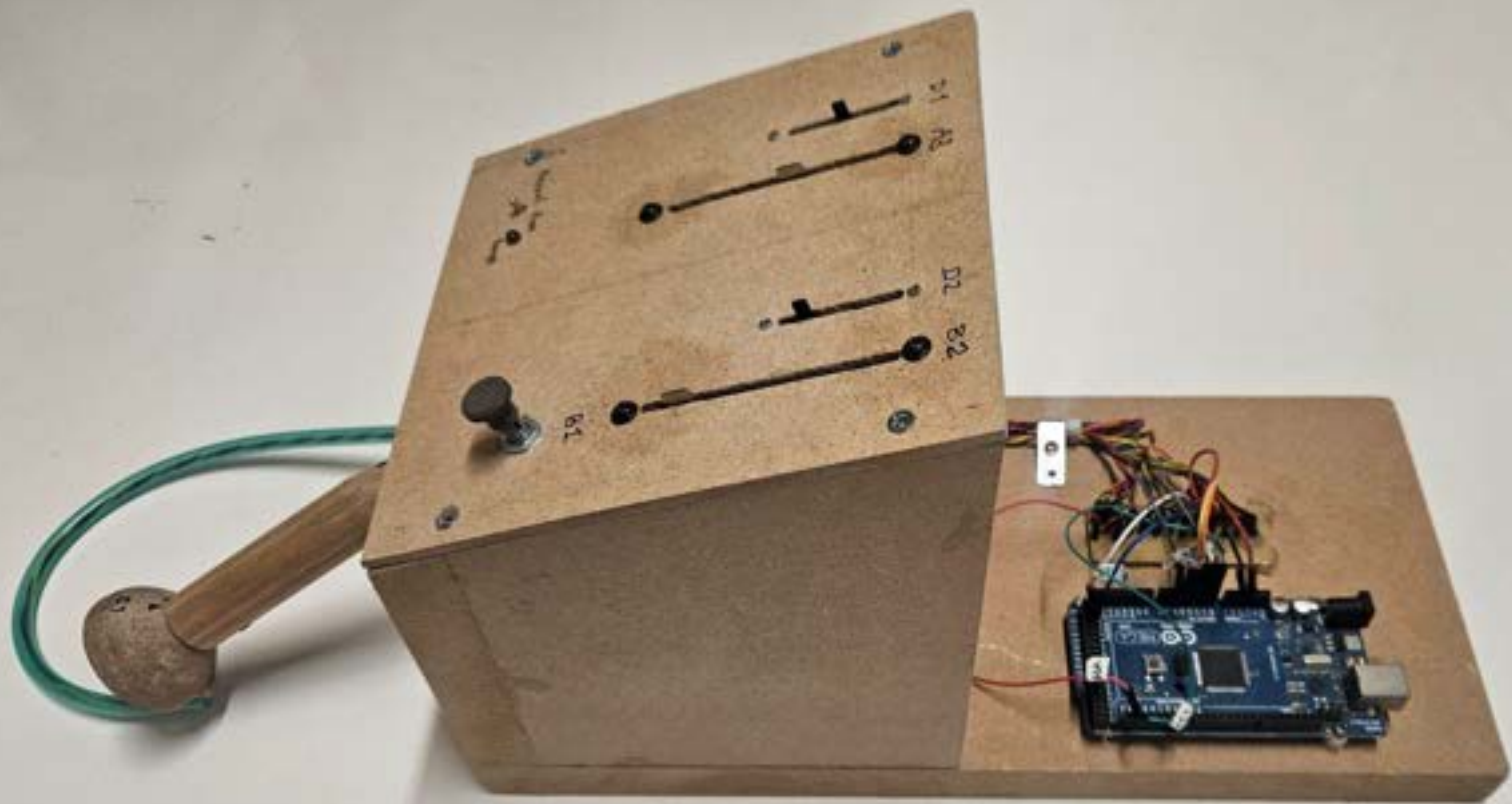
D_1
With the knob on the main handle, tool A can be slid in and out. (Tool A is the half circular shape to 'guide' or follow veins)



D_2
With the knob on handle B, tool B (the gripper) can be opened and closed, when pushed back, the heating is activated. This way branched veins can be separated.













Game ready Workshop / Gamejam



Coming up with game ideas

Learnings

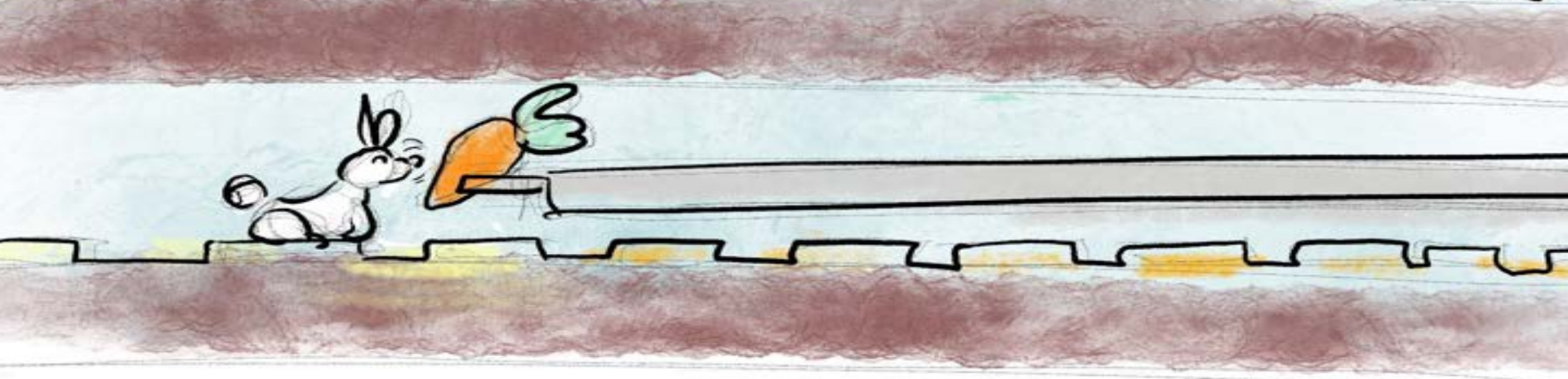
- Vasoview is a daunting device
- A lot of to pay attention to
- Focus on getting familiar with device
- Focus on hand-eye coordination
- Little focus on procedures
- A gamejam is a great event to spark and test ideas

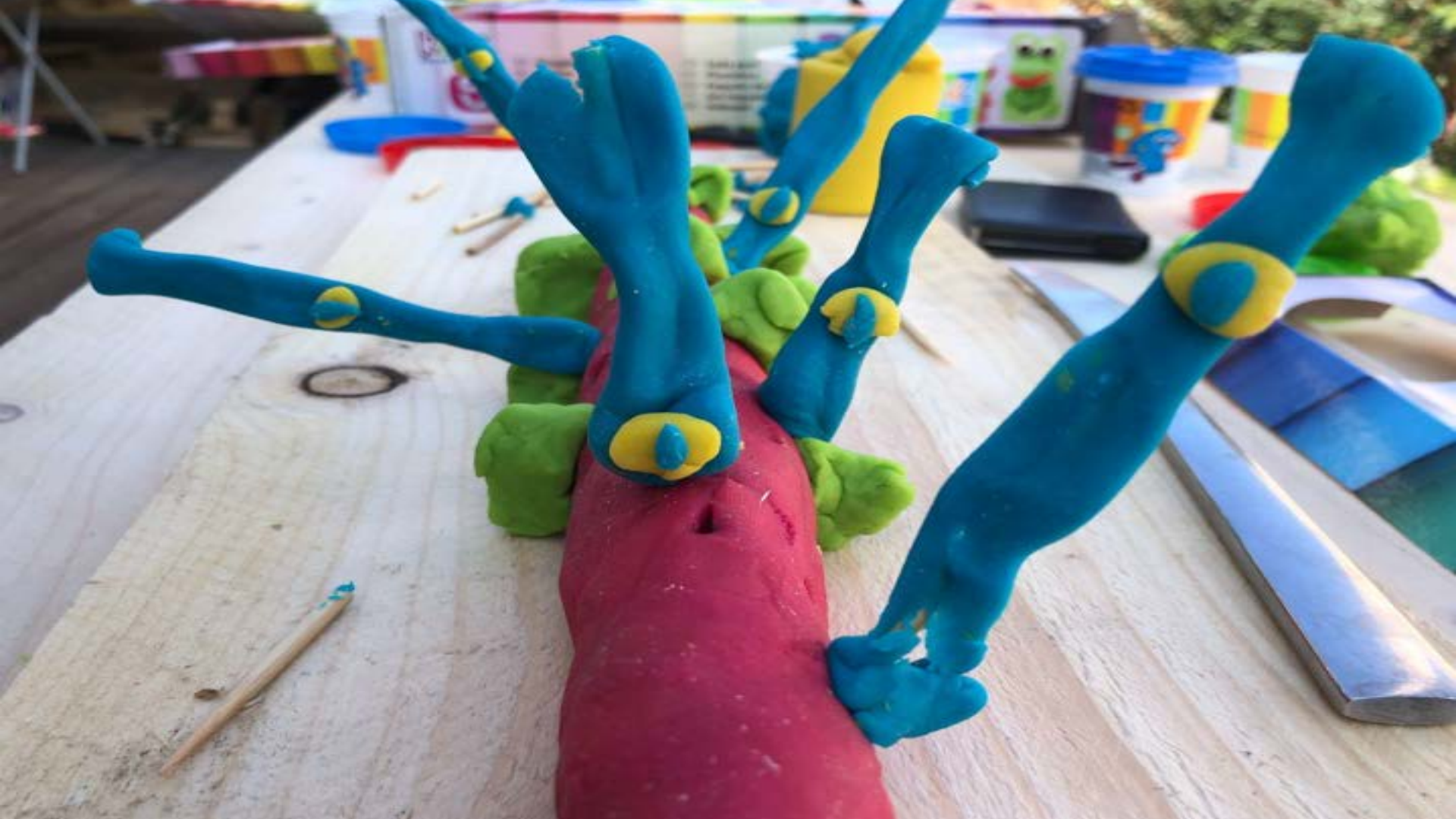


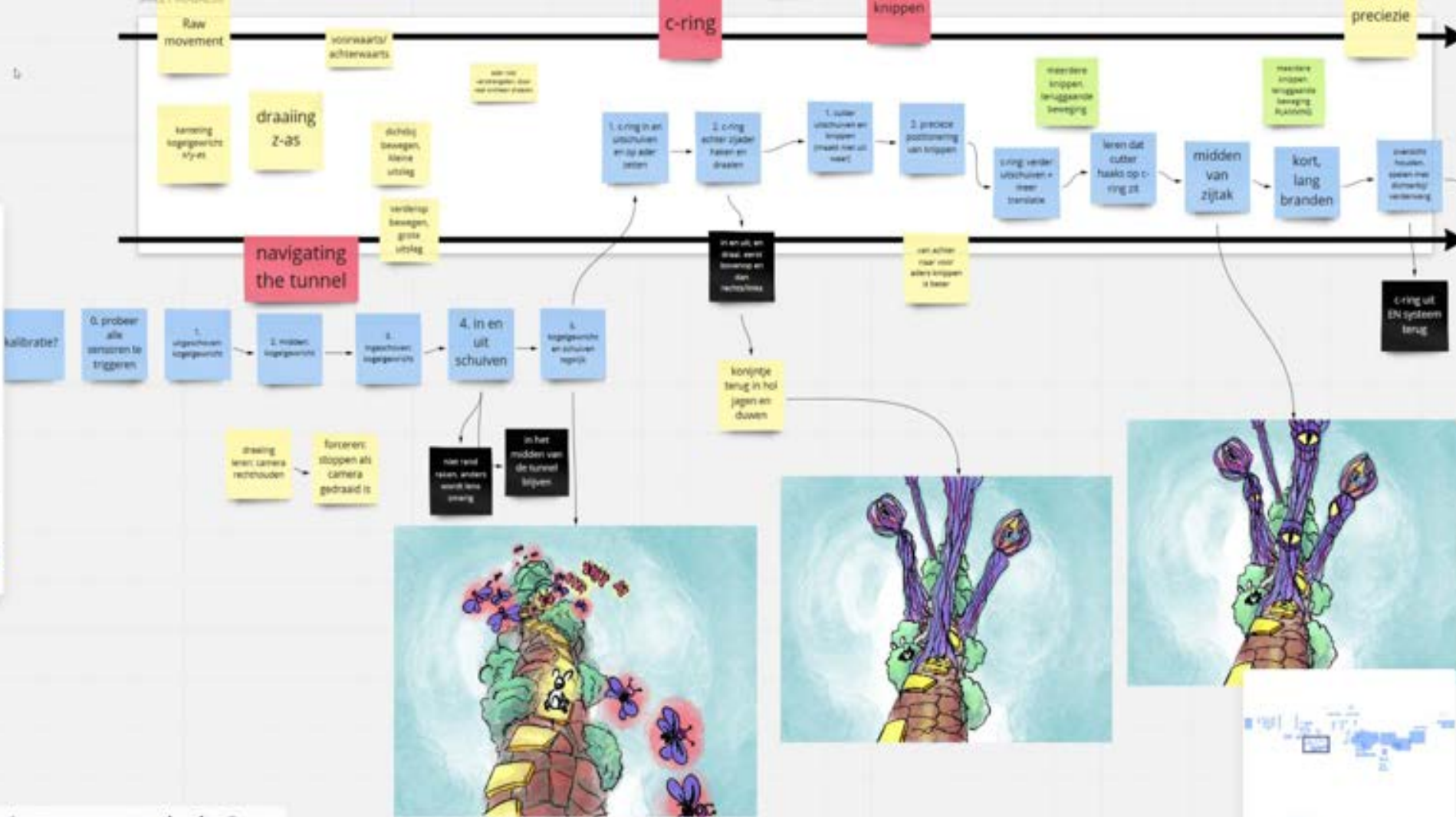
Prototyping



Fleshing out ideas











GETIN SE *



Expert review

Are we on the right track?

Control of the distal end of the device within the center of the tunnel is achieved while gaming	6,5
The motion of advancing and retracting the cannula down the tunnel emulates surgical endoscopic techniques	8,0
Does this game have appropriate resistance during advancing/retracting the device?	6,0
Following the bunny assist in understanding the endoscopic movements (i.e. hand up results in tip down)]	7,8
Do you feel this game will help improve hand-eye coordination in new clinicians?	9,0
Does the cannula move in and out and rotate within the tunnel as would be expected?	8,3
Does the C-ring slider and the HP2 cutting tool have similar resistance as the device?	8,0
Does the games C-Ring and Cutter closely mimic the Cutter and C-Rings relationship when compared to the Hemopro 2 Device?	6,8
Does the games C-Ring move similar to the C-ring of the HP2 Device?	8,8
Does the games Cutter function similar to the HP2 regarding independent movement?	7,3
Does the game assist in understanding the turning of the handle is what aligns the branches with the cutting tool and C-ring?	6,5
Does this device assist in proper placement of C-ring for cutting branches?	6,0
Does this device assist in cutting of a branch at a safe distance from the main vessel?	6,8
Does the game assist with keeping the vein in the middle of the tunnel?	6,0
Does the game help with keeping the cannula from bumping into the tunnel wall? (working space)	6,5
Was this a fun learning activity?	9,3
Was this game engaging which resulted in a desire to continue playing?	8,3
Do you feel this game will improve a new user's confidence?	8,5
Overall, do you feel that this game will assist a new harvester in learning the device mechanics?	9,3
Overall, do you feel that this game will assist a new harvester in learning the basic procedural aspects of EVH with HP2?	7,5
How self explaining is the game, in other words do you understand the goal of each level?	7,0

Outcomes

- Experts enthusiastic about game and device
- Confident that this will impact the learning
- Expected that quality of the vein will be reached earlier
- Extra opportunity for left-handed harvesting



Prototype v2



Stepping it up!



Curved

Thick

Diagonal

Straight

Hardware improvements

Drift is a major issue
(accelerometer)

Materials wear out
(not suited for long term
use)

Sensors wear out
(not suited for long term
use)

Cable management

Moves during use

Glued parts (maintenance)

Real procedure has
more resistance



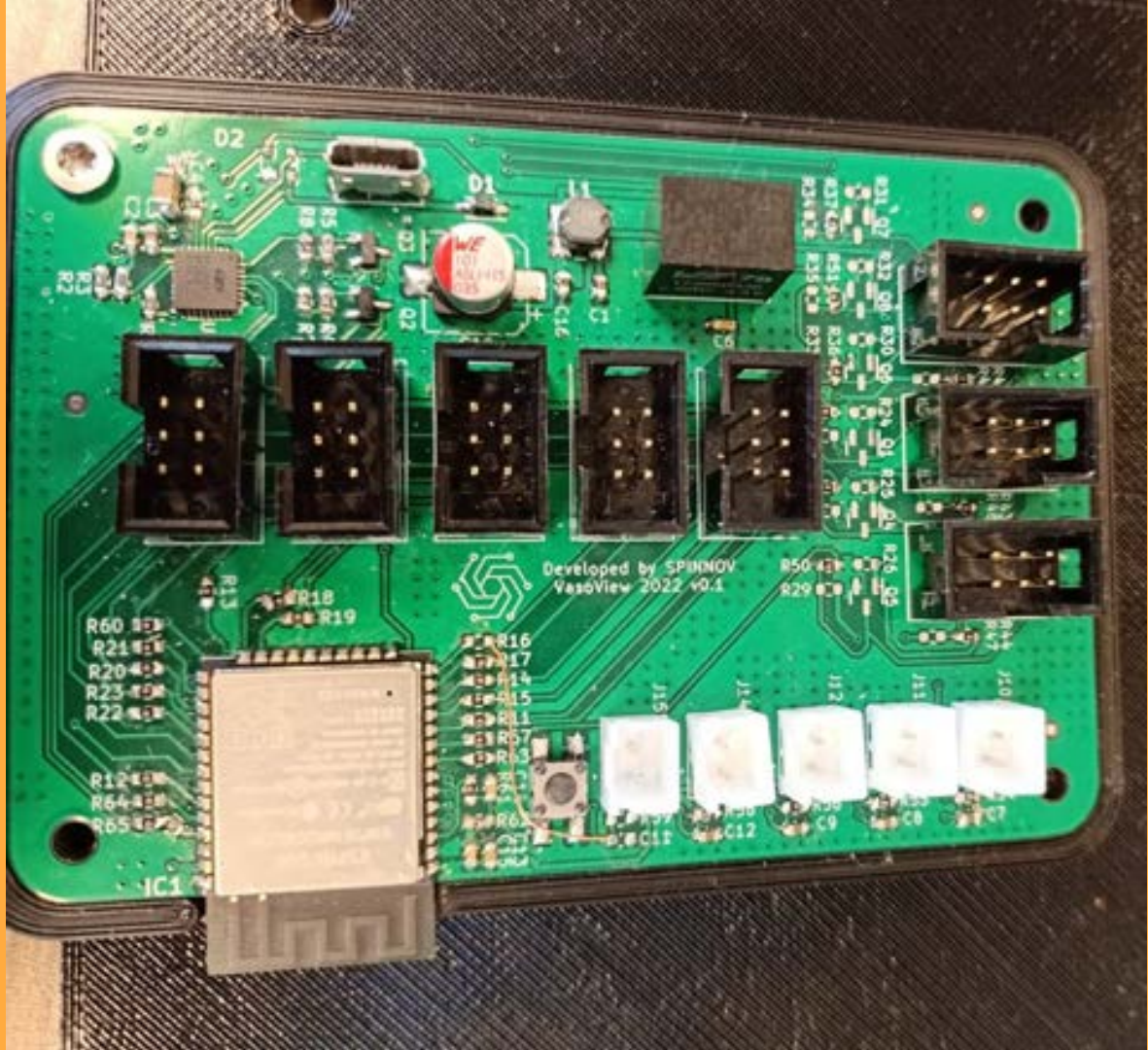






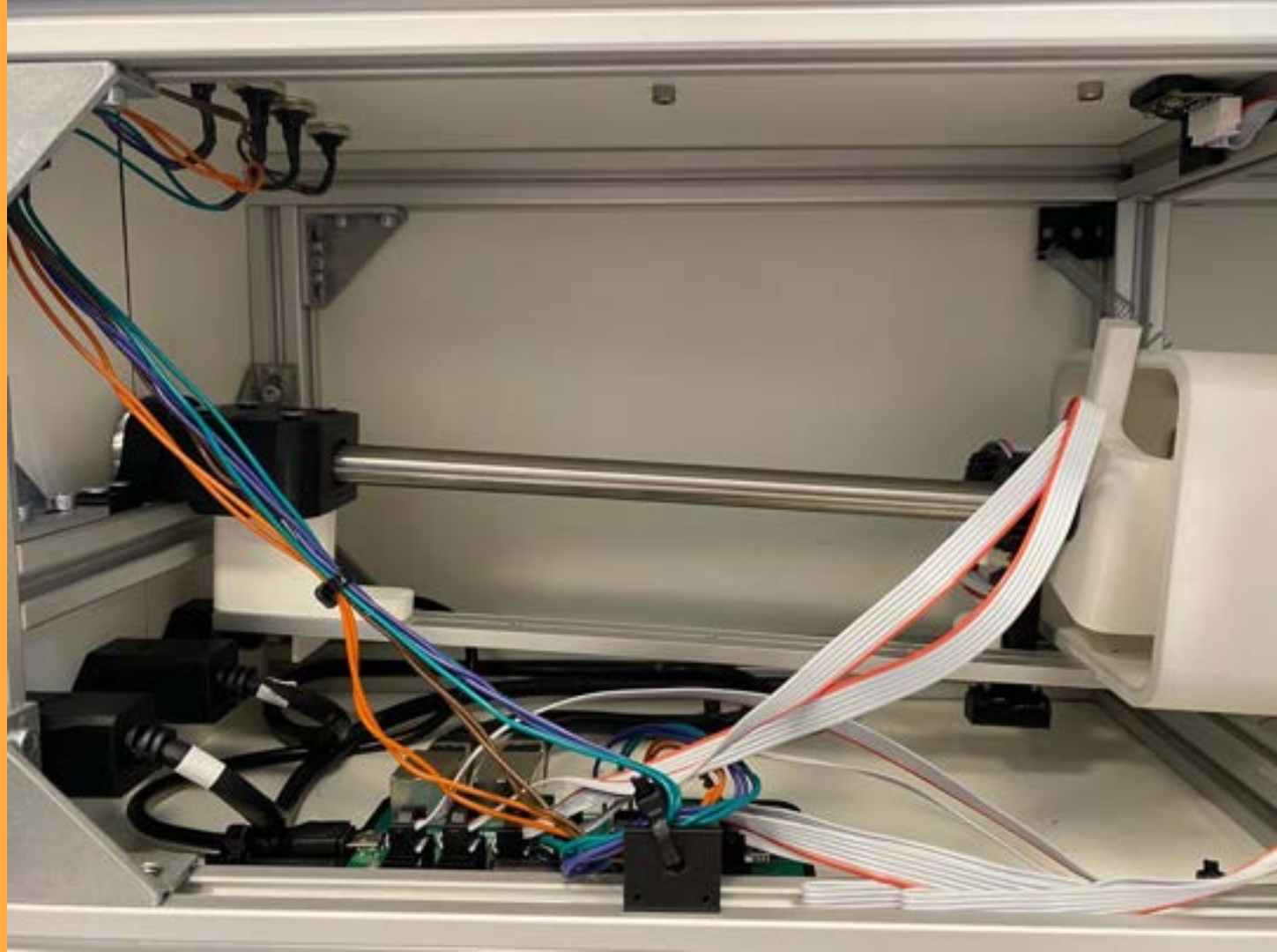
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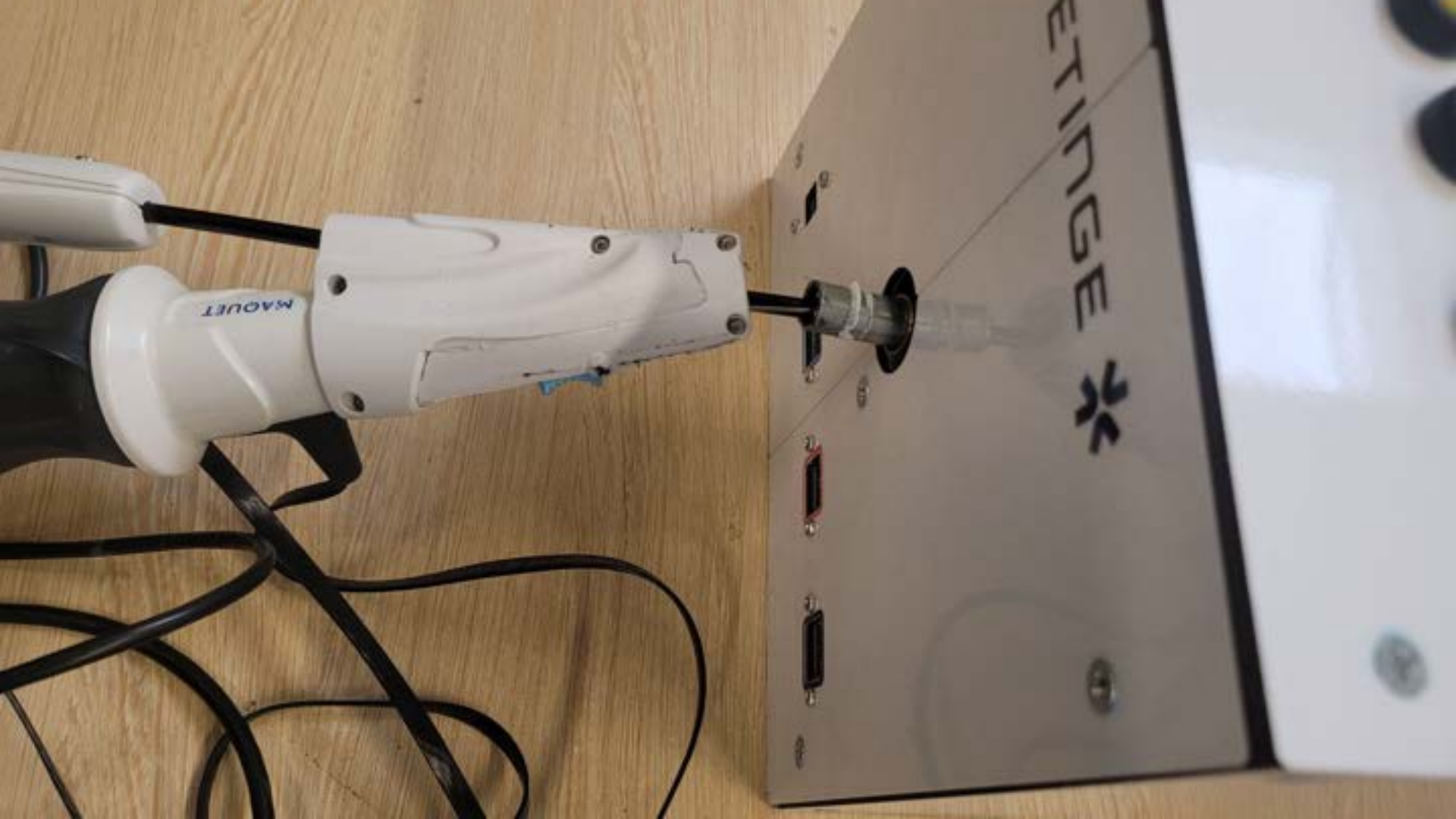












Field testing



Get it out there!



Get it out there!

- Although not passing shiptest, decided to bring 5 devices in rotation to learn from usage.
- Presented the project during a Getinge leadership conference

Pressure went up!



Product v1



Optimize

Hardware improvements

- 3d printed handles
- extra block to fixate the cannula
- optimization cable management
- optimization for maintainability
- durability improvements

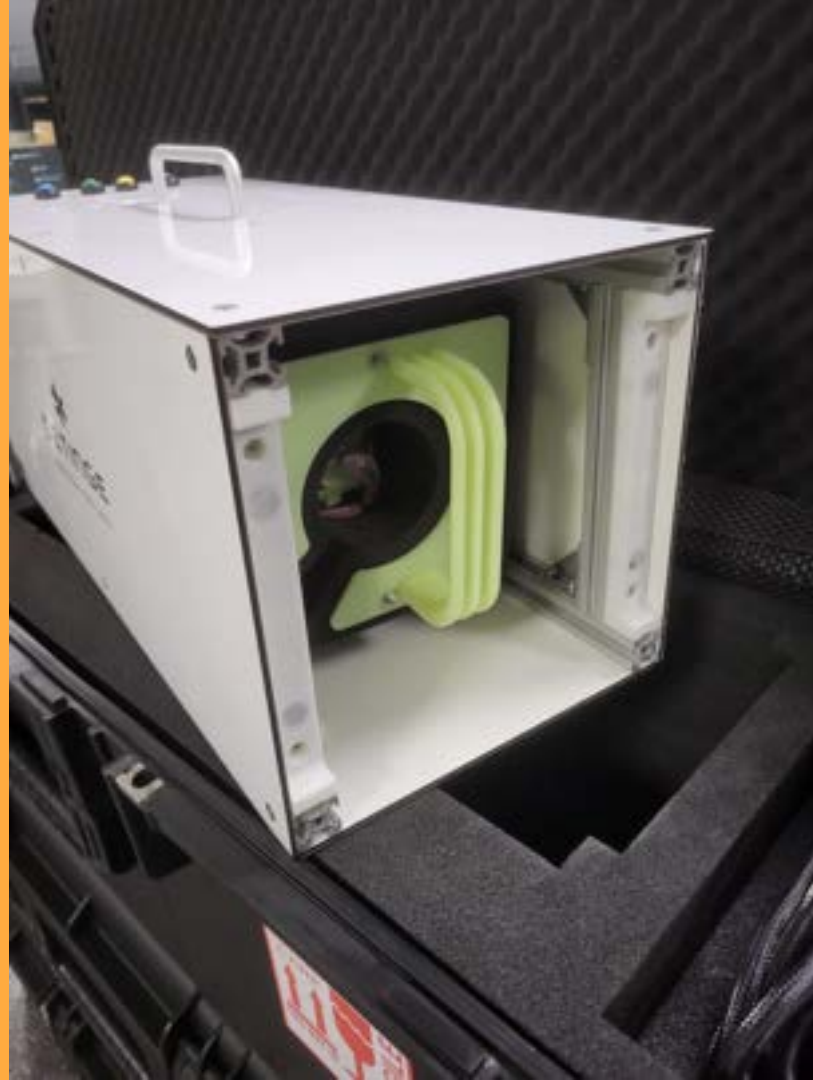














Test Certificate

Test Certificate No.: C24-001-P24-001

Part of technical report: M24-001-P24-001 rev.01

Date of test: 14 and 15 November 2024

This is to certify that the
Travel Case containing a Vaxoview training kit

Manufactured by:

Games for Health Europe

Vonderweg 1, 9501 EK Eindhoven,
The Netherlands

Has been subjected to test procedures A - G according to the test standard ASTM D 4919-23¹⁾, DC 2.

See the following table for the outcomes of the results:

Test A: Climate pre-conditioning test	Pass, no damage found
Test B: Free fall drop test	Pass, no movement or damage found
Test C: Rear Vibration test	Pass, no movement or damage found
Test D: Random shock vibration test	Pass, no movement or damage found
Test E: Random air vibration test	Pass, no movement or damage found
Test F: Free fall drop test	Pass, one piece of material had moved out of position inside the travel case, but no other movement or damage found
Test G: Compression test	Pass, no movement or damage found

Games for Health Europe will carry out the final inspection on the test items after the completed test sequence.

Testing carried out by:

E. Morris
Test Engineer

Bergschenhoek,
22 November 2024

Approved by:

M.F.H. Magdenius
Director

All the values listed in this certificate have been obtained with a digital electronic data acquisition system tested and fully accredited in the laboratory. The certificate number is unique. It is not to be reproduced or copied. It is not to be used for any other purpose. For more information, please contact the laboratory. The laboratory is not responsible for the use of the certificate for any other purpose than the one stated in this certificate. The laboratory is not responsible for the use of the certificate for any other purpose than the one stated in this certificate.

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ISO/IEC 17025 Accredited and ISTA[®] Certified Testing Laboratory

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*Visit www.iso.org to check the ISO scope registration number 17025

Field experience



Small scale release

Goal

- Evaluate new controller
- Evaluate game updates
 - how it behaves in real usage
 - procedures
 - wearing/breaking down







Learnings so far

- Shipping worldwide , logistical hell
- Need to standardize learning and handling the game
- Setup materials



Product v2



Iterate on learnings



Scale



Optimize operations and
improvements

Summary



Our learnings

Learnings

1. Design & development is a contact sport, take a dive!
2. Surround you with the right partners at the right phase
3. Keep involving experts & end-users
4. Focus on the must-haves
5. Focus on the learning goals, not strive for simulation
6. Make conscious decision about patent application
7. Get it out there as soon as possible
8. Shiptest early but not too early
9. Get second opinions



So, failing multiple times is easy

1. every iteration (that is thrown out there) needs assessment if new test is necessary
2. Too expensive and time consuming to model 3d and have it tested virtually (at that stage for this project)
3. Transportation is brutal

Tip

- do some basic (drop) test yourself during development





Come and play@our booth



Collect all six cards to win a free Game Ready Workshop!



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