I Appendix I: Competition infrastructure

I.1 Additional information

I.1.1 Version Management

<table>
<thead>
<tr>
<th>Version</th>
<th>Comments</th>
<th>Date</th>
<th>Responsible</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>This version includes additional information regarding the task infrastructure and drawings with dimensions crucial for the fairness of the competition. Changes in the task infrastructure since the last rules release are marked orange.</td>
<td>30 Sep 2022</td>
<td>Kilian Baur</td>
<td>completed</td>
</tr>
</tbody>
</table>
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I.2 Preamble

With the aim to standardize the task infrastructure of the CYBATHLON competition we specify the task infrastructure as far as necessary to facilitate equal and fair conditions for all participating teams.

This first version of the task infrastructure appendix provides dimensioned drawings and further information about the structure and physics of specific task infrastructure in the disciplines ARM, LEG, EXO, WHL, ROB and VIS. Furthermore, the task infrastructure provided by CYBATHLON to all teams and to CYBATHLON hubs is listed.

I.3 General remarks for ARM, LEG, EXO, WHL, ROB and VIS

I.3.1 Dimensions

If not stated otherwise, all dimensions presented without any units are measured in millimetres (mm).

I.3.2 General setup of a task

The general setup of a task consists of a start line, a finish line (both white) and two side lines (black). The tolerance of the distance between two opposite lines is +/- 5mm. The race direction in the drawings within this document is from left to right.

The four lines are represented by black and white tape and span the task space.
I.3.3 Specific task drawings

In sections I.6 to I.11 all the task infrastructure is described by specific drawings. The drawing in the “General task setup” subsection specifies the placing of the objects on the task space. The drawings in the “Infrastructure dimensions” subsection specify the dimensions of the infrastructure itself.

I.3.3.1 Tolerances for manufacturing of task infrastructure

If not stated otherwise, all dimensions must be within a tolerance of +/- 2mm.

I.3.3.2 Tolerances for task setup (placement of task infrastructure on the competition floor)

The tolerance for placing the task infrastructure on the competition floor +/- 5mm for all dimensions indicated in the general task setup drawings presented in the task subsections below.

I.3.4 Task infrastructure provided to registered teams

Registered teams are teams that have received the approval to be registered for a specific CYBATHLON event. The teams receive the infrastructure listed as “provided by CYBATHLON to all registered teams” of the selected tasks for this specific event. The infrastructure to be provided is stated at each task specifically. We reserve the right to add more objects to the group of provided objects.

I.3.5 Task infrastructure provided to CYBATHLON hubs

CYBATHLON hubs are official venues of a specific CYBATHLON event. The hubs receive the infrastructure listed as “provided by CYBATHLON to all CYBATHLON hubs” of the selected tasks for this specific event. The infrastructure to be provided is stated at each task specifically. We reserve the right to add more objects to the group of provided objects.

I.3.6 Torque tolerances for hinges

The torque tolerances for hinges will be provided at a later stage.

Tasks which include hinge elements with torque information to be specified, are:

- ARM – Serving
- EXO – Doors
- WHL – Doors
- ROB – Mailbox
- ROB - Doors
- ROB - Dishwasher

### I.3.7 Objects from IKEA

Whenever possible, standard furniture and objects available at IKEA are used in the competition tasks. If available by 2024, the currently presented furniture and objects will be used in the competition. IKEA furniture and objects, as well as associated dimensions are subject to change. Please check the dimensions of the IKEA Lerhamn tables before ordering as the dimensions have changed recently.

### I.3.8 3d-printed objects

The files for the 3d-printed objects are available for registered teams in the download section of the CYBATHLON dashboard. Objects must be printed with

- polylactide (PLA), a weblink to the product is listed in the task infrastructure sections below
- a maximal layer height of 0.35 mm (recommended: 0.2 mm)
- a wall thickness of the shell (side-, top-, and bottom wall) between [0.8 mm - 1 mm]
- infill density of 20%

We recommend

- a printing temperature of [215 °C - 230 °C]
- a build plate temperature of 60 °C
- to enable support structures during the print process

### I.3.9 Colour of objects

The colour is indicated either in the task infrastructure tables (“Details / Model” or indirectly via the “Source” weblink) or in the CAD model available on the dashboard of the CYBATHLON website. The specified colouring of the objects must be applied to produce a common appearance of the competition infrastructure across all hubs.

### I.3.10 Friction enhancing

In this appendix we specify the surfaces that must and the surfaces that may have increased friction. Surfaces with increased friction must be painted grey. The colouring of the specified surfaces is only mandatory for CYBATHLON hubs.
The CYBATHLON Zurich hub applies a paint containing quartz sand. The mixing ratio is 1:0.13, and the grain size is 0.1 - 0.6 mm. Anti-slip tape (e.g., Grip Tape) may be used as an alternative. The CYBATHLON Zurich hub colours the specified surfaces in silver grey (RAL 7001).
I.4 BCI

Information to the BCI infrastructure will follow at a later stage.
## I.5 FES

### I.5.1 Task infrastructure

<table>
<thead>
<tr>
<th>Object</th>
<th>Photo</th>
<th>Specification</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stationary bike trainer</td>
<td><img src="image1.png" alt="Stationary Bike Trainer" /></td>
<td>Kickr 5, self-calibrating and remote controlled</td>
<td>Wahoo</td>
</tr>
<tr>
<td>Virtual race scenario</td>
<td><img src="image2.png" alt="Virtual Race Scenario" /></td>
<td>Recumbent trike avatar taking system weight and road inclination into account</td>
<td>tbd</td>
</tr>
</tbody>
</table>
I.6 ARM

I.6.1 Bottles

I.6.1.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
<th>Provided by CYBATHLON</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Bottle (1.5l)</td>
<td>blue, partially filled with water (0l, 0.5l, 1l, 1.5l), bottle type subject to change</td>
<td>BOTTLESHOP</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>4</td>
<td>Bottle cap</td>
<td>blue</td>
<td>CZECH BREWERY SYSTEM</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Bottle crate</td>
<td>blue</td>
<td>SIOS</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (square)</td>
<td>IKEA</td>
<td></td>
</tr>
</tbody>
</table>

I.6.1.2 General task setup

![Diagram of task setup]
I.6.1.3 Infrastructure dimensions
### I.6.2 Stacking

#### I.6.2.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (square)</td>
<td>IKEA</td>
</tr>
<tr>
<td>10</td>
<td>Plastic cup</td>
<td>blue, Kalas, subject to change</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Chair</td>
<td>Adde</td>
<td>IKEA</td>
</tr>
</tbody>
</table>

#### I.6.2.2 General task setup

![Diagram of task setup]

#### I.6.2.3 Infrastructure dimensions

![Diagram of infrastructure dimensions]
### I.6.3 Do-it-yourself

#### I.6.3.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
<th>Provided by CYBATHLON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shelf</td>
<td>Kallax 2x4, holders mounted</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Hammer</td>
<td>blue handle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Nail</td>
<td>Art. No. 87.1001.35090, l: 90mm, d: 3.5mm</td>
<td>Hasler</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Wooden plate</td>
<td>3mm through-hole, 4mm/10mm for insertion, notch for initial nail position</td>
<td></td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Plate holder</td>
<td>custom made</td>
<td></td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Pliers</td>
<td>blue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Screwdriver (Torx)</td>
<td>blue</td>
<td>LUX</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Bolt</td>
<td>Art. No. 83.1340.06030, M6, l: 30mm, Torx head</td>
<td>Hasler</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>2</td>
<td>Nut</td>
<td>Art. No. 83.2420.0060, M6</td>
<td>Hasler</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Nut holder</td>
<td>custom made</td>
<td></td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Lightbulb</td>
<td>blue, Star A Décor-Color</td>
<td>OSRAM</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Bulb holder</td>
<td>E27</td>
<td>Max Hauri</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Bulb electronics set</td>
<td>The design of the electronics for this task will be communicated at a later stage.</td>
<td>custom made</td>
<td>To CYBATHLON hubs only</td>
</tr>
</tbody>
</table>
I.6.3.2 General task setup

I.6.3.3 Infrastructure dimensions
I.6.4 Laundry

I.6.4.1 Task infrastructure

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<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
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<tr>
<td>1</td>
<td>Hamper Torkis IKEA</td>
<td></td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>T-shirt subject to change</td>
<td></td>
<td>Neutral</td>
</tr>
<tr>
<td>1</td>
<td>Sweater zipper: blue slider and pull tab</td>
<td></td>
<td>Neutral</td>
</tr>
<tr>
<td>1</td>
<td>Clothesline black custom made</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Coat hanger Bumerang IKEA</td>
<td></td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Box for clothespins Glis</td>
<td></td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Clothespin blue, Wenko Colorado</td>
<td></td>
<td>WENKO</td>
</tr>
</tbody>
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I.6.4.2 General task setup
I.6.4.3 Infrastructure dimensions
### 1.6.5 Containers

#### 1.6.5.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
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<th>Provided by CYBATHLON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (square)</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Can opener</td>
<td>blue turning knob, one for left and one for right handed use will be provided, subject to change</td>
<td>Sieger</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Can</td>
<td>Flaschenbauer</td>
<td></td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Disc</td>
<td>red, 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_ARM_CONTAINERS_DISC.stl (on the dashboard for registered teams)</td>
<td>PRUSA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Bottle (0.5l)</td>
<td>blue, filled with 0.5l of red liquid (water-like viscosity)</td>
<td>bottleshop</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Bottle cap</td>
<td>bottleshop</td>
<td></td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Glass</td>
<td>visual, non-haptic mark 1cm under brim</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Jar (230ml)</td>
<td>filled with expanded clay</td>
<td>Agrimarkt</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Expanded clay</td>
<td>red, 78g, 4-8mm</td>
<td></td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Lid</td>
<td>blue, subject to change</td>
<td>Agrimarkt</td>
<td>To CYBATHLON hubs only</td>
</tr>
</tbody>
</table>
I.6.5.2 General task setup

I.6.5.3 Infrastructure dimensions
### I.6.6 Hot wire

#### I.6.6.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
<th>Provided by CYBATHLON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wire</td>
<td>custom made</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Handle with loop</td>
<td>blue handle</td>
<td>PB SWISS TOOLS</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Set of electronics</td>
<td>The design of the electronics for this task will be communicated on a later stage.</td>
<td>custom made</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Hot wire base</td>
<td>black</td>
<td>custom made</td>
<td></td>
</tr>
</tbody>
</table>

#### I.6.6.2 General task setup

![Diagram of task setup](image-url)
1.6.6.3 Infrastructure dimensions
### I.6.6.4 Wire (manufacturing information)

![Wire Diagram](image1)

### I.6.6.5 Handle with loop (manufacturing information)

![Handle Diagram](image2)
### I.6.7 Serving

#### I.6.7.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shelf, with front door</td>
<td>custom made</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Wire basket</td>
<td>Utruska</td>
<td>IKEA</td>
</tr>
<tr>
<td>3</td>
<td>Cup hinge</td>
<td>OPO</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Flap hinge left</td>
<td>OPO</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Flap hinge right</td>
<td>OPO</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Door handle</td>
<td>Bagganäs</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Frying pan</td>
<td>365+, 28cm, blue handle</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Casserole dish</td>
<td>Koncis, 1 blue handle</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (square)</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Trivet (round)</td>
<td>Heat</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Trivet (square)</td>
<td>Lämplig</td>
<td>IKEA</td>
</tr>
<tr>
<td>9</td>
<td>Lacrosse ball</td>
<td>CROSS EQUIP</td>
<td></td>
</tr>
</tbody>
</table>

In the drawings below the front door of the shelf is presented in its open state. The initial position of the front door in the competition is closed.

#### I.6.7.2 General task setup

![Diagram of task setup](image)
I.6.7.3 *Infrastructure dimensions*
I.6.7.4 Hinges - assembly information

The hinges are mounted as presented in the picture. The positions of the hinges can be taken from the CAD model.
I.6.8 Dishes

I.6.8.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shelf Kallax 1x4</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Insert with 2 drawers Kallax</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Cutlery tray</td>
<td>The design of the cutlery tray will be communicated at a later stage.</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Table Lerhamn (square)</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Plate holder Rinnig</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Cutlery stand Ordning</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Plate blue 365+</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Mug blue Vardagen</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Set of fork, knife and spoon blue 365+</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Bowl blue 365+</td>
<td>IKEA</td>
<td></td>
</tr>
</tbody>
</table>

In the drawings below the drawer of the shelf is presented in its open state. The initial position of the drawer in the competition is closed.

I.6.8.2 General task setup
1.6.8.3 Infrastructure dimensions
### I.6.9 Haptic bag

#### I.6.9.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
<th>Provided by CYBATHLON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Table</td>
<td>Table with holes for haptic bags</td>
<td>IKEA</td>
<td>CYBATHLON</td>
</tr>
<tr>
<td>2</td>
<td>Haptic bag - frame</td>
<td>custom made</td>
<td>To CYBATHLON hubs only</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Haptic bag - brush</td>
<td>blue, Standard strip brush, STL6001-494992, body: PVC deep black, fiber: PA6 signalblue 0 30, total length: 250mm, working length: 240mm, rows: 1, fiber height 100mm</td>
<td>PRUSA</td>
<td>CYBATHLON hubs only</td>
</tr>
<tr>
<td>2</td>
<td>Haptic bag - fabric</td>
<td>blue, Brugnoli Roche jersey royalblau</td>
<td>POMPON</td>
<td>CYBATHLON hubs only</td>
</tr>
<tr>
<td>6</td>
<td>Low compliance object</td>
<td>Grey, 3D-printed from the files on the CYBATHLON dashboard for registered teams: 20220930_ARM__HAPTIC_BAG__LOW_COMPLIANCE_CUBE.stl</td>
<td>PRUSA</td>
<td>CYBATHLON hubs only</td>
</tr>
<tr>
<td>6</td>
<td>High compliance object</td>
<td>foam (RG50), cube, cuboid, cylinder 1, cylinder 2, triangular prism 1, triangular prism 2</td>
<td>custom made</td>
<td>To all registered teams</td>
</tr>
<tr>
<td>6</td>
<td>Neutral object</td>
<td>white, 3D-printed from the files on the CYBATHLON dashboard for registered teams: 20220930_ARM__HAPTIC_BAG__NEUTRAL_CUBE.stl</td>
<td>PRUSA</td>
<td>To all registered teams</td>
</tr>
<tr>
<td>1</td>
<td>Frame (2x4)</td>
<td>for presentation of target and selected objects</td>
<td>custom made</td>
<td>CYBATHLON hubs only</td>
</tr>
</tbody>
</table>

The design of the frame will be communicated at a later stage.
I.6.9.2 General task setup

I.6.9.3 Infrastructure dimensions
I.6.9.4 Haptic bag - fabric manufacturing information
The fabric is cut and folded according to the cutting pattern and attached to a wooden frame which then is inserted into the whole in the table surface.
## I.6.10 Clean sweep

### I.6.10.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
<th>Provided by CYBATHLON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (square)</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Transparent box</td>
<td>Glis, <strong>blue</strong></td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cube, attached to the table</td>
<td><strong>white</strong>, 3D-printed from the files on the CYBATHLON dashboard for registered teams:</td>
<td>PRUSA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20220930_ARM__CLEAN__SWEEP_CARD_CUBE.stl</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20220930__CARD_KEY_CUBE.stl</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20220930__LEGO_CUBE.stl (+<strong>brown</strong> LEGO Block)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20220930__PEN_CUBE.stl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Key</td>
<td><strong>blue</strong>, KABA 8</td>
<td>KABA</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Credit Card</td>
<td><strong>blue</strong>, w: 85 mm, l: 54 mm, h: 0.8 mm</td>
<td>ETH Print and Publish</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Marble</td>
<td><strong>blue</strong>, d: 15 mm</td>
<td>Jugglux</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>LEGO Block</td>
<td><strong>blue</strong>, LEGO</td>
<td>KLICK-BRICKS</td>
<td>To CYBATHLON hubs only</td>
</tr>
</tbody>
</table>
I.6.10.2 General task setup

I.6.10.3 Infrastructure dimensions
I.7 LEG

I.7.1 Bench & table

I.7.1.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bench</td>
<td>Tjusig, stainless steel tubes not mounted</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (rectangular)</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Socle</td>
<td>red</td>
<td>Boje Sport</td>
</tr>
<tr>
<td>2</td>
<td>Pole</td>
<td>l: 800mm, red</td>
<td>Boje Sport</td>
</tr>
</tbody>
</table>

I.7.1.2 General task setup
1.7.1.3 Infrastructure dimensions
## I.7.2 Stairs

### I.7.2.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stairs</td>
<td>wood, optionally with recessed checker plate edge protection on each step. CYBATHLON uses multi-layer solid wood</td>
<td>custom made</td>
</tr>
<tr>
<td>2</td>
<td>Handrail (1 for each side)</td>
<td>steel</td>
<td>custom made</td>
</tr>
<tr>
<td>8</td>
<td>Separation unit - holder</td>
<td>wood</td>
<td>custom made</td>
</tr>
<tr>
<td>4</td>
<td>Separation unit - pole</td>
<td>red</td>
<td>Boje Sport</td>
</tr>
<tr>
<td>2</td>
<td>Side table</td>
<td>Lack</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Saucer</td>
<td>365+</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Espresso cup</td>
<td>365+, red</td>
<td>IKEA</td>
</tr>
</tbody>
</table>

### I.7.2.2 General task setup

![Diagram of stairs setup](image)
1.7.2.3 Infrastructure dimensions
I.7.3 Step-over

I.7.3.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Crate</td>
<td>Knagglig, bottoms removed</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Saucer</td>
<td>365+</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Apple</td>
<td>red</td>
<td>Floristik24,</td>
</tr>
<tr>
<td>1</td>
<td>Side table</td>
<td>Lack</td>
<td>IKEA</td>
</tr>
</tbody>
</table>

I.7.3.2 General task setup

I.7.3.3 Infrastructure dimensions
I.7.4 Slopes

I.7.4.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Ramp</td>
<td>wood, top surfaces with increased friction and painted grey</td>
<td>custom made</td>
</tr>
<tr>
<td>6</td>
<td>Object</td>
<td>white, 3D-printed from the files on the CYBATHLON dashboard for registered teams:</td>
<td>PRUSA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20220930_LEG__SLOPES__CIRCLE.stl</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20220930_..._CUBE.stl</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20220930_..._PENTAGON.stl</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20220930_..._STAR.stl</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20220930_..._TRAPEZOID.stl</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20220930_..._TRIANGLE.stl</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Target location</td>
<td>Printed shape on top presenting corresponding objects</td>
<td>custom made</td>
</tr>
</tbody>
</table>

I.7.4.2 General task setup
1.7.4.3  Infrastructure dimensions
### I.7.5 Hurdles

#### I.7.5.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Pole with socle</td>
<td>l: 1600mm, red</td>
<td>Boje Sport</td>
</tr>
<tr>
<td>7</td>
<td>Crossbar</td>
<td>l: 800mm, red</td>
<td>Boje Sport</td>
</tr>
<tr>
<td>14</td>
<td>Crossbar fixture</td>
<td>shortened</td>
<td>Boje Sport</td>
</tr>
</tbody>
</table>

#### I.7.5.2 General task setup

![Diagram of hurdle setup](image-url)
I.7.5.3 Infrastructure dimensions
I.7.6 Wobbly stones

I.7.6.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Circular plate with hemispheres</td>
<td>visible surfaces of the plate with increased friction and painted grey, hemispheres, set-up on O-ring seal</td>
<td>custom made</td>
</tr>
<tr>
<td>7</td>
<td>O-ring seal</td>
<td>positioned on friction layer</td>
<td>HUG</td>
</tr>
<tr>
<td>7</td>
<td>Friction layer</td>
<td></td>
<td>OBI</td>
</tr>
</tbody>
</table>

I.7.6.2 General task setup

I.7.6.3 Infrastructure dimensions
1.7.7 Boxes

1.7.7.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Box</td>
<td>3 boxes with <strong>blue</strong> top surface</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Boxes fixation system</td>
<td></td>
<td>custom made</td>
</tr>
<tr>
<td>12</td>
<td>Pole</td>
<td>l: 800mm, <strong>red</strong></td>
<td>Boje Sport</td>
</tr>
</tbody>
</table>

1.7.7.1.1 Dimensions of boxes

<table>
<thead>
<tr>
<th></th>
<th>Box 1</th>
<th>Box 2</th>
<th>Box 3</th>
<th>Box 4</th>
<th>Box 5</th>
<th>Box 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height [m]</td>
<td>0.18</td>
<td>0.20</td>
<td>0.22</td>
<td>0.24</td>
<td>0.26</td>
<td>0.28</td>
</tr>
<tr>
<td>Length [m]</td>
<td>0.30</td>
<td>0.27</td>
<td>0.29</td>
<td>0.31</td>
<td>0.33</td>
<td>0.25</td>
</tr>
</tbody>
</table>

The distance between the boxes ranges between 320 mm and 545 mm.

1.7.7.2 General task setup

[Diagram showing the setup of boxes and poles]

---

Page 50 / 145
I.7.7.3 Infrastructure dimensions
I.7.7.4 Box – manufacturing information

To prevent the poles from tipping over, they are guided by a second hole at the bottom of the box.

I.7.7.5 Boxes fixation system - assembly information

The boxes are attached to the lateral boxes fixation system with threaded nuts on a M10 threaded rod. For safety reasons and different to the pictures above we suggest to shorten the rod that protrudes the lateral fixation to a minimum and to use a self-locking nut instead of a butterfly nut.
I.7.8 Ladder

I.7.8.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Base plate</td>
<td>Black, with mounting bracket for shelving unit</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Stepladder</td>
<td>Wooden, all steps are reinforced with angle brackets, the ladder is screwed to the wooden baseplate, first step blue</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Shelving unit</td>
<td>Gnedby</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Side table</td>
<td>Lack</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Saucer</td>
<td>365+</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Apple</td>
<td>red</td>
<td>Floristik24</td>
</tr>
</tbody>
</table>

I.7.8.2 General task setup
I.7.8.3 Infrastructure dimensions
### I.7.9 Stones

#### I.7.9.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Base plate</td>
<td>wood, with fixtures for attachment and lateral reinforcement, holes with diameter of 21mm (half-cylinders fixed but easy to be removed)</td>
<td>custom made</td>
</tr>
<tr>
<td>2</td>
<td>Base plate for start/finish zone</td>
<td>wood, with fixtures for attachment, holes with diameter of 21mm (half-cylinders fixed but easy to be removed)</td>
<td>custom made</td>
</tr>
<tr>
<td>10</td>
<td>Spacer</td>
<td>wood, with fixtures for attachment, maintaining constant space between base plates</td>
<td>custom made</td>
</tr>
<tr>
<td>2</td>
<td>Half cylinder bar for start/finish zone</td>
<td>wood, top surfaces with increased friction and painted grey, l: 800 mm, dowels with diameter of 20mm and length of min. 20mm</td>
<td>custom made</td>
</tr>
<tr>
<td>8</td>
<td>Half cylinder bar short</td>
<td>wood, top surfaces with increased friction and painted grey, l: 250 mm, dowels with diameter of 20mm and length of min. 20mm</td>
<td>custom made</td>
</tr>
<tr>
<td>4</td>
<td>Half cylinder bar long</td>
<td>wood, top surfaces with increased friction and painted grey, l: 400 mm, dowels with diameter of 20mm and length of min. 20mm</td>
<td>custom made</td>
</tr>
<tr>
<td>2</td>
<td>Cube</td>
<td>white, 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_LEG__STONES__CUBE.stl</td>
<td>PRUSA</td>
</tr>
<tr>
<td>2</td>
<td>Target position disc</td>
<td></td>
<td>custom made</td>
</tr>
</tbody>
</table>
1.7.9.2 General task setup

1.7.9.3 Infrastructure dimensions
I.7.10 Balance beam

I.7.10.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Beam</td>
<td>wood, top surfaces with increased friction and painted grey respectively blue marks at entry zone on two of the beams</td>
<td>custom made</td>
</tr>
<tr>
<td>2</td>
<td>Bucket</td>
<td>PACKSTAR</td>
<td></td>
</tr>
</tbody>
</table>

I.7.10.2 General task setup

I.7.10.3 Infrastructure dimensions
I.8 EXO

I.8.1 Carry

I.8.1.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (square)</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Box with lid</td>
<td>Pappis</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Bottle (0.5l)</td>
<td>filled with water</td>
<td>BOTTLESHOP</td>
</tr>
<tr>
<td>2</td>
<td>Bottle cap</td>
<td></td>
<td>BOTTLESHOP</td>
</tr>
<tr>
<td>1</td>
<td>Side table</td>
<td>Lack</td>
<td>IKEA</td>
</tr>
</tbody>
</table>

I.8.1.2 General task setup

![Diagram of task setup]
1.8.1.3 Infrastructure dimensions
## 1.8.2 Stairs

### 1.8.2.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stairs</td>
<td>wood, optionally with recessed checker plate edge protection on each step, CYBATHLON uses multi-layer solid wood</td>
<td>custom made</td>
</tr>
<tr>
<td>2</td>
<td>Handrail (1 for each side)</td>
<td>steel</td>
<td>custom made</td>
</tr>
</tbody>
</table>

### 1.8.2.2 General task setup

![Stair diagram](image)
1.8.2.3 Infrastructure dimensions
### I.8.3 Benches

#### I.8.3.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
<th>Provided by CYBATHLON</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Bench with backrest</td>
<td>Applarö</td>
<td>IKEA</td>
<td>CYBATHLON only</td>
</tr>
<tr>
<td>1</td>
<td>Double-sided tape</td>
<td>to be specified, attached the bench to the floor</td>
<td></td>
<td>CYBATHLON hubs only</td>
</tr>
</tbody>
</table>

#### I.8.3.2 General task setup

![Diagram of task setup]

#### I.8.3.3 Infrastructure dimensions

![Diagram of infrastructure dimensions]
I.8.4 Tilted path

I.8.4.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ramp (4m)</td>
<td>wood, top surfaces with increased friction and painted grey</td>
<td>custom made</td>
</tr>
<tr>
<td>2</td>
<td>Sidewall</td>
<td>wood</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Backwall</td>
<td>wood</td>
<td>custom made</td>
</tr>
</tbody>
</table>

I.8.4.2 General task setup

I.8.4.3 Infrastructure dimensions
I.8.5 Free walking

I.8.5.1 Task infrastructure
No task infrastructure beside marking.

I.8.5.2 General task setup
### I.8.6 Crowd

#### I.8.6.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Table</td>
<td>Stensele, each with a black/white marking circle around IKEA</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Edge-following robot</td>
<td>The Thymio robots of the company Mobsya are the edge-following robots which must be used for the competition at all CYBATHLON hubs. Please contact Mobsya directly (<a href="mailto:sales@mobsya.org">sales@mobsya.org</a>) and mention that you are a CYBATHLON team to profit from a price reduction of 22%. Transport costs and customs fees must be paid by the ordering institution.</td>
<td>Thymio</td>
</tr>
<tr>
<td>4</td>
<td>Robot cover</td>
<td>red, 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_EXO_WHL_ROB_CROWD_ROBOT_COVER.stl (on the dashboard for registered teams)</td>
<td>PRUSA</td>
</tr>
<tr>
<td>4</td>
<td>Cover extension</td>
<td>red, rod, custom made</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cover extension sphere</td>
<td>red, 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_EXO_WHL_ROB_CROWD_EXTENSION_SPHERE.stl (on the dashboard for registered teams)</td>
<td>PRUSA</td>
</tr>
</tbody>
</table>

#### I.8.6.2 General task setup

![Diagram of the task setup](image-url)
I.8.6.3 Infrastructure dimensions
I.8.7 Boxes

I.8.7.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Box</td>
<td></td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Boxes fixation system</td>
<td></td>
<td>custom made</td>
</tr>
</tbody>
</table>

I.8.7.1.1 Dimensions of boxes

<table>
<thead>
<tr>
<th></th>
<th>Box 1</th>
<th>Box 2</th>
<th>Box 3</th>
<th>Box 4</th>
<th>Box 5</th>
<th>Box 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height [m]</td>
<td>0.18</td>
<td>0.20</td>
<td>0.22</td>
<td>0.24</td>
<td>0.26</td>
<td>0.28</td>
</tr>
<tr>
<td>Length [m]</td>
<td>0.30</td>
<td>0.27</td>
<td>0.29</td>
<td>0.31</td>
<td>0.33</td>
<td>0.25</td>
</tr>
</tbody>
</table>

I.8.7.2 General task setup

I.8.7.3 Infrastructure dimensions
I.8.7.4 Boxes fixation system - assembly information

The boxes are attached to the lateral boxes fixation system with threaded nuts on a M10 threaded rod. For safety reasons and different to the pictures above we suggest to shorten the rod that protrudes the lateral fixation to a minimum and to use a self-locking nut instead of a butterfly nut.
### I.8.8 Doors

#### I.8.8.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Doorframe rack</td>
<td>wood, CYBATHLON uses MDF custom made</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Doorframe</td>
<td>Pertura CPL white</td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door left</td>
<td>Pertura Yori CPL white, right</td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door right</td>
<td>Pertura Yori CPL white, left</td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door handle</td>
<td>Pertura BB Vitur alu F1</td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door knob</td>
<td></td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door closer</td>
<td>mounted to the second door and doorframe</td>
<td>Hornbach</td>
</tr>
</tbody>
</table>

#### I.8.8.2 General task setup

![Diagram of door setup]
1.8.8.3 **Infrastructure dimensions**
I.8.8.4 Door closer - assembly information
I.8.9 Stones

I.8.9.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Base plate</td>
<td>wood, with fixtures for attachment and lateral reinforcement, holes with diameter of 21mm (stones fixed but easy to be removed)</td>
<td>custom made</td>
</tr>
<tr>
<td>9</td>
<td>Stone</td>
<td>26mm height, visible surfaces of the stones may have increased friction and must be painted grey, dowels with diameter of 20mm and length of min. 20mm</td>
<td>custom made</td>
</tr>
</tbody>
</table>

I.8.9.2 General task setup

![Diagram of task setup]

I.8.9.3 Infrastructure dimensions

![Diagram of infrastructure dimensions]
I.8.10 Kitchen

I.8.10.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shelf</td>
<td>Kallax 1x4</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Insert with 2 drawers</td>
<td>Kallax</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Basket</td>
<td>Saluding (small)</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Bread surrogate</td>
<td>foam (RG80)</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (square)</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Butcher’s block</td>
<td>Aptitlig</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Bread knife</td>
<td>Vardagen</td>
<td>IKEA</td>
</tr>
</tbody>
</table>

In the drawings below the drawer of the shelf is presented in its open state. The initial position of the drawer in the competition is closed.

I.8.10.2 General task setup
I.8.10.3 Infrastructure dimensions
I.9 WHL

I.9.1 Restaurant

I.9.1.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Table</td>
<td>IKEA Lerhamn (rectangular)</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Table</td>
<td>IKEA Lerhamn (square)</td>
<td>IKEA</td>
</tr>
</tbody>
</table>

I.9.1.2 General task setup

I.9.1.3 Infrastructure dimensions
### I.9.2 Stairs

#### I.9.2.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stairs</td>
<td>wood, optionally with recessed checker plate edge protection on each step, CYBATHLON uses multi-layer solid wood</td>
<td>custom made</td>
</tr>
<tr>
<td>2</td>
<td>Handrail (1 for each side)</td>
<td>steel</td>
<td>custom made</td>
</tr>
</tbody>
</table>

![Diagram of stairs]
## I.9.3 Pick-up

### I.9.3.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
<th>Provided by CYBATHLON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bottle (0.5l)</td>
<td>blue</td>
<td>bottleshop</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Bottle cap</td>
<td>blue</td>
<td>CZECH BREWERY SYSTEM</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Table</td>
<td>Lack</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Target disk</td>
<td></td>
<td>custom made</td>
<td></td>
</tr>
</tbody>
</table>

### I.9.3.2 General task setup

![Diagram of task setup](image)

### I.9.3.3 Infrastructure dimensions

![Diagram of infrastructure dimensions](image)
I.9.4 Tilted path

I.9.4.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ramp (4m)</td>
<td>wood, top surfaces with increased friction and painted grey</td>
<td>custom made</td>
</tr>
<tr>
<td>2</td>
<td>Sidewall</td>
<td>wood</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Backwall</td>
<td>wood</td>
<td>custom made</td>
</tr>
</tbody>
</table>

I.9.4.2 General task setup

I.9.4.3 Infrastructure dimensions
I.9.5 **Uplift**

I.9.5.1 **Task infrastructure**

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Pole with socle</td>
<td>l: 1600mm, <strong>red</strong></td>
<td>Boje Sport</td>
</tr>
<tr>
<td>2</td>
<td>Crossbar</td>
<td>l:1200mm, <strong>red</strong></td>
<td>Boje Sport</td>
</tr>
<tr>
<td>1</td>
<td>Crossbar</td>
<td>l:1200mm, <strong>yellow</strong></td>
<td>Boje Sport</td>
</tr>
<tr>
<td>6</td>
<td>Crossbar fixture</td>
<td>shortenend</td>
<td>Boje Sport</td>
</tr>
<tr>
<td>1</td>
<td>Curtain</td>
<td><strong>yellow</strong>, with lead cord at the bottom to ensure height</td>
<td></td>
</tr>
</tbody>
</table>

I.9.5.2 **General task setup**

![Diagram of Uplift setup](image)
1.9.5.3 Infrastructure dimensions

![Diagram of infrastructure dimensions]
I.9.6  Crowd

I.9.6.1  Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Table</td>
<td>Stensele, each with a black/white marking circle around IKEA</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Edge-following robot</td>
<td>The Thymio robots of the company Mobsya are the edge-following robots which must be used for the competition at all CYBATHLON hubs. Please contact Mobsya directly (<a href="mailto:sales@mobsya.org">sales@mobsya.org</a>) and mention that you are a CYBATHLON team to profit from a price reduction of 22%. Transport costs and customs fees must be paid by the ordering institution.</td>
<td>Thymio</td>
</tr>
<tr>
<td>4</td>
<td>Robot cover</td>
<td>red, 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_EXO_WHL_ROB_CROWD_ROBOT_COVER.stl (on the dashboard for registered teams)</td>
<td>PRUSA</td>
</tr>
<tr>
<td>4</td>
<td>Cover extension</td>
<td>red, rod</td>
<td>custom made</td>
</tr>
<tr>
<td>4</td>
<td>Cover extension sphere</td>
<td>red, bar (custom made plus) 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_EXO_WHL_ROB_CROWD_EXTENSION_SPHERE.stl (on the dashboard for registered teams)</td>
<td>PRUSA</td>
</tr>
</tbody>
</table>

I.9.6.2  General task setup
I.9.6.3 Infrastructure dimensions
I.9.7 Doorstep

I.9.7.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Doorstep obstacle</td>
<td>Wood, with aluminum cover on top</td>
<td>custom made</td>
</tr>
</tbody>
</table>

I.9.7.2 General task setup

![Diagram of task setup]

I.9.7.3 Infrastructure dimensions

![Diagram of infrastructure dimensions]
## I.9.8 Doors

### I.9.8.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Doorframe rack</td>
<td>wood, CYBATHLON uses MDF custom made</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Doorframe</td>
<td>Pertura CPL white</td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door left</td>
<td>Pertura Yori CPL white, right</td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door right</td>
<td>Pertura Yori CPL white, left</td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door handle</td>
<td>Pertura BB Vitur alu F1</td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door knob</td>
<td></td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door closer</td>
<td>mounted to the second door and doorframe</td>
<td>Hornbach</td>
</tr>
</tbody>
</table>

### I.9.8.1 General task setup

![Diagram of door setup]
1.9.8.2 Infrastructure dimensions
I.9.8.3 Door closer - assembly information
### I.9.9 Stony path

#### I.9.9.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Base plate</td>
<td>wood, with fixtures for attachment and lateral reinforcement</td>
<td>custom made</td>
</tr>
<tr>
<td>16</td>
<td>Half cylinder bar (long, for placement across to race direction)</td>
<td>wood, top surfaces with increased friction and painted grey, l: 400 mm</td>
<td>custom made</td>
</tr>
<tr>
<td>12</td>
<td>Half cylinder bar (long, for angled placement)</td>
<td>wood, top surfaces with increased friction and painted grey, l: 400 mm</td>
<td>custom made</td>
</tr>
<tr>
<td>12</td>
<td>Half cylinder bar (short, along race direction)</td>
<td>wood, top surfaces with increased friction and painted grey, l: 250 mm</td>
<td>custom made</td>
</tr>
</tbody>
</table>

#### I.9.9.2 General task setup

![Diagram of Stony path setup](image-url)
I.9.9.3 Infrastructure dimensions

[Diagram showing infrastructure dimensions with measurements.]
I.9.10 Winding stairs

I.9.10.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stairs</td>
<td>wood, optionally with recessed checker plate edge protection on each step, CYBATHLON uses multi-layer solid wood</td>
<td>custom made</td>
</tr>
</tbody>
</table>

I.9.10.2 General task setup

I.9.10.3 Infrastructure dimensions
**I.10 ROB**

**I.10.1 Mailbox**

**I.10.1.1 Task infrastructure**

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mailbox</td>
<td></td>
<td>BURG WÄCHTER</td>
</tr>
<tr>
<td>1</td>
<td>Mailbox pole</td>
<td>steel</td>
<td>BURG WÄCHTER</td>
</tr>
<tr>
<td>1</td>
<td>Mailbox base</td>
<td>Wood, black</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Parcel</td>
<td>foam (RG80)</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Side table</td>
<td>Lack</td>
<td>IKEA</td>
</tr>
</tbody>
</table>

In the drawings below the door of the mailbox is presented in its open state. The initial position of the door in the competition is closed.

**I.10.1.2 General task setup**

![Diagram of mailbox setup]
I.10.1.3 Infrastructure dimensions
I.10.2 Toothbrush

I.10.2.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (square)</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Mirror</td>
<td>Liltjärn</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Mirror feet</td>
<td>wood</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Plastic cup</td>
<td>Kalas</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Toothbrush</td>
<td>Thoothbrush Special Care</td>
<td>TEPE</td>
</tr>
</tbody>
</table>

I.10.2.2 General task setup
I.10.2.3 Infrastructure dimensions
I.10.3 Pick-up

I.10.3.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
<th>Provided by CYBATHLON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bottle (0.5l)</td>
<td>blue</td>
<td>bottleshop</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Bottle cap</td>
<td>blue</td>
<td>CZECH BREWERY SYSTEM</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>1</td>
<td>Table</td>
<td>Lack</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Target disk</td>
<td></td>
<td>custom made</td>
<td></td>
</tr>
</tbody>
</table>

I.10.3.2 General task setup

I.10.3.3 Infrastructure dimensions
I.10.4 Laundry

I.10.4.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hamper</td>
<td>Torkis</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>T-shirt</td>
<td>subject to change</td>
<td>Neutral</td>
</tr>
<tr>
<td>1</td>
<td>Clothesline</td>
<td>black</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Box for clothespins</td>
<td>Glis</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Clothespin</td>
<td>blue</td>
<td>WENKO</td>
</tr>
</tbody>
</table>

I.10.4.2 General task setup
I.10.4.3 Infrastructure dimensions
I.10.5 Eating

I.10.5.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Coffee table</td>
<td>Vittsjö</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Plate</td>
<td>365+</td>
<td>IKEA</td>
</tr>
<tr>
<td>3</td>
<td>Apple</td>
<td>blue</td>
<td>Floristik24</td>
</tr>
</tbody>
</table>

I.10.5.2 General task setup

I.10.5.3 Infrastructure dimensions
I.10.6 Crowd

I.10.6.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Table</td>
<td>Stensele, each with a black/white marking circle around IKEA</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Edge-following robot</td>
<td>The Thymio robots of the company Mobsya are the edge-following robots which must be used for the competition at all CYBATHLON hubs. Please contact Mobsya directly (<a href="mailto:sales@mobsya.org">sales@mobsya.org</a>) and mention that you are a CYBATHLON team to profit from a price reduction of 22%. Transport costs and customs fees must be paid by the ordering institution. Thymio</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Robot cover</td>
<td>red, 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_EXO_WHL_ROB__CROWD__ROBOT_COVER.stl (on the dashboard for registered teams) PRUSA</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cover extension</td>
<td>red, rod</td>
<td>custom made</td>
</tr>
<tr>
<td>4</td>
<td>Cover extension sphere</td>
<td>red, bar (custom made plus) 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_EXO_WHL_ROB__CROWD__EXTENSION_SPHERE.stl (on the dashboard for registered teams) PRUSA</td>
<td></td>
</tr>
</tbody>
</table>

I.10.6.2 General task setup
I.10.6.3 Infrastructure dimensions
## I.10.7 Dishwasher

### I.10.7.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shelf, with front door</td>
<td>black</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Wire basket</td>
<td>Utrusta</td>
<td>IKEA</td>
</tr>
<tr>
<td>3</td>
<td>Cup hinge</td>
<td>BLUM CLIP top</td>
<td>OPQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BLUMOTION OPO</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Flap hinge left</td>
<td>OPO</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Flap hinge right</td>
<td>OPO</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Door handle</td>
<td>Bagganäs</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Plate holder</td>
<td>Rinnig</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Plate</td>
<td>365+</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (square)</td>
<td>IKEA</td>
</tr>
</tbody>
</table>

In the drawings below the front door of the shelf is presented in its open state. The initial position of the front door in the competition is closed.
I.10.7.2 General task setup

I.10.7.3 Infrastructure dimensions
1.10.7.4 Hinges - assembly information

The hinges are mounted as presented in the picture. The positions of the hinges can be taken from the CAD model.
### I.10.8 Doors

#### I.10.8.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Doorframe rack</td>
<td>wood, CYBATHLON uses MDF custom made</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Doorframe</td>
<td>Pertura CPL white</td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door left</td>
<td>Pertura Yori CPL white, right</td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door right</td>
<td>Pertura Yori CPL white, left</td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door handle</td>
<td>Pertura BB Vitur alu F1</td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door knob</td>
<td></td>
<td>Hornbach</td>
</tr>
<tr>
<td>1</td>
<td>Door closer</td>
<td>mounted to the second door and doorframe</td>
<td>Hornbach</td>
</tr>
</tbody>
</table>

#### I.10.8.1 General task setup

![Door setup diagram](image-url)
I.10.8.2 Infrastructure dimensions
I.10.8.3 Door closer - assembly information
I.10.9 Touch screen

I.10.9.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details</th>
<th>Modifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shelf</td>
<td>Kallax 1x4</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Tablet fixation</td>
<td><strong>black</strong>, the design of the custom made smart pad fixation will be provided on a later stage.</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Tablet</td>
<td>11&quot; display size, Android OS, task software will be provided at a later stage</td>
<td>e.g. Lenovo</td>
</tr>
</tbody>
</table>

I.10.9.2 General task setup
I.10.9.3 Infrastructure dimensions
## I.10.10 Clean up

### I.10.10.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shelf</td>
<td>Kallax 2x2</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (square)</td>
<td>IKEA</td>
</tr>
<tr>
<td>4</td>
<td>Box</td>
<td>Kugis</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Cylinder (long, narrow)</td>
<td>blue, 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_ROB__CLEAN_UP__CYLINDER.stl (on the dashboard for registered teams)</td>
<td>PRUSA</td>
</tr>
<tr>
<td>1</td>
<td>Die</td>
<td>blue, 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_ROB__CLEAN_UP__DIE.stl (on the dashboard for registered teams)</td>
<td>PRUSA</td>
</tr>
<tr>
<td>1</td>
<td>Disc</td>
<td>blue, 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_ROB__CLEAN_UP__DISC.stl (on the dashboard for registered teams)</td>
<td>PRUSA</td>
</tr>
<tr>
<td>1</td>
<td>Cube</td>
<td>blue, 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_ROB__CLEAN_UP__CUBE.stl (on the dashboard for registered teams)</td>
<td>PRUSA</td>
</tr>
</tbody>
</table>
I.10.10.2 General task setup

I.10.10.3 Infrastructure dimensions
### I.11 VIS

#### I.11.1 Front door

##### I.11.1.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
<th>Provided by CYBATHLON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Side table</td>
<td>Lack</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Card with name</td>
<td></td>
<td>custom made</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Wardrobe frame</td>
<td>Pax</td>
<td>IKEA</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sidewall</td>
<td></td>
<td>custom made</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Doorbell unit hooks</td>
<td>two each for mounting of the doorbell unit</td>
<td>custom made</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Doorbell unit</td>
<td>magnets for mounting of subunits</td>
<td>custom made</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Buttons subunit</td>
<td>the full button subunit will be provided to CYBATHLON hubs, 8 buttons</td>
<td>custom made</td>
<td>To CYBATHLON hubs only</td>
</tr>
<tr>
<td>2</td>
<td>Names subunit</td>
<td>with 4 names each, to be mounted on doorbell unit with magnets</td>
<td>custom made</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Name plate</td>
<td>detailed specification and mounting procedure will be provided on a later stage</td>
<td>laser cut</td>
<td></td>
</tr>
</tbody>
</table>
I.11.1.2 General task setup

I.11.1.3 Infrastructure dimensions
I.11.1 Task infrastructure for hubs

I.11.2 Colours

I.11.2.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Clothes rack</td>
<td>Turbo</td>
<td>IKEA</td>
</tr>
<tr>
<td>8</td>
<td>Hanger</td>
<td>Bumerang</td>
<td>IKEA</td>
</tr>
<tr>
<td>16</td>
<td>PVC foam board</td>
<td>DIN A3 size, different colours, mounted to hangers</td>
<td>custom made</td>
</tr>
</tbody>
</table>
I.11.2.2 General task setup

I.11.2.3 Infrastructure dimensions
I.11.3 Road work

I.11.3.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Pole</td>
<td>1600mm slalom poles, red</td>
<td>Boje Sport</td>
</tr>
<tr>
<td>6</td>
<td>Socle</td>
<td>black</td>
<td>custom made</td>
</tr>
<tr>
<td>6</td>
<td>Crossbar</td>
<td>800mm, red</td>
<td>Boje Sport</td>
</tr>
<tr>
<td>6</td>
<td>Crossbar elbow connector</td>
<td></td>
<td>3D-printed</td>
</tr>
<tr>
<td>3</td>
<td>Ring screw</td>
<td></td>
<td>Jumbo</td>
</tr>
<tr>
<td>1</td>
<td>Rope Guiding screw</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Crossbar connector</td>
<td></td>
<td>3D-printed</td>
</tr>
<tr>
<td>6</td>
<td>Tensioning rope</td>
<td>red</td>
<td>Berger</td>
</tr>
</tbody>
</table>

I.11.3.2 General task setup

![Diagram of road work setup]
I.11.3.3 Infrastructure dimensions

[Diagram of infrastructure dimensions with measurements marked.]
I.11.3.4 Tensioning rope – assembly information

The tensioning rope is attached at the crossbar connector and is guided through a ring screw at the crossbar elbow connector downwards to the socle. Tension and position of the rope facilitates a horizontal positioning of the crossbar.
I.11.4 Grocery

I.11.4.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Basket</td>
<td>Risatorp</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Card with shopping list</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Shelf</td>
<td>Heijne</td>
<td>IKEA</td>
</tr>
<tr>
<td>20</td>
<td>Can</td>
<td>Flaschenbauer</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Box</td>
<td>AliExpress</td>
<td>AliExpress</td>
</tr>
<tr>
<td>20</td>
<td>Bottle (0.5l)</td>
<td>bottleshop</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Bottle cap</td>
<td>bottleshop</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>Label</td>
<td>custom made, data (training set) for creation of labels will be provided at a later stage</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Side table</td>
<td>Lack</td>
<td>IKEA</td>
</tr>
</tbody>
</table>

I.11.4.2 General task setup
1.11.4.3 Infrastructure dimensions
I.11.5 Sidewalk

I.11.5.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grid</td>
<td>the grid will not be visible for the pilots during the race, it will only be visible for positioning of the objects before race start</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Chair</td>
<td>Adde</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Bottle (0.5l)</td>
<td>filled 0.3l, with water</td>
<td>bottleshop</td>
</tr>
<tr>
<td>2</td>
<td>Bottle cap</td>
<td></td>
<td>bottleshop</td>
</tr>
<tr>
<td>2</td>
<td>Scooter</td>
<td></td>
<td>AREBOS</td>
</tr>
<tr>
<td>2</td>
<td>Waste bin</td>
<td>Knodd</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Customer stopper</td>
<td></td>
<td>DEUBA-XXL</td>
</tr>
</tbody>
</table>

I.11.5.2 General task setup
I.11.5.3 Infrastructure dimensions
I.11.6 Finder

I.11.6.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (rectangular)</td>
<td>IKEA</td>
</tr>
<tr>
<td>6</td>
<td>Box</td>
<td>Tjena</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Coffee mug</td>
<td>Backig</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Toothbrush</td>
<td>Toothbrush Special Care</td>
<td>TEPE</td>
</tr>
<tr>
<td>2</td>
<td>Smart phone replica</td>
<td></td>
<td>AMAZON</td>
</tr>
<tr>
<td>2</td>
<td>Apple</td>
<td></td>
<td>Floristik24</td>
</tr>
<tr>
<td>2</td>
<td>Banana</td>
<td></td>
<td>Festfabrik</td>
</tr>
<tr>
<td>2</td>
<td>Bottle (0.5l)</td>
<td></td>
<td>bottleshop</td>
</tr>
<tr>
<td>2</td>
<td>Bottle cap</td>
<td></td>
<td>bottleshop</td>
</tr>
<tr>
<td>1</td>
<td>Lack</td>
<td>Lack</td>
<td>IKEA</td>
</tr>
</tbody>
</table>

I.11.6.2 General task setup
I.11.6.3 Infrastructure dimensions
**I.11.7 Path**

**I.11.7.1 Task infrastructure**

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Hexagon</td>
<td>different lengths, the hexagons can be joined in any order to form a path, fast repositioning of the hexagons has to be possible (e.g., through Velcro)</td>
<td>custom made</td>
</tr>
</tbody>
</table>

**I.11.7.2 General task setup**

![Diagram of a path with hexagons and dimensions](image)

**I.11.7.3 Infrastructure dimensions**
I.11.8 Serving

I.11.8.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (square)</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Tray</td>
<td>Klack</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Bottle (0.5l)</td>
<td>filled with 0.5dl of red liquid</td>
<td>bottleshop</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(water-like viscosity)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Bottle cap</td>
<td></td>
<td>bottleshop</td>
</tr>
<tr>
<td>2</td>
<td>Drinking glass</td>
<td>365+, visual, non-haptic mark 1cm</td>
<td>IKEA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>under the brim</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Fork</td>
<td>365+, red</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Knife</td>
<td>365+, red</td>
<td>IKEA</td>
</tr>
<tr>
<td>2</td>
<td>Deep plate</td>
<td>Oftast, filled with red liquid</td>
<td>IKEA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(water-like viscosity) up to 1cm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>under the brim</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Table</td>
<td>Lerhamn (rectangular)</td>
<td>IKEA</td>
</tr>
</tbody>
</table>

I.11.8.2 General task setup

![Diagram of task setup](image-url)
I.11.8.3 Infrastructure dimensions
### I.11.9 Touch screen

#### I.11.9.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details</th>
<th>Modifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shelf</td>
<td>Kallax 1x4</td>
<td>IKEA</td>
</tr>
<tr>
<td>1</td>
<td>Tablet fixation</td>
<td><strong>black</strong>, the design of the custom made smart pad fixation will be provided on a later stage.</td>
<td>custom made</td>
</tr>
<tr>
<td>1</td>
<td>Tablet</td>
<td>11&quot; display size, Android OS, task software will be provided at a later stage</td>
<td>e.g. Lenovo</td>
</tr>
</tbody>
</table>

#### I.11.9.2 General task setup

![Diagram of task setup](image-url)
I.11.9.3 Infrastructure dimensions
I.11.10 Empty seats

I.11.10.1 Task infrastructure

<table>
<thead>
<tr>
<th>Units</th>
<th>Object description</th>
<th>Details / Model</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Chairs</td>
<td>Adde</td>
<td>IKEA</td>
</tr>
<tr>
<td>8</td>
<td>Backpacks</td>
<td>Pivring</td>
<td>IKEA</td>
</tr>
<tr>
<td>8</td>
<td>Volunteers</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Filling of backpacks</td>
<td>Närsen</td>
<td>IKEA</td>
</tr>
<tr>
<td>4</td>
<td>Shelf</td>
<td>Vesken</td>
<td>IKEA</td>
</tr>
<tr>
<td>4</td>
<td>Frame (1x3)</td>
<td>for indication of empty seat</td>
<td>custom made</td>
</tr>
<tr>
<td>4</td>
<td>Results display cylinder</td>
<td>white, 3D-printed from the file on the CYBATHLON dashboard for registered teams: 20220930_VIS__EMPTY_SEAT_CYLINDER.stl</td>
<td>PRUSA</td>
</tr>
</tbody>
</table>

I.11.10.2 General task setup
I.11.10.3 Infrastructure dimensions