



FUTURISTIC BEEHIVES FOR A SMART METROPOLIS

Demonstrator Deliverable D6.1

Design and development of the automatic honey harvesting system and storage module

Lead Beneficiary	BST
Delivery date	20.09.2022
Dissemination Level	PU
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DELIVERABLE SUMMARY SHEET

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Title	FUTURISTIC BEEHIVES FOR A SMART METROPOLIS
Deliverable No	D6.1
Due Date	Project month M42
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Name	Design and development of the automatic honey harvesting system and storage module
Description	Full schematics of the operational module which extracts the honey through tubes into a storage module located on the outside of the beehive - a working prototype.
Lead Beneficiary	BST
Partners contributed	ULB, UNIGRAZ, FUB, EPFL
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Introduction

Purpose and scope of the document

The purpose of this document is to serve as an accompaniment to the demonstrator video which presents the current state of development of the Hiveopolist automated honey harvesting system, a part of the honey storage module. This document will provide additional context to the demonstrator video, describing the experimental setup and the future steps of integration.

Overview of the document

The document begins with describing how the Hiveopolis honey harvesting system was prepared for the demonstration, adding some context and concludes by presenting the next steps in the integration of the system into the final Hiveopolis concept.

Chapter 1: Experimental setup

The honey harvesting system was installed into a Hiveopolis hive between mid June and the end of August 2022. One concern was how the prototype would be accepted by the bees. They were slow to adopt the prototype and at least initially preferred the regular frames. Eventually the colony expanded and started building cells and storing honey in the prototype. About one third of the comb was filled by the end of the experiment. About half the comb had wax buildup, which was important for the experiment so we can confirm if the mechanics work after interaction with the bees. Also there were easily accessible empty frames, which the bees had not used, providing evidence that the prototype was accepted by the bees.

The actual activation of the extraction system and recording of the video were performed in the lab so we could observe and record the system in action. The extraction works by separating the comb base from the cells, which allows the honey to flow out of the cells. The process involves slightly heating the frame to soften the wax that glues the cells together. After that, heat activated springs trigger the separation of the cells and the flow of honey down into the collector. The separation between the frame and cells is minimal at about 3 mm. The whole process is also very slow, with extracting a full frame taking about an hour. For this reason some sections of the demonstrator video are sped up to 150% of the realtime to make the separation a bit more visible.

The experiment showed that we can successfully extract honey from the frame and the bees accept the prototype. It also showed some flaws with the build of the system which we will address in the next iteration. The future developments are discussed in the next chapter.

Chapter 2: Future developments

The current prototype is partially integrated inside the Hiveopolis hives. However the extraction system will be controlled by the central core computer. It also depends on the power supply unit, which is also in the process of being physically integrated inside the Hiveopolis unit. The next step in the development of the extraction system is the integration with the hive control and power systems. We will also work on an improved version of the system with better physical build, electronics and control.

Chapter 3: Demonstrator video

A demonstrator video is submitted along with this document. This video is low resolution due to upload size limitations imposed by the F&T portal, therefore we additionally provide an high resolution version of the video on YouTube under the following link.

https://youtu.be/ulc79hsd_cU

The linked video is unlisted and the link is only made available to consortium members, the reviewers and the project officer.