



# Modular Robotic Beehive

As a Service

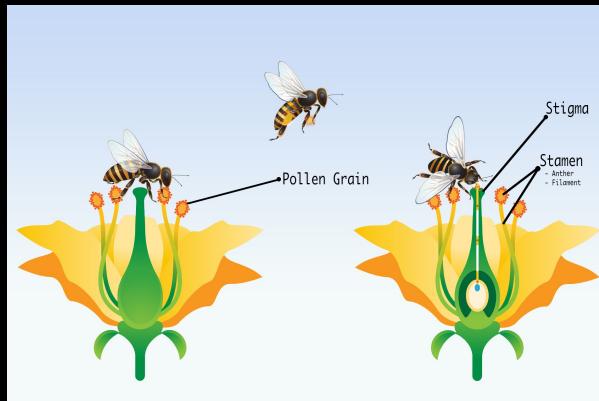


**Artjom Kurapov**  
Founding engineer



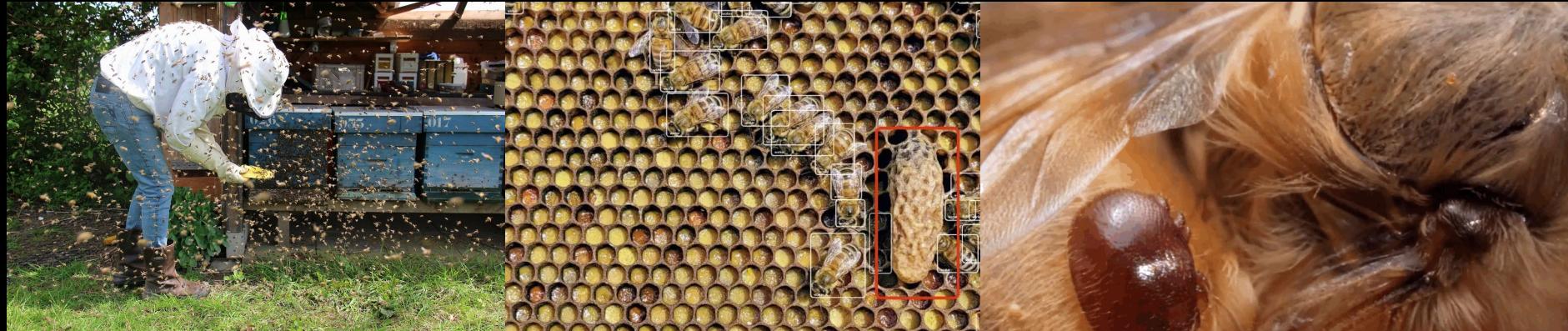
# Problem statement - Food security

- World population to reach 10 Billion, limited resources, need of advanced food production
- Farmers can increase crop yields by +37% with precise pollination
- **Beekeepers** providing services to **farmers** earn 9x more than from selling honey
- Demand of pollination grows 2x faster than growth of honeybee colonies



# Problem statement - Efficiency

- Bees swarm, get infested with mites or can be aggressive
- Beekeepers need to perform weekly inspections
- Beekeepers lose 20-50% of colonies every year, one colony loss impact > 350 EUR
- Common beehives are 150 years old and heavy to inspect
- Physical labour is hard to scale, it is a seasonal activity





# Vision



## Data analytics app for beekeepers

Manages state of the apiary

Performs AI detections and provides advices

Controls modular beehive hardware

State: openly accessible, in development





# Vision



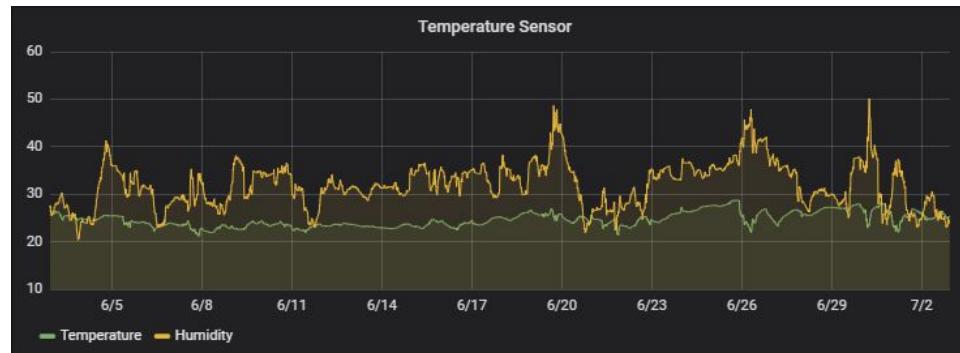
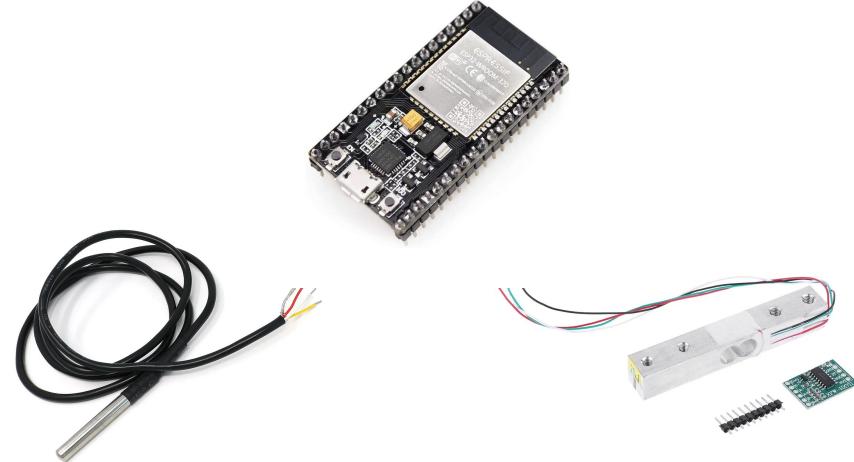
## Affordable set of sensors as beehive base

Sends hive internal temperature, weight, humidity

AI to detect anomalies

Sends alerts in case of swarming, storms, bear attack

Price ~200 EUR





# Vision



## Hive entrance video monitoring device

Incoming/Outgoing bee count to estimate colony strength

Varroa mite detection to estimate infestation level

Alerts on hornet attack or stealing state

Video streaming & playback

Price ~ 600 EUR





# Vision

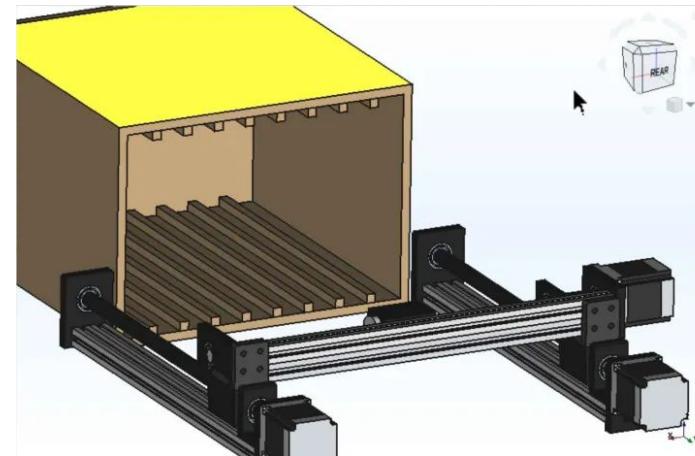


Frame extraction mechanism to autonomously inspect colony internal state

Alerts in case of swarming, starvation or missing queen

Colony development over time

Multi-hive robot for cost-effectiveness





# Customer

Addressable market - **370 thousand semi-professional beekeepers in Europe**

Europe in total has 620k beekeepers, 19-25M colonies

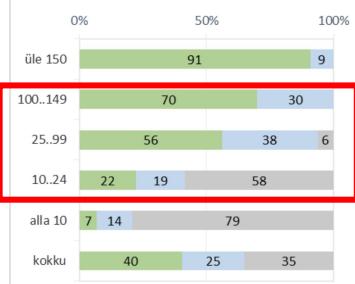
~ 60% beekeepers have > 25 bee colonies

> 50% have legal company (thus B2B)

Additional users - hobby beekeepers

Early adopters - young, tech-savvy beekeepers

percentage of customers registered as company, depending on amount of hives, (based on estonian market research)



age distribution depending on hive count (based on estonian market research)



number of beehives in EU over the years (in thousands)

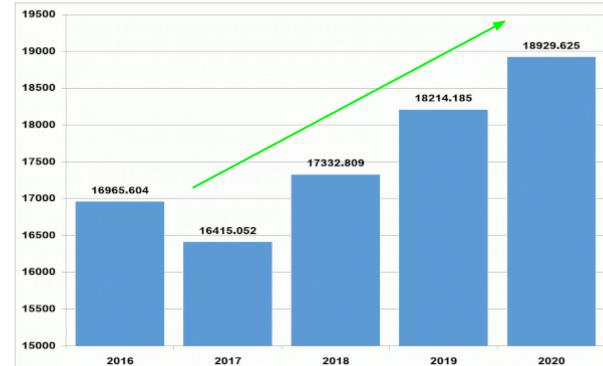


Table 1 – Number of beekeepers in selected EU countries

EU countries with more than 20 000 beekeepers	Total number of beekeepers	Beekeepers with >150 hives	
		Number	Average No of hives
Germany	116 000	81	587
Poland	62 575	324	272
Italy	50 000	2 000	413
Czech Republic	49 486	107	260
France	41 560	1 717	366
United Kingdom	37 888	50	443
Austria	25 277	380	233
Greece	24 582	7 288	165
Spain	23 816	5 361	406
Romania	22 930	1 545	194
Hungary	21 565	1 546	218





# Business model

Subscription model for data management and analytics, usage dependent

## Community tier

free

## Essential tier

**15 EUR / month**  
2 weeks trial, annual  
billing

## Professional tier

**5 EUR per beehive per month**  
+ **10 EUR per user per month**

Low-margin hardware with open hardware and software to ease adoption and trust

5 hives max

20 hives max

Moat - hardware-to-software integration,  
Hard to migrate (telemetry) data out

	🐝 Beehive IoT sensors	⌚ Entrance Observer	🤖 Robotic Beehive	�� Robotic Apiary
Web-app subscription	5 EUR / month	20 EUR / month	50 EUR / month	200 EUR / month
Purchase retail price (estimated)	200 EUR	~ 600 EUR	~ 3000 EUR	~ 10 beehives ~ 6000 EUR
Rent (annual billing)	20 EUR / month	50 EUR / month	250 EUR / month	500 EUR / month





# Market estimate for IoT sensor product

Estimated EU market penetration = 70%

Essential tier monthly price = 15 EUR/month

Essential tier estimated beekeeper ratio = 80%

$$620k \times 0.7 \times 0.8 \times 15 = \mathbf{62.5M EUR ARR}$$

Pro tier monthly price = 5 EUR/month/hive + 10 EUR/user

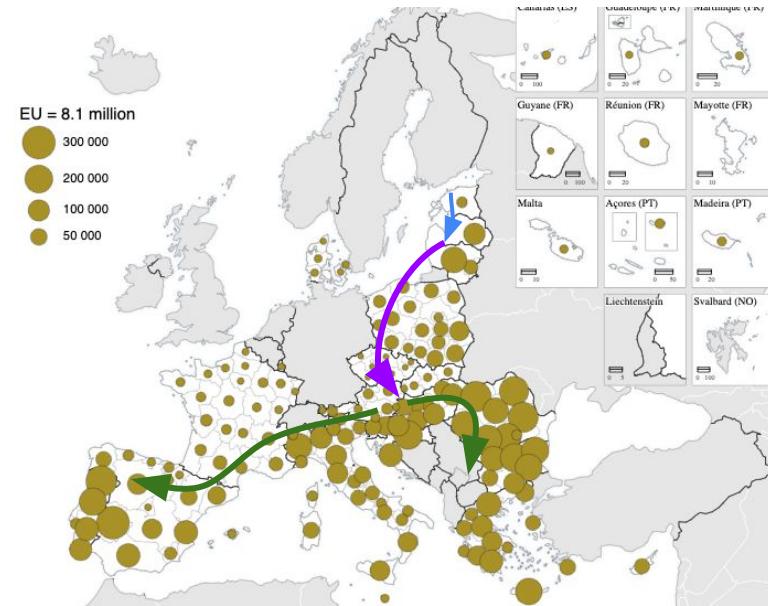
Pro tier estimated beekeeper ratio = 20%

Estimated average hive count = 32

Estimated IoT sensors coverage = 50%

$$620k \times 0.7 \times 0.2 \times (10 + 5 \times 32 \times 0.5) = \mathbf{93.7M ARR}$$

[Go to market strategy by region](#)





# Team

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Research and engineering heavy team  
with unique [company values](#)



**Artjom Kurapov**

Founding fullstack engineer,  
beekeeper  
(ex-Pipedrive, Clarifai)



**Aleksei Prokopov**

Robotics, backend engineer  
(ex-Fits.me, ex-Coop)

Research advisors, Estonia

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**Vyatšeslav Kekšin**

Researcher, PHD student  
TalTech

Research advisors, Czech Republic

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**Šimon Bilík**

Researcher, PHD  
System engineer / Beekeeper



**Adam Ligocki**

ML engineer, PHD

Equity CAP table. Equity is separate from voting

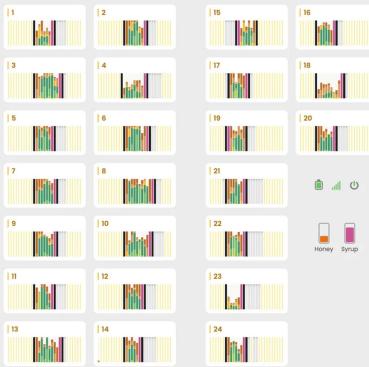
Who	angel phase	pre-seed	seed	series A
Founder	50% (50 M shares)	41.6%	34%	28%
Team option pool	45% (45 M)	37.5%	31%	26%
Share dilution for investors	2% (2 M)	+20% (20 M shares)	+20% (24 M shares)	+20% (28.8 M shares)
Advisors option pool (-0.1-1% per person)	3% (3 M)			
Shares total	100 M	120 M	144 M	172.8 M
Capital to raise in convertible loan (in EUR)	40k	1M	1.4M	10M





# Competition in AI vision and robotics

- [beewise.ag](http://beewise.ag) - robotic multi-colony container hive, total raised 120M \$
- [beehero.io](http://beehero.io) - IoT, total raised 64M \$
- [nectar.buzz](http://nectar.buzz) - SaaS, raised 820k \$
- [beemate.buzz](http://beemate.buzz) - counts bees
- [apic.ai](http://apic.ai)
- [bestbees.com](http://bestbees.com)



# Traction

- 100 registered users (0 paying)
  - 10 mobile app installs
- Community and volunteer building
  - 5+ contributors
  - 70+ discord members
  - Reached out from local research institutions  
(Kood Jõhvi, Vidrik.TalTech, University of Tartu)
- Publicity
  - 2 interviews to local newspapers
  - 200+ followers on linkedin
- Marketing channels
  - Facebook ad for beekeeping communities
  - Telegram channels for beekeepers
  - Local beekeeping group meetups





Raising 1M pre-seed round for 24 months runway

- Min. 2 summers are needed for field testing
- **Team of 4** + external contractors & beekeepers
- IoT sensors product development and release to the market
- Field testing with local beekeepers
- Entrance observer product development
- Robot prototype development

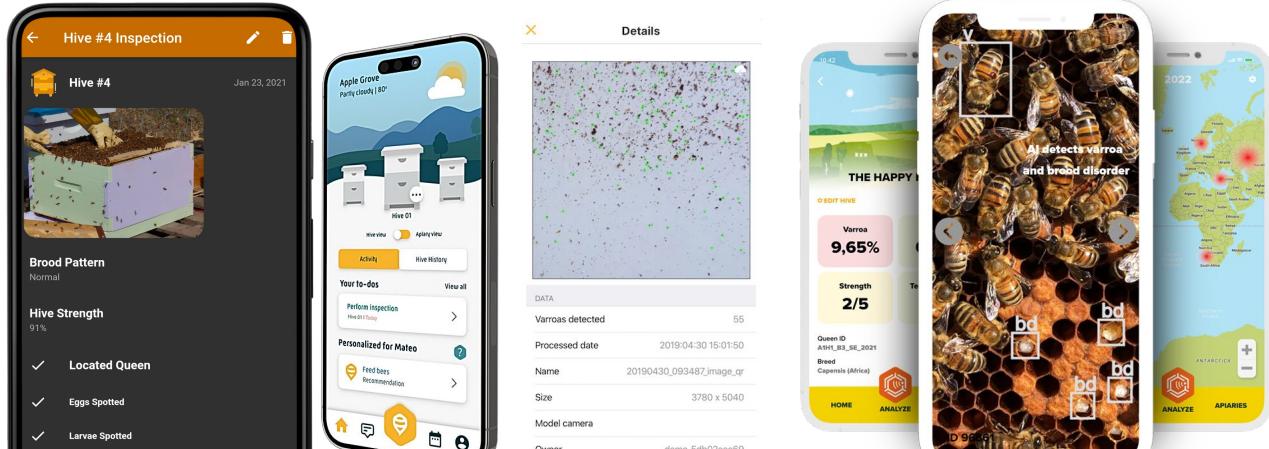
[pilot@gratheon.com](mailto:pilot@gratheon.com)





# Competition - Data organizer apps

- BeeScanning
- ApiZoom
- HiveTracks
- HiveBloom
- BeeQueenDetector
- apimanager
- apiary book



# Competition - IoT (audio, humidity, temperature)

- 3bee.com
- beep.nl - opensource
- broodminder.com
- beelab.se
- intelligenthives.eu
- beehivemonitoring.com
- solutionbee.com
- beehivemonitoringusa.com
- osbeehives.com
- beesage.co

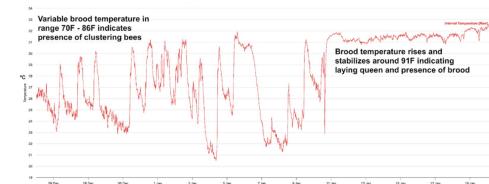


Fig. 2: Using Brood temperature to detect onset of laying queen in late winter/early spring

