TULIPZ

Quality rhyming with Sustainability

We empower people who build quality products that transform our lives and respect Earth's resources by making the world's best industrial monitoring solutions using Terahertz and AI.

Hani Sherry, cofounder & CEO TiHive
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TiHive History

- → Deeptech startup built in 2017 by ex-STMicroelectronics researchers
  - CEO Hani Sherry, PhD in Terahertz silicon-based systems
  - CFO/CIO Carlos Prada, PhD in high performance compution
  - 23 people, experts in THz, AI and ML, semiconductors, electronics, material sciences
  - 10 nationalities, 15 languages, lots of croissants
- → Received around 12M€ funding from:
  - BPI France, Grenoble Metropole and Auvergne RhoneAlps region
  - European Commission and the EIC Fund
  - **Currently in commercial Scaleup phase.**

EU PROJECT NAME
TULIPZ

quality diapers improve lives

- Babies will use about **6000 diapers** during their first two years of life.

Diaper industry is very wasteful and expensive

Polluting

→ 3rd largest single-use consumer item in landfills.

→ at least 500 years to decompose.

Expensive

→ Cost for a single baby around €80 a month and €900 a year.

→ 1 in 3 parents cut back on basic essentials to afford diapers for their children.

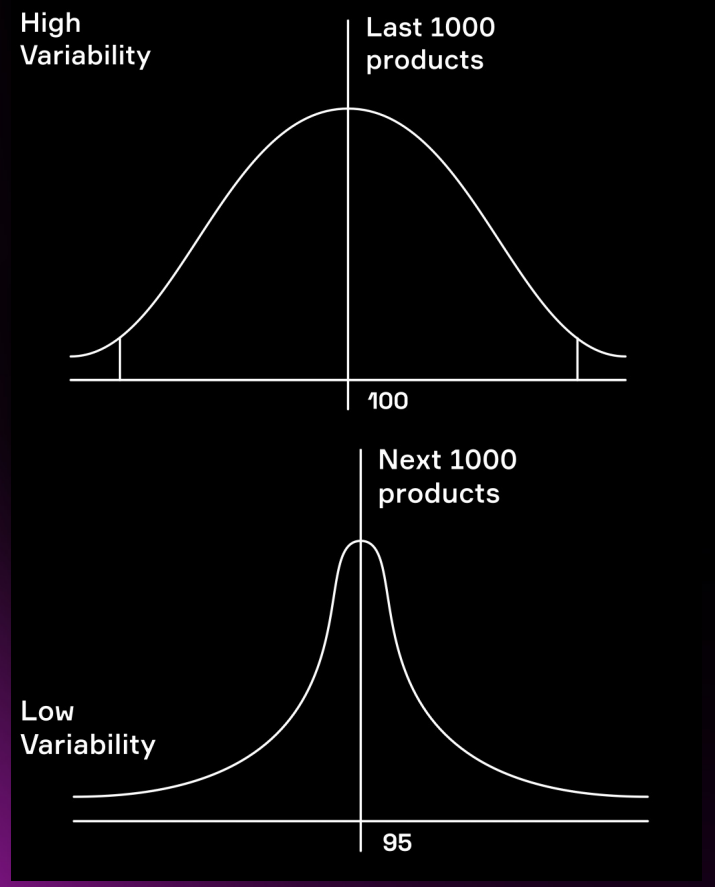
Challenges are in dosing super-absorbent polymers

- → Polymers make 50% of diaper cost
- → High Speed Production = big variability issues
  - → Overdosage = financial losses and plastic waste
  - → Underdosage = leaky products
- → Until recently, no Methods exist today that can monitor and quantify SAP at these extremely high speeds

Super absorbent polymers (10B€ market)

What is needed is a vision & control technology that can help:

→ MONITOR 100% products
→ STABLISE variability
→ REDUCE raw materials
→ IMPROVE quality



Limited Solutions

Visible	Can’t see through
	DANGEROUS
X-Rays	SAMPLING
	END OF LINE
Chemical	DESTRUCTIVE

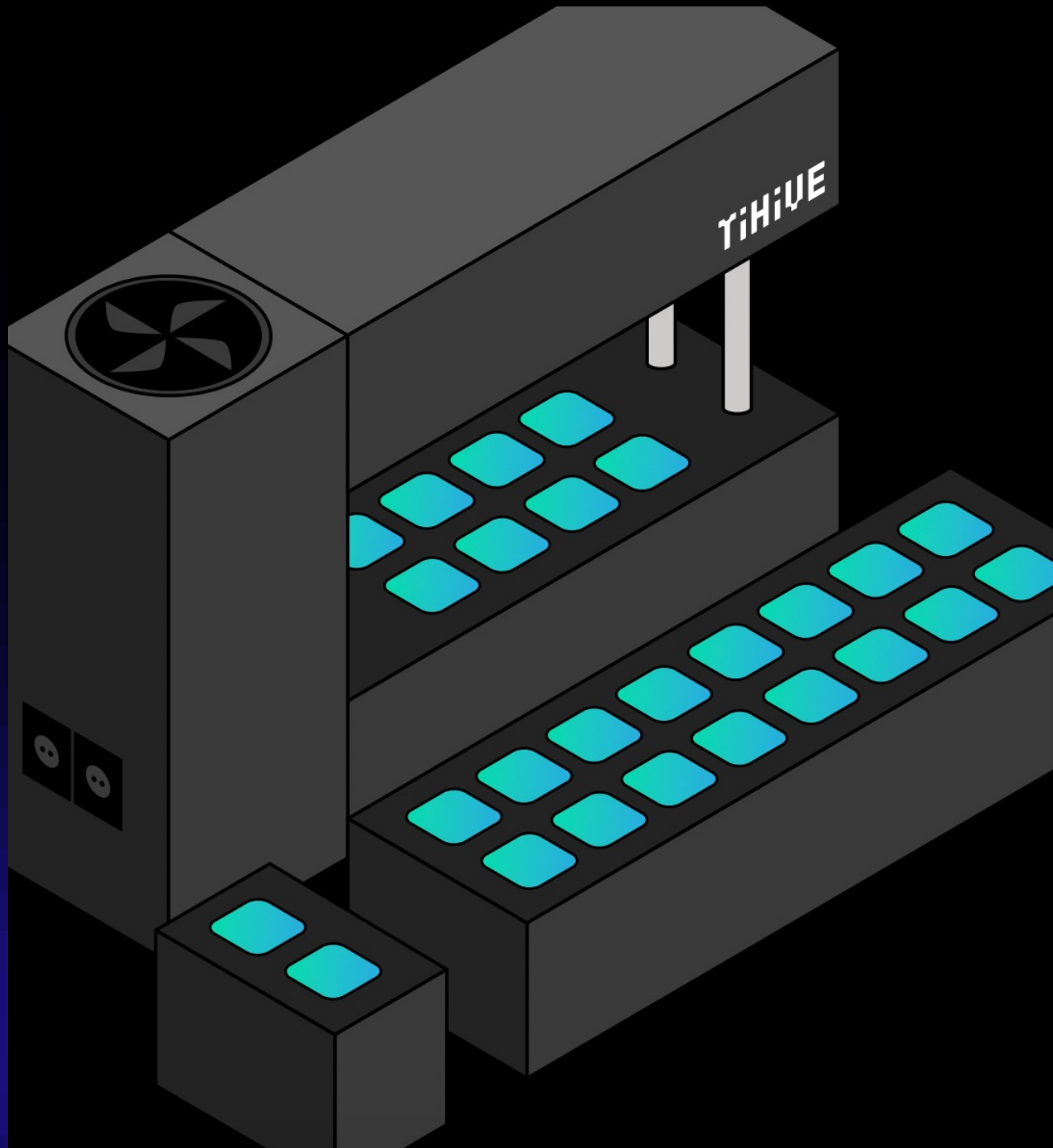
TULIPZ – a scalable Terahertz-AI inline inspection platform for quality and resource management

A World First Terahertz Camera System based on Silicon Semiconductor Chips

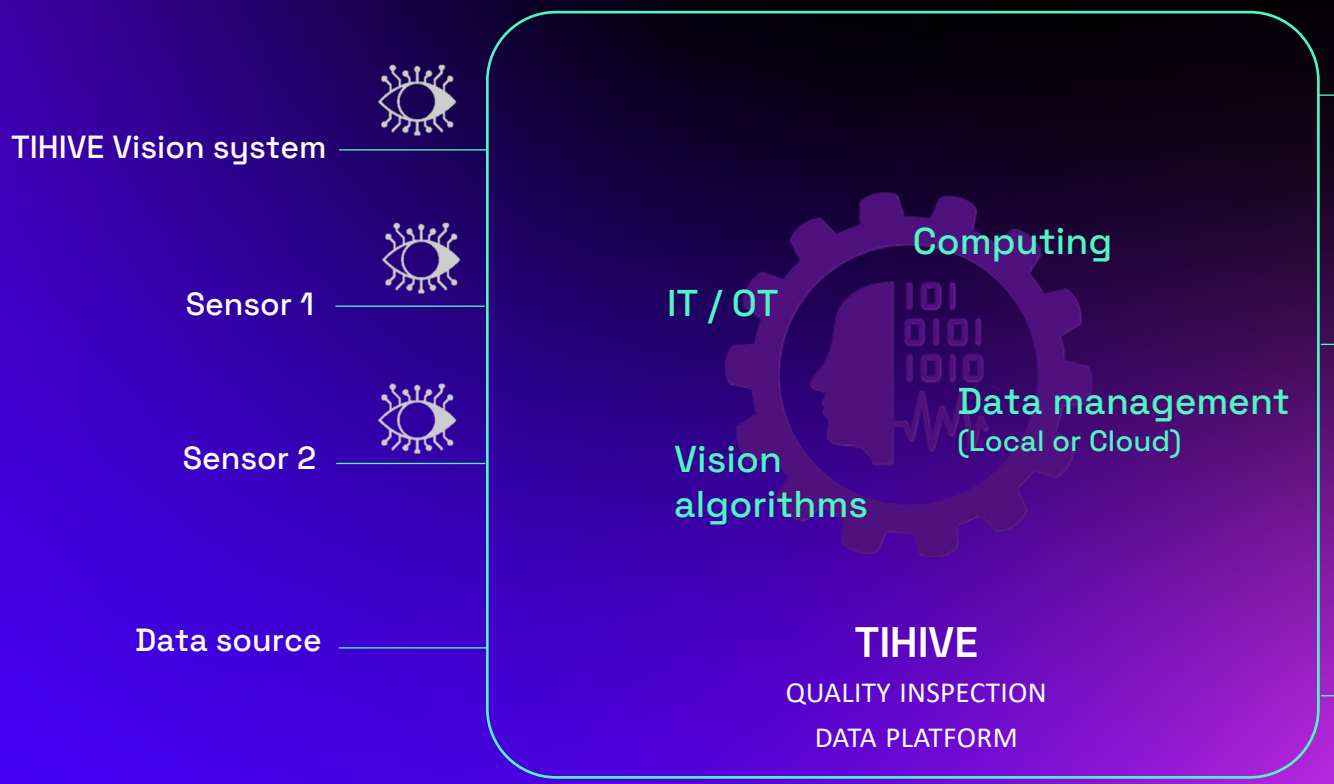
→ Fully integrated from chip to cloud

→ Highly Scalable and modular

→ See Through and Safe Vision technology



TiHive – inline Process & Quality Monitoring Platform



Dashboards

- Real-time data vizualisation
- Specific KPI's & Alerts
- Customizable boards

Automated Steering

- Machine to machine communication
- Specific KPI extraction
- To Soft and Hardware devices
- Real-time

Analytics & AI

- Event detection and caracterization
- Projection / prediction
- Correlations

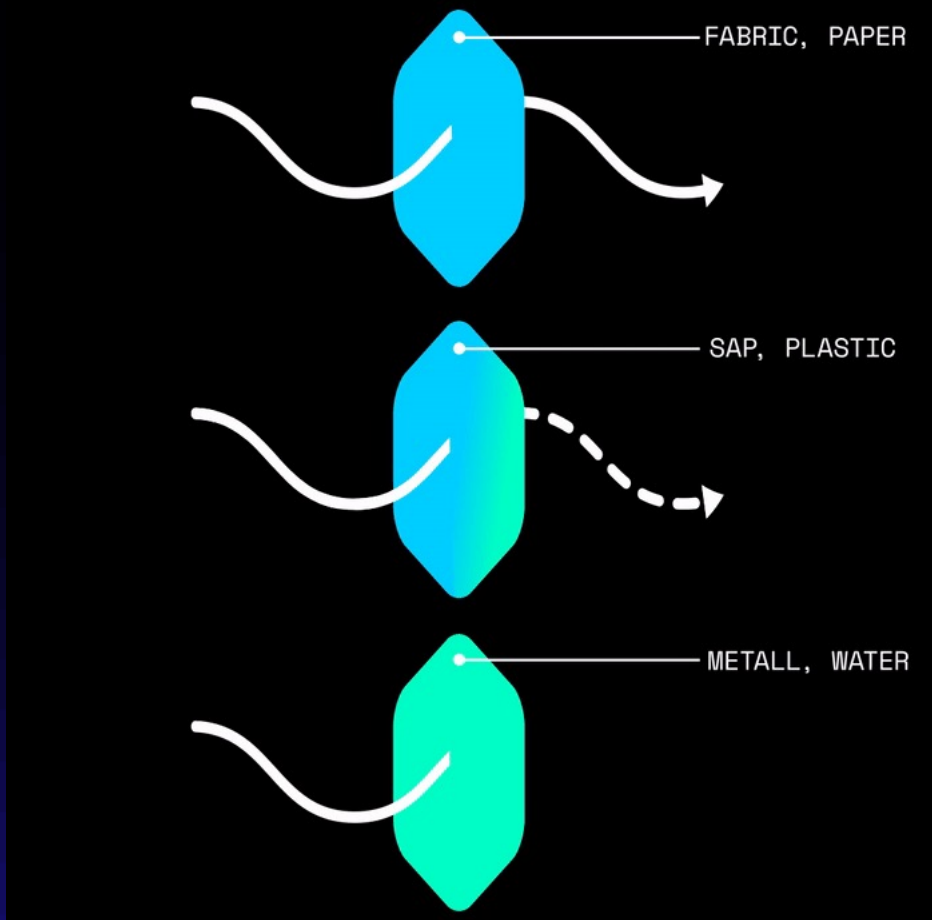
Terahertz Light

→ Safe see-through light

→ 300GHz to 3000GHz

→ Detects
- Defects
- Contamination
- Features

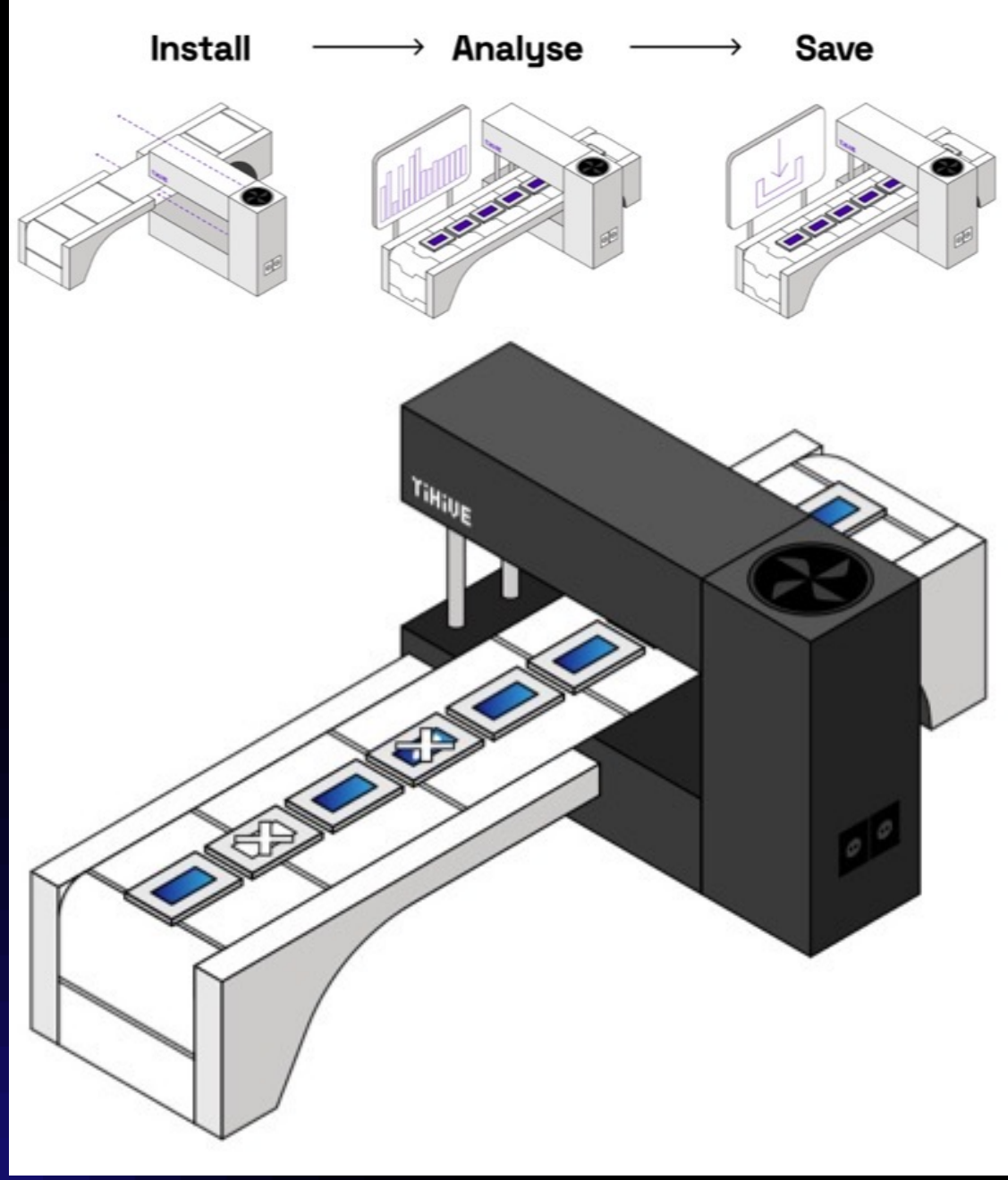
→ Measures
- Material quantity
- Quality



Terahertz interactions

TiHive's breakthrough see-through monitoring platform

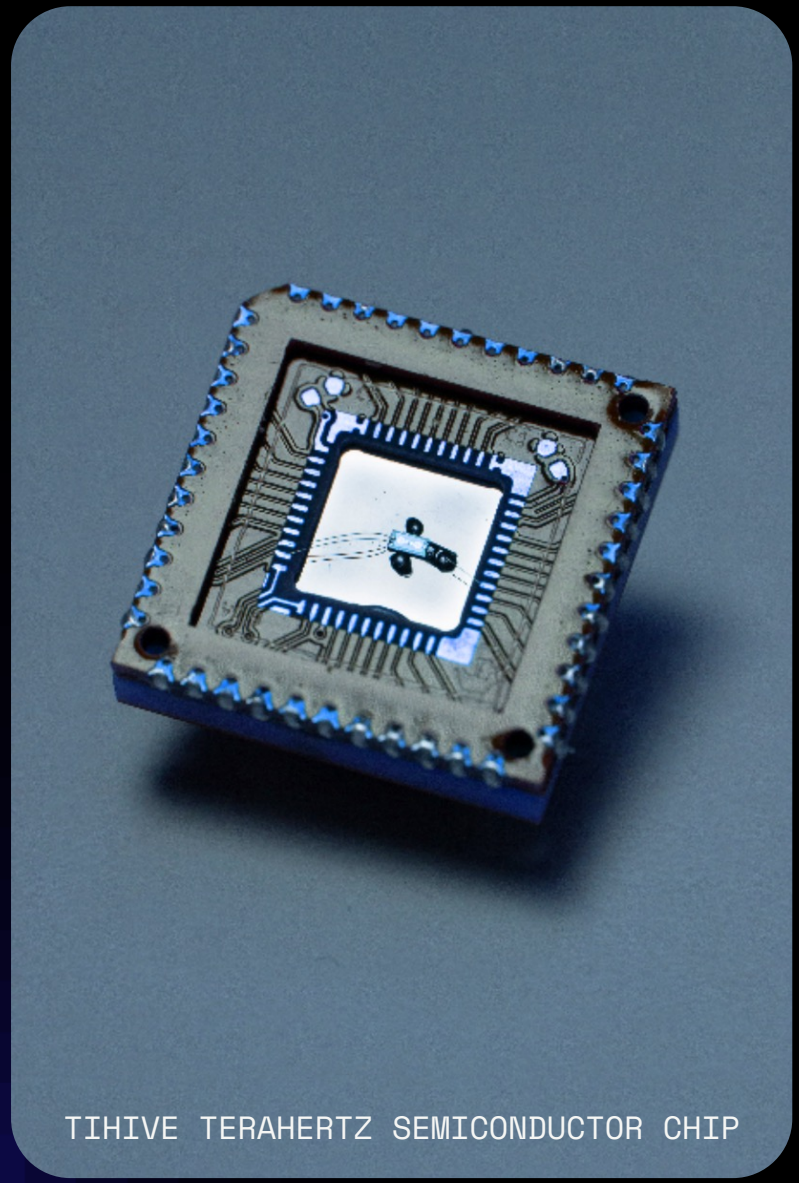
- → Each and Every Product qualified
- → Fully Inline & high speed
- → Multi User
- → Multi-KPI
- → Local or Cloud
- → Easy to integrate and scalable



Breakthrough Semiconductor chips

- → Industrial grade Terahertz Camera & Sources
- → Miniature and mass-production
- → Best in class performance
- → 1000x lower production cost vs competitors
- → 100x lower energy consumption vs competitors

- → The first in the world to miniaturise and scale Terahertz generation and detection



TIHIVE TERAHERTZ SEMICONDUCTOR CHIP

TiHiVE

TIHIVE TERAHERTZ CHIP MODULE

Terahertz Optics

High levels of electro-optic integration
Scalable modules
High resolution multipixel

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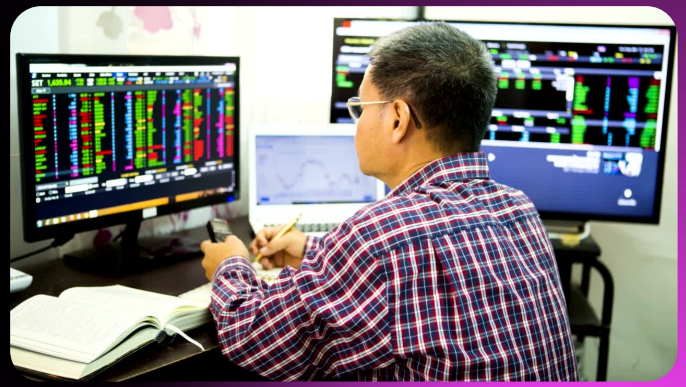
Terahertz AI multiuser Quality Platform

- → User friendly intuitive design
- → Production KPIs:
  - Quality Classification
  - Sustainability measurements
  - Root cause Analysis
  - Process Stability
  - Raw materials waste & Saving
- → Proprietary AI and imaging algorithms
- → Edge computing
- → Cloud analytics

TIHIVE THZ AI SW PLATFORM

TULIPZ full system successfully developped and deployed in production lines

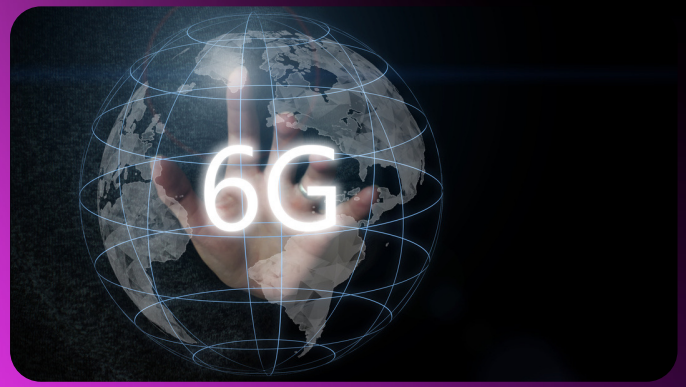
TIHIVE MARKETS



Quality and Resource Management

Authentication

SENSING of VITALS



6G and Secure Communications

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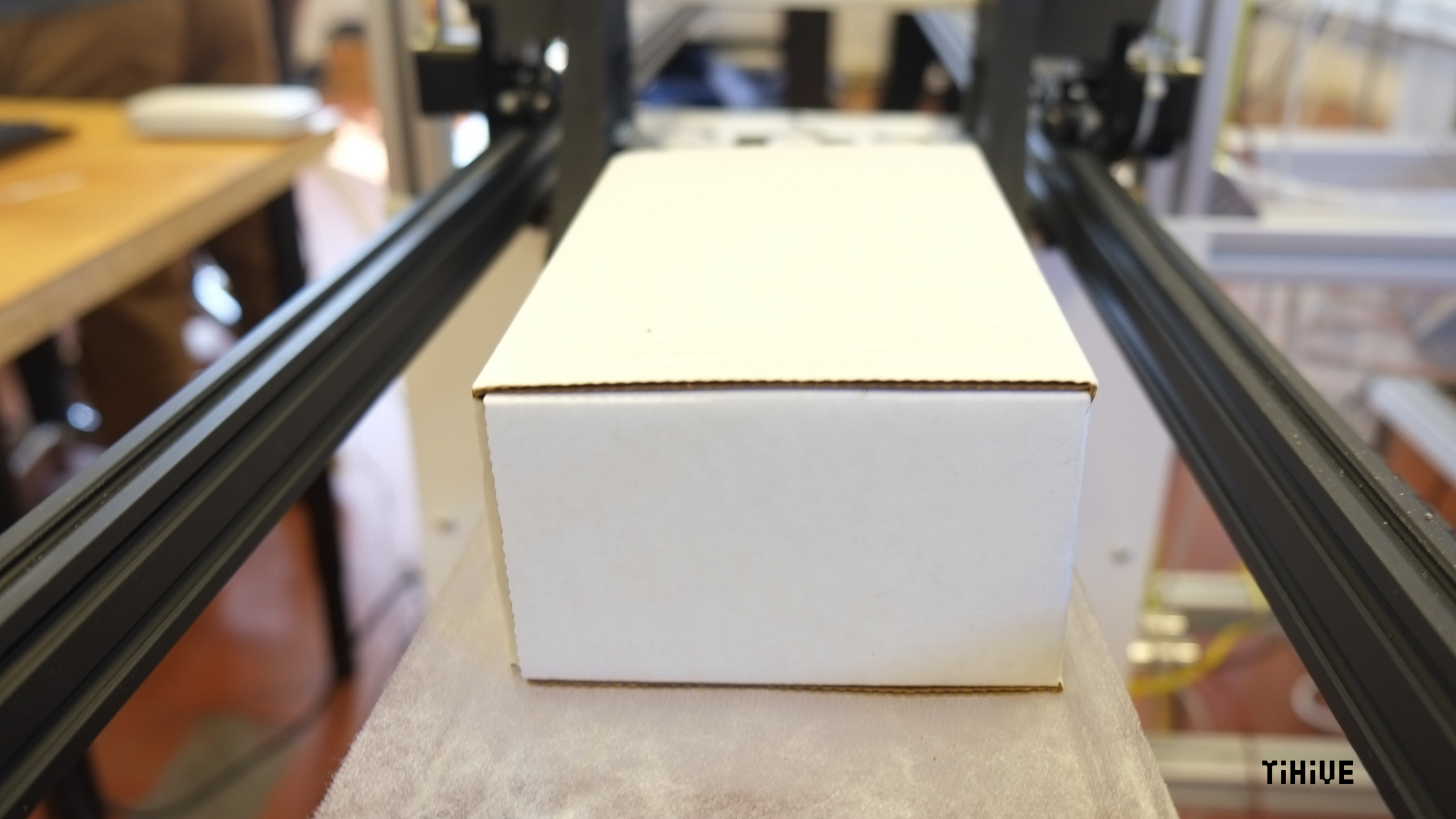
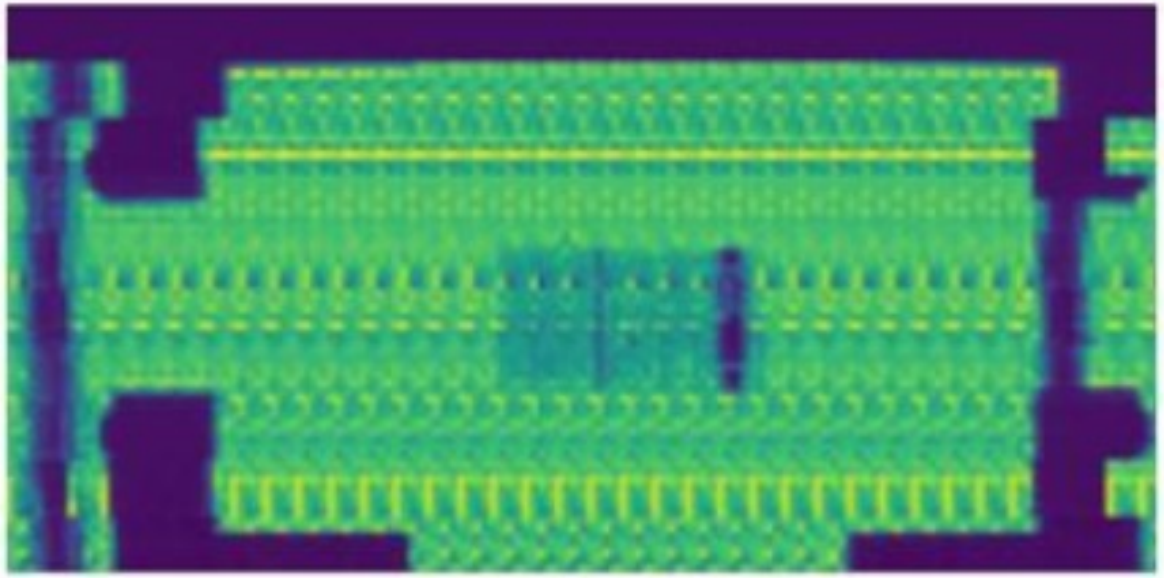

TiHiVE



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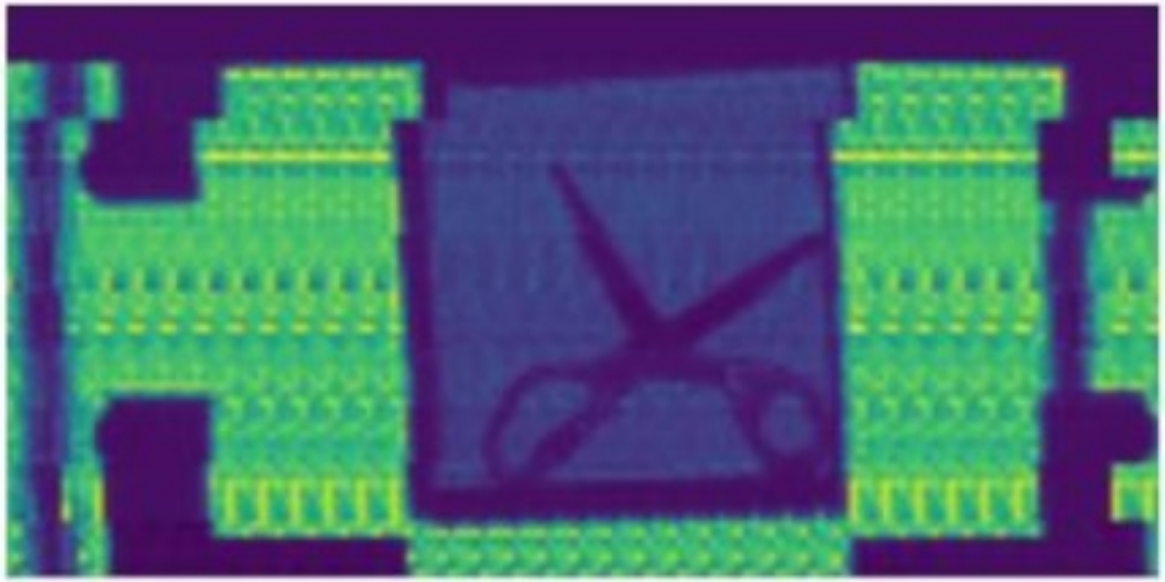

FILAMENT
BY JOSEF PRUSA
PRUSAMENT

Absorption Quality of women hygiene pads

Absorption Quality of women hygiene pads

100 millions

of products measured since 2 years using TiHive's Monitoring Platform

AVOIDABLE PLASTIC WASTE PER YEAR

TiHiVE

IF WE SAVE 1GRAM OF POLYMERS IN DIAPERS, WORLDWIDE

250k TONNES

LESS PLASTIC

AVOIDABLE E-CO2 WASTE PER YEAR

TiHiVE

IF WE SAVE 1GRAM OF POLYMERS IN DIAPERS, WORLDWIDE

500k TONNES

LESS E-CO2

E-CO2 EQUIVALENCE IN CAR KILOMETERS

IF WE SAVE 1GRAM OF POLYMERS IN DIAPERS, WORLDWIDE

E-CO2 EQUIVALENCE IN CAR KILOMETERS

TiHiVE

IF WE SAVE 1GRAM OF POLYMERS IN DIAPERS, WORLDWIDE

EARTH TO THE SUN

E-CO2 EQUIVALENCE IN CAR KILOMETERS

TiHiVE

IF WE SAVE 1GRAM OF POLYMERS IN DIAPERS, WORLDWIDE

EARTH TO THE SUN

30 ALLER-RETOUR BY CAR

EIC Accelerator helped us

→ Build a talented team and professionalise our internal processes
→ Develop a highly complex full-stack deeptech solution and reach TRL9
→ Equipe TiHive with state of the art facilities
→ Deploy pilot lines and validate use cases with customers in Europe and US
→ Adapt to COVID crisis

The EQUITY funding is helping us

→ Prepare for our Commercial Scale-up and attract high-calibre Investors interest

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Next Round Objectives

€8,6M EIC Accelerator: €2,3M Grants + €6,3M Equity (2M€ released as ORA) + VCs

€1,8M from BPI France ADD Grant/AR

2 years Objectives

Sales and Marketing
SCALE-UP IN EUROPE AND USA
DEPLOY 100 LINES
DEVELOP NEW VERTICALS IN SENSING

RnD & Operations:
ASSEMBLY, TESTING AND MAINTENANCE FACILITY
Higher and multifrequency chips with higher integration level

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