

Hybrid-Airplane Technologies GmbH

h-aero®

Sustainable Commercialization of
Lighter-Than-Air Aviation



3S DASSAULT
SYSTEMES

3DEXPERIENCE® CONFERENCE

OCTOBER 18 – 19 | DARMSTADT | GERMANY



COMPANY HISTORY



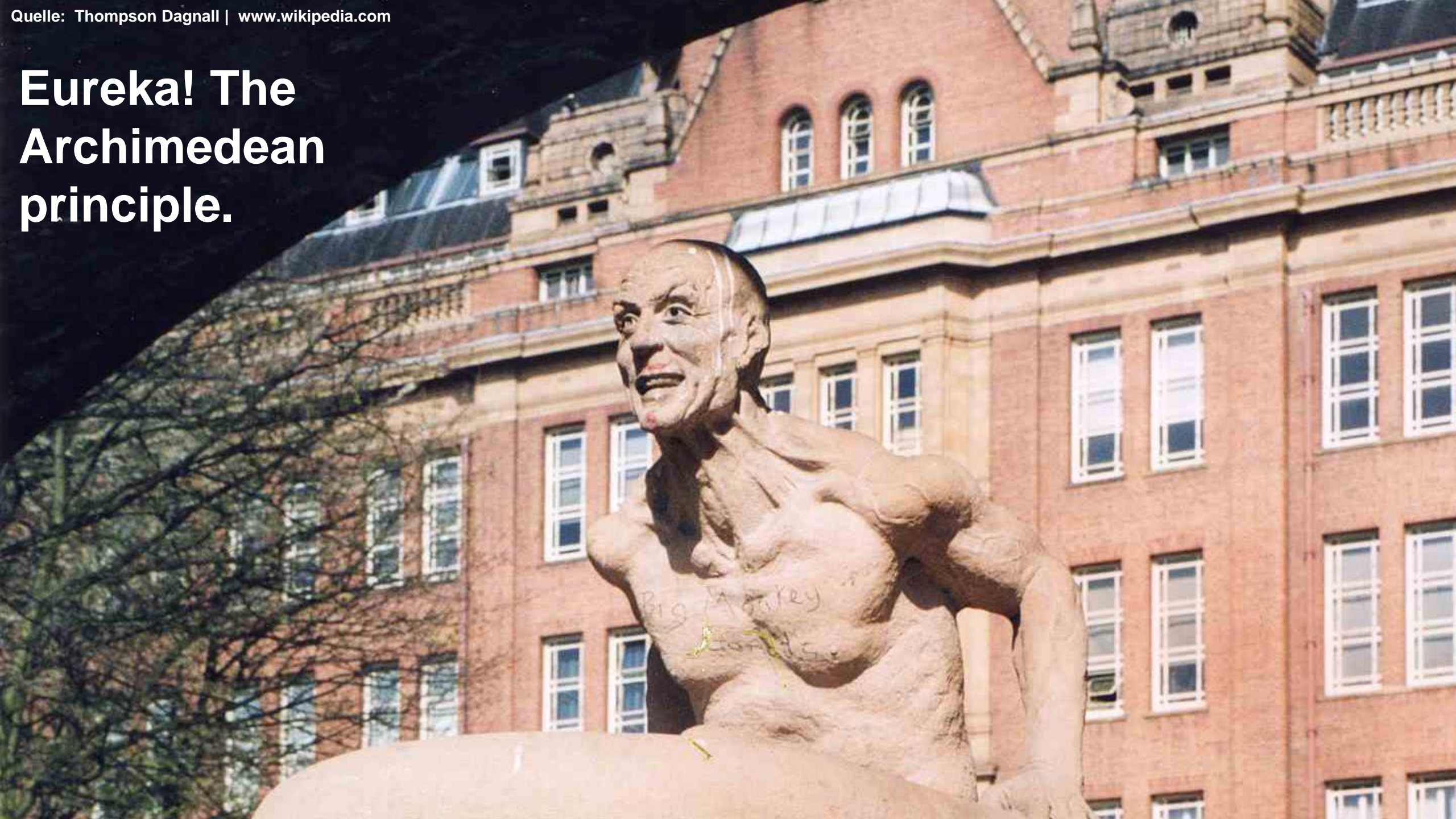
Located in Germany in the Heart of the Black Forest



What is Lighter than Air Technology?



Eureka! The Archimedean principle.











111,346 ft

01:59:21

33.938 m



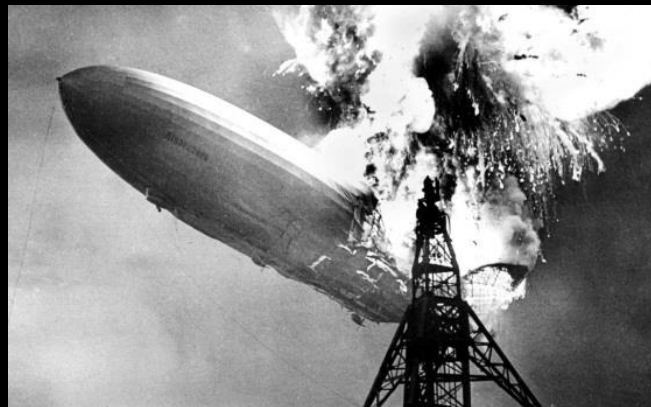






LTA is not easy ... if small, low amount of gas ... if big, **then it's really huge**

- In the past many projects failed due to
 - War (e.g. Zeppelin Hindenburg)
 - Management Issues and Strategy (Cargolifter)
 - Initial plans at too big dimensions and from scratch (e.g. Piasecki PA97)
 - No learning curve due to disaster and out of money
 - Over generations lost knowledge



LTA is not easy ... if small, low amount of gas ... if big, **lack of practice**

- In the past many projects failed due to
 - War (e.g. Zeppelin Hindenburg)
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✓ **Luckily, there are some lessons learned, not only in terms of size reduction**

e.g. with assumed 250g/m² shell material

R=1m / Ø=2m

Lift ≈ 4.2 kg

Mass ≈ 3.14kg

Lift/Mass ≈ 1.3

risk = very low

cost = cost effective

learning = monthly due to high number of experiments



R=10m / Ø=20m

Lift ≈ 4189 kg

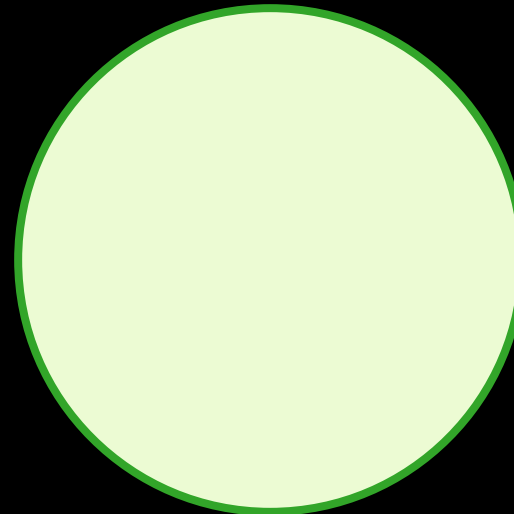
Mass ≈ 314 kg

Lift/Mass ≈ 13

risk = very high

cost = expensive

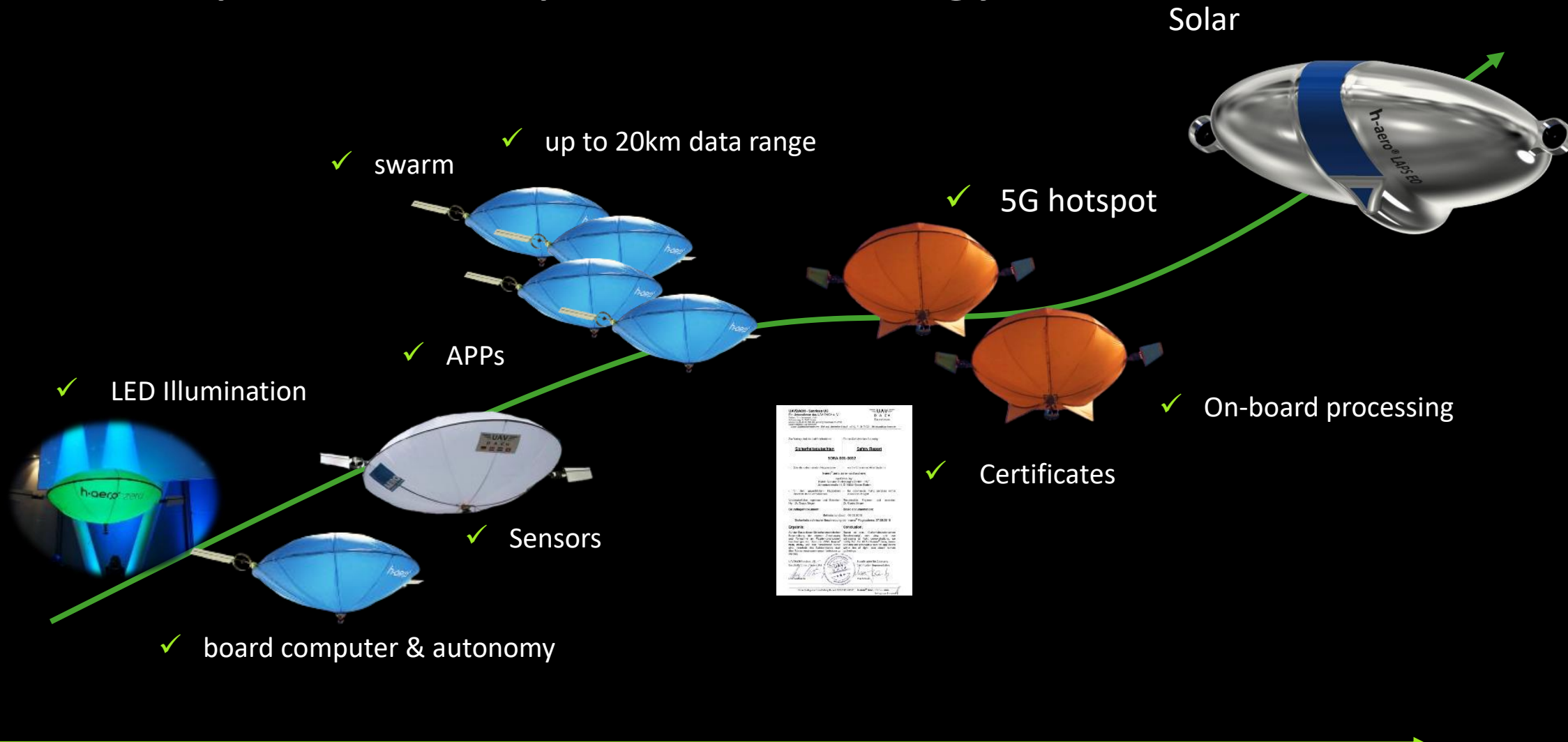
learning = no learning due to low number of experiments



TRACK MODIFICATION

Roadmap to scale-up the technology

h-aero® Autonomy, Communication, Payload



h-aero® handling, stability and other important features or time

GRAVITY IS SOMETIMES A PROBLEM



Aerial Data is Expensive, Not Real Time and Too Short

In the field of Earth Observation many problems can be solved with accessible real time aerial data and presence

SATELLITES

- Expensive & Complex
- Low Spatial Resolution
- Insufficient Temporal Resolution

AIRBORNE SYSTEMS - LIMITATIONS

- Balloons – low control
- Pilot Vehicles – high costs and risks
- Drone – limited payload and flight times



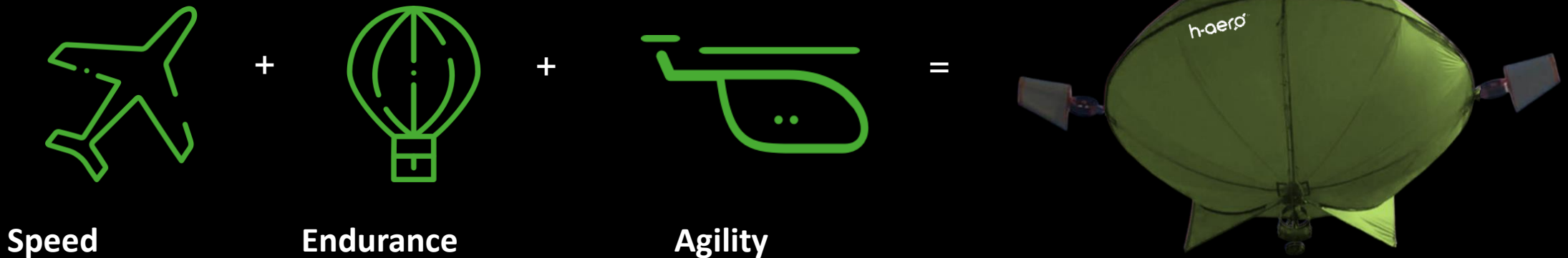
In pdf mode, please follow Link to Video: www.h-aero.com

THE SOLUTION

Enduring Low Cost Aerial Data and mobile 5G provision

HARDWARE

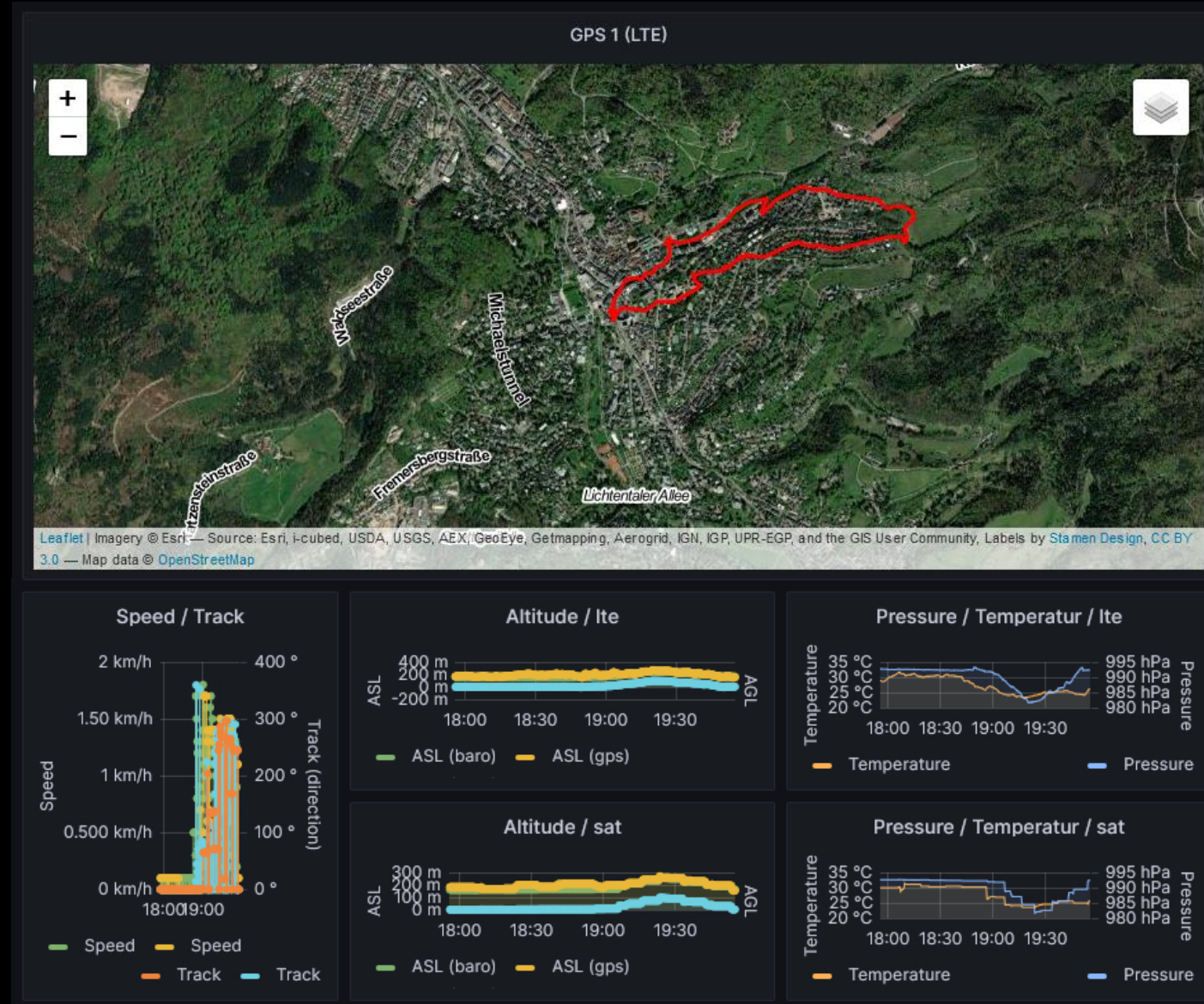
- improved endurance – 10x longer flights
- higher payload – 3x more sensing instrument
- Hovering Cybernetic System
- 10x higher altitude – up to 10 km
- greener & more sustainable – no pollution
- Buoyant Gas: Helium, Hydrogen



Highest Level IT in the State of Suspension

SOFTWARE | MARKET-SPECIFIC KITS

- Hovering cybernetic data gathering
- Data interpretation & cognitive abilities
- Multi-channel communication
- Full 5G connectivity
- Lowest noise level
- Low electromagnetic signature to be stealth
- AI, IoT, Big Data
- Georeferenced



PRODUCTS

 *over 20 systems and over 100 flights sold*



USB
Type C



LAN

HDMI



RS-232



WLAN



MULTI CHANNEL



h-aero[®] zero

4K Camera | > 2 h endurance | € 24.900,-

h-aero[®] zero+

Thermal Camera | > 4 h endurance | € 39.900,-

h-aero[®] one

Multimodal Sensors | > 7 h endurance | € 54.900,-

HUGE POTENTIAL



Multi-Market Customers reach SDG Key Goals with us

Exploration



Oil & Gas

Communication



Telecommunication

Observation



Metering



Meteorology



Promotion and Events



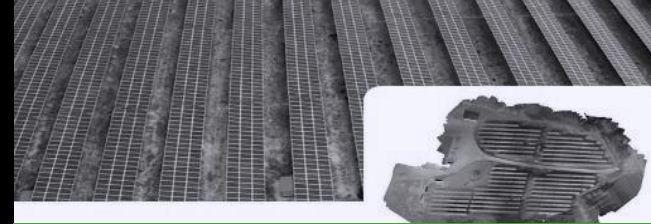
Surveillance



Forestry and Agriculture



Film Industry



Inspections

7 AFFORDABLE AND
CLEAN ENERGY



9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



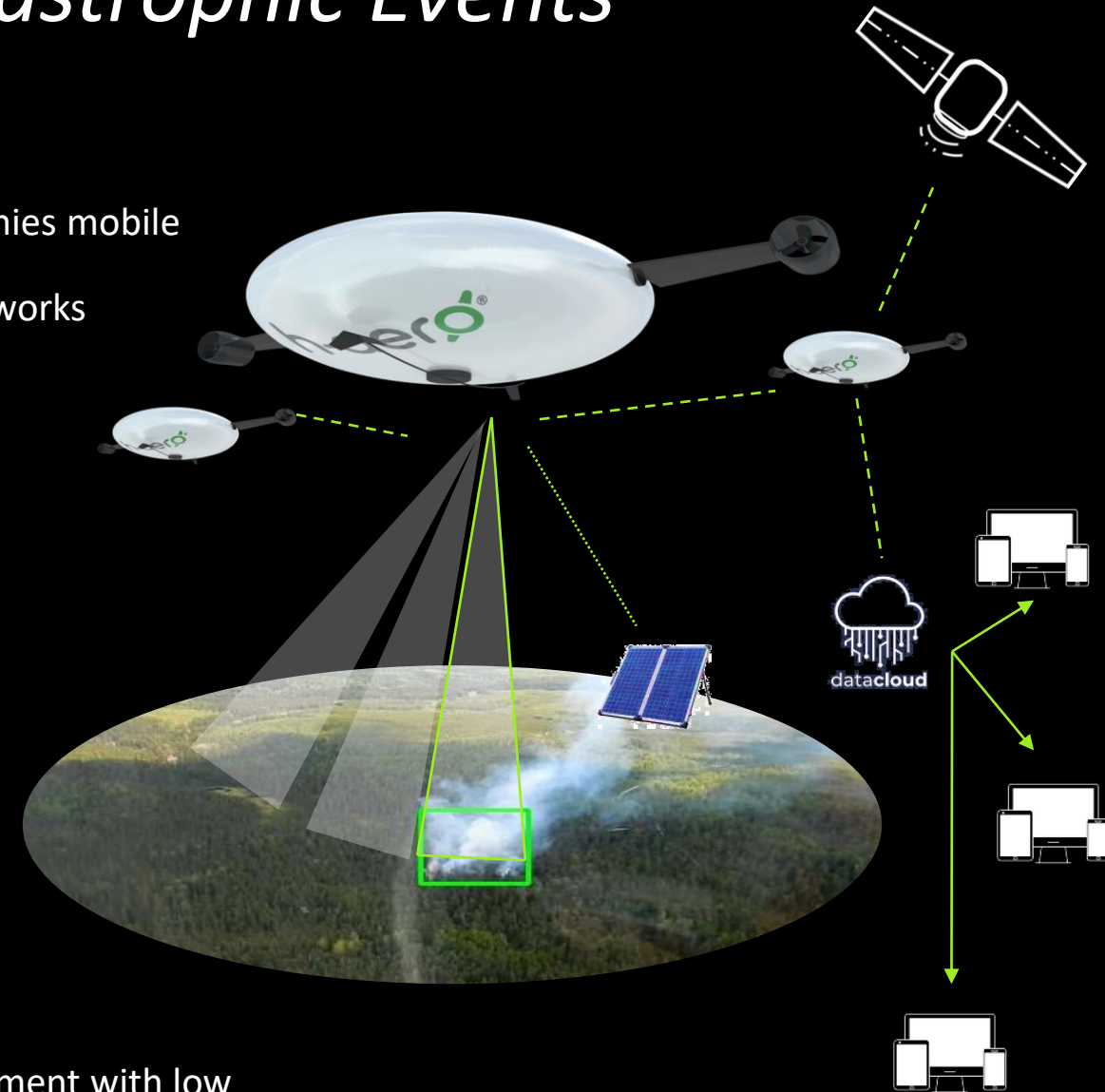
11 SUSTAINABLE CITIES
AND COMMUNITIES



GOVERNMENTAL SECURITY CUSTOMERS

Technical Support during Catastrophic Events

- for fire departments, disaster control, military, insurance companies mobile
- very short-term provision of official / military mesh telecom networks
- observation with any sensors (including cameras) during
 - forest fires
 - floods
 - earthquakes
 - border protection
 - avalanches / mountain rescue
- investigation of hazardous areas (ruins, caves etc.)
- damage analysis of insurance companies
- Advantages
 - agile, flexible observation of areas that are difficult to access
 - constant collection of data, observation of situation development with low energy consumption



HOW IT WORKS

Multiple Operation Modes both, In- and Outdoor

- Free Flight with Position Holding (FFWP)
- Tethered Mode (TM)
- Aerosole Mode (AM)



ENABLING TECHNOLOGY

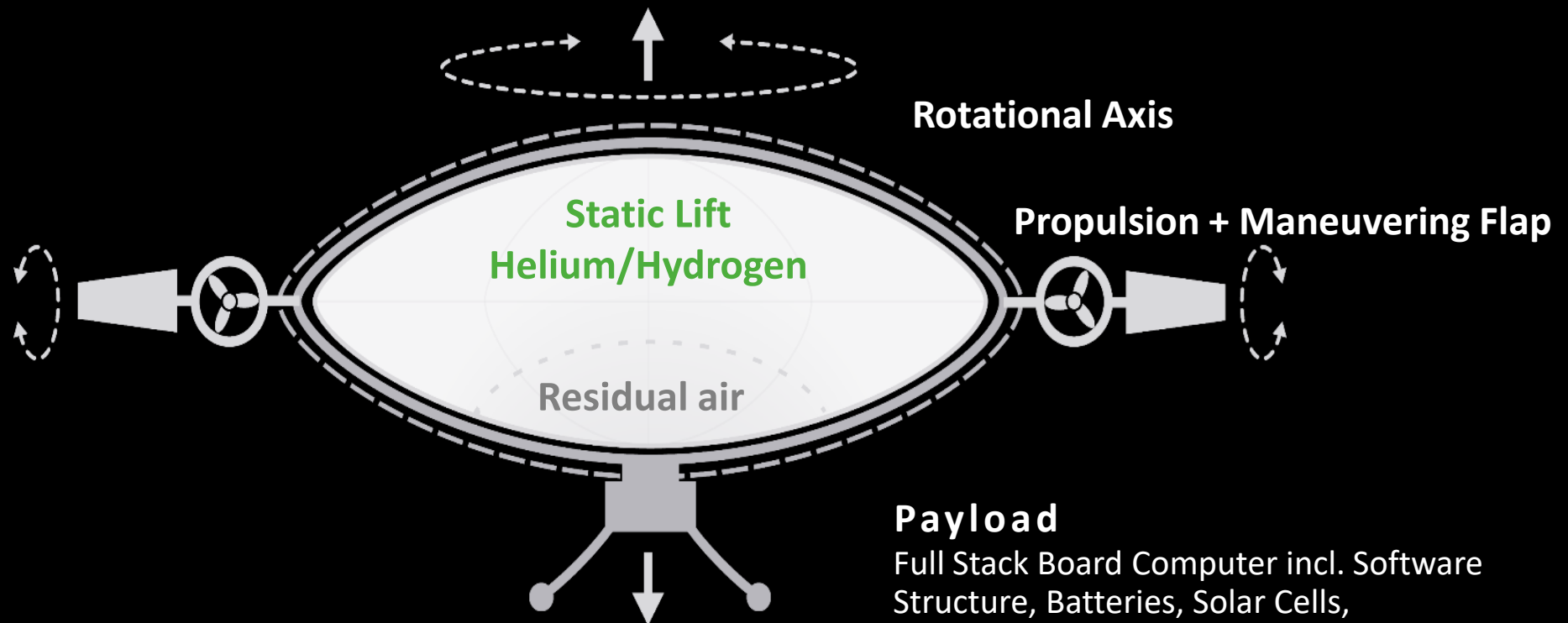
Aerial Data and Connectivity on Demand

- Big Data (Digital Twins, Cities, Forrest, etc.)
- IoT (Redundant Network, Real-time Data)
- AI (Recognition, Time Series, Autonomy)






UNDERLYING MAGIC

 *Issued Patents in 10 EU countries, USA and Canada*



Ultra-lightweight Components

-  Outside: Ripstop-Nylon
-  Inside: Helium-tight Multilayer Foil
-  Carbon Fiber Skeleton

Payload
Full Stack Board Computer incl. Software
Structure, Batteries, Solar Cells,
One-click Interchangeable Sensors

MARKETING AND SALES

Sales
≈ 1 Mio €

Patents
2 filed

Awards
9

Grants
≈ 530 k€

Media Reach
80 Mio 😊

- Bootstrapping startup
- Already sold over 20 systems worldwide
- Completed more than 100 missions.
- Revenues of approx. 1 Mio by 2023

- NASA 2012
- Copernicus Masters Winner 2017 (ESA)
- Innovation Award Baden-Württemberg (Ministry)
- 2x Solar Impulse Efficient Solution 2018 & 2023 (SIF)
- German Mobility Award 2020 (Federal Ministry)
- Young Green Tech Award
- SDG Award 2021 Shortlist Finalist (United Nations)
- EIC Seal of Excellence (European Commission)

- BBC
- Deutsche Welle
- Dubai EXPO 2020
- ESA BIC PoC
- Fraport PoC
- MIT – Review
- Vodafone OMR

- Federal Environment Organization - DBU
- HOAMAT (Free State of Bavaria, LuFo)
- ProTect (L-Bank, SK-Ventures, TheLand)
- Start80 - State of Baden-Württemberg



MEET THE DAILY ACTIVE TEAM

 *The pioneering team behind the success*



**DR. -ING.
CSABA
SINGER**

CEO, CTO



**MARISA
SPIES**

Administration



**BJÖRN-
ALEXANDER
PAHLS**

CIO



**ROLAND
ZONAI**

CFO



**MICHAEL
SCHELL**

CSO, digital marketing

MEET THE MONTHLY ACTIVE TEAM

 *The pioneering team behind the success*



**KARO
GODLES**

.....
CMO, Design



**DR. NASTASJA
SCHOLZ**

.....
CSO, Remote Sensing



**PHILIPP
LENGELING**

.....
CLO, IP & IT Law



**MAYA MARIA
DRÜCKER**

.....
Assistant to CEO

BOARD of ADVISORS

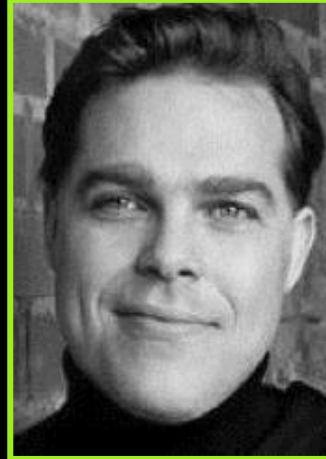
Shareholder or Options



Christian Schulze
Co-Founder



Manfred Spaltenberger
Business Angel



Burckhardt Bonello
Business Angel



Stefan Klocke
Investor



Alexander Pfurr
Commercial Advisor



Bertrand Piccard
Supporter



Konrad Roth
Business Coach



Prof. Dr. Rosemarie Wagner
Supporter



Prof. Dr. Jürgen Werner
Mentor

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INVEST NOW IN OUR GROWING AEROSPACE BUSINESS!

