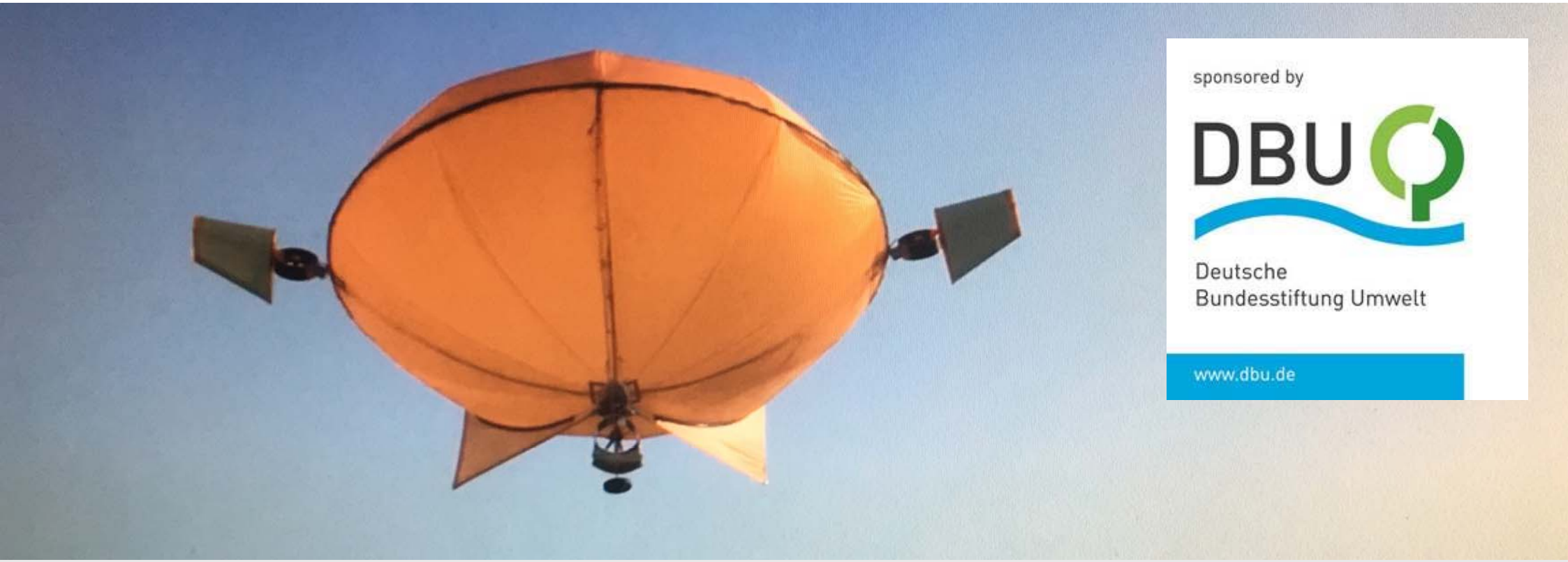


sponsored by

DBU

Deutsche
Bundesstiftung Umwelt

www.dbu.de

h-aero®

Hovering Cybernetics
ft.
Fraunhofer BIEC

Dr. -Ing. Csaba Singer | Hybrid-Airplane Technologies GmbH

https://www.h-aero.com

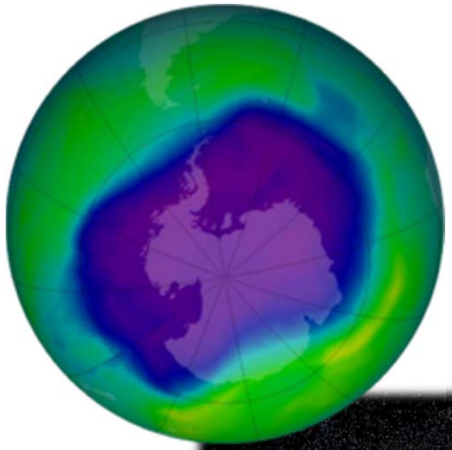
We are the world technology leaders for LTA-UAVs

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

Problems to solve …

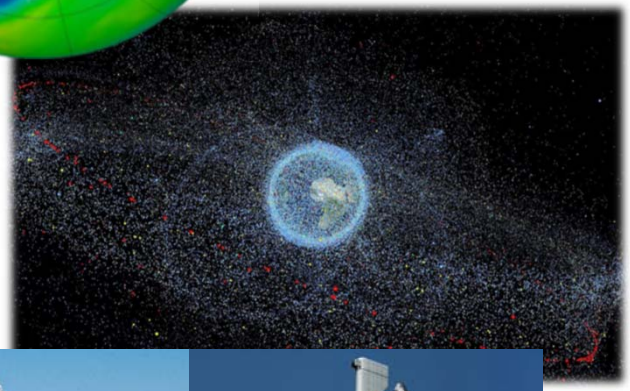
Fraunhofer ft. h-aero

- Pollution and Emissions, Ozone hole
- Space Debris pollute Orbit and Ground
- Costs of Aerospace Services
- Sustainable Processes

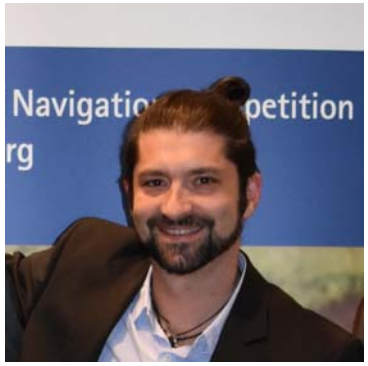


Michaela Keßelring
Advanced Systems Engineering
Fraunhofer Institute for
Industrial Engineering IAO

Liza Wohlfart
Advanced Systems Engineering
Fraunhofer Institute for
Industrial Engineering IAO



Csaba Singer
Chief Technical Officer,
Hybrid-Airplane Tech. GmbH

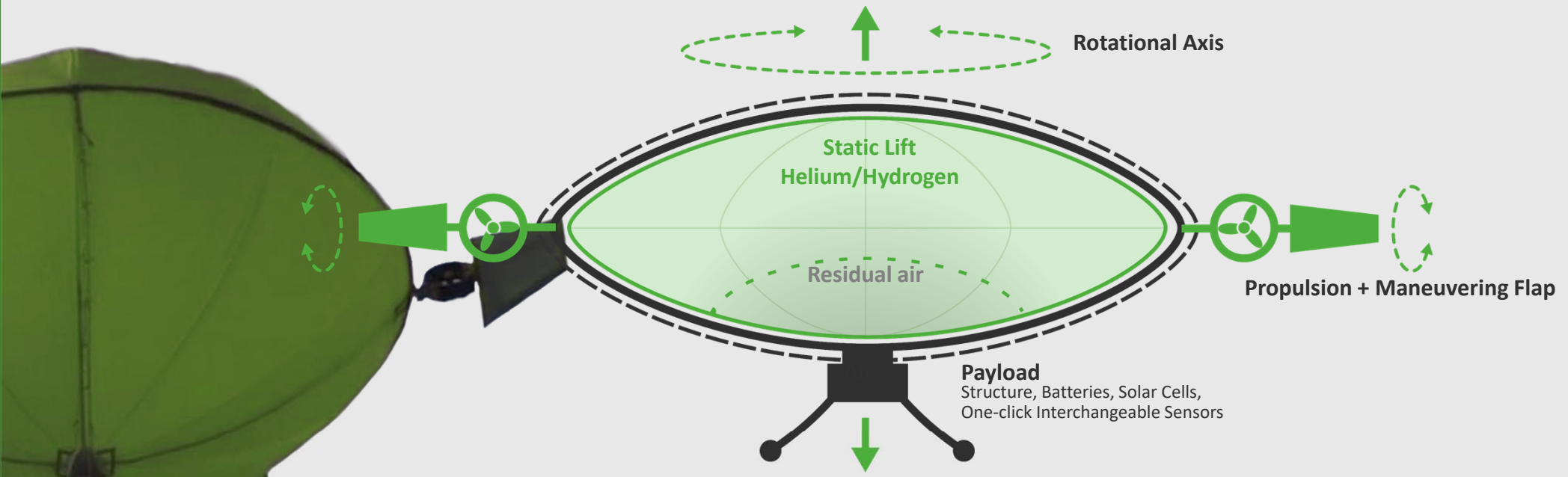


Björn-Alexander Pahls
Sales and IT
Hybrid-Airplane Tech. GmbH

h-aero® --- A Hovering Cybernetic IT Unit
A Computer in the state of Suspension

h-aero

Issued international Patents!



3-fold redundant Payload Protection
Ripstop-Nylon, Meridian Rods, Cable Tree
in case of failure, the h-aero® will come down slowly like a parachute

Dual-layer Shell
Outside: Ripstop-Nylon
Inside: Helium-tight Multilayer Foil

Carbon Fiber Skeleton

Hybrid flight characteristics
The lenticular shape of an h-aero provides both static and dynamic lift

h-aero® is the sole payload lifting system in the world that can be officially operated over crowds.

@SAP-Arena, Mannheim 2019

UAVDACH - Services UG
Ein Unternehmen des UAV DACH e. V.
Verband für unbemannte Luftfahrt
Schiesserweg 10, 88682 Salem
Anerkannte Stelle DE.AST.001 gemäß § 21d Absatz 2 LuftVO
Geschäftsführer: Uwe Nortmann
Leiter Qualitätsmanagement: Dipl.-Ing. Maximilian Strauß +49-(0)171-38 76 721 MStrauss@uas-buero.de

UAV DACH Services

Zur Vorlage bei der Luftfahrtbehörde | To the Civil Aviation Authority

Sicherheitsgutachten | **Safety Report**

SORA.001-0012

- über die unbemannten Flugsysteme | - on the Unmanned Arial Systems

h-aero® zero, zero+ und/and **one**

der Firma / by
Hybrid-Airplane Technologies GmbH - HAT
Lichtentalerstraße 14, D-76530 Baden-Baden

- für den gewerblichen Flugbetrieb innerhalb des Sichtbereiches | - for commercial flying services within visual line of sight

Verantwortlicher Ingenieur und Betreiber: Herr Dr. Csaba Singer | Responsible Engineer and operator: Dr. Csaba Singer

Grundlagendokument: | **Basic documentation:**

Betriebshandbuch, 06.08.2018

Sicherheitstechnische Beschreibung der h-aero® Flugsysteme, 27.08.2018

Ergebnis:

Auf der Basis dieser Sicherheitstechnischen Beschreibung, der eigenen Anschauung und Teilnahme an Flugdemonstrationen bescheinigen wir, dass die RPAS **h-aero® zero, zero+** und **one** hinreichend sicher sind, innerhalb des Sichtbereiches auch über Menschenansammlungen betrieben zu werden.

Conclusion:

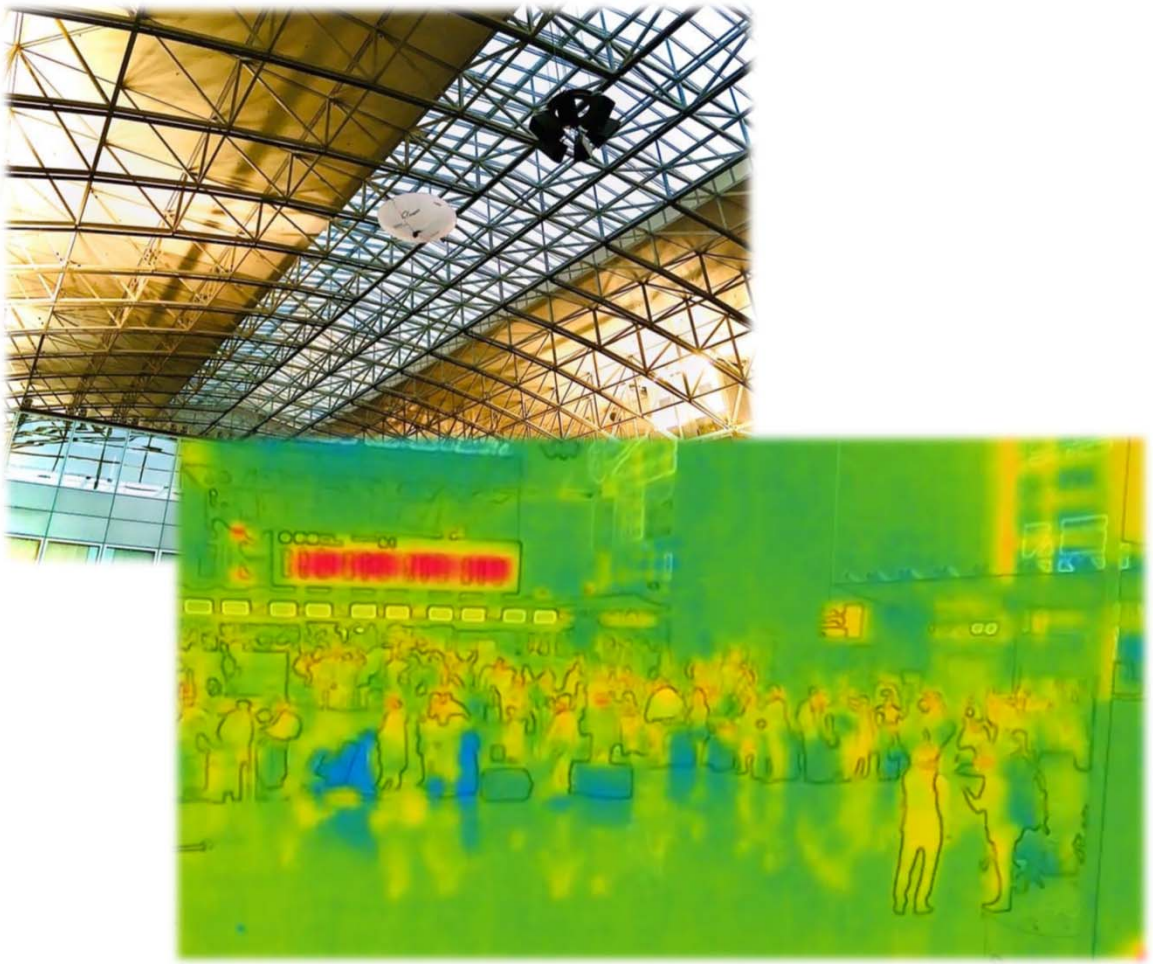
Based on a.m. "Sicherheitstechnischen Beschreibung", own view, and eye witnessing at flight demonstrations, we certify that the RPAS **h-aero® zero, zero+** and **one** are adequately safe for application within line of sight, also above human gatherings.

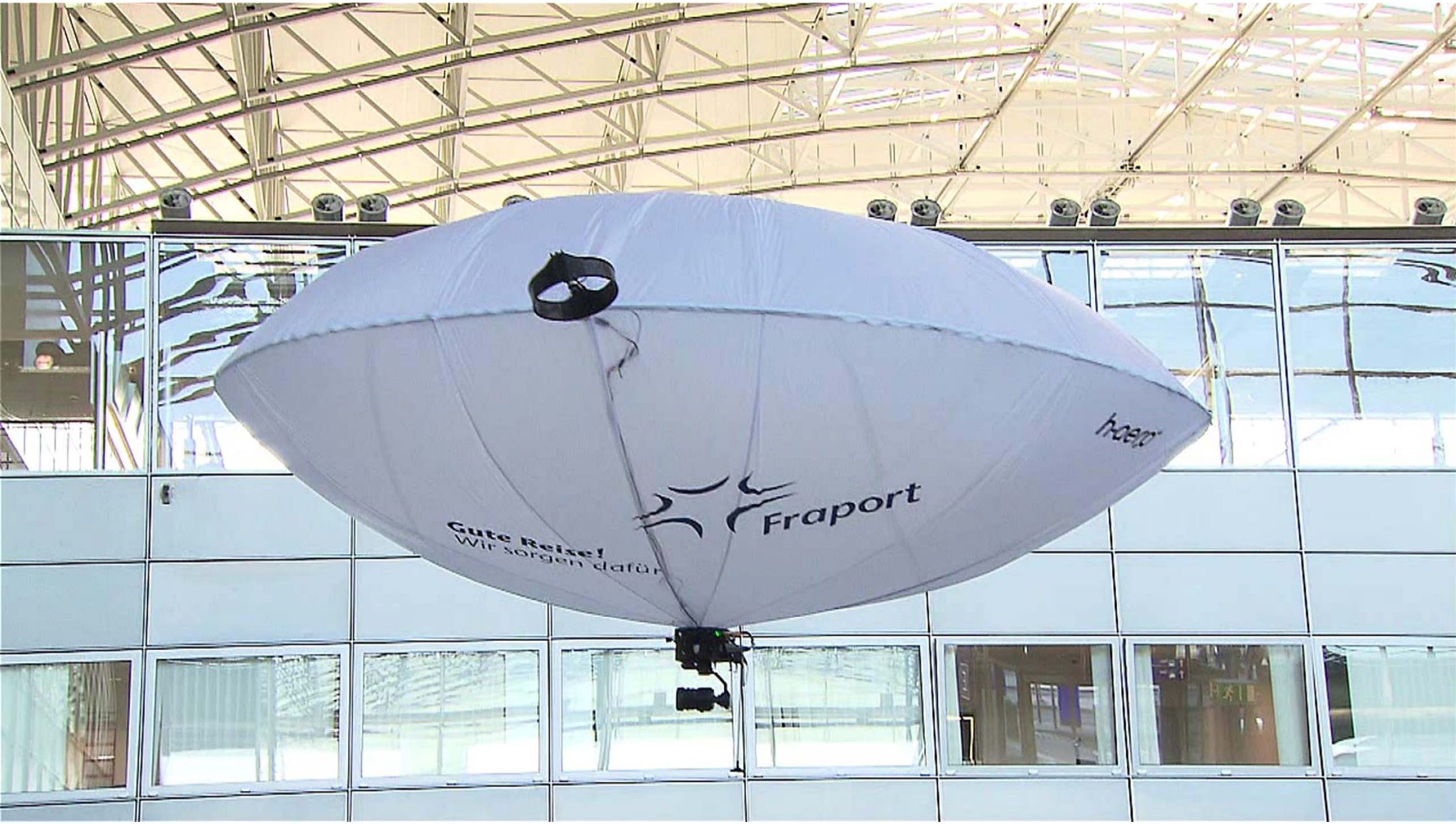
UAVDACH Services UG
Geschäftsführer / Expert UAS
Uwe Nortmann

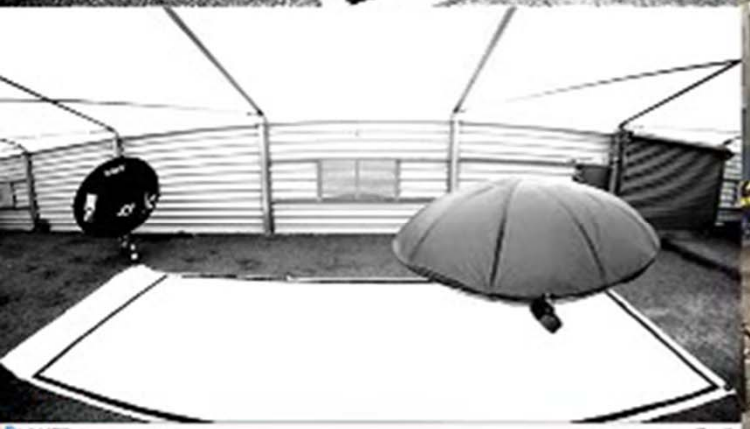
Anerkannte Prüfungsstelle DE.AST.001 UAV DACH UAVDACH Services UG gemäß §21d LuftVO

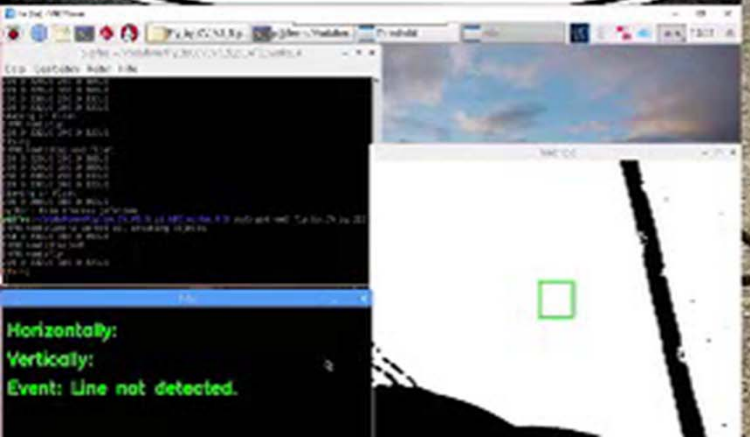
Beauftragter für Zulassung
Certification Representative
Max Strauß

Proof of Concept at Fraport AG




Gute Reise!
Wir sorgen dafür
Fraport



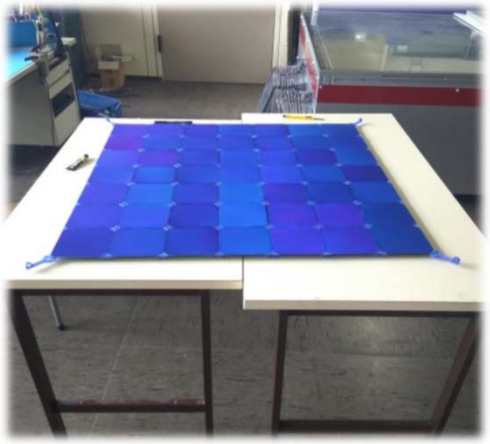


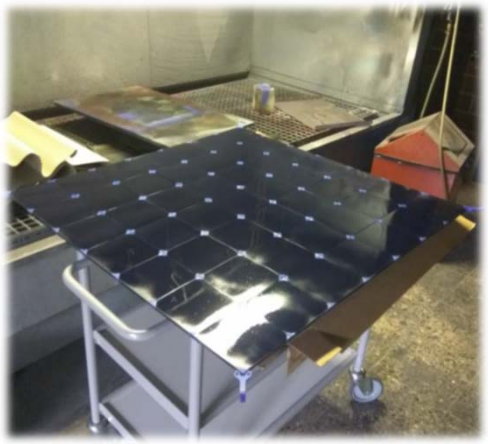
h-aero®

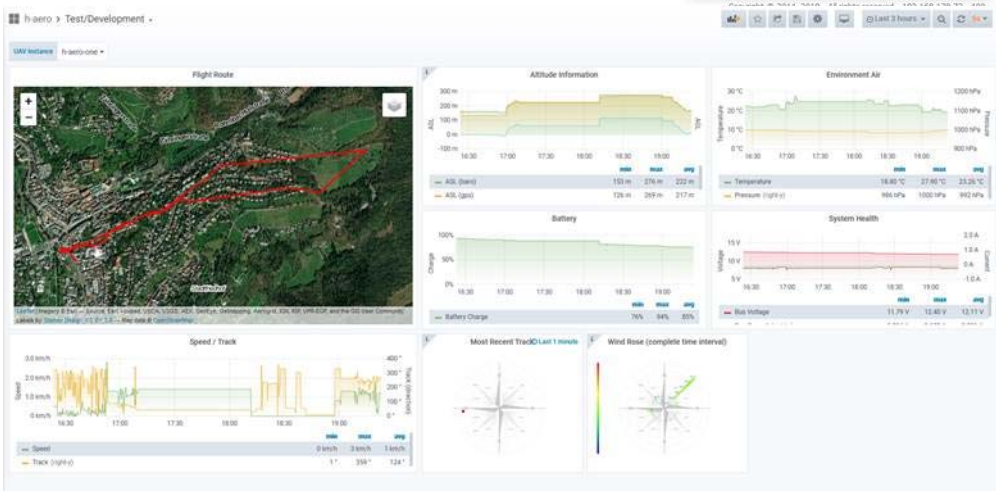
www.hybrid-airplane.com
Phone: +49 761 3873 7988
Mail: requests@hybrid-airplane.com
Follow us on Facebook @h-aero

IoT Software is ready incl. Wind Database, Photogrammetry and Autonomy

OUTPUT		
Loop (extern/intern)	25 / 408	
Date / Time	2019-08-04 / 22:35:04 UTC	System Online
Latitude	48.7601417	
Longitude	8.2384050	GPS Online
Altitude (rel/abs/gps)	1 / 161 / 167	
Track	284.1	
Speed	3.6	Battery:
Temperature	21.1	
Pressure	99568	
Gound Altitude o. Sealevel	160	Apply
Wind (dir/speed)	140 (90W 180S) / 6.06 km/hr	Try It





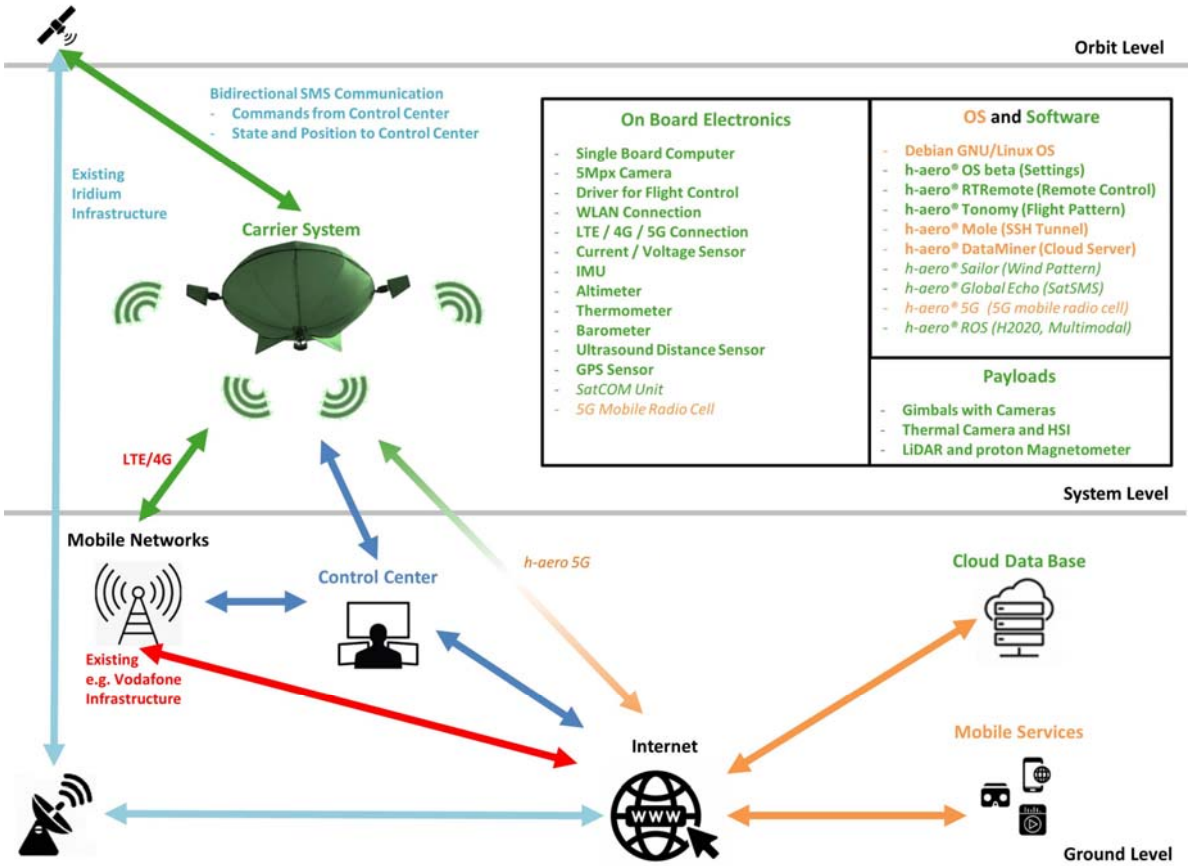


MONETARISATION STRATEGIES

Selling the Systems B2B

Buy yours now on Amazon
https://www.amazon.de/h-aero-zero/dp/B07VL68WXL

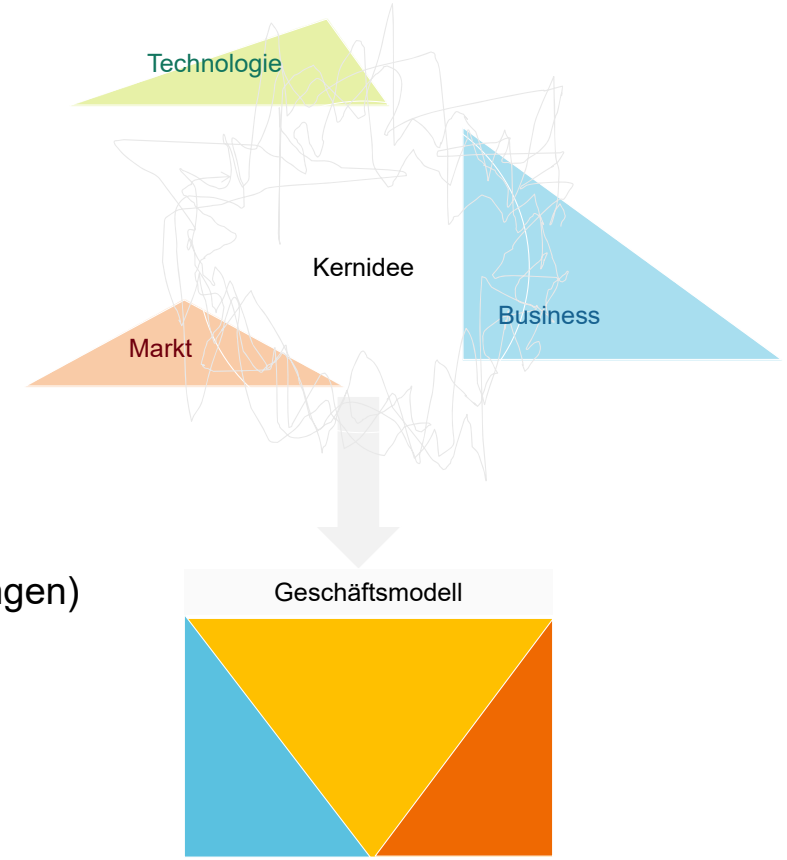
Selling the collected Data and Know-How



Lösungsweg und Methodeneinsatz

01

- Markt
  - Wertkurve (Wettbewerb, USP)
- Technologie
  - Funktionale Dekomposition (Funktionen vs. Technologien)
  - Ansoff-Matrix (Technologien vs. Märkte)
- Business
  - Einflussfaktoren-Analyse (intern & externe Rahmenbedingungen)
  - Golden Circle (Kundenkommunikation)
- Geschäftsmodell
  - BIEC Canvas (GM-Komponenten)
  - BIEC Geschäftsmodellprinzipien (Muster erfolgreicher GM)
  - Interviews (Kundenfeedback)



STECKBRIEF BIEC-PRAXISPILOT

Identifizierung und Erschließung attraktiver Marktchancen

Auszüge aus dem Abschlussbericht, Februar 2022

Fraunhofer IAO

h-aero®

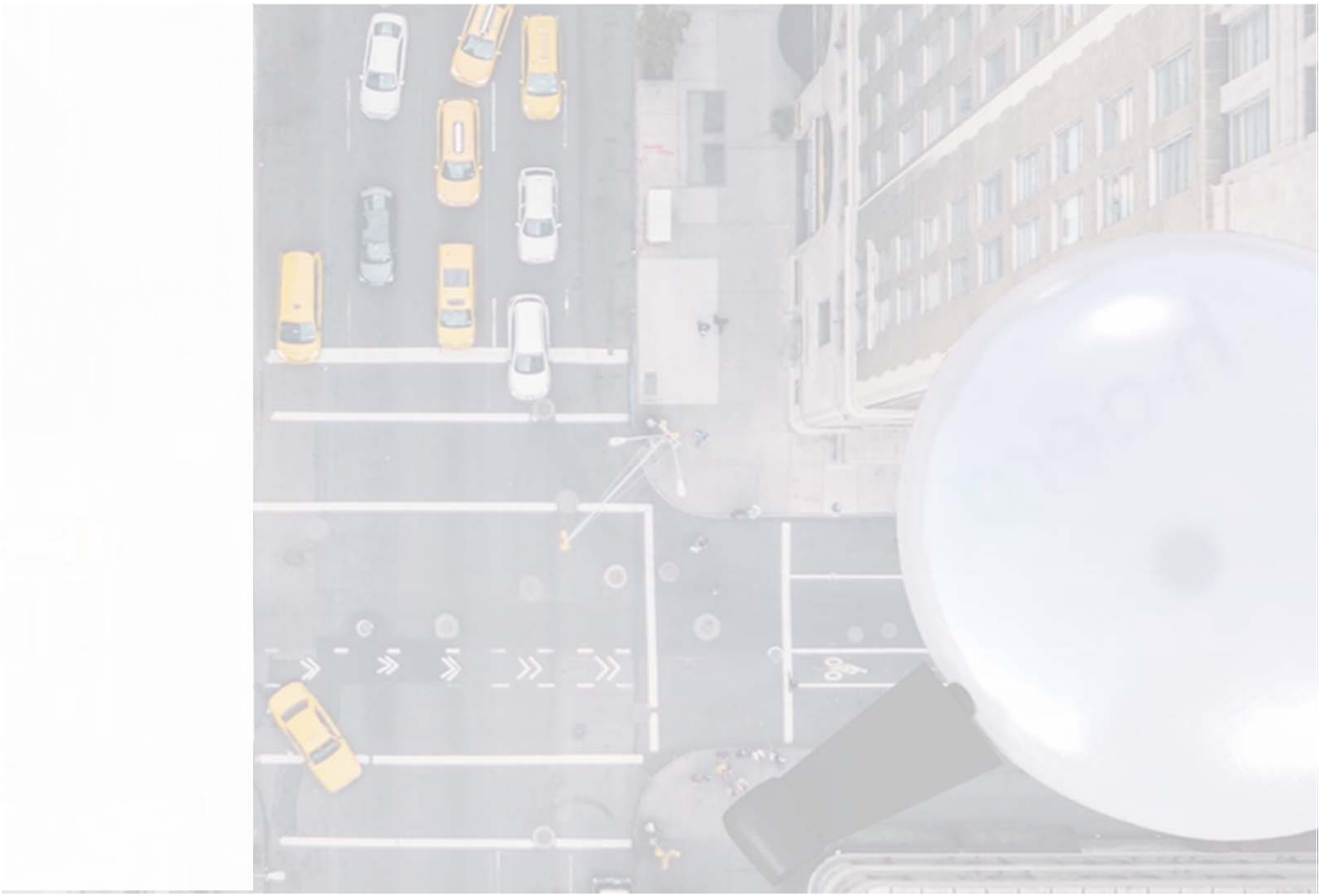
Zusammenfassung

8 Interviews

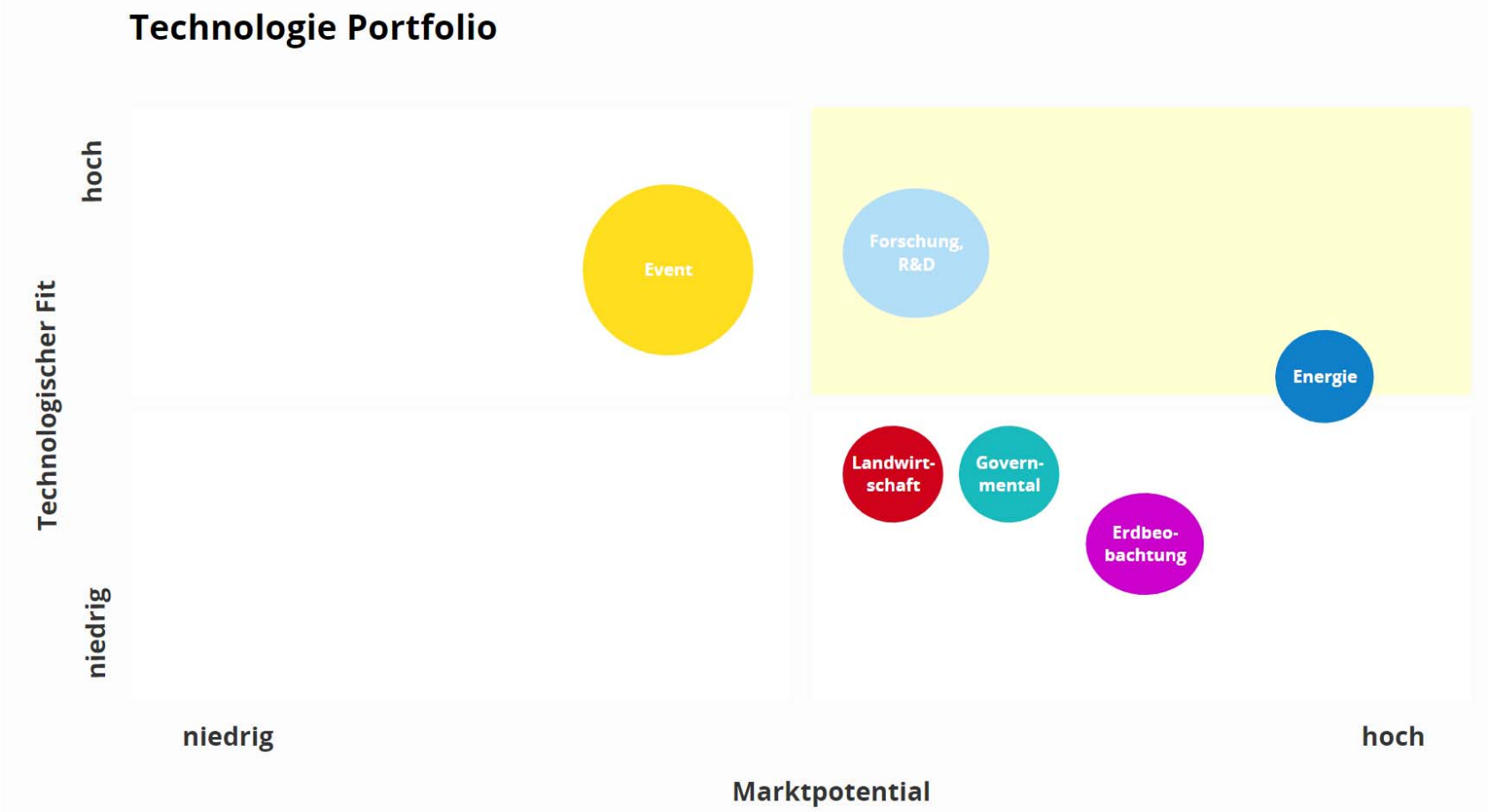
10 Workshops

> 150h Kreativarbeit & Analyse

∞ Neue Ideen und Ansätze



Technologie-Portfolio

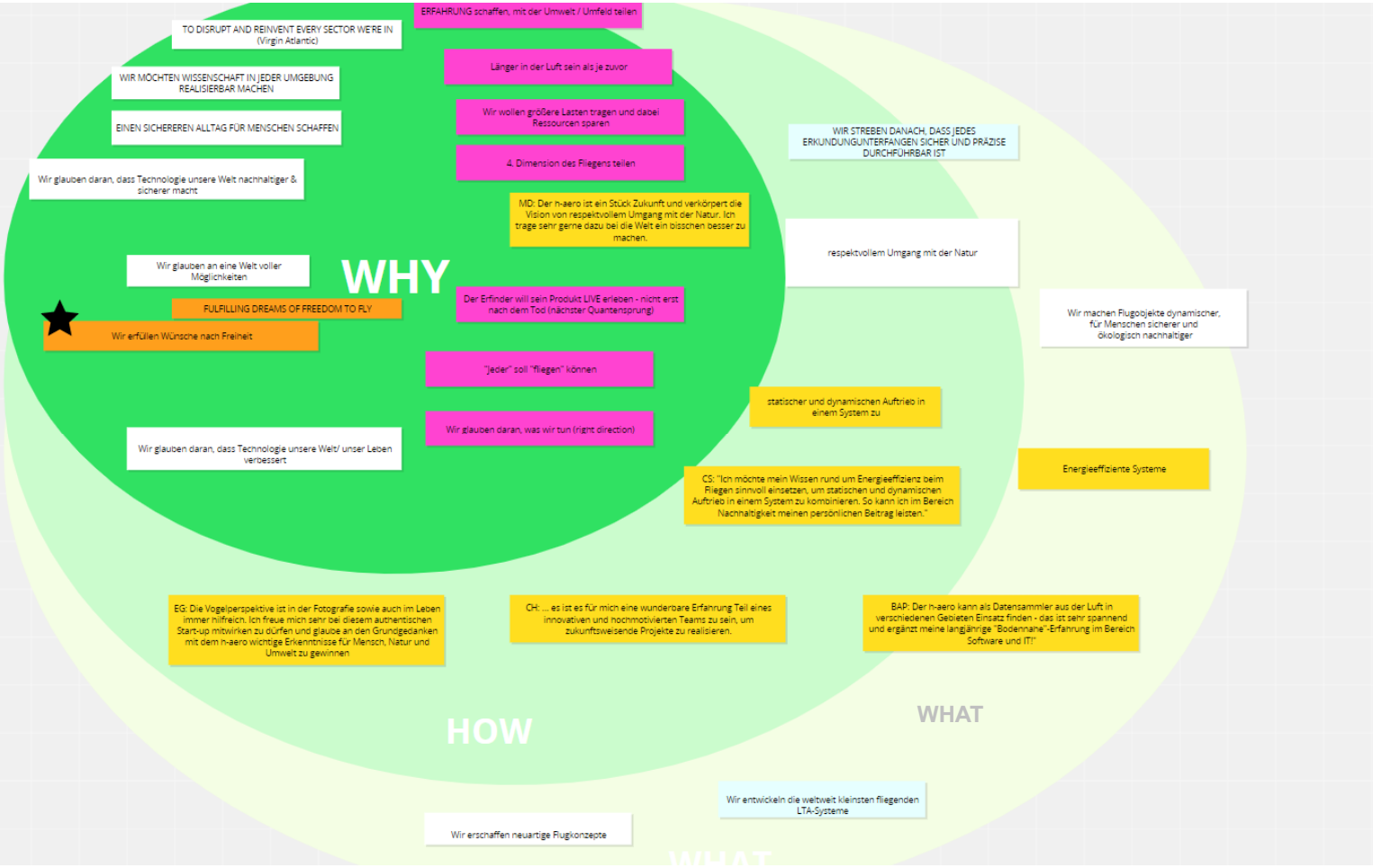


Golden Circle

Welches Produkt brauche ich?

Welchen Weg möchte ich gehen? Wie erreiche ich mein Ziel?

Welches Gefühl möchte ich erleben? In welcher Welt möchte ich leben?



Use- Case | Big Events (e.g Super Bowl, Demos, Olympics, etc.)

- for network operators (e.g. AT&T, Verizon etc.)
  - mobile platforms and supply venues with high network capacity
  - only platforms from HAT, network operator equips with network technology
- for authorities (disaster control, police etc.)
  - danger prevention, observation, AI-based classification of images
  - provide flexible, high performance data network
  - also we can provide technology for this
- Advantages
  - easy/quick placement (planning & implementation)
  - no buildings, roads or similar needed, (over crowds)
  - adaptation to changing requirements (crowds move)
  - optimal illumination can be realized (less infrastructure, no blind spots)

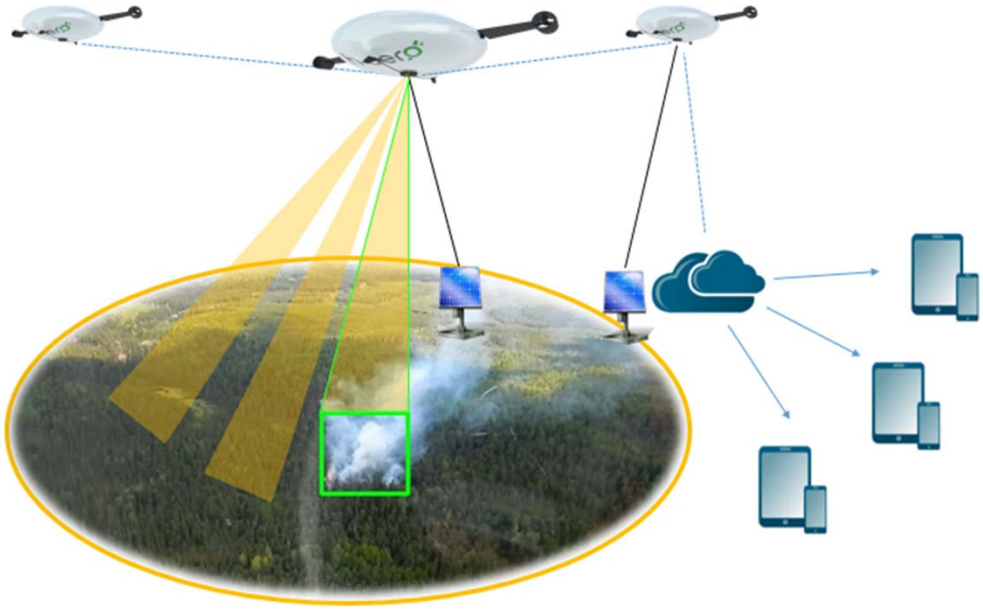
Use- Case | Film Industry (e.g. Hollywood, Bollywood, etc.)

- for film studios
  - Provide infrastructure for communications (including wifi, cellular network).
  - Equip with cameras: efficiently record and track scenes
- Advantages
  - line-of-sight connections enable wireless video connectivity with highest bandwidth (8k+)
  - easier and more flexible camera placement than crane or towers for cameras
  - cost saving and time saving on set



Use- Case | Technical Support during Catastrophic Events

- for fire departments, disaster control, military, insurance companies
  - very short-term provision of official/military mesh telecommunication 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

SOLARIMPULSE FOUNDATION

Historic flight

SDG's of application

The Sustainable Development Goals are a call to action to end poverty, protect the planet and ensure peace and prosperity everywhere.

SDG 6 — Clean water and sanitation

SDG 7 — Affordable and clean energy

SDG 9 — Industry, innovation and infrastructure

SDG 11 — Sustainable cities and communities

SDG 12 — Responsible consumption and production

Efficient Solutions

Labelled Solutions from Hybrid-Airplane Technologies GmbH

The Solar Impulse Efficient Solution label seeks to bridge the gap between ecology and economy, bringing together protection of the environment and financial viability to show that these solutions are not expensive fixes to problems, but rather opportunities for clean economic growth.

h-aero®

Exploration /
Communication /
Observation /

JUN 2018

Initial market

h-aero®

Solar-powered helium Unmanned Aerial Vehicle (UAV) for versatile monitoring activities

h-aero®

SOLARIMPULSE FOUNDATION

Lausanne, November 5th, 2021

This letter is to recommend Hybrid Airplane Technologies GmbH

Dear Sir or Madam,

As Initiator and Chairman of the Solar Impulse Foundation, I am writing to bring to your attention the initiative that we have undertaken. Indeed, after successfully achieving the first solar flight around the world with Solar Impulse, the Foundation has launched the second phase of its action: selecting 1,000 solutions that can protect the environment in a profitable way, and present them to decision makers and leaders around the world to encourage them to target more ambitious goals for the climate policies.

One of the solutions that we have evaluated and endorsed with the "Solar Impulse Efficient Solutions" Label is h-aero, a solar-powered helium Unmanned Aerial Vehicle (UAV) for versatile monitoring activities.

The project led by Hybrid Airplane Technologies GmbH aims to propose a solution that is safer, offers superior endurance, and can carry a larger relative load than conventional drones by combining concepts from helicopters, planes and balloons. This system does not yet exist on the commercial market and represents a clear innovation given the potential benefits for the environment.

Experts working with us have determined, using data available, that the project "h-aero" answered to all our technological feasibility, positive impact on the environment and economic profitability for the client criteria.

With warm regards,

Dr. Bertrand Piccard

Chairman and Initiator of the Solar Impulse Foundation

Chemin de Messidor 5
1006 Lausanne, Switzerland
solarimpulse.com
bertrand.piccard@solarimpulse.com

https://solarimpulse.com/companies/hybrid-airplane-technologies-gmbh

Thank You

Do you want to control h-aero® over the internet?
Write us an email to get a date for a trial.
fly@h-aero.com

Visit our Social Media Channels

Hybrid-Airplane Technologies GmbH

Lichtentalerstraße 14
76530 Baden-Baden
GERMANY

Tel: +49 7221 187 9773
Mob: +49 1523 356 2482
Fax: +49 7221 409 4991
Web: https://www.h-aero.com

Contact:
Dr. -Ing. Csaba Singer
csaba@h-aero.com

sponsored by DBU Deutsche Bundesstiftung Umwelt www.dbu.de

Gefördert durch: Bundesministerium für Wirtschaft und Energie aufgrund eines Beschlusses des Deutschen Bundestages

EUROPÄISCHE UNION

ESF Europäischer Sozialfonds für Deutschland

eXIST Existenzgründungen aus der Wissenschaft

Baden-Württemberg MINISTERIUM FÜR FINANZEN UND WIRTSCHAFT

Therefore our consortium operates the smallest and the biggest existing LTA UAVs

Sources: https://www.h-aero.com; https://www.tao-innovations.com;

h-aero® ROADMAP

h-aero® Autonomy, Communication, Payload

✓ swarm

✓ up to 20km data range

5G hotspot

Solar

✓ APPs

✓ On-board processing

✓ LED Illumination

✓ Certificates

✓ Sensors

✓ board computer & autonomy

h-aero®'s MAIN VISION is to develop
a new sustainable flight concept

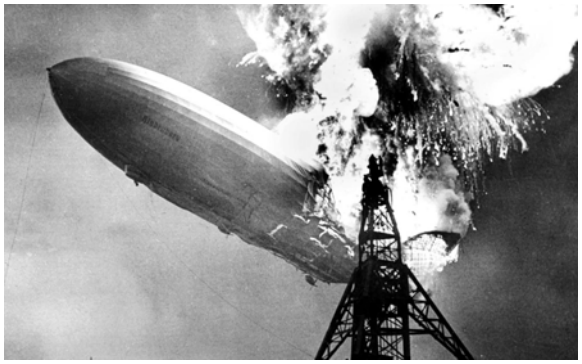
h-aero® handling, stability and other important features or time

LEAD CUSTOMERS AND ACTUAL MONETARISATION

LEAD CUSTOMERS AND ACTUAL MONETARISATION

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



Sources: https://www.youtube.com; https://www.wikipedia.com; https://www.google.com

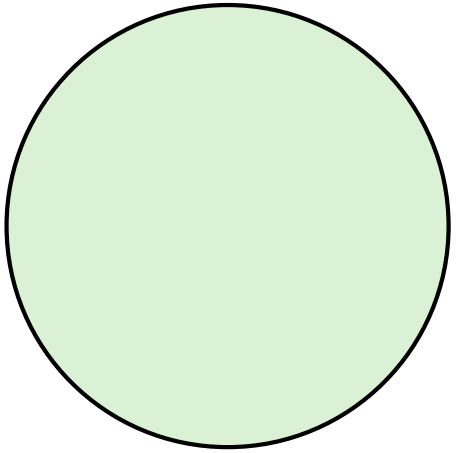
LTA is not easy … if small → low amount of gas … if big → lacking practice

- **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**

✓ **Luckily, there are some lessons learned, not only in terms of size reduction**

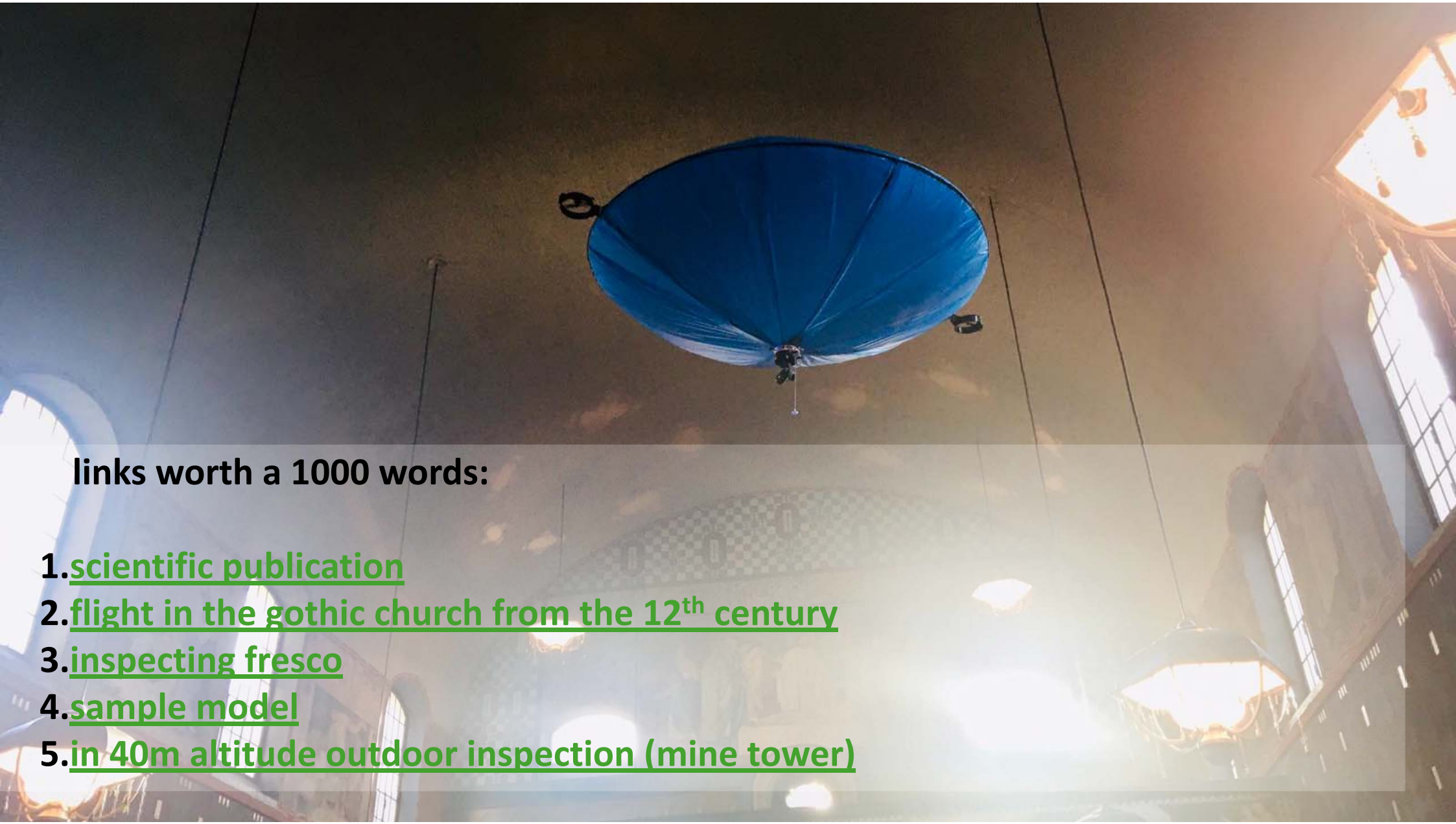
e.g. with assumed 250g/m^2 shell material

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 experinments

Sources: https://www.h-aero.com; https://www.tao-innovations.com;



links worth a 1000 words:

1. scientific publication
2. flight in the gothic church from the 12th century
3. inspecting fresco
4. sample model
5. in 40m altitude outdoor inspection (mine tower)