

Airborne Wind Energy

Implemented concepts

Roland Schmehl

18 September 2026

TU Delft

CC BY 4.0

Outlines

- Classification
- SkySails
- TU Delft
- Kitepower
- Kitenergy
- Toyota
- CPECC
- BLYET
- Wind Fisher
- EnerKíte
- Ampyx Power
- Mozaero
- Kitemill
- TwingTec
- Windswept
- someAWE
- Windlift
- kiteKRAFT
- Ventoplani
- Makani



Learning objectives

- Learn about the different implemented concepts and their working principles,
- Classify the implemented concepts according to various criteria,
- Discuss a representative set of prototypes in more detail.

Classification

AWE systems can be classified in many different ways.

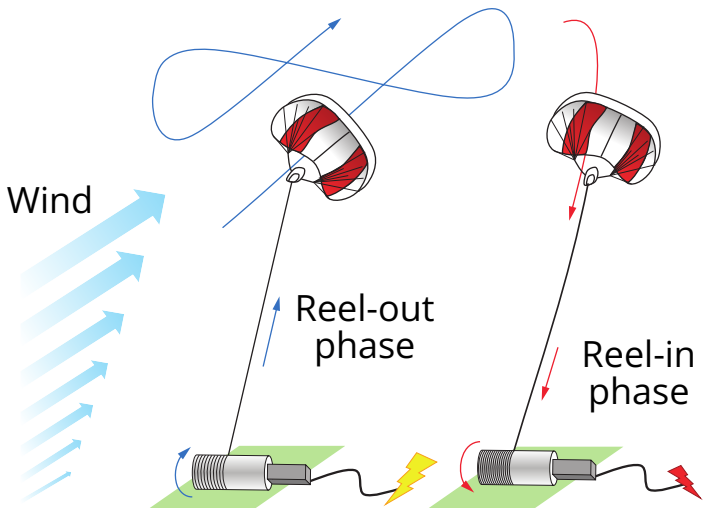
- Energy conversion concept
- Kite design
- Launching and landing concept
- Kite control
- Rated power
- ...

➔ Classification criteria are generally correlated.

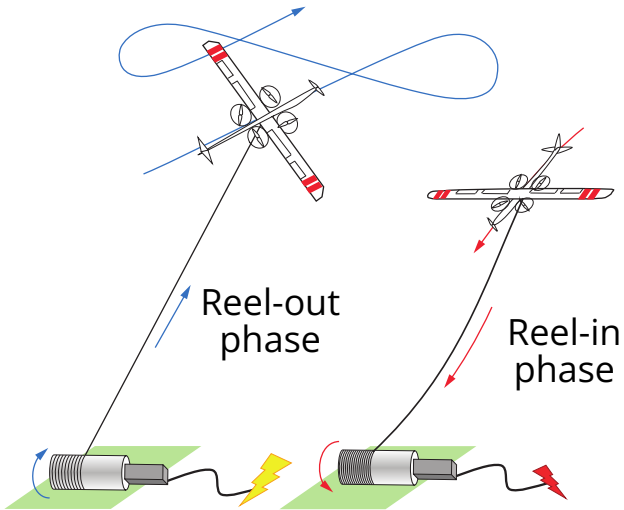


Criterion 1: Energy conversion location

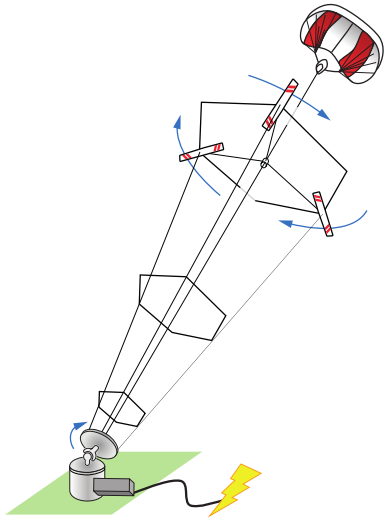
Ground-gen soft wing



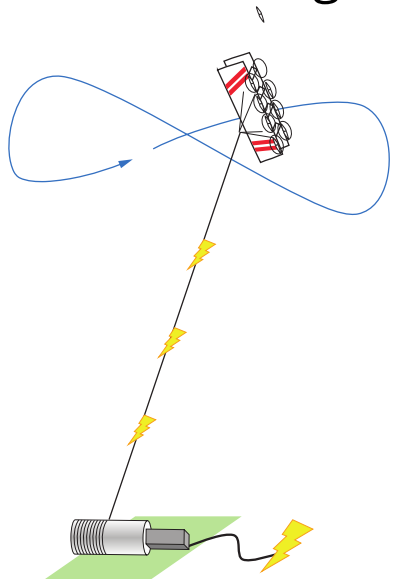
Ground-gen hard wing



Ground-gen rotary kite



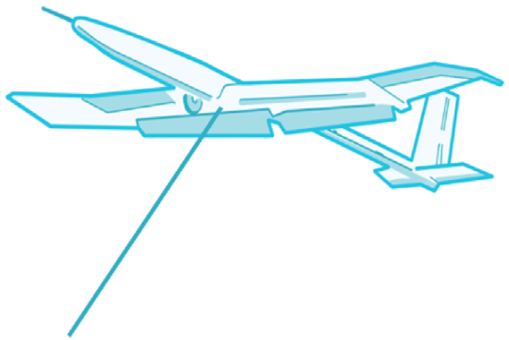
Fly-gen hard wing



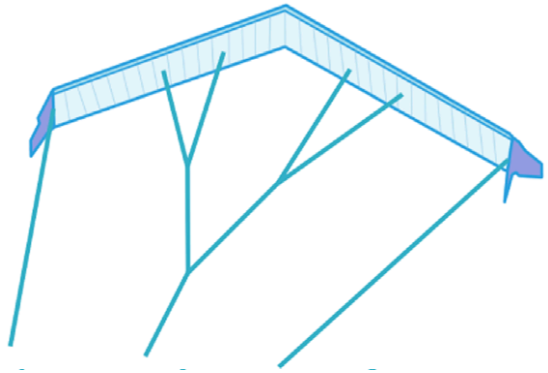
Lorenzo Fagiano | Dylan Eijkelhof

Criterion 2: Kite type

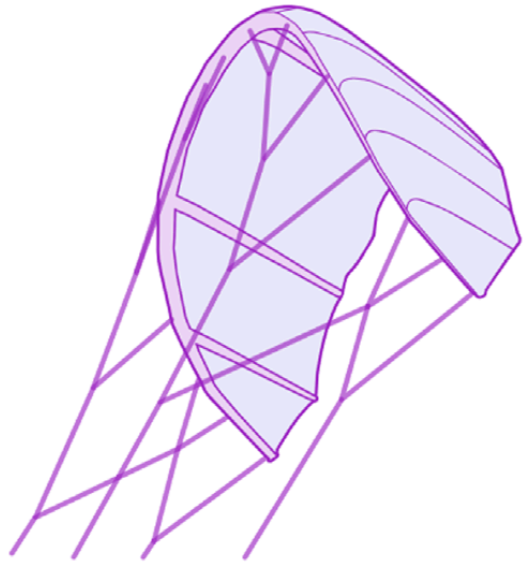
Hard-wing kite



Hybrid-wing kite



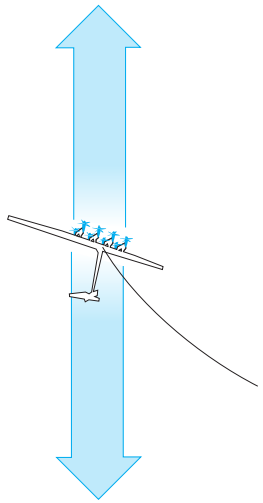
Soft-wing kite



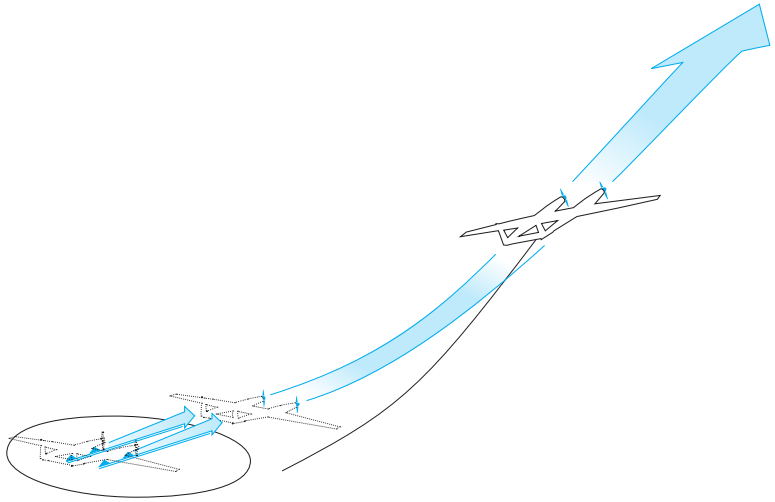
Antonello Cherubini

Criterion 3: Launching and landing concept

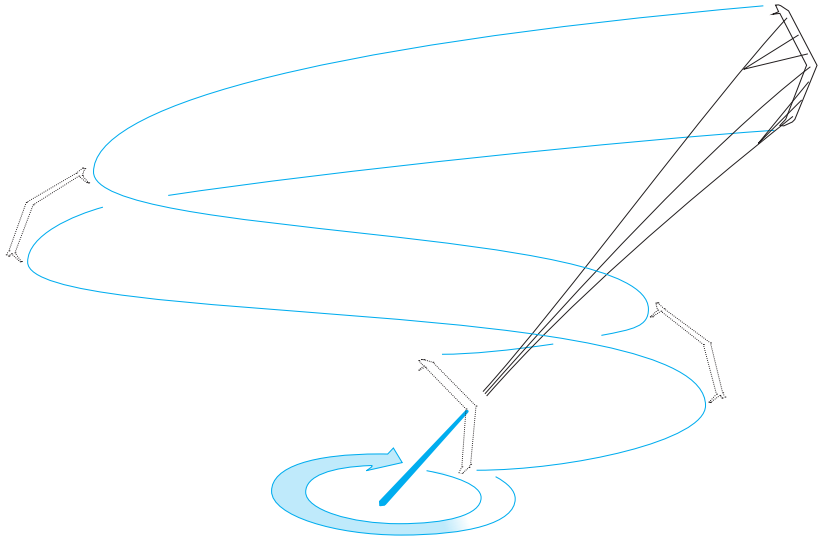
VTOL tailsitter



HTOL catapult



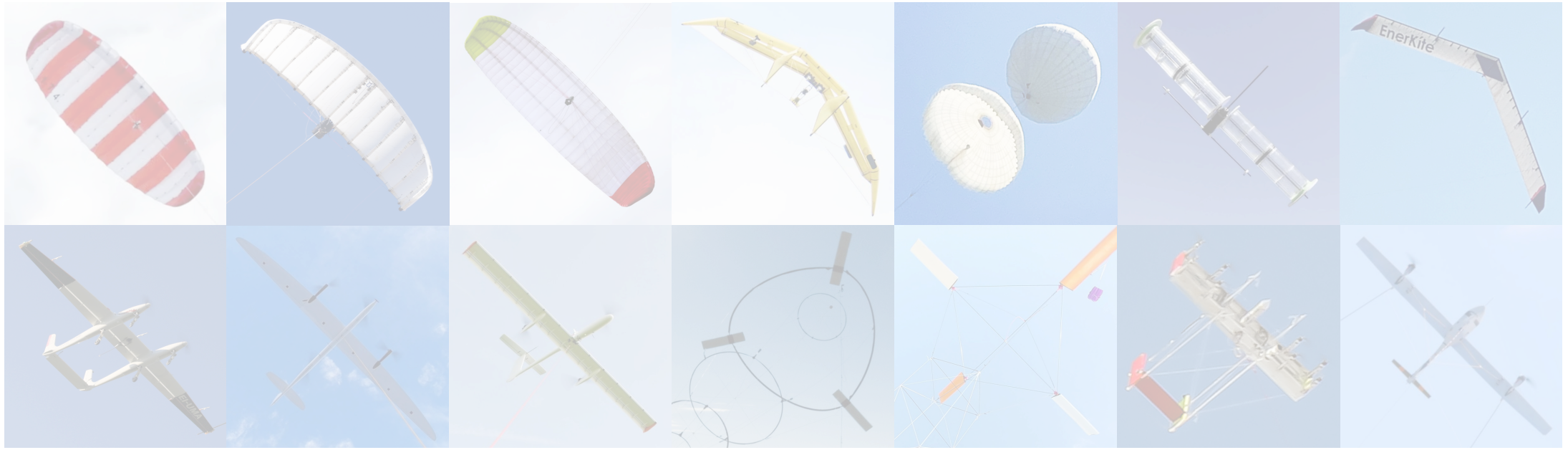
HTOL rotating arm



HTOL: horizontal take-off and landing
VTOL: vertical take-off and landing

Enerkite

Currently developed commercial prototypes

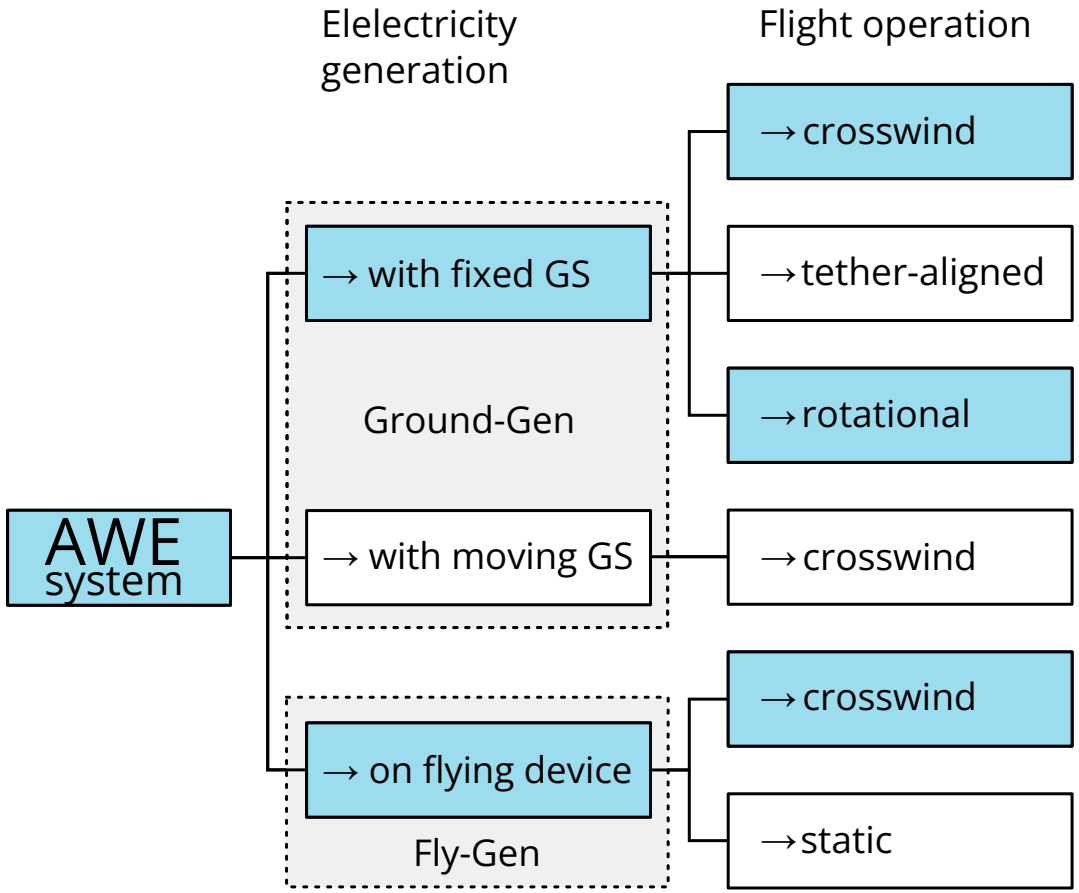


Applying classification criteria 1-3

Developer	Prototype name	Electricity generation location	Kite type	Launching & landing concept	Wing span (m)	Wing surface area (m^2)	Kite mass (kg)	Min.–max. operation height (m)	Rated power (kW)
SkySails	SKN-PN-14	ground	soft wing	static mast	15.6–22[a]	90[b], 180[c]	170[d]	200-400	200
Kitepower	Falcon	ground	soft wing	winch	13.3[a]	47[b], 60[c]	73[d]	70-400	100
Kitenergy	KE60 Mark II	ground	soft wing	winch	12.5[a]	42[b], 50[c]		100-400	60
Toyota	Mothership v11	ground	soft wing	winch	8	8	5.2	300-600	1
CPECC	Airpower	ground	parachute	pilot parachute	40[a]	1256[b]	1480	500-3000	2400[e]
Wind Fisher	MAG1	ground	Magnus rotor	winch	1.7	0.32[f]	1.0	0-50	0
EnerKíte	EK30/Enerwing	ground	hybrid wing	HTOL rotating arm	8-14	4-8	22.7	50-300	30
Mozaero[g]	AP3	ground	hard wing	HTOL catapult	12	12	475	200-450	150
Kitemill	KM1	ground	hard wing	VTOL quad-plane	7.4	3	54	200-500	20
TwingTec	Twing (T29)	ground	hard wing	VTOL tri-plane	5.5	2	25	up to 300	10
Windswept	Kite Turbine	ground	rotary	pilot kite	6×1[h]	6×0.2		10	1
someAWE	MAR3	ground	rotary	pilot kite	4×1[i]	4×0.15			0.5
Kitekraft	SN9	onboard	box wing	VTOL tailsitter	2.4	1.08	32	100[j]	12
Windlift	C1	onboard	hard wing	VTOL tailsitter	3.8	0.95	11.3	30-100	2

[a] projected wing span
[b] projected wing surface area
[c] flat (laid-out) wing surface area
[d] excluding tether, but including suspended kite control unit and bridle line system
[e] rated generator power
[f] rotor diameter × width
[g] formerly Ampyx Power
[h] rotor diameter 4.48 m
[i] rotor diameter 3.5 m
[j] tether length

Classification scheme



⊖ Skysails ⊖ Toyota ⊛ Enerkíte ● Kitemill
⊖ Kitepower ⊖ CT Ingenieros ⊛ Swift Airgen ● Kitekraft
⊖ Kitenergy ● Wind Fisher ● Mozaero

⊜ CPECC

⊛ Windswept ⊛ alphAnemo
⊛ someAWE

⊖ Kitedynamics

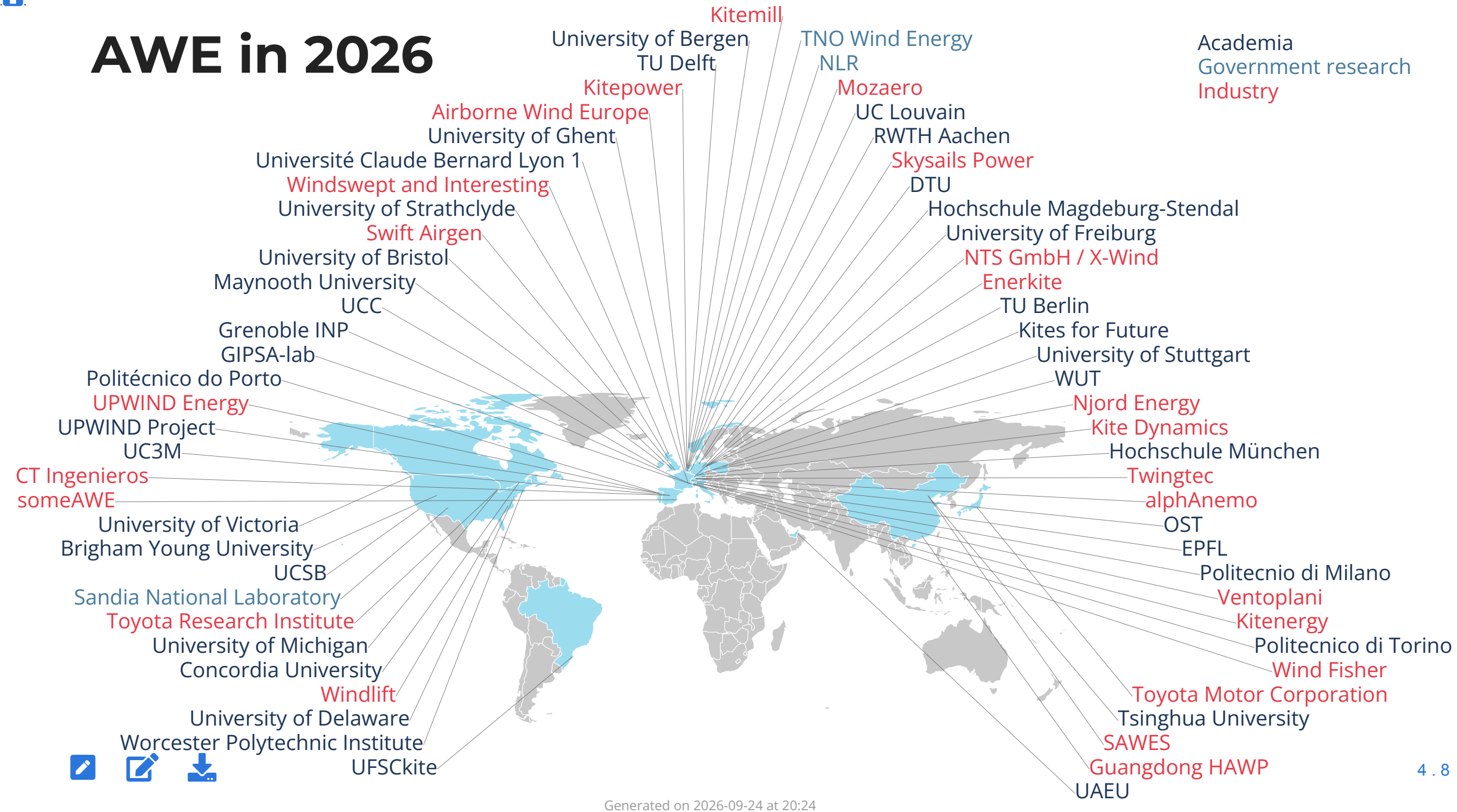
● Kitekraft
● Windlift

◎ SAWES

⊖ Soft-wing kite
● Magnus rotor
⊛ HTOL rotating arm
● HTOL catapult
● VTOL tri- or quad-plane
⊜ Parachute
⊛ Rotary kite
● VTOL tailsitter
◎ Ducted turbine balloon

awesco.eu/awe-explained/

AWE in 2026


Kitemill
University of Bergen
TU Delft
TNO Wind Energy
NLR
Kitepower
Mozaero
Airborne Wind Europe
UC Louvain
University of Ghent
RWTH Aachen
Université Claude Bernard Lyon 1
Skysails Power
Windswept and Interesting
DTU
University of Strathclyde
Hochschule Magdeburg-Stendal
Swift Airgen
University of Freiburg
University of Bristol
NTS GmbH / X-Wind
Maynooth University
Enerkite
UCC
TU Berlin
Grenoble INP
Kites for Future
GIPSA-lab
University of Stuttgart
Politécnico do Porto
WUT
UPWIND Energy
Njord Energy
UPWIND Project
Kite Dynamics
UC3M
Hochschule München
CT Ingenieros
Twingtec
someAWE
alphAnemo
University of Victoria
OST
Brigham Young University
EPFL
UCSB
Politecnio di Milano
Sandia National Laboratory
Ventoplani
Toyota Research Institute
Kitenergy
University of Michigan
Politecnico di Torino
Concordia University
Wind Fisher
Windlift
Toyota Motor Corporation
University of Delaware
Tsinghua University
Worcester Polytechnic Institute
SAWES
UFSCkite
Guangdong HAWP
UAEU
Academia
Government research
Industry

AWE test sites



SkySails POWER

skysails-power.com

Years active	2001-2026
Headquarters	Hamburg, Germany
Type	Company
Conversion concept	Pumping cycle
Kite design	Ram air kite
Kite control	Suspended kite control unit
Ground connection	Single tether
Launching & landing	Static, from mast

SkySails SKN-PN-14



SkySails' system in launch configuration

SkySails

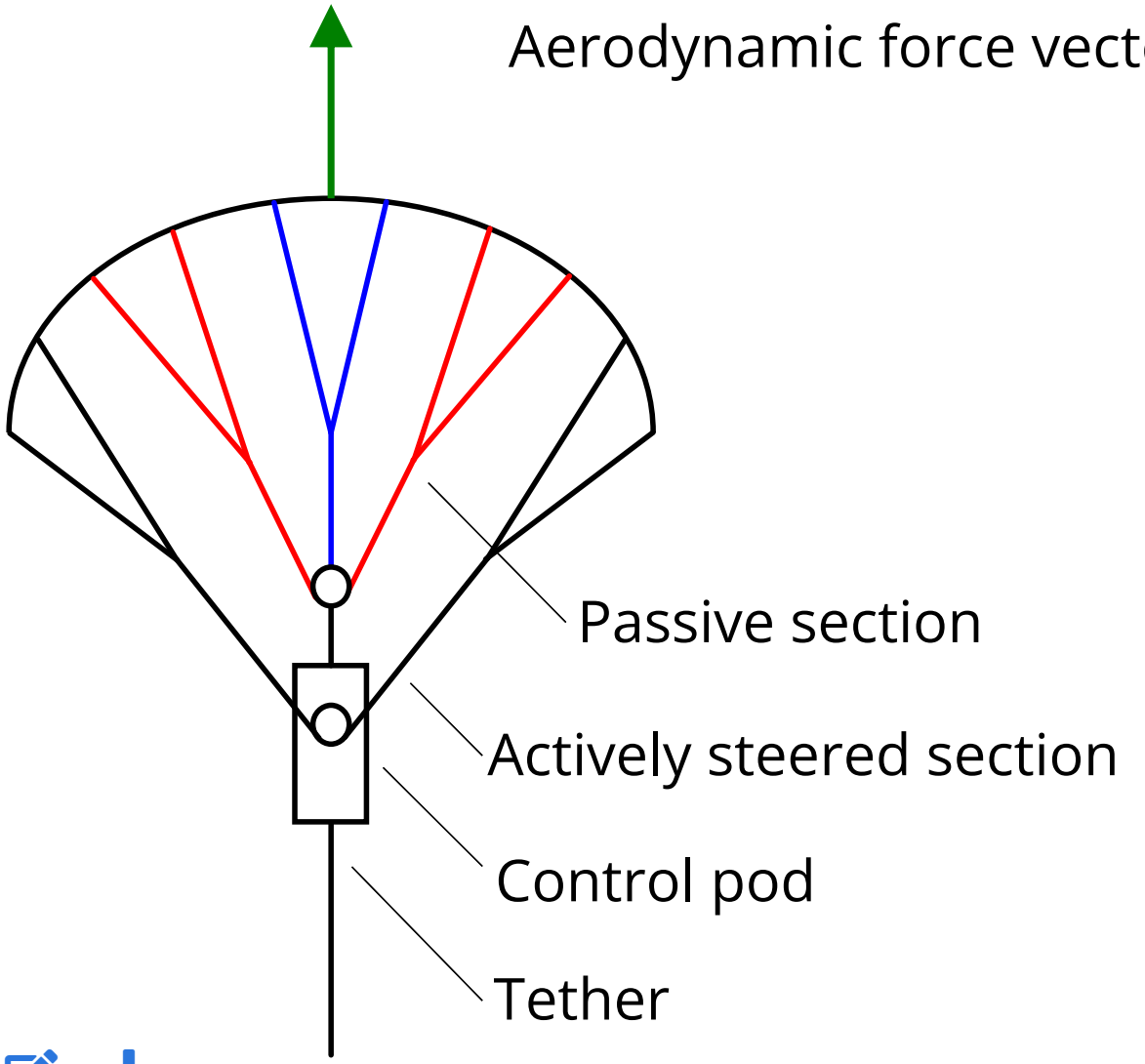
SkySails SKN-PN-14

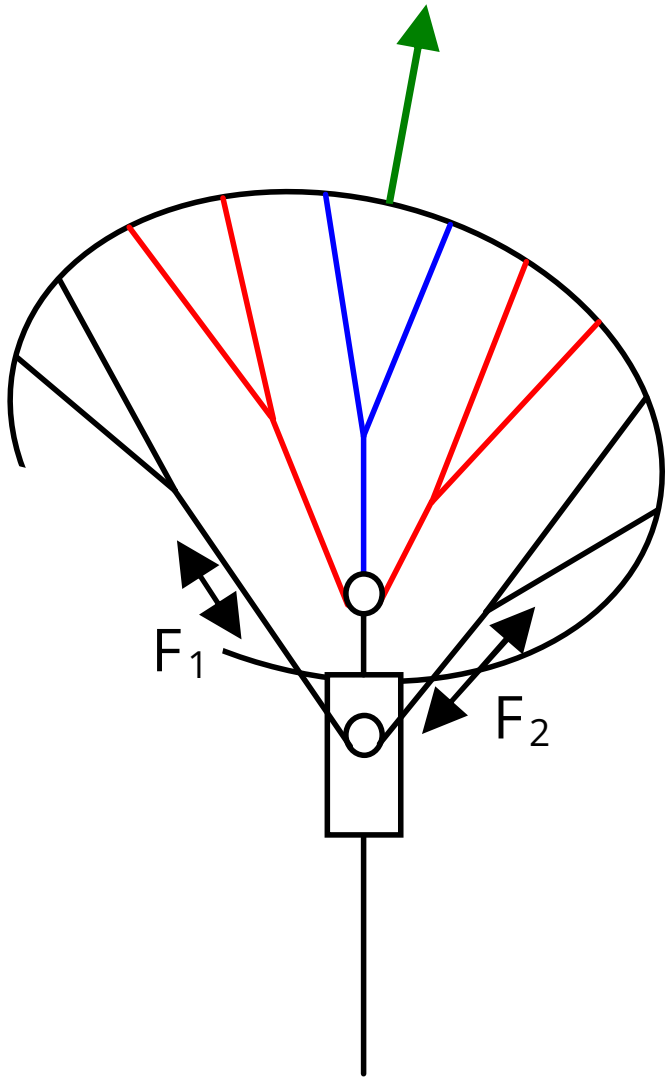


SkySails' system in airborne parking position

SkySails

SkySails roll control

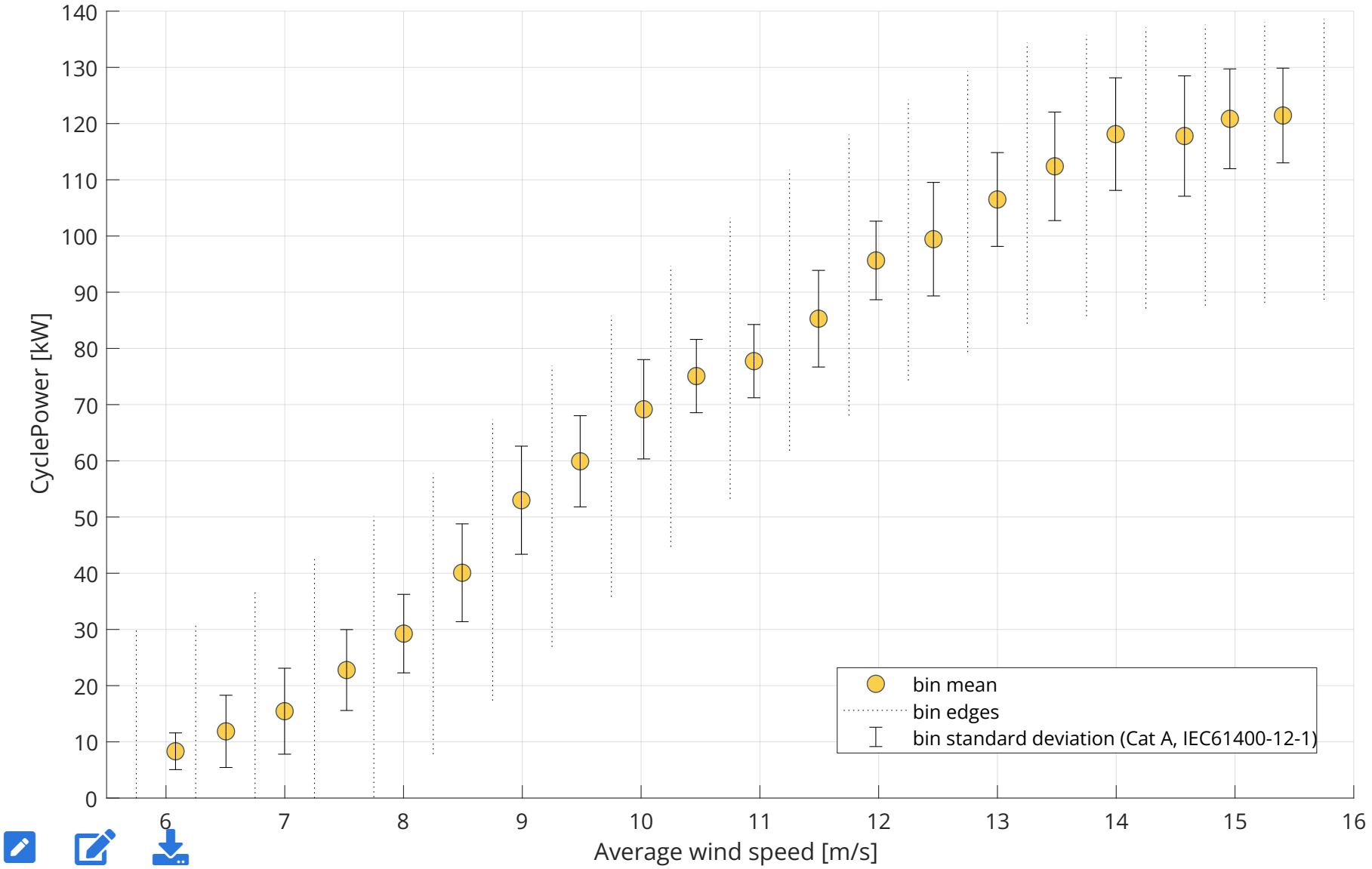




Paulig et al. (2013)

Power Curve SKN-PN-14

Released March 22th 2024

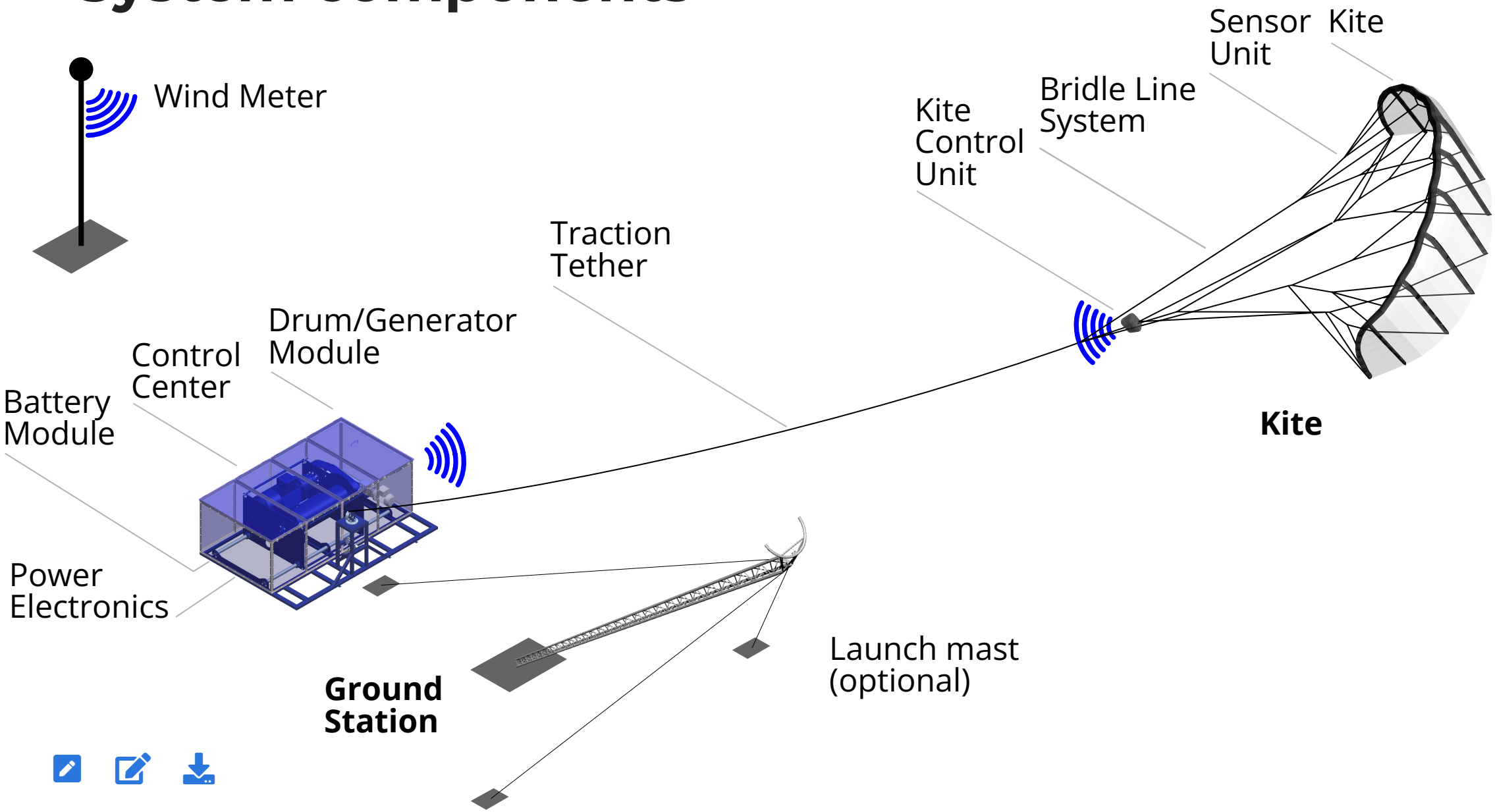


TU Delft

github.com/awegroup
@Laddermill

Years active	2004-
Headquarters	Delft, Netherlands
Type	University research group
Conversion concept	Pumping cycle
Kite design	Leading edge inflatable tube kite
Kite control	Suspended kite control unit
Ground connection	Single tether
Launching & landing	Winch & upswing from hanging position

System components



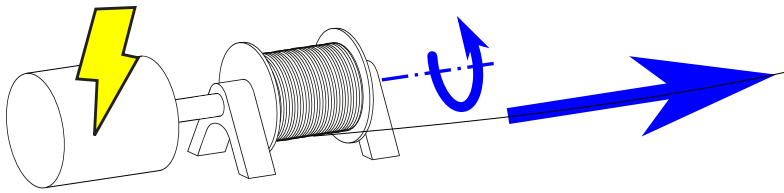
Vlugt et al. (2019)

Pumping kite concept

Wind

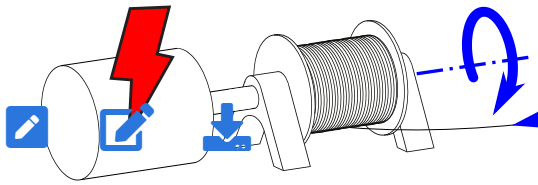
Traction phase

- electricity generation

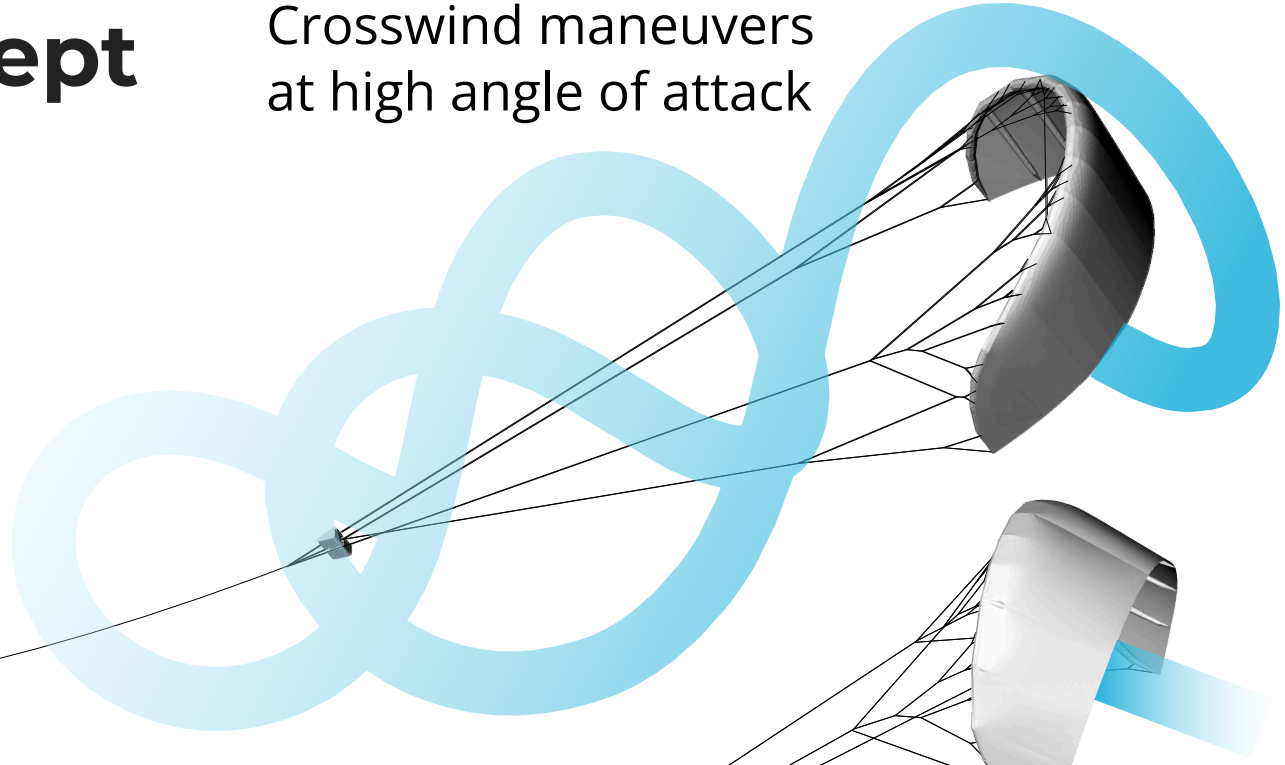


Retraction phase

- electricity consumption



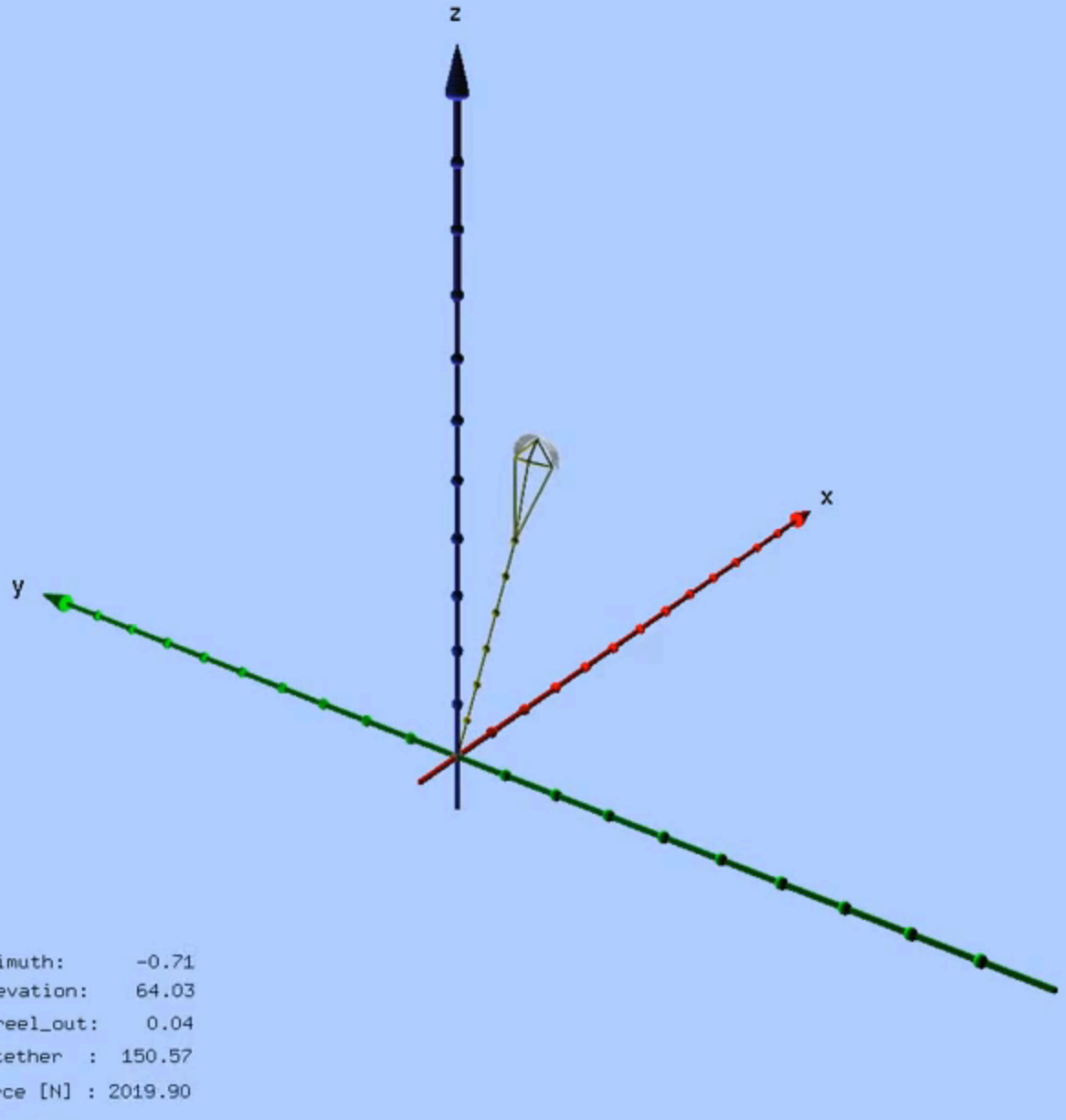
Crosswind maneuvers
at high angle of attack



Depowering by lowering
angle of attack of wing

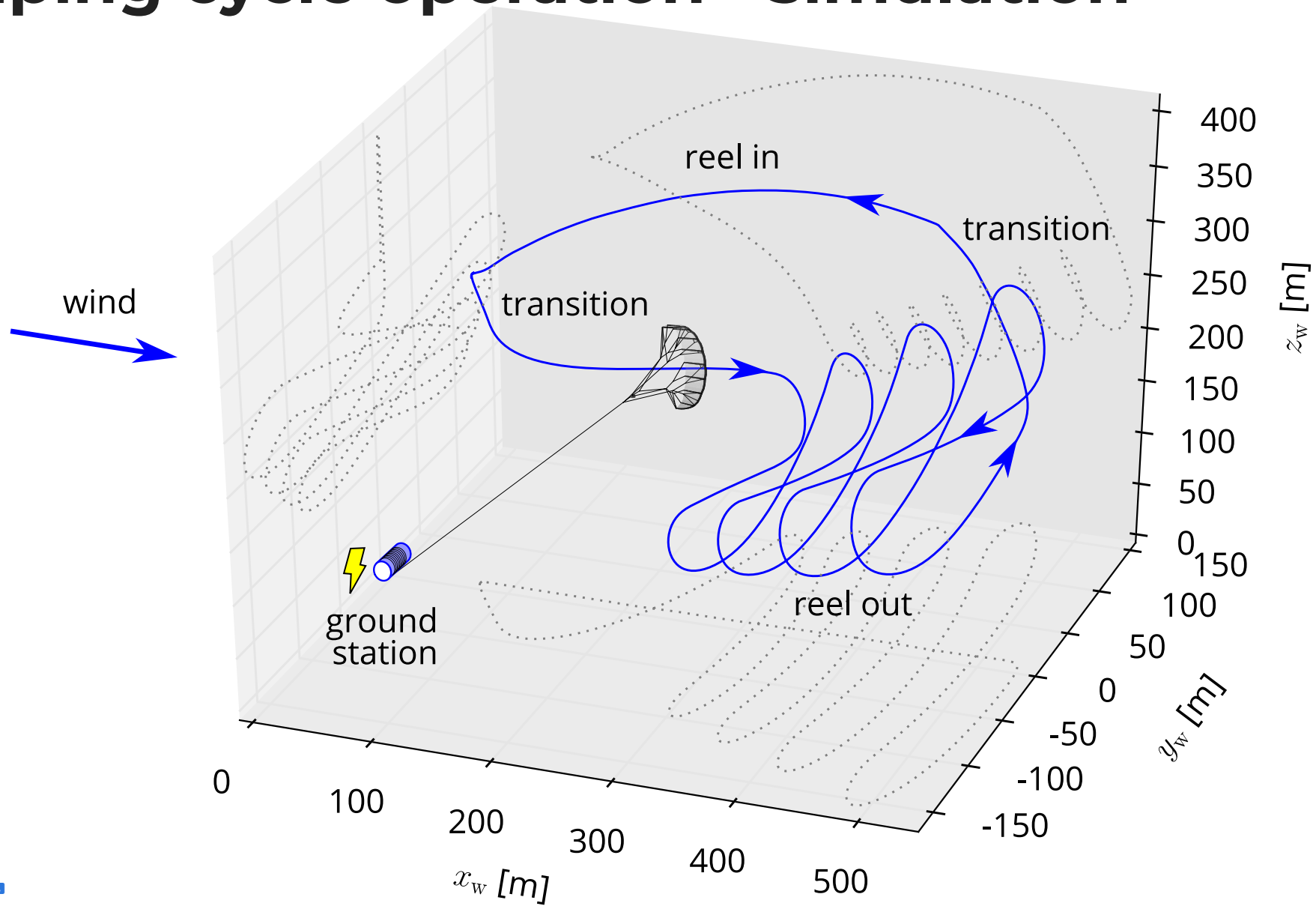
Vlugt et al. (2013)

Dynamic Simulation



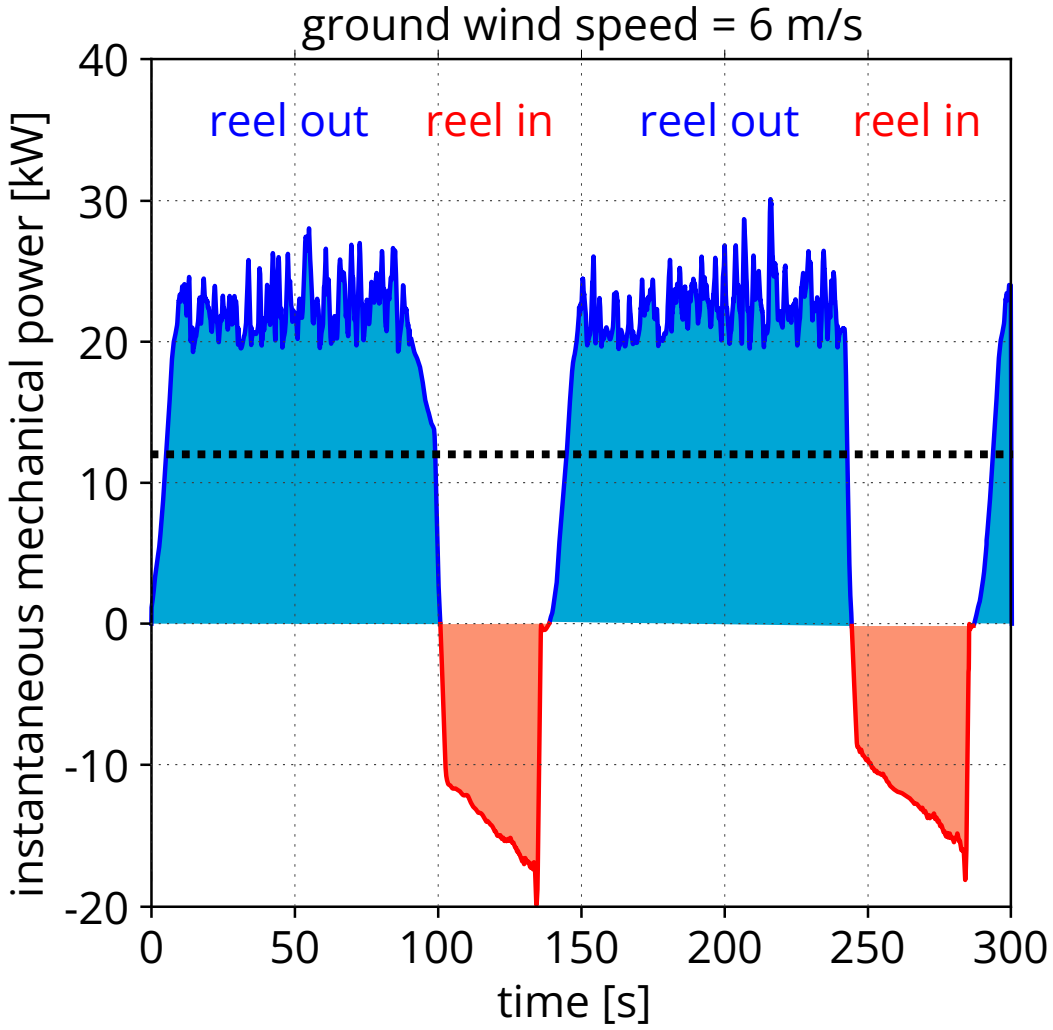
Fechner et al. (2015)

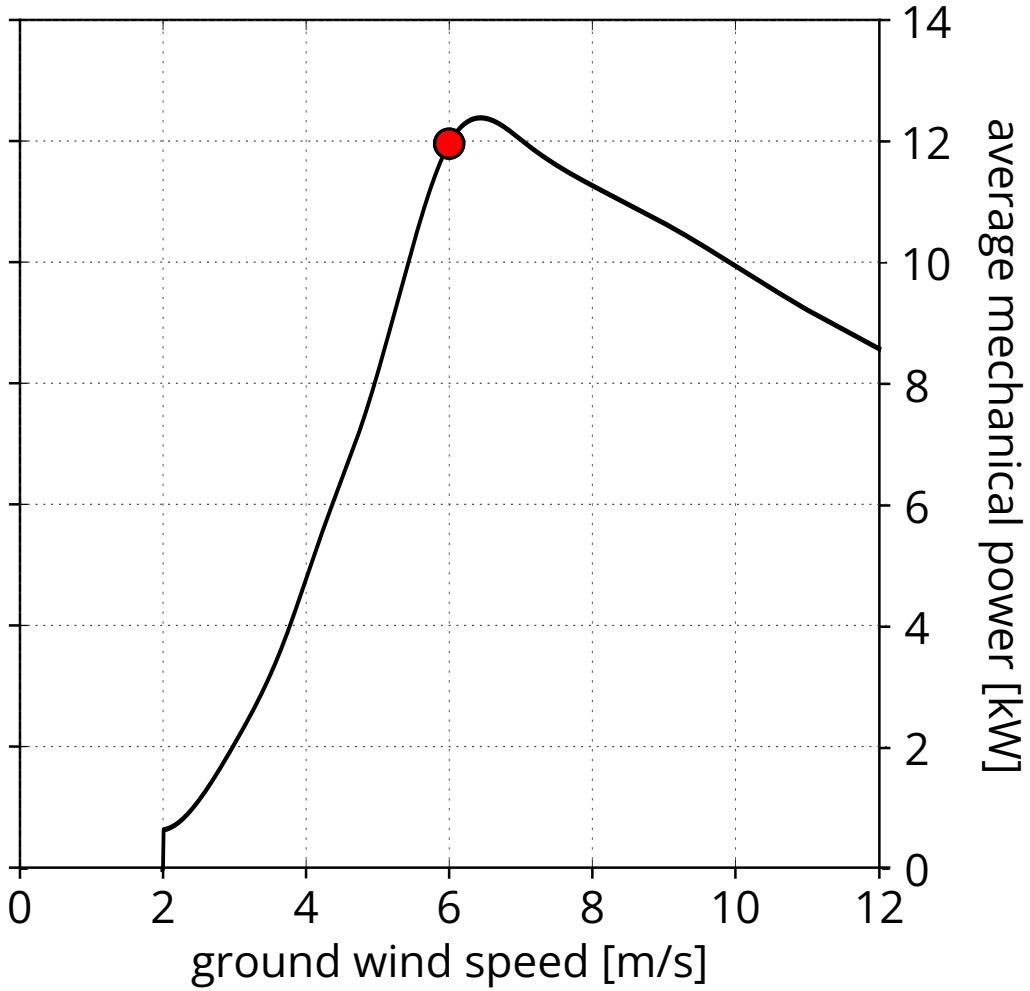
Pumping cycle operation - simulation



Fechner (2016)

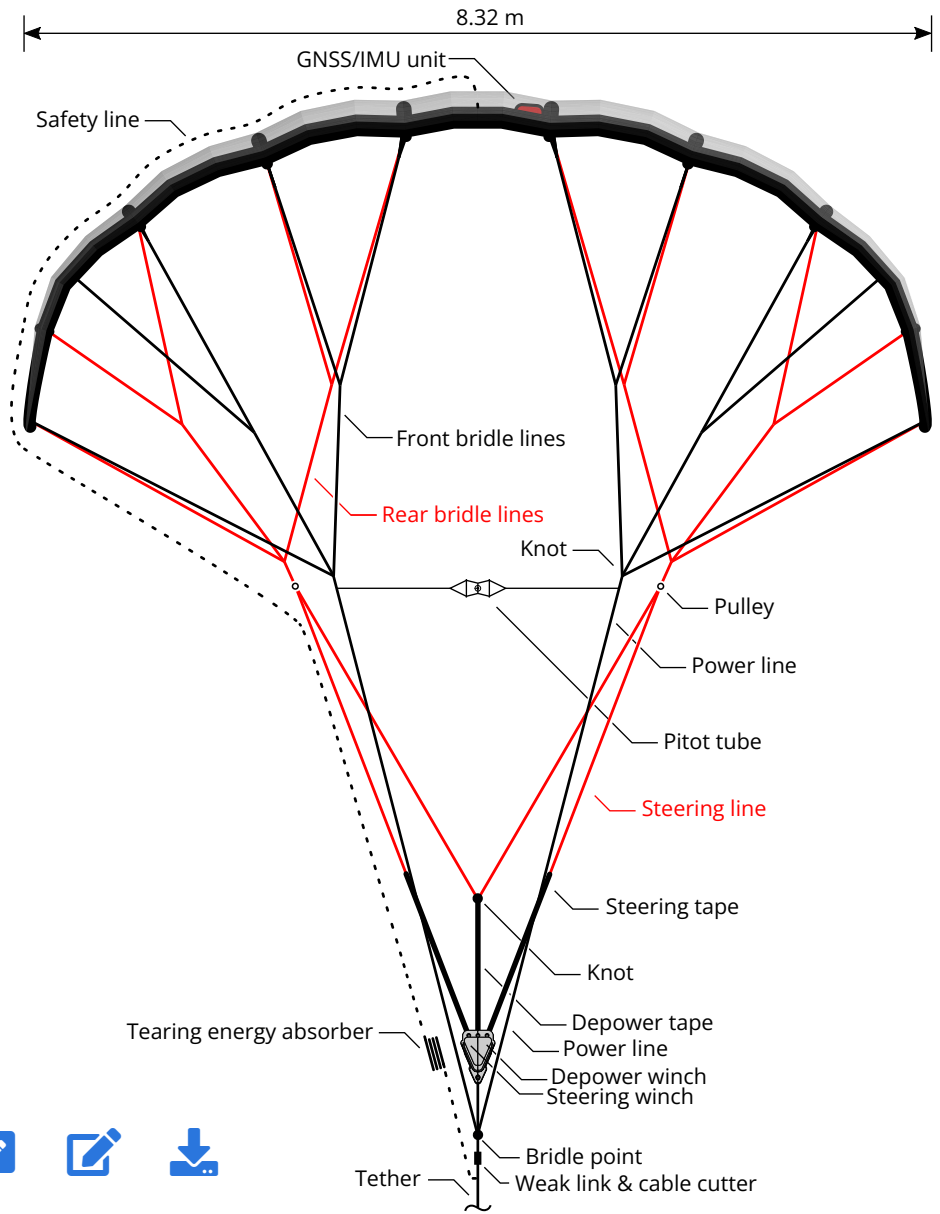
Power curve - simulation

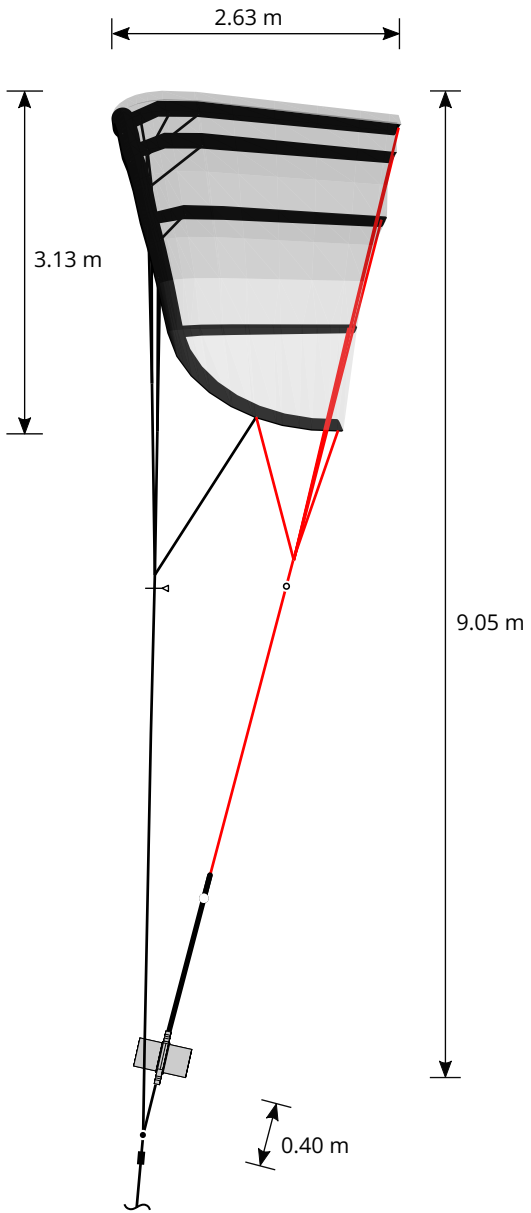


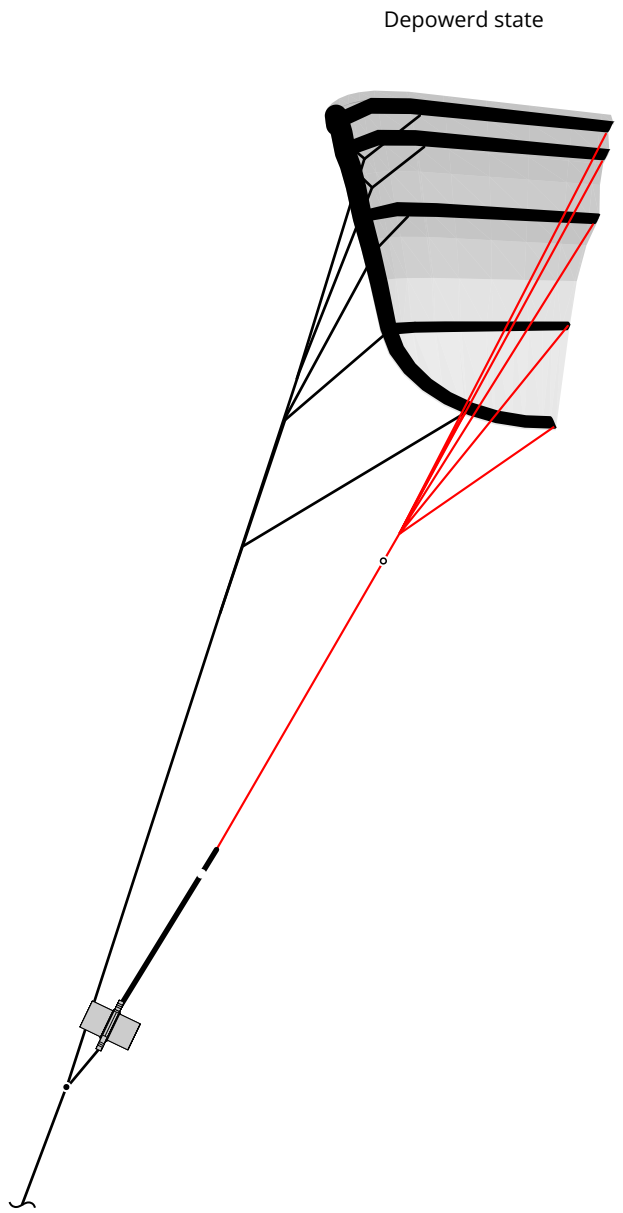


Fechner (2016) p. 166 & 181

V3 kite







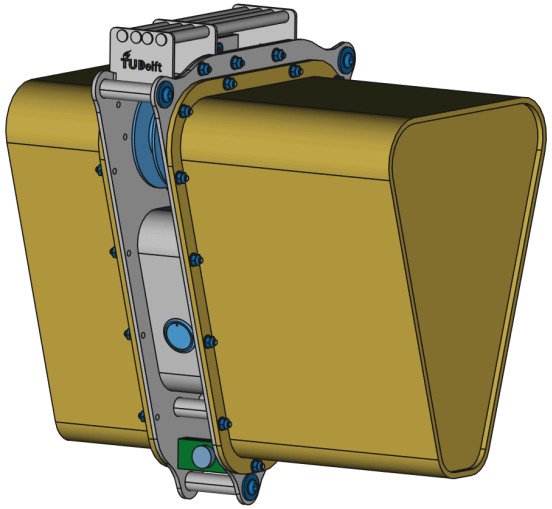
Oehler and Schmehl (2019)

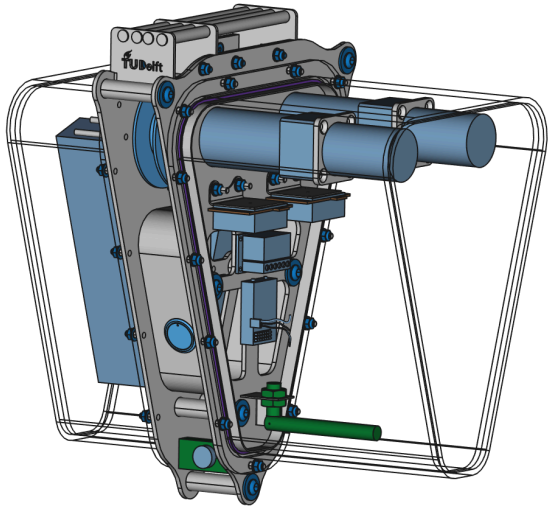
Control bridle layout in flight

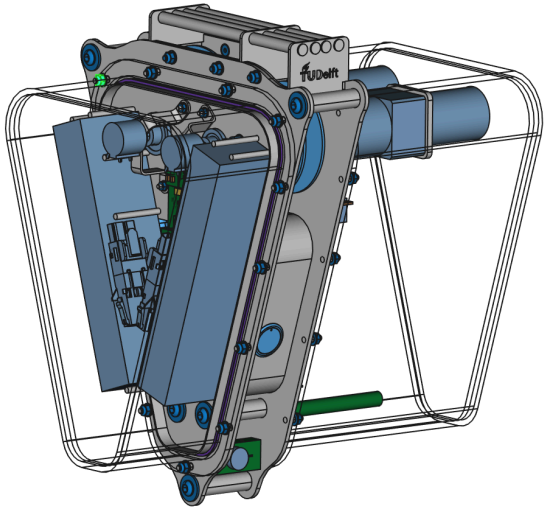


Max Dereta

Kite control unit



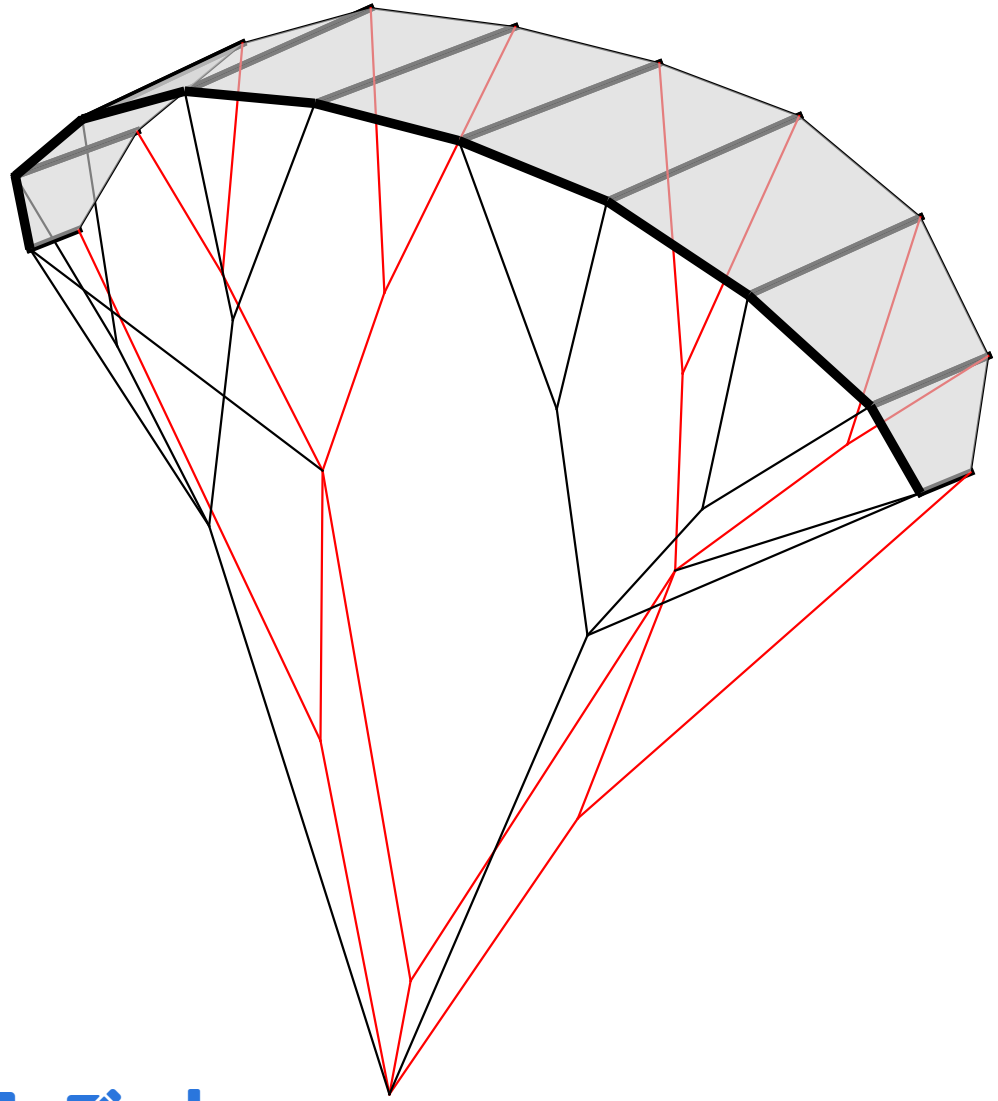


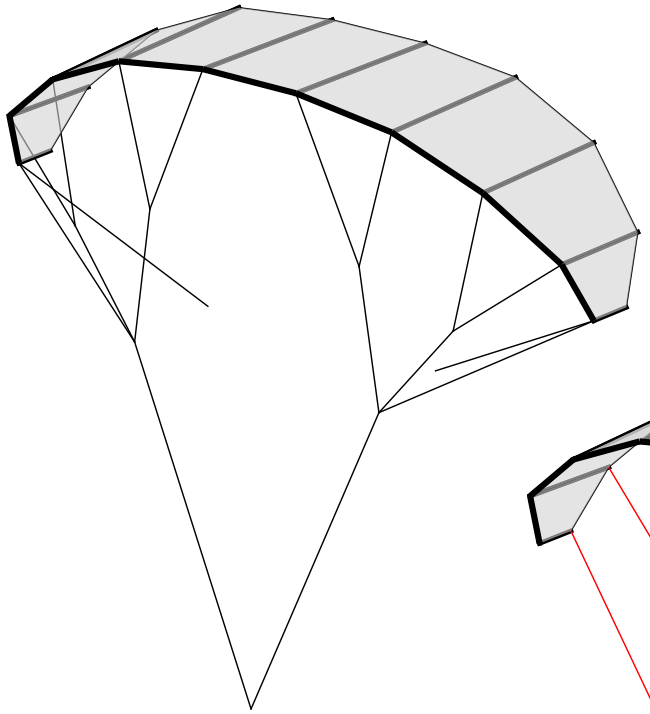


Features:

- Shock- and water-proof casing (shown without extra foam padding)
- Two separate micro winches for depowering and steering
- Depower winch includes piston brake
- Onboard computer and wifi antenna
- Rechargeable batteries for >2h flight
- Angular encoders to measure tape actuations

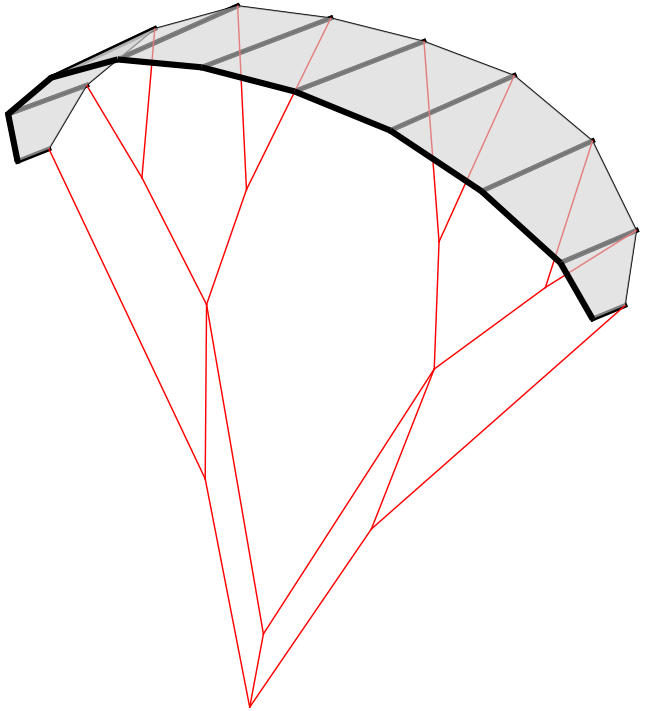
V3 kite bridle line system





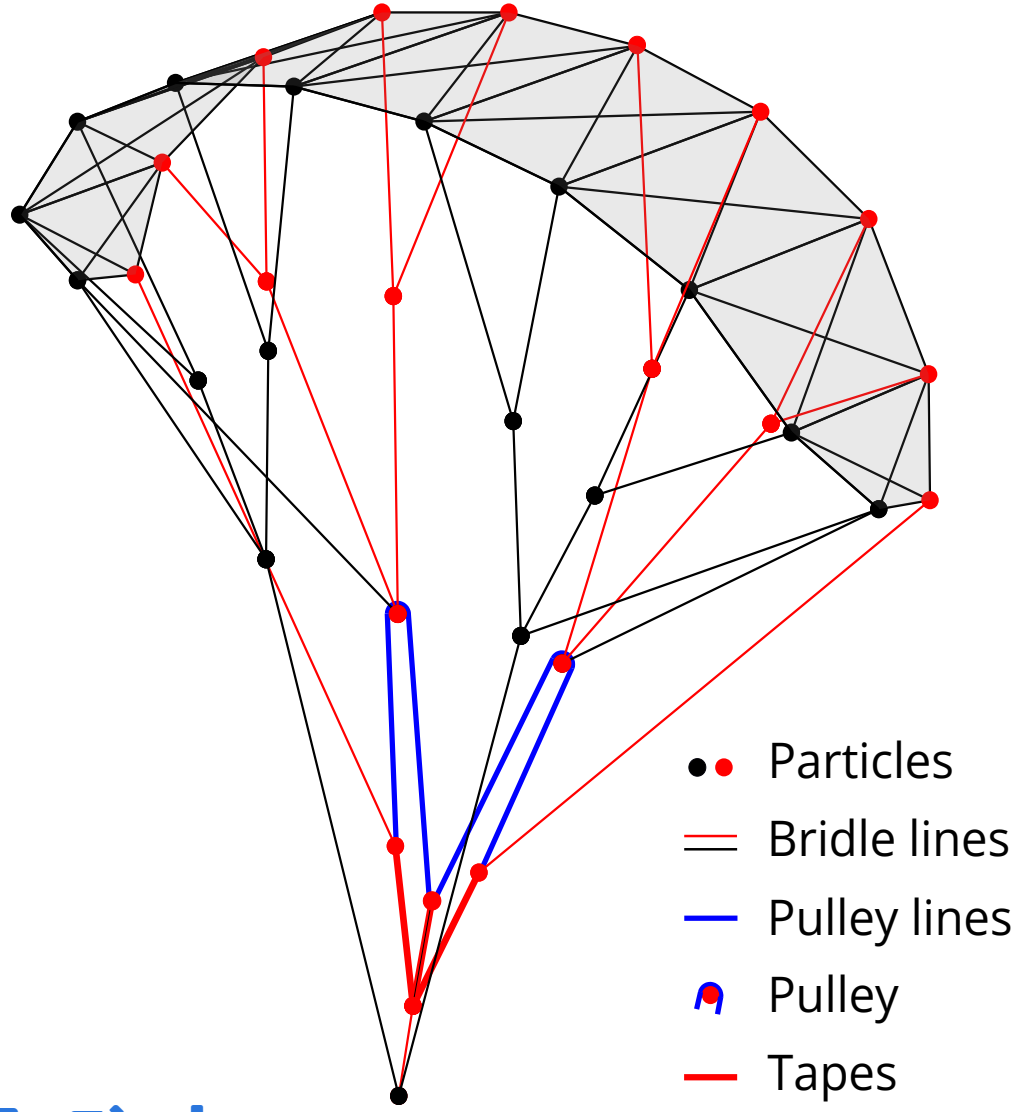
Front bridle

Rear bridle



Poland and Schmehl (2023)

V3 kite control



Video player configuration error

Error 153

Watch video on YouTube Learn more

Error 153

Left: Poland and Schmehl (2023), right: Oehler and Schmehl (2019)

V3 kite control during launching and landing



Powered



Depowered



Depowered & steering

End point of depower tape is marked.

Oehler and Schmehl (2019)

Mast-based launching and landing



TU Delft V3 kite on 25 October 2012.

Pulley mechanism



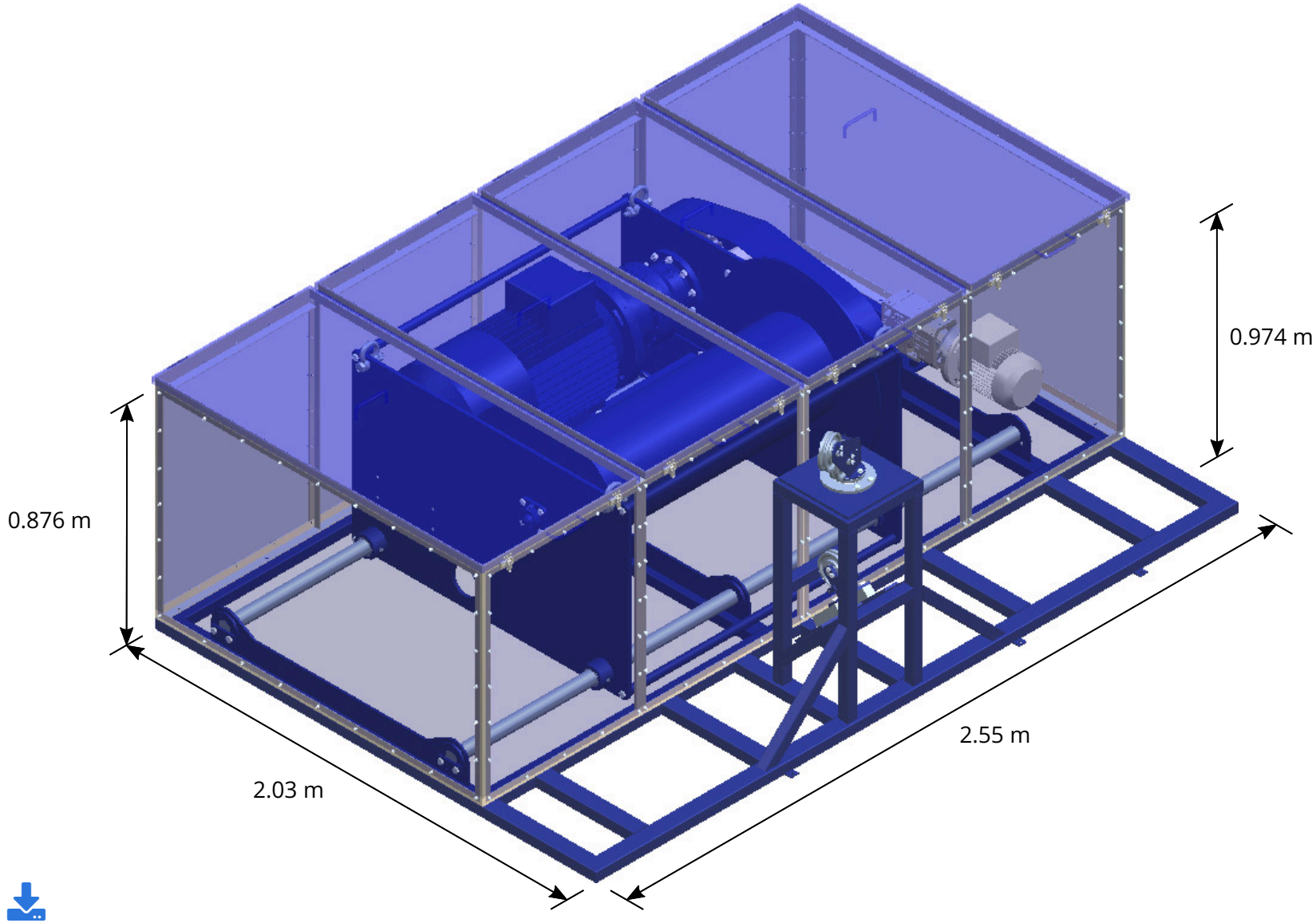
Pulley mechanism to retain the tether at the circular rail (left), gradual release of the retaining pulley (center and right)

V3 kite launching and landing

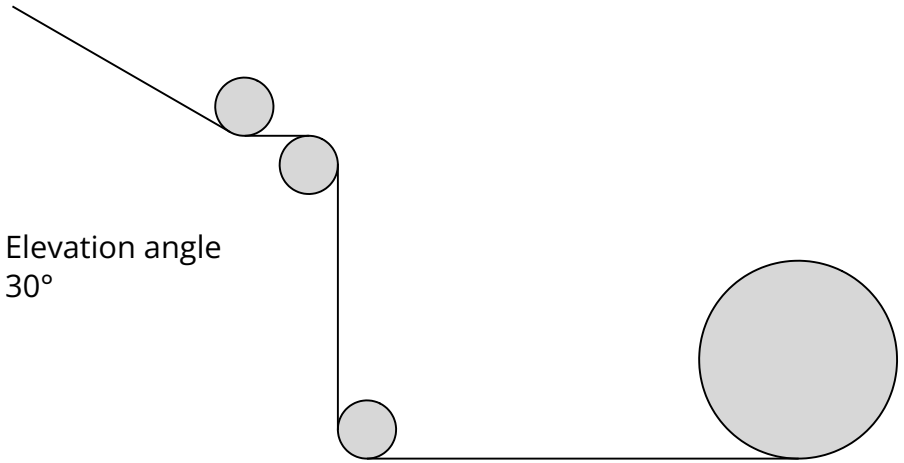
doi:10.5446/48640, doi:10.5446/48647

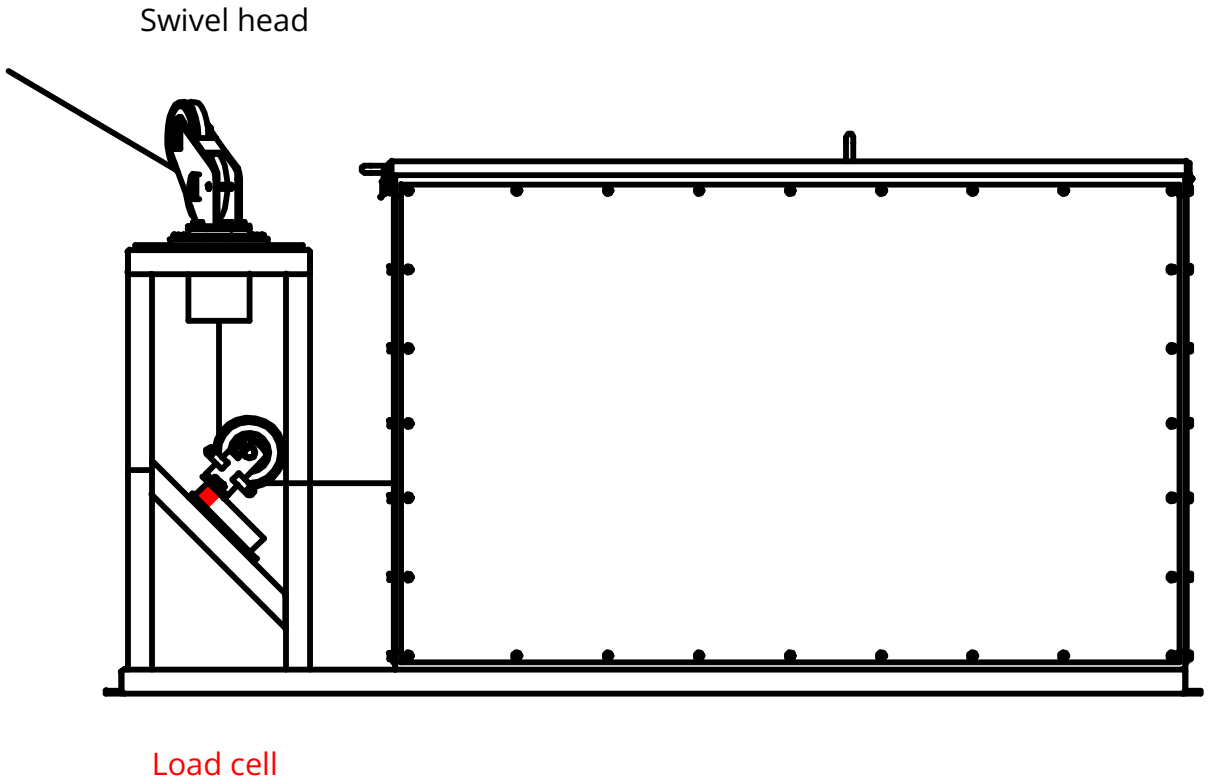


Ground station



Tether path


Elevation angle
30°
Pulley diameter
0.095 m
Drum diameter
0.323 m


Swivel head
Load cell

airborne wind energy
KITEPOWER

thekitepower.com

Years active	2015-
Headquarters	Delft, Netherlands
Type	Registered trademark of TU Delft spin-off company Enevate B.V.
Conversion concept	Pumping cycle
Kite design	Leading edge inflatable tube kite
Kite control	Suspended kite control unit
Ground connection	Single tether
Launching & landing	Winch

Daytime



Courtesy of Kitepower B.V. (2018)

Nighttime



Courtesy of Kitepower B.V. (2018)

Kitepower on Aruba (2021)



Kitepower on Aruba (2021)



System operation



System operation



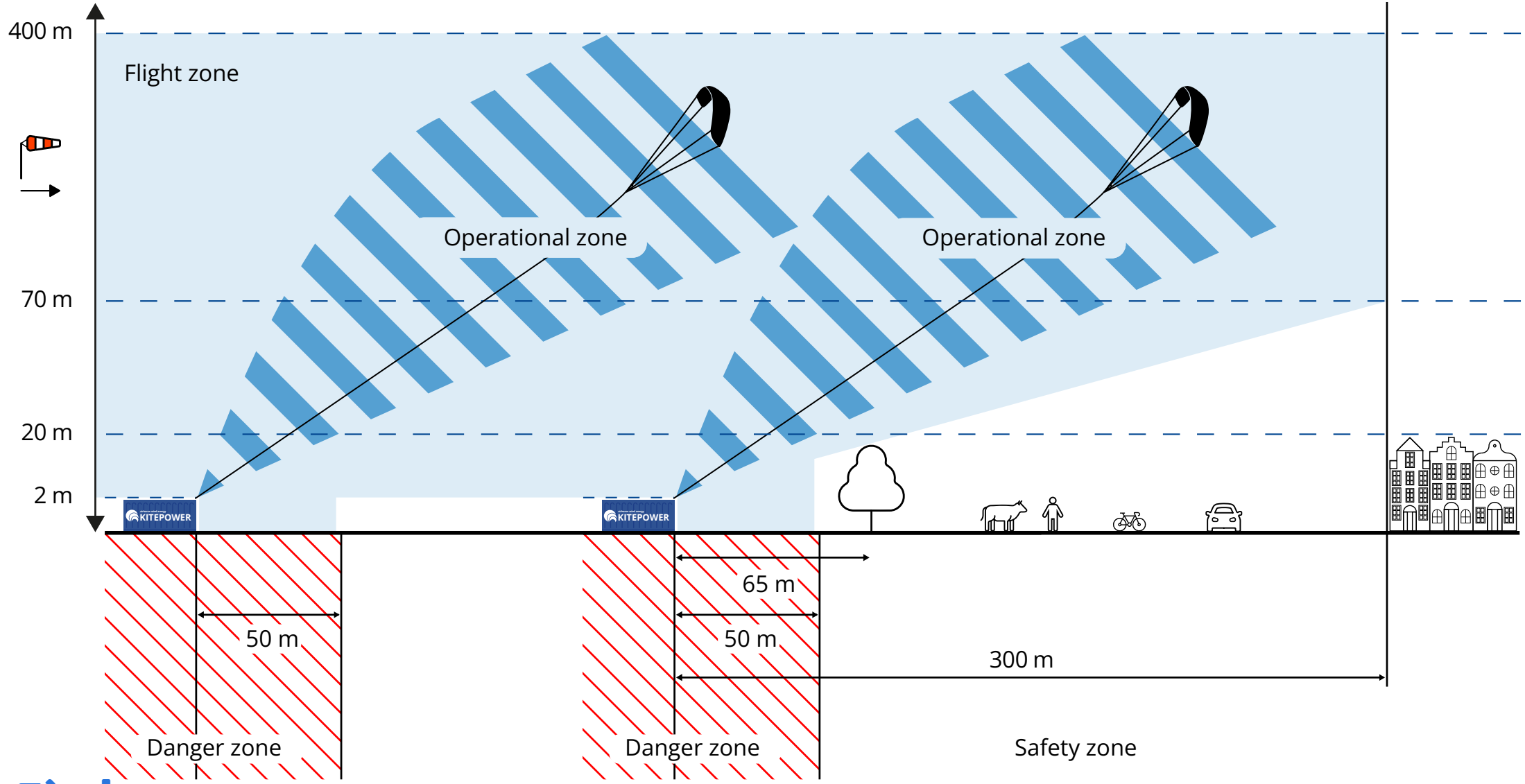
Courtesy of Kitepower B.V. (2019)

System operation



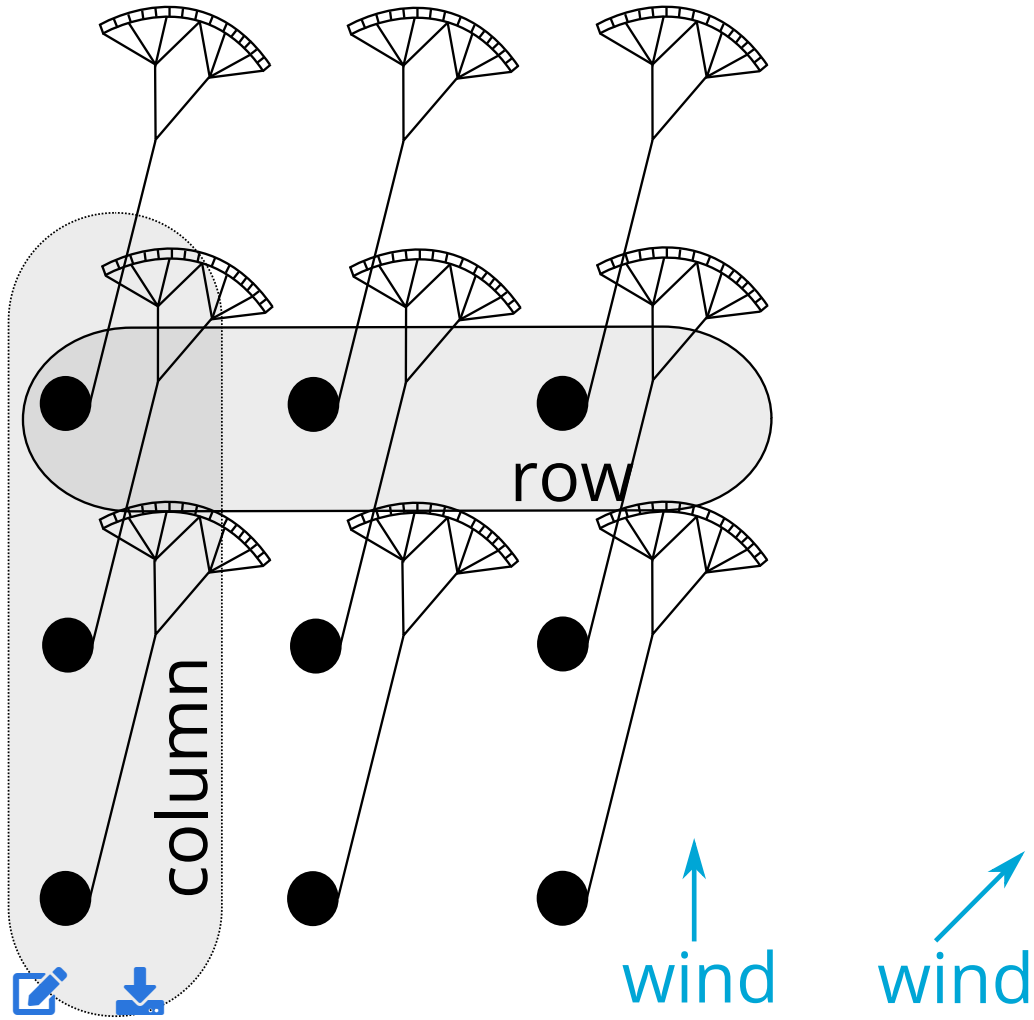
Courtesy of Kitepower B.V. (2019)

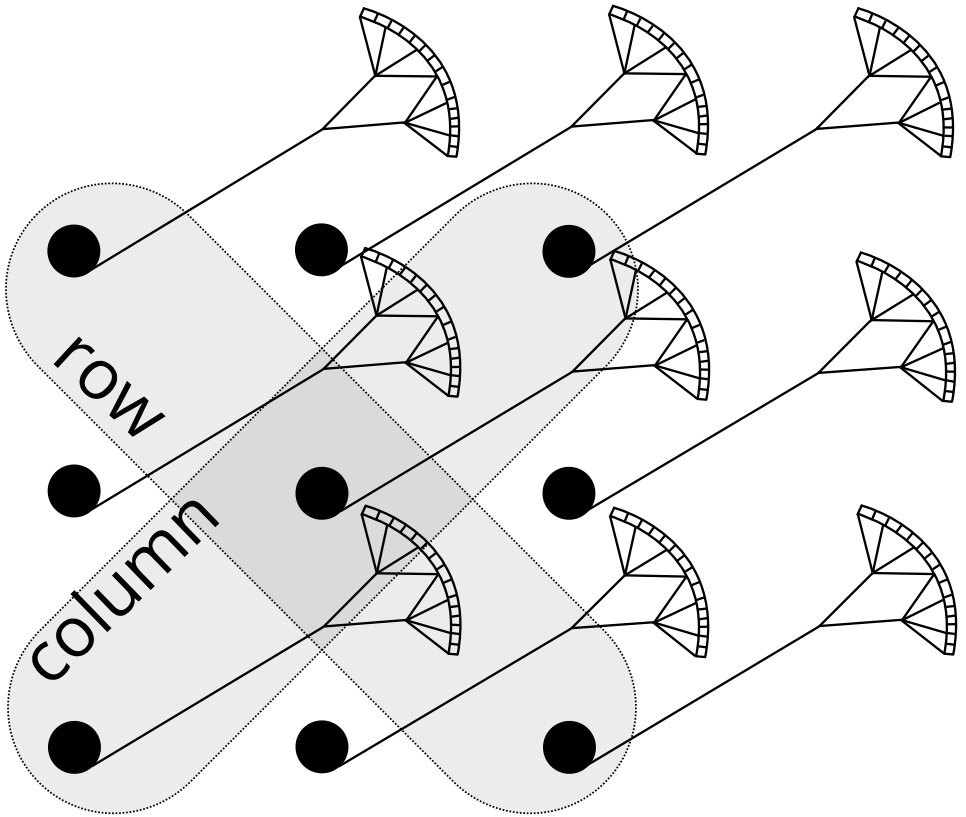
Operational zones



Salma et al. (2019)

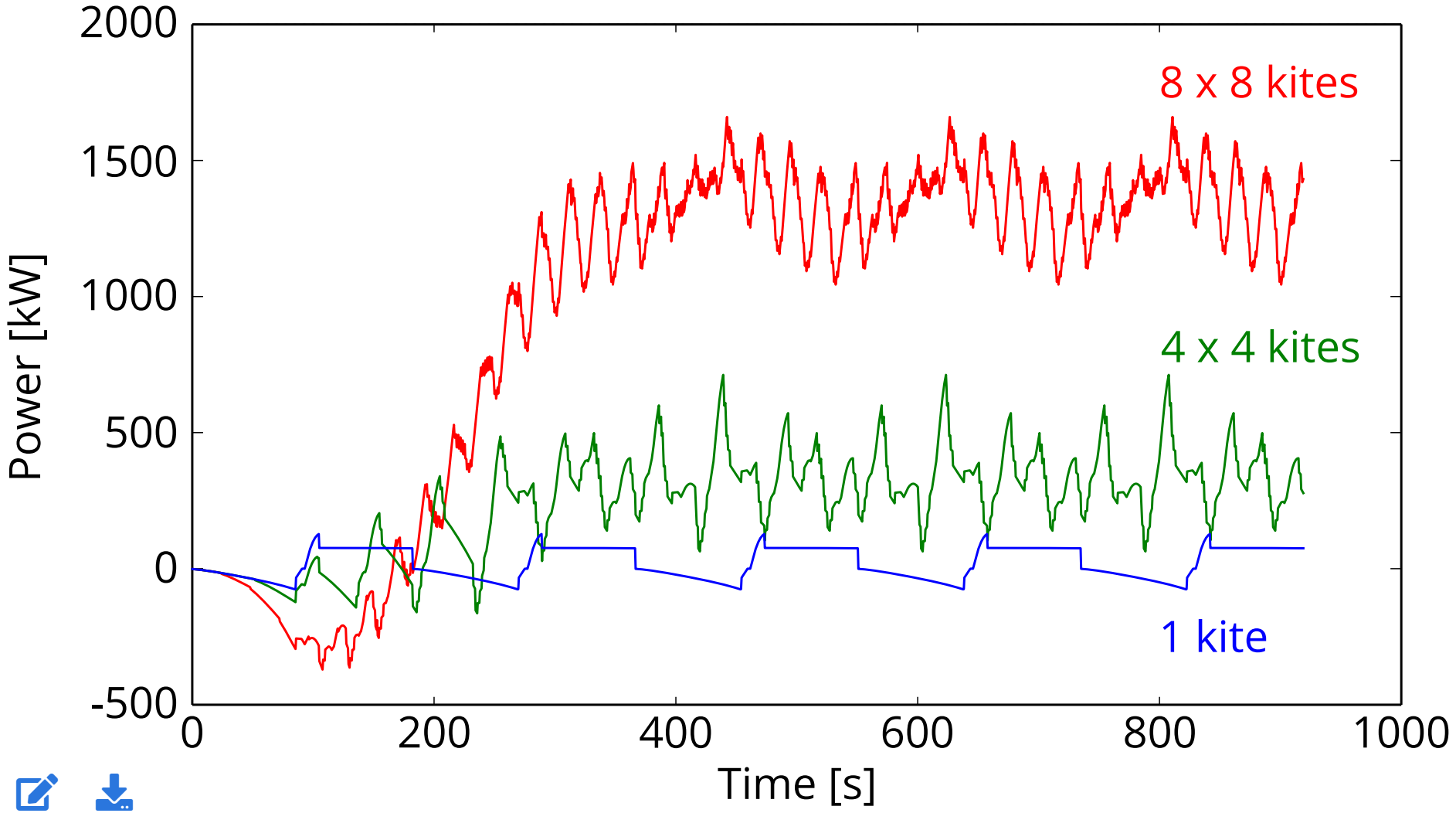
Kite park layout





Faggiani and Schmehl (2018)

Kite park power output



Faggiani and Schmehl (2018)

Ground station



Diehl et al. (2017)



Demo event May 2021, Melissant, the Netherlands (courtesy of Kitepower BV)

agiano et al. (2022)



Operation of the 100 kW system on Aruba in an exercise with the Dutch engineering corps.

Fagiano et al. (2022)

Offgrid charging

Dirksland, July 2023



Walter Hueber

Measuring audio footprint

Dirksland, July 2023



Kitepower

Bangor Erris AWES test center



Kitepower


Bangor Erris, 4 July 2024
KITEPOWER
Kitepower
7 . 18


Bangor Erris, 3 March 2025
Kitepower
7 . 19

Onboard wind turbine



RWE’s AWE test center at Bangor Erris



Video player configuration error

Error 153

Watch video on YouTube Learn more



Transporting the kite at Bangor Erris.

Paul Faith, AFP



Deploying the kite at Bangor Erris.

Paul Faith, AFP



RTÉ

We Care About Your Privacy

We and our **11** partners store and/or access information on a device, such as unique IDs in cookies to process personal data. You may accept or manage your choices by clicking below, including your right to object where legitimate interest is used, or at any time in the privacy policy page. These choices will be signaled to our partners and will not affect browsing data. **View our Cookie Policy** **View our Privacy Policy**

We and our partners process data to provide:

Use precise geolocation data. Actively scan device characteristics for identification. Store and/or access information on a device. Develop and improve services. Measure content performance. Understand audiences through statistics or combinations of data from different sources. Use limited data to select advertising. Create profiles for personalised advertising. Use profiles to select personalised advertising. Create profiles to personalise content. Use profiles to select personalised content. Measure advertising performance.

List of Partners (vendors)

Show Purposes | **Allow Only Necessary** | **Allow All**





02:00

launching customers

Dike reinforcement de Waal, Tiel-Waardenburg), 18 June 2025



Dura Vermeer/Jorrit Lousberg



Launching customers

Construction project A27 Houten - Hooipolder 24 October 2025



Launching customers

Construction project A27 Houten - Hooipolder 24 October 2025



Studio Retouched

Kitenergy

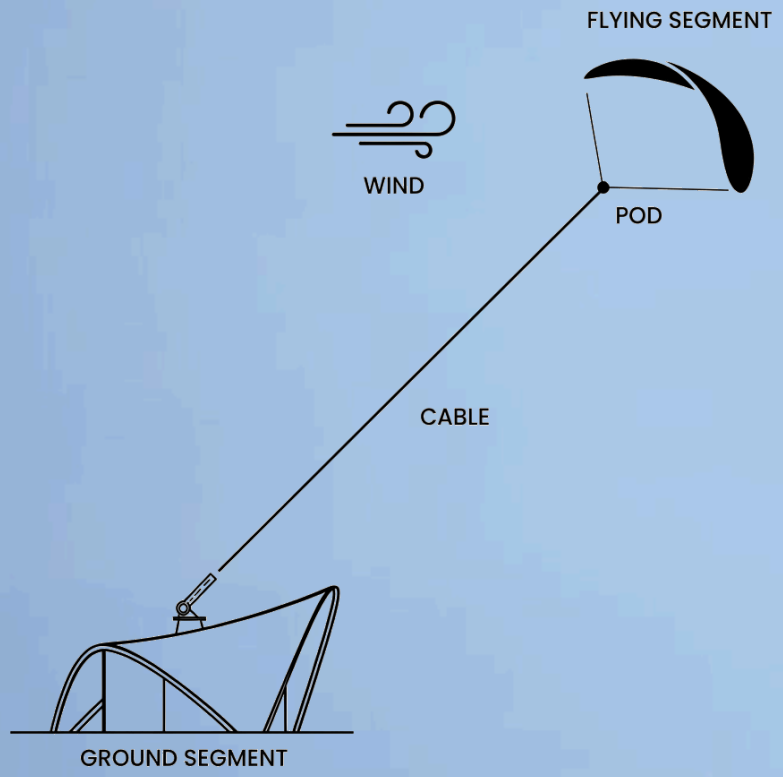
kitenrg.com

Years active	2010-
Headquarters	Turin, Italy
Type	Company
Conversion concept	Pumping cycle
Kite design	Ram-air kite
Kite control	Multiple winches on ground station
Ground connection	Multiple tethers
Launching & landing	Winch

KE60 Mark II



K100





TOYOTA

global.toyota/en/

Years active	2018-
Headquarters	Japan, USA
Type	Company
Conversion concept	Pumping cycle
Kite design	Leading edge inflatable kite
Kite control	Aerodynamic control surfaces
Ground connection	Single tether
Launching & landing	Winch

Mothership v11



Years active	2024-
Headquarters	Beijing, China
Type	Company
Conversion concept	Pumping cycle
Kite design	Parachute
Kite control	Power/depower mode
Ground connection	Single tether
Launching & landing	Pilot parachute

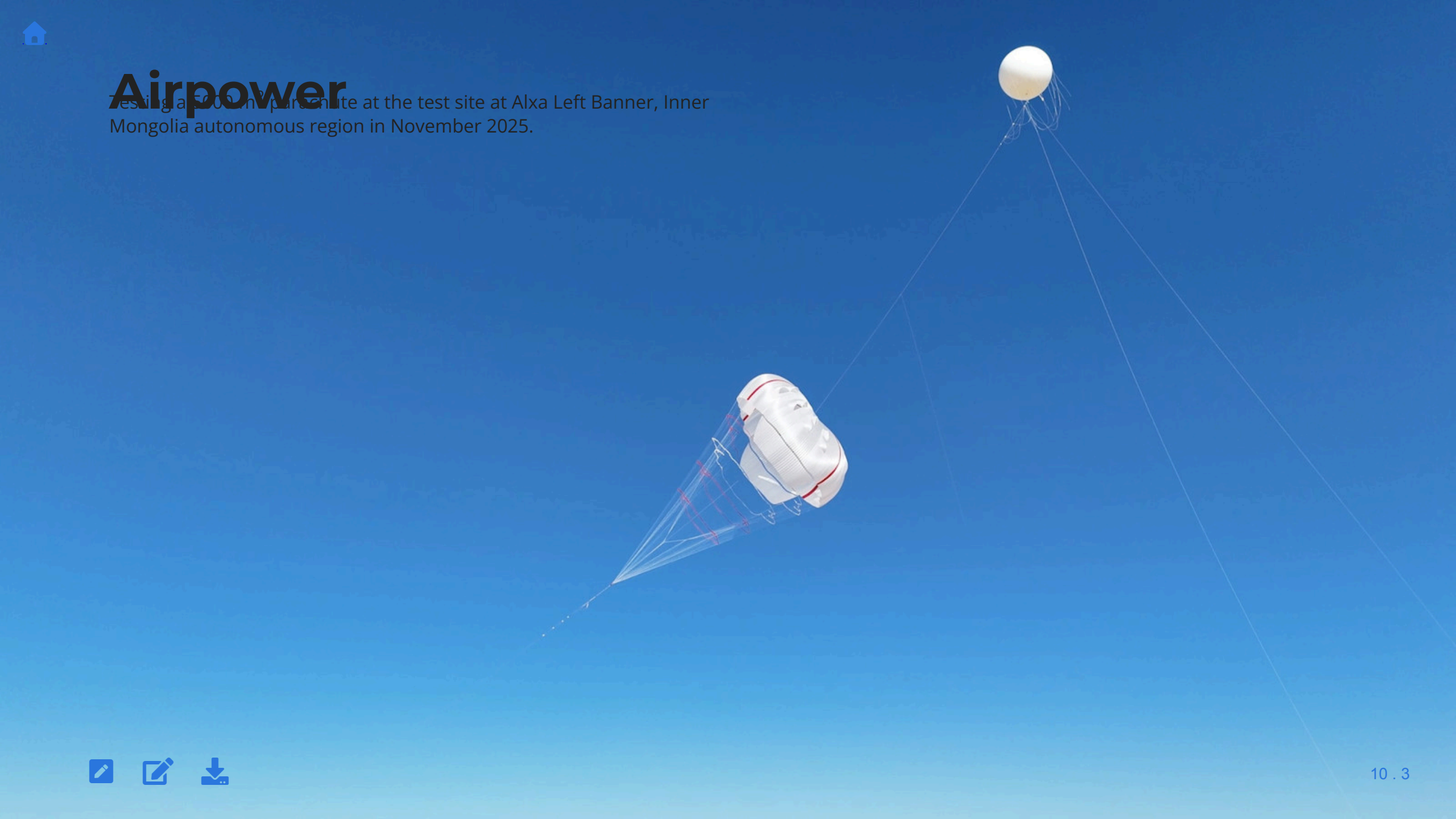
Airpower



Parachute-based prototype during take-off.

Airpower

Testing a 500-m² parachute at the test site at Alxa Left Banner, Inner Mongolia autonomous region in November 2025.



SAWES

sawestoone.com

Years active	2023-
Headquarters	Beijing, China
Type	Company
Conversion concept	Ducted airborne turbine
Kite design	Shrouded blimp
Kite control	Static
Ground connection	Tether
Launching & landing	Aerostatic lift

SAWES S2000



SAWES S2000



wind fisher

www.wind-fisher.com

Years active	2021-
Headquarters	Les Adrets, France
Type	Company
Conversion concept	Pumping cycle
Kite design	Magnus rotor
Kite control	Control tethers and cylinder rotation
Ground connection	Two tethers
Launching & landing	Aerostatic and aerodynamic lift

MAG1 kite



MAG1 tow test



MAG1 control



View from kite to towing vehicle.

MAG15 prototype first autonomous flight



Video player configuration error

Error 153

Watch video on YouTube Learn more

Error 153

EnerKíte

enerkite.de

Years active	2010-
Headquarters	Berlin, Germany
Type	Spin-off company of TU Berlin
Conversion concept	Pumping cycle
Kite design	Hybrid swept wing without fuselage
Kite control	Multiple winches on ground station
Ground connection	Three separate tethers & bridle line system
Launching & landing	Rotational HTOL with mast

EnerKíte



Enerkite swept wing

Video player configuration error

Error 153

Watch video on YouTube Learn more

Enerkite swept wing



ampyxpower.com

Years active	2008-2022 (continued as Mozaero / Fuchszeug B.V.)
Headquarters	The Hague, Netherlands
Type	Spin-off company of TU Delft
Conversion concept	Pumping cycle
Kite design	Fixed wing with double fuselage & tailplane
Kite control	Aerodynamic control surfaces
Ground connection	Single tether
Launching & landing	Linear HTOL with catapult

AP-1B1



Launch on 29 September 2012 (Schmehl 2015)

AP-2



AP-2



AP-2



AP-2



AP-2



AP-2

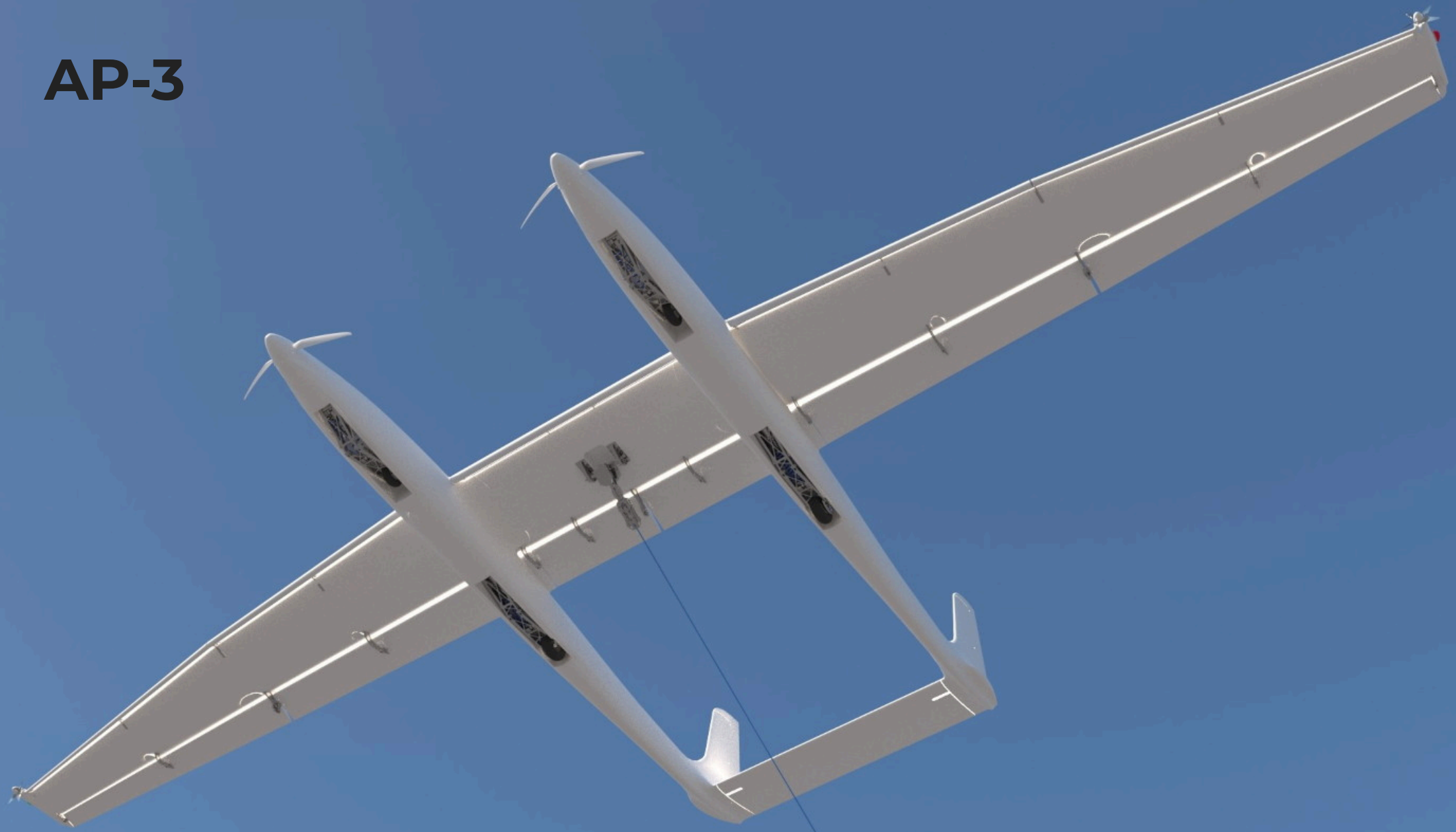


ampyxpower.com/

AP-2

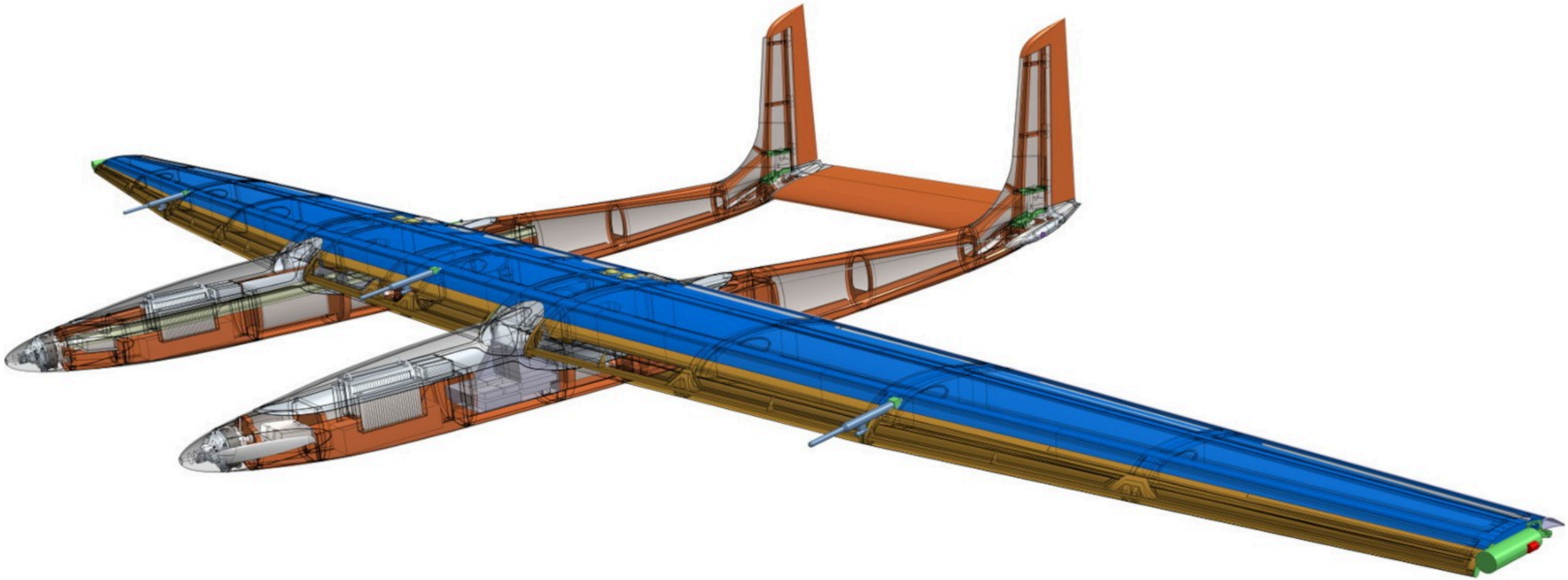


AP-3



nlr.org/news/sustainability-by-a-crossover-technology/

AP-3



Diehl et al. (2017)

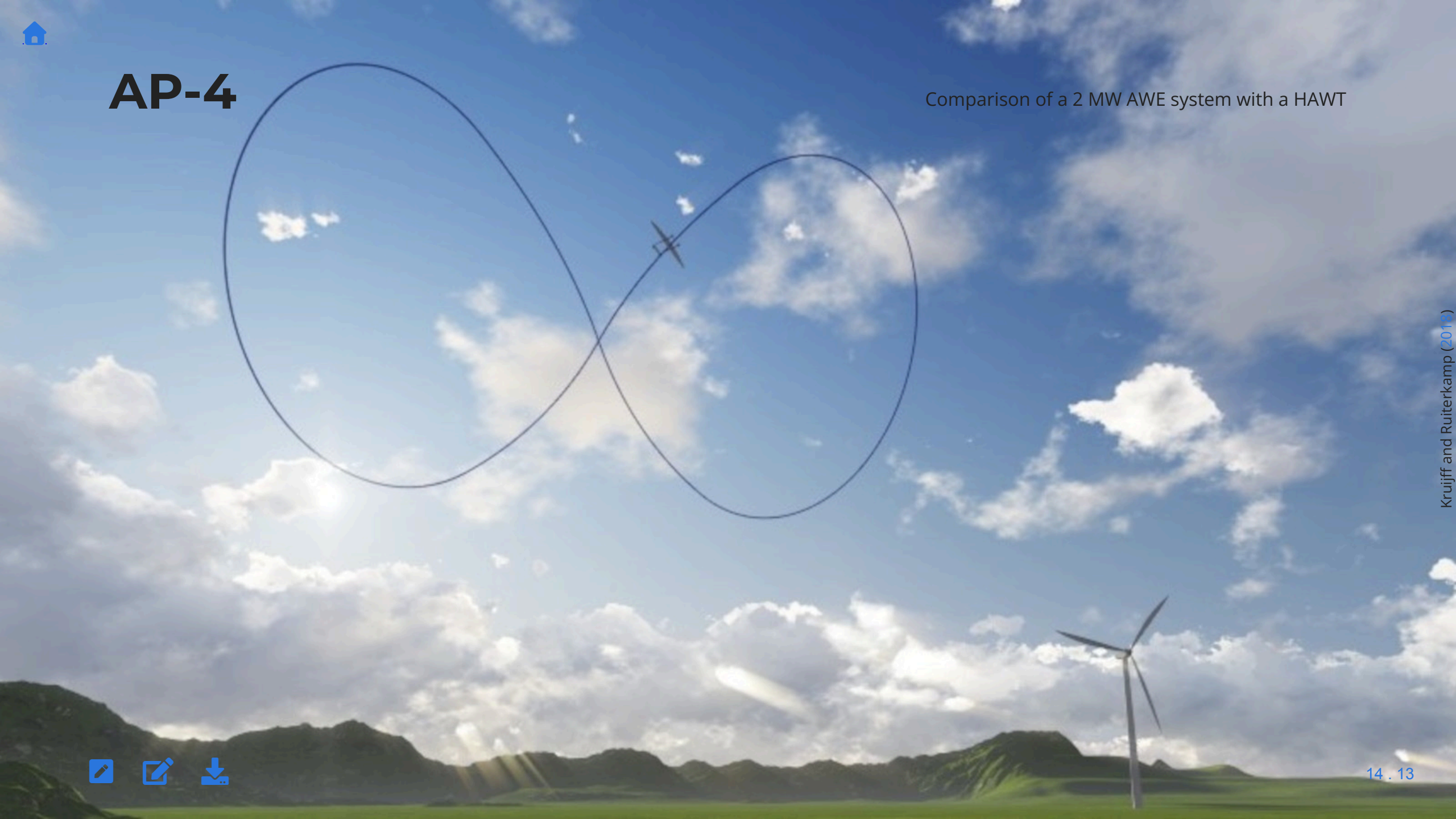
AP-3



Two prototypes in the workshop in May 2021

AP-4

Comparison of a 2 MW AWE system with a HAWT



Kruijff and Ruiterkamp (2018)

AP-4 floating windpark



MOZAERO

mozaero.com

Years active	2022- (continued from Ampyx Power B.V.)
Headquarters	Breda, Netherlands
Type	Project of Fuchszeug B.V.
Conversion concept	Pumping cycle
Kite design	Fixed wing with double fuselage & tailplane
Kite control	Aerodynamic control surfaces
Ground connection	Single tether
Launching & landing	Linear HTOL with catapult

AP-3



Breda International Airport in May 2021

AP-3



Breda International Airport in May 2021

AP-3

Breda International Airport in May 2021



AP-3



Breda International Airport in May 2021

AP-3 untethered flight



Oostwold Airport in November 2023

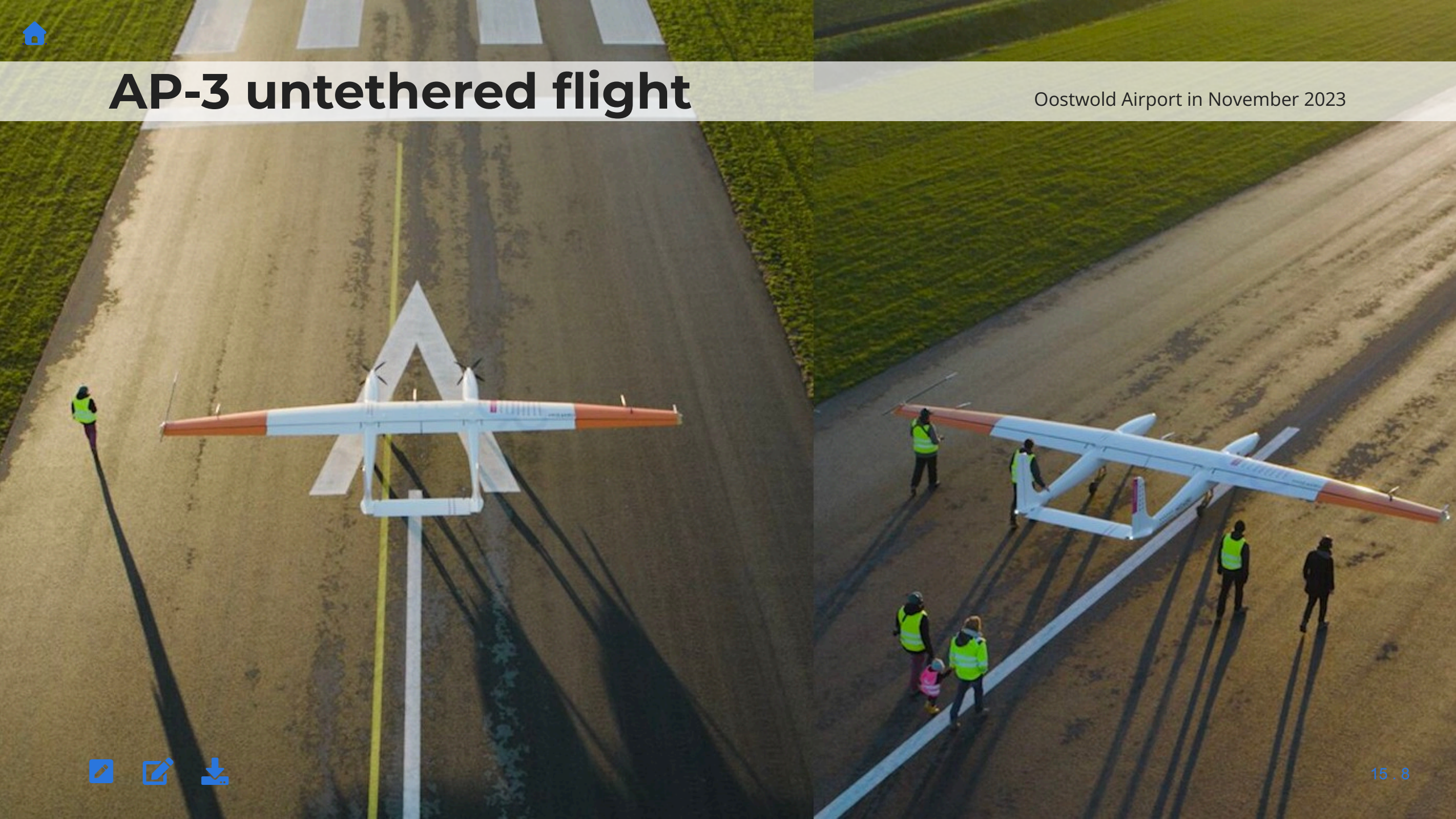
AP-3 untethered flight

Oostwold Airport in November 2023



AP-3 untethered flight

Oostwold Airport in November 2023



Mozaero

KITEMILL

kitemill.com

Years active	2008-
Headquarters	Voss, Norway
Type	Company (absorbed E-Kite and KPS)
Conversion concept	Pumping cycle
Kite design	Fixed wing with single fuselage & tailplane
Kite control	Aerodynamic control surfaces
Ground connection	Single tether
Launching & landing	VTOL

Kite producing up to 20 kW

Kitemill's KM1 prototype during testing, Lista, Norway.

Video player configuration error

Error 153

Watch video on YouTube Learn more

TWINGTEC
WIND ENERGY 2.0

twingtec.ch

Years active	2013-2026
Headquarters	Dübendorf, Switzerland
Type	Spin-off company of EMPA
Conversion concept	Pumping cycle
Kite design	Fixed wing with single fuselage & tailplane
Kite control	Aerodynamic control surfaces
Ground connection	Single tether
Launching & landing	VTOL

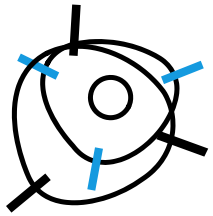
Comparison

TwingTec pilot next to wind turbine of comparable power (Schmehl and Tulloch 2019)



TwingTec





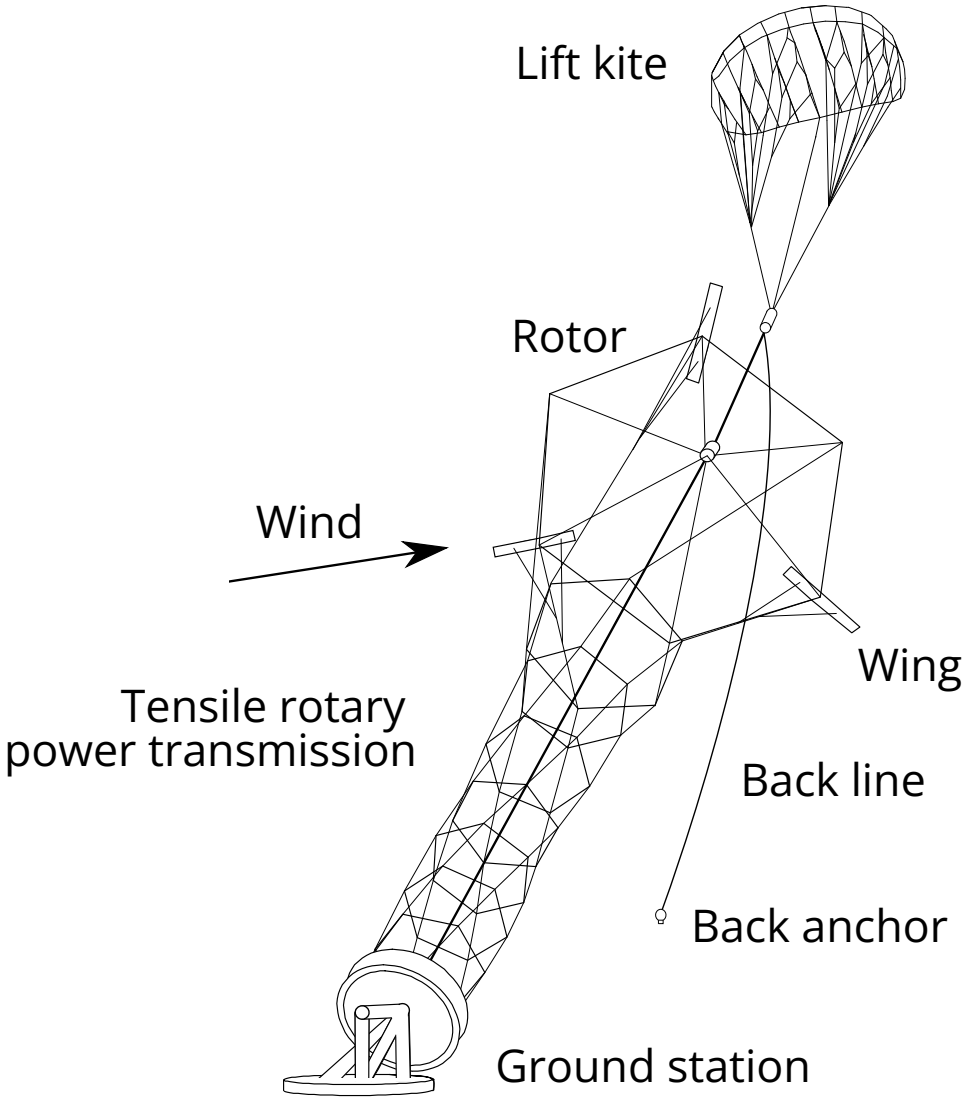
Windswept

windswept.energy

Years active	2012-
Headquarters	Lerwick, Shetland, United Kingdom
Type	Company, affiliated to University of Strathclyde
Conversion concept	Tensile torque transfer to ground generator
Kite design	Rotating autogyro kite with fixed wings
Kite control	Yaw stall via lift bearing on rotor top-side
Ground connection	5x networked rotary tethers & backline anchor
Launching & landing	Pilot kite and backline anchor

Kite Turbine





Windswept (left) | Tulloch et al. (2022) (right)

Kite Turbine sideview




2019/05/17 19:49:19
Windswept
18 . 4



someawe.org

Years active	2017-
Headquarters	Alicante, Spain
Type	Company
Conversion concept	Tensile torque transfer to ground generator
Kite design	Rotating kite with fixed wings
Kite control	Passive with pilot kite or cyclic pitch control
Ground connection	Networked tethers
Launching & landing	Pilot kite

MAR3



someAWE



windlift.com

Years active	2006-
Headquarters	Morrisville, NC, USA
Type	Company
Conversion concept	Onboard wind turbines
Kite design	Fixed wing with single fuselage & tailplane
Kite control	Aerodynamic control surfaces & onboard turbines
Ground connection	Single tether
Launching & landing	VTOL

Windlift C1



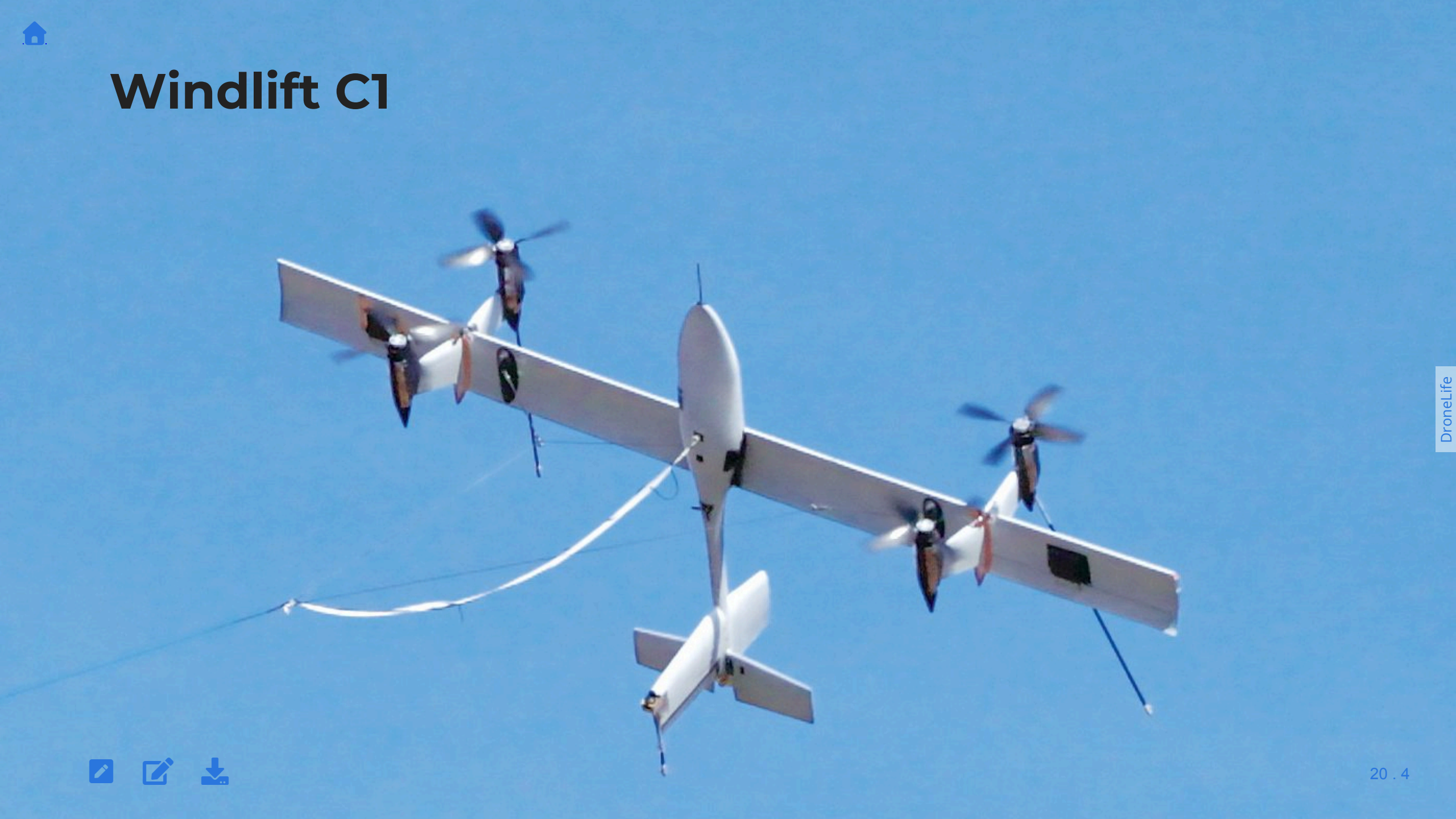
CoastalReview

Windlift C1



CoastalReview

Windlift C1



DroneLife



Windlift vision

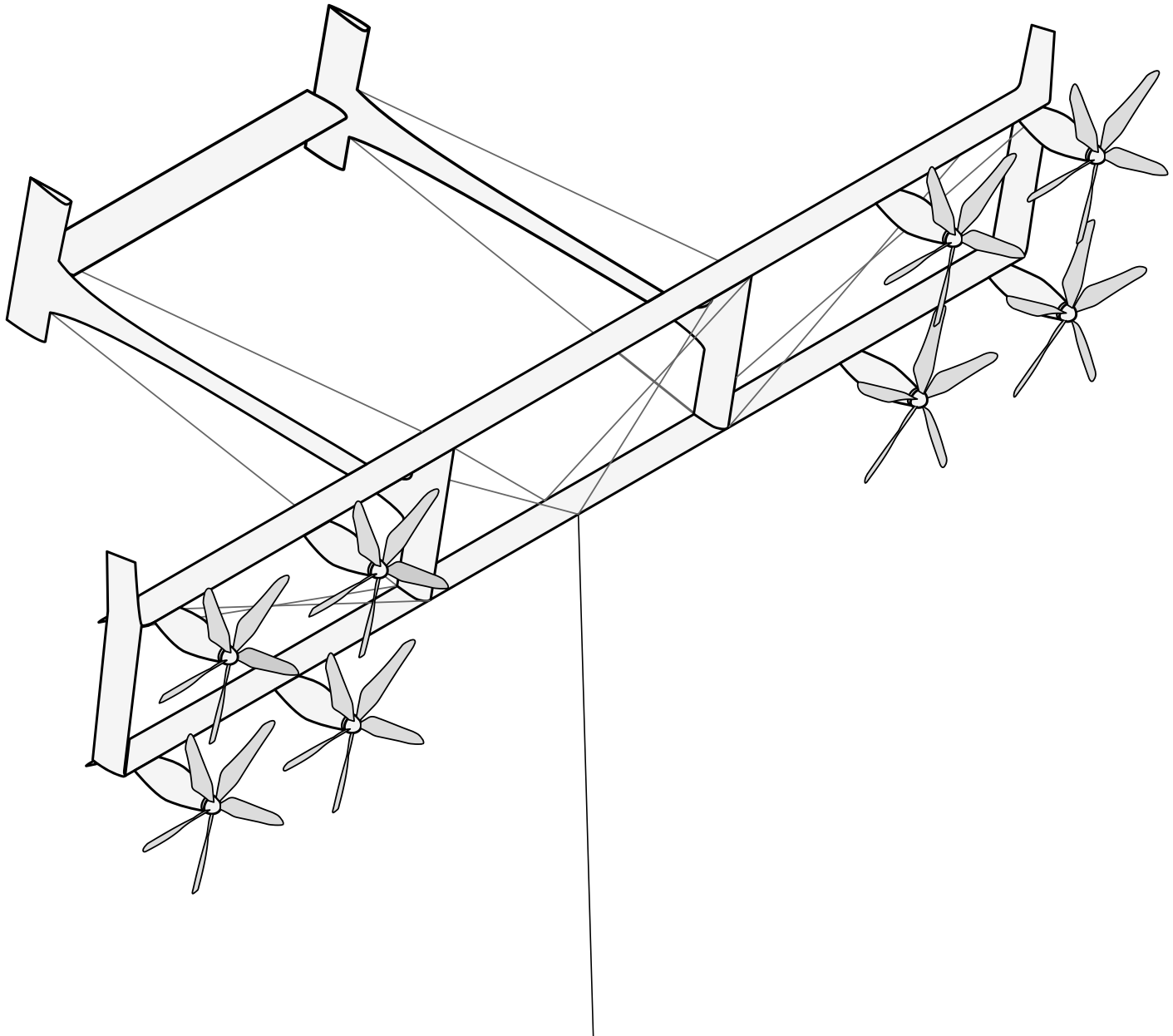


KITE//KRAFT

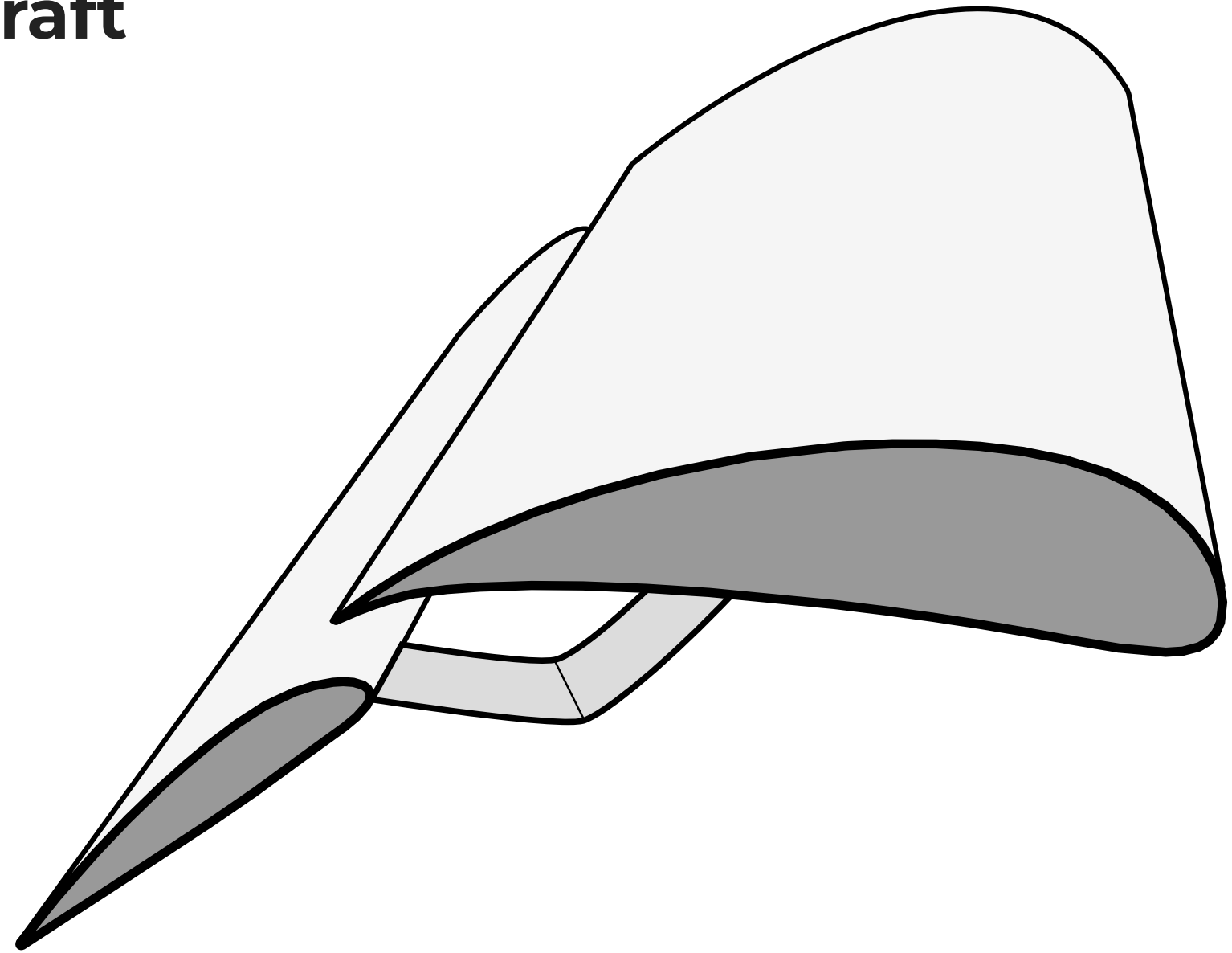
kitekraft.de
@Kitekraft

Years active	2019-2025
Headquarters	Munich, Germany
Type	Spin-off company of TU Munich
Conversion concept	Onboard wind turbines
Kite design	Box wing with double fuselage & tailplane
Kite control	Aerodynamic control surfaces & onboard turbines
Ground connection	Single tether
Launching & landing	VTOL

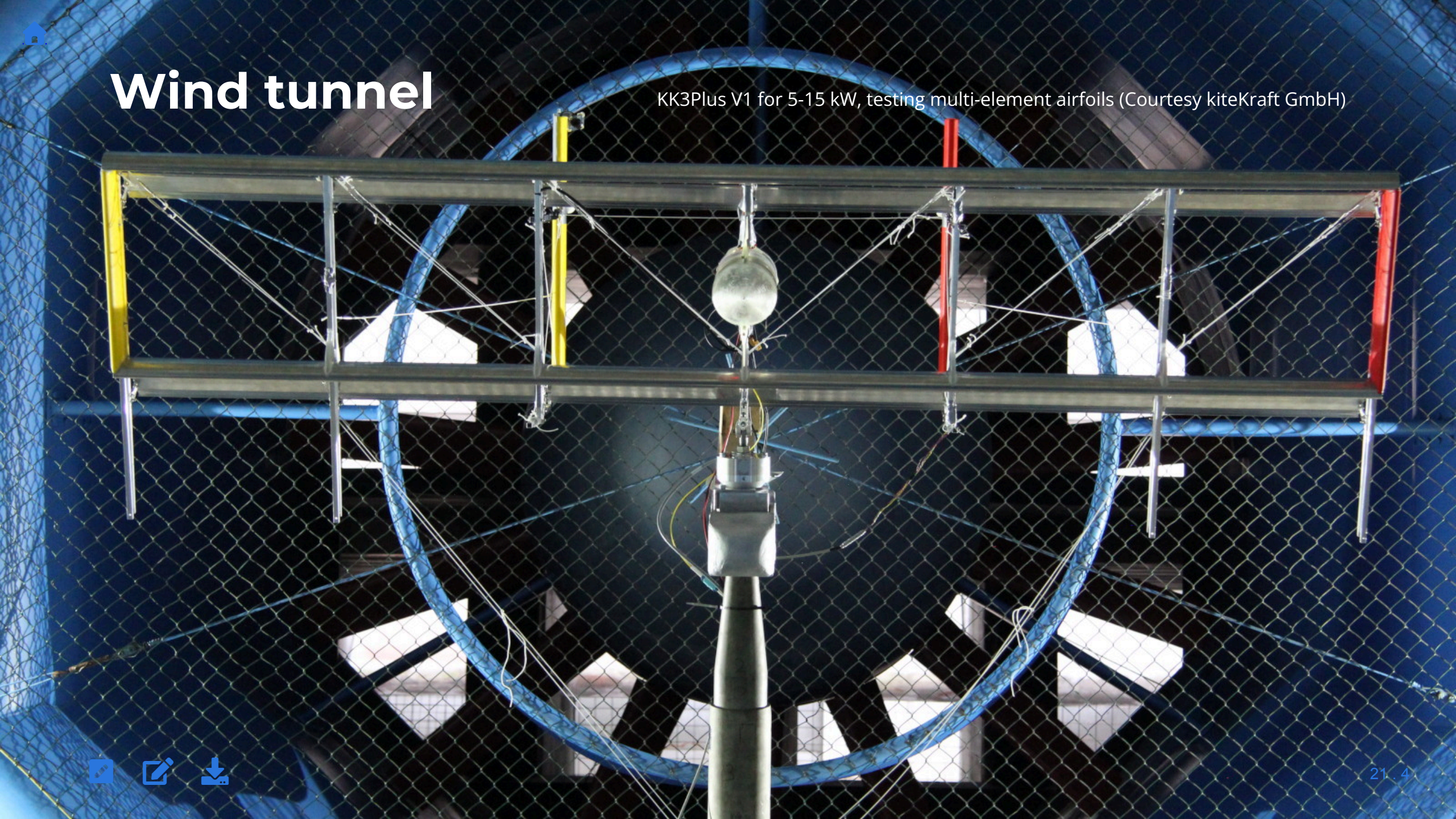
Kitekraft



Kitekraft



Wind tunnel



KK3Plus V1 for 5-15 kW, testing multi-element airfoils (Courtesy kiteKraft GmbH)


KITE//KRAFT
21.5

Nighttime flight in 2024

Kitekraft's flying wind turbine illuminated by the Anti-Collision-Lights.



Kitekraft

VENTOPLANI

WIND ENERGY 2.0

ventoplani.com/

Years active	2026-
Headquarters	Milan, Italy
Type	Spin-off company of SAS-Lab of Politecnico Milano
Conversion concept	Onboard wind turbines
Kite design	Single wing with double fuselage & tailplane
Kite control	Aerodynamic control surfaces & onboard turbines
Ground connection	Single tether
Launching & landing	VTOL

Team

- Filippo Trevisi, Co-founder & CEO
- Lorenzo Fagiano, Co-founder & CSO
- Leonardo Cecchin, Co-founder & COO





x.company/projects/makani

Years active	2006-2020
Headquarters	Alameda, CA, USA
Type	Subsidiary company of Google (2013-2020)
Conversion concept	Onboard wind turbines
Kite design	Fixed wing with single fuselage & tailplane
Kite control	Aerodynamic control surfaces & onboard turbines
Ground connection	Single tether with two-line bridle
Launching & landing	VTOL

Makani 2007



Andrea Dunlap / Makani.

Makani 2007



Makani 2007



Makani 2008



Miles Loyd visit



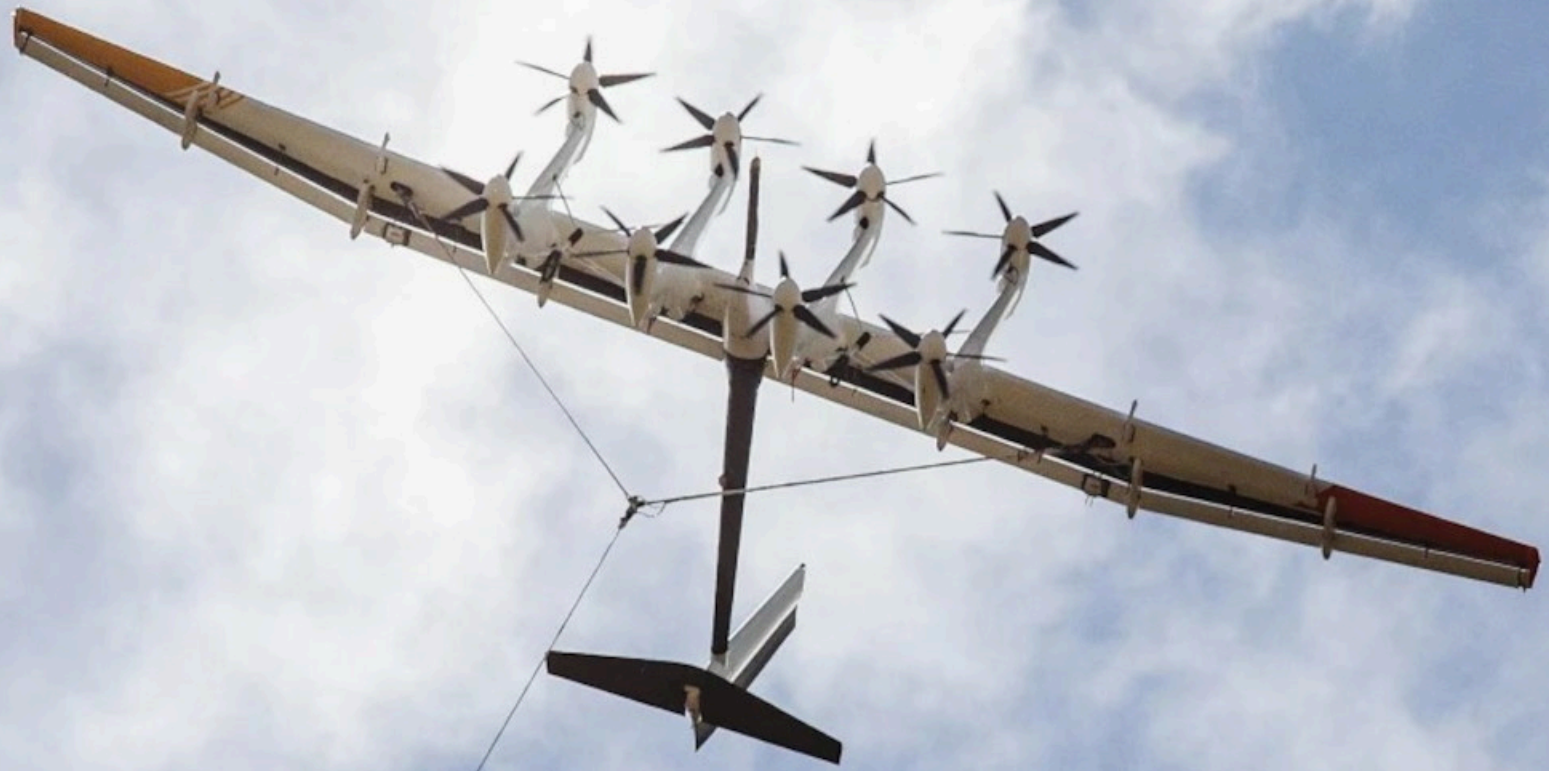
Visit of Makani test in 2010 (archive.org)

Wing 7



The 20 kW energy kite in 2013 (Schmehl 2015).

M600

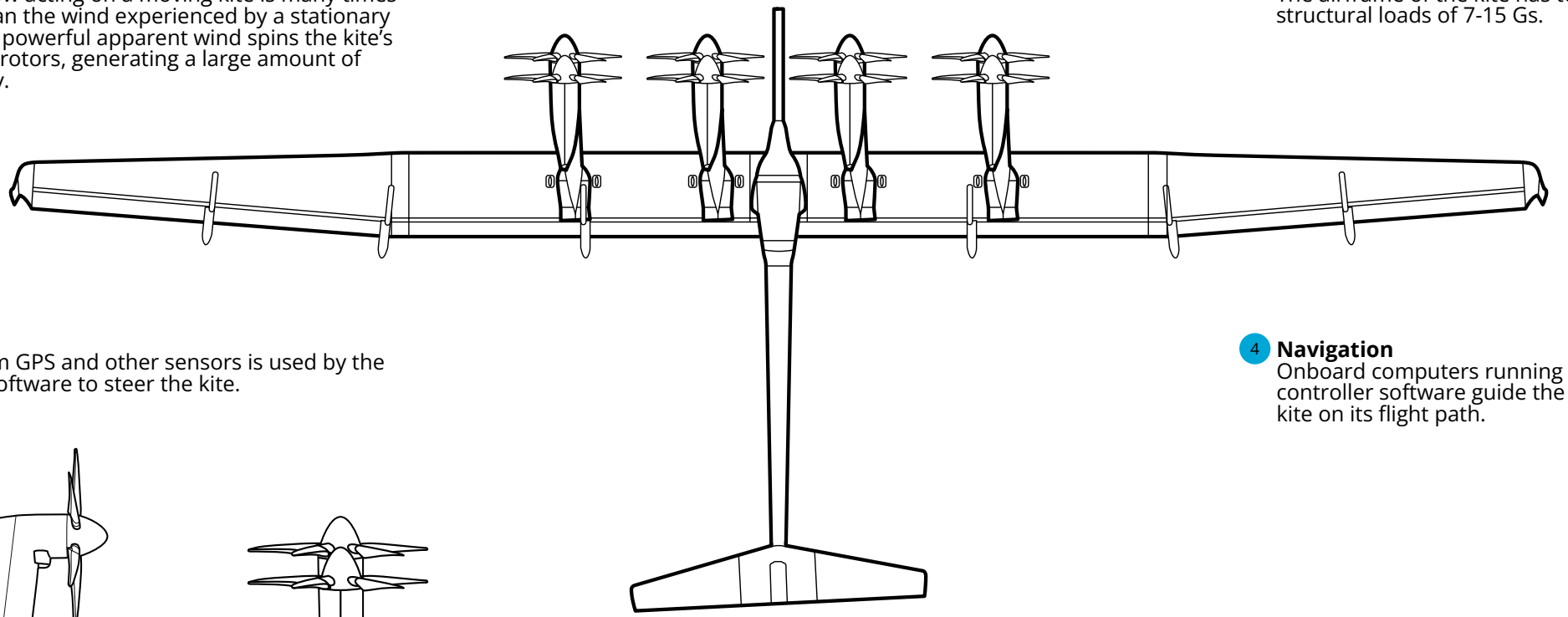


x.company/projects/makani/

M600

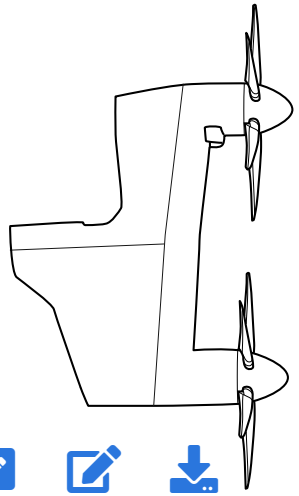
1 **Energy generation**
The airflow acting on a moving kite is many times faster than the wind experienced by a stationary kite. This powerful apparent wind spins the kite's onboard rotors, generating a large amount of electricity.

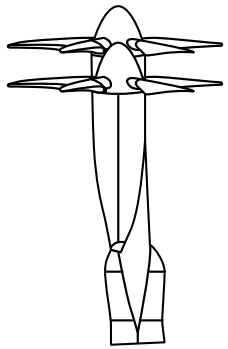
2 **G-forces**
The airframe of the kite has to endure structural loads of 7-15 Gs.



3 **Sensors**
Data from GPS and other sensors is used by the control software to steer the kite.

4 **Navigation**
Onboard computers running custom flight controller software guide the autonomous kite on its flight path.

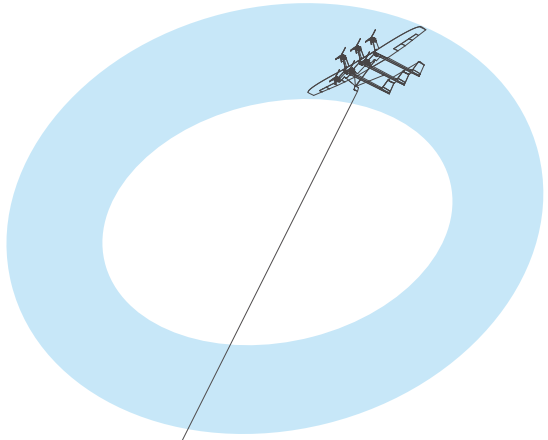




5 **Motor control**
1200V DC silicon carbide motor controllers handle high voltages efficiently with minimal mass.

6 **Stacked rotors**
8 stacked rotors are spun by the relative airflow generated by crosswind flight. Each one drives a permanent magnet motor/ generator that produces electricity onboard.

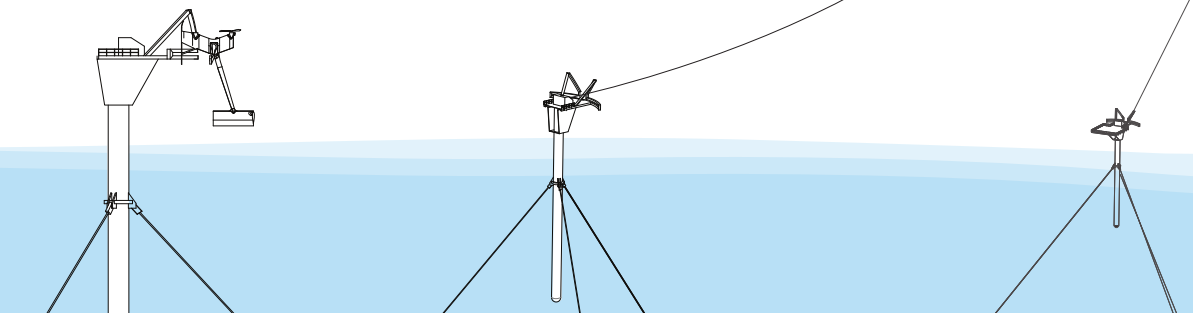
Flight modes



1 Before launch, and in unfavorable conditions, the wing is stowed at the top of the spar buoy.

2 The wing launches and lands by hovering like a helicopter.

3 In operation, the wing flies in a circular path at an altitude of 400 m.



Hardham (2012)

FAA testing



Echeverri (2020)

M600 test site on Mauii

Site still visible on Google Maps satellite footage.



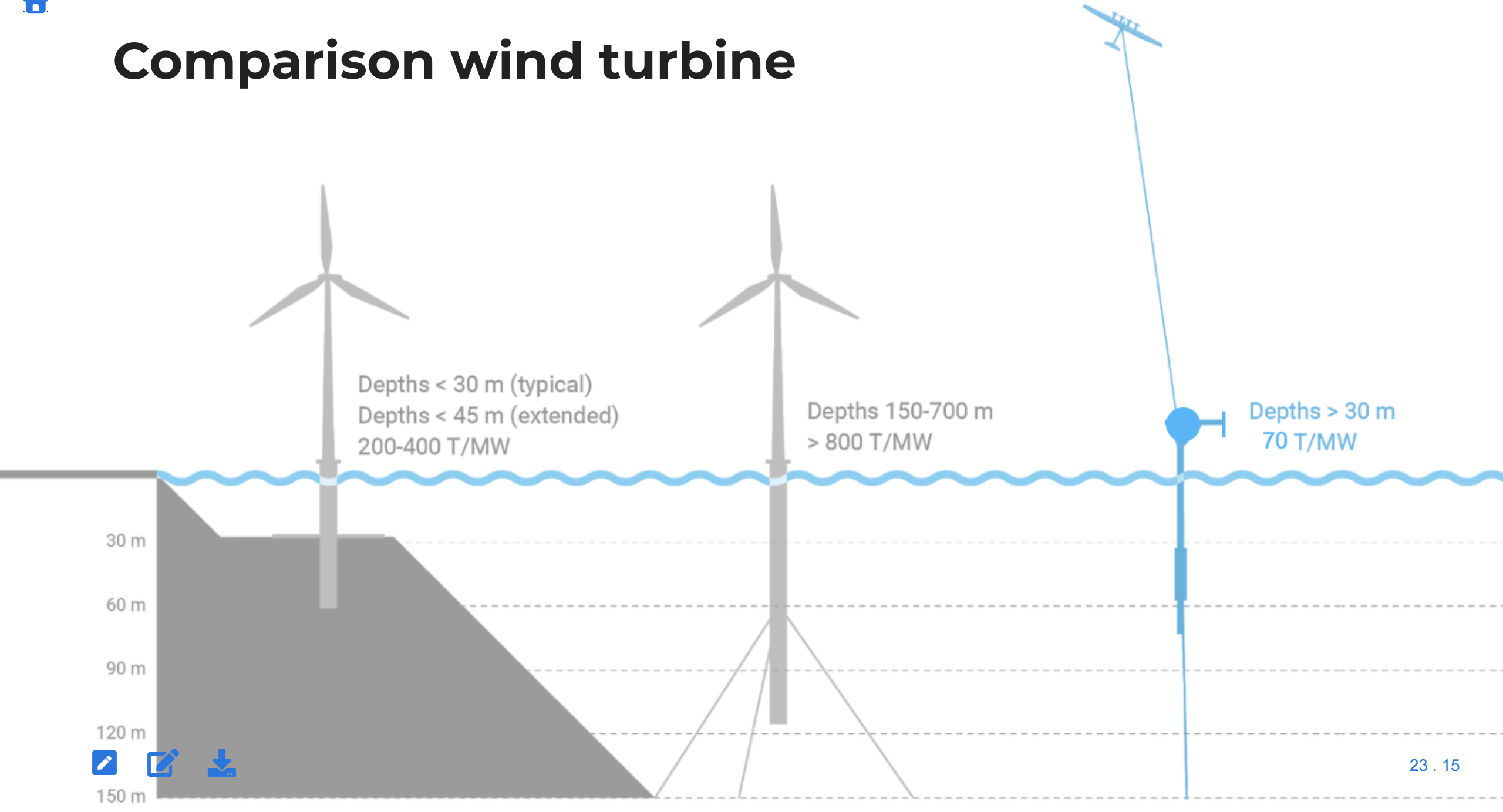
M600 testing on Mauii



M600 testing on Mauii



Comparison wind turbine



Offshore testing

Karmøy, Norway (2019)




HAVD


nordicCrane





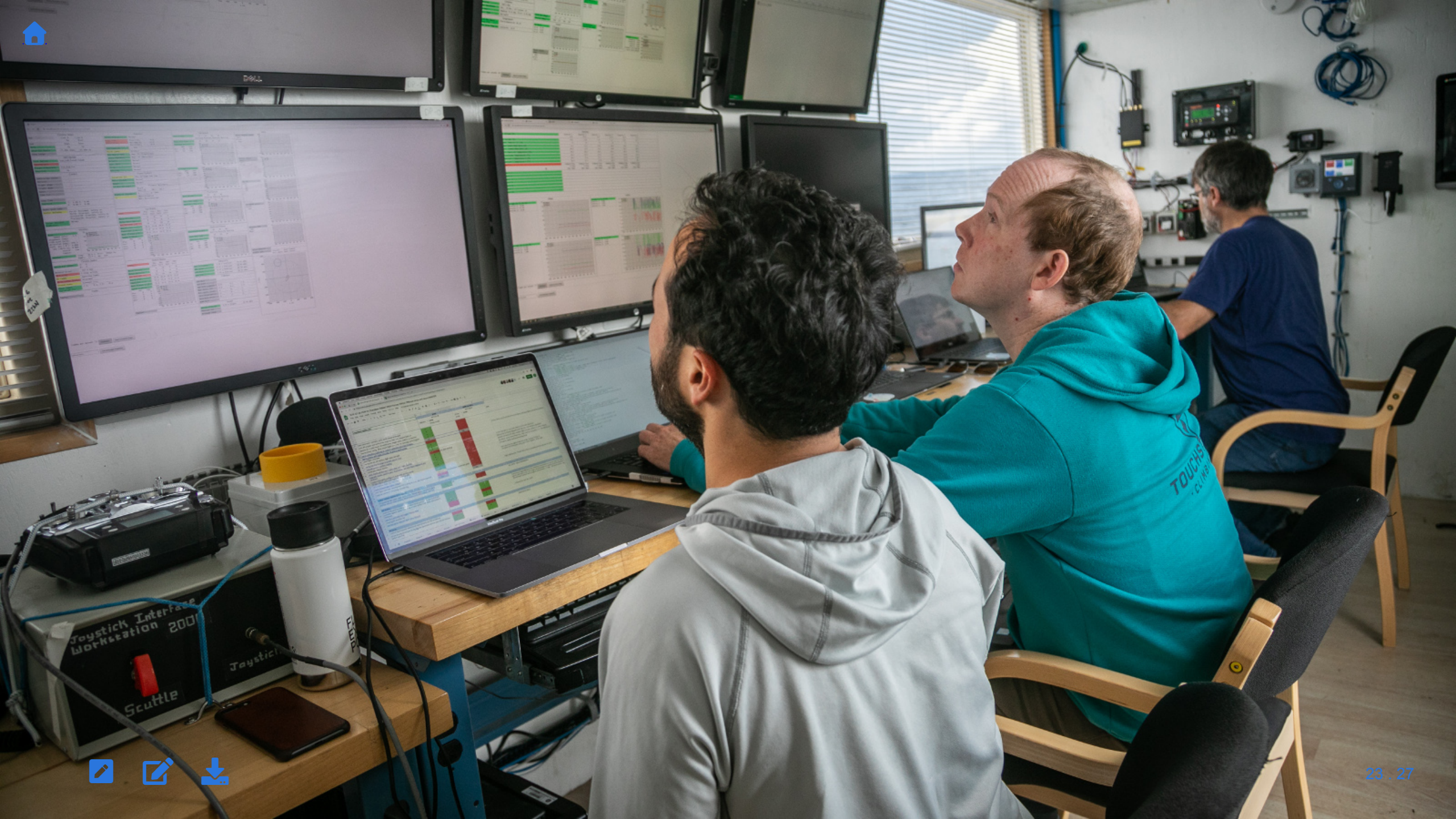











Joystick Interface
Workstation
Scuttle



23 . 28

Offshore testing



Video player configuration error

Error 153

Watch video on YouTube Learn more

Internet Archive - Makani Power collection


KASK
FRICK

Modeling Makani's Kite/Buoy Interaction for Deep Water Offshore

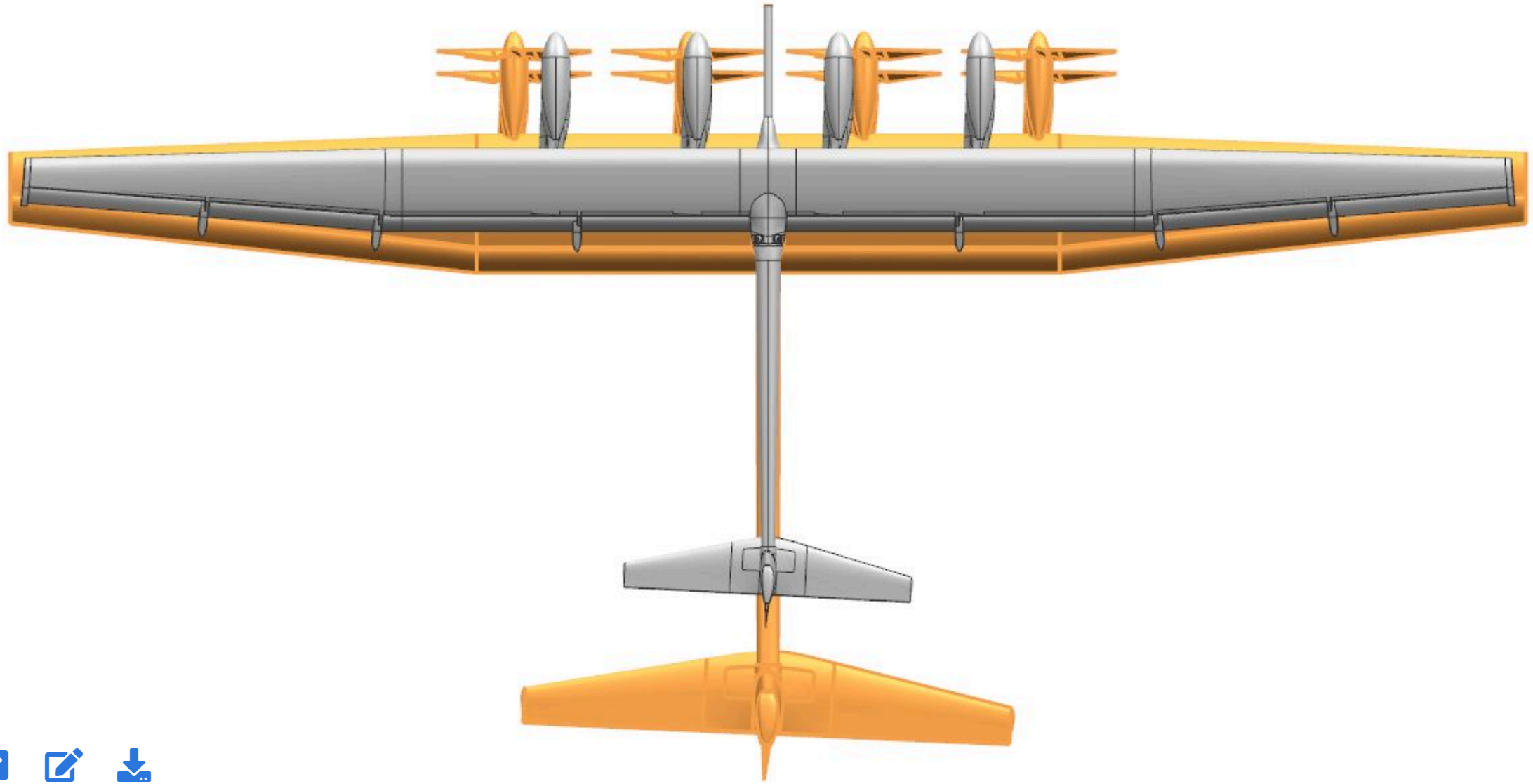
Controls engineer Joel describes modeling the first offshore energy kite system. One of the most challenging aspects of taking Makani's energy kite system offshore was predicting how to control the kite flying from a moving base station atop a floating platform. Makani's flight controller had to be modified to be able to handle the complexity of flying from a floating platform and that required updating a full simulation of the Makani system offshore.

The general development philosophy at Makani was to use simple analytic models for design and then throw in more complex physics into the simulation used for verification. While many approximations were employed in designing controllers, we tried to put all the physical effects we could think of into the simulator. The hope was that this would lead to a more robust system.

27 March 2019. Filmed and edited by Andrea Dunlap.

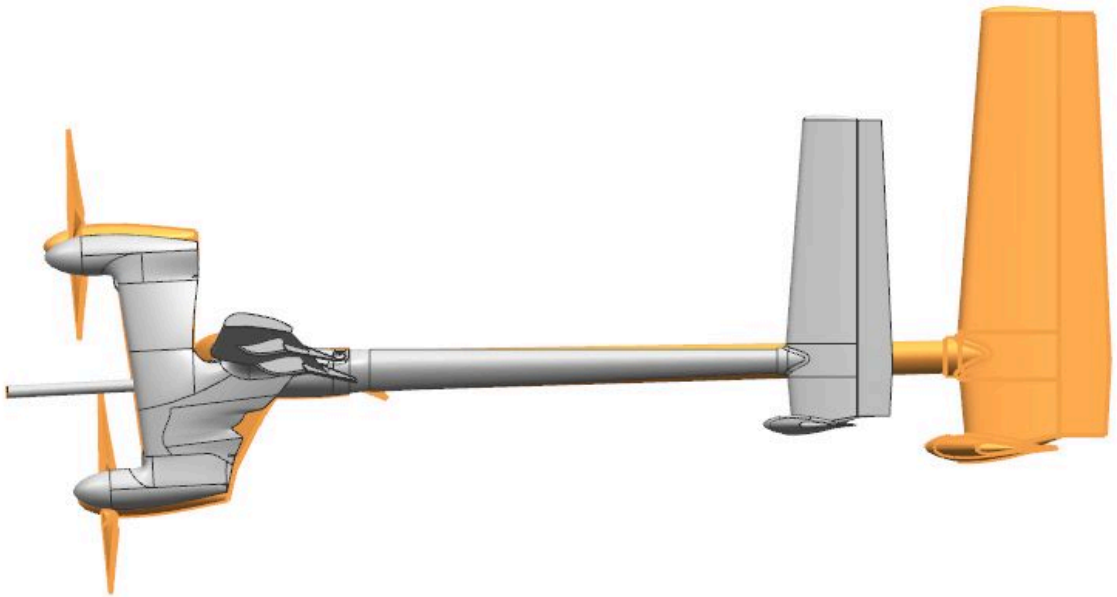
Internet Archive - Makani Power collection

Oktoberkite



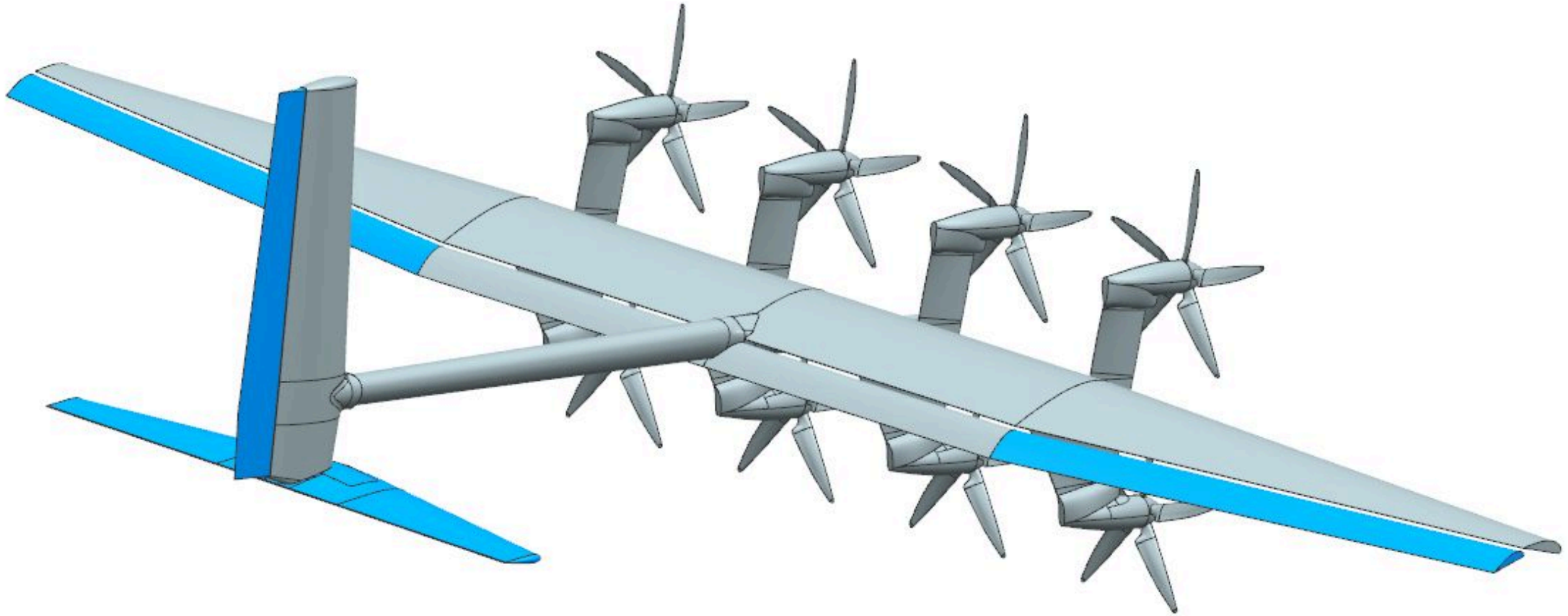
Homsy (2020)

Oktoberkite



Homsy (2020)

Oktoberkite



Homsy (2020)

Makani’s legacy

- Data, media and document archive: Makani Technologies LLC. This archive includes a detailed technical report in three parts.
- Medium post by Makani’s CEO: A long and windy road
- Feature film: Pulling Power from the Sky: The Story of Makani

References

Diehl, M., Leuthold, R., Schmehl, R. eds: The 7th International Airborne Wind Energy Conference 2017: Book of Abstracts. University of Freiburg | Delft University of Technology, Freiburg, Germany (5-6 October 2017)

Echeverri, P.: Makani's flight testing approach. In: Echeverri, P., Fricke, T., Homsy, G., and Tucker, N. (eds.) The energy kite: Selected results from the design, development, and testing of Makani's airborne wind turbines, Part I of III. Makani Technologies LLC (2020)

Faggiani, P., Schmehl, R.: Design and economics of a pumping kite wind park. In: Schmehl, R. (ed.) Airborne wind energy – advances in technology development and research. pp. 391–411. Springer, Singapore (2018)

Fagiano, L., Croce, A., Schmehl, R., Thoms, S. eds: The 9th International Airborne Wind Energy Conference 2021: Book of Abstracts. Delft University of Technology, Milan, Italy (22-24 June 2022)

Fechner, U.: A methodology for the design of kite-power control systems, (2016)

Fechner, U., Vlugt, R. van der, Schreuder, E., Schmehl, R.: Dynamic model of a pumping kite power system. Renewable Energy. 83, 705–716 (2015). https://doi.org/10.1016/j.renene.2015.04.028

Hardham, C.: Response to the federal aviation authority: Docket no.: FAA-2011-1279; notice no. 11-07; notification for airborne wind energy systems (AWES). Makani Power (7 February 2012)

Homsy, G.: Oktoberkite and the MX2: Toward best practices in energy kite design. In: Echeverri, P., Fricke, T., Homsy, G., and Tucker, N. (eds.) The energy kite: Selected results from the design, development, and testing of Makani's airborne wind turbines, Part I of III. Makani Technologies LLC (2020)

Kruijff, M., Ruiterkamp, R.: A roadmap towards airborne wind energy in the utility sector. In: Schmehl, R. (ed.) Airborne wind energy – advances in technology development and research. pp. 643–662. Springer,

Questions?



r.schmehl@tudelft.nl