



Logistics and Air Transport using UAS

Evolution of UAS operation and upcoming challenges

Ulrich Hoffmann, Project Lead UAV Services

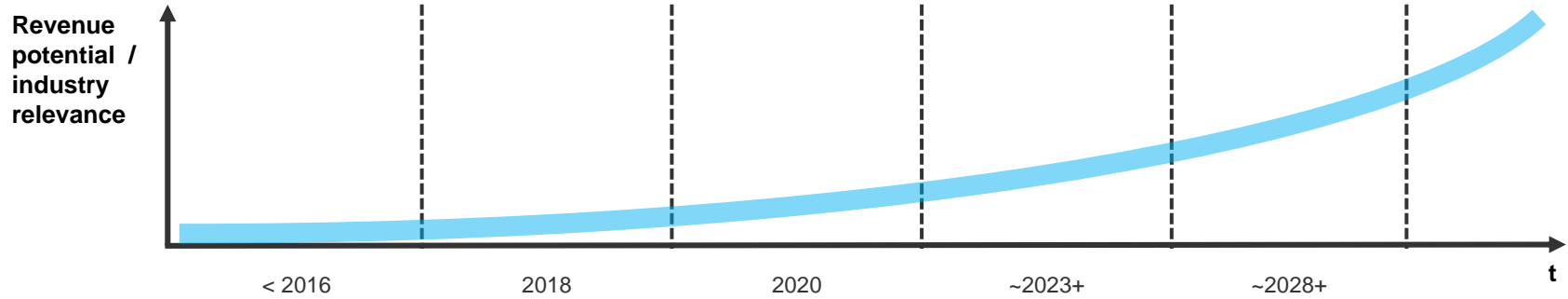
Lufthansa Technik AG

European Drone Summit, 15th October 2018



Putting UAS logistics and transport into context

Evolution of UAS applications

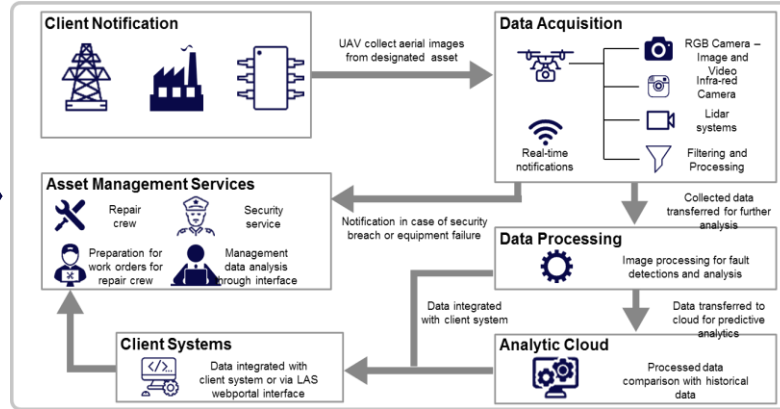


Key drivers

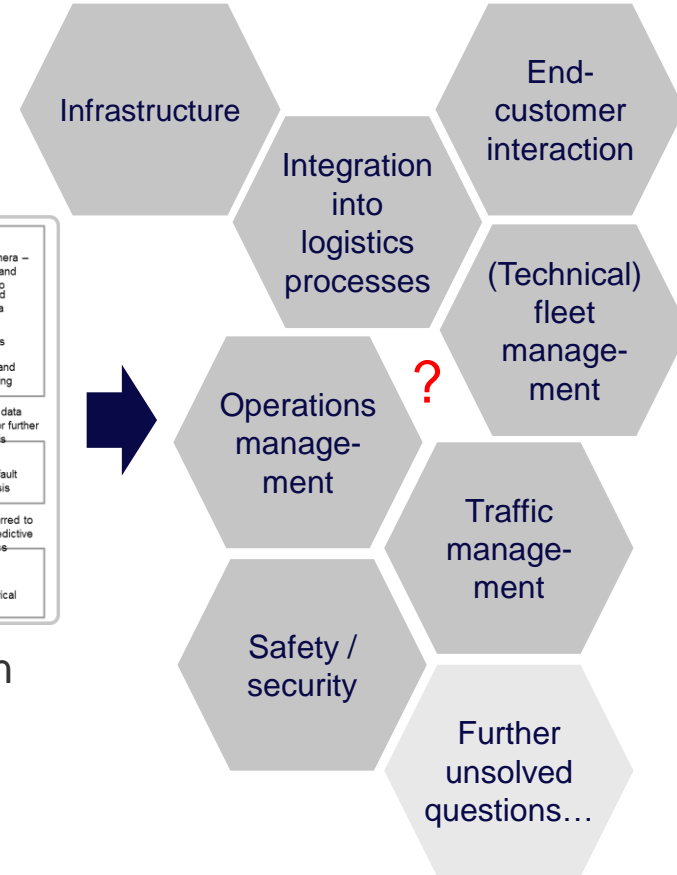
First viable VLOS commercial use cases	BVLOS: Logistics, last mile transport	Continuous extension of existing use cases		
Experiments, proof of concepts	First viable BVLOS commercial use cases	Extension of existing use cases	Unmanned cargo flights with increasing size	Unpiloted pax flights
Improvement of technology, regulations and services	Integration of UAS into commercial airspace	Increase of payload, range, efficiency	Regulation for heavy freight UAVs	Regulation for pax UAVs, social acceptance

UAS Logistics Applied More than just „steering a drone“

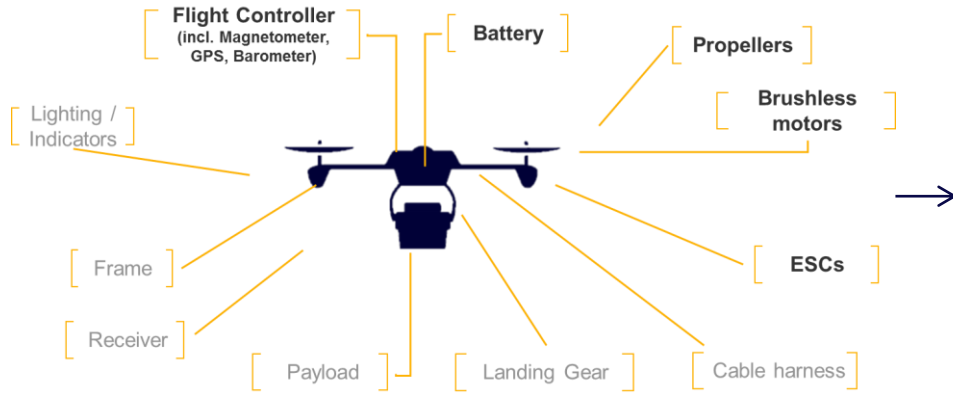
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Operational experience gathered in existing UAS operations



SafeDrone Health – Comprehensive technical fleet monitoring Ensuring reliable UAV operation

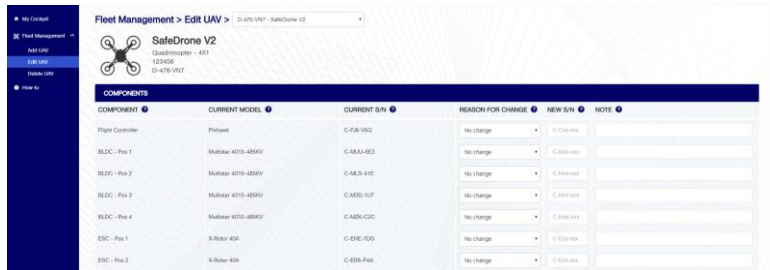



My Cockpit

4 UAV good to fly ✔ 0 UAV with information i 1 UAV with minor issue ! 0 UAV with critical issue ✘

UAV MODEL & SAFEDRONE REGISTRATION	SERIAL NO. #	FLIGHT HOURS & FLIGHT CYCLES	LAST UPLOAD #	UPLOAD	STATUS #	DETAILS
SafeDrone V2 D-476-1917	123456	00h:11min 2	19.12.2017, 16:06:47		Minor issue	>
YUNEEC H300 D-AAC-209	V3-H420-8998	00h:05min 3	19.12.2017, 16:06:47		Good to fly	>
Multistar M2 D-M27-JAT #1x60	M2-0002-66-06	01h:12min 18	19.12.2017, 16:06:47		Good to fly	>
Aerobotics Altus, Zivox AT30 D-A03-190	AT30_3456_AB	01h:16min 18	19.12.2017, 16:06:47		Good to fly	>
germandrones Songbird D-79-FJ61	SB02-001	00h:11min 2	19.12.2017, 16:06:47		Good to fly	>

Supervision of technical fleet status

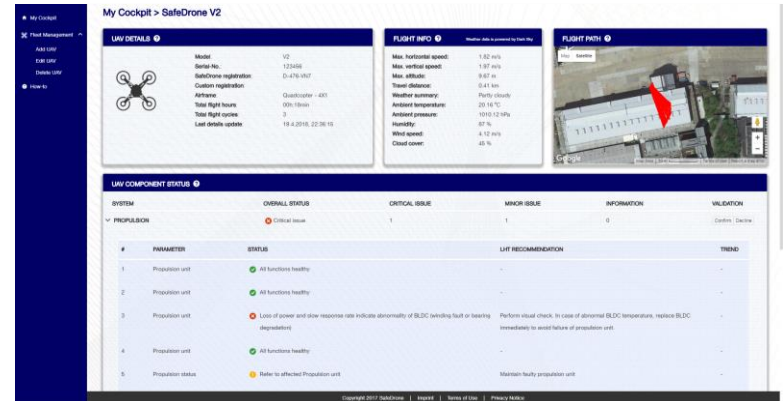


Fleet Management > Edit UAV > D-476-VAT - SafeDrone V2

SafeDrone V2
Quadcopter - 6X1
123456
D-476-1917

COMPONENT	CURRENT MODEL	CURRENT SW	REASON FOR CHANGE	NEW SW	NOTE
Flight Controller	Piwani	C.Fab-092	No change	C.Fab-092	
BLOC - Pix 1	Multistar 4110-4890V	C.MSX483	No change	C.MSX483	
BLOC - Pix 2	Multistar 4110-4890V	C.MS-41E	No change	C.MS-41E	
BLOC - Pix 3	Multistar 4110-4890V	C.MS-7U7	No change	C.MS-7U7	
BLOC - Pix 4	Multistar 4110-4890V	C.MS6-G2C	No change	C.MS6-G2C	
ESC - Pix 1	3.Falco 40A	C.E1E-100	No change	C.E1E-100	
ESC - Pix 2	3.Falco 40A	C.E1E-P16	No change	C.E1E-100	

Fleet and maintenance management



My Cockpit > SafeDrone V2


UAV DETAILS

Model: V2
Serial No: 123456
SafeDrone registration: D-476-1917
Custom registration: -
Airframe: Quadcopter - 6X1
Total flight hours: 00h:16min
Total flight cycles: 3
Last details update: 19.12.2016, 22:36:16

FLIGHT INFO

Max. horizontal speed: 1.92 m/s
Max. vertical speed: 1.97 m/s
Max. altitude: 8.67 m
Tasol distance: 2.14 km
Weather summary: Partly cloudy
Ambient temperature: 20.16 °C
Airspeed pressure: 1010.25 hPa
Humidity: 87 %
Wind speed: 4.12 m/s
Cloud cover: 45 %

FLIGHT PATH



UAV COMPONENT STATUS

SYSTEM	OVERALL STATUS	CRITICAL ISSUE	MINOR ISSUE	INFORMATION	VALIDATION
PROPULSION	! Critical issue	1	1	0	Confirm / Decline

#	PARAMETER	STATUS	LIFT RECOMMENDATION	TREND
1	Propulsion unit	✔ All functions healthy		
2	Propulsion unit	✔ All functions healthy		
3	Propulsion unit	! Loss of power and slow response rate indicate abnormality of BLOC (swirling fault or bearing degradation)	Perform visual check, in case of abnormal BLOC temperatures, replace BLOC immediately to avoid failure of propulsion unit	
4	Propulsion unit	✔ All functions healthy		
5	Propulsion status	! Refer to affected Propulsion unit	Maintain healthy propulsion unit	

Detailed technical information per UAV

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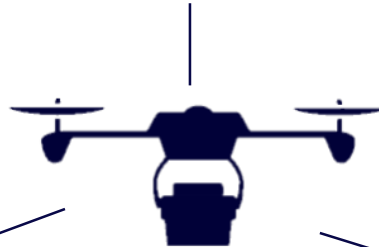
operations



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 **SafeDrone**
by  Lufthansa Technik

industry-related services



Delvag

insurance



Lufthansa Systems

IT that makes your life easier



**Lufthansa
Aviation Training**

Train smart. Fly safe.

operator qualification

UTM solutions



Looking forward to working with you!

ulrich.hoffmann@lht.dlh.de

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