



THE JOURNEY TO ELECTRIFICATION

MOTIVATION, GOALS, TECHNOLOGY & FUTURE





TOPIC OVERVIEW

- + CREATION
- + LINEUP
- + SYSTEM
- + OPERATION
- + PERFORMANCE
- + CHARGING & MAINTENANCE
- + FUTURE VISION

THE BEGINNING

- + NEW PERFORMANCE TWO SEATER
- + NO SUSTAINER FOR HEAVIER GLIDERS
- + JET SUSTAINER TESTS
- + FUNDING PROGRAM FOR ELECTRIC SUSTAINER
- + START OF THE CONCEPTUAL PHASE 2010
- + START OF THE PROJECT 2013
- + A LOT OF DEVELOPMENT
 - ONE OF THE FIRST UNDER NEW EASA REGULATION
- + TC DATE: 2017



IMPORTANT POINTS & KNOWLEDGE

+ EVALUATION OF TRACTOR / RETRACTABLE CONFIGURATION

COMFORT
SAFETY
HIGH MASS
FULL POWER CLIMB

+ PHILOSOPHY

BEST AERODYNAMIC RANGE
LOW SPEED - LOW Pylon DRAG
PROPELLER JET
DON'T USE THE LIMITS

+ HOW TO COMPARE

MASS - 800kg
SHAFT POWER VS. ELECTRIC POWER 10-20%



OUR LINE UP

+ ASG 32 EL

+ AS 34 ME

AS SIMPLE AS POSSIBLE

NO FLAPS

EASY TO USE SELF LAUNCHER

PILOT PROJECT

AS 33 ES STILL IN DEVELOPMENT

+ AS 33 ME

MINIMUM FUSELAGE

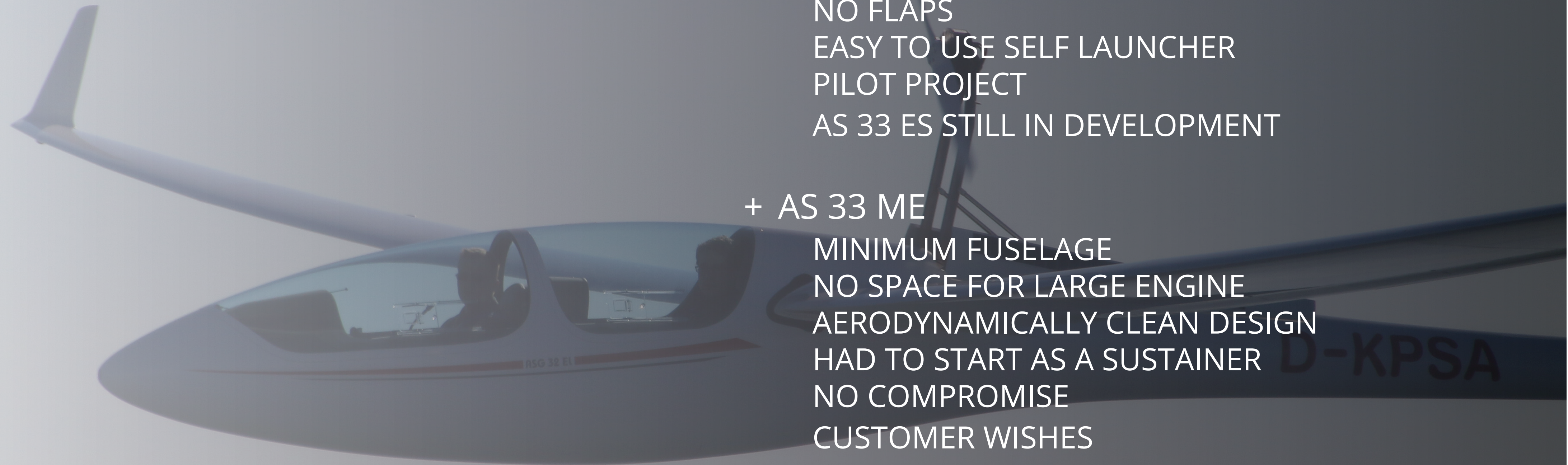
NO SPACE FOR LARGE ENGINE

AERODYNAMICALLY CLEAN DESIGN

HAD TO START AS A SUSTAINER

NO COMPROMISE

CUSTOMER WISHES



D-KPSA



ME THE SYSTEM





THE BATTERIES

+WEIGHT 2x 35 KG - 400 V

+CELLS - 18650 FORMAT

+SAFETY MEASURES

CELL LAYER

BATTERY LAYER - BMS

CONTROLLER LAYER

+ FIRE PROTECTION

CELL LAYER

CELL PACK LAYER

BATTERY LAYER

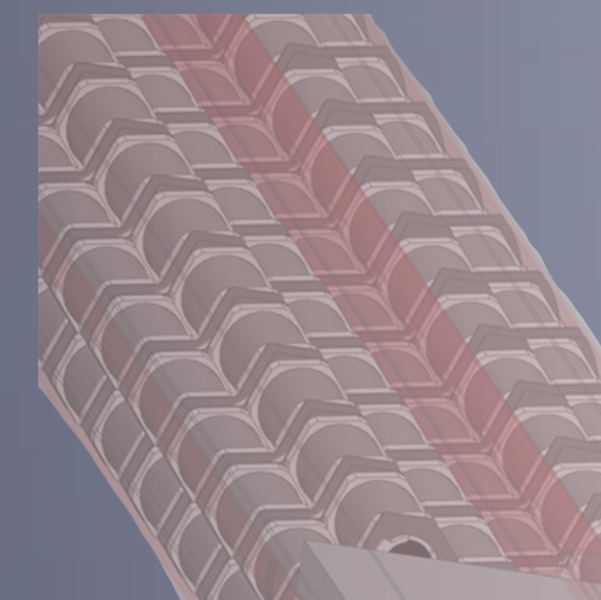
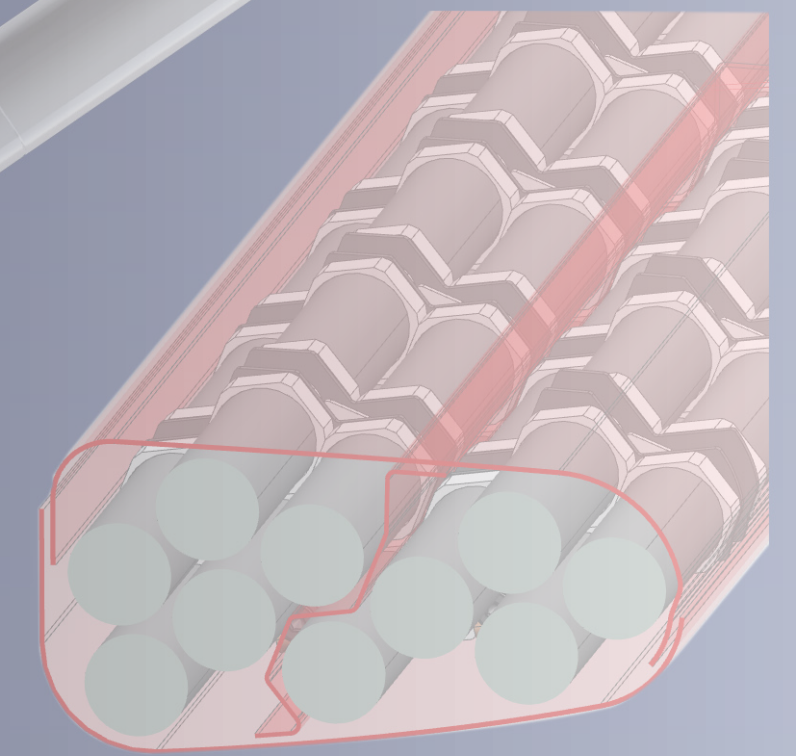
WING CASE LAYER

EXTRA SAFETY IN PILOT DIRECTION

TESTED FOR THERMAL RUNAWAY

CONTROLLED VENTING

FULL SCALE BATTERY TESTS IN THE WING





THE BATTERIES - POSITIONING

+USEFUL FUSELAGE LOAD

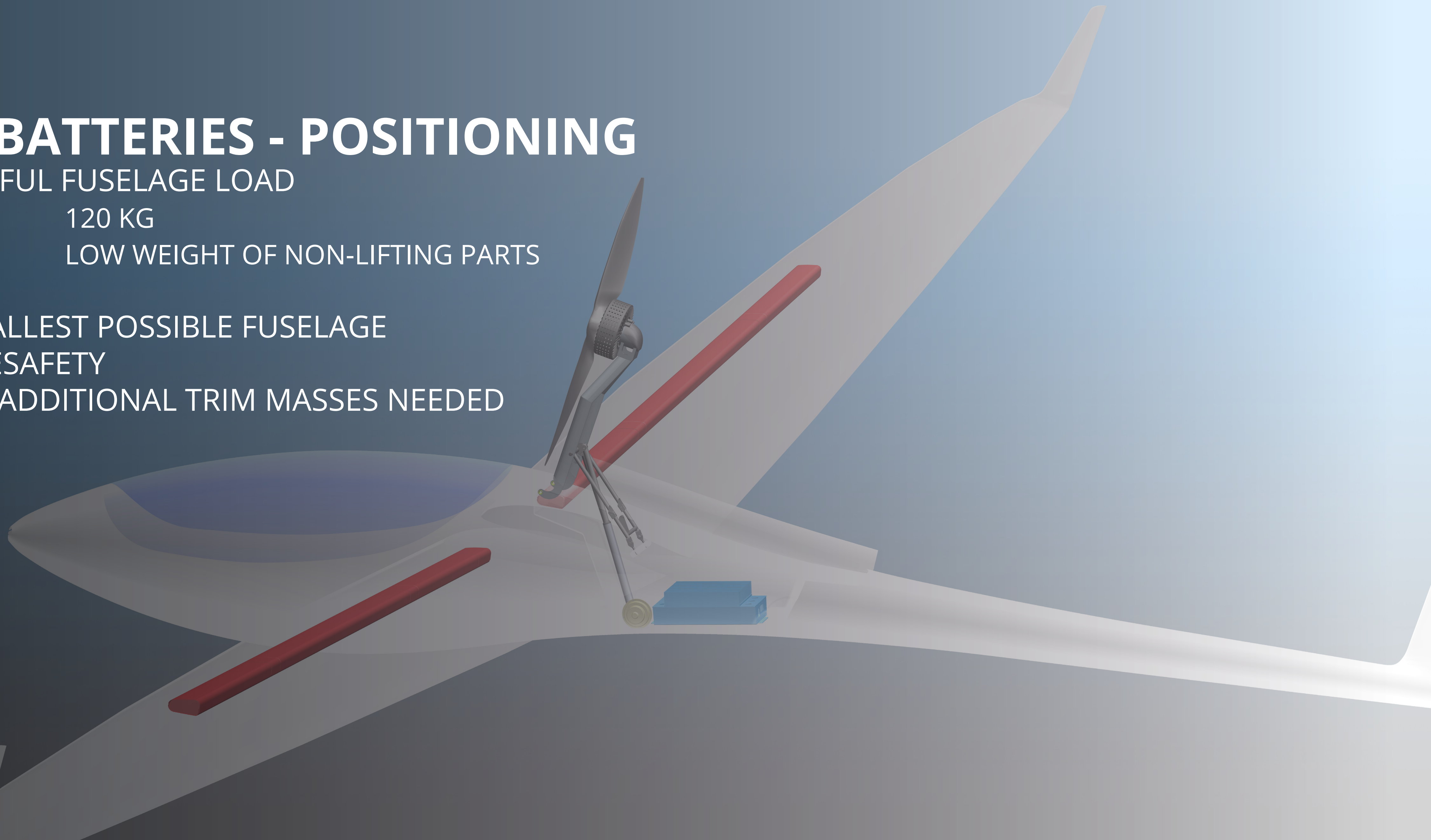
120 KG

LOW WEIGHT OF NON-LIFTING PARTS

+SMALLEST POSSIBLE FUSELAGE

+FIRESAFETY

+NO ADDITIONAL TRIM MASSES NEEDED





THE BATTERIES - PHILOSOPHY

- +FIRE WARNING IN EVERY BATTERY
 - WORKS WITHOUT BMS
- +MULTI-LEVEL SECURITY
- +IMD - INSULATION MONITORING DEVICE
 - SHOWS CABLE SCUFFING IN HIGH VOLTAGE SYSTEM
 - ALREADY DANGEROUS AT 12 V
- +WHOLE SYSTEM OUTSIDE OF THE COCKPIT
- +IEC 60449 HIGH VOLTAGE > 50 V AC VOLTAGE
 - BEHIND THE POWER ELECTRONICS





POWER ELECTRONICS

- + IGBT POWER ELECTRONICS / MOTOR CONTROLLER
- + HIGH DURABILITY AND HIGH EFFICIENCY
- + PASSIVE COOLING
- + LARGER LAYOUT FOR LESS THERMAL PROBLEMS
- + NO DEDICATED COOLER THAT NEEDS MAINTENANCE



- + LARGE LAYOUT FOR BEST COOLING
- + LARGER MARGIN FOR EXTREME USE CASES
- HIGH TEMPERATURE - MAX POWER
- + NO EXTRA COOLING SYSTEM

MOTOR





PROPELLER

- +IN HOUSE DEVELOPMENT
- +OPTIMIZED
GLIDER
SPEED RANGE (CLIMB)
STATIC THRUST

PYLON ANGLE

- +OPTIMIZED FOR BEST
CONTROLLABILITY
- +OPTIMIZED FOR BEST
AIRFLOW TO THE TAIL FIN





SYSTEM - PHILOSOPHY

- +SUFFICIENT DESIGN RESERVES IN THE COMPONENTS
- +PERFORMANCE IN EXTREME SITUATIONS
- +LESS MAINTENANCE PARTS
- +LOWER COMPLEXITY
- +LOW FAILURE PROBABILITY
- +MTOW POSSIBLE
- +AIR COOLED SYSTEM





OPERATING

Dieses Luftfahrzeug wird mit einer
"Fluggenehmigung"
betrieben
Die zugehörige Fluganweisung ist zu
beachten!

Triebwerk
Haupt-
schalter

tarter

28.09.2021 11:03
Motor Operation 2:10
System Voltages
398 V 13,6 V 398 V

22 °C

-OFF- °C

-OFF- °C

1. POWER SWITCH ON

2. EXTRACTION LEVER

3. START BUTTON

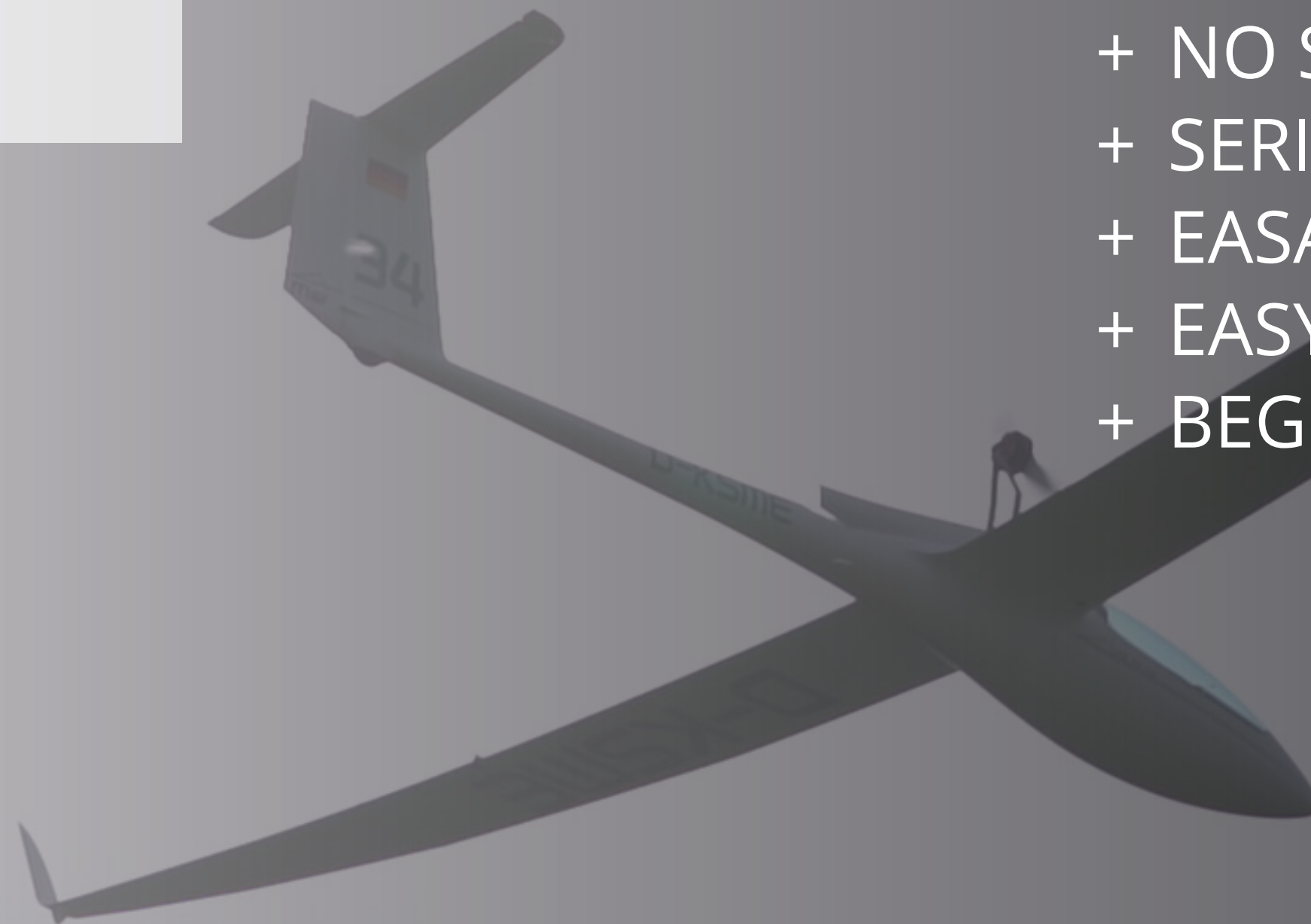
4. POWER LEVER

FLY -- LAND -- OFF
+ LEVER FOR IMPROVED
EMERGENCY
CONTROLLABILITY



PERFORMANCE

- + 2 MINUTES FULL POWER 38 KW
- + 25 KW OF CONTINUOUS POWER
- + MAXIMUM RANGE WITH SAWTOOTH PATTERN
- + 12 SECONDS TILL FULL POWER
- + FAST RETRACTION
- + AS 33 ME 600 KG MTOW
- + NO SPECIAL TAKE-OFF PROCEDURE
- + SERIES PRODUCTION
- + EASA CERTIFIED
- + EASY TO USE
- + BEGINNER FRIENDLY





PERFORMANCE

- + ENGINE DOORS OPEN
- + LOW DRAG AT CLIMB SPEED
- + LESS COMPLEX / MAINTENANCE
- + SMALL PORTION OF THE TOTAL DRAG





CHARGING & MAINTENANCE

- +4.5 HRS TILL FULL CAPACITY
- +SLOWER CHARGING FOR INCREASED BATTERY LIFE
- +SELECTABLE CHARGING POWER
- +RESTART AFTER POWER BLACKOUT
- +STANDARDIZED SOLUTIONS
- +TRAILER CHARGING POSSIBLE

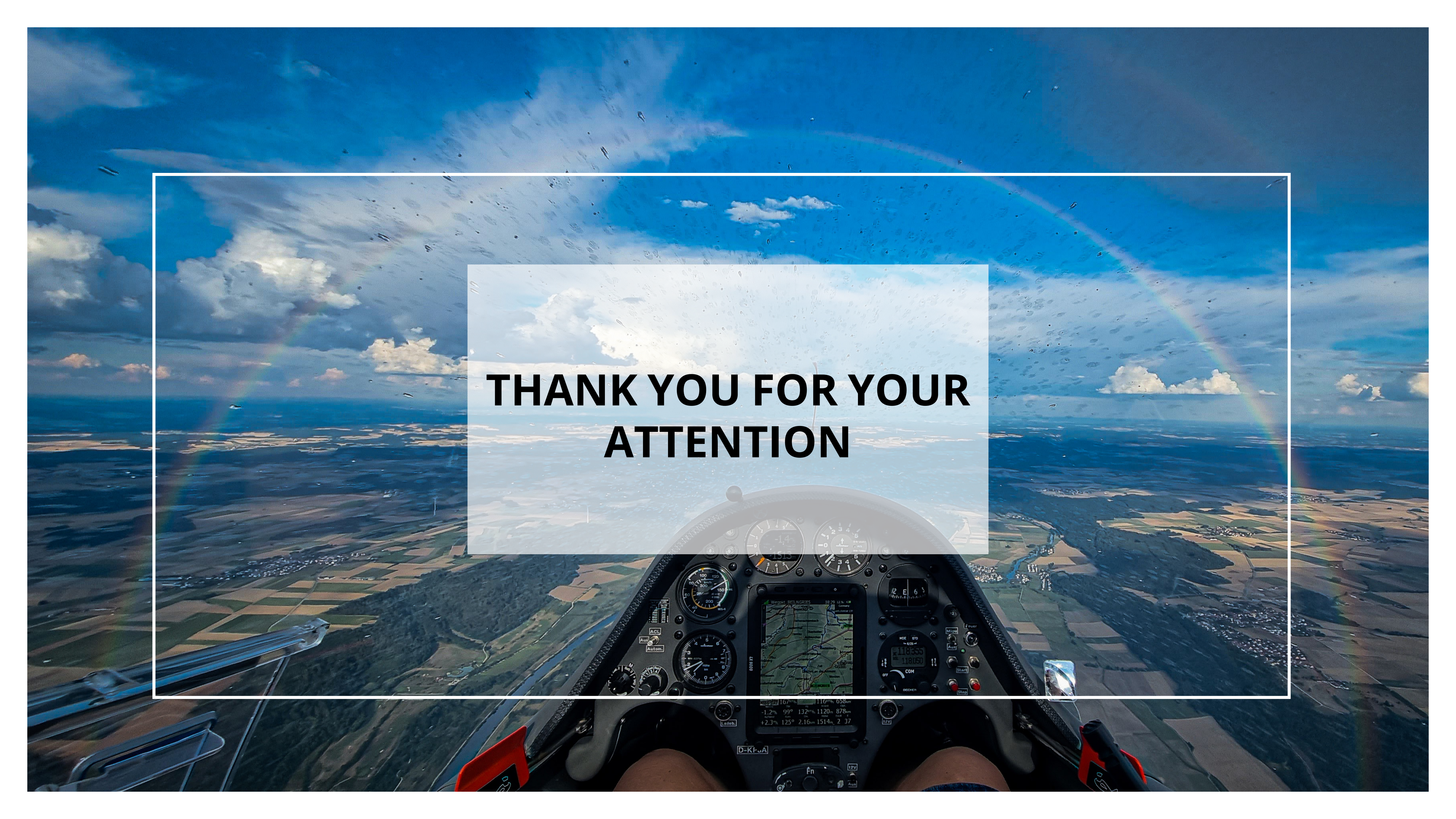




FUTURE



- + INCREASED BATTERY CAPACITY FOR INCREASED MTOW > 600 KG
- + CS 22 CERTIFICATIONS
- + NEEDS TO BE DURABLE
- + RACE CAR - ROAD CAR
- + GLIDING PERFORMANCE VS. MOTORSYSTEM
- + CONNECT THE COMMUNITY
- + CHARGING ENVIRONMENT STANDARD
- + OPTIONS & SOLUTIONS FOR EXTREME ENVIRONMENTS

A first-person perspective from the cockpit of a glider. The view looks out over a patchwork of green and brown fields, a winding river, and distant hills. Two vibrant rainbows are visible in the sky, one on the left and one on the right, arching over the landscape. The sky is filled with soft, white clouds. In the foreground, the cockpit's instrument panel is visible, featuring several analog gauges (altimeter, airspeed indicator, etc.) and a central digital display showing a map and flight data. The registration 'D-KFUA' is visible on the lower part of the instrument panel.

**THANK YOU FOR YOUR
ATTENTION**