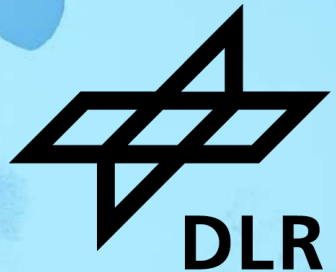


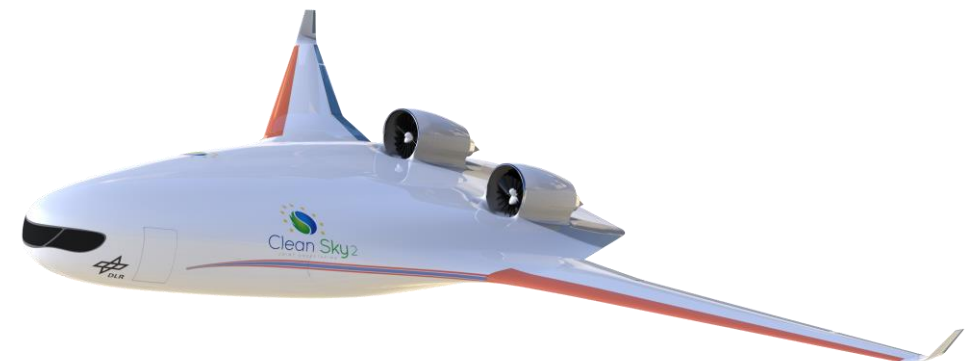
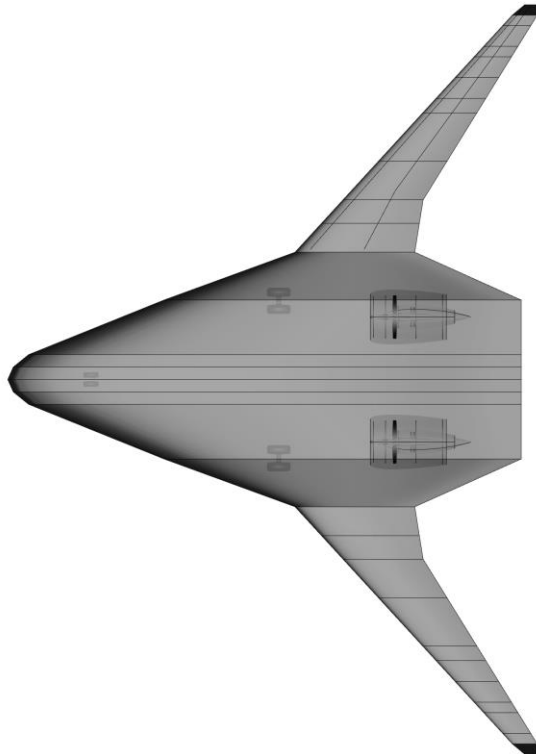
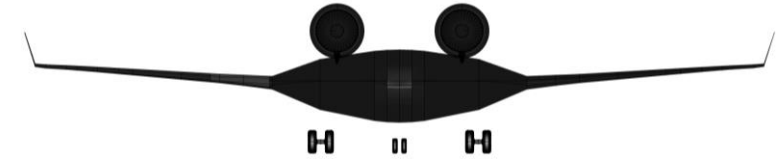
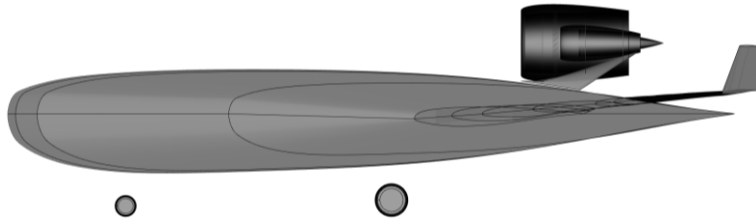
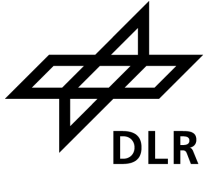
AIRCRAFT HANGAR <D150-BWB-2035>

Benjamin Fröhler

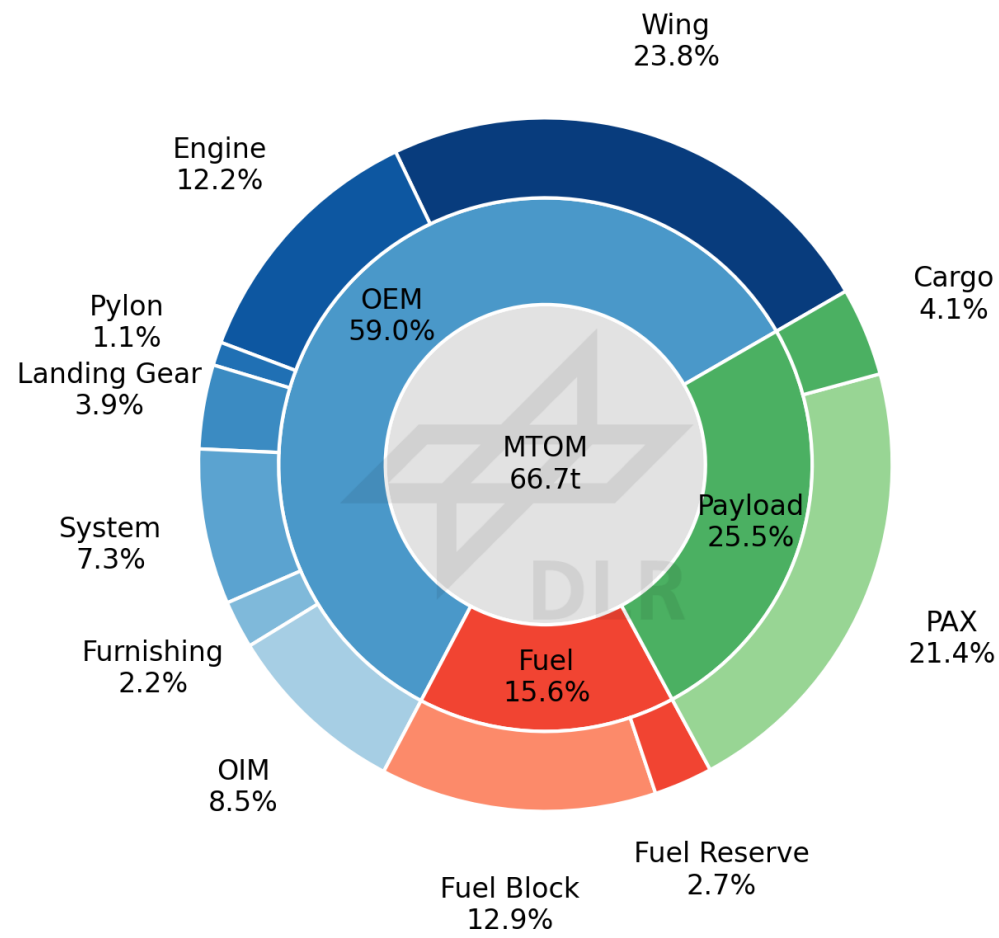
22.05.2022



CPACS Output

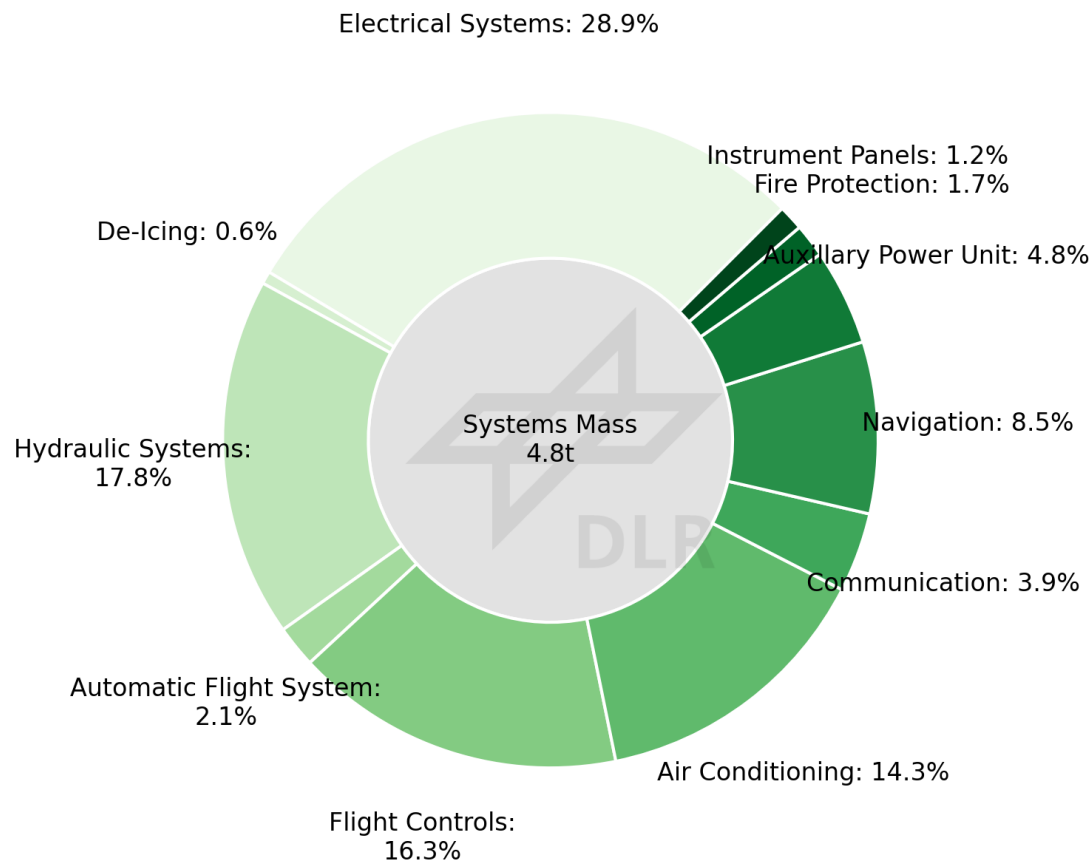


Mass Properties



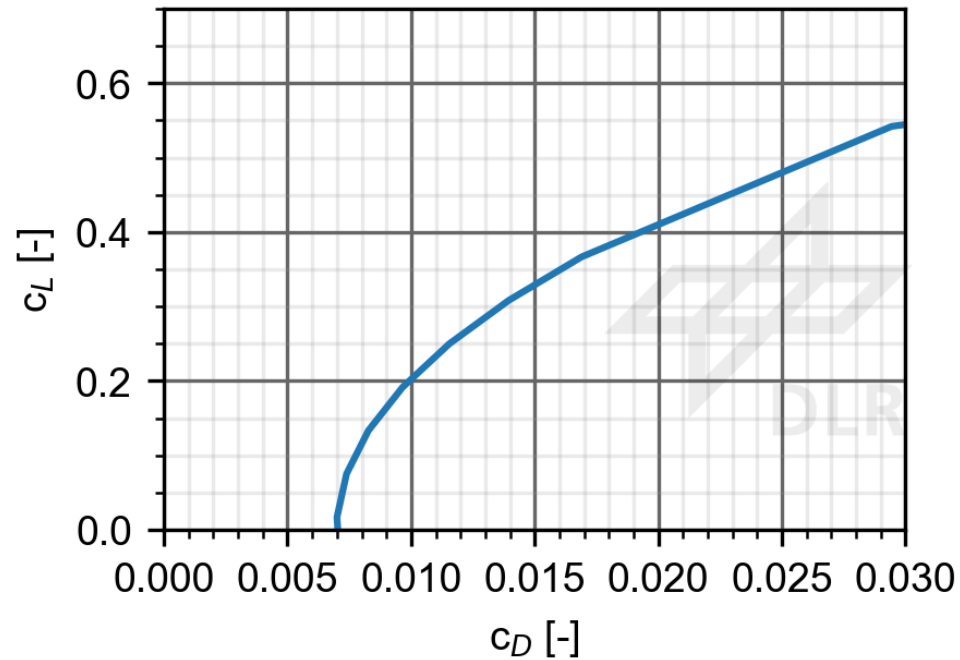
Component	Mass [kg]	x-Pos [m]
Wing	15880	11.57
Pylons	731	19.1
Power Units	8120	19.74
Main Gear	2264	13.02
Nose Gear	353	4.0
Systems	4840	11.47
Furnishings	1487	10.71
Manufacturer Empty Mass (MEM)	33676	-
Operating Items	5700	-
Operating Empty Mass (OEM)	39376	11.57
Maximum Payload	20000	7.84
Maximum Fuel	19216	15.76
Maximum Zero-Fuel Mass (MZFM)	59376	-
Maximum Landing Mass (MLM)	60926	-
Maximum Take-Off Mass (MTOM)	66719	11.33

System Mass Breakdown

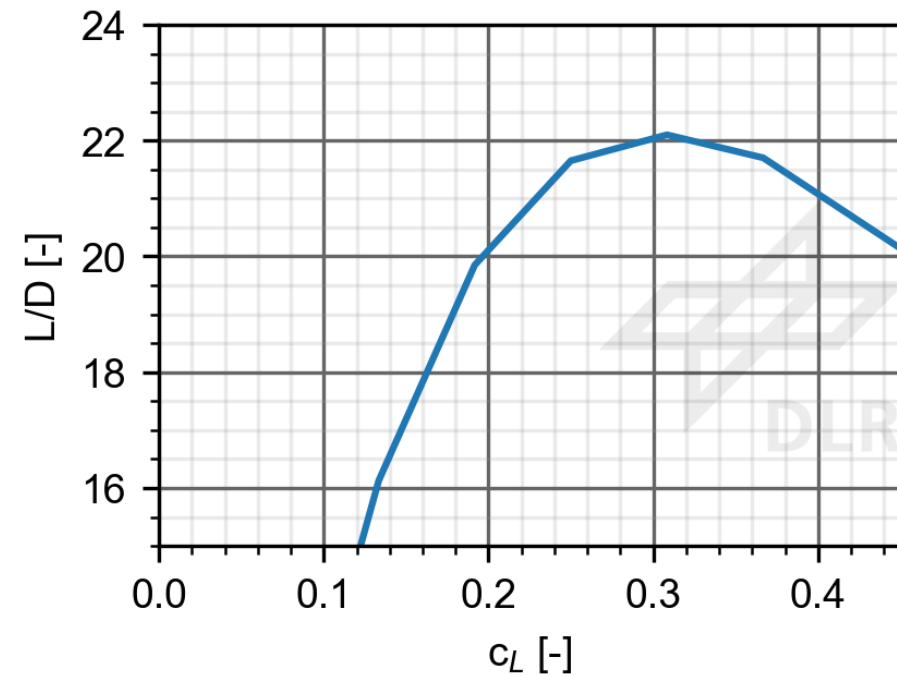


Component	Mass [kg]	Portion [%]
Air Conditioning	690	14.3
Auxiliary Power Unit (APU)	230	4.8
Automatic Flight System	100	2.1
Communication System	190	3.9
De-Icing	30	0.6
Electrical System	1400	28.9
Flight Controls	790	16.3
Fire Protection	80	1.7
Hydraulic System	860	17.8
Instrument Panels	60	1.2
Navigation	410	8.5
Miscellaneous	0	0.0
Systems	4840	100.0

Aerodynamic Performance

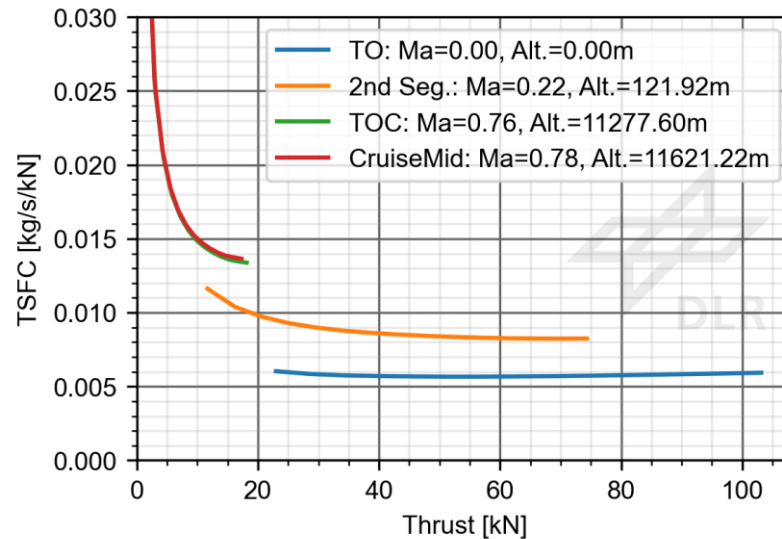
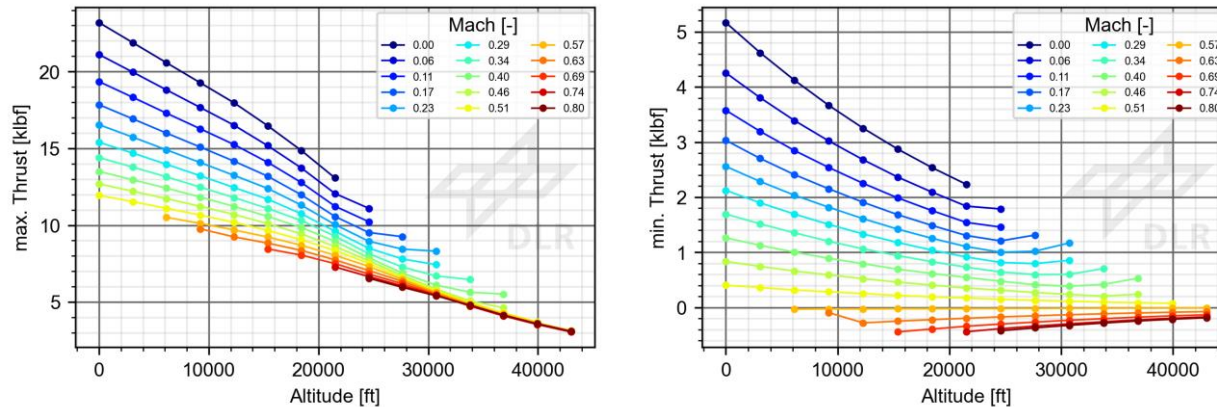


— Clean: Ma=0.78, Flight Level=390



— Clean: Ma=0.78, Flight Level=390

Engine Performance



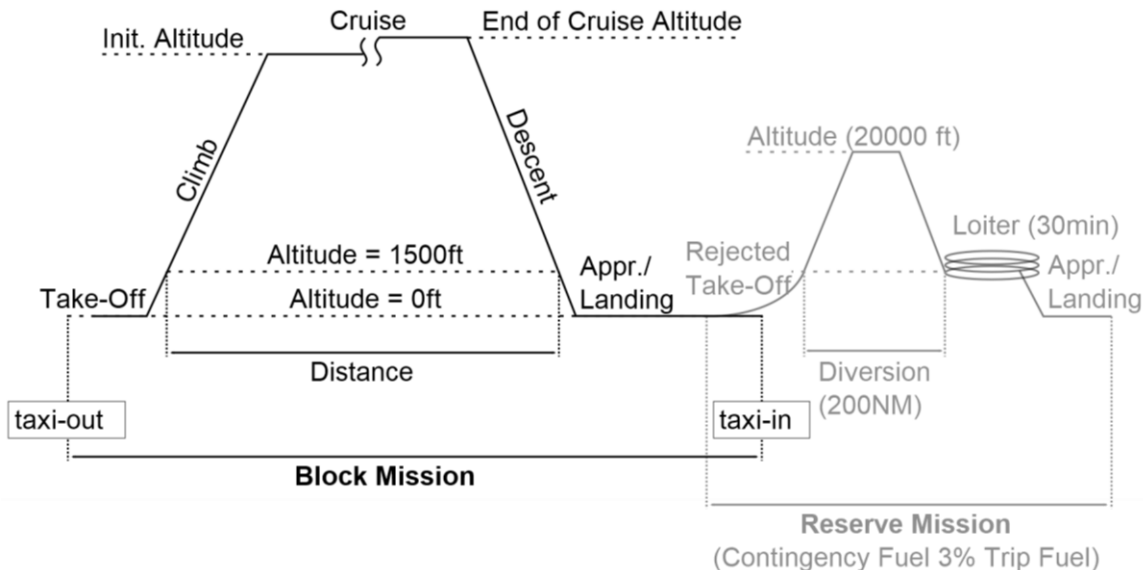
Description:

- Take-Off:
 - at MTOM
- EoF (CS25.121a)
 - at approx. MTOM
 - Landing gear extended, Without ground effect
 - Critical engine inoperative
 - Gradient of Climb > 0%
- 2nd Segment (CS25.121b):
 - at approx. MTOM
 - Landing gear retracted, Without ground effect
 - Critical engine inoperative
 - at V2 Speed
 - Gradient of Climb > 2.4%
- TOC:
 - ROC ≥ 300 ft/min
- Cruise:
 - typically not a thrust sizing point but rather a efficiency related point

Mission Definition and Key Aircraft Characteristics



A design mission with a range of 2500NM and a number of passengers of 150PAX at 95 kg/PAX was defined according to A320 NEO specification. For this design mission, all performance data are calibrated i.e. engine and aerodynamic performances

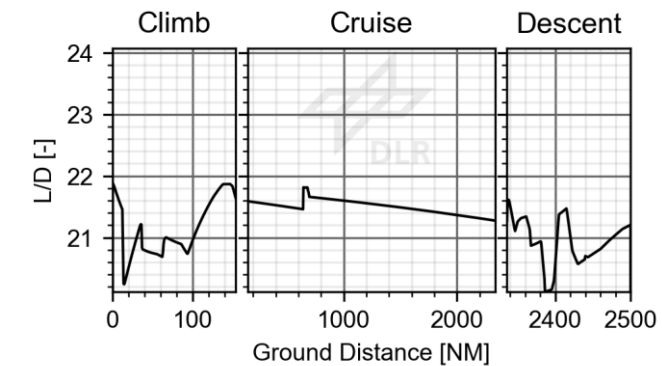
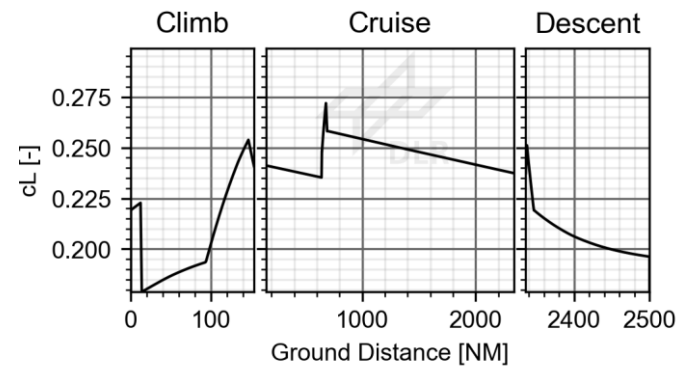
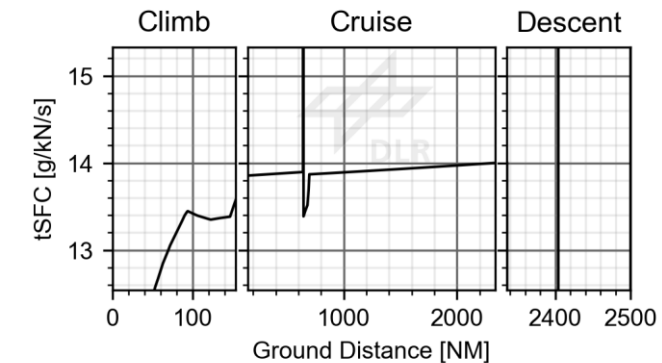
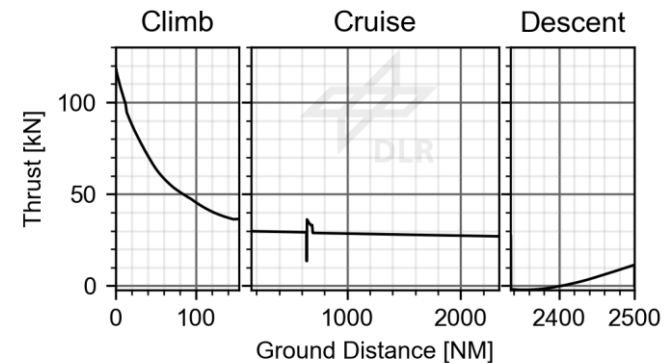
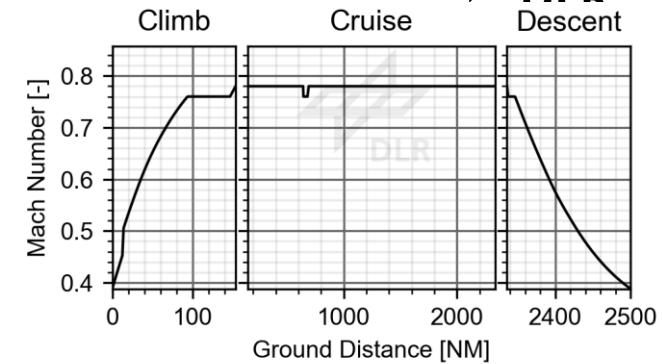
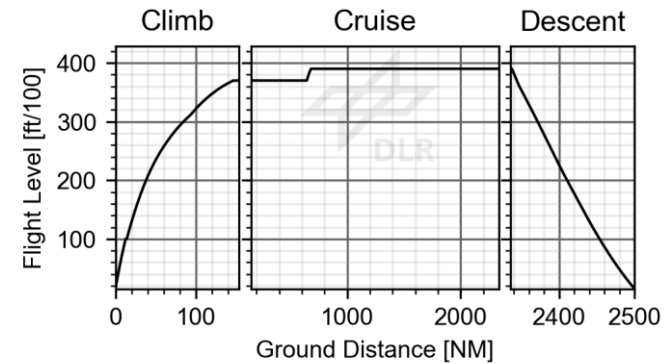


Parameter	Unit	Value
Design Range	NM	2500
Design Passenger Capacity	-	150
Design Cruise Mach Number	-	0.78
Max. Take-Off Mass	t	66.7
Max. Landing Mass	t	60.9
Max. Zero-Fuel Mass	t	59.4
Operating Empty Mass	t	39.4
Max. Fuel Mass	t	19.2
Max. Payload	t	20
Wing Area	m	287.5
Wing Span	m	36.0
Mean Aerodynamic Chord	m	15.7
Wing Loading (@MTOM)	kg/m ²	232.0
Thrust-to-Weight Ratio (@ISA)	-	0.404
Engine Type	-	Turbofan
Thrust (Sea Level Static, ISA)	kN	132.1

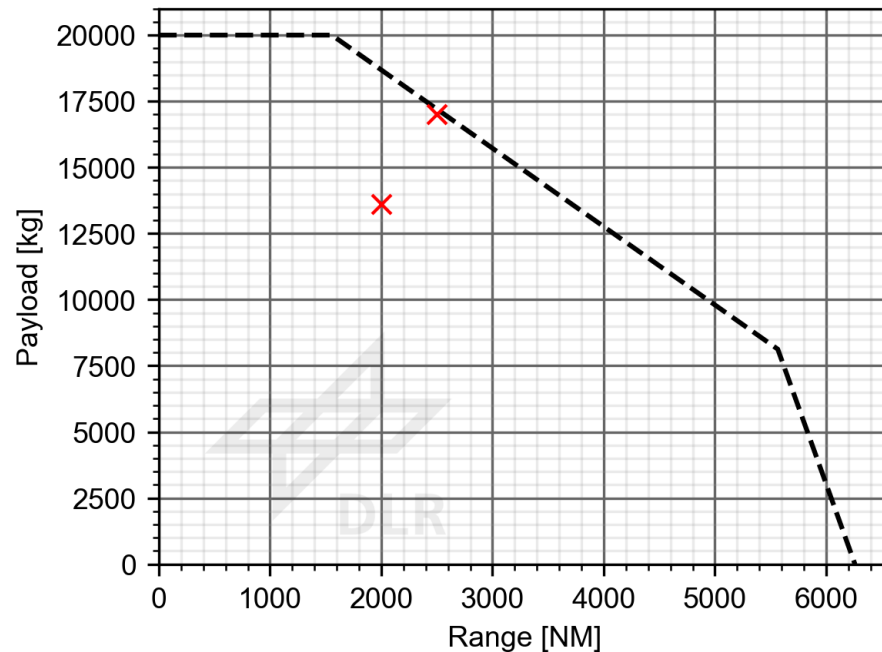
Design Mission Performance



Mission Phase	Flight Time [min]	Fuel Mass [kg]	Distance [NM]
Block Mission	367.5	8593.9	2500.1
Taxi-Out	9.0	105.4	0.0
Take-Off	2.0	125.1	0.0
Climb	23.5	1069.9	153.9
Cruise	292.8	6927.8	2181.8
Descent	30.2	270.0	164.3
Approach & Landing	5.0	37.2	0.0
(Taxi-In)	5.0	58.5	0.0
Reserve Mission	86.5	1884.7	390.4
Go-Around	1.6	112.6	0.0
Diversion Climb	8.1	475.8	45.1
Diversion Cruise	6.5	156.5	42.7
Diversion Descent	35.8	248.2	193.2
Holding	30.0	602.3	109.4
Diversion Approach & Landing	4.5	33.5	0.0
Contingency	0.0	252.9	0.0



Payload-Range Characteristics



General Information:

- Max. Payload: 20000 kg
- Design No. PAX: 150 @ 95 per PAX
- Design Mission: 2500NM @ 17000 kg Payload

Mission Profile:

- Start/Arrival: Typical Long-Range Allowance
- Climb: 280kts
- Cruise: Mach 0.78
- Descent: 250kts

Reserve:

- No wind, ISA condition
- 200NM Alternate Airport
- 30min Holding @1500 ft
- Contingency Fuel: 3.0% Trip Fuel



NACOR

(New innovative Aircraft Configurations and Related issues)

Acknowledgements



The project leading to this application has received funding from the Clean Sky 2 Joint Undertaking under the European Union's Horizon 2020 research and innovation program under grant agreement N°CS2-AIR-GAM-2018-2019-01. The authors would like to thank the project partners from Dassault Aviation (Jean Le Gall, Michel Ravachol) and AIRBUS (Lars Joergensen) for their interest in this topic and their guidance.

Acronym Definition



Acronym	Definition
A/C	Aircraft
AEO	All Engine Operating
AMC	Aircraft Mission Calculation
App	Approach
APU	Auxiliary Power Unit
Avg.	Average
BPR	Bypass Ratio
CAS	Calibrated Airspeed
CS 25	Certification Specifications for Large Aeroplanes
CFRP	Carbon-Fiber-Reinforced Polymers
CG	Centre of Gravity
CPACS	Common Parametric Aircraft Configuration Schema
DC	Drag counts
EIS	Entry Into Service
EOF	End of Field
FL	Flight Level
hAP	Airport Altitude
HiFi	High Fidelity

Acronym	Definition
HTP	Horizontal Tail Plane
ICA	Initial Cruise Altitude
ISA	International Standard Atmosphere
IPT	Intermediate Pressure Turbine
ITD	Intermediate Turbine Duct
JAR	Joint Aviation Requirements
klbf	Kilo Pound-Force
kn	Knots
LE	Leading Edge
LFL	Landing field length
LoFi	Low Fidelity
MCL	Maximum Climb Thrust
MCR	Maximum Cruise Thrust
MEM	Manufacturer Empty Mass
MLM	Maximum Landing Mass
MTO	Maximum Take-off Thrust
MTOM	Maximum Take-Off Mass
MZFM	Maximum Zero-Fuel Mass

Acronym	Definition
NM	Nautical Mile
OAD	Overall Aircraft Design
OEI	One engine inoperative
OEM	Operating Empty Mass
OPR	Overall Pressure Ratio
PAX	Passenger
RCE	Remote Component Environment
ROC	Rate of Climb
RTO	Reserve Take-off Thrust
RWY	Runway
SFC	Specific Fuel Consumption
SL	Sea Level
TE	Trailing Edge
TLARs	Top-Level Aircraft Requirements
TOC	Top of Climb
TSFC	Thrust Specific Fuel Consumption
VTP	Vertical Tail Plane