

# **FUTure PRopulsion and INTEgration**

towards a hybrid-electric 50-seat regional aircraft

## Deriving a Year 2040 Reference Aircraft from a Modern Turboprop, Implemented and Calibrated in SUAVE

October 19th 2022

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# FUTPRINT5



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*This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 875551*



The hybrid aircraft design is better than ...?

## Design Purpose



	<b>ATR 42-500</b>	<b>FUTPRINT50 Hybrid</b>
Technology level	1990-1995	2035-2040
Passengers	46-50	50
Design range	840 NM	430 NM

**Not a convincing comparison to show the impact of hybrid electric components**

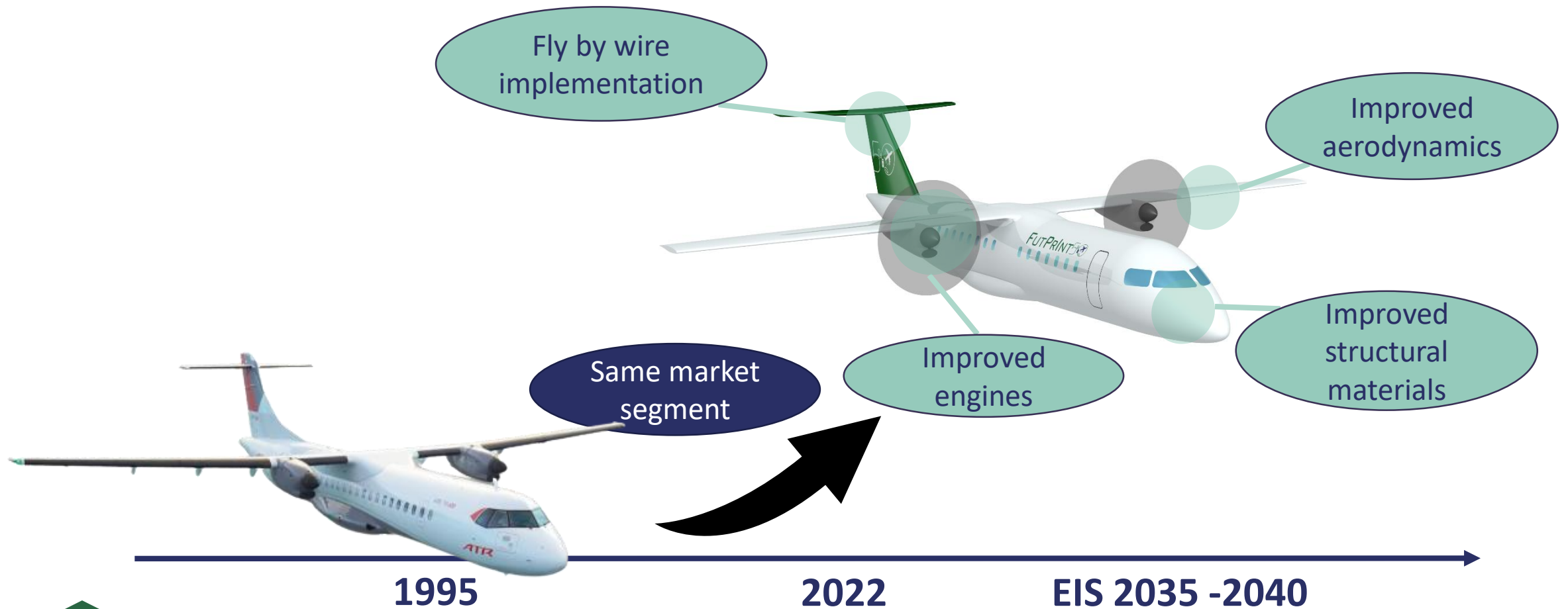
## Design Purpose



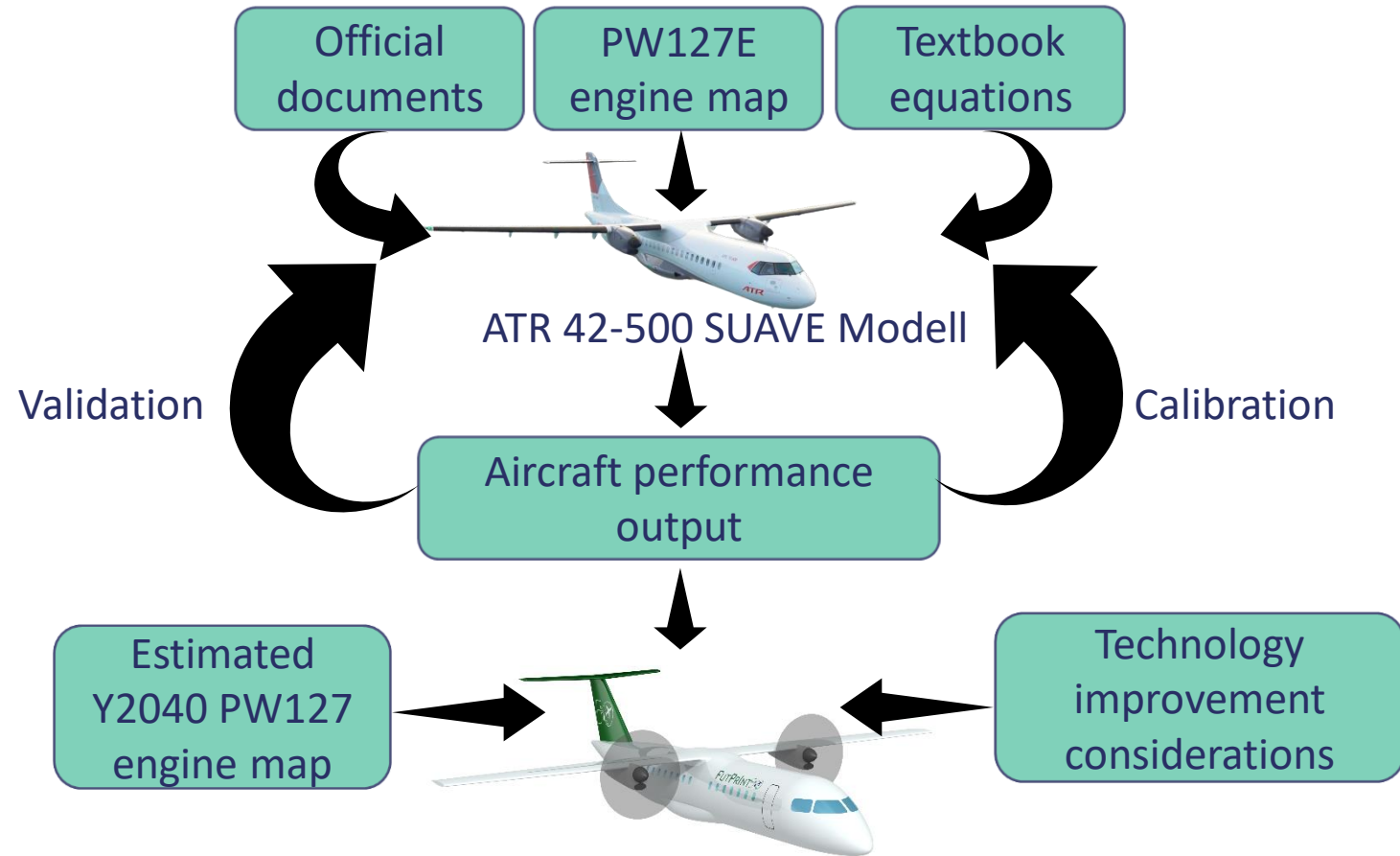
	<b>ATR 42-500</b>	<b>CRA 2040</b>	<b>FUTPRINT50 Hybrid</b>
Technology level	1990-1995	2035-2040	2035-2040
Passengers	46-50	50	50
Design range	840 NM	840 NM	430 NM

**Goal: Valid benchmark aircraft for 2040**

## Conventional Reference Aircraft for 2040



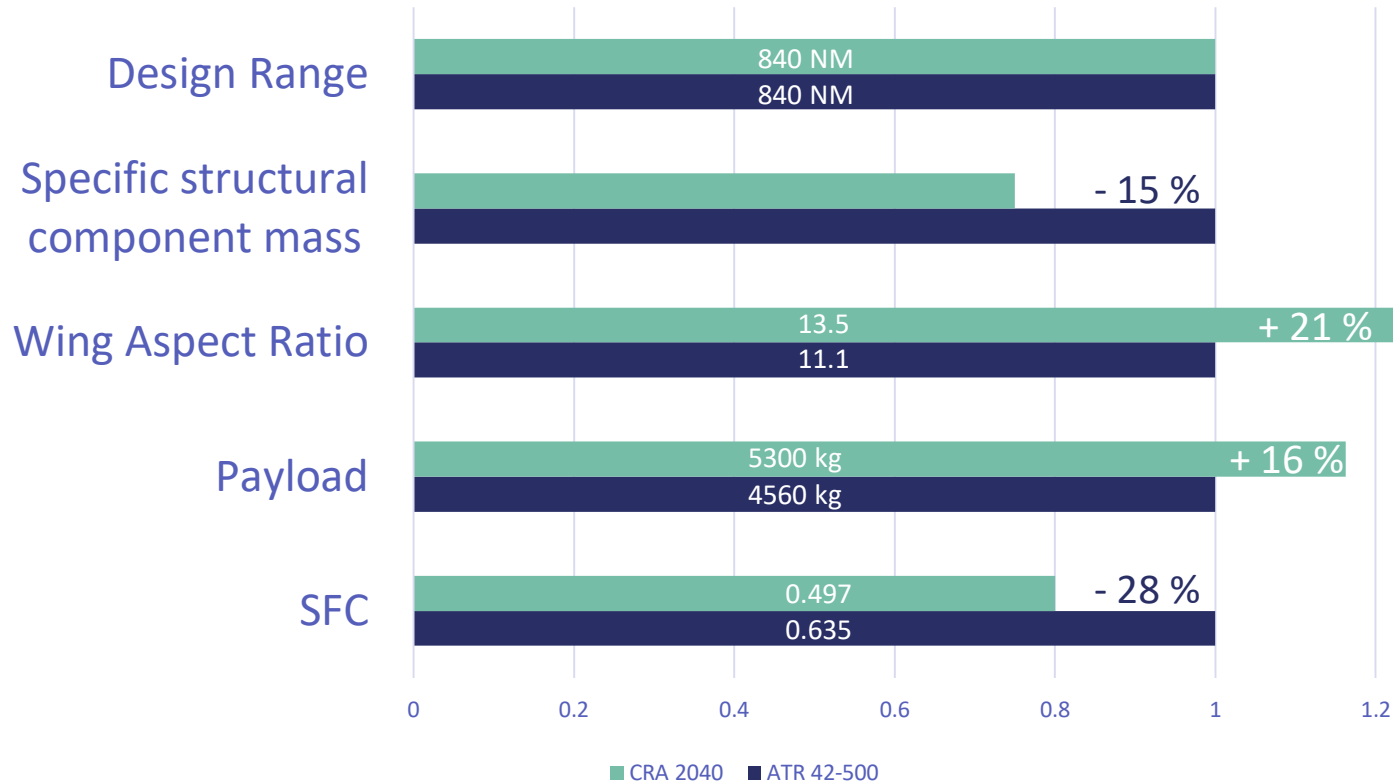
## Development Process



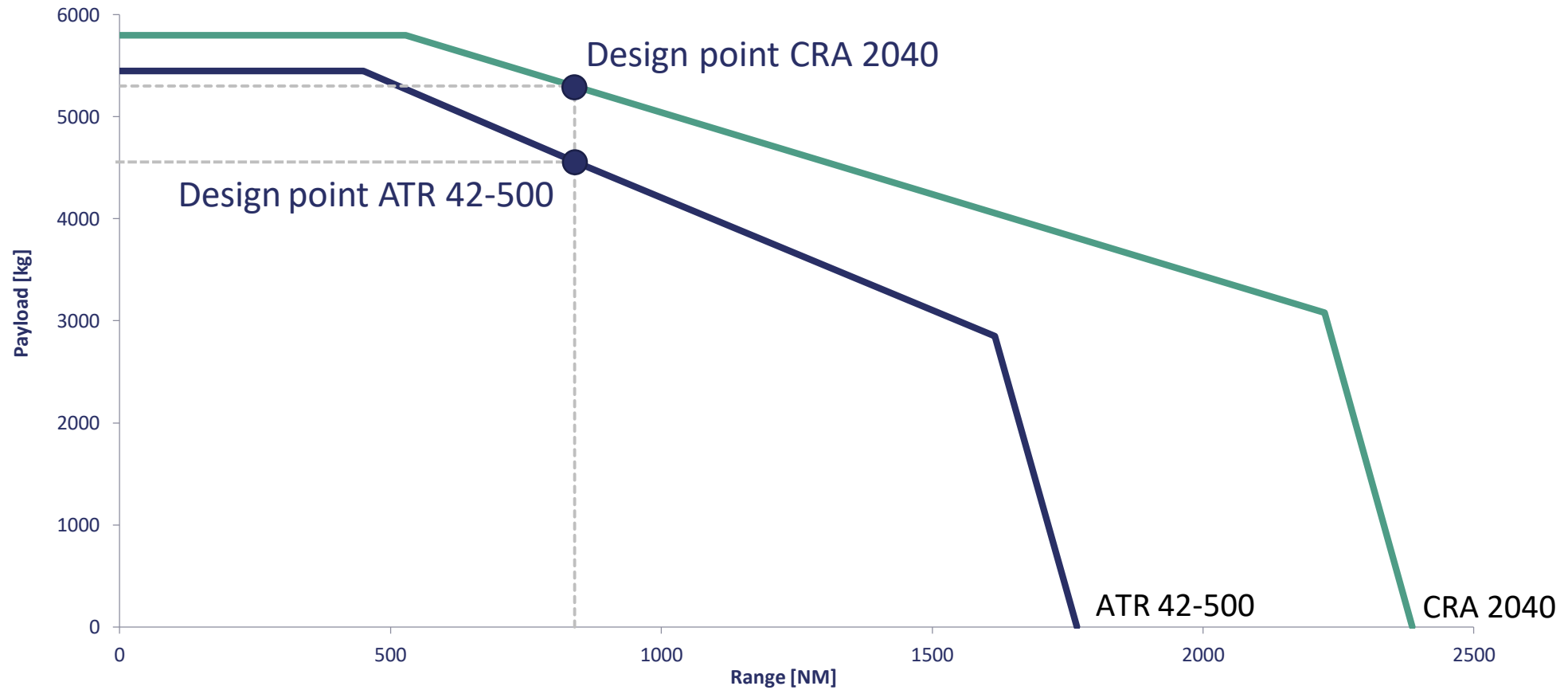
Conventional Reference Aircraft 2040

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## CRA 2040 Technology Improvements

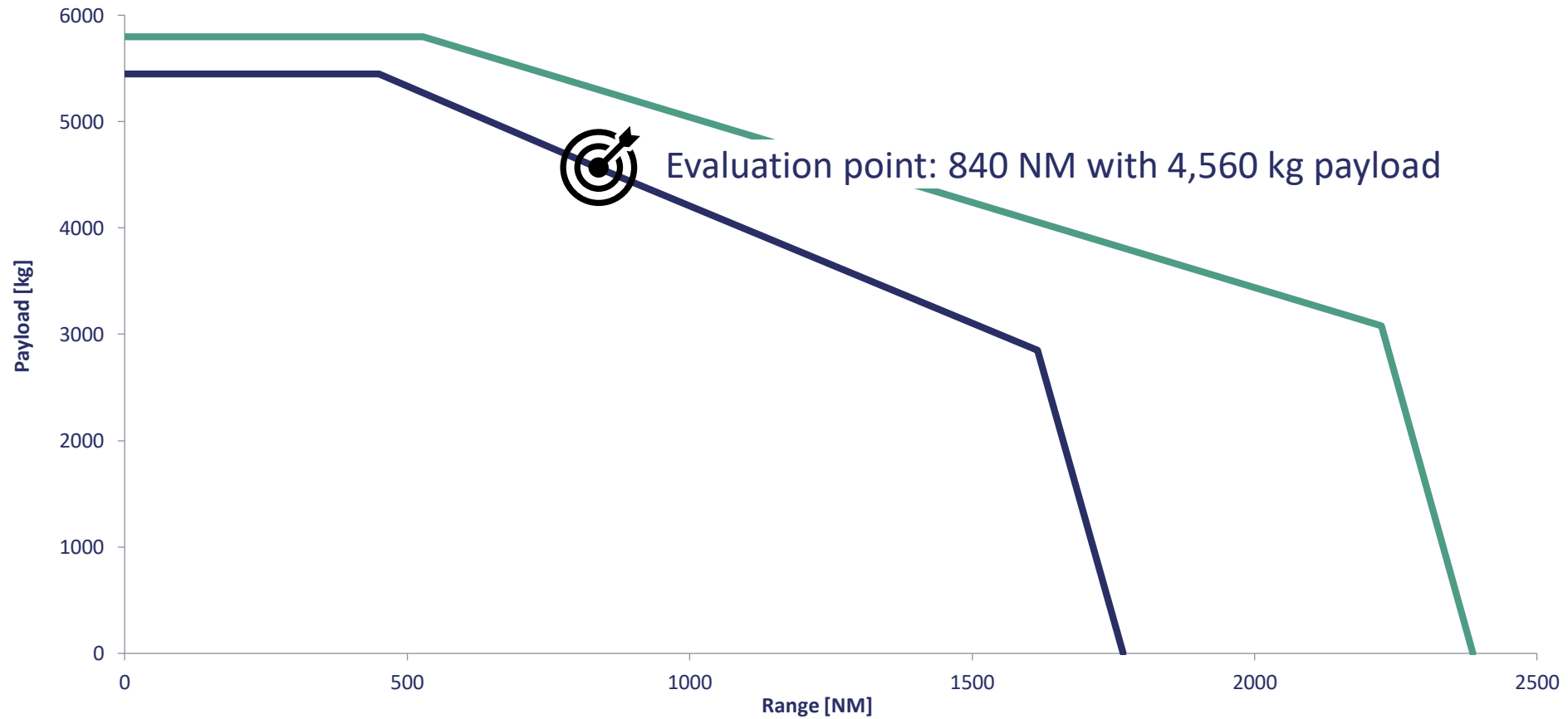


## Performance Comparison

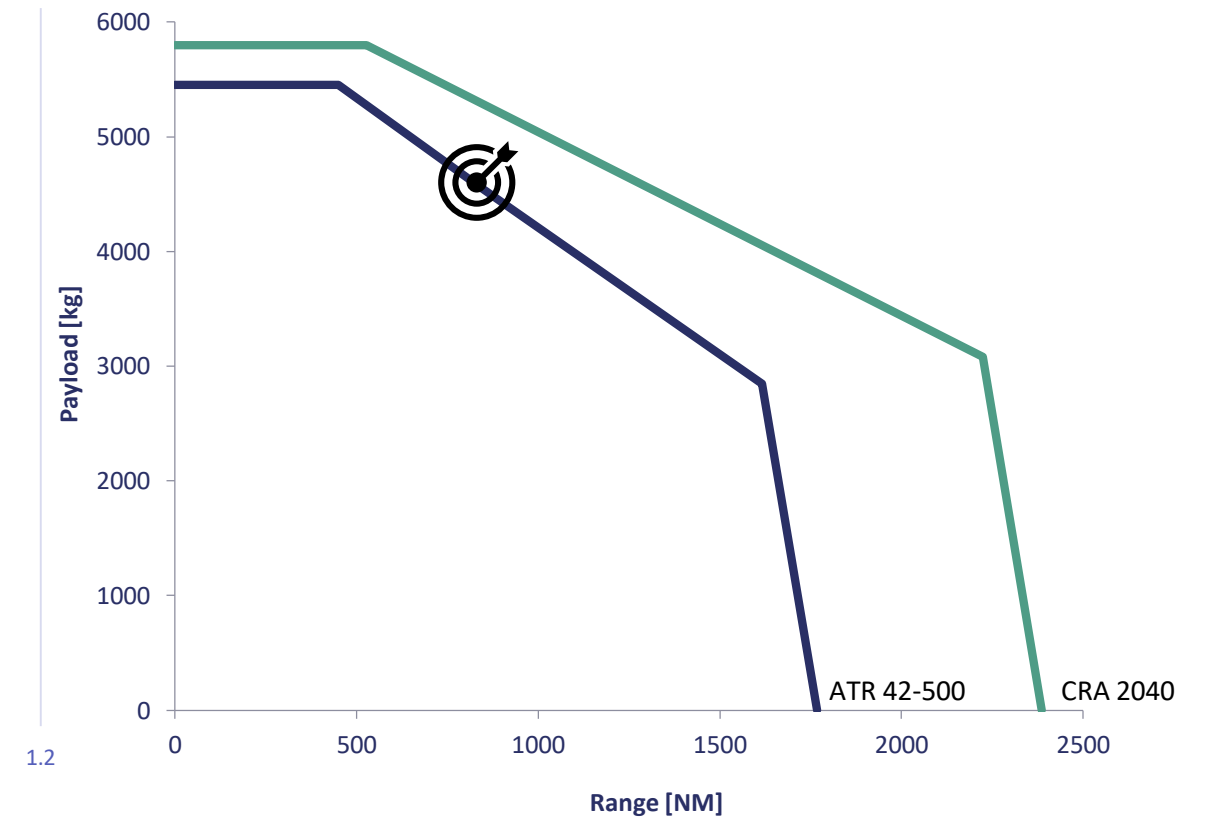
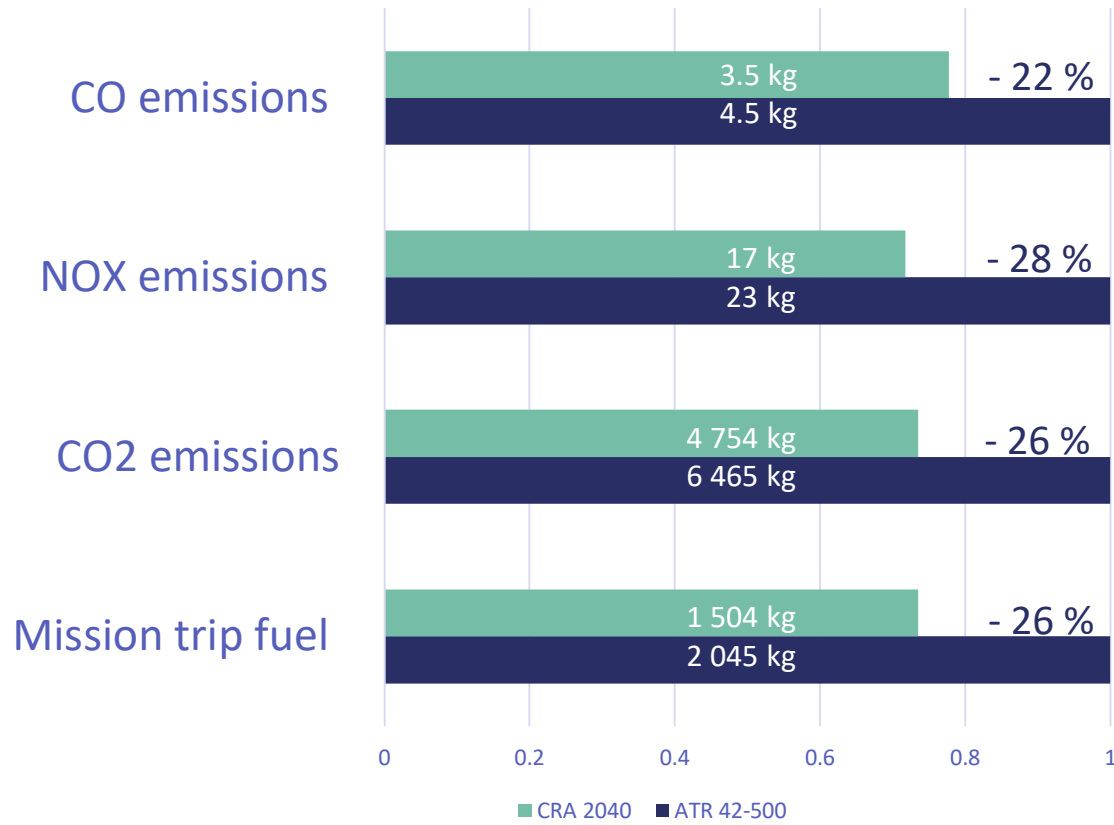




## Performance Comparison



## Performance Comparison



Evaluation point: 840 NM with 4,560 kg payload

## Conclusion: Conventional Technologies are not Sufficient

EU Flightpath 2050	CRA 2040
- 75 % CO <sub>2</sub>	- 26 % CO <sub>2</sub>
- 90 % NO <sub>x</sub>	- 28 % NO <sub>x</sub>

2050 Goals cannot be achieved with conventional aircraft using fossil JET A1

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# THANK YOU!



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## Acknowledgement

The research leading to these results has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 875551.

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