



# IMPACT MONITOR

University of Stuttgart  
Germany



Deutsches Zentrum  
für Luft- und Raumfahrt  
German Aerospace Center

## Iterative Aircraft and Engine Sizing Using SUAVE and TurboMatch in Remote Component Environment (RCE)

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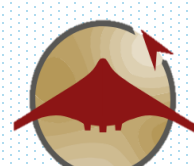
Cranfield University: Utkarsh Gupta, Atif Riaz

German Aerospace Center: Lukas Weber

### Objectives

- Demonstrate a higher fidelity sizing methodology for aircraft and engines using SUAVE and TurboMatch within the Impact Monitor Project
- This solves the problem of high-fidelity engine performance map becoming obsolete after reiterating the airframe sizing

### Software



**SUAVE:** Aircraft Design Environment  
Hosted at **University of Stuttgart**



### TurboMatch

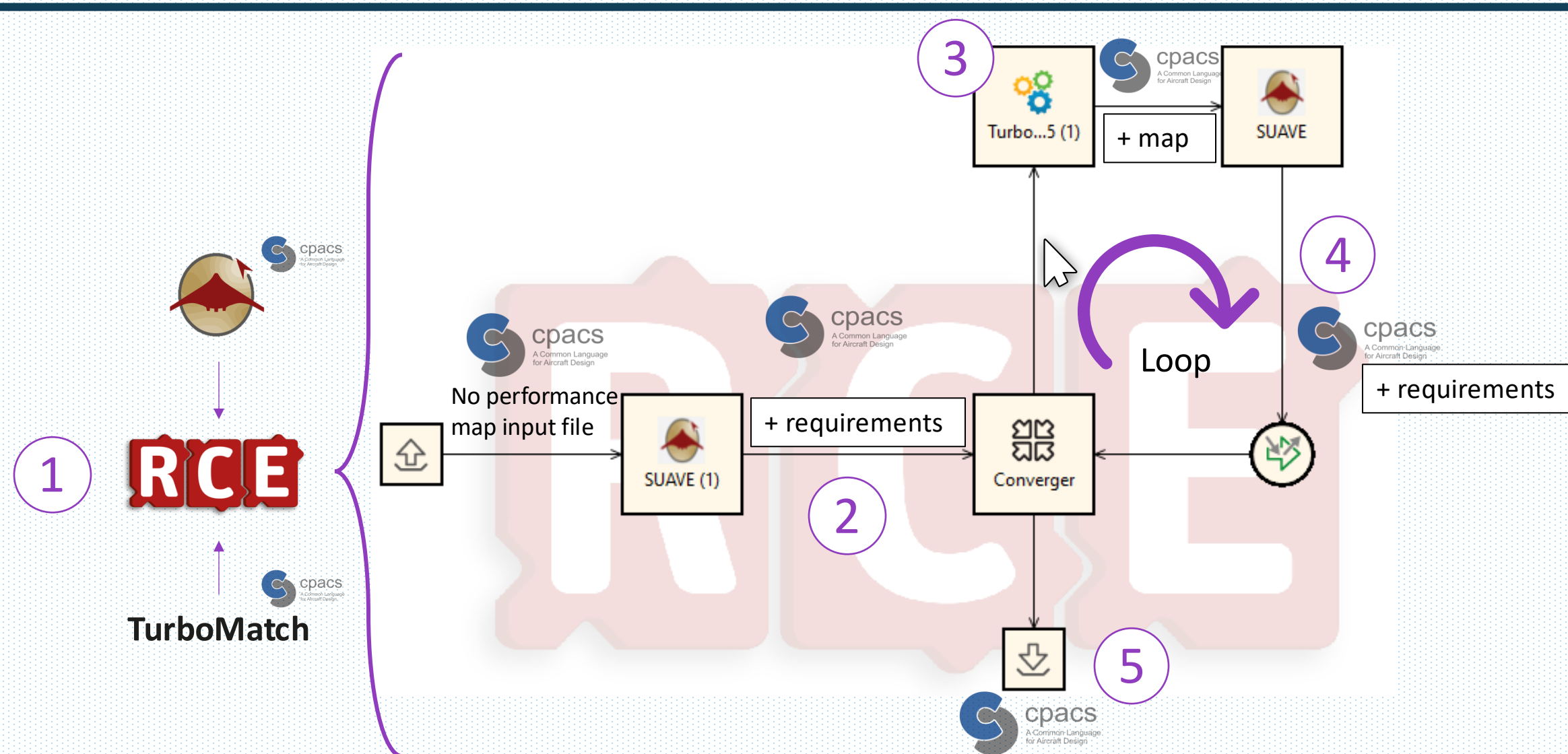
Engine modelling tool  
Hosted at **Cranfield University**



**Remote Component Environment:** Remote collaborative platform from **DLR**

### Methodology

1. Make both SUAVE and TurboMatch cpacs-compatible and connect via RCE
2. Engine thrust requirement based on low fidelity engine calculations in SUAVE
3. Generation of engine performance map in TurboMatch based on thrust requirements generated in SUAVE. Performance map is exported into the cpacs file
4. SUAVE imports the cpacs file and converts performance map into .csv file, that is used to recalculate the aircraft with a high-fidelity engine. New thrust requirements are forwarded in cpacs
5. Process is repeated until convergence is reached



### Results

SUAVE only: Empirical engine in SUAVE



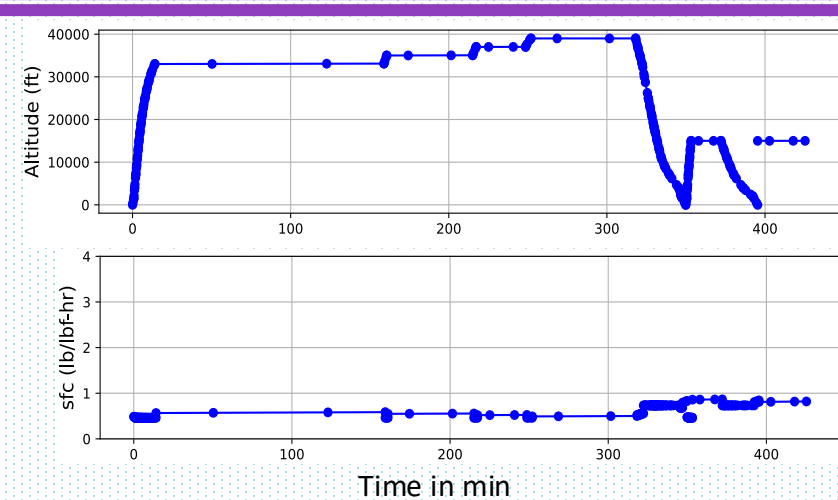
1 Loop: Performance map scaled by SUAVE



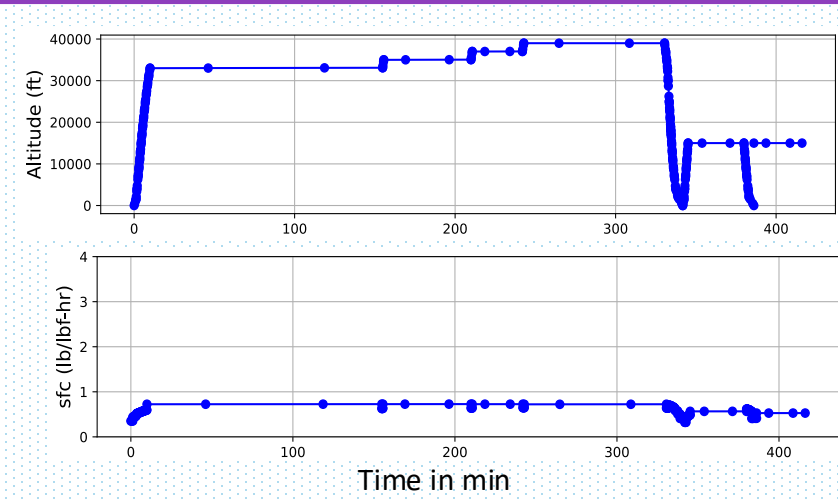
n loops: New performance map each loop until no further scaling required



OEM: 51086 kg  
PAX: 24000 kg  
FUEL: 18555 kg  
MTOM: 93642 kg  
Wing Span: 35.82 m



OEM: 51029 kg -0.11%  
PAX: 24000 kg  
FUEL: 18392 kg -0.11%  
MTOM: 93421 kg -0.88%  
Wing Span: 35.78 m -0.11%



Digital business card



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