SWEDEMO PROJECT OVERVIEW

NÄSTA GENERATIONS STRUKTURER, SYSTEM, INTEGRERADE SENSORER OCH ATM-TEKNIK FÖR DEN CIVILA FLYGMARKNADEN

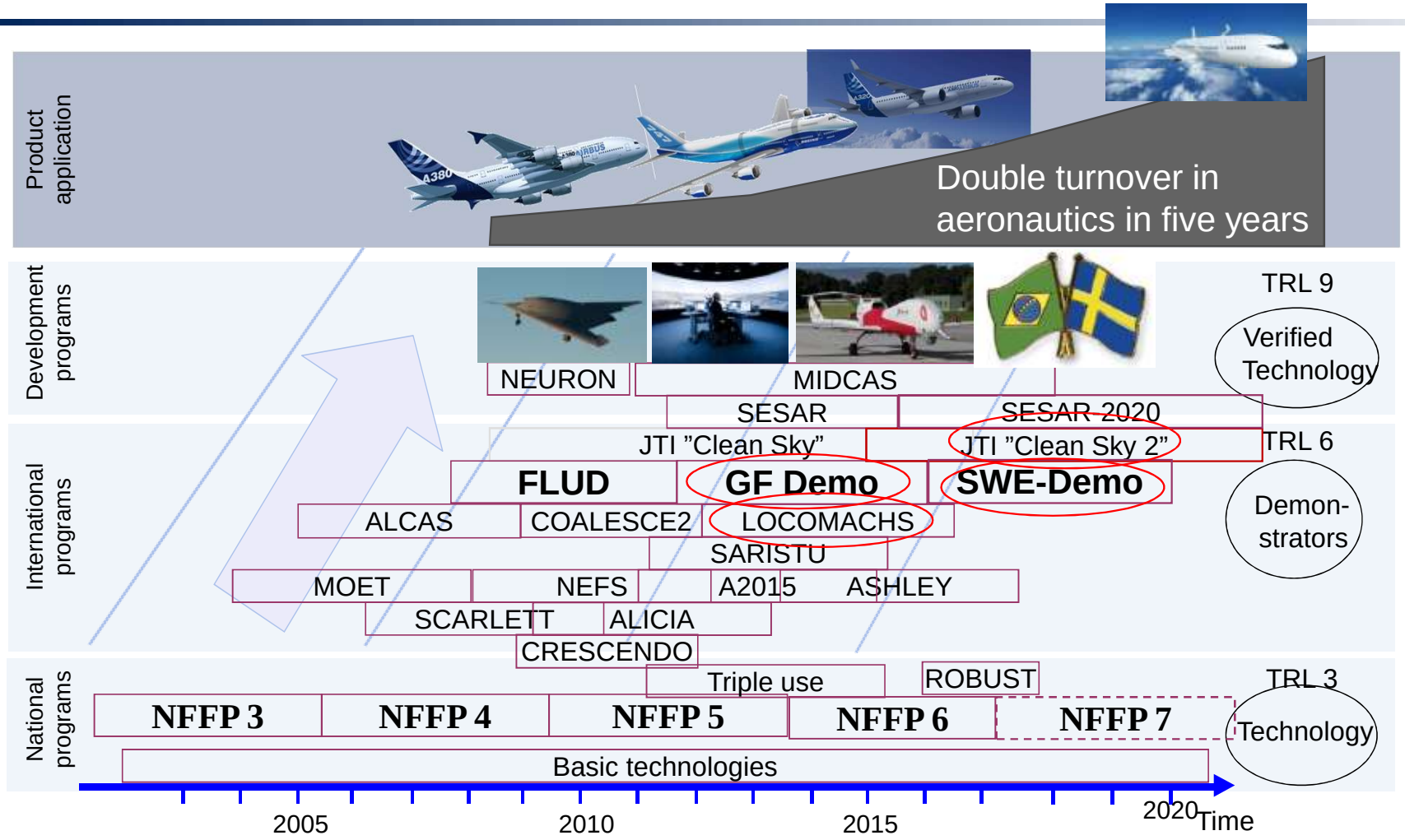
NEXT GENERATION STRUCTURES, SYSTEM, INTEGRATED SENSORS AND ATM TECHNOLOGIES FOR COMMERCIAL AVIATION MARKET

Maria Weiland, Saab AB, Aerostructures

PARTNERS IN SWE DEMO

The research leading to these results has recieved funding from VINNOVA under program n* 2015-06057

RESEARCH PROJECT OVERVIEW – SAAB GROUP

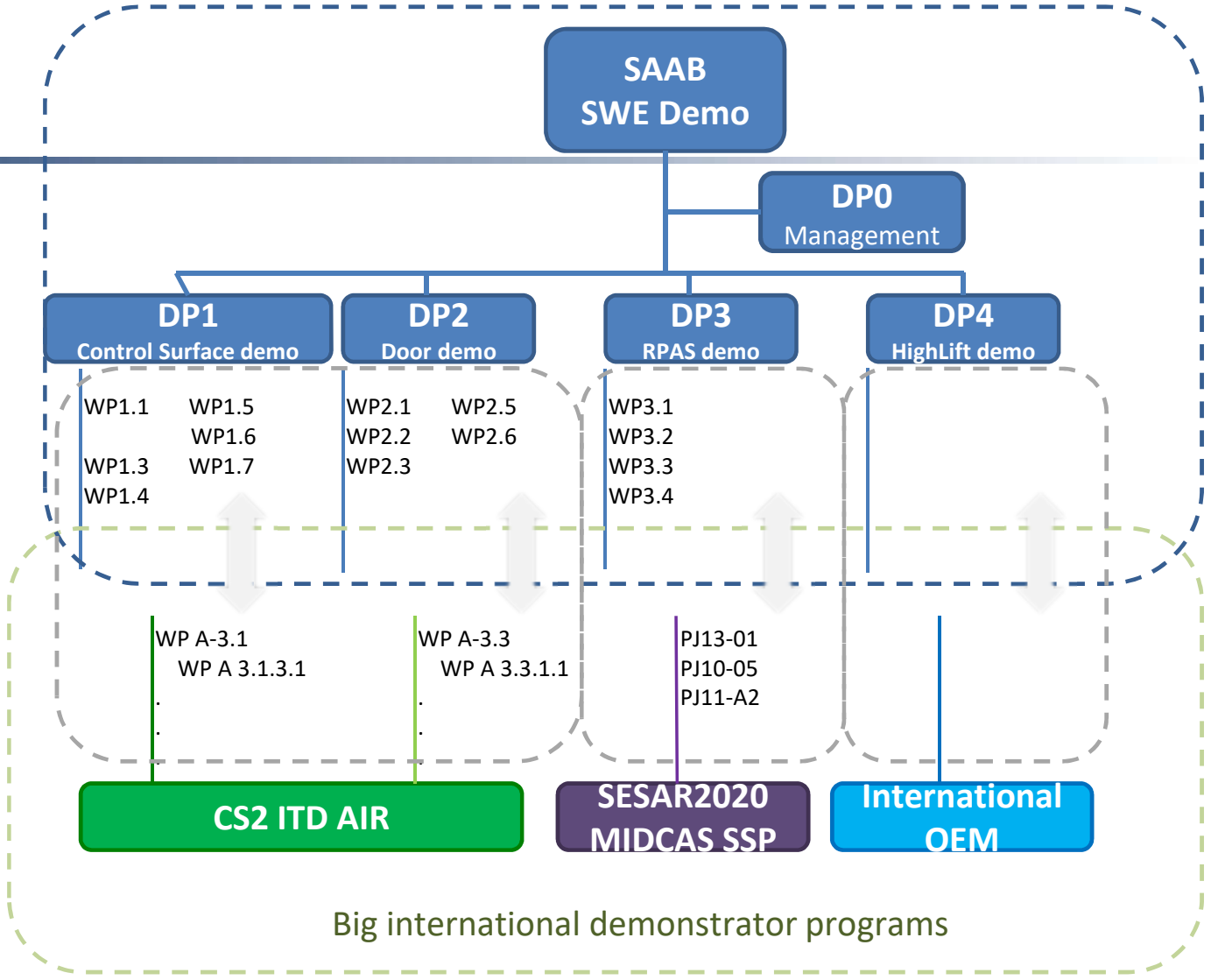


SWE DEMO AREAS & ORGANISATION

DP1&2
- Basic aeronautical technologies and overall capability
- Advanced structure and manufacturing of aircraft structures

DP3
- Air traffic management (ATM)

DP4
- Intelligent onboard systems



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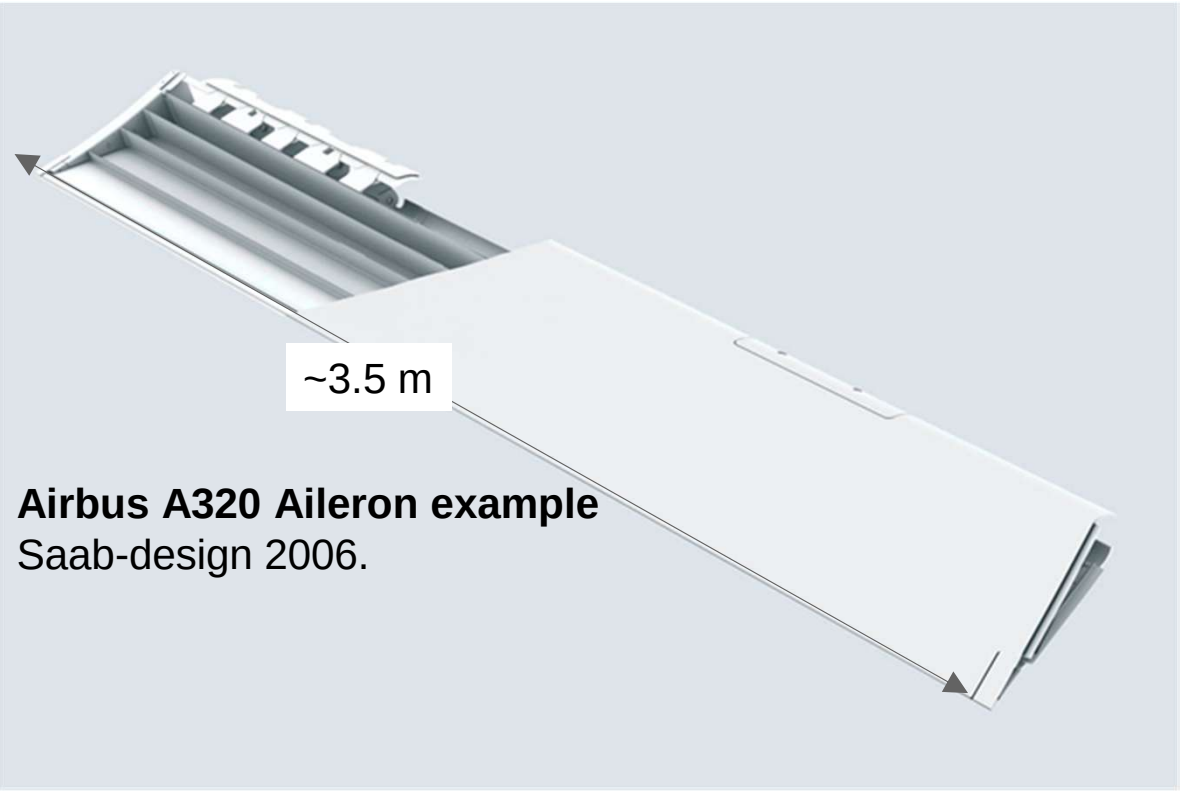
SUB PROJECT 1 COMPOSITE TECHNOLOGIES

- **WP1.1 Innovative tooling**
- **WP1.3 Automation**
- **WP1.4 Methods for Residual stress analysis**
- **WP1.5 High Temperature composite**
  and a pre-study of Out of Autoclave
- **WP1.6 Air flow control technologies**



Airbus A320 Aileron example
Saab-design 2006.

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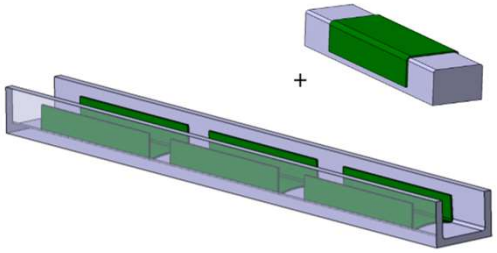
EXEMPLE OF WHAT HAS BEEN DONE

- **WP 1.1 Innovative tooling**
  - Industrial PhD Tommy Grankäll
  - Study of how male & female tools can be combined to compensate for the manufacturing process & planning of manufacture of these.
- **WP 1.3 Automation**
  - Work package launched with planning & discussions with all involved partners.
- **WP 1.4 Methods for Residual stress analysis**
  - Industrial PhD Erik Hörberg
  - Planning & definition of test program with respect to thickness effect of spring back on generic composite parts.
  - Evaluation of test results of this test.



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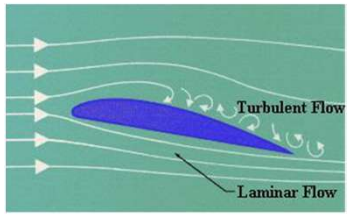
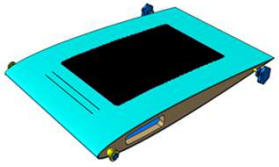
EXEMPLE OF WHAT HAS BEEN DONE

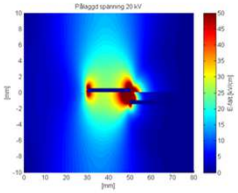
- **WP1.5 High Temperature composite and Out of Autoclave**
  - Litterature study to identify what High Temperature composites are available of the commercial market. A cost analysis of Out-of-Autoclave manufacture process is also performed.

- **WP1.6 Air flow control technologies**
  - Within Clean Sky Saab has a wing panel on the BLADE A340-300 MSN001 with Natural Laminar Flow (Passive)
  - Through active measures the laminarity can be expanded and Saab is investigating ways of doing this
  - We have prepared a wind tunnel test with active plasma to be performed in October.





Plasma modeller



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SUB PROJECT 2, METAL DOOR TECHNOLOGIES

- **WP2.1 Automated Sealant technologies**

CHALMERS Fraunhofer SAAB
LINKÖPINGS UNIVERSITET swerea|IVF Atlas Copco

- **WP2.2 Jig pickups in composite**

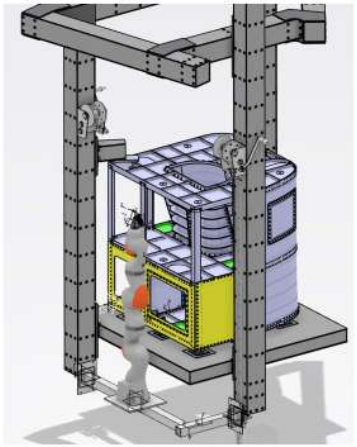
SAAB FlexProp Performance by competence

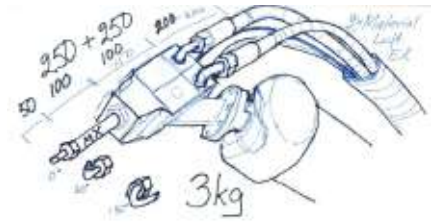
- **WP2.3 Electrically driven pickups**

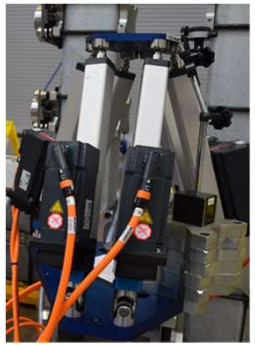
SAAB CHALMERS Prodtex

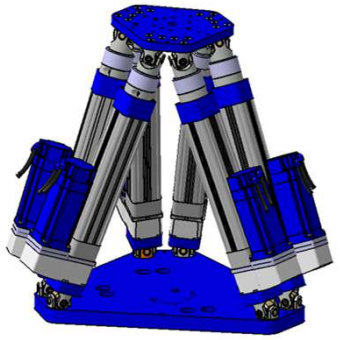
- **WP2.5 Repair technologies for highly integrated metal parts**

SAAB LINKÖPINGS UNIVERSITET









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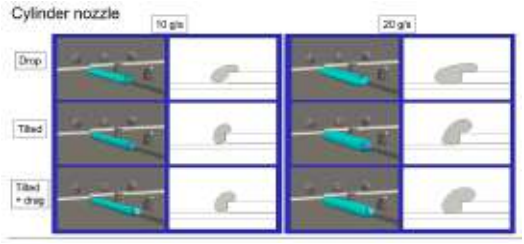
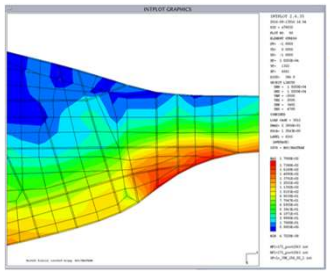
EXEMPLE OF WHAT HAS BEEN DONE

- **WP21 Automated Sealant technologies**
  - Process simulation of sealent flow
  - Concept and manufacturing of prototype
  - Tests started
- **WP2.2 Jig pickups in composite**
  - Design criteria and applications defined
  - Manufacturing and delivery of Jig pick-ups
- **WP2.3 Electricaly driven pickups**
  - Kravställning & definition av applikationer
  - Framtagning modiferad hårdvara samt tester påbörjat
- **WP2.5 Repair technologies for highly integrated metal parts**
  - Definition and realisation of topology optimisation challenge
  - Paper presented on WCSMO12





Abstract Submission

General Information

Submission Title: Topology optimization of repair patches for primary aircraft structures by minimizing energy release rate

Submission Type: ◉ Paper ○ Poster

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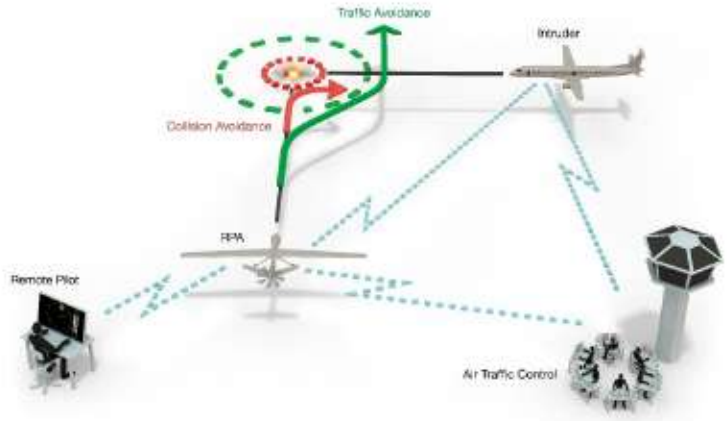
SUB PROJECT 3, RPAS INTEGRATION, DETECT AND AVOID

- **WP3.1 Technology development**
- **WP3.2 Demonstration**
- **WP3.3 Concept of Operation and regulatory aspects**



EXEMPLE OF WHAT HAS BEEN DONE

- Tracking and Fusion algorithms adapted for Detect and Avoid application and integrated with Collision Avoidance algorithms
- R5DAA hardware prototype developed and currently undergoing tests in rig environment
- Definition of R5DAA integration on Skeldar
- Preparation for simulations at LFV's Sturup ATC-simulator

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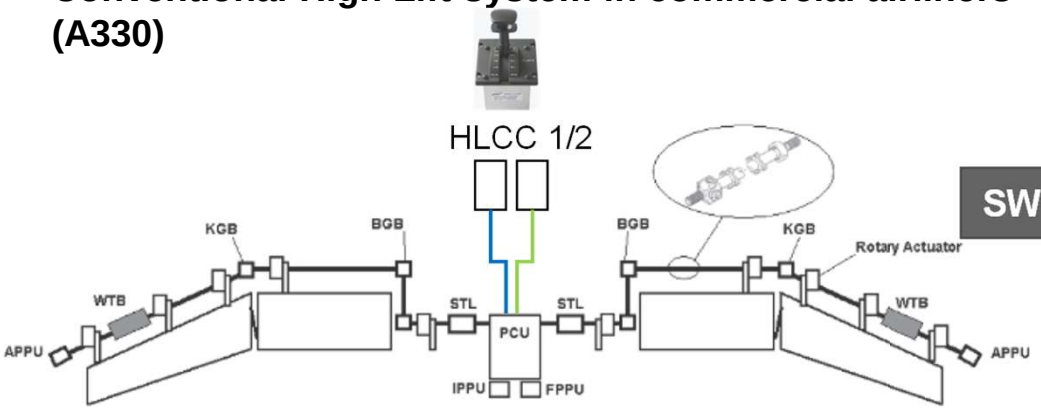
SUB PROJECT 4 – HIGH LIFT SYSTEM

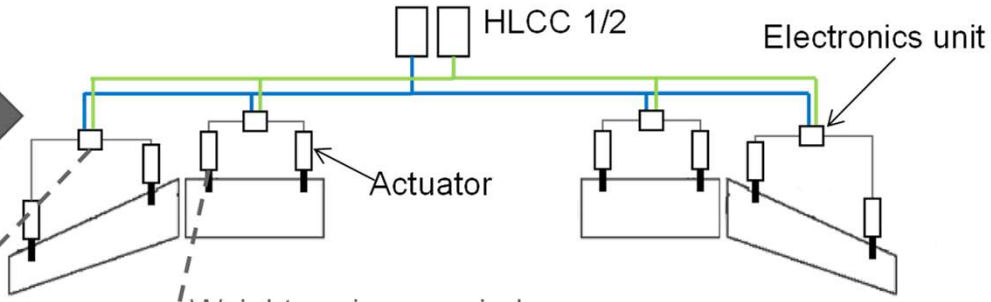
Conventional High Lift-system in commercial airliners (A330)

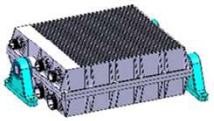


- Complex and heavy mechanical design
- Heavy hydraulic infrastructure required
- Mechanical single failure cause loss of High Lift
- Maintenance demanding
- Environmentally hazardous hydraulic oil

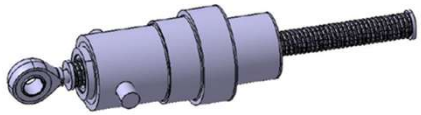
SWE DEMO

Electric and distributed High Lift-system





Electronics unit (draft)



Actuator (draft)

- Weight saving per airplane
  - > 500 kg for single aisle Large Comm. Aircraft (B737, A320)
- Facilitated assembly on airplane
  - 50% reduced assembly time
  - 66% reduction of parts
- Increased availability of High Lift
- Enables aerodynamic optimization during flight
- Power on demand

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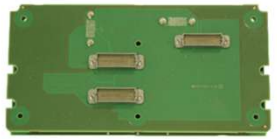
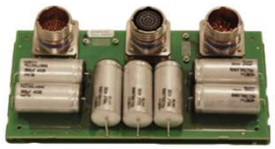
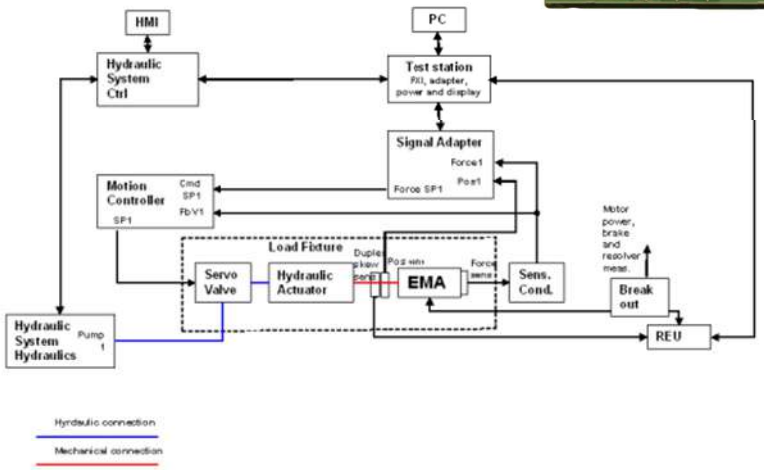
EXEMPLE OF WHAT HAS BEEN DONE

- Requirements capture and break down completed
- Concept analysis completed
- Preliminary design defined and presented for OEM
- Circuit boards for electronics unit manufactured, verification ongoing
- Dedicated test rig under development







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THANK YOU!

Questions?

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