



GSE & Tool Engineering

How innovations in GSE & Tools can reduce maintenance cost

13 September 2017

AIRBUS

GSE and Tools Engineering Services

Guillermo BATICON-RAMOS

- Head Of GSE & Tools design & engineering

Expertise details

- Industrial Engineering
- Tooling design
- Innovation management
- Aircraft maintenance



Nick FENDALL

- GSE services Business Development Manager

Expertise details

- Mechanical Engineering
- Tooling design
- Aircraft maintenance
- Maintenance planning



Airbus GSE and Tools



GSE and Tools Engineering Services

Experts in tooling design and support

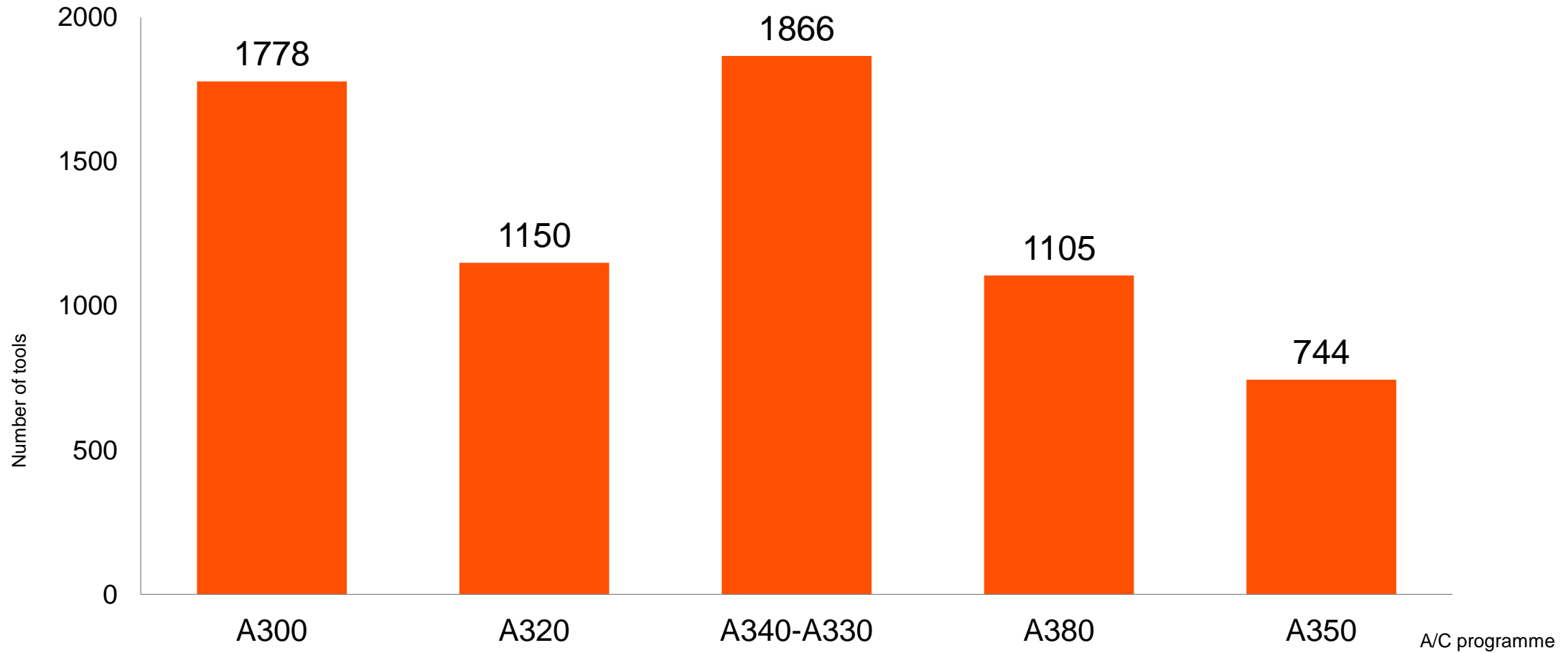


- Design in context, test on aircraft and customised technical data

Tailored tools and tool approvals

Benefit from Airbus expertise in tooling design

Specific GSE and Tools numbers





GSE Innovations

NDT inspection by non-specialist

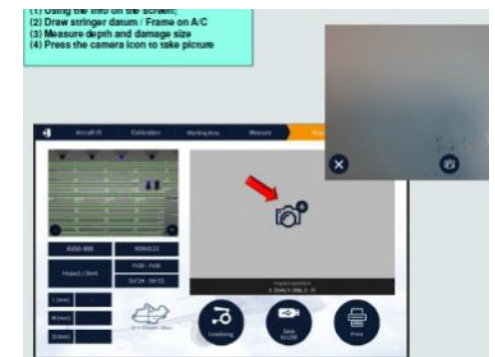
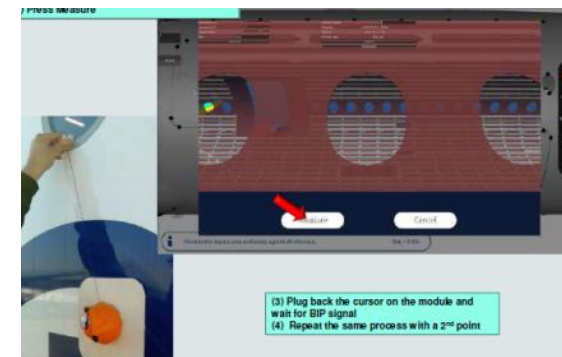
LineTOOL: go/no go composite delamination assessment tool

- Prevent flight delay and cancellation due to lack of Non Destructive Testing expert personnel availability
- Provide quick and reliable statement
- Already available and used by several Operators



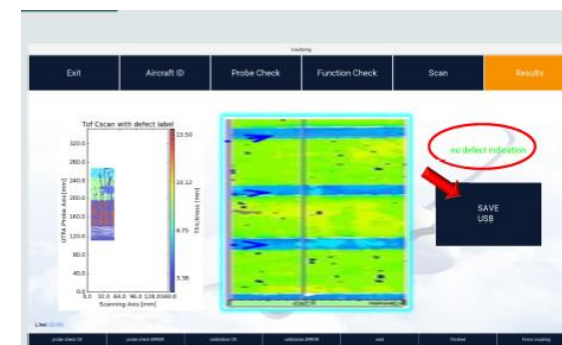
LineMAP: Damage Localisation

- Accurate location of damage on A/C fuselage, automatic integration in A/C DMU (Digital Mock-Up)
- Damage location tracking and report generation
- Already available and used by several operators



LineSIZING: Damage sizing and reporting

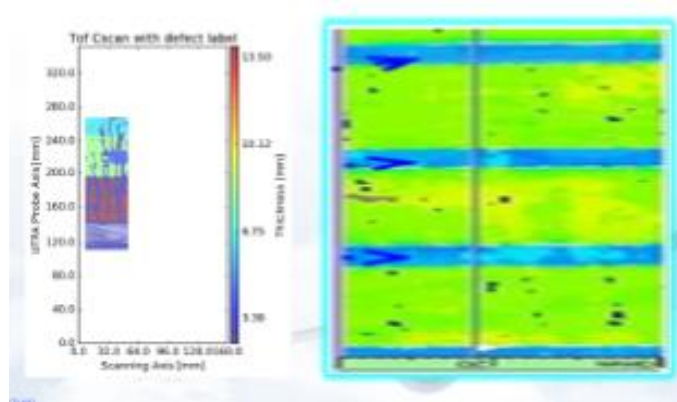
- Easy to use device, enable B1 or equivalent mechanics to perform damage sizing on A350 monolithic CFRP.
- Ultrasonic C-scan , automatic damage size measurement.
- Enhanced damage tracking and automatic report creation.



A350 CFRP damage reporting

LineSIZING - Measurement

- CFRP damage measurement by B1 mechanic



LineMAP – Localisation

- Accurate localisation using 3D data



66% time reduction

Fast and accurate damage report without NDT specialist



SWITS

For hard and
intermittent
electrical faults

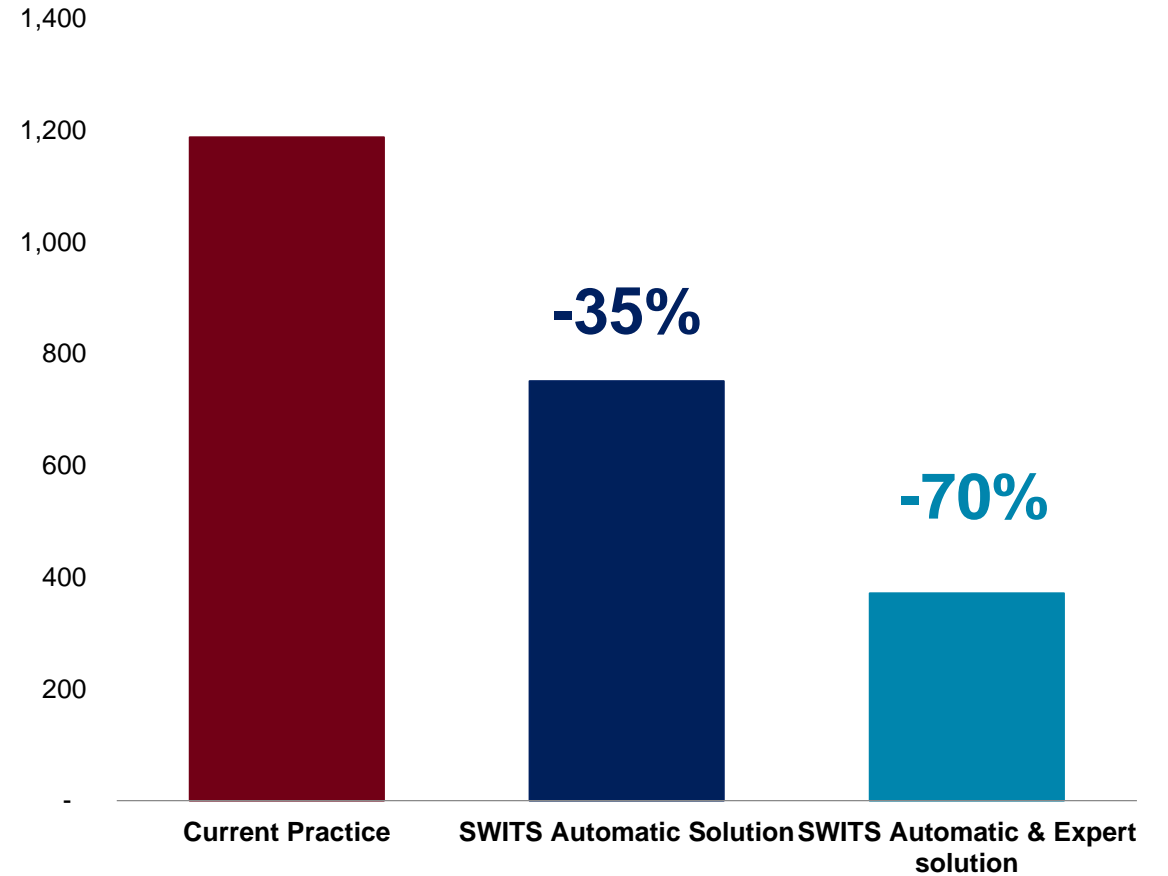
SWITS

Smart Wiring Trouble Shooting

- Quickly detect and localise electrical faults
- Limit A/C grounding time for wiring troubleshooting
- OI occurrence reduction
- Reduced troubleshooting cost
- Faster troubleshooting
- Reduced NFF events



Avg. Costs per A/C (in \$ (USD))





Electrical Hoist Kit

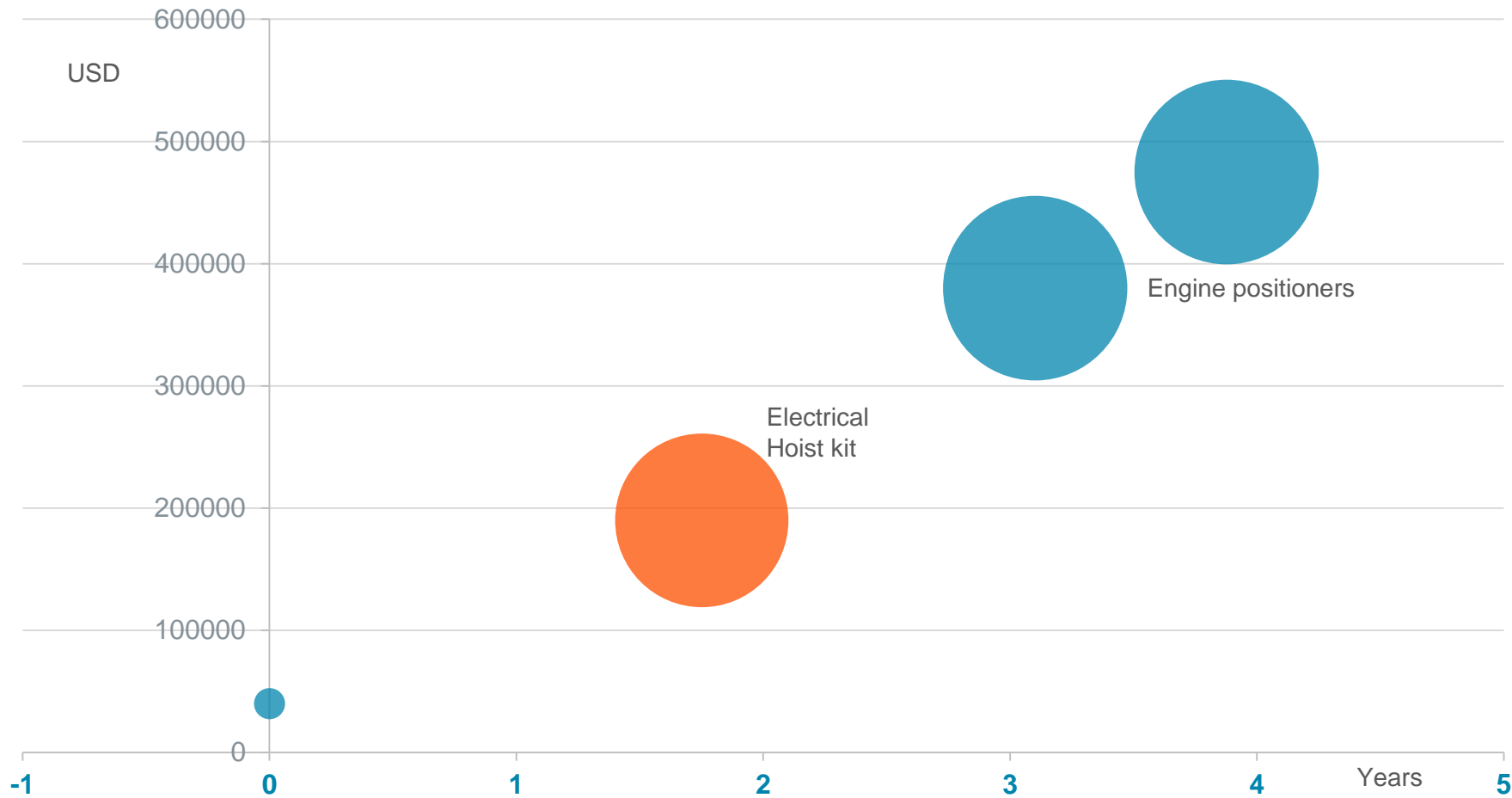
30% cost saving

Reduced elapsed time
Maintenance task optimisation

Electrical Hoist Kit: optimising your engine installation

- Reduced number of mechanics for an engine installation
- Limit overloading risks
- Compatible with all Airbus Bootstraps
- Already available and used by several Operators

Return on investment



Electrical Hoist Kit

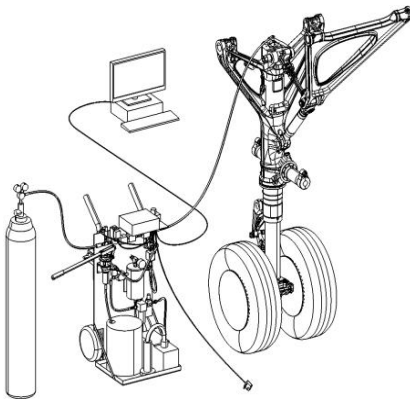
Example ROI

LANCE – Automated shock absorber servicing

Automated shock absorber servicing

Accurate oil and gas replenishment of Landing Gears

- Remove all risk of incorrect servicing due to nitrogen gas absorption
- Fast and fool proof, single-point service
- The only solution for automatic fluid and gas quantity in one equipment



Benefits and cost savings

- Check and replenishment of gear fluid “Weight on Wheels”
 - No maintenance jacking required
- Fluid removed under vacuum
 - No need to extend and compress the gear
- No ‘H’ dimension check required
 - More accurate and less operator error
- Fluid and nitrogen replenishment in one operation
- Accurate nitrogen charging
 - Reduces error due to nitrogen absorption.

Up to 64% saving

Faster and more accurate servicing

Automated weight on wheels gear servicing

Future developments

GSE DRONEs for INSPECTION:

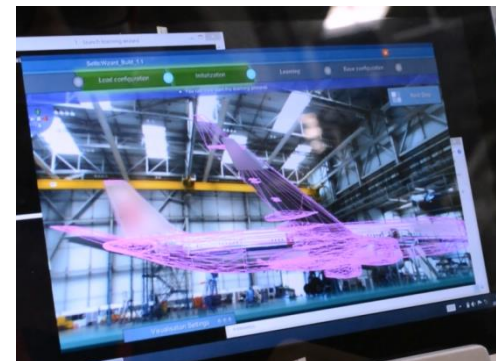
GSE based on Automatic Drone technology for Inspection of A/C upper surfaces

- Indoor automatic A/C inspection
- Faster Inspection
- Less equipment and resources
- Stronger inspection repeatability
- Automatic picture analysis, automatic report generation and damage tracking.
- Available mid 2018



Augmented Reality:

- Component location for maintenance, repair and troubleshooting
- Proof of concept. Industrial solutions under study



Up to 50%
time
saving

for aircraft
inspection with
drone

Removal and installation operations

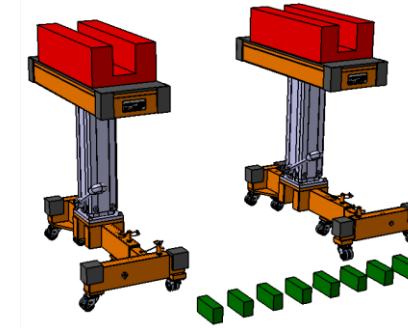
Business Seats R/I: Protect your A/C and operators.

- Only 2 people required to install large business seats
- Reduces the risk of workers' injuries (MSDs)
- Reduces the risk of cabin damage



Galleys R/I: Protect your A/C and operators

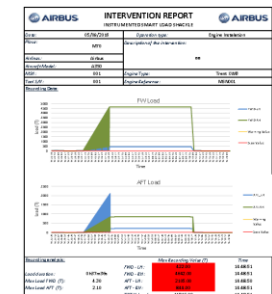
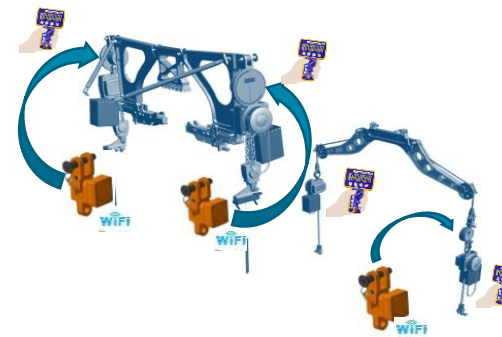
- Ergonomic solution, can be used with reduced amount of workers
- Avoids damage to aircraft structure and systems above galleys
- Saving time compared to disassemble galley completely



Instrumented Smart Shackle Kit:

Enhance your bootstrap system

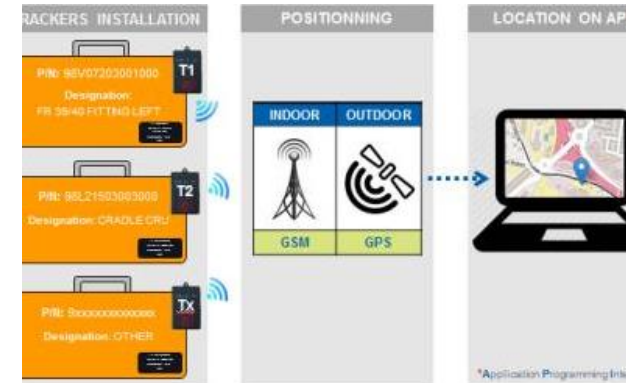
- Engine R/I operation loads control optimised
- Decrease human error and allows load tracking
- Easy to install with current bootstrap systems



Maintenance operations

GSE Geo-Location: Your GSE always located.

- Geo location of the GSE & Tools without having to pre-equip maintenance hangars
- Optimises resource allocation, avoid material losses
- Prototype available, industrialisation in progress, commercially available mid 2018



Inflatable Shelters: Perform maintenance everywhere

- Avoid use of hangar slots for some maintenance operations
- Engine shelters, fuselage shelters and clean rooms (for composite repair) available
- Full kit including shelter, temperature control, ground power, sized for the operation to perform (engine, door, wing)
- Tool available and already used by several Operators



Conclusion



© AIRBUS S.A.S. 2016 - photo by P. MASCLET / master films



GSE innovations reduces maintenance cost

By using new technologies we are working
to optimise your maintenance

Airbus offers you a range of services around tooling
actively dedicated to enhance your maintenance
operations.

Thank you