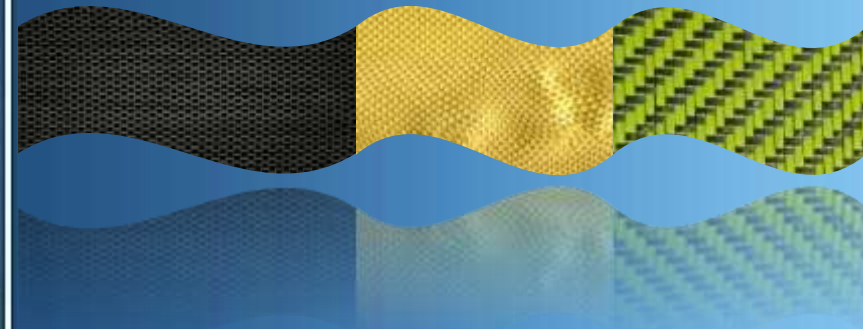


# M1

COMPOSITES  
TECHNOLOGY

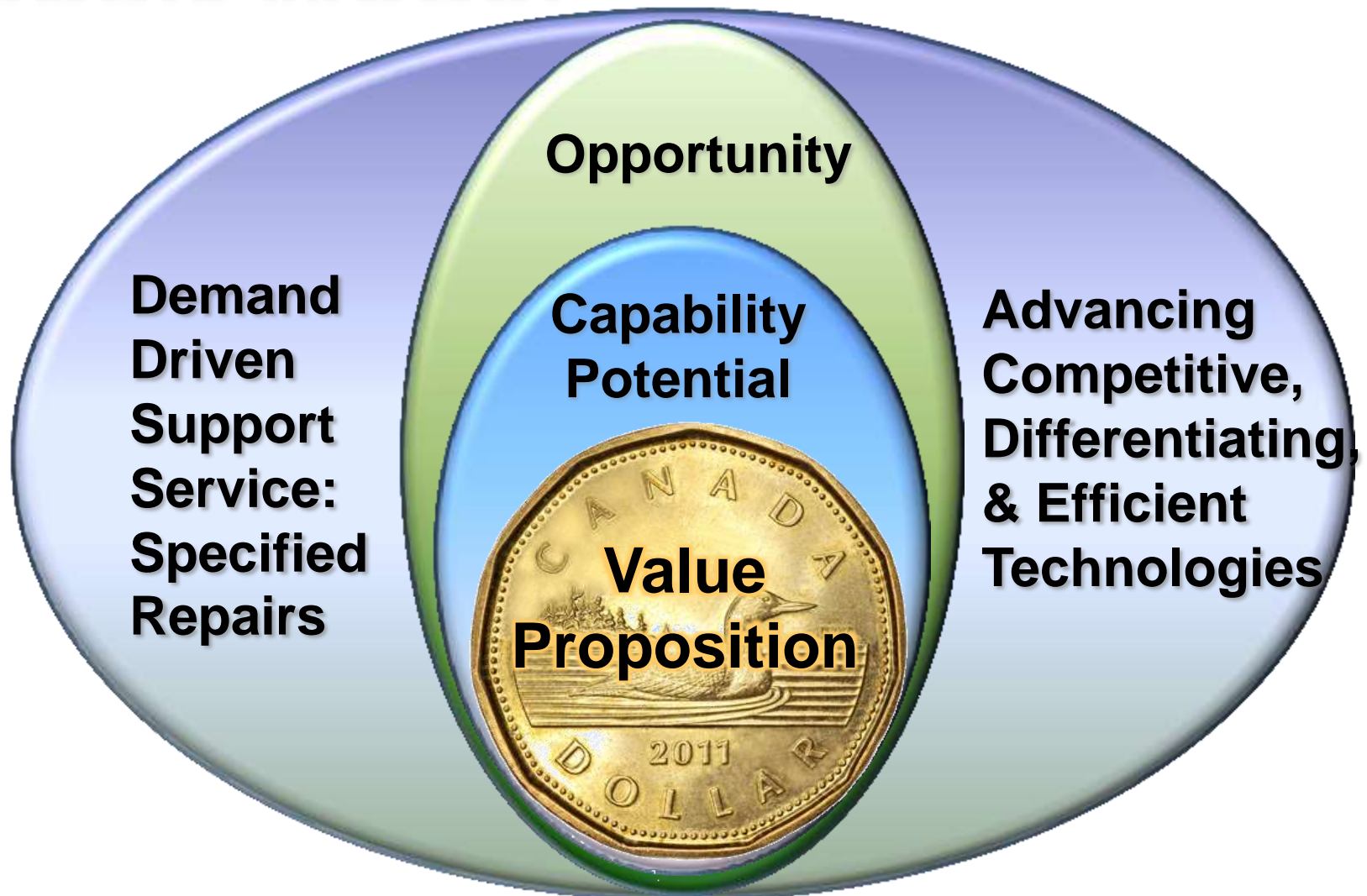


**DOING MRO IN CANADA**

**Aftermarket Repair  
Technologies**

**April 28, 2016**

# Aircraft Composites Repair Model



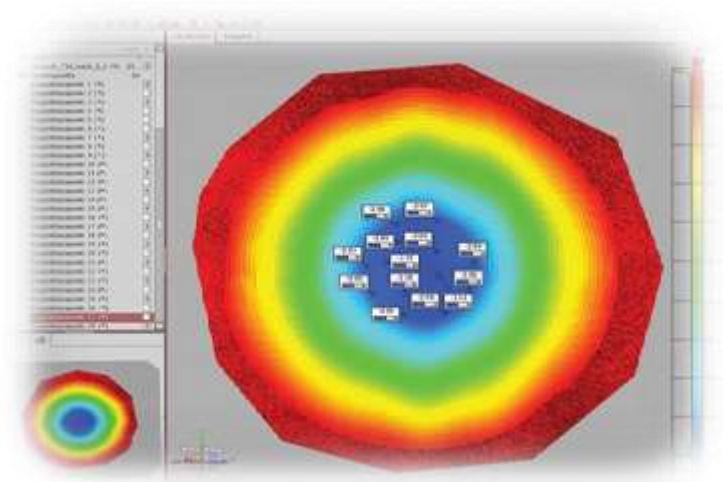
## Specified Repairs

- ▶ Specified and approved by aircraft manufacturer
- ▶ Approved by governing agency
- ▶ Accepted industry practice
- ▶ Validated by experience record



## Evolutionary Repair Methods

- ▶ Requires joint development with aircraft manufacturer & MRO
- ▶ Must become certified
- ▶ Must be monitored to develop experience record



# Evolution

As aircraft transitioned from analog to digital fly-by-wire, new mechanical and avionics skill sets were required by MROs



# Evolution

Analogous to the digital revolution is the transition of composites from secondary structures to primary structures



# Under a Microscope

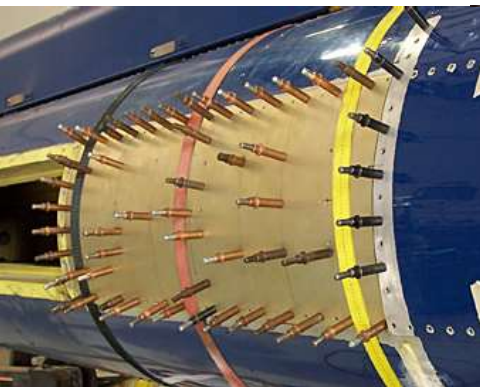


In the much publicized 787 incident in Heathrow, the trade press and investors expressed great relief that the primary fuselage structure could be repaired... and that the repair time was analogous to the restoration of a traditional metallic structure.

*The outcome of this successful field repair came as no surprise to the composites industry!*

# Elements of Airframe Repairs

Critical Area	Metallic Structures	Composites Structures
Specifications & Work Instructions	As required	As required
Materials Handling	Less critical	More critical
Environmental Conditions	Wide range	Narrow range
Substrate Preparation	Criticality varies	Always critical
Operator Skill Set	Traditional metal / mechanical skills	Specialized composites skills





Structural composites repairs require a high level of specialized skills and specific knowledge of materials and processes.

*The outcome of the repair is highly dependent on the operator*



# Adaptation



The commercial aircraft industry is coming to grips with the increasing number of composite primary structures and the factors that influence a successful repair outcome



# Other Industries



In other advanced composites arenas, a level of comfort and successful experience history has been established with repair of primary structures



## Advancements in MRO-Based Composites Repair

- ▶ Recognition that composites require a different skill set than that of traditional aircraft maintenance
- ▶ Enhanced training of composites technicians is required

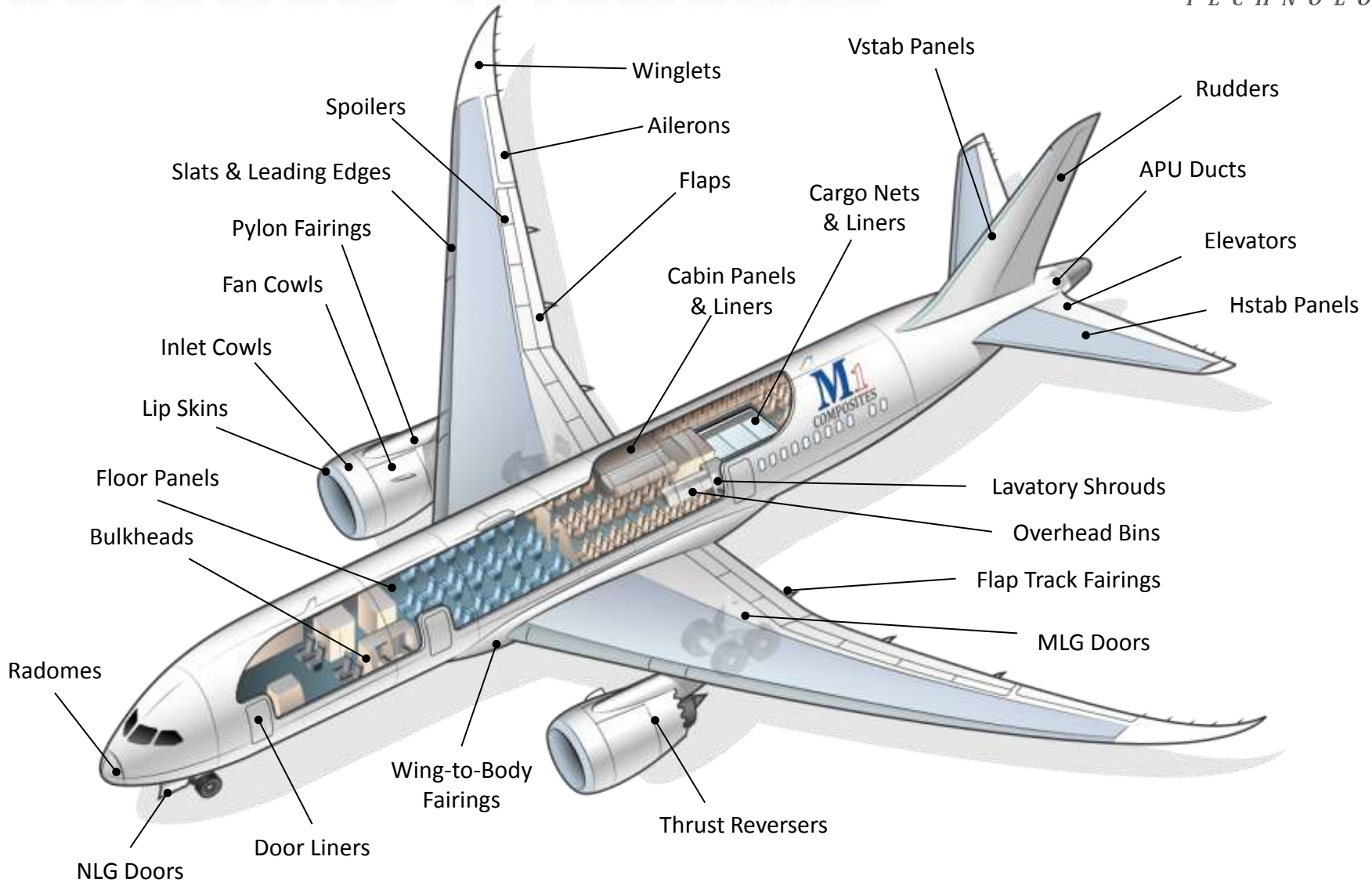


## Advancements in MRO-Based Composites Repair

- ▶ Certification of composites specialists will become necessary
- ▶ Reducing outcome dependency on operator skill by using technical solutions (e.g. robotics) may partially address the industry's comfort level with primary structure repairs



# Modern Aircraft



TODAY

# Thank You

**M1**  
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