



Wind Blade Technologies to Enable New Paradigms

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imagination at work

Critical Blade Technology Needs

Developing design, materials, and manufacturing for cost-effective quality in longer blades

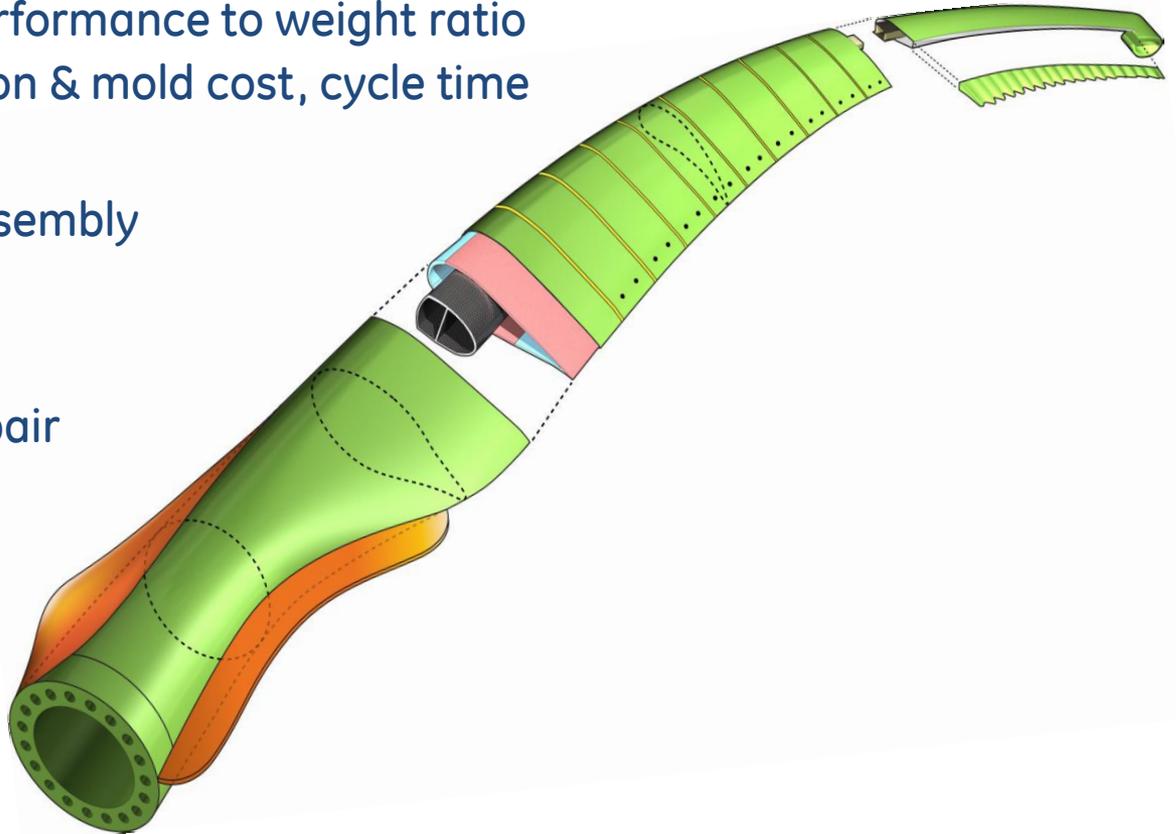
- Design: LCOE or DM/AEP (aero, blade length, matl & mfg), noise, & durability
- Material: Cost effective performance to weight ratio
- Manufacturing: Automation & mold cost, cycle time

Logistics

- Designs for robust field assembly

Service & quality control

- Field inspection
- Robust , low cycle time repair
- Blade upgrades

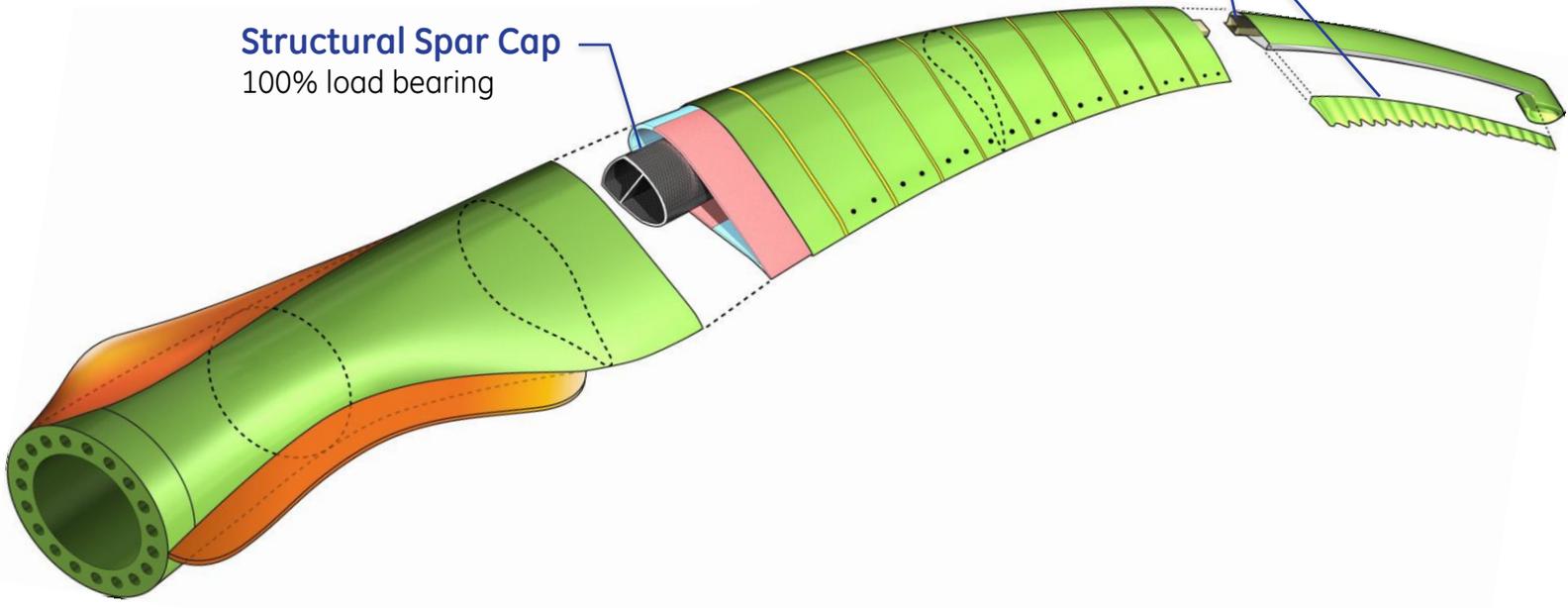


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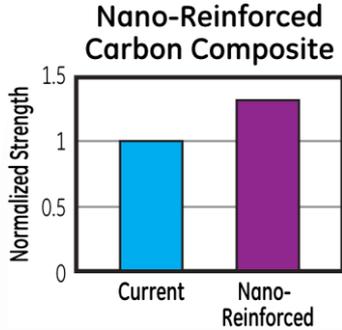
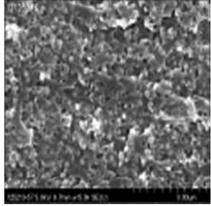
Structure



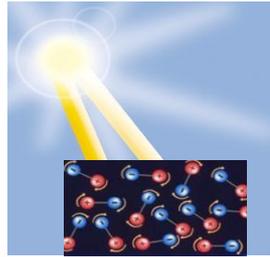
Structural and Non-Structural Joints
Site tailored blade - tip maintenance/upgrade



Material

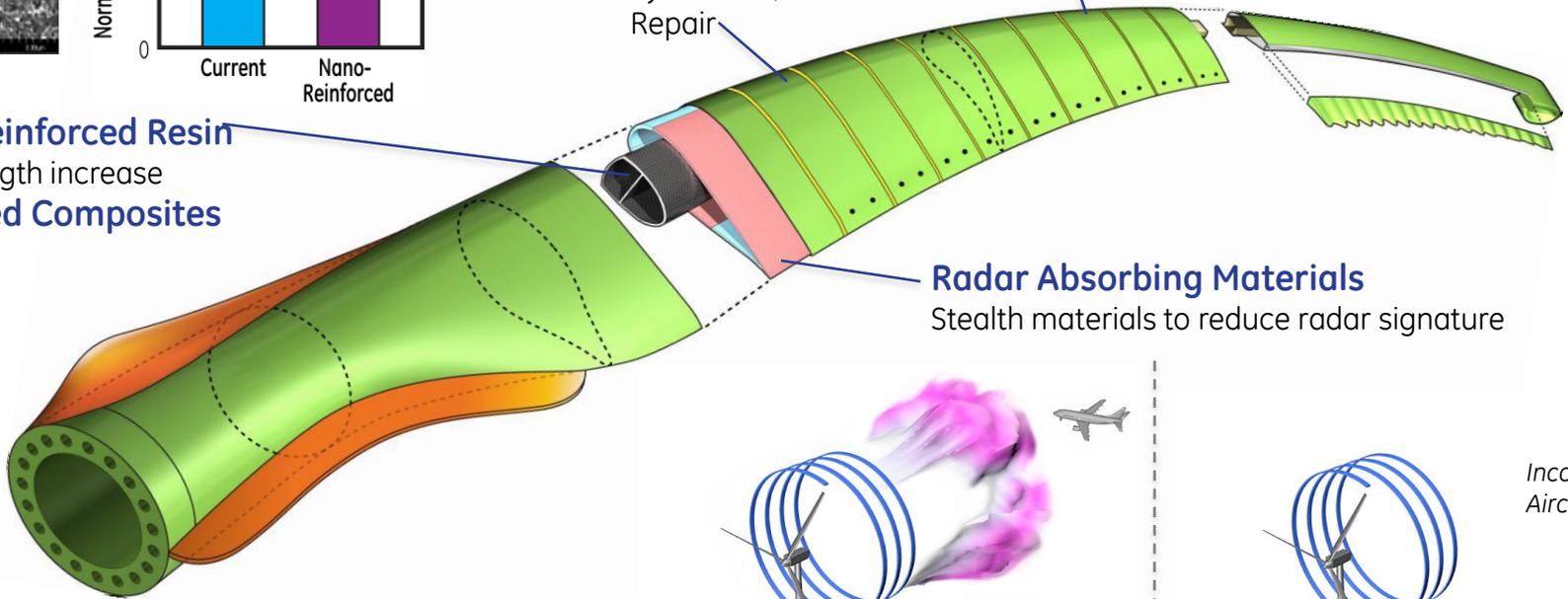
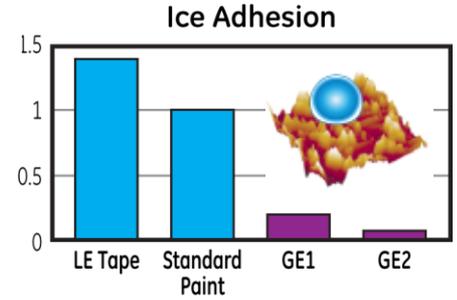


Nano-Reinforced Resin
30% strength increase
Pultruded Composites



UV Cure Resin
Low Cycle Time,
Repair

Icephobic & Erosion Resistant Coating
Advanced environment barrier coating



Radar Absorbing Materials
Stealth materials to reduce radar signature

Radar Antenna



Without Radar Absorbing Materials



With Radar Absorbing Materials



Incoming Aircraft

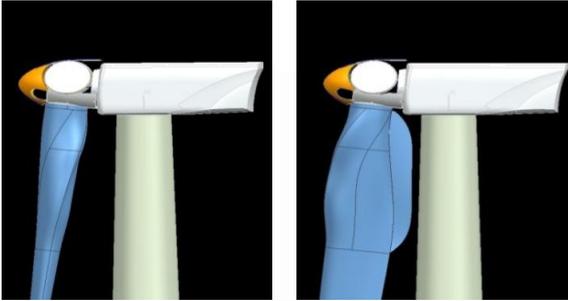


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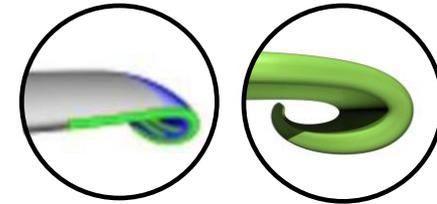
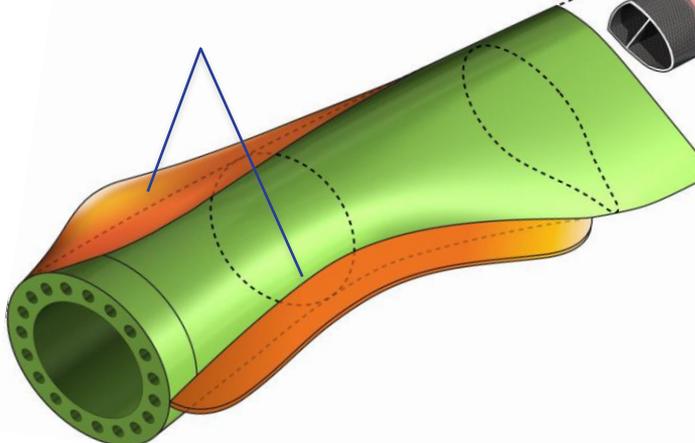
Aero Enhancements

Zero Pitch

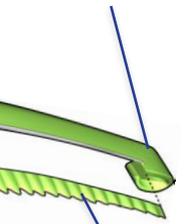
Feather



Strake Leading Edge Extension



Winglets



Sculpted Trailing Edge

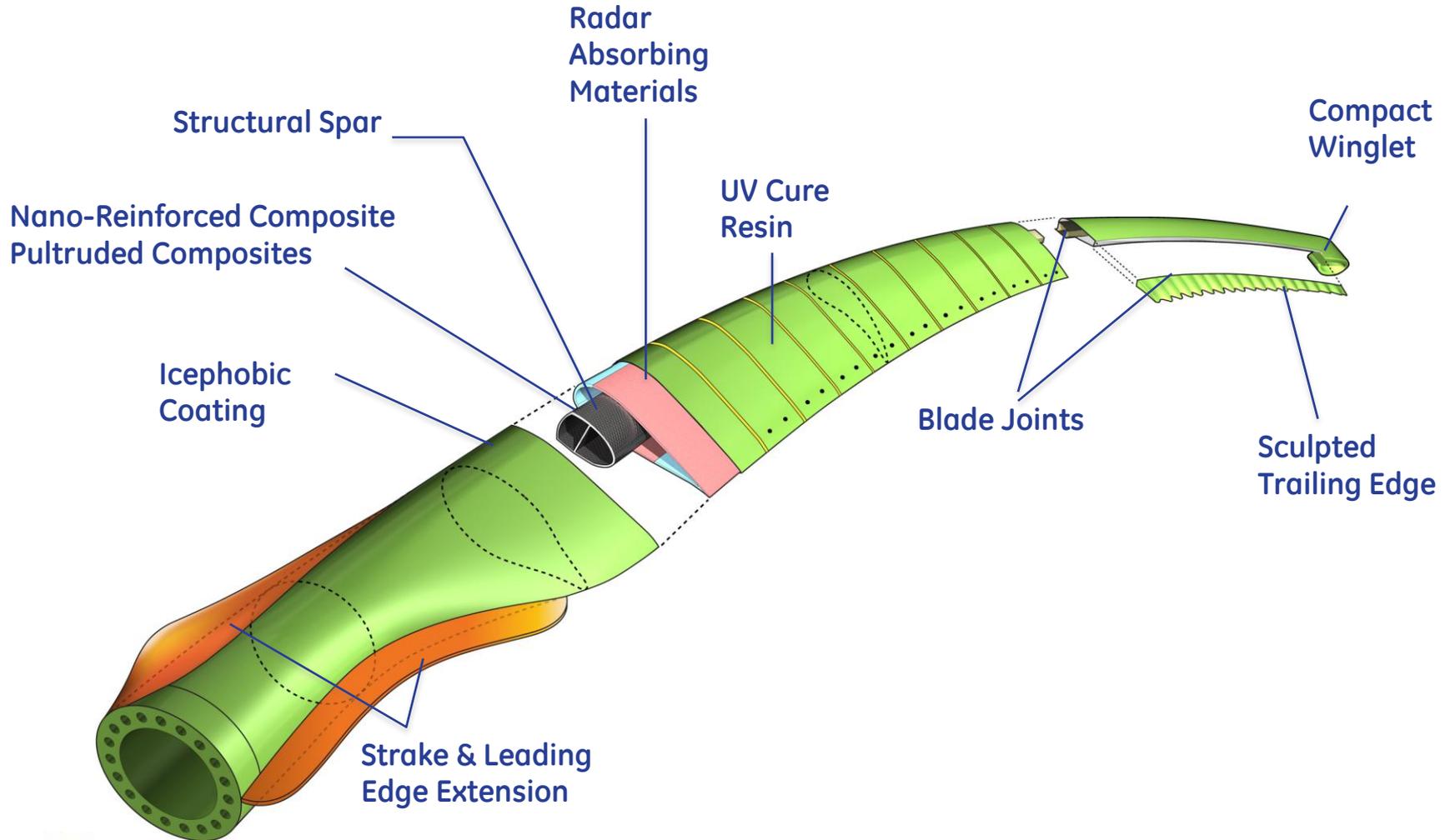
Active Flow Control



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Advance Technology Blade Concept

(Artist Rendition)



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