

Fully Integral, Flexible Composite Driveshaft

All-composite driveshaft technology for improved performance

An all-composite driveshaft incorporating integral flexible diaphragms was developed for prime contractor testing. This new approach makes obsolete the split lines required to attach metallic flex elements and either metallic or composite spacing tubes in current solutions. Subcritical driveshaft weights can be achieved that are half that of incumbent technology for typical rotary wing shaft lengths. Spacing tubes compose an integral part of the initial tooling but remain part of the finished shaft and control natural frequencies and torsional stability. A concurrently engineered manufacturing process and design for performance competes with incumbent solutions at significantly lower weight and with the probability of improved damage tolerance and fatigue life.

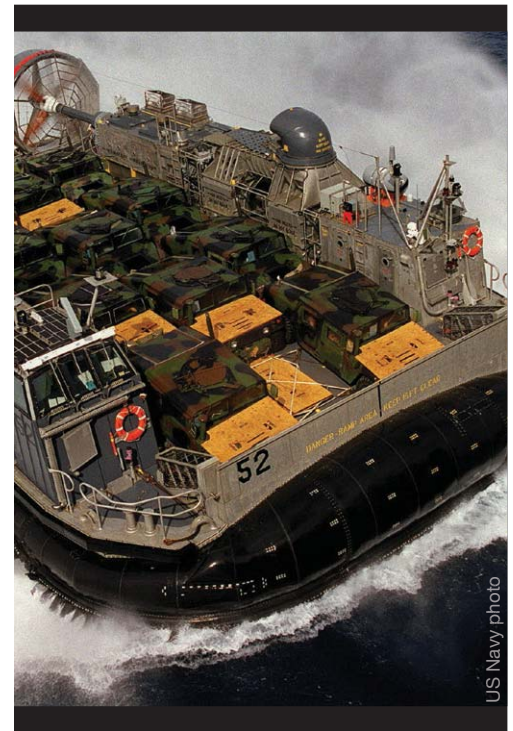
Applications

NASA

- ▶ Rotary wings:
 - Tail rotor drives
 - Tilt-rotor crossover drives
 - Tandem rotor connection shafts

Commercial/Military

- ▶ Rotary wing programs
- ▶ Weight-sensitive driveshaft applications
 - Joint Strike Fighter (JSF) lift fan flexible shafts
 - Navy hovercraft/air cushion landing craft
- ▶ Industrial applications
 - Very high speed turbomachinery that relies on long titanium spacing tubes



Phase II Objectives

- ▶ Build tooling and prototypes for larger diameter applications
- ▶ Build prototypes for JSF, hovercraft, tandem rotor helicopters
- ▶ Produce additional test articles for prime contractor fatigue test and support qualification plan

Benefits

- ▶ Improves driveshaft torque
- ▶ Provides higher operational speed
- ▶ Improves fatigue performance (resistance and damage tolerance)
- ▶ Reduces part count and weight

Firm Contact

Lawrie Technology, Inc.
Duncan Lawrie
duncan@lawrietechnology.com
227 Hathaway E
Girard, PA 16417-1552
Phone: 814-746-4125

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