

NEED & CUSTOMER REQUIREMENT

Need: Every aircraft manufacturer uses fasteners to hold their planes and rotorcraft together. To provide critical protection against galvanic corrosion and to seal moisture out and fuel in, a large portion of those fasteners are coated with sealant prior to installation through a wet installation process. The process is expensive, time consuming, and subject to technician error, and generates hazardous waste.

Value to the Warfighter: Advanced next generation strike fighter aircraft primes would meet manufacturing targets of one completed aircraft per day if they were able to bypass most of the time-consuming preparation steps involved in wet fastener installation and still provide higher reproducibility in sealant coverage.

Operational Gap: In the current fastener wet installation process, a trained technician begins either by mixing a two-part sealant or by thawing a batch of pre-mixed frozen sealant, each having a limited work life and shelf life before it must be discarded. The sealant is applied to each fastener, the fastener is installed, and excess sealant is removed using solvent-saturated wipes.

Customer Specifications: An installation-ready fastener/sealant system that cures in place; utilizes current fasteners, tooling, and installation geometries; has suitable shelf life, cure time and work life; and meets all performance requirements for adhesion, thermal and mechanical cycling, fuel exposure, fatigue/vibration, and corrosion resistance.

Technology Description: QwikSeal® is an automated method for pre-application of sealant to aerospace fasteners at rates meeting the demand of airframers. In this proprietary process, moisture-curable sealant is machine-applied to each fastener, then over-coated with a moisture barrier skin. Upon installation, applied stresses fracture the skin, freeing the sealant to flow throughout the hole and allowing the normal sealant cure process to occur.

TECHNOLOGY DEVELOPMENT MILESTONES (SBIR/STTR)

Milestone	TRL	Risk	Measure of Success	TRL Date
Develop cure-blocking chemistry	3	High	Proof-of-concept of cure-blocking reaction of polythioether resin and de-blocking upon exposure to moisture demonstrated	April 2006
Lab testing of QwikSeal chemistries and fasteners; Design instrumentation for QwikSeal application	4	High	Alpha prototypes pass lab testing; Conceptual design of high-rate machine complete	December 2007
Produce prototype QwikSeal fasteners using prototype application equipment	5	Moderate	Fasteners accurately and reproducibly coated with QwikSeal using prototype application machine at rate > 5 fasteners/min	June 2010
Prototype fastener pre-qualification testing	6	Low	Fasteners proven in simulated operational environments; QwikSeal ready for platform qualification	February 2011

Open contract: N68335-05-C-0089; N68335-09-C-0153 ending February 18, 2011

SPONSORSHIP of original SBIR/STTR Topic

SYSCOM: NAVAIR

Transition Target: TBD

Original Sponsoring Program:
PEO (A)

TPOC Phone Number:
301-342-8076



TECHNOLOGY TRANSITION OPPORTUNITIES (PHASE III)

Other Potential Applications:

QwikSeal pre-sealed fastener technology is applicable to all aircraft platforms that use sealed fasteners, including both fixed wing aircraft and rotorcraft, and can be used on commercial aircraft as well as non-aerospace applications requiring sealed fasteners.

Business Model:

In 2007, SMRC and PPG Aerospace/PRC-DeSoto International entered into a joint development agreement to optimize and commercialize QwikSeal technology. Under this agreement SMRC will grant PPG an exclusive license to QwikSeal for both military and commercial aviation markets worldwide. SMRC will supply PPG with production QwikSeal machines which will be placed in customer facilities. PPG will provide turn-key QwikSeal application and packaging services to customers on a just-in-time basis, taking in customer-supplied fastener stock, cleaning the parts, running them through the QwikSeal machine, and finally packaging and kitting them for delivery to the manufacturing floor.

Objective:

Obtain additional funding from DoD program offices and prime contractors to complete product development and deliver a viable pre-sealed fastener system and high-rate manufacturing capability to JSF primes and other customers.