



Defense Supply Center Richmond

DLA Reliability/Technical Programs

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Outline

- **DLA Reliability Program Overview**
- **Project Selection Strategy**
- **Reliability Projects**
- **Casting Forging Program**
- **Summary**



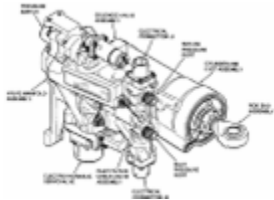
DLA Reliability Initiative



Improving Reliability And Availability



Decreasing Maintenance Manhours



Integrating Technology Solutions Across Services



Supporting the War Fighter and Improving Readiness



Aviation Supply Chain Approach

DLA
Reliability
Initiative

Identify Opportunities

- Customer Identified Deficiency
- Mature Technologies
- Broad Market Application

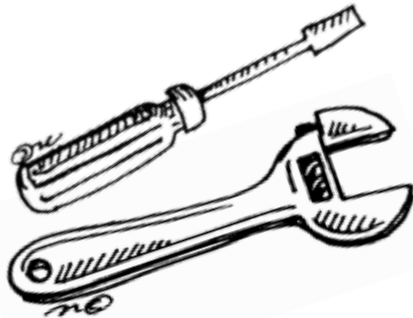
Increased Part Reliability

- Across Part Families
- Across Platforms
- Across Services

More Reliable Parts

- Fewer Replacements
- Fewer Inspections

Increased System Readiness and Availability



Reduced
Maintenance

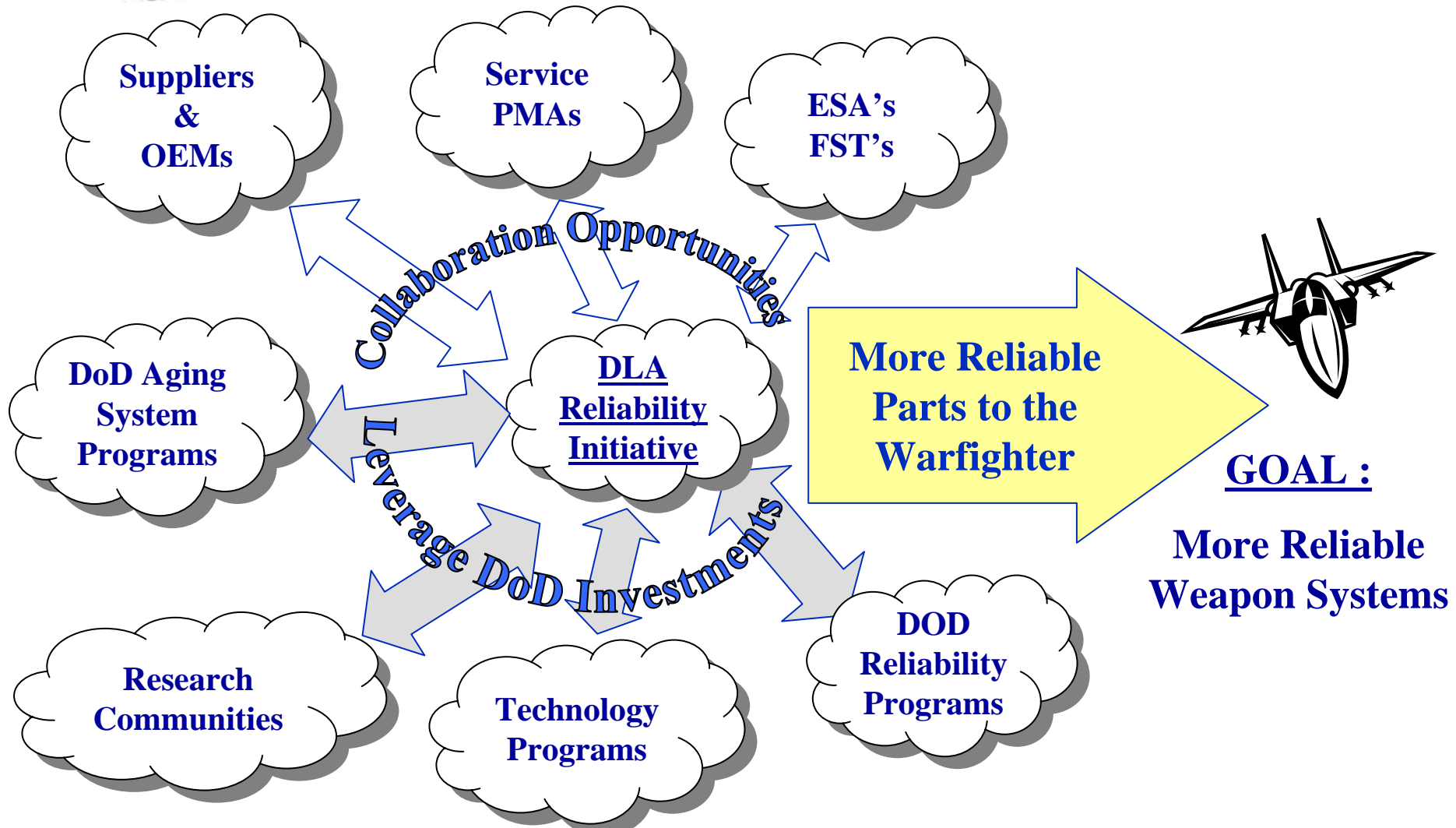
Increased System Uptime

- Reduce Logistic Tail





Aviation Supply Chain Approach





Aviation Supply Chain Approach

- **Single Face To Customer**
- **Focal Points At Each Inventory Control Point (ICP)**
- **Some Projects Involve Aviation Items Managed At Other DLA ICPs**
- **Coordination With Other DLA ICPs**
- **DSCC Program - Land And Maritime Supply Chain**

DSCR Reliability Engineering Website

<http://www.dscr.dla.mil/userweb/aviationengineering/>



Engaging the Services

Technical Communities Are Structured Differently Across Services

–NAVY

- NAVAIR Program Management Aviation (PMA) Offices
- Weapon System Fleet Support Teams (FSTs)
- NAVAIR Programs (such as Aging Aircraft, Engine Component Improvement Program (CIP), Avionics CIP)

–ARMY

- DLA-ARMY IPT with Aviation & Missile Research, Development And Engineering Center

–AIR FORCE

- Program And Engineering Offices At Three Air Logistics Centers
- Wright Patterson AFB / AFRL

DLA's Approach Must be Tailored to Each Service Structure



Cost Sharing

- **Sharing The Cost Of Some Projects With Services**
 - Helicopter/HMMWV Windshield Laminates
 - JCAA Universal Electrical Systems Analysis Tester
 - A-10 Blowing Agent Replacement for Ballistic Foam
 - T-700 White Harness Redesign
 - H-60 Door Latch Redesign

**Cost Sharing Between DLA and Services Shows Strong Need
and Project Commitment**



Project Process

- **Build list of Reliability Improvement Candidates**
- **Verify & Ensure Root Cause & Design Improvement**
- **Build Project Analysis & Determine Benefits-to-Costs**
- **Present Projects to DSCR Review Board**
- **Obligate Funds & Provide Resources for Approved Projects**
- **Monitor Project Progress and Implementation**



Project Selection Criteria

• Project Selection Criteria Focuses On

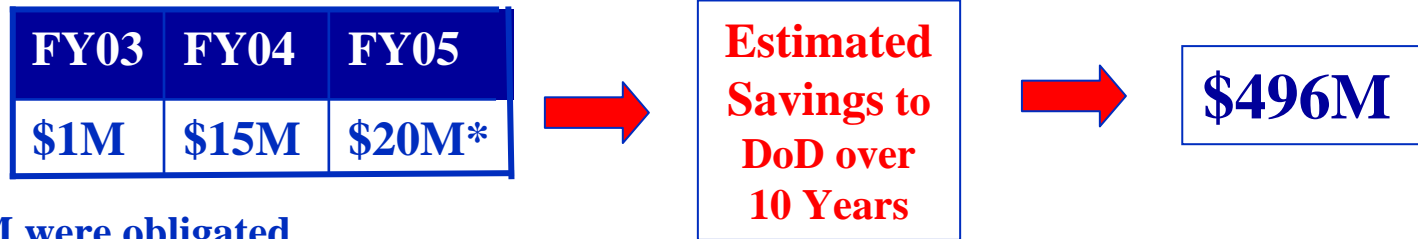
- Safety
- Strong Need/Readiness
- Customer Commitment
- Return on Investment (ROI)
- Risk
- Clear Approach
- Cost
- Broad Applicability

**Service Focus On
Readiness**



Progress To Date

- **DLA Has Provided \$36M for Reliability Initiative**



* \$16M were obligated

- **Ninety-Three Projects Across Three Services**
- **Relationships Developed with Service Engineering and Logistics Organizations**
- **Refined Project Development And Selection Processes**



Progress to Date (continued...)

- **Technology Insertion Efforts in Support of Aging Aircraft**
- **Engaged the Reliability Analysis Center (RAC), Non-profit DoD R&M Center of Excellence To Validate Reliability Predictions From New Designs**
- **Multi-platform Project Opportunities Have Been Identified**
- **Sharing Costs With Services**



✓ Technology Insertion
✓ RAC
✓ Multi-Platform Project
✓ Sharing Costs



Services Funding Summary

ARMY



27 Projects

Funding \$14.1M

**Estimated Savings
\$187M**

NAVY



45 Projects

Funding \$9.7M

**Estimated Savings
\$207M**

AIR FORCE



21 Projects

Funding \$8.3M

**Estimated Savings
\$102M**



Typical Reliability Projects

CH-47 Resilient Mount



Transition Commercial Part to Military Use

- Partnered with Lord Corp. to Qualify More Reliable Commercial Mount

EA-6B Pump



Redesign Pump for Greater Reliability

- Partnered with Parker Hannifin to Redesign Pump to Address Maintenance Drivers

A-10 Slat Strut



Redesigned Strut for Greater Reliability

- Partnered with Grumman to Redesign Strut for Longer Life



Windshield Laminate Project



UH-60 Removable Laminate



Expandable to Other Platforms



HELICOPTER SACRIFICIAL WINDSHIELD LAMINATES

- **Problem:** Windshields Are Eroded By Sand And Debris. Production Not Able To Keep Up With Current Operational Demands.
- **Solution:** Apply NASCAR Inspired Sacrificial Laminates to Helicopter Windshields For Protection from Sand Erosion and FOD Damage.
- **Cost:** \$500K
- **Benefits:** Savings to DoD Of \$18M Over 10 Years And Reduction Of A Significant Readiness Degraded. Extension of Windshield Life And Windshield Demand Mitigation.
- **Status:** Soldier training and installation of 303 ship sets on UH-60s (200), CH-47s (55) and AH-64s (48) since July 05 at various CONUS locations. Aircraft to be deployed to theater of operations later this year.





HYDRAULIC FLUID FILTERS

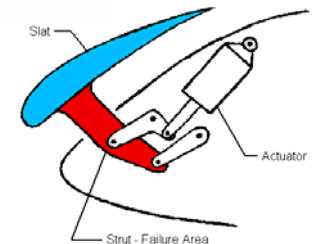
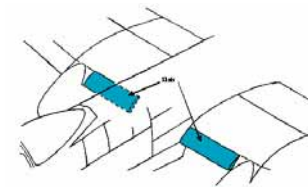
- **Problem:** Hydraulic fluid contamination is a major factor in hydraulic component failures. Some contamination is due to disintegration of fiberglass media in the current hydraulic fluid filters.
- **Project:** Develop and qualify fluid filters that use metal filter media for AH-64, CH-47, and UH-60. This technology is in use on OH-58D.
- **Cost:** \$1.55M
- **Benefits:** Improved readiness due to decreased component failure. DoD savings of approximately \$40M over ten years. Improvement transferable to 19 other Service Weapon Systems such as F16, B2, H60, F/A18, etc.
- **Status:** Static and dynamic testing of H-60 and AH-64 filters ongoing. Evaluation and Validation complete by Sept 05.





A-10 SLAT STRUT

- **Problem:** A recent redesign of the Slat Strut is flawed. In the redesign, the strut is too thick and bumps into hydraulic lines, causing a possible leak situation.
- **Project:** Redesign of the strut to fix both the original problem of the strut failing and the interference of the recent redesigned strut with the hydraulic lines.
- **Cost:** \$70K
- **Benefits:** Improved reliability, reduced maintenance. ROI of 12:1 with savings of \$840K over 10 years
- **Status:** Awaiting slat assembly for final fit check in September. Upon successful installation, part will be qualified.





A-10 BALLISTIC FOAM REPLACEMENT

- **Problem:** Environmental regulations have barred use of Freon as a blowing agent used to make ballistic foam. The foam is required around the fuel tanks in the A-10. Last production of the foam was 31 Dec 03. Quantity on hand should last through Dec 05.
- **Project:** Qualify a new foam composite which uses a non-regulated blowing agent. This requires ballistic testing in a wind tunnel environment.
- **Cost:** \$430K
- **Benefits:** Maintain availability of the A-10. Maintain DLA sales of over \$100K per year on bulk block only (about 500 different cut blocks increase sales volume).
- **Status:** Awaiting availability of test stand at Wright-Patterson. Testing should take about 3 weeks with acceptance recommendation about 6 weeks later.





F/A-18A-D PERISEAL ASSEMBLY

- **Problem:** Silicone O-rings within the periseal flexible coupling degrade, crack, melt and eventually leak hot bleed air onto Y453 Bulkhead. Failure triggers ECS shutdowns in-flight, structural damage, envelope restrictions, additional inspections at O-level, and in some cases, center barrel replacements.
- **Project:** Industry propose redesign solutions to FST and OEM. Develop prototypes and flight test best design.
- **Cost:** \$446K
- **Benefits:** Improve mission readiness by reduced O/I maintenance and inspections, prevent structural damage to aircraft, and prevent additional center barrel replacements.
- **Status:** Prototype has passed initial lab tests and initial flight tests at Patuxent River, Aug. 2005. Second series of flight tests are scheduled for September 2005.





E2/C2 GENERATOR COOLING DUCT

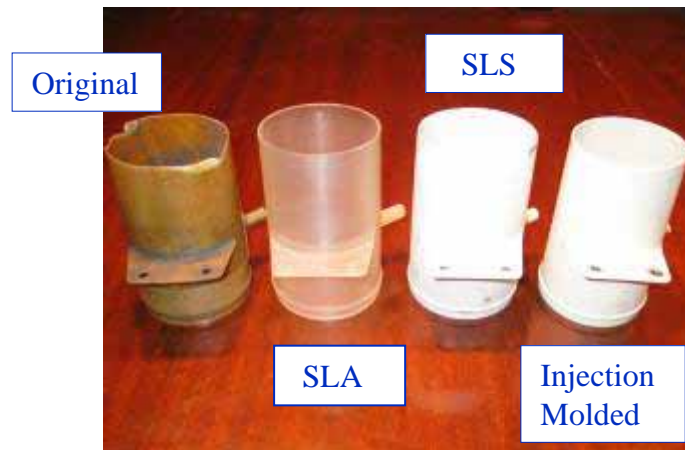
- **Problem:** Duct assembly attached to engine housing is highly susceptible to damage during engine and generator overhauls. Cooling duct is OEM sole-sourced part with 1.5 yr lead times at escalating prices.
- **Project:** DSCR to re-engineer duct for improved durability, and shorter production lead time at more acceptable costs.
- **Cost:** \$200K
- **Benefits:** Estimate re-engineered part will save the Navy \$312K/yr supply costs. Savings from item price reduction are estimated at \$484K/yr. Re-engineering process can be leveraged to similar fiberglass/plastic parts.
- **Status:** Environmental and durability testing initiated Aug 05 at NAS Lakehurst.





Prototyping Technologies

- ✓ CAD software was used to develop 3-D drawings.
- ✓ Stereolithography (SLA) – For verifying that CAD drawings represented original part. First model iteration.
- ✓ Selective Laser Sintering (SLS) models - Improved geometrical fit and provided a near-realistic model (material properties). Second and third iterations.

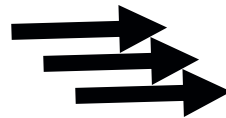




Manufacturing Technologies

✓ Advanced Manufacturing Techniques

- Eliminate hand lay-up of fiberglass (current)
- Rapid low cost tooling developed for part: Kirksite Mold
- Injection Molding Process Employed
- Material: High Temperature Nylon + glass fiber + flame retardant





E-2/C-2 Generator Duct Fit Checks

Fit checks performed at NAS Norfolk first six months of 2005. Iterations resulted in improved part geometry.



Location: Just aft of propeller blade underneath engine cowling.



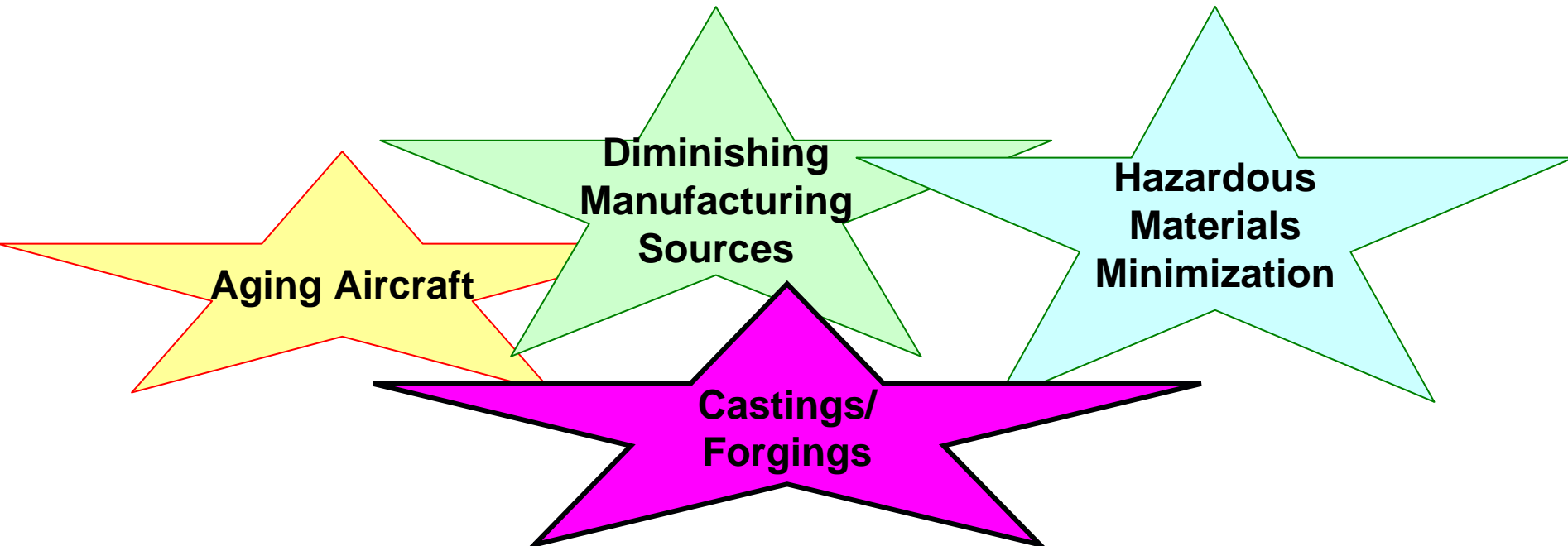
E-2/C-2 Duct - Current Status

- ✓ **Once environmental and vibration testing is completed, new part will be qualified.**
- ✓ **No flight tests are required.**
- ✓ **Supply strategies are being coordinated.**
- ✓ **Current unit price is \$4400. Anticipated unit price of new part is between \$300 and \$500. (includes tooling amortization).**
- ✓ **Current part PLT is 18 months. New part PLT is approximately 60 days.**



Synergy With Other Programs

- **This Initiative Compliments Other Programs Throughout DoD**





Casting and Forging (C/F) Program

Casting



Cost Effective for Complex Shape Parts

Forging



Required for High Strength parts

Problem

- Disproportionate Share of DSCR Backorders
 - 5% of NSNs
 - 10% of Backorders (NSNs & Lines)
 - 19% of Oldest Backorders (Rockpile)

Solution

- Change The Way We Do Business To Address Root Causes
- Root Causes of C/F Backorders:
 - C/F Requirement Not Identified
 - Supply Chain Broken/Unresponsive
 - Tooling Location/Cost/Lead Time



How The C/F Program Can Help

- **Sourcing** – Industry Consortium assists when C/F supply chain is unresponsive
- **Tooling Location** – Web-based National Tooling Databases provide tooling locations/sources
- **Update Procurement Information** with current sources, materials, processes, etc.
- **Technical Field Support** to Foundry/Forge by SMEs
- **Assist ESAs** in understanding and expediting required Engineering Analysis/Response for C/F related questions
- **Training** to familiarize with Cast & Forge supply chain challenges
- **Integrate C/F item visibility/improved procurement process** in BSM
- **C/F Program assistance** made available to OEM's



Typical C/F Solution

- **F-5 Crossbleed Valve Body (2995-01-088-7021)**
- **Problem:** DLA Backorder - Foundry Technical Issue
- **Resolution:**
 - The cast design was improved by AMC and approved by the ESA
 - The gating on the cast part tooling was modified
- **Result:**
 - “The new foundry tried several times to make good castings with no success. I got a call from American Metalcasting Consortium and they told me that they work for the Government ...AMC and the new foundry solved the problems with the castings and got them to pass x-ray. The castings are now being machined. The problem area for porosity has been machined and there have been no defects or rejections.”



John Stallbaumer, Triumph Accessory Services



C/F Partnerships

Forging

PRO FORGE

- Partnered with Sikorsky to optimize in-house forging acquisition program from design through procurement
- **Result**
 - Identified significant cost reduction opportunities
 - Reduced lead time to warfighter

Casting

R&D Partnerships

OEM Perspective

- Effective use of castings reduce cost
- Development of foundry computer simulation tools will reduce risk for end item manufacturer

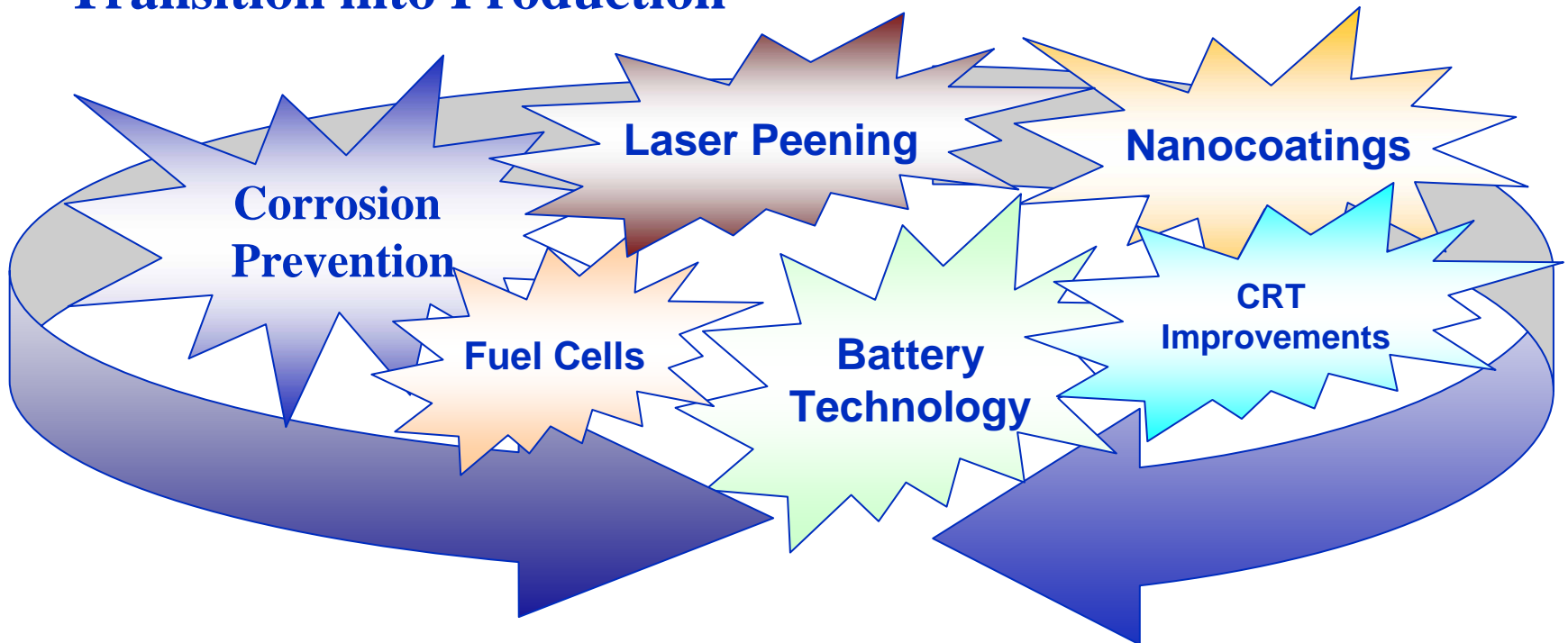
DLA Perspective

- Leveraged DoD investments benefit the warfighter and taxpayer
- DoD relies on viable foundry and forging industries



Technology Insertion

- **Technology Development And Insertion Projects Are Long-Term And Require Longer Term Agency Commitment**
- **Transition into Production**





Summary

- Relationships with Customers getting Stronger
- Customers Recognize DLA Value to Reliability
- DLA Plans to Continue the Effort



- ✓ Technology Insertion
- ✓ Multi-Platform Efforts
- ✓ Cross-Service Projects
- ✓ Sharing Costs
- ✓ DoD Savings of \$496M



DLA Is In A Unique Position As An Integrator Across Services And Weapon Systems