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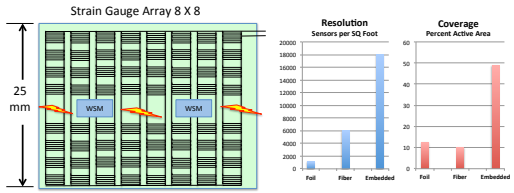
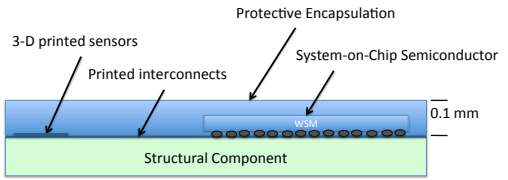
Title: Sensor Arrays for Aerospace Vehicles

PI: Rick Alena, Code TI,
Richard.l.alena@nasa.gov
Co-I: Daniel Celluci, Pathways

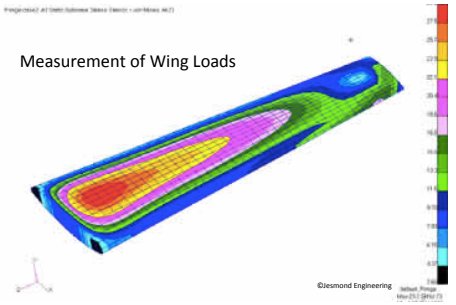


Innovation Statement:
The capability of routinely measuring aerospace vehicle structural and aerodynamic response during active flight remains a future goal. This proposal integrates sensor array manufacturing with high-performance semiconductors and embedded distributed processing to produce an early proof-of-concept prototype addressing this goal.



ARC Invention Disclosure 17880-1

Innovation Concept: The objective is to increase insight into structural performance of space vehicles and insight into the aerodynamics of new aircraft. Develop sensor arrays using innovative 3-D printing techniques integrated with embedded avionics and distributed processing to measure multiple distributed physical properties relevant to aerospace vehicle safety and operation. The use of System on Chip (SoC) semiconductors along with wireless data transfer can produce arrays of high-density with significant processing power. Distributed processing creates high-level representations of vehicle structural and aerodynamic state providing critical input for autonomous vehicle interactions with its environment. Resulting system can be extremely scalable, as sensing capability increases, computational performance increases in direct proportion. Multiple sensors for temperature, strain and air pressure measurement will be integrated into the array allowing embedding sensor fusion algorithms to produce more efficient representations of real-time state. Resolution and coverage is greatly increased over existing techniques.



Relevance to NASA
Sensor arrays can conceivably be embedded during composite manufacture and could be used during the entire lifecycle, solving multiple problems of quality control, optimization and monitoring. This addresses the OCT Roadmap TA 12: Materials, Structures, Mechanical Systems, and Manufacturing area directly. Further work for instrumenting aero elastic concept vehicles is being proposed in alignment with ARMD Strategic Thrusts ST-6: Assured Autonomy for Aviation Transformation and ST-5: Real-Time System-Wide Safety Assurance.

Resources			
FTE		**Procurement**	
PI:	0.1	WYE:	$0K
Co-I:	0.25	Travel:	$0K
Total:	0.35	Other:	$20K
		Total:	$20K

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