



Partnering with Langley Research Center

***[http://technologygateway
.nasa.gov/](http://technologygateway.nasa.gov/)***

***Ray Turcotte
Partnership Manager
Strategic Relationships Office
Langley Research Center***



Agenda

- **Partnering with NASA Langley—Ray Turcotte**
- **Nondestructive Evaluation Sciences—Dan Perey**
- **Tidewater Sensors—Jeff Caplan**
- **Unitech—Wayne LeGrande**



NASA's Mission

- Drive advances in science, technology, and exploration to enhance knowledge, education, **innovation, economic vitality** and stewardship of the Earth
 - Six Goals
 - Extend and sustain human activities across the solar system
 - Expand scientific understanding of the Earth and the universe
 - **Create the innovative new** space technologies for our exploration, science, and **economic future.**
 - Advance aeronautics research for societal benefit
 - Enable program and institutional capabilities to conduct NASA's aeronautics and space activities
 - Share NASA with the public, educators, and students to provide opportunities to participate in our mission, **foster innovation, and contribute to a strong national economy**



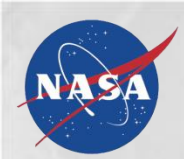
Langley Expertise

- **Available for Business Partnerships in Various Forms**
 - You work for us
 - We work for you
 - We work together to commercialize inventions



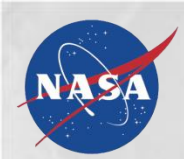
Partnership Agreements

- **Space Act Agreements**
- **Software Usage Agreements**
- **Material Transfer Agreements**
- **Licenses**



Invention License

- **Not Complicated, but.....**
- **Traditional Process, two-step**
 - Up-front fee
 - Running royalty
 - Minimum annual royalty
- **New “Research License”**
 - 2 years, \$2500



LaRC Patent Portfolio

- **Over 200 active patents**
 - 10% Direct aeronautics/space applications
 - 20% Sensors/instruments
 - 40% Advanced Materials
- 20 new patents per year
- 57 active licenses
 - 2-8 new per year



Aeronautics (1)

- **Several New Acoustics-related Inventions**
 - LAR-17655-1 Local Intelligence Based Impedance Optimization Scheme for Adaptive Noise Reduction
 - LAR-17478-1 Integration Of A Turbo-Fan Engine Above an Aircraft's Wing Which Reduces Drag and Community Noise
 - LAR-16605-1 Energy-Extraction-Based Active Noise Control System
 - LAR-16535-1 Design of Composite Panel for Reduced Sound Radiation Efficiency and Increased Sound Power Transmission Loss
 - LAR-16532-1 Low-Noise Fan Exit Guide Vanes



Aeronautics (2)

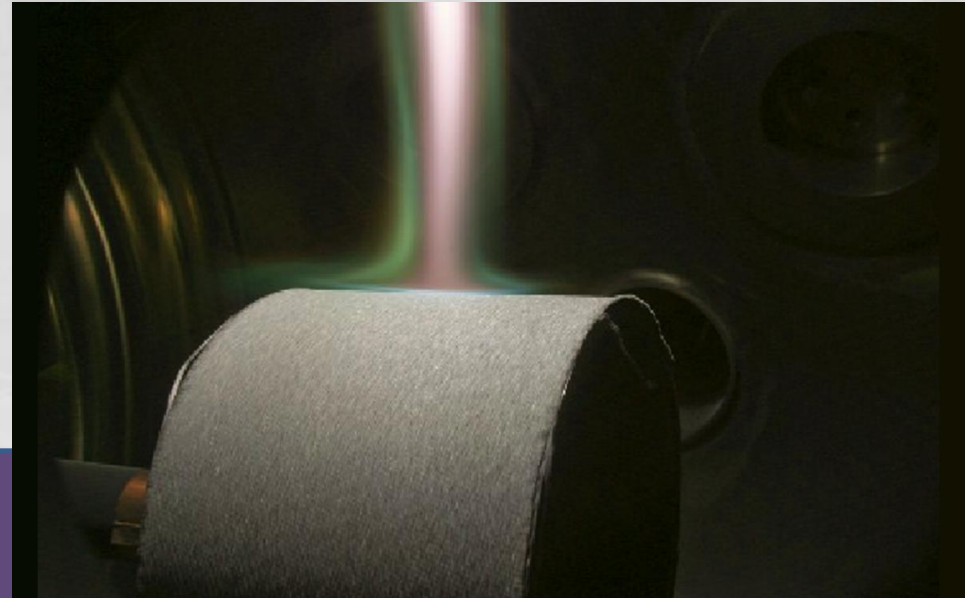
- **Several New Efficiency/Laminar flow –related inventions**
 - LAR-17390-1 Advanced High Performance Horizontal Piezoelectric Hybrid Synthetic Jet Actuator
 - LAR-17384-1 Advanced Modified High Performance Synthetic Jet Actuator With Optimized Curvature Shape Chamber
 - LAR-17382-1 Advanced High Performance Vertical Hybrid Electroactive Synthetic Jet Actuator
 - LAR-17365-1 Boundary-Layer-Ingesting S-Duct Diffusing Inlet Flow Control Using Hybrid Vane/Jet Approach at Transonic Flow Conditions
 - LAR-17361-1 Airfoil/ Wing Flow Control Using Flexible Extended Trailing Edge



Plasma Deposition of Metal in Composites

Enables Functional Design Using Metals in Composites

Metal deposition directly onto fabric with good porosity for resin infusion



Potential Applications:

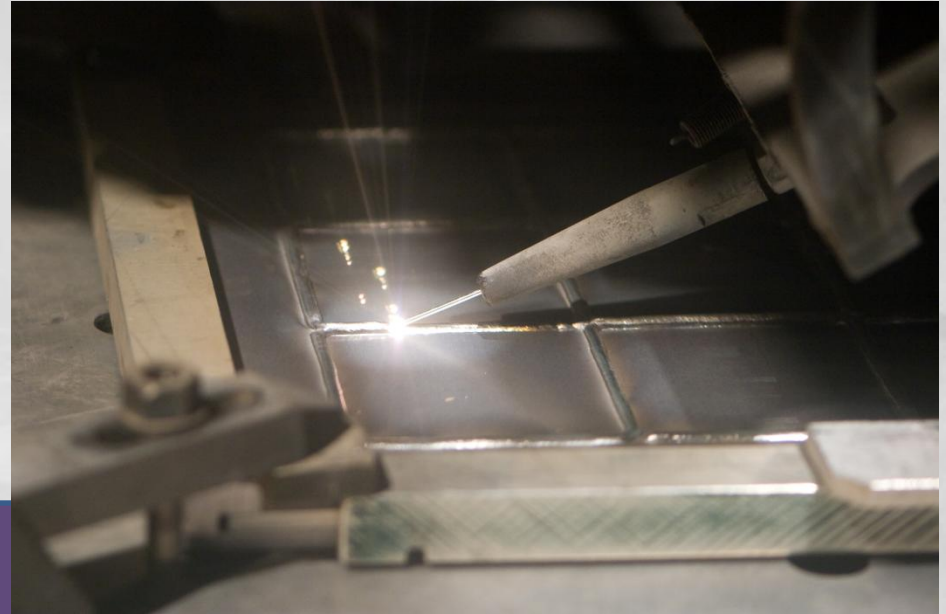
- Aeronautics and aerospace
- Pressure vessels and storage tanks
- Ballistic protection
- Automotive structures
- Composite doors and windows



Electron Beam Freeform Fabrication

Create Parts Using Electron-Beam Wire Deposition

Advanced process control technique for fabrication and welding



Potential Applications:

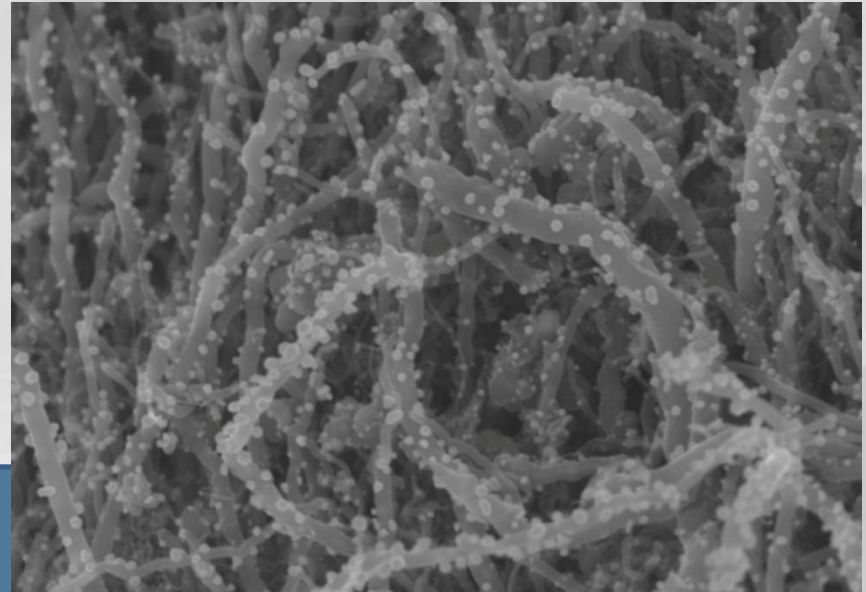
- Welding of metal structures
- Near-net shape manufacturing
- Rapid part prototyping / parts-on- demand
- Free-form fabrication



Tailored Dielectric Materials

With Metal and Metal Oxide Nanoparticles

Control & customization of thermal, mechanical, or conductive properties



Potential Applications:

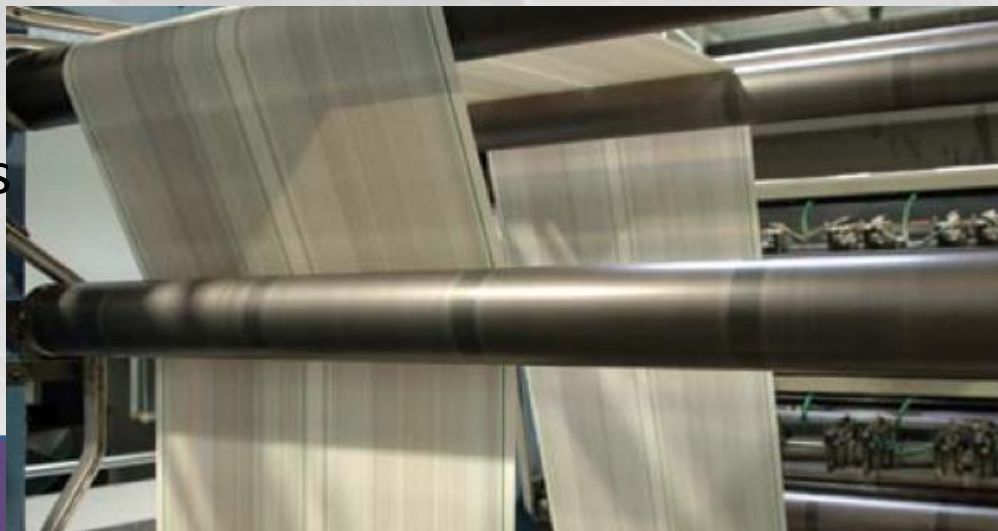
- Low-mass, ultra-thin microstrip antennas
- Fractal antennas for cell phones
- Radiofrequency identification antennas
- Low-profile substrates



Dispersion of Carbon Nanotubes (CNT)

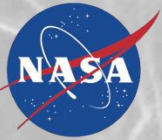
For Stable Resin Dispersions and Composite Plastic Films

Uniform, non-agglomerated dispersion of CNTs in polymers



Potential Applications:

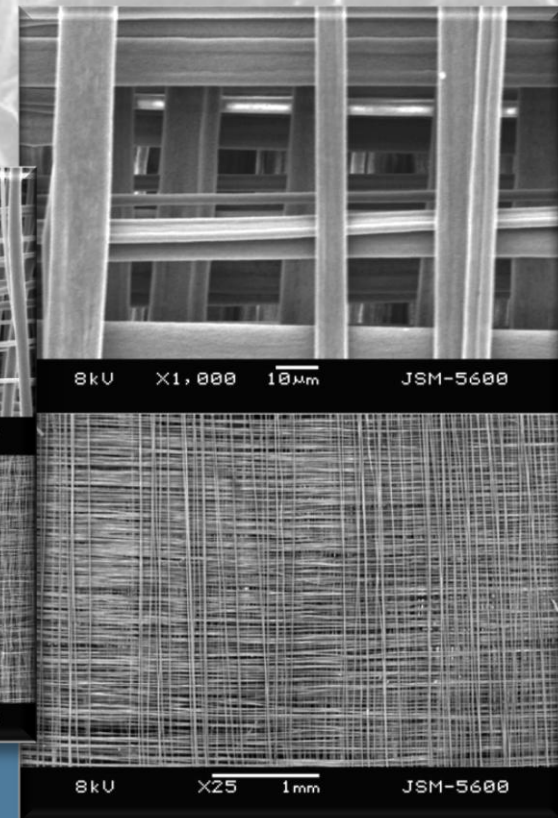
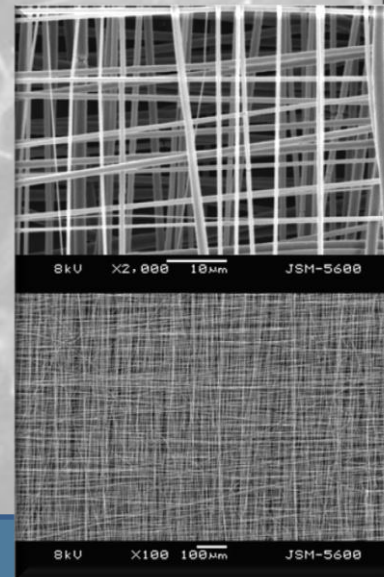
- Conductive Plastics
- Solar Cells
- Polymer Coatings & Adhesives
- High performance polymer composites
- Polymer / CNT composite Fibers



Highly Aligned Electrospun Fibers

Incorporation of an Auxiliary Electrode

Controlled micro- or nano-fiber placement, orientation, and porosity



Potential Applications:

- Biomedical (tissue scaffolds, wound dressing)
- Smart textiles with embedded sensors & actuators
- Structural health monitoring



Electrostrictive Polymers

Enabling Sensing and Actuation of Devices

Significant field-induced strain with low energy consumption



Potential Applications:

- Microrobotics
- Space structures – control of membrane structures
- Aircrafts – changing air flow on structures
- Automobile sensors (ex: accelerometers)



Contacts!

Partnership Initiation

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License Application

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