[illegible]

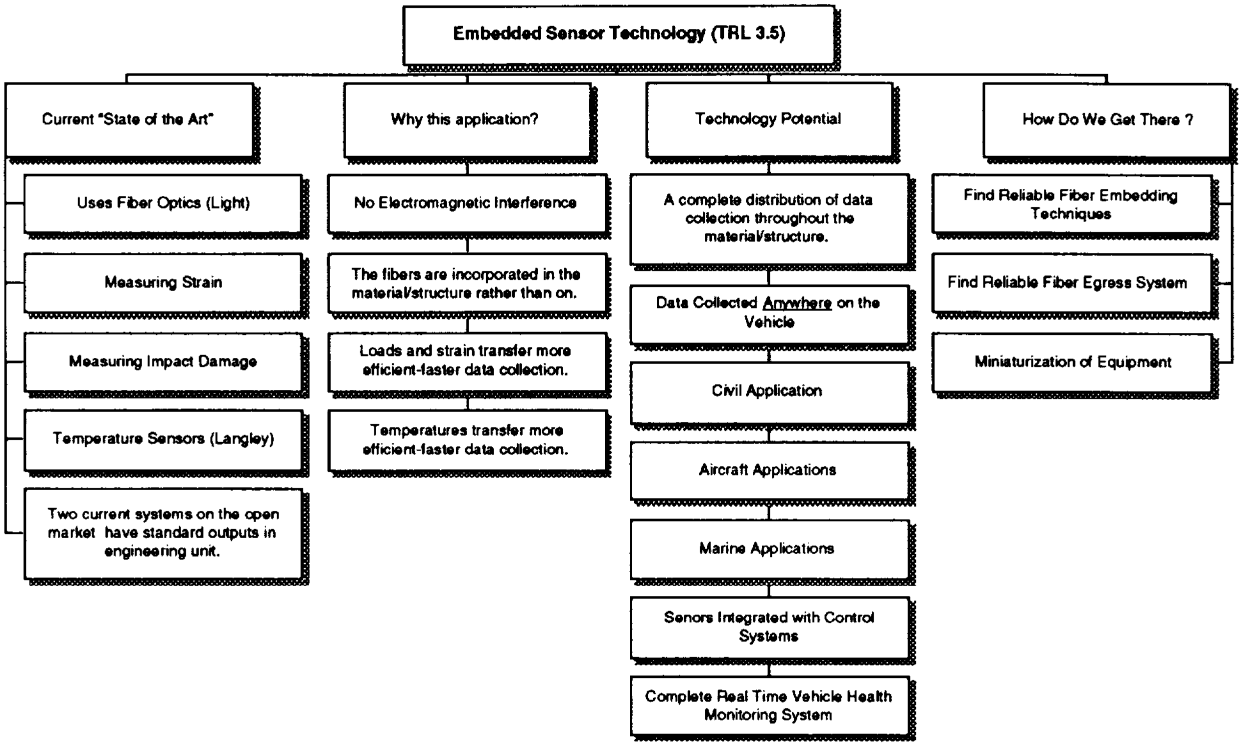
1995

NASA/ASEE SUMMER FACULTY FELLOWSHIP PROGRAM

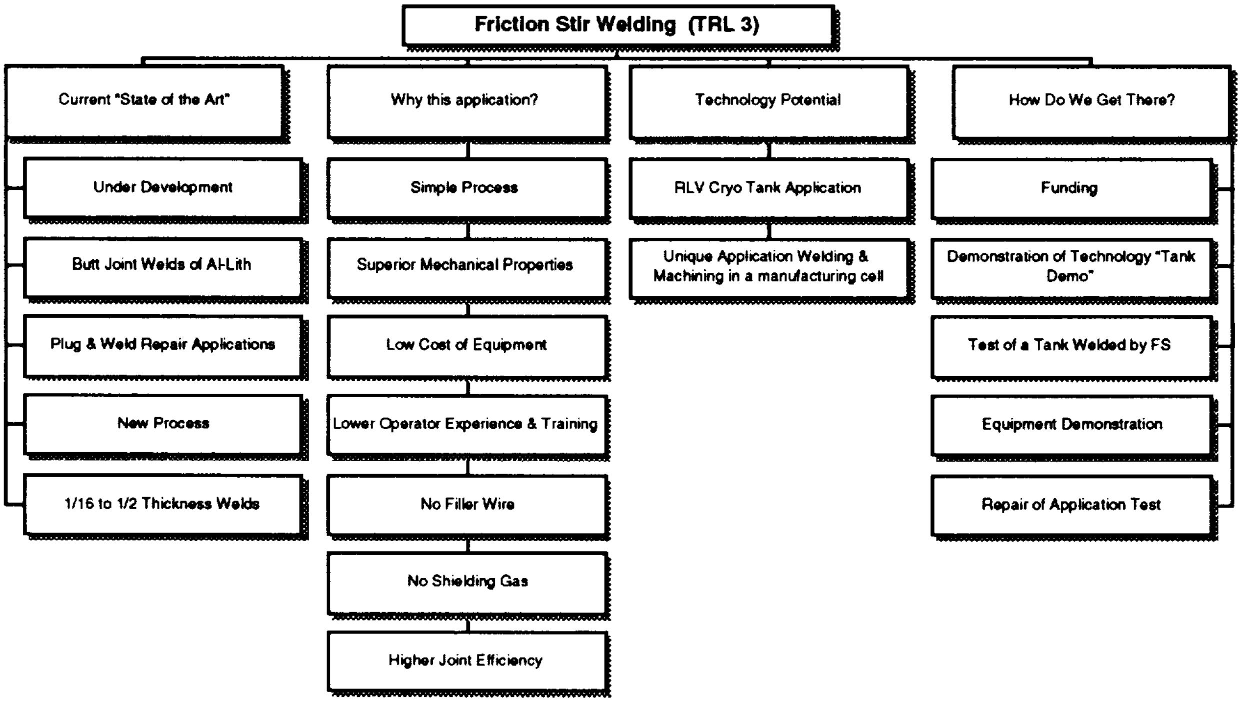
MARSHALL SPACE FLIGHT CENTER
THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

TECHNOLOGY READINESS LEVELS AND TECHNOLOGY STATUS FOR SELECTED LONG TERM/HIGH PAYOFF TECHNOLOGIES ON THE RLV PROGRAM

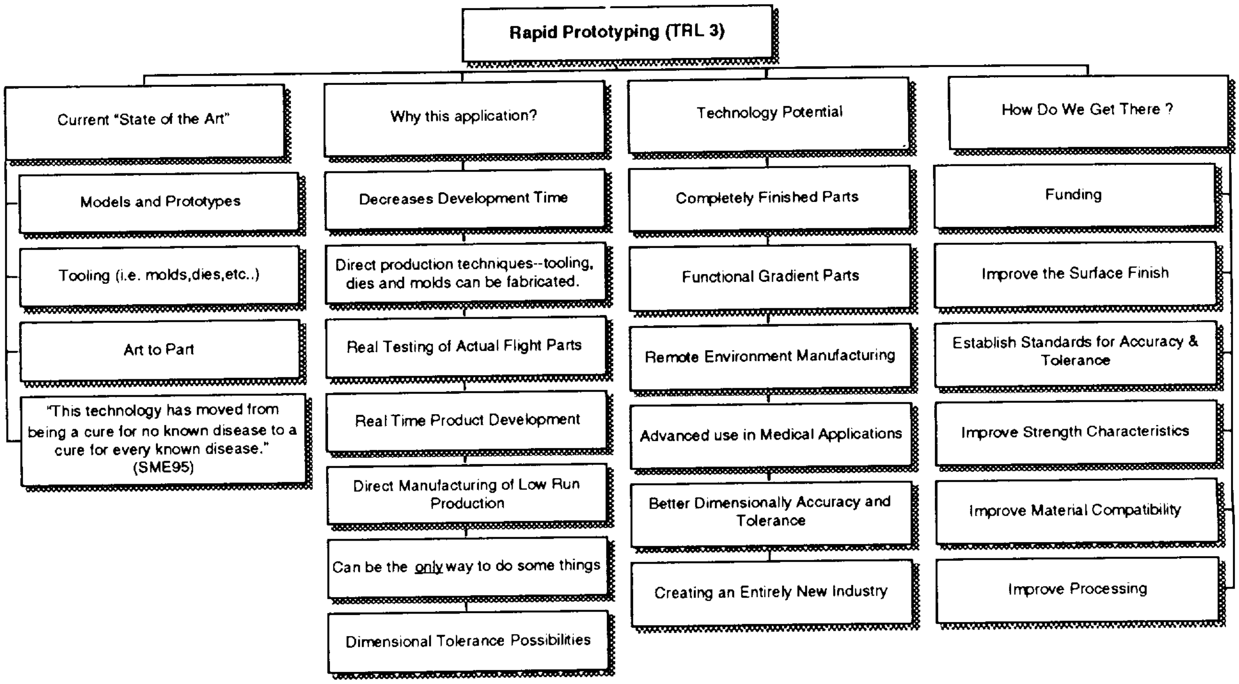
Prepared By:	Russell L. Rosmait
Academic Rank:	Associate Professor
Instituation and Department:	Pittsburg State University Department of Engineering Technology
NASA/MSFC:	
Office:	Engineering Cost Group
Division	Program Planning
Branch	Program Deveploment
MSFC Colleague:	Joseph W. Hamaker



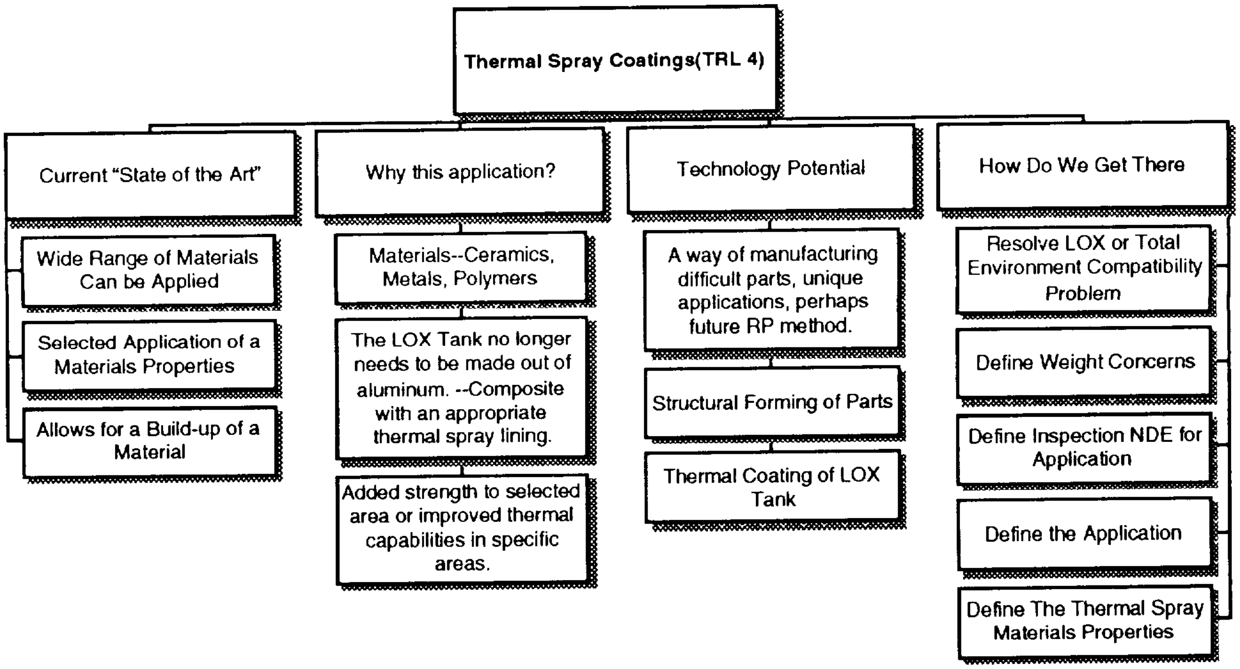
Embedded Sensor Technology is the application of fiber optic technology to filament wound composites. The fiber optics are placed with the composite where data on the product is monitored. The tree chart below gives and overall picture of the application for Embedded Sensor Technology



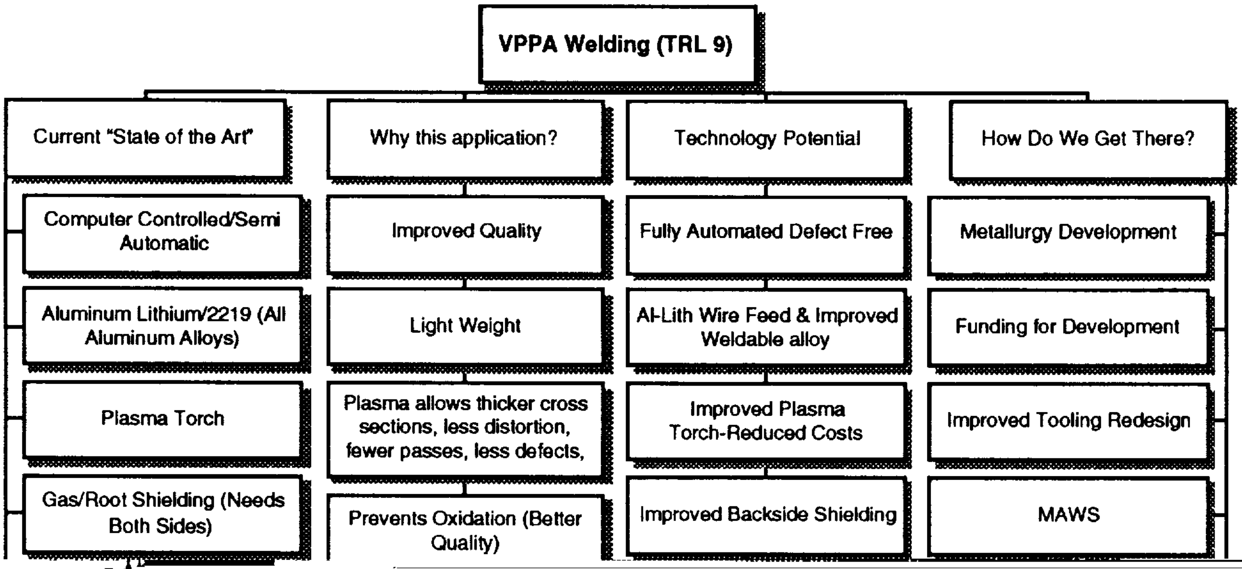
Friction Stir Welding is a new welding process that welds using heat that is generated by friction from a speciality tool as it is run along the joint that is to be welded. The process takes place using a milling machine. The joint to be welded is fixtured into the machine and the tool is run along the joint literally "stirring the metal together" with not a great deal of melting. The tree chart above shows the current status of this unique process.



Rapid Prototyping(RP) is simply, a process that takes the designers ideas from a CAD drawing and converts them directly to a visual or usable part. The process is basically the same for all the RP systems on the market today. Computer software cuts or slices the part on the screen. The RP unit then layers each slice one on top the other and builds the part. The tree chart below gives a good picture of the future for Rapid Prototyping.



Thermal Spray Coating is used to deposit metal, ceramic or a combination of materials to coating or from near net shape structures. Coating applications can include thermal resistance, wear resistance, corrosion protection and is being considered for high pressure LOX compatibility. The tree chart below gives a good picture of the future for development of Thermal Spray Coating.



VPPA Welding (TRL 9)

Current "State of the Art"	Why this application?	Technology Potential	How Do We Get There?
Computer Controlled/Semi Automatic	Improved Quality	Fully Automated Defect Free	Metallurgy Development
Aluminum Lithium/2219 (All Aluminum Alloys)	Light Weight	Al-Lith Wire Feed & Improved Weldable alloy	Funding for Development
Plasma Torch	Plasma allows thicker cross sections, less distortion, fewer passes, less defects,	Improved Plasma Torch-Reduced Costs	Improved Tooling Redesign
Gas/Root Shielding (Needs Both Sides)	Prevents Oxidation (Better Quality)	Improved Backside Shielding	MAWS