

**Kennedy Space Center's Partnership with Graftel Incorporated**  
**By Carol Anne Dunn**

NASA Kennedy Space Center (KSC) has recently partnered with Graftel Incorporated under an exclusive license agreement for the manufacture and sale of the Smart Current Signature Sensor. The Smart Current Signature Sensor and software were designed and developed to be utilized on any application using solenoid valves. The system monitors the electrical and mechanical health of solenoids by comparing the electrical current profile of each solenoid actuation to a typical current profile and reporting deviation from its learned behavior. The objective of this partnership with Graftel is for them to develop the technology into a hand-held testing device for their customer base in the Nuclear Power Industry. The device will be used to perform diagnostic testing on electromechanical valves used in Nuclear Power plants. Initially, Graftel plans to have working units within the first year of license in order to show customers and allow them to put purchase requests into their next year's budget.

The subject technology under discussion was commercialized by the Kennedy Space Center Technology Programs and Partnerships Office, which patented the technology and licensed it to Graftel, Inc., a company providing support, instrumentation, and calibration services to the nuclear community and private sector for over 10 years. For the nuclear power industry, Graftel designs, manufactures, and calibrates a full line of testing instrumentation. Graftel's smart sensors have been in use in the United States since 1993 and have proved to decrease set-up time and test durations. The project was funded by Non-Destructive Engineering, and it is felt that this technology will have more emphasis on future vehicles.

Graftel plans to market the Current Signature Sensor to the Electric Utility industry. Graftel currently supplies product and services to the Nuclear Power Industry in the United States as well as internationally. Product and services sold are used in non-destructive testing for valves, penetrations and other applications. Graftel also supplies testing services to an industrial customer base. The customer base includes 90 percent of the U.S. Nuclear plants and plants in Brazil, Europe, and Asia. Graftel works internationally with two representative groups and employees and has ten people at the principle location and a group of contract engineers around the country.

The benefits of the Smart Current Signature Sensor are several. One of the main benefits provided by the system is the ability to detect potential failures and operational degradation of solenoid valves that will cause failures in the near future and notify the users before they happen (valve health prognosis). Such capability greatly increases the safety, the reliability and the availability of the systems being instrumented with this device. Additionally, this approach will provide cost savings associated with failure consequences such as launch scrubs, etc. The Smart Current Signature Sensor was designed and developed to be utilized by the Space program on its ground support equipment and vehicle valves. Because of the uniqueness of the application, the sensor was designed with such flexibility that it could be utilized on any application using solenoid valves. An important advantage is that the system learns from good solenoid valves and reports deviation from its learned behavior; therefore, it is suitable for any aerospace application. Two additional major benefits of the software are the automatic identification of the features using a very small sample of the current signature and enhancements to the difference filter that provide a method to control the amount of noise rejection.

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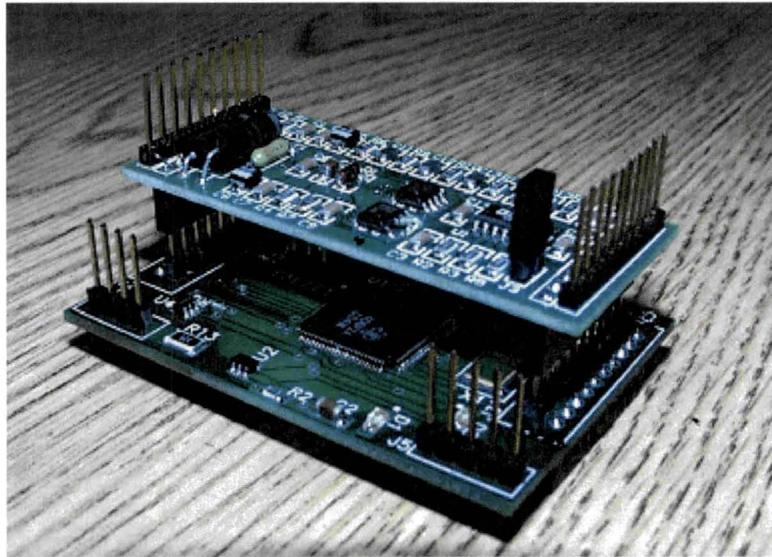
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*Smart Current Signature Sensor (SCSS) Analog and Digital Modules*

### **Side Bar on NASA's Innovative Partnerships Program**

Technology transfer has been a mandate for NASA since the Agency was established in 1958 by the National Aeronautics and Space Act. National leaders at that time recognized that NASA would play an important role in driving technology development to achieve its goals in space and aeronautics, and that those technologies could provide important benefits for the Nation. The Act requires that NASA provide the widest practicable and appropriate dissemination of its activities and results, and granted NASA the authority to patent inventions to which it has title. Under the terms of this Act, NASA retains title to all NASA inventions and intellectual property created using government funds, unless specifically waived by the NASA Administrator.

Since 1980, Congress has enacted a series of laws to promote technology transfer and allow commercial use of government-funded inventions. These laws encourage the sharing of technology and resources between federal laboratories and private industry, including personnel, facilities, methods, expertise, and technical information in general. NASA's Innovative Partnerships Program (IPP) provides needed technology and capabilities for NASA's Exploration Systems Mission Directorate (ESMD), and ESMD Programs and Projects, through investments and partnerships with Industry, Academia, Government Agencies, and National Laboratories. As one of NASA's Mission Support Offices, IPP supports all four Mission Directorates and has Program Offices at each of the NASA Centers. In addition to leveraged technology investments, dual-use technology-related partnerships, and technology solutions for NASA, IPP enables cost avoidance, and accelerates technology maturation.

IPP consists of the following program elements, as summarized: Technology Infusion, which includes the Small Business Innovative Research (SBIR)/Small Business Technology Transfer (STTR) Programs and the IPP Seed Fund; Innovative Incubator, which includes Centennial Challenges, and new efforts such as facilitating the purchase of services from the emerging commercial space sector and Partnership Development, which includes Intellectual Property management and Technology Transfer, and new innovative partnerships. Together these program elements increase NASA's connection to emerging technologies in external communities, enable targeted positioning of NASA's technology portfolio in selected areas, and secure NASA's intellectual property to provide fair access and to support NASA's strategic goals. Technology transfer through dual-use partnerships and licensing also creates many important social-economic benefits within the broader community.