



The Right Stuff of Tahoe, Incorporated

The Right Place
3341 Adler Court
Reno, NV 89503-1263

Department of Defense Awards
\$100K SBIR to The Right Stuff of Tahoe

Info@The-Right-Stuff.com
www.The-Right-Stuff.com
1.775.322.5186

Press Release, 24-Oct-2003 (v 5)

\$100K DoD SBIR to the Right Stuff of Tahoe

The Air Force Research Laboratory has selected The Right Stuff of Tahoe for a \$100K grant. The northern Nevada high-tech firm will develop and test breakthroughs for managing frequencies in the radio spectrum.

Dr. Laurence E. LaForge, President of The Right Stuff of Tahoe, is principal investigator for the proposal: "Voronoi-Hamming Algorithms for Optimizing Channel Selection From the Radio Frequency Transmission Hypercube". Dr. LaForge is a graduate of MIT and McGill University. He also an adjunct professor of Computer Science and Mathematics with Embry-Riddle Aeronautical University. His submission responds to the Office of the Secretary of Defense, in its most recent solicitation for Small Business Innovative Research, commonly known as SBIR.

"The SBIR program is extremely competitive," Dr. LaForge said, "and I am grateful for the superb collaboration of my Chief Operating Officer, Mr. James Turner. This grant enables us to build on the foundation laid by our previous work sponsored by the NASA Institute for Advanced Concepts: 'Architectures and Algorithms for Self-Healing Autonomous Spacecraft'. I am also privileged to draw on the expertise of Dr. M. Sami Fadali, Professor of Electrical Engineering at the University of Nevada, Reno." Dr. Fadali specializes in automatic control.

The Air Force is charged with administering Phase 1 SBIR's for the topic under which the grant falls: "Beyond Spectrum: Multiobjective Joint Optimization for Efficient Utilization of the Radio Frequency Transmission Hypercube". The Office of the Secretary of Defense challenged high-tech firms to develop innovative concepts for efficient utilization of electromagnetic transmission resources, such as time, frequency, geographic space, modulation, code, and polarization. This multi-dimensional electromagnetic environment is deemed the "Transmission Hypercube".

The Right Stuff of Tahoe answered with a proposal for expert-system software called *Connection Forge*TM. As described, this computer program will implement "new algorithms which – provably, autonomously, and in the presence of faults, optimize the selection of channels from the radio frequency Transmission Hypercube".

Emphasizing both military and commercial applications, the SBIR topic underscores how existing "set-it-and-forget-it" schemes for managing radio frequency communications are straining under immense pressure. The increased demand is due to burgeoning numbers of commercial and military wireless devices, such as short range home networks, cordless phones, and the global information grid. Most of the radio frequency spectrum is already allocated, a sobering fact which motivates fresh ways to manage communications.

Dr. LaForge explained, "While traditional approaches focus on network protocols, we believe that the most beneficial use of the Transmission Hypercube stems from a different tact, as posed by two simple questions: 'Which nodes to connect?' and 'Which channels to use?' *Connection Forge*TM will maximize throughput and fault tolerance, while simultaneously minimizing both latency and channel power." A channel is a communications pathway for transmitting information, which may be carried by copper wires, fiber optic cables, laser light, or radio signals. Dr. LaForge's proposal blends information theory with breakthroughs in the mathematics of connectivity: optimal routing enabled by Hamming graphs, and Voronoi algorithms from computational geometry.

The \$100K Phase 1 grant is for a six-month period of work, with Phase 2 possibilities of up to \$750K, spanning 24 months. For SBIR Phase 3, companies make the transition to commercial products with self-sustaining revenue. The Nevada SBIR Outreach Program (www.nsbdc.org) provides information and support to small businesses statewide.