



QUESTEK WINS THREE SBIR PHASE I AWARDS TO DESIGN AND DEVELOP ALLOYS

QuesTek will Design and Develop Three New Alloys to Address Compelling Energy, Aerospace, Environmental and Operational Needs

EVANSTON, IL, Dec. 8, 2009 - QuesTek Innovations LLC was recently awarded three Phase I Small Business Innovation Research (SBIR) projects to design and develop new alloys for the U.S. Department of Energy and the Office of Naval Research. The awards expand QuesTek's on-going record of innovation for governmental and commercial entities. The three recent project awards are:

1. "Computational Design of Oxidation- and Creep-Resistant Niobium Superalloys for High Temperature Turbine Applications" awarded by the U.S. Department of Energy. QuesTek will design and develop oxidation- and creep-resistant niobium-based superalloys to enable high temperature turbines to operate with metal temperatures of 1,300°C (2,372°F) and above. Land-based turbines operating at these high temperatures could achieve far higher efficiencies and lower CO₂ emissions than current equipment, and could further the development of Integrated Gasification Combined Cycle (IGCC) hydrogen-fueled, very-low-emission gas turbines and ultra-high-temperature steam turbines. Commercial and military aerospace turbine engines using these superalloys could also achieve significant gains in efficiency and performance output at these high operating temperatures. This is a nine-month, \$99,967 SBIR program.

2. "Computational Design of Cost-Effective, Oxidation- and Creep-Resistant Alloys for Coal-Fired Power Plants" awarded by the U.S. Department of Energy. QuesTek will design and develop novel, cost-effective alloys for advanced ultra-supercritical power plants with steam temperatures of 760°C (1,400°F). QuesTek will investigate and assess three novel new microstructural concepts by: using robust, proprietary computational models to design novel new compositions; manufacturing prototype ingots of select materials at an intermediate scale; and performing physical tests to demonstrate the ability of the new materials to address creep strength, thermal fatigue, oxidation resistance and other properties. Increasing the steam temperature of advanced ultra-supercritical boilers can raise the operating efficiency of next-generation coal-fired power plants and address compelling environmental issues. This is a nine-month, \$99,936 SBIR program.

3. "Computational Design of High-Strength, Anodize-Free Stainless Aluminum Alloys for Aerospace Applications" awarded by the U.S. Office of Naval Research and solicited by the Office of the Secretary of Defense. QuesTek will design and develop a new high-strength, anodize-free stainless aluminum alloy that will have intrinsic corrosion behavior similar to anodized 7xxx alloys and mechanical properties equivalent to non-anodized 7075-T6 alloy. Most aerospace aluminum alloys are anodized in order to enhance corrosion resistance, but anodization can reduce fatigue strength by as much as 40% and typically generates a hazardous waste stream. QuesTek will use its state-of-the-art computational design tools, custom thermodynamic and kinetic databases, microstructural evolution models, physics-based strength models, solidification process simulations, and stress-corrosion cracking models. Naval aerospace, commercial aviation, marine structures and other applications are expected to benefit from this new alloy. This is a six-month, \$99,995 SBIR program.

Charlie Kuehmann, President and CEO of QuesTek, commented: "We appreciate these awards from the DOE, the ONR and the OSD to design and develop next-generation, high-performance materials. These projects build upon our record of material design successes for energy, aerospace and other industries, such as our *Ferrium*® C61™ and *Ferrium* C64™ alloys for applications such as high-power-density, high-durability power transmission and our *Ferrium* S53® ultra-high-strength, corrosion-resistant alloy for applications such as aircraft landing gear."



ABOUT QUESTEK

QuesTek Innovations LLC (www.questek.com) is a global leader in computational materials design. QuesTek uses its proprietary *Materials by Design*® expertise to quickly develop new materials that reduce capital, processing, operating or maintenance costs, or improve environmental protection, competitive supply or competitive advantage. QuesTek has been highlighted in many leading business and technical publications, and has more than 30 patents awarded or pending worldwide. For more information, contact Rich Kooy at 1-847-425-8213 or rkooy@questek.com.