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COMMENTARY

Small Beginnings

Aerospace supplier sees innovative business startup as a way to grow its capabilities

What began with building a model helicopter during an innovation workshop has led to a company startup, a chance to work closely with Sikorsky and the opportunity for a make-to-print supplier to grow into a design-build partner.

Pankl Aerospace Innovations, formed by California-based Pankl Aerospace Systems earlier this year, is the first winner of Sikorsky's online Entrepreneurial Challenge, designed to identify small, innovative firms it can help incubate.

The competition invited inventors and entrepreneurs to propose solutions to five technical challenges. "Pankl's solution addresses the second challenge—adaptive signature control and active survivability technology," says Laurence Vigeant-Langlois, director of business development and technology partnerships for Sikorsky Innovations.

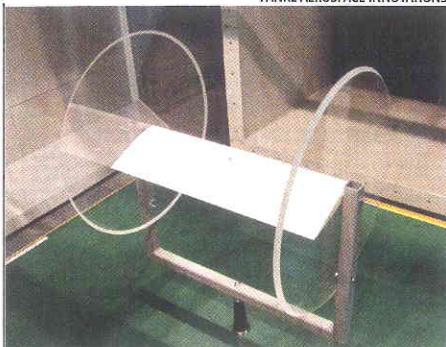
Pankl proposed a set of technologies packaged in a concept rotorcraft called Hero. "They include new fuselage materials, active camouflage, a new drive train and automation for autorotation," she says.

Austrian parent company Pankl Racing Systems is a leading supplier of critical drivetrain components for Formula 1 motor-racing teams, says Pankl Aerospace Systems CEO Sonya Zierhut.

From the "humble beginnings" of a fabric, wood and wire helicopter model built during a workshop last year to promote innovative thinking and increase understanding of vertical flight, Pankl began working with universities on advanced rotorcraft technologies.

The Hero concept has a four-rotor drivetrain, with interleaved main rotors and side-mounted ducted rotors for high speed and lift, powered electrically from a hydrogen-oxygen fuel cell. The main rotors have short blades with scalloped leading edges, inspired by humpback-whale flippers, that increase lift by delaying stall.

The fuselage has a lightweight, stretchable skin made of a fiber-rein-



PANKL AEROSPACE INNOVATIONS

forced, polyurethane-coated Lycra fabric, used by BMW in its Gina concept car. An alligator-inspired "wagging" tail allows faster turns, she says. The skin is covered with bendable thin-film displays for active camouflage and thin-film carbon-nanotube loudspeakers for active noise cancellation.

Pankl's cockpit philosophy is to divide pilots into different user groups and upload settings via an iPad or iPhone that configure the controls and displays to the needs of each group. A novice would be able to "drive" the helicopter most easily, with fewer controls and displays and automated flight-control modes

for cruise, combat and emergency maneuvers.

"All the technologies are at a readiness level [TRL] of 1-2," says Zierhut. "We are having fun with this, and Sikorsky says it does not sound too crazy for them." Pankl's goal is to develop some of the innovations to a higher TRL, "then pick the technologies with the highest potential and continue with them."

Although Pankl has packaged the technologies in an unconventional rotorcraft concept, "it was the complementary transformational technologies, not the product, that drew us," says Vigeant-Langlois. Pankl receives a year's free use of the Stamford (Conn.) Innovation Center, technology and business coaching, and an investment evaluation by Sikorsky.

"We had half a dozen submissions and were impressed by their quality," she says, so Sikorsky has "decided there is value in providing incubation support" to the other two finalists: Ottawa-based Smart Rotor Systems, with a new pitch-link control technology to reduce noise and vibration; and inventor Drew Lambert, with a mobile network weather information concept.

Model tests in a Munich University wind tunnel suggest that a bio-inspired rotor blade with a sinusoidally scalloped leading edge produces more lift than a conventional blade at high angle of attack.

Although it works closely with motor-racing teams like Ferrari's, Pankl is a make-to-print supplier in aerospace, and Zierhut sees the opportunity to learn from Sikorsky as a way to grow the company "into aerospace make-to-spec" and to become a design-build partner.

Sikorsky launched its second Entrepreneurial Challenge, posing a second set of five online technical questions, at last month's AirVenture show in Oshkosh, Wis. The challenge is aimed at companies with under \$5 million in revenues and no more than 10 employees. The first round drew submissions from individual inventors and university spinoffs as well as agile offshoots of more traditional companies like Pankl. ☺