SPECIAL DOUBLE ISSUE

$14.95 SEPTEMBER 3/10, 2012

AVIATIONWEEK
& SPACE TECHNOLOGY

Innovation
The Power of Small Companies

PLUS

NEIL ARMSTRONG
The Aviator

GERMAN AEROSPACE
The Big Squeeze

Epner Technology Assistant Quality Manager, Adam G. Drew, inspects the Laser Gold plated interior of a large chemical reaction vessel.

The McGraw-Hill companies

AviationWeek.com/awst

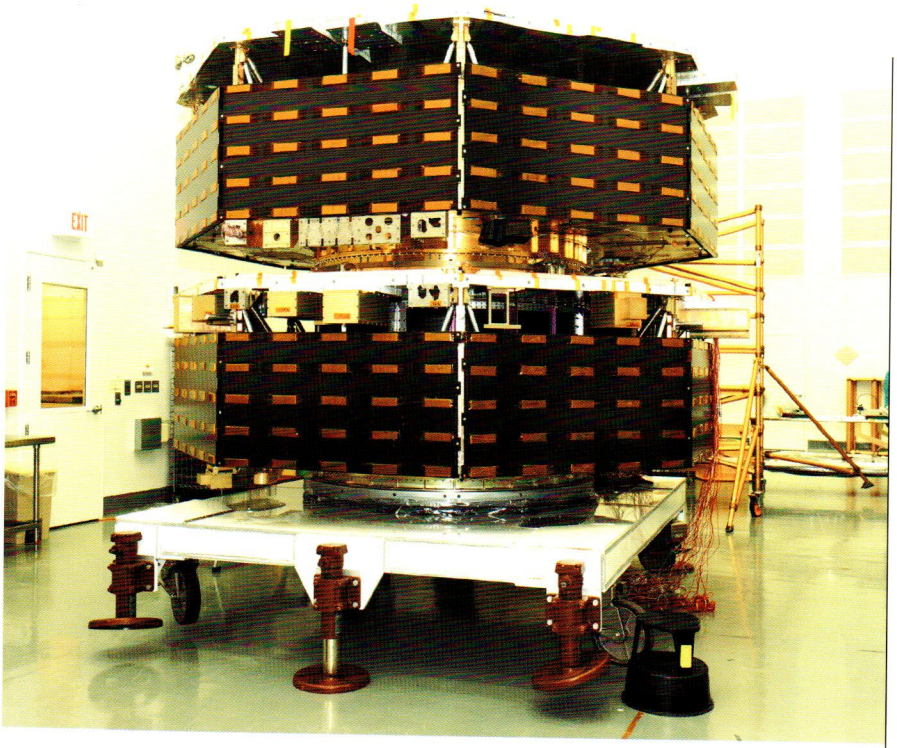
INNOVATION

Gold Standard

No black magic, coatings technology at Epner Technology is highly adapatable

Anthony L. Velocci, Jr.

Epner can laser-plate gold to less than 1.5 microns with 98% reflectivity



Large aluminum rings, laser gold-plated by Epner for low emissivity, form the framework for NASA's Magnetospheric Multiscale Mission spacecraft.

Epner Technology Inc. President and Founder David Epner takes enormous pride in the fact that his engineering team welcomes complex projects for which his customers cannot find another supplier to tackle successfully, if at all. Such challenges, practically routine, are what sustain Epner's culture of innovation—finding solutions to problems that seem to elude others.

"Conventional wisdom holds that the kind of work we do is more black magic than science, but I believe everything we do is science," Epner says. "If there is any art—or black magic—involved, it's how you apply the science, especially when it appears you have run into a brick wall."

What Epner does is laser gold- and black-plating—using a proprietary electrochemical process—for customers serving the aerospace and defense, automotive, computer, medical and semiconductor industries. Most of its work is for the government and defense contractors.

Epner's signature work has included such jobs as gold-plating super-sensitive radioactivity detectors and critical TOW and Maverick missile-guidance components. Two projects underway involve coating components that will provide one of the U.S.'s most lethal unmanned aerial platforms with night-vision capability, and gold-plating the heart of the electrostatic analyzer—which filters out electron particles—with laser black on NASA's Magnetospheric Multiscale Mission under the Solar Terrestrial Probes program.

Gold is one of the most reflective materials known to science, especially in the infrared spectrum. It is used to coat optical mirrors in spacecraft, satellites, lasers and missile countermeasure systems, among other highly sensitive instruments and components. The challenge with laser gold-plating is how to increase both its reflectivity and durability. The function of black laser-coating is to absorb light. There the challenge is increasing the amount of light absorption across a wider range of the IR spectrum—the main focus of much of the company's current R&D.

Innovation at Epner Technology is driven mainly by existing or prospective customers asking whether a particular coating job is technically possible. One of Epner's most memorable such inquiries came from a semiconductor manufacturer whose requirement involved coating a chemical-reaction vessel. Plating such a large part had never been attempted. The job called for laser-plating to a minimum of 1.5 microns (60 millionths of an inch) of gold, with at least 98% reflectivity.

The company's most recent request—challenge, really—came from the Department of Homeland Security (DHS) and involved plating 60 discrete spots with gold five-thousandths of an inch thick on a 12-ft. titanium tube. The DHS had been unable to find another supplier willing to attempt the job.

Inquiries like those from the semiconductor manufacturer and DHS harken back to a chance meeting Epner had with a Xerox engineer in the early 1970s. The engineer wanted to know whether Epner had a coating technology that would hold up under the high temperature of the powerful heat lamp used in copy machines. Epner Technology had such a capability, and it made adhesion under high heat possible; the fact that the coating also had superior reflectivity was a plus. At the time, the company's business mainly involved gold-plating jewelry. Epner Technology leveraged the Xerox work to win increasingly challenging projects.

Epner believes his company's three greatest strengths are the synergy that comes from close interaction between his technical team, the opportunity to pursue technically challenging work, and keeping an open mind about what otherwise might seem like hair-brained ideas. "It is the key to our success and sustaining a culture of innovation," he says.