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## Puerto Rico—A Shining Star In Aerospace Engineering

Even as Congress debates immigration reform and Homeland Security looks to erect a virtual fence on our southern border, the populace of the U.S. is inexorably changing. More than 12% of our residents are foreign-born, the highest percentage in nearly 100 years. Latin American culture in particular is

favoring the mainstream culture, fueling growth in many local economies around the country.

Latinos are also making their mark in engineering. I recently visited the University of Puerto Rico (UPR) along with several of the new engineering services companies setting up shop there, forming the foundation of a budding aerospace and defense contracting workforce. Puerto Rico offers tax advantages and a lower-cost labor force while allowing work on International Traffic in Arms Regulations (ITAR) contracts without restrictions.

These cost-saving advantages appeal to U.S. tech companies. But the most impressive draw is the commonwealth's engineering talent, underpinned by a great enthusiasm and respect for the profession. This atmosphere creates an extremely productive environment for focused, disciplined engineering.

Engineers make up 40% of the graduating class of UPR, with 606 degrees awarded in 2006, ranking it 24th in the number of engineering graduates compared with U.S. schools. It also ranked 17th in the number of EE degrees awarded (129) in 2006. The school stresses bilingual studies, with all textbooks in English, while classes are taught in Spanish.

**RESPECT FOR THE CAREER** • Being an engineer in Puerto Rico means having a titled position, like being a doctor or a minister. It's highly regarded, seen by both women and men as the key to getting ahead. Part of this has to do with Puerto Rico's still-vibrant manufacturing economy, with 40% of the GDP provided by manufacturing jobs. Still, the island is planning ahead to a service-based economy and has targeted engineering jobs as a vital part of that growth.

Ramon Vasquez Espinosa, an EE and dean of the College of Engineering at UPR, Mayaguez, explained some of the secrets of the university's success: an extremely mature, focused group of students participating in a five-year undergrad program now enhanced by expanding graduate research programs. Espinosa noted some of the school's current research projects:

- The Center for Subsurface Sensing and Imaging Systems (CenSSIS) is developing imaging technologies to view objects underground, underwater, or inside the human body
- The Tropical Center for Earth and Space Studies is focused on image and signal processing for bio-optical oceanography and biosystems engineering.

- The Collaborative Adaptive Sensing of the Atmosphere (CASA) program is creating a distributed, adaptive sensor network to sample the atmosphere via a network of low-power radars that overcome curvature blockage

UPR professors Domingo Rodriguez and Nayda Santiago are directing a space-based digital imaging research project sponsored by Lockheed Martin and General Electric. The research involves new algorithms for on-craft signal processing to analyze images of terrain and ground conditions. Rodriguez notes that halfway through the one-year project, GE/Lockheed managers have been "very happy and surprised" at how quickly the students understood and got into the programming.

**TAKING OFF IN AEROSPACE** • Infotech is a Pratt & Whitney joint venture that has grown from 18 employees in 2003 to 500 employees, mainly degreed engineers. While the company's current work is largely from Pratt and other United Technologies (Pratt's parent corporation) siblings, Infotech's charter includes contract-engineering work for outside companies as well.

Current projects include work on UTC Power fuel cells and Pratt's F-35 Lightning II Joint Strike Fighter, with electronic design work including signal processing and aircraft communications. Rita Peralta, Infotech's president and general manager, and Scott Leslie, chief engineer, recalled that their unit's first project was finished in half the estimated time.

Steve Witalis, a former Pratt engineer who has helped train staff in Puerto Rico, feels the energy and enthusiasm of the young engineers is a tremendous plus. But the real secret, he says, is the partnership with senior Pratt engineers as these "discipline chiefs" share their decades of experience.

Essig PR, which does much contract work for GE, has 15 open positions and plans to have 40 engineers by the end of the year—100 by the end of 2008. Lockheed Martin and Honeywell may be heading to Puerto Rico, as GE and others sniff the tropical air.

Essig president Joseph Daly says that when 1500 engineers are working in aerospace in Puerto Rico, a critical mass will be reached, creating an aerospace engineering hub. The new opportunities are also drawing Puerto Ricans who left the island years ago back to their homeland. While previously more than 80% of graduating engineers would have left the island, many are now staying and creating a vibrant engineering community. ☐