

A FRIENDLY SKY

ROB MCDONALD AND DAVID MARSHALL RESEARCH FUTURE AIR TRAVEL

BY SCOTT ROARK

TWO CENTURIES AGO, the concept of a modern jetliner was only a fantasy in the minds of a few futurists.

Unfortunately, you could say that quiet, comfortable and punctual air travel is once again only a dream.

Anyone who has flown recently knows that getting on a plane is the triumph of hope over experience.

An aviation renaissance may someday be the answer to a flyer's misery. Cal Poly Aerospace Engineering Professors Rob McDonald and David Marshall are collaborating with other researchers across the country as part of a multidisciplinary effort aiming to improve air travel by developing a new generation of aircraft.

The effort is being funded by NASA in the form of two separate contracts, one each for McDonald and Marshall, totaling several million dollars.

NASA aims to radically re-design the modern jetliner by improving fuel efficiency, reducing noise and allowing the planes to take-off and land using less runway space, giving them low-speed, high-lift performance.

In addition, the new planes will be quieter and less polluting. According to a NASA report, the agency is striving to have a generation of aircraft by 2012 that will greatly reduce engine noise, lower emissions by 70 percent and burn 15 percent less fuel relative to a standard 737 model. By 2018, those goals increase even more.

McDonald's team is developing the software to improve the aircraft design process. Marshall's team is working on the creation of the airplane models, testing them and developing prediction methods for low-speed, high-lift performance. Both professors have teams of Cal Poly students assisting in the research.

What could all of this mean for airline passengers someday? It comes down to the so-called "hub and spoke" system for modern air travel, according to McDonald.

Think of a bicycle wheel, with the hub at the center and



(L-R) Rob McDonald and David Marshall

the spokes reaching to smaller airports. Passengers flying from a smaller airport will most likely go first to a major hub before continuing to their final destination. "As nearly everyone knows, major hubs are bottlenecks – they become clogged very quickly," said McDonald.

Modern jetliners have to use these hubs because of the runway length – smaller airport runways are simply not long enough. However, short takeoff and landing designs similar to those being researched by Marshall will give larger aircraft access to smaller airports, allowing many more direct flights and fewer connections. Think of flying directly from San Luis Obispo to Colorado Springs, completely bypassing such hubs as Los Angeles or Salt Lake City.

Both professors are optimistic that the new technology will, literally, take off.

"Along with the benefits of fewer fuel emissions and improved travel convenience, having quieter airplanes will be significant for the thousands of people living near airports," said Marshall. "We are long overdue for new aviation design." □