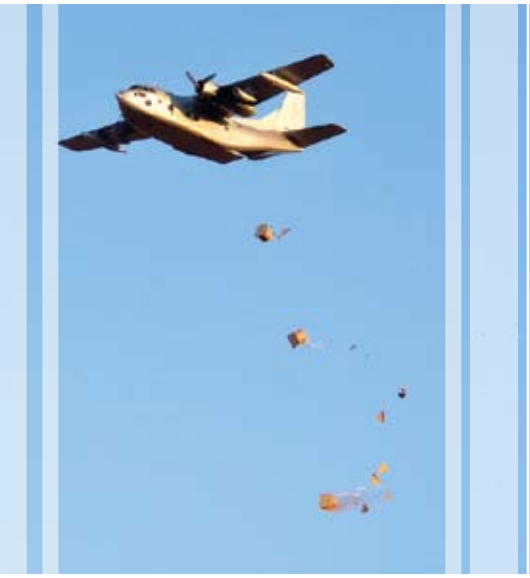

# Bull's eye!

## Could 250-gallon 'water balloons' guided by GPS help fight forest fires?

By Marc Sklar

On a single day in 2000, dry thunderstorms generated 75,000 lightning strikes that sparked more than 400 forest fires across the western United States. Granted, every day is not as intense for firefighters, but they do face a monumental task each summer in dry areas of the United States. Their challenge is to quickly contain blazes that can rapidly turn into monster fires that threaten lives, homes and businesses, as well as destroy forests and wipe out lumber resources.

Boeing and its partners in this project, International Paper and Flexible Alternatives, are developing a tool called the Precision Container Aerial Delivery System (PCADS) that could allow firefighters to snuff out blazes faster. The system—developed by the Advanced Systems organization of Integrated Defense Systems—is based on Boeing's extensive experience with air-drop technology. "We're taking what we know about placing a payload exactly on target and using that knowledge to get fire retardant precisely where it's needed," said William Cleary, PCADS project manager.

The system works with any aircraft with a rear cargo ramp. No special outfitting is needed, which vastly expands the fleet of aircraft available to fight fires. The system consists of a triple-walled, corrugated box made by International Paper with existing, off-the-shelf components. Inside the box is a 250-gallon (946-liter) plastic bladder made by Flexible Alternatives. Straps attach the bladder to the lid of the box. As the unit exits the aircraft with GPS-guided precision, the lid lifts off, slowing its descent and then opening the retardant-filled bladder as it nears the ground. The retardant is dispersed much closer to the ground, making its coverage more targeted and intense.

"The design challenge for the bladder was getting the right balance of strength," explained Ty Bonnar, vice president of Flexible Alternatives. "It was sort of like designing a bulletproof egg. We had to design a one-ton package, make it strong enough to meet cargo delivery standards, and then have it open correctly 100 percent of the time."

In September the program got a significant boost when $2.3 million in federal funding was authorized for testing PCADS next year. The PCADS team currently is working with the U.S. Air National Guard to plan those tests that could involve both Air National Guard C-130 and C-17 aircraft. Success with the 2009 tests could lead to certification of the system for fighting fires throughout the United States and, ultimately, other countries.

So, where did the idea for PCADS originate? "A prank," said Cleary. "I was on vacation with my family and walking through a hotel garden when my son dropped a water balloon on me from the third-story balcony. The fact that I was moving, and it was a direct hit, got me thinking."

But the potential benefits of the firefighting system are no joke. "It's user-friendly and can be precisely targeted," said Mike Rauton, a captain with the Verde Valley Fire District in central Arizona, who saw a PCADS demonstration last year. "If this product can squelch fires more quickly, that's definitely the way to go." ■

*marc.a.sklar@boeing.com*

**PHOTOS: Left: Precision Container Aerial Delivery System units are dropped from a C-123 cargo aircraft during a demonstration of the system. Center: Ty Bonnar of Boeing partner Flexible Alternatives fills the bladder of a PCADS unit with water for a demonstration. Red dye is added to the mix of water and retardant powder to better track dispersal patterns. Right: William Cleary, who developed PCADS, helps secure the lid of a PCADS unit for a test of the firefighting system.** BOB FERGUSON/BOEING