Weyerhaeuser

SUSTAINABLE FORESTRY INITIATIVE

PCADS

Precision Container Air Delivery System

What is PCADS?

Biodegradable bags filled with water or fire retardant

What is PCADS?

Cardboard containers are then secured in cargo aircraft and ejected over fires

What is PCADS?

The cardboard skid under the water bag falls free, the lid separates and the bag bursts above the ground

Why Use PCADS?

- Another tool for fighting fires in remote, inaccessible areas or where life and property are in immediate danger

- To slow rapidly advancing fire and give ground crews more time to establish fire lines or escape to safer locations

- To encase retardant in containers and prevent corrosion of the aircraft

How Does PCADS Work?

The system has three components

Biodegradable Bag

Biodegradable Cardboard Container

The Water Bag

- **Water bags are made by Flexible Alternatives Inc.**
- **The bags are made of biodegradable PVC film**
  - The straps are made of biodegradable PU
  - Straps RF welded to bag

The Water Bag

- Fully loaded they contain 2,000 lbs of water
- The size of a full bag is ~ 48” diameter and 48” in height
- Decomposition of the bag and straps depends on environmental conditions (tests average 9 months)

The Cardboard Container

The cardboard containers, similar to those used by the military to drop MREs, are made by Weyerhaeuser Company.

The Cardboard Container

- The containers are made from a wood by-product
- The glue is a natural sap substance
- The size of each box is ~48” in a squared diameter and 48” in height

PCADS Filling

- Empty water bags are placed in the containers
- Water bags are filled in 3-5 minutes using a fire hydrant or water truck or in 20-25 minutes with a 5/8” garden hose

PCADS Filling

A cardboard lid is then secured to the top of the container and straps that serve as “rip cords” are laced through the 4 corners, down and under the bag

The Aircraft

- Aircraft capable of deploying PCADS are the C-130 Hercules and the C-17 Globemaster
- Both aircraft are in the Air National Guard (ANG) fleet

The Aircraft

- These aircraft have modern avionics and navigation equipment that allows them to operate in limited visibility environments such as over forest fires and at night
- Aircraft also have large cargo doors and cargo handling systems that allow airdrop of PCADS

PCADS Loading

- Filled containers are transported to the aircraft by a K-loader
- Containers are pushed onto the roller system on the cargo ramp at the back of the aircraft

PCADS Loading

Containers are rolled forward and secured with straps to the tie-down rings on the floor of the cargo compartment

C-130 16 containers
(2 side-by-side)
32,000 lbs of water

C-17 70 containers
(4 side-by-side)
140,000 lbs of water

PCADS Delivering

- Tie-down straps are released prior to arriving at the release point
- Aircraft slows to ~130 knots

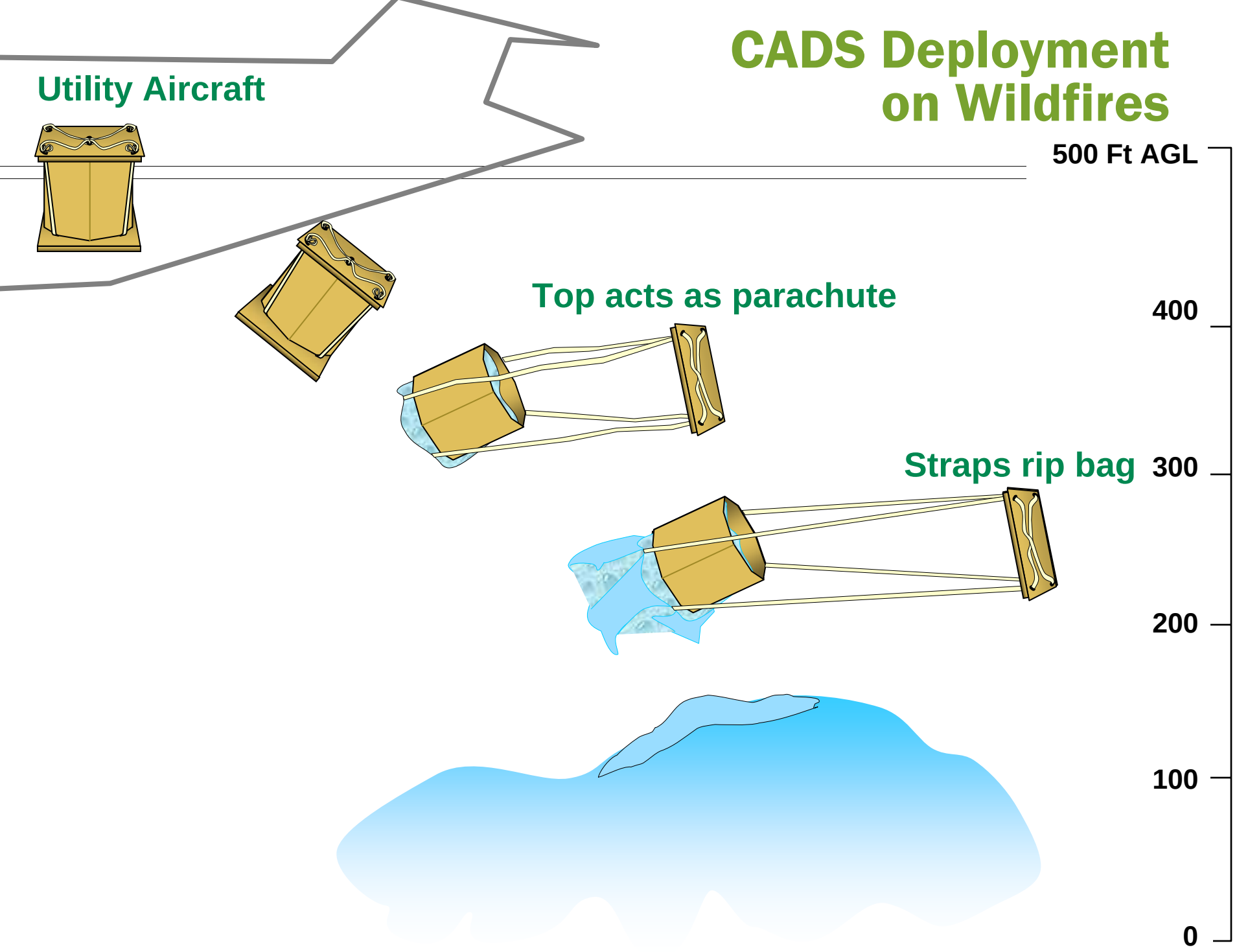
PCADS Delivering

At the desired drop point the aircraft deck angle is elevated and the containers roll out the back end

Container Separation

- Container departs aircraft and cardboard skid falls away
- Lid is pulled off by turbulent air aft of aircraft
- Lid separation pulls 4 straps that are wrapped under water bag
- Friction of straps bursts bags over fire

CADS Deployment on Wildfires



US Forest Service
Aerial Firefighting Mission

Aerial firefighting consists of 2 missions

- **Containment**
  - Low-level release of fire retardant over a designated fire line
  - The ANG uses the module aerial firefighting system (MAFFS) to support this containment mission. MAFFS II will be used to support the containment mission also
- **Direct Attack**
  - Low-level release of water on hot spots of a wild fire
  - The PCADS team is working with the US Forest Service in developing and testing a direct attack mission

ANG is a perfect candidate for deploying PCADS in the Direct Attack Mission

Effectiveness

- Safe Altitude Day / Night
- Safe Ground Impact — Airborne Burst
- Accurate Delivery Using Aircraft GPS
- Immediate / Unlimited Response
- Multiple Airdrops In One Flight
- Cost Effective
- Technology Growth Potential

Saves Lives, Property and Environment

Cost Savings

- Cardboard containers and bladders are cost effective to purchase and warehouse
- Airdrop training is similar to cargo airdrop training
- ANG aircraft does not require deployment
- Turnaround time based on cargo availability

No
- Special handling equipment required
- Dedicated aircraft required
- Additional system failure

Aerial Firefighting

	Aircraft	PCADS
		
Safety	Low, Old Aircraft, Retrofit	High, Any Transport, No Retrofit
Response	Planning Required	Anytime/Anywhere (Day/Night)
Cost	Aircraft Mission, Maintenance	Aircraft Mission
Efficiency	Eyeball, Unknown	GPS, Measurable Testing

Today	One Aircraft Multiple Flights
Tomorrow	*Multiple Aircraft One Flight*

Weyerhaeuser

SUSTAINABLE FORESTRY INITIATIVE

Questions?

Contact Rick.Goddard@weyerhaeuser.com