



# Missoula Technology and Development Center

## Shaping Solutions for the Forest Service

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*During severe fire seasons, Missoulians have been able to watch fire retardant drops near town. The Missoula Technology and Development Center sets and maintains the standards for all retardants used for wildland firefighting (Scott Peryam photo).*

For the past half century, the Forest Service's Technology and Development program has provided practical solutions to problems identified by USDA Forest Service employees and cooperators. The solutions help the Forest Service do its work more efficiently and more safely.

Two centers, one in Missoula, MT, and the other in San Dimas, CA, provide solutions. Each year, they work on 80 to 150 projects. Most projects are completed within 18 months to 3 years.

The current projects at Missoula include:

- Evaluating improved versions of the emergency fire shelter
- Testing fire retardants
- Developing a water pump that can be used by people with disabilities
- Developing a Web-based catalog of trail bridge designs

Such variety requires many different talents. The skills of the center's 50 employees include engineering, forestry, machine tool operation, metal fabrication, drafting, computer systems management, contract administration, publication design, helicopter rappelling, smokejumping, explosives, recreation management, sociology, global positioning systems, equipment design, textile design, contracting, editing, photography, finance, Web design, safety, statistics, chemical analysis, reforestation, and video production.

Although the centers are funded specifically to solve problems for the Forest Service, the solutions have been widely adopted by other agencies and by private groups in the United States and abroad.

# Camera Cooler's Job is No Picnic

There's no better way to learn about fire than to see inside. But photographers and cameras can't handle the heat.

Photographer Jim Kautz figured a way around that problem when he developed a camera box that allows a video camera to survive the heat of a wildland fire. Boxes based on his design have been used in the United States, Canada, and Australia.

Essentially, the camera box is a metal picnic cooler with a special glass window. The window has two layers of glass: an outer layer that can withstand temperatures of up to 2,500 degrees and an inner layer that allows visible light to pass, while reflecting heat.



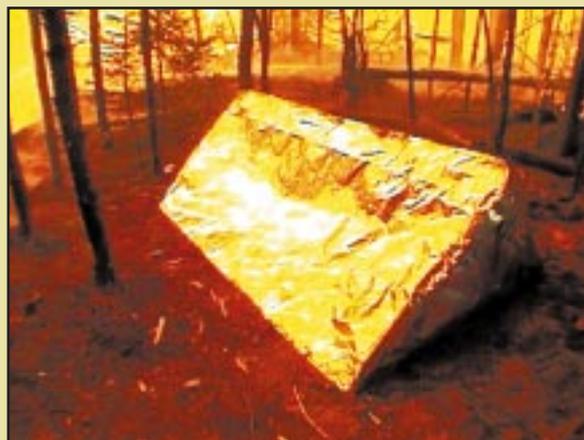
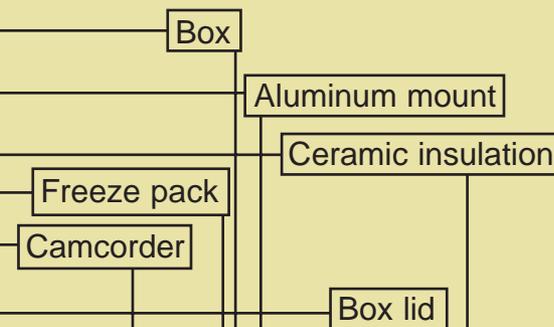
An assistant retrieves an insulated camera box after the experimental fire.

Ceramic insulation protects the camera from the heat of the fire. An ice pack protects the camera from the heat it generates as it runs.

The cameras have allowed researchers to measure exactly how long it takes the flame front of a fire to pass in different fuel types. Without video footage, that time is difficult to determine.



Specially insulated camera boxes allowed video cameras to record conditions within this experimental fire in the Northwest Territories.



These photos show the conditions fire shelters could be exposed to if they were deployed in timber. Shelters just 12 feet outside the timber survived the experimental fire.

# Born of Fire: Forest Service Technology and Development

During the late 1940s, Forest Service employees at the Aerial Fire Depot in Missoula, MT, began working on ways to use aircraft more effectively for fighting fires in remote areas.

When regular aircraft patrols detected a forest fire, smokejumpers and cargo were dropped to the fire. The success of these techniques led to the establishment of the Missoula Aerial Equipment Development Center in 1953.

Center employees worked in a variety of locations in Missoula before offices were moved to Fort Missoula during the 1960s. Meanwhile, fire equipment was also being developed by a center in California. The centers soon were solving other nationally important natural resource problems for the Forest Service. In 1987 the names of both centers were changed from "Equipment Development Centers" to "Technology and Development Centers" in recognition of their expanded role.

Both centers were scheduled for new facilities during the 1960s. The Forest Service purchased land near the Missoula airport

for the new facility in Missoula.

The San Dimas, CA, center moved into its new facility in 1965, but the Missoula facility was not funded. Plans for a new facility were redrafted several times during the past three decades, but funding for construction wasn't available until 2000.

Beginning in March 2002, the Missoula center began moving from seven buildings around Missoula to its new facility near the airport. The facility includes offices, a chemistry laboratory for analyzing fire retardants, a photo studio, a video editing studio, a textile fabrication shop, an electronics shop, a machine shop, and a large meeting room for training. The center enters the 21st century with all its employees under a single roof, better able to solve problems for the Forest Service.



*Gyroscopes kept this prototype cargo carrier upright, even when someone tried to pull it over. The goal was to find a way to transport ore from backcountry mines on trails rather than roads. The electronic controllers available during the 1960s did not respond quickly enough when the carrier hit large rocks. Once the carrier was part of the way over, the gyroscope threw it to the ground. The project was abandoned. With modern electronics, these carriers would be more likely to succeed.*



*Kevlar fabric in chain saw chaps protects users from injuries. The chaps were developed during the 1960s. Testing devices make sure that the chaps continue to work even as chain saws are improved.*

# The Early Days



Herb Harris, the first director of the Missoula Technology and Development Center, in the bed of a Dodge Power Wagon modified for firefighting.



This modified chain saw is one of many tools the center has evaluated for building fireline. Although the tools were fast, they threw rocks and posed other safety hazards.



The top photo shows testing during the 1950s that eventually led to development of the fire shelter carried by firefighters today. All but one of these designs have a fatal flaw: the firefighter is standing up. The photo below shows a firefighter lying down inside a fire shelter. Assuming that an area has been cleared of fuel, temperatures at the surface of the ground will be much lower than temperatures even a foot above the ground when a fire passes over. The fire shelter has saved the lives of several hundred firefighters since it was developed in the 1960s. The center is evaluating improved versions of the fire shelter and should have a new shelter for firefighters during the 2003 fire season.



Contoured fiberglass pack boards replaced wooden models, making the task of carrying fire packs a little easier.



These early snow machines were tested by the center during the 1960s and early 1970s.