

Firefighter Personal Gear Pack Redesign: M-2014

Godot Apuzzo, Equipment Specialist

Wildland firefighters and other field personnel are often required to travel away from their home bases, and the amount of personal gear they can carry may be limited. Typical assignments may last a few days or for as long as 2 or more weeks, and accommodations can range from a room in a hotel to a backcountry camping situation. Determining an optimal pack for carrying and storing as much as 2 weeks' worth of personal equipment can be challenging (figure 1). A personal gear pack that is too small may require lashing items to the outside. A pack that is too large may not meet weight and bulk requirements.



Figure 1—A firefighter using an early model personal gear pack.

Highlights

- Wildland firefighters and other field personnel often travel away from their home bases and require personal gear packs to carry and store their personal equipment.
- The Missoula Technology and Development Center (now the National Technology and Development Program) asked the wildland firefighting community to provide feedback on pack design.
- Responses from these surveys resulted in the redesign of the personal gear pack, field-testing of the prototype, and the production of a new model: the M-2014.
- This tech tip provides an overview of the history behind the Forest Service personal gear pack and tent bag, and introduces the release of the M-2014 personal gear pack redesign.

Personal gear packs must accommodate modern incident response operations. Field assignments can vary from spike camps in the backcountry to urban disaster relief incidents. Common methods of transporting personal gear packs are:

- Commercial airlines
- Helicopter sling loads
- Crew carrier compartments
- Fire engine gear compartments
- Back of a pickup truck

Most airlines charge extra for baggage weighing more than 50 pounds or measuring more than 62 linear inches (length + width + height). An Agency-provided travel pack design must conform to commercial airline limitations to avoid additional baggage charges.

The “National Interagency Mobilization Guide” (National Fire Equipment System [NFES] 2092) sets weight limitations for wildland firefighters traveling to and from wildland fire assignments. The current requirement for personal gear is a “soft” pack with a maximum weight of 45 pounds.

This tech tip provides an overview of the history behind the Forest Service personal gear pack (NFES no. 1855) and tent bag (NFES no. 0281)—from the original concept and design of the early 1980s to the 2016 release of the M-2014 personal gear pack redesign (NFES no. 0679).

U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center (MTDC; now the National Technology and Development Program [NTDP]) personnel surveyed the wildland firefighting community to gather feedback on the personal gear packs they were currently using. Respondents suggested some upgrades, which resulted in the design and construction of a prototype and field-testing of the personal gear pack redesign for the modern field employee.

National Technology and Development Program

In 1988, the U.S. Department of Agriculture, Forest Service, Missoula Equipment Development Center (MEDC), underwent a name change and became the Missoula Technology and Development Center (MTDC).

In 2016, the Missoula Technology and Development Center and the San Dimas Technology and Development Center (SDTDC) merged to become the National Technology and Development Program (NTDP).

Design History

The 1980s

In the early 1980s, the Missoula Equipment Development Center (MEDC) conducted a survey of Federal wildland fire management agencies. The survey revealed the need for a frameless, soft, luggage carrier with pullout shoulder straps for backpacking.

The result was the first personal gear pack available from the General Services Administration (GSA). Features of the 1983 design (figure 2) included:

- Top handle
- Large main compartment
- Sleeping bag compartment
- Outside front zipper pocket for small items
- Storage compartment for the backpack straps
- Zipper compression straps

In 1987, MEDC implemented some minor design changes. MEDC personnel removed the top handle, reducing the cost. They added small buckles on the lower corners, allowing the user to attach the firefighter field pack (fireline pack). They also replaced the thread-through buckles on the zipper compression straps with quick-release (side release) buckles (figure 3).

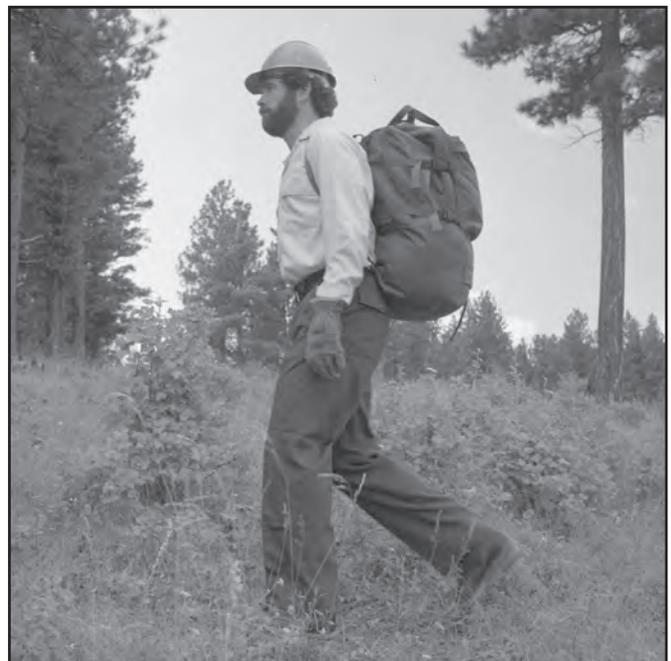


Figure 2—The 1983 personal gear pack developed by the Missoula Equipment Development Center.

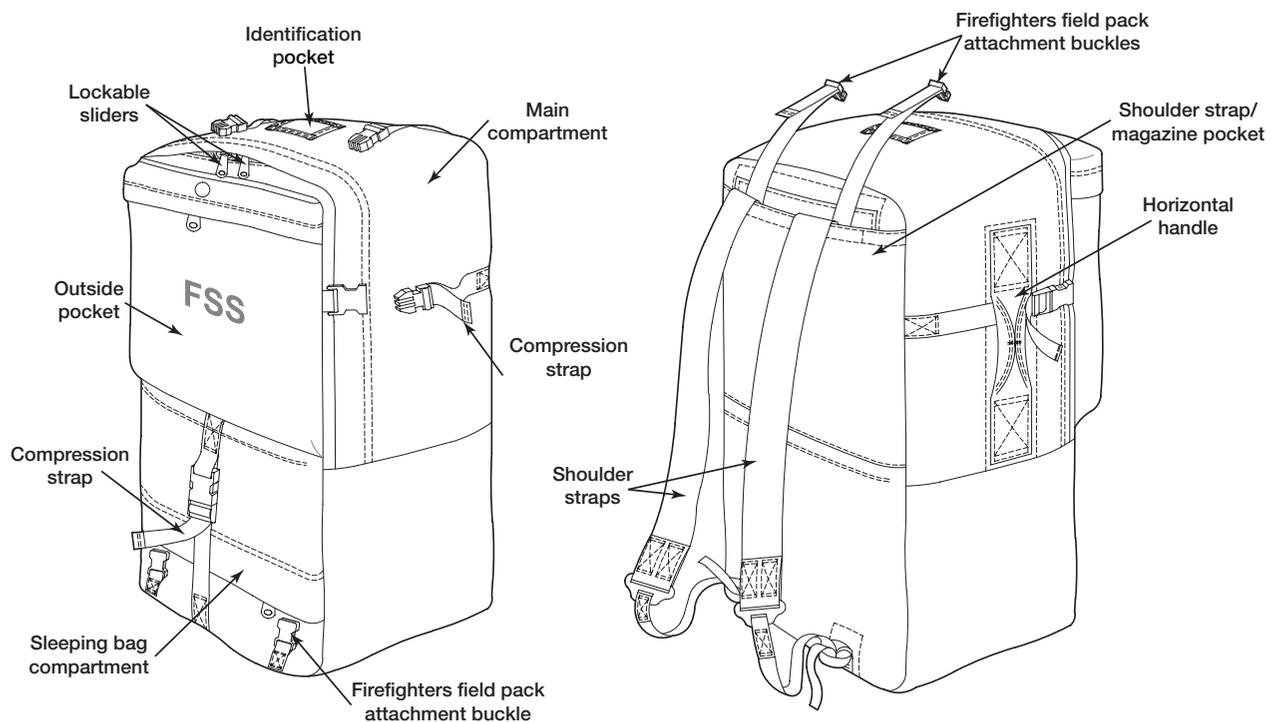


Figure 3—An early model personal gear pack.

The 21st Century

In 2001, MTDC designed the tent bag (NFES no. 0281) to make it easier for users to carry the standard national cache, two-person tent (NFES no. 0077). The tent bag design secured the 30-inch-long, two-person tent to the personal gear pack's existing compression straps and buckles. Strapping tents onto the outside of the pack was less than ideal and made for an irregular-shaped piece of baggage.

Feedback From the Fire Community

In June of 2010, MTDC distributed a product evaluation form to wildland fire personnel in the field to determine user satisfaction with the personal gear pack (NFES no. 1855) and the tent bag (NFES no. 0281). Two hundred forty respondents from 21 States provided feedback on the questionnaire. The results of the survey revealed that 66 percent of the respondents used the personal gear pack most often while on assignments. In addition, 74 percent of the respondents used backpacking tents other than the two-person cache tent. Many commercially available

backpacking tents have pack sizes under 25 inches and cost less than the two-person cache tent.

Additional analysis of the data determined that respondents wanted a personal gear pack to have the following features:

- Larger capacity
- Padded shoulder straps
- Improved durability
- Tent pocket (to eliminate the need for the tent bag)
- Sleeping pad pocket

MTDC equipment specialists applied this information to the design and construction of an improved prototype pack. Interagency incident responders from several geographic areas of the United States conducted wear testing on prototypes from March through October of 2012.

The 2012 field evaluation of the design modifications applied to the prototype pack yielded positive responses. The M-2014 personal gear pack went into production in 2016 (figure 4). NFES no. 0679 was the new number assigned to the pack.

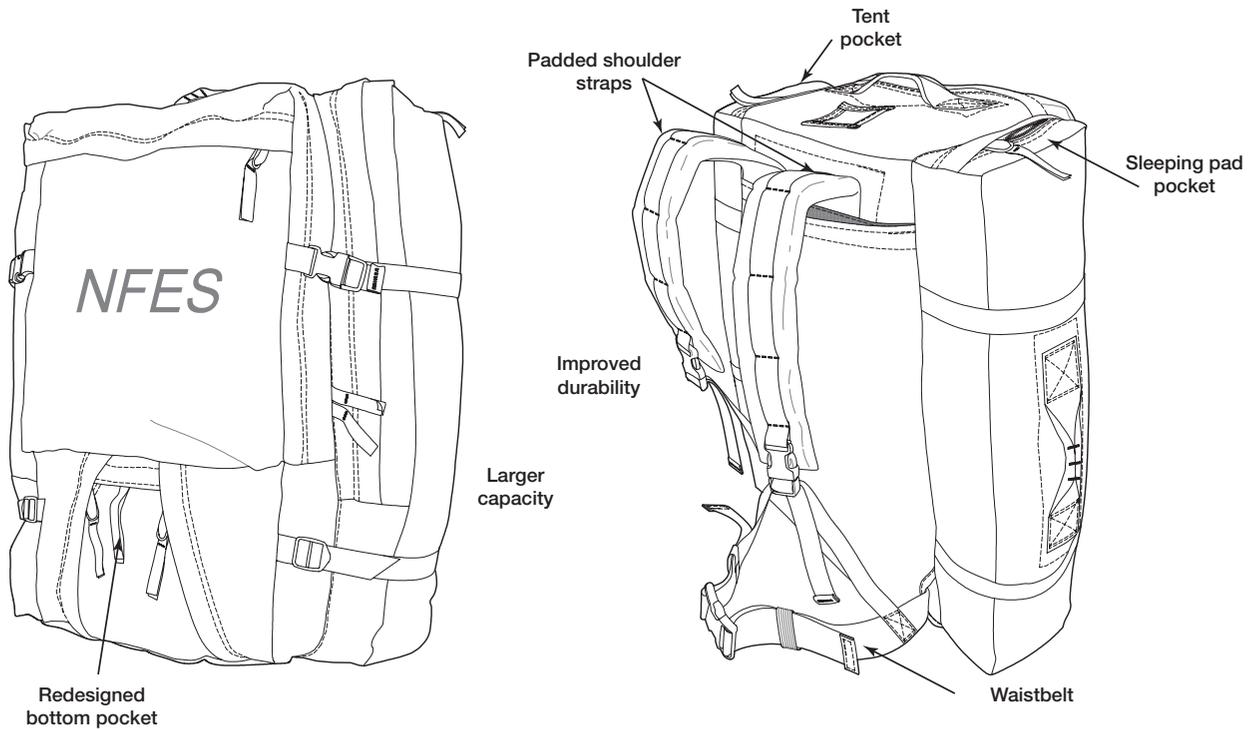


Figure 4—The personal gear pack redesign available in 2017.

Introducing the M-2014 Personal Gear Pack

The M-2014 personal gear pack, National Stock Number (NSN) 8465-01-647-6670 (NFES no. 0679) (figure 5), is available through the Defense Logistics Agency’s Wildland Firefighter Equipment Catalog at a cost of \$96.03 (2017 price). The finished pack dimensions are 25 inches high by 22 inches wide by 10 inches deep, which meets commercial aircraft size restrictions to avoid oversize baggage charges. The total pack volume is 5,215 cubic inches.



Figure 5—Front view of the M-2014 personal gear pack.

Improvements include:

- An additional side handle provides an alternative grab point.
- Padded shoulder straps and waistbelt provide added comfort (figure 6).
- Stowable backpack straps and waistbelt keep the pack neat for helicopter sling loads, vehicle storage compartments, and commercial aircraft baggage handling equipment (figure 7).
- An additional internal organizer pocket on the front of the pack provides convenient access to smaller items (figure 8).
- Binding tape sewn to high-stress areas increases pack strength and durability (figure 9).
- A redesigned bottom pocket opening reduces the effort required to stuff a bulky sleeping bag into the pack.
- Integrated tent and sleeping pad side pockets reduce the need to lash items to the outside of the pack.



Figure 6—Padded shoulder straps and waistbelt.



Figure 7—Stowable backpack straps and waistbelt.



Figure 8—Internal organizer pocket for securing smaller items.

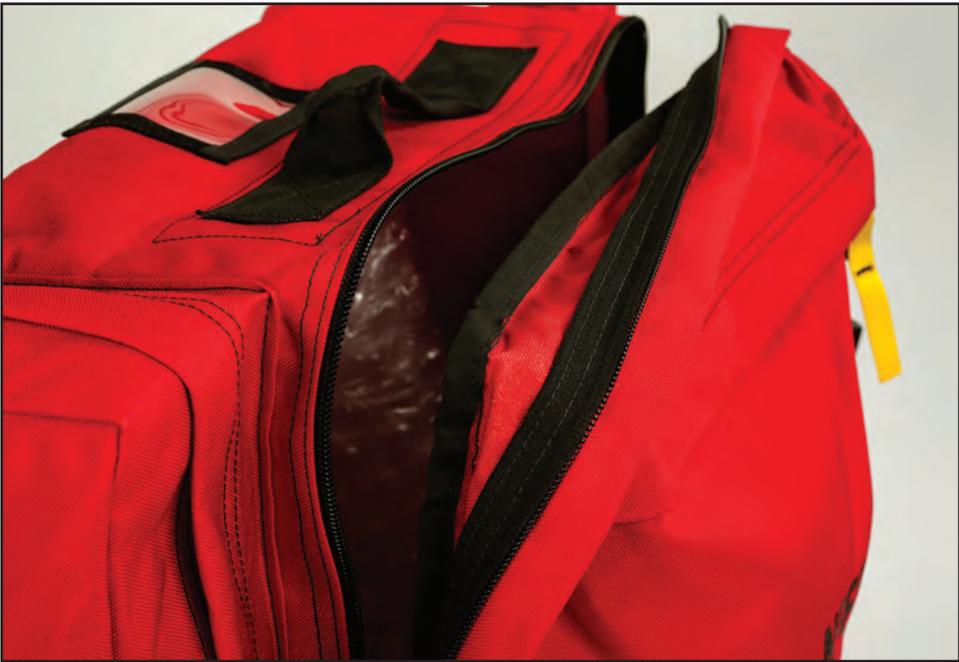


Figure 9—Inside seams have binding sewn onto the edges in high-wear areas.

About the Author

Godot Apuzzo is an equipment specialist for the Fire and Aviation Program at the U.S. Department of Agriculture, Forest Service, National Technology and Development Program (NTDP). He earned a bachelor's degree in forestry from the University of Montana. Apuzzo began working for the Forest Service in 1992 as a forestry technician and wildland firefighter. He worked for the Lolo Interagency Hot-shot crew from 1997 to 1999. In 2000, he became a smokejumper in Missoula, MT, and spent 12 years as a smokejumper and squad leader. In 2012, Apuzzo began working for the Missoula Technology and Development Center (now NTDP). His mission focus is to review and improve personal protective equipment and procedures to enhance safety for the wildland firefighting community. Apuzzo has participated in more than 14 accident investigations and learning reviews, providing subject matter expertise for several agencies, including the Forest Service; U.S. Department of the Interior, National Park Service; California Department of Forestry and Fire Protection (CAL FIRE); and County of Los Angeles Fire Department.

About NTDP

The U.S. Department of Agriculture, Forest Service, National Technology and Development Program, provides Forest Service employees and partners with practical, science-based solutions to resource management challenges. We evaluate, design, and develop new technologies, products, and systems to solve problems and deliver solutions.



Library Card

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