



Credits: NASA



Materials and Coatings

Convective Heating Improvement for Emergency Fire Shelters (CHIEFS)

Improved performance of emergency fire shelters for wildland firefighters

CHIEFS is being developed by NASA Langley Research Center to potentially improve the performance of emergency fire shelters for wild land firefighters. A fire shelter is a last resort safety measure that may protect firefighters entrapped by wildfire that has compromised their escape route. The current shelter design, resembling a small foldable tent, is primarily designed to protect the user from exposure from radiant heat. It provides limited protection when exposed to direct flame contact and convective heat. The Washington Office Fire and Aviation Management (WO-FAM) initiated a product review for the fire shelters to be completed by 2018. NASA is working closely with USDA Forest Service to understand the emergency fire shelter requirements and testing procedures.

BENEFITS

- ➔ Based on flight tested NASA technology
- ➔ System is optimized for manufacturability and packing
- ➔ Capable of withstanding temperatures up to 3,000 degrees Fahrenheit
- ➔ Lightweight

APPLICATIONS

- ➔ Wildland firefighting
- ➔ First responders

technology solution



NASA Technology Transfer Program

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THE TECHNOLOGY

The CHIEFS fire shelter material will use technology drawn from a new spacecraft flexible heat shield NASA is developing for future planetary exploration missions. By modifying this material, utilizing heat shield test methods, and experimenting with different shelter structures, the CHIEFS team strives to improve the convective thermal performance of the shelter while minimizing any increase in the weight and packed volume of the current shelter. To protect against radiant heat the exterior of the shelter uses a laminate which reflects over 90 percent of the radiant heat from a forest fire. To protect against convective heat and hot gases or direct flame contact the interior layers will be high-temperature insulation layers and a gas barrier layer to keep hot gasses from entering the shelter's interior.



Credits: USFS / Ian Grob

Fire shelter under test conditions.

PUBLICATIONS

Patent Pending

National Aeronautics and Space Administration

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