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By Senior Airman Shannon Chace
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168th Airmen use 3D printer to create masks

Eielson Air Force Base, Alaska — In order to reserve N95 masks for medical personnel, Airmen from the 168th Wing, Alaska Air National Guard, are taking on the challenge to create a functional respirator mask using 3D printers.

The recent low availability of the N95 mask has been a concern expressed by professionals on the front lines of combating the COVID-19 virus.

Although the N95 mask is commonly used in health care as personal protective equipment, it is used in a variety of other career fields, as well.

"Some of our jobs demand PPE-like masks, but we're trying not to use them," said Lt. Col. Jennifer Casillo, commander of the 168th Maintenance Group. "We've sent a list to medical letting them know what we have in our current work sections."

Senior Master Sgt. Ray Allen, the production superintendent for the 168th Aircraft Maintenance Squadron, said he enjoys looking for creative solutions to problems and is excited to potentially help fill a need.

Working with a team of Airmen, he began looking at online forums for a respirator mask design. This turned up several options, not all of which were effective.

"There's a lot of stuff out there right now," Allen said. "We've tried different designs, experiments have failed."

His team decided on a design called the Montana Mask, which is designed to be reusable and uses less of the filter material N95 masks are made from.

The creation of the Montana Mask was initiated by Dusty Richardson, a neurosurgeon in Billings, Montana. Due to COVID-19, he became concerned with a shortage of masks available for medical staff. The 3D print design can be found at makethemasks.com and is free for anyone to download and use.

Although not yet approved by any state or federal regulating institute, early testing shows the mask to be effective if fitted properly. Because the body of the mask is made of plastic, this makes the mask reusable and can extend the current supply of mask material available.

"With this you can wash and sterilize it, and then just add another paper filter that's smaller than the mask so you get more uses," Allen said. "Because you can keep this mask clean, your filter material will last longer."

The 3D print design creates the hard body of the mask, but there are still other components needed to make it functional, such as straps to hold it in place.

One of the common concerns expressed by professionals who are required to wear masks is the discomfort caused by straps that are held in place behind their ears. With their design selected and several prototypes printed, the 168th Wing Airmen are now working to develop a piece that would enable the straps for the mask to be adjustable and distribute tension.

"We're getting creative to find the components we need to make an effective mask," Allen said.

The masks currently being made will be used by non-medical 168th Airmen who need them in their line of duty. During this challenging time, Airmen from the 168th Wing are showing that anyone can step up to fill a need.

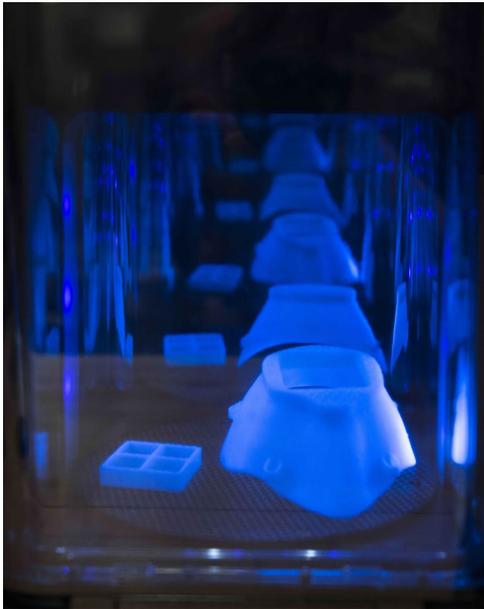
"The best ideas come from all ranks," Casillo said. "If we have an open door where ideas can come forward, the most unsuspecting people will all of a sudden come up with a solution to a problem."

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PHOTOS

1. **Attached pdf** includes story and a small selection of low-resolution photos for viewing on screen.
2. **DVIDS link** includes selected full-resolution photos. (Primarily for media, DVIDS is accessible from .mil computers.) <https://www.dvidshub.net/news/366727/168th-airmen-use-3d-printer-create-masks>



A Montana Mask that was recently printed sits in a UV cabinet April 1, 2020, at the 168th Maintenance Group hangar on Eielson Air Force Base, Alaska. The UV light cures the resin so that the mask can properly maintain its shape and structure. (U.S. Air National Guard photo by Senior Airman Shannon Chace)



Senior Master Sgt. Ray Allen, 168th Aircraft Maintenance Squadron production superintendent, tests the fit of a 3D printed Montana Mask April 1, 2020, at the 168th Maintenance Group hangar on Eielson Air Force Base, Alaska. Allen was the team lead for a project to create functional respirator masks for non-medical 168th Wing Airmen. (U.S. Air National Guard photo by Senior Airman Shannon Chace)



Senior Master Sgt. Ray Allen, the production superintendent for the 168th Aircraft Maintenance Squadron, removes the scaffolding from a 3D printed Montana Mask March 31, 2020, at the 168th Maintenance Group hangar on Eielson Air Force Base, Alaska. The scaffolding helps support the mask material as it is being printed so that it maintains an accurate shape. (U.S. Air National Guard photo by Senior Airman Shannon Chace)