

AirSpace Transcript Season 10, Episode 2: From Flight to Floor

Emily: It's maybe a niche kind of fun, but I do appreciate where you're coming from.

Matt: It gives you kind of, you know, the, the museum warm and fuzzies.

Emily: it's what we specialize in is niche fun.

Matt: Very cutesy. Very niche.

AirSpace Theme in then under

Emily: Welcome to AirSpace from the Smithsonian's National Air and Space Museum. I'm Emily.

Matt: And I'm Matt. We have a lot of military equipment in the museum. Planes, rockets, missiles, and more. And before those things go on display, they have to be demilled.

Emily: Demilling, or demilitarization, is a process that makes artifacts safe and declassified so that they can go on public display.

Matt: It involves removing explosives, taking away proprietary technology, and sometimes even changing the shape of an artifact. We're learning all about demilitarization today on AirSpace, sponsored by Lockheed Martin.

AirSpace theme up and out

Emily: Matt, I'm going to play my geologist card again this season and say, I don't know anything about demilling. It's a thing that apparently you do if you have to collect artifacts what is the nuts and bolts of demilling?

Matt: Yeah. So demilling is like one of those aspects of collecting technologies from the military, from even from NASA that we just have to do to make the artifacts safe and preservable and displayable. It's called demilitarization or demilling, but it's not only military airplanes and missiles and things that go through this process.

It involves removing all of those things that could potentially either be dangerous to people or corrosive for the artifact but also things that might be top secret military technologies that the government doesn't really want people to come and see and get information about.

Emily: So we do demilling on a lot of our aircraft specifically. I'm sure you've got some stories to tell about demilling spacecraft, but we wanted to bring in somebody who deals with aircraft on a regular basis, unlike you and I.

Matt: That's right. So to get some insight into the process, we talked to curator Dr. Mike Hankins.

Mike: My name is Mike Hankins. I'm the curator for post World War II U.S. Air Force, Navy, and Marine Corps Aviation¹

Emily: Objects in our collection are often demilled in more than one way, and oftentimes for more than one reason.

Mike: Well, there's two main reasons. And the first is explosives. Uh, you don't want any explosions happening for people, and you don't want to reduce any danger risk of that. Uh, and the second big reason you would demil an aircraft is for classification. If there's classified material or certain types of technology that the military does not want the public to have access to for any variety of security reasons.²

Matt: So obviously, or maybe not so obviously to people who don't think about this on a daily basis, but like, you know, none of the weapons that we have on display actually have any ammunition in them.

And we also essentially defuse all of our missiles and rockets. They don't have warheads or explosives within the stages of the rocket but there could be explosives in parts of the airplane that you don't even think about, like the cockpit.

Mike: When we bring an airplane in and we're thinking about hazards or potential explosives, the biggest thing that usually comes up is the ejection seat.

For those who don't know, um, an ejector seat has little rockets on it. And sometimes the canopy that, that, you know, that glass or, or plexi shield that sits above where the pilot sits or the crew sits that will sometimes, depending on the airplane, that might also have some rocket boosters on there.

¹ <https://airandspace.si.edu/people/staff/michael-hankins>

² Fun Fact: Demilitarization also happens to all those tanks and cannons that municipalities and others can apply for. So if your hometown Memorial Day parade culminates at a park with a huge WWII gun, know that that also was demilitarized before it was put on static display.
<https://tacom.army.mil/ilsc/donations/displays>

So we don't want those active on display. You know, we don't want an ejection seat accidentally going off while visitors are walking around the museum. That would be really dangerous. So we want to make sure that those are taken out and uninstalled and that we are disposing of that potentially explosive material properly

Emily: We're not just talking about explosives when we're talking about demilling. We're also talking about other kinds of dangerous materials, whether they're dangerous materials for humans or dangerous materials for the artifact. A lot of fluids, propellants, that kind of thing, which can be really flammable, are flushed from the aircraft or maybe the spacecraft before they go on display.

If you think about all the kinds of fluids that exist in just your vehicle, right? Your regular, everyday car. I mean, there is a lot of different kinds of things and, um, it's not uncommon for those things to leak onto your driveway. And we certainly don't want those kinds of leaks to be happening within the museum. You've seen our airplanes are hanging over other airplanes that are hanging over other artifacts.

It can really cause an actual cascade of materials kind of going from one artifact and contaminating other artifacts.

Matt: That's right. And with aircraft, I'm sure this is an instance too, but like with spacecraft, one of the things we very frequently have to remove is any kind of battery that might be there because batteries, you know, they're chemical, over time the chemicals corrode metals, et cetera. And it's just overall not good for long term storage or display to have a battery, an aging battery sitting in the museum.

Music Button

Emily: The other pillar of demilling has to do with parts of spacecraft or aircraft that are classified. If it's something about one of these objects that is still classified, demilling makes sure that that classified thing is protected and safe and usually involves the removal of the item or the object or the part of that aircraft that is classified.³

Matt: While we do a lot of the removing of the fuel, the explosives, the batteries, the demilling that involves classified materials happens before it even comes to us. So we don't often even know what the thing is that was removed. We can kind of guess in a lot of cases what types of equipment are being removed but the specific things that were removed are a mystery to us.

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https://history.army.mil/Portals/143/Images/Publications/Army%20Reg/r870_20.pdf?ver=KXnsD0R3kbOfCEuvb-v-pg%3D%3D

Mike: It's done on the military side, usually. So they are the ones making the decisions about what does or doesn't get released to us, what does or doesn't go on display. There are people who spend their careers worried about proliferation of military technologies. And so they make all those tough decisions before we even see any of that.

Matt: But, we do know generally what types of things they're trying to prevent information from getting out about. So we can kind of put together some of the pieces about what's being removed because of these concerns.

Mike: It tends to fall into a few categories. The number one thing that the military does not want out there is called ComSec, communication security equipment.

And that's things like, you don't want, you know, a potential enemy or adversary nation to be able to get your cryptologic information. They don't want, you don't want the bad guys to break your codes. You know, so that's a big part of it.

And that's kind of related to the second big issue, which is anything involving electronic warfare. So if you're talking about, the ability to jam enemy communications or prevent the jamming of your own communications or keep your lines of communications clear, that's a big thing that the military wants to keep safe and make sure that people aren't finding out how that stuff works.

Those things, you know, electronic warfare, signals, intelligence, communications, those are so vital to what the military is doing and what their mission is, uh, that they don't want to take any risks of, of anything sensitive, uh, being out there in the public.

And the other big thing is radar equipment. A lot of radar, uh, because of how sophisticated it is and what it can do and what it can detect or not detect. Uh, the military wants to keep basically anything radar related that's kind of current generation behind that veil. So they might need to take the radar dish out of the front of an airplane.

For those who don't know, most military aircraft have a big radar dish inside the nose cone at the front of the airplane. If it's a current generation that's still classified that they don't want on display in a museum, they might take that radar out.

But if it's something that needs to be flown to a museum for delivery, having a giant radar dish in the front is important to how that airplane flies in terms of the weight. So they might put weights or concrete or something in the front of that airplane to give the weight of that radar back in so that they can fly it for delivery for display.

Emily: So does that make your job just a little bit harder in how you interpret a particular artifact or how you do your job, given that there's a little bit of a hole in the story and you're only making educated guesses about what might be missing from a particular spacecraft or aircraft.

Matt: Right. So you have to be kind of creative in how you're going to tell the story of the purposes that those things that have been removed were there to serve.

Mike: We're certainly able to tell the story of that big picture of what these things are, how that capability is important to the mission, and the people who are performing that mission, like the people who fly those electronic warfare missions or have to do that role while they're flying other missions. Certainly their stories are things we can tell. We can talk about their experiences. We can talk about what they're doing and how it contributes to the bigger mission.

We just can't go into the technical details and explain specifically exactly what they're doing because we don't want that information getting out there because it can then be used against the military.

Matt: So certainly there are like components and instruments and things that, that need to be removed because they're classified, but in the case of some types of aircraft, like stealth aircraft, it's actually the shape of the aircraft that's part of the secret

Mike: One of the key components in making an aircraft stealthy is actually the shape of the airplane itself. And how like the wing or the body is shaped in a certain way that it's ideally deflecting radar waves away from it, uh, at certain angles, which makes it harder to detect. For some of these planes that shape is so important it is still considered classified. The shape of the airplane itself is considered classified.

For example, there's an airplane called the F-117⁴. It's the stealth fighter. You may have heard of it. These are just now starting to be made available to museums and some of them are already on display at a few museums around the country.

And in all of these cases parts of that aircraft have actually been cut off to protect them, uh, so that the public can't see the exact shape of certain parts of it, not all of it. But like certain parts of the wings and the tails and certain parts of the nose, uh, have been removed and then they're replaced with parts that look very similar but are not exactly the same because the military doesn't want any potential adversaries to find out exactly what that shape is and how it deflects radar.

⁴ <https://www.lockheedmartin.com/en-us/news/features/history/f-117.html>

Emily: Sometimes if we're lucky, we get the opportunity to collect items that were initially classified from, let's say, a branch of the military, to reinstall back into one of our artifacts and kind of make it more whole. And so rather than demilling, we're remilling.

And so the process of remilling sounds maybe even more complicated because you don't always know if you have all the puzzle pieces. Because the way it's happening in my brain is as a curator you sometimes know that there's something missing because there's, let's say, a hole in the panel in the cockpit, so you know they've removed something.

But in other cases, there's going to be more subtle things that have been demilled by the military that you don't know has happened. And so when it comes to trying to make sure that your, let's say, aircraft is complete, You don't always know what's been taken out, or why it's been taken out, or even if something's been taken out. But I also think it's interesting that you can get some of those things back if they've been preserved.

Mike: If an opportunity presents itself, sure, as a curator, we would definitely want to jump on that. So if something that was classified, maybe when we originally got the artifact and then later on becomes declassified, uh, we would certainly want to look into getting that and either reinstalling it in the aircraft, which might be cool, uh, or putting it on display separately so people can understand, and there's a story there that we can tell about, you know, how something gets declassified over time.

Matt: Right. And if you think about the period of time that probably goes by between when we collected the airplane and the technology was later declassified, you might even be talking about two different curators, right? One who collected the aircraft and the other who is now able to make it whole in some way.

And so it's this kind of interesting, at least from a museum perspective, interesting generational kind of work that happens at the museum where one curator starts the project and it's another curator who eventually makes it complete at the end.

AirSpace Theme in and under

Matt: AirSpace is from the National Air and Space Museum.

AirSpace is produced by Jennifer Weingart and mixed by Tarek Fouda, hosted by Dr. Emily Martin and me, Dr. Matt Shindell. Our managing producer is Erika Novak, our production coordinator is Sofia Soto Sugar, and our social media manager is Amy Stamm.

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Emily: Depending on how you define biohazard, it is a hazard to the bio, but um, it's not maybe that kind of biohazard