AirSpace Transcript Season 9 Episode 9: Birds of a Feather

Matt: So Amy was invented? Is that what you're saying?

Emily: Don't ruin this for me. Because I gotta tell ya, a movie about a guy named Bill wasn't gonna stick in 12 year old Emily's brain.

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 aircraft in our collection from the supersonic Concorde to hang gliding sails, but one of the uniquely used aircraft you can go see in the museum downtown is an ultralight that was used to help birds migrate.

Emily: You may have heard about this if you've ever seen the movie Fly Away Home, which is loosely based on reality, but the organization that was used as the inspiration was a real life group that did wildlife conservation for more than two decades.

Matt: We're talking about Operation Migration and the more unusual uses of aircraft today on AirSpace.

AirSpace theme up and out

Emily: So Matt, usually when we're talking about aircraft and aviation, we're talking about things that are heavier than air. We've done a few balloon episodes talking about lighter than air flight. I feel like ultralight[1] is kind of sandwiched in between those two.

Matt: Yeah, we haven't really talked a lot about these smaller craft that people use sometimes more recreationally rather than commercially, which is, you know, most of us have experience riding on large airplanes when we do commercial air travel, but there's whole communities of people who use these smaller aircraft to do different things from, you know, just messing around on weekends to flying for more purposeful missions.

Emily: And, of course, we have a lot of aircraft in our collections but we have quite a few ultralight aircraft in our collections, and we want to talk about one very special ultralight aircraft. And so, of course, we had to go talk to one of our experts, Curator Russ Lee[2].

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[1] https://www.eaa.org/eaa/aviation-interests/ultralights
[2] https://airandspace.si.edu/people/staff/russell-lee

Russ: I am Russell Lee, and I am a curator, and also the chair of the aeronautics department at the National Air and Space Museum.

Matt: So yeah, we wanted to know what exactly is an ultralight.

Russ: Ultralight aircraft were developed beginning in the late 1960s and early 1970s. And they grew directly out of the hang glider community[3]. When hang glider pilots had been flying for some years and they wanted to extend their flights. You know, normally hang glider pilots will jump off a hill and they'll glide down to the bottom and that's it.

But they started mounting these small engines, uh, engines like the kind that are used on chainsaws and lawn care equipment. And these extended their glides and then they got more powerful engines and they were able to soar and fly, you know, for minutes and even hours at a time.

And the, uh, hang gliders then began to get heavy and awkward. And the pilots couldn't land on their legs anymore, as they had with their conventional hang gliders, so they started adopting landing gear. And that's when you start to see this aircraft called an ultralight. And they have various names around the world, but that's what we in America have come to call them.

And they have evolved into small aircraft that are capable of flying cross country flights, staying in the air for several hours.

Emily: In a way it feels really like a simple design, but since Matt, you and I are staring at a picture of this aircraft, And we've both seen it, IRL[4], um, and we're on a podcast. I feel like we need to describe it in detail for those who haven't been down in the museum recently.

Matt: Yes, this is not a visual medium. So let us bring you…

Emily: bring you into our brains. *Both laugh*

Matt: Yeah. So, right. It is a very small craft, right? It is, this one in particular is bright yellow and, um, kind of looks like it's got the propeller from an airboat on the back of it. And then to sort of complete the picture, put glider wings on top of that.

So I think it looks kind of like, um, a, uh, what are those?

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[3] https://en.wikipedia.org/wiki/Ultralight_aviation
[4] https://airandspace.si.edu/collection-media/NASM-A20060594000cp01

Emily: The sidecar on a motorcycle from, um, Indiana Jones?

Matt: Like a sidecar. I was going to say like a soapbox derby style car,

Emily: Ohhhh I went straight Indiana Jones Last Crusade

Matt: I think you're probably, you're probably got a better one.

Emily: Yeah, so it's like a sidecar with the fan on the back. And like a big hang glider sail at the top.

Russ: The Cosmos Phase II[5] is an unusual looking aircraft. Uh, it's a whole, uh, subcategory of, of airplanes. It's small, lightweight. It's usually only for one person, but there are models made that carry two people. And, in fact the Cosmos Phase II is equipped to carry two.

It's got a big sail for a wing, which is over top of the cockpit, if you will, which is also equipped with landing gear. So, what you see, if you look up and you see an ultralight like the Cosmos Phase II, is you see this big sail, like a hang glider. And hanging beneath it from struts and wires, is this compartment with wheels on it, and that's what holds the engine. And the two occupants, the pilot and the passenger.

Matt: So the ultralight craft we're talking about is the Cosmos Phase II, and it looks the way it does because it was adapted for a specific purpose, which was leading migratory birds. So, like I said, it kind of looks like it's got a airboat propeller. And part of the reason it looks like that is because there's a cage around that propeller that makes it kind of look like big utility fan or, or whatever. And, you know, that's specifically because of what they use this aircraft for.

Emily: Yeah, it's like a really big version of one of those fans they would put in your hallway if somebody flooded their apartment.

Matt: Yeah.

Emily: I wouldn't know anything about that.

Matt: *laughs* And why would you need a cage around the fan? Because in this case you're dealing with birds and you don't want to hurt any of the birds that are flying alongside of this craft.

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[5] https://airandspace.si.edu/collection-objects/cosmos-phase-ii/nasm_A20060594000

Russ: The birds would get so close to the ultralight that they didn't want the birds to be injured if they happened to, uh, you know, get too close to the ultralight and maybe get close to the propeller.

Emily: And birds born in the wild that are part of a species that migrate learn this behavior from their bird parents. Endangered species of birds that are migratory species that are born in captivity don't necessarily learn this behavior. So there was a concern about how do you maintain and help to reestablish a natural population of endangered species if you can't teach them how to migrate. And so enter these ultralight aircraft like the Cosmos Phase II.

Russ: What makes the ultralight so useful for bird migration is their ability to fly with precise and exact and safe control at such low airspeeds primarily and low altitudes. These trikes, they are controlled in a way that's borrowed from the hang gliders and the trike wing, the ultralight wing, is attached to a framework that's rigidly mounted to the part of the aircraft that carries the crew and the engine and landing gear.

And so the pilot's feel of the airflow is through the entire wing and, and the, uh, least amount of turbulence or exactly what the air is doing as they maneuver the wing, that can be felt right through the pilot's hands. So the ability to have precise control is, is very much emphasized and brought to the fore, uh, with this trike type ultralight.

They're reliable now. They've got nice, reliable engines. They're capable of, uh, landing on very short fields and taking off in very short spaces. And, of course, that helps greatly with the migration training of the birds because the birds will do what the birds will do, okay? Some days they get up and they're happy and they're ready to fly for a hundred miles.

And they'll do that and the ultralight will fly with them. Other days, the, uh, birds would get up and they wouldn't feel like they wanted to fly at all. So they might fly 25 miles or 20 miles and then land again in a field. And that was it for the day. So, uh, the trike ultralight is very flexible in those capabilities.

Matt: So this is definitely not an off the shelf sort of aircraft, and in fact the person who modified it is a little bit of a Renaissance man? It was owned by a Canadian sculptor, inventor, and naturalist, Bill Lishman, who began working with migratory birds on his own, but then eventually started a group called Operation Migration[6].

Russ: In the early 90s Bill Lishman decided that he would try to develop this technology. And he got an ultralight, got a trike ultralight, and he conducted some experiments. But

[6] https://airandspace.si.edu/stories/editorial/operation-migration

he had started with training some, uh, Canada geese to follow his motorcycle going down the road. And so with those early experiments, he was confident that he could move up to aircraft[7]. And so he got an ultralight and he trained these birds to imprint on the machine. That's the key. When the birds hatch, you know, the first thing that they encounter is the thing they start to imprint on and to identify, you know, as their sole provider and their parent, if you will.

And the technique that was eventually evolved was to take the eggs of the birds before they hatch and play the sounds of the ultralight next to the eggs. And then as the eggs hatched, they would continue to play the sound. And, um, any human who came up to take care of the birds had to wear this white smock, totally white, and it was to prevent the birds from imprinting on humans, because they wanted to do everything they could to keep the birds wild, if you will, as wild as possible.

So they would progress, gradually more and more, taxiing around faster and faster. And eventually, of course, they would, when the birds are ready to fledge and ready to fly, they would take off with the ultralight and nine times out of 10, the birds would go ahead and take off with them and they would circle the airfield and then immediately land.

Emily: When this episode idea was first pitched to us being a, you know, technically elder millennial, I guess. My very first thought was, 'Oh my gosh, there was this movie called Fly Away Home[8], and this girl flew this ultralight and helped all these birds migrate. Doesn't anybody else know what I'm talking about?'

And Matt, you didn't know what I was talking about.

Matt: No, I, I, I didn't. Well, I knew about the movie, but I had never seen the movie. And honestly, there's been like a ton of stuff about this airplane and this operation, right? There was a PBS documentary[9], there was a 20/20 special[10], there's an autobiography written by Lishman[11], and eventually the movie you're talking about that came out in 1996.

So, you know, if I missed watching this movie, it was because 1996, I was 20 years old, I was off at college, and maybe I just didn't, uh, end up going to see this one.

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[7] https://www.pbs.org/wnet/nature/flight-school-interview-joseph-duff-operation-migration/2660/
[8] https://www.imdb.com/title/tt0116329/
[9] https://www.youtube.com/watch?v=Acc-FaLqXzI
[10] https://www.youtube.com/watch?v=eU-SCGdRWrM
[11] https://www.goodreads.com/book/show/205712.Father_Goose

Emily: So, I just did the quick math. In 1996, I was almost the exact same age as the girl, Amy, who is kind of the leading character in this film. And, if you remember being a 12 year old girl, Matt, *(Matt laughs)* there's not a lot of movies about 12 year old girls[12].

And while this wasn't, like, an obvious point in my head, I think it's one of the reasons it really stuck with me because nobody ever writes adventure films about 12 year old girls, or if they did, it's like few and far between. I think that's a big part of why this, like, stuck so deeply in my head as like a film that actually happened.

But Fly Away Home is, like, really tangentially related to real life events, right? Because there was no 13 year old girl named Amy who was leading the charge at trying to help save migratory bird populations.

Matt: Yeah, so, you know, Canadian wildlife officials here turn out to be the villain in this movie, threatening to clip the wings of these birds because they are not wild geese, but domesticated pets.

And Amy takes on the task of rebuking the Canadian wildlife officials and teaching the birds to fly and migrate. And her and her father bond, as they teach the geese, to be geese, to fly. And, um, you know, it's not entirely inaccurate, even though Amy doesn't exist. Uh, in real life, it was Bill Lishman and some of his helpers who did this work, rather than a teenager and her father.

But the Cosmos Phase II which is in the movie, is actually one of the ultralights that Lishman used, and it's one, it's the one that's in our collection.

Emily: Man, it's like provenance on top of provenance. We get the best stuff, Matt.

Matt: Yeah, it's a real airplane that was used for this, then it was used in the movie, and now we have it.

Russ: That ultralight aircraft that we see in our exhibit, uh, We All Fly, is an aircraft that was donated to us by Operation Migration. And it's unique in that it was not only seen in the film Fly Away Home, but it was also used extensively to fly and lead the bird flocks. Either Canada geese, uh, may have been used for Whooping Cranes. I'd have to go back and look. But, yeah, it's got that operational history that we so value in our aircraft artifacts.

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[12] Fun Fact: the Amy character in the movie was based in part on Lishman's daughter, Carmen. And Carmen was in the movie as one of Amy's classmates.
https://flyawayhome.fandom.com/wiki/Carmen_Lishman

Emily: So in the movie Fly Away Home, we're talking Canadian geese. If you've ever hung out in the Northeast in the summer and spring, you would realize that that's not an endangered species by any stretch of the imagination. But the reason Canadian geese were an important part of this story is that it's kind of the birds that Bill Lishman started working with as kind of a proof of concept to prove that this might work, because the ultimate goal was to work with endangered species like Whooping Cranes.

Matt: Right, and Whooping Crane's have their summer nesting grounds in Canada and their winter nesting grounds are on the Gulf shore of Texas[13]. So it's a, a pretty long journey that they have to make. And it's challenging because Whooping Cranes will imprint on someone who's not another Whooping Crane if they're the one who raises them and they will actually attack their own species thinking that they are not Whooping Cranes for some reason.

So when there's not that many of the birds to begin with, building a population of Whooping Cranes can be a really big challenge.

Emily: And because of this challenge, it's why Bill Lishman and his team started working with Canadian geese in the first place, because Whooping Cranes have this very specific challenge.

But leading any group of birds on a migration is a really big task, and when we had a chance to talk to Russ, I didn't fully appreciate the support staff that was needed in order to run each and every migration. It wasn't just a single person in an ultralight flying a few thousand miles. It was an enormous logistical feat.

Russ: The process of leading the birds became quite a thing in that it was not just the ultralight that happened to be leading the birds on any given day, but they had to have a backup ultralight in case the primary, you know, had engine trouble or anything like that. They had to have a chase crew with a big Winnebago, you know, so that they could have a place for people to stay and sleep over, you know, at the end of the day when, when, uh, when the day's flight was over.

They also had a Cessna aircraft, you know, um, uh, higher flying, faster airplane that would kind of orbit the whole group as it slowly matriculated across the land and they would be at a higher altitude and they would sort of spot for them and call out, you know, maybe there's this brush fire, you know, in their path. And so, so let's lead the birds, you know, on the other side.

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13 https://cranetrust.org/file_download/inline/ade62c8c-7024-441f-b9d5-7cde9e52900d#:~:text=Whooping%20Cranes%20usually%20migrate%20as,an%20average%20of%2029%20days.

They had to have logistics, you know, supplies that they took with them. These migrations, again, you know, the maximum they covered in a day was maybe 100, 125 miles.

So you're talking a 1,500 mile trip from Wisconsin to Florida. That is going to take several months. So they had to be supplied and, you know, carry their equipment, backup equipment, you know, parts for the ultralight if it broke down, parts for the vehicles that accompanied them.

So it came to be quite a group of, uh, people all pulling together and, and, you know, working to, to lead this small group of birds.

Matt: Eventually, Operation Migration had to stop doing their conservation work[14].

Russ: Operation Migration continued to work until 2016, and that was when the U.S. Fish and Wildlife, after carefully reviewing the operation and success, the impact on the birds, uh, regretfully, had to tell Operation Migration that they couldn't lead any more migrations of the Whooping Cranes. I believe the concern was that the process wasn't natural enough for the birds.

Emily: And while this feels like a really big bummer, I also really love the fact that you have decades worth of data that you can analyze to see how good your conservation work is. It's not about the intention. It's about how effective it can be. And it doesn't mean that you didn't do your best and that you didn't do all of the right things, but some things just don't work because animals are complicated. Environments are complicated.

And it was really interesting to find out that these birds, essentially being raised in captivity by humans and then being taught to migrate. They were learning how to migrate, but they weren't learning how to teach migration to the next generations, which meant that essentially every generation of birds would have had to continue to be led through these migrations because they would never learn how to pass on that information.

I think that's, from a scientific standpoint, an incredibly interesting result, even though it feels like a giant bummer that this whole operation wasn't successful in the way that everybody wanted it to be.

Matt: Yeah, it's interesting to think that this effort turned out to not be a complete success, essentially because birds have to teach other birds how to parent, right? It's something that's passed down from one generation to another, as these birds reproduce in the wild.

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[14] https://wsobirds.org/about-wso/news/445-operation-migration-calls-it-quits

So it's not just something that they know instinctively, which is what I thought it probably would be.[15]

Emily: Well, and this is not that podcast, but I have so many more questions now about the whole really sort of altruistic nature versus nurture scientific question that people have been trying to answer for a really, really long time. But this isn't, I don't, I don't think this is that podcast, Matt. I don't think we're, that's not what we do, but I think it's an interesting result because of that.

Matt: Yeah, we'll put that in the idea bank for, you know, maybe a later season. But, um, you know, another interesting thing about this is that while Operation Migration and you know, preserving endangered species in this way using ultralight aircraft didn't end up being completely successful or sustainable.

It's just one example of how these communities of people who fly ultralight aircraft, try to use it to do good with these recreational aircraft. And amateur pilots use their craft and what they've learned about flying to try to benefit the world.

Russ: Yeah, uh, you touched on something that I've thought about a lot over my time as an aviation enthusiast and a pilot. And, um, that's that you consider flying a gift and a thing that you cherish and you want to experience as much and as often as you possibly can. The second those wheels leave the ground, and you've, you know, you don't get the vibration of the runway or the airfield, and it's just this incredible, smooth sensation that you can't get really any other way.

You've entered into another world, and it's a joy and a privilege to be able to explore that world. And every single flight is different, and so pilots, you know, become very enthusiastic ambassadors, you know, for flying and you want to use these skills you've gotten this incredible gift to do good.

Emily: And there are all kinds of piloting communities that do an awful lot of public service, community service, and good works that are beyond conservation and include free flights for people who need to get to medical appointments[16] that are really far away from where they live[17]. There's groups that are transporting adoptable pets to their new

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[15] https://www.cbc.ca/radio/asithappens/as-it-happens-wednesday-edition-1.4471382/remembering-artist-bill-lishman-the-man-who-flew-with-canadian-geese-1.4471389

[16] https://wingsofmercy.org/

[17] https://palservices.org/about-pals/

homes or places where they will be adopted[18]. And there's also groups that continue to work with wildlife organizations to do aerial monitoring and surveying of animals[19].

And it's frequently very specific to the kind of craft that you have available to you. So folks that have ultralights are going to be doing a different kind of work than folks that have an aircraft that is more suitable for transporting something like kittens.

Matt: So yeah, this episode is for all of those pilots out there who want to use something that they do for fun to help others. Thank you for your service.

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Emily: AirSpace is from the Smithsonian's National Air and Space Museum.

It's produced by Jennifer Weingart and mixed by Tarek Fouda. Production help by Erika Novak and Sofia Soto Sugar. Our social media manager is Amy Stamm.

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[18] https://www.pilotstotherescue.org/

[19] https://www.lighthawk.org/pilots/become-a-lighthawk-pilot/#:~:text=LightHawk%20offers%20a%20unique%20opportunity.different%20kind%20of%20adventurous%20flying.
(These are just some of the organizations, do your own googling if you're curious or want to volunteer)