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Arctic Technology Evaluation

Making Waves: Episode 127



Preparing for the Future

From left: (1) U.S. Coast Guard Cutter *Healy* (stock image courtesy of U.S. Coast Guard); (2) Zachary Winters-Staszak (left), NOAA spatial data specialist, and U.S. Coast Guard deck crew prepare to launch an Aerostat balloon from the USCG Cutter *Healy* in Nome, Alaska, on Aug. 12, 2014; (3) Zachary Winters-Staszak and Mark Rogers from the NOAA Unmanned Aircraft Systems Program view live Aerostat balloon data on a laptop aboard the *Healy* on Aug. 12, 2014. Patrick McCardell from the Aerostat team, who is directing the camera on the balloon, looks on.

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How would we respond to an oil spill in the Arctic?

Transcript

This is Making Waves from NOAA's National Ocean Service. I'm Troy Kitch.

What comes to mind when you think about the Arctic Ocean? Sea ice, polar bears, harsh wind, frigid waters. It's a cold place. We all know that. But here's the thing ... it's getting warmer up there. Every summer, the extent of the sea ice in the Arctic is shrinking. And as the sea ice shrinks, here's what we're likely to see: more shipping, more oil exploration, more tourism, and more fishing. And all of this activity means that in the future, some day, we'll probably going have to deal with an oil spill in this remote region. So how do we prepare for that?



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NOS Office of Response and Restoration
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The Coast Guard cutter Healy, a 420-foot-long icebreaker, is now heading north in answer to this question. The mission: an annual exercise called Arctic Shield led by the U.S. Coast Guard's Research and Development Center. Onboard the Healy, scientists are gearing up to deal with a simulated oil spill in the icy Arctic.

To tell us all about Arctic Shield and NOAA's role in this expedition, I called Zachary Winters-Staszak, a spatial data specialist on the mission from the National Ocean Service's Response and Restoration office. We caught up with him just before the Healy departed Seward, Alaska.

So Zach, tell us a little bit about Arctic Shield.

[Zachary Winters-Staszak] "Arctic Shield 2014 is a technology demonstration focused on oil spill response. We'll be onboard the U.S. Coast Guard cutter Healy for about three weeks. There are 50 scientists and 80 crew aboard the ship and we're going to steam from Seward, which is where we're docked right now, to the ice edge in the Arctic Ocean, hopefully somewhere 75 degrees north in latitude."

So Seward, where you are now, is in the southern part of Alaska. How long is it going to take you to get that far north to where the ice is?

[Zachary Winters-Staszak] "It will take us roughly about a week to get up to the Barrow area, where we'll start looking for different types of ice. The various technologies that are being demonstrated have different requirements for the type of ice they need to be deployed in."

So how will you be using these different technologies once you get to where you need to be in the ice?

[Zachary Winters-Staszak] "So this year the Coast Guard is presenting the scientists here with an oil spill simulation where they're going to use an inert dye compound they're going to put into the water which will just naturally dissipate over time and we're going to deploy various technologies to try and track what they're calling a plume, a dye plume, and NOAA's here to kind of work in the same vein as if it were an actual oil spill."

Can you tell us a little bit more about NOAA's role in this exercise?

[Zachary Winters-Staszak] "NOAA's Office of Response and Restoration is here to support the Coast Guard in their mission. We provide scientific support to the Coast Guard during pollution spills and natural disaster response. The U.S. Coast Guard Research and Development Center, which is facilitating this exercise, they've done it since 2012 and this is the second year that we've been invited to participate. NOAA is also represented by the unmanned aircraft system program office. They'll be collecting aerial imagery and data with a small unmanned plane called the Puma. NOAA is also represented during this mission by the National Ice Center. The lead scientist for that center is here."

So the scientific crew on the ship are mainly from the Coast Guard and NOAA, right?

[Zachary Winters-Staszak] "Oh no, there's plenty of other organizations, institutes, and agencies that are onboard as well. One of the cool things we're looking at is the Oil Spill Recovery Institute sent up some drifter buoys for us to deploy and track the ice movement and sea surface currents. They actually provided initial funding for Arctic ERMA, which I'll talk about in a little bit. University of Washington's Applied Physics Lab is here. We work with them on the marginal ice zone program looking at sea ice dynamics. Cambridge University is here. They'll be deploying an autonomous underwater vehicle, an AUV, to try and map the underside of the ice where oil tends to collect. And also one of the main technology - what we're calling nodes - is an aerostat balloon that's going to collect video and imagery, and that's by Inland-Gulf Maritime, and we worked with them earlier this year on another demonstration project."

So there's a lot of different technologies at work with the oil spill simulation. As I understand it, your specific role on this mission, along with your colleague Jill Bodnar, has to do with putting all this data that is gathered together into a mapping product for everyone to use. It's a tool you referred to as 'Arctic ERMA' just a moment ago. Can you explain what this is?

[Zachary Winters-Staszak] "So ERMA is NOAA's Environmental Response Management Application. It's an Internet-accessible geographic information system, or Internet-based map. One of our main roles here is to integrate the data streams from various technologies being demonstrated here. We'll bring those data streams into ERMA to provide a centralized visual representation of data that are collected in the field. For Arctic Shield specifically, we've brought a stand-alone instance of ERMA that doesn't require an Internet connection and this is going to come in very handy because most of the Alaska coast is very remote and Internet isn't available, especially out in the Arctic Ocean. The need for a tool like this that fills that gap was especially apparent in the native Alaska communities that we've held workshops in. Internet is even unreliable in towns like Barrow, which have a fairly substantial population and infrastructure for an Arctic community."

I think some people may have a hard time visualizing what the Arctic ERMA tool really looks like.

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IN CASE YOU MISSED IT



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[Zachary Winters-Staszak] "You go to Google Maps and you try to route some place that you need to go. ERMA is going to look a lot like that. There's going to be a map there for you to orient yourself and then you think about the various spatial data products that are out there — you can have high resolution imagery, you can zoom in and see down to two point five meter resolution. You can have, for, you know for ERMA, it makes sense that we would have a lot of wildlife information. You know, where are bowhead whales in different seasons? Where do sea birds nest during various seasons and different times of the year. What type of shoreline do they like? Is there a more rocky shoreline that a different species gravitates to, you know, mud flats, tundra, those type of things, we can put those on a map all together in one centralized focus."

That's pretty cool. So it gives the people who are responding to, say, an oil spill a really detailed view of not only where the oil is and where it is moving, but also where the the wildlife is at.

[Zachary Winters-Staszak] "Exactly. So you can bring in operational data if there were an incident. So you could have ship locations, say, if two ships were to collide. You could have those point features overlaid on the map, and also have sensitive habitat turned on, so you can see proximity to where oil could potentially spill and come aground in those areas. So you can deploy measures to protect those really sensitive areas, those can also be placed on the map."

I can see how useful that would be. But here's a question I'm sure you sometimes hear: why couldn't you just simulate dealing with a spill in a cold, icy place by using, say, a computer model? What's the benefit of actually travel to the Arctic on an icebreaker instead of just doing this exercise from home?

[Zachary Winters-Staszak] "Well, the U.S. Arctic is home to a lot of people. There are many native Alaskan communities, and those communities could be severely affected if oil were to be spilled. These communities rely on the Arctic environment for subsistence activity that are fundamental to their cultural heritage. I think to be truly prepared, you can't replace hands on experience in an environment that you're looking to protect. If oil were actually on the water, on the ice, you would quickly ask questions: how do you get there? How far is any significant infrastructure from where the spill could potentially occur? A lot of these places are really, really remote, so where would oil spill responders sleep and eat? What equipment do you need? How do you get that there? These are questions that are best answered, I think, when you actually have to deal with it. And that's not necessarily something that Arctic Shield is focused on, but having professionals in the field like you do here dealing with the Arctic environment, dealing with the elements, those questions are in people's minds. People are actively thinking about these situations."

I guess I just have one more question. What's it like to be on an icebreaker in such a remote place for such a long time? I understand that this is the second year for you participating in Arctic Shield.

[Zachary Winters-Staszak] "Well, you better really like your bunkmates! Three people to a room, six people to a bathroom. No, you get into a routine like anything else pretty quickly: early mornings, long days, early nights. Rinse, repeat. The crew that operate the ship are very good-natured, fun to be around, helpful, and it's just gratifying to work with the different scientists towards a common goal with such an important purpose behind it. There's really nothing quite like the high Arctic. It's very harsh and uncompromising, but in the same right it's also utterly beautiful. I feel really lucky to have the opportunity to be here and to be a part of a demonstration like this."

Zach, thanks for taking the time to talk before heading out — and safe travels! Is there anything else you want to add?

[Zachary Winters-Staszak] "So there are a great amount of unknowns when it comes to oil spill response in the Arctic. The region is entering into a new era. There's a great deal of work to be done. But NOAA is really committed to stewardship in the region and will continue to provide sound scientific research and support to protect the Arctic environment and the people that depend on it."

That was Zachary Winters-Staszak, Geographic Information Systems specialist with NOAA's Response and Restoration office.

Want to know more about Arctic Shield? Check our show notes for the links. You can find us on the web at oceanservice.noaa.gov (<http://oceanservice.noaa.gov/>). Have a question? Shoot us an email at nos.info@noaa.gov (mailto:nos.info@noaa.gov). And thanks for listening to Making Waves from NOAA's National Ocean Service.

Do fish sleep? (/facts/fish-sleep.html)

The nature of fish "sleep" is an area of active research. While fish do not sleep in the same way that land mammals sleep, most fish do rest.

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