

<https://nationalpost.com/news/canada/after-decades-of-failed-searches-the-holy-grail-of-avro-arrow-artifacts-uncovered-at-the-bottom-of-lake-ontario>

# After decades of failed searches, the 'holy grail' of Avro Arrow artifacts uncovered at the bottom of Lake Ontario

*The famous test models of the Avro Arrow were long believed to be lost at the bottom of the lake, and it took four years of searching to find one*

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The Arrow's debut to the world as it was pulled out of the hanger to be viewed by Avro employees and invited guests. PHOTO BY SUNMEDIA

After the end of the Second World War, Canada found itself in the middle of a Cold War between the United States and the Soviet Union. Fearing a possible Soviet bomber attack via the Arctic Circle, the burgeoning nation began work on one of the most famous projects in its aviation history: the Avro Arrow.

To be able to counter a potential bomber threat, in the early 1950s, the Royal Canadian Air Force called for the creation of a fighter jet unlike any other: with a range of 300 nautical miles and the ability to take off from a 6,000 foot runway and cruise at Mach 1.5 (roughly 1,852 kilometres per hour) at an altitude of 70,000 feet.

<https://youtu.be/EaH456hLww8>

And despite the odds, thousands of Canadian workers came together and succeeded. The Avro Arrow had its first flight in March 1958 and became the crown jewel of Canada's aviation industry.

But, tragically, the Arrow program was cancelled by Prime Minister John Diefenbaker's Progressive Conservative Party less than a year later — the program was costing millions in taxpayer dollars and the government likely wanted to reallocate the budget. The cancellation has been dubbed the "Black Friday" of the aviation industry and tens of thousands of people lost their jobs.

The Arrow was mourned and continued to remain in the collective consciousness of Canadians. Documents and even pieces of the constructed Arrows are displayed in museums across the country.

But there was always one piece of the Avro Arrow story that had been lost for decades: the 12 test models, fired into Lake Ontario between 1954 and 1957, that contributed to the final design of the finished fighter jet.

The tale of the sunken treasure hidden somewhere in one of Canada's great lakes was alluring to John Burzynski, the president and chief executive officer at Osisko Mining Inc., a Canadian mining company. Burzynski was inspired by the discoveries in 2014 and 2016 of the two ships involved in the 19th century Franklin Expedition, during which British Captain Sir John Franklin and his crew of 129 men were lost in the Northwest Passage, in Canada's Arctic.

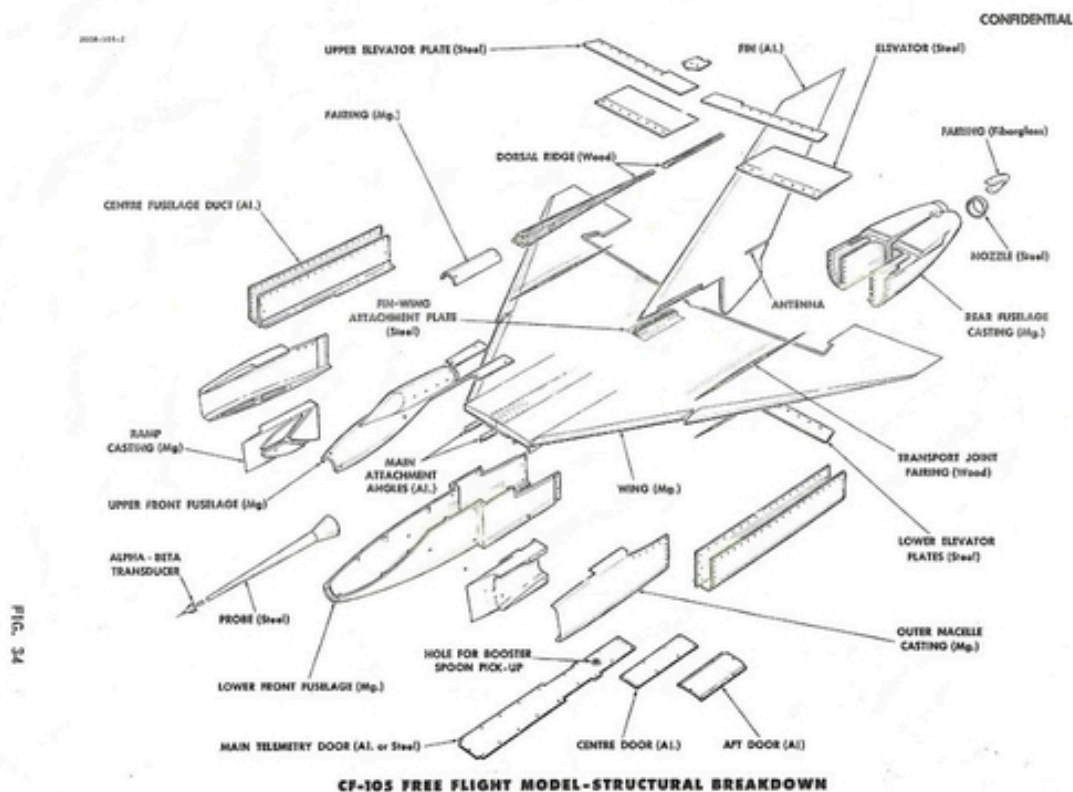
The discoveries got Burzynski thinking about what other famous lost Canadian items are out there, which led him to the elusive Arrow test models.

"Because (of) the way it ended," Burzynski told the National Post, "these were some of the last parts of the Avro Arrow program that were still out there to be found."

And after four years of searching, Burzynski and his team might have made history.

The majority of test models for the Avro Arrow Mk. 1 supersonic jet interceptor project were launched from Canadian military base at Point Petre in Prince Edward County, Ont. These models were fired out over, and eventually into, Lake Ontario. According to Burzynski, the models had to be fired over the lake because the base didn't have access to a big enough wind tunnel that could reach high enough speeds for their testing.

Since the late '90s, at least five expeditions have attempted to find the models at the bottom of the lake, but none have found even a single piece.



A declassified schematic of the Avro Arrow's Free Flight Models, which were mostly fired into Lake Ontario from Point Petre. PHOTO BY COURTESY RICHARD MAYNE

Burzynski's search, however, didn't start right at the lake. Funded through private firms, his team founded OEX Recovery Group Incorporated, which would serve as the flagship organization on the hunt for the lost artifacts. The mission was dubbed the Raise the Arrow Project.

The team partnered with a few museums and the RCAF, and received help from organizations such as the Canadian Conservation Institute, the Royal Canadian Navy, and the Canadian Coast Guard.

Before a single boat hit the lake, Raise the Arrow had to figure out where to look — a task assigned to Richard Mayne, RCAF's chief historian. As the story goes, most of the documents relating to the Avro Arrow were ordered destroyed after the program was cancelled. Mayne explains that a Soviet spy was suspected of working at Avro and the documents were destroyed to keep them out of enemy hands. Another possibility, he said, was that there was simply no need to keep them when the program was shut down.

Regardless, Mayne says that there are still plenty of documents, as well as footage of interviews with people involved in the project.

When it came to locating the test models, Mayne said three key pieces of information came together to give the team its search window. The first was the report from one of the test models, Free Flight Model number seven, found in the National Research Council's archives in Ottawa. The most detailed of the reports, Mayne said, allowed them to determine the trajectory of the models. Second, the team was then

able to hand that information to a former Avro aerodynamics department employee, who was able to calculate some possible landing zones in the lake.

And third, that trajectory, coupled with information from an interview with another employee who manned one of the cameras during the test model's launch day, helped the team narrow down a possible area where these models could be found.

"John and his team had a lot of these details. What they were able to do is put everything together in a way that it hadn't been before," Mayne said. "There were a lot of other details that were out there. This was really the first attempt to put the whole story together."

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All they had to do now was search about 100 square kilometres of lakebed, and they would have their prize.

"At the beginning, this seemed like a simpler task. We knew there were these nine prototype on the bottom of the lake somewhere. We were thinking 'how hard can this be?'" Burzynski said. "With great hindsight, it was pretty hard."

The team would use sonar technology to scour the bottom of Lake Ontario, looking for anything that could resemble the famous Arrow models. But since Point Petre had been a military testing base for years beforehand, the challenge was sorting through everything else left down there.

"The lakebed there is just littered with targets," said Dave Shea, senior VP of engineering at Kraken Robotics, the firm that provided sonar technology to the project in 2017. "One of the challenges with this kind of search, it's not like you're looking for a needle in a haystack. It's like you're looking for a needle in a haystack full of needles."

Even worse than the field of debris was the thousands of zebra and quagga mussels that have made their home on the lakebed. These mussels are an invasive species from Eastern Europe introduced to the lakes from freighters in the 1990s.

According to Nancy Binnie, a senior conservation scientist at the Canadian Conservation Institute, the mussels stick to solid surfaces and can damage infrastructure.

"Anytime there's rocks that stick up onto the bottom, or maybe a dead tree that's drifted in, or a nice test rocket or booster rocket that's floated on the bottom," Binnie said, "when the Quaggas need a place to settle on, they choose to settle on the harder objects."





Conservators Anne-Stephanie Etienne and Tiffany Eng Moore painstakingly restore the Avro Arrow test model, removing mussels and debris that had gathered on the machine from decades at the bottom of Lake Ontario. PHOTO BY JULIE OLIVER/POSTMEDIA

When the mussels entirely cover an object, it becomes very difficult for the team to be able to properly identify anything through sonar, and it often must send divers to take a closer look.

As they were combing the bottom of the lake lawnmower-style in 2017, the team finally found something. It looked like a fully intact Arrow test model, save for a bent nose and wing. But it didn't match the model blueprints of the known test models, and nobody knew what could be inside.

After some research, it turned out to be a Delta Test Vehicle, a precursor to the known Arrow test models.

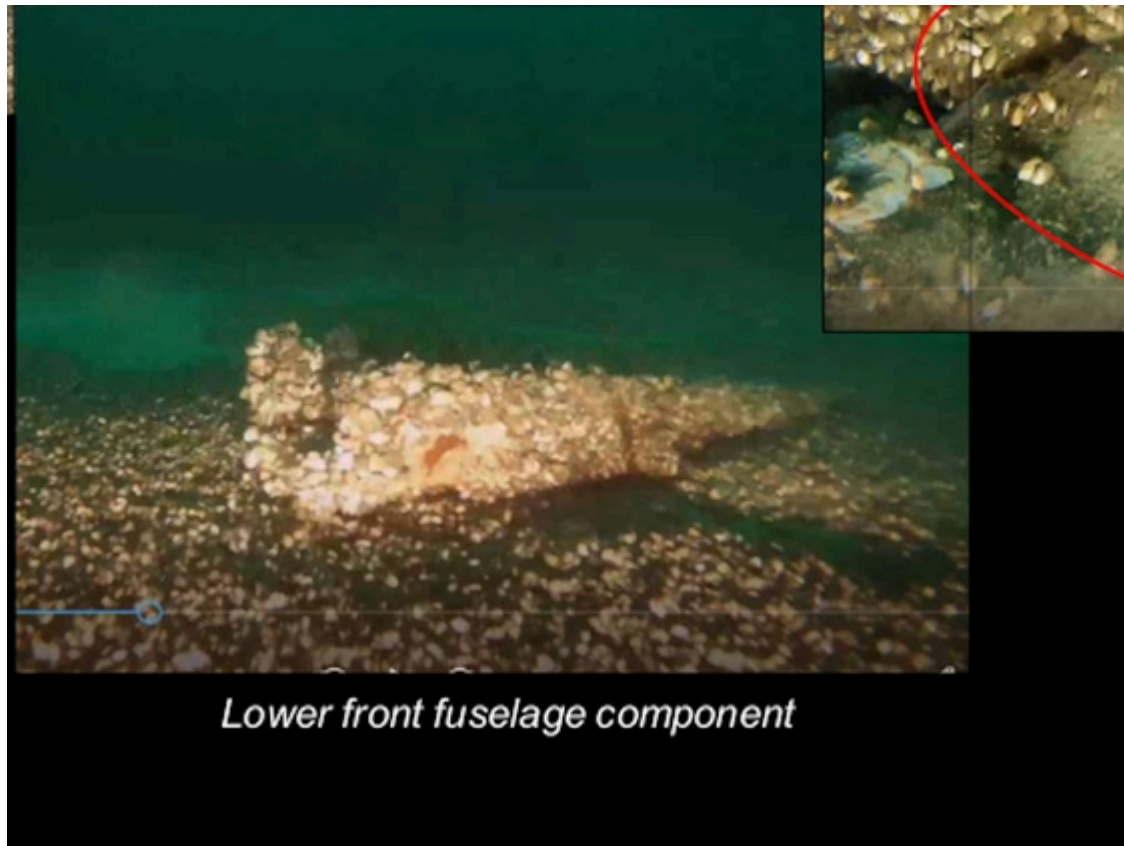
"It was a good few weeks before we finally found that DTV," Shea said. "When we did, we were very excited because it confirmed the theory that we had. It confirmed that the models were actually down there."

Binnie, who helped the team on conservation issues, said getting the DTV out of the water posed a lot of challenges, mostly coming from how little was known about the object. Removing a decades-old historical artifact from its sunken resting place could possibly break it into pieces.

And then there were the mussels.

The DTV was covered in layers and layers of quagga mussels, which had used threads of protein to stick to the surface of the test vehicle. Prying them off, Binnie said, could risk destroying the paint and losing key information about the model.

“We had to literally cut all the mussels off using sharp scalpels. Not pulling them off, not scraping them off,” Binnie said. “Because we wanted to keep the paint on the surface. It was really considered important.”



A photo of the Avro Arrow test model at the bottom of Lake Ontario found in September, 2020. PHOTO BY COURTESY OSISKO MINING/OEX

The test vehicle was put on display at the Canadian Aviation and Space Museum in Ottawa in 2019, but Burzynski wasn't done. The team had set out to find one of the final five test models, which were almost identical replicas of the completed Avro Arrows.

Three years after they found the DTV, in mid-September 2020, they finally made headway. A sonar image from the lakebed matched the blueprints for the test model's fuselage. The only problem was that it was in pieces.

“I immediately knew what it was and my first reaction was ‘fantastic. Darn,’” Burzynski said. “It was immediately evident to me that the model, and almost certainly the other ones, when they hit the water, they had come apart at the welds and settled as pieces on the floor.”

He says the team is still trying to determine how to remove the piece, and are planning on reviewing their existing sonar images nearby. Now that they've found one piece, it becomes much easier to find the rest.

But for now, the four-year search for the Avro Arrow test models is coming to a close. It might not have been the success they were hoping for, but it's a success nonetheless.

*You can see an image of them and it takes us back to that moment where Canada was punching well above its weight*

Mayne says that this piece of the model is "the holy grail of Arrow artifacts." Many other remains of the project are displayed in museums today, but these were used in the program's infancy and represents its potential, he said.

"Every individual has an 'only if' moment in their life. Collectively as a people, there's something about the Avro Arrow story where it's that moment for us," Mayne said. "Literally, the Arrow was almost shooting for the stars, or as close to the stars as Canada could come, and then suddenly it's axed.

"That's what these free flight models, in effect, have done. You can see an image of them and it takes us back to that moment where Canada was punching well above its weight."