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Great

The Man Who Invented

The Airplane

Would you believe that the man who invented the modern airplane has decided to get back into airships?

Nonsense, you say? Obviously no single man invented the modern airplane. Thousands of people contributed to its creation, not the least of whom were the Wright brothers who first got it off the ground.

But let's underline the word "modern" and eliminate everything made of bamboo, piano wire, linen and molded plywood. This brings us closer to today's 747s or one of those sleek new corporate jets.

If we look closely at one of these, we see light metal structures, jet power with a flush riveted, pressurized fuselage, all perched on a tricycle landing gear. In short, the modern jet. Yet each one of these parts was developed by the same man.

Does the name Vladimir Pavlecka ring a bell? Probably not. Even a careful student of aviation history could have missed him, but it's time to set the record straight.

One year younger than the Twentieth Century, Vladimir Pavlecka's first memory of aviation is the rumble of German Zeppelins flying over his village in Bohemia on their way to bomb the Eastern Front.

When he finally made it to the New World it wasn't exactly the case of the country boy coming to sit at the feet of the masters of aeronautical invention. Though the Wrights had been the first to fly, the second through the fifth were Europeans, and all lurched aloft on their own, ignorant of the Wrights' accomplishment.

So when young Vladimir, heading West across the continent, ran out of money in Detroit, we find a young man with fair English and marketable skills in thermodynamics, fluid dynamics and elastic fluid turbomachines. He found work at General Motors Research Corporation where in his first six months on the job, they let him design the first Buick Straight Eight, not a great engine, he admits, but not bad for a new kid.

His real interest was down the hall where a couple of young aviation enthusiasts named Ralph Upson and Carl Fritsche were designing an all-metal dirigible. That was where the action was and Pavlecka signed on.

Why a metal airship? It seemed like a good idea at the time. Such a good idea that Edsel Ford and GM's Charles F. Kettering put up the money and William B. Stout of the Stout Metal Airship Company and W.L. Gilmore, chief engineer of the Curtiss Aeroplane & Motor Company joined the engineering advisory staff.

The fact is that in 1925 the airship looked like a winner, even to men like Stout and Gilmore, a couple of the airplane's best designers. Since the first flight of the first of Count Ferdinand von Zeppelin's creations back on July 2, 1900, the huge flying machines that carried his name had ruled the skies with a record of achievement untouched to this day: the world's first airline, the first strategic bombers, first in commercial passenger service across the North and South Atlantic and the first non-stop flight across the Pacific.

In 1925 a lot of smart money was on the airship and Upson's concept of an all-metal ship seemed to offer distinct advantages over the Zeppelin-type fabric-covered, aluminum girdered design. The metal cover would be gas-tight, eliminating the need for interior gas bags, it would be little heavier than a fabric cover and would last far longer.

Pavlecka was soon promoted to Chief of Hull Design and the all-metal ZMC-2 was launched in August, 1929, the world's first successful metal airship. Built for the U.S. Navy, she remained in service for 12 years until 1941 when, too small for war patrols, she was finally dismantled.

Though the smaller fabric-covered blimps continued to prove their worth with 168 flown by the Navy, the big rigid ships were out of place in wartime and the last three Zeppelins, two in Germany and one in the U.S., were broken up for scrap.

Continuing his interrupted journey westward, Pavlecka had left the Metalclad Company in 1933 bound for California. There the Douglas Aircraft Company had a problem. They had just

completed work on what was to become the most successful airliner of its day, the DC-2. Its prototype, the DC-1, carried 12 passengers. The DC-2 had been enlarged to carry 14. The airlines wanted one larger still but the DC-2 was already the largest twin-engined U.S. landplane ever built. How could Douglas put more people inside without making the outside so big it couldn't fly?

The answer, of course, was to make the plane lighter. Less metal meant more lift for passengers. Douglas needed an expert on light metal aircraft structures, someone, for instance, who had just finished building a metal balloon. They hired Pavlecka.

"Douglas had around 150 engineers which was a big operation in those days," Pavlecka recalls, "but there was no history of light metal aircraft structures in the United States. There was in Germany but the experience had come from airships where every extra pound has to be eliminated. There both Claude Dornier and Adolph Rohrbach had worked for Count Zeppelin before he set them up in the metal airplane business."

The new Douglas airliner was not to be simply a rebuilt DC-2. With only 5% more wing surface, Pavlecka helps add 50% to passenger capacity. The new plane is three feet longer than the DC-2 yet carries 21 passengers instead of 14. They call it the DC-3, the most successful airplane in history. "The pilots were scared to death of the first DC-3's," Pavlecka says, "because the wings flexed. They'd never seen that before. I gave seminars for the airlines explaining the principles involved but the pilots didn't believe me. Only experience allayed their fears."

For his work on the DC-3, Douglas promoted Pavlecka to Chief of Structural Research. He invents wing folding for naval aircraft and flush riveting, develops the tricycle landing gear and designs Douglas' first pressurized fuselage for the DC-4. But with his early training in turbomachines, it is the turbine engine that interests him most. At the Metalclad Airship Company he had designed a steam turbine for a larger dirigible that was never built. Now he sees that the steam turbine is too heavy for an airplane but a gas turbine might be just right.

Early in 1939 he brings his preliminary designs to Douglas management. Douglas gives them to Pratt & Whitney who send them to their consultants at MIT. After careful study, the experts at MIT return their verdict. It can't be done. The jet engine won't work.

Douglas management loses interest but a former Douglas engineer thinks Pavlecka might have something. His name is John Northrop. Pavlecka quits Douglas to sign on as Northrop Aircraft's first Chief of Research. There he develops the first magnesium alloy airplane structures, invents the Heliarc and Argonarc welding processes and builds America's first jet engine.

After Northrop, Pavlecka invents the turboprop engine, works on the Apollo moon rocket and completes development work on the compound supercharger and the contra-rotating gas turbine. His wind and water turbines are currently being tested at Caltech and the Department of Energy to see if they really are two and a half times more effective than any others.

Now after fifty years spent developing modern aviation, Vladimir Pavlecka has turned once again to the airship. Why? Even without the disruption of World War II, the airship was fated to be replaced on the world's great ocean routes by the airplane. Development of the jet engine allowed the airplane to operate at high altitudes in low air temperatures with high thermal efficiency. The airplane could fly economically at high speed through low density atmosphere for long distances. It could finally match the airship's range and low cost. And it now added the tremendous advantage of high speed.

The airplane's high speed, however, is purchased at the price of high fuel consumption, 70% higher than an airship carrying the same load. When the jet offered much greater speed at equal cost there was no question of its advantage over the dirigible. But now OPEC has changed the equation. Now it has become a question of the jet's high speed and increasing fuel cost versus the airship's low speed and 70% lower fuel cost, and some people think that, for certain jobs, the scale may already have tipped back in the airship's favor.

NASA, the Navy and the Coast Guard have all been studying the airship's revival. So too have the World Bank, the Shell Oil Company, the U.S. Forest Service and the Canadian government. Japan's Ministry of International Trade and Industry has already budgeted $75 million for airship development. A Booz-Allen-Hamilton study for NASA's Ames Research Center determined that there is a worldwide market for 1,270 dirigibles of all sizes.

Pavlecka agrees. In the half century since his work on the ZMC-2, he has continued to study the problem of the airship.

"I have always regarded airships as an important form of transportation," he says. "I was dismayed that they were not taken seriously in the industry. Even after the very successful performance of the Navy blimps in World War II, I was amazed at the depth of the negative feeling about them. I even hesitated to talk about them for fear that I would be considered odd. But that did not stop me from continuing to work on the problem."

His continuing interest in airships combined with his pioneering work in the aerospace industry has made Pavlecka "undoubtedly the leading airship designer in the world today." That is the opinion of Admiral Carl J. Seiberlich, the U.S. Navy's chief airship expert and the chairman of the Lighter-Than-Air Committee of the American Institute of Aeronautics and Astronautics.

Another of the ZNC-2's original builders is John Roda. He, too, later joined Douglas Aircraft where he worked as General Factory Superintendent for 27 years. There he originated the multi-model, variable rate production line and also lectured on Prototype and Production Manufacturing Programs for Military and Commercial Aircraft at Caltech. Roda and Pavlecka, with the backing of Dr. Earl Kiernan, a former Strategic Air Command flight surgeon with 30 years experience in the physiology of flight, recently formed Airships International. A dozen friends from the aerospace industry, engineers, mathematicians and cost accountants have joined them in their goal of creating a truly modern, metal airship.

And the result? After 50 years of thought by "the leading airship designer in the world today" plus the efforts of a dozen of the aerospace industry's top engineers, what have they finally come up with? What is going to bring back the great days of the dirigibles, and rescue aviation from the machinations of OPEC by flying the same load as a 747F from New York to Los Angeles while burning 37.8 tons less fuel at a saving of $2.12 per mile?

Pavlecka's answer is a pressurized lithium-aluminum metalclad with boundary layer control powered by gaseous fuel turbines and steered by computer-activated thrusters just like those on the Lunar Lander, a concept pioneered by dirigible designer Enrico Forlanini back in 1930.

Its pressurized metal hull will give their ship twice the speed of an ordinary blimp. Its computer-controlled thrusters will give it the maneuverability of a helicopter and, as an airship, it will have the range of an airplane plus a load-carrying ability and endurance far beyond anything else in the sky.

Will it ever get off the drawing board? Will we ever fly again in airships? Only if we hurry. "I am the last surviving member of the ZMC-2 design team," Pavlecka says. "Most men my age are already into their second decade of retirement but if I don't do this, it won't get done. Anyone else would have to start back at the very beginning. I feel a great responsibility to pass my knowledge on. I owe it to all my friends who believed in the airship, and I owe it to my country."

The ZMC-2 gave us the development of light metal structures that led directly to the DC-3 and modern aviation. Now the aerospace industry has a chance to return the favor by giving back to the airship the modern technology that can create a new generation of metal ships as far ahead of the ZMC-2 as today's jumbo jets are beyond the plywood airliners of the 1920's. It is a question of time.