

ASCENT

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Apollo Spacesuit and Lunar Rover This spacesuit, worn by Commander David Scott during the 1971 Apollo 15 lunar mission, allowed for increased mobility and comfort compared with earlier suits. Apollo 15 was the first of three missions in which astronauts deployed and used a lunar roving vehicle (LRV) of the kind pictured here. The lightweight LRV was guided by a central T-shaped "joystick," ran on four .25-hp motors (one built into each wheel), and traveled up to eight miles an hour. The actual Apollo 15 LRV is still on the moon. It carried Scott and astronaut James Irwin on a seventeen-mile trek around the moon's Hadley-Apennine region, where they gathered 169 pounds of lunar geological material before returning to Earth.

JRS-1:

THE ENTREPRENEUR'S Last Amphibian



He stays up all night, chasing cold dinners with black java, trying to eke measurable results from his first experiments. Although his technological tinkering puts him in danger of flunking out, the 21-year-old engineering student is certain that all his "extreme effort" will result in a dynamic piece of hardware that will secure his future—if his money holds. Like so many other pioneers, he labors on technology's lonely cutting edge: work that's part science, part art, with no trained instructors, no textbooks, and no predecessors. He's hooked "heart and soul" on his research, which offers him only the mere possibility of being a leader in modern engineering's "most interesting line."

These were life's choices in 1910 for Russian-born aviator Igor Sikorsky, as he struggled to assemble his first flying machines near Kiev. Within a few years, after building two unsuccessful helicopters, Sikorsky would develop what would be called the world's first multi-passenger "aerial bus," one of the earliest enclosed-cabin aircraft. Soon afterward came production of his powerful four-engine World War I bomber, the Il'ya Muromets. Then, in 1918—facing arrest and possible execution by the Bolsheviks—Sikorsky was forced to flee Russia and start again, literally from scratch, in New York. Another decade of scrappy venturing in the U.S. would lead to a line of remarkable "flying boats," amphibians (seaplanes with landing gear), and the hard-working helicopters for which Sikorsky Aviation Corporation (now a division of United Technologies) became best known.

"Sikorsky was always interested in developing aircraft as transport, even in Russia," explains Dorothy Cochrane, a curator at the Smithsonian's National Air and Space Museum. "He had a very fertile mind, a lot of innate talent, and he was always able to find backers. He was able to sell himself, sell his company, and convince people that his designs had value."

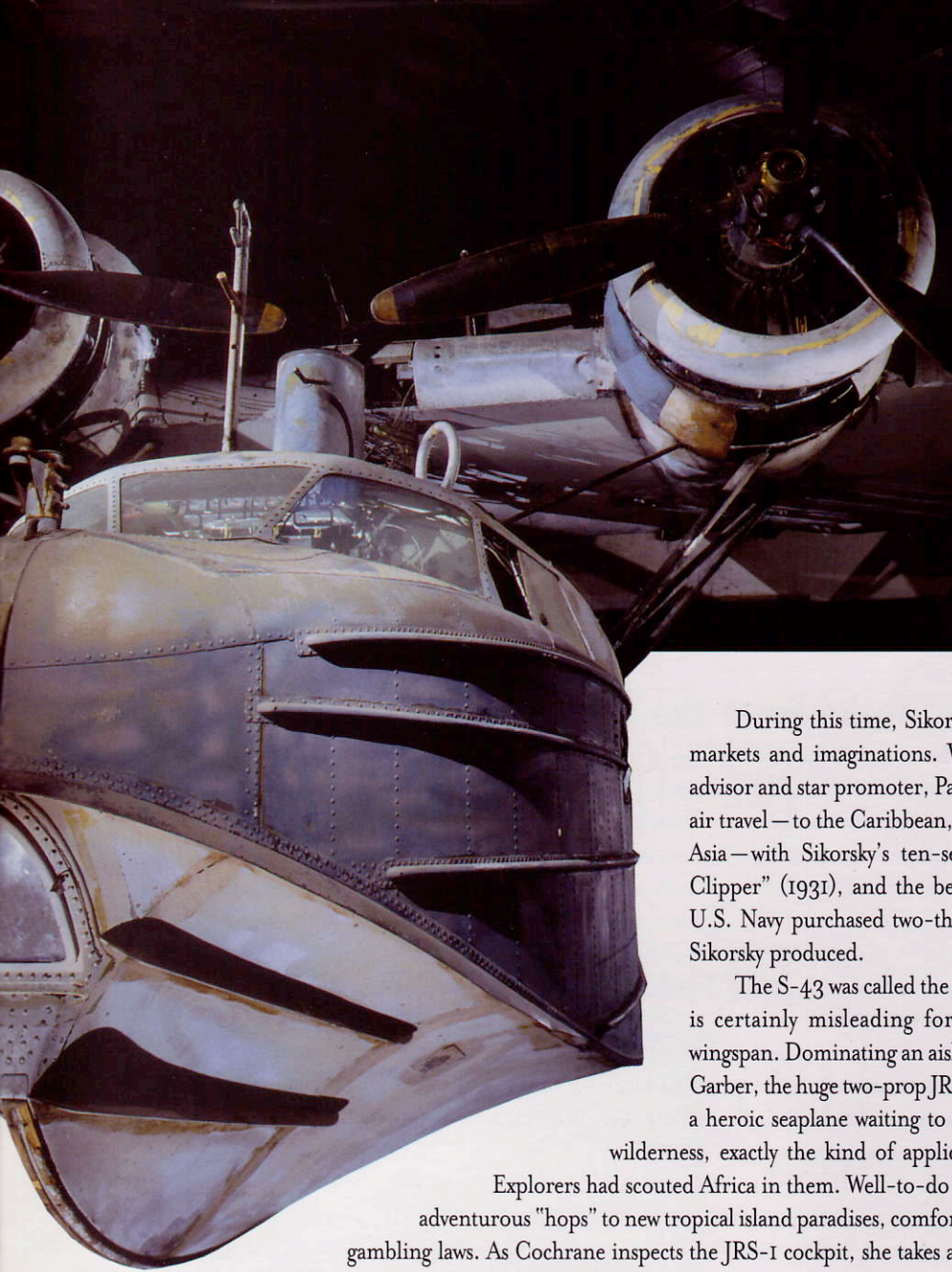
Today Cochrane examines the cockpit of the JRS-1, the military version of Sikorsky's S-43, produced by his Connecticut-based company in the mid-1930s. This extraordinary plane—lodged in the Museum's Paul E. Garber Preservation, Restoration, and Storage Facility—represents the aviation designer's last amphibian aircraft. Sikorsky, who died in 1972, was a strong believer in amphibians and "flying boats" for extending air service to the most remote cities of the globe, often located on lakes, bays, and rivers. The planes were very much a part of aviation's Golden Age, putting Sikorsky near the center of what his oldest son describes as a "romantic and glamorous time."

"Growing up in our house was fascinating," Sergei Sikorsky remembers. "You could be listening to dining-room conversations with people like Charles Lindbergh, Roscoe Turner, and Antoine de Saint-Exupery. [Composer and Sikorsky investor] Sergei Rachmaninov would visit from time to time. It was like Camelot—an aviation Camelot."



Igor Sikorsky

PHOTO: UNITED TECHNOLOGIES CORP. FROM NASM, SI



"It's as if they took a boat and just put a big wing on top, with two giant engines,"

—DOROTHY COCHRANE

At the National Air and Space Museum's Paul E. Garber Facility, the huge JRS-1—the military version of the Sikorsky S-43—is reminiscent of the planes that ferried explorers in and out of exotic foreign lands, the kind of task intended by its innovative designer.

PHOTO: ERIC LONG

During this time, Sikorsky's seaplanes and amphibians captured markets and imaginations. With Charles Lindbergh as its technical advisor and star promoter, Pan American Airways pioneered luxurious air travel—to the Caribbean, Central and South America, and even to Asia—with Sikorsky's ten-seat S-38 (1928), the S-40 "American Clipper" (1931), and the behemoth S-42 (1934). Pan Am and the U.S. Navy purchased two-thirds of the fifty-three S-43s and JRS-1s Sikorsky produced.

The S-43 was called the "baby sister" of the S-42 although "baby" is certainly misleading for this plane, which boasts an 86-foot wingspan. Dominating an aisle of light, single-engine "tail draggers" at Garber, the huge two-prop JRS-1 looks like something out of Hollywood: a heroic seaplane waiting to ferry explorers to and from some exotic wilderness, exactly the kind of application Sikorsky intended for his planes.

Explorers had scouted Africa in them. Well-to-do vacationers used them to make their first adventurous "hops" to new tropical island paradises, comfortably escaping American Prohibition and gambling laws. As Cochrane inspects the JRS-1 cockpit, she takes a moment to gaze out the windshield and recall this exciting time in aviation history.

"You can almost imagine landing in some Caribbean bay," she says. "The pilot would circle the bay, just to give the passengers a sense of the island scenery and the lush vegetation below. People in the cabin would see the blue water coming up. And, by then, they could feel the high, tropical humidity penetrating the cabin.... It must have been quite a thrill."

Leaving the cockpit, she moves past the navigation room/baggage area, and enters the main cabin, which seated ten to fifteen passengers. The spacious interior of the S-43 was reportedly inspired by luxurious railroad club cars, but the stripped-down JRS-1's nautical elements are hard to miss. Cochrane nods to the portals lining both sides of the cabin, as big and round as European cheeses. Oval doors on either end of the compartment sustain the impression of being on a '30s-era cruise ship.

"It's as if they took a boat and just put a big wing on top, with two giant engines," the curator observes.

She points out that the Museum's JRS-1 is in "fair shape," adding that specialists will still require "a number of years" to restore the Sikorsky artifact. The restoration won't begin until sometime after the plane's 2003 move (along with about 180 other planes) from the Museum's Garber Facility to the Steven F. Udvar-Hazy Center in Dulles, Virginia.

At the Udvar-Hazy Center, specialists will recondition the aging amphibian to its original state, as a military transport that found itself in America's opening battle of World War II. Purchased by the Navy in



PHOTO: IGOR I. SIKORSKY HISTORICAL ARCHIVES, INC.

The cabin of an S-43 "air yacht," owned by William K. Vanderbilt. Other owners of the plane included millionaire aviator Howard Hughes.

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1938, the Museum's JRS-1 had been stationed in San Diego until summer 1940, before flying to its assignment at Pearl Harbor, Hawaii. Ten Sikorsky planes, including this one, somehow survived the surprise Japanese airstrike of December 1941. The Museum's amphibian took off immediately after the attack to conduct a five-hour patrol, searching the region for enemy submarines. Thus, the JRS-1's colorful civilian and military history bridges aviation's Golden Age and the war that marked its close.

Igor Sikorsky continued his work on aviation's cutting edge after the war, solving difficult problems of aircraft design and control that resulted in the first truly practical helicopter. He was always recognized as a man of extraordinary vision. In

1930, the Russian-born aviator/designer had been asked by a journalist to speculate on the conditions of air travel in the distant future. Sikorsky dazzled his Depression-era listener with predictions of high-speed, all-metal airliners that would link all the major cities of the world.

"Travel will be comfortable," the designer predicted, "and passengers will feel as if the craft is entirely motionless. The rooms of the ship will be kept at a constant atmosphere pressure, ...no motion of any sort will be felt except for a slight vibration...by extremely powerful motors or, rather, turbines."

Such was the foresight that had inspired Igor Sikorsky's early designs in czarist Russia, sustained him as an innovator in this country, and established him as an international entrepreneur well ahead of his time.

Construction Works From the Ground Up...Way Up

After years of hard work and anticipation, the Smithsonian's National Air and Space Museum is celebrating the groundbreaking of its colossal Steven F. Udvar-Hazy Center at Dulles International Airport.

The groundbreaking ceremony of October 25, 2000, launches construction of the 700,000-square-foot Udvar-Hazy Center, where the Museum will display hundreds of airplanes, helicopters, spacecraft, airliners and unusual, never-before-exhibited aircraft. Following its December 2003 opening, the center will host an estimated 3 to 5 million visitors each year.

"We're very eager to see the construction begin," says architect Walter Urbanek, of Helmuth, Obata + Kassabaum (HOK), designers of the new center. "It's the realization of years and years of planning and designing. We'll soon see something three-dimensional and very real coming out of all the work."

Visitors will enter the Udvar-Hazy Center to find themselves "nose to nose" with some of the most amazing aircraft and spacecraft ever made. The Space Hangar will house the space shuttle *Enterprise* and other space artifacts. At 260 yards long, the Aviation Hangar will provide room enough for the display of 180 historical aircraft, including scores of airplanes suspended from steel trusses, arching ten stories overhead.

Preparation for installation of the trusses begins immediately after the groundbreaking, with drilling and "socketing" of huge concrete columns into the bedrock below the building site. These underground columns will bear the burden of the eighteen steel arches, the "rib cage" of the aviation gallery. Aside from bearing up against roofing material, wind, rain, and snow,

each truss is designed to carry as much as 10,000 pounds of suspended aircraft — about the weight of a World War II fighter plane. Each steel truss requires a month to erect. When enough trusses go up, secondary framing and roofing elements are added. They are triangular, 16 feet thick, and will span a distance of some 230 feet.



"As they're putting up trusses at one end of the building, they'll be completing finishing work on the other end. You'll be seeing what amounts to the entire sequence of the building's construction from one end to the other."

Urbanek plans to be at the site "a couple of times a month" as construction gets under way. As much as he looks forward to seeing the realization of HOK's design, however, the architect predicts an "absolutely wide-eyed" reaction from staff and supporters of the National Air and Space Museum.

"Even people who know a lot about the project already will be amazed at the three-dimensional reality of the actual spaces," he says. "I'm looking forward to being out there with our clients and seeing their reactions to this wonderful building."