

## Firefighting with the Erickson S-64 Aircrane Helitanker, the ultimate firefighting helicopter



The Erickson S-64 Aircrane Helitanker has given the firefighting world cause to sit up and take notice of the revolution that is occurring in aerial firefighting technology. Our unique and versatile helicopter features a 2,650 gallon (~10,000 liter) tank with microprocessor controlled tank doors that allow for 8 different coverage levels. Unlike many fixed wing tanker firefighters, the tank doors of the S-64 are controlled by a microprocessor that actually adjusts for airspeed and opens the tank doors to allow for a flow rate that matches the particular coverage level selected by the pilot. The tank adds the delivery capacity of fixed wing tanker planes to the maneuvering capability of a helicopter. The tank system and the S-64 Aircrane helicopter are manufactured by Erickson Air-Crane of Central Point, Oregon. The tank system attaches to the Helicopter through 8 hardpoints on the fuselage and has been designed to give the Air Attack Coordinator more control over where and how the drops are made. The Helitanker has received certification and approval from the United States Interagency Airtanker Board, which means that the fixed tank on the S-64 Aircrane firefighting helicopter conforms to the same criteria as tanks installed on fixed wing aircraft. The computations and planning involved with Airtanker drops can be applied to the Helitanker. Considering the fast refill time of 45 seconds or less in any water source as shallow as 18 inches (45 cm), no other system can compare with the precision in which up to 30,000 gallons (~114,000 liters) of foam mix, retardant, or water is delivered, per hour, to the fire.

Erickson Air-Crane has also developed a spray nozzle attachment for the Helitanker. The "*Water Cannon*" attaches to the tank and forces a stream of water or foam mix at 300 gallons (~1,140 liters) per minute with a coverage range of 200 ft (~760 meters). The water cannon was originally created to fight high rise structure fires in congested inner city areas

at altitudes too high for effective use of ground-based hose delivery systems. The cannon can also be used as a remote nurse tender refill tanker for fire engine apparatus stranded at a fire with no nearby water source. With the Water Cannon, the S-64 Helitanker can fill up to four Type 3 engines with one tank.

A special "*Sea Snorkel*" has recently been designed for the tank, and augments the freshwater fill capabilities of the hover snorkel as it can refill the tank in nearby salt water sources as well as fresh water sources. Refill with the Sea Snorkel is accomplished by skimming above the water surface at 35-45 knots as the hydrofoil ram scoop forces water up and into the tank. With the Sea Snorkel, refill can be accomplished in 40 seconds.

The Airplane Helitanker continues to be a proven effective firefighting tool in Australia. In 1998, the Airplane combated several fires in areas such as Caledonia and Macedon in the State of Victoria. The Helitanker averaged 30,000 gallons (~114,000 litres) per hour and filled from nearby lakes, streams and even a golf course pond. The city of Frankston, north of Melbourne, saw the Airplane Helitanker knock out a potentially devastating blaze burning through a stand of trees in the middle of a crowded suburban area. The Australians fondly attached the moniker of "Eric The Water Bomber" and made sure that the Helitanker was around for the 1998,'99, and 2000 fire season. In late December of 2001, a series of fires, some suspected to be arson related, sprang up around the suburbs of Sydney. It was December 27th, when N179AC "Elvis", and S-64F Helitanker, arrived by barge at Swanston Docks near Melbourne. By December 28th, the Helitanker was ready to begin it's yearly contract with pilots Kenny Chapman and Grant White at the controls. Because of the immediate danger the fires presented, the DNRE(?) immediately sent the Helitanker to Bankstown, 15 minutes from Sydney to begin fire suppression efforts in the most threatened areas.

From December 29 until January 4, "Elvis" waged what has become a much publicized war against the flames in Sydney saving an estimated 300 homes, according to news sources. Elvis was brought out to the Blue Mountain region of Woodford to stop the advance of a firestorm threatening a nearby small town.

On January 2, 2002, because of the increasing threat the fires posed and the predictions of more hot dry weather, the New South Wales Rural Fire Service requested the services of two more S-64 Airplane Helitankers from Erickson Air-Crane. Erickson began immediately mobilizing and preparing two S-64E model Helitankers for the trip to Sydney.

On the morning of January 7, the Antonov arrived at Sydney International Airport with N154AC "Georgia Peach" and N164AC "Incredible Hulk" inside. Upon arrival, news sources say that customs and inspection procedures were greatly expedited to allow for the two Helitankers to be cleared for flying in Australia as quickly as possible. After unloading, the two aircraft were taken to the nearby Qantas facility to accomplish reassembly and flight status.

The following morning, both helitankers, along with "Elvis" were assigned to an airbase in the town of Nowra, near Sydney. "Incredible Hulk" began immediately fighting the fires dumping an average of 19,900 gallons on the fires near Shoalhaven. The following day, "Peaches" began her fire suppression efforts in the same area dumping an average of 13,200 gallons per hour on the fires. "Elvis" had already been fighting the fires in the same

region and had been reported by local news sources as assisting in ground firefighting efforts that saved a small coastal resort of Fisherman's Paradise with a population of over 200 residents.

In the Years since the firefighting tank attachment was perfected by Erickson Air-Crane, the Helitanker has been in service for many Forest Protection agencies in the United States and around the world. The United States Forest Service (USFS) continues to call on the Helitanker's firefighting services. In California, Los Angeles City and County agencies continue to keep a Helitanker in service through Shared Resource and Exclusive Use contracts. Other U.S. agencies have called on the Erickson Air-crane Helitanker when they were in need of fast and precise suppression of threatening wildfires. These agencies include:

- California Department of Forestry
- Minnesota Department of Forestry
- Oregon Department of Forestry
- United States Federal Bureau of Land Management (USFS)
- National Parks Service
- Bureau of Indian Affairs
- National Interagency Fire Center(NIFC)
- United States Federal Emergency Management Authority (FEMA)

Worldwide agencies contracting Helitanker fire suppression services include:

- Ministry of Civil Protection, Italy
- Department of Natural Resources and Environment, Australia
- Ministry of the Interior, Greece
- Korea Forest Service, Republic of Korea
- British Columbia Forest Service, Canada
- Sultan of Brunei / Brunei Forest Service, Borneo
- Mexican Forest Service, Mexico

In late Spring of 1998, Hundreds of lightning strikes ignited the drought-stricken swamplands and underbrush of Florida creating one of the largest fire scenarios in the state's history. Firefighting aircraft as well as personnel and equipment were mobilized from across the United States to assist in controlling the fast moving wildfire that threatened to engulf over one third of the state. Erickson Air-Crane responded to the call and sent 5 Helitankers to assist in controlling the blaze. Over a 25-day period, two of the firefighting S-64's flew 139 hours dropping over 2,000,000 gallons (~7.6 million liters) of foam mix and water and delivering an average of 19,000 gallons (~72,200 liters) per hour. The high volume snorkel attachment allowed for quick refill in the shallow "gator ponds" and streams close to the fire and gave the helitankers a needed advantage against the many rapidly spreading wildfires and prevailed when helicopters with buckets failed.

Summer of 1999 brought unusually dry weather that parched the Florida landscape and created fire conditions considered worse than the 1998 fire season. The State of Florida took the initiative and allocated over 5.6 million dollars to fight the rampant brush and grass fires that burned thousands of acres of property. Florida Governor, Jeb Bush, granted an interview on CNN News in which he clearly stated that he wanted "...(*Aircrane*) *Helitankers*

*fighting my fires in Florida."*

In August of 1999, Erickson Air-Crane made six S-64 Aircrane Helitankers available to the California Department of Forestry and the United States Forest Service to fight a series of big fires in northern and central California. Three Aircranes were based at Benton Airport located at the Southeast edge of Redding, California and flew an average of 7 hours per day dumping as much as 19,000 gallons (~72,000 litres) of water, per hour, on the fires burning at the "Shasta-Trinity" and "High" Complexes.

The fourth Aircrane based at Redding Municipal Airport, which was under an "Exclusive Use" contract with the U.S. Forest Service, dropped over 178,000 gallons (~674,000 litres) of water and retardant on the fires around the "High Complex" of fires around Redding in a two-day period.

The fifth Aircrane was brought from logging operations in British Columbia, Canada to Redding, California to assist in firefighting efforts on the "High Complex" fire. By September 10, 1999 the fire, which had grown to over 18,500 acres (7,400 hectares) in size, was judged by the United States National Interagency Fire Center (NIFC) to be contained.

The sixth Aircrane was based in Oroville, California flying an average of 8 hours a day fighting the "Walker" fire which was one of six fires burning in the "FRRD Complex" located in the Plumas National Forest in Northern California. The six lightning-ignited fires, over 3,800 acres (~1,520 hectares) in size, were 72% contained 4 days later according to information provided by NIFC.

During the 1999 fire season, Italy and Greece suffered one of the worst fire seasons in recent history.

Wildfires raged beyond the control of suppression efforts resulting in tragic losses of lives and property. As a result, the civil protection agencies of both countries began looking at new firefighting technologies on the ground and in the air. Erickson Air-Crane's impressive resume of worldwide firefighting service lead to contracts with the governments of both countries. On the Italian Island of Sardegna, the Helitanker impressed government evaluators to the extent that a high ranking official was heard to say "*...With the maneuverability and water carrying capacity of these (Aircrane) helicopters, who needs any other aircraft?*" Two Aircrane Helitankers in Italy began firefighting operations June 19<sup>th</sup> with one Helitanker based at Cagliari on the southern coast of Sardegna and the other staged at Fenosu Airport at Oristano located in the middle of the western coast of the island. In the month of July, both Helitankers flew 112 hours dropping a total of 1,373,850 gallons (5,220,630 litres) of water. On July 24<sup>th</sup>, a third S-64 Helitanker arrived at Cagliari after the Department of Civil Protection formally requested and contracted for a third Aircrane Helitanker to participate in urgent fire suppression efforts.

Also in 1999, an Erickson S-64 Aircrane Helitanker contracted to the Greek Ministry of Interior became one of the first American firefighting aircraft sent to Turkey as part of a disaster relief effort. At 7:40a.m., on Wednesday, August 18<sup>th</sup>, Helitanker 47 was dispatched from its base in Ioannina, Greece to the area of Izmit, Turkey 44 miles (~74 km) East of Istanbul. The region had just experienced the largest and most deadly earthquake in one hundred years with over 30,000 people dead or injured. The Helitanker would join the fire

team in a suppression role with the primary mission of combating the immense blaze at the Tupras Oil Refinery located near Izmit. The Tupras Refinery, the country's largest crude oil processing facility, accounts for 35% of the Turkey's oil and natural gas supplies with 30 storage tanks holding over 7 million barrels of crude oil. The storage tanks were at an extreme risk of igniting from the fire and the built-in salt water fire suppression systems were heavily damaged from the earthquake. Helitanker 47 joined other aircraft in the task of applying a dense mixture of aqueous film-forming foam to tanks surrounding the fire in danger of exploding. The foam mix is designed to suppress flammable liquid fires. In 3.1 flight hours, the Helitanker dropped over 16,400 gallons (~62,000 litres) of AFFF foam mix on areas surrounding the fire. The next morning, the Helitanker began another day of suppression operations resulting in 37 drops of over 79,000 gallons (~299,000 litres) of foam mix applied to the most dangerous fire zones. On Friday, many of the salt water fire suppression systems were brought back online. The firefighting aircraft were released and ground firefighting crews were brought in to extinguish the blaze. Helitanker 47 was released back to the home base in Ioannina, Greece to fight a large wildfire that threatened the town.

In Greece, after commencing firefighting operations on July 8<sup>th</sup>, 2000 a single S-64 Helitanker began flying every daylight hour fighting a devastating series of fires off the west coast of the North Aegean Island of Samos. The Helitanker, part of the "Hellenic Fire Brigade", was based out of Megara Army Helibase located 35 miles (64 km) west of Athens. In the first month on station, the S-64 Helitanker flew an average of 10 hours a day dropping over 627,550 gallons (2,384,690 litres) of water on the fires on the North Aegean Island of Samos and on the mainland near Athens. The "Sea Snorkel" saw tremendous use in Greece with over 400 flight hours recorded as it was used to refill the Helitanker at coastal areas of the Mediterranean Sea. The firefighting contract in Greece lasted 107 days with the Helitanker flying over 522 flight hours fighting fires across the country.



Our patented ram scoop hydrofoil allows the Helitanker to refill from fresh water and sea water sources in less than 45 seconds.





The 2,650 gallon tank drops water, retardant, or foam mix. Microprocessor controlled tank doors offer eight individual coverage level options

## Aerial Timber Harvesting



Erickson Air-Crane grew out of the Erickson family business, which had generations of experience in the timber industry. With the purchase of two S-64 Skycranes in 1971, Erickson Lumber Company expanded into heavy lift helicopter logging and became Erickson Air-Crane. Since that time the company has conducted successful operations in the Pacific Northwestern United States, Canada, and in the tropical forests of Malaysia and Indonesia. Canadian Air-Crane Ltd., a subsidiary of Erickson Air-Crane, located in Delta, British Columbia, has been in business since 1992 performing aerial timber harvesting, firefighting, and heavy construction operations in and around the province of British Columbia. Currently, Canadian Air-Crane is engaged in an operating partnership with Weyerhaeuser Canada which involves S-64 Aircranes in timber harvesting operations during all seasons of the year.

Helicopter timber harvesting with the S-64 is a cost-effective and environmentally sound method of harvesting wood, a natural renewable resource. Timber is lifted vertically and flown out rather than skidded across the forest floor. The benefits of this state of the art forest practice include far less damage to adjacent stands of trees, soil, and riparian areas resulting in a healthier forest environment. In addition, timber harvesting by helicopter provides for substantial cost savings by minimizing the need for road development, reducing the costs of falling, loading, and hauling the timber. The S-64 is not bound by limitations of conventional logging practices, allowing for a greater number of harvesting options. Through

the use of irregular cut block boundaries patterned for the environment rather than the machinery, the visual impact concerns are significantly reduced, preserving the natural beauty of our forests.

Erickson Air-Crane uses a highly successful hydraulic grapple system for the S-64 that has greatly enhanced the non-intrusive nature of helicopter timber harvesting. The Erickson Air-Crane Logging Grapple operates from aircraft hydraulic power to open and close the jaws within 3 seconds exercising over 42,000 pounds (19,000 kg) of pressure to keep the logs secure as they are pulled up and out of the forest floor. The grapple has been used extensively on conventional helicopter timber harvesting operations across British Columbia and in the Pacific Northwestern United States.

Recently, Erickson Air-Crane has developed a revolutionary new method of retention harvesting that involves pulling standing tree stems up and out of the forest with no damage to the tree or surrounding area. "Standing Stem Harvesting" involves the S-64 Aircrane using a standard grapple with two shackles welded to the frame allowing the grapple to be suspended horizontally. The horizontal grapple grabs the stem where it stands as the Aircrane pulls and snaps the tree off at the pre-cut point. This new method has been used with great success in harvesting operations along the B.C. mainland coast where the scenic value of the land must be maintained. In these areas, it is nearly impossible to tell that there has been any harvesting at all.





## Aerial Hydroseeding



The S-64 Aircrane is the delivery system of choice over conventional land based methods when the terrain is excessively steep, prohibits land based access, or contains a highly erodable soil type. The Aircrane can deliver a standard mixture of hydroseed or lime suspension to steep hillside terrain or any other area that may be judged impractical for conventional systems. The application process is substantially accelerated with the high volume delivery and as low as 3-4 minute turn around times achieved with the S-64 Aircrane and the 2,650 gallon (~10,000 litre) tank.

Erickson Air-Crane also specializes in the delivery of Lime pellets to neutralize the acidity of the soil and allow plant life to flourish. The Helitanker, in the hydroseeding configuration, has applied over 1,050 tons of pellet lime in 5 days to 235 acres in preparation for hydroseed application. Erickson Air-Crane employs an advanced version of the hydroseed tank that features an on-board circulation system to keep a saturated mixture of lime and mulch in suspension during flight.

Re-growth after the Helitanker lime application and hydroseeding has proven to be dramatically beyond expectations. After a successful Helitanker hydroseeding operation in Kellogg, Idaho, growth was expected to be around 40 percent using contemporary terrain models provided by the U.S. Army Corps of Engineers. Approximately six months later, re-growth was charted at 80 percent.



Choose up to 8 different coverage levels depending on the viscosity of the mix, soil, and terrain type.



Refill is accomplished in 1-2 minutes with a specially designed manifold which includes an agitator to keep the mix in suspension during flight.





Using the Helitanker, large areas of remote, inaccessible landscape can be covered within days

### **Powerline Transmission Tower Construction**



The first transmission tower set by Erickson Air-Crane was for Pacific Gas & Electric Company in 1971. Since that time Erickson has erected more than 7,000 miles of transmission lines.

The S-64 Aircrane flies with a crew of two pilots with a conventional forward facing pilot position and an aft facing pilot position. The forward facing pilot flies the aircraft to and from the work site. The aft facing pilot operates a full set of flight controls to maneuver the aircraft during load hook up and load placement. A plexi-glass bubble airshield offers the aft facing pilot an unobstructed view of the load being carried by the helicopter.

Erickson Air-Crane has developed and patented a load orientation device and guide system for use in erecting transmission towers. The "Anti-Rotation Device" provides four cables for lifting and prevents the load from rotating independently of the helicopter. This gives the aft facing pilot complete control over the helicopter as well as the load being carried. Fixed guides and stops provided by Erickson, assist in aligning the tower sections and securely holding the sections when they are bolted together. Our patented guide system is adaptable to virtually all transmission tower structures. Our operations department consists of professional staff with over 20 years of experience coordinating and assisting with the entire process of transmission tower placement from the specialized construction of the towers, to planning right of way paths and staging areas, to on-site assistance during the installation of the towers.

Fully assembled wooden H-Frame structures are transported with ease and require minimum ground support during installation. The aft facing pilot simply places the structure in the excavated holes and releases the frame. Up to 148 H-frame structures have been placed in one day. Up to sixty-four miles of H-frame wood poles have been installed in as little as three days.

Guyed structures are set with only two catch crews. The tower base is set on the foundation and the tower is tipped in one direction as two guy wires are attached to the anchors in the permanent hardware. The helicopter brings the tower up against the two guyed wires and the remaining two guy wires are pulled into position with rope blocks and caught in the permanent hardware. A separate crew is used to tension and plumb the tower.

Erickson Air-Crane has developed a timesaving method of installing caisson tower foundations using an hydraulic vibrating hammer driver. The "vibro driver", power pack and caisson are flown into place on the right of way and the caisson is driven without use of any additional support equipment. After the caisson is installed, the steel pole transmission tower structure is flown into place. This method of line construction eliminates the need to build temporary roads or use heavy equipment in sensitive wetland areas.





Wetlands caisson/steel pole construction is handled entirely with the S-64 Aircrane. Restoration fees are avoided and the process takes days, not weeks



With the high production capability of the Aircrane, over 100 lifts can be completed each day.

## Ski Lifts, Tramways, Structural Steel Construction



### **Ski Lifts:**

For over 30 years, Erickson Air-Crane has transported and installed ski lift towers throughout the United States, Canada, and Korea. We have extensive experience and a remarkable working relationship with the major ski lift tower manufacturers such as Poma, Dopplemayr, Garaventa CTEC, and Leitner.

With the significant lift capacity of the S-64 Aircrane, it is possible to lift more weight at a higher elevation. In a number of cases it is possible to transport the entire tower / cross-arm structure up to the set site and keep it stationary and level while workmen accomplish the bolt-down. In situations when altitude and temperature restrict the helicopter's lift capacity, Erickson Operations Staff assist in the design and planning process to separate the towers into safe working loads that are reassembled efficiently and securely at the "set site".

When assembling a ski lift tower by helicopter at the set site, the ability to secure the tower or tower sections during installation can mean the difference between a quick job and possibly destroying the tower and cement foundation. For this reason, Erickson Air-Crane employs our patented "Anti-Rotation" rigging system which keeps the load from spinning independently of the helicopter. The anti-rotation device allows for precision control over minute movements of the load to set the base quickly and safely over the bolt stubs and minimize damage to bolt threads. The anti-rotation device consists of a 6-foot (2 meter) spreader bar suspended with the 25,000 pound (~11,340 kg) capacity winch and a "locking ring" with several catch points around the ring to lock the cargo into facing any major azimuth. The locking ring is secured to the helicopter through 4 hard points located on the fuselage.

Speed and efficiency are some of the biggest advantages of the S-64 ski lift construction system. With decades of experience in the industry, remarkable piloting skill, massive lift capacity, and quick, precise placement, the average time per lift can be as low as 7 minutes.

### **Tramways:**

Erickson Air-Crane has employed the S-64 in Tramway construction spanning the Pacific Northwest from the Silver Mountain Gondola Tramway located in Silver Valley, Idaho ([info@silvervalley.com](mailto:info@silvervalley.com)), to the Heavenly Valley Tramway near the southeast corner of Lake Tahoe ([www.skiheavenly.com](http://www.skiheavenly.com)), to the Mt. Roberts Tramway located near Juneau, Alaska weighing more than 1,000 tons. ([www.alaska.net/~junotram/](http://www.alaska.net/~junotram/))

Our Patented anti-rotation device and the tremendous lift capacity of the Aircrane combine for the ideal construction crane system in areas that may be inaccessible to land-based construction teams. The Mt. Roberts Tramway, for example, stretches 1,800 feet (~549 m) and is cantilevered off of a cliff face located near the top of the mountain and the overall slope angle is greater than 60 degrees in some areas.

### **Structural Steel:**

Erickson has used the S-64 Aircrane to place large structural steel framework, artistic structures, statues, and ornamental steel across the United States and Canada.

Our reputation has often led to high profile work. When contractors have needed a reliable helicopter backed by experienced industry professionals to accomplish the task in the most efficient manner possible, the S-64 is the aerial crane system of choice. It was our reputation that led to Erickson being selected to remove and replace the Statue of Freedom from the dome of the United States Capitol Building in Washington, D.C. in 1993. The Commonwealth of Pennsylvania counted on experience and expertise when they contracted Erickson to remove and replace the Statue Commonwealth that sits atop the Capitol Dome in Harrisburg. In 1975 the Erickson Aircrane installed the weather metering systems and antennas that would top off the world's second tallest self-supported structure, the CN Tower, standing over 1,800 feet (~549 m) high, located in Toronto, Canada.

In the United States, Erickson employs the S-64 "F" model aircrane on a daily basis lifting and setting structural steel framework on Automotive plant buildings and skyscrapers across the Midwestern and Eastern United States. From complete frames, to multiple lift structures placing individual beams and grillage, our Marketing and Operations Departments get involved in the planning process from the beginning to help create safe and efficient working loads. Our Construction pilots and crews have over 20 years of experience in aerial heavy lift construction and it pays off in time savings with a remarkably efficient lift operation. Our very satisfied customers include:

Canron  
Fruchey  
Kirk and Blum  
ABB  
Shambaugh and Sons





Structural steel can be slung into place by the Aircrane with precision and control unmatched by any other aircraft.







The precision guides and patented anti-rotation system will work with almost every type of structure.

### **Paydirt at Quartz Hill**

At Quartz Hill, located 120 miles (193 km) from Ketchikan, Alaska in 1983, U.S. Borax found one of the largest deposits of Molybdenum deposits in America. Environmental restrictions, weather, and time constraints dictated a compressed schedule for the 9 mile (14 km) access road to the mining area. The solution was to build the road in 6 sections, towards each other, all at once. To accomplish the task, heavy construction equipment had to be brought in and placed at several different locations. The motivation for this bold and innovative approach was the use of the Erickson S-64 Air crane with a proven capability for heavy construction and precision placement. More than merely delivering the loads, the helicopter had to put large pieces of machinery back together with machine tool accuracy. After drilling and clearing out landing pads, smaller earthmovers like the D-4 and D-6 were brought in as 1 and 2-piece lifts.

The S-64 Airplane is the only aircraft built specifically as a flying crane in contrast to those with fuselages built for internal loads. The S-64E is powered by two 4,500 Horsepower Pratt and Whitney jet engines. The pilot can draw on 9,000 Horsepower for normal lifts. The Erickson Airplane will fly in any kind of weather that men can work in with the only exception being reduced visibility, as in fog.

The S-64 features a uniquely designed aft-facing pilot station with a full set of flight controls that allow the aft-facing pilot to control the aircraft during operations requiring a high degree of precision. A plexi-glass bubble airshield provides an unobstructed view of the load being carried. The S-64 is always serviced by a full Erickson ground crew including FAA-certified Airframe and Powerplant mechanics capable of complete overhauls. During the Quartz Hill job, a floating hangar carried a large inventory of parts and spare components for the job.

Working closely with the equipment dealer, NC Machinery, and contractor, Southcoast Incorporated, Erickson Operations personnel assisted in breaking down the heavier construction equipment into maximum lift configurations. A Caterpillar 980 loader was broken down into four lifts: the axles and tires, the front lift arm assembly, the main body, and finally, the bucket fully loaded with miscellaneous parts. Special modifications, such as steel guide rods and templates were attached to the pieces to facilitate quick reassembly. Since there were no hoisting devices available, it was critical that the sections were properly aligned when they were lowered onto the pad. Within hours the 980 was at work.

The largest and most critical piece of equipment was the Cat 235 Excavator. The track was held in a rigid frame to maintain its original factory alignment so that the next piece would fit back on top of it. The second piece, the lower frame, was quickly and precisely seated on the tracks. The 1,800 pound (~8,100 kg) center body was set down on a dowel pin with a tolerance of only 4 tenths of a millimeter. An attached metal alignment post brought the carriage into general alignment as series of cylindrical and conical alignment guides positioned it within the micrometer tolerances of the dowel pin. The engine was also guided into general alignment by a post and positioned by flange plates in the precise final fit.

In all, Erickson Air-Crane moved 176 lifts over two, two-day periods, a total of 1,100 tons (1,000,000 kg). Among the major pieces were four D-4s, three D-6s, two D-7s, two D-8s, four 235 backhoes, four Cat 980 loaders, eight Mac trucks, four DJB dump trucks, one grader, eight drills, and eight compressors. The essential tools that made the multiple-heading concept work and made airlift history at Quartz Hill with the largest civilian airlift operation ever attempted.

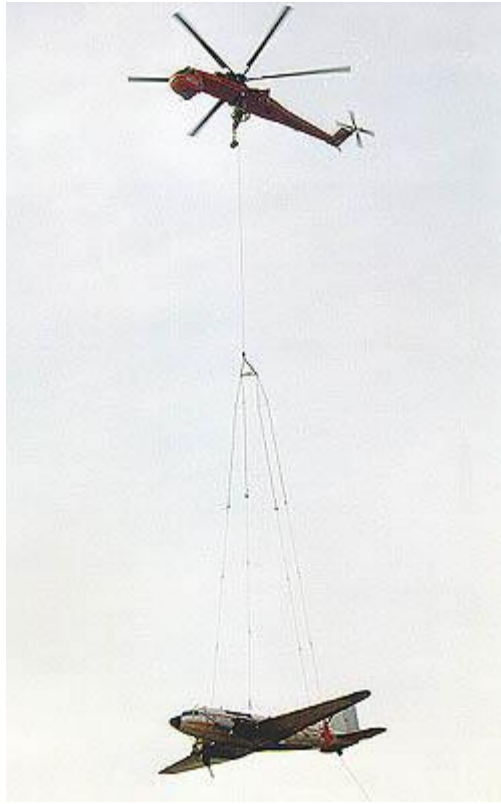


The Aircrane is ideally suited to transport heavy equipment into remote, inaccessible wilderness or jungle.



Large volumes of concrete, riprap, dirt, or other material can be moved quickly and economically





From small MD 500's to large DC-3's, Erickson has moved a wide variety of airplanes and helicopters.





## Heating, Ventilation and Air Conditioning

Erickson Air-Crane has placed air handling units from the small 8,000 pound (~3,629 kg) HVAC units to the large 21,000 pound (9,500 kg) or greater multiple lift air house systems across the United States and on the East Coast of Canada. We've placed over 20,000 units since 1971, placing air handling units on major auto manufacturing plants with Ford, Chevrolet, Toyota, GM, Chrysler, Honda, and Mercedes.

The S-64 Aircrane employs Erickson's patented anti-rotation rigging system which keeps the load oriented to the right direction during lift and placement. The anti rotation rigging has always been the ideal device for lift jobs requiring an unusually high degree of accuracy while placing air handling units on wooden and metal curbs and structural steel framework. The device is made up of a triangular spreader bar that is suspended from a 25,000 pound (~11,340 kg) capacity winch. The winch brings the spreader bar up into a locking ring, attached to the fuselage, which secures the load to face any major azimuth

Speed, safety, and efficiency are hallmarks of Erickson's reputation in the heavy lift construction industry. A recent operation at the Toyota manufacturing plant in Indiana involved the placement of over 1,700,000 lbs of HVAC components in one day. With the knowledge and experience gained from decades of transport and placement of air handling units, Erickson pilots and ground crew personnel placed 134 HVAC units and 7 exhaust stacks all on one hot July day.

As with any operation involving the S-64 helicopter, Erickson Air-Crane Marketing and Operations Staff will get involved early in the process and help with organizational and logistical efforts to facilitate the most efficient use of the Aircrane. From design and consulting on special lift lug arrangements, to design and implementation of special guides, to assistance in breakdown and rigging of multiple piece units, Erickson staff combine years of experience in construction and aviation to achieve the highest level of performance, safety, and efficiency in the industry.

But don't take our word for it, talk to some of the companies we've worked with:

Professional Supply Inc.

Dunbar

Stewart Mechanical

John E. Green

Ainsworth Inc. (Canada)

A.B. Myr

Kirk & Blum

Durr Industries

Industrial Contractors

H.M. White

Zack Co.

Ample Sheetmetal

Hussung Co.

Apex Industries

I.D. Griffith

McKennys Mechanical Contractors

Shambaugh and Sons



To assist in the placement of the loads, our patented anti-rotation cargo handling system keeps the load secure during placement.



The unique aft-facing pilot station features a full set of flight controls and gives the aft seat pilot an unobstructed view of the load being carried.



The Erickson S-64 Airplane has returned to the East Coast and is back in business. Call or email to find out how we may meet your needs.





Erickson Air-Crane has placed over 20,000 HVAC units on buildings across the United States. The S-64E can lift units weighing up to 16,000 lbs. with a 170 sq. ft. footprint. Erickson's experienced pilots and crew are capable of moving over 100 units a day.

## **Petroleum Exploration and Drilling Support**



Robust reliability combined with up to 25,000 pound (11,340 kg) lift capacity make the Erickson Aircrane a safe and efficient machine for movement of drill rigs and heavy pipeline equipment.

Erickson has provided lift services for the movement of multiple drill rigs and platforms in several countries, including extensive work at frontier locations in Ecuador, Peru, Indonesia, Papua New Guinea, and Canada. The robust reliability of the S-64 combined with up to 25,000 pound rated lift capacity and precision placement capability make the Erickson Aircrane a safe and efficient performance machine for movement of drill rigs, heavy equipment and drill pipe. A demonstrated and remarkable level of lift expertise under all types of conditions ensures the highest level of performance in the oil and gas theater of operations.

Erickson understands the unusual requirements of the oil industry and is uniquely positioned to meet any challenge. We also understand that timing is critical in the oil and gas industry and we have established an enviable reputation for on-time reliability and outstanding operational availability.

We regularly transport helicopters worldwide and specialize in shipping our heavy-lift helicopters via ship or aircraft on short notice. In addition, Erickson maintains permanent bases in Malaysia, Canada, Europe, Peru, and the U.S. for support of aircraft operations.



We regularly transport helicopters and crews worldwide and specialize in shipping our heavy lift helicopters via barge or aircraft on short notice.

### **Manufacturing, Maintenance, Repair, and Overhaul**



FAA REPAIR STATION # JYDR439F

JOINT AVIATION AUTHORITY # JAA.5108

FAA PRODUCTION CERTIFICATE # 716 NM

The production certificate quality system meets the requirements of AS 9000 Aerospace Quality Standards and ANSI/ISO/ASQC Q 9002 Quality Systems Model for quality assurance in Production, Installation and Servicing. The program complies with applicable sections of FAR Part 21 & 45.

**QUALITY DEPARTMENT CAPABILITIES:**

Calibration of measuring and test equipment in compliance with MIL-STD-45662A and

ANSI-NCSL Z540-1 ISO 10012-1.

1 each Mitutoyo model BH1015L coordinate measuring machine with computer and GeoPak 2100 software.

Hardness testing IAW ASTM-E-18.

**Non-Destructive Testing:**

Magnetic Particle Inspection in accordance with ASTM-E-1444-93.

Fluorescent Penetrant Inspection in accordance with MIL-I-6866, Type 1, Method A, C&D or ASTM-E-1417.

Ultrasonic Inspection in accordance with MIL-STD-1875.

Eddy Current Inspection in accordance with MIL-STD-271.

**COMPONENT OVERHAUL AND REPAIR CAPABILITIES:**

S61, S64 E & F:

**Hydraulics**

Auxiliary Servo

Primary Servo

Main Landing Gear

Test stand capabilities up to 4500 PSI



## **Dynamic Components**

Main Rotor Head

Intermediate Gear Box

Tail Gear Box

Tail Rotor Head

Main Gearbox

To include, tear-down, inspection, repair, assembly and test.

### **Electronics**

AFCS Amplifier and ASE Card repair

### **ENGINE OVERHAUL REPAIR CAPABILITES:**

Pratt and Whitney JFTD12A-4A/ 5A

Complete tear-down, inspection, repair and buildup and test.

### **SPECIALIZED CLEANING EQUIPMENT:**

Liquid Abrasive System, Kleiber & Schulz, Inc.

Cabinet size 64 cubic feet with 10-inch manual positioning table

OD gun 3/8 straight nozzle, air assisted.

Used for wet aluminum oxide 320 to 80 grit

Liquid Honing System, vapor blast, model # 3-30

Cabinet size 15 cubic feet.

Fully contained aqueous jet wash system, solvent equipment, and ultrasonic.

Dry glass blast and plastic blast for paint and corrosion removal.

### **FACILITIES LIST:**

#### **MILLING:**

2 each Series I Bridgeport vertical mill .0005 DRO resolution .0005

1 each Series II Bridgeport vertical mill .0005 DRO resolution .0005

1 each Lagun Mill accuracy's .0005 DRO resolution .0002, 18" X 18" X 40"

1 each Lagun Mill accuracy's .0005 DRO resolution .0002, 13" X 13" X 30"

1 each Lagun Mill accuracy's .0005 DRO resolution .0002, 16" X 16" X 32"

1 each G&L Horizontal Boring Mill travel X axis 52", Y axis 50", Z axis 80", table size 36" X 72", machine accuracy 20" 0 bolt hole circle true position .006

### **LATHE:**

1 each Clausing lathe, 15" swing X 42" length, accuracy +/- .00025 per foot DRO

1 each Clausing lathe with gap 15" X 42" without gap 24", swing 3" length from chuck jaws, accuracy +/- .00025 per foot DRO

1 each YAM lathe with gap 18" X 60" without gap 22" swing X 7" length from chuck jaws, accuracy +/- .0005 per foot on diameter

1 each Graziano lathe 96" length 26" swing 1' from chuck 20" swing remainder of lathe length, accuracy +/- .0005 per foot on diameter

1 each Vertical lathe DRO work piece maximum diameter 6 ½', overall height of work piece 4' maximum, maximum length of cut 4' RPM 3.7 - 180, machine tolerance +/- .001 per foot on diameter

### **CNC LATHE:**

1 each MORI-SEIKI SL-25B maximum work area 10" diameter X 20" long.

Accuracy of +/- .0002 per foot.

### **CNC MILL:**

1 each HAAS VF-4 mill 50" X axis - 20" Y axis - 25" Z axis, +/- .0002 within all axis

1 each HAAS VF-5 mill 50" X axis – 26" Y axis – 25 Z axis, +/- .0002 within all axis

1 each HAAS VF-9 mill 84" X axis – 40" Y axis – 30" Z axis, +/- .0002 within all axis with auxiliary 5<sup>th</sup> axis capability.

### **CNC EDM HANSVEDT:**

1 each Machine Tool

Positioning table travel 15.7" x 19.6" (400 x 500 mm)

Worktable size 19.6" x 31.4" (500 x 800 mm)

Work tank size 27.5" x 49.2" x 18" (700 x 1,250 x 458 mm)

Platen-to-table, maximum 29" (737 mm)

Ram travel 12" (305 mm)

Backslide travel 12" (305 mm)

Platen size 7.8" x 11.8" (198 x 300 mm)

Maximum electrode weight 550 lbs. (250 kg)

Maximum work piece weight 3,300 lbs. (1,498 kg)

**GRINDING:**

1 each STG-450 OD/ID cylindrical grinder 6" X 17" O.D. 5" X 5" I.D. .000125 inc. .00002 rept.

**BALANCE:**

1 each Single Plane Hoffmann HDV30J Balancer, 1-150 lbs. 36" maximum diameter 12" maximum height, 0-1750 RPM range

1 each Schenck Dynamic Balancer HL4B, 8' 3" bed length, 3-1100 lbs. 41" maximum diameter, minimum length 5.3" maximum 83"

**PLASMA:**

1 each 6' X 10' X 7' spray booth

1 each environmentally controlled spray booth

1 each grit blast cabinet, 4' X 3' X 3" pressure system

Metallurgical lab for bond testing and grain structure

1 each Metco 40 kW power supply

1 each Metco 7MC control console

1 each Metco 7MB plasma gun

1 each Metco 11MB extension plasma gun

1 each Sulzer-Metco SMF-100 plasma gun system (extension, standard)

1 each Metco 4MP-D (UAL) powder feeder

1 each Fanuc 6 axis robot

1 each 30" turntable, variable speed



Ceramics

Cermets

Metals (alloy)

Pratt & Whitney's specification 53 requirements

Sikorsky SS8491

AMS2437B

**PLATING:**

2 each Ovens, 2' X 2' X 2', maximum temperature 500° F

2 each plating stations with exhaust and ventilation

Metallurgical lab to test hydrogen embrittlement specimens

1 each Sifco, 50 vdc, 150 amps

1 each LDC, 25 vdc, 300 amps

1 each Peristaltic

2 each Sifco, heater/pump systems, 3 gallon capacity

1 each lathe, 24" swing, 48" bed

1 each lathe, 36" swing, 48" bed

1 each tank, 2' X 2' X 2' volume

Maximum component size is 18" cube

Electrodes/stylus as required, including rotoflow, platinum

All LDC materials and alloys (including precious)

Brush cadmium-plating Mil Std 865

Tank cadmium-plating AMS QQ P 416

**SHOT PEEN EQUIPMENT:**

Pressure system, Kelco, model # CH-66-66C

Cabinet size 64 cubic feet with a 54 or 22 inch powered positioning table.

Cyclone dust removal system,

Two pressure pots one for glass bead and one for steel shot

ID guns hollow blast junior capable of an ID  $\frac{3}{4}$  inch to 2 inch.

Hollow blast capable of an ID 2 inch to 12 inch.

ID guns operate on an electrically actuated hydraulically operated lance.

The lance has a throw of 9 inches and is adjustable from the cabinet floor to within 10 inches of the cabinet ceiling

OD guns, Kelco  $\frac{3}{8}$  inch venturi nozzles and  $\frac{3}{16}$  to  $\frac{1}{2}$  inch strait nozzles

Suction system, Pauli & Griffin Co., model # DH48

Cabinet size 36 cubic feet with 10-inch manual positioning table.

Bag filter dust removal system

OD gun, Pauli & Griffin Co.  $\frac{3}{8}$  and  $\frac{1}{2}$  strait nozzle, suction type

AMS 2430-L shot peening

AMS-S-13165C shot peening of metal parts

SS8766 shot peening titanium alloys

SS8767 shot peening aluminum alloys

SS8768 shot peening steel alloys

SS8769 shot peening metal parts local rework of

PWA SPOP 500 bead peening

PWA SPOP 501 shot peening

## **HANGAR CAPABILITIES:**

Airframe – Class III & IV

Structural repairs, major, and minor

Airframe MOD's

Aircraft inspections

Aircraft stripping and painting

Metal shearing and forming up to .250 X 10 ft. long

Hand formed bulkheads, ribs, etc.

Aluminum and stainless steel fabrication of hydraulic line.

Certified aluminum welding

Engine line repairs, silver solder to P & W Spec's

Aircraft weighing (with electronic scales)

Electrical systems re-wire, troubleshooting and repair

Wire harness design, stamping, and assembly

Radio installation and testing

AFCS component test and repair

Soldering to MIL Standard 2000

Pitot-static test and certification I/AW CFR 14, Part 43 Appendix E, to comply with CFR 14, Part 91.411

Test and Inspection of ATC Transponder Systems, excluding Mode S Transponder Systems, I/AW CFR 14, appendix F to comply with CFR 14, Part 91.413

## **FUSION WELDING TO AMS-STD-2219,& PWA16**

### **WELDING CAPABILITIES CERTIFIED TO AMS-STD-1595:**

#### **Gas Tungsten Arc Welding per AMS-STD-2219**

4130 AMS 6350

A286 AMS 5525



Hastx AMS 5536

Inco 718 AMS 5590D/5596

6061 AMS 4025

AZ61A AMS 4350

L-605 AMS 5537F

SS 321 AMS 5510N

6061 AMS 4025

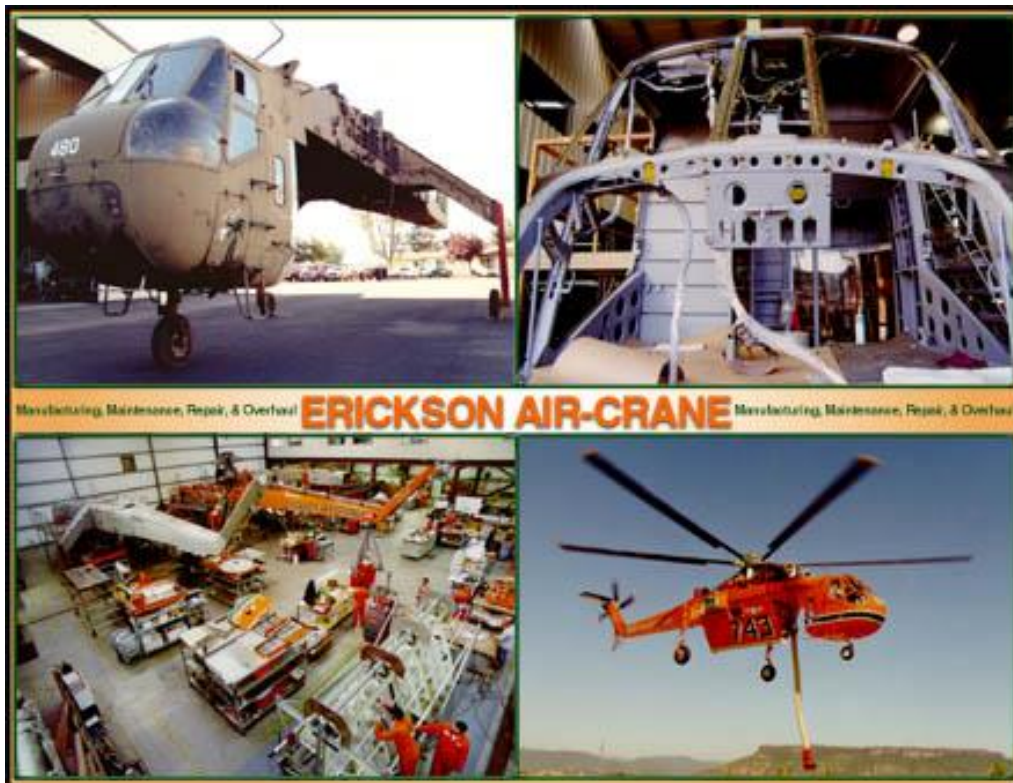
Field calls, portable welder and stress relief available.

Special Capabilities:

Component Container Manufacture

Engine and Main Transmission Test Cell

## Aircraft Sales



In 1992 Erickson Air-Crane purchased the Type Certificate for the S-64 Skycrane helicopter from Sikorsky Aircraft. Since that time, under the H6EA Type Certificate, we have manufactured 14 “Zero Hour” S-64 helicopters under the new designation of “Erickson S-64

Aircrane.” A milestone in helicopter manufacturing happened in Central Point, Oregon when, in February of 1993, the first civilian FAA certified “Standard Transport Category” S-64 “F” model, rolled out of the Erickson hangar with a longer main rotor chord length, reinforced tailboom and a 25,000-pound (~11,340 kg) rated lift capacity. Until that time a civilian counterpart to the military CH-54B model heavy lifter did not exist.

The remanufacture process begins with the arrival of a CH-54 or S-64 airframe. All existing avionics, wiring, hydraulic lines, and accessories are removed and the airframe undergoes a chemical paint removal process down to the bare metal. Each individual section of sheet metal as well as every spar and stringer is inspected and tested for integrity. Any defects are repaired using FAA certified procedures.

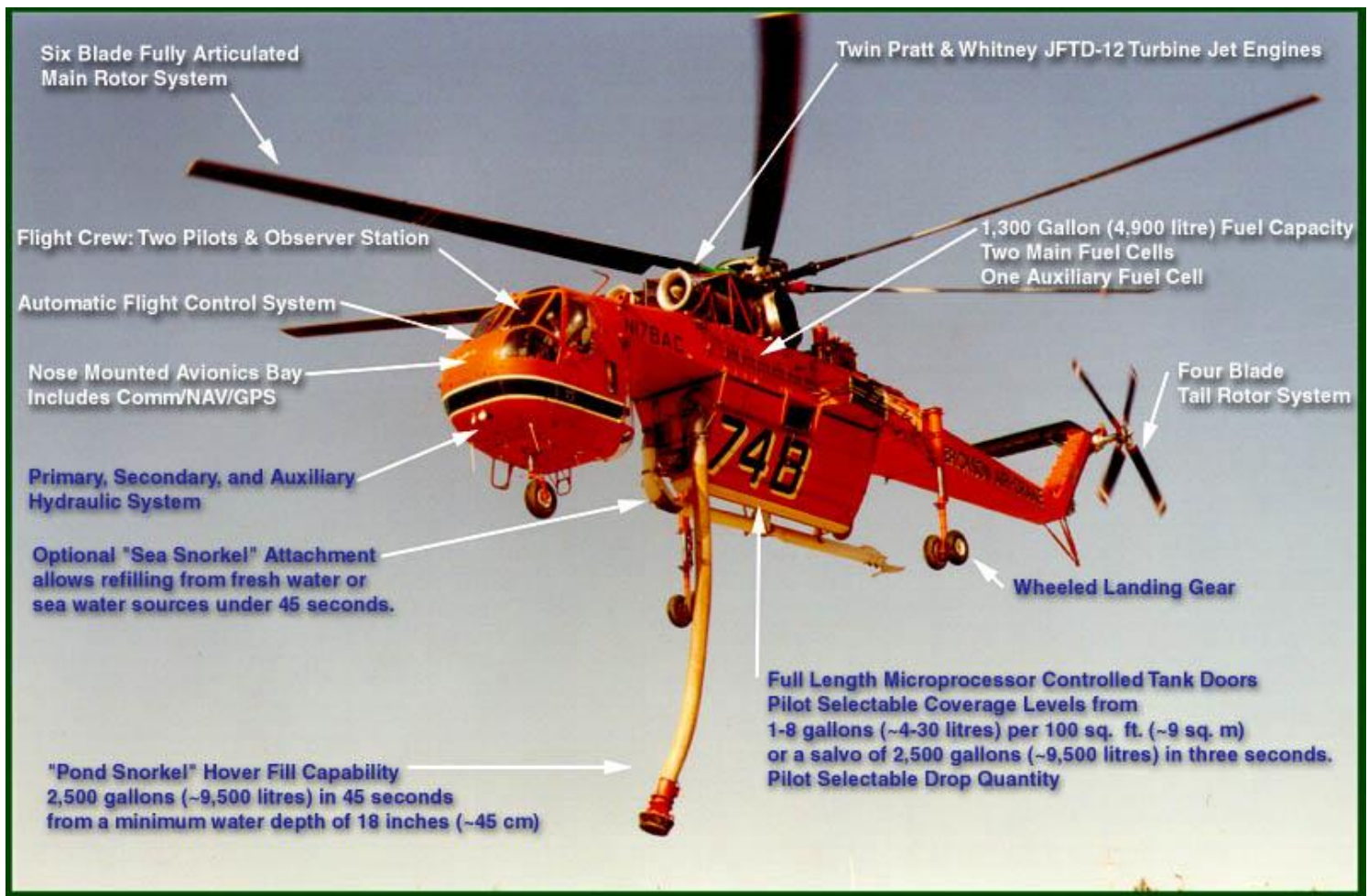
After the airframe has been thoroughly overhauled and inspected, Erickson technicians install fully assembled Pratt & Whitney turbine jet engines. Avionics Technicians string the miles of wiring and state of the art Communication, Navigation, and Global Positioning Systems. Hydraulic Technicians install all of the necessary conduits and pumps that enable powerful direct linkage flight controls augmented by a complicated network of servos and gyros that make up the Automatic Flight Control System or the “Power Steering” for the Aircrane.

The entire remanufacture process typically takes 6-9 months from receipt of a decommissioned airframe to demonstration and certification of airworthiness depending on the configuration requested by the customer. Prospective buyers may request the following:

1. S-64 “E” or “F” model Aircrane in the Construction Configuration with a fully operational aft-pilot station, 25,000-pound (~11,340 kg) capacity winch with cargo hook, and patented anti-rotation device.
2. S-64 “E” or “F” model Aircrane in the Fire Suppression Configuration with the 2,650 gallon (10,000 litre) variable flow tank, “Hover Snorkel” 45-second refill hose, “Sea Snorkel” hydrofoil sea water ram scoop, and the “Water Cannon” 300 gpm (~1,136 lpm) horizontal stream delivery nozzle.

Further accessories include a wide-mouth hydroseeding refill manifold with on-board agitation system to keep the mix in suspension during flight and a 3,000 psi external hydraulic power pack for long-line grapple timber harvesting operations.

\*\*It is important to note that the information above is meant for education and reference purposes and does not constitute any binding proposals. It is highly recommended that any potential buyer for the S-64 Aircrane contact our Sales and Marketing Department for further discussion about how we can best provide an Erickson S-64 Aircrane helicopter to fit each set of individual needs.



**Contact Erickson Air-Crane at:**

Telephone: 541-664-7615  
 Fax: 541-664-7613  
 U.S.A. Only: 800-424-2413

Address: Erickson Air-Crane Incorporated  
 3100 Willow Springs Road  
 P.O. Box 3247  
 Central Point, Oregon 97502  
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<http://www.ericksonaircrane.com/index.asp>