

S-2F Trackers from VT-28 rendezvous for a carrier qualification flight.

composite (VC) squadrons. *Skyhawks* have performed in a broad, multipurpose role and after 12 years are still being used as the Navy's advanced training aircraft. They have held their own from the days of early jet aircraft to today's variable swept-wing supersonic planes.

In its search for an all-purpose jet trainer which could be used in basic flight training through solo and on into advanced flight training, in July 1956 the Navy selected the T2J design developed by North American. In order to evaluate its future program of using the T2J jets in basic training, the Navy had ordered a limited number of Temco TT-1 *Pinto* aircraft on June 29, 1956. This was the first purchase of a basic jet trainer by any of the services. The TT-1s were delivered in 1957 and possessed many of the features found in operational jets, including ejection seats, liquid oxygen equipment, speed brakes, and controls and instrument panels. They served their purpose, which was evaluating the use of jets for basic flight training and, by the end of 1960, the TT-1s were no longer in operation in the naval training command.

The first T2J made its maiden flight in December 1957. It was designed for use as a basic jet trainer that would provide the type of features found in high-performance jet fighters and modern service planes. It had a tandem-seat, single jet engine, straight wing and tricycle landing gear. The T2J was capable of operating as a land or carrier-based training aircraft. A unique feature was its dual ejection system which the instructor could operate from either the front or back seat. The low-level, rocket-propelled ejection system provided a safe means of escape for pilot and student throughout the flight envelope, including ground level. This was the first

time this type of escape/ejection system had been incorporated into a trainer.

Simplicity of operation was an important feature provided by the T2J-1. It was equipped for use in gunnery, bombing and rocket training; formation and tactics; instrument training; carrier qualifications; and other operations including tow target. The T2J was designed to provide a comprehensive training program from primary through advanced training, giving the student a well-rounded background for further advanced training. These features, combined with ease of maintenance, reliability and economical operation, provided the Navy with an excellent basic jet trainer.

After the completion of Navy tests at the Naval Air Test Center (NATC), Patuxent River, Md., and aboard *Antietam*, the Naval Air Basic Training Command (NABTC) received its first T2J-1 *Buckeyes* in July 1959. After a training syllabus was developed, flight instructors began familiarization training. On November 2, 1959, the first class of Navy flight students began, assigned to BTG-9 (later redesignated VT-4) at NAS Pensacola.

More firsts followed for the T2J-1s. They were the first jets used in air-to-air gunnery practice in May 1960 and another milestone was recorded on June 2, 1960, when cadets from VT-4 were the first to carrier qualify in the T2J-1 aboard *Antietam*.

The last of the T2J-1s were delivered to the Navy in April 1961, bringing the total number built for the Navy to 217. The commands operating the *Buckeye* at that time were VT-4, VT-7, NABTC at NAS Pensacola and the Naval Air Technical Training Unit at Olathe, Kansas.

With the end of production, the Navy began to investigate possible upgrading

of the *Buckeye*.

North American (later known as Rockwell International) modified the T2J-1 to a twin-engine aircraft. The prototype, designated YT2J-2, made its first flight on August 30, 1962. The two new engines, weighing less than the single engine in the T2J-1, provided a substantial increase in performance. A contract was signed with North American in February 1964 for an initial production number of the new *Buckeyes*, redesignated YT-2B because of aircraft designation changes by the Department of Defense (previous T2J-1s were redesignated T-2As in 1962). The Naval Air Basic Training Command at NAS Pensacola received two YT-2Bs on April 6, 1964, for use in evaluating the jet training syllabus.

The first production model of the T-2B made its maiden flight on May 21, 1965. It was a twin-engine jet with some new electronics. The major systems, such as flight controls, landing gear, fuel and speed brakes, were almost identical to those on the T-2A. This was done to keep costs low, including the cost of the spare parts inventory, and for ease of maintenance training. The twin-engine *Buckeye* provided a large increase in power, which brought the aircraft's performance more in line with high-performance jet fighters and made the transition from jet trainers to combat-type planes easier for Naval Aviators. The addition of the two engines increased safety since, if there was a malfunction in one engine, there would be sufficient power in the other to bring the aircraft back safely.

On August 24, 1965, testing of the T-2B began at the NATC and the first squadron delivery was to VT-7 on November 9, 1965, followed by additional T-2Bs to VT-4 at NAS Pensacola in December. VT-4 incorporated the new aircraft into its training syllabus in August 1966, the first squadron to use the T-2B for air-to-air gunnery and carrier qualification training. The first carrier landing by a student Naval Aviator was on September 2, 1966, aboard USS *Lexington*. A third in the *Buckeye* series, designated T-2C, was introduced in 1966. The only major difference between the C and B models was a change in engines. General Electric J65-GE-4 engines provided an additional 45 pounds of thrust for each engine over the Pratt & Whitney J60 engines on the T-2Bs. VT-9 at NAS Meridian was the first squadron to

receive the new T-2C on April 30, 1969. The twin-engine T-2Bs and Cs eventually replaced the single-engine A model. The last of the T-2As were retired from the Naval Air Training Command on February 28, 1973, after 14 years of service in basic flight training. In a reversal of the traditional pattern of aircraft acquisition, several T-2Bs which had been retired to storage at Davis-Monthan AFB were brought out of mothballs in the latter part of 1981 to fill the shortage of T-2Cs in the training

command. They were restored to operating condition by NARF Pensacola and made ready for use.

Training planes are generally thought of in terms of primary and advanced training requirements. The T-39D or CT-39E/G *Sabreliner* is an exception. It was ordered by the Navy in 1961 for NFO flight training in radarscope interpretation. The Air Force had contracted for development of the T-39 in 1956 with production scheduled for 1958. When the Air Force added a

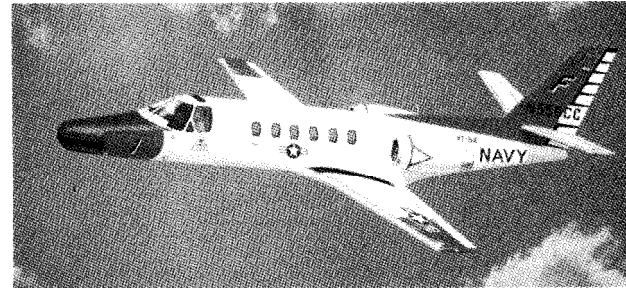
fighter-type radar to the aircraft for special training, the Navy followed suit and ordered the T-39D (as the T3J-1) with a Navy fighter-type radar.

The T-39 is a sleek swept-wing, twin-engine jet capable of a wide variety of duties, including training NFOs. The Navy also ordered another version, designated CT-39E or G, for use as transports. These aircraft were a common sight at many naval air stations.

While the T-39D had an active role in

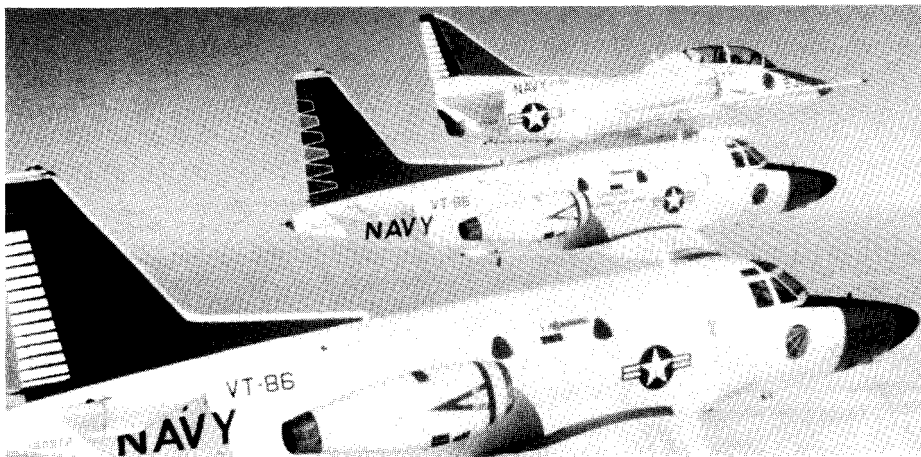
**An R.G. Smith painting depicting the T-45 jet trainer scheduled for introduction to the Training Command in early 1991.**





The T-47 is the newest aircraft assigned for the training of NFOs.

The T-44 Pegasus is used for multiengine instrument training.



Two T-39D Sabreliners and a TA-4J Skyhawk assigned to VT-86. The T-39 was used extensively in the training of NFOs.

the training of NFOs, changes in technology and the introduction of many new types of radars made the old radars outdated and difficult to maintain. This problem, combined with age, led to the search for a replacement system for NFO training. On May 10, 1983, a contract was awarded to Cessna Aircraft Company for modified Citation IIs (Navy designation T-47A) with upgraded radars to be used as part of the new training program for NFOs. The first Cessna T-47A arrived at the training command on December 31, 1984, and this was the beginning of the phaseout for the old T-39D. All T-39Ds were replaced by T-47As as of February, 13, 1986.

In 1975 the Navy began looking for a replacement for the aging TS-2A Tracker multiengine trainer. After reviewing several designs, the Navy selected the Beechcraft King Air 90 and a contract was signed for initial delivery of three aircraft by March 1977 for testing. The King Air, designated T-44A Pegasus, had been in operation since 1964 in various civilian and military versions.

The original Navy requirements

included a proven design, turboprop engines, excellent performance at high and low altitudes, reliability, quiet operation and economy. The T-44 provided all these features in an aircraft that had already flown more than seven million hours. It was a trainer with high availability and low maintenance and operating costs.

The first T-44As arrived at NAS Corpus Christi on April 5, 1977, and student training began in July 1977 under the cognizance of Commander, Training Air Wing 4. Student pilots completing their training in the T-44A for advanced multiengine instruments were assigned to squadrons flying aircraft such as the P-3 Orion and E-2C Hawkeye.

Another chapter in Naval Aviation training was started in the early 1980s—introducing a new program for training jet pilots, with emphasis on a complete package to include all aspects of jet training from the aircraft down to the flight training syllabus. The Undergraduate Jet Flight Training System (VTXTS) is designed to cover the intermediate and advanced phases of Navy undergraduate jet pilot training.

It will be a fully integrated system consisting of aircraft, simulators, computers, academic materials and a training management system, which will reduce time and cost of training with a minimum acquisition price. As a complete package, the program is being developed to phase out the aging T-2 Buckeyes and TA-4 Skyhawks from the Naval Air Training Command, and to serve as the sole aircraft and system for jet training.

The aircraft portion of the VTXTS program, the T-45 is a variant of the British Hawk jet trainer and the overall program is known as the T-45TS (T-45 training system). The T-45 will be configured with tailhook and launching gear to make it fully capable of supporting carrier qualifications. The aircraft's available speed and maneuvering envelope permit a safe transition for primary students, but allow for increased task loading as the students gain experience. The British Hawk will undergo some modifications to meet Navy requirements. Its approach speed is 121 knots with a maximum level flight of Mach .85, and it has a very efficient fuel consumption rate. The tandem-seat transonic trainer is powered by a single Rolls-Royce Adour engine. The T-45 is scheduled to make its first flight in July 1986 and introduced into the Naval Air Training Command in early 1991. This is the first time the Navy is purchasing an entire training package under a single contract — a package that will cover jet pilot training from beginning to end and include state-of-the-art, computer-aided instruction; instrument and operational flight trainers; formal academics; a training integration system to streamline management of the training program; contractor maintenance support; and the actual aircraft.

The era of rotary aircraft is relatively new. Interest in the development of helicopters had some support in the early period of Naval Aviation and on December 5 1917, the Secretaries of the War and Navy Departments established a policy for encouraging its development. However, it was not until January 1931 that the Navy ordered its first rotary-wing aircraft, an XOP-1 autogiro from Pitcairn Aircraft Corporation.

The XOP-1 was delivered to the Navy on June 1, 1931, and made its first landing and takeoff aboard *Langley* while underway on September 23, 1931. Three autogiros were ordered for experimentation and possible use in carrier operations, and patrol and rescue work. One of the XOP-1s was assigned to the Marine Corps during the summer of 1932 and was used in the second policing action in Nicaragua. However, it did not have the range needed for expeditionary use and was not capable of carrying heavy payloads. It was used primarily for medical evacuation and reconnaissance. The XOP-1 was returned to Quantico for testing as an artillery spotter. Its slow speed and the restricted vision of the pilot/observer made it unsatisfactory for this purpose and by the end of 1933 it was no longer mentioned in Marine Corps records.

The Navy continued to experiment with the autogiro. On March 12, 1935, a contract was given to Pitcairn to remove the aircraft's fixed wings and convert it to the XOP-2, the Navy's first rotary vehicle without fixed wings. The last mention of an autogiro was on August 9, 1937, involving the conversion of an N2Y-1 trainer into an experimental gyroplane capable of water takeoffs. After this brief period of experimenting with autogiros, the Navy did not become actively involved with rotary aircraft until WW II.

On July 24, 1942, the Bureau of Aeronautics issued a directive for the procurement of four Sikorsky helicopters for study and development by the Navy and Coast Guard. Navy officials witnessed landing trials of the Army Air Forces XR-4 helicopter on board a merchant tanker in May 1943, which led them to order a YR-4B (Navy designation HNS-1) from the Army for evaluation.

On October 16, 1943, the Navy received its first successful helicopter, a Sikorsky YR-4B (HNS-1), after a 60-

minute acceptance test flight by Lieutenant Commander Frank A. Erickson, USCG. Experiments were conducted at Floyd Bennett Field, N.Y., which proved the feasibility of using the HNS-1 as an airborne ambulance. Looking ahead to the use of helicopters in shipboard operations, on January 1, 1944, the Chief of Naval Operations directed that a separate helicopter pilot training program be conducted by the Coast Guard at Floyd Bennett Field under the direction of DCNO (Air). Various missions were carried out during 1944 which proved the operational worth of the HNS-1, including its use in rescue missions.

The evolution of the helicopter called for new administrative procedures and, on May 13, 1944, a system was established to distinguish between fixed and rotary-wing, heavier-than-air craft. The old helicopter VH designation was abolished and helicopters were established as a separate class, designated H, with the mission letter added to the class designation, such as O, N and R for observation, training and transport, respectively.

As in the case of the early fixed-wing planes, early training helicopters were the same aircraft as those used in an operational role. Models of the Army's R-4B were procured by the Navy to train pilots to fly its first operational helicopter, the HNS-1. The HNS-1s were equipped with a 200-hp Warner R-550-3 engine, a rotor diameter of 38 feet, a tail rotor and maximum speed of 82 mph. VX-3 was the last squadron to operate the HNS-1, which was phased out on December 31, 1947.

The successor to the HNS-1 was the HOS-1, also manufactured by Sikorsky and operated originally by the Army. It was received in September 1944 and delivered to NAS New York for evaluation and experimentation, as well as training. The HOS-1 had a 235-hp Franklin O-435 engine, a 38-foot rotor diameter, a tail rotor and maximum speed of 96 mph. After extensive service with VX-3, the HOS-1 left the squadron's inventory on January 31, 1948.

Despite their relatively short life spans, these first two helicopters played an important role in the training of pilots and the development of operational procedures. Helicopter flight training was first conducted by the Coast Guard at Floyd Bennett Field, NAS New York. The Coast Guard was involved in training Navy helicopter pilots because

it had become part of the Navy Department during WW II. With the end of hostilities, the Coast Guard reverted to the control of the Treasury Department. On July 1, 1946, Experimental Squadron (VX) 3, also known as Helicopter Development Squadron, was established at NAS New York to study and evaluate the adaptability of helicopters to Navy requirements. Besides developing operational procedures and conducting experiments with helicopters, VX-3 was responsible for training Navy helicopter pilots at the air station.

After two years of increased helicopter activity in the fleet, it became apparent that VX-3 was becoming more involved in fleet operations and less in development. On April 1, 1948, VX-3 was disestablished and two new squadrons were established, designated Helicopter Utility Squadrons (HUs) 1 and 2. Personnel from VX-3 formed the nucleus of the two new squadrons. Their primary mission was search and rescue, and providing utility services for the fleet. HU-2, based at NAS Lakehurst, N.J., was also tasked with training helicopter pilots.

Following the establishment of HU-2, CNO issued standards on June 11, 1948, for training helicopter pilots. The CNO standards also stated that helicopter pilots who had previously been trained by VX-3 or the Coast Guard would retain their qualifications. HU-2 continued to train helicopter pilots until the training element of the command was moved to Ellyson Field, Pensacola, where it was designated Helicopter Training Unit (HTU) 1 on December 3, 1950.

Since January 1951, when HTU-1 began its first class, all basic training for helicopter pilots has been conducted in the Pensacola area. Helicopter Training Squadrons (HTs) 8, the descendant of HTU-1, and 18 are the current helicopter training squadrons.

The early period of Navy rotary-wing operations saw rapid technological advances in helicopter design and in operational capabilities with a variety of aircraft produced by different manufacturers. One example was the HO3S, built by Sikorsky and accepted by the Navy in November 1946. It was used by HU-2 and later by HTU-1 for training. While the HO3S served in a wide variety of roles during its operational life, its most memorable service was with HU-1 during the Korean conflict in rescue missions. The





Air-sea rescue tests were conducted with the Navy's first helicopter, the HNS-1.

An HNS-1, in the background, and the HOS-1, in the foreground, were the first two helicopter types used for training, experimentation and general utility.

The XOP-1 Pitcairn Autogiro, one of the Navy's early experimental rotary-wing aircraft.



The HTL (later designated TH-13), right, and the H-34 Seahorse, below, were assigned to the helicopter training squadron at Ellyson Field, Fla.



An HO3S-1 assigned to Helicopter Utility Squadron One performing rescue exercises and drills.

HO3S-1 accounted for a major change in the configuration of aircraft aboard nonaviation ships. It displaced the fixed-wing seaplanes which had operated aboard cruisers and battleships, and also became the mainstay for rescue craft aboard carriers.

The HO3S had a rotor diameter of 48 feet and was powered by a 450-hp P&W R-985-AN-5 engine. It could carry three passengers and a pilot, and its maximum

speed was 96 mph. HU-1 was the last squadron to operate the HO3S. It was phased out of squadron operations on November 30, 1954, but remained in the Navy inventory and was used at shore-based activities until 1957.

The first helicopter acquired by the Navy specifically for training was the HTL built by Bell Corporation. HTL was the Navy designation for Bell Model 47, a commercially produced helicopter. A

contract for the HTL was signed on June 20, 1946, and the first HTL-1 was delivered to the Navy in February 1947. Seven model variations were accepted by the Navy. The HTL was also used in limited utility roles and the HTL-7 model, which had all-weather capabilities, served as an instrument trainer. In 1962, the HTL designation was changed to the TH-13 series, with the nickname *Sioux*.

Depending on model variations, the helicopter could carry a pilot and two passengers, or just a pilot and one passenger. It had dual controls, a twin-rotor system, a rotor diameter of 35 feet and a tail rotor. Horsepower ranged from 178 to 240, depending on the model. After 26 years of service to the Navy, the last HTL (UH-13P) to be reported in the Navy inventory was on June 30, 1973.

The HUP *Retriever* was first contracted for on February 8, 1946, and was delivered in January 1949 to begin a long period of service with the Navy. Its primary mission was search and rescue and as a utility-cargo helicopter. In the search and rescue configuration, it was used extensively in plane guard duty for carriers. It was designed specifically for shipboard use and became the Navy's first interim ASW helicopter. The HUP-2S was the first helicopter to have an autopilot. It was equipped with dual controls and carried a crew of three plus four passengers. The tandem rotor diameter was 35 feet, each rotor had three blades, and it was powered by a Continental R-975-42 engine with 550 hp. There were slight variations between the different models. In 1962, the HUP