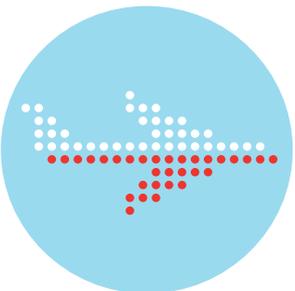


an exhibition by the **Polish Aviation Museum in Krakow**
Museum of Flight, Seattle, WA • November 2012 - February 2013



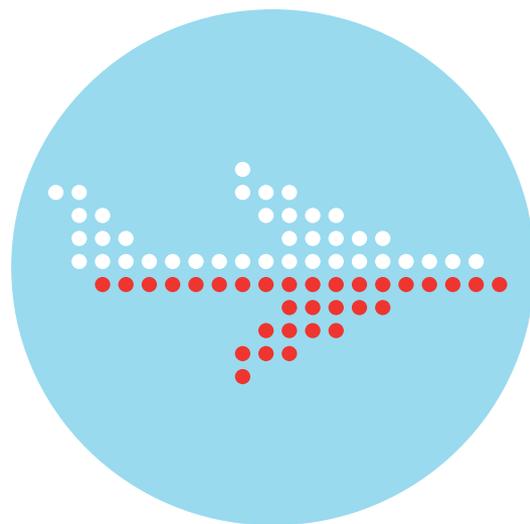
FRANK PIASECKI

AND OTHER **POLISH**
AVIATION DESIGNERS



● **FRANK PIASECKI AND OTHER POLISH AVIATION DESIGNERS**





FRANK PIASECKI

AND OTHER POLISH AVIATION DESIGNERS

organizers:

THE MUSEUM OF FLIGHT



POLISH
AVIATION
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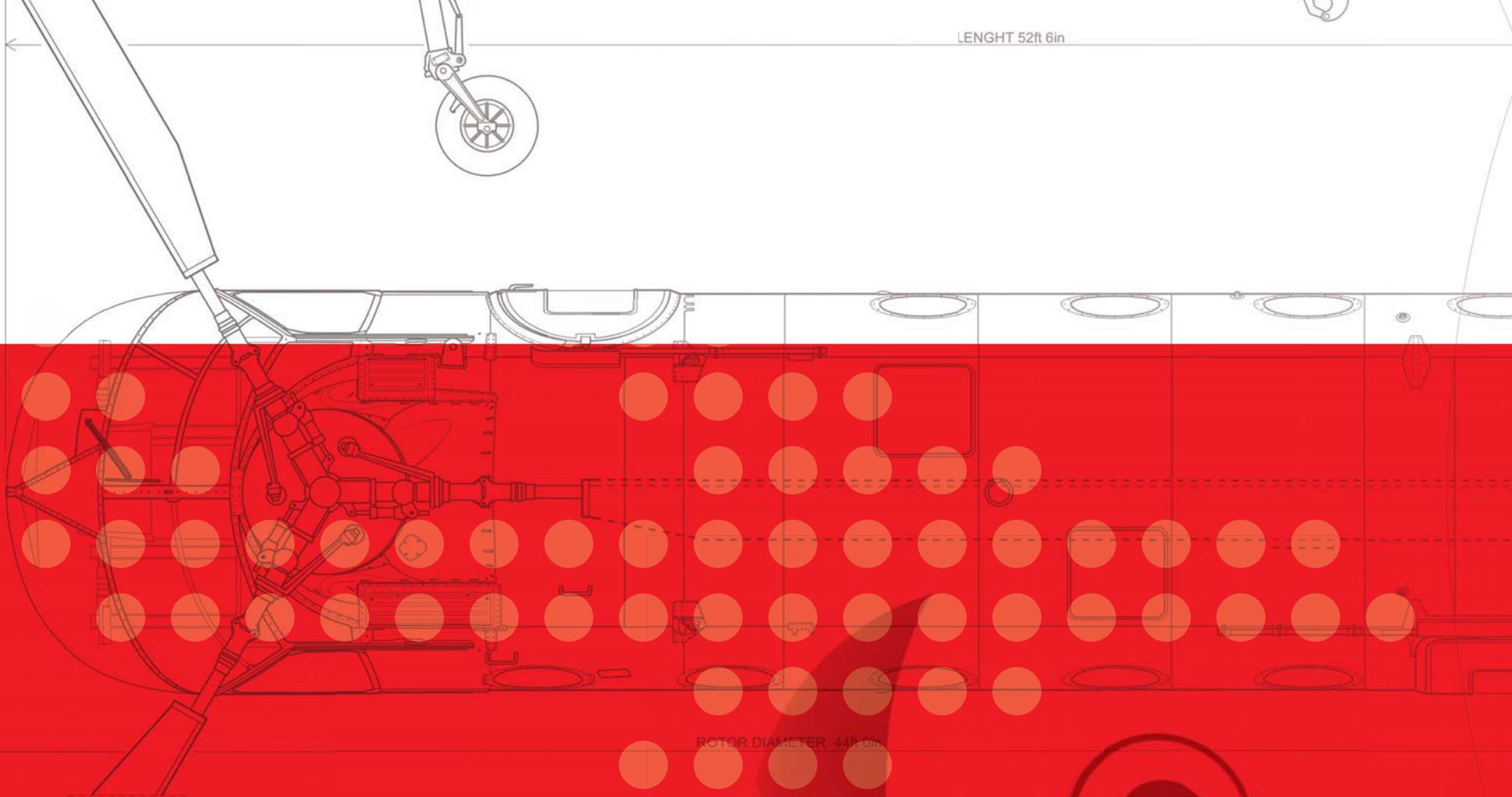
partners:



Ministerstwo
Kultury
i Dziedzictwa
Narodowego.

WWW.FRANKPIASECKI.ORG

LENGTH 52ft 6in



ROTOR DIAMETER 44ft 6in



HELICOPTER CORP.

ARMY H-21B HELICOPTER

PART NO.	NO. REG	SIZE	DESCRIPTION
			MATERIAL
SCALE 2" v 3FT & NOTED			TOTAL WT-LBS

GENERAL VIEW (PART ONE)

M.RADDY	R E T	
3-2-54	3-4-54	
DRAWN	CHECKED	APPROVED

184947

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FOREWORD



Dear Ladies and Gentlemen,

It is my honor to present to you the exhibition "Frank Piasecki and Other Polish Aviation Designers", providing an excellent opportunity to display a portion of Malopolska Region in a place so exceptional as the Museum of Flight, Seattle.

I would like to invite you to see the exhibition and learn about the vicissitudes of those who committed their lives, talents and efforts to creating the milestones of global aviation: the great sons of the Polish nation. For we, the Poles and the Americans, are heirs to their exceptional and glorious achievements. And the achievements that last, as the planes preserved by both the Museum of Flight and the Polish Aviation Museum in Krakow attest, bearing witness to their designers' ideas. Even though the person who comes to mind first when the airplane is mentioned is the pilot, it is the designer, who provides the wings. Thanks in most part to their expertise and skill it is nowadays considered prestigious to become an aviation engineer.

The Polish Aviation Museum has once again initiated a most interesting project promoting Polish history. Old airplanes, gliders, helicopters, wide array of aviation engines — have

all been collected at the Museum. More than 200 aircraft amassed make for one of Europe's top aviation collections. The exhibition "Frank Piasecki and Other Polish Aviation Designers" organized by the Polish Aviation Museum addresses long-lasting emotions — patriotism and the sense of common nationality. Common heritage, culture, knowledge and respect for the past — the ideas so close to everyone living in Malopolska.

The region is the part of Poland that has the greatest number of historical monuments, that is the cradle of Polish culture, where old traditions are preserved and which is the richest in beautiful landscapes. The capital of Malopolska is the city of Krakow, once the seat of kings, today a major cultural and intellectual hub. The heritage of Malopolska Region comprises Wieliczka and its ancient salt mine dating back to the XI century, the Wooden Architecture Route preserving unique local architecture, and the harrowing memento of World War II: the former nazi concentration camp Auschwitz-Birkenau.

But Malopolska is also a land of innovation, where people labor to take the utmost advantage of their potentialities. What constitutes our greatest advantage are the opportunities for Research &

Development activity, therefore it is this area that many of our efforts are focused on. It has also become our local specialty to encourage the implementation of new technologies. We also put an intense effort to promoting our region as a place with many economic advantages as we introduce more and more business-friendly solutions. The region has already attracted, among others, the ABB, Delphi, Google, IBM, Sabre, Comarch, Ericpol, Motorola and Nokia Siemens Networks companies, which established their R&D centers here. Krakow ranks among the leading global BPO centers, dominated by financial branch. We concentrate on the IT, life science and modern energetics, which combine with ever improving communication to produce a strong economical stimulus to development.

World War II forced Polish designers to seek a new home in the hospitable American land. It was in America that people like Frank Piasecki, a son of Polish immigrants, lent them a hand in the most difficult time of their lives, and enabled them to continue their work which led to designing such history-making aircraft as the Concorde and B-58. The characters the exhibition presents belong to a wider cultural phenomenon which also constitute a part of Malopolska Region heritage.

History forbade them to return to their homeland and deprived them of our region's charms, as well. And Malopolska has to offer, apart from Polish trademark hospitality, unforgettable experience of many cultural and sports events, as the famous Christmass Fair, Mountain Carnival in Bukowina Tatrzenska and CIS Ski-Jump World Cup contest in Zakopane. There is also the world-famous Festival of Jewish Culture. Krakow proves comfortable for street theater, music and film festivals. Such musical festivals as Sacrum Profanum and Misteria Paschalia attract visitors from around the world.

For us, the exhibition in the Museum of Flight, Seattle is exceptional in every way, mostly because the latest in American passenger aircraft technology, the Boeing 787 Dreamliner, is starting its service simultaneously as part of LOT Polish Airlines fleet.

I am convinced that the Seattle exhibition will provide all visitors with an inspiring experience and will act as a spur to undertaking a multi-faceted collaboration.

- Marek Sowa,
Marshal of
Malopolska Region



INTRODUCTION

Fans of aviation will be immediately familiar with Frank Nicholas Piasecki and his engineering achievements. However, who were these “other Polish designers”? They were the leading experts in their respective areas of expertise, but due to the conditions imposed upon them by history very few people will associate their names with machines such as DH-106 Comet, Westland Lynx, Caravelle, or the icon of passenger aviation: the Concorde.

These “others” are forgotten Polish engineers to whom the present exhibition is dedicated. Their talents and skills blossomed before the Second World War when the dynamic growth of the aviation industry in inter-war Poland was being shaped by deliberate policy of utilising domestic facilities. This way our aviation industry could boast a number skilled engineers who could easily compete with top foreign experts. They were graduates of Institutes of Technology in Warsaw and Lvov. They worked at Polish aviation companies, especially at Panstwowe Zakłady Lotnicze (PZL — State Aviation Works), Podlaska Wytwórnia Samolotów (PWS — Podlasie Aircraft Works) and Lubelska Wytwórnia Samolotów (LWS — Lublin Aircraft Works). We also must not forget about the scientific personnel employed by Instytut Techniczny Lotnictwa (ITL — Technical

Institute of Aviation). In 1930s Poland was one of the eight exporters of aviation equipment.

Few other professional groups of Polish intelligentsia contributed so much to the material and spiritual achievements of global engineering ideas. They created and executed research programmes, courageous scientific and technical designs, and they also glorified Polish engineering ideas on all continents. Frank Piasecki was born in the New World but all the other protagonists of our exhibition were born on the old continent. Turmoil of history made it so that the Polish engineering ideas ended up mainly in the West.

When Poland lost the defensive war of autumn 1939 more than 200 engineers and approximately 800 aviation technicians ended up outside the Polish territories occupied by Germany and USSR.

When the Polish Armed Forces were disbanded and acknowledgement of the Polish government-in-exile was withdrawn in July 1945, a new chapter in life began for them. The fight for independence of their homeland – with gun in hand or behind the drawing board – ended in failure. Someone else and according to different plans began creating a completely new air fleet in Poland.

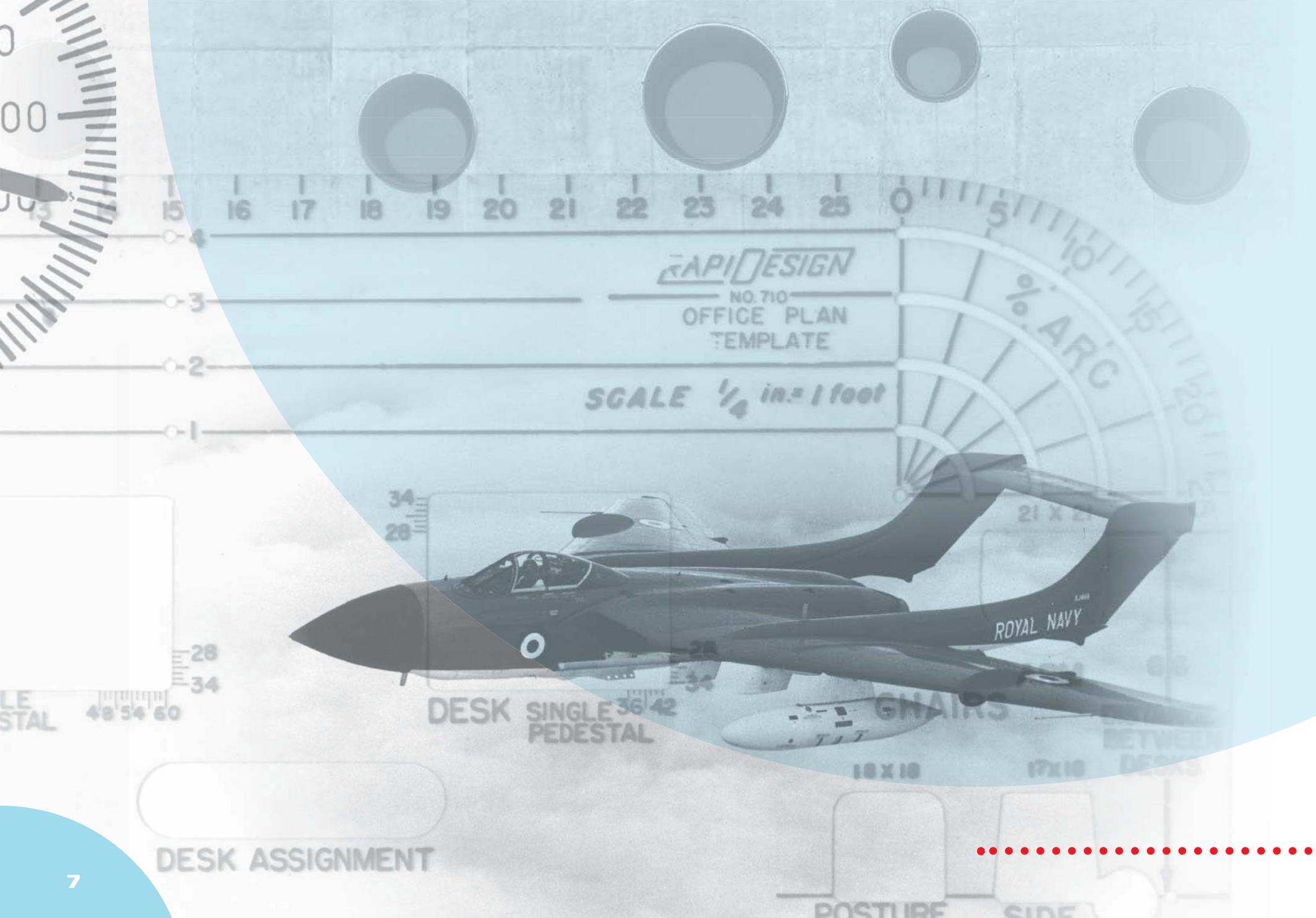
When their dreams of triumphant return home were shattered they had to face the new dilemma of what to do next. The British were reluctant to employ them at their design bureaus. “Go home” was frequently said to Poles, including engineers as well. However, Canadians and Americans saw things differently. After all, a new “cold war” had begun and they had been looking for prominent minds.

As a visionary, Frank N. Piasecki was gladly taking them under his wings, he knew and trusted them. When discussing the so-called national traits of Poles, people usually list imagination, boldness, penchant for risk, dislike for small, ineffective actions, and tendency to undertake ambitious tasks. Therefore, it is very interesting to note that the most

prominent of all the great Polish engineers created their magnificent works in difficult conditions and thinking outside the box. Frank N. Piasecki had all those traits, even though he was born in America. Many famous Poles worked at Piasecki’s facilities, among others the late professor Wieslaw Stepniewski, engineer Piotr Kubicki, Bogdan Trocki, and Tadeusz Tarczynski.

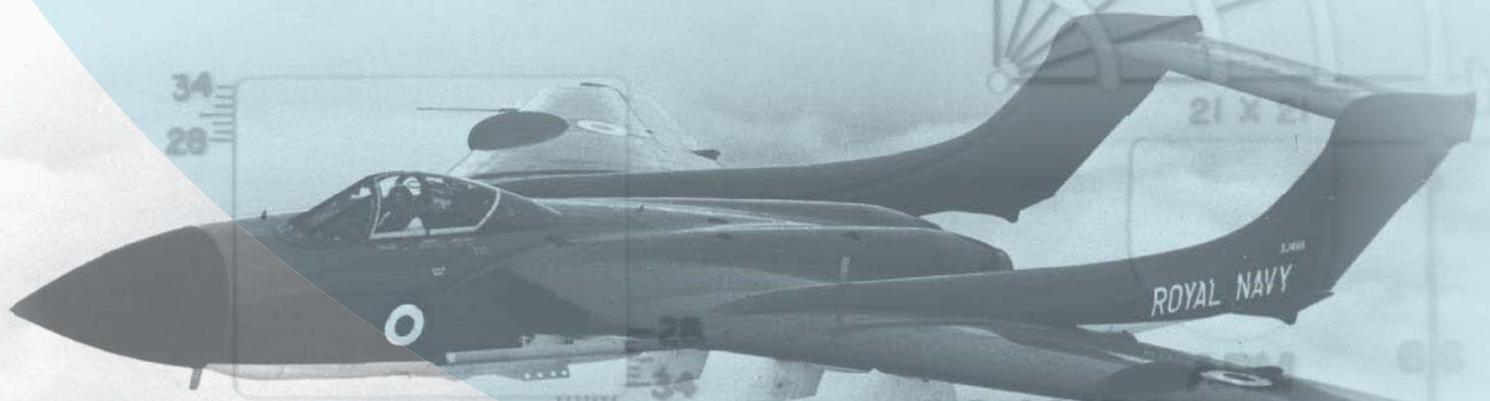
Piasecki and other Polish aviation designers were involved in creation of such constructions as: H-21B Shawnee, Piasecki YH-16, DHC.1A Chipmunk, DH.112 Venom, General Dynamics F-111, Convair B-58 Hustler and many others.

- Krzysztof Mroczkowski, PhD, exhibition curator



RAPI DESIGN
NO. 710
OFFICE PLAN
TEMPLATE

SCALE 1/4 in. = 1 foot



DESK ASSIGNMENT

POSTURE SIDE

FRANK NICHOLAS PIASECKI



1919—2008

aircraft designer, aeromechanical engineer, pilot, industrialist, and philanthropist

He was born in Philadelphia. He graduated from the Guggenheim School of Aeronautics of New York University. In 1940, he formed PV-Engineering Forum research group.

Three years later Piasecki presented a single-seat PV-2 helicopter. It was the **second successful helicopter design** in American aviation history. In 1945, he constructed the **world's first successful tandem rotor helicopter**

suitable for transporting heavy loads: the Flying Banana. This initiated a series of helicopters (HRP-1, HRP-2 and HRP-3). They were also used outside the military — in transport and rescue roles.

In 1955 he sold his company, the Piasecki Helicopter Corporation, to the Boeing Airplane Co., and then founded Piasecki Aircraft Corporation design office, which developed prototypes of the **first quadruple rotor drone**, the Sea-Bat, the VTOL Ring-Wing, and the Airgeeps. In 1962, the Pathfinder was tested: the **first compound helicopter**, combining the advantages of both helicopter and aeroplane. In 1986, Piasecki designed the Heliostat



aircraft vehicle, a combination of a blimp with four helicopters attached to a frame.

He registered a total of more than 20 patents, was the author of 40 professional publications, and he received honorary doctorates from three U.S. universities. In 1986 he received the highest award in the field of technology, the National Medal of Technology, from President Ronald Reagan, and the U.S. Army chose him for the U.S. Army Aviation Hall of Fame (as the first Polish-American engineer). In 1993 he was awarded the Commander's Cross of the Order of Merit of the Republic of Poland by President Lech Walesa.

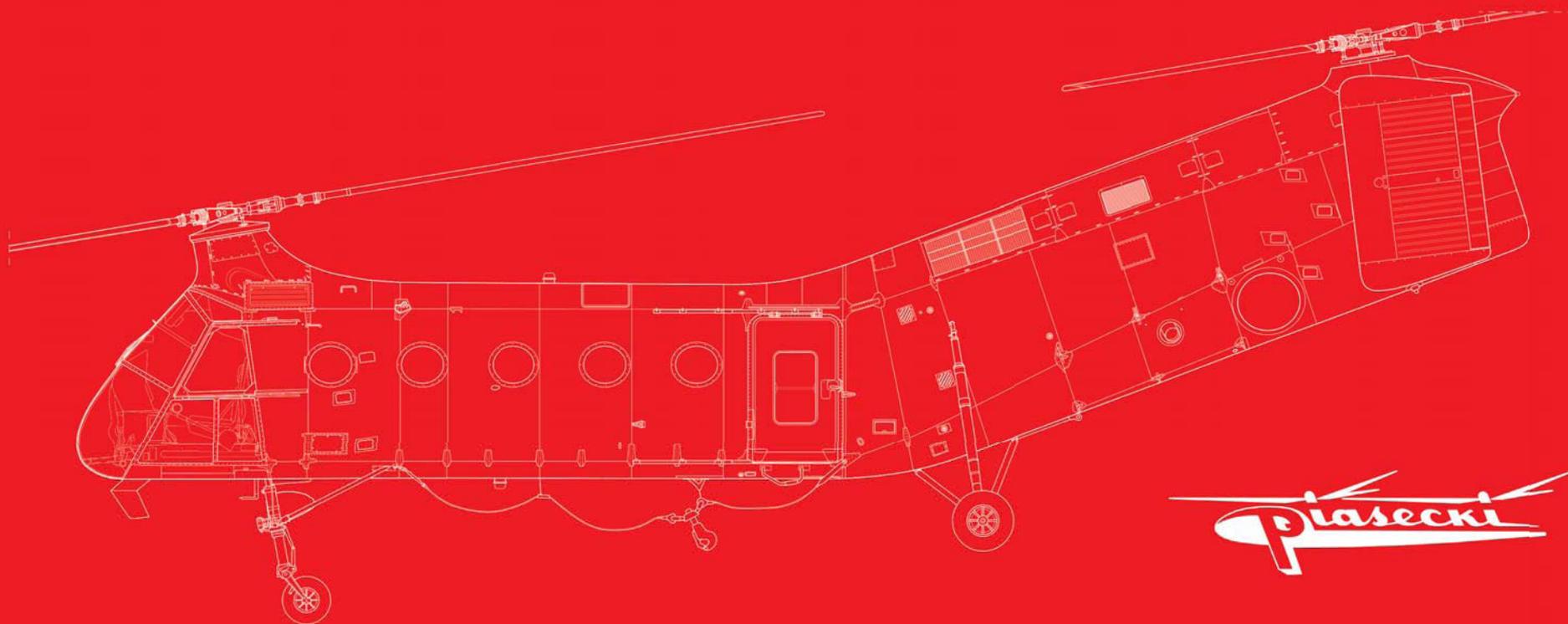
Piasecki was a member of several technical associations, including: the Helicopter Council of the Aerospace Industrial Association,

the Committee on Innovation of the National Foundation, The National Society of Professional Engineers, the American Society for Testing Materials, the Franklin Institute, the American Institute of Aeronautics and Astronautics and the American Helicopter Society. He was also actively involved in the Polish-American organisations such as the Kosciuszko Foundation and the Polish American Congress.



Although Frank Piasecki developed several innovative aircraft configurations, the tandem rotor helicopter, exemplified by the HRP Rescuer (left) and the HUP Retriever (below), remains his trademark achievement.





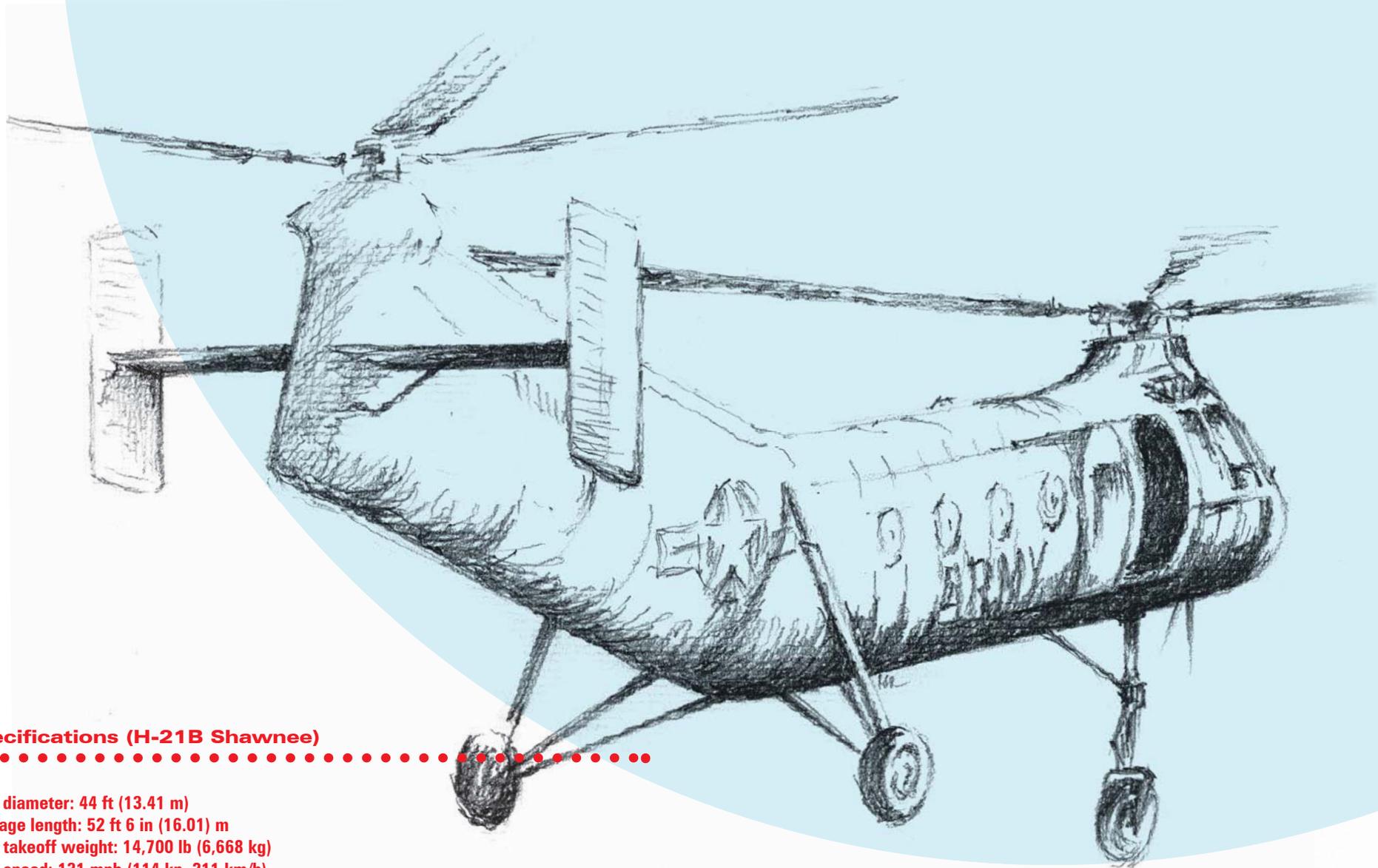
H-21 SHAWNEE/WORK HORSE

Piasecki H-21 is probably the best known of Frank Piasecki's designs. Originally conceived as arctic rescue helicopter, its prototype first flew on 11th April 1952. It displayed Piasecki's trademark tandem-rotor configuration and was powered by the famous radial Wright R-1820 engine rated at 1445 hp. The helicopter could carry up to 20 soldiers, 12 wounded on stretchers or 2,520 kg of equipment.

U.S. Air Force pilot Captain Russell M. Dobyns beat helicopter world records in speed (234.7 km/h) and altitude (22,110 feet) flying an H-21. The aircraft was used operationally by French Air Force, U.S. Air Force, U.S. Army, German Air Force and several other users.

In French service it took part in the Algerian War, in transport and ground support roles.

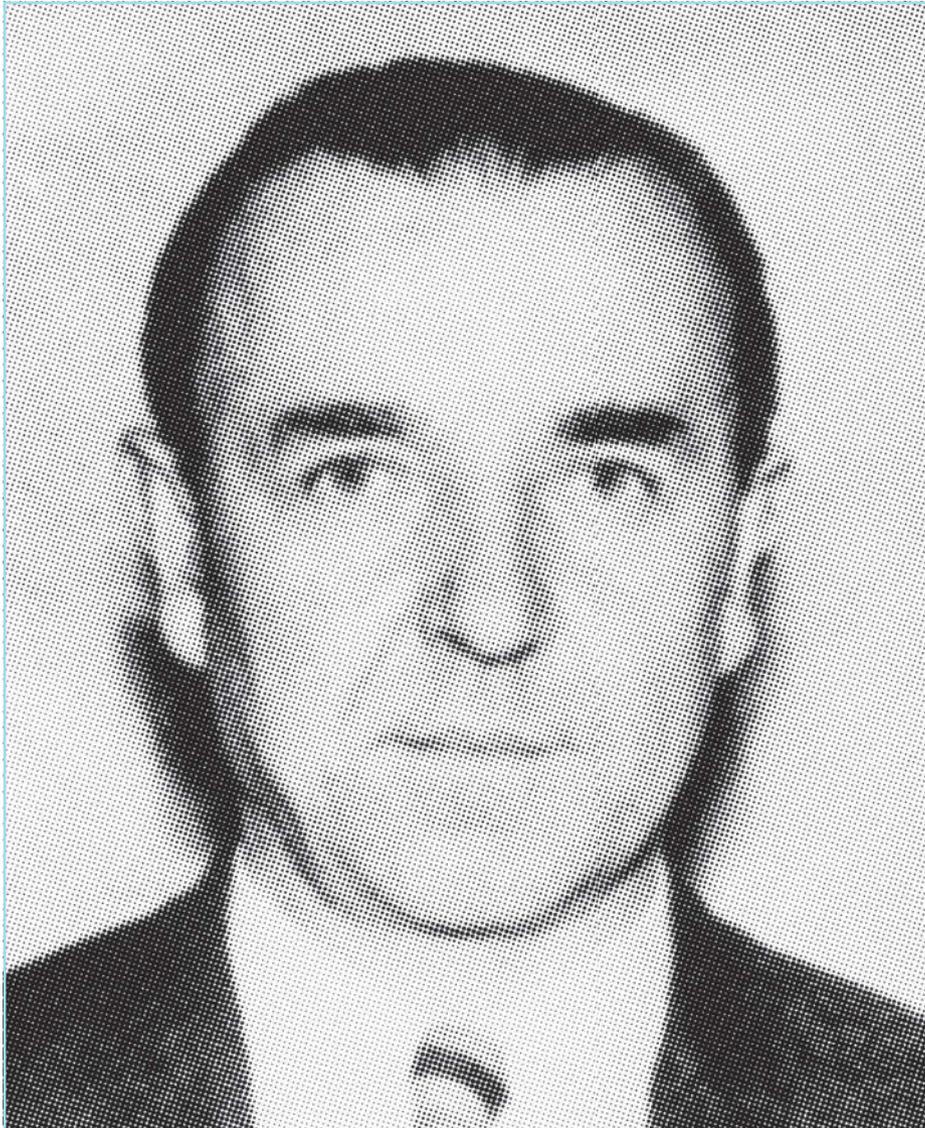
American Army named its H-21s *Shawnee* and Air Force chose the name *Work Horse*, although it was unofficially known as "flying banana" due to its having a long and curved canopy. A U.S. Army H-21 *Amblin' Annie* became the first rotorcraft to cross the United States non-stop. The helicopter was used in the initial phases of the Vietnam War (1961-65). Following French example, apart from transporting troops and cargo the H-21 was armed and used for ground support until new types, better adapted to the climate and combat conditions, became available.



Specifications (H-21B Shawnee)

- rotor diameter: 44 ft (13.41 m)
- fuselage length: 52 ft 6 in (16.01) m
- max. takeoff weight: 14,700 lb (6,668 kg)
- max. speed: 131 mph (114 kn, 211 km/h)
- ceiling: 7,740 ft (2,360 m)
- max. range: 400 mi (348 nmi, 644 km)
- powerplant: Wright R-1820-103 Cyclone engine rated at 1,445 hp

WSIEWOŁOD JAN JAKIMIUK



1905 (1902?)—1991

Jean Jakimiuk, „Jaki”, aviation engineer, aircraft designer

He was born in the Vilnius region. He graduated in mathematics from the Stefan Batory University in Vilnius. He also took on engineering studies in Paris at the Ecole Nationale Supérieure d'Aéronautique and at the Sorbonne. In 1930 he started work at PZL in Warsaw in the engineering team of Zygmunt Puławski, the famous builder of fighters with the “Polish wing” or “Puławski wing”. After Puławski’s tragic death, Jakimiuk became the head of the construction team and worked on development versions of

the PZL P.11, PZL P.24, PZL P.8 and PZL P.28 aircraft. He also designed the PZL.44 Wicher airliner.

After war broke out, he was evacuated along with PZL’s technical personnel through Romania to France. He worked there as **manager of a team of Polish engineers** at the Societe Nationale des Constructions Aéronautiques – Sud Est (SNCA-SE) aircraft factory.

The British de Havilland company offered him the position of **chief designer** at its subsidiary in Canada (DHC). Jakimiuk led the conversion of the Avro Anson there; constructed a wooden wing for the NA-66 Harvard II training aircraft; and designed the



mounting for the Menasco engine in the DH.82 Tiger Moth training plane. In 1942, he launched the production of the DH.98 Mosquito.

After the war, along with W. Stepniewski, he custom designed the DHC-1 Chipmunk training aircraft (1292 built) for the RAF, followed by the DHC-2 Beaver (1718 built) and drew up a preliminary design for the DHC-3 Otter. In 1948, he moved to the de Havilland factory in the UK, where he developed the DH.112 Sea Venom jet fighter. From 1951 he again worked with SNCA-SE, designed the SE-5000 Baroudeur fighter jet (not manufactured), and was a consultant on the construction of the SE-210 Caravelle jet airliner.

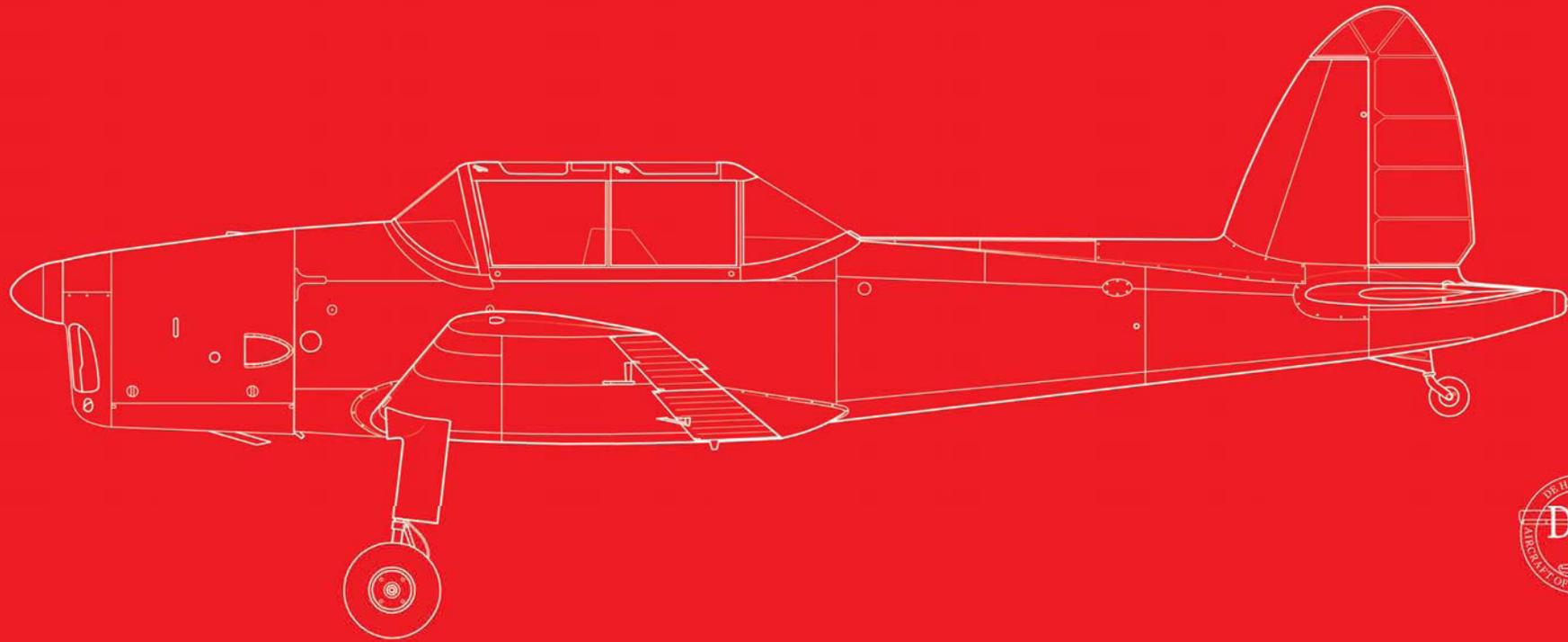
Because of the merger of French air manufacturers, Jakimiuk continued his career in the resulting Aerospatiale corporation, dealing with technical-

economic and commercial affairs. He participated in the Concorde project. From 1966-1972 he was President of the French Aerospace Corporation (a subsidiary of Aerospatiale in the U.S.). After retiring, he remained a technical and economic consultant at Aerospatiale.



W. Jakimiuk designed the Chipmunk trainer (right) and the Baroudeur jet fighter (left). He also contributed to the development of the Caravelle (bottom right) and the supersonic Concorde (below) airliners.





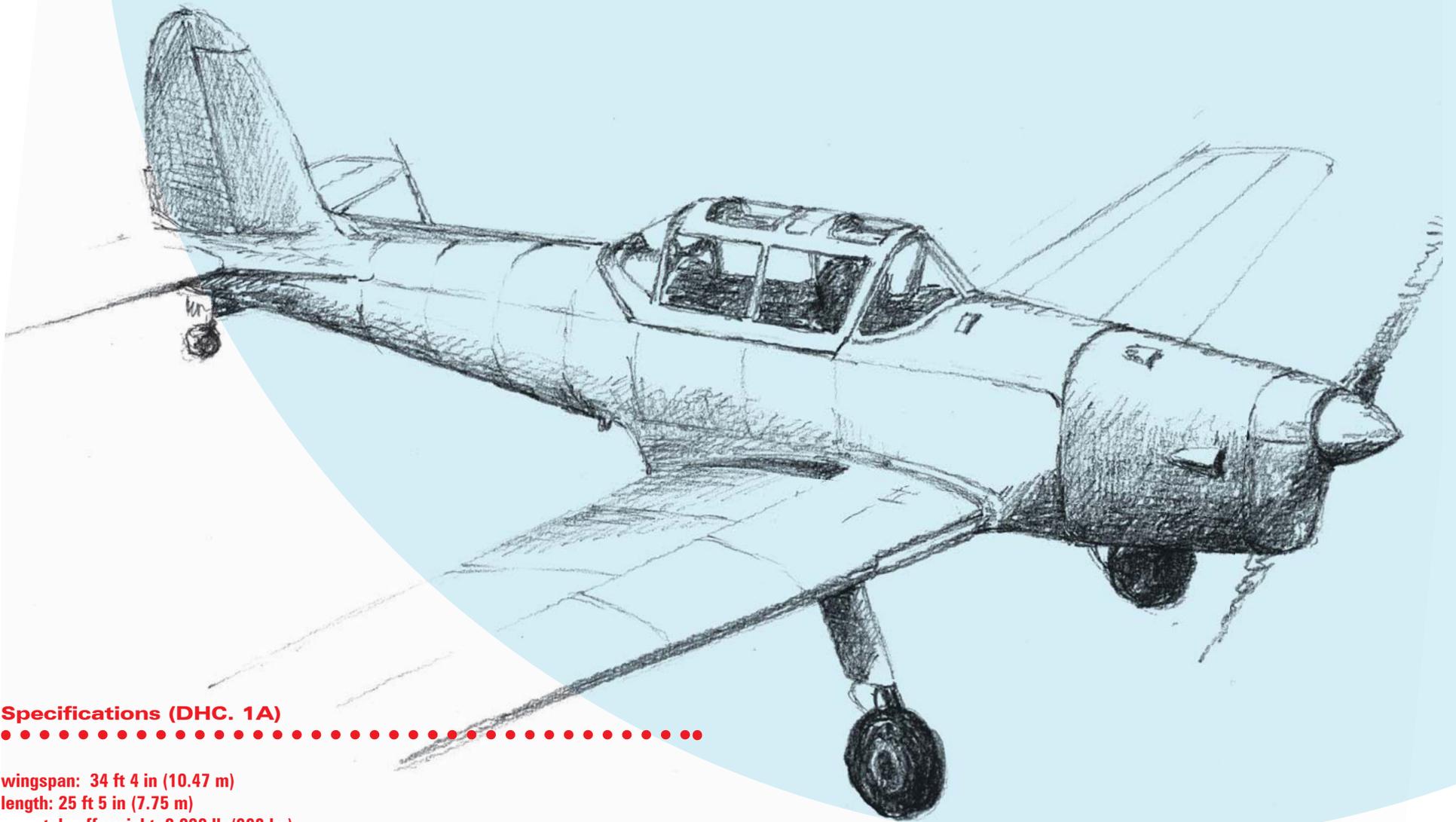
DHC. 1A CHIPMUNK

The Chipmunk was designed just after the Second World War in De Havilland Canada works by engineers Wsiewolod Jakimiuk and Wieslaw Stepniewski. The plane was conceived as a replacement for DH.82 Tiger Moth in the role of basic trainer. The prototype first took off from Downsview airfield in Toronto on 22th May 1946. It was a single engine low-wing cantilever monoplane of all metal construction.

Production started in 1948 and by 1956 217 examples had been built. The Chipmunk remained Canada's primary military trainer until 1972. It was also manufactured by

De Havilland works in Hatfield, Great Britain, which built around 1,000 planes. Apart from the Royal Air Force the plane was operated by air forces of a number of countries: Belgium, Denmark, Norway, Ireland, Israel, Egypt, Iraq, Saudi Arabia, Jordan, Kenia and Malaysia. Portuguese OGMA factory produced another 66 examples.

The DHC-1 Chipmunk is no longer in military use, but there remain around 500 airworthy "chippies" in private hands. Interestingly, a highly modified Chipmunk was featured in the 1975 Hollywood movie "The Great Waldo Pepper".



Specifications (DHC. 1A)

.....

wingspan: 34 ft 4 in (10.47 m)

length: 25 ft 5 in (7.75 m)

max. takeoff weight: 2,200 lb (998 kg)

max. speed: 120 kn, 138 mph (222 km/h)

ceiling: 15,800 ft (5,200 m)

range: 225 NM (445 km)

powerplant: four-cylinder, inline, de Havilland Gipsy Major 1C rated at 145 hp

STANISLAW WOJCIECH ROGALSKI



1904—1976

Doctor of Mechanical Engineering,
aircraft designer

He was born in Olomouc in Moravia, the son of a military doctor. He studied at the Faculty of Mechanics at Warsaw University of Technology. In 1927, together with Stanislaw Wigura, he designed and built the WR-1 two-seater sports aircraft. These designers, with Jerzy Drzewiecki, formed the RWD team and began constructing the RWD-1 two-seater high-wing sports monoplane. Over 850 of the resulting 21 types of

RWD were manufactured in different factories in Poland and abroad.

After graduating in 1929 as a mechanical engineer, he did academic work at Warsaw and L'viv Universities of Technology.

After the outbreak of war and the evacuation of the RWD technical personnel to Rumania, Rogalski got to France, and then to the UK, where he designed weapon mountings for the Whirlwind and Lysander aircraft at the Westland factory. In 1941, he left for Turkey, and became technical director at the Turk Hava Kurumu Ucak Fabrikasi factory headed by



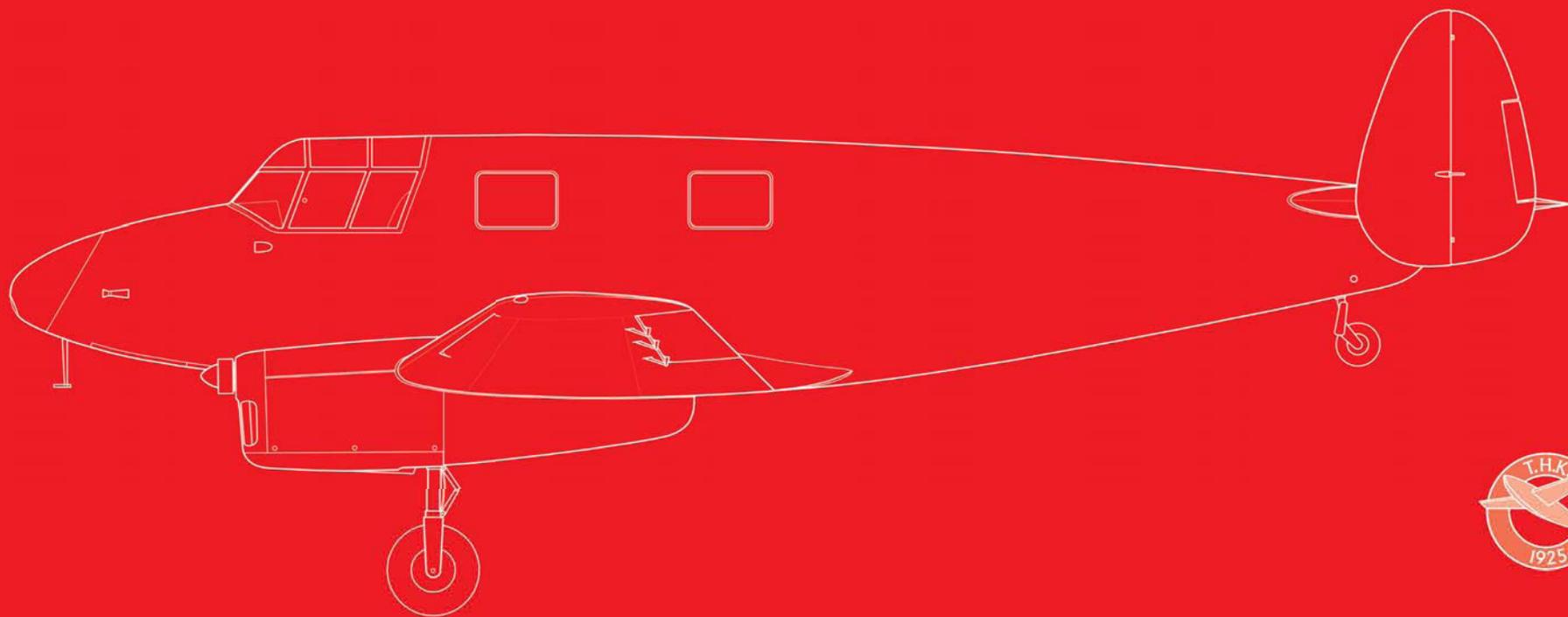
Jerzy Wedrychowski. It was here that the licensed production of the Magister training aircraft took place. Together with Jerzy Teisseyre and Leszek Duleba he designed the THK-1 transport glider, the THK-2 single-seater acrobatic aircraft, the twin-engine THK-5 air ambulance and airliner, and the THK-11 sports aircraft. In 1942-48, he did academic work at the University of Technology in Istanbul.

In 1948, Rogalski emigrated to the USA and settled in Erie (Pennsylvania), where he worked at the air damper company Lord. In May 1949 he joined Chase Aircraft in Trenton (New Jersey), where he participated in the design of the C-123 twin-engine transport plane. In 1956, he moved to Grumman Aircraft Engineering in Bethpage (New York), where he solved the problem of stability of the E-2A Hawkeye twin-engine military aircraft. In 1961-1964 at the Grumman plant in Fort Worth (Texas), he worked on the design of the F-111 fighter-bomber jet aircraft with variable geometry wings.

In retirement, he continued working with Grumman as an advisor on the design of the Flying Acre transport hovercraft and with the Center for Space Research at NASA on projects and technological solutions for the lunar vehicle.



The F-111 (left & right) was the first variable-sweep wing aircraft to enter serial production.



THK-5

A two-seat, twin-engine personnel transport and air ambulance. Manufactured by Turkish company Turk Hava Kurumu Ucak Fabrikasi in the capital city of Ankara, it was developed by three Poles: Stanislaw Rogalski, Jerzy Teisseyre and Leszek Duleba. A low-wing cantilever monoplane of wooden construction, with retractable main undercarriage. The air ambulance version carried two wounded on stretchers, while the transport version (THK-5A, later improved and redesignated THK-10) could carry six passengers. Altogether 13 examples were built, one being sold to Denmark. Following the THK's takeover by MKEK company a further development of the plane was planned, but this never materialised.

Specifications (THK-5A)

wingspan: 14.63 m (48 ft 0 in)
length: 9.98 m (32 ft 9 in)
max. takeoff weight: 1,920 kg (4,255 lb)
max. speed: 220 km/h (137 mph)
ceiling: 4,000 m (13,100 ft)

range: 646 km (404 miles)
powerplant: two four-cylinder, inline,
de Havilland Gipsy Major rated at 123
kW (165 hp) each

In the 1930s Stanislaw Rogalski was a member of RWD aircraft design team, together with Stanislaw Wigura and Jerzy Drzewiecki. The trio produced a number of touring and sports planes that supplied Polish aero clubs and took part in international competitions, winning two FAI Challenge International de Tourisme contests. The RWD-5 was a high-wing monoplane of mixed construction intended for aero clubs. In 1933 a modified example was flown by Captain Stanislaw Skarzynski from Warsaw in Poland to Rio de Janeiro in Brazil, crossing the Atlantic. The RWD-5 remains the smallest plane to ever fly across the Atlantic Ocean. The photo shows a replica built in late 1990s.



TADEUSZ LEOPOLD CIASTULA



1909—1979

mechanical engineer, test pilot,
captain, helicopter constructor

He was born in Kazimierz Dolny. He graduated from the Faculty of Mechanical Engineering at Warsaw Technical University with a degree in mechanical engineering, specialising in aviation. During this period, he was a success at gliding. Between 1936-39, he worked at ITL in Warsaw as a test pilot. When war broke out, he was evacuated to Romania and then to France, where he served at the Observer and Gunnery School in Bordeaux. After the fall of France, he

evacuated to the UK, where in 1941 he was appointed to the Department of Applied Aerodynamics at the Royal Aircraft Establishment at Farnborough. He also flew in 302 Fighter Squadron of the Polish Air Force and 65 Fighter Squadron of the RAF. At the end of 1944, he was sent to the U.S. to learn about transport aircraft for paratroops and how to use them.

In the spring of 1947, he joined the design office of the Cierva Aircraft Company in Southampton. There he designed a light helicopter, the Cierva W.14 Skeeter. Following the acquisition of these plants in 1951 by Saunders-Roe (Saro), the Skeeter was manufactured in 1951-1960 in

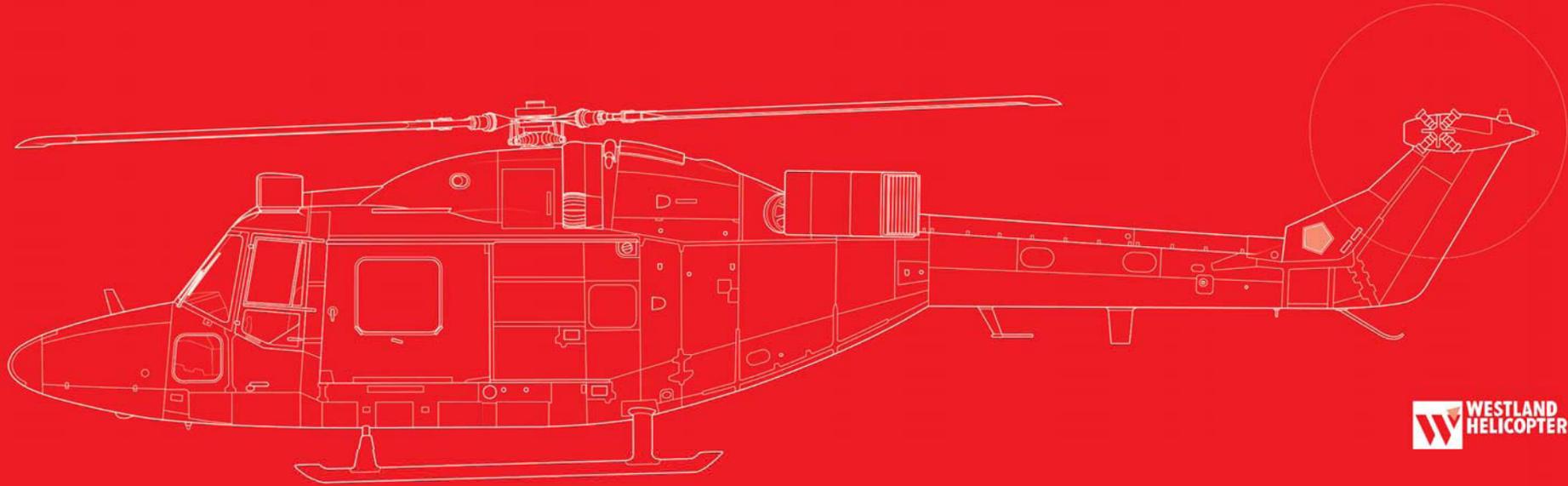


a series of 86 for the Air Forces of the UK, Germany and Portugal. For this company, he also designed the **Saunders-Roe P.531** helicopter. Saro was acquired in 1959 by the Westland factory in Yeovil, Somerset. There, between 1961-1970, 275 helicopters of this type in Scout (land) and Wasp (sea) versions were manufactured. The Scout was used in the UK, Australia, Bahrain, Jordan and Uganda. The Wasp was used by the UK, Brazil, the Netherlands, New Zealand and South Africa. Under Ciastula's leadership, the G.13 design was created, which was produced as the **Lynx military helicopter**. By 1997, 380 machines of this type had been built. Over 740 helicopters designed by Ciastula were constructed in total. In addition, he participated in the modification of Sikorsky S-58 - the **Wessex** (373 units built) - and the Sikorsky S-61 - the **Sea King** (326 units) - built under

license from the U.S., and adapted the Puma helicopter, produced under license from the French, to British requirements. He also managed the arming of the helicopters and special equipment, including reconnaissance and rescue.

● **Ciastula was involved in development of several important British helicopter types: Saunders-Roe Skeeter (bottom left), Westland Wessex (below), Westland Wasp (right) and Westland Lynx (bottom right).**





WESTLAND LYNX AH.1

The premier utility helicopter of the British military since 1977, the Lynx was developed since 1960s (factory designation WG.13) by a team of designers led by Tadeusz Ciastula. In cooperation with French Aerospatiale company, the Lynx was intended to replace earlier Ciastulas design, the Westland Scout/Wasp helicopter. First flight of the WG.13 prototype took place on 21 March 1971, although a full-scale copy had already been presented at Paris Air Show '69. In 1972 the Lynx broke the world speed record. Production was ordered by the British Army and deliveries started in 1977. The British Army and the Royal Navy have used the Lynx in the roles of transport, anti-tank, rescue and others.

Other operators have included French, German, Dutch, South Korean and Brazilian navies, Omani, Danish and South African air forces.

The Lynx has a crew of two sitting side by side and it can carry nine passengers in a compartment equipped with sliding doors on each side. The solutions implemented in the design of the main rotor enabled the helicopter to perform full helicopter aerobatics. In 1986 it established the current world speed record for helicopters, travelling at a speed of 249.09 mph (400.87 km/h).



Specifications (Lynx AH.1)

- rotor diameter: 42 ft (12.80 m)
- length: 51 ft 3 in (15.61 m)
- max. takeoff weight: 1,000 lb (4,535 kg)
- max. speed: 190 mph (165 kn, 306 km/h)
- ceiling: 10,600 ft (3,230 m)
- range: 390 mi, 340 nmi (630 km)
- powerplant: two Rolls-Royce Gem Mk 2 engines rated at 671 kW (910 hp)

JERZY DABROWSKI



1899—1967

mechanical engineer, aircraft designer



He came from a railway family in the Łowicz area. He studied at Warsaw University of Technology. From 1923-1926 he worked at the Military Aviation Research Centre, and in the period 1926-1928 he worked at the aircraft design studio of the E. Plage and T. Laskiewicz Mechanical Plant in Lublin.

In 1928 he joined the design office of PZL in Warsaw, where, together with Franciszek Kott he designed the PZL Ł.2 two-seater liaison aircraft

(tested in 1929 and built in 1931 in a series of 30). In 1934-1936 Dabrowski participated in designing the PZL.37 "Łos" twin-engine bomber, built in 1936 (96 manufactured). Its wing section was then used in the PZL.38 "Wilk", the PZL.44 "Wicher", the PZL.46 "Sum", and the PZL.50 "Jastrzab".

In September 1939, together with aviation industry workers, he evacuated through Romania to France, and then, after its surrender, to the UK, where he worked in the Polish Air Force Base in Blackpool. There, along with Peter Kubicki, he developed the design for the "Gazelle" training aircraft.



He received his diploma in mechanical engineering in 1947 at the Polish University College in London. In 1948-1949, he worked at Bevan Brothers in Chelmsford, constructing a jet-powered helicopter rotor. From 1949 to 1954, at Percival Aircraft in Luton, he took part in the design of the engine mounting for the Pembroke airliner and the wings for the Jet Provost. While there, he worked on the next version of the "Gazelle", a military observation aircraft. From 1954 to 1955 he worked at Folland Aircraft in Hamble, near Southampton, on designing the central section of the airframe for the Gnat fighter. In 1955 he moved to the US, where between 1955-1957 he headed the design group at Cessna Aircraft in Wichita (Kansas) for the fuselage front and tail for the Cessna 620. In 1958-1959, at Stanley Aviation in Denver (Colorado), he participated in designing the ejector seat and rescue capsule for the Convair B-58 Hustler supersonic bomber, and between 1959 and 1967, at Boeing Airplanes in Renton (Washington), he designed the crew space and seats for the Space Shuttle.

●

In Poland Dabrowski remains most remembered for his PZL.37 bomber (left), which pioneered the use of independently suspended wheel bogeys as the main undercarriage, a solution ubiquitous in contemporary airliners. In later years his contribution included the life-saving systems of Convair B-58 Hustler supersonic bomber (right).





CONVAIR B-58 HUSTLER

The Hustler has the distinction of being world's first supersonic jet bomber, capable of reaching a speed of Mach 2. Designed by Robert H. Widmer in the 1960s, it was built by a chain of contractor companies. The aircraft featured delta wings under which four jet engines were attached. The Hustler was intended to serve in Strategic Air Command carrying nuclear weapons, its high speed was a means of avoiding interception by Soviet fighter planes. However, the advancement in Soviet anti-aircraft technology rendered the B-58 obsolete soon after it entered service.

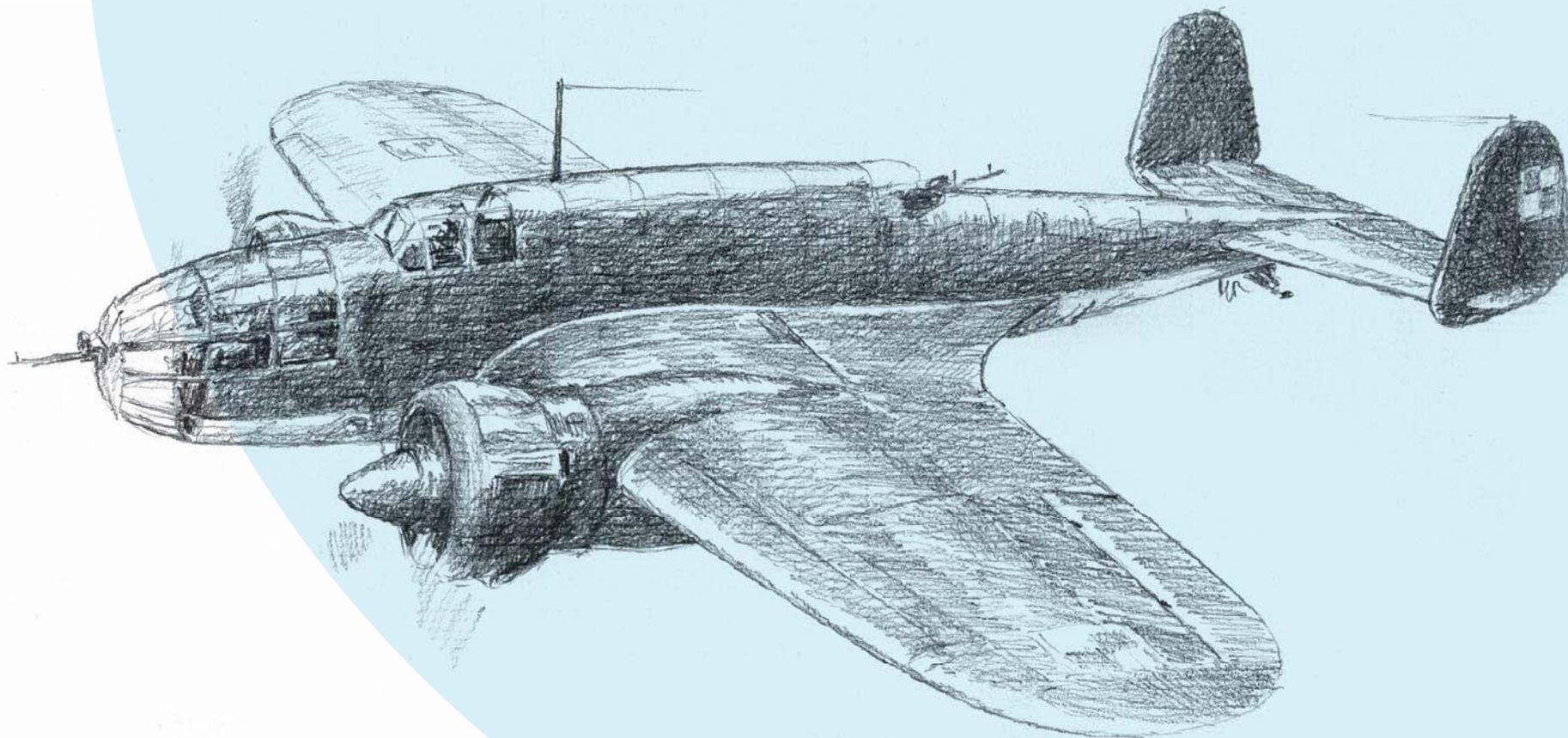
One of the problems posed by operating at high speeds is the evacuation of the crew, should the plane be damaged. A team of engineers of Stanley Aviation based in Denver, among them Jerzy Dabrowski, was responsible for designing adequate ejection system. Since using a typical ejection seat at speeds above 650 mph was immensely hazardous, he conceived an escape capsule fitted with rocket propulsion, a parachute and flotation cells which could be ejected or used for temporary shelter in the event of oxygen loss. The

capsule was equipped with flight controls, so the pilot could make a descent to an altitude at which pressurization and oxygen systems were no longer needed.

Specifications (B-58A)



wingspan: 56 ft 9 in (17.3 m)
length: 96 ft 10 in (29.5 m)
max. takeoff weight: 176,890 lb (80,240 kg)
max. speed: Mach 2.0 (1,319 mph)
ceiling: 63,400 ft (19,300 m)
range: 4,030 mi (3,500 nmi, 6,480 km)
powerplant: four General Electric J79-GE-5A turbojets



PZL.37

PZL.37 Los ("Elk") bomber was the most modern aircraft in Polish Air Force inventory in 1939 and one of the best medium bombers of its time. Remarkably, its bomb load almost amounted to its empty weight. It pioneered several design innovations, such as an airfoil of near laminar-flow characteristics, twin-wheel main undercarriage units with independent suspension of each wheel and a lift-generating fuselage.

Almost 50 examples of PZL.37s were used by Polish Air Force in September 1939, achieving their greatest success against 16th Panzer Corps near Czesochowa, wreaking havoc among German armoured columns and halting their advance. Not a single example has survived; a full-scale model has recently been built. An engine from a PZL.37, shown at 1939 New York World's Fair, is currently on display in Polish Aviation Museum in Krakow.

JERZY STANISLAW RUDLICKI



1893—1977

engineer, aircraft designer



Born in Odessa into a middle-class family. He created his first aircraft designs before the First World War. He served as a pilot in the army of the Tsar, and later in the Polish Air Force. He graduated with an engineering degree at the Ecole Supérieure d'Aéronautique in Paris. In 1925-1926 he worked at IBTL in Warsaw as head of the experimental and laboratory department.

Between 1926-1936, he was the chief designer at the E. Plage and T. Laskiewicz Mechanical Aircraft Plant in Lublin. Many of his designs

arose there of which the most popular was the R-XIII Lublin liaison and observation aircraft (270 produced), together with its training version the R-XIV (15 manufactured). During this period, Rudlicki also invented the „butterfly tail“.

After the September defeat, he evacuated to the West via Romania, Yugoslavia and Italy. He worked at the Société Nationale de Construction Aéronautique in Casablanca, where under his direction Polish engineers mounted and repaired 200 US aircraft. After the capitulation of France, the whole group evacuated to the UK and were employed at the Burtonwood Repair Depot. There Rudlicki developed a number of his own inventions, including a sound



transmitter for bombs, a design for a flying wing with a jet engine and streaming ailerons and flight controls (1941), an electric bomb ejector (1941), an electric bomb ejector (1942), and an ejector for flares (illuminating bombs) used before night bombing (1943).

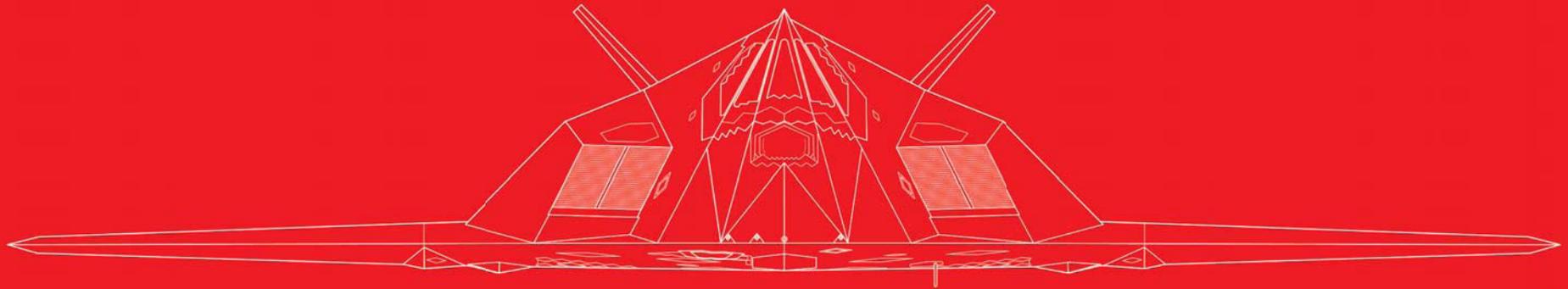
In 1943 he moved to the workshop of the subsidiary of the American Lockheed aviation company in Belfast, Northern Ireland. There he developed a release mechanism for surface bombardment from the four-engine Boeing B-17 Flying Fortress bombers.

From 1945-1961 he worked at the US Republic aircraft factory, where he improved aviation and aerospace designs and developed numerous inventions, including exhaust nozzles for the General Electric J-85 jet engine, which enabled the direction of the jet stream to be altered, and which were designed for VTOL jet aircraft. In 1961 Rudlicki retired and moved to Florida. There he continued to work on the concept of vertical take-off rotors and jets.



● **What connects designs as distant as a wood-and-canvas Lublin R.XIX (left) from the 1930s and a late 20th century aviation icon, the Nighthawk (top right), is Rudlicki's concept of a V-shaped tail. Conceived as a means to reduce weight and drag, it also proved useful in development of a stealth aircraft. The Beechcraft B35 Bonanza (right) remains the most popular airplane type in which the "butterfly tail" was used.**





LOCKHEED MARTIN



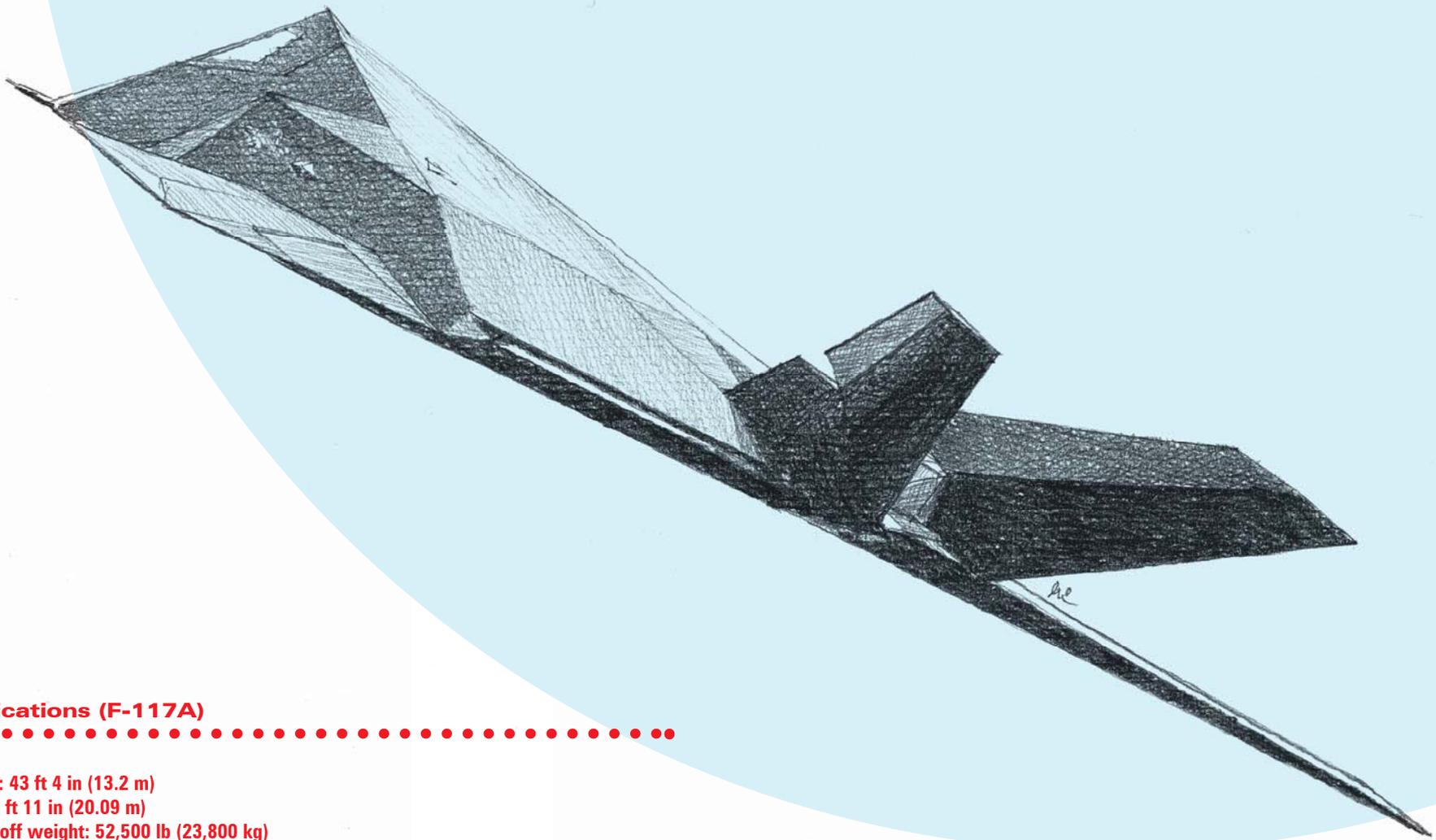
LOCKHEED F-117 NIGHTHAWK

A famous aircraft that became an inspiration even before it was revealed to the world. Due to secrecy wreathing the first stealth aircraft the imagination of the public was inspired to produce various fantastic ideas of how the plane could be like. It was not even clear what its designation will be.

Finally, in 1988 the design was revealed to the world and shown to the public in 1990. It proved a sensation with its ungainly, angular form which seemed to defy the laws of aerodynamics. Indeed, the plane needed a novelty fly-by-wire control system to enable

the pilot to fly at all. Another feature was the tail, designed according to Jerzy Rudlicki's patent. The butterfly tail, with its oblique surfaces, proved effective in deflecting radar signals as envisioned by the theory behind stealth concept.

The Nighthawk proved its mettle in the conflicts of 1990s and 2000s, delivering precise blows to its targets with impunity, apart from a single loss to enemy air-to-air missile system. Retired in 2008, it was superseded by improved stealth designs, but the shape of a F-117 still comes to mind when stealth technology is mentioned.



Specifications (F-117A)

wingspan: 43 ft 4 in (13.2 m)

length: 65 ft 11 in (20.09 m)

max. takeoff weight: 52,500 lb (23,800 kg)

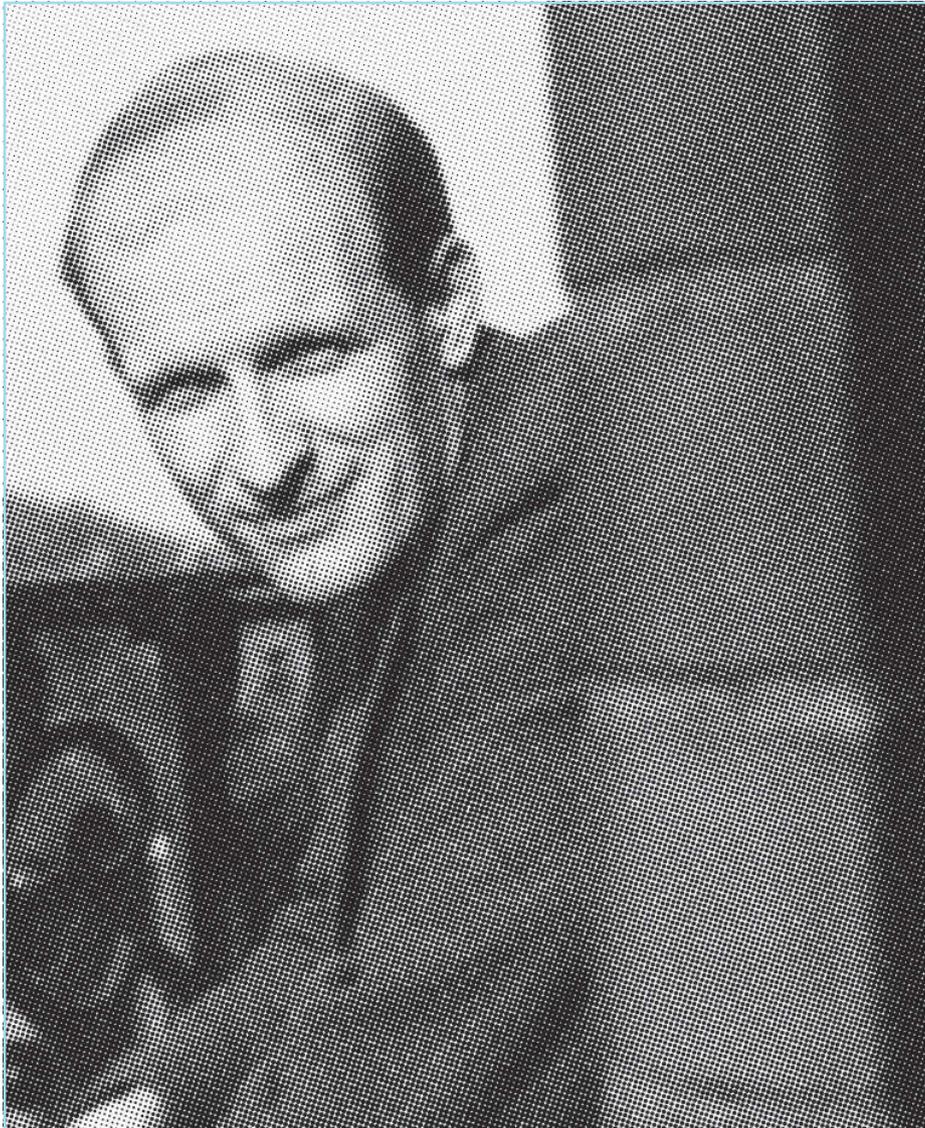
max. speed: Mach 0.92 (617 mph, 993 km/h)

ceiling: 45,000 ft (13,716 m)

range: 930 nmi (1,720 km)

powerplant: two General Electric F404 turbofans, 10,600 lbf (48.0 kN) each

STANISLAW PAWEL PRAUSS



1903—1997

mechanic, aircraft designer



He was born into a middle-class technical family in Warsaw. He studied at Warsaw University of Technology, where in 1928 he graduated in mechanical engineering. Later he was assistant professor in the Faculty of Airframe Construction and Flight Mechanics.

During this period he worked in the **construction office at PZL**. He participated in the design of the PZL P.I fighter aircraft, and then the triple-engine PZL.4 airliner. In 1931 he

designed the five-seater passenger aircraft PZL.16. Then he joined the team working on the PZL.23 Karas aircraft (250 were produced in two versions). Prauss also worked on the design of the PZL.46 Sum reconnaissance-bomber, the Karas' successor.

He was evacuated to Romania, from where, via Yugoslavia and Italy, he reached the West. In 1940 he joined the **Westland Aircraft** factory in Yeovil. He designed new undercarriage fairings, aerodynamic brakes and section fittings for the Lysander observation aircraft (1652 built). For the Welkin high-altitude fighter aircraft (tested 1942, 67 built), he designed

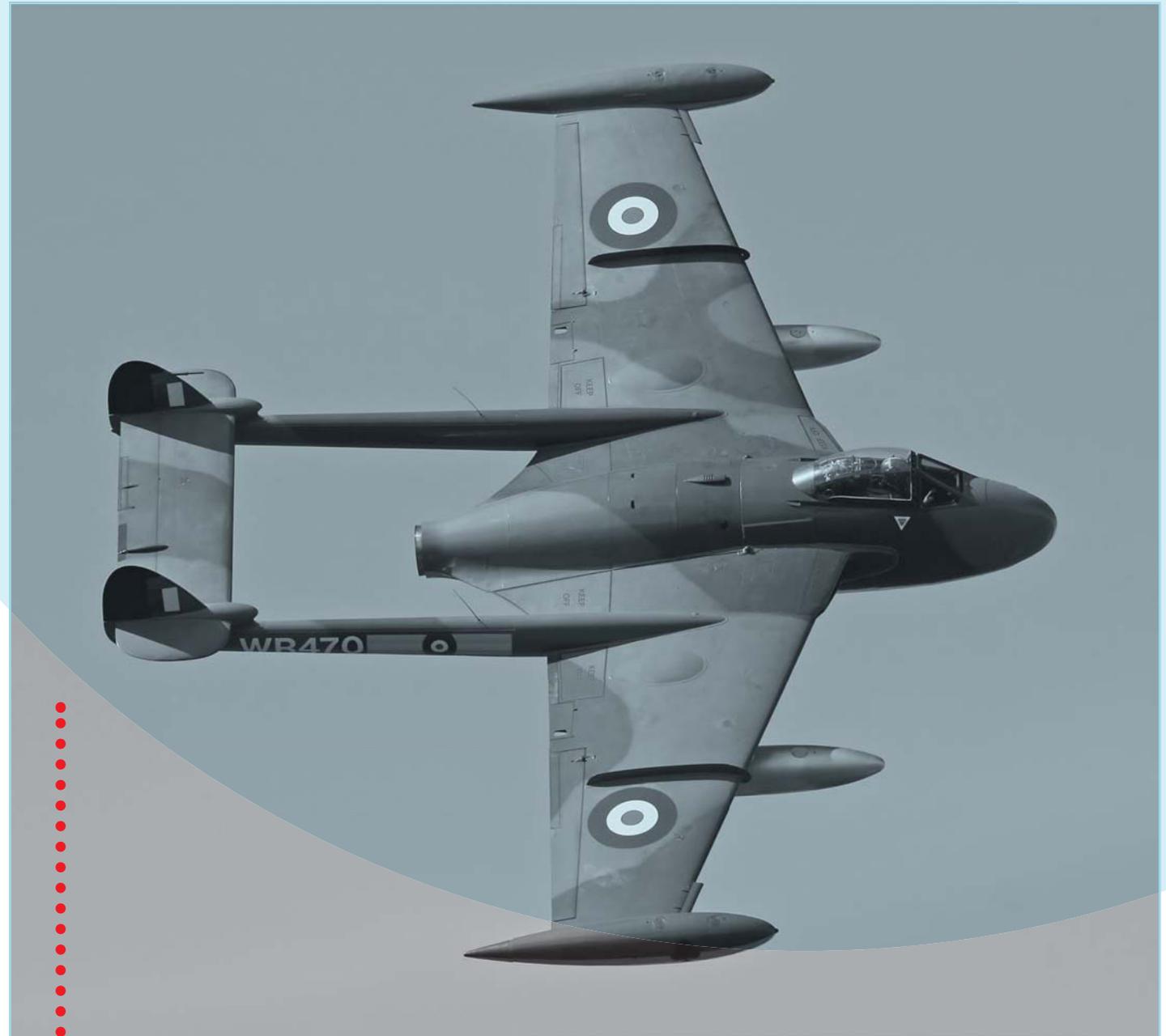


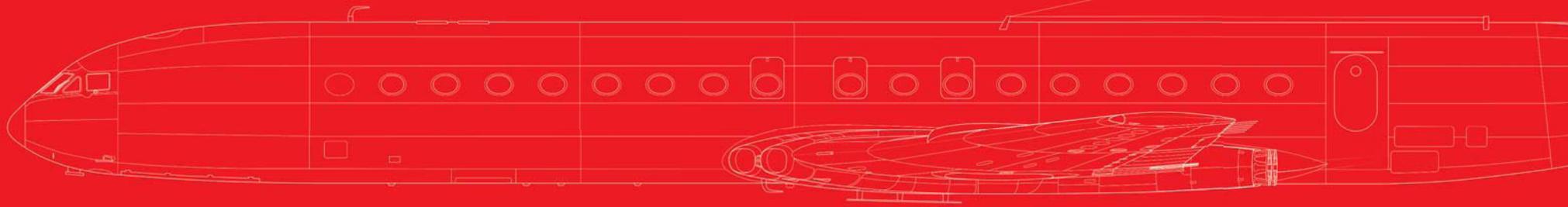
the central section of the wing with the cooling inlet in the leading edge and the cockpit pressure cover. In 1945 he became a lecturer on airframe construction at the Polish University College, London.

From 1946, at the De Havilland aircraft factory in Hatfield, he was involved in the development of the world's first jet passenger plane, the **DH.106 Comet** (tested 1949, 112 built). In 1949, he joined the design team for the **DH.112 Venom** jet fighter (test flight 1949, 1,435 built), and then the DH.110 (test flight 1951). From 1952 he worked on the Comet III aircraft and the marine version of the DH.110, known as the Sea Vixen (test flight 1955, 148 built). Between 1956-1961, he participated in the design of the **DH.121 Trident** airliner (test flight 1962, 117 built).

In 1963, the factory was taken over by **Hawker Siddeley Aviation Ltd.**, which from 1966 created the design for the Airbus A.300 airliner. In 1969-1970, Prauss focused on the preliminary design for the HS-135 and HS-144 aircraft. The extension of the HS-135 was the BAe 146 airliner (test flight 1981, 270 built).

●
The De Havilland DH. 106 Comet (left) initiated an era of jet airliners, while the DH.112 Venom (right) became the main British jet fighter of the 1950s used in operations during the Suez Crisis and the Malayan Emergency.





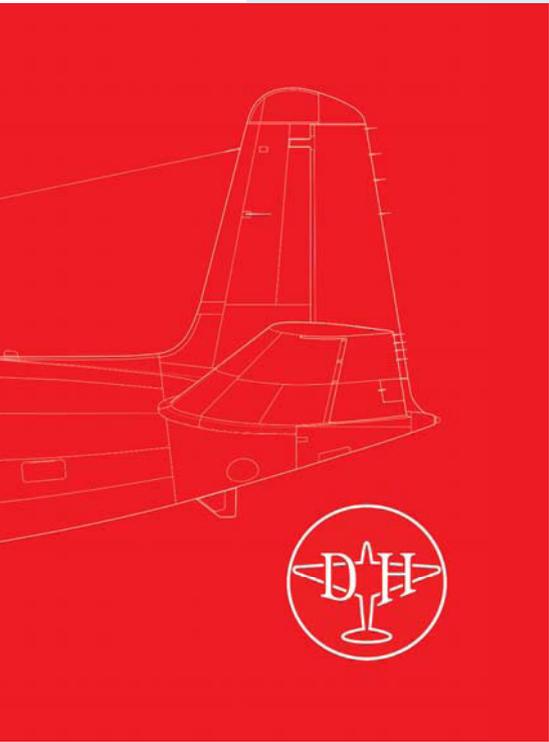
DE HAVILLAND DH.106 COMET

The Comet was world's first commercial airliner powered by jet engines. Designed by a team led by Ronald Bishop (of Mosquito fame), it first flew on 27 July 1949 and began its service in 1952. The plane was powered by four engines buried in wings near the wing roots, a solution dropped in subsequent jet airliner designs in favor of external engine nacelles attached under wings due to easier maintenance and security reasons.

Jet propulsion made the Comet unrivalled in terms of flight comfort, significantly reducing noise and vibration that plagued passengers of piston-engined aircraft. The prospects seemed promising and former reservations about jet airliners were dropped, as De Havilland was approached by several airlines that intended to purchase the aircraft.

However, the Comet was soon to face dire problems. In 1952 a Comet crashed at takeoff, followed by another accident in 1953. Also in 1953 and in the following year two Comets fell to the ground for no obvious reasons. Subsequent examination determined metal fatigue to be the main cause of disasters. Because of unprecedented operating speeds and cabin pressurization, the fuselage design employed new materials and construction features. Some of the alloys used were discovered to be prone to metal fatigue, resulting in disintegration of several planes in mid-air.

The design was improved to answer the problems and afterwards the Comet flew passengers until 1981, although it was quickly outclassed by newer designs.



Specifications (DHC. 1A)

- wingspan: 115 ft (35 m)
- length: 93 ft (28 m)
- max. takeoff weight: 110,000 lb (50,000 kg)
- cruising speed: 740 km/h (400 kn; 460 mph)
- cruise altitude: 42,000 ft (13,000 m)
- range: 1,500 mi (1,300 nmi; 2,400 km)
- powerplant: four de Havilland Ghost 50 Mk1 turbojets, 5,050 lbf (22.5 kN)

WIESLAW ZENON STEPNIEWSKI



1909—1998

mechanical engineer, aircraft designer

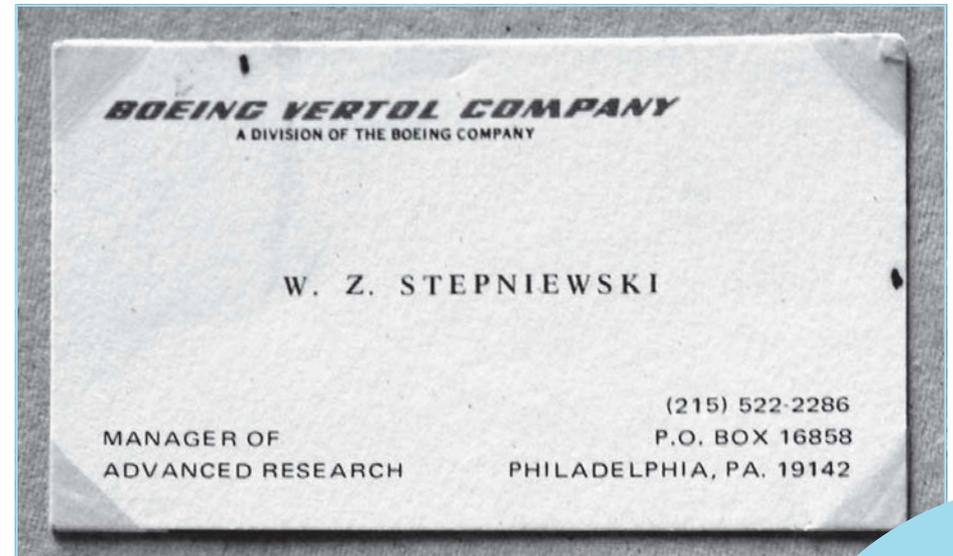


He came from Kamieniec Podolski. He graduated from the Cadet Corps, and then studied at the Department of Aviation at the Faculty of Mechanical Engineering at Warsaw University of Technology (graduated in 1933). He collaborated on the design of the PZL.37B Łos aircraft. From 1935, he was technical director of the Technical Institute of Gliding and Motorised Gliding in L'viv. He also continued his scientific work, and from 1936 he taught the mechanics of flight and

aviation technology at the Technical University of L'viv.

He was evacuated to France in September 1939, where he worked in the aviation industry at the Bronzavia factories in Paris. After the fall of France, he was evacuated to the UK, and from 1941 he worked as head of aerodynamics and endurance at the Canadian factory of the British company De Havilland (DHC).

After the war, he settled in the US, where he became involved with the helicopter industry, first with Jet Helicopter Corp., and from 1947 at the Piasecki Helicopter Corp. (later Boeing



Vertol), where he held managerial positions in aerodynamic research and advanced technologies.

He worked on aerodynamics for dual-rotor tandem helicopters. He led work on the vertical takeoff and landing **Vertol 76 (VZ-2)** aircraft with tilt rotors. He lectured in rotorcraft aerodynamics courses for engineers.

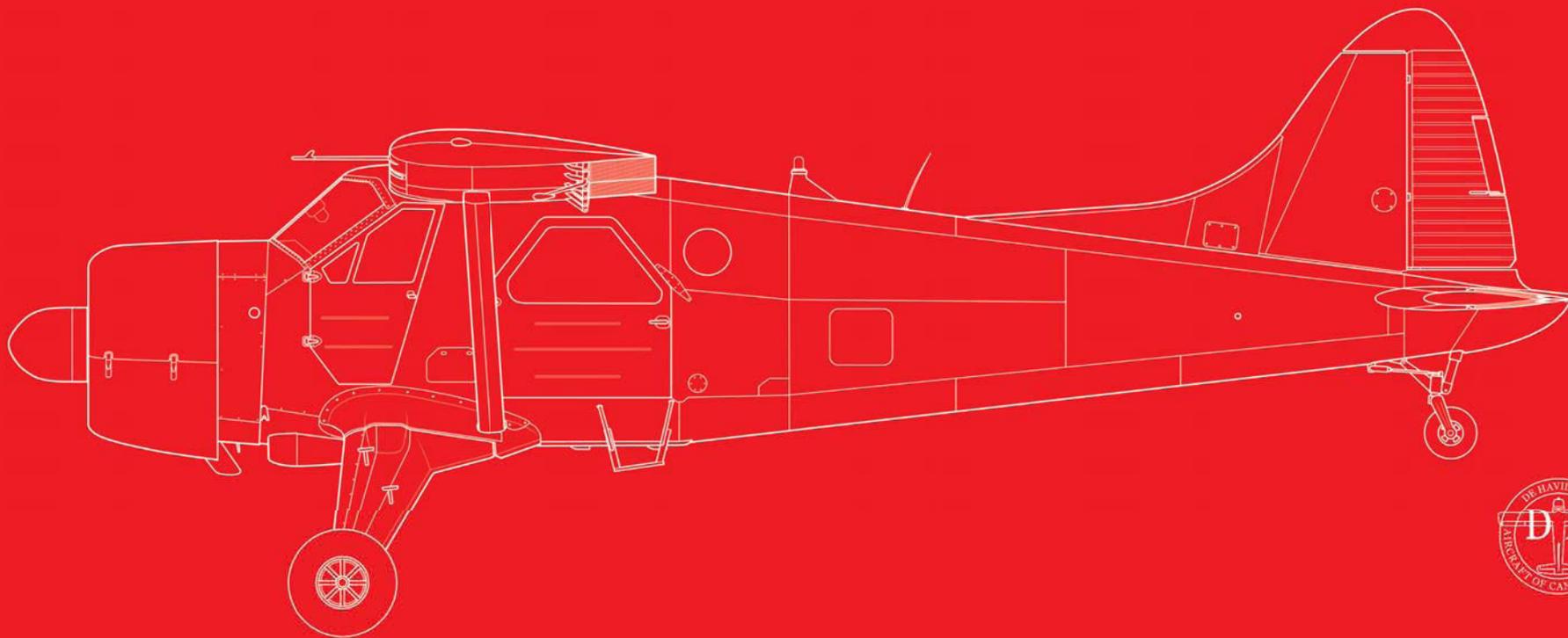
In 1969-75, Stepniewski lectured at **Princeton University**. He published nearly 100 papers, including the fundamental textbook for rotorcraft aerodynamics. He also translated scientific studies from Russian into English.

From 1975, Stepniewski was retired, but continued as a consultant with **Boeing Helicopters** in Philadelphia. In 1992, he founded his own company to conduct studies and translations for the military and NASA.

Stepniewski's main achievements include the formation of aerodynamics, flight mechanics, and the performance for more than 5,000 aircraft, the development of transparent methods for the calculation of helicopter aerodynamics, and the training of hundreds of helicopter professionals.

●
Business card of W. Stepniewski as Boeing Vertol manager (left). Stepniewski was responsible for an early tiltwing design, the Vertol VZ-2 (right).





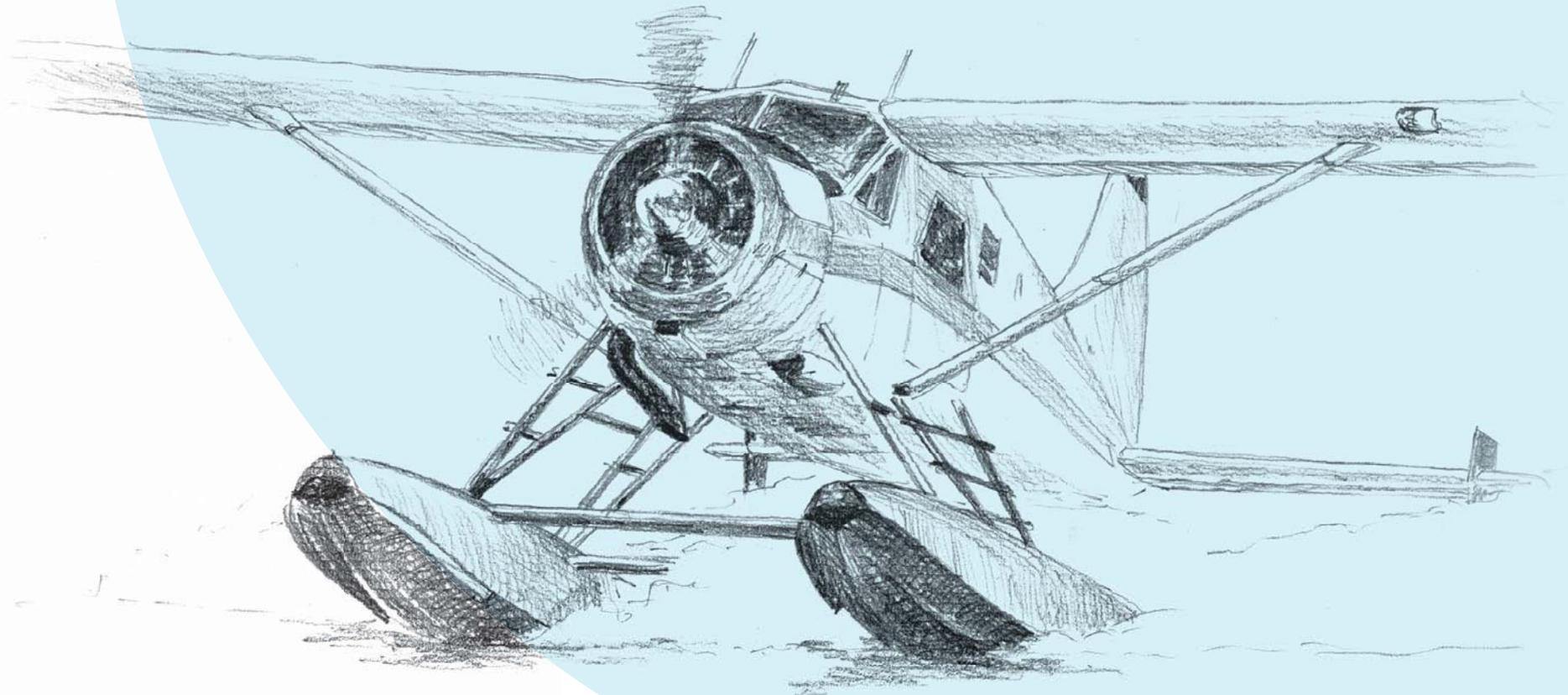
DHC.2 BEAVER

The Beaver is a highly successful STOL utility transport, used by military and civilian operators for moving personnel and cargo (especially in remote areas), search and rescue operations and crop dusting. De Havilland designers led by Phil Garratt with chief engineer W. 'Jaki' Jakimiuk and aerodynamicist Z. 'Steppy' Stepniewski in 1946 set on designing a robust plane with STOL characteristics, which could answer the needs of Canadian aviators flying in difficult conditions of the country's vast interior.

On 16 August 1947 the plane made its maiden flight. It was a high-wing monoplane of all-metal construction powered by a radial engine. It could be equipped with wheels, skids

or floats, enabling operations in various conditions. Large doors installed on either side of the fuselage allowed easy loading of cargo, including oil drums. The plane had a payload of 2,100 lb (953 kg) and could carry 6 passengers.

Over 1,600 examples had been built when the production ceased in 1967 and many were exported abroad. The United States Army became one of the major operators. Hundreds of Beavers are still flying and the plane is considered to be one of Canada's top engineering achievement of the 20th century.



Specifications (DHC. 2 Beaver Mk 1)

- wingspan: 48 ft 0 in (14.63 m)
- length: 30 ft 3 in (9.22 m)
- max. takeoff weight: 5,100 lb (2,313 kg)
- max. speed: 158 mph (255 km/h)
- ceiling: 18,000 ft (5,486 m)
- range: 455 miles (732 km)
- powerplant: Pratt & Whitney R-985 Wasp Jr. radial engine rated at 450 hp (336 kW)

HENRYK KAZIMIERZ MILICER



1915—1996

mechanical engineer, sports pilot,
aircraft designer

He came from a middle class family in Warsaw. He studied at the Faculty of Mechanics at Warsaw University of Technology. In 1936-1937, he worked in the construction office at PZL, participating in the design of the PZL.37 Łos bomber and the PZL.46 Sum reconnaissance aircraft and bomber. In 1939 he joined the DWL in Warsaw, where he participated in work on the RWD-21 sports aircraft,

the RWD-22 seaplane, and the RWD-25 fighter.

In September 1939, he participated in the evacuation of aircraft from the factory. After reaching the West, he took flight training in France and the UK. In 1941-42 he worked in the PSP Office of Instruction and Translation in Blackpool. Between 1942-45, he studied at the Faculty of Aviation at Imperial College (University of London). By 1944 he was working at the Airspeed aircraft factory in Esher designing the Ambassador airliner (23 built). From 1947, he was employed at the Percival factory in Luton, where



he prepared nine tail versions for the **P.40 Prentice** training aircraft (422 built). He also developed a preliminary design for the **Percival P.56 Provost** training aircraft (461 built), which was developed into the **P.84 Jet Provost** training jet (505 built).

Because he was unable to find suitable employment in Europe, in 1950 he moved to Australia, where until 1960 he worked at the Government Air Factory in Melbourne designing the **Jindvik** target jet and **Malkara** antitank rocket. In 1960, he was chief engineer and technical manager at the **Victa** factory. He refined his design for the **Victa Airtourer 100**, which, together with its sister version the **Airtourer 125** was built from 1962 to 1966 in a series of 172. After the collapse of the **Victa**

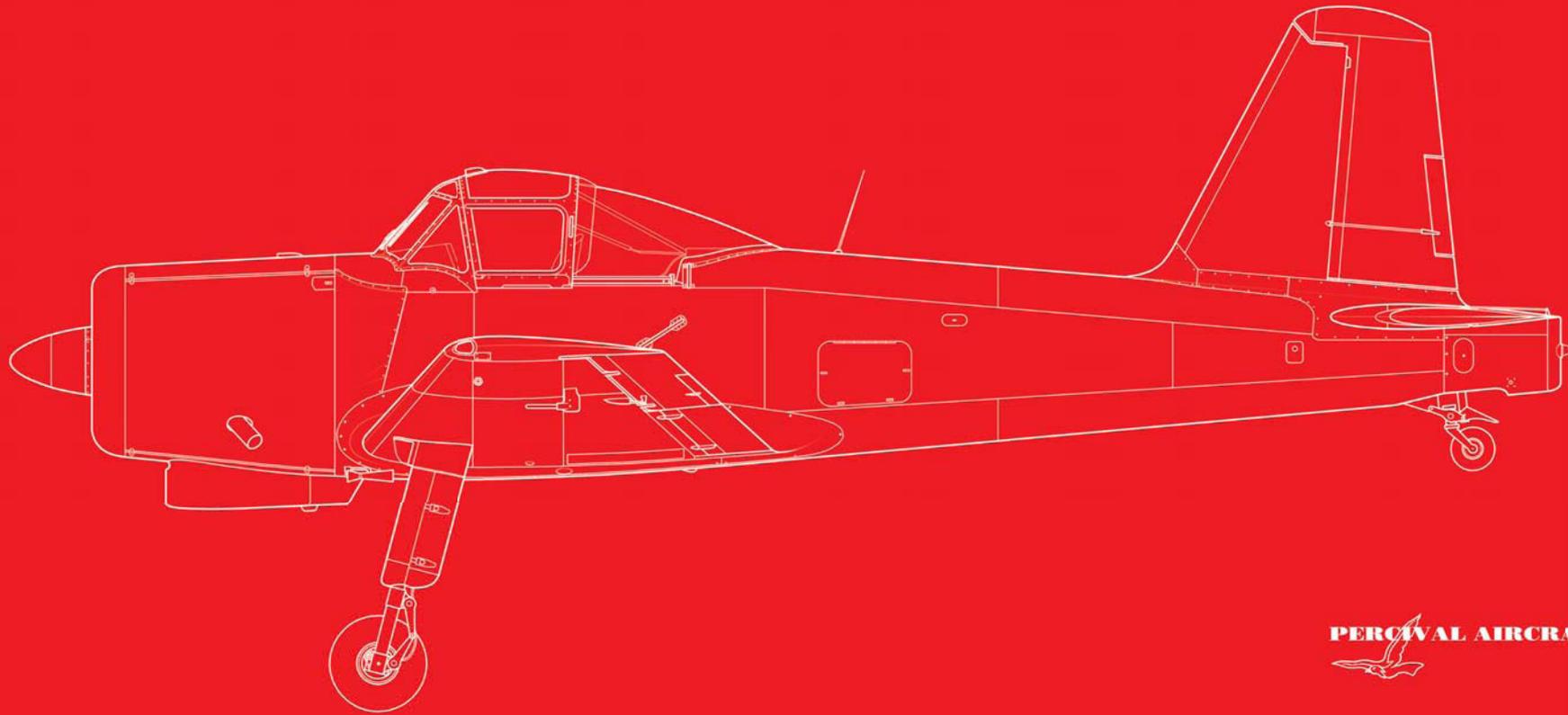
plant, the **Victa Airtourer** was taken over by New Zealand's **AESL**, which launched the production of a two-seater training version — the **CT-4 Airtrainer** (series of 114) — used by the Australian, New Zealand and Thai militaries. A total of 286 aircraft were built in this family.

In 1967, Millicer started lecturing on aerodynamics and aircraft construction at the **Royal Melbourne Institute of Technology**.



Millicer's contribution to trainer aircraft design include: the Prentice (left), the Airtrainer (below & top right) and the Jet Provost (bottom right).



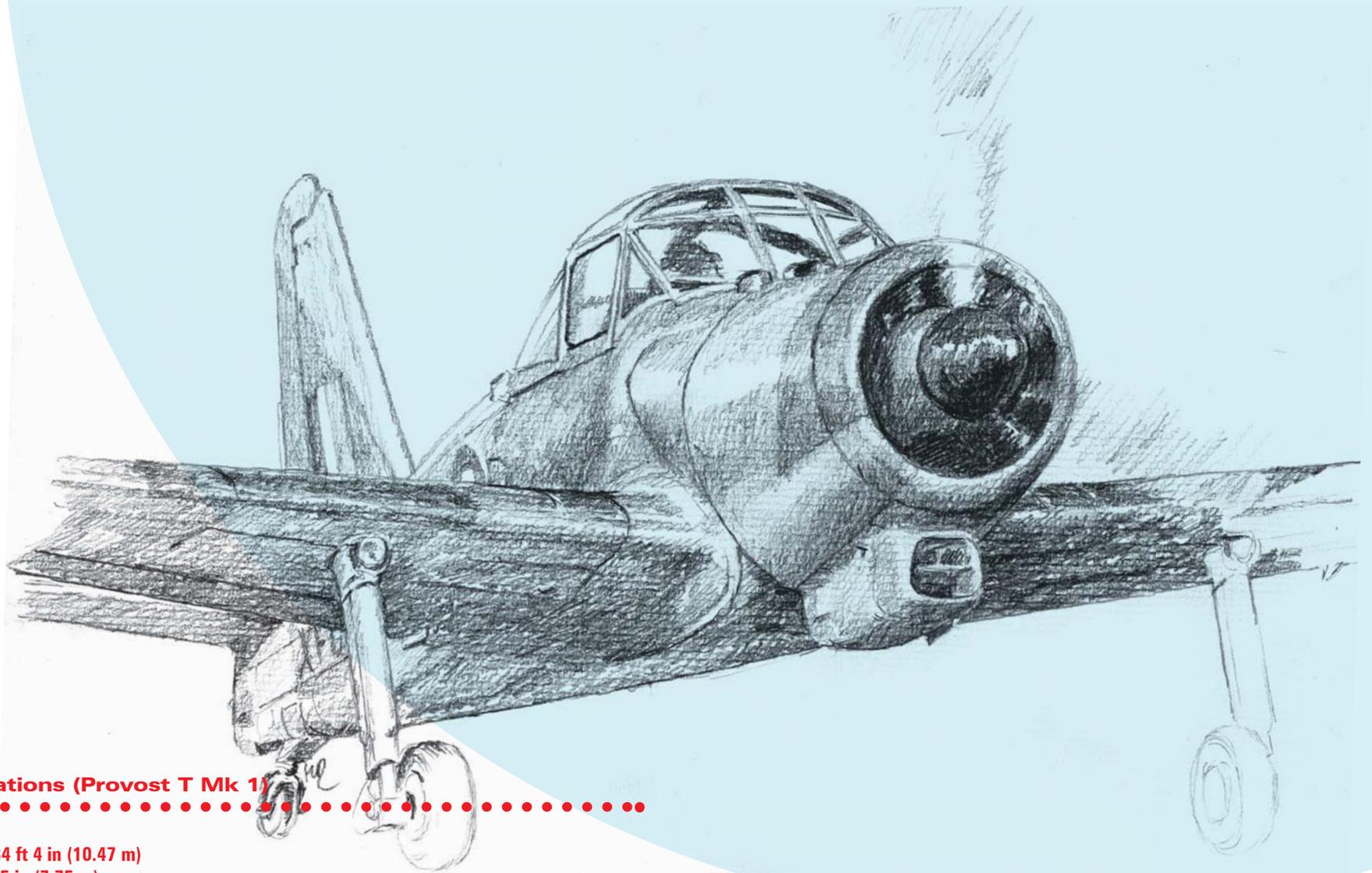


PERCIVAL AIRCRAFT


PERCIVAL P.56 PROVOST

A low-wing monoplane with fixed undercarriage, with the crew seated side-by-side. The Provost served as a basic trainer of the Royal Air Force, designed in accordance with the RAF requirement issued in 1948. It was intended to replace an earlier Percival trainer, the Prentice. The plane took off for its maiden flight in 1950. 461 examples were produced between 1951 and 1956 and the Provost was introduced in the RAF in 1953.

The Provost proved a great improvement over its predecessor and had a long service lasting until 1960s. It was finally replaced with Jet Provost, based on the P.56.



Specifications (Provost T Mk 1)

wingspan: 34 ft 4 in (10.47 m)

length: 25 ft 5 in (7.75 m)

max. takeoff weight: 2,200 lb (998 kg)

max. speed: 120 kn, 138 mph (222 km/h)

ceiling: 15,800 ft (5,200 m)

range: 225 NM (445 km)

powerplant: four-cylinder, inline, de Havilland Gipsy Major 1C rated at 145 hp

POLISH AVIATION MUSEUM

The oldest and leading Polish museum dedicated to aviation technology and history ranks among the most original attractions of the Krakow region in southern Poland.

The Museum is located in the former Polish capital of Krakow, famous for its numerous historical monuments preserved as UNESCO heritage. Apart from the marvels of medieval and renaissance architecture and art, the city happens to host an old Rakowice-Czyzyny aerodrome which is a cradle of Polish aviation.

First established by Austro-Hungarian army as observation balloons base, in 1912 the Rakowice field became an aerodrome for military airplanes and subsequently experienced continuous expansion during WW I. In 1918 the field was taken over by Polish authorities which presented one of the earliest events of the struggle for independence of the country.

Subsequently, the field became a base of one of Polish aviation regiments, then a civil airport and Krakow Aero Club field as well. Enlargement programs resulted in the construction

of new hangars and other facilities. This period of blossoming ended abruptly with the German invasion in 1939 and subsequent occupation of Poland.

Although the damage done by bombing in September 1939 was repaired and the airfield reused as a major Luftwaffe airbase, the retreating Germans conducted a thorough demolition of airfield facilities in January 1945. Only one hangar was rebuilt by the communist authorities of postwar Poland and the airfield never returned to its former status.

Further east the development of a vast industrial and residential district of Nowa Huta was initiated making the airfield operations increasingly problematic. Finally, in 1963 a decision was made to close the field. Yet at this moment several aviation enthusiasts' efforts led to establishment of an aircraft collection in the remaining hangar.

The exhibits included aircraft from the Technical Museum stores plus several obsolete machines of the Polish Air Force. Among these were surviving examples of prewar Polish constructions, experimental designs of postwar designers, military aircraft used by contemporary Air Force, and wrecked remains of German Aviation Collection abandoned in Poland and retained in accordance with international law.

Prior to 1989 the Museum had never received adequate support from the communist authorities, because Polish aviation heritage was perceived as having 'bourgeois' prewar and wartime provenance. Largely unknown, the collection

Aerial view of the Museum with the Main Building in the foreground, hangars and outdoor exhibition nearby. Surrounded by residential and business districts, the PAM grounds provide the recreational function in the area.



was nevertheless preserved until 1989 transformation of Poland into a democratic state.

For the last 20 years the Museum has been vastly expanded and part of the former airbase was recreated as a park open to the public and brought back to an airfield status, allowing sports planes and helicopters. Every Summer a widely popular airfest is held, as well as many other cultural events (concerts, fairs, local community celebrations), utilizing an airstrip which is now registered as a historical monument.

The Museum itself boasts one of the most valuable collections of aircraft in Europe including many unique examples. Starting with pioneering constructions, through WW I and interwar planes, veterans of world war II and early jet age to contemporary combat and civilian planes and helicopters, the exhibits of Krakow's old airfield present a comprehensive display of aircraft technology from the hundred years of the history of powered flight.

Most notable items in the collection include Levavasseur Antoinette, an early French design from 1909; Sopwith Camel and Halberstadt CL.II of World War I fame; sport and military aircraft from interwar Poland; German experimental Me 209; World War II icons Supermarine Spitfire and Lisunov Li-2 (license-built DC-3).

There are numerous examples of post-WW II aircraft, including military jets of Warsaw

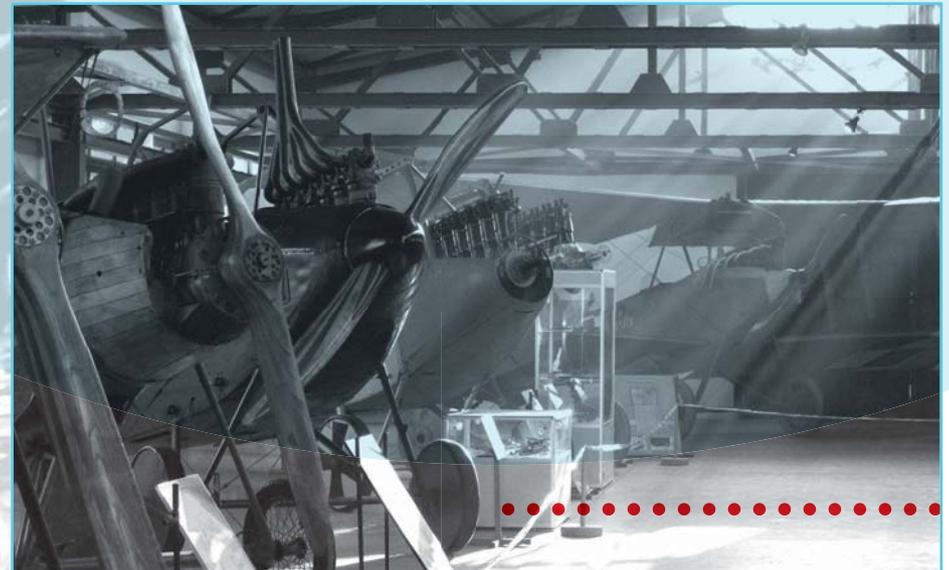
Pact and NATO, crop dusters and air ambulances. There is an interesting collection of gliders and sport planes, including several experimental constructions.

Yet the institution is a **museum of aviation, not just a museum of aircraft**. A separate exhibition comprises one of the world's most impressive collection of aircraft engines, allowing technology geeks to explore scores of ideas, solutions and innovations that testify to advancement in propulsion technology of the last 100 years. There are anti-aircraft weapon systems, airfield devices and vehicles that illustrate various aspects of flying. There are scores of other objects pertaining the matters of the air: flight uniforms and gear, instruments, personal possessions of memorable aviators. Last, but not least, there is a vast archive and library.

Visitors to the Polish Aviation Museum can enjoy its **landmark Main Building** with its award-winning architecture, educational facilities, exhibition space and regularly held cultural events. Then there are several indoor exhibitions, providing different perspectives on various aviation themes. Finally, there is an outdoor exhibition, which offers an opportunity to fully experience the **climate of an old airfield** with its hangars and planes surrounded by alleys of trees and fields of green. Combining education with recreation constitute the idea behind the Polish Aviation Museum experience.



The Exhibition Wing in the Main Building (above) offers a quick introduction to aviation with a diverse choice of aircraft and flying gear and provides room for temporary exhibitions. A separate hangar (below) houses World War I airplanes, several of which are world's last remaining examples.





The Polish Aviation Museum is an institution of Malopolska (Krakow region) Voivodeship, a part of the country which is the most attractive both in terms of historical substance and beautiful landscape. One of the most populous and developed regions ever since the beginnings of Polish history in 10th century CE, Malopolska is famous for the city of Krakow with its medieval Old City, ancient salt mines of Wieliczka and Bochnia, fancy karst formations in the highlands and picturesque Carpathian ridges. The Polish Aviation Museum, even though concerned with aviation traditions of the country as a whole, acts as another tourist attraction of the region and adds to its cultural potential.

Still, the Museum aims at, so to say, reaching behind the horizon. Aviation has connected people and made the world smaller, and local traditions of aviation have always been intertwined with that of the wider world. Therefore the Museum aspires to establish and deepen cooperation with partners worldwide in order to exchange



The outdoor exhibition comprises the "MiG Alley" (above), a collection of Soviet MiG fighters from 1940s to 1980s in almost every version that had been used by the Polish Air Force during the communist era. One of the main statutory aims of the Museum is education (left), which takes various forms that utilize different exhibits, interactive toys, and, most importantly, the staff's knowledge and skills. Lessons, trainings and lectures are adapted to various levels of education and students of various age.

knowledge, enlarge the collection and promote common heritage.

In the year 2012 there were two notable examples of such projects, both made in cooperation with American partners. First the **American Year in the PAM** was inaugurated. It comprised two temporary exhibitions, one of which was concerned with WW II operations of USAAF over Poland, the other with American and Polish women aviators. There was a screening of a series of rare American aviation movies, educational activities and several other events.

The other example is the exhibition in the Museum of Flight which the Polish Aviation Museum is proud to present. "Frank Piasecki and Other Polish Aviation Designers" is an exhibition which was first shown in Krakow in 2011. Now it has arrived to Seattle in order to reach American public as well.

The subject of the exhibition perfectly suits the PAM's intentions of promoting Polish aviation as a part of the global advancement of aviation technology and organization. All the people whose biographies and achievements the exhibition promotes had Polish roots, but their input in aviation is of a universal nature. Which is exactly what accounts for a message the Museum labors to promote: wherever someone comes from, when they take to the air, they become involved in a common world.



The Museum houses various cultural events not necessarily related to aviation, such as musical concerts (above). However, the most important event is the annual Malopolska Air Picnic, a family-oriented airshow attracting tens of thousands of spectators. Among many aircraft that can be seen over the old airstrip is the Museum's own Jakovlev Jak-18 military trainer from the 1950s (below), restored to flying condition in 2000 and attending airshows throughout the country ever since.



MUSEUM OF FLIGHT

In 1964, a number of aviation enthusiasts in the Seattle area banded together to form the **Pacific Northwest Historical Aviation Foundation (PNHAF)**. Their initial goal involved the restoration of the last surviving Boeing Model 80A-1 airliner.



The airplane had been abandoned at the Anchorage, Alaska airport after World War II. An Alaskan newspaper

reporter, Harriss Darby, discovered it in the local garbage dump. Just before bulldozers were about to demolish the airplane, Darby received permission to transfer it to his private property where he had accumulated other antique aircraft. Aware of its historic significance, Darby eventually tracked down the right people in the Seattle area. Jack Leffler, a retired United Airlines pilot acquired the airplane. A committee was formed and eventually

U.S. Air Force transports were used to fly the dismantled airliner to Seattle. The methodical restoration process began.

By 1966, PNHAF had accumulated enough artifacts that it established a **small museum at the Seattle Center** near the Space Needle. In the mid 1970s, Harl V. Brackin, The Boeing Company's historian and PNHAF member, proposed that the

foundation acquire the **Red Barn**. Boeing intended to sell its original land adjacent to the Duwamish River next to the First Avenue South Bridge. William E. "Bill" Boeing had acquired the Red Barn in 1910, then used as a wooden boat shipyard. After Boeing started his airplane company, the Red Barn served as his plant beginning with the construction of Model C trainers for the United States Navy during World War I. Brackin suggested barging the Red Barn two miles up the Duwamish River to Boeing Field. Negotiations had begun in 1975 with officials from King County, owner and operator of Boeing Field. They agreed to let PNHAF locate the Red Barn on a parcel of land near the southwest corner.

In 1979, Seattle officials decided that they wanted to use the Seattle Center space for other purposes. PNHAF's Pacific Museum of Flight was forced to vacate the premises and closed at the end of September. At the same time, PNHAF Executive Director Howard Lovering declared the **foundation needed to finalize plans for a museum**. By fall, the museum site plan, remarkably similar to the layout in 2010, was created. Meanwhile, the majority of PNHAF's holdings had been consolidated into storage at the Tacoma Industrial Airport. In August 1980, officials broke ground on



William E. Boeing Red Barn with T.A. Wilson Great Gallery building in the background — a combination of both historical and contemporary faces of the place.

the construction of Phase I — the Red Barn and some administrative space. At the ceremony, they remembered the efforts of Brackin, who had passed away in 1977, to preserve the Red Barn. By the end of 1980, PNHAF lacked a site but it had three full-time employees—Lovering, educator Georgina Franklin and researcher Gretchen Boeing-Clough.

In 1981, PNHAF renamed itself The Museum of Flight Foundation and finalized the lease with King County. In October, architect Ibsen Nelsen unveiled his vision of the Museum's Phase II — the building of the Great Gallery in which to display the larger artifacts. In 1982, the Museum initiated its Pathfinder Awards. The original inductees were Clyde Pangborn, Leslie Tower, Thomas Hamilton, Louis Marsh, Boeing, Noel Wien and Claire Egvedt. **On September 1, 1983, The Museum of Flight, located in the renovated Red Barn, officially opened at its Boeing Field location.**

In 1987, the next phase in The Museum of Flight's growth occurred with the opening of the Great Gallery. This six-story glass-enclosed structure has been the Museum's centerpiece ever since. In 1991, the U.S. Air Force agreed to loan The Museum of Flight the world's only Lockheed M-21 Blackbird spyplane, equipped to carry a drone. Only two aircraft of the type ever flew; the other crashed during a test flight in 1966.

Similar in appearance to the better known SR-71, the

Blackbird is extremely popular with Museum visitors.

Ralph Bufano succeeded Lovering as executive director in 1991. Bufano's tenure, which lasted until fall 2005, is best remembered for the following: the re-hang of the aircraft in the Great Gallery; the acquisition of what is considered by many to be the world's first fighter plane, the 1914 Caproni Ca.20; the permanent loan of the Concorde supersonic transport from British Airways and the opening of the Personal Courage Wing featuring the aircraft and artifacts from the Champlin Fighter Museum of Mesa, Arizona.

Dr. Bonnie Dunbar, a former astronaut and University of Washington graduate, replaced Bufano. Supported by her passion for space exploration, The Museum of Flight opened its Space Gallery in 2006. In 2010, Dr. Dunbar stepped down as President and CEO to concentrate on acquiring a Space Shuttle for the Museum. The Museum of Flight welcomed its newest President and CEO Doug King in November 2010.

William E. Boeing Red Barn

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The Boeing Red Barn is among the Museum's oldest and largest artifacts. Saved from demolition and moved to its current site by the efforts of aviation enthusiasts and community leaders, the Red Barn first served the shipbuilding industry before dozens of workers began building



J. Elroy McCaw Personal Courage Wing. The exhibits in World War I gallery includes these two former foes: Aviatik D.I (front) and Sopwith Camel fighter planes (back).



J. Elroy McCaw Personal Courage Wing's World War II Gallery (above) comprises some of the most famous planes of the era, including a Spitfire, a Bf 109 and a Lightning. **T.A. Wilson Great Gallery** (below) offers a wide variety of planes demonstrating wide impact of aviation on the world in the last 100 years.



World War I-era United States Navy trainers for The Boeing Airplane Company. On most of two floors, the Red Barn today features exhibits that discuss the beginning of the Boeing story through the development of the first multi-jet engine aircraft. Other first-floor galleries describe the emergence of the Wright brothers (Birth of Aviation), legendary aviation visionaries (Founders of Aviation) and early regional developments (Northwest Aviation).

T.A. Wilson Great Gallery

The T.A. Wilson Great Gallery's varied assortment of aircraft, from unpowered gliders and unmanned reconnaissance aircraft to some of the world's fastest airplanes, offers something for everybody. In between are a wide-ranging variety of general aviation, commercial and military aircraft. Without question, the Lockheed M/D-21 Blackbird sizzles most. Visitors looking for something slower can inspect the nearby human-powered McCready Gossamer Albatross II. Tucked away in the corner are two state-of-the-art flight simulators. On the mezzanine level, visitors can observe flight operations at Boeing Field from the Tower. In the Flight Zone, kids can slip into cockpits and "fly" a hang glider.

J. Elroy McCaw Personal Courage Wing

As visitors arrive in the J. Elroy McCaw Personal Courage Wing's

World War I gallery either by hiking up the stairs or riding the elevator, they encounter one of the Museum's more remarkable artifacts, the Italian-built Caproni Ca.20, believed to be by many historians the world's first purpose-built fighter aircraft. Artifacts, films and dramatizations help explain the history of the war and the first widespread use of airplanes as aerial weapons. Because the United States entered the war more than two years after it began, the gallery's strong international flavor reminds the visitor that Europe led in aviation well into the 1920s.

The Personal Courage Wing's World War II Gallery allows Museum visitors to carefully examine some of the best-known piston-powered fighters ever built. These legendary aircraft are only part of the story. Besides various video presentations, visitors can enjoy a "fireside chat" with Franklin Roosevelt or detect the tension in CBS Radio legend Edward R. Murrow's voice as he describes the German bombing of London. Curious about how the massive Republic P-47 Thunderbolt compares in size to a Boeing B-29? Almost all World War II military aircraft can be found in 1/72nd scale in the Holtgrewe model collection.

Charles Simonyi Space Gallery

Space travel remains one of the most challenging human accomplishments. To overcome the difficulties it

presents, a successful human space mission requires years of crew training aboard simulators and mockups like The Museum of Flight's Full-Fuselage Trainer. During training, they build a fundamental knowledge of spaceflight and the outer space environment, and rehearse the specific tasks they will need to successfully complete their mission. Though NASA retired the Space Shuttles in 2011, the need for astronauts did not go away. NASA's operations aboard the International Space Station continue and the agency is developing a new vehicle for exploring destinations beyond Earth orbit such as the Moon, Mars and asteroids.

Airpark

The Museum of Flight is more than a building. It's a campus. The T. Evans Wyckoff Memorial Bridge links the main Museum building with the Airpark — home to some of the largest and most significant aircraft in the collection. Staffed almost exclusively by volunteers, the Airpark enables visitors to squeeze into the tube known as Concorde and experience a bit of history in one of the presidents' planes, a former Air Force One. Oh, by the way, there's the pioneer of the jumbos, the first Boeing 747 and the first of the most successful jetliner series ever, the Boeing 737.

Charles Simonyi Space Gallery (above)
and the **Airpark** (right).



THE BOEING COMPANY



Boeing Chicago Corporate Office (above). **Boeing 787 Dreamliner** (below) represents the latest in airliner technology and passenger comfort.



Boeing is the world's largest aerospace company and leading manufacturer of commercial jetliners and defense, space and security systems. A top U.S. exporter, the company supports airlines and U.S. and allied government customers in 150 countries.



Boeing products and tailored services include commercial and military aircraft, satellites, weapons, electronic and defense systems, launch systems, advanced information and communication systems, and performance-based logistics and training. Boeing has a long tradition of aerospace leadership and innovation. The company continues to expand its product line and services to meet emerging customer needs. With corporate offices in Chicago, Boeing

employs more than 170,000 people across the United States and 70 other countries. This represents one of the most diverse, talented and innovative workforces anywhere. Our enterprise also leverages the talents of hundreds of thousands more skilled people working for Boeing suppliers worldwide.

Boeing is organized into two business units: Boeing Commercial Airplanes and Boeing Defense, Space & Security. Supporting these units are Boeing Capital Corporation, a global provider of financing solutions; the Shared Services Group, which provides a broad range of services to Boeing worldwide; and Boeing Engineering, Operations & Technology, which helps develop, acquire, apply and protect innovative technologies and processes.





Boeing Central & Eastern Europe

The region of Central and Eastern Europe is diverse and dynamic, with substantial growth rates. Boeing became a partner to Central and Eastern European airlines as soon as the region began to form closer contacts with the West. Both through lease and direct-purchase agreements, Boeing airplanes have met, and continue to meet, the requirements of airlines in this region as air traffic grows. A Boeing regional office in Warsaw, under the leadership of Henryka Bochniarz, president of Boeing Central and Eastern Europe since July 2006, has been established to further this strategy and to coordinate the company's business in the region.

Boeing's presence in the region is further enhanced by a team of Commercial Aviation Services field service representatives, providing a broad array of business and technical support and ensuring a smooth introduction of new Boeing jetliners. In January 2007, Jeppesen purchased C-MAP, a provider of digital maritime cartography, data services and other navigational information,

with significant operations and more than 100 (in 2007) and 180 (in 2012) employees in Gdansk, Poland. Jeppesen is a subsidiary of Boeing Commercial Aviation Services, a unit of Boeing Commercial Airplanes.

On the defense side, several Central & Eastern European countries including Poland are members of the 12-nation Strategic Airlift Capability (SAC) consortium that acquired three Boeing C-17 Globemaster III advanced airlifters that joined the Heavy Airlift Wing (HAW) in July 2009. The SAC's approach to shared use of the strategic airlifter is regarded as a model for the pooled acquisition and management of defense capabilities. As members of SAC, the nations jointly operate the C-17s out of Pápa Air Base in Hungary, with Boeing employees based in Pápa providing ongoing support.

Boeing has also developed successful supplier-partner relationships in the region, going back to the 1980s with suppliers supporting several Boeing programs. Most recently during the U.S.-Polish Summit in Warsaw in June 2012, Boeing Research & Technology-Europe announced the signing of a memorandum of understanding (MOU) with LOT Polish Airlines, Polish

government agencies and academic institutions to collaborate on air traffic management (ATM) research to make commercial aviation in Poland more efficient and to support airline profitability. In addition to LOT Polish Airlines and Boeing, the ATM project consortium includes Jeppesen Poland, Polish Airports State Enterprise (PPL), Enter Air, Polish Air Navigation Services Agency (PANSA) and the University of Warsaw Interdisciplinary Center for Mathematical and Computational Modeling (ICM).

Boeing Global Corporate Citizenship

Boeing Central and Eastern Europe participates in activities of the Boeing Global Corporate Citizenship organization, which manages the company's philanthropy and community service around the world. Boeing makes contributions in the areas of arts, civic, environment, education, and health and human services. Boeing is working with various organizations and nongovernmental organizations (NGOs) in Central and Eastern Europe. These include:

- Lodz Children's University, an educational program for children aged 7 to 12, promoting enthusiasm for higher education and the study of science.
- Projects in support of the Museum for the History of Polish Jews.
- Project HOPE (Health Opportunities



Henryka Bochniarz, president of Boeing Central and Eastern Europe.

for People Everywhere) — a Central and Eastern European neonatal care training exchange.

In collaboration with the Seattle-Gdynia (Poland) City Association, **Business Week Gdynia** is an intensive six-day program in which high school students experience a simulated work environment and develop business management skills.



Boeing has sent Polish teachers to **Space Camp** — a gathering of educators from the United States and other countries who spent a week together in Huntsville, Ala., participating in hands-on workshops that include simulated space missions and astronaut training as well as presentations by rocketry and space-exploration experts.

In September 2012, Boeing supported the opening of **AEROLAB at the Museum of Polish Aviation in Krakow**. AEROLAB is a collection of stands that allow children to conduct simple and practical experiments and learn about the principles of flight. Boeing's successful cooperation with the Museum of Polish Aviation in Krakow resulted in the opening of

the "Frank Piasecki and Other Aviation Designers..." exhibition in May 2011.

At the exhibition's opening ceremony, Boeing acknowledged the achievement of Polish students from the Warsaw University of Technology who received the first prize in the **SAE Aero Design East competition** held in Marietta, Ga., in the spring

of 2011. Boeing Central and Eastern Europe supported the students who participated in the competition and continued its support in 2012, when the students also brought home prizes from the SAE Aero Design East competition.

Boeing also works with the Warsaw-based Our Earth Foundation (Fundacja Nasza Ziemia) on an educational program on sustainable development. The garden-animal habitat program combines restoring habitats for animals in big cities with ecological education for children.

Boeing Central & Eastern Europe milestones in community engagement and promoting Polish heritage in aviation

Boeing Central & Eastern Europe's engagement in promoting the history of aviation in Poland goes back several years. The company has helped to reach communities in various parts of the country through educational programs and cooperation with cultural institutions. Highlighting the contribution of Polish engineers to the development of aviation worldwide, Boeing has also been actively engaged in showcasing examples of Polish heritage in aviation history.

Boeing supported Polish team celebrates winning the 2011 SAE Design competition (top left). "Frank Piasecki and Other Polish Aviation Designers..." exhibition in the Polish Aviation Museum (next page).



Successful cooperation with cultural institutes help to raise awareness around Polish success stories

.....
 "Frank Piasecki and Other Polish Aviation Designers..." exhibition

Boeing's engagement with the Aviation Museum continued in 2011 as the company supported the "Frank Piasecki and other Polish Aviation Designers..." exhibition devoted to engineers of Polish origin who have contributed significantly to the development of aviation. It may be interesting not only for aviation fans, but also people interested in history, national heritage, and biographies of outstanding Poles.

Engaging youth to learn about aviation

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 Activities in relation to the exhibition at the National Museum in Warsaw

In March 2008, Boeing supported an exhibition at the National Museum in Warsaw which was devoted to the period between World War I and II. The exhibition focused on the time when LOT Polish Airlines came into existence and Polish engineers created airplanes and flyers like Zwirko and Wigura and were celebrated as national heroes in Poland. On the occasion of the exhibition, Boeing sponsored accompanying meetings and activities for children to gain more insights into the history of aviation.

Corporate Citizenship projects help to establish unique educational project

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 Project Muzeobus with the Polish Aviation Museum in Kraków

The cooperation between Boeing Central & Eastern Europe and the Polish Aviation Museum in Kraków started long before the modern New Main Building of this cultural institution in the Małopolskie Voivodeship region was opened in the autumn of 2010.

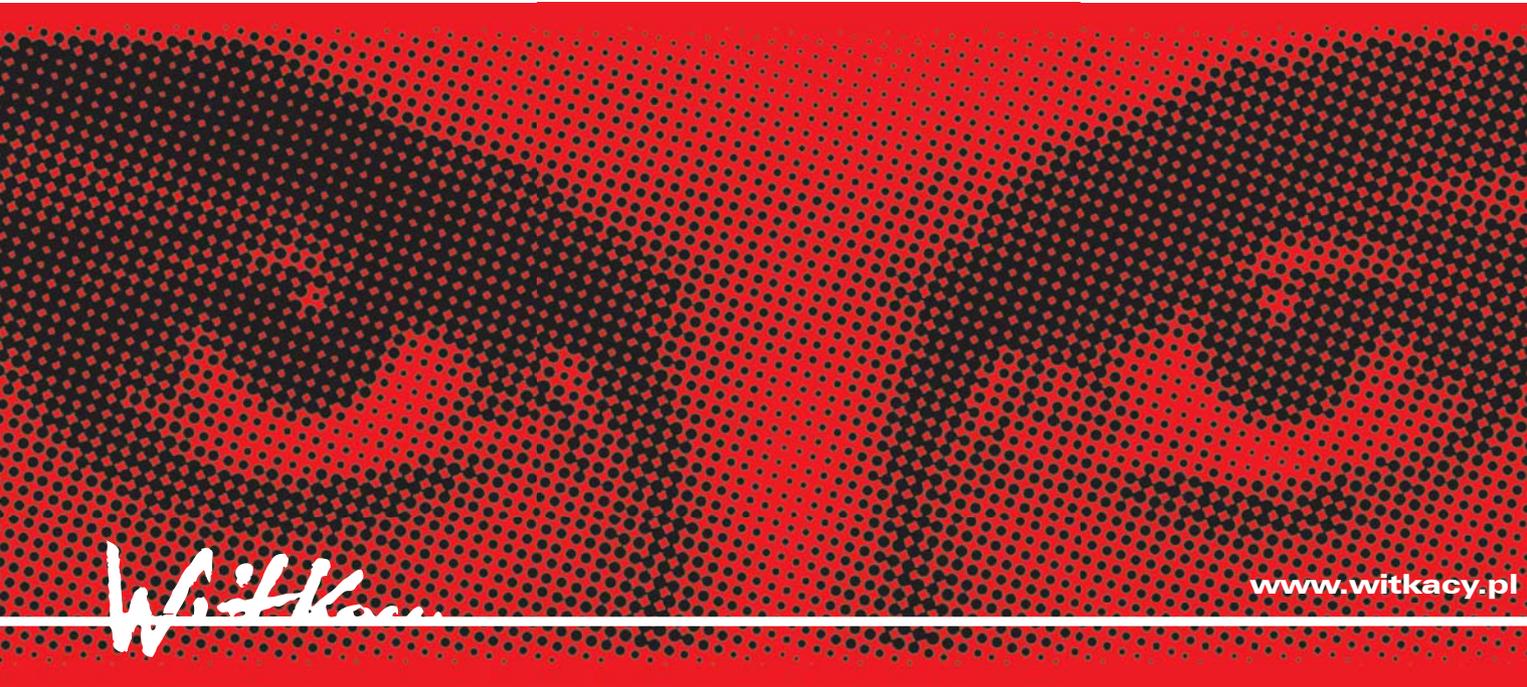
The mobile educational project called Muzeobus started in 2008. Its main goal has been to convey knowledge about aviation and its history in an attractive way to young people from primary and

secondary schools. Thanks to the support of Boeing Central & Eastern Europe, the interior of a minibus was fitted for educational purposes. A small movie theatre, a projector, educational boards, a display case and aviation exhibits selected from the museum's collection are located inside the vehicle. The car is also equipped with eight seats — original plane seats. Classes held in the Muzeobus by the employees of the Museum of Polish Aviation in Krakow are interactive, and their main goal is to arouse interest in aviation history and encourage children and teenagers to examine the subject deeper.

Muzeobus was the first educational project of this kind in Poland. It has been modeled after American educational programs. Boeing has been cooperating with cultural

institutions and is supporting local communities around the world within the Boeing Global Corporate Citizenship program for many years. We are proud that we are giving Polish children the opportunity to learn in an unusual and attractive way.

Over the three years the program has been in operation, Muzeobus reached many, mainly small, towns located primarily in the Małopolskie Voivodeship area. It gained significant popularity and recognition, not only among children and teenagers but also teachers. In 2010, the program reached about 1,500 people. The vehicle was also presented during family picnics, local festivals, air shows, and various fairs, mainly educational ones.



Stanislaw Ignacy Witkiewicz Theatre — an institution of Malopolskie Voivodeship — is based in Zakopane — the town at the feet of the Tatra Mountains, the most beautiful mountains in Poland.

This unique place we have created ourselves — young graduates of theatre schools opened the Theatre in the ancient building of the former sanatorium on **24th February 1985**. It happened on the 100th birthday

of our Patron — Stanislaw Ignacy Witkiewicz — “Witkacy”.

This legendary Polish artist with unusual personality was a **playwright, painter, writer and philosopher** from the beginning of XX th century — the man of art, famous worldwide.

We created an **open theatre** — with avant-garde expression, provoking — which, according to Witkacy’s way of thinking, has become the “shelter” for all the people who still feel the need

of contact with true art — culture. Not only do we show the theatre performances but also organise concerts, film screenings, plastic arts exhibitions — we are the true centre of art.

What distinguishes us, what attracts people to our theatre, what is the most important thing for us from the very beginning — is close contact, the **meeting of an actor with a spectator** — we treat the audience as our nicely awaited and cordially welcomed

Guests and every performance is a trial of starting the conversation — a dialogue with our spectators.

Our theatre is also unique because of the Team — the group of **extraordinary actor personalities**, connected by the common way of thinking about the theatre, taking artistic decisions together.

Our most important performances concern the things which are **universal, important and vital today and always** — solitude of a man in the world abandoned by God in which all the values are devaluated; problem of atrophy of interpersonal communication; a man facing the important choices. We are interested in the role which an individual has to play in the world of dynamically changing reality — process of continuous social and mental changes. We want to witness the truth of our times, remaining the artistic theatre. Our Theatre is known for its brave and innovatory interpretations of the world’s literature works, among others “Oedipus the King” by Sophocles, “Doctor Faustus” by Christopher Marlowe, “As You Like It” and “Macbeth” by William Shakespeare, “The Crucible” by Arthur Miller, “The Master and Margarita” by Mikhail Bulgakow, “Caligula” and “The Plague” by Albert Camus, “The Magic



Mountain" by Thomas Mann, "Who's Afraid of Virginia Woolf?" by Edward Albee. Plays and texts of our Patron — Witkacy are permanently present in our repertory. So far we have produced his most important works: "Beelzebub Sonata" (performance "Sonata b"), "Mother" (performance "Katzenjammer"), "The Madman and the Nun", "Water Hen", "Nameless Work".

Referring to the avant-garde of the break of XIXth and XXth centuries we propose to the spectators the performances which provoke to reflection through intelligent entertainment.

Our performances are extremely attractive in a visual layer — we try to surprise our spectators with the space arrangement and plastic vision. We freely arrange our stage, but we work using the non-theatrical space — performances were played in the moving train ("OL 12 Steg, Wien" based on "Crazy Locomotive"), or in as extraordinary places as a shelter in Morskie Oko in the Tatra Mountains, a cable car and on the top of Kasprowy Wierch mountain.

Although our place of residence is in Zakopane, we travel a lot — we show our performances in numerous cities and towns in Poland and abroad — we have taken part in many prestigious festivals and theatre competitions winning numerous prizes and honorable mentions. We are often invited to participate in extraordinary events, for example

Witkacy



we took part in the presentation of the biggest sport arena in Poland — National Stadium in Warsaw.

Some of the most outstanding Polish artists have cooperated with us. Among our Friends have been such musicians as: Thomas Stanko, Zbigniew Namyslowski, Henryk Mikolaj Gorecki, Ursula Dudziak, Andrzej Kurylewicz, Wanda Warska, Grazyna Auguscik, Ewa Bem, Jacek Kaczmarski, Wojciech Mlynarski, Stanislaw Sojka, OSJAN Group...

The distinguished plastic artists have created scenography for our performances or showed their works in the Theatre Gallery — among others Jan Jaromir Aleksiun, Andrzej Dudzinski, Kiejstut Bereznicki, Tadeusz Brzozowski, Jerzy Duda-Gracz, Eugeniusz Get-Stankiewicz, Leszek Madzik, Andrzej Kreutz-Majewski, Jerzy Nowosielski, Jerzy Skarzynski, Jonasz Stern.

We have just finished the renovation of our theatre venue thanks to European funds and now we have one of the most advanced theatre stages in Europe.

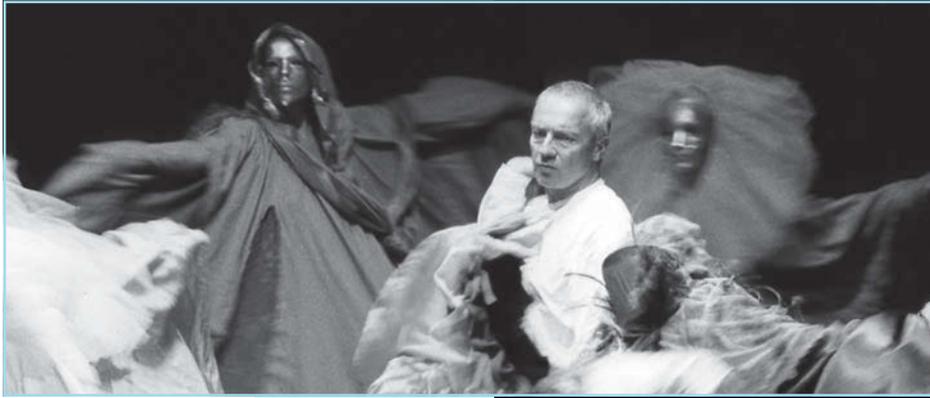
We are very pleased with the continuous interest of our spectators, people from Poland and abroad who are attracted by, as they say, the magic of our Theatre. We still want to surprise, entertain, make laugh, move — so laugh, cry and think with us.

We are very happy that we can participate in such an important event

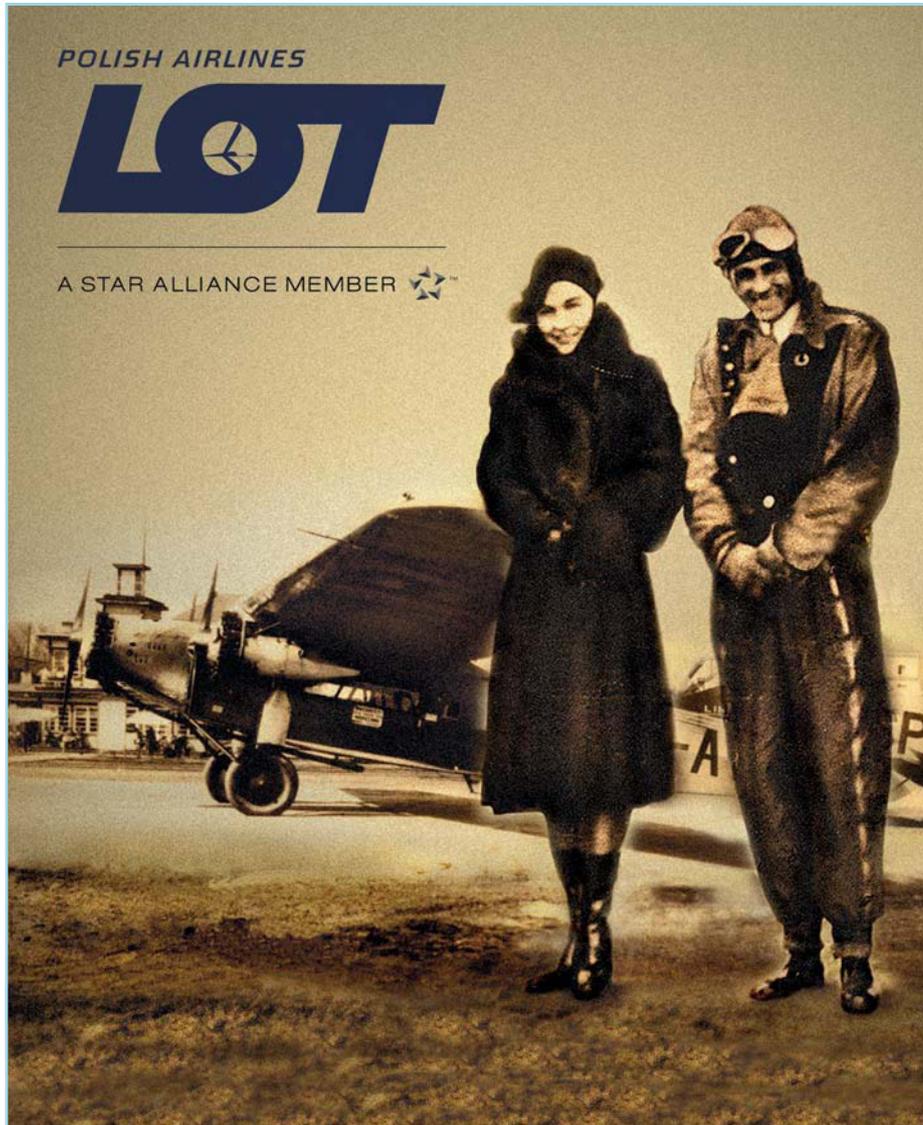
as the vernissage of the exhibition "Frank Piasecki and Other Polish Aviation Designers" in the Museum of Flight in Seattle. It is a new and beautiful experience for us — since we are here for the first time.

Meeting you is a true honor and distinction for us. We wish you the miraculous dreams in reality with Stanislaw Ignacy Witkiewicz Theatre from Zakopane.





LOT POLISH AIRLINES



LOT Polish Airlines has been operating continuously since 1st January 1929. As one of the oldest airlines, LOT has come a long way since its first aircraft — Junkers — designed with limited seating and a yearly carriage of several hundred passengers.

- In 1930 LOT Polish Airlines joined the International Air Transportation Association (IATA).
- In 1989 LOT became the first carrier in Eastern Europe to fly western-made Boeing 767.
- In 2003 LOT joined Star Alliance

whose network currently offers more than 21,555 daily flights to 1,356 airports in 193 countries all over the world.

- In 2010 LOT carried 4.58 million passengers, successfully competing with other airlines in respect of modern equipment, convenience of connections and the quality of service.
- In 2011 LOT carried 4.63 million passengers.
- In 2012 LOT is the first airline in Europe to receive the most modern aircraft in the world — Boeing 787 Dreamliner.





Four generations of aircraft used by LOT Polish Airlines. Fokker F.VIIb/3m (far left) was the world's premier airliner in the years between 1920s and 1930s, competing with other trimotor designs of the period, such as Ford Trimotor and Junkers Ju-52/3m. It was

succeeded by DC-3 (close left), an epitome of a cantilever low-wing airliner of the '30-'40s. The Tu-134 (below) was ubiquitous in the airlines of the Eastern Block from the late '60s till '80s. Boeing 787 Dreamliner (above) will soon become LOT's most modern airplane.



Its emblem (a stylized crane) is recognized almost everywhere as the symbol of the Polish flag carrier.

Today LOT is one of the most reputable and recognizable Polish brands in the world marketplace. The quality of the Polish air carrier's services has been valued by passengers in Poland and abroad, a fact attested to by the abundance of awards it has received from industry organizations, websites, and specialist periodicals, including the British and American editions of the magazine Business Traveller and the American magazine Global Traveler.

At present, aircraft with LOT's livery fly to almost 60 destinations in Europe, North America, Africa and Asia.

LOT currently operates a fleet of 3 Boeing 767-300s, 3 Boeing 737-400s, 1 Boeing 737-500s, 10 Embraer 170s (LOT was the launch carrier for this type), 12 Embraer 175s, 5 Embraer 195 offering two-class service (Economy and Business) on all international flights.

In 2012, LOT will start flying the latest generation of passenger aircraft – the Boeing 787 Dreamliner offering a level comfort and safety that is incomparable with other aircraft. LOT is successively replacing its fleet with newer, more economical aircraft in cooperation with the world's leading passenger aircraft manufacturers.

LOT's pilots are among the world's foremost aviators, having

received a multitude of awards and won championships in many fields of competition flying. The professionalism and quality of our flight and cabin crew are confirmed by the positive assessments of our passengers, and the safety of our flights is attested to by the positive results of audits conducted by international aviation institutions.

Complete offer of services including all of newest products are available on the web at www.lot.com. You can also take advantage of our site's Web Check-in service, purchase travel insurance, rent a car or make hotel reservations. For those who are unable to access the web site, you may also check in by telephone using Tele Check-in. Also always at your disposal are our Call Centre and ticket sales offices in Poland and abroad.

LOT Polish Airlines welcomes you aboard!





POLISH-AMERICAN COMMUNITY IN SEATTLE



Poland's Ambassador to the US Robert Kupiecki with Poland-Pacific Northwest Conference 2011 participants

White and Red in Emerald City

For over a century, the vibrant Polish-American community of the Pacific Northwest has been contributing

to the local fabric of society while vigorously supporting their homeland throughout its turbulent history.

Over **125,000 residents of Washington State claim Polish ancestry**; around 5,000 Poles live in the Seattle area. It

may not sound like a lot, but their level of energy and initiative compensates for the numbers.

The oldest local organization, the Polish National Alliance Lodge 156 in Tacoma, was established in 1890 and

is still going strong. Other notable organizations from that period were the PNA lodge in Wilkeson and in Seattle, founded in 1899, and the first Polish parish established in Tacoma in 1890. In Seattle, the Polish parish began to form in the 1980s, and was eventually established in 1992.

The first Polish Hall was established in today's **Ballard neighborhood** in 1906 and quickly proved to be too small for the growing community. In 1918, the Polish Home Association was created to procure a larger hall, which, after fundraising and a remodel, opened in the Capitol Hill neighborhood in 1920.

The hall, named "Dom Polski" (**Polish Home**), has been a cornerstone of Polish life in Seattle ever since. After a recent expansion and creation of a new wing to modernize the facility, the **Polish Cultural Center**, as it was renamed, is still going strong into the 21st century. It serves, as it has been for almost a century, as a place for meetings, celebrations, dances, and festivals for Poles and their friends in the community.

The center provides a home to a **choir, a library, and many other organizations** that



Prof. T. Snyder addressing the audience at the UW PSEC lecture (top left).
SGSCA delegation visiting Gdynia (bottom left).



Ewa Kasprzyk and Jakub Michalski with the Seattle Polish Film Festival organizers (top right).
Mlodzi Polanie ensemble (bottom right).





Vivat Musica! Choir

hold their meetings and celebrations there. The boy and girl scouts, book, poetry, and dance clubs meet there on a regular basis. The stage and ballroom welcome not only local dance groups or cabaret performances but also famous visiting guest artists and politicians. The school at the Polish Home has been offering evening Polish language classes to children and adults for the past several years. To accommodate families living on the east side of Lake Washington, another school opened in Bellevue.

For nearly 50 years, the Ladies' Auxiliary has been organizing the popular **Fall and Spring bazaars** that bring faithful supporters to the Polish Cultural Center from all over the area. The organization supports many initiatives and community events throughout the year with funds, volunteering, and great homemade food. The Ladies' Auxiliary have also published a cookbook and organized arts and crafts workshops.

The Seattle-Gdynia Sister City Association (SGSCA), committed to sharing and promoting business,

cultural, and academic exchanges between the two cities, has been cooperating with the city of Gdynia for over 25 years. The organization has been awarded many honors for its achievements, including the Best Overall Program, 2006 and 2011, as well as Best Single Project, 2010 for its work with Gdynia Business Week. SGSCA is the organizer and sponsor of the Seattle Polish Film Festival, which is celebrating its 20th anniversary this year.

Polish language has been taught at the University of Washington for 60

years. To ensure that this tradition continues, a group of volunteers established the **UW Polish Studies Endowment Committee (UWPSEC)**. The organization is raising funds to establish the Chair of Polish Studies, sponsors a Distinguished Polish Speakers Series, provides student scholarships, attracts Fulbright scholars to the UW, and builds partnerships with community organizations.

The Polish Home Foundation (PHF) is a non-profit organization that

promotes Polish heritage in the Pacific Northwest by sponsoring local events involving Polish culture and arts and by assisting Polish-American organizations in the area. During the last decade, it raised funds to make improvements to the 100-year-old building hosting the Polish Home and provided financial and organizational assistance to cultural and art events. Most famous is the annual Pierogi Fest at the Polish Cultural Center. Building on this success, this year, the PHF produced and sponsored the first-ever Polish Festival at Seattle Center, an event enthusiastically received by the city of Seattle.

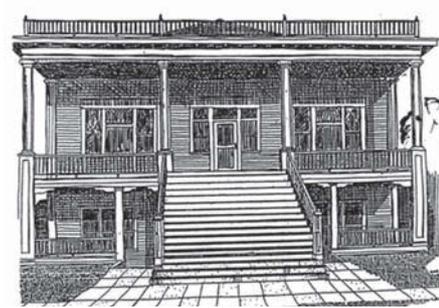
The Polish-American Chamber of Commerce Pacific Northwest (PACCPNW) promotes Polish-American industry, entrepreneurship, and innovation. With the mission to facilitate cooperation and exchange between Polish and American businesses, it promotes economic development, hosts trade delegations, and holds seminars related to business opportunities between Poland and the Pacific Northwest. The chamber builds partnerships with local organizations and raises support for important issues, such as the visa waiver program for Poles.

To keep the community and public informed about current events in Poland and in the local Polish community, **Seattle Polish News** reaches over a thousand recipients via internet every week. The PHA publishes a quarterly magazine, *Nasz Dom*,

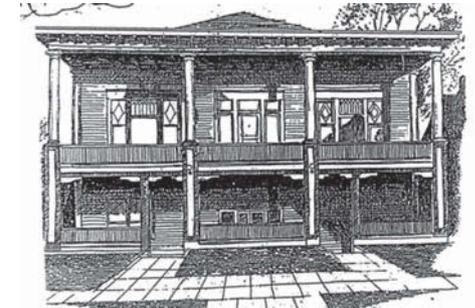
and an internet podcast, *Radio Wisła*, keeps subscribers informed about events in the community and in Poland.

The Polish-American community in the Pacific Northwest is well represented among the ranks of Boeing, Amazon, and Microsoft. Polish scientists and professors teach at local universities and work in the medical industry. Many small businesses and companies owned by Poles are spread across the region. Over the years, we have seen an **amazing impact made by Polish men and women** pursuing their dreams and passions, and carrying on their culture of courage, honor, hard work and tradition.

For some of us, Seattle has been home for decades and for others only a few years. No matter how long we have lived here, we continue our predecessors' tradition of **contributing to our Polish and American culture**. We love our city of Seattle and the Pacific Northwest – the climate, the majestic nature, the appreciation of education, science, technology, music and art – which remind us of our home country.



1900



1950



2010

The Polish Home (above) has been a cultural center and the hub of the Polish community of Seattle and the Puget Sound area since 1919. The building itself was constructed in 1902. It was remodeled and renovated several times, notably in late 1960s and over the last decade.

The latest remodeling projects included a space addition, an overall modernization of the center, an elevator installation, and an improvement of the parking area.

The Polish Home is located at 1714 18th Avenue in Seattle.

LEGENDS OF AVIATION

Polish Foundation “Legends of Aviation” along with its partners are building a flying replica of the PZL P.11 airplane, on a scale one to one. This plane proved a sensation in the USA and Europe when it first appeared at the beginning of the 30’s.

The PZL P.11 is one of the most famous Polish constructions in aviation. Work on this machine was started by State Aircraft Factory in early 1931. After tragic death of the designer engineer Pulawski in March 1931, the design was successfully

continued by engineer Wsiewolod Jan Jakimiuk — an airplane constructor who later achieved success in the United States.

From the beginning, the PZL P.11 was a unique blossoming during the 1930’s due to a number of innovative construction designs. The most characteristic feature of Pulawski’s planes was the shape of the wings, called later “Pulawski’s wings” or “the Polish wings”. The wings were in the shape of a flattened letter M.

A second unprecedented solution

was the undercarriage which had oil and air shock absorbers located inside the fuselage. Each wheel in the undercarriage had an independent shock absorber. The airplane was so well designed from an aerodynamic point of view that it was possible to pick up speed without limitation while diving.

At the beginning of the 1930’s, the airplane was so new and so well received by the international aviation world that in August 1931 it was invited to participate in the National Air Races in Cleveland, Ohio.

present Polish aviation equipment abroad. The most famous pilots and best airplanes in Europe were invited to the air shows.

The air demonstrations in Cleveland ran from 29 August to 07 September 1931. Besides acrobatic air exhibitions, over 30 contests of air battles were conducted in speed and distance.

The end result was a great success for the PZL P.11 and its pilot Boleslaw Orliński. The plane and pilot won the air competition in Cleveland in 1931.

Both the pilot and the plane impressed the Americans, distinguishing themselves out of a group of fantastic airplanes and the best air aces. PZL achieved a great success, professional recognition, especially by the American press which named the PZL P.11 “the best plane in the world in its class”.

The Polish airplane was so liked by the Americans, that a year later it was invited again to participate in the Cleveland air show. The PZL P.11 took part in the fighter plane races from 27th August to 5th September 1932.

Piloted by Jerzy Kosowski, the PZL P.11 achieved the best numerical result. It also won the competition for maximum

This was the first time that a Polish airplane was invited to participate in an International Air Show in the United States. Adding to this, at the cost of the American organizer, which did not happen often.

This was a great opportunity for the PZL airplanes as well as a chance to



air speed, winning over its rivals by a big advantage.

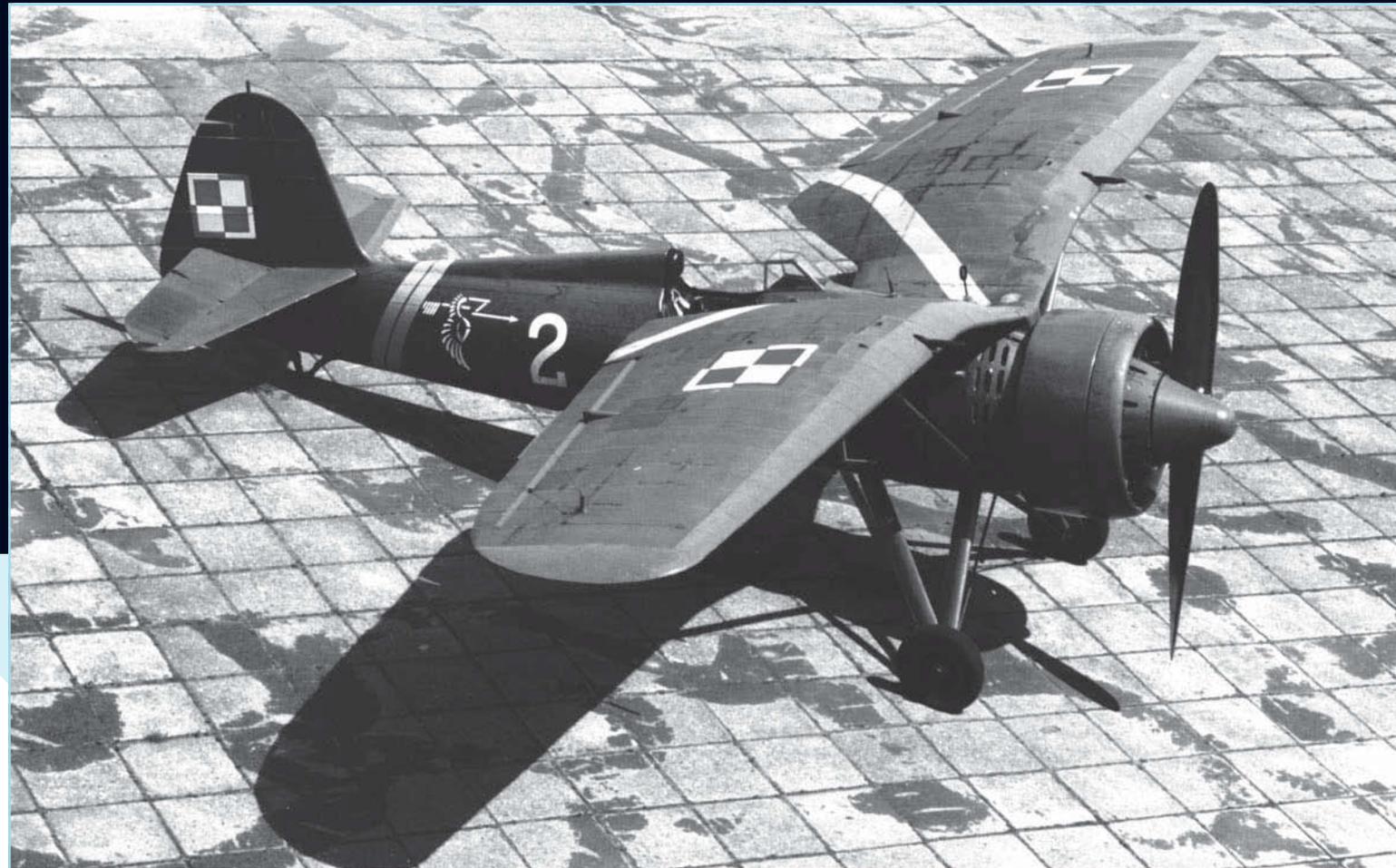
The outbreak of World War II caused the PZL P.11 to stand against other airplanes, although the rivalry was no longer of a sports nature. The airplane also demonstrated its fighting value. It was the first allied fighter plane to fight in World War II, defending with success Polish sky against the Nazis until 17 September 1939.

Despite the fact that in 1939 the P.11 was already obsolete and gave way to German fighter planes in speed and fire power, the flying skills of Polish pilots and the amazing maneuverability of the P.11 resulted in one-to-one kill ratio.

On the PZL P.11 flew and fought the real Polish heroes of World War II, later to be squadron leaders and participants in the famous Battle of Britain.

It was in 2009 that the idea was born of building an example of the P.11 and bringing it back to flight. This very difficult and ambitious task was undertaken by the Foundation "Legends of Aviation", which is the creator of the project. The Foundation cooperates closely with the Polish Aviation Museum in Krakow. Thanks to this cooperation, the Foundation has an access to the only remaining, albeit non-flying, original P.11 in the world.

The access to the P.11 enables a thorough examination of the plane and reconstruction



of technical drawings, on the basis of which a flying replica of the plane will be constructed.

The engagement by a large group of professionals as well as aviation fans who support this project will result in the fact that history will repeat itself and will have the remarkable occasion to see the legendary airplane in flight.

See you at the air shows in the United States and Europe.

Project website:
www.legendyloctnictwa.pl

The sole surviving PZL P.11c at the Polish Aviation Museum in Krakow. Even though the Museum boasts many rarities from WWI and earlier, the P.11c remains the most valued item of Krakow's collection due to immense historical value as a symbol of the heroic, if eventually losing, struggle of Polish fighter force against the September 1939 onslaught of the German Luftwaffe.

Contrary to a common belief with origins in Nazi propaganda, Polish Air Force in 1939 was not destroyed on the ground. Combat planes had been deployed to secret field air bases prepared by military authorities long before the war. Located among agricultural lands,

these bases enabled most of the Polish air force to survive the initial German attack on major airfields. Masked with hay and foliage, the planes thus evaded the fate of French and Soviet aircraft destroyed on the ground with surprise Luftwaffe attacks.





A pilot taking seat prior to takeoff in his P.11. Although vastly outnumbered and outperformed by their opponent and lacking sufficient warning systems, Polish pilots nevertheless put up a good fight due to high skills imposed by Polish

training programs in prewar years. When given planes that were on par with German types, Polish fighter pilots who had made their way to England proved their mettle during the Battle of Britain and subsequent fighter operations on the Western front.

foreword

Marek Sowa,
Marshal of Malopolska Region

introduction

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biographical notes

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Artur Jachna

aircraft descriptions

Jaroslaw Dobrzynski

aircraft profiles and hand drawings

Marek Radomski

photos

Polish Aviation Museum archive

Andrzej Glass archive

public domain

Museum of Flight

Boeing Eastern & Central Europe

LOT Polish Airlines

photo on page 5: Pawel Tokarczyk

Witkacy Theatre photos: Wojciech Plewinski; team photo: Mateusz Frycz

Polish-American Community in Seattle photos: Piotr Horoszowski, Jagoda Sondej

Polish Home drawing

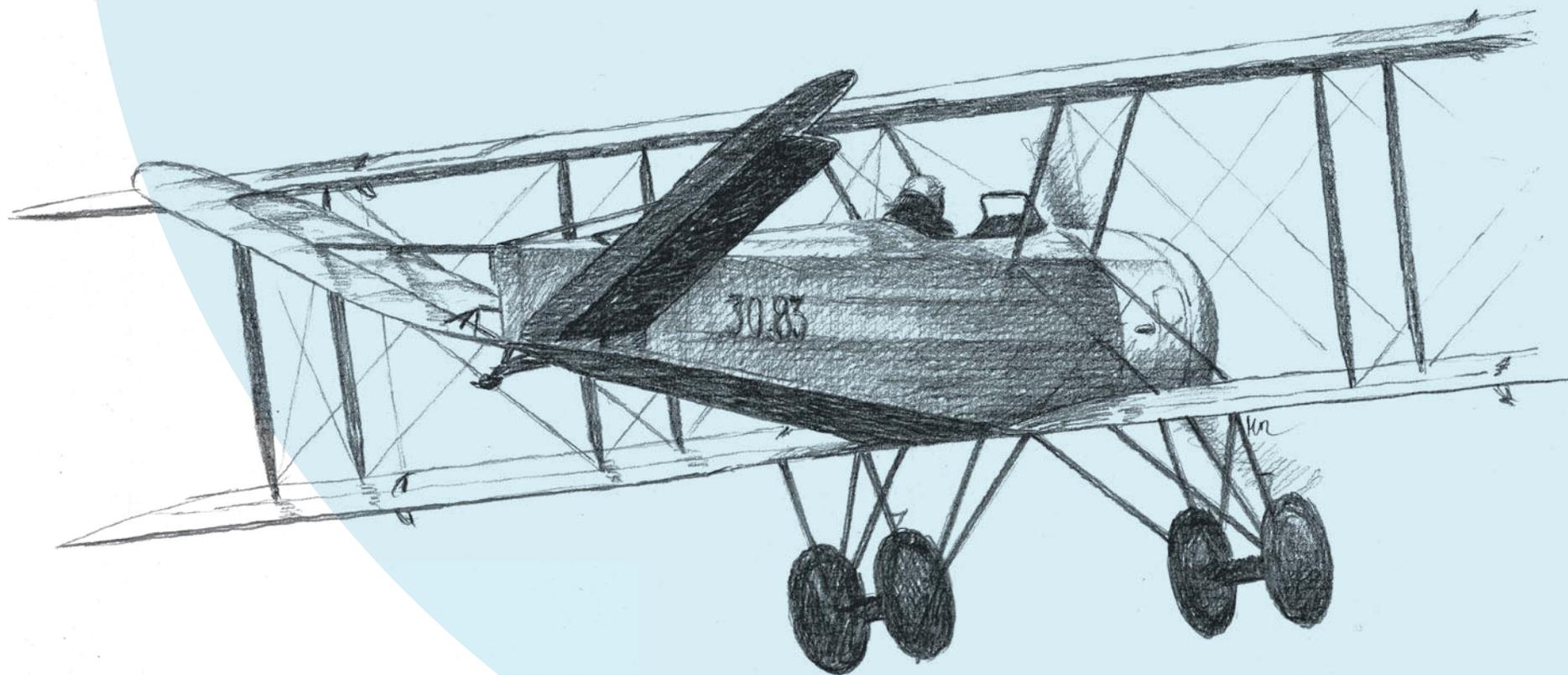
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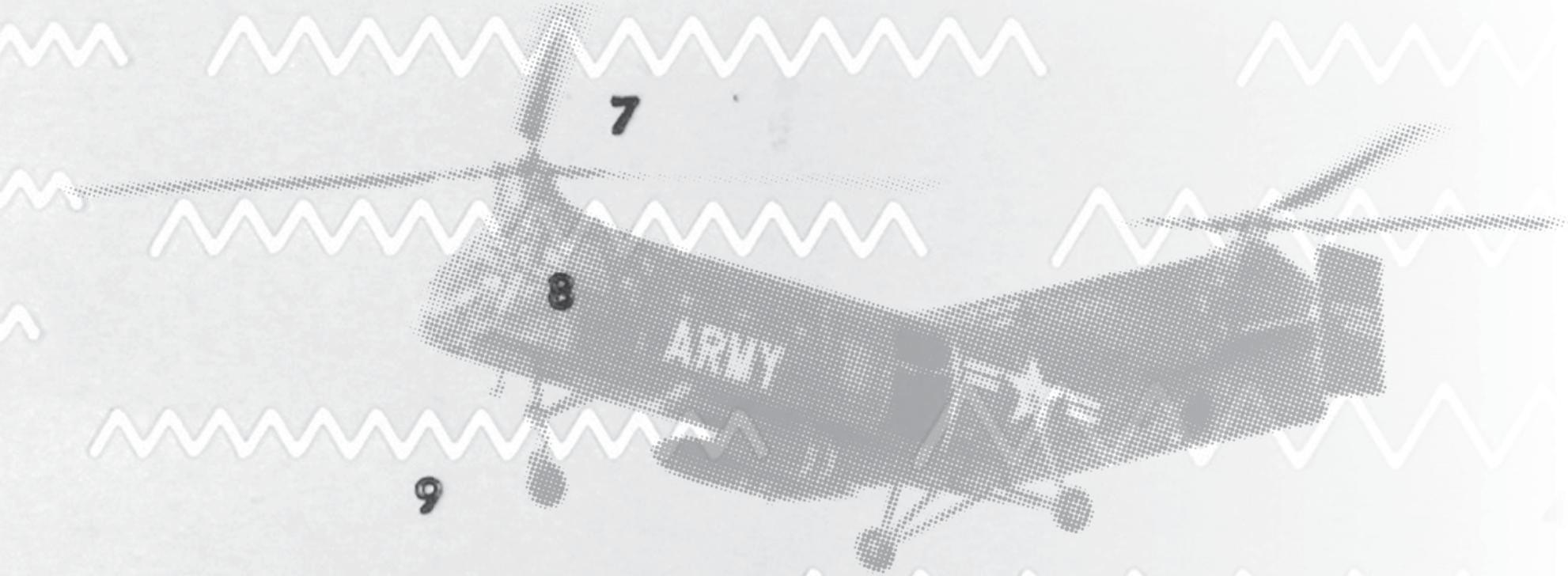
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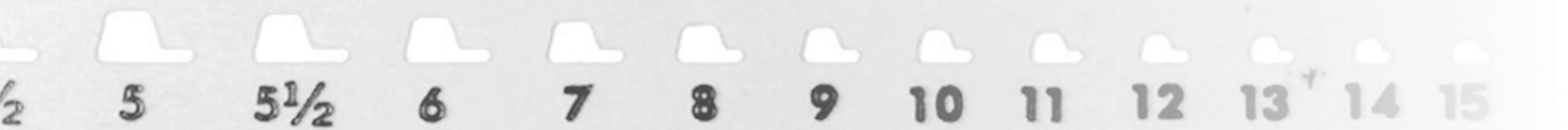


**A Hanriot H-28 trainer displaying a V-tail invented and patented in 1930 by Jerzy Rudlicki.
It was with the Hanriot airplane modified in Plage & Laskiewicz factory that the concept
of a butterfly tail was first put to test in 1931.**

WWW THREADS PER INCH WWW



SLIDE →



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