

✈ UP, UP AND AWAY: ALL ABOUT FLYING WITH GRANDPA EDWARD

WRITTEN & ILLUSTRATED BY TOMAŠ SMOT SVOBODA

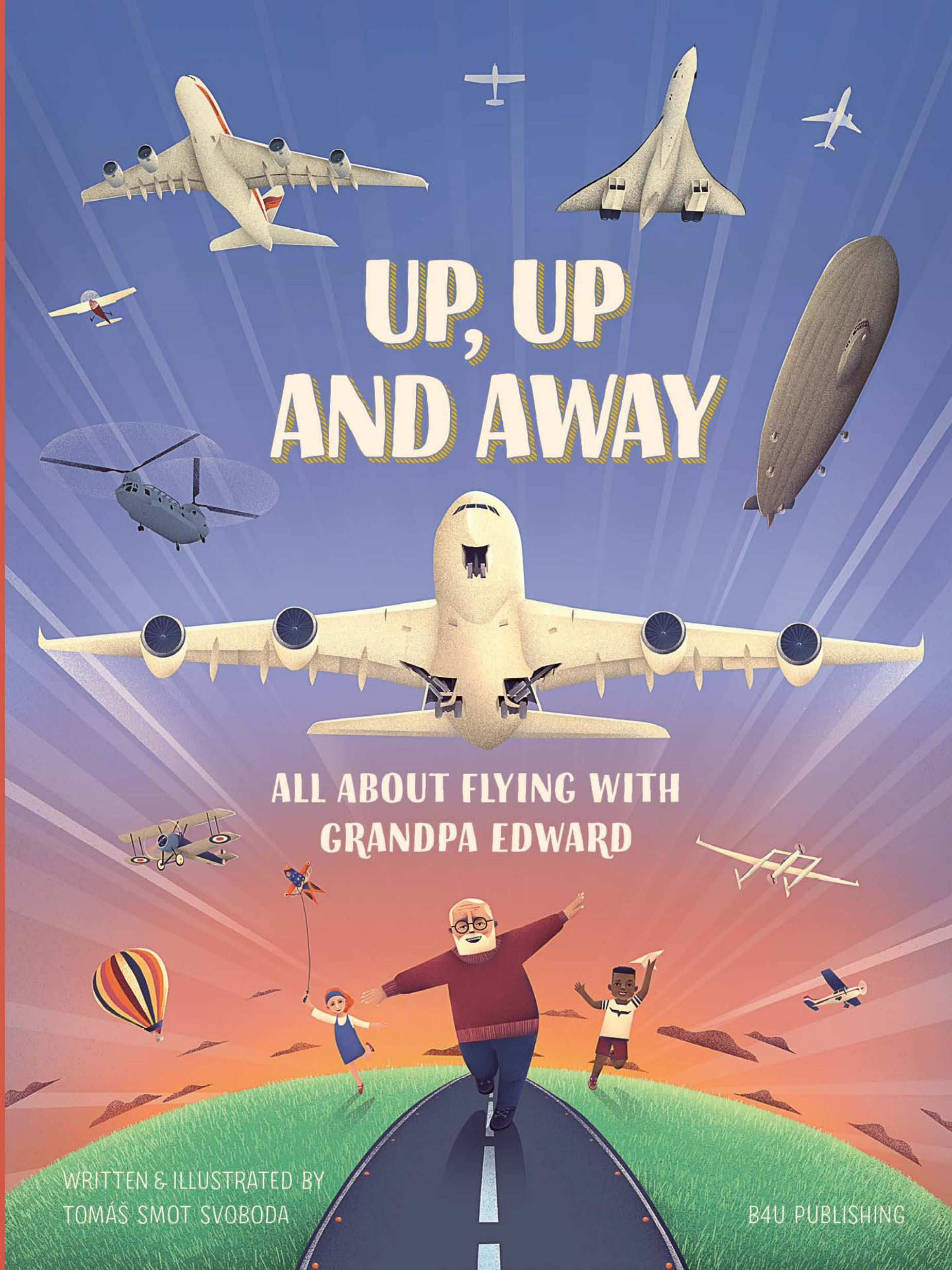


# UP, UP AND AWAY

## ALL ABOUT FLYING WITH GRANDPA EDWARD

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B4U PUBLISHING





# SIZES OF FLYING MACHINES

## LARGE AND SMALL



**LZ-129 Hindenburg**  
LENGTH: 245.3 m  
DIAMETER: 41.2 m



**Airbus A380**  
LENGTH: 75.7 m  
WINGSPAN: 79.7 m



**Antonov An-225**  
LENGTH: 84 m  
WINGSPAN: 88.4 m



**Gulfstream G650**  
LENGTH: 30.4 m  
WINGSPAN: 30.3 m



**Concorde**  
LENGTH: 61.7 m  
WINGSPAN: 25.6 m



**Hot-air balloon**  
DIAMETER: 20 m



**North American X-15**  
LENGTH: 15.4 m  
WINGSPAN: 6.8 m



**Blériot XI**  
LENGTH: 7.6 m  
WINGSPAN: 7.8 m



**Cirrus SR22**  
LENGTH: 7.9 m  
WINGSPAN: 11.7 m



**Flyer**  
LENGTH: 6.4 m  
WINGSPAN: 12.3 m



**Supermarine Spitfire**  
LENGTH: 9.5 m  
WINGSPAN: 11.2 m



**Mil Mi-26**  
LENGTH OF FUSELAGE: 33.7 m  
MAIN ROTOR DIAMETER: 32 m



HELLO,

(write your name here)

You have opened this book just in time. My grandchildren Molly and Simon are waiting in the room. I'm going to the kitchen to get the goodies Grandma Elizabeth has prepared for us. While I'm there, why not explore the room so you know what we're going to talk about today?



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## FEATHERED MUSE

'I have the feeling, Grandpa, that the bird is to the pioneer of aviation what the muse is to the artist.' 'Nicely put, Molly. The greatest example of that is Leonardo da Vinci, whose inventions were way ahead of their time.'

## RENAISSANCE MAN

'I know him—he painted the Mona Lisa!' 'That's right, the most famous painting of all time. As well as being an excellent painter, Leonardo was an inventor, architect, sculptor, naturalist, musician, designer and engineer. He lived in Italy in the 15th and 16th centuries, the time of the Renaissance.'



## PRINCIPLE OF HELICOPTER FLIGHT

'As well as conceptualizing flying machines, Leonardo came up with the principle of helicopter flight, using an aerial screw powered by four people running round and round.'

## OVERHEAVY MACHINE

'Didn't they get dizzy, Grandpa? As happens to me when I stay on a roundabout too long.' 'That may be one reason why Leonardo never built his machine. Others are that it would have been impossible to control and that it was too heavy to lift four people into the air. But his invention of the aerial screw was of great importance for the future.'

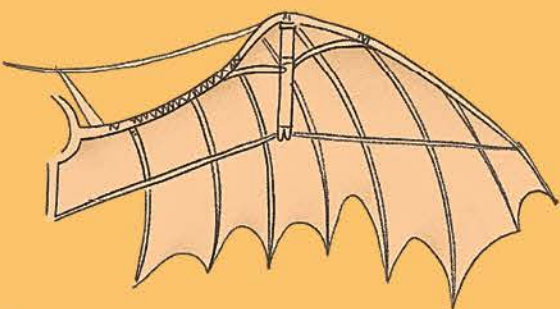


I SHOULDN'T HAVE HAD SECONDS AT LUNCH.



## ON THE FLIGHT OF BIRDS

'Leonardo was fascinated by flying from childhood. He made detailed studies of bird flight and the anatomy of birds' wings, even bats' wings. His Codex on the Flight of Birds contains a remarkable 1700 drawings on 1600 pages.'



## IDEAS ON FLYING

'He made plans for an ornithopter, a heavier-than-air, man-powered craft. His notes on this contain designs of wings, mechanisms by which the wings would flap, and how the ornithopter would land. As no drawing of the entire craft has been found, we can't say for sure what it would have looked like. Yet there is some evidence that Leonardo built the ornithopter and tried it out in 1504. It was said that his assistant flew it for several kilometres from the hills of Fiesole.'

EVERYONE WILL BE FLYING IN A YEAR.

I WOULDN'T WISH TO UPSET YOU, SIGNOR LEONARDO, BUT I'D SAY IN SEVERAL CENTURIES, NOT A YEAR.



## RENAISSANCE PARACHUTE

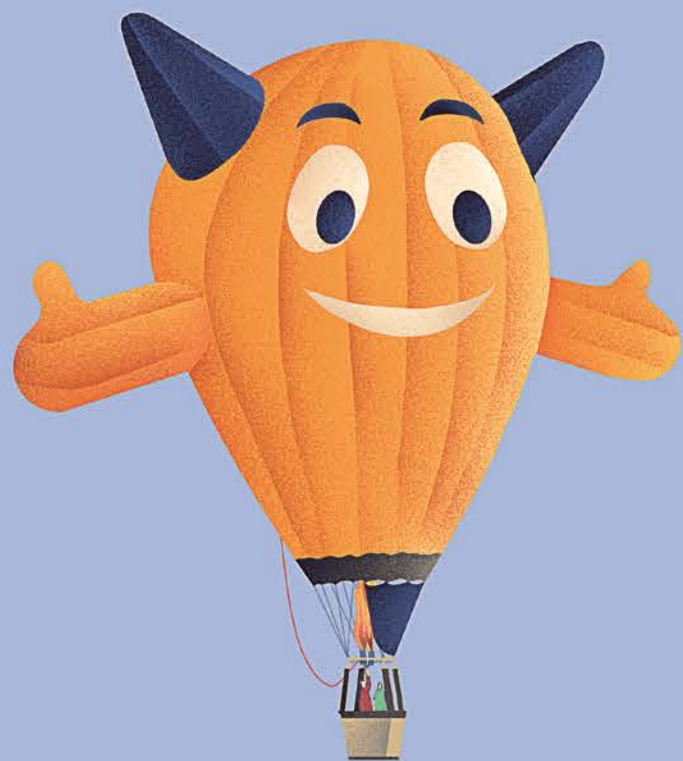
'Among the celebrated inventor's notes and sketches we find a design for a parachute that looks like a pyramid. It consisted of four equilateral triangles with sides 7 metres long. In 2008, Swiss amateur parachutist Olivier Vietti-Teppa became the first person to make one and perform a successful jump with it, from a height of 650 metres.'





## COLOUR IS NICER

'Why are balloons so colourful, Grandpa Edward?' 'To make them look jollier. It's common for a balloon's bag to act as a kind of billboard, as it is clearly seen at a distance. A balloon doesn't have to be round. It can be some weird and wonderful shape.'



## THREE, TWO, ONE, LIFT-OFF!

'How does a hot-air balloon take off? Surely the pilot can't blow in hot air from the burner straight away?' 'No, he can't, Molly. The bag is inflated with cold air while the balloon is still on the ground. The burner is switched on only once there is enough cold air in the bag to heat. The pilot and his crew climb aboard only when the balloon is ready to fly. Before this can happen, the guy ropes must be untied.'

### ENVELOPE

'The envelope comprises the bag and the blast valve (device for releasing air). The bag is filled with the hot air that fuels the balloon. It is made of polyester or a polyamide fabric coated to make it airtight. The balloon is designed so that the weight of the basket is borne by the vertical supports.'

BLAST VALVE

CLOSE BLAST VALVE

OPEN BLAST VALVE

BASKET

BURNER

FUEL TANKS

ROPE FOR BLAST VALVE CONTROL

CABLES HOLDING THE BASKET AND ENVELOPE TOGETHER

BURNER

BASKET

**The basket**—carries the crew and equipment needed for the flight, including the fuel tanks. Its sides are woven from wicker; its floor is made of waterproof plywood. The edges of the basket are padded for passenger comfort.

**Fuel tanks**—these contain liquefied gas for operation of the burner. Tanks are protected with padding and stored directly in the basket.



## WARPED WINGS

'Grandpa, where are the ailerons on the Wright brothers' plane? I can't see any.' 'The first planes didn't have ailerons. Instead, the ends of the wings were warped. As were those of another of the best known planes of the age, the Blériot XI, built by French engineer Louis Blériot. On 25 July 1909, Blériot took the first flight in a heavier-than-air craft over the English Channel. The flight was 36.6 km long and lasted 27 minutes. Blériot received worldwide acclaim and was deluged with offers to build new planes. His success changed how plane travel was viewed. Before, it was thought of as dangerous fun for wealthy adventurers. Blériot showed that it could be practical.'

WINGSPAN: 10.25 m  
LENGTH OF CRAFT: 8.45 m  
HEIGHT OF CRAFT: 2.5 m  
TOP SPEED: 106 km/h  
ENGINE: 25 horsepower Anzani

THE WINGS WERE CLEVERLY DESIGNED TO BE DETACHABLE AND PLACED ALONG THE FUSELAGE FOR TRANSPORT.



WOODEN FRAME REINFORCED WITH STEEL TUBES

WALNUT-WOOD PROPELLERS



## ADRENALINE OF FLIGHT

'For me, flying is mostly about fun and a bit of adventure!' 'You're not alone in that, Molly. Some flyers actually seek out danger. I'm thinking now of an American called Lincoln Beachey, pioneer of the air show. With his best-known plane, nicknamed "Special Looper", he performed sharp turns, loop-the-loops, spirals, rapid descents and upside-down flight. His races against racing cars were especially popular.'



'One of the best-known triplanes was the single-piloted Fokker Dr.I. It was in this that legendary nobleman German Manfred von Richthofen, known as the Red Baron, became the most successful pilot of the First World War. This plane had the drawbacks of greater aerodynamic drag and lower speed in flight and the dive. When in trouble in the fight, it would fly upwards, when all other planes flew downwards.'

WINGSPAN: 20.73 m  
LENGTH OF CRAFT: 13.27 m  
HEIGHT OF CRAFT: 4.7 m,  
TOP SPEED: 166 km/h  
ENGINE: 360 horsepower  
Rolls-Royce Eagle VIII

HEY, RED BARON!



FOR ITS GUNS TO FIRE THROUGH SPINNING PROPELLERS, IT WAS FITTED WITH A SYNCHRONIZATION DEVICE INVENTED BY ANTONY FOKKER.

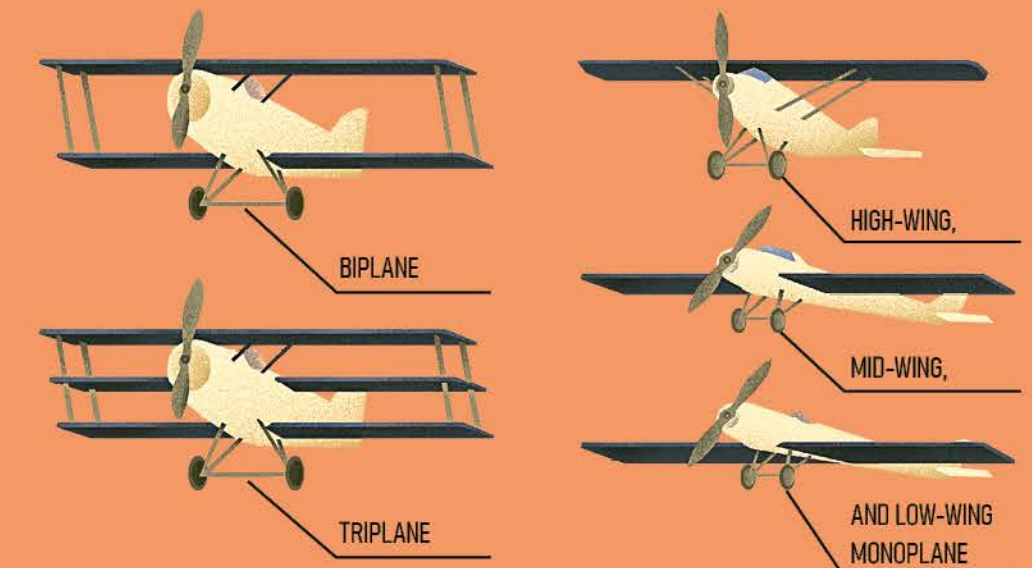
WINGSPAN (FROM THE TOP): 7.12 m; 6.23 m; 5.7 m  
LENGTH OF CRAFT: 5.77 m  
HEIGHT OF CRAFT: 2.95 m  
TOP SPEED: 185 km/h  
ENGINE: 110 horsepower Oberursel UR.II

## SPEED AND MANOEUVRABILITY

'Isn't lower speed a problem for a fighter, Grandpa?' 'It is. But the Fokker Dr.I made up for it by greater manoeuvrability. The Red Baron said that his plane climbed like a monkey and manoeuvred like a devil. During the First World War, the British military responded with a biplane called the Sopwith Camel, and this tipped the scales in their favour. 1294 German machines were shot down by British ones. The best-known models of the Sopwith Camel were the F.1 Camel and the 2F.1 Camel.'

## WHY WERE PLANES DOUBLE-WINGED?

'Why were these planes double- or triple-winged?' 'We call them biplanes and triplanes, Molly. More wings gave the planes a greater load-bearing area, and so greater lift. Also, they were good for sharper turns and manoeuvrability. These advantages were used in the design of First World War fighter planes.'



BIPLANE

HIGH-WING,

MID-WING,

TRIPANE

AND LOW-WING MONOPLANE

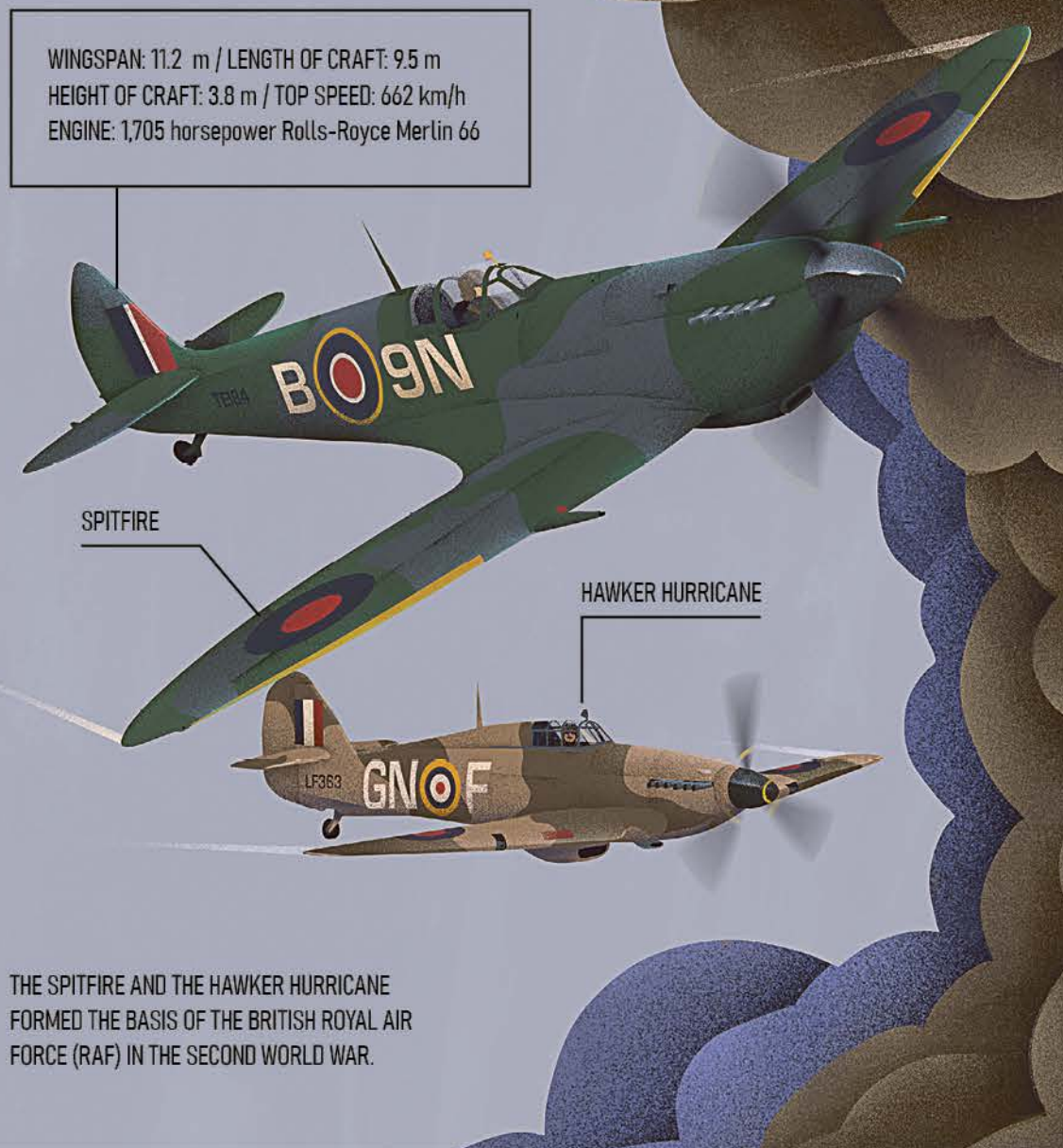


# 6. SMALL PLANES WITH HIGH PERFORMANCE

## DANGEROUS BEGINNINGS

'The first aviators must have had some amazing adventures, Grandpa!' 'Oh yes, but some real danger too. No beginning is possible without it. Thanks to their courage, ever better planes can be developed. Let me tell you about a few planes that have gone down in history or are still making it. Not just passenger planes, but also planes that support agriculture, planes that make no sound in flight, planes powered by the sun ...!'

'Let us begin with the Supermarine Spitfire, a British fighter plane, which made a crucial contribution at the Battle of Britain. It was an all-metal aircraft whose low, geometrically pitch-angled wings made it manoeuvrable in the most difficult circumstances. The naval version of the Spitfire had folding wings and an arrestor hook for braking on aircraft carriers. Although Spitfires were decommissioned in 1961, enthusiasts keep a few dozen active today.'



WINGSPAN: 11.2 m / LENGTH OF CRAFT: 9.5 m  
HEIGHT OF CRAFT: 3.8 m / TOP SPEED: 662 km/h  
ENGINE: 1,705 horsepower Rolls-Royce Merlin 66

SPITFIRE

HAWKER HURRICANE

THE SPITFIRE AND THE HAWKER HURRICANE FORMED THE BASIS OF THE BRITISH ROYAL AIR FORCE (RAF) IN THE SECOND WORLD WAR.



WINGSPAN: 11 m  
LENGTH OF CRAFT: 8.2 m  
HEIGHT OF CRAFT: 2.7 m  
TOP SPEED: 240 km/h  
ENGINE: 178 horsepower  
Avco Lycoming O-360-F1A6

## A GREAT FAVOURITE

'The Spitfire must be a very popular plane for people to maintain it to this day.' 'It's a beautiful plane. In terms of popularity, though, it can't beat the Cessna 172, the best-selling plane of all time, which has been in production since 1955. Today's model differs from that of the 1960s by its high-performance engine, plus elements of modern design including electronic instruments and displays.'

## PLANES THAT HELP

'What can planes help with, Grandpa?' 'Farming, for instance. With fertilization and spraying of pesticides. You will have noticed planes flying over fields and spraying something on them, Molly. The largest single-engine aeroplane used in agriculture is the Air Tractor AT-802A from the USA, which has been in service since 1990. It is also used in firefighting, for which its traditional undercarriage is replaced by amphibious floats that collect water from lakes and rivers.'



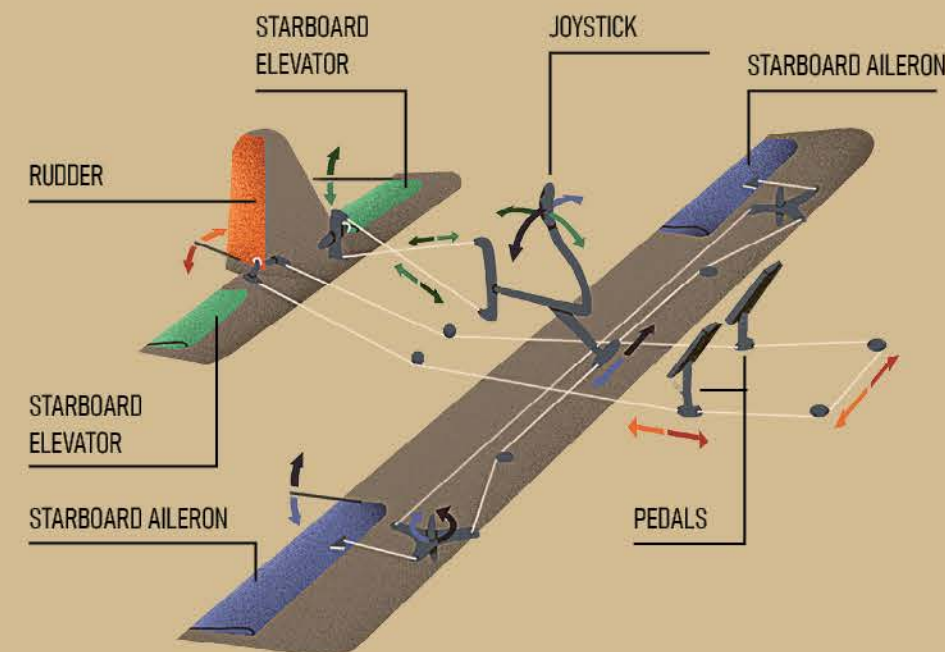
THE FIREFIGHTER CRAFT HOLDS 3,100 LITRES OF WATER, PLUS 130 LITRES IN ITS FLOATS.



WINGSPAN: 11 m  
LENGTH OF CRAFT: 8.2 m  
HEIGHT OF CRAFT: 2.7 m  
TOP SPEED: 240 km/h  
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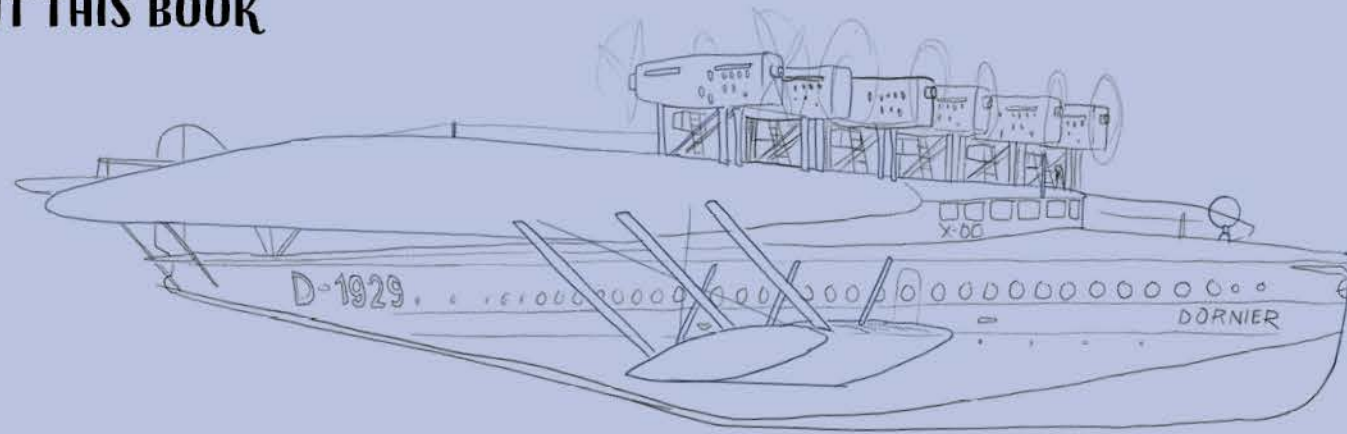
## THE SECRET OF AIRCRAFT CONTROL

'How does the pilot control the plane, Grandpa?' 'Well, Simon, we've already mentioned that a plane has ailerons, elevators and a rudder. The pilot has controls in the cockpit, notably a joystick and pedals. The joystick controls the elevators by movement backwards and forwards, causing the plane to climb or drop. Movement to the sides controls the ailerons, and so the aircraft's pitch. The rudder, which determines the direction of flight, is worked by the pedals.'





## ABOUT THIS BOOK



Summer 1981, end of the school year. A proud first-grader, I show my grandmother the big "A" on my report card. She rewards me with an ice cream and a book. I fall in love with the book not because of the subject, but because of my name in the title: *Tommy's Discoveries*. Everything Tommy in the book goes through, I go through with him. The memory has remained so sharp that when I got a chance to write a children's book of my own, I wanted to give my reader(s) the same feeling. On opening my book, he, she or they are welcomed by Grandpa Edward by name, so becoming part of the adventure.

In 1993, I was waiting at Frankfurt Airport for a flight to New York with my mates from the Czech national baseball team, about to fly for the first time. I'd never been more nervous. But when I laid eyes on the double-decker Boeing, my nervousness gave way to awe. I'll never forget the size of the thing, the take-off forcing me back in my seat, and the landing at the second attempt (the pilot got it wrong first time round). As you see, I didn't have to search very hard to find a subject for my book.

At first, however, I was unsure where to begin with it and how to go about it. Czech writer Zdeněk Svěrák once

remarked that when he writes for children, he gets down on his knees to see the world from a child's perspective. I opted for this approach. I used social media to ask parents to find out what interests their children most about flying. In this way, I gathered lots of questions and suggestions that have helped me see my subject through a child's eyes.

To find answers to all that interests the children, I had to do my research. I read books with titles like *The Aircraft Book: The Definitive Visual History*, *An Encyclopaedia of Modern Aircraft*, *How Airlines Fly*, *Ask the Pilot*, and *Myths and Legends of Ancient Greece*. I searched the internet for interesting stories about aircraft and people who developed them. I discovered many more interesting things than I was able to include in this book. But all the most interesting stuff is here.

I'm confident that child readers will enjoy this book. What's more, I trust that some will be inspired to explore the subject and take the adventure further. Maybe they are pilots and aircraft designers of the future!

Tomáš SMOT Svoboda, a.k.a. Air Ace

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Written and illustrated by  
**Tomáš SMOT Svoboda**

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## BOOKS I REALLY ENJOYED, AND YOU WILL TOO.

*The Aircraft Book: The Definitive Visual History*, by DK, 2021

*Means of Transport That Changed The World & Means of Transport That Almost Changed the World*, by Štěpánka Sekaninová, Tom Velčovský; Albatros, 2022/2023

*Pilot odpovídá – 100 otázek – 100 odpovědí pro zvědavé cestující*, by Mathias Gnida; Kopp, 2021

*The Encyclopedia of Modern Aircraft: From Civilian Airliners to Military Superfighters*, by Jim Winchester; Thunder Bay Press, 2006

*Vzpomínky na létající stroje*, by Břetislav Ditrych; Epocha, 2020





# UP, UP AND AWAY

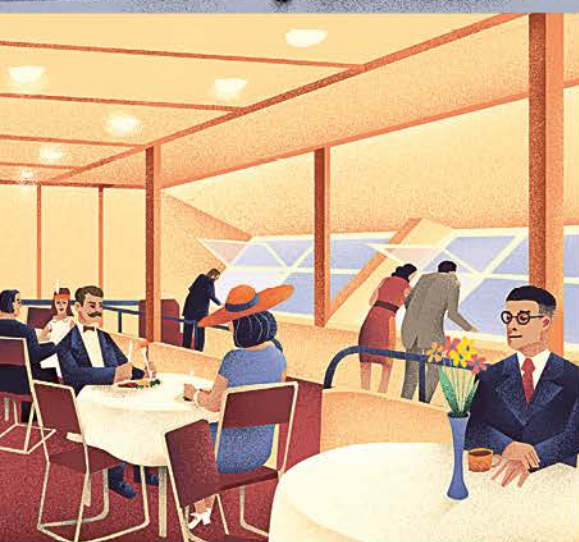


## ALL ABOUT FLYING WITH GRANDPA EDWARD

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Look at the sky, kids. What do you see? I see clouds, Grandpa. And birds – birds flying. And there's an aeroplane, with a long white trail behind it! Where can it be flying to? I see a hot-air balloon floating over that hill. How lovely to see the world from such a height! Over there, I see a rescue helicopter. How fast it is flying!



If you, too, look up at the sky with awe and curiosity, join Grandpa Edward and his grandchildren on a journey through the history of flying. Learn about famous aviators and aircraft designers, flying machines that are best in terms of size, speed and other things, and historical events that changed the way we travel forever.

So, what are you waiting for? Up, up and away!

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