

THE ANNUAL REPORT 2010

presents:

# Solar Impulse

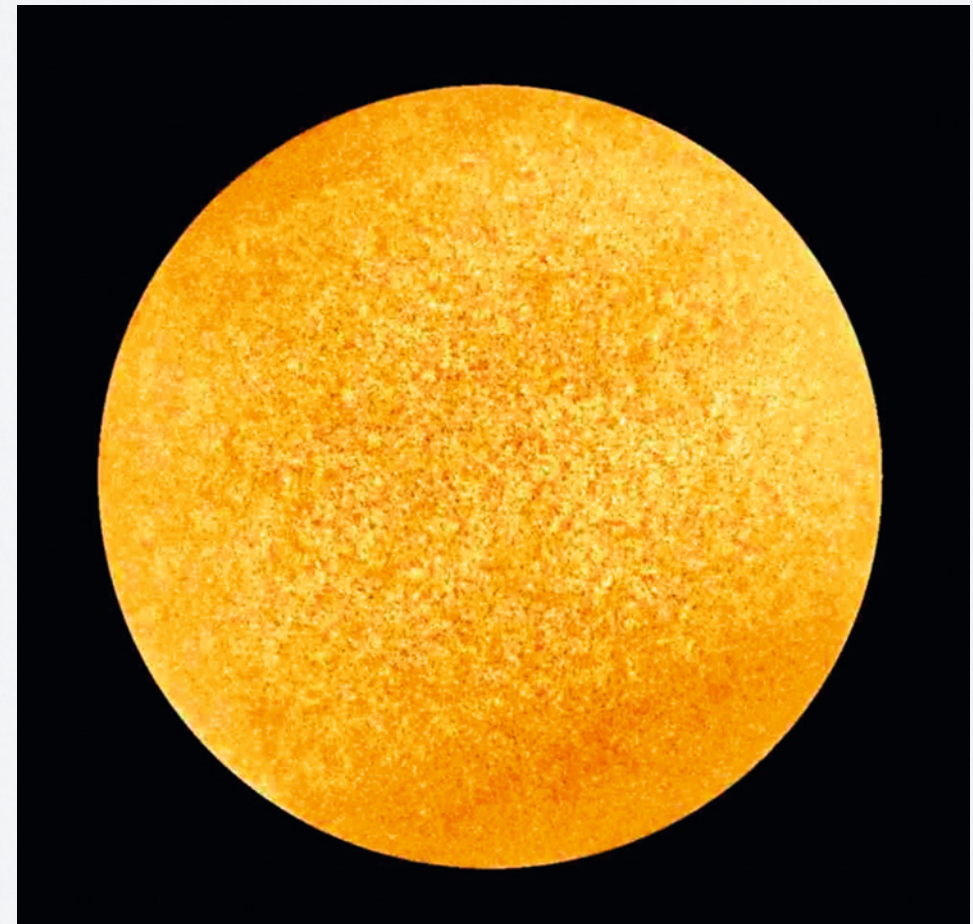
by Bertrand Piccard  
and  
André Borschberg

A dream of  
the future  
has become  
reality.





Solar Impulse and Swisscom -  
we are partners!



Pioneering spirit

To make the impossible possible,  
to develop new technology and  
use it for the good of our planet:

that is the message of  
Solar Impulse.

Swisscom shares this philosophy.





Solar Impulse  
EPFL Scientific Park  
CH-1015 Lausanne

Worblaufen, 25 March 2009

Dear Bertrand Piccard and André Borschberg

You want to harness the power of the sun to fly round the globe in 2014. Your aircraft will have the wingspan of an Airbus passenger jet and the energy output of a motor scooter. Your round-the-world flight is both a pioneering feat of aviation and a great adventure. It is also splendidly symbolic, for a world in dire need of alternatives to fossil fuels.

We are delighted to be allowed in on your adventure. After all, we share your vision of a world powered by renewable energy. Swisscom already procures all its electricity from renewable sources and is Switzerland's biggest customer for electricity generated from solar and wind energy.

By developing the telecommunication package for your flight, we are privileged to play our part in this technological tour de force. We are proud to contribute our knowledge and experience from our own field. We link the solar aircraft with the ground, and thus make Switzerland, and the whole world, participants in this adventure.

It is wonderful to be able to show the readers of our annual report how teamwork, innovation and abundant passion are building the aircraft which will make this dream possible.

Yours sincerely

Anton Scherrer  
Chairman of the Board of Directors Swisscom AG

Carsten Schlöter  
CEO Swisscom AG



*"Solar Impulse exemplifies that dreams can come true."*

*"We want to prove what new technology can already do. What we can do, up in the air, can be done in everyday life, down on the ground."*





*Solar Impulse is ...*

*... more than an airborne adventure...*

*... more than a technical feat...*

*... more than the pursuit  
of new world records.*

*Solar Impulse is the symbol  
of a world independent  
of fossil fuels.*

*My Dream*

*by  
Bertrand Piccard*



# Solar Impulse

## TO-DO LIST

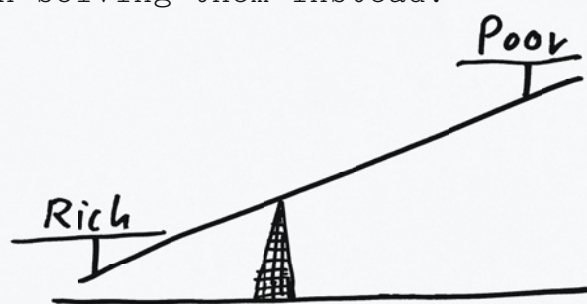
- ☒ To get to the poles
- ☒ To explore the ocean depths
- ☒ To walk on the moon
- ☐ Quality of Life
- ☐ Human rights
- ☐ Renewable energy sources
- ☐ Tackle poverty
- ☐ The future!

## THE ADVENTURE

"The great adventures of the 20th century were stupendous, without a shadow of doubt. The expeditions to the North Pole, the lunar landing, the exploration of the world's oceans - all were great enterprises. But now they lie behind us, as done deeds. So what lies ahead? What are the goals of the future? The answers are clear: to improve the quality of life, to safeguard human rights, to ensure sustainability and to tackle poverty. These are the tasks of the pioneers of today and tomorrow."

## PIONEERING SPIRIT

"We have the good fortune to be comfortably off. But the problems of energy and the environment are enormous. We cannot carry on as we used to in the past. How can we improve the quality of life on our planet? It is a question of existential significance. It will take modern, pioneering spirit, and Solar Impulse is one example of this. Such modern adventures prove that dreams can come true. The boundless enthusiasm of Solar Impulse puts a stop to never-ending pessimism. We must finally quit talking about problems, and set to work on solving them instead."



## MY DREAM

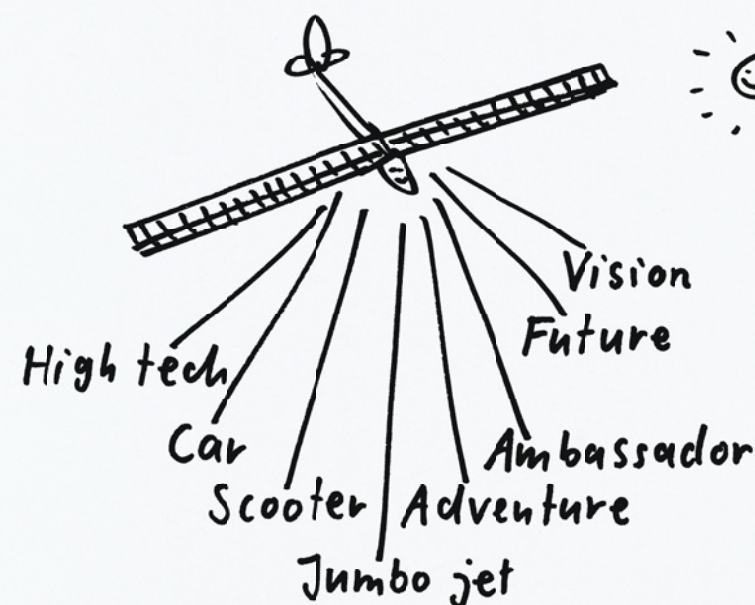
"When I think back to my childhood, I see all the boffins and researchers who used to flock to our house to visit my father or my grandfather. Wernher von Braun was a friend of the family. We used to go fishing together. Then he took me with him to the launch of Apollo 11. It was a life-changing experience for me. I saw those astronauts blast off to the moon and thought: these people have a dream and put their lives on the line to make it a reality. I, too, would like to realize my dreams."



## THE AIRCRAFT

"With André Borschberg, we have built an aircraft which is an all-time first. Though as big as an Airbus, it weighs only as much as a car, and its average power output is like a motor scooter. It consumes less energy than any other aircraft. Its flying characteristics are also completely different and pose an extreme challenge to the pilot. The plane is really difficult to fly, incredibly sensitive to the slightest turbulence, and can only be flown manually. That means the pilot can never take his hands off the control yoke for a few minutes' nap. Constant wakefulness is essential.

These difficulties are part and parcel of any adventure. If everything were plain sailing, others would have done this long ago. But it's not the difficulty that counts. Our goal is not to fly an aircraft which is difficult to fly. We are not primarily concerned with aviation challenges: they are just the means to the end. And the end of our mission is to prove what solar energy can already do, right now. Solar Impulse is an ambassador for renewables."



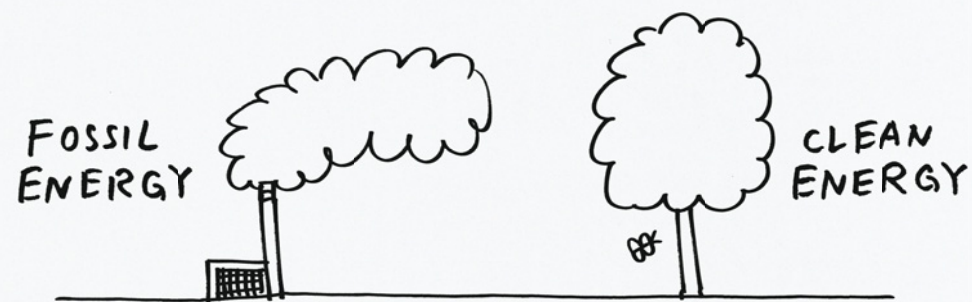
## THE MESSAGE

"If it is possible to fly an aircraft round the world without aviation fuel, of course it is also possible to apply this new technology in our everyday lives. Our society could be far less dependent on fossil energy sources today than is commonly assumed. We want to demonstrate this with Solar Impulse. We do not need a full tank. We fly with 12,000 solar cells on our wings. This is no futuristic dream: it is reality. The dream comes true. What we do in the air, everyone can do, every day, on the ground. That is the message of Solar Impulse."

Solar  
Impulse





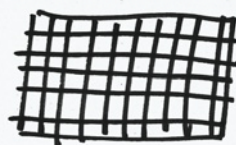


## THE ECONOMY

"An economy based on fossil energy sources is destined to disappear. One reason is that it pollutes our environment, but the main one is that fossil fuels are finite. They become ever more scarce, prices rise and, in the end, the economy suffers."

With clean energy sources, the position is quite different: the sun, the wind, biomass and geothermal energy place limitless quantities at our disposal. All we need is the right technology to use clean energy. We can create new jobs and win new markets. An economy based on clean energy sources is bound to flourish."

Solar cell



Sexy solar cell



## THE FUTURE

"Mine is not a 'green' vision. All too often, 'ecology' has come to mean 'reduced growth,' which is not exactly motivating. I estimate that not even 5 percent of the world's population, myself included, feel attracted to that way of living. I am for comfort, I am for mobility, I am for growth - but with reduced environmental impact, thanks to new technology. That is the way forward, the way to the future. Solar Impulse, the glittering aircraft with 12,000 solar cells on its wings, is a modern symbol. It is sexy. We must make renewables a sexy subject, or people will never take an interest in them."

## PREMIERE

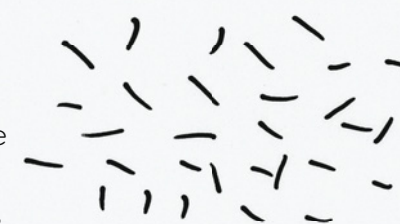
"My aim is not to break records. In 1999 my balloon touched down after the longest flight in aviation history: 20 days non-stop and a distance of 45,755 kilometres. That moment was special to me, not because I had beaten a record, but because I had achieved a significant premiere. I wanted to be the first. What fascinates me is to do something that no-one has ever done before. Everyone says, 'That's impossible.' Still, you dare. You get up and go. You don't follow the beaten track. You are the first. I love these projects. They are the spice of life."



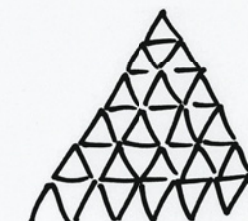
## PARTNERS

"To make a dream like Solar Impulse come true, you cannot go it alone. You need partners: business partners like Swisscom or Solvay, Omega, Deutsche Bank, Bayer Material Science and Altran. Without Swisscom's input, we would not have the first-class technology which allows communication between the aircraft and the ground station."

No team



Best team in the world



## FREEDOM

"Pioneers are people who see present-day certainties with total clarity - then try to do the exact opposite. The opposite is not necessarily better, of course: what matters is that you constantly question your own position. If you can think and act outside your comfort zone, that is true intellectual freedom."

Pioneer



## MISSION IMPOSSIBLE

"There is a famous comment of Jules Verne, 'The impossible has yet to be achieved.' Wonderful, isn't it? The quotation is written in big letters on the wall of our hangar."



impossible!



Courage

Luck

Alone

# Flights of Fancy

by André Borschberg

...to feel the wind...

Freedom

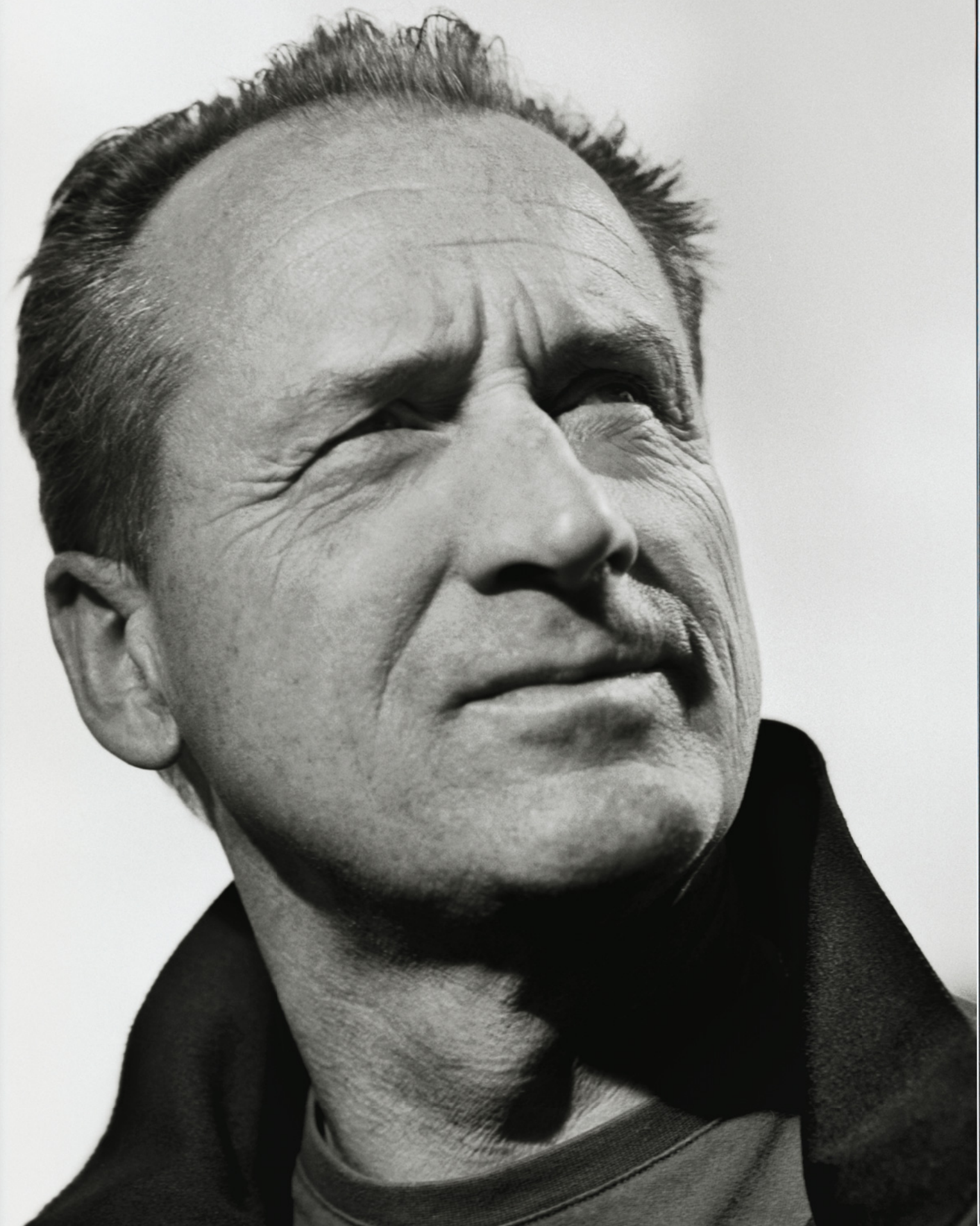
Team

...like a bird...

Magic moments

Sky Speed

Horizon





ANDRÉ BORSCHBERG

Payerne, July 2010

"I can still remember quite clearly how I was bitten by the flying bug. The year was 1964, and the place was the 'Expo,' the Lausanne exhibition. They showed a fantastic film about the Swiss Air Force on a 360-degree screen - a sensation at the time. I saw these jet fighters airborne. It was simply incredible, and I thought: I'd love to sit in an aircraft like that. I'd like to become a pilot like that. I was 11 years old. No two ways about it: it was something I had to do.

At 15 I completed my first training to become a pilot. The Aero Club offered courses under army supervision. At 17 I gained my pilot's licence. Sounds crazy, but I could fly before I was allowed to drive a car. Then I applied to join the Air Force. The selection was tough. Out of 2,000 candidates, only 6 passed - and I was one of them.

At 20 I gained my licence as a jet fighter pilot. My dream had come true.

Flying is the great passion of my life. The sense of freedom is unbelievable, especially in a jet fighter. For example, you take off in the grey dawn. It is still dark on the ground, but you rise to an altitude of 10,000 metres in a few seconds and see the sun rise. Then you descend back into the depths of night: an overwhelming experience.

Seen from the sky, the world is indescribably beautiful: the clouds, the light. I remember a night flight across the Atlantic. The polar light glowed ahead of me for five hours, like a giant green curtain, 50,000 metres up. It was a magic, mystical moment.

Estimates suggest that, in an aircraft, one is 50 percent stupider than on the ground. The reason is the speed at which our brain has to function. Unexpected things happen: a system error, a wind change, a switch of runways at short notice, and so on. Suddenly you have to rethink your decisions as the aircraft hurtles on. The jet fighter is 5 kilometres faster than your brain, and your brain has to catch up. This means that a pilot must constantly be planning ahead for what might happen, to be quick enough when it actually does happen.

Suddenly  
the sun gives us  
the power to fly.

By nature, I am suited to this. I am a man who lives in the future. People who live in the past would find it difficult to become pilots. My ability to catapult myself into the future has enabled me to work as an entrepreneur, administrator and even consultant. Parallel to my passion for aviation, I have been able to gain a variety of other experiences. The range of my professional skills has enabled me to start up businesses and, in 2003, to form the Solar Impulse team of engineers which designed the HB-SIA. Before we started work on the construction, we simulated and tested everything. There was an element of risk and of trust in the projections, before opting for one design and starting the construction. As I knew that I wanted to pilot this aircraft myself, I followed the development work at close quarters, down to the last detail. Ultimately this gave me the confidence to fly it!

The challenge of Solar Impulse is not the speed, but the totally novel type of aircraft. Of course experience counts, but you have to be able to adapt very rapidly. You are flying an aircraft that has never flown before. As a pilot, I must always take everything into account. After all, this is a prototype, and I embark on a new voyage of discovery every time it flies.

Pilot, heart and soul



Flying is both a solo activity and, at the same time, intensive teamwork. I enjoy the feeling of being alone in the cockpit, bearing sole responsibility. Everything rests on my shoulders. That sense of personal responsibility is quite special when flying. On the other hand, there's also a tremendous sense of community. A military formation of 24 jets streak across the sky together. 24 pilots share the same experience in those unforgettable moments. I have always loved this combination of individualism and teamwork. It fits my character nicely.

I appreciate exactly the same thing now with Solar Impulse. I sit alone in the cockpit, but I know the team are there on the ground: the meteorologists, the engineers, the specialists. They are my co-pilots and I trust them blindly. This mutual trust is essential and highly emotional.

It was a terrific feeling to fly Solar Impulse for the first time. I can really only liken the experience to my maiden flight. We had spent seven years building this aircraft, and suddenly I was airborne in it. I felt very moved at that moment. Besides, I was sitting in an open cockpit. I could feel the wind. I felt like a bird.

There was also this colossal tension. How would the aircraft respond? Could I stabilize it after take-off? What would happen on the first gentle turn? Would the landing be successful? Naturally I was relieved and very happy that it all came right.

The next decisive stage was the first night flight. 26 hours in the air is a long time. Would the batteries charge sufficiently during daylight to endure overnight? I was riveted. Yet still I could admire the glorious sunset. The towns on the ground were already shrouded in darkness, their lights twinkling, the red evening sky shimmering in the lake, the stars coming out, the moon - absolutely incredible. You slip noiselessly through the night until, suddenly, the first rays of sun light up the horizon.

Of course you don't get any sleep. That is going to be a problem if we fly round the world. I reckon I shall take my sleep in individual, short bouts. Ten minutes here, ten minutes there. Seafarers do the same."

... above the clouds ...



... simply incredible ...  
You are aware of  
three dimensions...

... happy!!



BERTRAND PICCARD  
and ANDRÉ BORSCHBERG  
at Dübendorf Air Base

# The Big Moment

26 June 2009 1235 hours  
World premiere:  
we unveil the plane!





"You might say it's the myth  
of Icarus in reverse.  
Icarus plunged down to  
earth because of the sun.  
Bertrand Piccard flies  
higher and higher "  
because of the sun."

Pascal Couchepin

SOLAR IMPULSE HB-SIA,  
the PROTOTYPE of  
the aircraft which made  
the first test flights





800 invited guests gaze in amazement at the first plane of its kind in the world: 22 metres long, 63 metres span width and weighing only 1,600 kilograms - a sensation.

We are proud of this milestone!



The HEROES OF THE SKY on stage  
Symbolic act, multimedia relay



"As late as November 2003, we had no partner, no money and no team. Now we have all three."  
(André Borschberg)

The plane was built right here in the hangar in Dübendorf.



SWISSCOM is a partner in this historic project.



BERTRAND PICCARD  
Dübendorf, 26 June 2009

"Yesterday it was a dream, today it is an aircraft and tomorrow it will be a flying ambassador for responsible use of our resources.

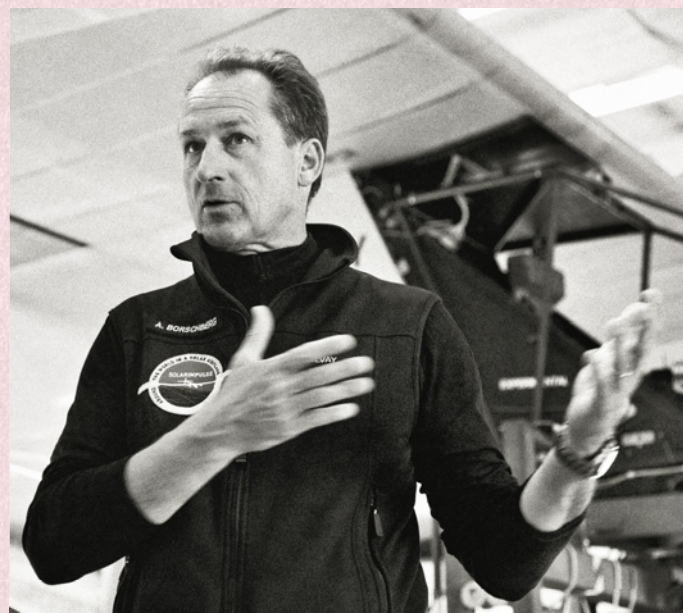
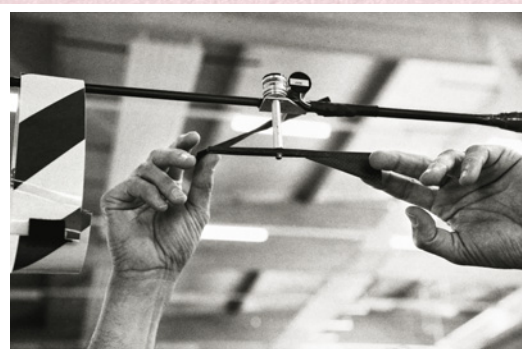
Today we unveil the plane to the eyes of the world. We have laboured seven years, and finally we have something to show for it. No-one has never seen the like of this aircraft. The unveiling takes place at the military air base in Dübendorf - a historic location. This is where Auguste Piccard began his famous flight in a gas-filled balloon in 1932, reaching a record altitude of 16,940 metres. We have yet to prove that our aircraft can actually fly. It is a prototype. We are going to make the first test flights over the next few months. They will give us the experience we need to build the plane with which we will achieve our goal. That is: the first manned flight round the world in an aircraft without kerosene. The whole world has to see what renewables can do. That is the message of Solar Impulse.

The unveiling of the aircraft marks a major milestone in our project. We owe our companions a debt of gratitude. A vision like Solar Impulse cannot be realized as a one-man band. It takes a team. We seek partners which have the same philosophy and the same vision as we do. We have found such a partner in Swisscom. Swisscom is one of the biggest buyers of solar power in Switzerland. That is exemplary, and just right for us. We are on the same wavelength. Besides, Swisscom's expertise is a big plus. We need a highly complex platform for our telecommunications. We have stringent requirements in this respect. The system cannot weigh more than 5 kilograms, and must get by on 50 watts - the same as a conventional light bulb. It has to assure communication between aircraft and ground station, relay all data from the aircraft, anywhere in the world, the voice of the pilot, the photographs and films. We are confident: Swisscom can do it."

*Dübendorf:  
a historic site*







# What on earth's THAT?

Solar Impulse is the world's most revolutionary aircraft. André Borschberg explains why.

To fly day and night, our energy consumption must be ultra-lean. The term "efficiency" is right at the top of the list of priorities for Solar Impulse and its partners. To save energy, we had to build a very big aircraft - with a wingspan of 63.4 metres (the size of an Airbus). This maximizes aerodynamic performance. But the aircraft also had to be ultra-light. Every gram counted. It weighs just 1,600 kilograms, as much as a small car. The aircraft's size provided the necessary space for the solar cells, most of which are on the wings: 12,000 silicon cells.

Each of the four propeller motors has a maximum capacity of just 10 HP. The aircraft flies no faster than 70 km/h. This means, practically, that we cannot use any of the components normally used in aircraft engineering - they are far too heavy. We have to develop most of them ourselves, working with partners. Many components are unconventional. Sometimes they do not look high tech at all, but they are. That is what happens when you build an aircraft to fly round the world on solar power.

*Solar Impulse =  
creative solutions*



This is the PROPELLER NOSE CONE. Or rather it is all four PROPELLER CONES, stacked on top of each other. They are made of Kevlar, a plastic, and their total weight is just a few grams. But they are incredibly strong when mounted.





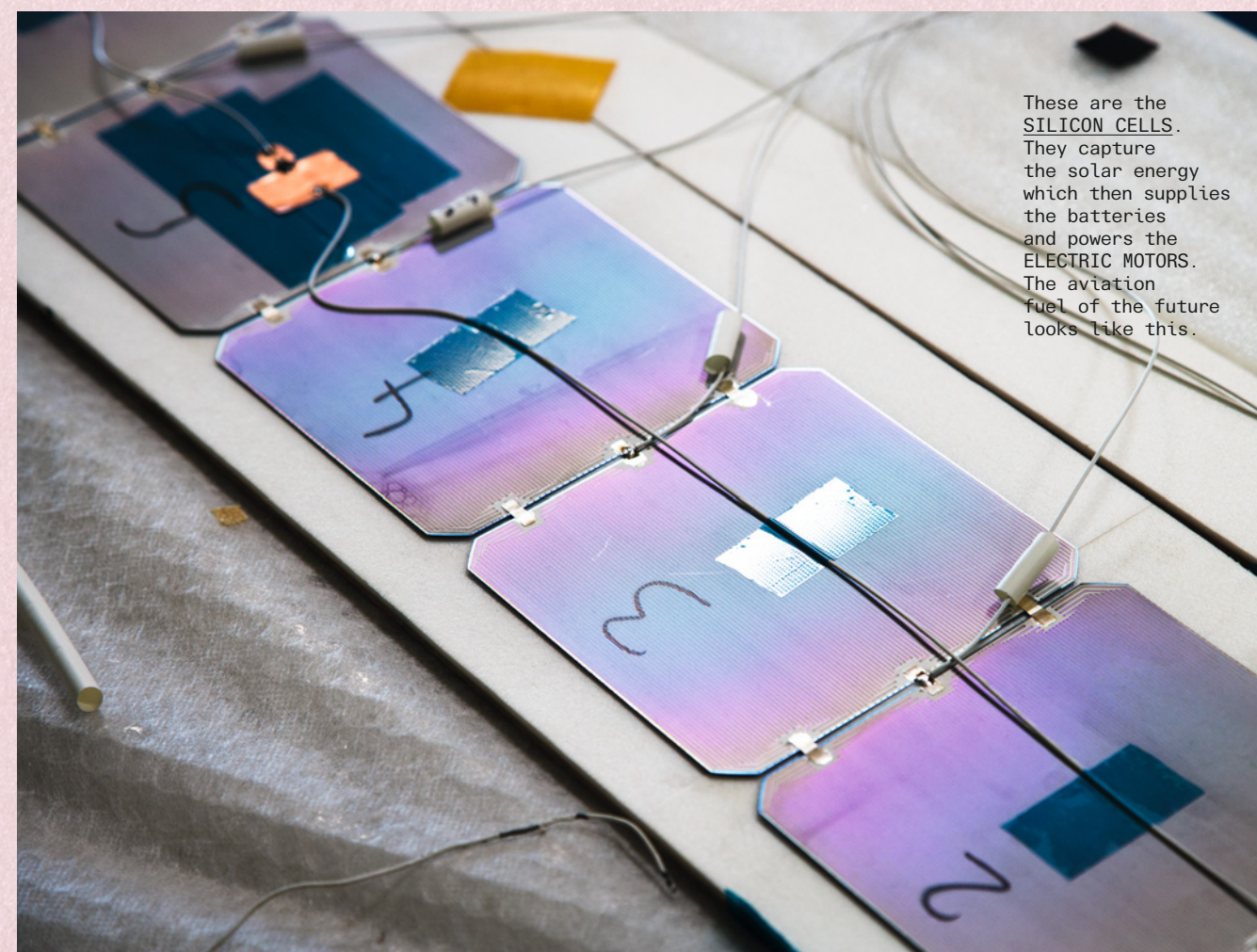
The pilot needs fresh air in the cockpit - hence the AIR VENT in this position, to provide ventilation. The seal is infinitely adjustable, to avoid a permanent draught which is either too hot or too cold.



This ADHESIVE TAPE joins the individual SOLAR CELL PLATES. They must not touch each other. That might happen, for example, if the wings bent slightly in the air. So we need a flexible connection.



We have attached a long carbon rod to the aircraft's nose. At the tip are two measuring instruments, which tell us our main flying parameters: SPEED, INCIDENT AIRFLOW ANGLE, temperature, etc. This part is highly sensitive, and crucial for the pilot.

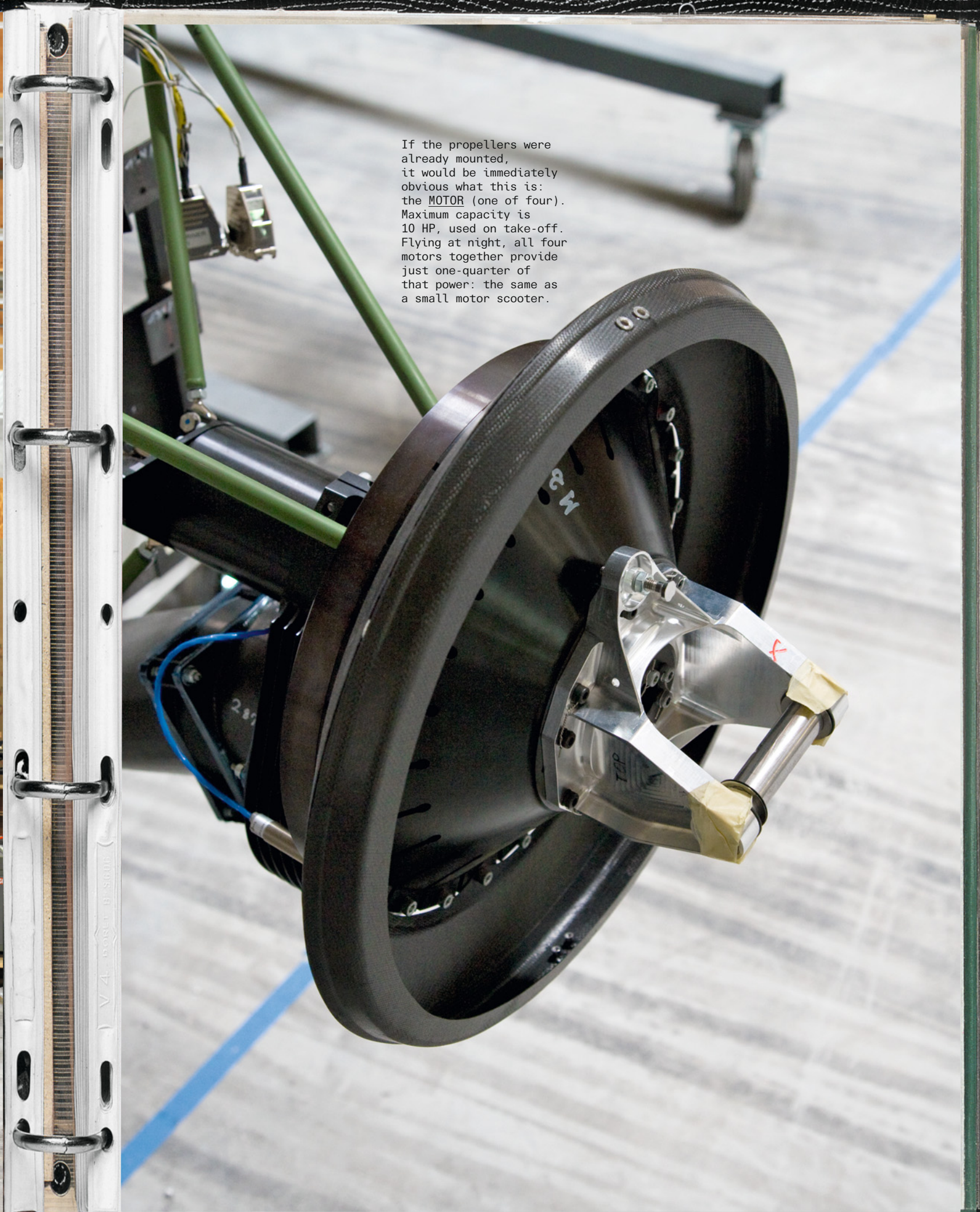


These are the SILICON CELLS. They capture the solar energy which then supplies the batteries and powers the ELECTRIC MOTORS. The aviation fuel of the future looks like this.



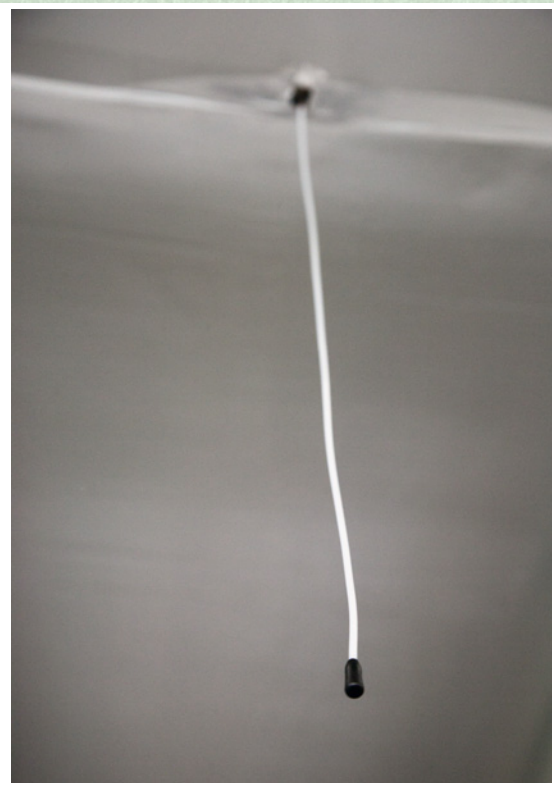


This is the COCKPIT.  
 It looks like metal, but is in fact expanded plastic.  
 It weighs only 8 KILOGRAMS. I am going to sit  
 in here. It will protect me from the cold, 9,000 metres up.



If the propellers were  
 already mounted,  
 it would be immediately  
 obvious what this is:  
 the MOTOR (one of four).  
 Maximum capacity is  
 10 HP, used on take-off.  
 Flying at night, all four  
 motors together provide  
 just one-quarter of  
 that power: the same as  
 a small motor scooter.





It looks like a wire dangling from the aircraft, doesn't it? This is the TRANSFORMER ANTENNA, which relays the aircraft's call sign to the radar system.



The aircraft has no heating or air-conditioning system, so the pilot needs a THERMAL SUIT. This offsets the extremes of temperature in the cockpit, between +40 and -20 degrees, by inflating or deflating as the pilot presses a button.

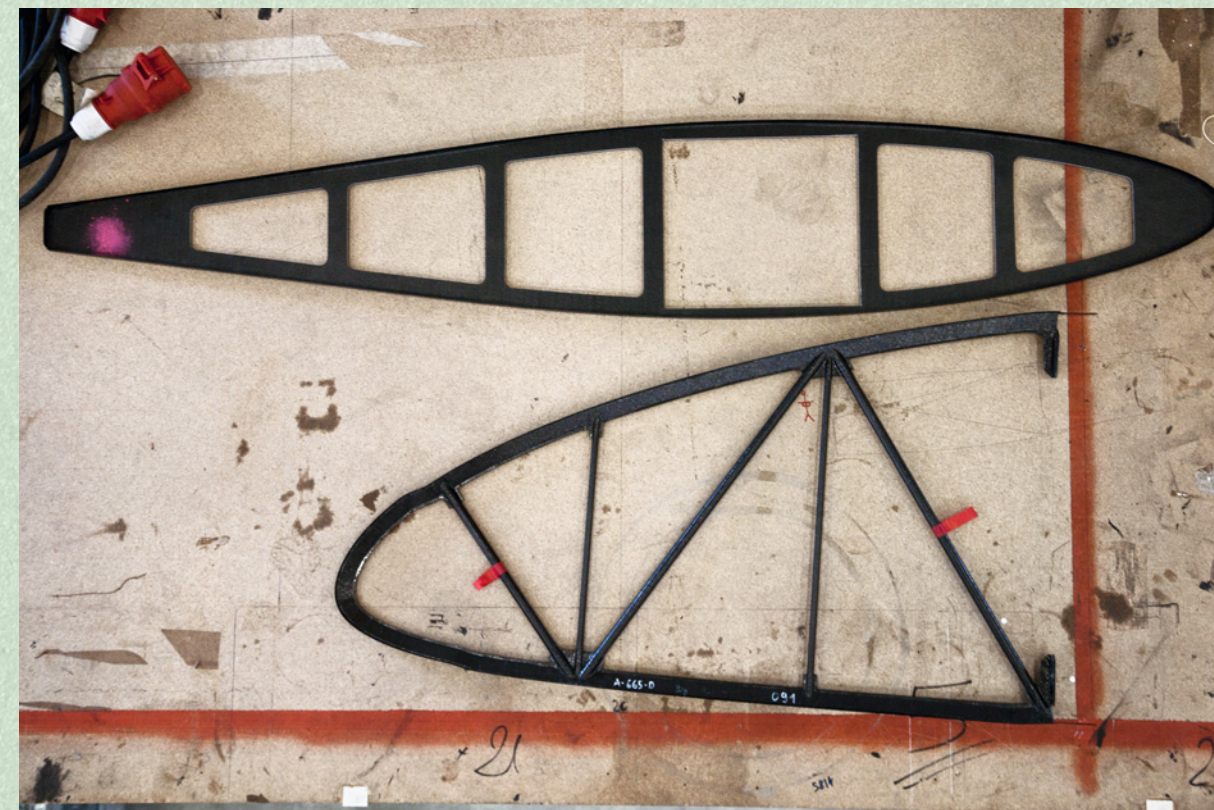


This is my ultra-light sagex ARMREST. It makes longer flights more comfortable. But I don't always need it. That's why we have configured a movable component.



We have just one central LANDING WHEEL, fitted in the middle of the aircraft, not the usual pair. The unusual feature is that, if a side wind is blowing, the undercarriage positions itself automatically for landing.

These are the WING STRUTS, known as bracing ribs. They are carbon, a very light and stable material, so one part weighs no more than a hat.



This is the POD covering the motor. It is in expanded plastic, and insulates mainly the battery. A child could lift it with one hand. The aircraft has four pods.



Payenne, 18 October 2010



# The Summit



Bertrand Piccard and André Borschberg welcome two visitors – project partners who have become friends: the Chairman of the Board of Directors of Swisscom, Anton Scherrer, and Swisscom CEO, Carsten Schlöter. They are here to view the communication package being developed by Swisscom for Solar Impulse.

The COMMUNICATION SYSTEM built into every ordinary aircraft weighs 25 kilograms and can do much less...

... we have to get it down to 5.



The development takes SWISSCOM into uncharted territory. No such solution has ever been found. Besides, it has to meet extreme requirements.



This little computer here is the core of the COMMUNICATION SOLUTION for SOLAR IMPULSE. It is the interface between pilot and satellite communication system.



CARSTEN SCHLOTER  
Payerne, October 2010

“The world needs fundamental change. That is Bertrand Piccard’s view, and I share his conviction. So we hit it off at once. If we want to convey the urgency of this change effectively, we need signs. We require powerful symbols that illustrate: things can be different. Solar Impulse is just such a symbol. That is why we are supporting this project specifically with what we do best: communication technology. Our contribution is a platform enabling communication between aircraft and ground station. The pilots need such a platform to fly round the earth. Moreover, our contribution enables many people in the world to follow this symbolic event live: on the Internet, on smartphones and on interactive television.

However, technology is only one aspect of this partnership. We have a common commitment to sustainable action. An aircraft flying round the world on solar energy illustrates the power of visionary thinking. We need that power for the future of the earth. Today, seven billion people are consuming more resources than our planet can support. By 2050 there will be nine billion. This spurs us on: Solar Impulse and Swisscom.

As a major corporation, Swisscom is answerable to society in particular ways – entrepreneurially, socially and ecologically. Our long-term business orientation, our training of more than 800 apprentices, our free connection of Swiss schools and colleges to the Internet, and our support of people in need are as much part of that responsibility as our careful handling of natural resources. We are an energy-intensive company, and it is therefore significant that we procure all our electricity from renewable sources in Switzerland, and are Switzerland’s biggest customer for electricity generated from solar and wind power. We are developing electricity-saving products and processes and services which conserve resources. These products, in turn, save our customers electricity and CO<sub>2</sub>. Examples are videoconferencing systems, electricity-saving routers and energy-efficient computer centres. We are unremitting in the enhancement of the energy efficiency of our infrastructure and have set ourselves binding energy efficiency targets. Already, 400 of our 1,000 telephone exchanges in Switzerland dispense with conventional air-conditioning. Some use an innovative fresh-air cooling system instead.

All this is only the beginning of the change our world needs.”



A PILOT PROJECT,  
in every sense  
of the word



Would you like a peek inside the cockpit?



The plane is still in its hangar.  
The communication system will be installed  
on the prototype in spring 2011.



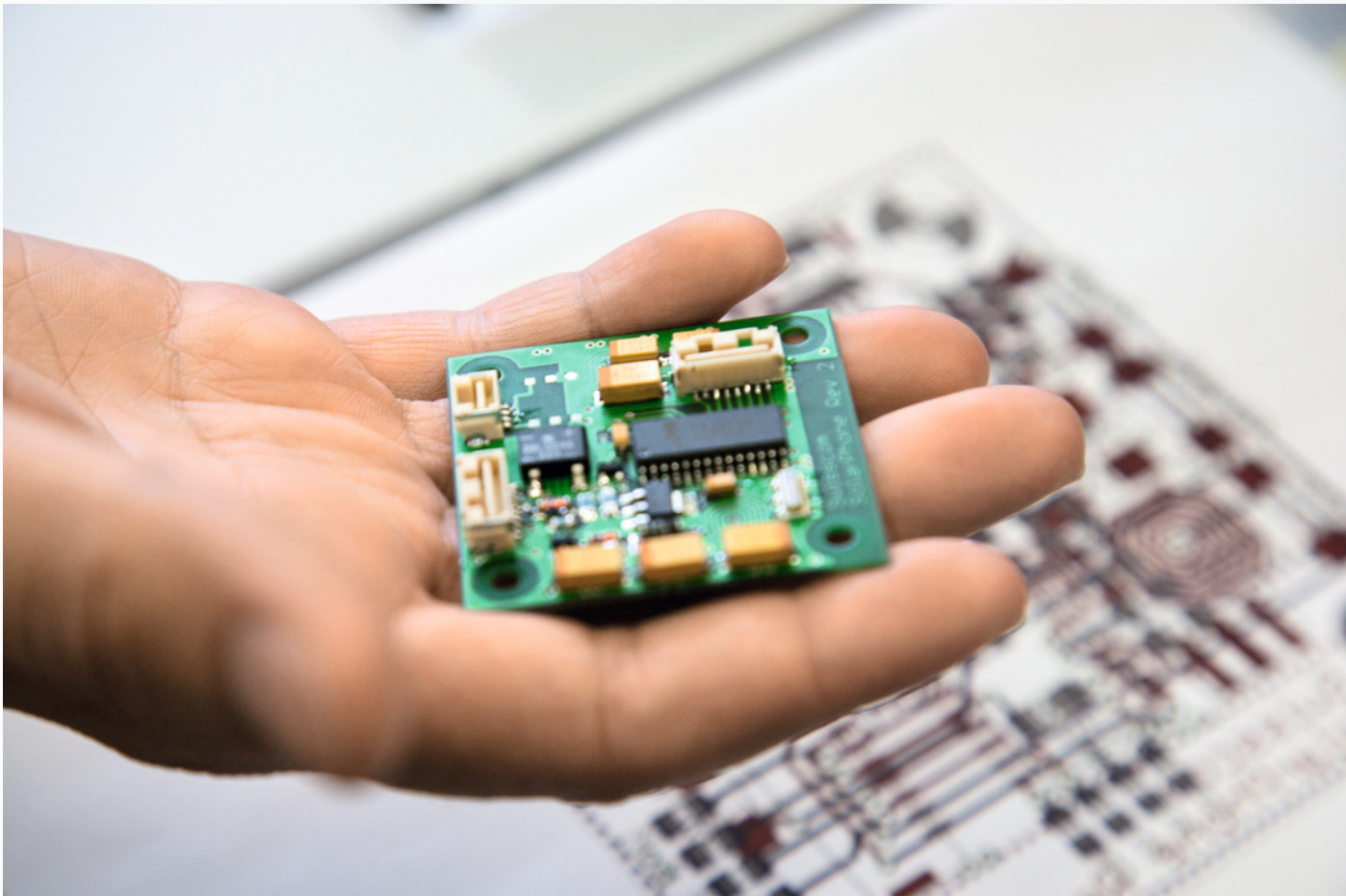
The COMMUNICATION SYSTEM in action:  
here is the current weather report.



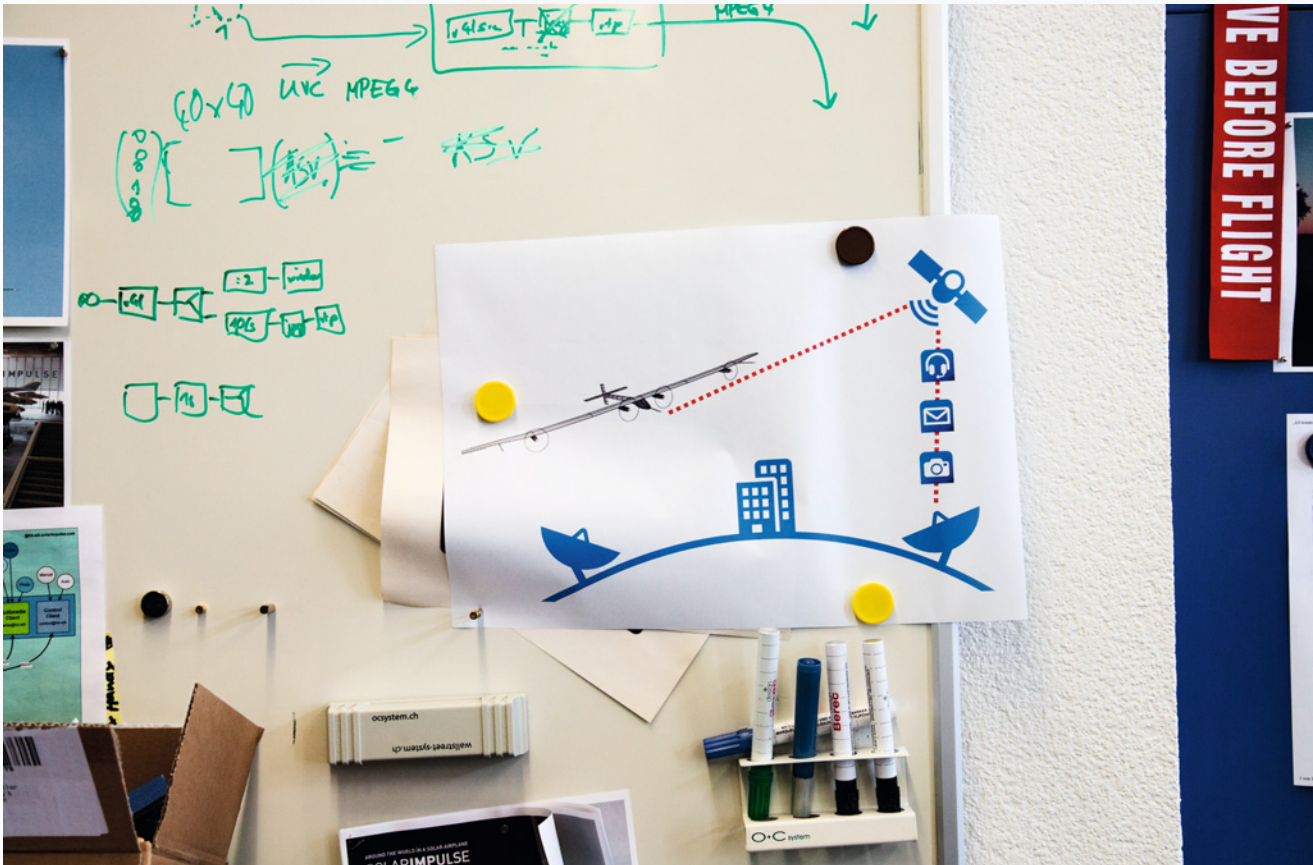
14 Swisscom's Ostermündigen Laboratory



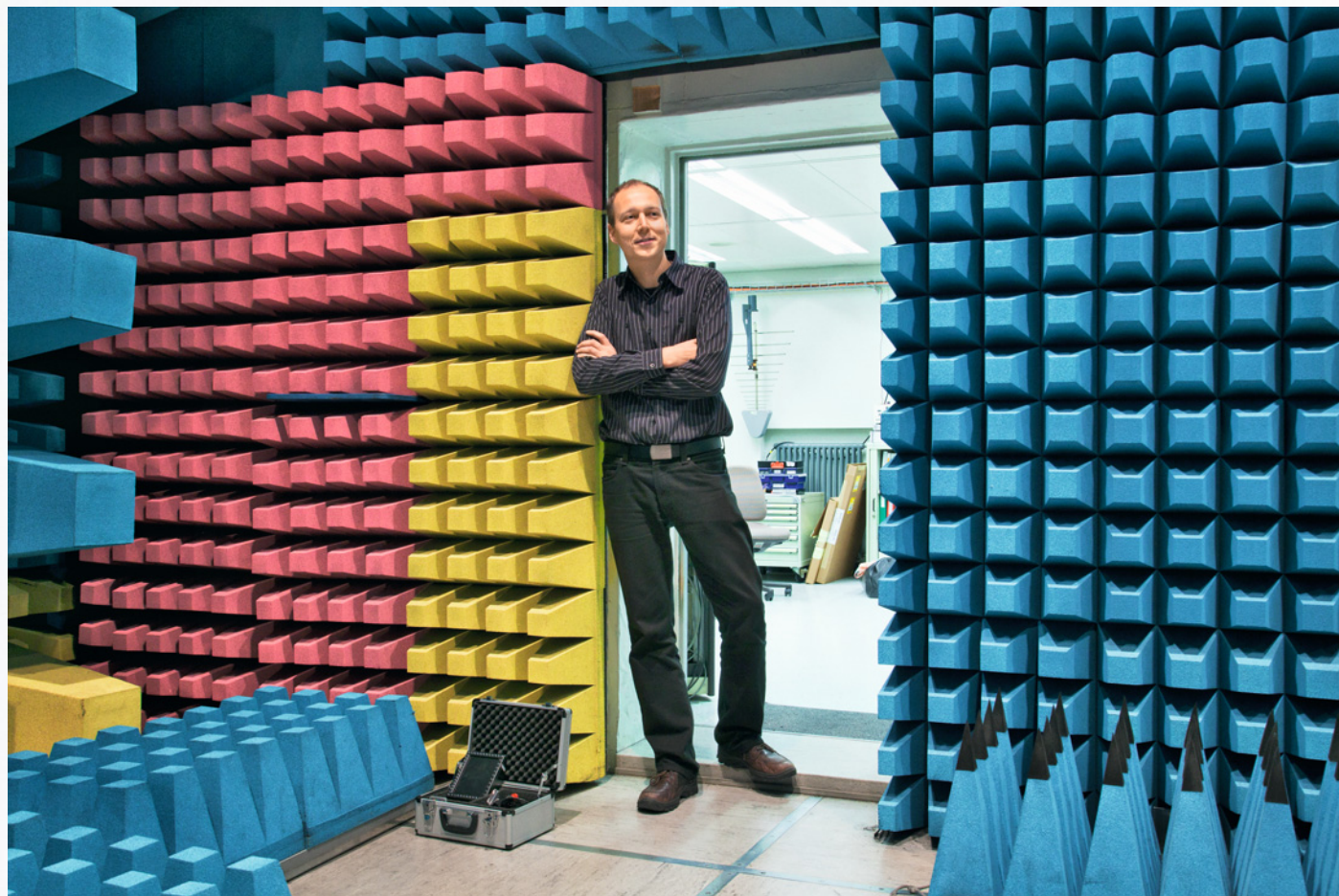
This is where the solution to SOLAR IMPULSE's communication requirements is being developed. A team of engineers is engaged in pioneering work. The equipment really has to work miracles. It facilitates video conferences and transmits position and sensor data, weather information, films from the cockpit, the pilot's heartbeat and much more. At the moment they are actually working on the antenna.



At an altitude of 10,000 metres, the pilot can even send e-mails and make telephone calls. Here is the telephone – a miniature masterpiece of engineering, developed in-house by the Strategy&Innovation team. Everything must be as tiny and light as possible. Five kilograms is the specification for the communication package.







ROGER JEGERLEHNER is the Project Leader. He heads the Swisscom team developing the communication system, and liaises with SOLAR IMPULSE.

REGULA GÖNNER looks after the satellite communications which relay data from the aircraft to the ground. The electrical engineer is a pilot herself.



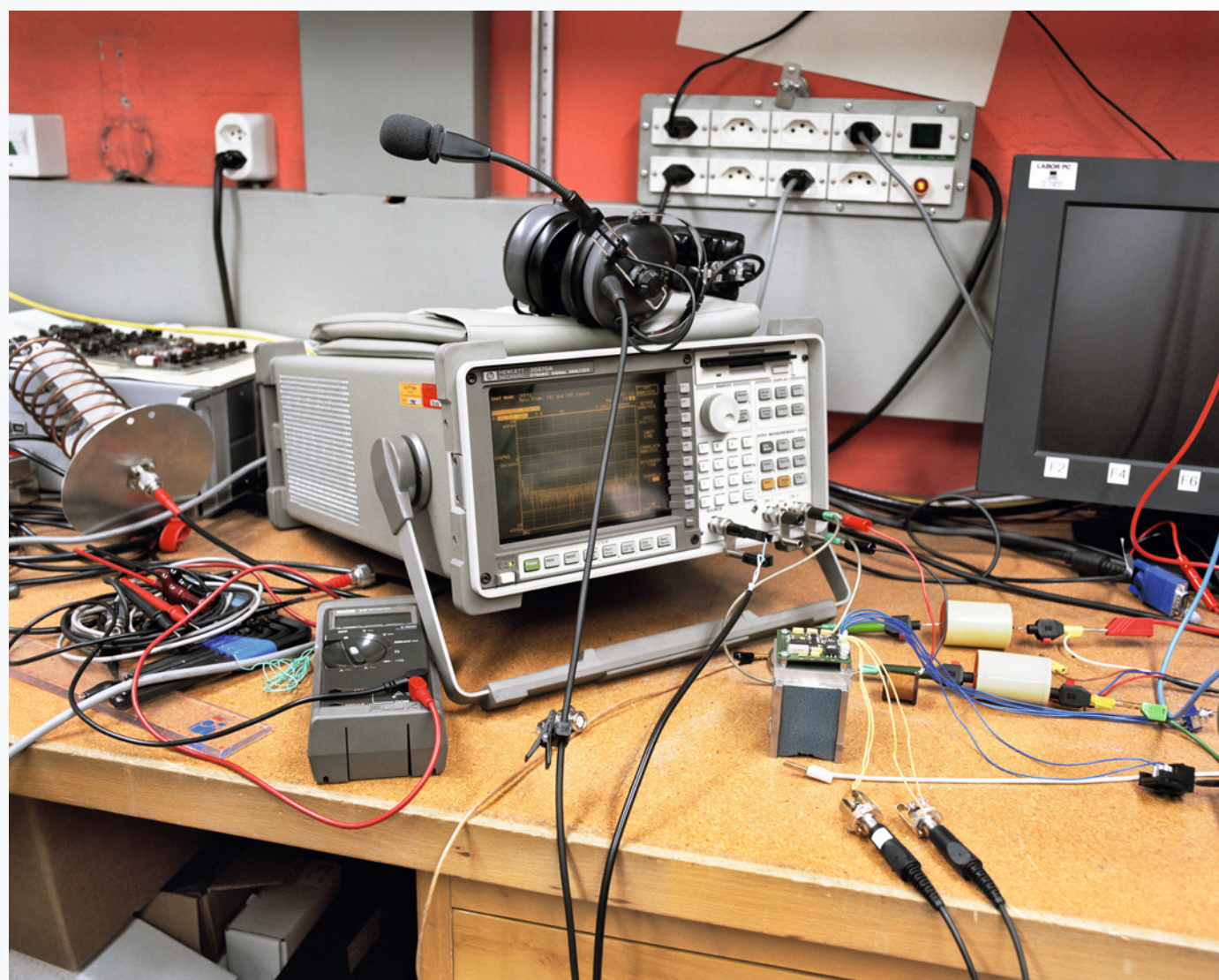
MANUEL HAAG is responsible for the system architecture. His work consists mainly of design tasks.

*A project by  
Strategy & Innovation,  
Swisscom's innovation  
department*

DOMINIK HILTBRUNNER is one of the software developers. He develops software which controls and monitors the transmission of data.







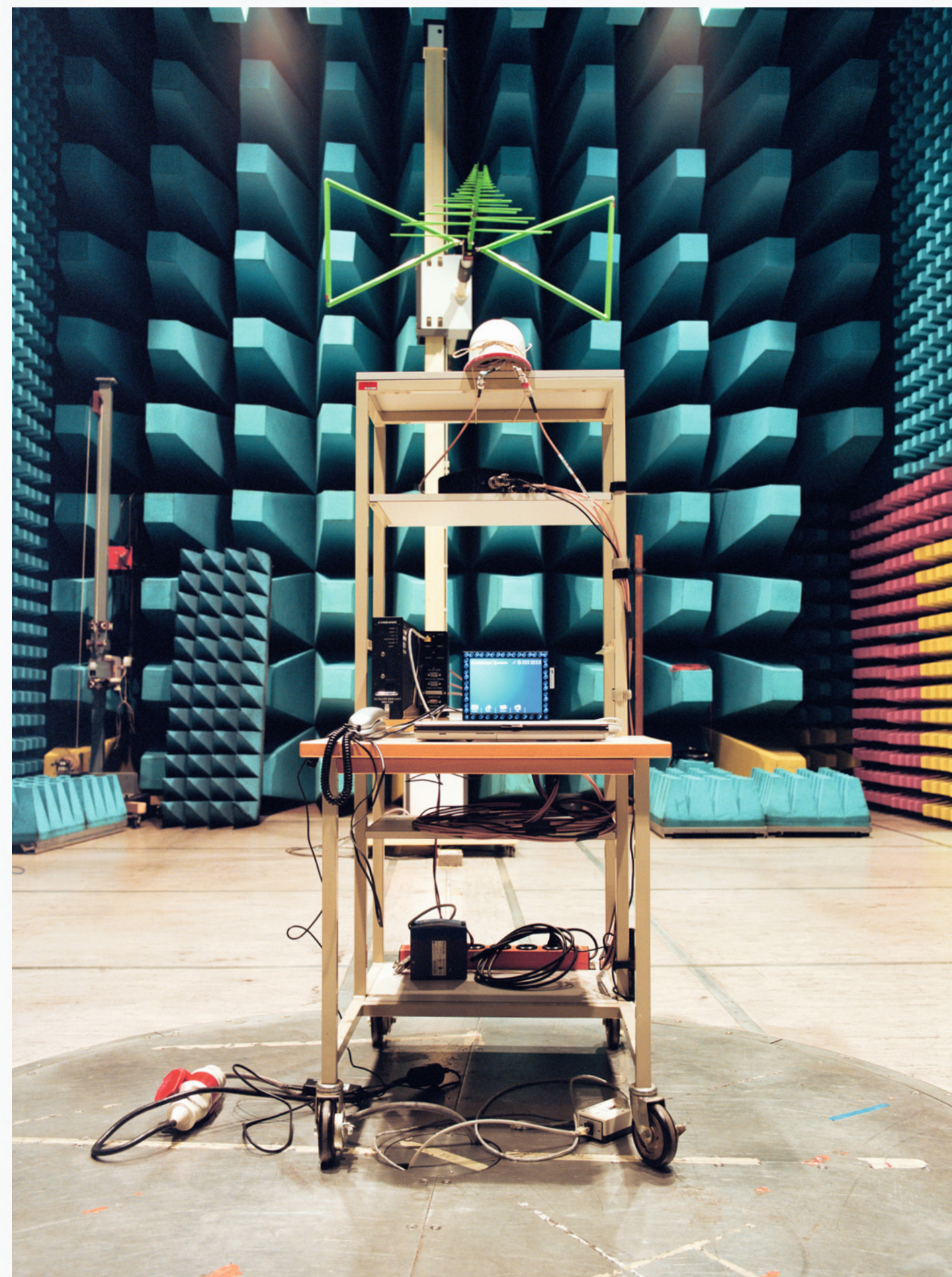
Now for the test stage. This exposes the TELEPHONE to all the stresses it will subsequently have to resist on board the aircraft.



Air pressure: the TELEPHONE under atmospheric pressure



ENRICO BLONDEL - he is responsible for tests such as temperature, atmospheric pressure and radiation.



The SYSTEM in the EMC test laboratory. This checks whether the SYSTEM has inadvertently been allowed to emit electromagnetic radiation, which might interfere with the instruments on board the aircraft.



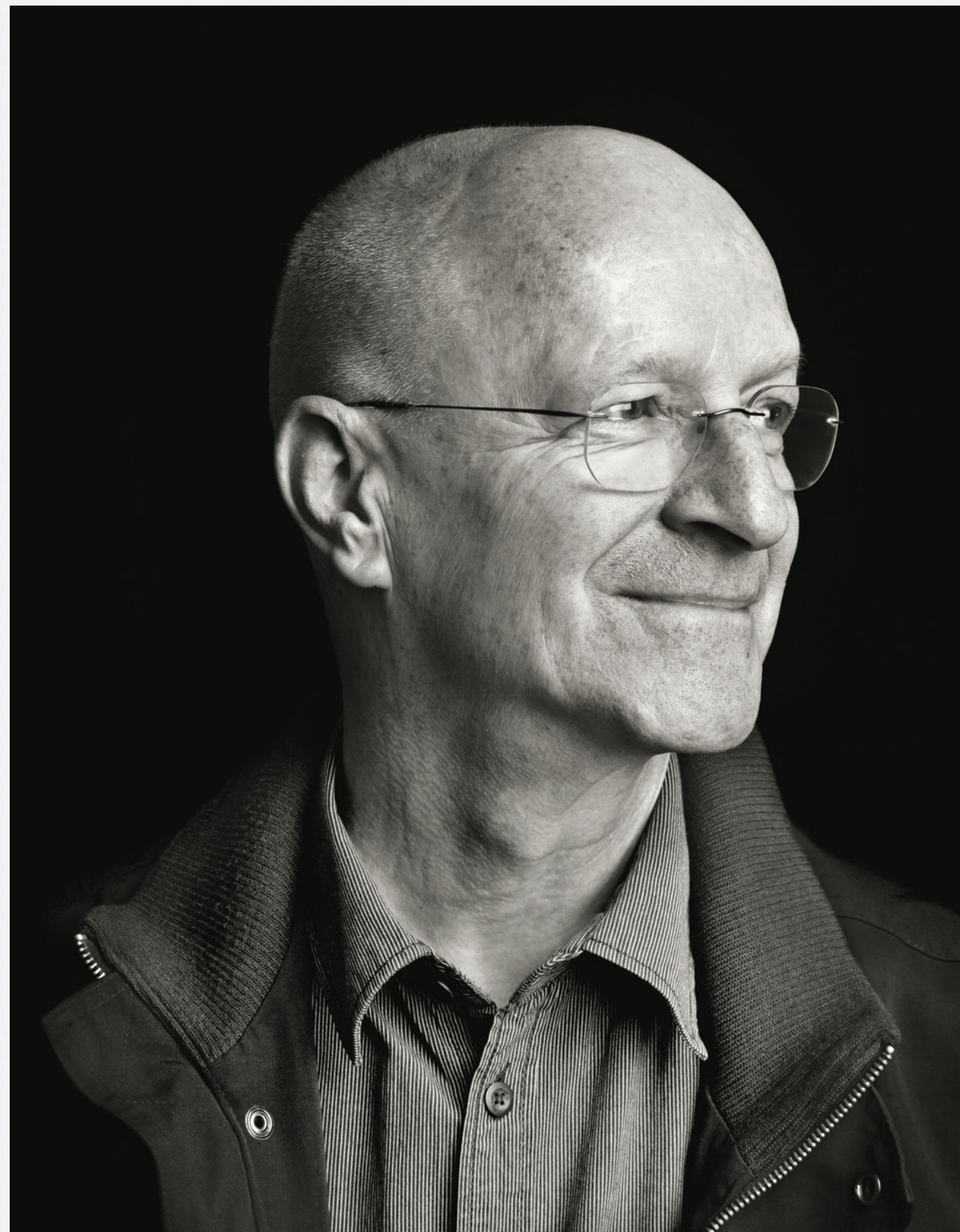
# OUR TEAM

"Ten heads are better than one."  
Some of the many who are making  
Solar Impulse possible.

BERTRAND PICCARD AND ANDRÉ BORSCHBERG

Solar Impulse is far more than a grand dream. Solar Impulse also relies on quite specific entrepreneurial skills. As the person with responsibility for building the aircraft, André made the decision of principle to develop core skills in-house rather than outsource them. After that, he began to build up a team of engineers and technicians from very different backgrounds, and made the best engineering partners, experts and specialists available to them in support. André was successful in creating a unique team spirit, by drawing on the experience, talent and motivation of strong personalities from major corporations and SMEs. He was equally successful in tapping synergies and instilling a culture of innovation, without which there can be no technological breakthroughs, no devising of ingenious new solutions.

While all this was happening, Bertrand Piccard was demonstrating his flair for winning the institutional, technical and financial partners who have proved unstinting in their financial support for the project. A key part of his task was to communicate the values of this scientific, ethical and human adventure: to win support for renewables and the principle of energy saving, and get companies "on board" if they held similar values and were convinced of the project's many positive effects and symbolic impact.



CLAUDE NICOLLIER Head of Test Flights

"André Borschberg is an old friend of mine. We flew jet fighters together in the Air Force and dropped bombs over the Alps. So there's a bond. When SOLAR IMPULSE kicked off, André asked if I would like to contribute my experience as a NASA test pilot and astronaut. Test flights have to be planned and executed with extreme care. The slightest error can ruin everything."





PETER FREI Head of Configuration and Structure

"Right at the start we even wondered whether to make SOLAR IMPULSE an airship. Then we opted for an aeroplane. I dealt with the design: I'm actually a pilot myself. I love hang-gliding. Sometimes I spend six hours in the air, gliding over the mountain peaks between the Valais and Graubünden for distances of hundreds of kilometres. Lately I've circled with eagles - an incredible experience."



ROBERT FRAEFEL Head of Design

"I used to build model aircraft kits as a child. It was my great passion. I went on to study mechanical engineering, specializing in lightweight construction and development. I have been with SOLAR IMPULSE for five years. My task is to organize the whole engineering team so that we design an aircraft, as efficiently as possible, which will then fly round the world."





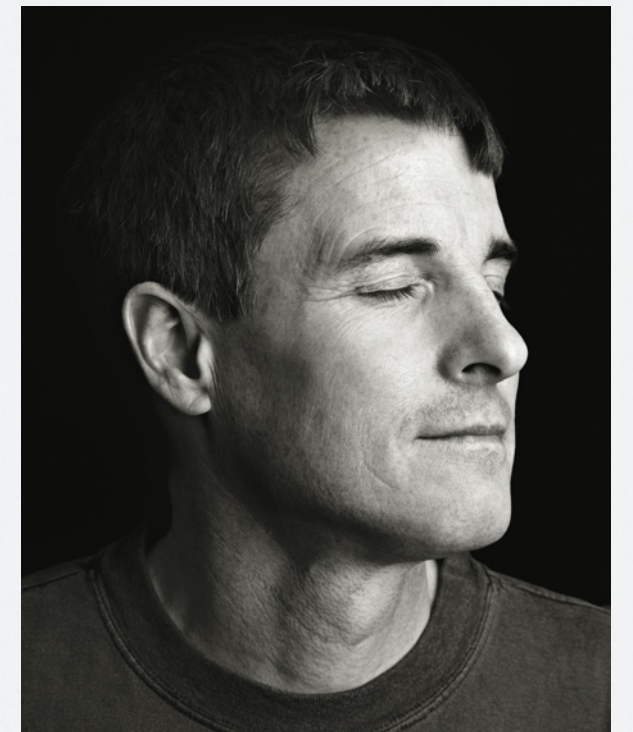
SÉBASTIEN DEMONT Head of Drive Systems

"My team is responsible for all the electrics. These are a major factor in a solar-powered aircraft: the motor, the generator, the batteries, the telemetry, the control systems, communication with the ground station, and so on. SOLAR IMPULSE needed an electrical engineer who also had flying experience. So I applied. I hold a pilot's licence, and practise aerobatics in my spare time."



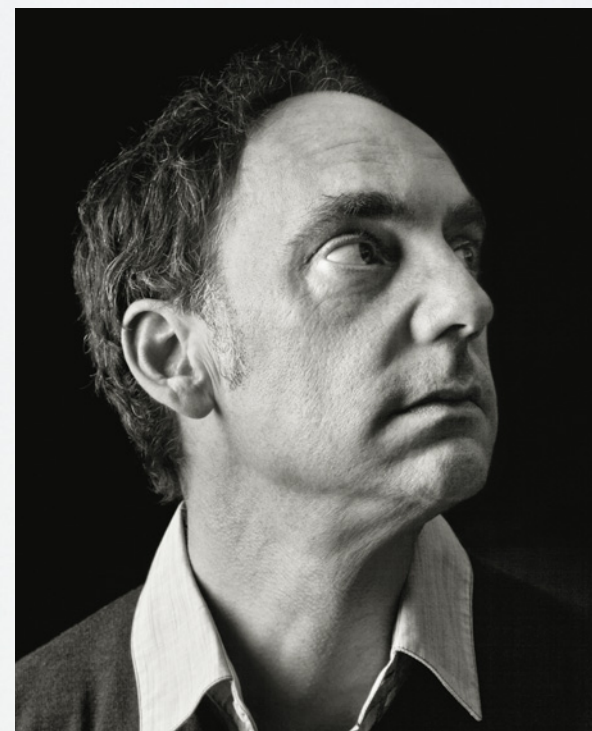
PHILIPPE RATHLE Head of Finance & Administration

"I've known Bertrand for more than 30 years. Both the economic and the scientific aspects of his projects have always held a fascination for me. I had the privilege of belonging to the team from zero hour in 2003. My role is to save Bertrand and André from getting bogged down in the detail of financial and administrative problems."



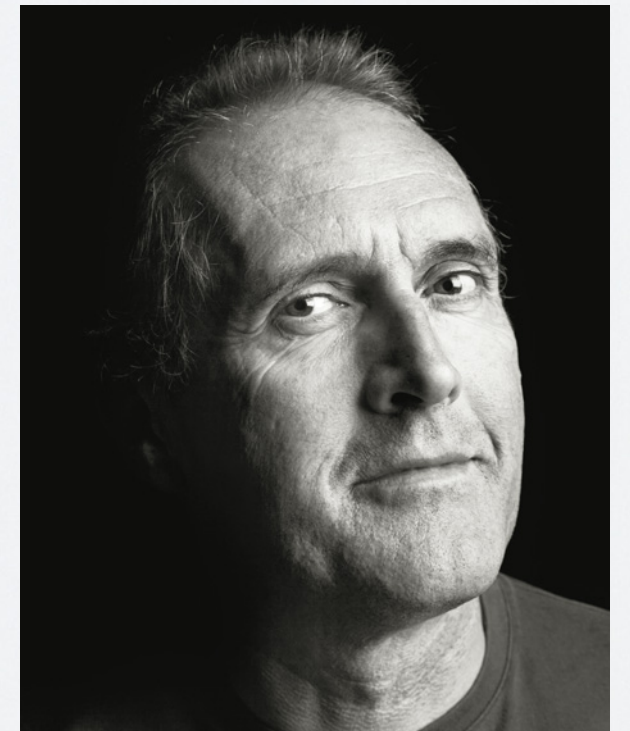
MARKUS SCHREDEL Test Pilot

"I was the first to fly the solar plane. Don't imagine the motto is 'hop in and see how it goes.' That would be far too dangerous. The test pilot is the link between the engineers and the pilot. My job is to check that the aircraft is safe to fly, right from the development stage. I am also responsible for the pilot training programme."



GREGORY BLATT Head of Communications & Marketing

"I was on a sailing trip in Thailand when I received a telephone call: would I like to sign up for SOLAR IMPULSE? So much for my sabbatical! It marked another surprising twist in my life. Originally I wanted to become a diplomat. That plan took me as a young man from Canada to Geneva, but then things took a different turn. I became Managing Director of the World Economic Forum in Davos. That is also where I first met Bertrand Piccard."



RAYMOND CLERC Head of Air Traffic Control

"I am the pilot on the ground. My team consists of weather specialists, air traffic controllers, engineers and medics. We give the pilot in the cockpit all the information he needs. We guide him. When André Borschberg is sitting in the cockpit, there is an extra-special relationship of trust. I know exactly what makes him tick, as he does with me. We have known each other since the 1970s, when we were both in the same fighter squadron. I became an airline pilot, and worked for Swissair for 30 years. I have 17,000 flying hours under my belt. I know the job."





MARC LIENHARD Head of Workshop

"I am responsible for building the aircraft. In fact I learned my trade as a boatbuilder. Several members of my team come from boatbuilding: some were involved with the ALINGHI, for example. I'm attracted to the combination of lightweight engineering and high tech. This interest took me into Formula 1 for a few years, with the Sauber team. So I have already been on the water and on the racetrack. Now for the sky!"



RALPH PAUL Head of Flight Dynamics and Flight Mechanics

"I used to work on jet fighters such as the Eurofighter and the Tornado. That was high-performance military engineering. Now I am seeing the other side of the coin: an aircraft which flies so slowly that it can barely stay airborne. The mathematics are the same, but the background is different. This is a peaceful adventure of ecological significance. I warmed to that."



Page One,  
7 July 2010



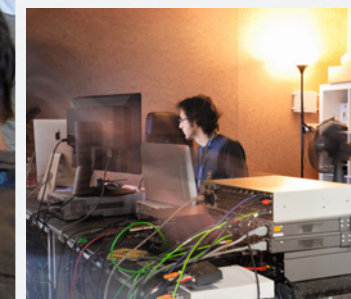
The SOLAR IMPULSE hangar



CLAUDE NICOLLIER



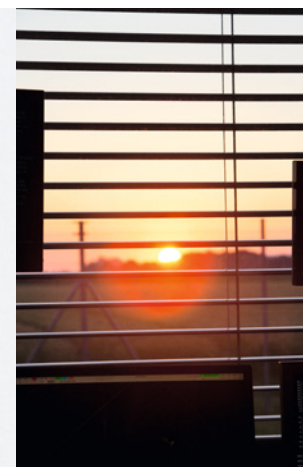
As ever, ANDRÉ is relaxed,  
even now. Only missing his  
THERMAL SUIT.



0420 hours: BRIEFING.  
The countdown begins.  
0500 hours: On to the runway  
to inspect the aircraft



the first  
Night FLIGHT











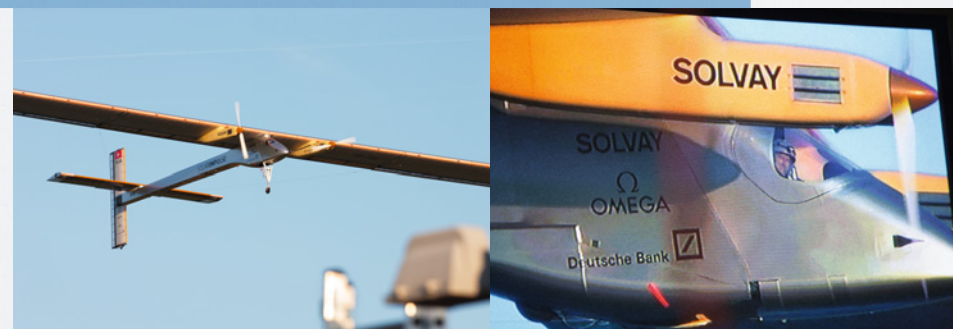
0645 hours  
*Have a good flight, André!*

Minutes to go before HB-SIA takes off  
on its historic flight



So far, so good!

André has been airborne since 0652 hours.





... Meanwhile, on the ground  
by the marquee:



**CHEERS!** all  
from the team, the partners,  
and the many spectators.

round...  
the VIP guests







The make-or-break stage begins.  
For the first time, a solar-  
powered aircraft is flying  
through the night.  
Will the batteries make it?  
Will André make it?

Sunset



During the day, the batteries  
have become sufficiently  
charged to endure overnight.



"In the eight years that lie behind us, I have lost no opportunity to speak about renewable energy. I have met statesmen, participated in symposiums, but all I could do was describe a vision. I had nothing to show, nothing to back me up. I was giving a message on borrowed time, so to speak. It was not always easy..."

"... Suddenly, everything is different. The aircraft is coming in to land after its first night flight - and the credibility of the vision is immediately proved. It's like hitting the jackpot. First borrow, borrow, borrow - and now the jackpot at last."  
(Berhard)



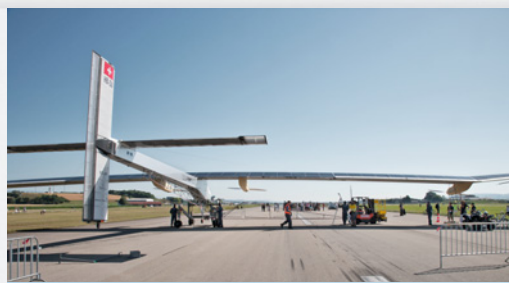


8 July 2010, 0900 hours



"Seven years of development work, the tests, the uncertainty...  
and today the proof that this technology works  
and can power our flight for several consecutive  
days and nights, something close to perpetual flying."  
(André)





"BRAVO  
André!  
You have proved  
that it is possible."



For the first time in aviation history, an aircraft has remained airborne for 26 hours without fuel - a triple world record.



DER SPIEGEL

Nr. 38/20.9.10  
Deutschland: 3,80 €  
4 190700 703809 38

# Der teure Traum von der sauberen Energie

*SILLIGE  
und profitabel*

MORAL

Stephanie  
zu Guttenbergs  
Kreuzzug gegen  
Lady Gaga



www.spiegel.de

## News

about our planet's state of health.  
Recent press articles prompt us to comment.  
By Bertrand Piccard

IS CLEAN ENERGY AN EXPENSIVE DREAM?

(DER SPIEGEL, Germany)

Rubbish. Anyone who draws this conclusion is committing a conceptual error, by confusing price with cost. The price of solar energy is currently higher than oil. But many things are not factored in to the oil price: the costs of the disastrous oil spills, the costs of the environmental destruction, the costs of climate change, the costs of the wars waged for oil reserves, and so on. Add up all these costs, and the bill starts to look rather different. On the other hand solar and, indeed, all renewable energy prices do include the associated costs. My calculation is this: every franc not spent abroad on oil, coal or gas can be invested here in Switzerland, to insulate homes or build photovoltaic power plants. This is money which boosts our economy, creates new jobs, leads to new products for export, and wins new markets. What an idea! Obviously the real expense lies in the dependency on fossil fuels. This is expensive for society and expensive for the country. So DER SPIEGEL's cover picture expresses the very argument I oppose. Take account of the global dimensions, and it appears fundamentally flawed.



DE L'ESPRIT PIONNIER, SVP !

04.11.10 10:18

Le Monde.fr - Imprimer

Le Monde.fr

L'éolien fournira 20 % de l'énergie mondiale en 2030

LEMONDE.FR avec AFP | 12.10.10 | 11h51 • Mis à jour le 12.10.10 | 11h54

+ 20 % solaire

+ 20 % hydro

+ 10 % biomasse + etc ...

+ 30 % économies d'énergie

Total: 100 % SANS énergies fossiles !

WIND POWER WILL MEET 20 PERCENT  
OF WORLD ENERGY NEEDS BY 2030. REALISTIC?

(Le Monde, France)

Definitely. Then there's another 20 percent from solar power, plus 20 percent hydro - suddenly that takes us to 60 percent. Add geothermal, add everything we gain from energy savings, and the total is 100 percent. Is this possible? The Americans decided to fly to the moon in 1962 - and landed on it in 1969. How can we doubt whether we can meet 20 percent of our energy needs from wind power in 20 years' time, let alone make my calculation come true?

CATTLE RELEASE MORE CO<sub>2</sub> THAN CARS.  
SHOULD WE ALL GO VEGETARIAN?

(SonntagsBlick, Switzerland)

That's right. We do eat too much meat. But I think CO<sub>2</sub> from cattle is harder to eliminate than from cars. It is no problem to convert cars to electric power: it is actually profitable for the automotive industry to do so.

It is not so easy if we want to replace meat with another source of nutrition, because there are seven billion people on earth. Of course this touches on the problem of overpopulation. Our planet is overpopulated, and the cause is poverty. The poor have large numbers of children because children are their insurance for old age. That is why education is so important. The more educated people are, the better jobs they get, and the less they rely on having large families. Fewer people in the world mean fewer cattle, and lower CO<sub>2</sub> emissions.

SOLAR IMPULSE + SWISSCOM  
= PIONNIER

SWITZERLAND'S LARGEST SOLAR POWER PLANT  
UNDER CONSTRUCTION IN MELCHNAU  
(Berner Zeitung, Switzerland)

Great news! Swisscom has pioneering spirit, which is why it is a partner of Solar Impulse. What is pioneering spirit? 130 years ago, when Switzerland was peopled by poor farmers, a few crazy individuals were suggesting, "We should stop walking over the Alps or riding across them on horseback. Let's build tunnels." No-one answered, "It's too expensive." Thanks to the crazy few, Switzerland has become a rich and prosperous nation at the heart of Europe. Today, once again, a few crazy individuals are saying: "Let's go over to renewables. Let us build solar power plants." But the answers they are being given are, "It's too difficult, it's too expensive." If the people who think this way had ruled the country 130 years ago, Switzerland would not be a trading nation today. Swisscom knows this. Swisscom is investing in the future.

LATEST WWF "LIVING PLANET" REPORT PREDICTS WORLD  
POPULATION WILL NEED A SECOND PLANET BY 2050  
(La Repubblica, Italy)

I am sure there are plenty of individuals whom we would like to dump on another planet. Think of the stupidity that clouds many minds in business and politics. I would be delighted if they were on another planet.



verstorbenen  
USA gelebt  
liegen, wenn  
ten handelt.  
jüngerer Zeit  
weil die US-

## ENERGIEPOLITIK IM VERGLEICH Die Schweiz ist Weltmeister der Nachhaltigkeit

gvm. Montre  
seinen nur al  
jeweils für  
Eine ist ein  
Klimapolitik.  
In der die  
ten Mal erhol  
mit dem erst  
Schweden u  
Senegal, Äth  
sind. In der S  
Nationen (üb  
die Golfstaate  
Europäern ist

WORLD ENERGY COUNCIL VERDICT:  
SUSTAINABILITY WORLD CHAMPION IS SWITZERLAND  
(Neue Zürcher Zeitung, Switzerland)

We come across as very eco-friendly, because our natural environment is so beautiful. Our streets are litter-free. People look around and think: all spick and span. But they are wrong. As far as clean technology goes, we are well below the level where we ought to be. I am optimistic that things will move forward on this front, not least because we have Doris Leuthard as a Federal Councillor. She is a politician of vision and I admire her for it. Switzerland could halve its fossil energy needs today – right now! – and the other half would come from renewables. It would be feasible. Switzerland could be so much further forward.

GULF OF MEXICO  
HOW TO CLEAN UP THE MESS – AND WHO'S TO BLAME?  
(Time Magazine, USA)

We are to blame! It's no good always blaming other people. BP does not bear sole responsibility for the catastrophe – we all share the blame. The lads at BP did not deliberately cause the damage. They pump the oil into our society, into our economy, because we need it. That is why it is such an urgent necessity to break away from oil. The next disaster can only be averted by a radical rethink, and by switching to renewables.

Am Sonntag  
glücksquell  
gegen 5 Mi  
Golf von M  
offiziell als  
Was mit den  
vorr geschel  
anlin noch  
gm. Am So  
wurde es offiz  
der Küste Lou  
quelle «Maeon  
Während fast d  
dem Bohrloch f  
in den Golf vor  
eine Naturkata  
nicht gekannten  
Mehrfachbesitz  
schen Erdölkonz  
Jahren finanziell

Drei

Das mit vollem  
Canyon Block 252  
hatte BP vor zwei  
vom amerikanischen  
Das Unternehmen  
Gebiet beteiligt. W  
amerikanische Erd  
darker Petroleum,  
15% gehören MO  
Tochtergesellschaft  
Konglomerats Mits  
sung wurde von der  
Schweiz domiziliert  
Bohrplattform «De  
samt Besatzung gen  
nen und anderen Fachleuten ergänzt.

«Basel III» bewert

Mexiko von besonderer Bedeutung.  
tag legte der Aktienkurs leicht zu.

wert, der sich seit der Explosion um  
über 70 Mrd. \$ verringert hat. Am Mon  
tag legte der Aktienkurs leicht zu.

und vor allem auf Investitionen zielen  
misse. Es sei bisher nicht gelungen, die  
Kreditverträge wieder anzupassen, und  
im Schattenbankensystem herrsche im

vorher reichhaltig genug gewesen, um  
miten in der Blasenbildung einzugehen.  
ten. Und mit Blick auf die Zukunft sieht  
es erst recht als Aufgabe der Zentral-  
banken an, nicht nur Preisstabilität, son-  
dern Finanzstabilität anzustreben.

TIME

Israel: Can it right the ship?  
Elections: Nikki Haley's moment  
Family: Gay pride at Disney World  
Food: Rise of the global chef

How to Clean Up The Mess  
And who's to blame\*  
BY ORYAN MATOK

By stopping to use oil!



Bertrand Piccard

# My Memories

Family Friends



Souvenirs Records

Archive →

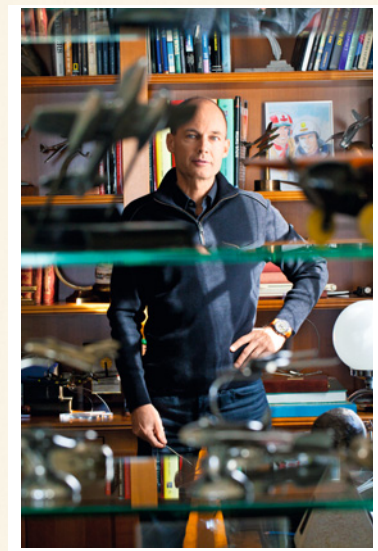
Lausanne,  
December 2010



Here are some of my favourite family keepsakes.



In the frame is a photograph  
of three generations of Piccards:  
my grand-father, my father and me.







My grandfather,  
Auguste Piccard.

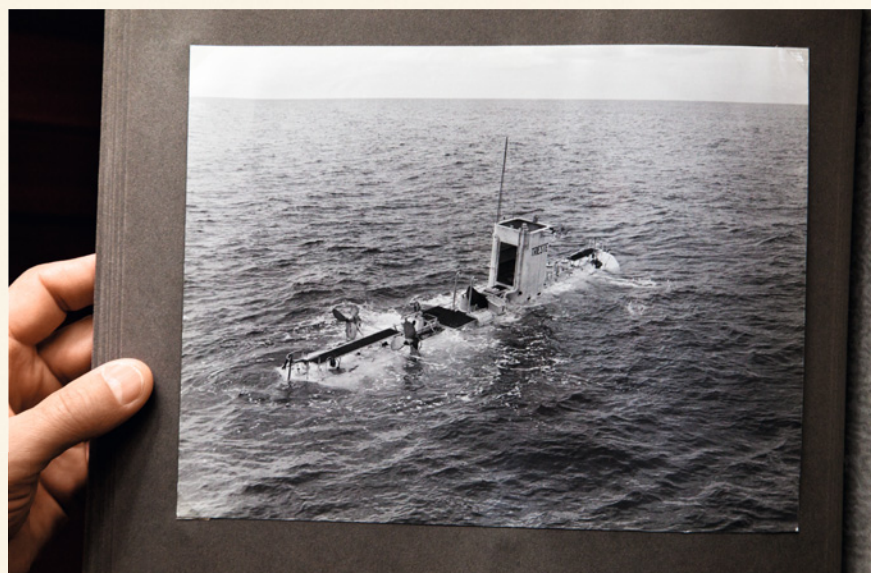
A nurse, who worked  
in the hospital where  
my daughter was  
born, told me, "My father  
is an admirer of your  
grandfather. He has  
even painted his  
portrait in oils."  
This is the oil painting.



Bathyscaphe was my grandfather's name  
for the submarine...



...in which he and my father plumbed  
unexplored depths of the world's oceans.



In 1953 my grandfather made  
his first dive in the Bathyscaphe  
off the island of Ponza.



This is the Mariana Trench, the deepest point  
of the world's oceans, plunging 10,916 metres  
below the surface of the water. My father  
was here on 23 January 1960.



When the submarine surfaced,  
the fishermen were so thrilled  
that they gave him the "saw"  
of a sawfish. I treasure  
the trophy to this day.





Me, standing in front of a picture of Jean Mermoz, a pioneering aviator, whom I revere - a friend of Antoine de Saint-Exupéry. I like his gaze into the future.



This is an incredible story: an American, unknown to me, sent me this "funny piece of metal" which his uncle had found on a glacier in Obergurgl. He guessed it was a wheel from the balloon in which my grandfather made his first stratospheric flight in 1931. He was right! It is the door handle of the pressurized cockpit.



My wife and I went on a trip to Syria to celebrate our 15th wedding anniversary. I came across this teapot there, in the shape of an aeroplane. I just had to buy it.



I found this balloon in a flea market. It is nothing to do with my balloon flight.

One of my collection of Jules Verne first editions.



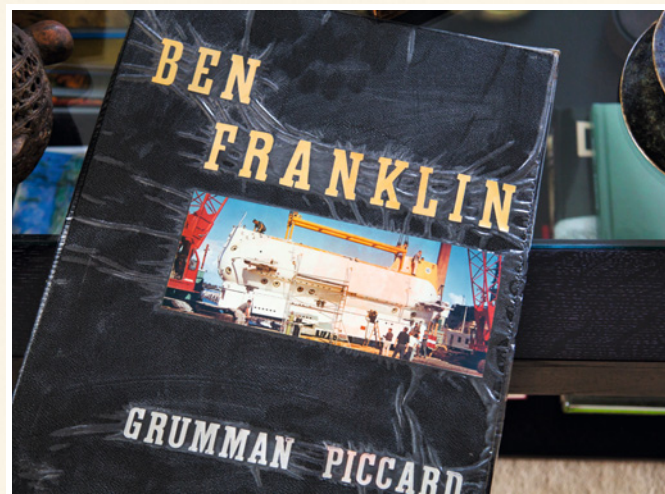
This is the pencil my father used to write his logbook with, when he was diving into the Mariana Trench.



A photo album from the time when I was living in the USA.  
My father was researching the Gulf Stream at the time.



This is how I remember my father -  
radiant after his trip 11,000 metres  
below the ocean waves.



Cape Canaveral - Apollo 11.  
The turning point of my life.



# My family

BERTRAND PICCARD  
Lausanne, December 2010

"By stroke of good fortune, I was born into an exciting, inspiring family. My childhood was full of comings and goings of researchers, adventurers, astronauts and physicists at our house. I remember going to the cinema with my father as a boy. We were watching "Twenty Thousand Leagues under the Sea," the film of the Jules Verne story. I turned my head to look at my father and thought, 'I'm sitting next to Captain Nemo.' For me it was not science fiction, but ordinary fact, to have a father who had explored the furthest depths of the sea. Again, my grandfather had been the first man in the stratosphere, and one of the most famous scientists of his day. So I was not at all startled when Albert Einstein knocked at the door. After all, he had been my grandfather's doctoral supervisor. My eldest daughter, Estelle, once said to me, 'Don't be sad that grandpa is dead. You can see him whenever you want. You only have to look at a Tintin book.' She was right. My grandfather was the inspiration for Hergé's Professor Calculus.

I shall never forget the moment when I watched the Apollo 11 rocket lift off, bound for the moon. I was 11 years old at the time. Wernher von Braun, the inventor of the Apollo rockets and a friend of my family, had invited me there. That is how I was able to observe the start live in Cape Canaveral. There and then I thought: 'These astronauts, who are now setting off for the moon, have a dream, and that dream is greater than the fear of failure. These heroes dare to do the impossible. They are doing something that no human being has done before them. That is true pioneering spirit.' The moment was certainly a turning point in my life. I sensed that I, too, wanted an adventurous life like theirs. I, too, wanted to dare to do something impossible.

My dream was fulfilled many years later, with the success of the Orbiter 3 expedition, the first round-the-world balloon flight with no intermediate landing. I found out how exhilarating it is to do something that no-one has ever done before.

Everything is possible with the necessary dose of curiosity, persistence and respect. I experienced that in my parents' home as a child. Now it is the message I, as a father, am passing on to my own children."



One of the nicest  
periods of my life:



We lived in Florida. My father was happy  
designing new submarines.  
We were invited to six Apollo launches.

Wonderful.

Do you think I look like my grandfather? My grandfather was the  
model for Professor Calculus, the comicstrip figure in Tintin, by Hergé.  
The joke is: my grandfather was 1.96 metres tall. Later Hergé once noted,  
"I had to draw Professor Calculus shorter than Auguste Piccard, otherwise my books  
would have needed a larger format!"







*The great adventure continues.*

*Our goal:*

*to make the first round-the-world flight  
in an aircraft without aviation fuel-  
on solar energy alone.*



# "SWISSCOM AND SOLAR IMPULSE SHARE THE SAME VALUES. THAT IS WHY WE ARE PARTNERS."

Carsten Schloter

SOLAR IMPULSE

SWISSCOM

## Pioneering spirit

"A pioneer may not always succeed, but he is not afraid of failure, either."

"To question limits, to be a pioneer, even at risk of occasional failure."

## Sustainability

"We are proving what renewables can already do. That is our message. A dream becomes reality."

"To think long-term, and not conceive strategies solely for short-term profit."

## Adventure

"It is much more comfortable to believe in what is 'tried and trusted' than to dare to do something new."

"Adventure always means getting into situations over which one's control is limited. This also trains the ability to respond correctly in unpredictable situations."

## CleanTechs

"Clean energy is the way ahead. Only an economy based on clean energy sources can flourish."

"We help our customers to save CO<sub>2</sub> through information and communication technology. Examples are the intelligent control of buildings or traffic, and virtual mobility (videoconferencing)."

## Tradition

"Three generations of the Piccard family have produced researchers and pioneers. Naturally this makes its mark."

"We draw strength from a century and a half of experience in telecommunications."

SOLAR IMPULSE

SWISSCOM

## Innovation

"Many a great technical achievement has begun as a mad idea. At first it was dubbed impossible. Then it became reality. After that, it was taken for granted."

"There is no question of individual geniuses in a company. Instead, what is needed is the right corporate culture."

## Swissness

"We are proud that Solar Impulse is associated with Switzerland. It shows off modern Switzerland to the world."

"We are connected to Switzerland in a way that hardly any other company here can equal. Swisscom is an integral part of Switzerland."

## Team spirit

"Such a project cannot be done alone. It needs a team. It needs partners."

"Ultimately a company's success lies in the vigour of its employees and their willingness to work in a common cause. It may be a truism, but still it is a fundamental factor."

## Research

"Probing, respect, initiative and passion: these are the inspiring values of Solar Impulse."

"To develop further what exists already, and turn it into something new. The driver is unfettered curiosity."

## Quality

"We are looking for partners who have similar visions to our own, and who demand the same performance."

"Quality means making, and keeping, important promises to the customer. No ifs, no buts."



MASTHEAD:

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Tom Hauk (Head of Brand Communication, Swisscom AG)

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