

SWISSQUOTE

FINANCE AND TECHNOLOGY UNPACKED



PORTRAIT
Galenica,
the iron
horse

THE INTERVIEW
JEAN-CHRISTOPHE
ZUFFEREY
CEO of Sensefly

THE MATCH
Richemont
vs
LVMH

ANALYSIS
Should you
be selling your
tech shares?

DOSSIER

ATTACK OF THE DRONES

A new industrial revolution
Swiss start-ups take to the skies
The leisure drone boom

40-PAGE
FEATURE





TO BREAK THE RULES,
YOU MUST FIRST MASTER
THEM.

THE VALLÉE DE JOUX. FOR MILLENNIA A HARSH,
UNYIELDING ENVIRONMENT; AND SINCE 1875 THE
HOME OF AUDEMARS PIGUET, IN THE VILLAGE OF
LE BRASSUS. THE EARLY WATCHMAKERS WERE
SHAPED HERE, IN AWE OF THE FORCE OF NATURE
YET DRIVEN TO MASTER ITS MYSTERIES THROUGH
THE COMPLEX MECHANICS OF THEIR CRAFT. STILL
TODAY THIS PIONEERING SPIRIT INSPIRES US TO
CONSTANTLY CHALLENGE THE CONVENTIONS OF
FINE WATCHMAKING.



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TOURBILLON AND
CHRONOGRAPH
IN PLATINUM

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Le Brassus

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Up, up and away!



Marc Bürki,
CEO of Swissquote

What were we thinking devoting an entire 40-page feature story to drones when most people see these unmanned aerial vehicles as intrusive? In a poll by the University of Neuchâtel, nearly 90% of those surveyed said they consider UAVs to be mobile surveillance cameras. Yet the drone market is booming. And sales are set to soar. A growing number of tech fans and aviation buffs – whose inner child is generally alive and well – are having a go at piloting the machines as a **hobby**, often for the photographic thrill of taking spectacular aerial images.

p. 62

Many governments are starting to realise how important this trend has become, even in city centres. In late May, the City of Paris announced that it was considering opening areas dedicated to flying leisure drones. The city is even organising a drone festival this September. One of the highlights will be a drone **race** on the Champs Elysées.

p. 66

But the entertainment aspect of drones belies their far greater implications. By offering a new approach and perspective, UAVs have begun to transform entire sectors of the

economy. Professional drones are being used to rationalise processes and make many jobs more efficient in such industries as construction, surveillance, infrastructure inspection, agriculture and the media. In the meantime, who knows? They may revolutionise express parcel delivery. Swiss **Post** is currently testing drones to develop potential new services.

p. 58

As it puts dozens of manufacturers and contractors to work, the commercial drone market has every reason to be catching the eye of investors. And as is often the case with robotics and precision measurement, **Swiss** firms stand out in the industry. The Lausanne-based companies Sensefly and Pix4D – founded at the Swiss Federal Institute of Technology in Lausanne and since bought by the French manufacturer Parrot – are world leaders in their respective specialities of mapping and 3D mapping software. Jean-Christophe Zufferey, the CEO of Sensefly, met with us for a key **interview** at the company's headquarters to talk about the latest trends in this exciting industry. And just maybe it could change people's minds about drones.

p. 32

p. 38

Enjoy!



GALENICA

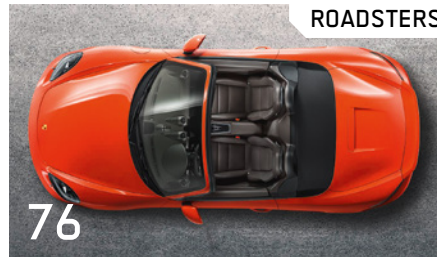


TRENDS



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ROADSTERS



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DOSSIER

ATTACK OF THE DRONES

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FRIPP ISLAND

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SCANS

tourism

HOUSETRIP JOINS THE TRIPADVISOR FAMILY



Steve Kaufer, CEO and co-founder of Tripadvisor.

DR

Housetrip, a Swiss start-up founded in 2010 by the alumni of the Lausanne Hotel School, has been taken over by Tripadvisor for an undisclosed amount. The platform, which is now based in London and allows individuals to rent out their apartment, offers a selection of 300,000 rental properties, essentially in Europe. But it had difficulty competing with Airbnb, which has over 2 million offers on its website and has recorded 129 million reservations since it was created. This takeover is also a boon for Tripadvisor, which already has online reservation platforms such as Numba and Holiday Lettings, and wanted to consolidate its presence in European cities. — TRIP



Tuk-tuk in Dar es Salaam, Tanzania.



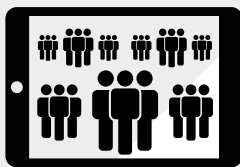
“Apple is lagging behind and losing ground in China.”

Jia Yueting,

founder of Leeco, a streaming platform that is the Chinese equivalent of Netflix.

tech

GOOGLE'S VIRTUAL ASSISTANT



1,660,000

is the number of people that work in the “app economy” in the United States, according to a study published by the Progressive Policy Institute for the year 2015. In 2013 only 750,000 people worked in this sector.

Google recently announced the launch of a new device that could give the smartphone a run for its money. Google Home is a small, white cylinder that you place on a flat surface in your home. You can ask questions to Google's search engine, stream music and manage your daily activities. For instance, you can ask it to make a dinner reservation or send a text message to a friend. The concept is very similar to that of Amazon's Echo, which launched mid-2015. Echo is a virtual assistant that allows you to listen to music, follow the news and weather and check your diary. — GOOGLE



DANIEL HAYDUK / AFP

transport

BOOM OF THE AUTO RICKSHAW
IN AFRICA

They are called “bajaj” in Ethiopia, “toktok” in Egypt, “keke-marwa” in Nigeria, “raksha” in Sudan and “kekeh” in Liberia. The auto rickshaw, which was once restricted to Asian cities, is now taking Africa by storm. Often they replace motorcycle taxis, which are more dangerous. This is a boon for the manufacturers of these three-wheel vehicles, located mainly in India. The country produces 800,000 per year. TVS King, which exports them to 30 African states, and Bajaj Auto are leaders on the market. The former witnessed a 26.8% rise in earnings last year and the latter 7.2%. \swarrow TVSL \swarrow BJAUT

oil
ARAMCO IS GETTING READY FOR ITS IPO

Ras Tanura
(Saudi Arabia),
the world's largest
refinery, operated
by Saudi Aramco

Saudi Arabia has planned to sell 5% of the national oil company, Aramco, as stock on the New York exchange. The company is the main source of income for the country, but also the largest oil and gas company in the world. Created in the 1930s, it was jointly operated by Riyadh and Standard Oil, before being nationalised in 1980. A listing of 5% of the

company on the stock exchange would represent over \$125 billion – a greater market capitalization than the entire French oil company Total – while the total market value of Aramco is estimated at 2,500 billion. The funds raised will be invested in a 2,000 billion sovereign wealth fund, with the aim of diversifying the country's economy.

RANKING

THE FIVE COMPANIES
THAT EMPLOY
THE MOST WORKERS
(in 2015)

1. WALMART
2.1 MILLION
2. MCDONALD'S
1.9 MILLION
3. CHINA NATIONAL PETROLEUM
1.6 MILLION
4. STATE GRID CORPORATION OF CHINA
1.5 MILLION
5. FOXCONN
1.2 MILLION

Source: Forbes

THE FIVE COMPANIES
THAT TREAT THEIR
SHAREHOLDERS BEST

(on the basis of dividends paid over 12 months up until March 16, 2016)

1. EXXON MOBIL
\$12.09 BILLION
2. MICROSOFT
\$10.37 BILLION
3. AT&T
\$10.2 BILLION
4. JOHNSON & JOHNSON
\$8.17 BILLION
5. CHEVRON
\$7.99 BILLION

Source: Investopedia

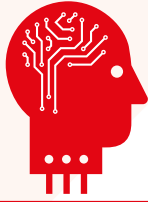
THE FIVE LARGEST SMARTPHONE
MANUFACTURERS

(in units sold in 2015)

1. SAMSUNG
320.2 MILLION
2. APPLE
225.9 MILLION
3. HUAWAI
104.1 MILLION
4. LENOVO
72.7 MILLION
5. XIAOMI
65.6 MILLION

Source: Gartner

SCANS



250

is the number of engineers who will work in the new Google laboratory dedicated to artificial intelligence, which will be inaugurated in Zurich in 2016. They will focus in particular on “machine learning” and the capacity for computers to learn on their own.

Head office of the information website BuzzFeed in New York City.



BRENDAN MCDERMID / REUTERS

media

CONTENT FOR MILLENNIALS

Verizon and Hearst Corporation have sealed a partnership deal to develop TV channels for Millennials designed for streaming on smartphones. The first two are Ratedred, for young conservatives in the Republican centre of the United States, and Seriously TV, with comedy content.

This is not Hearst’s first attempt to target this audience: the publisher has already invested in BuzzFeed, Vice and Awesome-nessTV. Others have also tried, like Disney and Univision, which created the Fusion channel, and Time, which launched Motto, a site for young women. —vz

automobile

THE PEOPLE’S ELECTRIC CAR

Tesla wants to reach a broader customer base with its electric cars. In early April, the Californian brand put its Model 3 on the market with a sticker price of \$35,000. It immediately received 400,000 orders, a record for the manufacturer. But Tesla doesn’t plan on stopping there. It plans on launching the Model 4, which is even cheaper. The vehicle, which is more like a compact than a sedan, will be out in 2018. But Tesla is not the only company that wants to sell more electric cars: the Nissan Leaf (€30,000) and Renault’s Zoe (€15,000) are also competing in the same sector.

—vz TSLA



SHU CHIU / REUTERS



\$161 billion

corresponds to the amount invested last year in solar energy worldwide, or more than all funds combined injected in the gas and coal industry. China and India are emerging as leaders in the field.

finance
**HARD TIMES
 FOR INVESTMENT BANKS**

Faced with increasingly strict capital requirements and market volatility, especially the commodities market, most investment banks have announced very bad results for the first quarter of 2016. Goldman Sachs has been hit the hardest with a 60% drop in net earnings year on year, which reached \$1.1 billion. Barclays, faring little better saw profits decline 33%, Deutsche Bank announced a 58% dip in revenue and Citibank indicated a decrease of 27%.

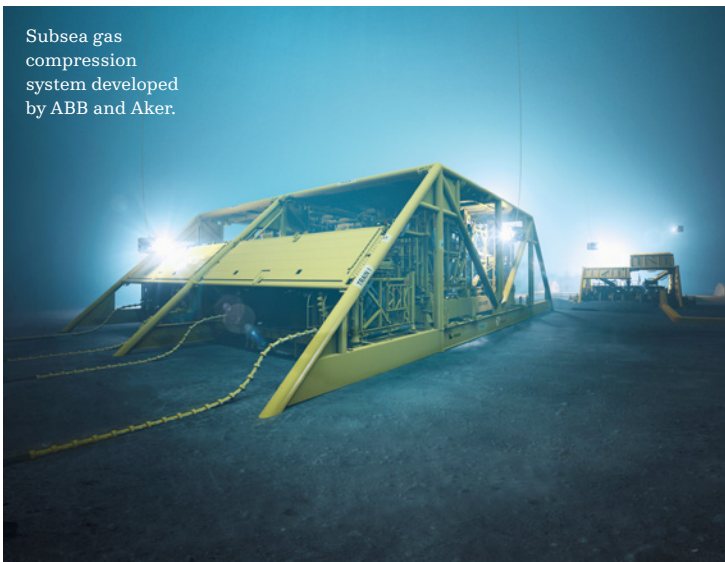


“It’s a
 marathon,
 not a
 sprint.”

Harald Krüger,
 CEO of BMW,
 regarding the market
 for electric cars.

energy
ABB'S NORDIC ALLIANCE

Subsea gas
 compression
 system developed
 by ABB and Aker.



After getting off to a rough start this year, ABB might actually turn around. In addition to clinching the huge 265 million Swiss franc contract to deliver transformers in China, and acquiring SVIA, a Swedish manufacturer of robot automation cells for machine tending, the Swiss-Swedish group has also formed an alliance with

the Norwegian giant Aker Solutions. The two firms are joining forces to develop subsea power and automation solutions that streamline oil and gas production. Building on ABB and Aker's strong positioning on the oil and gas markets, this partnership is expected to attract opportunities worldwide. — ABBN — AKSO

KICKSTARTER



BACKBONE

BACKBONE

The connected harness
 for better posture

Nearly 80% of adults occasionally suffer from back pain. Very often pain is caused by poor posture. This incited Khoa Phan, a young engineer from San Francisco, to design Backbone, a black harness that is worn on the upper back, and launch a Kickstarter campaign to fund its creation. The device encourages users to adapt their posture by straightening their backbone and shoulders.

But that's not all: the device is connected by bluetooth to an app that can check if the user's position is appropriate and transmit data to a smartphone. When the user slouches the harness gently vibrates. When the user spends too much time sitting or without moving, the app warns him it is time to take a break and stretch his legs.

FUNDS RAISED
 \$467,833


AVAILABLE
 IN OCTOBER 2016

SCANS

internet

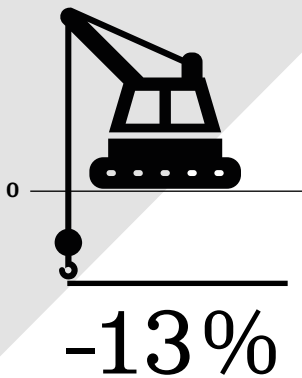
NINTENDO AVATARS
FAIL TO IMPRESS

Nintendo is going through a rough patch. Not only is the Japanese group clearly losing ground in home consoles to Sony and Microsoft, its handheld consoles are struggling against an endless barrage of smartphone games.

But Nintendo did generate a buzz this spring with the launch of its first app, MiiTomo, which quickly cruised past the 10 million-user mark. A hybrid between gaming and social networking, MiiTomo enables you to make a personalised avatar, called a mii, which you can use to chat with friends or play games. Unfortunately, users were quick to forget the app, leaving it in the dust just weeks after its wildly successful debut. The stats are unforgiving: nearly 50% of users stop using MiiTomo just one week after installation.  7974



DR




is the decline in the number of construction site machines sold by Caterpillar in Q1 2016. This poor result illustrates the slump in the construction sector worldwide and the fracking crisis in the United States.

FLOP

Sanofi scraps its insulin inhaler

French pharmaceutical company Sanofi has decided to stop selling Afrezza, a new form of insulin that is inhaled rather than injected. Designed for diabetics, the product generated only \$5 million during the first nine months after its launch in early 2015. Doctors still aren't convinced that it's effective. US health authorities have also expressed doubt about the product's effectiveness for people with

asthma and chronic lung disease, and recommend that smokers avoid using it. Afrezza was developed in California by Mannkind Group, at a cost of \$1.8 billion. The product was approved in the US in June 2014. Sanofi paid \$925 million for the right to distribute it. This isn't the first time an insulin inhaler has flopped: a similar product launched by Pfizer in 2007 called "Exubera" also failed.  SAN



€ 23.3 billion

is the sum four major German nuclear groups (RWE, EnBW, E.ON and Vattenfall) will have to pay into a fund, according to a commission preparing Germany's exit from nuclear power. The funds will be used to deal with radioactive waste.

banking
UBS AGAINST CANCER

UBS has created a new venture capital fund endowed with \$471 million. Its aim is to finance the development of promising molecules in the treatment of cancer and to speed up their launch on the market. The UBS Oncology Impact Fund has teamed up with a Boston firm, MPM Capital, to identify the most innovative start-ups in the field. UBS aims for 10 to 20 investments over the next five years, for an initial sum of \$10 million. It hopes to generate annual returns of around 10%. Oncological treatments represent the greatest opportunities thanks to recent breakthroughs in genetics. — UBSN



“Investors would be better served by a more scrupulous and thoughtful approach.”

Howard Schultz,
CEO of Starbucks,
on Deutsche Bank's
decision to downgrade
the group's shares.

“Focus on your objectives and you will succeed.”

Anthony Martial,
Striker



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“If the market won’t allow us to make a profit, then we will withdraw from the mobile phone segment.”

John Chen,

CEO of BlackBerry, on announcing the launch of two new mid-range smartphones, a last ditch effort for the Canadian company.



\$8.1 billion

is the combined value of second-hand private jets currently on sale. This represented only \$5.2 billion in 2014. An anti-corruption campaign initiated by Beijing has encouraged many Chinese billionaires to part with their planes.

luxury

DE BEERS IS RECYCLING DIAMONDS

De Beers, the largest supplier of diamonds worldwide, is moving into second-hand gemstones. The South African group, which belongs to Anglo-American PLC, has created a branch in New York, the International Institute of Diamond Valuation, which buys up used diamonds

through a network of affiliated jewellers across the United States. Individuals can also send precious stones directly. The institute examines the stones in its 600 square foot laboratory and determines their price. The market for second-hand diamonds is worth \$1 billion. — AAL



LEON NEAL / AFP

IPO

THE BURMESE STOCK EXCHANGE WELCOMES ITS FIRST CUSTOMER

Burma is one of the most hermetic countries in the world. But since 2011 it has hesitantly started to open to outsiders. This has led to the inauguration, at the end of March, of a stock exchange in Rangoon, the country’s former capital. The first listed company is First Myanmar Investment, a conglomerate active in real estate, financial services and health care. Shares quickly rose by 19% to reach 31,000

kyats (25.4 Swiss francs). A second company, Myanmar Thilawa SEZ Holdings, followed suit in May. It operates in a special economic zone in the southeast, with Mitsubishi, Marubeni and Sumitomo. In all, the Burmese exchange should include a dozen companies by the end of the year. At the end of April the volume of trading for the platform reached 30 billion kyats (24.6 million Swiss francs). — 00001

WORLD'S
FIRST

THE HYDRO
MECHANICAL
HOROLOGISTS

HYT

H2 | ICEBERG WHITE GOLD

HYT is the first timepiece ever to combine mechanical and liquid engineering. H2, unique Swiss technology and movement made in cooperation with Audemars Piguet Renaud & Papi - manual winding and 8-day power-reserve - driving a unique high-tech fluidic technology. HYT - a new dawn in watchmaking.

GEnEvA: **Montres Prestige** | LAuSAnn E: **Ouranos** | vERBiER: **Michaud** |
Luz ERn : **Les Ambassadeurs** | in TERLAKEn : **Kirchhofer** |
ST MORITz : **Embassy - La Serlas** | zuRICH: **Les Ambassadeurs** |

HYTWATCHES.COM

TRENDS



the figure

HOLGER CORDES

ASCOM

Holger Cordes at Ascom's bedside

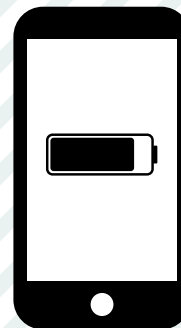
Position
CEO of Ascom

Nationality
German

Age
47

In June, Holger Cordes stepped in take over the leadership of the Zug-based telecommunications firm Ascom. He has replaced Fritz Mumenthaler, who had been CEO since 2011. Before joining Ascom, this 47-year-old German native was chief operating officer for Europe and Latin America at Cerner Group, a U.S. firm that provides IT solutions for the health care industry.


With a Master's degree in economics from the University of Poitiers, Holger Cordes was chosen as new CEO of the group for his expertise in information and communications technology (ICT) in health care. This strategic move is in line with the company's plans to refocus its businesses on the ICT industry. Ascom's primary target groups are hospitals and clinics. And the firm is already developing a range of high-tech tools, including the Myco smartphone designed for nurses. The global ICT market specialised in health care, or eHealth, is growing fast, at an average annual rate estimated at 13.4%. A report by Marketsandmarkets predicts that the eHealth industry could be worth as much as \$228.7 billion by 2020. The appointment of Holger Cordes comes after a challenging year for Ascom, which saw its revenue drop to 411 million Swiss francs in 2015, a decrease of 6.1% over one year.  ASCN



the innovation

FUEL CELLS

The smartphone with energy to burn

The British company Intelligent Energy has developed a fuel cell that can be used in mobile phones. It is more powerful than nickel-based batteries that are currently used in smartphones and can function for more than a week without being recharged. Intelligent Energy has already struck a partnership deal with a mobile phone manufacturer, whose name has not yet been disclosed, to develop a smartphone with both a fuel cell and traditional battery. The former will serve as a backup power source when the latter is dead. Because of the high price of materials that go into a fuel cell and the need to recharge it periodically with hydrogen, it cannot be used as the sole power source. Intelligent Energy already sells an external charger for mobile phones equipped with a fuel cell. It has also conducted tests to develop a taxi and a plane that run on this technology.  IEH

Company
Intelligent
Energy

Launch date
not available

Estimated cost
7.3 million
Swiss francs

Gyeongbokgung
Palace in Seoul.



BAILEY CHENG

the country

SOUTH KOREA

Per capita GDP
\$36,700

Growth
(2015)
2.6%

Main economic
sectors
electronics,
cars, ships,
trains,
construction

A nosedive in exports

South Korea is ailing. Exports, which represent 50% of GDP, have dropped again in April for the sixteenth month in a row. They fell by 13.3% over the first four months of 2016. The country suffers from strong exposure to the Chinese market, which is slowing down; from a strong won compared to the yen - which gives its Japanese competitors an edge; and falling oil prices, which has a negative impact on its vast petrochemical industry. The giant steel company POSCO,

Hyundai automobiles, and the naval division of Daewoo are all affected. The latter lost more than 5 billion won (4.2 billion Swiss francs) in 2015, the worst results in the history of the company. The only glimmer of hope is in the entertainment industry, which is surfing on the popularity of Korean films and TV series in China and the rest of Asia. CJ&M, a subsidiary of CJ Corp, has become one of the leading exporters of media content in the country.


THE MATCH

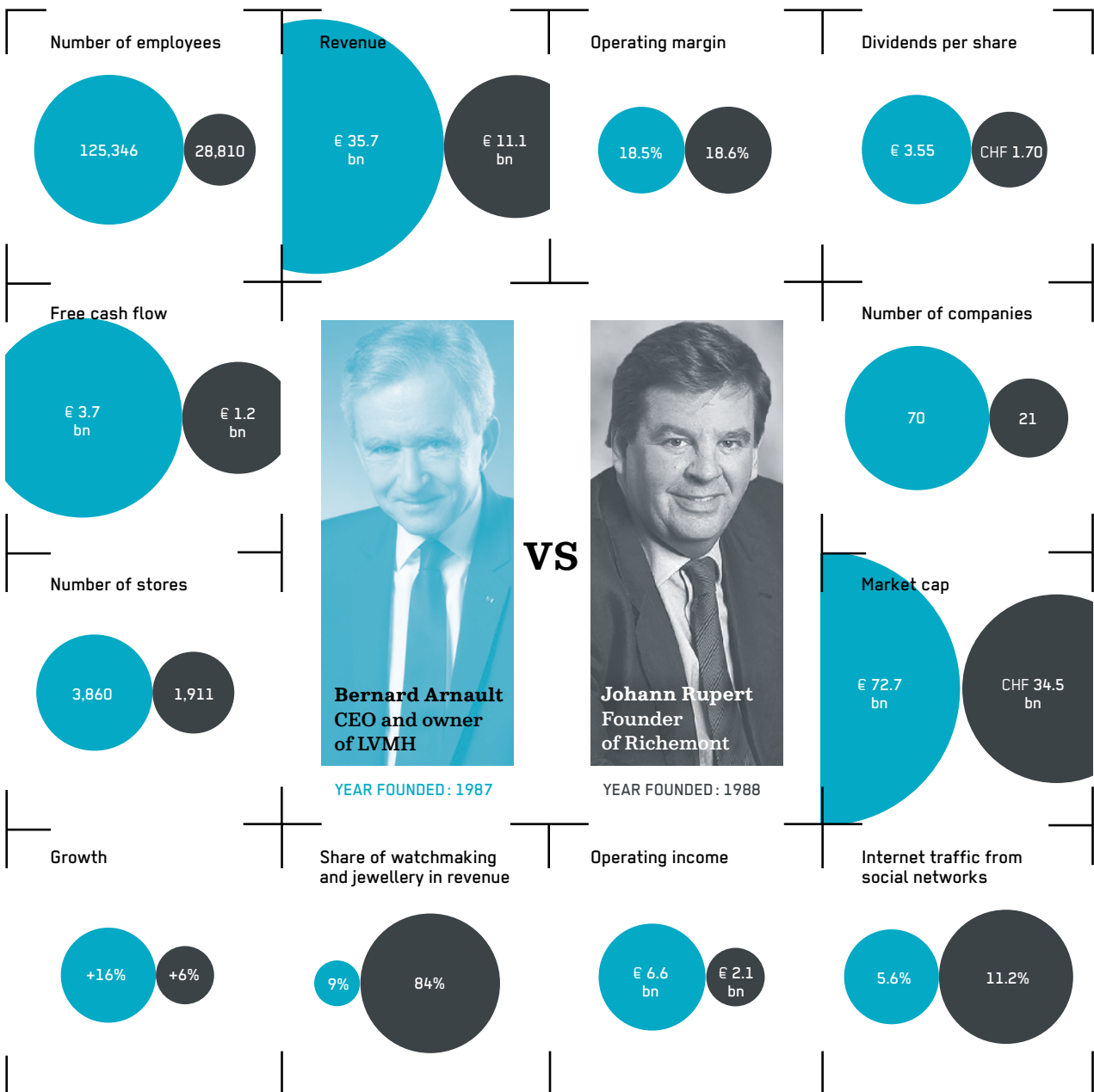
LVMH VS RICHEMONT

BY BENJAMIN KELLER

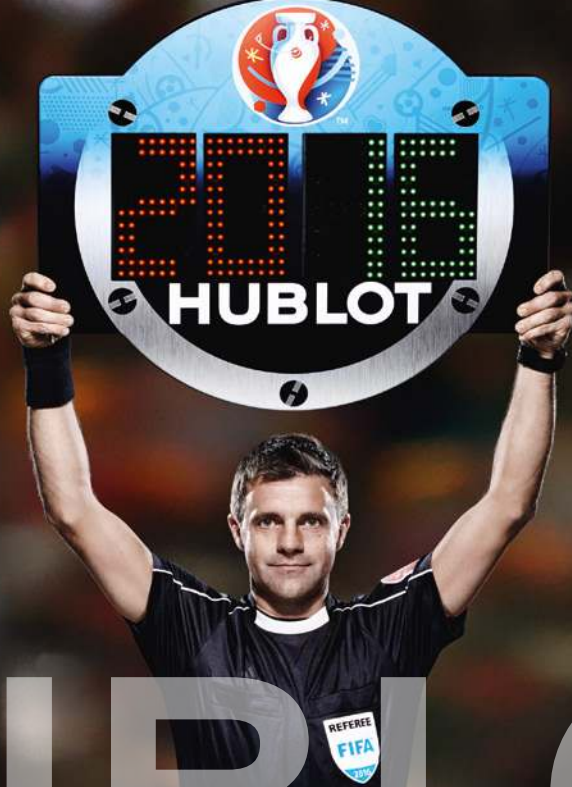
LVMH is laughing, Richemont is crying. The French group and world leader in luxury – its brands include Louis Vuitton, Moët & Chandon, Guerlain and Zenith – seems less troubled than its Swiss counterpart (owner of Cartier, Piaget, Montblanc and Van Cleef & Arpels) by the headwinds blowing from China and the Middle East in particular, where its

demand has slowed down. While LVMH delivered impressive results for 2015, Richemont's performance came in below expectations with annual growth down by 1% at constant exchange rates, followed by a 15% plunge in sales in April. Only sales in continental China continue to experience strong growth. Unsurprisingly, the Richemont share

spiralled downwards on the Swiss stock exchange after publication of the group's results on 20 May. The Geneva group has suffered in particular from weak demand in the watch market, to which it is highly exposed, and a strong Swiss franc. The group's directors do not expect the situation to improve in the short term.  



Sources: annual reports, Similarweb



HUBLOT

T H E A R T O F F U S I O N



Big Bang Unico Retrograde UEFA Euro 2016™.
Official UEFA Euro 2016™ Watch. Manufactured
UNICO chronograph dedicated to football with
an innovative display. Case and bezel in scratch-
resistant ceramic. Limited edition of 100 pieces.



HUBLOT

BOUTIQUES

GENEVE • GSTAAD • LUZERN
ZURICH • ZERMATT

hublot.com • f • t • i

Distribution centre
of the wholesaler
Galexis, owned
by Galenica, in
Niederbipp in the
canton of Bern.



A1

A2

NUMBERS

1927

Galenica was founded as a pharmaceutical wholesaler.

7,804

The number of employees worldwide.

3.79

Billion Swiss francs of revenue generated in 2015, up 11% from the previous year.

+4,000%

Overall share increase from 1995 to 2015, holding the record in Switzerland.

36%

Global market share in iron-based products, estimated at 2.45 billion Swiss francs in 2015.

491

The number of directly operated and partner pharmacies in Switzerland, making it the country's largest network.

Galenica, the iron horse

The Bern-based pharmaceutical company has seen phenomenal growth over the past 20 years, boasting the highest surge on the Swiss stock exchange last year. But the group that owns Sun Store and Amavita is about to split into two.

BY BENJAMIN KELLER

Galenica doesn't like the spotlight. The pharmaceutical group is known for being discreet and generally avoids contact with the media. But these days, the company can't remain in the shadows with such spectacular growth. In the past few years, Galenica has become a real powerhouse on the Swiss stock exchange. The owner of Sun Store and Amavita pharmacies was recently in the news after announcing that it would separate into two companies. This move puts an end to its unusual business model which combines pharmaceuticals and retail.

"As we're not a typical pharmaceutical firm or a mere logistics company, we've managed to stay below the radar, says its executive chairman, Etienne Jornod, 63. But Galenica is actually the second-largest listed company between Lausanne and Aarau, behind Swatch." The Neuchâtel native has spent his entire career at Galenica and was appointed to ▶

lead the group in 1995. Since then its performance has shot up. At breakneck speed.

In 20 years, the enterprise value has soared from 250 million Swiss francs to more than 10 billion Swiss francs. Its share has outperformed all others on the Swiss stock exchange, averaging annual growth at an eye-popping 23%. And its biggest year yet was in 2015. Revenue and profits increased for the twentieth consecutive time last year.



“We are the second-largest listed company between Lausanne and Aarau, behind Swatch.”

Etienne Jornod, executive chairman of Galenica

When Etienne Jornod stepped in at the helm, Galenica was still a wholesaler managed by pharmacists like a cooperative. Its outlook was dull. “Margins were eroding, competition was encroaching, and the global market was overrun with other wholesalers,” says the graduate of the business school HEC Lausanne. He went on to completely transform the company. His diversification and internationalisation plan was built on two strategic moves, turning Galenica into a retailer while investing massively in pharmaceuticals, particularly in the market for iron-based medicines.

And that strategy has paid off. The group now owns the largest chain of pharmacies in Switzerland and is the world leader in iron-based

drugs. The sector is worth 2.45 billion Swiss francs and grew 14% between 2011 and 2015 worldwide. Galenica holds 36% of that market. Its number one product, Ferinject/Injectafer, is registered in 70 countries. That drug alone generated 250.9 million Swiss francs in revenue in 2015. That’s a 33.2% increase from the previous year, mainly due to its expansion in the United States.

“Galenica’s remarkable performance is primarily a result of its ‘unique’ position in iron-based products,” says Sibylle Bischofberger, an analyst at the Zurich Cantonal Bank. “It’s a lucrative market that the Bern-based company clearly dominates. Half of the population suffers from an iron deficiency at least once in their life,” she says. “And Galenica is practically on

its own in this niche not deemed attractive enough by major pharmaceutical groups.”

SPLIT SET FOR 2017

Galenica is on the verge of another metamorphosis. The group will be divided into two distinct companies. Each will be listed separately on the stock market. Vifor Pharma will focus on developing, manufacturing and selling pharmaceutical products, specialising in iron deficiency treatments and infectious diseases. Galenica Santé will cover the pharmacies, wholesale businesses (supplier for pharmacies and hospitals) and services (pharmaceutical software and databases). The split will be finalized by the end of 2017 at the latest.

Galenica announced its plans in the summer of 2014, saying it wanted to

ANALYST OPINION

“BOTH COMPANIES WILL COME OUT ON TOP”

Is Galenica unstoppable? The group posted its twentieth consecutive increase in net profits (370 million Swiss francs, up 18.6%) and revenue (3.79 billion Swiss francs, up 11%) in 2015. How will the split impact its business? “Both companies will come out on top,” says Stefan Fuhrer, portfolio manager at the Bern Cantonal Bank (BCBE). “However, current trends are more favourable for Vifor Pharma than for Galenica Santé, which posts lower margins and growth.”

The financial expert confirms that the split was inevitable. “Galenica is a retailer, and the pharma business has grown fast over the past ten years. That’s what has driven the share performance. Vifor Pharma had to separate from the health division to become a big player in the pharma industry. Investors like ‘clean’ businesses. The segments had become too different

from each other.” Stefan Fuhrer is full of praise for Etienne Jornod, Galenica’s chief for the past 20 years, who announced his intention to leave the group as it was being split, before re-considering his decision (he will remain the Executive Chairman of Vifor Pharma’s Board): “He is not alone,” Fuhrer says. “But it’s true that he can really shine on stage. His presentations have always been amazing. At the end, everyone is interested in the share! In addition to being a great leader, he has a head for marketing.”

Like most analysts, Stefan Fuhrer believes that the Galenica share is slightly over-valued and recommends waiting for further information about the split. The group has already announced that shareholders are expected to receive one share in each of the two new companies and will soon provide more details about the separation.



An employee at the Geneva site of Vifor Pharma, a division of Galenica.

and Sprint Investments has it now, he says. But Sprint is on its way out. “We can no longer maintain the same strategy.”

“It may sound absurd, but analysts don’t know how to classify us.”

Etienne Jornod, executive chairman of Galenica

Galenica’s chairman, as well chairman of the Management Board of the Newspaper NZZ, “regrets” that the company has to split up. He is convinced that the current model is still the best “for the shareholders, employees, customers and patients”.

Etienne Jornod, who joined Galenica in 1975, will head the board of Vifor Pharma after the split, although he had hoped to leave the company at the time of partition. “If Galenica was a family-owned business, it wouldn’t have to break up into two entities,” Jornod says. Couldn’t they just find another majority shareholder? “Not a lot of shareholders are willing to buy 25% of the shares, i.e. invest at least 2.5 billion Swiss francs, and then have to abide by the decisions of the Board of Directors.” ▲ ~ GALN

“maximise the potential” of its pharma business and “step up its independent development.” That means answering to market requirements (see inset). “The problem is that Galenica doesn’t fall into any category,” Jornod

says. “It may sound absurd, but analysts, who represent investors and therefore the market, don’t know how to classify us.” We used to be able to “hold the group up” with one majority shareholder. Alliance Boots played that role for 17 years,

HOUSEHOLD NAMES

In addition to its widely known pharmacy chains Amavita and Sun Store, Galenica owns a number of brands that are familiar throughout Switzerland. These include the mosquito repellent Anti-Brumm, which has recently celebrated its 50th anniversary, Algifor anti-inflammatory drugs, the painkiller Perskindol and the cold treatment medicine Triofan. All of these products come under the Galenica Santé division.





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ANALYSIS

THE POINT OF VIEW OF SPECIALISTS

INVESTOR INTERVIEW

“The life expectancy of tech firms is getting shorter”

Netflix, Google and Apple are today's big champions of the tech industry. But how long will they survive? American analyst Rob Enderle shares his views.

BY CLÉMENT BÜRGE

Yahoo, BlackBerry and Nokia dominated the tech industry for years. But now, Yahoo is being picked apart and sold off piece by piece. BlackBerry's revenue is one-tenth what it was in 2011. And Nokia's mobile division, which held a 50% share of the mobile phone market in 2007, was sold to Microsoft. Even Twitter and Apple currently seem to be losing steam.

The tech industry is more volatile than others. That is primarily due to the intense competition and the need for constant innovation. This instability can put off some investors. Why invest in this sector if a company's life expectancy could turn out to be just a few years? And how can we tell which companies are going to sink? The high-profile American analyst Rob Enderle met with us to answer our questions.

Why do tech firms only shine for just a few years?

What happens very often when a company rises to the peak of its industry is that it starts ignoring the changes taking place outside its area of expertise. They rest on their laurels, to the point that when a new product comes and disrupts their market, their earnings slide. On top of that, tech companies often owe their success to the personality and genius of their founders. And those people tend to leave the company about ten years after it's listed on the stock exchange. Once they're gone, the company is taken over by a team of professional managers. They don't understand their product.

That's when poor performances start building up. That's exactly what's happening with Apple right now. The company has never done well without Steve Jobs. Everyone knew that performance would flag when Tim Cook took over. It was just a question of time.

What are these new management teams doing wrong?

The new managers have trouble understanding what makes a company unique. These managers focus way too much on the company's quarterly earnings, while founders work on long-term success. As a result, R&D investment is reduced, and the new products are less impressive than the old ones.

The media also seem to provide exhaustive coverage of the tech industry. Does that have an impact on a share price?

Definitely. The media have talked so much about Facebook, Apple and Netflix that it has artificially increased investors' expectations, and therefore their share price. Let's take Apple. People expect the company to come out with a revolutionary product several times a year. That's unrealistic! It's an outstanding company, but it's actually in many ways like Sony or Samsung. As for Yahoo, the media have inflated the share price by talking about Marissa Mayer as some sort of messiah. But it was a lost cause. She couldn't save the company.

So you are not too optimistic about the future of the sector as a whole?

Indeed, especially in view of the increasingly strict rules on encryption and private property being put in place by European and American regulators. And the tense relations between China and the United States have led to greater protectionism. What does that mean? Google can't work in China, and Huawei is running into problems for setting up in the United States. That will have a negative impact on tech firms. Their life expectancy is getting shorter.

What should we do if we want to invest in tech?

Tech companies are so popular that people sometimes forget a key point. You have to really understand the industry you're investing in. You have to analyse a company and understand its strengths and weaknesses. The less investors understand the technology used by the company, the greater the chances they'll lose their money.

How can we spot a company that's going to sink?

There are many warning signs that point to a company likely to decline in the near future. You have to look at whether the company is prepared to face challenges and how it approaches new projects. Has it invested enough money in launching a new product? Has it hired enough people to develop it? Has it done everything it can to attract new customers?

“The management of Google acts like 4-year-olds who've eaten too much sugar.”

For example, Google hasn't invested enough time or money in its social network Google+. As a result, it hasn't achieved the success initially hoped for. The same thing happened to Microsoft, which lacked the involvement it needed in developing its MP3 player, Zune. It was supposed to compete with the iPod, but migrating your music from the Apple device to the Zune turned out to be far too complex. And IBM did not put enough funding into research on new computers. In the end, that division was bought by Lenovo in 2005. Apple doesn't currently appear to be putting enough effort into Apple Pay. The platform has had some security issues, and that can shake customers' confidence.

Which tech company do you think is currently over-valued?

People talk about Google too much. The management team lacks rigour. It's having difficulty maximising the revenue generated from online ads, while its various “moonshot” projects [Google Glass, the Calico life extension project or Loon balloons developed to bring Internet access to remote areas] are not realistic. Its management acts like 4-year-olds who've eaten too much sugar.

And social media? All hype or safe investment?

I wouldn't put my retirement savings in the sector. Social media companies are popular investments but can only work in the short-term. You have to be careful and ready to sell your shares quickly in case of a problem. That said, Facebook has impressed me. The firm started out struggling to monetise its platform, but their online ads now bring in a lot of money. However, Twitter is another story. The company is in a terrible position.

Which companies do you think are currently under-valued?

Intel seems to be in a good position to excel in the automotive industry. First, because they make a range of electronic components built into driverless cars. And second, because they formed a partnership with Witricity, which manufactures wireless power devices. That technology could transform the electric car industry.

What is your biggest bet?

Blackberry. These days, governments have a problem. No smartphone on the market guarantees users absolute privacy. And Blackberry is investing massively in new products to do that. As the group is based in Canada, it isn't subjected to surveillance by the U.S. National Security Agency. Once it has completed its transition and developed a line of safe smartphones, the Blackberry share will take off. ▲



Rob Enderle
Chairman of Enderle Group
San Jose, California

THE QUESTION

“Should you be selling your gold for silver?”

Silver prices jumped nearly 30% in the first quarter of 2016. The metal dubbed “poor man’s gold” is inexpensive while promising upside potential. But silver prices are more volatile. Experts tell us what they think.

BY MARIE MAURISSE



EMMANUEL FERRY
Chief Investment Officer
at P&B Bertrand Sturdza



JAMES STEEL
Precious Metals
Analyst at HSBC



MARC FABER
Investment analyst
and entrepreneur

This expert working at the Geneva bank says that silver is now more profitable than gold, and the trend is expected to last several months.

“After many years of decline, gold is currently regaining its appeal due to the slide in the dollar, the lack of efficiency and credibility at central banks and widespread negative interest rates. These negative rates have driven investors to flock to gold, which has always been a safe investment. The decline in silver has been stronger in the past few years but it’s now catching up with gold. Historically, silver has been able to outperform gold by 60% to 300% during a phase of about two to three years. This trend is expected to continue in the months to come, presenting some attractive opportunities.”

This expert based in the United States feels that silver is too volatile for small investors to put all their money on it.

“I don’t see why people should have to choose between silver and gold. Both metals feature very different characteristics. Silver – unlike gold, which is mainly used as an investment – is first and foremost tied to industry, which accounts for half of annual demand. Its main consumers are electronics companies. Silver is significantly cheaper than gold in U.S. dollars, but that makes it more volatile. In both bull and bear markets, silver outstrips gold in terms of positive – and negative – performance. Silver hit \$50 an ounce a few years ago but plummeted shortly afterwards. If gold gets too expensive, small investors can opt for silver coins or bars. But large traditional investors have always gone for gold.”

The famous Swiss investor thinks precious metals should account for 25% of investor portfolios.

“Some people think that silver will overtake gold. Not me, because silver has a higher risk of falling. Of course, everything depends on the person, if they have a family, property, etc. But I think that every investor should put 25% of their portfolio into precious metals. Transaction costs are low, because they can be bought and sold like currencies, unlike other investments such as property assets. Silver is less expensive than gold and has more reliable consumers. Most demand comes from manufacturers, just like platinum. Silver could have more upside potential than gold mines, but I wouldn’t advise selling all your gold in exchange for silver.”



#UnitedandMe



Foundation



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The Elios model of the Swiss firm Flyability, with its anti-collision cage.



Feature by
Clément Bürge,
Ludovic Chappex,
Benjamin Keller,
Jean-Christophe Piot,
Julie Zaugg

DOSSIER

ATTACK OF THE DRONES

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Sky-high industrial revolution

Civil drones are taking flight, and the market for professional use in particular is growing fast. Time for investors to take a closer look.

BY LUDOVIC CHAPPEX

A whole new territory is opening up to private investors. With the simultaneous boom in leisure and professional drones, dozens of listed and soon-to-be-listed companies have come under the spotlight.

Yet, investigating further, one might be surprised to see how little consensus there is on the size of this market. The California research firm Drone Analyst reviewed 31 studies on current and future sales in the industry and found highly inconsistent forecasts. Predictions ranged from \$2 billion to \$96 billion, depending whether they covered business generated by subcontractors, software developers and service companies. Variance was also based on factors such as machine size, weight and minimum price. For example, the data can be completely skewed by taking into consideration the segment of military drones, which often resemble pilotless aircraft more than flying cameras.

So that's the first observation. Moving beyond that, all the studies share one important point. Profes-

sional drones are expected to show the strongest growth over the next few years (see infographic opposite). Most experts agree that this market will eventually outstrip the leisure drone market, which is currently the most visible with China's DJI and France's Parrot leading the segment.

The added value will gradually shift away from the manufacturing of the machines towards the software developed to interpret the data collected by drones

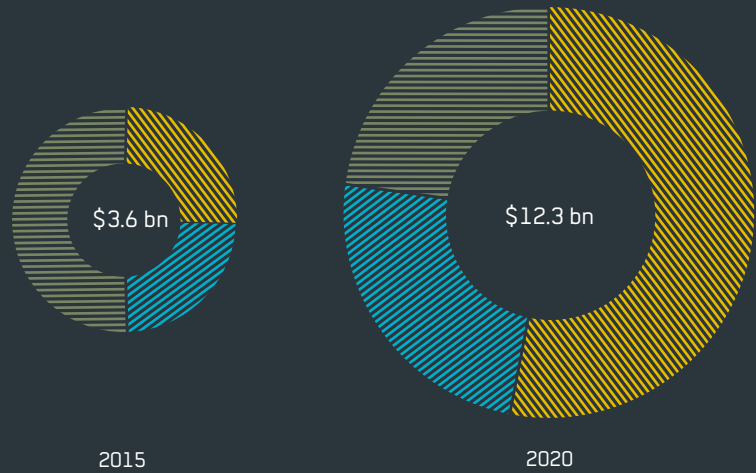
Commercial drones are considerably cheaper than planes and much easier to deploy. These unmanned aerial vehicles are increasingly being used for mapping and all sorts of jobs that are either dangerous or complex for humans to perform, such as inspecting bridges, dams, antennas, nuclear power plants,

etc. And their utility doesn't stop there. Using thermal or multispectral imaging, the potential professional applications of UAVs increase exponentially. These built-in systems can capture and measure parameters that are invisible with a standard camera. With multispectral imaging, drones can determine the chlorophyll content in a plant and quantify its level of water stress. Thermal imaging makes it easy to get an accurate human or animal count. Thermal cameras have also become the instrument of choice for inspecting building insulation or detecting defects in electricity pylons.

The wide range of ways drones can be used provides valuable insight into the future development of the market. And software developers are expected to follow that direction. Many experts believe that the added value will gradually shift away from the manufacturing of the machines towards the software developed to interpret the data collected by drones. This is excellent news for Swiss firms, as a number of them have already started to position themselves in the sector. ▲

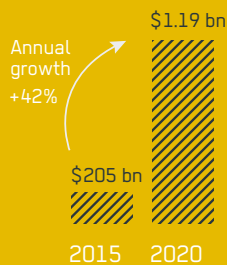
COMMERCIAL DRONES TAKE OFF

GLOBAL MARKET FOR UAVS WEIGHING LESS THAN 11 KG
(INCLUDING COMPONENT MANUFACTURERS AND SERVICE AND APPLICATION PROVIDERS)

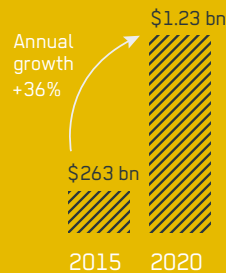
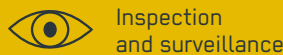


Source: ABI Research

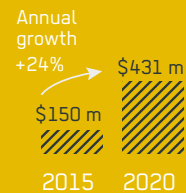
THREE FAST-GROWING INDUSTRIES



Drones with a built-in multispectral camera can fly over a field to measure chlorophyll content in plants, allowing farmers to better plan how much fertiliser and water to use, and where.



Drones are used to inspect infrastructure such as bridges, dams, nuclear power plants, electrical antennas, etc. They can detect problems and flaws invisible to the naked eye.



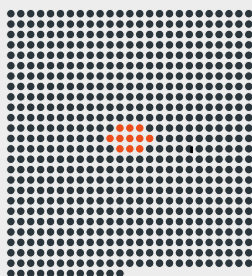
Drones offer numerous advantages over surveyors and planes in all precision measurements. In the construction of buildings, bridges, roads, etc., they dramatically reduce costs and save time.

Source: ABI Research

AN ACTIVE INDUSTRY

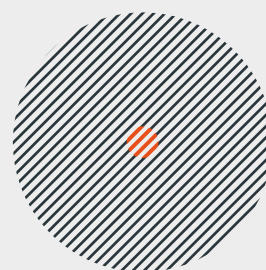
Number of drone manufacturers

World: 637
Switzerland: 11



Number of drone models

World: 2,115
Switzerland: 31



Swiss drones on cloud nine

The country is leading the way in cutting-edge civilian craft, thanks in particular to its researchers. Here are the most promising firms.

BY BENJAMIN KELLER

As usual, by striving for excellence and adding value, Swiss industries have managed to grab a significant share of the drone market. While the segment for consumer versions is dominated by Chinese groups like DJI and the French firm Parrot, Switzerland stands apart in the manufacturing of highly demanding and complex systems for professionals, in areas as varied as mapping, site inspections or agriculture.

The two polytechnical schools are breeding grounds for start-ups

The Swiss ecosystem has made significant gains over the last two years with the emergence of numerous start-ups. Some older well-established firms are even international leaders in their field. This is the case for Sensefly, on the market of mapping drones, or Pix4D in the field of 2D and 3D mapping software. The two firms emerged from EPFL (Ecole Polytechnique Fédérale de Lausanne), which, just like its cousin in Zurich, is a breeding ground for start-ups.

In the experimental area, the country has the best specialists in drones. They are gathered within a national research cluster in robotics (National Centre of Competence in Research or NCCR) that has partnerships with four universities (including two EPF or Swiss Institutes of Technology) and includes 20 professors and 100 researchers. Oriented towards technology transfers, it plays a major role in the rise of Swiss flying robots.

A "DRONE FRIENDLY" CLIMATE

Furthermore, Swiss companies benefit from very liberal laws in force inside the country. This friendly climate offers a stark contrast with most European countries where drone flights are prohibited in residential areas. "Switzerland is progressive" says Chris McCall with enthusiasm. The latter is CEO of Fotokite, a firm that sells a quadcopter capable of tracking its owner. "We can fly our drone over the centre of Zurich every day. The fact we are in a 'drone friendly' zone is very important for our development."

According to key players in the sector, the main challenge is financial. While fund-raising systems (contests, endowments, venture capital, etc.) exist during the initial phase of a start-up, "there isn't an investment



environment for the second stage" observes Olivier Küng, co-founder of Pix4D. There are some signs of improvement: young firms like Flyability and Wingtra have recently managed to raise significant funds. Others, such as Sensefly, Pix4D or Skybotix have chosen an exit strategy.

ON THE FRONT LINES OF HUMANITARIAN MISSIONS

Swiss drones are drawing attention in areas like humanitarian and rescue missions. After an earthquake struck Nepal in 2015, Pix4D trained local actors to use their mapping software to help manage reconstruction. Flyability's Elios model,



FOSTER + PARTNERS

with its anti-collision cage, was specially made for helping rescue teams save individuals trapped under rubble or in burning buildings or lost on mountains.

At EPFL, the director of the Afrotech initiative, Jonathan Ledgard, is developing a crazy project called Red Line. The former journalist wants to build “drone ports” in Africa and send essential supplies to regions lacking basic infrastructure. An initial test will take place in Rwanda in 2017. The idea is to deliver blood for transfusions to remote areas. “Death during childbirth is the main cause of mortality among African women” he points out. ▲

“Droneport”, designed by the architecture studio Foster + Partners for an EPFL humanitarian project in Rwanda. The structure will be used to transport blood out to the hardest to access regions of the country. Launch scheduled for 2017.

3 QUESTIONS FOR



Roland Siegwart, 57, head of the autonomous systems lab at ETH Zurich

“The market isn’t saturated yet”

Why does Switzerland have so many firms working on drones?

The country has historically been very strong in high-precision microsystems and micromechanics, which are required for drones. The driving force has really been universities like ETH Zurich or EPFL, which train lots of young people in these fields. Their skills interest foreign firms, which recruit in Switzerland, when they don't just buy out a start-up.

Should we be happy with these buyouts or are they a threat for Swiss industry?

The most important thing is the benefit for the Swiss economic fabric. And for the moment the benefit is real. Parrot has taken a majority stake in Sensefly and Pix4D, while Gopro acquired Skybotix. These companies have invested and created jobs in Switzerland. The result is an environment in which business is growing and that will attract other players.

Is there still room for new start-ups in Switzerland?

Yes, because there are many different applications for drones. Within the same country it's still possible to have competing firms. We will see how the market evolves, but it's not saturated yet.

The Swiss companies on the rise

GAMAYA

A GUARDIAN ANGEL WATCHING OVER FARMERS

CREATION: 2015
EMPLOYEES: 12
HEADQUARTERS: LAUSANNE

Using images shot with a hyperspectral camera, the software produced by this EPFL

spin-off can analyse properties of plants (growth, diseases, etc.) according to the way they reflect light. Gamaya raised 3.2 million Swiss francs at the end of May.

Swiss start-ups have been moving to the top of the professional market. Here's a look at some of them.

BY BENJAMIN KELLER

VERITY STUDIOS

THE EXPERIMENTER

CREATION: 2014
EMPLOYEES: 17
HEADQUARTERS: ZURICH

Verity Studios was created by the "star" in drones at ETH Zurich (Swiss Federal Institute

of Technology), Raffaello D'Andrea, along with Markus Waibel and Markus Hehn, who are also from the Zurich school. The trio designs interactive machines that are very sleek and high-tech, notably for the entertainment industry.

SENSEFLY

FLYING THE SWISS FLAG

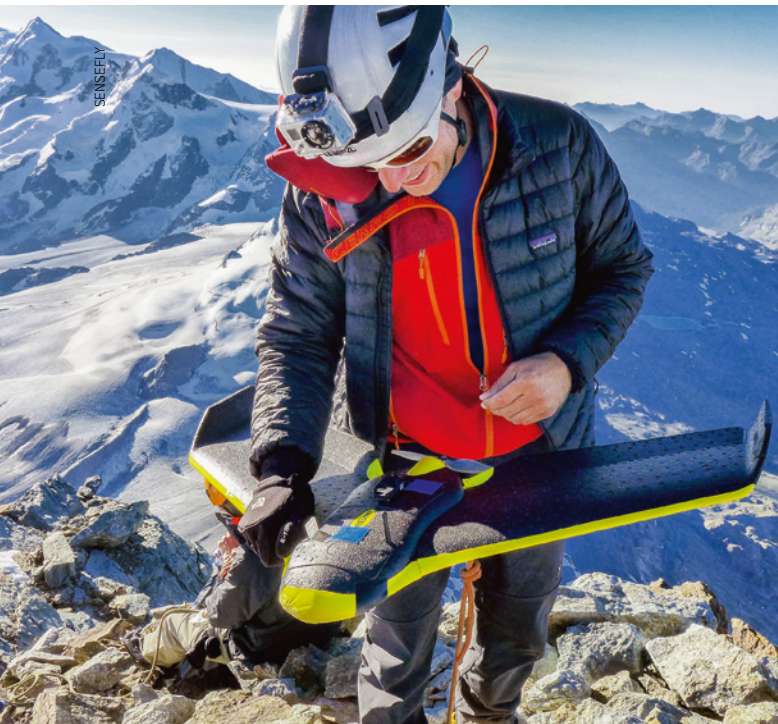
CREATION: 2009
EMPLOYEES: 130
HEADQUARTERS: CHESEAUX-SUR-LAUSANNE

The Swiss manufacturer is the world leader in intelligent mapping. This

edition features a special report on the company and includes an interview with CEO Jean-Christophe Zufferey.

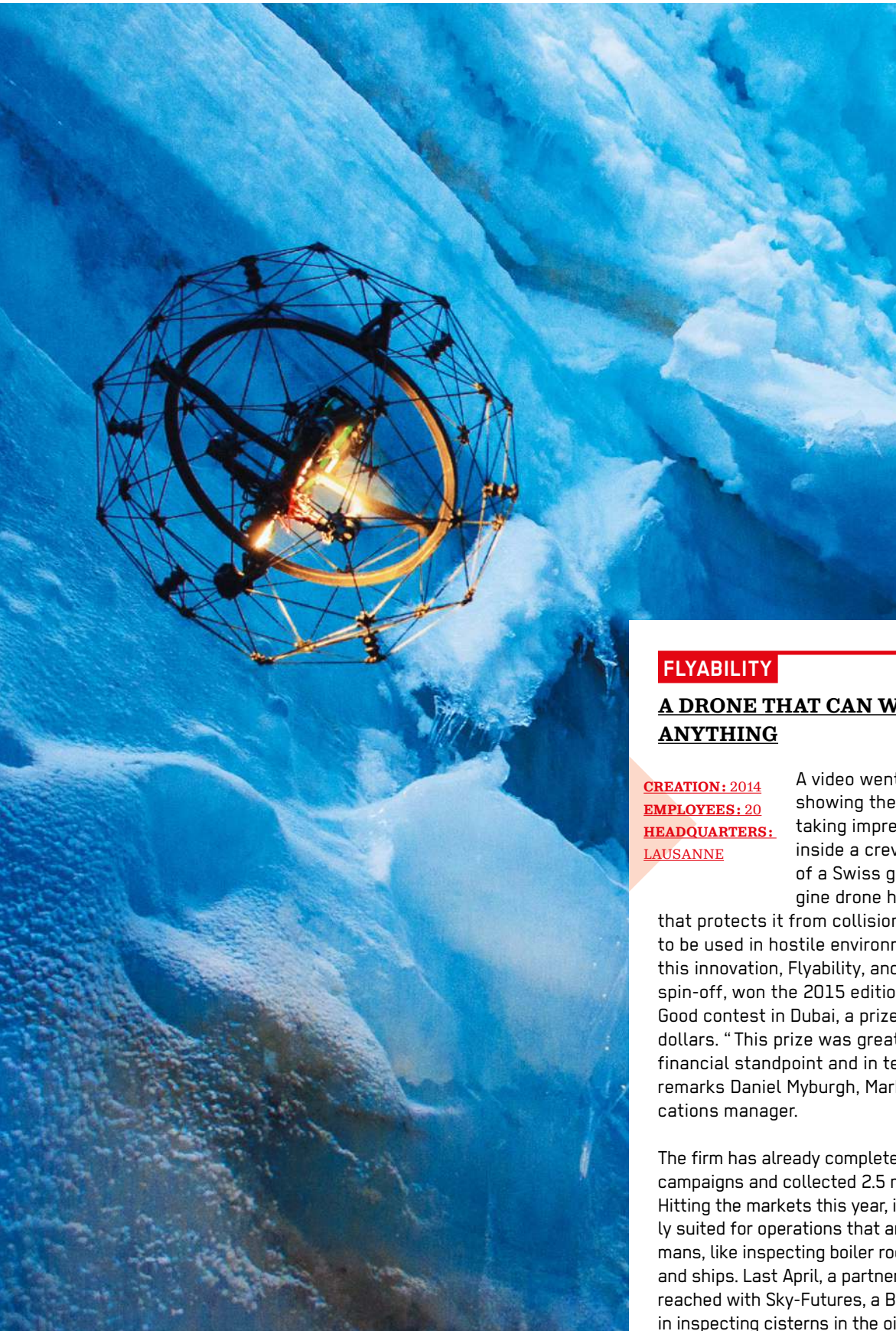
SEE P. 41

eBee drone at the moment of take-off. This fully autonomous UAV is the world leader in mapping.



SENSEFLY

FLYABILITY



The Elios flying robot, developed by Flyability, is designed to resist collisions and fly through high-risk areas. In a crevasse on one of the glaciers of Zermatt in the Swiss Alps.

FLYABILITY

A DRONE THAT CAN WITHSTAND ANYTHING

CREATION: 2014

EMPLOYEES: 20

HEADQUARTERS:

LAUSANNE

A video went viral in January showing the firm's Elios drone taking impressive footage inside a crevasse at the heart of a Swiss glacier. The four-engine drone has a spherical cage that protects it from collisions, thus allowing it to be used in hostile environments. Thanks to this innovation, Flyability, another NCCR and EPFL spin-off, won the 2015 edition of the Drones for Good contest in Dubai, a prize worth one million dollars. "This prize was great for us, from a financial standpoint and in terms of reputation", remarks Daniel Myburgh, Marketing and Communications manager.

The firm has already completed two fund-raising campaigns and collected 2.5 million Swiss francs. Hitting the markets this year, its drone is particularly suited for operations that are dangerous for humans, like inspecting boiler rooms in power plants and ships. Last April, a partnership agreement was reached with Sky-Futures, a British firm specialised in inspecting cisterns in the oil and gas industries.



PIX4D

THE KING OF MAPPING SOFTWARE

CREATION: 2011

EMPLOYEES: 60

HEADQUARTERS:
LAUSANNE

What the firm's name doesn't indicate is that Pix4D commercialises software capable of creating 2D maps and highly precise 3D models based on images taken by any moving camera, including drones of course. The firm, a spin-off

of EPFL, has offices in China and the United States and is the world leader in its field. "Before there was practically only software for devices costing half a million Swiss francs" explains the firm's co-founder, Olivier Kung. "We can produce the same thing, but with a GoPro."

The company has tens of thousands of customers, mainly in the United States, China and Europe. The software was initially used in mining. Now it is used for surveying, agriculture or humanitarian missions. In 2012, the French group Parrot, number two worldwide for consumer drones, injected 2.4 million Swiss francs (31% of the capital) into Pix4D.

WINGTRA

A HELICOPTER-PLANE

CREATION: 2014

EMPLOYEES: 22

HEADQUARTERS:
ZURICH

Wingtra's birotor takes off and lands vertically like a helicopter and flies like a

plane. This ETH Zurich spin-off, which raised \$3.1 billion at the start of 2016, is focused, in particular, on agriculture and mine inspection. Its first test craft will be delivered this summer.



VISUALBWRITTEN / NEWS.COM

Drone training in Nepal. The Swiss Pix4D brought aid to local populations after the earthquake in 2015.

INSIGHTNESS

EYES FOR DRONES

CREATION: 2014
EMPLOYEES: 6
HEADQUARTERS:
 ZURICH

GPS tracking is not always the best option for drones as it is slow and inaccurate,

especially indoors. Insightness, an ETH Zurich spin-off, has developed a positioning system that uses ultra-efficient vision sensors.

The Fotokite model, a fetish with reporters, comes with a cable that allows it to follow its user.



PERSPECTIVE ROBOTICS AG

PERSPECTIVE ROBOTICS

A JOURNALIST'S FAVOURITE TOY

CREATION: 2014
EMPLOYEES: 9
HEADQUARTERS:
 ZURICH

The little quadcopter produced by this ETH Zurich and NCCR spin-off autonomously follows its user. It is designed for Gopro cameras. Big media outlets like CNN and the BBC use it.

SKYBOTIX

THE COMPANY THAT WON OVER GOPRO

CREATION: 2009
EMPLOYEES: 16
HEADQUARTERS:
 ZURICH

In autumn 2015, Gopro quietly bought Skybotix – an ETH Zurich spin-off that specialises in navigation software and sensors for drones – and renamed it Gopro Zurich, as the US action camera maker confirmed to *Swissquote Magazine*.

Just months before acquiring Skybotix, Gopro bought Kolor, a French software developer specialising in 360-degree video solutions. Gopro is currently going through a rough patch – its share price continues to drop and it once again posted a loss of nearly \$ 110 million in Q1 – but the California start-up is hoping to bounce back with the launch of a new quadcopter (see p.48). Initially scheduled for release in the first quarter of 2016, Karma probably won't hit the market until winter. Maybe it will be a "must-have item" this Christmas...

“Social acceptance of drones remains a real challenge”

Swissquote Magazine met with Sensefly’s CEO, Jean-Christophe Zufferey, at the company’s head office in Cheseaux-sur-Lausanne. He talked to us about the future of civil drones and their most promising opportunities.

BY LUDOVIC CHAPPEX / PHOTOS: MICHAËL OTTENWALTER

I’m standing on the third and top floor of SenseFly’s headquarters in Cheseaux-sur-Lausanne, in the middle of a small industrial zone surrounded by countryside. Jean-Christophe Zufferey, Sensefly’s CEO, kindly offers to show me around before we begin our meeting (read our in-depth report on the company on p.41). Our impromptu tour cuts through the vast open space of the research-and-development department and its many screens – the head office is home to one third of the group’s employees – before coming to the prototype assembly workshop, which would thrill any robotics or model building fan. We quickly take in the rooftop, which is often used as a landing strip, before crossing the cafeteria (where employees can play table football or pool), the assembly chain, and lastly the basement which holds a testing area for helicopter-style inspection drones. The building is modern, the atmosphere relaxed and clearly stimulating; all that you would expect from a new economy business. The employees look very young, which is immediately confirmed when I enquire about the average age. “Definitely under 30,” replies Jean-Christophe Zufferey. Back to the second floor to start our interview.

How come the drone market is only coming to the fore now, as opposed to 10 or 20 years ago?

From a technological point of view, we are able to benefit from the progress achieved in other industries. Innovation in smartphones in particular has had a huge impact on our work. Three criteria are particularly important when designing a drone: you have to have light sensors, powerful microprocessors and long-lasting batteries. Before lithium-polymer batteries became widespread, it was impossible to develop an effective electric drone.

“In the professional civil drone segment, Switzerland is on a par with Silicon Valley.”

Is the civil drone industry reaching maturity?

We haven’t reached that stage yet, at least not for all industries, but it is true for mapping. Between 10% and 30% of surveying firms worldwide already use drones and are satisfied with their performance. In other sectors, such as infrastructure inspec-

tion, it’s only the start. The growth potential remains high. There are a lot of improvements that can be made in this sector to make drones fully autonomous, such as enhancing sensors, software and artificial intelligence.

What is the main technical challenge?

Flying close to objects. When it’s just a matter of flying a drone over a structure under a clear blue sky, it’s easy to make the flight automated, but in a number of other cases, the drone needs an experienced pilot. For example, when you need to get very close to a complex piece of infrastructure to repair a crack or when the drone needs to be flown inside a structure or between cables. In these situations, it is not the software or artificial intelligence that pose a problem, but the sensors. And of course, more effective sensors mean extra weight and a heavier drone to bear that weight.

Which is why more efficient batteries are a must...

Technology is evolving in a very linear manner in this area. The great leap we were hoping for has not yet been made, but battery capacity is increasing by 10% each year. ▶

Interview with
Jean-Christophe
Zufferey at
the Sensefly
headquarters
in Cheseaux-sur-
Lausanne.



Short visit to the garage for those Albris UAVs. Sensefly's workshops produce 100 to 200 drones a month.



Drones don't like rain or wind. The technical manual for your Albris model, designed for infrastructure inspection, advises against flying in winds of over 40 km/hr. Does that not complicate things for your clients?

First of all, 40 km/hr is already pretty windy. If you fly a drone in such conditions, it's too unstable to take decent quality images and the battery is used up much faster. Having said that, professionals tend to keep an eye on the weather and take great care when choosing the days they fly. As for rain, it generally goes hand in hand with poor light, which means that the drone cannot operate under

the best conditions. We could develop a waterproof drone but it would be a lot heavier.

Why are Swiss start-ups so successful in the professional drone sector?

In general, Switzerland has a strong presence in mobile robotics. The ETH Zurich (ETHZ) and EPFL laboratories in particular are very successful in this field. The history of watchmaking also plays a role in terms of studying how to integrate different components. The people who work in our labs are not just theoreticians. They are capable of combining their skills in software, electronics and

mechanics to build functional devices. You can't focus on simulation alone or only concentrate on the mechanical and electronic aspects. You have to combine both. In our business, we call it embodiment. It's one of the central ideas in robotics. That's what helped us to make a drone that weighs just 700 grams. Not only is it three or four times lighter than those sold by our direct competitors, it's also easy to use and transport, and safety has been maximised.

"The construction sector is clearly our main area of opportunity."

Can Switzerland remain at the cutting edge of innovation?

The real question is whether we can protect our added value. We don't necessarily need to develop our activities on the consumer drone market, for example, as such products are generally manufactured in Asia. For instance, Parrot produces its leisure drones in China. What Switzerland needs is to continue setting itself apart in the areas of software, precision quality and information processing. At this point in time, in the professional civil drone segment, Switzerland is on a par with Silicon Valley.

What can the authorities do to promote this new area of Swiss expertise?

The Federal Office of Civil Aviation (OFAC) already provides us with the support we need. They take our interests into account and help Switzerland's pragmatic voice be heard in relation to legal matters at EU level. With more political involvement, we could no doubt attract entrepreneurs who are having trouble carrying out tests in their own country, particularly entrepreneurs from the United States where legislation is still very strict.

According to a study by the University of Neuchâtel, almost 90% of people see drones as surveillance cameras. What message do you have for people who don't trust drones and consider them invasive?

Social acceptance of drones remains a real challenge. The fact that most models are currently aimed at individuals raises questions as to their function and the kind of images they are likely to take. There is therefore clearly a risk that the private use of such devices will have a negative impact on their reputation and on the manner in which governments regulate them. Where professional drones are concerned, the flights take place

in a strictly defined area and not over people or their homes. What is needed is a system that allows the public to identify the different categories of drones. It's a topic that is subject to a lot of debate at the moment. For example, special mineralogical plates could be used or, even better, digital plates so as not to weigh down the drones. That way they won't fall on our heads!

Let's get back to Sensefly. Which are your most profitable markets at present?

We make less than 10% of our sales in Switzerland. Our products are distributed in over 100 countries but most of our clients are residents

of the United States, Canada, Latin America and Australia. The construction sector is clearly our main area of opportunity. According to a recent study by Goldman Sachs, this sector will drive the market over the coming years. Using a mapping drone, it is now possible to verify whether a site has been correctly excavated, to precisely measure the height of land masses, to plan the extension of construction sites and roads, etc. Agriculture is the second most important sector for our products. Our multispectral cameras make it possible to measure the level of chlorophyll in plants and therefore make it easier to assess the need for water and fertiliser. ▶



SENSEFLY

DRONES TO WORK BETTER AND FASTER

Construction, agriculture, mining and infrastructure inspection – these are just some of the areas Sensefly and its drones are changing radically.

The company, which had just seven employees in 2012, now boasts a staff of 130 and has established itself as a world leader in the development of mapping and precision drones. Sensefly's technology makes professionals' work easier and optimises their activities in a broad range of areas such as construction, agriculture, mining, geology and infrastructure inspection (bridges, dams, antennas, etc.). The company doesn't provide exact figures but says it sells between 100 and 200 devices per month, with prices starting at 10,000 Swiss francs per unit.

The acquisition of a majority stake in Sensefly by French company Parrot for 5 million Swiss francs in 2012 gave the EPFL spin-off the financial clout needed to expand its business. The Swiss company has built its

reputation on its eBee model, a small drone weighing less than 700 grams, equipped with a propeller and a camera, and, above all, capable of flying autonomously. Once the flight path has been programmed by computer, all you have to do is throw it into the air and the drone takes flight. It then maps out the defined zone taking highly accurate photos, before coming back down towards the ground and landing softly. Special software is then used to make a 3D map of the area covered, based on the images captured. The amount of time saved compared with traditional methods is significant: for example, the amount of gravel extracted from a pit can now be calculated in a matter of hours compared to 4 to 5 days previously.

Having achieved fame thanks to its fixed-wing drone, the Laus-

anne start-up is now seeking to extend its product range to other segments of the market. Last autumn, Sensefly launched a new drone model called Albris which it hopes will help the company make a name for itself in helicopter-style professional drones, used for surveillance and inspection purposes. With four propeller blades, this device flies lower and slower than its big brother eBee. However, it is easier to control and can take off and land vertically from a small surface, making it suitable for use in confined spaces and in close proximity to other objects. For instance, this semi-autonomous device, which is principally designed for use in infrastructure inspection, is capable of flying alongside a dam in automatic mode. An operator is needed however for more delicate manoeuvres, such as flying close to complex geometric objects.



A CEO WITH A HEAD FOR HEIGHTS

It would be hard to find a more legitimate CEO for Sensefly than 41-year old Jean-Christophe Zufferey. The co-founder of the Lausanne company was destined to fill the role and his CV is tailored to the job. Passionate about aircraft modeling as a child and teenager, it wasn't long before he passed his pilot's licence, which was later followed by a gold medal in the advanced category of the Swiss Aerobatic Championships.

Career-wise, Zufferey, who is originally from Anniviers in the canton of Valais, holds a Master's in micro-engineering and a PhD in autonomous robotics from the Swiss Federal Institute of Technology in Lausanne (EPFL). He was the first researcher on the Lausanne campus to experiment with flying robotics. In fact, that's where the idea to create Sensefly was hatched, between a group of engineering students with a passion for aviation. During his free time, this voracious CEO continues to fly and practice aerobatics, and obtained his helicopter pilot licence in 2013. Jean-Christophe Zufferey is married with two children.

What are your ambitions for the Albris drone, launched last autumn?

If you look at the civil drone market as a whole, “helicopter” drones represent almost 90% of drone sales. After having established ourselves as leaders in the mapping segment with our fixed-wing drone, we were looking to break into the professional market from which we had been absent up until now. The Albris is just the start.

“Our products are distributed in over 100 countries.”

What portion of your revenue do you allocate to R&D?

To give you an idea, out of 130 employees, over 40 work for the R&D department. Our approach is similar to Tesla’s. We put products on the market that continue to evolve during their life cycle thanks to regular updates to their software. All of the upgrades are free.

More specifically, how are drones made? Do you make some of the parts or components yourselves?

The drones are assembled, programmed and tested by our teams. We design the parts and chose the materials ourselves, but we don’t make the parts on site. Similarly, we design the electronic parts but call on subcontractors for the various components, which often involve information technology. These include well-known brands such as Nvidia and Qualcomm, for example. We also use some of the processors developed by Parrot.

How are your relations with Parrot? Do you still enjoy the same independence as when you started out?

Three of Parrot’s directors are members of our board of directors, which

meets at least once every quarter. Overall, Parrot has managed to stay close to the start-up spirit and we have a lot of independence. We are lucky to be backed by a small international group that considers itself a bit like our older brother. Our role is to develop the professional drone sector, while they focus on leisure drones. But there is some overlap regarding technology in some areas. Some solutions are now jointly developed by our R&D teams but the sales and distribution networks remain separate.

And how are your relations with Pix4D (Editor’s note: the other major Swiss player in which Parrot also holds a majority interest)?

We have a historical link with Pix4D, as well as being part of the same family today. We have known the

founders for a long time, having attended EPFL at the same time. Pix4D also provides our competitors with their software, but we still have a special relationship with them. We resell their software through our drones and we are working on several R&D projects together.

Are you planning to remain a small manufacturer or do you plan to branch out into software development in the future?

We are already very focused on software. It’s actually one of our main strengths. In any case, I don’t think you can dissociate software from the product. Look at Apple and Tesla, their success is due to the combination of a quality product and excellent software. If we only focused on software, we wouldn’t have the proper device to use it. ▽

ANALYST OPINION

“THE USE OF PROFESSIONAL DRONES IS GOING TO INCREASE SIGNIFICANTLY”

Sensefly has been part of the Parrot group since 2012, which has also changed greatly over the past few years. Created in Paris in 1994, the company, which now has approximately 1,000 employees, first centred its business model on infotainment technology and hands-free kits for drivers. It then started to develop consumer drones, using its own technology, before branching out into the professional sector mainly through its takeover of two Swiss companies: Sensefly and Pix4D.

Drones are now by far the group’s main source of growth. The group’s 2015 revenue amounted to €326.3 million, of which €183.4 million represented drone sales, an increase of 121% compared to the previous year. “Drones should make up

at least two-thirds of Parrot’s earnings in 2016 and the professional market is going to become increasingly significant compared to the consumer segment,” predicts Thomas Delhaye, analyst at Genesta Finance, who has been following the company’s progress for several years. Overall, the future looks bright for Parrot, but it does depend on certain conditions: “The company has invested heavily in on-board technology for cars. However, this sector has not really taken off as car manufacturers have chosen to develop their own solutions. We’ll have to see how Parrot manages this chain of events.” Delhaye feels, however, that the company has the capacity to overcome this obstacle by capitalising on the success of its drones. He recommends buying the share, with a price target of €16.60.

LEGISLATION

Can drones pass the legal test?

Safety. Privacy. Noise pollution. With the explosion in the use of recreational drones, these hot topics have come under close scrutiny. But what are governments doing about it?

BY JEAN-CHRISTOPHE PIOT

Kentucky, July 2015. William Merideth shot down the \$1,500 drone that was flying over his property, triggering a legal maelstrom that has yet to die down. A discussion for the water cooler? Much more, actually. This case shows the challenges of adapting current legislation to the drone phenomenon. The authorities are at a loss to find a solution between the opposing and sometimes irreconcilable differences in opinion. Some are concerned about safety and privacy, while others believe this innovative economic and business sector should not be stifled.

In the United States, the Federal Aviation Administration (FAA) is still grappling with a spate of incidents that took place last summer in which private drones flew over several forest fires, getting in the way of firefighters. The FAA decided to crack down. As of February 2016, all drone owners have to register their vehicles and affix them with a licence number. But the FAA seems decidedly softer

on those using drones for commercial purposes. A case in point is Project Pathfinder, a partnership between the FAA and three companies developing new uses for these unmanned aerial systems. The project authorises CNN to use drones for reporting in urban areas, Precisionhawk to fly over fields to monitor crops and Santa Fe Railway to inspect its railroad infrastructure. This testing ground could be allowed due to the lobbying from Google and Amazon, which are keenly following developments in the drone business. They have even threatened to relocate their R&D to a country with looser regulations, such as Canada, where small drones are considered to be like remote-controlled toys.

On the old continent, the situation varies from one country to another. In Germany and the Netherlands, a flight permit is required, and in Ireland, the local police must be warned before any recreational flight. In Norway, two authorisations are even required, one for aerial pho-

tography and the other for a flight permit. And that can take up to six months. Tough? That's not as bad as Austria, where using a drone requires a medical certificate.

What about France, especially in the current state of emergency? France has a reputation for being strict on the use of drones. Recreational drones cannot be flown higher than 150 metres off the ground or come within 50 metres of an urban area or 150 metres of a group of people.

Higher security is needed in France in the aftermath of the 2015 terrorist attacks

Night flights are completely banned, as is flying over airfields and other sensitive sites such as nuclear power plants. Cameras are authorised as long as the images are not for commercial use.

The French Civil Aviation Authority (Direction Générale de l'Aviation Civile or DGAC) acknowledges that higher security is needed in France in the aftermath of the 2015 terrorist attacks and the upcoming Euro 2016 football championship. The police headquarters in Paris has recently invested in a fleet of faster, more technologically advanced drones that can fly for longer periods. They are currently testing drones that can intercept harmful devices. The authorities do not wish to go into further detail, but the solution could have something to do with tests being conducted elsewhere on devices such as scramblers, net launchers and the like.

But one thing remains unknown. How can the government respond to this vast array of new ways to use drones?

A draft law still under wraps is expected to encourage pilots to take training sessions. But no mention of a licence. For now.

SOFTER RULES IN SWITZERLAND THAN IN THE EUROPEAN UNION

Could Switzerland be a relatively safer haven for drones? "Switzerland is actually more liberal than other countries," says Martine Reymond, head of communication of the Swiss Federal Office of Civil Aviation (Office fédéral de l'aviation civile or OFAC). Pilots are only required to maintain permanent line of sight with the vehicle, which must not fly over a group of people. Another restriction is that drones are banned within five kilometres of airfields and protected military sites. As for the rest, including flying over sensitive areas such as nuclear power

NUMBER

20,000

The number of drones already buzzing through Switzerland's skies, according to the Swiss Federal Office of Civil Aviation (OFAC). And that number continues to rise.

plants, embassies, etc., no specific rules apply to drones weighing less than 30 kg. Aerial photography is allowed as long as it complies with regulations applicable to military sites, privacy and more generally data protection laws. Basically, images must not violate the privacy of your neighbours or a company's operations. This rule is interpreted by many drone pilots as meaning that they are free to fly their vehicles in the countryside if they so choose.

The OFAC states that "legislation covers current needs, but the cantons are allowed to apply tougher restrictions, which may either be temporary for a given event or permanent." Although a flight permit is not necessary or planned for the time being, pilots operating professional drones are required to obtain special authorisation from the OFAC and register their vehicles.

What are the next steps? The OFAC is pleased about the newly created Swiss Federation of Civil Drones, an organisation that will work to better understand the needs of pilots and carry out information and prevention campaigns. But it insists on one point, "any changes in current regulations must not be limited to Switzerland but must be discussed at the European level." ▲

PILOTING A DRONE: THE BASIC RULES IN SWITZERLAND

Visual contact



Pilots must keep visual contact with their drones at all times.

Crowd



The minimum authorised horizontal distance for any flight near a group of more than 24 people.

Airports



It is strictly forbidden to fly a drone within 5 km of a civilian or military airport.

Privacy



Pilots must comply with all legislation regarding personal privacy.



Twelve key players

Bebop, Parrot's best-selling drone designed for consumer use. The machine is popular for being easy to manoeuvre.

PARROT

The drone industry attracts hundreds of companies that compete to design the best components, the most innovative sensors or the most effective software. From listed companies to promising start-ups, here are the companies to watch.

BY JEAN-CHRISTOPHE PIOT

TECHNICAL DATA SHEETS

MANUFACTURERS
SUBCONTRACTORS

QUALCOMM

The specialist of processors

HEAD OFFICE: SAN DIEGO, CA
UNITED STATES
REVENUE: \$25.3 BILLION
EMPLOYEES: 33,000
QCOM

The US giant in mobile technology, known for its smartphone processors, has not missed the opportunity to develop an integrated model specially designed for drones. Snapdragon Flight

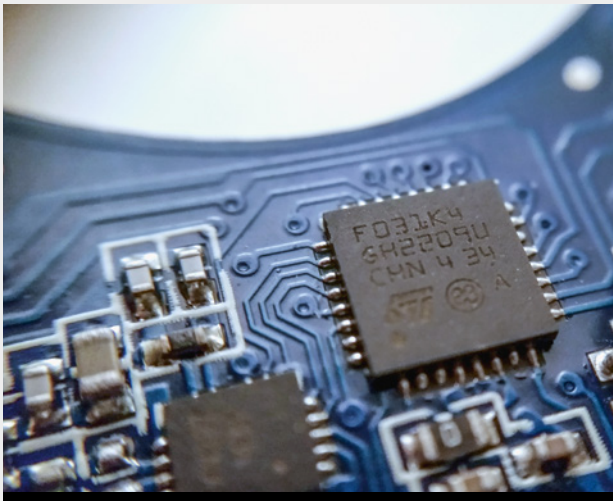
guarantees reduced weight and costs for a dozen vital functions on current models: CPU, radio transmissions, obstacle avoidance, image processing chips, rapid battery charging, to name just a few. Most notably, Snapdragon equips, Yuneec's new Typhoon model.

PARROT**A pioneer in drones for fun**

With one million devices sold worldwide in 2015, Parrot is the leading brand among the general public. Listed on the Euronext since 2006, the French company has seen its earnings jump by over a third, thanks to its results in the drone business, which have more than doubled (+121%). Famous for its easy-to-use “leisure” models and the emblematic Bebop, the company has adopted a completely diversified growth strategy, expanding its business with the public and professionals alike. Thanks to some clever acquisitions, such as Airinov last year – a SME that makes on-board sensors for farmers who want to manage fertilizer use – Parrot

HEAD OFFICE: PARIS, FRANCE**REVENUE:** €326.3 M**EMPLOYEES:** 951


has one of the broadest product portfolios on the market. The company has also taken control of the Swiss start-ups Sensefly and Pix4D.



INVENSENSE

INVENSENSE**The king in on-board gyroscopes**

While this American company does not design drones directly, its miniaturised gyroscopic systems are essential for flight. With solid experience in the smartphone and tablet business, Invensense naturally turned to the drone

market, whose growth greatly depends on on-board tools. The company has everything it takes to grab a large share of the market.

HEAD OFFICE: SAN JOSE, CA,

UNITED STATES

REVENUE: \$418.4 M**EMPLOYEES:** 632

Start-ups to be reckoned with**3D ROBOTICS**

The company makes some of the most sophisticated drones on the market, particularly those used for making films like the 3DR Solo.

HEAD OFFICE: BERKELEY, CA, UNITED STATES**EMPLOYEES:** ABOUT 230**AIRMAP**

The company has developed software for all drones that automatically indicates no-fly zones, thus preventing any potentially illegal flights.

HEAD OFFICE: SANTA MONICA, CA, UNITED STATES**EMPLOYEES:** ABOUT 15**BLUE-CHIP UNMANNED AERIAL SOLUTIONS**

Founded by American veterans, this start-up is specialised in differentiated analysis of vegetation, which is a key element in precision agriculture.

HEAD OFFICE: NEWTON, MA, UNITED STATES**EMPLOYEES:** ABOUT 5**DRONEBASE**

This online platform can be used to hire drone piloting services anywhere in the world and for any project: aerial imagery, video, mapping, etc.

HEAD OFFICE: LOS ANGELES, CA, UNITED STATES**EMPLOYEES:** ABOUT 5**DRONEDEPLOY**

The company has designed software that can be used to analyse data collected by any drone, by any manufacturer.

HEAD OFFICE: SAN FRANCISCO, CA, UNITED STATES**EMPLOYEES:** ABOUT 15

SKYCATCH**Drones on demand
move into new territory**

Skycatch has built its success by offering drones on demand for aerial observation, primarily used in construction. The start-up has since developed into a leading provider of software solutions used to analyse data collected by drones. And 2016 is a busy year for the company. The new leisure drones manufactured by world leader DJI will now work with Skycatch's iOS app Commander to bring the machine powerful mapping capabilities. Skycatch has also teamed up with the software developer Autodesk to consolidate its leading position in data analytics. Meanwhile, rumours persist of an IPO in the not so distant future.

HEAD OFFICE: SAN FRANCISCO, CA,
UNITED STATES
REVENUE: ABOUT \$2 MILLION
EMPLOYEES: 63
NOT LISTED

IXYS CORPORATION**The energy optimiser**

HEAD OFFICE: MILPITAS, CA,
UNITED STATES
REVENUE: \$317.2 MILLION
EMPLOYEES: 1000
IXYS

Ixys provides manufacturers with a series of vital chips and circuits for optimal energy consumption, a key challenge in making more powerful and autonomous drones. Ixys has a great asset: its components are useful for all drones. Whatever the device is used for (surveillance, leisure, exploration, etc.), it needs effective power controllers to reduce operating costs while improving performance.



Nick Woodman, founder and CEO of GoPro, at the Techcrunch Disrupt conference in San Francisco, 22 September 2015.

GOPRO**The new kid
on the block**

HEAD OFFICE: SAN MATEO, CA,
UNITED STATES
REVENUE: \$1.6 BILLION
EMPLOYEES: 1,539
GOPRO

Could drones save GoPro? The California company published very disappointing annual figures and has laid off 7% of its staff. It is hoping to reassure investors and customers by launching its Karma model on the market, a four-engine drone announced for this year. The first videos very carefully presented on social networks show the company pinning its hopes on a model that corresponds to its brand image: action, extreme sports and 4K quality. However, a release date has not been announced, sparking rumours of production delays. Could this be bad Karma for GoPro?



DJI's Phantom 4 is considered one of the top consumer drones.

VISUALWRITTEN / NEWS.COM

DJI

The world leader in leisure

With two-thirds of the leisure market worldwide, the Chinese company is a giant in the drone business. An experienced manufacturer, the company is positioned at the high end of the market with a range of high-tech products that rarely sell for less than 1,000 Swiss francs. With its futuristic designs, cutting-edge technology and a knowledgeable flock of followers, the brand is considered the equivalent of Apple in the drone world. And the leader continues to innovate: its latest model, the Phantom 4, is a high-tech marvel designed to meet the expectations of a broader and less savvy audience interested in a drone that is easy to use and film with.

HEAD OFFICE: SHENZHEN, CHINA

REVENUE: \$1 BILLION

EMPLOYEES: 3,000

NOT LISTED
(ESTIMATED VALUE: \$8 BILLION)

With an estimated worth of \$8 billion, rumours are constantly circulating surrounding the company's IPO, but for the moment they remain just that.

Start-ups to be reckoned with

FLIRTEY

This little start-up is testing delivery of urgent medical supplies in New Zealand and the United States with the blessing of the Federal Aviation Administration (FAA).

HEAD OFFICE: SYDNEY, AUSTRALIA

EMPLOYEES: ABOUT 15

HUBSAN

This Chinese manufacturer produces some of the most popular drones on the market. They are inexpensive and ideal for beginners.

HEAD OFFICE: SHENZHEN, CHINA

EMPLOYEES: ABOUT 550

MATTERNET

The company has developed Matternet One, the first drone dedicated exclusively to shipping parcels weighing up to one kilo.

HEAD OFFICE: MENLO PARK, NJ, UNITED STATES

EMPLOYEES: ABOUT 20

MOVIDIUS

Movidius makes the ultra powerful processor that allows DJI's Phantom 4 to fly without hitting obstacles. What next? An IPO?

HEAD OFFICE: SAN MATEO, UNITED STATES

EMPLOYEES: ABOUT 150

REDBIRD

The company is a pioneer in acquiring and analysing data from mines, quarries and even factories. Its web platform, called Cardinal, processes data securely while reducing costs.

HEAD OFFICE: PARIS, FRANCE

EMPLOYEES: ABOUT 30

SKYDIO

The company develops a program that allows drones to fly more autonomously and avoid obstacles.

HEAD OFFICE: REDWOOD CITY, UNITED STATES

EMPLOYEES: ABOUT 35



The Solara drone developed by Titan Aerospace can remain airborne for up to five years.

GOOGLE

GOOGLE

The game changer?

HEAD OFFICE: MOUNTAIN VIEW, CA,
UNITED STATES
REVENUE: \$75 BILLION
EMPLOYEES: 61,814
— GOOG

While drones are not among the Mountain View company's main activities, the tech giant has made a series of acquisitions that prove it is interested in the sector.

In 2015 Google bought Titan

Aerospace right out from under Facebook's nose in order to launch its Skybender project. The objective? To revolutionise the web (again) thanks to huge solar

powered drones with 60-metre wingspans designed by Titan Aerospace. Capable of remaining in the stratosphere for five years without landing, these machines could deploy a 5G network, a technology potentially 40 times more powerful than 4G. This would also make Google the worldwide provider of web access. This fascinating project, which is currently being tested in New Mexico, is not as crazy as it seems: a 50-metre drone would cost \$2 million, or 50 times less than a satellite... And operating costs would be lower since only a single person is required to monitor each craft.

YUNEEC

The Chinese challenger

Way behind the giant DJI, Yuneec is an upstart that demands to be reckoned with. Originally in aeronautics and model building, the Chinese company can count on support from Intel, which has invested \$60 million and intends on challenging DJI in the high-end leisure drone sector. Its latest model, the Typhoon, proposes an obstacle avoidance feature and automatic target tracking system that have forced DJI to bring forward the release of its own model.

But the outsider must resist a counter-attack by DJI, which accuses its competitor of stealing two patents. The case is being examined by judges in California.

HEAD OFFICE: SHANGHAI, CHINA
REVENUE: \$54.3 MILLION
EMPLOYEES: 1,800
NOT LISTED

AMBARELLA

Vital chips

HEAD OFFICE: SANTA CLARA, CA,
UNITED STATES
REVENUE: \$316.4 MILLION
EMPLOYEES: 640
— AMBA

This Californian company, specialised in chips, compression software and HD video processing (TV broadcasting, cutting-edge surveillance cameras), has been

listed since 2012 and is finding new and promising outlets on the drone market, which already represents 10% of its business and is growing fast.



The Nano Hummingbird micro-drone.

AEROVIRONMENT

AEROVIRONMENT

The military expert

Aerovironment is an American company that derives 85% of its revenue from drones and particularly small military models used for observation like the Nano Hummingbird, a micro-drone the size of its namesake, or the Raven, a \$180,000 star product that has already sold more than 20,000 units worldwide. Its subsidiary, Skytower, is

specialised in high altitude drones developed with NASA and the company is also a leader for models powered by hydrogen motors or solar energy.

HEAD OFFICE: LOS ANGELES, CA,
UNITED STATES

REVENUE: \$259.4 MILLION

EMPLOYEES: 663

AVAV

ELBIT SYSTEMS

The Israeli giant in defence electronics

Like Aerovironment, the Israeli company Elbit Systems relies on its experience as a pioneer in defence electronics and 50 years in unmanned aeronautics. Buoyed by the drone sector and the success of reconnaissance models like the Hermes series, the value of shares in the Israeli company has increased by more than 15% over the past 12 months.

HEAD OFFICE: HAIFA, ISRAEL

REVENUE: \$3.1 BILLION

EMPLOYEES: 12,134

ESLT



The Skylark I-LEX drone, the latest reconnaissance model from Elbit Systems.

ELBIT

Start-ups to be reckoned with

SKY-FUTURES

The company monitors equipment in the oil and gas industry and can provide HD videos or thermal imaging.

HEAD OFFICE: LONDON, UNITED KINGDOM

EMPLOYEES: ABOUT 30

VELODYNE

The inventor of Lidar, the laser sensor on Google Cars, is working on reducing the size and weight of its invention for use on drones.

HEAD OFFICE: MORGAN HILL, CA, UNITED STATES

EMPLOYEES: MORE THAN 90

VIRES AERONAUTICS

The company developed Ora, a solar powered drone. It is designed for precision agriculture, water management, emergency rescue operations and environmental protection.

HEAD OFFICE: SAN FRANCISCO, UNITED STATES

EMPLOYEES: ABOUT 15

How drones are changing the world

Drones are handy devices and people are finding uses for them in a number of different industries, from farming and media, to surveillance and delivery services. Here's an overview.

BY JULIE ZAUGG AND CLÉMENT BÜRGE



Drones, or unmanned aerial vehicles (UAVs), are revolutionizing industries ranging from farming to parcel delivery, cinema and even facility inspections. And once they make the move, there's no turning back. These flying robots have opened up new horizons, saving time, money and headaches.

1. SEEING THE UNSEEN

One of the main advantages of UAVs is how they gather information in ways that used to be impossible. Not only can they shoot photos and videos, they can also check temperature, create 3D models, take infrared images and measure air quality. "These functions are applied to measure all sorts of parameters that are invisible to the naked eye," says Angela Schoellig, a drone expert at the University of Toronto. She is working on a project that uses a drone equipped with a tiny gamma ray sensor to inspect nuclear power plants and measure the radioactivity they emit.

Amin Al-Habaibeh, a product design professor at Nottingham Trent University, has developed a drone carrying an infrared camera to check water pipes in the desert. "The technology can be used to detect leaks. As water evaporates, it cools the surface of the sand," he says. These systems can also be used to test a building's energy efficiency or find earthquake or avalanche victims with sensors that pick up on their body heat.

Drones can recover victims of an earthquake or avalanche

Farmers can equip their drones with high-definition cameras to better assess what is happening in their fields. "They feature a resolution as high as 1 to 4 cm per pixel, compared with 2 to 3 m per pixel with a satellite and 1 to 15 cm per pixel with a plane flying

at low altitude," says James Lambert, a researcher who studies drones for farming at the University of Sheffield. Drones can also be fitted with sensors to measure humidity, atmospheric pressure and sunlight.

Even more impressive, drones mounted with multispectral or hyperspectral cameras can capture the refraction of sunlight on crops. "Areas that are poorly irrigated or infested with parasites reflect less light than

FLYING INSPECTOR



Manufacturers use drones to monitor their facilities. These machines come in especially handy when infrastructure is hundreds of kilometres long or located in remote areas.

The French natural gas giant GRTgaz has 32,000 kilometres of pipelines, i.e. the longest high pressure natural gas transport network in Europe. This infrastructure must be checked frequently. That makes for no less than 600,000 kilometres of tubing that the firm has to inspect every year.

Potential problems that might be detected range from gas leaks and vandalism to invasive plants or backhoes about to dig on the site of an underground pipeline. The Bordeaux-based company Air Marine began carrying out these inspections for GRTgaz in 1998. Until recently, planes and ground crews were used to provide that service. But last year Air Marine tried something entirely new. It monitored 80 kilometres of gas pipelines over a period of six months using a drone. “The test went smoothly, even though the region chosen for the experiment, the middle of the Corrèze in France, is extremely hilly, covered in trees and near several air fields and inhabited areas,” says the company’s managing director Vincent Fournier. “This experiment is likely to soon be extended to other regions.”

A number of companies like GRTgaz use drones to inspect their infrastructure. This type of aerial surveillance is ideal for electric power line networks, railways, roads and oil pipelines as they extend for extremely long stretches. Drones can also observe more complex structures. Property companies use them to take aerial shots of their construction sites and monitor their progress.

Companies including ArcelorMittal, BP, Royal Dutch Shell, Alstom, Vestas and Areva use these unmanned aerial vehicles (UAVs) to inspect their offshore oil platforms, factories, nuclear power plants and wind farms. The French energy giant Engie sends them to the bottom of its boilers to assess their condition. Even governments are joining in the movement. Germany has used drones to monitor its highest dam, Rappbode Dam. The U.S. Department of Transportation put drones to work to detect potholes on its roads, while the state of Minnesota has used them to examine cracks in its bridges.



AIRMARINE

healthy areas,” says Martin Benoni, a co-founder of the French solar drone company Sunbirds. “These areas appear lighter on the image.”

Drones can also provide a more complete view of some equipment by generating a 3D model. Delta Drone, a company based near Lyon, in France, uses this technique to inspect mines and quarries. “We used to have to send surveyors out to the top of aggregate stockpiles to measure their ▶

A drone operated by the French company Air Marine, inspecting an electricity pylon.

volume,” says the company’s director Christian Viguié. “Today, drones can deliver a much more accurate estimate of the inventory of extracted raw materials by conducting a set of topographic surveys of stockpiles on the ground.”

2. AGILE CREATURES

Drones can careen through spaces that are either too tight or dangerous for humans to reach. For example, they can reach the bottom of the deepest mines or glide through a

boiler. Michigan Tech University in the United States has developed a drone that can slice through the water to inspect underwater pipelines.

UAVs are currently being tested by Swiss Post for parcel delivery. It believes that the devices will find applications in reaching areas with no access, “such as a remote mountain chalet or an area where roads have been cut off by an avalanche,” says Claudia Pletscher, who heads the project at Swiss Post. Flyability, a start-up created at the Swiss Federal

Institute of Technology in Lausanne (EPFL), modelled its drones after the flight of insects. Protected from collisions by a cage, these machines can veer through almost any tight or uneven space (see p. 35).

This agility is most spectacular in what it can achieve in cinema and the media. “We can now film a room, move through a hallway, go out a window and show a bird’s eye view of the building in a single shot,” Schoellig says. “It used to take an army of cameramen and



NEW EYE OF THE MEDIA

Drones are being used to take new types of images. And RTS, BBC and Hollywood studios are just loving it.

In 2011, Channel 9's program *60 Minutes* wanted to shoot images of refugee camps on the infamous Christmas Island in the middle of the Pacific Ocean. But the Australian authorities declined access to the Australian television channel's camera crew. Its reporters decided to take the issue into their own hands. They flew one of the station's drones over the island to film the conditions in which refugees were being detained in the camps.



MOVIESTILLSDB

A growing number of television channels and newspapers are now using drones to film their newscasts and entertainment programmes. These little robots are not only less expensive than a helicopter but also more discreet. And they can take closer images at different angles. The *New York Times*, the *Washington Post* and NBC Universal have formed a partnership with Virginia Tech University to test the use of drones for reporting.

UAVs are especially useful in assessing the extent of an event or phenomenon. In Russia, Air Pano launched a drone over a protest in Moscow after the 2011 election to show how big the demonstration was. The BBC deployed a drone to film a concentration camp in Poland. "The video showed how huge the camp was. It was impressive," says Owain Rich, Senior Innovations Producer at the BBC. "A helicopter would have flown too high. The images wouldn't have been as powerful." The video was watched more than 11 million times on YouTube.

Drones are also used to get more stable footage. "We had to shoot a sequence from a boat on Lake Geneva for the RTS programme *Passe-moi les jumelles*," says Noam Perakis from RC-Tech, a company specialised in aerial photography. "The camera on the boat kept rocking because of the waves. So we used a drone to film the shot."

The use of drones is also gaining ground in the film industry. In the recent Netflix-produced series *Narcos*, four actors jump onto rooftops and run away through laundry hanging out to dry. To shoot that sequence, the directors opted for a drone because they wanted to film close enough to see their faces. These days, nearly 10% of films deploy these flying cameras. They were used extensively in the television series *The Leftovers* and *Supergirl* and films *Skyfall* and *Transformers: Age of Extinction*. The footage is smoother from a UAV, and renting a cinematography drone with a crew is cheaper, costing \$5,000 a day versus \$25,000 a day for a helicopter.

A scene from the film *Mission Impossible 5* shot by a drone. These flying cameras are increasingly used by filmmakers.

Aerial view taken by a senseFly drone. By using a multispectral camera, farmers can accurately assess the condition of their crops.



THE NEXT GREEN REVOLUTION

A growing number of farmers are using unmanned systems to monitor their fields. This helps them to perfectly calibrate the amount of pesticide and water used.

Andrew Williamson grows wheat and barley in the county of Shropshire in western England. A few years ago, he noticed that his crops were not doing well. “I was sure that it was weeds, but I didn’t know what type,” he explains. Williamson decided to fly a drone over his fields. “That helped me to identify the weed responsible and spray the right pesticide on the area affected,” he says.

Drones have ushered in the era of precision agriculture. “These machines can be used to assess crop health, providing a detailed un-

derstanding of the composition of each parcel and identify any problems, such as a lack of water or parasite infestation, says Romain Faroux, a co-founder of Airinov, a French start-up that makes agricultural drones. “The amount of water, pesticide and fertiliser can be adjusted accordingly.”

Drones can also be used to assess crops following a weather disaster. “Farmers can spot what percentage of their field was damaged by hail and use those measures to receive compensation from their insurance company,” says Tom McKinnon, CEO of the U.S. company Agribotix, which provides farmers with these types of metrics.

Those assessments used to be done blindly. Farmers would collect samples by hand or use blurry satellite images. Wealthier farmers

SENSEFLY

a helicopter to do something like that. And there was no guarantee of a smooth final result. Owain Rich, a professional drone pilot for the BBC, adds, "These devices have been used to capture images just a few centimetres from the Christ in Rio, a waterfall or one of our reporters. The powerful blast of air from a helicopter would have made those shots impossible."

3. PREDICTING THE FUTURE

The images and data collected by drones are typically analysed by a computer to create predictive models based on algorithms. "Farmers can map out which areas of their land need water or are most often infested with weeds. They can then decide how to irrigate and treat their crops for the next season," James Lambert says.

Similarly, the information gathered by Delta Drone during its inspections of mobile telephone antennas can be used to build a database of photos taken at regular intervals. "This is a valuable tool for monitoring the condition of that type of infrastructure," Christian Viguié says.

could use planes to fly over their crops. In the future, these flying robots could even be designed to spray pesticides or fertiliser. "Japanese farmers already use a crop-dusting drone developed by Yamaha in the 1980s to reach terraced rice fields," McKinnon says. The Chinese company DJI has recently released a new model with a capacity of 10 litres.

And farmers are not the only ones using drones. The Swiss agro-chemical group Syngenta uses them in an experimental project in the United States to monitor ten experimental GMO fields. The NGO International Potato Center has deployed drones in Uganda and Tanzania to map out cultivated fields. The organisation realised that official statistics underestimated the amount of sweet potatoes grown in the eastern region of Uganda by 50%.

The U.S. Department of Transportation has decided to use these flying robots for traffic control. Analysts can identify upstream places where traffic jams could develop or accidents are likely to occur before they even happen.

4. FASTER AND CHEAPER

Drones can save businesses considerable amounts of money. In farming, they can bring expenses down \$25 to \$100 per hectare. Farmers can boost the yield of their land and use pesticides and fertiliser more sparingly, says Tom McKinnon, CEO of the U.S. company Agribotix, which provides farmers with these types of metrics. "It costs €10,000 to take a satellite image of a field or deploy a small plane for an hour," Benoni says. "But a small drone is priced at a mere €1,000."

**"We inspect
500 bridges
a year for
a customer
in Italy."**

Benjamin Federmann, director
at the German firm Aibotix

These unmanned aerial vehicles can also be used to work faster. "We inspect 500 bridges a year for a customer in Italy," says Benjamin Federmann, director at the German industrial drone manufacturer Aibotix. "It would take 100 to 150 human inspectors to achieve that rate." A drone takes 30 to 60 minutes to examine a mill, versus two days using traditional methods. "And the information can be gathered without having to clear everyone out of a building or halt production," he points out.

Swiss Post hopes to benefit from these machines' ability to fly in a straight line, without having to avoid obstacles, to deliver parcels and letters. "That'll save us time, especially in mountainous regions," Pletscher says. ▶

The speed of these machines can even save lives. Alec Momont, a researcher from the Delft University of Technology in the Netherlands, has designed a drone that can carry a defibrillator and other emergency supplies. His device can cover 12 kilometres in one minute, whereas ambulances average about ten minutes to cover the same distance.

Jonathan Ledgard, director of Afro-tech at EPFL, plans to use cargo drones to transport blood in Africa. "Blood is a highly perishable product that can only be kept for about 30 days," he says. "Many hospitals outside cities badly lack reserves." And by road, transport can take two days.

5. FEWER WORK ACCIDENTS

By using drones, machines can now take care of certain dangerous tasks, which until now have been performed by humans risking their lives. This includes nuclear reactor inspectors, who are subjected to high radiation levels. Surveyors sent to the top of aggregate stockpiles at quarries often get caught in the rubble. Technicians who have to climb to the top of cell towers or pylons carrying high-voltage power lines risk falling or getting electrocuted. Crop-duster pilots working in the American Midwest and Australia also face threats. "There are about ten deaths a year," says Benoni. And reporters sent to war zones could capture images using drones without endangering their lives.

6. GOOD FOR THE ENVIRONMENT

As they run on rechargeable electric batteries or, for models such as the Sunbirds vehicle, on solar power, drones generate less pollution than other means of transport, including planes, lorries and helicopters. Their large-scale use, as planned by some parcel delivery companies, could significantly reduce CO₂ emissions.

PARCEL CARRIERS GROW WINGS

Swiss Post, Amazon and Walmart all plan to use drones to deliver their parcels. This type of system would save time and widen their customer base.

In July 2015, Swiss Post began working on a revolutionary new project at the Bellechasse airport in the canton of Fribourg. Over two weeks, the postal service carried out several hundred parcel deliveries using drones. "These initial tests were a real success," says Claudia Pletscher, the head of the project at Swiss Post. "Drones transported parcels of up to 1 kg over a distance of 10 kilometres." These trials are set to continue for the next five years.

The Swiss postal service also hopes to use drones for special deliveries. "We want to fly them in remote regions such as the Alps or in medical

By using drones in agriculture, farmers do not have to spray their crops with large amounts of chemicals. "When we know exactly what herbs we're dealing with and where they're located, pesticides can be used on highly targeted areas, instead of spraying the whole field evenly," James Lambert says.

Drones can ensure surveillance, 24 hours a day, seven days a week

7. ALWAYS ON THE LOOKOUT

Unlike inspections led by humans, drones can ensure continuous surveillance, 24 hours a day and seven days a week. "That means that inspections can be carried out more frequently, especially in high-risk areas such as residential neighbourhoods," says Vincent Fournier, the managing director of Air Marine, which inspects pipelines for the French firm GRTgaz. Sensitive facilities such as nuclear power plants >



emergencies," Pletscher says. "For example, we could quickly transport drugs to an area difficult to reach." But the company has made it clear that it will not replace its postmen with these flying robots. "They'll be used to serve in addition to our current offer," she says. Swiss Post plans to implement this service within the next five to ten years. "That mainly depends on regulations," Pletscher adds.

Matternet, a U.S. start-up working with Swiss Post on this project, is developing drones specifically adapted for parcel and letter delivery. "Our new machine, the Matternet TWO, can carry 2-kg parcels and cover up to 20 kilometres," says Oliver Evans, who heads the start-up's global operations. "Since most parcels delivered by e-commerce marketplaces weigh between 1 kg and 3 kg."

Swiss Post is far from alone in its foray into the segment. Rakuten, Japan's online retail leader, launched the first commercial drone delivery service on 9 May 2016. But this is limited to an extremely small geographical scale for now, serving Japanese golf courses by bringing refreshments and goods to golfers. "We're using this project to test our technology before extending it to real deliveries," says Hiroshi Mikitani, the CEO of Rakuten, in a presentation of the machine.

In the United States, Amazon is developing its Amazon Prime Air delivery service to bring customers their parcels weighing up to 2.26 kg in less than 30 minutes. Google has also announced a drone delivery programme set to begin in 2017. Meanwhile, Walmart has partnered with the Chinese firm DJI to design its own system.



Swiss Post is already experimenting with parcel delivery by drone using a vehicle developed by the Californian start-up Matternet. Maximum load: 1 kg.

can also be monitored more closely. Francis Enejo Idachaba, an engineering professor at the Covenant University in Nigeria, recommends flying drones with built-in infrared cameras over oil pipelines to spot attacks led by armed assailants. "Nigeria lost \$11 billion between 2007 and 2011 due to oil theft and pipeline vandalism," he says.

These devices can also fly on cloudy days. "As they generally operate at a maximum altitude of 150 metres, they can take pictures even in cloudy weather. That's something satellites can't do," Lambert says.

Another advantage is that UAVs can gather images regularly over a long period. Some American insurance

companies, including Allstate, AIG and State Farm, use them to shoot photos of building construction sites at regular intervals. In the event of a disaster, they can more accurately estimate the extent of damage in determining compensation. Farmers and breeders use drones in a similar way to keep an eye on crop growth and count livestock. ▲

BIG BROTHER IS WATCHING... FROM ABOVE

In many countries, drones assist the police in their surveillance and peacekeeping efforts, sometimes even spraying tear gas. The cantons of Zurich, Neuchâtel and Vaud have each bought one.

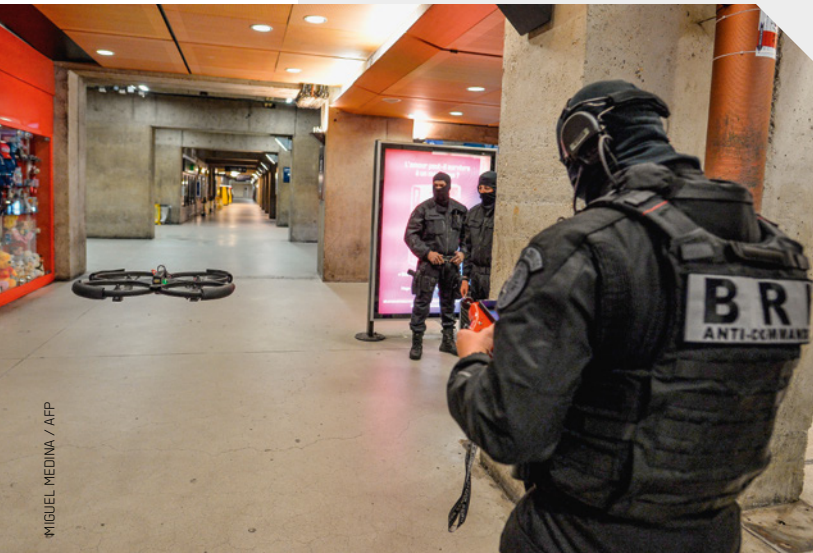
suspected terrorists. In 2015, North Dakota became the first state to use weaponised drones carrying tear gas, rubber bullets and tasers.

The only other country that uses drones so extensively is India. The police frequently deploy drones to monitor protests. The northern city of Lucknow has recently received authorisation to arm the devices with pepper spray. In the United Kingdom, five counties have now bought drones, mainly for surveillance operations. And the city of Paris has launched a tender to invest in a fleet of UAVs, mainly in preparation for the Euro 2016 football championship.

Switzerland is pioneering the drone movement. The Zurich police force stepped up first by acquiring a drone in September 2014. The device was bought to collect evidence in the event of a large-scale incident such as a multi-vehicle accident on the motorway. Drones can be used to spot pieces of evidence scattered across wide distances, which could determine facts in a case.

The Neuchâtel police have also bought a drone to document accidents. The machine is deployed about 30 times a year and can take up to 60 images of a site in about 10 minutes. Fitted with an infrared camera and thermal sensor, it could eventually be used to find missing persons or fugitives and to intervene in a hostage situation.

The Vaud police department plans to use its drone more pragmatically. Its UAV will be flown over roads and lakes in the canton to catch traffic violations and hand out fines to the guilty parties. The device was used for aerial surveillance during the Iran nuclear talks in Montreux and Lausanne in the spring of 2015.



MIGUEL MEDINA / AFP

Terror attack exercise at Montparnasse Station in Paris, 20 April 2016.

In June 2011, Rodney Brossart, a breeder in North Dakota, barricaded himself up along with his three sons, all armed, at his farmstead. Staging a stand-off with the police, he refused to return six cows that belonged to his neighbour. Law enforcement agents then deployed a drone over the farmer's property to locate and arrest him. He was the first citizen ever to be arrested by a drone.

In the United States, the police have been using these flying robots since 2005 to patrol the country's borders. The machines are also used to gather information on criminals and

MILITARY DRONES

ARMCHAIR WARFARE

Using drones for warfare has brought up a number of moral and legal issues. But not enough to keep the industry from booming.

BY JEAN-CHRISTOPHE PIOT

Since 2011, the United States army has trained fewer aircraft pilots than drone pilots. While his predecessor authorised 50 targeted strikes, Barack Obama has already green-lighted more than 500. According to a study by the publishing company IHS-Jane's, military drones are here to stay. The market is expected to grow 5.5% every year for at least the next decade.

While most civilian drones weigh no more than a few kilos, military drones span the entire spectrum, ranging from the tactical nano-drone, now part of the modern soldier's gear, to actual pilotless fighter jets and machines that can replace the reconnaissance aircrafts. With so many different kinds of military drones out there, it's tough to come up with accurate figures on the industry. A recent study by Goldman Sachs estimates that the entire gamut of military drones will generate \$70 billion in revenue over the next five years.

The industry's biggest names can be found in Israel (Israel Aerospace Industries and Elbit Systems) and the United States (Northrop Grumman, AeroVironment, General Atomics, Lockheed Martin and Boeing). Meanwhile, Europe is looking to develop in the sector to reduce its depend-

ence on U.S.- and Israeli-made drones. In October 2015, Paris announced its plans to join forces with London and invest nearly €2 billion in a programme to develop next-generation unmanned aerial vehicles (UAVs). That's good news for a number of companies, both in the United Kingdom (BAE System, Selex ES, Rolls Royce) and France (Dassault Aviation, Safran, Thales). Although international projects such as Neuron, led by Dassault, are far from operational, they clearly show the direction that the European Union is taking. In the meantime, Seoul aims to become the world's third-largest drone producer by 2023.

The distance separating the shooter from the target makes warfare that much more inhumane

Among the customers of these flying machines, Switzerland has recently ordered six Hermes 900 unarmed drones from the Israeli manufacturer Elbit Systems. Under normal conditions, these new drones will mainly be used by the civil authorities such as border guards, the police and fire brigade.

COLLATERAL DAMAGE

Military drones not only drastically reduce the costs of deploying traditional aircraft, they also reduce the risk of loss of human life among pilots to zero. However on the opposing side, collateral damage is heavy: in Pakistan, for example, the Bureau of Investigative Journalism estimates that between 424 to 966 civilians have been killed in strikes of American drones since 2004. The several thousand kilometres often separating the shooter from the target, totally isolating them from the dangers of combat, makes warfare that much more cruel and inhumane. And that's not the end of it. Boeing and Lockheed Martin want to take advantage of the empty cockpit to design their latest machines with acceleration and manoeuvrability capabilities that no human could withstand.

This point has raised concerns, to start with among human rights NGOs which are more than ever worried about the increasingly autonomous drones being developed that can decide for themselves when to strike. Some even suggest the dangers of an "incremental and involuntary journey towards a *Terminator*-like reality". Is that the writing of an overblown science fiction novel? No, just a warning from a report by the British Ministry of Defence. ▀

Toys for grown-ups

Drones are taking off as a hobby, as more and more people seek the pure pleasure of flying and shooting images. *Swissquote* takes a closer look at the new craze.

BY CLÉMENT BÜRGE

Frédéric Sidler loves the autumn. At this time of the year, he hops in his car at the weekend and heads to Derborence in the Valais Alps. He adores the valley, its mountains, lake and the many forests in the area. "It's a beautiful season in the region," says the 44-year old Valais native. But during his Alpine adventures, he doesn't budge an inch. Only his thumbs do. Frédéric Sidler is a "droner" and explores the Swiss Alps using his DJI Inspire 1.

"Seeing the mountains from the air is wonderful," he says. "It gives you a different perspective of the landscape. I feel like a bird." When he returns home, he posts his images on the video platform Vimeo, where he can share his aerial adventures with other drone fans.

Flying unmanned aerial vehicles (UAVs) has become an increasingly popular hobby. In French-speaking Switzerland, a few hundred hardcore followers and a handful of organisations have cropped up in recent years. "The number of enthusiasts really began to soar in 2015," says Gérard Koymans, the president of Airshoot, an organisation of aerial photography lovers and professionals based in Geneva. "Drones have become increasingly popular as prices have

come down and quality has improved. You now see them everywhere."

The market is indeed booming. Leisure drone sales totalled \$2 billion in 2015, according to a report from Wintergreen Research. That figure is expected to reach \$21.5 billion by 2022.

The customer base is mostly made up of 40- to 50-year-old men

Manufacturers are now scrambling to get their hands on a piece of the market. "There's already lots of money to be made," says Alex Ng, an analyst at China Merchants Securities in Hong Kong. "The Chinese consumer drone maker DJI doubled its revenue in 2015 and is likely to maintain similar growth in the years to come."

The Shenzhen-based manufacturer clearly dominates the leisure sector, holding two-thirds of the market. "DJI has managed better than an-

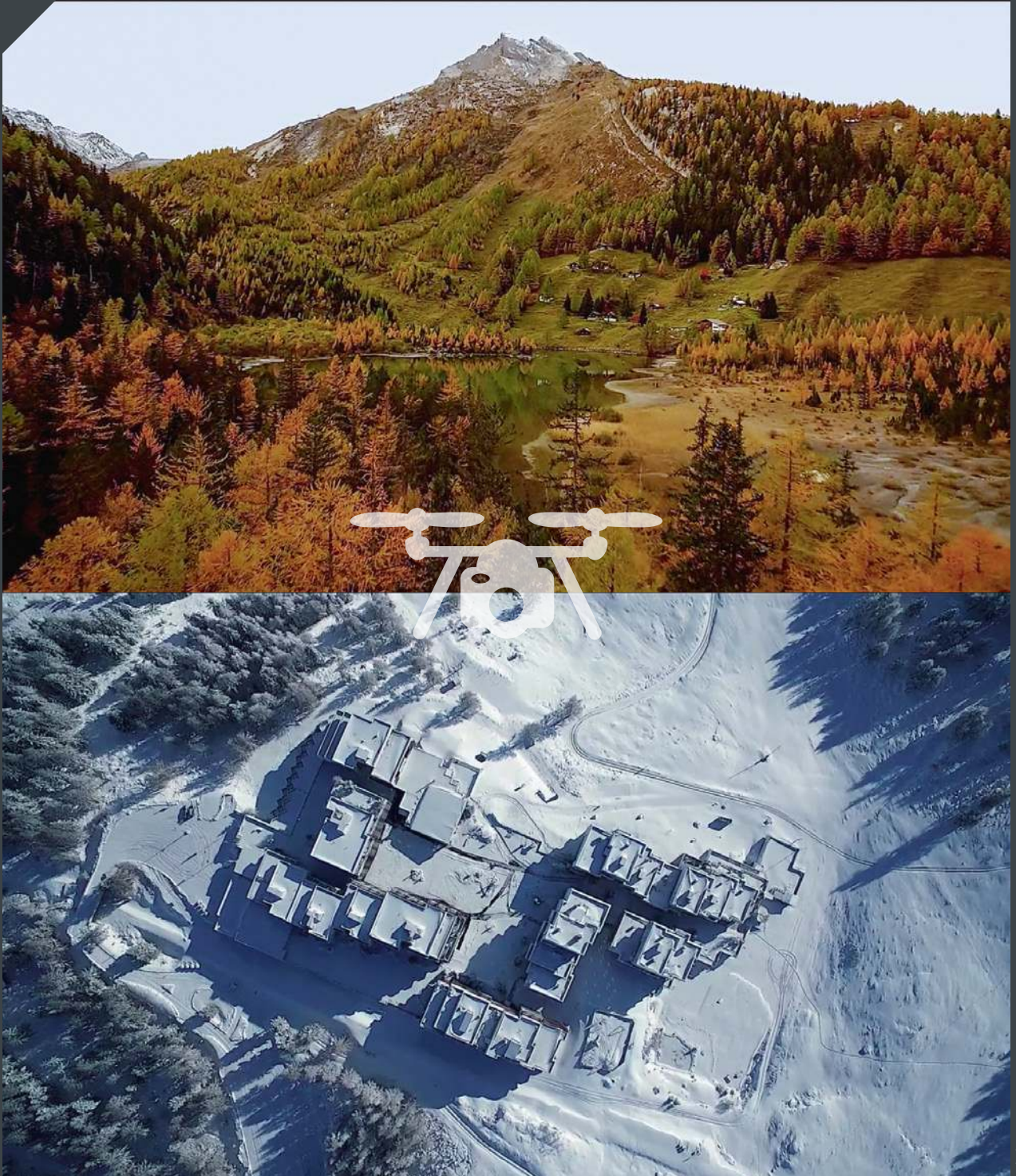
yone else to integrate sophisticated functionalities such as automated landing and an obstacle avoidance system," Ng adds. Companies such as Parrot in France and 3D Robotics in the United States, as well as a few Chinese manufacturers such as Yuneec, have a more or less equal share of the remainder of the market."

A study conducted by Airshoot reported that the customer base of these companies is mostly made up of 40- to 50-year old men. "Most droners spend 1,000 to 2,000 Swiss francs on a machine," Koymans says. "On average they pour an additional 816 Swiss francs into accessories." That makes it an expensive pastime that can only be enjoyed by relatively wealthy people.

"But that is expected to change in the next few years," says Philip Solis, research director at the tech consulting firm ABI Research. "As the price of components falls, leisure drones will become more mainstream. Teenagers and young adults will be able to afford them. The same thing happened with smartphones starting in 2010."

Droner Noam Perakis embodies this trend. "I loved building models as a kid," the 38-year old says. "But it's a complicated hobby. You have ▶

Two screen captures of videos shot by the droner Frédéric Sidler in the Valais. Top: Derborence Lake. Bottom: Thyon 2000 ski resort.



A selfie taken by a drone enthusiast is called a dronie. More of this new type of video can be seen on YouTube and social media.



build the planes and repair them often.” Leisure drones are a lot easier to fly. “When you buy a drone, you can use it straight away. You don’t have to make any adjustments or assemble any parts,” he says. “Drones are also easy to control with the range of flight assistance programmes available. Anyone can use them.”

But what is it deep down that drives these droners to spend their weekends with a controller in their hands? More than anything, Noam Perakis loves shooting photos and videos, like the vast majority of these hobbyists. “Flying cameras would actually be a more accurate description,” Solis says. “Or flying selfie-sticks.” This phenomenon has even given rise to a whole new category of photography, where people snap pictures of themselves from the air, known as the “dronie”. Others are thrill-seekers, such as fans of FPV (First Person View)

drones. “This type of machine brings an almost full immersion experience,” says Pascal Ducret, manager of Aeromodel, a store specialised in remote-control drones and cars in Lausanne. “The pilot slips on smart glasses to watch the live footage taken by the drone. That makes them perfectly suited for racing.”

“As the price of components falls, leisure drones will become more mainstream.”

Philip Solis, research director at ABI Research

There are also 3D aerobatics droners out there. “They use special drones that can fly incredibly fast in all

directions,” Ducret says. “People who choose these models are generally already used to remote-control helicopters.”

Some drone enthusiasts are getting so good that they’re turning it into a profession. Frédéric Sidler now produces tourist videos using drones. Noam Perakis has founded RC-Tech, an aerial photography company that works with the Swiss public radio and television broadcasting organisation RTS.

Drone fans now only fear one thing. Regulation. “Several countries or regions, such as Hong Kong, have banned leisure drones,” Gérard Koymans says. “Our organisation has set out a safety charter that our members must comply with. We want to prevent amateur pilots from losing their drones at Geneva Beach or above the city’s fountain, as authorities would then be stricter on the issue.”



YUNEEC

1



PARROT

2



DJI

3



BLADE

4



ISTOCK

5



Crème de la crème of leisure drones

1. YUNEEC TYPHOON G BEST VALUE FOR YOUR MONEY

Often referred to as the main rival to the DJI Phantom 3 Professional, the Yuneec Typhoon G is extremely fast (90 km/h at top speed) and manoeuvrable. The vehicle can remain in flight for 20 minutes and offers some useful features such as its return-home mode. A Gopro camera must be installed to shoot photos or videos.
Price: 649 Swiss francs

2. PARROT BEBOP SHARPEST-LOOKING DEVICE

Parrot's Bebop is arguably the most aesthetic drone on the planet. And it offers good value for money. The machine can fly 11 minutes at a top speed of 50 km/h and shoot in full HD resolution. However, some users complain that its control system lacks precision. Parrot came out with the Bebop 2 this year, but reviews mention connectivity issues.
Price: 349 Swiss francs

3. 3D ROBOTICS SOLO VIDEO EXPERT

The pearl of 3D Robotics was made for video lovers. They can hook up their Gopro camera – bought separately – to this drone to produce excellent quality images. Flight paths can be pre-programmed, which shoots more stable footage. With a top speed of 88 km/h, the Solo is also one of the fastest devices in its category. Its battery lasts about 20 minutes.
Price: 1,149 Swiss francs

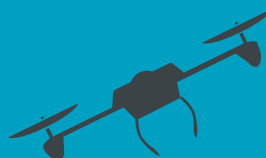


4. BLADE NANO QX RTF QUADCOPTER ENTRY-LEVEL MODEL

This UAV is perfect for beginners and children. The Blade Nano QX RTF is operated like a remote-controlled car and can fly for 7 minutes. The model is inexpensive and easy to repair but has no camera. The manufacturers have integrated a special "safety" mode which lands the small drone quickly in the event of a problem.
Price: 129 Swiss francs

5. DJI PHANTOM 4 ROLLS ROYCE OF DRONES

Probably the best consumer drone out there is the DJI Phantom 4. This easy-to-fly UAV can reach speeds of up to 72 km/h with a battery life of 28 minutes and a camera that shoots in 4K resolution. The device also features an automatic collision avoidance system. Some droners might opt for DJI's Phantom 3 Professional, a similar model that is 300 Swiss francs cheaper.
Price: 1,570 Swiss francs



Real-life Wipeout

FPV racing, the spectacular new sport featuring drones that speed through futuristic arenas at more than 100 km/h, has become hugely popular over the past year. Just a fad?

BY BENJAMIN KELLER

The dream of all *Wipeout* fans has come true. Races between futuristic flying machines have left the realm of fiction to take over arenas that rival those of PlayStation's cult video game. The only difference is that you can't yet fire missiles at your opponents. Since the sport took off last year, drone racing has gained a huge following. What is FPV (First Person View) racing all about? You fly a machine as fast as possible over a track while dodging obstacles and other competitors. Pilots are immersed using smart glasses similar to virtual reality headsets that show real-time footage – via what are typically radio waves – from a camera mounted onto the drone.

The machines weigh between 350 g and 450 g and can zip through the air at over 100 km/h at top speed. The record is held by a Belgian man who reached 178.3 km/h with a home-made drone. But at those speeds, the batteries don't last more than one minute.

The first major FPV racing competitions took place in the United States

and France in the summer of 2015, but the World Drone Prix in Dubai held in March 2016 was the event that really thrust the sport into the limelight. The finals were streamed live online, and showed 32 teams who went head-to-head along an 800 metre long race track that was beautifully lit up at night, with views of the impressive skyline of the UAE's largest city in the background. It was quite the spectacle. And a million dollars was up for grabs. That kind of prize money was unprecedented. A 15-year old from the United Kingdom, Luke Bannister, led his team, the Tornado XBlades, to win first prize before the 2,000 spectators attending the event to take home \$250,000.-.

Getting started as a racer requires a minimum initial investment of about a thousand Swiss francs

“Drone races began as components specifically made for racing hit the market, such as transmitters and



Luke Bannister, 15, won the Dubai World Drone Prix in March 2016. The British teen pulled off the feat in front of 2,000 spectators, pocketing \$250,000 along the way.

receivers to connect drones to smart glasses,” says Vincent Sergère, co-founder of the French website *course-de-drone.fr*. “They started out as challenges between friends. Then amateur videos went viral, and people really started talking about it. One of the first to attract attention was the race organised by Airgonay [a French model-making organisation] in 2014.” It garnered nearly three million views on YouTube.



KATRAN JEBRELI / KEYSTONE

Pilots are immersed using smart glasses similar to virtual reality headsets

The race track at the World Drone Prix in Dubai features illuminated rings, just like in *Wipeout*.



SAVANNAH OLIVE

Getting started as a racer requires a minimum initial investment of about a thousand Swiss francs. The gear needed includes the drone, goggles, the video transmitter and the flight controller. Racing drones are designed by specialised companies such as Immersion RC, which is based in Hong Kong but opened its R&D laboratory, Lémantech Labs, in late 2013 in Gland, Switzerland. Its star drone, the Vortex, is a favourite

among pilots. The version released in April 2015 has sold nearly 8,000 units. Some also use vehicles made by consumer drone manufacturers, including the French company Parrot, and then customise them.

“Now what people are really starting to ask,” says Vincent Sergère, “is whether DJI and Parrot, numbers one and two respectively on the consumer drone market, will come out

with their own racing copters. I think that Parrot is waiting to see what DJI will do. Indications suggest that the Chinese group might release a model this autumn.” In any case, Parrot is interested in FPV racing, having formed its own team, Parrot Racing. It also sponsors the French pilot Pablo Sotes, who took part in the qualifying rounds for Dubai, funding him with its equipment and covering his expenses at events. ▶

Nicholas Horbaczewski, CEO and founder of the Drone Racing League (DRL), the most famous American drone racing championship.



GOING PRO

Can teams live off competition alone? "In France, definitely not," Sergère says, "because races don't bring in money, instead teams win prizes. However, Dubai was a bit of a game-changer as the finalists took home cash. If anything, teams are just barely beginning to support themselves with racing." In the United States, some competitions also award prize money, and pilots with the Drone Racing League (DRL) are paid.

The DRL race is the main rival of the World Drone Prix in Dubai. The League brings together 17 teams, nearly all Americans, to compete in six regular season races before a final. A demonstration was held in an abandoned power plant in New York City in July 2015, and a 2016 pre-season event took place on February 22 at the stadium that is home to the Miami Dolphins. What is different about the DRL is that its tournaments are organised in unique venues with no spectators.

They shoot spectacular videos and then stream them online. About a hundred LED lights cover the robots, which are custom-built and supplied for pilots.

Other, sometimes purely promotional, events also take place. Drone races do not follow any international set of rules or standards. "It's a jungle," says Yann Oeffner, who is on the management team at Immersion RC and Lémantech Labs. He also heads the European Rotor Sports Association (ERSA), working to introduce a shared set of rules. An initial victory was won when the Fédération Aéronautique Internationale (FAI), which coordinates the organisation of worldwide aeronautical competitions, adopted regulations. But no one is required to comply with them.

The network ESPN is the first to air a drone race

"There is no FIFA for drones, or world cup, so to speak," Oeffner says. "There are several major events and minor ones for people to get into it." One of them will take place for the first time in Payerne, Switzerland, from 5 to 7 August 2016, which Yann Oeffner also helps to organise. Up to 100 pilots and 2,000 spectators are expected in this race recognised by the FAI. Those who qualify in Payerne will also move on to the ERSA Euro Cup 2016 in Ibiza, Europe's leading competition, and the 2016 Drone World Championships in Hawaii in October. This second competition will even be covered by ESPN.

The American sports network is the first to air a drone race. Trials will be examined closely, as public response is key. There is no doubt

about the interest of this race for pilots, but the jury is out when it comes to spectators. Drones are hard to follow with the naked eye in an arena due to their high speed; and watching them fly around on a screen can be boring, even in first-person view. The final race in the DRL event in Miami barely garnered over 200,000 views on Youtube. Not a lot, considering the \$8 million invested by promoters.

In Payerne, raising 50,000 Swiss francs is already a challenge

The problem is: no audience means no sponsors; and with no sponsors, there is no money. And not everyone is a member of one of the UAE's royal



Imitating Wipeout

Video game lover or not, you can't help but think of *Wipeout* when watching drone racing. PlayStation's legendary game, which originally came out in 1995, is forever etched in the minds of generations of players, with its winding, psychedelic tracks and hypnotic techno music by famous bands such as *Prodigy*.

families. In Payerne, raising 50,000 Swiss francs from sponsors is already proving a challenge, according to Yann Oeffner, who plans to set up screens and a night race track with LEDs covering the drones to make the races more impressive to watch. Spectators might one day be able

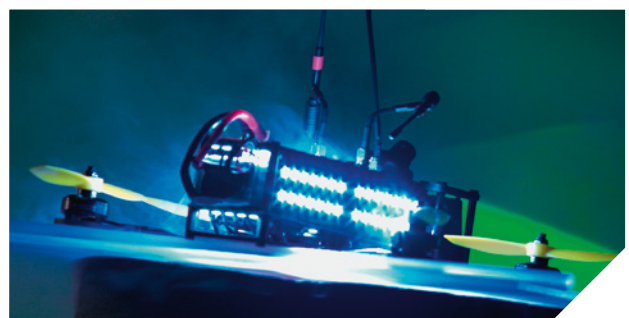
to connect to the pilots' goggles with their smartphones. "For the sport to develop, we need media interest. To achieve that, we need to attract people," Oeffner says. "And to attract people, we need something like *Wipeout*." What about using missiles after all? ▲



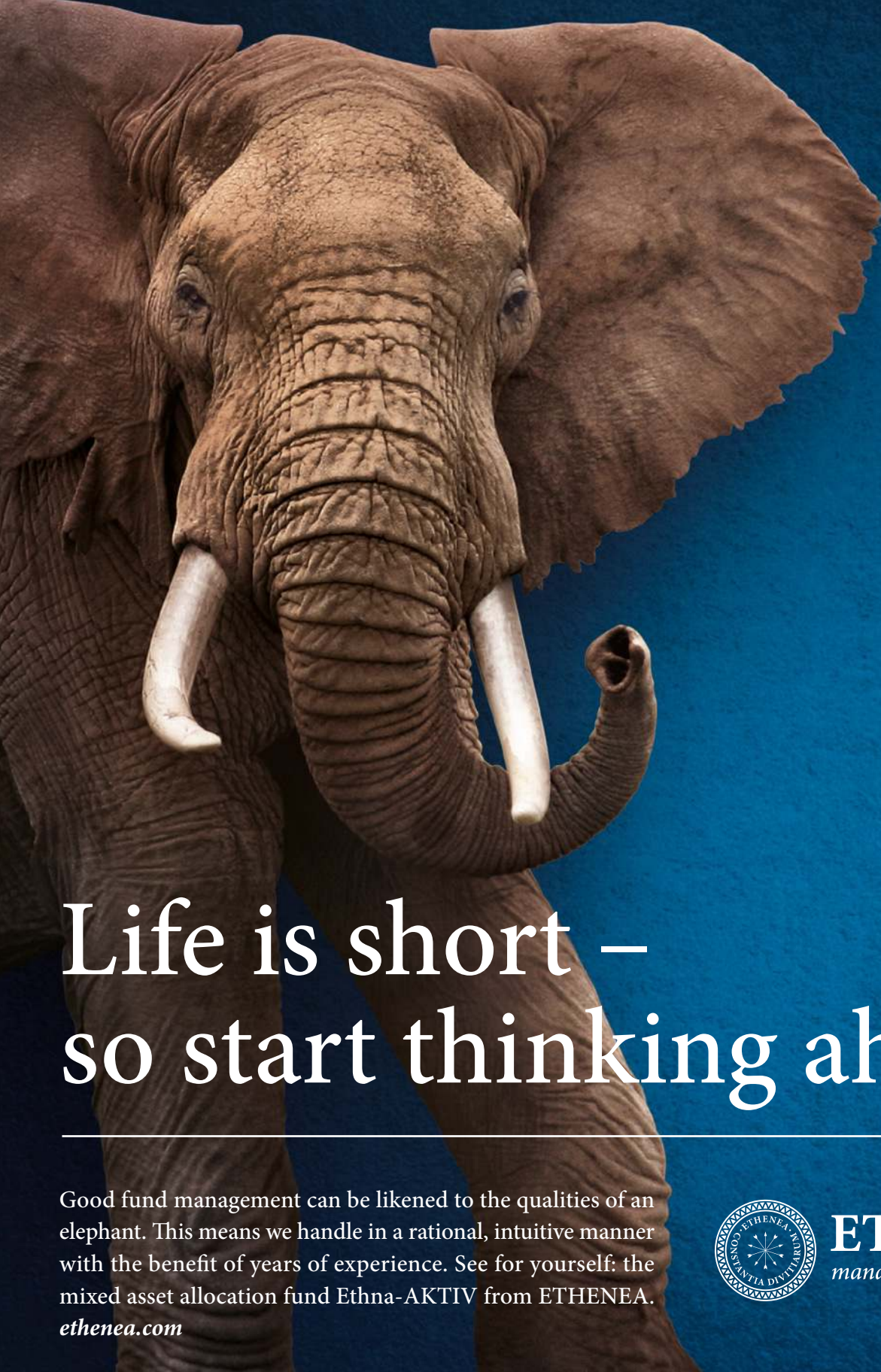
THE DRONE RACING LEAGUE (DRL)

Ballet of lit-up drones during a Drone Racing League event. The season includes six races, all of which take place in the United States.

The Drone Racing League's official drone, covered in about 100 LED lights.



THE DRONE RACING LEAGUE (DRL)



Life is short – so start thinking ahead.

Good fund management can be likened to the qualities of an elephant. This means we handle in a rational, intuitive manner with the benefit of years of experience. See for yourself: the mixed asset allocation fund Ethna-AKTIV from ETHENEA.
ethenea.com



ETHENEA
managing the Ethna Funds

In each issue, *Swissquote Magazine* looks at the cultural capital of a listed company through an aspect of its communication, representation or other projects. After covering Swatch Group's new headquarters designed by Shigeru Ban, we will shift gears to explore the artists in residence programme at Autodesk.

Autodesk, taking artists under its wing

BY SYLVAIN MENÉTREY

Autodesk is the computer software giant that no one has heard of. The company's name is well-known to architects and engineers who use its star product, the 3D modelling software AutoCAD. This firm operating out of San Rafael, California, is also enjoying the current boom in the lucrative new market of 3D printing. With revenue of \$2.5 billion and 9,500 employees, Autodesk ranked twentieth in the PricewaterhouseCoopers ranking of software leaders.

Since 2011, Autodesk has also stood out with its cutting-edge artists in residence programme, which Facebook copied on a smaller scale three years ago. These are innovative initiatives from the tech world, which has a reputation for its aversion to culture. Silicon Valley firms are blamed for driving the gentrification of the region, forcing artists to take exile in areas with more budget-friendly rents. Artists have also criticised their lack of financial support for cultural projects.



The Autodesk's Pier 9 site, which hosts the artists in the heart of San Francisco.

AUTODESK

The Autodesk programme launches two calls for applications a year on its website. Sixteen artists – or “makers” – who show interest in new technology are selected for each residence period. “After forming the cohort of 16 artists, we teach them how to use our equipment and software,” says Amelise Javier-Lane, a communications manager at Autodesk. The lucky winners hail from diverse backgrounds, including visual arts, multimedia,

gastronomy and fashion design. Paid a monthly stipend of \$2,000, the artists are then completely free to roam Autodesk's Pier 9 site in the heart of San Francisco.

Artist John Briscella developed the optimal archery bow with the help of the team that develops Autodesk's software Dreamcatcher. The program uses an algorithm to create objects based on a set of parameters chosen by the user, such as mass

and ergonomics. Dreamcatcher then generates the object automatically, often in an unexpected design. Adrien Segal studies data visualisation. During her residence at Pier 9, she created a canyon-shaped bench using drinking water consumption statistics in the United States. “What makes this initiative unique is that the projects they develop are 100% owned by the artists,” says Javier-Lane.

By getting artists involved at the company, Autodesk can test the programs it is developing by applying them in experimental ways. The firm also makes sure that ideas flow smoothly between technicians and artists. Artists and staff members work side by side, have lunch together and sometimes continue working together after the four-month residence is over. This pragmatic approach could set a new model for collaboration between art and industry. Instead of just buying up works of art, the two worlds can join forces in the creative and innovation process. ▀



Jürg Schwab
Director Trading

LOMBARD LOAN

“The time is right to take out a Lombard loan”

Want to take advantage of new investment opportunities or generate cash without selling any of your securities? It's possible – and easy – with the Lombard loan. Swissquote's Head of Trading Department Jürg Schwab explains how.

SPECIAL OFFER

From the beginning of May to the end of September, Swissquote is offering an exceptional 0% rate on all new Lombard loans.

When you have a healthy securities portfolio, it might seem strange to borrow money – and therefore pay interest – to obtain cash, while all you have to do is sell a few shares. There's just one thing. Divesting assets also means diminishing returns. When the portfolio is performing well, you're much better off letting it prosper. That's where the Lombard loan comes in. It can be used to take advantage of new investments or meet a short-term need for liquidity (to buy a car, go on holiday, etc.). Furthermore the current political and economic environment is ripe for enjoying available market opportunities, according to Jürg Schwab, Head of Trading at Swissquote.

Why is it a good idea to take out a Lombard loan in today's environment?

We believe that the time is right, as the stock market is expected to rise over the next few months and years. That's why people should invest in securities now, while prices are relatively low. Central banks have been pumping huge amounts of liquidity into the economy to encourage companies to invest. The downside is that this policy drains the value of money. As a result, the value of any cash held,

for example, in a savings account will dwindle. Meanwhile, the prices of products and services will increase, causing companies' profits and reserves to grow. This generally leads to an eventual increase in share prices and dividends. In the end, the returns on stocks will be significantly higher than for savings, where interest rates are on a historical low.

“This offer is available to all our customers, including those who invest small amounts.”

What do you mean by cash losing value?

Anyone who would currently choose to keep their assets in a savings account might not get any interest and could even lose purchase power with growing inflation over the next few years. To compensate this negative effect, our customers can invest more diversified in financial market, especially equities, the expected rise in stock prices along with high dividend payments

could maintain or improve their purchase power. Of course, you have to be ready to accept price fluctuations.

What are the terms for taking advantage of a Lombard loan at Swissquote ?

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What products can customers invest in ?

Our platform offers the widest selection of products on the market. More than two million products are currently available. We have more than 60 equity markets worldwide, two large platforms for bonds and investment funds and a broad range of derivatives. And our search engine is very powerful. Customers benefit from all the tools they need to devise the investment strategy they want.

Any advice on what strategy to take ?

You should definitely diversify your equity portfolio, in terms of both country and business sector, to reduce risk. For higher portfolios we recommend to invest directly in single stocks; when it comes to smaller investments, we recommend selecting a few exchange-traded funds (ETFs) – again to diversify – which in the end achieve similar performance.

What do you think are currently the most attractive investment sectors ?

I'd say commodities – especially oil companies – and financial securities, which have suffered in recent years but could now recover. Furthermore we prefer high dividend papers and a diversified investment portfolio. ▲



What is a Lombard loan ?

A Lombard loan is a credit guaranteed by securities (equities, bonds, investment funds, etc.). This type of loan can be used to obtain cash or seize attractive market opportunities without having to dig into your current portfolio. And the bonus is that loan interest is tax deductible.

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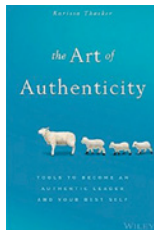
The Swissquote advantages

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- + Attractive terms and interest rates

TO READ

THE ART OF AUTHENTICITY

By Karissa Thacker (Wiley)



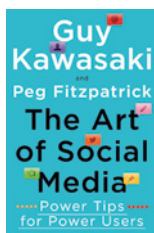
When the management psychologist Karissa Thacker gives advice, people listen. Lots of people. Two hundred Fortune 500 companies have already sought her services.

She says that, in a nutshell, to be a better leader you have to become a better version of yourself, in other words, authentic. You have to understand the complexity of your own mind before you can grasp how other minds work and be able to guide people. In her book, the author provides tools and insights to bring out the authentic you.

From \$25.-

THE ART OF SOCIAL MEDIA

By Guy Kawasaki and Peg Fitzpatrick (Penguin)



Whether we like it or not, these days social media plays a huge role in the success or failure of a business, product or job.

The authors – Peg Fitzpatrick is hailed as the top social media expert around – give readers more than a hundred practical tips and tricks to guide them through the steps that will optimise their social media profile, attract more attention and develop their personal brand.

From \$14.-

TO DOWNLOAD

MailTime EMAIL MESSAGING



MailTime is out to change the way we communicate by email. The app has reformatted

the email thread to look like an SMS chat. The interface trims away unnecessary information and leaves just the content that users need to make email messages easier to read. And the added bonus is that MailTime automatically sorts emails between individual messages and newsletters.

Free

Apple Store, Google Play

MyAirSeat TAKE A RIDE IN A HELICOPTER



This free app makes it easy to book a seat on a tourist flight in a helicopter or

airplane. Created by the Swiss start-up MyAirSeat, the app offers over 130 flights from Swiss cities to places such as Corsica's Calvi and Austria's St Johann im Pongau. A number of Swiss and Austrian flight companies, such as Air-Glaciers, Air Zermatt, Heli-West, and Heli Austria, use the app to fill their private – and often half empty – flights.

Free

Apple Store, Google Play

ProtonMail SECURE MESSAGES FOR ALL



The *Wall Street Journal* praised this app developed by scientists concerned about

protecting civil liberties. ProtonMail offers secure email service using end-to-end encryption by default. Once the app is installed, no one other than the sender and recipient can read not only messages sent and received but also emails stored in the message box. No encryption expertise required. ProtonMail takes care of it all.

Free

Apple Store, Google Play

VHS Camcorder OLD-SCHOOL VIDEOS



This app is for anyone nostalgic for those poor quality videos from the 1980s, with

the shaky tracking lines across the screen, noise distortion and date and time displayed in the lower left corner (which the user can configure). All the effects are there to get the look and feel of those good old VHS tapes. Three resolutions are available, and users can film in colour or black and white and in wide screen or retro 4:3.

\$3.99

Apple Store, Google Play

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SWISSQUOTE





CAR

Summer roadsters

Focus on three freshly revamped legends.

BY BLAISE DUVAL

GO ATHLETIC : PORSCHE 718 BOXSTER S



ENGINE : FLAT 4 TURBO, 2497 CC

POWER : 350 HP AT 6500 RPM

0 TO 100 KM/H : 4.6 SEC.

BASE PRICE : 80,900 SWISS FRANCS

Let's start by getting a sensitive issue out in the open. The 2016 version of the Porsche Boxster has dropped two cylinders, which were sacrificed on the altar of CO2 emissions. The new flat 4-cylinder turbo is a technological gem of an engine. Taking centre stage in the rear, the powerhouse shines in almost every respect but leaves us nostalgic for that captivating sound and upshifting of the famed, naturally aspirated flat 6. In every other department, however, Porsche has got it right. The Boxster – adding 718 to its name in reference to the 1950s race car – has made terrific advances in terms

of both efficiency and power. Edgy at any speed, the turbo-charged engine of the S variant (350 hp) thrusts the vehicle from 0 to 100 km/h in a mere 4.2 seconds with the PDK automated transmission and the Sport Chrono pack. A performance on par with the old 911 Carrera S.

The not-too-shabby base model in the Boxster range clears 300 hp with its two-litre engine and runs that same 0 to 100 km/h in 5.1 seconds on a manual gearbox. The “small” model, going for a smooth 65,600 Swiss francs, would almost be a deal if the long list of options

didn't brutally jack up the price. The indestructible ceramic brake pads, for example, tack on an additional 8,920 Swiss francs to transform the Boxster into a race car with phenomenal stopping power.

The interior has undergone few noticeable changes, but the detailing remains top notch: namely the new, 918 Spyder-inspired steering wheel, 7-inch multi-touchscreen and perfect driving position – a Porsche hallmark. ▽



GO PLAYFUL : MAZDA MX-5

The popular MX-5, which has sold more than a million cars worldwide, has been remastered into a concoction of lightness, agility and pure enjoyment. The roadster comes at an unbeatable price for the category. Starting at 23,200 Swiss francs



GO SLEEK : MERCEDES SLC

For its 20th birthday, the SLK has changed its name to SLC. The model still features its signature retractable hardtop, an industry favourite. Horsepower ranges from 156 hp to 367 hp for the AMG version. Starting at 39,900 Swiss francs

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Osswald Perfumery and Jelmoli in Zürich and Hyazinth Perfumeries in Basel and Lucerne.

TRAVEL

Fripp Island, golf in a tropical paradise

On Google Earth, Fripp Island is just a speck of sand somewhere off the Atlantic coast. But in reality, this South Carolina coastal island is like a little chunk of paradise that fell straight down from heaven. Featured story.

BY SALOMÉ KINER



The last kilometres are often the longest. This is particularly true of the road that leads to Fripp Island. You get there via Savannah, Georgia, where colourful colonial houses line the streets like boxes of candy, or via Beaufort, in South Carolina, where wisps of Spanish moss murmur nonchalantly as they dangle from the trees. In either case, the long paved line that separates dry land from the marshy lagoon of Fripp Island seems to stretch on infinitely. However, on the side of the road, shops selling surfing gear and fishing tackle offer proof that the ocean can't be far.

Little by little, the luxuriant curtain of maritime forest grows thinner and the marsh approaches, meandering among the first stretches of sand. Waves of hot air occasionally stir up the scent of the peat bogs, mixing it with the ocean spray, and the sun will most likely be setting when you finally reach the gates of the Fripp Island Golf & Beach Resort. You have to plan your arrival on this privatised residential island reserved for members or - the most common option for tourists - for those who have rented one of the four categories of villas, ranging from Bronze to Platinum. But why does one come to Fripp Island? ▶

FRIPP ISLAND RESORT

Ocean Point golf course, designed by George Cobb.



TOM WOODWARD

One of the many deer roaming the island.

the setting for certain scenes from *The Jungle Book* and *Forest Gump*. In either case, Ocean Creek and Ocean Point are extremely well kept. There is not a blade of grass out of place on the fairway and the greens look like they are made of silk, barely marked by shadows from the nearby palm trees. However, these manicured areas cannot stop nature from expressing herself.

Fripp Island is also a protected natural reserve, inside which colourful wildlife thrives

Fripp Island is also a protected natural reserve, inside which colourful wildlife thrives. There are signs almost everywhere indicating the presence of alligators and their cunning profiles can be seen lurking at the water's surface. But unless they disturb them, golfers and holiday-makers need not fear them. The deer are more enchanting to watch and their graceful silhouettes are often

To play golf, essentially, on its exceptional courses. The 1.5 square kilometres of Fripp Island are home to Ocean Point, designed by George Cobb, who is also known for his courses at Augusta National Golf Club, and Ocean Creek, imagined by a golfer, Davis Love III, captain of the American Ryder Cup team in 2012. The first course, built in 1964 on the northern tip of the island, faces the ocean. Each hole offers a new panorama that, if you take time to admire it, can considerably extend the average time of a round, estimated at 3 hours. In addition to breathtaking views of the silver waves of the Atlantic, the course is situated between ponds and marshes and forces players to deal with subtle changes in the wind.

Ocean Creek is more recent and unfolds between crests and valleys. It doesn't offer a prestigious view, but the course is more sophisticat-

ed with greater precision and attention to detail for each of its eighteen holes. Its wet zones and luxuriant vegetation have been



HOAN LUONG

Bridge connecting Fripp Island to South Carolina.



SALOMÉ KINER

seen crossing the golf courses and sandy paths on the island. They are everywhere (around a thousand according to the latest headcount) but remain aloof. Entire families come sniffing about the marshes when the tide is low and into the gardens to glean their dinner under the azaleas.

Marc Shondel is a Club House staff member who left his native Pennsylvania for this place that he qualifies as “paradise on earth”. There are 300 permanent residents, but the population reaches 5,000 during the high season, from June to October. Designed as a “holiday village” with a resort and private villas, the island has been preserved against the effects of mass tourism. It enjoys protected status as a natural park and has earned many positive environmental citations each year.

The absence of cars, replaced by golf carts and rented bicycles, contributes to the subtle charm of the island. This quiet atmosphere is appreciated by some and loathed by others: you better not come to Fripp Island looking for nightlife or cultural events. This place is a highly prized destination for families and young retirees. ▶

PRACTICAL INFORMATION

Website: frippislandresort.com



RATES

Count on spending an average of 2,200 Swiss francs a week. The Fripp Island Resort package includes accommodation in an apartment (houses are available at a range of rates) and a card offering access to the golf courses, pools, tennis courts and restaurants. A round of golf with the card costs 75 Swiss francs.



GOLF

Important: Golfers can't access the courses without the Fripp Island Resort card and it is not systematically included in offers organised outside the control of the resort (Airbnb, private rentals).



HOW TO GET THERE

Savannah airport is located 1 ½ hours away by car. There are flights from Zurich and Geneva to Atlanta. The connecting flight from Atlanta takes about an hour. Otherwise it takes about 5 hours to reach Savannah by car.



SALOMÉ KINER

The resort offers a wide range of quality hospitality services, with restaurants and bars. But all accommodation comes with kitchens and all you have to do is leave the island to sample the local “soul food”, a gourmet attraction in and of itself in the southern United States.

The absence of cars contributes to the subtle charm of the island

But Fripp Island is not only for golfers. When he is not busy teaching golf, Marc Shondel enjoys one of the many tennis courts, goes paddle boarding or sea kayaking, takes yoga classes on the beach or joins his friends at the creek. “A large community of fishermen meets up every day in the salt marshes or at the marina to fish offshore.” Every day they come back with nets full of umbrine, sea perch, barracuda, marlin, flounder, trout, crab and, the more daring even catch small shark. More patient visitors can sometimes

observe a school of dolphins or loggerhead sea turtles. Each year the Fripp Turtle Nest Protection Program allows volunteers and amateurs to observe these turtles who dig their nests along the 3.17 kilometres of sandy beaches particularly suited to their reproduction. Marc Shondel promises bird lovers will also be delighted: “There are eagles, pelicans, egrets, herons and osprey. It’s like a film. All you have to do is look through your binoculars.” At night, shooting stars put on a show in the sky. ▲



Second golf course,
at Ocean Creek.

Invest in the most sustainable Health Care Fund: The Ronald McDonald Kinderstiftung™.

The Ronald McDonald Kinderstiftung is running seven parents' houses in Switzerland. These houses are close to children's hospitals: in Basel, Bern, Lucerne, St. Gallen, Bellinzona and Geneva. They provide a home away from home for parents so they can stay close to their seriously ill children, under the motto "Closeness helps healing". To date over 14,200 families have spent a total of 116,000 nights in the Swiss Ronald McDonald Houses.

Help us with your donation. Thank you.
www.ronaldmcdonald-house.ch



BOUTIQUE



SUNNY SOUNDS

The solar panel built into Helios headphones, developed by the Paris-based start-up Exod, recharges its battery in natural light. The wireless device can access audio and video content within a range of up to 10 metres via Bluetooth technology and features a hands-free function to answer phone calls. Helios can stay charged for more than 16 hours. The micro-USB cable can be used if necessary to charge the headphones using electric power.

www.exodline.com
About \$270.-

COMPOSTABLE CHIC

F-ABRIC, the new collection of compostable clothing by the Zurich-based label Freitag, works the casual chic style. The 100% biodegradable, broken twill blazer is made with a blend of 81% linen and 19% hemp with buttons in the zinc alloy zamak. It also includes a super-clever detail: the cyclist's pocket hidden in the back.

www.freitag.ch
About \$400.-



IN YOUR CORNER

The Cross Body Trainer reinvents the traditional boxing workout. This system features a double end striking bag equipped with a Bluetooth sensor. Users hook up their device before a training session and follow the instructions provided by the app, which suggests exercises to practise. The controller measures metrics such as power, accuracy and strike speed.

www.crossbodytrainer.com
About \$495.-





FULLY HATCHED

For the brand Vondom, the Spanish designer Ramon Esteve has come up with a daybed that opens and closes like a shell. This tastefully designed, circular object can swivel around 360 degrees, and its parasol opens and closes easily whenever you want. The bed is 100% recyclable and made of polyethylene resin with rotational moulding to withstand UV rays and extreme temperatures.

www.vondom.com

About \$5,300.-

SMOOTH SAILING

America's Cup sponsor Louis Vuitton celebrates its 33-year partnership with the prestigious sailing competition in 2016 by designing a men's collection featuring the event's logo and colours. This seafaring wardrobe includes eye-catching mules in waterline rubber. What an elegant way to show off one's passion for the open sea, even at the beach or pool.

www.louisvuitton.com

About \$440.-



SMART LOCKS

Who wants to weigh themselves down with keys? BitLock has developed a Bluetooth-activated bike lock that unlocks whenever its owner and the app on his or her smartphone are within range. The GPS function can also help absent-minded owners find their bike's location. Very practical.

www.bitlock.co

About \$129.-

DIFFERENT STROKES

Stand-up paddling is a centuries-old Hawaiian sport that has worked its way onto Swiss lakes over the past few seasons. The Swiss brand Hopman has decided to ride that wave. Embedded with a Bluetooth-enabled sound system, the entire surface of its new board is transformed into a speaker. Now avid fans of the sport can (stand-up) paddle along while grooving to their favourite tunes.

www.hopman-st.com

About \$3,800.-



BOUTIQUE

WATCHLIST

SPORT STYLE



No one expected a sports watch from **H. Moser & Cie**, but the Pioneer Centre Seconds is indeed impressive. Its reasonably sized 42.8-mm case and minimalist dial make for an elegant, discreet timepiece. The sportier features include the Superluminova hands, the 13 luminescent dots indicating the hours on the flange and the rubber strap.

www.h-moser.com
About \$23,600.-

REVVED CLASSIC

With its dial encircled in red, its oversized numbers like a 1950s dashboard and its strap styled after a vintage Dunlop tyre tread, **the Mille Miglia GTS Automatic Speed black** by Chopard exemplifies a love for classic car racing. This edition limited to 1,000 copies draws its inspiration from the legendary Mille Miglia rally, which would bring together more than 400 classic cars every spring to compete in a race between Brescia and Rome.

www.chopard.com
About \$7,100.-

TIME FLIES

With its Pilot's Watch Mark XVIII **TOP GUN Miramar**, IWC has come out with a ceramic timepiece at a very attractive price for the brand. The design of its dial brings to mind traditional observer watches, whose main requirement was easy-to-read minutes and seconds. Featuring a 41-mm case engraved with the Top Gun logo on the back, the model is water-resistant down to 6 bars and packs a 42-hour power reserve.

www.iwc.com
About \$6,000.-



IN PERPETUITY

Following up on its smartwatch unveiled last year, **Frédérique Constant** goes back to basics with a collection focusing on the perpetual calendar, one of the most emblematic complications in Swiss horology. The independent watchmaker reinterprets this classic feature in a streamlined version with a silver dial, 42-mm steel case and an in-house automatic calibre. And the price undercuts the competition in fine watches.

www.frederiqueconstant.com
About \$8,600.-



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SYLVIE REINHARD
DIRECTOR OF PIONIERLAB
AT MIGROS

BORN ON 1 OCTOBER 1980
IN NEUCHÂTEL

TRIPPY BASS AND CIGARS

DR

Sylvie Reinhard has devoted her boundless energy to developing new businesses and digital innovation for the past 15 years. Today, she is director of Engagement Migros, the development fund of the Migros Group which supports innovative projects. Additionally, for the consulting firm Crstl, she gets projects off the ground that bring together culture and technology. Sylvie was the Managing Partner for the Lift Conference from 2007 to 2015, and in 2014 she co-founded Digital Alliance, an initiative that aims to promote and finance creative industries in Switzerland. This bilingual leader feels at home on either side of the Sarine and is a council member at the Geneva University of Art and Design (HEAD) and House of Electronic Arts Basel (HeK).

A KEY EVENT FROM YOUR CHILDHOOD ?

When my mother launched the intercultural library Bibliomonde in Neuchâtel. That encouraged me to develop projects and turn my ideas into reality.

THE PROFESSION YOU WOULD HAVE LIKED TO DO ?

Head waitress. As a student, I loved working at Restaurant Dampfzentrale in Bern. Really interesting people came there - lots of artists.

YOUR SECRET HOBBY ?

Shining shoes. This passion must be genetic. My whole family on my paternal grandfather's side worked at Bally.

SOMETHING THAT INSPIRED YOU RECENTLY ?

The augmented reality installation at the Geneva-based start-up Artanim. An absolutely amazing and incredibly immersive experience.

A SONG THAT SUMS YOU UP ?

Any electronic music with really trippy bass, like "Warriors" by Hudson Mohawke.

THE FILM THAT YOU WOULD'VE LIKED TO EXPERIENCE ?

"Grand Budapest Hotel" or another film by Wes Anderson. I love his style, with his omnipresent symmetry.

A PLACE THAT MADE AN IMPACT ON YOU - AND WHY ?

Seoul. I went there for the Korean editions of Lift. I was really impressed with the Koreans' "work hard, play hard" attitude. What energy!

THE IDEAL WOMAN ?

Likes to smoke cigars.

THE IDEAL MAN ?

Isn't a conformist and has a good sense of humour.

THE IDEAL ANIMAL ?

The iguana. I don't know why, but it's my favourite animal.

YOU WIN 5,000 SWISS FRANCS ON THE STOCK EXCHANGE. WHAT DO YOU DO WITH THE MONEY ?

I treat myself to a Céline suit. The cut and fabrics are to die for, but they're way too expensive!

A BOOK THAT YOU RECOMMEND ?

Thinking, Fast and Slow by Daniel Kahneman. The author shows us some of the surprising (and quirky) ways in which our mind works. And for fun, he gives instructions on trying new experiences.

YOUR FAVOURITE WORD AND YOUR FAVOURITE SWEAR WORD ?

"Excellent" and "putain". Simple but effective. ▲

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