

NEWS p.4 Formula 1 Racing, Fernando Alonso and Renault, world champions / **Foundation**, 2006 Award theme: energy/**Techno-shopping** HRP-2, a robot that moves like a human **HIGH-TECH p.11 Faster**, higher, stronger **PEOPLE p.19 Solar Impulse**, the goal of "perpetual flight", in partnership with Altran/ **Campus** Lucie Portmann's decisive experience at Altran

November 2005

N° 8

ALTRAN'S
SCIENCE &
TECHNOLOGY
MAGAZINE

Altitude

**FASTER,
HIGHER,
STRONGER**



 **ALTRAN**

ALTRAN FOUNDATION: INNOVATION FOR A GOOD CAUSE

On the eve of its 10th anniversary, I think I can correctly say that the Altran Foundation for Innovation figures prominently in Europe's corporate patronage landscape. I am particularly proud of its standing and pledge to maintain it.



As you may know, each year our Foundation grants an international science award to the leaders of innovative projects related to research, teaching and business.

The originality of Altran's contribution to the community undoubtedly lies in the service it offers award recipients: a year of consulting. By participating in this year of guidance and support, Altran's consultants are directly involved in the Foundation. They offer all the keys to success to the ambitious project selected by the jury.

A vast array of themes has been chosen throughout the Award's history: memory, pain, water, food safety, living conditions in urban areas, developing countries, early childhood, discovering science, overcoming social exclusion, and this year, energy. More relevant to current events than ever, this theme covers the entire concept of energy, from production to environmental effects to use – either for transportation, the home, or industrial purposes. It is concrete evidence of our eagerness to take full responsibility and contribute to solving society's problems.

I hope that the 2006 Award will showcase many innovative projects, and I wish every candidate the best of luck.

Christophe Aulnette
President of the Altran Foundation for Innovation
Chairman of the Management Board of Altran

ALTRAN

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Through her experience with Altran, she confirmed her interest in human resources and recruitment.

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ELECTRONICS
PICTURE-PERFECT DETAILS

Say goodbye to those dreaded photos where everyone's eyes are half-closed! In a few years, cameras might feature a blinking prevention mechanism. Anti-red eye systems use short, repeated flashes before the image is captured that often force subjects to blink. Japanese researchers at the University of Electro-Communications have created a digital camera that takes 15 images in a half-second with the push of a button. A software program then quickly selects only those photos where the subject's eyes are completely open. According to claims, this system works for group photos of up to 30 people. The invention could be on shelves within two years.

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LETTERS
IS THE LENGTH OF THE LONGEST GERMAN DOMAIN NAME, AND THE MAXIMUM AUTHORISED BY GERMAN REGULATIONS.
HTTP://WIEMENSCHLICHMENSCHENSINDZ EIGTHRUMGANGMITDERMUTTERSPRACHEFRSCH.DE
TRANSLATES TO "THE WAY A HUMAN TREATS HIS NATIVE LANGUAGE SHOWS HOW HUMAN HE IS."



ALTRAN FORMULA 1
CHAMPIONS ARE BORN!

Three weeks after Fernando Alonso — at the age of 24 — became the youngest world champion driver in the history of Formula 1, the victory of this Spanish prodigy at the China Grand Prix and a suspenseful, breathtaking finish propelled the Renault F1 Team to the status of world champion car manufacturers. This was a first for the French team, who ended the long reign of Ferrari, and the victory of a team united toward the same goal: seeing Alonso and Giancarlo Fisichella pass first under the checkered flag. Straddling two industrial sites on either side of the Channel (see Altitude n°3) — Viry-Châtillon, France, for the engine and Enstone, UK, for the chassis and gearbox — the French team counts on the support of 20 Altran consultants from all over Europe. These experts contribute to every aspect of the yellow and blue race cars, from the design phase, to the testing, manufacturing, and burn-in phases. As the Renault F1 Team's technological partner for four years running, Altran is proud to share in the team's victory and congratulates its consultants for their part in this great success.



A GLOBAL ACCOUNTS STRATEGY

Altran has set up a Global Accounts department charged with the goals of identifying and coordinating its subsidiaries' areas of expertise and showcasing a clearer offer to its clients while strengthening the ties it first forged with them several years ago. To this end, Altran's services have been standardised and broken down by sector: aeronautics to begin with, then automobile and telecoms. "We will finally be able to measure our subsidiaries'

potential for mutualisation," explains Christophe Aulnette, CEO of Altran. "This type of organisation is being tested for three of our primary clients, and an aeronautics offering comprising eight subsidiaries was officially introduced at the Le Bourget Paris air show in June. Our Global Accounts strategy is designed to preserve the source of the group's originality and vitality: its decentralised structure based on multiple subsidiaries."



ALTRAN : « COMPANY OF THE YEAR » IN SWEDEN



The French Chamber of Commerce in Sweden elects Altran Scandinavia

as "Company of the Year" for 2005. The award jury chose Altran for the following reasons : "In just 10 years, Altran has successfully built up a renowned consulting business in Sweden. The company is growing at a considerable pace, backed up by a strong recruitment drive. Altran has increased its appeal and awareness through working with several business schools and universities, such as Handels, KTH



and Chalmers (among the top in Sweden). To conclude, Altran is a great example of a French company's success on the Swedish market." First started in 1988, the prize rewards a French company for having made a major contribution to the French-Swedish exchange and for developing French presence in Sweden. Former companies awarded include France Telecom Nordic, Michelin Nordic AB, Sodexho and Citroën.

40 YEARS AGO

AUDIO CASSETTES



In 1965, Philips began marketing the first pre-recorded audio cassette. This was the start of a great adventure for the Dutch company, just two years after it officially unveiled the first magnetic audio cassette, a.k.a. the Compact Cassette. Philips used those two years to file a patent guaranteeing compatibility and fee exemption for all manufacturers. As a result, the cassette quickly grew in success and renown. In 1979, its handy size and shape paved the way for the first portable audio devices (Sony's Walkman®). The following year, cassettes outsold records. In 1987, 691 million cassettes were sold in the United States, Japan and Europe. The subsequent advent of the compact disc (CD) brought the era of the cassette to a close. In developing countries, however, a significant amount of music continues to be sold in cassette form.

ALTRAN

AGS: NEW HORIZONS

Now an inevitable aspect of doing business, outsourcing has a growing impact on a company's competitiveness, flexibility, and responsiveness to new economic challenges. In every industrial sector, outsourcing to lower-cost countries has cut costs by 20 to 45%.

This approach requires a "Global Sourcing" strategy to identify the most competent and appropriate supplier for each new product component (sourcing), service, or software program (offshoring). Altran has developed Altran Global Sourcing (AGS) to assist the Group's companies abroad (Brazil, China, India, Portugal, etc.) and to add a network of partners in Russia, Romania, Vietnam, etc. Altran Group companies now benefit from extensive resources for managing the outsourcing of their clients' R&D and production.

Altran in India, a promising reality

A precursor to this development strategy, Altran Technologies India Ltd is poised to address both the offshore market of major European accounts and Indian market leaders. Among other projects, a 2G/GSM network is in the works for the Alcatel account. A preliminary assessment was conducted for Renault in order to determine the costs of retrofitting potential local suppliers to meet the constructor's current standards.

ALTRAN TELECOMS

INTO THE FUTURE

Eight landline telephone operators participated in a survey by Altran Europe, a group subsidiary company in Belgium, on the future of telecom operators. This study was conducted in partnership with the leading Belgian economic magazine, Trends, which published the results.

A paradox came to light: half of the operators stake everything on IP (Internet Protocol), while the other half views it as one technology among many. Meanwhile, two major types of operators surfaced: the small variety, which continues to offer more competitive prices; and the others, which maintain their prices while offering content-rich services (video on demand, football, etc.). Finally, the main international operators ground their strategy on all-purpose solutions that offer customers a single interface (from the operator to the integrator). For more information, see www.trends.be.

ALTRAN ARCHITECTURE

2AD IN CHINA

In partnership with two other Altran group companies (Arthur D. Little Italy and Hilson Moran), Altran's architecture firm 2AD has just completed an urban development project aimed at converting a former Shanghai working-class neighbourhood into a business district. 407,000 square meters of shops, offices, museums, theatres and other leisure facilities will soon grace the area's 12 hectares. The group companies involved conducted a marketing study for the Chinese government, analysing the district's existing services and future needs in order to plan its makeover. Next, they presented an urban planning proposal (design of buildings, dimensions, volumes, facades, etc.) along with technical specifications (solar and thermal data, environmental recommendations, etc.). 2AD's second mission in China will be the construction of 475 houses and 300 apartments in Shanghai, totalling 156,000 square meters in surface area.



SPACE

« DEEP IMPACT »

It was a spectacular collision. According to the European Space Agency (ESA), the probe launched by the Deep Impact spacecraft dislodged even more material than expected when it slammed into the Tempel-1 comet. On July 4th 2005, after a six-month journey across 133 million kilometres of outer space, the impactor probe scored a bull's eye, hollowing out a stadium-sized crater in the comet's side. Comets are primitive bodies containing a mixture of ice, dust, and organic matter that conveys precious information on the origins of the solar system.



ALTRAN AUTOMOBILE

HIGH-TECH CRAFTSMANSHIP



The Maserati is an exceptional automobile, and not just in terms of its looks and power. The trident-emblazoned vehicle is also unique in its short development phase (lasting roughly two years), the relatively

long time it spends on the assembly line (several ten-hour periods), and its low daily production volumes (just 15 cars per model). According to Paul Courouble, a Lore (Altran group) consultant in charge of passive security for Maserati, this grants the brand greater flexibility than larger constructors. Low volumes imply numerous hands-on procedures; hence, the quality of the finished product depends on the expertise of the production teams much more than in other companies. Maserati strikes a real balance between workmanship and high technology, in the name of achieving a true work of art.



2006 THEME: ENERGY

The theme of the 2006 Altran Foundation Award is "Technological innovation and energy." Sweeping and troubling, to say the least, this oh-so-timely topic involves a number of different issues: the production and transformation of energy (renewable, fossil, nuclear, etc.), the storage and transport of energy, reducing energy consumption (domestic, industrial, transportation), campaigns and education to raise public awareness, and, of course, questions related to respecting the environment.

The application process opened on October 1st 2005 and will close on January 11th 2006.

For more information: www.fondation-altran.org

THE INTERNET LENDS A HAND

WebSourd, which received the 2005 Award's honourable mention, aims to put the Internet at the service of the hearing-impaired, improving their access to information, training, employment and the arts. An update on the company follows.

There was no summer holiday for the WebSourd team this year. The past few months have been chock-full of new endeavours: more video interpreting, more videos posted on the site, increased participation at special events, and much more. "We are also conducting a deeper investigation of the delicate question of neologisms," says François Goudenove, the company's director. "Our philosophy is to avoid spelling as much as possible, thereby showing that everything can be expressed with sign language. We also hope to communicate regularly with users of the site so they can point us to any

comprehension problems with new entries. Indeed, we are fully aware that the entire deaf community must accept new words in order for the language to grow. Our long-term goal is to create an online dictionary at www.websourg.org." In other news, a WebSourd team attended the 2005 Clin d'Oeil festival in Reims. Through a number of agreements with the Cinésourds association, certain performances were filmed and will be posted on the website in the coming months. Reports on artists and festival participants, most of whom are deaf themselves, were also prepared during the event and will add to the site's



content. Another significant milestone: WebSourd just finished setting up video interpreting equipment in the town halls of each of Paris's 20 arrondissements – a major step forward for the city's deaf community.



HAPPY BIRTHDAY

The Altran Foundation for Innovation is turning 10! Inaugurated in 1996, this philanthropic initiative represents a long-term commitment. October 2005 marks the kick-off of the tenth edition of the Award, based on the theme "Technological innovation and energy."

2005 WINNER: ALTRAN GETS INVOLVED



Jonathan Wolpaw and his team of researchers at the Wadsworth Center took home the 2005 Altran Foundation Award for their Brain-Computer Interface (see Altitude n°7). This system is a major advance over conventional methods, which depend on muscle control and thus cannot be used by severely disabled people. Altran met with the Wadsworth Center in late July 2005. Following this initial discussion, a project manager was appointed to supervise an audit of the project

and the writing of an action plan. Altran will offer support and guidance for several aspects: the business plan, the financing process, research and study protocol, the specification and design of the system for home use, and the management of intellectual property.

The first 10 prototypes

Concretely, the first BCI development project consists of setting up equipment in the homes of ten handicapped people for an in-depth study of the BCI's conditions outside of the laboratory as well as its benefits to users. This step requires the creation of ten specially adapted models featuring applications that are sturdier and more user-friendly than the laboratory versions, along with training professional caregivers to use the system.

THE FOUNDATION GETS TALKED ABOUT

A number of different events in both Europe and the United States will help get the word out on the Altran Foundation's 2006 Award. The goal is to attract the best candidates from every corner.

From September to December, press conferences, special events for clients of group companies as well as industrialists (in particular the Foundation's partners), and other gatherings

will take place throughout the world. Jonathan Wolpaw, an American who received the 2005 Award for his brain-powered remote control for paralysed people, hosted the first event in Lisbon. Next on the agenda: an appearance during French design week in Stockholm (after all, a team of Altran designers revised the design of the 2003 Award-winning food allergy detection patch) followed by a series of conferences at the Harvard Faculty Club, in Brussels, and in Madrid. The Foundation will enjoy many opportunities to widen its renown.



MAGIC FINGERS FOR YOUR COMPUTER

Plug a digital fingerprint reader into your USB port and your keyboard can recognise your fingers! This technology replaces the multiple passwords necessary to access certain applications and websites. The advantage: your fingerprints are unique and allow for definite identification. The Microsoft Fingerprint Reader is a small glass panel not much bigger than a finger. Once installed, the software memorises your fingerprints. You place as many fingers as you want on the reader for four scans.

All saved fingerprints then serve as identification.



Microsoft

Optical Desktop with Fingerprint Reader: around 115 euros

Fingerprint Reader only: around 70 euros

AN ECO-FRIDGE

The Silencio fridge from Dometic (the French subsidiary of a Swedish company) is the first refrigerator designed for recycling. Reminiscent of a mini-bar, it has a PVC body and steel cooling system that separate easily for quick and clean recycling. Thanks to a system that cools by absorption (a chemical reaction between water and ammonia), the fridge is completely quiet (no motor, no compressor, and no moving parts). The Silencio also features an energy-saving electronic thermostat. The body and door are available in your choice of grey, white, or orange.



Dometic

40-litre version: 299 euros

60-litre version: 439 euros

WORKER ROBOT

The robot that can do it all, HRP-2 was the star of the 2005 Aichi exposition in Japan. It is the brainchild of the Human Robotics Project, which set out to create a robot that moves like a human. In robotics terms, movement is often based on avoiding obstacles. In a natural environment, however, the robot requires support points for moving about while maintaining its balance. It must therefore use the obstacles it encounters for support. Specific algorithms were created for the HRP-2, which measures 154 centimetres and weighs in at 58 kilograms (including batteries). The system is marketed by Kawada Industries, Inc., with the design assistance of other manufacturers and the financial support of various Japanese public organisations.

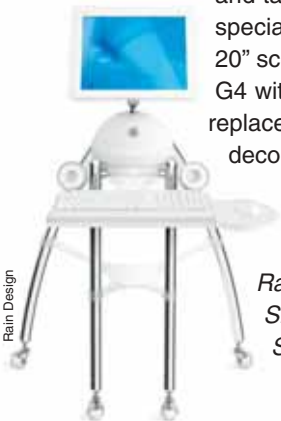


Kawada Industries, Inc.

The sale price of the most advanced robot to date is estimated at between 300,000 and 400,000 euros.

iFURNITURE

Computer technicians care about aesthetics, too. The Rain Design company makes accessories that cater to the demands and tastes of Mac users. The iGo Desk is specially adapted to the iMac G5 with a 17" or 20" screen, but can just as easily house an iMac G4 with a 15", 17", or 20" screen. The iGo Desk replaces dowdy old office furniture with modern, decorative, and practical styles. Two different heights are available for either sitting or standing.



Rain Design

Rain Design - iGo Desk

Sitting version: around 335 euros

Standing version: around 460 euros



Kawada Industries, Inc.



Franck Faugère/DPPi

HIGH-TECH DOSSIER

> **FASTER,**
HIGHER,
STRONGER

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FASTER, HIGHER, STRONGER

It's often said that records are made to be broken. An increasing number of sophisticated tools (software and equipment) are available to high-performance sportsmen and women who want to do just that. High-tech methods are coming into being, triggering the improvement of athletic techniques and strategies.



Swimming is the epitome of sports that have benefited from numerous technological developments in terms of both equipment and training.

Franck Faugère/DPPI



A 1920s swimmer trains at Joinville-le-Pont, France.

© Insep

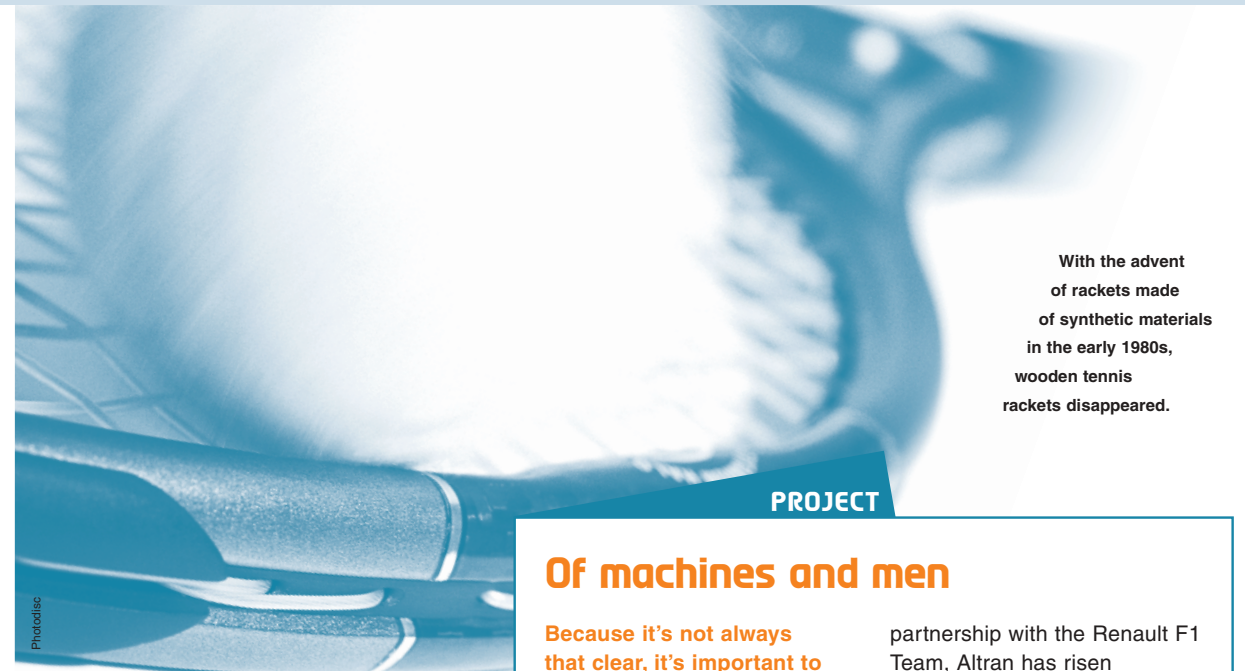
Citius, Altius, Fortius (faster, higher, stronger), proclaims the Olympic motto. And so an endless succession of records has shaped the history of sport, stretching and challenging the limits of humankind. But how far can this go? Indeed, the 2004 Olympic Games belied this motto: only one athletics record was broken in Athens. Fortunately, a happy surprise awaited fans of the sport at a June 2005 meet in Athens. Jamaican Asafa Powell, who had never won a medal at any major championship event, broke the 100-metre record by one hundredth of a second, clocking a time of 9.77 seconds. So it is always possible to do better. Nevertheless, the fact that Powell broke the record by a mere whisker

There are two main ways to create new records: equipment and training.

illustrates that records are becoming increasingly difficult to defeat. It falls to technology, then, to bring hope to athletes who long to set new standards.

IMPROVING EQUIPMENT AND TRAINING

There are two main ways to create new records: equipment and training. New performance standards often derive from an evolution – or revolution – in equipment. In tennis, for example, wooden rackets disappeared between 1980 and 1984 with the advent of synthetic rackets (made of carbon, fibreglass, etc.). Both light and performance-enhancing and featuring better shock absorption, these new rackets sped up the balls and the



Photodisc

With the advent of rackets made of synthetic materials in the early 1980s, wooden tennis rackets disappeared.

PROJECT

Of machines and men

Because it's not always that clear, it's important to remember that Formula 1 is a sport above all else.

The financial stakes are enormous and the pressure from the media is stifling, but at the centre of it are men and machines striving to become one and cross the finish line in triumph. To accomplish this, pilots train just like athletes do, while cars need the guidance of engineers. Altran consultants participate in this process. Throughout four years of

partnership with the Renault F1 Team, Altran has risen to the standards of excellence required by the most demanding competition. Whether working on the engine's internal aerodynamics, on the test benches, or on logistics, all of our consultants share in this quest for perfection, for an extra hundredth of a second, and for the euphoria of victory. Thanks to them, the team and its partnership with Altran are hailed throughout the world.

players' movements. Certainly, the racket doesn't make the athlete. Tennis players had to bring serious adaptation skills to the court to learn how to use this new equipment.

Training, therefore, remains one of the necessary keys to creating new records. This is why the sprinter relies on computer technology to gain a few hundredths of a second. When practice runs are filmed at a rate of 24 images per second, each frame captures four hundredths of a second. Analysis software can also create intermediate images for more precision. Computer technology allows for extremely precise analyses of the reaction time, starting position, movements during the race, and intermediate time. It is also possible to work on model starting positions by adjusting the position of the runner's feet on the starting blocks and by improving the push-off.

LIKE A FISH IN WATER

Swimming is the epitome of sports that have benefited from technological developments in terms of both training and equipment. Unlike

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Renault F1

SCIENCE AND ATHLETIC PERFORMANCE

TECHNOLOGY IS A VALUABLE TOOL for training and preparing athletes. The Science Department at the National Institute for Sport and Physical Education (INSEP) conducts ongoing research alongside various sport organisations and coaches. Through science, sportsmen and women can evaluate and polish their performance.

Body stickers

Reflective stickers four centimetres in diameter are placed on various joints in order to better observe the runner in the video.

A thousandth of a second

Video technology enables the analysis of movement at a rate of 24 images per second. Its rapid shutter speed (to a thousandth of a second) allows for sharper freeze frames.

The intelligent racetrack

A force platform built into the track records changing data such as the force exerted during a full-speed stride or during a start from the starting blocks.

An all-out analysis

An analysis of the data sheds light on a number of aspects of running: time, length, frequency and speed, angles, force, impulses, leg cycle characteristics, efficiency of the start from the starting blocks, etc....

For the coach

Detailed information on the runner's performance on the track enables the coach train the athlete.

For the coach

This training assistance tool enables athletes to perfect their technical movements and modify their tactics.

For the coach

The athlete and/or coach use headsets to receive immediate biofeedback for modifying shooting techniques.

For the coach

Metabolic data shows how the body adapts to physical exertion and helps optimise training (intensity, number of sessions, etc.) to avoid chronic fatigue and improve athletic performance.

Analysis of technical movements

Computer transcripts of matches help detail fencers' postures, reaction times, and attack speeds.

Filming movements

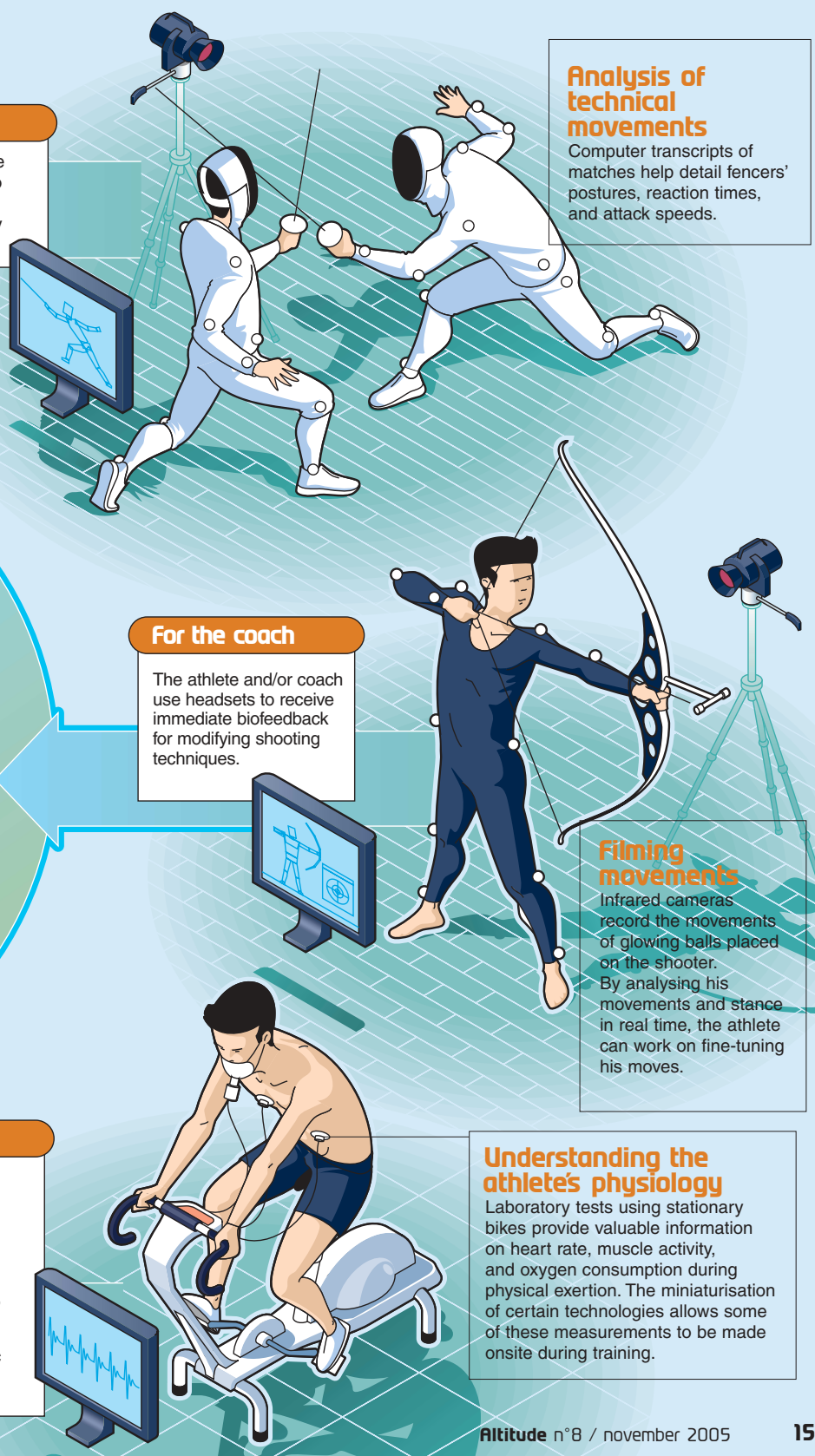
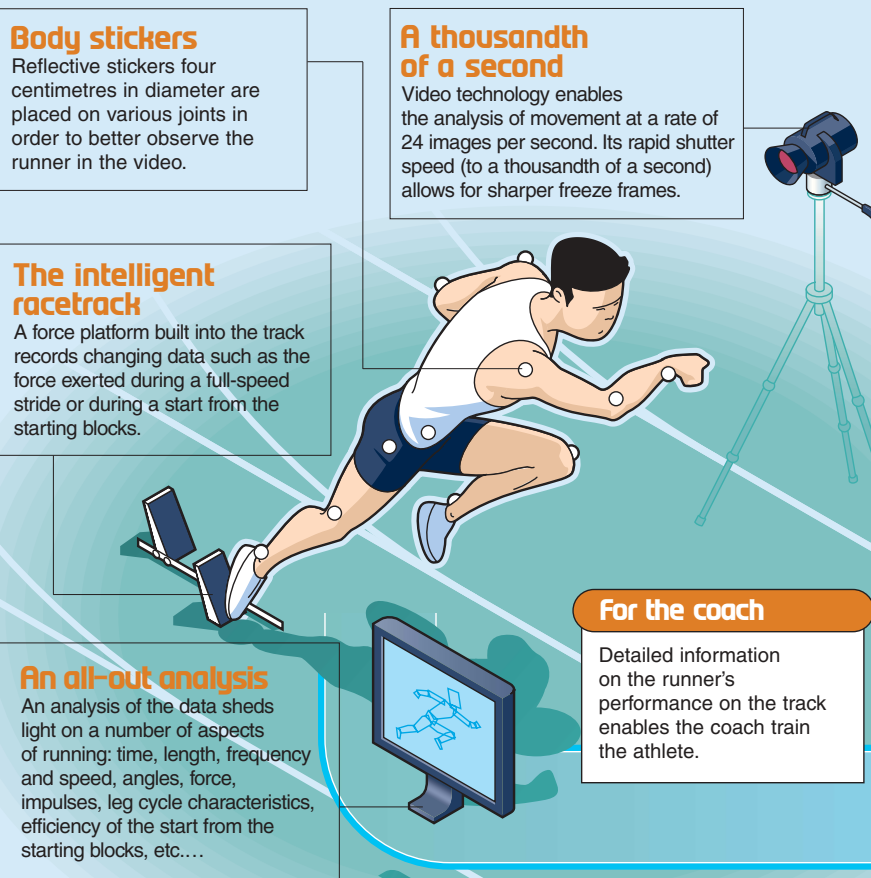
Infrared cameras record the movements of glowing balls placed on the shooter. By analysing his movements and stance in real time, the athlete can work on fine-tuning his moves.

Understanding the athlete's physiology

Laboratory tests using stationary bikes provide valuable information on heart rate, muscle activity, and oxygen consumption during physical exertion. The miniaturisation of certain technologies allows some of these measurements to be made onsite during training.

A computer laboratory for sport (LIAS)

LIAS develops technology to improve the analysis of athletic performance and training methods, offering software and other specialised measurement systems. Innovation, research and development, technological watch, help, advice, and training are LIAS's principal goals when it comes to computers and electronics.



CLOTHES THAT MAKE THE ATHLETE



Special fabrics can artificially regulate body temperature before, during, and after physical exertion. Used by most major athletic labels, Dupont's anti-UV Coolmax fabric is made of injected polyester with special channels that improve air flow and move moisture to its outer layer. The most recent version boasts additional channels to eliminate sweat even faster.

SMALL BUT POWERFUL DEVICES

The miniaturisation of measurement instruments has made great strides in the past few years. Centaure-Metrix's Locometrix is a portable device that assesses the way a human walks or runs. It combines two miniature accelerometers with a recording system that is worn by the subject and accurately measures the biomechanical characteristics of his or her gait: regularity, symmetry, frequency of strides, shock, and mechanical power. For athletes, these tests can help perfect technique and provide information on physical abilities.

PROJECT

A unique process

Manuel Kathofer is a manager of Teamworks, an Altran subsidiary based in Austria. He worked with Head, the well-known maker of tennis and ski equipment.

"We analysed the tennis racket production process looking for a means to accelerate it, specifically through increased automation. Before our analysis, Head was using mostly manual labour

to ensure the high quality of each racket. We looked at the source of the problems, and experimented with different ways to create an entirely machine-based production process. We achieved our goals through four months of hard work, and in the ten months that followed, we continued to research and develop methods to optimise the production cycle." A team of consultants

worked on this project and brought with them their knowledge of process mechanisation and polycarbon technology. There still remain a couple of steps to be done manually, but nevertheless this new process signifies a big step forward for the racket production. This mechanisation process is the exclusive property of Head.

INTERVIEW

TECHNOLOGICAL SUPPORT FOR ATHLETES

Meeting with Jean-François Stein

Director of the Movement, Action, and Performance Laboratory at Insep¹ in Paris.



Altitude: What is the role of technology in the daily lives of athletes?

Jean-François Stein: For more than 20 years, technology has played a growing role in athletes' careers. This is true in terms of

athletic equipment – a field as vast as the world of sport itself – and in terms of training aids. Here at Insep, our research focuses on the latter category and consists of analysing biomechanical, physiological, dynamic, and kinematical data.

Alt.: How does technology help athletes improve their performance?

J.-F. S.: Decision support tools help to enhance physical preparation and to improve technical movements and game tactics in group sports. The technological degree of

equipment has a direct correlation to athletic performance. In pole vaulting, for example, the use of carbon fibres instead of wood has enabled athletes to clear six metres instead of four. Similarly, the most recent generations of skis have considerably reduced skiers' times, even though – and this is often the case when equipment evolves – skiers have sometimes had to "relearn" their sport to adapt to their new gear.

Alt.: Will technological advances continue stretching athletes' limits indefinitely?

J.-F. S.: Ultimately, these

technologies are tools and nothing more. They will never be able to replace athletes or trainers. Sprinters can optimise their leg cycles, perfect the placement of their starting blocks, and wear traction-enhancing shoes if they like...but I doubt they'll ever be able to run 100 metres in seven seconds! And let's not forget that the use of technology is approved and regulated by international federations. For example, the coefficient of restitution of playing surfaces must comply with very strict standards. The same can be true of virtually any aspect – down to the type of glue used in ping-pong rackets!

1. Insep, the French National Institute for Sport and Physical Education, is an organisation attached to the French Ministry of Youth and Sport. It caters to the needs of high-level athletes, offering optimum conditions for combining training with scholarly and professional pursuits. Recruited through their athletic federations, Insep's 1,000 athletes have access to the necessary means for achieving their goals on a 34-hectare site.



A STROKE OF GENIUS

Swimmers know that improved control of their most subtle movements can shave off precious seconds. Thanks to a new device called Nagero, they can now work on fine-tuning their movements under realistic conditions without getting their feet wet. The company Sport System Engineering, which is now marketing the finished product, developed Nagero in partnership with the French Swimming Federation, CAIPS (the Centre for Analysis of Athletic Images and Performance), and the Mechanics of Solids Laboratory at the University of Poitiers, France.



The race against doping

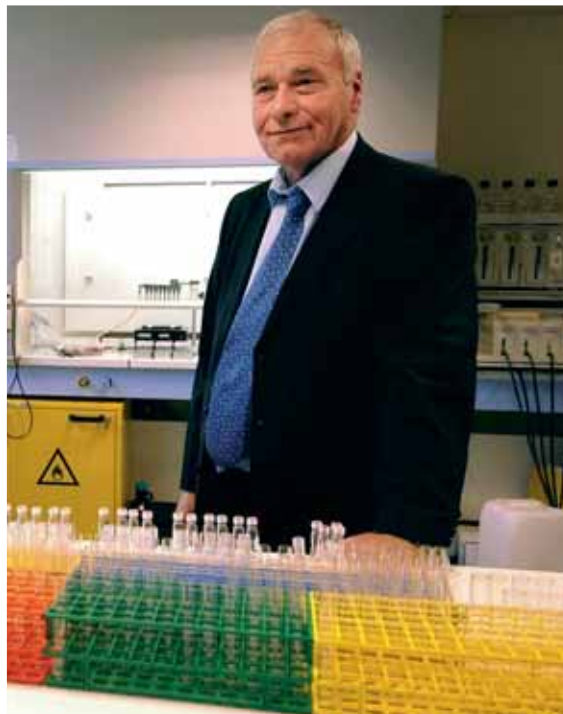
Since the 1980s, steroids and other drugs used in sport have been competing for survival against new methods for detecting them. Meanwhile, the latter have attempted to keep abreast of the most recent biotechnological advances.

Today, complex techniques¹ are used to identify doping products and their metabolites in urine or blood, but these methods are limited. Products that resemble natural substances found in the body (erythropoietin or EPO, growth hormones, etc.), which are often used in weak doses, are difficult to identify. It is important to make use of blood samples,

which may also reveal the side effects and indirect symptoms of doping. Current legislation prevents this type of testing, however: only athletes whose samples reveal direct traces of illegal products are suspected of doping, not those whose samples reveal its side effects.

The ideal solution would be to mark doping molecules for easy detection during their manufacture, but a great deal of negotiation lies ahead between politicians and pharmaceutical laboratories.

1. Immunoenzymatic methods, gas or liquid chromatography, and mass spectrometry.



France has a national anti-doping laboratory. Jacques Ceauriz is the director.

Bruno Bader/Agence Vandystadt

••• continued from page 13

with athletics events, swimming records are easily made and easily broken. Eight world records were defeated during the Athens Olympic Games, followed by two more in July 2005 at the World Championships in Montreal. Today's swimmers train in a "scientific" way: by analysing their movements, they improve their diving and turning techniques and boost their overall performance. Materials and equipment have also progressed. Starting panels are now inclined, granting swimmers a stronger push-off. Also, swimmers now use more comprehensive stroke combinations that enhance slippage. The shape of swimming pools has also been revamped to avoid backsplash from other swimmers' movements. Since every last detail must be scrutinised methodically, professional swim-

mers are backed by teams of specialists. In an article that appeared in the French newspaper *Le Monde* this summer, Don Talbot, the former coach of the Australian team, explained that one coach and one delegation leader escorted the team to the 1956 Olympics in Melbourne. In Sydney 44 years later, it was accompanied by 28 people, including doctors, physiology specialists, etc.

Today's athletic competitions are certainly high-tech, but technology doesn't take away from the beauty of sport itself (despite the claims of some detractors). On the contrary, the attention to detail that technology brings can help it blossom. So, are you ready for sport in the 21st century? Take your marks, get set, go!

There are some consultants whose work knows no borders, who find inspiration and share their know-how in countries around the world. From Austria, Russia, and Scandinavia to Holland, India, and Singapore, Altran's expertise is international.



METHODICALLY YOURS

> Solving problems thanks to a method invented in 20th-century Russia that has been available since the fall of the Iron Curtain: all in a day's work for Laurent Staub, winner of the 2004 Altran Awards.



In any case

Laurent Staub has not wasted any time since winning an Altran Award in Strategy and Management. As he entered the programme, his goal was to develop a complete innovation offer by becoming an

expert in TRIZ (Theory of Inventive Problem Solving). *"The point is to take a specific problem and formulate a general problem with universal solutions. These solutions are then interpreted to arrive at the specific solution that is being sought. With this method, I can bring added value to my clients and share this knowledge with other consultants."*

In keeping with his Excellence Plan, he trained at the National Institute of Applied Sciences (INSA) in Strasbourg, under the leadership of European and Russian TRIZ specialists. Initial contact with major players in European research hinted at encouraging prospects. Proving that the Altran Awards have made a difference in his career, Laurent Staub's new expertise has already drawn attention both within and outside of his company Ariane Ingénierie (part of the Altran Group), landing him an interview in the human resources press. While awaiting participation in Altran's offer development process, Laurent Staub will have the chance to meet other TRIZ experts at the European meeting in Graz (Austria) in November.

BIO

1982 > Graduated from ENSAM (Higher Institute of Mechanical and Industrial Engineering)
1985-1988 > Consultant for Dow Chemical
1993-1998 > Consultant for Johnson Controls
2001-2003 > Consultant for KPMG
2004 > Joined Altran

CHILD'S PLAY

> Microchips are everywhere and are growing more powerful by the day. Marc Moons, winner of the 2004 Altran Awards, is part of the microchip revolution.



In any case

While the specific nature of his work can be illustrated with Lego bricks, Marc Moons's ideas are meant to be taken seriously. Winner of the 2004 Altran Awards in the Electronics category at the beginning of the year, the Belgian senior

consultant has used the added publicity to hasten the development of the group he had just founded. Initially, the System On Chip Virtual Design Center (SVDC) was a network of Belgian consultants. Today, it includes 11 consultants, three companies, and six business managers. It has made contacts in Holland, Scandinavia, Singapore, and India in view of expanding. The goal is to cover

the entire Altran network. SVDC focuses on System on Chip systems and increasing their productivity, particularly by using blocks of intellectual property that can be reused in a variety of products. These blocks, however, are not entirely convenient as they are not always able to work together.

As Marc Moons notes, *"To overcome this problem, we have created a common interface that allows the blocks to connect amongst themselves. This is similar to the Lego example, where all blocks have a compatible interface and where the result is better than the simple addition of elements. Moreover, we can then easily construct an electronic system from small parts. In this way, we can achieve our original goal of increasing productivity."*

BIO

1990 > Masters in engineering and thesis on the processing of digital images
1992-1997 > Philips
1997 > Began at Altran
2003 > Multimedia project for Thomson

Four years after circling the globe in a balloon, Bertrand Piccard has taken on a new technological and human challenge: going round the world in a solar-powered aeroplane. Altran will be at his side as an engineering partner of the Solar Impulse project.

THE ONLY PLANE OF ITS KIND



Christian Halconruy, an expert in systems engineering at Altran Technologies, has worked on this very special plane for a year now.

"Solar Impulse is a fascinating project. Creating a solar aeroplane involves pushing the boundaries of technology. The challenges are numerous: a wingspan bigger than that of an A380 imposes constraints on the plane's structure and aeroelasticity. It is also necessary to have high-capacity batteries, high-yield solar panels, guaranteed good flying conditions, and all of this without exceeding a next-to-nothing mass. To accomplish this, I will lend my expertise in systems engineering and try to confront as many problems as possible from the kick-off in order to rein in their consequences. I also bring a broad perspective to the project: instead of merely focusing on flying the plane, I can address other situations that could influence its design, such as repairs and moving it on the ground." Once it is actually built, this plane, which uses innovative materials, will be an extraordinary showcase for new technologies. The ultimate objective of a trip around the world without burning fuel or generating pollution is to make the larger public aware of the Earth's ecological future. Take-off is predicted five years from now.

FLIGHT SIMULATIONS

Robin Ladmiral, a consultant for Altran Technologies, recently joined the Altran team in charge of designing a simulator.

"Our objective is threefold: to verify the feasibility of the project, to optimise the design and course of the plane, and to optimise the use profile," explains Robin. "We serve as a liaison between the design teams, the university physics specialists, the weather team, and the users, who are ultimately pilots." The team is also responsible for obtaining models from the various groups and combining them in order to assess the expected overall performance for the plane. Robin's expertise in the digital modelling of multi-physical phenomena is vital to the project. But if he enjoys this project so much, it's also because it allows him to work within a variety of disciplines: aerodynamics, solar cell electronics, the electronic technology of engines, and meteorology. "Our simulator

includes the plane, of course, but also meteorological data and topographical data, amounting to an additional 1,500 parameters. This creates a very realistic environment. As a result, we carried out a simulation flight around the world last May, integrating real meteorological and geographic data." This experiment highlighted key areas for developing flight protocol.

For more information: www.solar-impulse.com



BERTRAND PICCARD CREATOR OF THE SOLAR IMPULSE PROJECT AND FUTURE PILOT

INTERVIEW

Altitude: What exactly is the Solar Impulse challenge?

Bertrand Piccard: The goal is to create an airplane capable of taking off on its own, climbing to 12,000 metres, and continuing to fly for several days without any fuel by using energy captured from solar cells mounted on the wings. The energy stored throughout the day will be used to fly the plane but also to charge the batteries and enable night flying. Each night, the pilot will have full batteries and use the available energy sparingly in order to keep flying until the next sunrise. It's the incarnation of the myth of perpetual flight.

Alt.: So the airplane brings together a number of technologies, doesn't it?

B.P.: Building the plane requires some of the most advanced technology and stimulates scientific research in a number of fields: composite structures; light, so-called "intelligent" materials and ways to produce and store energy. These results could have many other useful applications for society.

Alt.: What is the philosophy behind Solar Impulse?

B.P.: Solar Impulse is a fascinating gamble in human terms and a technological challenge in terms of wingspan. This is a crazy project that speaks to our emotions while remaining within the realm of the possible. By writing the first chapter of solar-powered aviation history, we want to use scientific innovation in the name of sustainable development. Beyond that, it utilises the premise of an exciting adventure to alert the public to the changes necessary for preserving our planet's energy and environment. It also illustrates the marriage of alternative energy sources and new technologies, a union that brings the impossible within reach.

Alt.: What is the connection between Altran and the Solar Impulse project?

B.P.: The synergies between Altran and Solar Impulse made this partnership an obvious strategy. Meeting this challenge calls for the help of capable engineers who look beyond well-established fields, tackle questions in a systematic and coordinated manner, and develop simulations and models for systems and subsystems. The partnership with Altran grants us access to specific skills and to engineers who can quickly integrate into a growing team. For its part, Solar Impulse is an extraordinary laboratory that allows Altran's engineers to give their best. It's a winning partnership for both parties, and we are extremely satisfied with the work of the Altran consultants who have been working on the project for the past year.

In late 2004, Altran signed an agreement with the Turin Polytechnic Institute. Altran consultants have already given courses there. Meet its new president, Francesco Profumo.

“ATTRACTING FOREIGN TALENT”



Altitude: You have only recently become president of the Turin Polytechnic Institute. What will be your stance on internationalisation?

Francesco Profumo: The internationalisation of the Institute is one of my primary initiatives. It was also one of the central topics of the plan I presented in order to become president, and it was heartily welcomed. Concretely, the goal is to bring international recognition to the Polytechnic Institute by following the example of its European equivalents, working to progressively transcend the rigid boundaries between different ways of thinking. I hope to shape an establishment that is open to new ideas and that attracts foreign talent. I would also like to emphasise two worrying phenomena here: the “brain-drain” and the lack of interest in the sciences among young people of 18 or so, evidenced by the fact that fewer of them are entering the sciences than ever before. This second problem may be the more serious of the two.

Altitude: What measures has the Institute taken to create ties with businesses?

F.P.: The Polytechnic Institute already has a strong tradition of closeness with businesses. The results are satisfying but our efforts need to take into account the transitional period that industry is going through at the moment, which is a real crisis for local prospects. We have to get involved downstream of processes. We must contribute by fostering the completion of new projects and the building of knowledge and skill networks.

Alt.: From this perspective, how will the Institute’s agreements with Altran help these initiatives?

F.P.: The agreement signed with Altran at the end of 2004 is a step in this direction. We need to help the Polytechnic Institute and businesses complete concrete projects. That is possible only if we picture universities not as detached entities but as vital building blocks of society that constantly interact with regional players. I’m speaking in terms of research fields, training, and innovation. Along these lines, I am in the process of formulating and taking concrete actions that already exist in other countries to create a real “citadel of technology and knowledge” that would be open to business projects, research strategies, and policies for efficiently welcoming students.

ALTRAN GERMANY: REACHING OUT TO STUDENTS

What do BDSU – the German Junior Enterprises Confederation that brings together some 2,000 students from the best universities – and Altran Germany have in common?

Entrepreneurial spirit, energy and excellence. These shared values have naturally led to a partnership. Through the confederation, Altran negotiated an exclusive contract with engineering schools and technical and scientific universities, joining the exclusive company of the five major partners (among them Siemens, Mercedes and the Boston Consulting Group). This adds to the group’s other local partnerships with the French, English, and Italian confederations.

HOW DO WE INNOVATE?



Teaching innovation is the main goal of eight classes that have been taught at Harvard since 2002 and are now being offered to 30 French students.

On the agenda: applying creativity and innovation to science and engineering, adapting an innovation to a given market, and more. Featuring periodic case studies, the classes were taught by American, English and French

experts. The students themselves came from the following elite French institutions: the Electrical Energy and Information Sciences Institute (Supélec), the Polytechnic Institute, the International Management School of France (HEC), Paris-Sud University, École Normale Supérieure (ENS), and the Optics Institute. They took the classes in Saclay, in the Paris region, and appreciated both the curriculum and the opportunity to meet and exchange ideas with Altran representatives. Yet another great way for students to succeed as they enter the workforce.

ALTRAN LOOKING TOWARDS THE FUTURE

Check out an article by Christophe Aulnette, CEO of Altran, on the website of the Junior Enterprises Alumni Movement. In it, he discusses the importance of Junior Enterprises for Altran and his eagerness to make their partnership permanent. The Altran Institute for Management (the company’s in-house university) has also created a programme of instruction specifically adapted to Junior Enterprises. Based on the transfer of our best practices, it is taught using training modules and a business development book. Each year, several hundred Junior Entrepreneurs benefit from this programme.

ALTRAN IS WELL-REPRESENTED AT ECP

Altran signed a partnership with the Junior Enterprise at École Centrale de Paris (ECP). Six Altran consultants, themselves former JE members, will work with them. They will provide training in communications, help them prepare client meetings, and grant

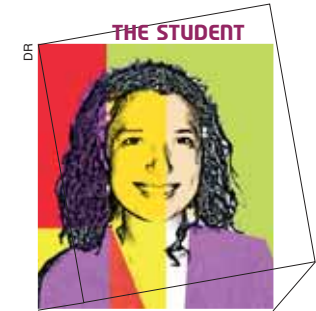
them access to the group’s other areas of expertise. For their part, the JE members will serve as Altran’s representatives on their campus (by organising a conference, for example) and at the Centrale Entreprises forum in late November.

“OLA” TO ALTRAN AND THE RENAULT FORMULA 1 TEAM



The Spanish are very popular with the Renault Formula 1 Team: Fernando Alonso was crowned world champion and 22-year-old Isaac Prada won the first international edition of the Altran Engineering Academy. Presided over by Robin Tuluie (the Renault F1 Team’s R&D director), the jury awarded his project on the storage and transmission of energy generated during turns. With housing,

transportation paid for and a nice salary, Isaac Prada began a six-month internship with the team in early September. In addition, 12 students from prestigious institutes of higher learning (grandes écoles) – including Centrale Paris, ENSPM, and Supélec – paid a visit to the team’s premises in Viry-Châtillon (France) and left with new ambitions in mind.



A TASTE FOR HR

Lucie Portmann, 23, is a graduate of Sciences Po Bordeaux and holds a Master in European Business from ESCP-EAP.

“I wanted to go to Sciences Po for a long time without having any real idea of a career goal. It was my interest in the various subjects taught there that helped me make my decision.

In addition, choosing Sciences Po allowed me to spend an Erasmus year at the University of Warwick in England, which I enjoyed very much.” During her year-long Master programme, Lucie spent a

semester in Paris and one in Bangkok. In 2004, she accepted an internship offer at Altran in the University Relations team.

“I really appreciated the ambiance at Altran and the autonomy I had there. I also liked participating in recruiting interviews, in ‘Business Game’ sessions, etc. These things were not only a part of University Relations but also confirmed my own professional goals: working in human resources and, in the shorter term, recruiting.”

IN NUMBERS

26,000 students are part of 7 campuses: Turin, Alessandria, Aosta, Biella, Ivrea, Mondovì, Vercelli
2,300 students with a Master of Science
2,000 students with a Bachelor’s Degree
170,000 hours of instruction

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