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Donnons un sens à l'innovation

Interactions

LES DOSSIERS

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FROM THE PRESIDENT'S DESK

Six action groups to build UTC's future

The stakes and challenges lying ahead of UTC, as identified and assessed today, are such that the Codir (the University's executive directorate) and the University Board (UTC-CA) proposed that six action groups be set up - each being assigned a thematic axis that embodies potentially high-level strategic contents, some of which will mature in the very short term, thus requiring a clarification of the university's policy stance. The following 6 themes were identified, on the basis, on one hand, of certain challenges and relevant questions and, on the other, of the current asssessment of the University's forward policy plan:

- the stance of UTC with respect to its partnership environment, notably vis-à-vis the project for a new university proposed by Paris 4 (Sorbonne), Paris 6 (Pierre & Marie Curie) and the Group of French UTs (UTBM, UTC, UTT);
- the evolution of the training offer including the plan for further development of UTC's continuous education packages offer;
- the pursuit of the organization of the Innovation Mission with the assigned objective to fully assume this third 'connected' UTC mission;
- an increase and diversification of UTC's financial resources, in relation to its development policies;
- a quantitative and qualitative development of research activities via the PhD training offer;
- the integration of digital technologies, notably providing a formal framework to accommodate the global and transverse facets of the ongoing revolution, embodying the latter among the strategic policy axes of the university.

Given the nature of certain themes above – the conclusions of which may strongly affect the overarching development trajectory of UTC, each Action Group, comprising Members of the Codir, of the university's executive staff and of experts coordinated and moderated by a person making at least a one quarter full-time commitment to his/her mission.

The Action Group deliverables for 2016 will, necessarily, not only integrate the following pensum "Any thought not converted into action is a bad thought" but also lend meaning to a (re)conciliation among the values on which UTC founded and developed its credo (intercultural relations, humanism, cooperation and courage) and the market value of our outputs. All of this, without degrading or denaturing the term "value" taken in its singular acceptation. ■

Prof. Alain Storck,
President & Vice Chancellor UTC

A 'Young scientists Prize' 2015 for a UTC graduate

FONDATION BETTENCOURT SCHUELLER

Claire Redin, who graduated from UTC in 2010, was awarded one of the 'Young Scientists 2015' Prize by the Bettencourt-Schueller Foundation; Claire Redin majored in Bio-Engineering at UTC, with the specialty Design and Innovation in Bio-Products (GB-CIP); she pursued her studies beyond her engineering diploma, obtaining her PhD in Biology (specialty Human Genetics) at the Institute for Genetics, Molecular and Cellular Biology (IGBMC), University of Strasbourg. As of Nov. 2014, Claire has been engaged in post-doc research at the Boston, Massachusetts General Hospital / Harvard Medical School where she is studying patents suffering from large scale DNA depletion, duplications or displacements. ■

www.fondationbs.org/fr/sciences-de-la-vie/soutien-aux-chercheurs/prix-scientifiques/prix-pour-les-jeunes-chercheurs

EMECIS : creation of a new European Double Diploma

January 26, 2016, the University of Technology, UTC) and the University of Genoa (UNIGE), Italy finalized and co-signed the creation of a new Double Degree combining the UTC Master in Interacting Complex Systems -MSCI and the ICT Engineering Diploma awarded by UG. The new Double Degree will be entitled EMECIS "European Master in Engineering for Complex and Interacting Systems" and will be launched Sept. 28, 2016. The agreement was signed for UG by their Dean and for UTC by the Director for International Relations. The new French Italian HE collaboration was initiated in the framework of the MS2T Labex - Control of Technological Systems of Systems" (UTC). The EMECIS Master's diploma aims at training students in engineering and control of complex interactive systems, in particular, processes linked to industrial safety and for driverless vehicles. ■

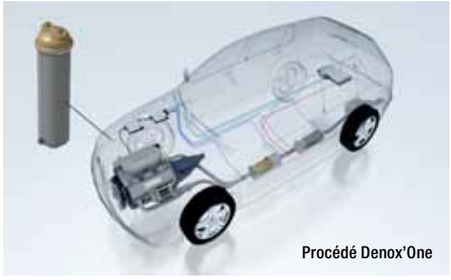
UTC's partnership with Powergrid Campus Lille

Powergrid Campus Lille is a national research, innovation and training platform for so-called Smart Grids. Two projects will be presented at the RUE event.

RESEARCH

Salts for gas storage

High-pressure, gas cylinders, which are heavy and present a risk of exploding if the pressure is too high, do not necessarily constitute the best way to store large volumes of gas. As Departmental Head Khashayar Saleh at UTC and a specialist of physico-chemistry of divided solids sees it, gas storage in mineral powdered salts could provide an attractive alternative. This solution has been adopted by Aaqius, a company specialised in innovative automobile equipment, in a partnership with UTC to assemble salt tanks to depollute emitted exhaust gases or to store hydrogen, seen a valuable fuel for the future.



Procédé Denox'One

A 200 litre H2 tank pressurised at 200 bar (i.e., 200 times the ground-level atmospheric pressure) is what it takes to equip a car to cover a distance of 500 km. Not only is this volume unreasonable but driving a vehicle fitted with explosive gas-filled cylinders at this sort of pressure does raise questions in respect to road safety. Framed this way, the future of hydrogen fuelled cars is fraught with difficulties. "One solution is to store hydrogen in a solid-state chemical bond with mineral salts", proposes Khashayar Saleh, Director of UTC's Industrial Process Engineering Department (UTC-GPI).

Salt to absorb and desorb gases

The process implemented by the research scientist and Aaqius, a company specialised in innovations for the automobile sector, allows a car fitted with a salt tank of only a few litres to contain enough hydrogen to travel 500 km. "Different types of salts are used to chemically bind the hydrogen" details Khashayar Saleh, adding that "the final choice is a question of a balance to be struck between storage efficiency, environmental impacts, facility to manufacture the device and to recycle them, their capacity to release hydrogen and other constraints such as cost factors. The physic-chemistry involved consists of having the hydrogen absorbed by powdered salt cakes arranged in an optimized geometry, under controlled temperature and pressure conditions. To release or desorb the gas, one "need only" heat the salts and a quantity of gas -in relation to the thermal input – will be released.

From understanding the process to assembling a working product

Although chemists have been familiar with this sort of process for a long time now, "assembling gas tanks with mineral salts calls for considerable research efforts to specify an equipment that will prove truly operational for road going vehicles" underlines Khashayar Saleh. His research teams at the UTC-GPI (Industrial Process Engineering) Dept. focused their attention on obtaining the best performing chemical geometric structures and selecting various salt combinations to optimise the overall set of constraints. Aaqius worked on the tank heating system needed to desorb the gas content. A microprocessor chip was specifically designed to manage the heating process as a function of the hydrogen demand from the car propulsion unit. Aaqius also manage the project, from analysis of automobile construction parameters to finalising and assembling the industrial product.

Depolluting exhaust gases

Shortly, we shall see a PhD (CIFRE contract financed by Aaqius and the ANRT) working on final design phases for the tank. If we are to consider future vehicles as being hydrogen propelled, the issue of depolluting engine exhaust gases is definitely a problem for today's engineers and research scientists. And we can see here that the UTC Aaqius partnership has several solutions to hand. For example, why not use the salts to store a gas to neutralize the NOx that are dangerous for our health and the environment? Today, there is a liquid product on sale that allows operators to neutralize Nox. It comprises urea, which can vehicle large quantities of ammonia and it is the

latter that dissociates the Nox, returning them to neutral nitrogen and water. The only draw-back to this liquid phased product is that it freezes below -11°C.

Rechargeable cartridges

"What we developed was an alkaline-earth chloride powder based structure with the capacity to store ammonium directly in its gaseous phase", explains the Director of UTC-DPI. His research teams, in a partnership with Aaqius, developed a special cartridge containing less than 1 kg of ammonia to ensure a one year operational life expectancy (for a reasonable daily average use). When operating, the tank is maintained at a steady 6 bar pressure; in its gaseous phase, the ammonia store would occupy 150 litres. A replenishing system is planned where empty cartridges can be exchanged for full units. The empty cartridges will then be transferred to special refilling stations and there will be distributors to exchange empty for full tanks.

A hydrogen-propelled vehicle at the Paris COP21

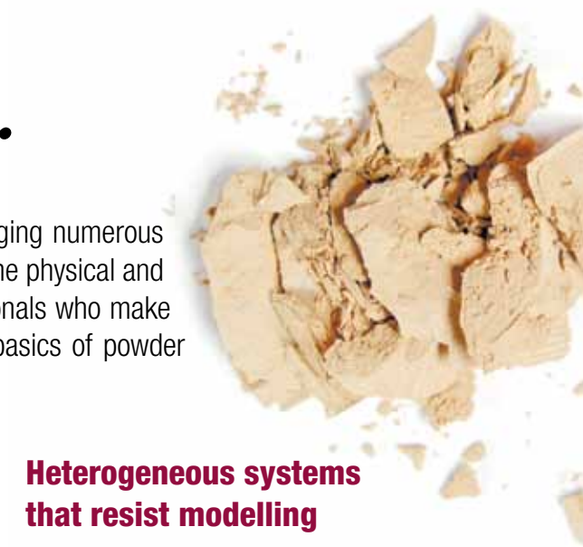
To refill the on-board hydrogen tanks, one could imagine increasing the number of filling stations. In this case, the answer will depend on an arbitration between H2 production costs plus associate constraints due to excessively centralized refill possibilities. In a lesser degree of development than the ammonia cartridge, the H2 tank was presented last Dec.4 at the Grand Palais exhibition hall in Paris, during the Solutions COP21 gathering, the aim of which was to valorise various solutions in respect to climate change in the framework of the Paris COP21 conference (end 2015).

As far as the H2 tank is concerned, costing is difficult to estimate inasmuch as it implies taking all the amortisement costs into consideration, if a policy decision is made to launch a hydrogen propelled vehicle sector… Notwithstanding, a viable solid state hydrogen storage tank will still require several years research input before it can be fitted in a mass-production series of vehicles. But it is a promising prospect see hydrogen as a future propellant and energy vector in the automobile sector. ■

EXECUTIVE EDUCATION

Powders, a tricky matter

Powders are a form of matter that prove useful for storing, preserving and packaging numerous substances, but they also carry some risks, in terms of hygiene and safety, plus some physical and mechanical properties that are not well understood. In order to assist the professionals who make and/or use powders, some UTC specialists offer training packages to teach the basics of powder characterization and their properties.



"Today, close on 80% of existing products have at some time a powder-based existence" says Khashayar Saleh, Director of the UTC Industrial Process Engineering Department (UTC-GPI), a specialist in the physics and chemistry of 'granular' matter. We find such powdered matter in many areas, ranging from foodstuffs, cosmetics, chemistry and pharmaceuticals or even to nuclear power fuels. They can be compacted in tablet form, or 'raw' (unprocessed) and present many advantages but controlling their uses calls for special expertise. The first advantage when matter is transformed into a powder lies in improved storage and preservation.

Advantages: dry, concentrate and separate

"Powdered milk, for example, loses 94% of its mass in drying out the water content" emphasises Khashayar Saleh. This is a commonplace product that clearly shows the advantage of the powder form: easy to store, easy to preserve. Cosmetics also make use of the fine grain of powders and the soft touch obtained. Powders also allow for concentrations of substances that can be very concentrated indeed, such as in the case of colour pigments. Powders are also used in pharmaceuticals to produce the coatings of so-called smart pills that will dissolve or release their active principles only under certain conditions (milieu or time). The release process is selective and increases the action and also allows you to decrease the amount of the doses administered. Another advantage of powders is that two antagonistic matters can be associated in a single product. "Detergents often mix acids and alkalis and hair creams can mix colorants and decolorants" adds Khashayar Saleh. The powder format allows industrialists to package different matters and products with perfectly controlled contents.

Risks: an explosive nature

Powders also possess a few disadvantages! In terms of hygiene and safety, those that come from organic products call for a degree of special care. It is necessary to characterize the way these bio-materials degrade so as to avoid putting unsafe products on the shop-shelves, and on top of that, organic powders have a propensity … to explode! Sugar, flour and other powders can lead to explosive mixes (detonating chemical reactions) because of the fine grain and the high surface exposed to oxygen. "In sugar and flour factories, safety mechanisms are installed, capable of detecting when a too high concentration of powder is in the ambient air", confirm the UTC powder specialist but who immediately adds that these questions are dealt with very seriously by the industrialists in the relevant sectors.

Heterogeneous systems that resist modelling

"Another difficulty relates to powder flow and rheology. The way powders flow and how they behave under stress are features that have not as yet been studied thoroughly", stresses Khashayar Saleh. For example, a defect in the flow line of enriched nuclear fuel could lead to possibly very disastrous results. Less dangerous, but still expensive, the unforeseen behavioural modes of the way powdered paint in projected on car bodies in the automobile industry can lead to major paint finish faults and therefore incur serious expenses for the car-makers. "Powders, by essence, are heterogeneous systems that do not readily lend themselves to modelling equations – indeed no such equations exists as is the case for fluids and gases with well-modelled mechanical properties", underlines Khashayar Saleh, who adds that these issues are often under-estimated given that engineers are not often trained in the appropriate techniques and approaches.

Training courses offered at UTC

In the absence of a general physical model that can represent powdered systems and the wide range of problems associated have forced engineers to analyse situations on a case-by-case basis. In this perspective, UTC offers training packages to as to

• PLER (Local Renewable Electric Power Production): a demonstrator of an optimized urban micro-network controlled by a smart connection interface to the public service distribution network via a smart grid input connection.
• Stella (Smart Transport and Energy Living Lab): a demonstrator for a new urban infrastructure to recharge electric cars and to optimise current flow levels. ■

Demonstrations at the RUE event – cf. Agenda p.16

A new double degree - UTC-Poly-MTL

February 24, 2016, UTC and the Poly-MTL (Polytechnique Montreal) signed an add-on agreement to launch a new joint double degree, for the specialty 'Processes and Technologies to Valorise Renewable Resources' (PTV2R), in the framework of the Master's degree "Transformation and Valorisation of natural Resources (TVRN). Polytechnique-Montréal (POLY-MTL) and UTC have been collaborating for several years now on joint research projects and offer other double degrees for their respective students. ■

INTERNATIONAL

Understanding *nano-reinforced materials*

Introducing nanoparticles in polymers provides a spectacular improvement to their mechanical properties. These results have already been observed and used and Fahmi Bedoui, a research scientist with the UTC-Roberval Laboratory and at the California Institute of Technology (Caltech) would like to better understand the phenomena with a view to modelling them and predicting their behaviours.

It is one thing to "play" with nanoparticles to make new materials but to better understand the physical and mechanical properties to predict characteristics is another game altogether. This is what Fahmi Bedoui, a research scientist at UTC-Roberval Laboratory (and a specialist in polymer mechanical behaviour) has noted. "By adding nanoparticles to polymer structures, their rigidity and resistance factors can be modified", explains Fahmi Bedoui but "we are incapable of understanding why or how these mechanical properties change as a function of the quantities involved or the materials involved". And to study such assemblies, it is necessary to explore the crossroads between chemistry, physics and mechanical engineering sciences.

A model in molecular mechanics

Inasmuch as the UTC-Roberval Laboratory specializes in mechanical engineering sciences, Fahmi Bedoui looked up some former colleagues had met a couple of years ago at the New Jersey Center for Biomaterials, USA. Currently holding positions at the prestigious California Institute of Technology (Caltech), these material physics experts are developing a model in molecular mechanics that could be used to explore the nano-doped materials and related questions. Fahmi Bedoui first went, in 2009, to the Caltech Materials and Process Simulation Center as a visiting research scientist, and is now an associate scientist at Caltech.

Understanding and predicting nano-reinforced material behaviour

The objective assigned to our research is to better understand what takes place at a molecular scale when nanoparticles are used as additives, to assess the benefits of using them to reinforce polymer matrices", explains our specialist of molecular mechanics models. A very wild range of applications can be envisaged to replace composites: in sectors such as automobiles, aeronautics, aero-space and even in certain medical fields. The collaboration between the UTC-Roberval - specialised in mechanical engineering sciences and the Materials and Process Simulation Center (Caltech-MPSC), brings together 'pure physicists' and can be seen as a rewarding combination leading potentially to predictive models to explain the behavioural patterns of nano-reinforced materials. "At this time, there is no specific agreement between Caltech and UTC", emphasizes Fahmi Bedoui and collaboration currently relies exclusively on scientist-to-scientist research work and exchanges. A partnership should be planned for at least 2 years to finalise the two ongoing projects. Fahmi Bedoui envisages other forms of collaboration, given that "there is no lack of viable, joint research topics", he adds. Collaboration among research scientists does not preclude having a more formal collaborative agreement. The Caltech model is not so different from that at UTC and an official agreement would surely open up prospects for PhD students and young scientists to travel, exchange and work between the two institutions. ■

make the industrial actors more aware of the issues when making/using powdered matter. The courses are modular and lecturers are invited as per the specialties covered so as to detail how powders are characteristic and to convey information and data as to the physical and chemical proprieties. The overall objective is to supply information that will prove useful for questions of analysis, control and improvement of processes and products. Whereas Khashayar Saleh is very happy to be able to organise these twice yearly seminars, for professionals who come from many differing horizons, he also finds his own personal interest here. In many instances, the trainees come with their questions but also provide valuable experience and case-studies that enrich the knowledge base of the scientists and the class lecturers. ■

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Start up UTC Série II

Following suit to Series I presenting just some of UTC's start-ups, we offer our readers the Series II which will continue on UTC's WebTV facility and via our social network pages. They indeed are the living proof that UTC through it's a la carte pedagogy and its training/research continuum enhances the maturing and personal development of all its students, encouraging them to express and release their creative and innovative talents.

Creating *conviviality*

Reviatech is a company specialised in interactive 3-D technologies and was created in 2008 by Romain LELONG and Medhi SBAOUNI. As they see it, the local ecosystem enables and formalises a trend to encourage and enhance dialogues that already exists in the company.

Reviatech can recreate an industrial line post to train operators without danger and without stopping production, on a course that covers all sorts of failures and alarm states. Reviatech also edits training software packages and is now orienting its policies to creating virtual reality (VR) environments for public events. So, who are their clients? Continental, the DCSN, Areva … Reviatech has a turnover of 100 00 euros and advises UTC-Compiegne on its choice of equipment for the future VR room at the Innovation Centre. "The relationships that UTC-Compiegne is developing with industrialists are interesting for us, the start-ups; The Innovation Centre will act as the hub and the accelerator to help us exchange more spontaneously, more easily and thus create new opportunities. For example, we could access Renault's needs or reply to calls to tender by the ARC (Greater Compiègne) if we had better information sources, and indications as to needs", explains Romain LELONG. We had heard about a museum structure that would require 3D display of works, but it did not come about. Medhi SBAOUNI adds "In order for the ecosystem to become a convivial, user-friendly network, such that participants can find new axes for development, we should be organising breakfasts, after-work get-togethers, demonstrations, meetings … in this highly symbolic place for the ecosystem as a whole, viz., UTC's Innovation Centre".

An emblematic collaborative research project

Reviatech is already involved in collaborative research with students, notably in the Coyote Project which has enrolled 40 Mechanical engineering trainees to improve the interface in virtual reality training. It provides real added value for the company, inasmuch as the kind of people capable of doing this sort of testing are not exactly running around on the streets. Another project, for the moment under the wraps but seen as "emblematic of future developments of the ecosystem", associates Reviatech, an industrialist and UTC-Compiegne. "The local ecosystem enables other enterprises to build up special relationships with UTC-Compiegne if they have joint interests, and also Reviatech gets the chance to widen its knowledge about the universities laboratories and ongoing work". The two young CEOs advise that communication/PR be made as widely as possible on real examples, so as to better identify needs, wishes, and to detect people/structures with viable promising projects, who embody ideas and know how to get to the aid structures. "Moving on from the exceptional to the normal" as they put it. ■

Reviatech participated in the development of the new concept of a la carte Hypermedia to display in detail the laboratory activities, as needed.
Enjoy a Hypermedia tour of UTC's laboratories at- www.utc.fr

A 'green' printer

August 25, 2015, Xavier Garcia, a student engineer in the elective specialty Industrial Design Engineering (GM-IDI) in the Mechanical Engineering major at UTC was declared 'finalist' for this year's James Dyson Award, with his ecological printer Weeprint.

Xavier had been thinking about this project for years. When you realize, he says that some "15 M hectares of forestland disappear every year and it takes 10 litres of water just to produce one sheet of A4 paper. And yet, despite these alarming figures, our printers spawn 15 000 billion sheets every year! I began to set up a recycling process for old lecture-course brochures before it dawned on me that it would be more efficient just to use the exact amount of paper needed for a given job. That was how my Weeprint project came to be."

In numerous instances (tickets, discount coupons, e-mail messages), one third of an A4 sheet is ample surface, but no personal printer on the market-place allows you to print on a variable surface. Xavier decided to set about designing and assembling one. "Weeprint is the name of a project I have been working on alone", explains Xavier. "Nevertheless, I did have help from Antoine Lablée - one of the students employed by the UTC Innovation Centre's Fab'Lab - to prepare the mock-ups. The latter and working prototypes are essential when you want to develop a market-ready product". Moreover, Xavier also received assistance from the Engineering Design colleagues and from UTC in general, for the purpose of accompanying and encouraging students who wish to register for the Awards.

In essence, Weeprint embodies a simple principle: the printer is fitted with a roll of paper rather than A4 batch paper sheets, and the printout is cut to size when finished. The printer itself is made of recycled and recyclable materials and, with a modular design provides for simple maintenance, making Weeprint a lasting piece of home equipment.

As a finalist in the James Dyson Award, Xavier will now be able to run for the International Award, the winner of which will be announced next Nov.10, 2015. "My intention is to continue working on the design of Weeprint, developing a fully operational prototype, with the help of M Emmanuel Corbasson, head of the UTC's GM-IDI elective specialty. The ideal situation would be to have an important industrial actor interested in my project as that would lead to rapid development." But the student does not wish to limit his focus to a single project. "It is already an incredible opportunity to have the UTC Innovation Centre so close; I have loads of other projects in mind and I really want to make the most of the facilities offered there before I graduate". ■

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From design to collaborative creation

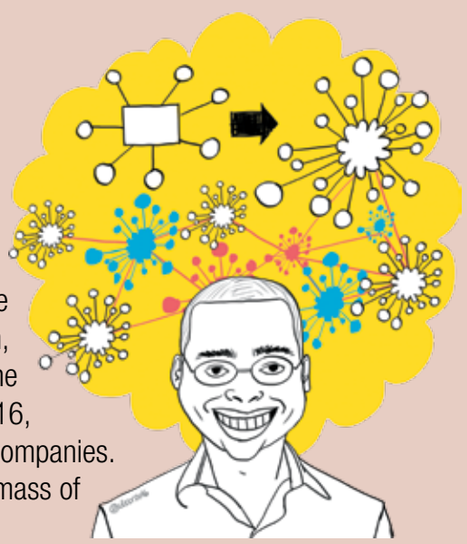
The industrial design electives are very popular at UTC. a design-intensive approach allow company managers to take on board the market trend and to imagine new forms of utilization (service or socially oriented, such as – as an illustration – the Parrot Bebop model drone. This model was designed by the Entrautre design agency, founded by 2 former UTC graduates (both majoring in Mechanical Engineering in 2004), Christophe Tincelin and Bertrand Vignau-Lous.

"What we wanted to do, with several other designer friends at UTC, was to be able to create, design and prototype our own projects – for this purpose, we launched the collective venture 'Entrautre'. Followed the definite success of our so-called Résille lamp (exhibited at the 2008 Deign Biennale), we decided in 2010 to give Entreautre a commercial company status", says Christophe Tincelin. "At the time; we focused on accompanying innovative companies through part design contracts and we are experimenting product life

Videos of UTC start-ups :
http://webtv.utc.fr

cycle concepts, from initial design phase through to after-sales services, thanks to our activities editing contemporary objects (lights, furniture)." Entreautre works both with innovative startups, implementing a global approach running from design strategy and carrying out design missions, and with major groups, using an expert design approach for various industrial assignments.
As Christophe details "we are trying to strike proper balance between product design, the use made of the product by the customers and the constraints related to assembly. It also enabled us to tackle a very varied set of themes. Currently, we are notably working with Ardi Rhone Alpes, moderating seminars for company executives. We analyse their projects so as to be able to improve on them using a user-intensive design approach, before assisting them to implement an action plan to structure their strategic policies. We also work with Beaba, a French SME developing 'Made in France' child-care items. We are accompanying them in the development of some innovative products".
The activities of the Entreautre Studio go indeed much further that editing objects and providing advisory services in design. Over the past two years, the Studio has invested in Fab'Lab dynamics and was involved in the co-creation of the Fab'Labs at Crest in 2004 and moderation of design awareness workshops at the Fab'Lab and at LabSud, Montpellier. "When we analyse the situation, Fab'Lab dynamics is very close to our designer professional world, and for this reason we chose to invest in it. Fab'Labs are places that rely on sharing, with open access to the available digital tools and test rigs: laser knives, 3D printers … These Fab'Labs encourage knowledge sharing. They federate a community of experts in a wide range of areas. For example, round the Fab'Lab in Montpellier, there are over 400 members, many of who are already experienced engineers. This creates new synergies and approaches which allow novel innovative projects to emerge. Thanks to these new tools and exchanges, our 'editing' activities are gradually being transformed into a mini-industrial nursery".
At the moment, Christophe and Bertrand are focused on developing the Studio, notably through signing of partnerships with project managers, and have been certified already with the French government's Innovation Tax Rebate scheme and with the recently created public investment bank. ■

How to valorise your data bases



In 2007, the Île-de-France (greater Paris region) published a report in which we read, quote "the quantity of data made available on a global scale doubles up every year. This data proliferation, coming from various public or private media, combined with inherent heterogeneity makes the understanding and analysis of data increasingly difficult, yet they are absolutely vital". In 2016, management and analysis of Big Data have become essentials activities for numerous companies. The start-up Perfect Memory, founded by a UTC graduate is in the business of making the mass of information easier to handle and to be valorised.

Document engineering is a new field into which Steny Solitude – CEO of Perfect Memory ventured - while he was following the elective specialty 'engineering of culture-intensive industries'* set up initially by Bernard Stiegler; Steny who graduated in 2001, adds "UTC is the only engineering school to possess a real school of documentary engineering and knowledge engineering, under the leadership of Bruno Bachimont and Stéphane Crozat. Engineers graduating from UTC in the specialty Digital technologies are unequalled in the world and it is for this reason we have quite a few in my company today.

Indeed it was because the subject was so appealing to Steny that he set up Perfect Memory, a start-up specialized in documentary engineering. Moreover, what we see is a rapidly expanding international market for multimedia semantic data bases in which France is lagging somewhat compared with other countries, notably in Europe. As in many other areas, France here can be seen as last adapter" … adds Steny Solitude.

Today, Perfect Memory works with several press agencies, e.g., RTBF, Radio France, RTL, as well as for then Belgian ministry in charge of Culture. "Today, TV channels, Radio channels, etc., have several heterogeneous data bases that group together text, videos, photos … and they therefore are difficult to manage and to be used in the market-place", explains Steny Solitude. "We allow the channel authorities to reconcile the various information sources round a given programme they wish to sell (internally, externally, open data …). To implement this, we feed the bases with all the information available in our client's immediate ecosystem. Then we provide the search engine, navigation and display tools enabling the client to rapidly find what they are looking for.»

Value-adding to the gigantic data bases is often what motivates enterprises, as Steny Solitude confirms in these terms "At this point in time, we are working on a tremendous project with Cap Gemini, aimed at internationally marketing the entire production output of French television channels. This entails bringing together the 118 TV programme producers, harmonizing all the sources in a space with a single common referential for everyone involved." Having note the exponential growth of digital products, the data base market is far from running out of steam! ■

** Today known as knowledge base engineering (KE) and ICT support management*

The simple way to share snaps of an event

Is there a simple, immediate way to share snap-shots of an event for all those present? The answer is 'Yes': Timeshot, an 'app' developed by three UTC undergraduates (Lucas Willemote, Nicolas Zantour and Valentin Paul) presented at the recent Start-up Weekend.

It all started out of sheer curiosity, when I decided with Nicolas Zantour and Valentin Paul to attend the Start-up Weekend, in fact to learn how you launch a business from scratch", explains Lucas Willemote, doing an engineering apprenticeship course in Computer science and applications. "But the idea of this 'app' came when I was at a surfing event with some 60 or so other UTC undergrads", he adds. "At the end of the one week stay, we simply had not managed to get everyone's photos collected together – the reason was that there was no easy way to do it. So I thought, wouldn't it be terrific if we had an 'app' that solved the problem. After the Start-up Weekend, our team came second* with an 'app' called Picatch'Us (renamed since as Timeshot). And the enthusiasm raised round our project was such that we decided to pursue; our 'app' met the requirements perfectly", says Lucas.

The Timeshot 'app' should enable any user to create a photo album that can immediately be shared by all present at the event. But as Lucas sees it: "the problem with this sort of app is that you have to store the photos, on server stations and that calls for a hefty infrastructure. So, what we decided was to use an existing format, viz., Facebook®".

After downloading the 'app' (available for Android and iOS), users connect to their Facebook® account and the 'app' automatically recovers all the Facebook® events that one intends to attend. During one of these events, when the user takes a photo with the 'app', the photo will be displayed immediately on the relevant Facebook® page. Anyone present, whether they have downloads the 'app' or not, will be able to see all the photos on Facebook. But why did they make the choice of Facebook®? "Today, a large majority of events where students get together are already on Facebook® - birthday parties, festivals, concerts, barbecues … so it was a logical move to use Facebook® to rapidly and simply share the photos taken. Facebook® also allows self-promotion, since the photos published via our 'app' are marked. Moreover, it allowed us to develop our 'app' much faster since we didn't have to accommodate the issues of storing-archiving. When all is said and done, we developed the functionalities in the core of our 'app' over a 4-5 week period. Nonetheless, it was quite a race towards the end of 2015, striking a balance between classwork and our start-up", adds Lucas®.

Several events organized by students at UTC, such as the Imaginarium Festival, have allowed the team to progress in offering a scale-one test area. This enables several improvements to be made in the app through user experience "For the moment, we are three: Valentin Paul, majoring in Computer science and applications like me», explains Lucas, and Nicolas Zantour, doing Mechanical engineering and who envisages moving to an entrepreneurship-elite status. We also rely a lot on project workshops at UTC to progress. This we saw a group that analyses the market competition and which defined a 'launch' strategy and another worked on our business plan. We made the best use possible of all the resources that UTC offers!" says Lucas enthusiastically. In reference to the business model, if the 'app' is totally free for the users, "we will then propose a wall-image format to the agencies that organize events, a wall on which the photos taken by the participants", reveals Lucas, "a wall on which they can display publicity for commercial partners".

But our three students are already thinking ahead: "We now envision the possibility for users to download those photos they prefer. Next step, depending on the evolution of the start-up, but also the changes in Facebook®! Of course, we retain the option of being able to back off to our initial idea, i.e., the possibility and to store our own photos directly with the 'app', on our own". ■

** http://interactions.utc.fr/thematiques/campus-art-et-culture/le-start-up-week-end-compiegne-au-centre-dinnovation.html*

Videos of UTC start-ups :
http://webtv.utc.fr

Nemopay

a 100% UTC start-up acquired by Weezevent

Arthur Puyou, Mathieu Guffroy and Thomas Recouvreux, three students at UTC in the Computer Sciences and Applications speciality, began developing their project for a cashless pay system, based on the UTC student's card. The aim was to simplify things for both students and associations. "Our system was immediately adopted and has been extended to numerous associations", recalls Arthur. Today they have sold their start-up "Nemopay" to Weezevent, an actor in the world of ticketing and on-line registration.

"In the beginning, our objective was to offer the opening of a single account, at the student's Bureau, to simplify and optimize personal and association accounts. With Mathieu and Thomas, we developed a system enabling the students and other users, to debit and reload their credit card. That way the holder could pay for travel expenses, attend events … Then the system was adopted by ITC itself to run the photocopy services, the automatic distributors … Finally, our system was installed for all the pay services on the campus!" says Arthur Puyou, beaming. The system is cashless, and non-contact in a closed loop design which can be a school, an entertainment park, a company … The aim is not to compete with classic bank card settlements, but to equip well-defined spheres with an in-house pay-scheme that avoids people having to carry small change around.

First client: LaSalle-Beauvais!

The solution and the offer were so simple that the team was rapidly contacted by other engineering schools. The first client will be the Picardie region school LaSalle-Beauvais. "We offered to share the source-code, but it turned out that they preferred to pay to use the system. That gave us the idea to market the product" Nemopay was created by the three students, who hesitated a little before launching the system, at the end of their diploma cursus. The question was - do we go it alone as entrepreneurs or do we prefer to look for a salaried job? "We wanted to work together to develop our product, something which we liked a lot; in fact, we were not really taking a huge risk; if the worst came, we would have learned a lot and eaten spaghetti for 6 more months non-stop!" Another safety net lay in the dynamic employment market at the time our trio graduated, especially in computer sciences and applications. So they set up shop in Paris, where they sought out clients and prospects, including Weezevent – where Arthur Puyou had done an end of course placement. Since then, Weezevent have bought out Nemopay to launch the first integrated cashless ticketing system.

From UTC to Weezevent

"As we saw it Nemopay introduced a real added value to on-line ticketing: Weezevent's customers only need to make one stop for the ticketing and pay at the event door entry" explains Arthur. "For us the credentials and commercial skills of Weezevent are essential factors to success and so now we are free to concentrate on our core skills – to continue to improve the product and its technical solutions". Arthur is convinced that UTC played an important role in their adventure: the a la carte choice of course and key lecturers for the development of their solution – covering technical, legal and operational aspects and the associative local life to test the beta versions. Today, Mathieu Guffroy lectures at UTC in a credit course for software development and web architecture. ■

d'infos plus ▶ **http://webtv.utc.fr** > Notre quotidien > Centre d'Innovation Daniel Thomas

d'infos plus ▶ **http://www.weezevent.com**

An e-pad tailor made for Senior Citizens

Smartphones and pads are terrific tools when it comes to keeping contact with our friends and family. But their utilization is still often a complicated matter for persons who are not very familiar with the handling of new technologies, for example, senior citizens. Consequently, they are cut off from having simple communications with their family. It was with this challenge in mind that François Lerebourg created the Facilotab, specially designed for senior citizens.

« It was around a year and a half ago that we began thinking about designing a tactile pad for seniors, when I realized that my Grand Mother was a bit deaf and lived far away and so communicating became increasingly difficult", explained François Lerebourg, a UTC graduate.
"Many people offer tactile devices to their elders, thinking that this would facilitate contacts. But the truth is that smartphones and pads are complex devices to operate and tactile features are highly disturbing when users are not familiar with them. Consequently, the seniors give up and their devices end up forgotten in a drawer".

The company CDIP, founded by François Lerebourg and his family, in the editing sector for over 20 years, for software packages used in the field of genealogy and photography, decided to design a pad especially for the senior segment. "Our aim is to get someone who has never touched a computer or a pad before to use our device immediately. More than just a pad device, Facilotab is an assembly of several essential, basic services: a message system, photo archiving, access to Internet and various memory and logic training games," explains François Lerebourg.

In order to have a pad that is accessible to all, the whole process had to be rethought, from the tactile function to use of virtual key-boards, or as François Lerebourg confirms: "People who have never before used a computer, are often 'put off' by the standard AZERTY keyboard layout. So, we offer with Facilotab the possibility to have a simple alphabetic order keyboard. We also moved the control knobs away from the device edges so that users can hold the device easily; the action zones are clearly identified and delimited by large knobs. There is no risk of making a false move! Moreover, the 'home' switch is always accessible no matter where the person is in the pad operations". The device comes with two instruction manuals which have been drafted in such a way as to be understood any people with no knowledge about digital practice. For example, one of the guide-books teaches the senior how to create and install an e-mail address, without outside assistance. The mail-box is also simplified: the incoming messages are also displayed in text format (to avoid advert pop-ups); it is also possible to filter the senders (only those on an approved list) to avoid spamming mails. Moreover any attachments are automatically filed in the photo archive folder so the user can find them easily. "The pad has been designed as an always-active device placed on a table top", adds François, "and a large visual message notifies the incoming messages". The pad comes with a metal support base. If the elderly person needs help, beyond the guide-booklets. "Close friends, relatives have a number and a programme to be installed on their own PC to be able to remotely control the pad, if needed, or to accompany the senior to surf on Internet. These close contacts can also receive a message when the pad needs to be recharged", reveals François Lerebourg. The O/S of the Facilotab is Android® and the user can then download a series of "apps" from the "Store". "It is also possible to activate a Skype® account, preloaded on the pad. Our aim is that the users progress as they discover the contents and possibilities of the pad, starting with some basic functions, and they can then proceed with new "app" downloads", indicates François. From a purely technical specification, the pad is an 'Archos' given, as François puts it, that "the starting prices are quite competitive and allow us to propose the Facilotab for a reasonable price". The latter is 245€ for a 10" WIFI model and 325€ for a 3G model. "We already have received orders from Belgium and from certain French Townhalls who wish to equip their senior citizens. We would now like to see our device offered in smaller computer stores, so that the potential senior users can go in and test them". ■

CDIP, a Family Business

CDIP, above all else is a family business, explained by François Lerebourg: "It all began when I helped out with a computer science club, with my Father, when I was still going to the Lycée. I wrote a small software routine for people who were genealogical fans which proved very successful and in 1992 we set up the company CDIP (Centre for Development of Personal Computing Skills) where my Mother and brother still work. We then installed several Internet and mobile 'apps' that are references in genealogical research. In parallel, we launched two other software packages: one to archive and handle photos and one for virtual scrapbooking. And now we are busy developing a version of our genealogy software as an 'app' compatible with the Facilotab!"

Videos of UTC start-ups :
http://webtv.utc.fr

Guillaume, a Google Ambassador

French Success Engines

When a young 'UTC undergrad' designs and assembles an olfactory alarm clock in his garage, so to speak, success is just round the corner and the awards begin to accumulate, from the Paris Concours Lepine to the Google Science Fair; a success story where it is difficult to ascertain whether the success came mainly from the product or from the noteworthy mastery of development and communication techniques displayed by this young start-up. One thing is for sure, the CEO Guillaume Rolland, who gained admission to the Elite Entrepreneurship elective at UTC, was selected by Google for these very same skills.

The giant company Google demonstrates to all – in its press campaigns with the Ambassador's faces and their global regional locations – that the digital world can prove to be a growth factor for the companies involved. The term 'Ambassador' is used by Google for the young and promising start-ups that they follow and encourage. "It is not possible to know the number of applicants, but today there are three Ambassadors, including myself, selected by an international jury", notes Guillaume proudly. By doing so, Google is seeking to promote successful ventures made possible thanks to digital technologies and software. The Google campaign moreover, is called French Success Engines. Whereas, the web giant Google has already financed a strong PR campaign for its Ambassadors, SensorWake® is not dependent only on this opportunity. With its dynamic, upstage and media-friendly CEO, the startup is managing its image and its network in an American manner, with the advice and stimulation also provided by Google. In France, Guillaume makes the most of the specialist and general public media, ensuring that he is aware he must be successful also in the PR and 'comm' aspects of his strategy. And, recognizing that PR is not everything to ensure corporate success, SensorWake® has gradually built up a solid base team, setting up connections with potentially important partners and also bearing in mind the need for sales, trading and distribution outlets.

Building up the corporate image, the company and its network of partners

"Today the industrial partnerships to mass produce the alarm clock are in place", details Guillaume, underlining that the Swiss company Givaudan, a world market leader in aromas and perfumes are on the list. Now with a payroll of ten, Guillaume's young start-up has raised enough funds from private investors to operate the company and production on a full-scale level. "Total pre-production orders are high too", confirms Guillaume Rolland and this allows the team to advance in the sales operation's side. The presence of the start-up at the Consumer Electronics Show (CES) in Las Vegas, January 2016 – the world's largest technology and innovation intensive exhibition allowed Guillaume to further bolster the Sensorwake® image and to extend the company's future distribution net.

A stand at CES 2016-Consumer Electronics Show, Las Vegas

Selected by Business France an agency that helps and enhances international development of various companies, the SensorWake® startup had the privilege of a high-class stand to show the product in its finalized version. "The highly relevant advice given by Business France and other well-heeled actors in the field proved very useful to progress in the dense CES jungle", recognizes Guillaume Rolland. However, being one of the ten innovations that received a CES Innovation Award, in the category Home Appliances, made him enthusiastic about participating in the CES event. Returning to France with a positive assessment on their product, an improved corporate image and of the product, as well as with an operational distribution net in position, the SensorWake® team is now ready to move into the final phase, viz., selling the product. The sales phase (at 99€ a clock) should begin in June 2016 and as Guillaume sees it should preferentially be of interest to a CSP+ clientele (artisans workers, business managers, HE and intermediate trades).

Adjusting university course requisites for young entrepreneurs

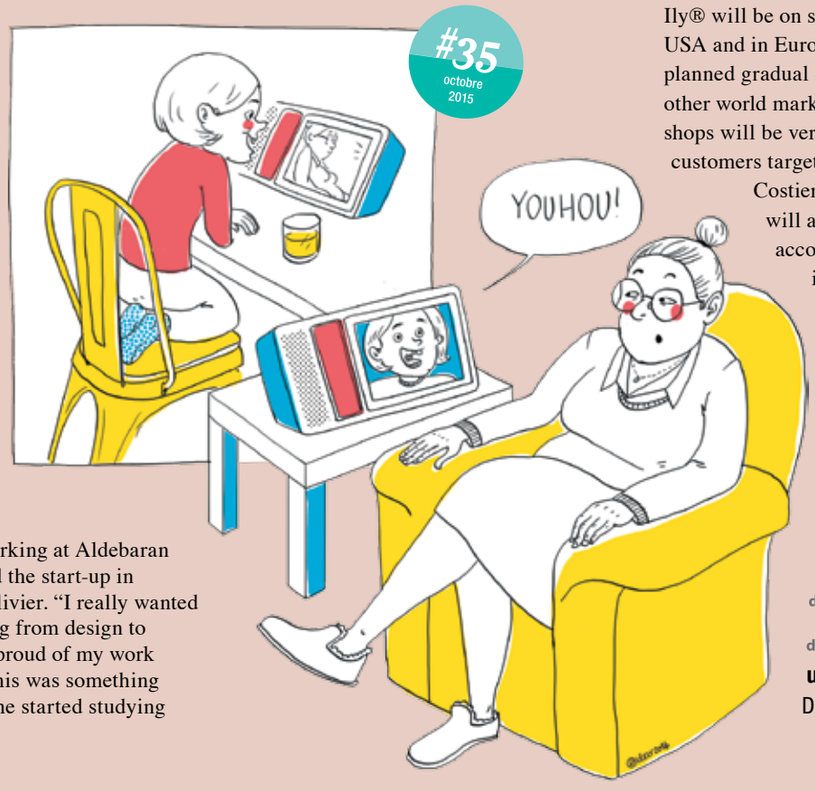
Admitted to first year of UTC in 2014, Guillaume has to apply for a year break in his cursus to handle the early growth phase of his company and project. Naturally, he confirmed his desire to pursue the course work later to gain his engineering diploma. UTC, moreover, had instated a new and adapted curriculum for such cases, called the "Elite entrepreneurship" course, where the students accepted can develop their early business skills, followed by an entrepreneur coach as well as having course timetable adapted to the progress of the project. The young CEO of SensorWake® no doubt will make best use of the flexible timetable arrangements inasmuch as he must ensure not only the PR aspects for the olfactory alarm clock but also prepare new products. "Taste and smell senses are not commonplace outside the agro-food and perfume sectors", admits Guillaume Rolland who sees important possibilities here for ad-mass products. The start-up does not wish to rest on its olfactory clock and the team are already working on a new product. But 'hush-hush', the young director does to wish to raise the wraps yet. Of course, it will be a technology-intensive device using flagrancies as its base, but other than it being a connected object for a general public, nothing more is known about the product at this point in time. ■

Videos of UTC start-ups : **http://webtv.utc.fr**

A phone brings generations closer

The objective of Ily® – developed by the French start-up Insensi – is to enable all the members of a family to communicate easily without needing a computer, a laptop or even a smartphone.

Ily® (a US buzz-word for "I love you") was the result of a simple observation made by Ilan Abehassara, CEO of Insensi. He realized that young children and seniors only had a limited access to modern communication systems such as computers and smartphones, and that, consequently, they most often borrowed devices from their parents to communicate together. That was why he decided to set up Insensi in April 2014. The Ily® is a wifi-connected fixed phone, with a tactile screen that allows the user to call out, to leave vocal messages and videos and also to share photos and pictures and drawings. The various contacts possible are signalled by a photo. An associate mobile "app" allows the users (notably the parents when travelling) to receive calls on their smartphone. Moreover, Ily® has a "presence sensor" which allows the device to display notifications of incoming missed calls, messages or videos when someone passes near (in front of) the device. When he set up his start-up, Ilan Abehassara secured the services of Olivier Costier, a UTC graduate in the elective major Computer sciences and engineering, who at the time was working at Aldebaran Robotics. "I joined the start-up in June 2014" says Olivier. "I really wanted to create something from design to market and to, be proud of my work when finished". This was something he felt even when he started studying at UTYC: "When I came to Compiegne (UTC), I noted that lots of technologies with on-board electronics and sensors were 'coming on line", so to speak. My own background was a first level diploma in mechanical engineering and so I thought it would be interesting to look more closely at these technologies. UTC is particular in that it allows students to compose a personal curriculum, and a freedom of choice as to the elective areas in which we could specialize. That was how I came to organize myself more towards electronics and computer sciences and engineering". Indeed, it was this personal profile with the combined mechanical engineering and computer sciences vision that the CEO of Insensi found attractive. "At Insensi, I am the mechanical engineer-cum-designer and I work with a design office. What I get from them is their visions and intentions and I have to transform these into mechanical parts that are assembled to form the devices. There are some very particular constraints in terms of the device components and my job is to integrate them as best as possible and to design mechanical parts that fit together perfectly". The design aspects are essential for a product like Ily inasmuch as it must present the clearest and most intuitive user-friendly interface possible. "In the case of the Ily® unit, we adopted a special approach", says Olivier, i.e., that once the design phase was over, we then chose how to integrate the technologies. This was somewhat complex but very interesting as we proposed an ergonomic style that did not in any way decrease its performance features. A lot of work went into the design to attain this extremely accessible interface and to ensure that the interactions were as natural as possible".



Ily® will be on sale in shops in the USA and in Europe early 2016, with a planned gradual expansion to cover the other world markets. "Physical sales in shops will be very important, given the customers targeted", explains Olivier Costier. The Ily® terminals will also be fitted out to accommodate new functions in coming years, as Olivier confirms: "We already have numerous development projects in mind, but we really want to propose a high-quality experience to our first costumers". ■

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A new look at innovation

Thierry Mandon, French Government Minister in charge of Higher Education and Research, answers questions from Interactions.

The report co-commissioned by the Ministry of the Economy and the Minister for Higher Education and Research from Prof. Suzanne Berger (MIT)* underlines the need to rethink the relationships between public research laboratories and the private sector companies. Two pivotal points emerge in this area. In the first instance, intellectual property rights do not constitute a financial objective, but are a means to improve and enhance collaboration between research and enterprise. Secondly, the less intermediate go-between there are between the research scientist and the entrepreneur the more fluid innovation will be. In this framework, UTC can be considered a mature actor and has perfectly understood the new deal and circumstances.

You defend the idea that Higher Education and Research must play an essential role in getting Frances economy back on a positive, upwards curve. Could you comment for our reader, lease the main conclusions and good practice noted in the Berger Report on Innovation, a Report you co-commissioned from an MIT professor, an expert in economics?

The main conclusion is that in the midterm public research establishment and private enterprise must move closer together, so that they can identify new areas to explore jointly and also to learn to cooperate better. This is not only the case for technological and applied research. Enterprises must also go out of their way to seek potential innovations in basic research. These explorations will offer a vision of what the market-place will be like in 5 to 0 years to come. One important and central consideration to bear in mind is the evolution of intellectual property rights. Far from adopting the vison of "treasures within" our universities, we adopt the position that intellectual property rights represents a means to bring research and enterprise closer together, in an exchange process that is win-win, i.e., a mutually advantageous situation. Public research must not just be seen as a gold vein to be explored but an actor with whom collaboration can and should be sought.

Public research must not just be seen as a gold vein to be explored but an actor with whom collaboration can and should be sought.

UTC is a leading-edge University of technology still pioneering in many sectors, combining the status of engineering school and university and constantly in the interface with the entrepreneurial world; can this combination be conducive to co-construction of an innovation-intensive ecosystem.

Universities of technology, and in particular UTC, were able to integrate their environments ever since they were established and are now involved in what we call today innovation ecosystems. Through its close relation with enterprise, and its international networks (indeed as a pioneer in the case of links with China), UTC has become a key actor in innovation projects and practice.

What developments would you expect from UTC to enhance its role as a university of technology on a par with other similar European of American institutions?

Constantly listen to your students (who are the real wealth of any university), constantly be in touch with your partner companies, emphasizing the international partnerships, to be more innovative in the campus pedagogy … in short, UTC has no choice but to be ambitious – 'noblesse oblige!' ■

DID YOU KNOW THIS?

***The Berger Report, forwarded to the Ministry, January 20, 2016 on «Good practice in Innovation in the framework of industrial ecosystems»**

Cf. (in French) www.enseignementsup-recherche.gouv.fr/cid99081/rapport-de-suzanne-berger-sur-les-dispositifs-de-soutien-a-l-innovation-en-france.html

THE COMPOSITES FESTIVAL

An opportunity to bring art and technology together

The Composites Festival with its original format, open to exchanges was organized Mars 1st-31, 2016 at the Espace Legendre in Compiegne. Visitors and participants were struck by the events allowing them to reflect on possible links between technology, science and art.

This 19th edition of the Composites Festival – off-beat, innovative, modern and unusual was organized at the Espace Legendre, Compiegne. Often referred to as the "Off-beat festival that will change the way you perceive the stage" the Festival is totally devoted to exchanges on the interactions between stage, plastic and digital arts, providing an opportunity for scientists and artists to get together. And this year will see the UTC research scientists directly involved, proposing several unusual objects in the exhibition area; they will also participate in the thematics debates and meetings.

The key exhibit is an immersion experience in a digital 3D reconstitution representing the Stone Age painted walls (circa 36 000 BC) Chauvet Caves. Serge Bouchardon, Director of the COSTECH UTC Laboratory and research scientist specialist in ICTs, will propose several 'strange', yet poetic devices. The Typomatic is not the new name for a Cyber-Cafeteria, but a booth that looks like a 'photomaton' where the visitor can enjoy a small poetic break. The booth was designed by Pierre Fourny, Executive Director of ALIS (housed by UTC) and it operates by playing with alphabetic letters to transform words and phrases to generate surrealist, original poetic creations. Visitors can print their art-pieces and take them home.

Serge Bouchardon will be presenting two of his digital creations. DEPRISE (cf. http://deprise.fr), a co-work with Vincent Volckaert, a UTC engineer which 'plays' on seeing a visitor taking control/losing control through a storyboard where his body moves and actions are used to deform sound s and displayed texts. This art-piece was awarded the 2011 New Media Writing Prize. DETRACE 'plays' on the tensions felt between the desire to leave digital traces and the opposite – erasing the traces (cf. http://i-trace.fr/detrace). This was a joint creation, with UTC student-engineers, Clément Routier, Antoine Aufrechter and Elsa Chaudet.

Over and above the Festival's 'mini-shows' and the exhibits, attendees are invited to a series of meetings and debates with scientists and 'actors' in the artistic and scientific research areas. Among the visitors, we have Clément Mabi, a specialist in concertation engineering, socio-technological controversy, Internet governance who works at the UTC-COSTECH laboratory. At the Festival he will participate in the events that looks at the theme Artists-Scientists-Public: sharing Innovation. Nicolas Dauchez, a research scientist, member of the Acoustics and Vibrations (AVI) team at the UTC-Roberval Laboratory participated in another thematic, When 3D takes over musical creation. ■

RESEARCH

The reasons to get together

As Serge Bouchardon, Director of the UTC-COSTECH Laboratory, Professor in ICT, sees it, the artists and scientists have lots of points in common. Witness the shared approach in research and creation that aims at emancipating actors from raw, direct observation of reality to better seize its deep nature. This specialist in digital writing is also an author in the field of digital literature. He explains why science and art would find it advantageous to work together.

Artist-scientist collaboration often leads to rethinking the priorities, valorising the process rather than the results

What links do you see between artistic creation and engineering sciences?

Both artists and engineers must have an in-depth knowledge of their 'supports' and tools (digital tools, for example) they use in their work. Their shared adventure is how they control and use their tools and on how they contribute to 'lending meaning' to their work, and new dimensions opened by (or avoided by) technology and its progress which is a reflection that is very important in digital operations which is the basis of today's technological milieu. One form of collaboration consists of welcoming artists into our academic laboratories. Experiments were conducted as of the 1950s, then further developed in the 1960s and 70s. Nowadays, we see more frequent interactions and indeed real-life collaboration. The alchemy between artists and scientists is a fragile situation, where going beyond the specialty boundaries (leading to scientific, technological and aesthetic breakthroughs) presupposes that art is not serving science, nor the reverse. Artist-scientist collaboration often leads to rethinking the priorities, valorising the process rather than the results, but also throwing light on the role of prototypes as something common to artists, research scientists and engineers. This collaboration is exemplified in the stage work proposed by ALIS who explore non-verbal language uses. In 2015, an artistic residential agreement was signed with UTC, under the denomination research artists in residence, with the aim to underline how artists can be totally involved in the scientific research work. In symmetry, scientists can also be actors in artistic creation, as we can see in the project called La séparation.

But why do you get student-engineers involved in artistic projects?

The way you can learn creativity can come via

various channels, among which a primer to artistic creative practices. Engineers, above all other considerations, build uses but can also be inspired by artistic works that, in essence, reroute and rethink the uses and invent new possible worlds and ways. Some features here can be seen as shared by artists and engineers. When an engineer designs objects, he/she is in fact doing a DIY mix of heterogeneous ingredients (they can be scientific, social, economic …). Such handicraft is akin to the work done by artists when seeking their ingredients for a piece of art-work. For several years now, I have had student-engineers get involved in digital artistic creations, and also had them work with the artists themselves. In this approach they have a better sense of the interdependence of technical and cultural aspects in the digital world.

What is the contribution and 'creative' role in your research?

UTC often emphasizes research-design approaches, where the basic hypothesis is that research can not only help us understand and implement but also to implement and understand. This idea come hand-in-hand with research creation which allows you to create and understand. This novel approach is encouraged at UTC by the Research Directorate and also by the UTC Daniel Thomas Innovation Centre who wish to take advantage of (and build on) the students' artistic potential. It is my privilege and pleasure at IUTC to embody this research-creative approach, among others. As a research scientist, my work focuses on digital writing (multi-media, interactive, collaborative projects), especially in the field of e-literature, where I am interested by staging interactivities and the role of gestures in interactive writing. A research-creation approach is an invitation to design and assemble experimental set-ups (objects …) which allow me to verify certain hypotheses and certain concepts. Creation allows you, in effect, you create the conditions needed to ensure observability of phenomena and their occurrences. Research-creation can prove attractive for the designing of objects/practices that relate to the digital world. The latter are still being perfected and the creative approach offers opportunities to 'think differently" and to perceive as yet unknown levels of meaning. ■

SKILLS

Acoustics : *coming developments, and 'dreamy' jobs ahead*

During the events that marked the Industrial Acoustics and Vibrations Conference (AVI), March 10-11, 2016 that focuses on how these fields have evolved over the past 40 years, several UTC graduates from this engineering specialty UTC-GM-AVI offered their visions as to the prospects for the coming 2 decades in their respective professions.

Florence Margiocchi, Head of Infrastructure Innovation with the French railways Group, SNCF, took part in the Conference Round Table on the theme "Rail and Sea", sharing her views on the needs in acoustics research through her personal knowledge of several professions involved.

Progress in the field of railroad noise has been significant. We have observed a 10 dB improvement of rolling stock noise (bogies) when comparing the 1981 orange generation TGVs and those running today. Tightening of noise abatement standards implies that the SNCF will need AVI engineers if it wants to be able to operate high speed strains that comply with legislation and environmental regulations. As far as technological tools are concerned, digital modelling of course is more and more relevant to our studies. UTC is both a pioneer and at the forefront of this specialty and it proves a trump card for graduates when entering the job market. In this AVI field, we are, for example, working on the question – can we certify part of our equipment just by virtual modelling. We have the software to do this, but these packages do not take into account separately the railroad infrastructures and the rolling stock. They are moreover reserved for real modelling experts. Some holistic approaches do, however, allow us to model how people living near railways perceive the sounds/noise levels. The need for real, live testing is thereby considerably reduced. Moreover, accompanying digital corporate transformation and BIM (virtual building) mock-ups allows the engineers to adopt systemic approaches and to integrate noise and vibration considerations to each stage of a rail transport project. Connected apps constitute another future development. It would allow us, for example, to monitor real-time track and material status and to measure their noise emission level with connected sensors devices that could be available soon. Probably using social networks will also totally change the way enterprises operate internally".

Connected apps constitute another future development

Isabelle Chaye-Mauvarin has held several posts with marketing activities (value assessment service and customer satisfaction). She currently manages the Acoustic Testing Department, Passive Safety, Performance and Consumption and Fuel circuits with Renault Group. How does she see coming changes in the acoustician-engineering profession over ten coming decade?

"Excellent background knowledge and skills in physics are a sure asset for students. In contradistinction, with the advent of connected vehicles, the notion of driver-machine interactions will still prove necessary for engineers who want to be recruited in the automobile sector. This is not the only attractive sector, in terms of acoustic research, but it does offer some excellent opportunities. Even if this is not necessarily true in Europe, cars are major attractions in other continents, in particular in Asia. It is a very pleasant feeling when you take part in a design process that makes clients dream!"

Christian Glandier, who works with Daimler AG, shares his vision as to needs in acoustics and vibration studies over the next 20 years

"Over the past 15-20 years, the development of vehicles has been radically transformed due to the deployment and use of digital design and assembly tools: CAD, experimental computer aided test calculations. The trend also is accompanied by shorter design and development time and the reduced number of prototypes needed. In a context like this, the computational approach must provide better quality products and more efficient test work protocols. Engineers tomorrow will have to be familiar and skilled in both areas and know how to make the best use of them. Vehicles today are continuously being improved but this does not mean that the vibro-acousticians will be out of a job. On the contrary! Results come not by chance but by non-stop efforts all the time. Moreover, efforts undertaken to lowering fuel consumption by reducing the vehicle's overall weight, with the advent of new materials together turn the noise abatement question into an even bigger changer for design engineers. New propulsion units (all-electric, hybrid, fuel cells) also bring new challenges to the design rooms. Customers not only wish to benefit from less noise, but they expect now to have a sound characteristics for the type of vehicle they purchase– sporty models or urban comfort … hence the trendy term of "sound design". ■

L'AGENDA

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19th Edition of the Composites Festival
March 1-31, 2016
At this 19th edition of Composites festival - which will bring together numerous artists and scientists at the Espace Jean Legendre, Compiegne, on the general theme of art-works, visual and digital arts … - the public and participants will be invited to experience several digital, artistic setups developed and assembled by Serge Bouchardon, director of the UTC-Costech Laboratory (cf. page 14).
www.espacejeanlegendre.com/composites.aspx

RUE 2016, at the French Higher Education and Research Fair
March 24-25, 2016
The Group of the 3 French Universities of Technology (UTs) will be present at the 'University meets Enterprise' event, organized by the AEF Group. The participants will be invited will analyse and debate today's digital revolution as it impacts higher education and research. Participants will include representative of enterprise, profession trade unions, start-ups in this field, other university clusters and specialist schools, and research establishments. Several UTC-Compiegne, UTT- Troye and UTBM- Belfort Montbeliard digital specialist start-ups will on hand to present their products and systems.
www.rue-aef.com/

3rd Edition of the Imaginarium Festival
May 14-15, 2016
This third edition of the Imaginarium Festival, with the support of UTC and the Sorbonne-Universities Cluster (SU) will yet again be organized at the Tigre hall, in Margny-les-Compiègne, with the aim to bring together at least 10 000 festival goers over the two days. On the programme – 24h live music and also an associative village with animations throughout the weekend. Organizers already announce the participation of Hyphen Hyphen, Naaman, Alesia, Last Train...
https://imaginariumfestival.com

Second Raid Sorbonne Universities (SU Cluster)
April 2-3, 2016
Organized by UTC students and supervised by the university Sports Department, this SU Raid is a multi-sports competition. The event(s) come under the banner of the COMUE Sorbonne Universities (Cluster). On the event agenda – 'pedalo' boating, trailing, running and biking, an orientation race on all-terrain bikes, paintball combat, orientation, race (on foot).

Final Round of the 'Eloquent Flowers' Competition
Tuesday May 10, 2016
The final round of the 'Eloquent Flowers' competition, organized by the Culture Service of Paris-Sorbonne (SU) Cluster is open to all students registered in one of the partners universities in the Sorbonne –Universities Cluster. The final will take place at the Bibliothèque nationale in Pars, 6:30 pm, May 10, 2016. The subjects are revealed to the candidates beforehand, but they have a limited tie to develop their 'arguments' and oratory presentation. In 2015, it was a UTC students Guillaume Ouattara who was declared final winner.
www.fleursdeloquence.com/

INTERNATIONAL SUMMER SCHOOL

A "winter school" for

DIY candidates

Some people see Fab'Labs as "the place to be" for least cost, rapid innovation. Are they becoming a popular focal point for any engineer or SME Manager who wishes to prototype his/her creation very simply? The success of the International School of Innovative Products in Fab'Labs, jointly organized in the recent winter period by UTC and Polytechnic University Turin (PoliTO) seems to point in this direction.

Would you like to learn how to rapidly make a low cost prototype starting from an innovative idea? The International School of Innovative Products in Fab'Labs (DIP Fab'Lab) was the training course for you. Organized jointly by UTC-Compiegne and the Polytechnic University Turin (PoliTO), the two week course took place, last February, in both Verres (Aoste valley, Italy) and at the UTC Innovation Centre, Compiegne. The objective was to host some 15 students and initiate them in methods and use of tools for rapid prototyping available in the Fab'Labs. These "fabrication laboratories" emphasize the gains of applying a DIY (Do-it-Yourself) approach, offering space and allowing the trainees to rapidly design, assemble and test their prototypes.

Discovering the tools

Out of 63 applicants, 16 were selected by the DIP Fab'Lab organizers. The first week was scheduled Feb. 1-5, 2016 in Verres, in the Aoste Valley, Italy with the assigned aim to teach the participants the necessary base for prototyping work: training in 3D design, in CAD, in the use of Arduino cards to control mechanical systems or the handling of laser knives. "The basic idea is to propose the theory and to show at the same time that the tools available can be used properly by the without any prerequisites", underlines Andrea Guerra, a lecturer at PoliTO and co-organizer of this DIP Fab'Lab event. This "theory-intensive phase was completed by training on product development processes.

"Hands-on" training

The second week of week was to put into practice the theory learned in Italy, through concretely implementing a project. There were 4 teams, each assigned the mission to design and make a prototype in 3 days' time, on the theme "light". The first prize went to a "light-key" for a light-activated lock. The next group made a modular lamp, made up of cubes that can be moved around, changing intensity and the light colour. The third team made a lamp that uses gravity as its source of power, for places with no electric grid supply. The device relies on a weight falling several minutes to generate enough electricity. The fourth project was an "emotion sensor" that uses a heart sensor (infrared) to transform the intensity and the frequency of heart-beats into messages displayed on a pad screen. The event organizers entertain the hope that, who knows, some of these ideas (and others) will be pursued and lead to viable products. The International School of Innovative Products in Fab'Labs welcomed a group of students at varying levels of their studies and at different points in the training cursus" adds Bruno Ramond, Director of the Daniel Thomas Innovation Centre and French co-organizer of the event, who underscores the important role of a multidisciplinary approach for processes like those found in a Fab'Lab. Bruno Raymond envisages holding the event for a second edition next year, opening participation to SME managers who express the wish to discover these new tools. The visit made by Prof Alain Storck, President and Vice-Chancellor UTC to meet Marco Gilli, Rector of PoliTO, as well as the visible investment of the regional partners such as the Val d'Aoste authorities is a good omen for the opening of new, wider-reaching forms and areas of collaboration. ■

TRAINING

A new double degree in design engineering

UTC and ésad-Amiens (the École Supérieure d'Art et de Design d'Amiens) have just awarded the new double degrees to the first class of graduates. The 'designers' will hold the ESAD's Master's degree in digital design and the specialty User eXperience Design of the UTC Master's degree. This approaches places the designers and their functions at the centre of the innovation process.

As Barbara Dennys, Director of ésad-Amiens, sees it: "A good designer does not just dress things up, but is a collaborator who is involved far upstream in the process of designing and developing a new product". With this sort of statement, it is not at all surprising, that ésad has just set up – at the invitation of UTC – a double degree training course. From an administrative point of view, this is quite an original proposal, indeed unique in design training, inasmuch as the students are registered simultaneously for both courses and will be awarded both establishments' diplomas.

Choice of the "opening"

The course innovation does not stop here, because the students chosen to follow the double degree and the ideas on which the package is based are quite surprising. At a time when head-hunters subdivide the profiles they want into surgically narrow sets of skills, the ésad-UTC collaboration addresses "students in design, graphic arts, in computer science and in humanities who want to carry out forward-looking projects focused on human/world interactions which mobilize technologies". And this apparently heterogeneous group is invited to implement this far-reaching programme by relying on an essential concept, design cantered on user experience. For Anne Guénand, head of this particular UxD course at UTC, "design is one way to shape experience".

Experience as a source of innovation

The vision above is shared by Barbara Dennys for whom artists and designer have in common that "they produce forms which also represent thoughts". For experience intensive design work, shapes are generated through an in-depth exploration of the world and all our sensorial feelings. From this standpoint, the user plays a central role and designers seek to "understand our experience to translate it into then formal qualities needed inn a design process as expected by a user". Here we have a philosophy where perception and action are intertwined, as defended by the UTC lecturers in charge of the course, like Charles Lenay, for example.

Designers less focused on their personal experience

One of the five students who registered for this double degree package this academic year underlines the fact that the UxD approach "allows designers to be in a better position to defend user expectations and needs". Barbara Danny see a way "to delocalize design thinking for the benefit of users and to limit any temptation to adopt an ego-centric stance of design students while in training". This vision, focused as it is on experience and on the alter ego, justifies the presence of students coming from previous humanities studies. "Today, digital objects are becoming pervasive and there are increasing numbers of projects to design the new objects", explains Amandine Masset, laureate in the first class of the new UTC-ésad double degree package.

A win-win-win situation

In an environment with increasing numbers of connected, interacting, communicating objects in every aspect of day-to-day life, computer science engineering is a must for designing "apps". Designers use software packages that frame interactions and various displays but do not cover development aspects of the products. Where these three worlds meet: humanities, design and engineering, you have something that is close to the future professional contexts. Designing a new technical object today, when you think about it, comes down to meeting and understanding the future users, inventing forms that will reflect 'their image', while complying with necessary technical constraints, product feasibility and making a safe introduction in the market-place. This is the win-win-win ideal.

The social connection, an object yet to be designed

In this perspective, designers are required to bring together all the various dimensions of a creative process. Moreover, adds Barbara Dennys "this partnership arrangement with UTC increases the scope of possible actions for future designers through additional potential orientations", underlining the open-attitude of UTC via the pluridisciplinarity approach to its Master's degree. As far as the notion "design" itself is concerned, the new students would like to see its scope enlarged, as can be noted in their choice in favour of "designing social links". We can see that digital, social networks have become commonplace and we can readily observe that the digital world is seeking to re-build and format communities, commerce and services. The ""social link" itself has become an object that can be re-designed, much in the same sense as an on-line client-area is designed! This first class of graduates demonstrates that the UxD double degree is successful, as seen both by the students and the lecturers. Eleven new students have already registered for the next academic year of this innovative course offer.

Amandine, taking the digital option

Trained as she was at ésad in graphic design, Amandine Masset has just finished her end-of-course placement to validate her double-degree… which she did at a design oriented innovative start-up. This somewhat hype qualifier covers the philosophy of the UxD Master's degree: innovating via prototyping, progressing by iteration, in a close relationship with all the actors involved. "The way the start-up User Studio (cf. http://www.userstudio.fr) operates corresponds perfectly with the 'training image' we acquired in our UxD courses: innovation via experience and a better understanding of the user's expectations", underlines Amandine Masset. As Amandine sees it, the philosophy can be summarised by 3 words: curiosity, empathy and resolve … to which she adds creativity, ingeniousness and … the capacity to calls oneself into question. She made good use of these intrinsic assets during her 5 months placement to design applications for the company customers' Internet sites. Today, she doesn't want to limit her professional horizon to graphic arts, nor to get involved too much in industrial object design. "Personally, I would prefer to continue in start-ups or design agencies so as to learn more about the designing of digital products", she says. As an understandably ambitious young person, what she likes above all is to be fully in charge of the design of new products, underscoring the importance of team-work and customer relations. We need not add at this point that Amandine Masset puts human relationships at the core of her activities. ■

Presented by **Toby,** UTC's 'Visitor from the Future'

More at
http://webtv.utc.fr/
Nos séries • Ces thèses qui changent la vie
Nos séries • Les laboratoires de recherche • Laboratoire Roberval

Our gratitude goes to the Doctor and to UTC's Roberval Laboratory for allowing this family to do their choir stint in the garden without being too overwhelmed by the 100 dB aircraft wind tunnel.

More at
http://webtv.utc.fr/
Nos séries • Ces thèses qui changent la vie
Nos séries • Les laboratoires de recherche • Laboratoire Heudiasyc

Our gratitude goes to the Doctor and to UTC's Heudiasyc Lab for offering safety and some energy saving in both irrigation and harvesting phases, with the help of cryptographic keys!

It is a recognized fact that PhDs bring undoubted talents and innovative skills to the world of enterprise. UTC has chosen to present - in text, videos and humoristic photos - some theses that have led to highly beneficial applications in our day-to-day life. We'd like to think that you, the entrepreneurs will be inspired to trust PhDs as recruiting officers do all around the world nowadays!
Our series "**Theses that impact life-styles**"
can be viewed at http://webtv.utc.fr/ • Nos séries • Ces thèses qui changent la vie

Theses that impact on life-styles

Our gratitude goes to the Doctor and to UTC's LMAC Lab helping throw light on some unpredictable phenomena!

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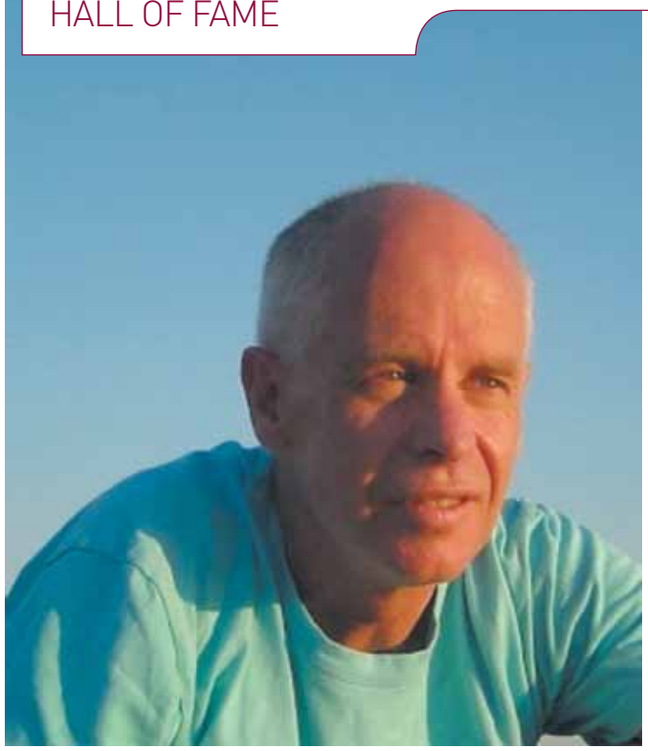
Nos séries • Les laboratoires de recherche • Laboratoire LMAC



L'UTC : the perfect matching machine

Adaptation is a key feature for all living organisms; it has nothing innate about it and has to be learned. When Luc Alba came to UTC Compiegne in the very beginning, with a diploma that was as yet not recognized, Luc Alba agrees that the conditions then were acrobatic compared with the means UTC has today, yet they served to reinforce the self-confidence of his comrades and himself, such that they all were able to adapt to a variety of real-life situations they were to encounter.

In the presence of Luc Alba, we could qualify him as 'curious' and 'open-minded' and definitely not dogmatic yet a hard thinker when needed. This former boss of the Software Engineering department at Sagem Mobile phones (2003), ex-Director at Ulysseo, a software editing company, is clearly adamant about new-wave social network addictions and others – not that he calls for a rejection of technologies but more the (mis) uses made and the subsequent total loss of critical minds. In a sense, it is logical that he finds it impossible to reject those very tools he himself developed over several years.

Travel and signal processing

It was not, however, the technological gadgets that motivated his first employment. "After I had gained my engineering diploma, I in fact wanted to make a break with UTC and head of to work outside France". And what could be better in this respect than accepting a job in petroleum exploration, for the Compagnie Générale de Géophysique. From the Arctic Circle to California, via Brazil, the Congo or Spain, his job was with missions designed to identify promising geological structures. "90% of our drillings turn out to be dry and the cost of an echographic sonar sounding campaign is 10 times less than drilling a bore-hole", explains Luc Alba.

A real soft spot for software engineering

After spending several years prospecting, Luc Alba moved back to a more sedentary life-style as a software developer for the same company. "Learning how to modify, upgrade and develop software packages was not a real difficulty at all", explains Luc Alba, well aware as he was concerning the "adaptability genes" provided by his years at UTC. This new activity in fact shows him the path forward for his next career moves: as a consultant in software engineering, especially in the field of programme architecture, which is the key to finding modular software solutions, given their demonstrable competitive advantages. "We realized that a large number of software functionalities can be re-used and that an advantage accrues from thinking ahead for system target during the design phase" underlines Luc Alba, who see here an analogy with Lego® construction.

Thus he then became interested in development processes per se, establishing two start-ups with major industrial groups as clients. He also later enjoyed his incursion to the industrial world of mobile phones and the first "apps" with SAGEM … to the point that today he heads the department responsible for deployment of profession-intensive software packages at Safran.

Too many standards kill initiatives

Today and 60 years old, Luc Alba sees himself as a facilitator for the development and deployment of software packages for use in the aeronautical sector, which bring with it a new challenge: standards inflation and regulatory overkill process, whether it be in the public or less known in private sectors inasmuch as the trend is in-house. "Safety in aeronautics is primordial: any change or evolution of a given system requires ten engineers to demonstrate that the risk factors are fully under control. The statistical end-result is that air transport incurs about 20 times less accidents that with cars/trucks on the roads", underlines Luc Alba. Standards he agrees are important, but nevertheless it is their sheer proliferation that impinges negatively on the corporate performances factors: on one hand, you have the intermeshing of processes and after a while the engineers are 'out on a limb', so to speak; on the other hand, a lot of time is wasted in justifying every move, with the engineers forced to play the role of lawyers rather than being totally focused on solving the problems to hand, as (and before) they arise.

Alongside his professional track-record, Luc Alba has remained faithful to UTC, as an Bureau officer of ADAUC (which became Tremplin, the UTC alumni association) in 1998, helping professionalize the association in close liaison with its Bureau officers, a long-term partnership with UTC and a true service offer based on a reliable data base (witness the UTC graduate entrepreneurs who today are members of the Business Club. Today UTC counts some 26 000 graduates round the world. He is also a keen follower of the Prix Roberval, a prize given each year to books (etc.) that promote a better understanding of technology. ■

BIO EXPRESS

1979	Qualified as a UTC engineer in Mechanical Engineering
1980	Development of software packages specific to signal processing problems and head of a geographical marine data acquisition mission for the prospection company, Compagnie Générale de Géophysique.
1987	Software consultant for Intelsys
1991	Director of Triangle Technologies, an SSII specified in software engineering
2003	Director of Ulysseo, a software editor (contents and technologies) foe mobile phone applications
2006	Head of the Software Engineering Department for Sagem Mobile phones
2009	Process Manager with the Myriad Group
2011	Software consultant for the Safran Group - Division Safran Electronics – Sagem

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