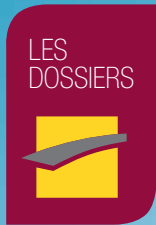


Donnons un sens à l'innovation

Interactions



The socio-economic ambitions assigned to the PIAs

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FROM THE PRESIDENT'S DESK



'Science aware' research at UTC

This and the previous issue of Interactions illustrate in a detailed manner the major commitment of UTC in the French Government's Investment for the Future Programmes (PIA) and the striking success of the Picardie Region's Higher Education and R&D structures in their candidatures to the PIA calls to tender. However, as the regrettably departed Professor Daniel Thomas stressed: "PIAs do not constitute UTC's scientific policy but must serve it". This indeed is the strategic objective we have adopted and constantly implement, viz., we produce knowledge and know-how enabling the advancement of science (in the battle of wits) making the most of our power and ability to act and do things ("obeying the logic of action and implementation"). Technology, as we see it at UTC, is a scientific activity perfectly in line with the dual, self-reinforcing logic "understand to do things better", i.e., not only to produce socio-technical objects (materials, processes, organized systems, services ...)

but also "make things to better understand them".

With a cognitive and practically oriented policy objective, doing things transcends the concept that encompasses the tasks set and this leads us where only rarely we imagined we would go. It is via this combination of thinking, analysing and translating theory into decision that drives our efforts. It is through this awareness of science and research that UTC accepts its triple responsibility: be it cognitive, societal (solving the major challenges faced by society today) or territorial (serving enhanced creativity, attractiveness and territorial development schemes) or indeed all together.

This triple responsibility generates multiple forms of tension (the tenets of basic research vs those who favour applied research), opening our academic vision to the world rather than limit it to a local, territorial setting, academic freedom versus "enslavement" to solving socio-economic issues ...) but when examined closer, we see here the dialogic representing the opposite facets of reality. Consciously engaging in and pursuing science and research activities is clearly the assumed vision that UTC has inscribed among the core principles of its development plans. ■

Alain Storck

President and Vice-Chancellor

A « Best Paper Award » for Vincent Lanfranchi

Professor Vincent Lanfranchi, at UTC-LEC [Electromechanical Engineering Lab., Compiègne] has been awarded a Best Paper Award during the proceedings of the 9th Conference on ecological vehicles and renewable energies, held this year, 25-27 March at Monaco. The objective assigned to this work is to develop a toll capable of 'designing' and predicting the electromagnetically generated noise from a new motor for railroad transportation, viz., synchronous permanent magnet motors. ■

4 UTC laureates at the 16th i-Lab competition

Four UTC students have become laureates at the 16th so-called "i-Lab", national competition for aids to creation of technology intensive start-ups; their prizes were announced July 1st, for:

- Linkurious, a start-up created by Sébastien Heymann in 2013, winner in the category "creation-development". This company proposes a simple interface to companies producing huge amounts of data that helps them display, analyze and explore their data graphs.
- TEM Project, a start-up project proposed by Eric Simon and Victor Grimaldi, winner of the PEPITE Prize – "Tremplin Entrepreneuriat étudiant". The aim of the project is to provide musicians with a new form of instrument control, enabling various new ways to produce sound outputs.
- Eplays, is a project proposed by Jean-Baptiste Guignard, laureate in the category "emerging companies";
- Myartmakers, a start-up developed by Adrien Saix, in the last ten for the PEPITE prize PEPITE – Tremplin Entrepreneuriat étudiant » 2014. MyArtMakers social network, specialized in modern art, produces bespoke, personal art-work. ■

Driverless vehicles a UTC

The UTC-Heudiasyc laboratory organized, June 30-July 3, 2014, a second international Multi-Unmanned Vehicle Systems workshop at the UTC Innovation Centre. The aim of the workshop and conference was to enable contacts between experts of airborne, sea surface or submarine or terrestrial unmanned vehicles, to present ongoing research and development of products and applications in communications and coordination of multi-robot systems, control of robot flotillas, 3D imaging and analysis. ■

The European Summer University 2014 «When science gets involved in politics...»

The French Institut des Hautes Etudes for Science and Technologies (IHEST) organised a summer recess university on the theme "When science gets involved in politics ..." July 8 to July 18, 2014. Bruno Bachimont, Executive Director of Research activities at UTC, was a member of the scientific advisory committee for this summer university and co-moderated a Round table on the topic «Evidence based policies». ■

Congratulations to UTC's Zurich Gold Medallist, Marie Gayot

Marie Gayot, UTC undergraduate in Urban System Engineering (GSU) won a Gold Medal in the Women's 4 x 100 m relay at the recent European Championships at Zurich, with her relay team-mates: Muriel Hurtis, Agnès Raharolahy and Floria Guei. Finishing 7th, Marie also put up an excellent performance in the 400 m event.
http://webtv.utc.fr/watch_video.hp?v=MAAH6W31MD1G



UTC INNOVATION CENTRE

UTC and the 'Digital Springtime'

The second edition of the Digital Springtime was organized at UTC, June 5 with a wide panel of experts and actors to decipher the issues and impacts of the digital world in every sphere. Laurence Monnoyer-Smith, Vice-President of the CNDP and Eric Verhaeghe, essayist and founder of 'Parménide', an agency specialized in social innovation, notably in politics and economics for a digital era answered questions for Interactions and offered their analyses.

SEMINAR

Could a digitized world improve democracy?

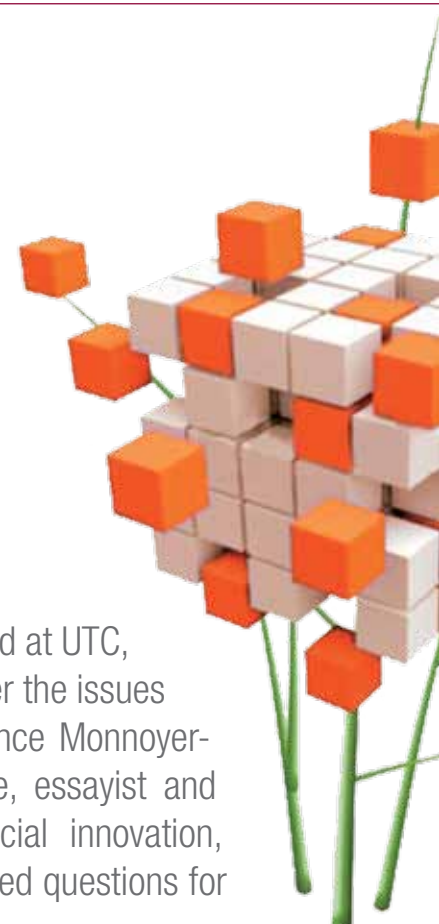
UTC Professor Laurence Monnoyer-Smith, Vice-President of France's national committee for public debate (CNDP), addressed the Digital Spring event, on the theme of the role of elected officers in the innovation process and that of digital transition for our territorial authorities and lands. As she sees things, we must transcend the narrow perception of digital tools (transparency and open access to data), to seize all the opportunities that reside in citizen participation.


“Elected officers have realized the advantages that lie in digital approaches to make progress in terms of transparency and access to information.

Nonetheless, it is a restricted approach to digital processes, anchored as it is in a linear, top-down tradition of communication line that run from the elected to the citizen voters”, details Laurence Monnoyer-Smith. What she hopes is that the concept of transparency will not constitute an exclusive filter for the digital relationship between political representatives and their voters and, indeed, she calls for a new equilibrium going beyond the simple digital service of providing access to data. “This service remains influenced by a consumerist vision. What we have is information consumption using digital tools, the majority of which is represented by commercial and marketing operations”, she adds. Internet offers very attractive inter-activity possibilities where the aim is to enlarge and improve citizen participation in our regions, and this is borne out by an increasing list of examples.

Improving transparency and participation

The national label “Internet City” – a government scheme which began in 1999 to reward towns best equipped with digital facilities – was awarded this year to Grand Evreux Agglomération in the category “urban democracy”. This township proposed an experimental platform to co-implement a project with its inhabitants. In Saint-Médard en Jalles, which like was similarly distinguished in the same category, the town council minutes and even the council voting process have been digitized! “Paris recently launched its first participative budget and several other cities such as Nantes, Bordeaux, the Riviera Region PACA, have also launched some very innovative procedures”, notes Laurence Monnoyer-Smith, underscoring the rarely mentioned aspect, viz., that use of digital tools can serve also preserve urban memories. Concerning long term projects, frequent in urban planning, they can record and organize the archived debates, those needed to ensure high-quality concertation, etc. “There





are hundreds of ways to initiate and organize citizen participation, through workshops, exhibitions, public debate venues ... but to synthesize and make all this information available, it is readily admitted that digitizing the data offers simple and accessible ways to do this”.

Are there digital tools to regain the people's confidence?

The Vice-President of the CNDP regrets the growing gap between the wish citizens express to participate in local life, or in the ongoing debate on territorial land planning (the current reduced number of Regions debate), where citizens are absent supposedly because of the urgency to get the plan through Parliament. This reform would have been an opportunity to close the gap between

elected and electors, a gap that politics today tends to widen once more. “If the elected officers are in the optic of using digital tools serving transparency, without developing their potential in terms of citizen participation, the crisis of confidence will not be resolved yet ... To offset this lack of concertation, a special Internet site has been set up “Our Regions Tomorrow” to encourage citizen initiatives? The CNDP, the Economic, Social and Environmental Council and other institutions support this site. Its role is to organize on line debate, with thematic forums”, underlines Laurence Monnoyer-Smith. A synthesis of the debates is forwarded to the Government ministers and members of Parliament; their influence therefore depends on the number and dynamics of those who contribute to the on-line exchanges. “This debate is all the more necessary that the new territorial distribution will lead to reorganization of the structures that underpin participative democracy. What will be the results? How will they fit in to existing structures?” Other initiatives, are becoming increasingly prominent, such as Démocratie Ouverte (Open Democracy), defined as

“a French language community accessible to elected officers and citizens who desire to collaborate for the purpose of making our representative democracies transparent and participative”. The site accommodates many citizen initiatives (in a wide connotation), including an Appeal to instate Citizen-Intensive Territories, supported by the CNDP. “All these expressions of intent expressed by France’s component territories, to participate and become involved do not fit in with the Government initiative to reform the country’s regions. This constitutes a vital democratic transition”, adds Laurence Monnoyer-Smith, who recalls the role that the Universities (and in particular UTC) play in the changing scene. “UTC ensures that the undergraduates become aware of their future responsibilities in their dual role as citizens and engineers faced with a digital world and its tools and is also involved in its local regional, territorial environment to accompany the democratic transition as and when it occurs. UTC must pursue along the same lines, with the same vision”. ■

plus d'infos ► <http://webtv.utc.fr>

SEMINAR

A post-Fordian economy in a digital era

Eric Verhaeghe, essayist and founder of ‘Parménide’, took part in the Digital Spring, addressing the question of a digital transformation of the economy. He shares his vision of a transformation of France, but with caution.

“A digital economy, by opening up possibilities for a constant collective approach, tend to flatten hierarchic organizational structures”, says Eric Verhaeghe and adds an example. If a “bad buzz” for a given product or service circulates on social networks, the crisis communication must be validated by the hierarchy to be as reactive as possible. Social networks shorten the decision chain and lead to delegations through the necessity to act and react rapidly. “A direct relationship between producer and consumer, increasingly frequent now that digital tools exist, also have an effect on the marketing and sales services, whose ‘privileges’ have shrunk to the point that their very existence can be questioned”, adds Eric Verhaeghe. Digital transformation of an economy therefore modifies considerably the ‘symbolic’ geography of an enterprise. In a system that depends on pyramidal hierarchy and on the distinction between front and back offices, the enterprise will adopt more direct and horizontal relationships between the actors. “This is what I call a liquid democracy, operating via horizontal contamination and not by top-down dissemination of information and distribution of power ...”, summarizes Eric Verhaeghe.

This is what I call a liquid democracy, operating via horizontal contamination and not by top-down dissemination of information and distribution of power

Innovation, responsibility, initiative

Our economy today is facing a problem period of transition: the concepts and values that prevailed earlier on have been “blasted to smithereens” by those introduced by the younger generations. The latter is still considered as operatives by their superiors whereas they in fact master the new technologies far better. This can complicate in-house relationships. “The challenge is to have the underlying processes and jobs evolve to assure productivity gains. New sets of values – to which the French are patently allergic – are necessary if we wish to stay competitive in the market-place: things like innovation, responsibility and initiative, at all levels”, declares Eric Verhaeghe. “This is a task that French management should be tackling head-on, with its multiple levels of interpretation/rereading, vetting every document we produce and 3 weeks delay before any decision can be made – all of this must change. The superior is not here to chastise, reprimand or even oversee, he/she is there to free people’s minds and energy”. According to Eric Verhaeghe, in protestant countries, exemplified in Northern Europe we do not have the handicap of elitist knowledge bearers and they adapt themselves and their national economies more readily than others to the new digital coding.

Change the tools; change the managers

Another challenge is to close the ‘gap of scorn’ that is growing between those that think (the intellectuals) and

those that « do » (operatives). It is this gap that deprives companies from advice and ideas that could help gain in competitiveness. “Innovation no longer follows the Fordian lines from the top echelons of hierarchy down to the production lines, but stems now from individuals initiatives that ‘contaminate’ the entire structure”. So, what forms of organization should be adopted to guarantee a positive ‘contamination’? Eric Verhaeghe advocates setting up horizontal digital tools, such as in-house social networks, to help build new forms of collaboration within companies. A case in point here is Siemens that developed an in-house social network where all the company collaborators can share ‘good practice, no matter where they are posted round the world. “We must also change the managerial echelons, replacing ‘defenders’ by ‘conquerors’ made of Hussar mettle” he advises. “We are now entering an as yet not totally recognizable, post-Fordian society where the opponents hunker down behind ‘deresponsibilizing’ procedures, refusing to adopt new codes of initiative”.

Set your intelligence free!

“Let me give you this piece of advice, if you really want to dive into the economy from a digital angle: start a born-fire with all the procedural cards and set your intelligence free! The digital revolution offers a window to infinite thought, whereas the Cartesian revolution had drawn the outlines of a closed world. France and its typical techno-structure are organizing resistance to change, exemplified by the fight by licensed taxi-cabs to ‘free-rider’ VTCs, or the hesitant reactions of traditional banks to the trend of crowdfunding, or the organization of subsidies for start-ups by major groups”, adds Eric Verhaeghe. “Phenomena like these are delaying the digital transformation of the country’s economy and point to the possibility of having a brutal change – in a pure French tradition!” ■



INTERNATIONAL

A 'first' in Morocco

Morocco has set a target to train 15 000 graduate engineers in 2015, the figure rising to 25 000 as of 2020 to meet national needs and ambitions. UTC is participating in the creation and development of three specialities at the ENSET (Ecole normale supérieure de l'enseignement technique de Rabat), an engineering school integrated to the University Mohammed V – Souissi.

“The companies EADS, Renault, Bombardier, just to mention a few, have a high potential for recruitments, provided that Morocco as a country reduces its shortfall of qualified engineers. The first target level of 10 000 graduate engineers for 2013-2014 has been exceeded”, explains Abdelouahed Laksimi, who heads Mechanical Engineering specialty at UTC and a close colleague of Abdellah El Gharad, the Director of ENSET. ENSET was created in the 1980s to train teaching staff for technical subjects. In the 1990s, the pedagogical offer was extended to training technicians, with 5 BTS level specialties followed by 2 Masters and 5 Vocational degrees after integrating University Mohammed V – Souissi. “Our aim is to reposition the ENSET by offering engineering training courses. The Moroccan Minister for Higher Education approved my project to develop the school, provided we could implement some innovative projects; he suggested that we set up a biomedical engineering training package”, adds Abdellah El Gharad.

Three new specialty courses for 2014-2015

This was how the two establishments began collaborating:

the Director of ENSET, who was making enquiries about biomedical engineering, learned that one of UTC's best courses was precisely in this field. He therefore visited UTC in 2013 and sought the advice from 3 research scientists to accompany his project: Abdelouahed Laksimi for mechanical engineering, Didier Lemoine for mechatronics and Jean-François Lerallut for biomedical engineering. “We went to Rabat last February to offer our advice in order to establish these new specialties in ENSET. Training in biomedical engineering had not existed before, notwithstanding the huge needs of hospitals and clinics”, underscores Jean-François Lerallut. The shortfall of biomedical engineers has led health establishments to hiring, for a high cost, external services for maintenance and servicing of their equipment. There are several hundred job openings and which could change the situation. “Training in biomedical engineering is supported by the largest hospital in Rabat, with whom we signed an agreement to cover internships and recruitments. The 3 new specilitis have just been certified by the Morocco's national degree accreditation committee” says Abdellah El Gharad, proudly. “This is a first in Morocco and was widely discussed in the academic world !” The 3 specialties will see the first undergraduates matriculated for the start of the coming univefrsity year.

Future exchange programmes

To build up the nascent collaboration between UTC and ENSET, an agreement was signed in May 2014, by the President of the University Mohammed V – Souissi and Alain Storck, President and Vice-Chancellor of UTC, with the presence of the Prime Minister of Morocco. One of the objectives is to encourage and support student and staff exchange programmes. “Training in the field of mechatronics - to which I added a more ‘mechanical-intensive thrust, more than ENSET had originally envisaged – was rethought to favour the exchange projects during the studies in each establishment. Industrial partnerships already exist and should be developed” underscores Didier Lemoine. “UTC already welcomes a large number of Moroccan undergraduates and some of these graduates have set up a Moroccan UTC alumni ‘club’ at home. My task will be to coordinate the UTRC/ENSET collaboration plans and it promises to be quite rewarding”, explains Abdelouahed Laksimi. This is in line with the wish expressed by Abdellah El Gharad: “With these 3 training courses, we hope to be able to contribute to the rapid development of Morocco. It is an honour for us that UTC accepted to work with us: its international visibility and pedagogical model are inspiring examples. ■

INTERNATIONAL

UTC staff on a QMUL honours' list, London

Notoriety for the UTC BMBI Lab (Bio-mechanics and Bio-Engineering. Emeritus Professor Dominique Barthès-Biesel and Anne-Virginie Salsac, Research Officer at the CNRS, were appointed Honorary Professors by the Institute of Bio-Engineering, chaired by Professor Wang at the Queen Mary University of London. This title opens splendid prospects for new collaboration between UTC and QMUL, both institutions seeking to enhance their international visibility.

Queen Mary University of London (QMUL) is one of the numerous HE institutions that together form the University of London. With its 3 faculties (Humanities and Social Sciences; Science and Engineering; and Medicine and Dentistry), QMUL boasts some 15 000 students. It is ranked 3rd in the Russel Group of the UK's best establishments and in the Top 100 for research-intensive universities. “Our strategy consists of developing solid institutes that group together research scientists for various laboratories and various specialties so as to reach the critical mass needed today in international affairs”, underlines Professor Wang.

Two years ago, he used this very approach to create the Institute of Bio-Engineering at QMUL, with 50 experts who specialties ran from mathematics to fluid mechanics and seven skin specialist. QMUL supports the Institute and approved a month ago, the acquirement of a high resolution microscope worth half-a-million Pounds. The objective is to rapidly reach a world-class notoriety and thereby to attract the best scientists.



Very demanding selection criteria

“The selection criteria of the members of the Institute are very demanding and we are impatient to collaborate with their establishments”, explains Professor Wang. With UTC and in particular with the BMBI Laboratory (excellent international reputation), the collaboration will focus on modelling the dynamics of capsules in a fluid reproducing the human blood circulation. “UTC-BMI is a pioneer laboratory in digital modelling of mobile micro-capsules. Encapsulation (with a membrane to protect molecules deemed of interest) has many possible uses, in medicine, in cosmetics and in agro-food applications”, says Dominique Barthès-Biesel. Modelling the dynamics of mobile microcapsules is therefore necessary to ensure proper targeting of these molecules. “Our skills are complementary here” adds Yi Sui, research officer who assists Professor Wang in London. “Dominique Barthès-Biesel was the pioneer in this field of research in the 1980s, authoring the first theoretical article which remains our reference text. She was joined by Anne-Virginie Salsac, who developed a simulation model that

today is one of the most accurate that exist. What we do is provide our knowledge and know-how in capillary vessel circulation and we hope that these honorary appointments, in itself a rare event, will lead to profitable exchanges between our establishments”. The future joint programmes would include European theses, under co-directors, post-doc exchanges, etc. Yi Sui and Anne-Virginie Salsac are seeking to develop a joint research programme under the aegis of the CNRS in France and the Royal Society, London. Yi Sui et Wen Wang will be present at UTC July 15-18 for the international conference on “The Dynamics of capsules, vesicles and cells in flow”. The attendees will be composed both of theoreticians and experimental practitioners working on the mechanical, physical and biological aspects of capsules, vesicles and cells that will enable them to establish the scientific guidelines for future research work. “We are investing a lot for UTC's international reputation in this specialist field” assures Anne-Virginie Salsac. “Bringing together 70 world-class experts, plus our recent appointment to the QMUL Institute of Bio-Engineering, will contribute directly to the international visibility ad notoriety of the BMBI Laboratory which is already an honour and to that of UTC in general”. ■



The socio-economic ambitions assigned to the PIAs

and to UTC's research activities // Part 2

In the previous issue of Interactions, readers will have readily observed that a certain number of Investment for the Future projects (PIAs) involving UTC were not covered. Et not least by far, the MS2T Laboratory –control of technological transfer), the excellence equipment set-up called Robotex, the technology transfer accelerator unit (SATT); Lutech and the SUPER Initiative launched with the cluster Sorbonne Universities. All Nathalie Van Schoor, Deputy Director General for “Economic Development, Research and Innovation for the Picardie Region, supportive as the latter has been for a long time of research and innovative activities in and with Picardie partners. Finally, a vision by Jean-Pierre Bourguignon, new Chairman as of January 2014 of the European Research Council (ERC) enhances the contents.

PICARDIE REGION

A remarkable harvest

The Picardie Region is among front-line runners of French Regions in the Government's “Investments for the Future” incentive programme (PIA). Regional Deputy Directors General, Nathalie Van Schoor (for economic development, research and innovation), sees this high score (14 projects accepted under the PIA) stemming from two regional policy initiatives: a long term positive policy in favour of research and additional support awards to every project approved under the PIA calls to tender.

“The Government PIA incentive was a blessing for two of our Region's research intensive establishments (UTC and UP Jules Verne).

But the Regional authorities played their part too”, recalls Nathalie Van Schoor. “As of 2000, our policy to support research enabled regional actors to set up better internal structures and create more efficient networks, as was need for them to develop”. Further to this thrust, a supporting letter was signed by the Region's President, guaranteeing that project candidates would be ‘accompanied’ by the Region during the PIA calls to tender. By ‘accompanied’, we refer to financial support, manpower resources and aids to purchase new equipment, according to the project needs.

5 specialist areas, 14 projects and 307.54 Meuros

All told, 14 regionally proposed projects were approved (in 25 PIA calls to tender, out of a total of 400 approved nation-wide. This was a remarkable harvest, all the more spectacular given the Picardie Region's research potential (cf. insert). Indeed, the ministry for Higher Education and Research underscored this in its status report referring to the first two POIA rounds: “Certain Regions, such as Picardie, will benefit from considerable support in terms of means, compared with their rank in scientific production”. The ministry identified 5 specialist areas for Picardie: biology-health, biotechnologies and bio-resources, chemistry,

mathematics and mobile robotics. 8 out of the 14 projects approved were purely regional (excluding any supra-regional networks). They called for 81 Meuros investments, on top of which came the Regional credits. As an example, we can cite the financial aid for the building erected to house ‘Figures’ (cf. Interactions #28). “Building work is planned to start early next year”, adds Nathalie Van Schoor. The PIVERT Biogis Centre (cf. Interactions #28) also receives an additional financial support from the Region. “This centre will be the very first building with PIA support to be erected (corner stone laid): we see it as emblematic inasmuch as it structures a new regional specialty sector and the commencement of new relations between academics and industrialists. The PIA scheme therefore accelerates our efforts to do research and development in certain thematic areas, such as bio-sourced chemistry, energy storage, enhanced mobility, etc. What we have is continuity and fulfilment of our regional policy”.

Three locations for a new dynamic thrust

The next step will include the Energy storage hub, a building specially made for the needs of the STORE-EX Laboratory (UPJV) where research work will begin in Autumn 2014. With ‘FIGURES’ the Picardie Region will have three new locations “of scientific excellence, with a new dynamic thrust

to bring scientific academics and economic actors closer together. Thanks to the PIA Incentive, we shall be able to accelerate the meeting of laboratories and enterprises”, underscores Nathalie Van Schoor who also cited UTC's Innovation Centre. SAS PIVERT has, to date, recruited 7 persons, and likewise SAS Improve (a shared institute for vegetable proteins based in in the regional capital, Amiens) yet another ten personnel and which receives 3.7 Meuros from PIA. “This only the beginning and does not include indirect job position created. The sectors will need to restructure themselves and thus attract even more, actors to join in”, says Nathalie Van Schoor.

Our strength lies in working together

And we have left aside the PIA second round for the moment, under preparation and which favours land planning projects. “We are working with UTC and UPJV to present highly structured application files in two specialist areas: plant chemistry (bio-economics and the bio-refinery) and ‘smart’ management of mobility and energy. Our strength lies that dates back for at least 20 years now. UTC and UPJV Laboratories fully appreciate each other's merits and skills, guaranteeing an integrated answer to the calls to tender. This constitutes a real added value and which will allow us to succeed in the long term”. ■



THE EUROPEAN RESEARCH COUNCIL (ERC)

Pushing back the frontiers of science



© Jean-François Dars

"The European Union is the first and foremost knowledge production area in the world. But research in Europe is now facing two sorts of challenge: sprinkled, splintered efforts among Member States and lower budgets by some States", says Jean-Pierre Bourguignon by way of an introduction. As the scientific and financial arm for blue-sky, exploratory, research within the EU, the ERC is one appropriate response to the two challenges above. If France wanted to draw maximum benefits from the system, it must reorganize itself accordingly.

Decentralized research spread among the Member States of the EU has thrown light on the lack of cohesion, a handicap for the Union engaged in the international race for advancement of knowledge and innovation. To remedy

this situation, the EU first supported research programmes provided it was conducted via associations of several countries. As Jean-Pierre Bourguignon sees it "The positive results, in terms of network creation, are definitely there, but the programmes sometimes suffered from excessive bureaucracy and an operating mode that was not exactly what we expected to manage scientific production. From this point of view, the new European research and innovation programme, called "Horizon 2020" is a step in the right direction consolidating the place of ERC in the pillar "Excellence science". At the beginning of the decade 2000, the European scientific community was mobilized to demand a European research area, both efficient and compatible with the tempo and operating modes suited to modern scientific research. "It was this grass-roots movement, supported by several politicians that led in 2007 to the setting up of the European Research Council (ERC). ERC's remit is to generate a new dynamics to maintain the EU in race of global competition with the USA, of course, but also now with China, Brazil, India and South Korea", explains the President of this young European institution.

2014-2020: 13 billion euros to enhance the EU's attractiveness

ERC operates by calls for projects to which research scientists can apply in their own name, whatever their nationality, with the proviso that they reside at least 50% of their time in an EU member (or EU associate) state. Calls for projects are subdivided into 3 categories, defined as a function of

the applicant's experience, viz., ('Starting grants' for PhD +2 to 7 years' experience, 'Consolidator grants' for PhD +7 to 12 years, 'Advanced grants' with no attached restrictions). With 2/3 of the ERC budget earmarked for younger generation scientists, the objective is to provide the means for these young scientists to develop ambitious programmes and to avoid that they are not wooed by the sirens of more generous countries. The age bracket 25-40 is therefore well represented among the ERC laureates. The sole criterion for selection is the quality assessment for the projects, which naturally must be 'excellent'. No particular theme, area or priority is enforced, nor is there any restriction of actually implementing the project. ERC provides a grant that has a ceiling value for each category (see above), running up to a possible 3.5 Meuros over 5 years. For the period 2014-2020, ERC disposes of a budget of 13 billion euros. "The overarching aim is to maintain the attractiveness of the EU at a time when – given the continuing world crises – some States are making drastic cuts in their financial support to research while the USA, China or South Korea are continuing their efforts to attract the best scientists", says Jean-Pierre Bourguignon, adding: "Some countries such as Austria or Finland only support finalized research, leaving any initiatives for basic research with the scientists alone. We must note that support via Horizon 2020 only represents 7% total of the research budget available in Europe and the ERC, with an average success rate for its calls for project standing at approximately 11% necessarily omits some excellent projects proposed by high quality research workers. The fact that ERC exists must lead to the States refraining to provide their own support and ERC, in this respect, must liaise with the various national research agencies to ensure that this is does not happen".

570 ERC grants for French applicants

ERC can select projects in exploratory 'sky-

blue' research, basic or applied research. A contract is signed between ERC and the institution that hosts the scientist selected and this can change if the work conditions do not come up to expectations. The ERC grant therefore follows the grantees wherever they work in Europe. Over 4 300 contracts have been signed since 2007. "In just 7 years' existence, ERC has become a benchmark and scientific institutions always show their interest to welcome an ERC grantee", underlines Jean-Pierre Bourguignon. The UK universities of Cambridge, Oxford and Imperial College, London each now host some 120 ERC grantees, in other words as many each as all 13 most recent States admitted to the EU. "This imbalance raises questions and we are determined to help the universities so that they can prepare their research staff for this sort of selection procedure", underlines President Bourguignon. The ERC acts as a revelator of crises: out of 46 Italians selected during the last call for projects for the category

France obtained a total of 570 ERC grants, compared with 960 for the United Kingdom but with the highest success rating, at 16%

"Consolidator Grants" – which places Italy on the second step of the podium after Germany – more than 50% were not in their home country. "This dramatic exodus prove that the training capacities and talents do exist in Italy but the institution s cannot retain these promising elements of excellence", analyses Jean-Pierre Bourguignon. "We are endeavouring to convince the various

EU ministers of research to approach and draw on European 'structural funds' – which are often used to build transport infrastructures – to build a national framework capable of developing the home scientific talents and retain them later". France obtained a total of 570 ERC grants, compared with 960 for the United Kingdom (but with the highest success rating, at 16% since there were less French applicants for ERC grants). "French institutions, universities and research establishments have not as yet made sufficient efforts to accompany the grantees efficiently. The French ANR has recently modified its 'white paper programme' asking that the laureates be candidates for an ERC grant after their projects have been running for 3 years". The way research is organized in France

complicates matters significantly: there is not a single French university among the first 20 (in terms of numbers of ERC grants) because of the way research activities are spread between universities and research establishments. The CNRS alone has more than 200 ERC laureates. “The Greater Paris Area (Île-de-France) is the 1st region in Europe in terms of ERC financial support but this does not come across clearly because of the difficulties met when it comes to analysing the details of funding assignments”, notes Jean-Pierre Bourguignon who underscores also the sharp drop in financial support offered by French universities compared with the richer equivalent establishments round the world. “The Government programme Investments for the Future too often privileged the desire to see France’s institutions at a higher ranking in the Shanghai classification – a totally artificial rating, may I add. The end result is the creation of top-heavy superstructures with tens of thousands of students that risk losing their original coherency and agility, whereas the best universities at

world-class level are medium-sized establishments or even with modest numbers of students, etc.”

« Frontier research »

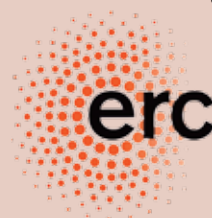
Now at the head of the ERC, Jean-Pierre Bourguignon wishes to preserve its “light” bureaucracy, one of the reasons underpinning its success. Governance of the ERC lies with its Scientific Advisory Council so that the financial support provided really correspond to what the research scientists need. The applicant project files are assessed by ad hoc scientific committees, competent in 25 different areas. “Each committee has about 15 research workers among the most active in the field, 15% coming from the USA and Asia. Their selection is an essential task carried out by the Advisory Council: we try to attract the very best experts to build up multidisciplinary committees capable of identifying

emerging new sectors and projects that really are ‘frontier research’, as we say”. Good examples here are: the 3D printer, prediction of political behaviour, therapeutic nano-vectors, musical creation, use made of biomass as an energy source ...

Another proof of ERC’s success is in its accounting figures of the administrative structure that manages ERC: management overheads are less than 3% of its budget. “UTC, a university with an unusual operating system, can support its research workers in encouraging them to lodge project applications”, indicates Jean-Pierre Bourguignon.

Over the coming 7 years, the level of support is guaranteed: the budget outlay for research and innovation is the only line in the EU budget to have increased for the 2014-2020 period, with an increase of over 70% for the ERC!! ■

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LABEX MS2T

The MS2T Labex an interdisciplinary-intensive laboratory

Professor Ali Charara and his ‘excellence’ MS2T laboratory (Control of technological systems of systems), which is coordinated by the UTC-Heudiasyc laboratory, in collaboration with UTC’s Roberval and BMBI Laboratories, are pursuing a clear objective: to become one of Europe’s (or the world’s) leading laboratories in the field of systems of systems, within the decade.

The government-labelled ‘excellence’ laboratory MS2T was selected after the first call for project candidacies in 2011 launched by France’s national Research Assessment Agency (ANR). “The aim is to provide means to selected French laboratories to move up to the top of the world ratings”, underscores Ali Charara. “The original feature of the MS2T ‘Labex’ (abbreviation for excellence laboratory) lies in its interdisciplinary work-load and skills composition and in its integrating approach, tackling both potential scientific and technological stumbling-blocks”. The first initiative of the Labex was precisely to identify these observes, and this stage was vetted by the international scientific advisory council of the laboratory. This council, chaired by Prof. Mo Jamshidi (University of Texas, USA), Dominique Luzeaux being a member (cf. insert) – convened for the first time in September 2013 to draw an interim report on the first 18 months of MS2T’s work load and progress. “We held this meeting concomitantly with the first international Labex workshop, with

research scientists and industrialists from all round the world”, underscores Prof. Charara.

The idea hub, monthly seminars and the Master’s degree

Over and above this important international meeting, the Labex organises in-house workshops and seminars to create an emulative atmosphere and meetings between experts in this field. “The experts can exchange ideas, share the results of their research activities ... This guarantees an excellent level of visibility for the Labex”, adds Ali Charara. “The aim is to create a team pushing effect, working with new partners and becoming a recognised focal point for interdisciplinary scientific projects”. Another positive fallout of the MS2T Labex is a new

What exactly is a Labex ?

The Labex units (excellent laboratories in French Government parlance) are the result of two calls for proposals issued by the national Research Assessment Agency (ANR) in 2010 and 2011, where the projects submitted came mainly from laboratories working in networks or in collaborative configurations. 100 projects were selected in the first round, 71 in the second, out of a total 436 projects submitted. These 171 were awarded funding amounting to 2 billion euros (1 billion for each round). The so-called Programme of Investments for the Future (PIF) aim at “providing laboratories that already benefit from international visibility with ways and means that enable them to be on a par with peer institutions abroad, to attract research scientists and lecturers of international

standing and build on this basis an integrated policy for teaching and training and high level valorisation of their processes and products. The projects are very varied and have implications that go far beyond the academic research community, via new partnerships between public research establishments and private enterprise”, assures the spokesman of the French ministry for Higher Education & Research. The Labex units share the following ambitions:

- To raise the level of excellence of the unit and augment its scientific notoriety, to enhance transfer of knowledge produced and, consequently, increase the international attractiveness of French research in general, drawing other national laboratories into this virtuous spiral;
- To guarantee pedagogical excellence and to play a key role in Master’s and PhD level courses;
- To be an integral part of the higher establishment’s strategy and to reinforce the dynamics of sites.





Master's programme launched at the start of the 2013 academic year on interacting complex systems. "This is an area which immediately proved attractive for potential students", say Prof Charara proudly. Some 50 students registered and grants have been given to the best French and foreign students.

9 visiting lecturers, 13 theses and about 50 publications

Since it was created, the MS2T Labex has financed 13 PhDs, 3 of which were jointly financed (DGA, the Picardie Region and partner industrialists). Seven post-docs are under way, one of which has been financed with support from Alstom. As far as the international scene is concerned, nine foreign professors (from Australia, Brazil, Italy, Mexico, Poland, Spain and the USA) came to UTC to occupy the visitors' chairs (7 more are planned for 2014) and some 40 research staff (French and foreign) who organised and moderated seminars. "Among the foreign visitors, some have never heard of UTC. The Labex now opens the way for new forms of collaboration", adds Ali Charara. "The Labex is an accelerator for scientific activities; we have been able to fund some inter ships, some stays abroad for the PhD students and for the teaching staff." Five international conference have been organized in Compiègne in 2013, over and above the seminars and all told, some 50 articles, published in international reviews, have been written by Labex staff and accepted.



Building a close partnership with the socio-economic world

Studying systems of systems cannot be conducted in a purely abstract manner: concrete, real-world problems have to be addressed, using the equipped platforms and the integrative software packages to validate the relevance of the scientific data and results obtained. For this reason, MS2T has built up strong links with the Robotex (intra) teams who are working on inter-system communications and have the means to carry out experimental setups with drones and other self-driven vehicles. "The Labex can come up with a theoretical answer to the problem set and can develop generic methods applicable to all the areas concerns, viz., transportation; health, energy, the environment, safety, etc. We are working currently on a project with Alstom that consists of optimizing energy production from several concomitant sources in the framework for future smart network management policies", says Ali Charara, to illustrate. Other partnerships have been signed or are being finalised with Renault and PSA (car manufacturer) and the government's DGA (weapons). "We are negotiating contracts with 2 industrialists who would like to remove stumbling blocks met in several theme areas: managing uncertain situations, optimized design protocols, inter-system communication", explains Prof Charara, who is more than satisfied with the scope of research activities that Labex can now handle.

Detailed 10 year targeted objectives

More and more industrialists are expressing their interest in this new area of research and associate problems to be solved. The Labex, with its 6.7 Meuros budget over 9 years

(787 000 of which are through public allocations, credited in 2013). The Labex is in favour of co-funded research. "For each area (transportation, e-health, energy, safety, monitoring & surveillance, we have drafted a roadmap that details the stumbling blocks as we perceive them today, identifies potential industrial partners and 4-10 year target objectives", underscores Ali Charara, adding to illustrate: driverless vehicles running at low speeds and intercommunication with other vehicles will be on the roads and, in 10 years' time, they will be running at normal road speeds and able to communicate with other transport systems. "We also plan to be able to control a squadron of mini-drones that self-coordinate itself in flight", foresees Ali Charara. The priority research fields, to be investigate in conjunction with the partner industrialists, are on-board system design, vehicle interactions, driving protocol in smart modes, etc. "There are numerous contacts and discussion to be held over the coming months", says Ali Charara. "The results of the first theses will be available end 2014, an annual summer school will be organized as of 2015 and a club of the industrial partners will rapidly be set up". The creation of a system of systems university Chair is being negotiated with an industrialist partner. "Before the end of 2014, we hope to announce several concrete applications of the Labex work programme so that the positive contributions of our research can be made visible and appreciated", concludes Prof. Ali Charara. ■

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The position of the UTC-BMBI Laboratory

"The concept of 'systems of systems' - carried over from the world of engineering - applies very well to living matter. Our body represents a very complex system of systems, structured in sub-divisions, running from cell level to the organs", says Anne-Virginie Salsac, research scientist at the UTC-BMBI Laboratory, where systemic biology is a daily ingredient of the research teams' work programmes.

As she sees it, the living world offers a wide panel of possible applications and future investigations, for ideas and conducting research on systems of systems, for the benefit of all. "This is a new path forward to better understand certain pathologies and better define certain treatment protocols, etc." says Anne-Virginie Salsac, for whom the key advantage of a Labex is to allow for various UTC to join forces and engage in common projects, adding to illustrate that "It is a very federating tool enhancing our

synergies. I, for a start, have been in charge for the past 18 months of a thesis prepared in collaboration with our UTC-Roberval Laboratory, in the reference framework of the MS2T Labex".

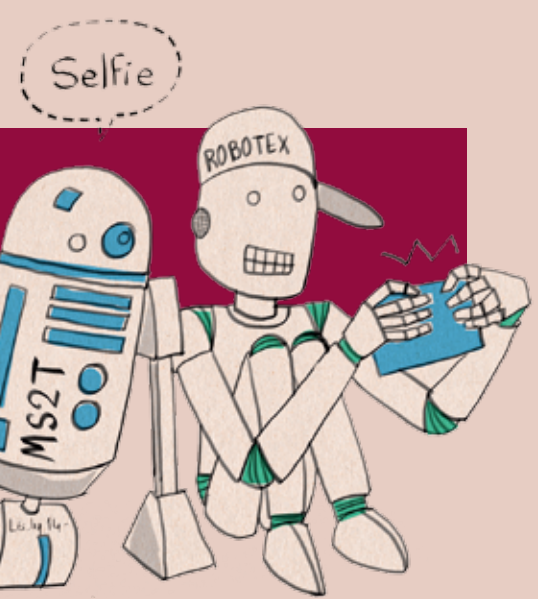
A Roberval/BMBI PhD thesis

"We were faced with an image processing problem in the context of this thesis. We discovered that the UTC-Heudiasyc Laboratory had the skills needed to solve it", notes Anne-Virginie Salsac. This particular thesis is being prepared by Benjamin Sévénie and focuses on a development of a model to simulate the dynamics of micro-capsules in human blood streams. The objective is to build appropriate modelling tools to learn more in situ about the effects of micro-capsule treatments injected in patients. "We have to simulate a large number of deformable objects, such as those present in our blood streams, and this represents a lot of work. We are seeking to discover new numerical procedures to facilitate the computations", explains Anne-Virginie Salsac. The research related to optimization and model reduction techniques is carried out by the UTC-Roberval Laboratory while the work on fluid

mechanics and digital simulation is carried it at the UTC-BMBI Laboratory

Succeeding with interdisciplinarity

"This UTC Labex now has considerable scope; it is very structuring for the university and highly beneficial for ten research scientists working there, especially at a time when funding of interesting, innovative research work is not exactly easy", adds Anne-Virginie Salsac. This work places UTC in the forefront of the underlying concepts of "systems of systems. "What we have is an ongoing, developing concept. UTC organized an international conference on the subject in September 2013, bringing with it an excellent visibility for our unit", underscores Anne-Virginie Salsac. The objective is to see UTC become a recognised key-player in the field, and this can later be extended to all fields covered by UTC. "The very concept of systems of systems is just emerging today but could in the future overarch all the university's specialties. Anyway, this is how we intend to move to attain interdisciplinarity", says our enthusiastic research scientist Anne-Virginie Salsac ■



EQUIPEX ROBOTEX

Inventing a future for robots

What exactly is an Equipex ?

With a budget envelope of one billion euros, the first call to tender for “excellence equipment” is designed to enable French laboratories to acquire cutting edge scientific intermediate range research equipment (costing between 1 and 20 Meuros) to carry out world-class research, “for the purpose of furthering the advancement of knowledge and innovation”. Out of 336 projects deposited at the French ministry of Higher Education & Research, only 52 were selected as viable. 340 Meuros were allocated to the laureates. UTC is involved in two projects selected - Robotex and Figures. These two projects are among the 12 that were allocated more than 10 Meuros each.

The objective of having this equipment, for UTC, is to reinforce its Heudiasyc laboratory’s potential, to enable the research teams to carry out smart vehicle experiments (land-based and airborne). «“With Robotex, UTC focuses on mobile robotics, making good use of the expertise we have assembled over 15 years. Today, we are finishing the first phase of the equipment investments installation. We have received three vehicles that we are fitting with instruments and sensors, a laboratory on wheels a test track and a drone flight area. We feel the same, I suppose, as if we had been granted a particle accelerator!” says Philippe Bonnifait, research scientist at the UTC-Heudiasyc laboratory, who is responsible for the UTC Equipex and the sub-network “Mobile land and air-borne mobile devices” in the Robotex programme. After modification, the three all-electric cars (two Zoe’s and a Fluence from Renault) will be totally operable via computer. The “driverless” runs will be carried

The Robotex platform was ranked 1st ex aequo among 52 projects selected in the first wave of government labelled “excellence” equipment units in year 2010. Robotex has enabled a network with the 15 main robot research teams in France. Mobile robotics are dealt with by UTC and its Heudiasyc Laboratory. The equipment needed has arrived and the research work has commenced.

out on our test track, part of the UTC Innovation Centre, as will the drone flight area – the first out of five air-borne robots is already operational.

A structuring programme for UTC-Heudiasyc

All told, the equipment represents a budget of 1.5 Meuros, 800 000€ of which came from the Robotex programme. “Thanks to our Government labelling under ‘Equipex’, we have been able to raise extra funds”, underscores Philippe Bonnifait. “Robotex has proved to be a very structuring programme for UTC-Heudiasyc and has generated a dynamic in-house feeling for mobile robotics and allowed us to receive some remarkable equipment. It is a great opportunity for us and our research teams can experiment their ideas with a high degree of freedom and at scale one.” The Heudiasyc teams are focusing on control functions and robotics, with applications in perception, localization, control and navigation of the vehicles, solo or in groups and in co-operation with human operators. Robotex also procures better national and international visibility, consolidated links with automobile manufacturers, drone assemblers, etc. The UTC-Heudiasyc closed ranks with two of UTC’s partners, Renault, PSA and also Parrot, who build civilian drone. “There are numerous applications and we are only at the beginning of driverless vehicles and air-borne robots that will no doubt be common a few years’

time” foresees Philippe Bonnifait. “Both French and German constructors are announcing driverless cars for year 2020!”

Catching up on France’s lag in robotics

The second phase of the project relates to ensuring regular use of the equipment. The aim here is to raise funds to ensure planning of experiments on a regular basis. UTC is building for this purpose a network of the 15 Robotex laboratories, to exchange know-how, return on experience, on technologies ... and to open Equipex facilities to new academic and industrial actors. “We would also like to see Robotex registered with other European-scale projects. France come in 3rd place in terms of its scientific publications, but has no less than 1 000 research scientist and engineers in the field of robotics. But France has a lag in associated experimental research: Robotex could provide the opportunity to catch up on the gap and stay in the global robot race, inasmuch as you need cutting edge equipment to stay at the forefront of research”. ■

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Robotex key figures

15 laboratories : CNRS joint units at the Universities of Montpellier, Grenoble, Poitiers, Strasbourg, Rennes, Franche-Comté, Nice, Marseilles, Paris6 (Pierre & Marie

Curie), Cergy-Pontoise, Université de Technologie de Compiègne (UTC), Ecole Centrale Nantes, Ecole des Mines de Nantes

Allocation : **10.5 Meuros**

Research thematic: the main robotics themes that will impact on Society. Humanoid robotics that will assist partly disabled persons (reduced mobility), industrial and medical robotics (micro and nano devices), mobile robotics for the promising field of transportation and security.

Serving *maturation* of research

After the State authorities recognized that the results of public research laboratories are rarely valorized industrially or in innovations, because of the large gap between the two worlds, the SATTs were created (Technology Transfer acceleration units) the mission of which is to enable maturation of scientific work. "Companies must be able to cross the so called 'valley of death' that separates the laboratory from industrial development" summarizes Chantal Vernis, President of SATT Lutech of which UTC is a stakeholder.

"Our universities are full of highly skilled persons but they rarely speak the same language as the industrialists but who rarely speak the same language as the industrialist."

UTC however is an establishment where the gap is less wide than elsewhere, but we must create a limited number of forums for our exchanges so that the industrialists can "connect"; that indeed was why the SATTs were created", notes Chantal Vernis, by way of an introduction. The SATTs have their own capital assets (1 Meuros for SATT Lutech) and this enables recruitment of staff with double profiles (academic and industrial) in very specific sectors, with the capacity and talent to identify interesting research topics and to imagine "maturation" programmes to valorize such projects. The programmes must be designed so as to decrease the risk factors that inhibit industrialists in their capacity to innovate. "Maturation" is a process that aims at transforming scientific inventions into the socio-economic innovations stage, in other words, to have inventors and market-places come together. To achieve this aim, several



unanswered question remain (technological and industrial feasibility, market position, economic viability, etc.) removing or assessing risks such that future industrial partners (entrepreneurs, existing companies) can join in for the follow up stages. "SATTs are private companies by law and serve as interfaces between public research and the socio-economic world. In keeping with the current philosophy to encourage decentralization, SATTs are located by geographic logic and not by specialty. They constitute the new link between the clusters and the university poles of competitiveness", adds Chantal Vernis. Thus, the SATT Lutech enjoys a privileged relationship with Sorbonne Universités (cluster) and there is clear overlap of members of both entities.

SATT Lutech accelerates in 2014

SATT Lutech was created in early 2012 and has already invested 4.5 Meuros in 22 projects (figures as of end 2013) and has enabled creation of 2 start-ups. There are 17 new projects in maturation phases, 7 of which could lead to the creation of others start-ups. There are 69 projects undergoing initial design phases and assessment. "Currently we are analysing the 'why' and the 'how' we can/should accompany

the projects to full maturation", stresses Chantal Vernis. SATT Lutech has a financial potential amounting to 20.6 Meuros for the first 3 years and 73.1 Meuros are expected over a 10 year period. "If the objectives we set are reached at the end of the 3rd year, i.e., end 2014, then the following financial commitments will be taken", adds Chantal Vernis. "To date, we have financed with our own funds all the maturation programmes. The amount of the financial outlay relates directly to the specific needs expressed in each project. The amount granted can run from 30 000€ to 500 000€. On the agenda of then next SATT Lutech investment committee, we shall present the first co-maturation scheme. This is a formula where industrialists can show interest from the beginning and elaborate the maturation programme with us, co-financing the work as it progresses – we think the formula will prove increasingly attractive. If the risk elements have been removed at this stage, the industrialists can then proceed to signing commercial licenses". This form of co-maturation will contribute positively to the SATT Lutech's first objective – to be self-financed within 7 years. "At that horizon SATT Lutech will have transferred a sufficiently significant number of projects onto the industrial sectors that the revenues will be able to guarantee out capacity to invest in new programmes and enable the State to withdraw their contributions", offers President Vernis. After two years getting into its stride, SATT Lutech is really beginning to accelerate in 2014, witness the number of licenses foreseen for end 2014 (25 to 40), the first 3 of which were already signed early 2014.

What exactly is a SATT ?

Positioned at the crossroads of research and enterprises, the SATTs (technology transfer accelerator business units) are new economic actors the aim of which is to raise the efficiency level of France's research valorization mechanisms, helping notably to accelerate the transfer and subsequent use in the industrial sectors. SATTs intervene as service providers in terms of research valorization for their shareholders and for other potential clients. They also have financial means to support projects in a maturation phase. The operator is the National Research Assessment Agency (ANR). A SATT is a subsidiary company created by one or several HE establishments (universities and research establishments, with the assignment to ensure the interface between public laboratories and enterprises; their mission consists of 'translating' discoveries and skills existing in public research spheres into concrete applications that meet industrial/service sector needs. Their activities focus on registering patent claims, concept proving, launching start-ups, licensing, etc. The SATTs were created via the French Government programme Investments for the Future and have received 900 Meuros funding. Following a call to tender in 2010, 12 SATTs were established and 2 are being created at the present time (SATT Conectus Alsace, SATT Lutech, SATT Toulouse Tech Transfer, SATT Ile-de-France Innov, SATT Sud-Est, SATT Aquitaine Science Transfert, SATT Nord, SATT Ouest Valorisation, SATT AxLR, SATT Grand Centre, SATT Grand Est and SATT Lyon Saint-Etienne. (Currently being finalized: the SATT Paris Saclay and GIFT Grenoble).

A contractual agreement between SATT-Lutech and UTC

The SATT Lutech and UTC have signed an agreement. “Every week, we meet with Bruno Bachimont, Executive Director for Research activities at UTC, who helped us gain a better understanding of UTC’s laboratories so that we could be more efficient in identifying projects that SATT Lutech could accompany in a maturation programme. We have a staff member present half-time in UTC premises and we are currently negotiating a similar contract with the Picardie Regional Authorities. UTC as you know is well implanted and involved in the Region, and this contract will help coordinate our support for local research effort”, adds Chantal Vernis. The new UTC Innovation Centre also interests the SATT Lutech. “It is essential that we work coherently and in the same direction. By the end of the year, we hope to be able to handle all the projects and facilitate

technology transfers”, estimates Chantal Vernis. One of the 22 projects currently maturing at the SATT comes from UTC. It is the IDCCM project managed by Eric Leclerc, based on research work done by the Microfluids and Cell Microsystems team of the UTC-BMBI (Biomechanical and Bio-Engineering). The objective of the IDCC project (acronym for Integrated Dynamic Cell Cultures in Microsystems) is to propose an in vitro test to the pharmaceutical, cosmetics and chemical sectors on cells (primary human or animal cells, cancer cells, etc.) that reproduce the in vivo conditions thus avoiding live animal tests. This system leads to test cost reduction, to improvement of their validity, limits animal testing, and allows for simulation of circulating blood circuits, allows also real time in situ analyses and last but not least to work with human cells to make better in vitro/in vivo extrapolations. SATT Lutech has accompanied this project in terms of intellectual property rights, marketing and also in its technological development. The SATT financially

supports the cost of complementary biological testing and the development of a more integrated version of the IDCCM platform. “We shall soon be assessing new projects proposed by UTC-BMBI and we shall shortly be approaching UTC-COSTECH”, notes Chantal Vernis. “UTC’s participation and presence in the SATT will increase over coming months, in close liaison with Bruno Bachimont. UTC is used to working with industrial partners, a rather rare situation but which makes for a very enjoyable collaboration. I also hope that we shall be able, as of this year, to approach UTC’s undergraduates proposing that they consider projects for corporate start-ups. Two graduates have already launched a start-up after maturing in the SATT environment, TEM Project in the field of musical creation. UTC’s students have a real role to play in these interactions”. ■

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Industries : test molecules *without animal experimentation*

When Eric Leclerc and his research team presented their bio-reactors to the SATT Lutech in 2012, his intention was to validate the project to set up a company on the basis of this new equipment and on the results of the research work carried out at the BMBI Laboratory (Bio-mechanics and Bio-engineering). There are some industrialists who have already expressed their interest but some work still remains to make the reactors easier to handle before commercializing them.

In the beginning, Eric Leclerc's team had designed 1 square centimeter bioreactors, on which human cells could be grown and observed in 3D. The result is a far better cell function than with traditional petri dishes. “Other parameters, such as the level of concentration of soluble matter or the material liners of the bioreactors that affect oxygenation also enhance cell activities”, explains research scientist Leclerc. In order for these bioreactors, also known as labs-on-chips, to be used on an industrial scale, they are installed in parallel on a test-bench platform. That way, they can undergo continuous and stringent testing. “We imagined a box with 12 bioreactors since this arrangement guaranteed a higher degree of flexibility, to test in situ various doses, products, flow rates and other parameters”, underscores Eric Leclerc. It is also possible to position membranes in series with the bioreactors inside the ‘box’ to simulate various human barriers such as the skin or the intestines. In this way, the molecules tested in the boxes must be able to pass through these barriers before they reach the bioreactors. The aim here is to provide pharmaceutical, cosmetology and chemical industrialists with an efficient tool to lab-test their molecules, gaining time and avoiding having to carry out certain tests on animals.

Initial test phase - 2013

“I presented my project to SATT Lutech in 2012, who then proposed that it be assessed by students at the business school INSEAD, Fontainebleau. Three of them selected this project in the framework of an in-house competition for enterprise creation, and they

won, says Eric Leclerc, proudly. With this excellent omen, the students in question continued to support the project throughout their studies at INSEAD before presenting it to the SATT investment committee. It was designated IDCCM, standing for Integrated dynamic cell cultures in microsystems. Again the project was selected, with the proviso that prior tests be carried out with a contractor outside the UTC-BMBI Laboratory to assess and validate the relevance of the results. “The tests carried out in 2013 revealed that the handling of the box was difficult and not in line with the intended use”, reports Eric Leclerc. “Consequently, the SATT asked us to improve design features before making more tests and validate the better efficiency rating expected”; That is the prime aim of work ongoing at the moment, focusing on two aspects: choice of materials and design. How, for example, are we to avoid that someone who starts working with a box does not introduce a bubble? What materials are best suited to meet the needs in terms of biological activity and mass production of the boxes? In parallel to SATT Lutech, financial support has also been forthcoming, for almost two years now, from the national research assessment agency (ANR) to carry out the optimization of the device

First industrial contacts

We are moving forward, cautiously, because we do not have unlimited means. The costs to develop such a device are enormous and we hope to receive some complementary funding from SATT as soon as we

have met and implemented the recommendations of their investment committee”, adds Eric Leclerc. As he sees it there are many advantages to be ‘under the wing’ so to speak of SATT Lutech: the contact established with the INSEAD students, access to seed funding to test the IDCCM project and initial results, support in the search for solutions to improve the device, presentation of work and progress to the SATT investment committee, opening prospects to new potential funding sources to continue to develop the project, full assistance to register patent claims... The ambition today is to solve the remaining technical problems and the certification of

the device as being relevant to create the enterprise (s planned) that will commercialize the box services to the industrialists or sell the boxes directly. “We already have contacts with potential industrial partners to test certain types of bioreactor on their own applications”, underscores Eric Leclerc. ■





IDEX SUPER

The Sorbonne Universities Cluster and its involvement in *major societal challenges*

With 900 Meuros capital assets, the label “excellence initiative” assigned to the Sorbonne Universités cluster, called “SUPER” enables its members to build tomorrow’s universities, both in terms of training and research. Interactions interviewed Thierry Tuot, President of Sorbonne Universités.

What exactly is an IDEX ?

The IDEX call to tender, managed by the Agence Nationale pour la Recherche (ANR), is the most emblematic action of the Government programme Investments for the Future. The funding made available amounts to 7.7 billion euros and carries the ambition to see 8 pluridisciplinary HE and research clusters develop in France to become world-class entities, rivalling with the largest/best universities in the world. Three IDEX were selected in 2011, 5 others (including SUPER) in 2012. All have received allotments between 700 and 950 Meuros. The 7 other IDEX are:

- IDEX Bordeaux, under the PRES Université de Bordeaux
- Unistra under the Université de Strasbourg
- Paris Sciences et Lettres (PSL) via the Fondation de coopération scientifique
- A*MIDEX, managed by the PRES Aix-Marseille Université
- UNITI, under the PRES Université de Toulouse
- IPS, via the Fondation de coopération scientifique Campus Paris-Saclay
- USPC, under the PRES Sorbonne Paris Cité

Training is the first priority of SUPER, the members of which are the universities, the engineering schools and various research establishments.

«We have instated a Degree College at Sorbonne Universités to manage various degrees that are developed in pedagogical innovations. We aim at reducing the sometimes artificial ultra-specialization of certain degrees, to limit degree drop-out rates. We have set up degrees with one

major and one minor subject, with a timetable ratio 2/3 – 1/3 and including some attractive combinations such as Chinese language and Science”, explains Thierry Tuot, underlining the fact that the new organization reflects that already in practice at UTC. Some other aims of SUPER: to enable the students to study for a full semester abroad, as of the degree level, and to create bridges between the worlds of research and training as early on as possible. “To do this, we shall set up research laboratories that are close to teaching such that students can follow their normal courses and at the same

time, over their first three years, carry out a research project. Other objectives for SUPER: to enable students to do a semester’s studies abroad after their first degree and to create bridges between research and training as early as possible. “To achieve this, we shall set up laboratories that will be devoted specifically to training in research activities so that students during their first three years at UTC can carry out a research project. “An ordinary degree can become a professional diploma opening a route to a

master’s degree and the doctorate levels,” foresees Thierry Tuot. SUPER also has a doctoral college offering services to some 28 doctoral schools. “What we are creating is an integrated, transverse campus where all our students can access the rich possibilities of SUPER from their own establishment”, summarises President Tuot.

14 Labex account for one third of the SUPER budget allocation

Research within SUPER is represented by 14 “excellence” labelled laboratories, so-called Labex, including the MS2T at UTC and a programme called Convergence with a budget allocation of 1.75 Meuros/yr. This programme aims at bring the Sorbonne Universités partners and members closer together, on the basis of collaborative programmes. The Labex units cover a wide range of specialist areas, ranging from social sciences to medicine, literature and mathematics. “They represent one third of the SUPER IDEX budget allocation contributing to smooth operations”, underlines Thierry Tuot. “In this context, the IDEX can be seen as running contrary to two trends that stifle research: ‘short-termism’ with its annual assessments that

can have negative effects on the work in progress, and co-financing by private actors which orients the research towards market outlets. Thanks to SUPER, our members can gain a degree of independence and thereby take exploratory decisions". During the first 4 years of SUPER (the probationary period), 135 Meuros will be allotted each year. This margin for manoeuvre is valid for all projects registered under the Convergence framework.

Second round for Convergence!

Convergence is a programme that uses calls to tender in thematic areas and transverse topics; the theme Society and the Environment selected 13 projects registered and those in the 3 following themes (Processes and Dynamics in Decision; Science and Cultural Heritage; Life cycles are currently being assessed. "We registered over 30 proposals in Cultural Heritage, bringing together archaeologists, curators, engineers and chemists ... ! This serves as a perfect illustration of the spirit of SUPER: inter specialty boundaries no longer make sense when it comes to practical applications. UTC

plays a key role from this point of view inasmuch as the university has always associated engineering sciences, social sciences and humanities. For this reason UTC is closely involved with Convergence", underscores Thierry Tuot. Given the success of Convergence and the level of frustration of those who did not manage to join the bandwagon in time, there is now talk of opening up a second round for Convergence for each theme by end 2014, loosening up a bit some of the criteria and decreasing the budgetary amounts awarded.

A SUPER ambition: continuous (life-long learning) training

In terms of continuous training, SUPER is as yet at the project stage, but nourishes the ambition to "break down" the French system that implies that everything is said and done by the age of 25 where studies and learning are concerned. "We intend to start a degree in 2014 on 'sanitary democracy', that will target members of associations and NGOs to be trained in how to intervene in public debates in bodies such as the regional health agencies", says Thierry Tuot to illustrate his point. "This course will be conducted in conjunction with the Faculty of Medicine". In the long run, other 'professional/vocational courses will be organised, so that citizens can train themselves to take part in debates on major societal issues such as shale gas or nanotechnologies. "What we hope is that research scientists will enrich the exchanges with scientific

The 'excellence' labelled initiatives comply with a territorial logic, grouping HE and research establishments that have already gained notoriety for their scientific work and pedagogy. They are designed to assure a level of integration that enhances their international attractiveness and visibility. They are built round especially ambitious scientific projects than could assure France's scientific reputation elsewhere in the world and contribute significantly to the country's potential growth rate, accelerating innovation and technological transfer to the entrepreneurial world. During the probationary period (4 years), part of the revenues from the capital fund of 7.7 billion euros set aside for the Idex will be allotted to each campus selected so as to finance their initial project expenditures. After probation, and as a function of the objectives attained, each labelled campus will receive a capital allotment to ensure their long-term finances. This grant (up to 1 billion euros) will come in addition to private funds raised.

fact and will help analyse these issues, in regard to health, energy or environmental questions", adds Thierry Tuot. "It will also help us to avoid getting into sterile discussions and making dangerous decisions without any proven basis". There is a collective dynamics here, created and maintained by the members of SUPER and which gain the admiration of President Tuot, who entertains the desire that soon, the term "Sorbonne Universities" will be heard round the world. ■

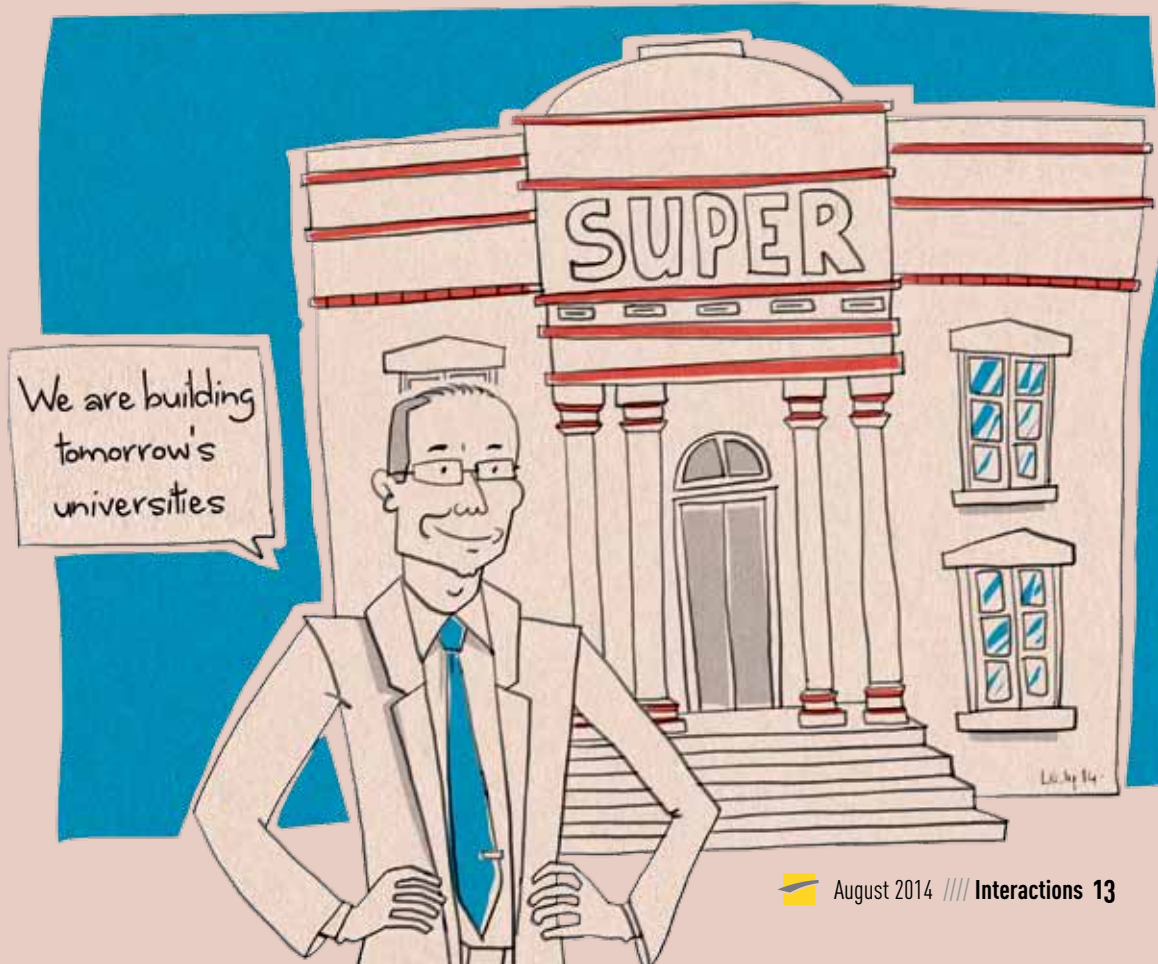
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Sorbonne Universités Member institutions

Sorbonne Universités, a PRES (cluster) set up in 2010, is a 'community' cluster of Universities and similar establishments with 8 lead Members in the SUPER Initiative, as follows:

- The Paris universities – Paris Sorbonne (literature, social arts & sciences & humanities, and Paris 6 – Pierre & Marie Curie (science engineering and medicine)
- One engineering school- UTC, Compiègne
- One business school : INSEAD, Fontainebleau
- The Muséum national d'histoire naturelle
- Three national research establishments: the Centre national de la recherche scientifique (CNRS), the Institut national de la santé et de la recherche médicale (Inserm) and the Institut de recherche pour le développement (IRD)

Eleven associate Members: the École nationale de la magistrature (ENM), the Centre de formation professionnelle notariale de Paris (CFPNP), the École de formation des barreaux (EFB), the Écoles de Saint-Cyr & Coëtquidan, the École des officiers de la gendarmerie (EOGN), the École nationale des chartes, the Institut national d'histoire de l'Art (INHA), the art PRES Paris Boulogne-Billancourt (PSPBB), the Centre des monuments nationaux (CMN), the Archives nationales, the Centre International d'études pédagogiques (CIEP) and the École Navale.





A new look at the Investments for the Future

Louis Schweitzer, Commissioner General for Investment and Chairman of the 'Initiative France' Plan, shares his thoughts and convictions about these two structures, refusing as he does the idea of an inevitable decline of France. He will preside over the UTC Graduation ceremony, November 22, 2014.

What is the relationship, if any, between your two functions?

A shared desire to achieve growth and produce innovation. "Initiative France" is a body federating the efforts of 230 associations for the purpose of aiding start-up creators and business purchasers - 2/3 of whom are currently unemployed - to successfully move their corporate projects forward. We have contributed to the creation of 16 500 enterprises in 2013, with 40 000 employees on the payrolls. Their survival rate (with a horizon set at 3 years) is 87%, compared with the national average of 60%. These good results can be explained by the "intelligence" imbedded in the Initiative France approach, whose role it is to accompany and support the start-up creators, offering an interest free guaranteed loan somewhere between 2 000 and 25 000 euros. These loans are invested in the company's assets enabling the management to obtain bank loans representing amounts some 7 to 8 times more. The procedure is open to all - this therefore includes applicants who are (under) graduates from UTC. In the future, Initiative France will focus more on growth of recently created companies, to compensate for the marked reticence of the banks. We shall likewise inaugurate several regional service points to help innovative companies and we wish to bolster our action to companies deemed "remarkable" in terms of their growth potentiality. There is a similar mission assigned to the Government's "Investments for the Future" programme (PIA). The latter carries more 'punch', with a distribution fund close to 47 billion euros, but also with the aim to financially support projects considered as remarkable in terms of intrinsic excellence and innovative potential?

What orientations would you like introduce to the Investments for the Future Programme?

The extraordinarily remarkable idea underpinning the PIAs is based on the analysis made by two former French Prime Ministers, Alain Juppé and Michel Rocard. The Commissariat General for investments works well and as get ready to distribute 15 billion euros (second wave PIAs) over the next two years, I personally would stick to the line viz., respecting continuity in projects as set down by Messrs Juppé and Rocard, who themselves agreed to pursue their co-chairmanship of the PIA monitoring committee. PIA calls to proposals allow high-quality project applicants to make themselves known. Their files are examined by experts capable of judging their relative merits and potential to innovate. The amounts distributed run between several hundreds of thousands of euros to several Meuros. We can of course improve the procedure making it more expedient and loosening a bit

the criteria for selection. Current delay is around one year and we shall endeavour to reduce this to 6 months to analyse the application files and set up the contract agreements with the laureates of the selection process. For both research laboratories and enterprises, the simple hope to benefit from a PIA allocation does not necessarily implies a positive decision. The good example to be followed here is the World Innovation Competition, which selected 100 laureates after 2 waves of proposal and selection. Some of them were still undergraduates! Three months after their files were registered, they received 200 000€ subsidy. Those who present an attractive level of potential growth obtain 2 Meuros more and for the most promising among the selected, 20 Meuros. The grantees told me they had never before enjoyed such an efficient system, including those who are familiar with the American ecosystem. I hope to be able to launch a 3rd wave of calls to proposals.

We can improve the
procedure making it
more expedient and
loosening a bit the
criteria for selection

Could there be a special role for the universities of technology in the PIAs?

Inasmuch as the universities of technology (and UTC in particular) serve as excellent go-betweens between basic research and industrial applications, they can be seen as natural partners for the Commissariat General. From the outset, UTC was a novel concept and the institution has lost none of its vitality after 40 years, witness the success several of its projects have met

in our calls for projects. The Institute for Energy Transition (ITE), aka PIVERT, is the perfect example of success here and reveals the extraordinary potential of UTC.

What advice would you give graduates arriving on the job market? More specifically, those who want to set up a company?

I am convinced that team quality in any enterprise is more important than its basic sector activities. Some people like to work in a competitive atmosphere, others in a less stressful ambiance. The graduates should choose a company where they feel they can fit in well. For those who want to set up their own companies, France offers a technically rapid and not so expensive environment. However, if they wish to avoid having to go into receivership after 3 years (1/3 of new companies know this fate), the entrepreneurs must have a good project, whether it be technological or not. Innovation lies more in the concepts than in the technologies and is not restricted to just several sectors of activity. Wood and timber - wrongly considered to be traditional raw materials, for example - are sadly lacking in innovations. Networking is also a key to success, to build up a solid financial structure before suddenly finding yourselves alone in the more difficult times. ■

DID YOU KNOW THIS?

47 billion euros were ear-marked for the French Government's Investments for the Future Programmes (PIAs). A first round of 35 billion euros was voted by Parliament in 2010 and a second round of allocations worth 12 billion euros was likewise approved in 2013.

HOMAGES



in remembrance of the great man, Daniel Thomas.

Titular Professor, his career is intimately linked with the success of UTC to which he contributed in an outstanding manner. UTC has lost one of its most significant figureheads whose international reputation in the field of biotechnologies – at his personal initiative – and his human qualities will forever be engraved in our minds and hearts.

In memoriam, UTC and friends pay homage to Prof. Daniel Thomas

Biotechnologies – a 40 year history – Prof. Daniel Thomas, key actor in their applications.

Friday October 10, 2014, the UTC Enzyme and Cell Engineering Laboratory (GEC) will be organizing a Special Day to pay homage to Professor Daniel Thomas, who departed in May this year; the event, convened at the Technology Transfer Centre, UTC, will recall Prof. Thomas' 40 year career serving the scientific development and applications of biotechnologies.

Details and registration on-line at www.utc.fr

Striving for general interest

In departing this life, Daniel Thomas left an immense emptiness. We had worked together to create PIVERT, Daniel at the time being the President of the IAR Competitiveness Pole.

We were three (with Thierry Stadler, Executive Director of the IAR Pole) – striving to build a structure to federate actors in the field of biotechnologies between the regions of Picardie and Champagne-Ardenne. Between 2009-2012, we spent hours and hours on the project leading to the PIVERT installation; but I greatly enjoyed the professional friendship that built up between Daniel and myself. We shared the same vision of the shape that 'odd creature' was to take. Beyond his scientific and human qualities, Daniel Thomas always placed general interests as first priority. Without this stance, I feel, he might not have become our scientific guarantor, through the science-based programme Genesys. He also managed to federate

a community of researchers scientists to launch calls for project proposals and to select the most relevant applications. Without Genesys, PIVERT simply would not have become the Institute it is today.

Daniel Thomas was also a basically passionate person, with a capacity to share his passions. I myself discovered the attractiveness and interests of plant chemistry thanks to his explanations and enthusiasm – my own background and training being in the petro-chemical world. He can be considered as the father figure for industrial biotechnologies in France and, indeed, he knew how to present the subject in such a way that made you really want to learn more. His gifts to make science popular ties in with the importance he attached to the concept of general interest. Some scientists



Jean-François Rous, Vice-President of Innovation Sofiprotéol

prefer to match alone ahead of the competition; Daniel preferred to be closely followed and had this urge to transmit his knowledge albeit through tireless explanations and always as if he was explaining things for the very first time.

He conveyed the feeling that we were the intelligent ones, allowing us, as he did so well, to understand his research work and investigations. Daniel Thomas was endowed with a sense of humour and even self-derision, but he certainly was no 'softy'.

He was totally honest, sincere and spoke out as he felt the situation commanded. Industrialists listened to him and he gained their full respect. Thanks to Daniel Thomas, plants are now seen as a highly attractive form of raw material. ■

Jean-François Rous

The humble visionary

Daniel Thomas was the main instigator of the IAR (Industry Agro-resources) Pole of competitiveness, both in the planning and building phases.

Long before the public authorities had imagined the idea of "poles of competitiveness", he had built a bridge between the two regions Picardie and Champagne-Ardenne, between Alternattech and Europolagro, to create Alternoval, the structure that initiated the IAR Pole. When the first call for proposals was launched in the context of future poles of competitiveness, Daniel Thomas was at the core of the IAR group project, not only throwing his scientific notoriety in the balance, but also contributing through his 'communicative' enthusiasm and his immense talents as an orator. He could galvanize his companions, overthrow rivalries all for a common cause, placing science and technology at the service of the regions.

While he was first Vice-president of the IAR Pole, he was totally complementary to Bernard Marie, the first President when it came to developing the Pole and its activities. Delicately, with simplicity and humility, he knew perfectly how to stay in the 'wings' to better accompany

those who worked with him, whereas his natural authority and scientific aura could quite legitimately have led him to monopolizing the management of the Pole. Professor Daniel Thomas took over the presidency himself, becoming the first academic to hold this responsibility. This is the perfect illustration of his personality: partisan and actor in favour of science to be admired and useful, value-adding to the regions in question.

The reason here lies perhaps in his modest, agricultural origins: Daniel always battled for social and economic equity, with special attention given to creation of a job-basin and local training facilities to meet the needs and capacities of the social categories involved. I think that of all the academics I have met in my career, he was the only one who advocated strongly full and open dialogue – he was tutor for an agricultural lycée – and who had the talent to federate a new science-based industrial sector. Daniel Thomas always held the opinion that thanks to science, agriculture could provide a viable alternative for fossil fuels, thereby also generating added value for primary agricultural crop growing. He wanted to implement his ideas in his beloved Region (Picardie) but he also associated the Champagne-Ardenne Region in his adventure.

Daniel Thomas was himself a world-class benchmark in biotechnologies. He possessed that extraordinary capacity to think ahead, prospectively and see his ideas advance.

Thus, he largely inspired the Chantilly Conference (Grands Entretiens) on bio-refineries, a concept he advocated and defended. Thanks to his perfect knowledge of French and European institutions he enabled the IAR Pole to play a major role in the validation of this concept, in France and in the EC corridors at Brussels; indeed, we have just learned that in the framework of the Horizon 2020 Programmes, the EU has validated the public-private partnership in bio-economy that he set up. It is one of the few public-private partnerships vetted positively by the EU in this 2020 framework. The summit, so to speak of his scientific career must be the PIVERT installations, for which Daniel Thomas was the visionary architect. It is a remarkable creation that will stand for a long time in Picardie as a flagship venture and a focal point for scientific and economic benefits, generating jobs and added value for the area.

I am the first and foremost beneficiary of his kindness: he enabled me to follow in his footsteps at the presidency of the IAR Pole with his discreet yet efficient support; for this I am terribly grateful. All the members of the IAR who personally came to know Daniel were struck by his outstanding intelligence. A man of immense culture, extending well beyond science. An honest man, a great gentleman and a friend. ■

Dominique Dutartre



Dominique Dutartre, Chairman of the IAR Competitiveness Pole

In tribute to Daniel Thomas, you can leave your messages of sympathy on <http://interactions.utc.fr>

**UTC Autumn semester
Start of term 2014**

Newly matriculated UTC undergraduates in the core programme or in the university specialties will begin term Tuesday September 2, 2014 at the Benjamin Franklin Centre. Official the autumn term starts on Monday September 8.

**Inauguration of the UTC Innovation Centre
October 15, 2014**

The UTC Innovation Centre will be inaugurated officially October 15, in the presence of Arnaud Montebourg (to be confirmed), Government Minister for the Economy, Productive Rehabilitation and the Digital Economy. The inaugural event will also provide an opportunity to discover the various technical rigs and platforms installed at the UTC Innovation Centre.

**The Science Festival
October 15-19, 2014**

The 23rd edition of the « Fête de la Science » (at UTC-ESCOM) will focus on "Crystallography ; light and sound and progress in technology during WWI". It will allow the public at large to discover (with the help of research scientists and students) how movement analysis led to adapting German foot-troops' combat uniforms in WWI, the evolution of biomaterials from end 19th century to date and 3D printing of molecules, etc.

**The Comutec Forum
Thursday October 23, 2014**

The next Comutec Forum Students-Enterprise for UTC and ESCOM will take place October 23, 2014 at the 'Tiger' Event Pol, Margny-Lès-Compiègne. This job Forum brings together nearly 100 companies and provides an opportunity for student engineers from both establishments to gain a better insight into sectors they might want to target and to discover numerous companies who are actually recruiting.

**Innovation Week in China
October 27-29, 2014**

In the framework of the France-Chine 50 Agreement, "Innovative cities in a digital era and sustainable development", the Sino-European University of Technology of the University of Shanghai (UTSeuS) and the French UT Group will be co-convening the Innovation Week in China France-China 50, on October 27-29, 2014. This special Week will also announce the launching of the ComplexCity Master's degree (data sciences and complex systems for a smart sustainable future of the future).

**International Innovation Summit
November 27-28, 2014**

With the overarching theme "Metamorphosis of innovative territories", after ETS and the University McGill, Montreal in 2012, and after the University of Liege, Belgium, this time it will be the turn of UTC to organize the next Innovation Summit, November 27-28 2014 at the UTC Innovation Centre, Compiègne. This Summit will enable the main international actors in innovative projects to meet at the venue, exchange and debate.

START-UP



Communicating by touch

We are saturated by visual and audio information all day every day, but how could we transmit information via our sense of touch, not used very much today? This is the question addressed by the UTC-Costech Lab via an innovative prize winning project at the Innovation Centre in 2010. After 3 years maturing, the two UTC graduates in charge of the project design Thibaud Severini and Vanessa Caignault created their company Novitact.

The aim is to lend meaning to touch, notably through functions offered by the first product, the Feeltact vibratory comm-bracelet.

This bracelet is a connected object that transmits and receives tactile messages in the form of vibrations. "The lexicon of our sense of touch is adapted to the users. The messages can be easily interpreted as a function of duration, intensity, rhythm and number of oscillators set in motion", says Thibaud Severini, Chairman of Novitact/. The bracelet is also connected to smartphones via a Bluetooth® connection. There are very numerous possible applications for Feeltact. These could lie with professionals but also with private individuals even if Novitact – in the first instance – has targeted the profession safety sector, for environments where visual and oral communication prove difficult, or even dangerous. "For example", explains Vanessa Caignault, CEO of Novitact, "a ticket inspector on a train who feels he/she is in danger can discretely send a message via the bracelet to warn his/her colleagues and receive a message in return about their arrival possibilities". This idea for a vibration based data transmission system emerged in 2010 through a proposal by Nicolas Esposito, a research scientist working with the UTC-Costech Laboratory. It was Nicolas who first contacted Thibaud Severini – a graduate in Computer sciences and engineering from UTC. Thibaud joined the adventure in

June 2010, managing what was to become an innovating project, and he co-invented the the bracelet format. Then it was the turn of Vanessa Caignault to join the team (likewise a graduate from UTC specialised in innovating projects management). "After 10 years helping others to launch products and start-ups, I decided to 'cross the line' and get into entrepreneurship on my own". This prize winning project benefited from funding by the Picardie Regional authorities, via the Maturation Fund and likewise from Europe via the FEDER (Regional development fund). The company was officially created in October 2013 and won the Digital Spring prize awarded June 5 this year, convened at the UTC Innovation Centre, thereby earning their tickets to seats on the French delegation who will be present at the next Consumer Electronics Show (CES), Las Vegas and this will surely add a lot of international visibility to the young company.

"But the main objective this year", says Thibaud Severini, "is to test the bracelets in real-life situations using some prototypes that we assembled as of April this year. The prototypes allowed them to contact several companies interested potentially in the product and to identify those who expressed a wish to join forces in a test phase to be conducted by end 2014. ■

VALORISATION

Energy management for smart cars

"Today, the most serious brake to a commercial introduction and deployment of electric vehicles is their lack of range" announces Alessandro Victorino, research scientist and lecturer at the UTC-Heudiasyc Laboratory. "Moreover, the current demand is for safer vehicles on the road". It is to comply as best as possible to this demand that the UTC-Heudiasyc laboratory and the UT Ilmenau (Thuringe, Germany) decided to work together to design a new concept of "smart electric vehicle".

The VERVE project is an international research programme managed jointly by UTC and UT Ilmenau (Thuringe, Germany) which began in 2011, co-financed by the Picardie Region, France and the FEDER (the European Development Fund). Both UTs are associated because of the complementary skills and means. UT Ilmenau is specialized in power unit

management, whereas the skills of UTC-Heudiasyc focus on artificial intelligence (AI) systems. UT Ilmenau will therefore conduct research to identify new methods and technologies to increase vehicle range by controlling power intelligently. "If we can detect if a vehicle is climbing or descending", reports Alessandro Victorino, we can forward this information to the motor propulsion

group to optimize power supply. One of the objective of VERVE is to provide more reliable more accurate information”.

At the UTC-Heudiasyc Laboratory, the research is currently focused on aids to driving. “To assist the driver, an electric vehicle must be able to “see” and interpret its environment, to as to avoid obstacles on the carriageway”, explains Alessandro Victorino. “The final objective of VERVE is that the vehicles

be able to interact with the drivers, interpreting their movements and the degree of feasibility of the actions requested (in taking a bend, for example) and to assist rapidly in case of an emergency”.

At the end of 2015, the research teams will have operational “demo” vehicles, built partly with the help of industrialists: “this will also enable us to study the possibility to commercialise this sort of system of aid to driving and ‘smart’ power management” adds

Alessandro Victorino. The Picardie and Thuringe Regions will then equip their groups with safer and more ecological vehicles. ■

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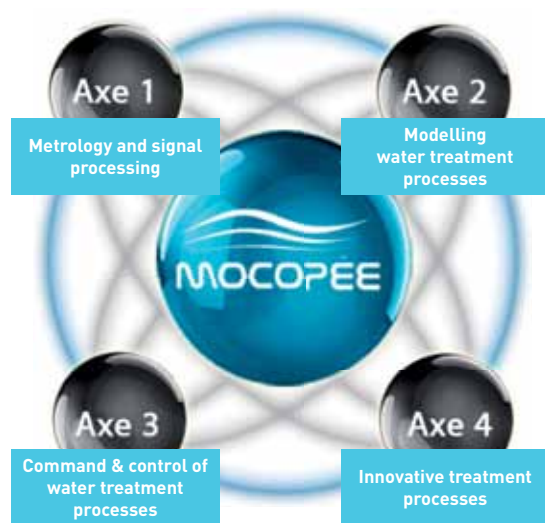
plus ▶ <http://www.tu-ilmenau.de>

VALORISATION

Optimisation of water treatment processes

The challenges faced in treating effluent waste water are becoming increasingly complex, encouraging the operators to optimize their treatment facilities. Two UTC laboratories (UTC-TIMR Integrated transformation of renewable matter) and UTC-LMAC (Applied mathematics) are currently working with the Irstea (acronym in French for Institute of scientific and technological research for agriculture and the environment) and the SIAAP (interdepartmental agency for water treatment in the greater Paris area) to improve process control for the Agency – among the largest in Europe.

The Mocopée Programme perimeter



SIAAP treats 2.5 Mm3 of effluent waste water every day, i.e., the volume used by 9 M inhabitants of the greater Paris area for domestic and industrial uses. The Agency manages 6 treatment plants and returned the treated water to the Rivers Seine and Marne. For some time now, SIAAP has been supporting research projects, the most important being the OPUR (Observatory for Urban Pollutants) and the PIREN-Seine “These programmes address the question of water as a territorial resource? We are working with SIAA on themes that relate to the installations themselves”, notes Professor André Pauss, UTC-TIMR Laboratory and in the university’s Industrial Process Department. After several short-term projects organized between UTC and SIAAP, these two were joined by Irstea thereby creating a 4 year partnership called Mocopée (an acronym in French for Modelling, Control and Optimization of Water Treatments). “This is a long-term project which pursues some of the work done previously and introduces new dossiers”, underlines André Pauss, who is the Mocopée coordinator representing UTC.

Metrology, control & command and treatment processes

Following the more stringent regulations applicable to treatment of effluent water wastes over the past 2 decades, the architect-builders have equipped their stations with efficient technologies: physico-chemical layer decanting, bio-filters, membrane bio-reactors, etc. “These intensive technologies serve to maintain high quality waste treatment, but the system management requires a high level technico-scientific expertise. In particular, questions relating to metrology, to control and command for waste treatment processes are now at the heart of industrial investigations”, assert the programme coordinators, Jean-Marc Choubert representing Irstea and Vincent Rocher for SIAAP. “The treatment unit managers must also scrutinize their operation costs. The French today consume less water and consequently the revenues decrease while the standards applicable become more demanding. The treatment processes must therefore be optimized. We hope, for example, to be able to economies 10% on the process additives”, notes Jean-Marc Choubert.

Development of real-time monitoring instruments

Metrology applied to effluent water treatment is an important feature of the Mocopée project. The effluents must constantly be “perfectly clean” whereas the input waters vary enormously in quality and quantity, from one quarter of an hour to the next. “We can even detect the variations before and after the Sunday night classic TV film!” says a smiling André Pauss. It then becomes important to have instruments that enable the operators to assess quickly – even in real-time – the quality of the effluents. Part of the work is to design new tools to rapidly fix ten orders of magnitude for the biochemical oxygen demand (BOD) as needed to measure the biodegradable fraction in the effluents. Currently, it takes 5 days to carry out this analysis. “The SIAAP has been working with an industrial partner for 2 years now, to bring the time needed for the analyses down to

20h”, explains André Pauss. “This represents some very complex, applied research, with large scale instruments deployed in a complex milieu”. Other phenomena still need to be better understood, such as for example the creation of foams during the water treatment, sometimes measuring up to 30 m long and 1.5m deep! Given that anti-foam additives are expensive, we must identify a way to prevent or control this reaction in a non-stop manner. De-nitrate cleansing is another research subject where UTC has developed an operational, no-break instrument, with an industrial partner. “The scientific challenges related to treatment of wastes effluents are still numerous. If we are to answer the industrial problems as we see them today, we must build up an intensive knowledge base and develop efficient metrology and mathematical tools that are necessary”, adds Vincent Rocher.

6 PhD theses in 2015

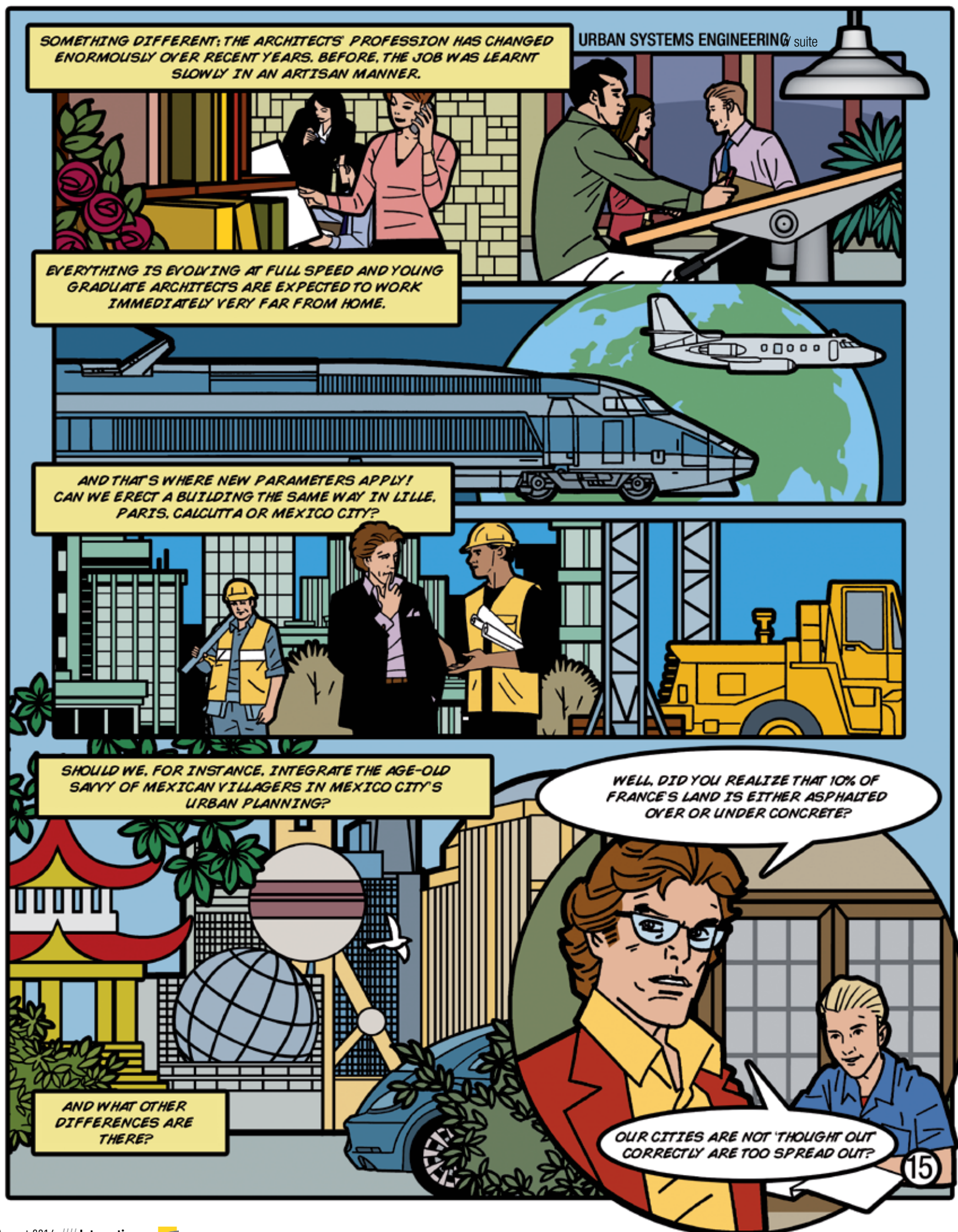
“Irstea and SIAAP provide their knowledge and know-how about treatment stations and we offer our expertise in process engineering and applied mathematics, no-break metrology and control and command techniques”, says André Pauss. “The solutions currently under development will first be implemented by the SIAAP, a benchmark company in water treatment and after that they could be put on the market-place”. The Mocopée project which began on January 1, 2014 is already under investigation by a UTC PhD student. “Indeed, for the project as a whole, we hope that 6 doctoral theses will be defended and also that there will be publications, patent claims, etc.” foresees the Professor proudly. “What we have here is a wide-ranging project in terms for its knowledge base and applications and it is an attractive area of research for UTC”. ■

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On its 40th anniversary, UTC rewrites its history, in comic strip style : **In the heart of the Future**



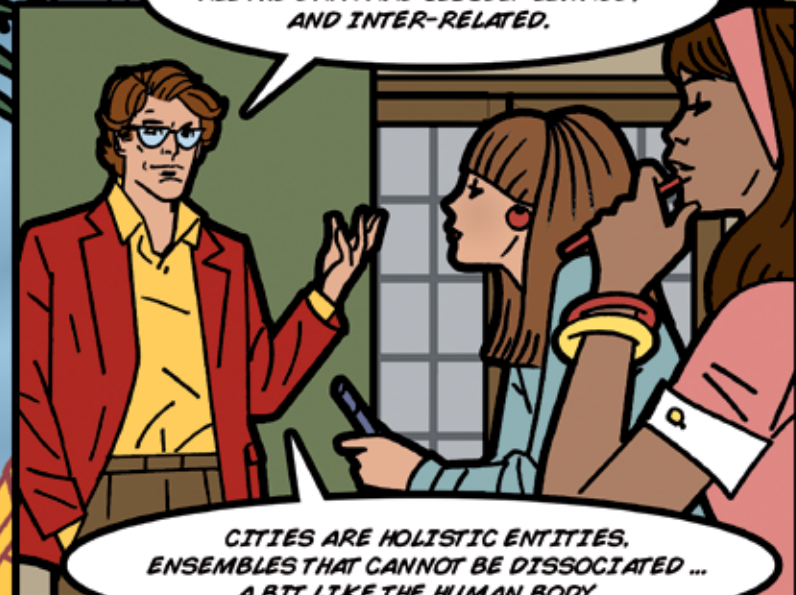
IN TERMS OF URBANISM, THE GOOD EXAMPLES ARE NEW YORK OR HONG KONG, "TIGHTLY" BUILT, DENSIFIED TO OPTIMIZE CLIMATE AND ENERGY CAPACITY, PRESERVING THE LIFE-STYLE OF NEW YORKERS OF THE RESIDENTS OF HONG KONG.

WHAT WILL TOMORROW'S CITIES BE LIKE? THAT'S A HUGE QUESTION AND MANY HYPOTHESES HERE CAN CLASH IN CONTRADICTIONS!



... IT'S FOR THESE VERY REASONS THAT WE SHALL TEACH YOU HOW TO THINK ABOUT URBAN MODELS YOU WILL BE DESIGNING, IMPLEMENTING AND OPTIMISING.

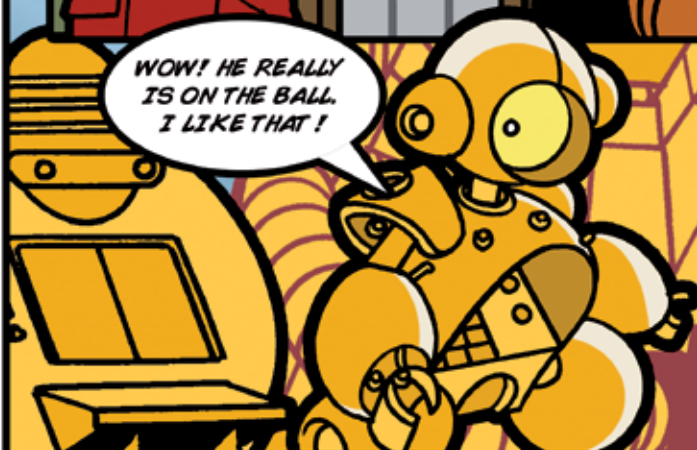
... TAKING INTO ACCOUNT THAT ALL THE DATA ARE CLOSELY LINKED, AND INTER-RELATED.



CITIES ARE HOLISTIC ENTITIES, ENSEMBLES THAT CANNOT BE DISSOCIATED ... A BIT LIKE THE HUMAN BODY ...

WOW! HE REALLY IS ON THE BALL, I LIKE THAT!

DO YOU WANT TO SIGN UP FOR HIS CLASS?





Where intuition & risk-taking top the bill

Director General Delegate for Scientific Affairs at the CNRS, Philippe Baptiste prepared his doctorate, awarded in 1998, at UTC. "I wanted dearly to work with Jacques Carlier", recalls Philippe who went on to enjoy a "passionate" academic career.

The first time he met Jacques Carlier, a research scientist and lecturer at the UTC-Heudiasyc Laboratory, he found him hunkered on the office floor, scrutinizing cardboard rectangles.

"He was in fact investigating a concrete case of queuing theory, a topic lying between mathematics and computer science" adds Philippe with a smile. Armed with patience and determination, he had to wait a year before Jacques Carlier found the time to accept to supervise his thesis. "While waiting, I did a so-called Advanced HE Diploma (DEA) at the university Paris 6 (Pierre & Marie Curie) and that was where I really got to discover the joys of mathematics".

A passion for discrete mathematics and algorithmics

It was his passion for mathematics that led Philippe Baptiste to start an academic career. He built up a really friendly relationship with Jacques Carlier, who left him lots of degrees of freedom during his PhD work. Here we have a research scientist for whom intuition and risk-taking take top priority, without neglecting the necessary scientific rigorous attention. I stayed on for a year at the UTC-Heudiasyc Laboratory with the professional status of ATER (research assistant) after which, with the support of Messrs Carlier, Charara and Dubuisson, my application to join the CNRS was accepted". Between 2000-2001, Philippe Baptiste went over to the USA, to work at the IBM Research Center in New York. His work there revolved round basic research in the theory of complexity. Receiving a proposal to accept a professorial teaching position at the prestigious Ecole Polytechnique, Philippe Baptiste returned to France. "That's the kind of proposal you just cannot turn down!" At the time, he was supervising or co-supervising (some with Jacques Carlier) several PhD theses. Two of these PhD students joined or stayed at the UTC-Heudiasyc Lab/: Antoine Joulet (UTC lecturer) and David Savourey (research scientist and lecturer). Philippe then joined the joint CNRS/Ecole Polytechnique Computer Science research teams at the LIX Lab over which he became director in 2008 and then set up the Computer Science Institute for the CNRS. For a short period, he held the position of Head of the Research and Innovation Strategy Service at the French ministry for HE and Research, after which he was appointed Director General Delegate for Scientific Affairs at the CNRS by President Alain Fuchs.

1 000 start-ups in the past 15 years at the CNRS

In his current position, Philippe Baptiste is responsible for the coordination of the CNRS' 10 Institutes, for interdisciplinary projects, for innovation, international cooperation and partnership agreements and contracts. "The aim is to develop interdisciplinary projects, and this runs against the temptation to enjoy mono-disciplinary comforts. It is easier to work at the core of one's own skills. However, an interdisciplinary approach becomes inevitable for certain scientific topics. We must have the means to take these practical and epistemological hurdles into our stride to encourage and induce more interdisciplinary exchanges and work". Philippe also underscores the little known role of the CNRS to value-add to research and enhance innovation transfer operations. Thus, the CNRS is preparing to celebrate its 1 000th start-up, created in a partnership with other academic or economic actors. "The CNRS is far from being an ivory tower and its real added value is to see that breakthrough research in the laboratories actually gets transferred to socio-economic applications". Philippe Baptiste himself participated in the creation of several companies, including Ergelis, specialists in thermal building management using special optimization tools. Philippe would like to see the start-up operations multiply and grow and also to engage the CNRS in wider scope R&D programmes.

Structuring the French university scene

"I have an exciting and captivating job, since it lies at the crossroads of a multitude of scientific fields in close liaison with the laboratory heads and their highly-qualified research scientists. The CNRS also has an important role to play to help restructure the French university scene; at the present time, the latter is still somewhat 'disorderly'. The CNRS, with its national vision, its superb equipment and its highly dynamic international policy, is a key actor in HER (higher education and research)." A vast majority of the 1 000 CNRS labs are joint research structures. "It is in our interest at the CNRS to have strong academic and university partners". For students who wish to take up an academic career, Philippe Baptiste's advice is to love science and be prepared to take risks. "There can no such thing as a good thesis without taking high risks! France offers some very attractive openings for young high-flying research scientists." ■



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1998: PhD in computer sciences and engineering, UTC

1999: recruited by the CNRS

2000 to 2001: IBM Research Center, New York

2002 to 2011: appointed adjunct professor at École Polytechnique

2008: appointed Director joint CNRS/EP computer science Lab, the LIX

2010: appointed Director of the Institute for Computer Sciences and Engineering and interactions at the CNRS

2013: Head of the Research and Innovation Strategy Service at the French ministry for HE and Research

June 2014: appointed Director General Delegate for Scientific Affairs at the CNRS