

Acronym of the project	GUI+
Titre du projet en français	Initiative d'excellence Grenoble-Alpes Université de l'Innovation
Project title in English	Excellence Initiative Grenoble-Alps University of Innovation
Project manager	Name: Yannick Vallée Address: yannick.vallee@grenoble-univ.fr PRES Université de Grenoble bât. les Taillées - 271 rue de la Houille Blanche 38400 Saint Martin d'Hères – France
Institution leading the project (Project leader)	Name: GUI+ Committee
Capital grant requested	908 million Euros

Structure of the Idex partnership

Higher education institutions	Research institutes	Other
Université Joseph Fourier	CNRS	CHUG (Grenoble University Hospital)
Université Pierre Mendès-France	CEA	
Université Stendhal	INRIA	
Institut Polytechnique de Grenoble	Cemagref	
IEP Grenoble	INSERM	
Université de Savoie		
Ecole Nationale Supérieure d'Architecture de Grenoble		
Grenoble École de Management		

1 CONTENTS

2	ADDITIONAL FILE: OPERATIONAL MEASURES	3
3	EXECUTIVE SUMMARY	12
4	DELTA DOCUMENT	18
4.1	The legal status of the structure carrying the Idex	18
4.2	The management of the EPCS	18
4.3	Resource allocation	19
4.4	Human resources policy	20
4.5	Training.....	21
4.6	The link between universities and schools “grandes écoles”	22
4.7	International Relations	23
4.8	Our roadmap.....	23
4.9	Our vision of the “finished model” of our university	23
5	DETAILED DESCRIPTION OF THE PROJECT.....	25
5.1	Ambition and strategy: The University of Grenoble-Alpes in the European top10.....	25
5.2	Structure and characterization of the initiative of excellence	30
5.2.1	Presentation of the project leader	30
5.2.2	Application to the actions of the program “Investissements d’avenir”	30
5.2.3	Excellence perimeter, environment, prospects and added value	33
5.3	Project and prospects	39
5.3.1	Training & education (bachelor’s, master’s levels)	39
5.3.2	Doctoral studies	45
5.3.3	Research and innovation.....	47
5.3.3.1	Innovation and society priority	47
5.3.3.2	Health priority.....	53
5.3.3.3	Sustainable planet priority	57
5.3.3.4	Information priority	62
5.3.3.5	Scientific Instrumentation.....	70
5.3.4	Support and campus life.....	74
5.3.5	International strategy	75
5.4	Governance, organization and management.....	76
5.5	A policy of excellence for human resources	79
5.6	Means.....	81
6	KEY DATA AND FINANCIAL PLANNING	84

2 ADDITIONAL FILE: OPERATIONAL MEASURES

Perimeter of excellence

A recent study on the excellence of the top 30 French research sites, conducted on the basis of assessments from the AERES (national agency for the evaluation of research and higher education), ranks the Grenoble site as follows:

- Physics: 2nd
- Sciences and information technology: 2nd
- Mathematics: 3rd
- Earth and universe sciences: 4th
- Social Sciences: 4th
- Chemistry: 7th
- Human Sciences and Humanities: 7th
- Engineering Sciences: 8th
- Biology: 9th
- Agronomical and Ecological Sciences: 14th

Our perimeter of excellence is built on our strongest disciplines (Physics, Computer Sciences, Mathematics), our specific expertise in Engineering and Earth Sciences, and our strong points in Biology, Social Sciences and the Humanities, all in the service of a cross-disciplinary approach that seeks to provide answers to major societal issues. It contains a large number of laboratories ranked A+ or A by the AERES.

It is presented in terms of priorities (Innovation and Society; Health; Sustainable Planet; Information) and cross-disciplinary projects that seek to reinforce our effectiveness and attractiveness, both towards students and researchers.

<i>Priority</i>		<i>Nb of academics in the perimeter</i>
INNOVATION AND SOCIETY <small><i>Human Sciences and Social Sciences</i></small>	Creation, Culture, Technologies	100
	Innovation, Territories and Governmental Sciences	200
HEALTH <small><i>Health, well-being, nutrition, biotechnology</i></small>	Health / Biology / Biotechnology	350
SUSTAINABLE PLANET <small><i>Environmental emergency and eco-friendly technologies</i></small>	Environment	400
	Energy	700
INFORMATION <small><i>Information, communication and nanotechnologies</i></small>	Micronanotechnologies	800
	Intelligent Systems and Software	600
	Scientific Instrumentation	350
	Education	16 000 students

Our perimeter of excellence incorporates 35% of the total number of academics in our territory and 25% of our students.

Current strengths and weaknesses

The strong and the weak points of our perimeter can be studied from the rankings given above. Nonetheless, we consider that our insistence in basing this perimeter on pluridisciplinary themes, of major societal concern, constitutes the real point of strength. Grenoble's reputation has been based on this emphasis placed on major projects of strong international visibility. Such an approach has brought together diverse disciplines to confront complex problems with a combined effort which means that the excellence of our strongest disciplines pulls the others upwards to a higher level and to increased visibility. In this way interdisciplinarity is the creator of excellence.

This pursuit of excellence is also the consequence of what we call the perimeter of emergence, presenting thereby a dynamic vision of excellence, with the emergence of today becoming the excellence of tomorrow. We consider this dynamic vision as one of our strong points. Even if this entails the possible risk of a decline, at least relatively, of certain domains of excellence, it is up to us to be able to counter such a tendency. Previous success stories in our perimeter of excellence have shown that the combination of education, research and industry in the same site is a guarantee of an effective transformation of emergence into excellence.

Scientific ambition (Criteria 2)

Thanks to the quality of research being conducted over a number of years, Grenoble has a significant visibility resulting in particular in our presence in major international rankings. The scientific university of Grenoble (UJF) is ranked in the TOP200 Shanghai rankings (the sixth French higher education institution, the second outside Paris). It is abundantly clear however that Grenoble's position in the world's rankings would be considerably higher if the numerous collaborations between UJF and partner institutions in the GUI+ project were effectively and adequately taken into account. It is precisely in order to achieve such integration, which is a sine qua non for major international recognition, that we wish to move forward towards one large, very well coordinated, institution. The success of GUI+ will enable us to achieve a quantitative and qualitative step forward towards this ultimate goal and help us to further improve our position by making Grenoble one of the most recognized European universities. Such recognition will promote, as much as it will be promoted through, an ambitious welcoming policy towards foreign students and researchers. It will also be enhanced by our participation in all the major European calls for proposals, and will benefit from the massive presence of international facilities, unique in Europe.

Furthermore our excellence-emergence combination outlined above allows for a medium- and long-term vision of a comprehensive dynamic to be applied to the whole site, where aspects currently outside GUI+ could fuel its perimeter of emergence while, moreover, establishing the principle that, if a project that emerged when GUI+ was launched has not demonstrated its ability to reach the first level of excellence, then it should be discarded.

The four-year and ten-year targets for each of our actions are presented in the 60-page fifth section of this document. We have attempted to present a fully quantified version of all our proposals.

Teaching: ambition and innovation (Criteria 4)

The part of this dossier devoted to education & training has been largely reformulated. It is now divided into a section on the Doctorate and a section on the Bachelor's/Master's degree programs.

Our ambition for the doctoral program is very pronounced: we wish to confirm our position as the top university for doctoral studies in France. Our closest competitors in this respect will be the Paris universities. It is true that if they regroup into large university units, we shall probably be overtaken in terms of the number of theses defended annually. It is therefore evident that, whatever the case, we must place

emphasis on the quality of our training and on the professional insertion of our newly qualified doctors if we are to retain our primacy. This professional insertion can be helped by leading figures from the socioeconomic world participating in the training of our doctoral students. This can increase job opportunities including the possibility of the newly qualified taking part in the creation of spin-off companies.

Concerning our course programs at the Bachelor's and Master's level, we shall concentrate on our strengths in promoting links between science and technology, between the hard sciences and the human sciences, that is to say, as in research, promoting interdisciplinarity as a key factor in our excellence. This will be demonstrated through dual- or multiple-skill degree programs. Above all, we intend to encourage all students (on condition of course that they have the requisite level) to follow educational/training modules which are offered by another institution than their own (or, in the long term, by another institute of the University of Grenoble-Alpes). Interdisciplinarity will also play a prominent role in the network of research/training course platforms that we shall develop and which we intend to make the most impressive and effective platforms in the whole of France.

Finally, we shall set up a Centre for Educational Innovation and Teaching Quality. This will put to good use the best local practice, promoting the best innovatory methods, using information and communication technologies, all with international benchmarking.

It is clear that the present dispersion of our training offer through numerous separate establishments is a major hindrance. Centripetal forces, including those coming from outside our region (including national pressure to maintain certain traditional divisions) can clearly work against our strong commitment. We must therefore be vigilant in pursuing our objective, which is to offer a coherent and unified educational/training program for the University of Grenoble-Alpes.

Economic partnerships, exploitation of research results and technology transfer (Criteria 5)

With more than 3,400 groups of patents, our site holds the most concentrated patent portfolio in Europe among research organizations.

With the creation of more than 120 businesses using innovative technology, of which close to 60% have received awards in creativity-development from the *Concours National d'Aide à la Création d'Entreprises de Technologies Innovantes*, our site holds the highest rating in France for fostering innovative, high-potential businesses (businesses having raised more than € 1 million or achieved more than € 1 million in turnover prior in the first three years of activity). This track record remains wholly unique in France and among the very best in Europe.

We are conscious of the key role we have to play, at both the local and the national level, in enriching the economic fabric through injecting knowledge and innovations that we have the potential to produce. IDEX with its crucial role of coordinating the range of tools available under "*Investissement d'avenir*" (IRT, SATT, Labex, etc.) will allow us to improve our capacity to serve as a major driving force for stimulation of the economy.

It is our ambition to increase the process of technological transfer, as well as to create new values to accompany them. We shall also strengthen the transfer of research knowledge towards public decision makers, local authorities and other socioeconomic forces in this region. This transfer can take many forms: providing assistance to project promoters, undertaking policy and program assessment, defining indicators and information systems, setting up partnership programs for a more sustainable territorial development, providing expertise in risk management, etc.

International and European policy (Criteria 6)

The effective integration of international perspectives will be a core characteristic of our university. In line with our objective to be one of the top universities of world renown, all international links and partnerships should be specifically aimed at positioning the University of Grenoble-Alpes as a knowledge and education provider of the highest quality. The differentiators of our strategy will be:

- World class platforms, both for education and research
- Industrial champions (STMicroelectronics, Soitec, Schneider,...) and floor of SMEs.
- Cross fertilization between education, research and industry
- Multidisciplinarity of education and research enabling innovation mixing new technologies and imagination by design

This strategy will be focused on:

- Attracting the best students worldwide to study with us
- Attracting the best academics worldwide to work with us
- Developing strategic alliances with leading world universities
- Favouring student mobility (incoming and outgoing)
- Creating a true "international spirit" on our campuses
- Intensifying our participation in European calls for proposals
- Diversifying our international activities especially beyond the academic world.

Our achievements will be measured using a list of indicators:

- International university rankings
- Notoriety of our brand outside France, especially in Europe and other countries of strategic importance
- Percentage of students experiencing some form of placement abroad
- Diversity of international student population (number of countries of origin represented) and total number of international students present
- Percentage of foreign staff
- Percentage of our staff with visiting professorships abroad
- Percentage of visiting professorships coming from abroad
- Number of students successfully completing our degrees through transnational programs
- Number and quality of degree programs offered in English
- Number of European projects selected

Governance: ambition, identity, transformation and structure (Criteria 8)

Once the IDEX is awarded, we shall immediately set up a new institution. This will be the forerunner of the "finished model" of the University of Grenoble-Alpes. The finished model of the single University will be finalized in 2016.

The new institution created in 2012 will be responsible for the *Initiative d'excellence* and will coordinate our commitment to the *Investissements d'Avenir*. It will concentrate its resources on our perimeter of excellence. Its strategy will be a global one. As well as for the IDEX (and its funding), it will be the coordinating framework in which the planning strategies of each of its participating components will develop their plans. This will take concrete form in one action plan put in place with the support and funding of each of the participating components, and with the extra funding obtained thanks to the *Investissements d'Avenir*: IDEX, IRT, Labex, Equipex, etc.

Ambition 1:

The University of Grenoble-Alpes is the leading university for doctoral studies in France

This ambition is rendered entirely credible by the fact that already we award one single doctoral degree: the Doctorate of the University of Grenoble, and also by the decision taken to create one Doctoral Division which groups together all the Doctoral Schools with a budget which will be five times greater than the funding coming from the IDEX.

Ambition 2:

The University of Grenoble-Alpes is a research university of world rank

From 2012, we shall be handling a research budget which is three times greater than that contributed by the IDEX. Within four years, all the professional profiles of those working in the perimeter of excellence will be under the seal of, and coordinated by, the University of Grenoble-Alpes. Our research laboratories will be administered by the University of Grenoble-Alpes, either directly, or through delegation to one of its partners. On the basis of a system of skill sharing to be quickly implemented, the appropriate allocation of specialisms and expertise will be carried out. It is not a question of centralizing all decision-making, but of having the centre take all the strategic decisions concerning overall institutional policy.

Ambition 3:

The University of Grenoble-Alpes is resolutely committed to achieving a very high success rate for its students

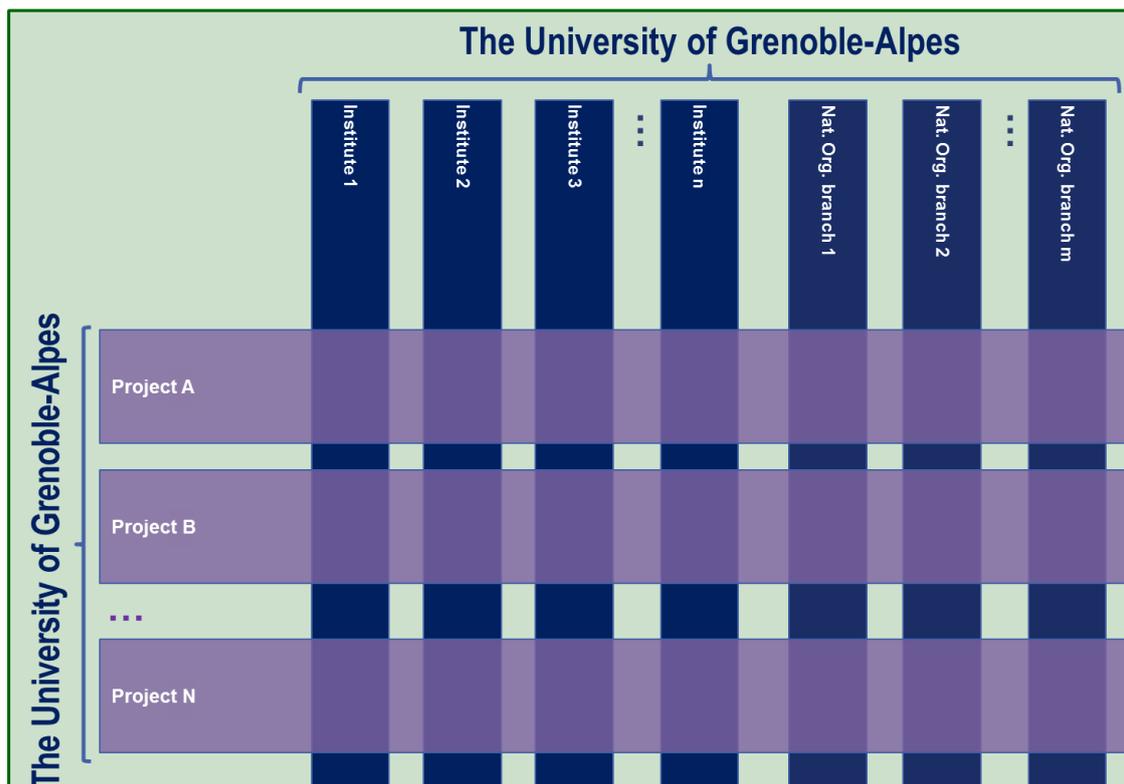
We are determined to create a coherent and comprehensive structure of course offerings which will encourage interdisciplinary training programs based on the underlying principle that each of the training modules of the University of Grenoble-Alpes is accessible to each of our students. It is a question of decompartmentalising our training offer, in particular between the universities and the “grandes écoles”, in order to create a full panoply of course opportunities at the University of Grenoble-Alpes. Pedagogical innovation will be at the heart of this initiative with a major impulsion given by our Centre for Educational Innovation and Teaching Quality together with our network of experimental platforms. The budget devoted to this will be three times greater than that coming from the IDEX.

A new institution serving as a precursor

Beyond the commitments which are implicit in each of these stated ambitions, our overriding endeavor to create the University of Grenoble-Alpes is testified by the creation of a new public institution, intended as a necessary step towards the achievement of the final goal. And this university which will serve to carry the project forward, is an institution with a carefully constructed and tightly-knit governance, basing its policy choices on a high-level International Scientific Council and on a Senate representing the major academic disciplinary communities. The new institution’s Board of Management will be aided in its managerial role by a Planning and Evaluation Service and by a general administrative service.

The University of Grenoble-Alpes : the « finished product »

And yet this “first” University of Grenoble-Alpes represents only a transitory stage towards a more fully integrated “finished model”. Our objective is the creation of a single University of Grenoble. Its finalized organization will be modeled on the very best international criteria. It will cover both institutional structures (which will eventually be called “institutes” together with local branches of national research organizations) as well as “project centres”. Its governance will take account of these two elements.



The Institutes will result from the reconfiguration of the existing establishments of higher education, the objective being to obtain the most comprehensive and functional unitary divisions as possible. The perimeter of these institutes will be defined in the next three years. The reconfiguration will be facilitated by the increasing awareness within the new university of the mutualization of resources and the pooling of skills. The statutes of these institutes will ensure significant autonomy allowing a high reactivity. The articulation of their governance with central management of the University of Grenoble-Alpes will be subject to special attention. Their integration into the new university is an effective guarantee of our strategy for the Grenoble site.

The “project centres” will also be essential elements in the re-organization (for example, the centres of excellence in micro-nano-technologies: Minatec; in computer software: PILSI; in biotechnologies: Nanobio; in innovation sciences: G2i; etc.). These “centres”, cutting across institutional structures, have greatly contributed to Grenoble’s success story. We shall continue our investment in those that already exist, and further pursue this path by helping to develop new inter-institute centres. The matrix of “structures x centres” will reinforce the University of Grenoble-Alpes by breaking down institutional barriers and creating new links between the various sections. This will facilitate the optimal management of our activities in courses, research and technology transfer.

Our ambitions and our confident anticipation of the successive stages in our transformation (starting immediately with the setting up of the new public institution; then in four years’ time, with the mutualization of resources and transfer of spheres of activity; and then finally with the “finished product” of a single University) give us the confidence to affirm with optimism that our common identity will grow steadily in the years to come and that the feeling of belonging to one common university will take hold and be the subject of pride among both staff and students. Our distinctive character will have progressively emerged and taken on its full meaning. This does not imply a lessening of diversity, but rather its true appreciation through shared identities (“The Grenoble-Alpes University Institute of....” and “The Grenoble-Alpes University Project for”). This recognition of diversity will be part and parcel of our desire to build a common future.

Resource allocation system (Criteria 11)

We shall guarantee that the allocation of resources will be strictly in line with the strategic decisions taken. The allocation must be selective, concentrating on the most significant projects, while encouraging the start-up or reinforcement of projects of excellence. It must also permit the launching of emergence projects and allow domains which presently have low visibility in Grenoble to attain excellence.

The three Divisions (Research, Education, Doctoral) will benefit from an annual budget which will be attributed to them by the Administrative Council (*Conseil d'administration: CA*).

The three Councils of the Divisions will make propositions for the allocation of funds in strict accordance with the written policy guidelines clearly stated by the CA. These propositions will result in most cases from Calls for Proposals. The choice of the projects selected will largely be based on external expertise sought outside the University of Grenoble-Alpes.

The projects selected by the Division Councils will be forwarded to the Board of Management (*Directoire*) which will examine their general validity (making sure that the projects meet the stated guidelines and meet the excellence or emergence criteria) before validating them.

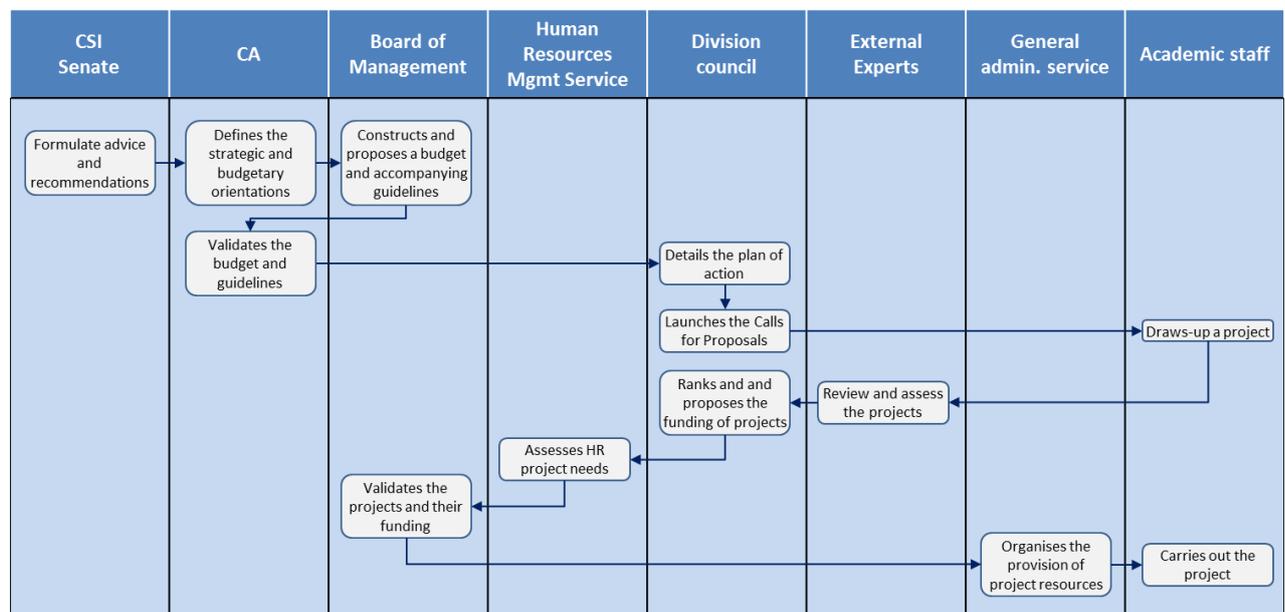
The Administrative Council shall be responsible for the sharing out of the budget between the Divisions (and the four transversal administrative services (*Directions*)) and also for voting annually the guideline instructions letter. In making its choices, the CA will benefit from the advice of:

- The International Scientific Council (*Conseil Scientifique International: CSI*)
- The Academic Senate (*Sénat*).

The budget will be decided by the CA on the basis of a proposition made by the Board of Management.

The whole of this system will be subject to internal procedures of control and is functioning subject to regular audit.

Furthermore, indicators for the monitoring of objectives will be established in order to ensure the overall procedural efficiency of the University of Grenoble-Alpes. These indicators will facilitate a careful monitoring of our activities, comparing its development with that of similar international institutions with which the University of Grenoble-Alpes wishes to be compared. The impact of our budgetary choices on these indicators will be examined on a regular basis. This will be one of the functions of the Planning and Evaluation Service (*Direction de la prospective et de l'évaluation*).



In particular we attach the greatest importance to the optimal management of our human resources. The policy of pursuing high-level excellence in managing human resources will be targeted by the management of the university for which this will constitute one of its principal missions. The central management must play the key role in staff recruitment, with a triple objective:

- Identifying potential recruits and centralizing proposals made by researchers
- Coordinating the recruitment process
- Giving assistance in the evaluation of applications, all this in order to possess the means to make competitive offers for top researchers on the international market, this for both junior and senior posts supported by the IDEX.

The control of this policy and its implementation will be the responsibility of the Board of Management which will be supported in this by the human resources management service, part of General Administrative Service (*Direction générale des services*).

Our roadmap

2012

1. Setting up of the main organs of authority for the new institution (the Administrative Council (*Conseil d'administration*: CA), the Councils (*Conseils*) of the three Divisions (*Départements*), the International Scientific Council (*Conseil scientifique international*: CSI) and the Senate (*Sénat*), all of which will carry the project through to the creation of the institution (point 2).
2. Creation of the new Institution by the 14 partners (*EPCS*, in the month of June)
 - The partners will determine the way in which the functions which are exercised inside the present PRES are to be distributed in the new structure.
 - This new institution replaces the present PRES.
 - The partners make a commitment to their contributions to the new central organization.
3. Beginning of the functioning of the IDEX
 - The Board of Management (*Directoire*) becomes operational
 - The Councils and Administrative Services (*Directions*) of the three Divisions become operational
 - Launching of the first Call for Projects
 - Setting up of the network of platforms, led by the admin. office of the Education Division
 - The first meeting of the Senate
4. Definition of the brand strategy of the institution.
5. Launch by the new Administrative Council of the work on the overall design of the target university.

2013

1. First meeting of the International Scientific Council
2. Implementation of the brand strategy process
3. Internal control procedures put in place
4. Launching of "action plans" for the Doctorate, Education and Research
5. Welcoming of first newly appointed researchers (professorial Chairs, grant allocations, etc.)
6. Setting up of the Centre for Educational Innovation and Teaching Quality.
7. The theme-based international schools (summer schools) are managed by the Doctoral Division.

8. Benchmarking report on the organization of the world's best universities
9. Vote by the Administrative Council of:
 - A framework document on international relations prepared by the Service for International Relations
 - A framework plan for the following three years prepared by the Service for Campus Life

2014

1. Idex reaches its normal operational « cruising speed »
2. Evaluation of the overall Idex performance and achievement half way through the first 4-year phase
3. Report on progress towards target model of world university
4. Stage assessment of progress concerning the emergence mechanism
5. The responsibility for international relations strategy is assumed by the EPCS
6. Coordination of the course offerings by the Education Division. The course programs proposed jointly by partners to increase by 20%.
7. Increased role for the Research Division, taking control of coordinating the valorization activities (link with the SATT).
8. Signature of a framework agreement between partners for the management of the laboratories of the perimeter of excellence by the Research and Valorization Division (direct responsibility or through delegation to a partner).

2015

1. First evaluation of the economic impact of the program *Investissements d'avenir*.
2. External evaluation of performance of the Centre for Educational Innovation and of Teaching Quality and also of the Network of Platforms.
3. The Research and Valorization Division, with the support of the Human Resources Service, issues report on the impact of the Idex on scientific employment
4. Signature of a framework agreement between partners for the award of diplomas.
5. Recommendations of the Senate and of the CSI
 - a. on the target model
 - b. on the emergence mechanism

2016

1. Completion of coordinated description of Education & Training Offerings on the site.
2. Management of the laboratories of the perimeter for excellence established by the Research and Valorization Division.
3. All the employment profiles of the perimeter of excellence coordinated in a centralized fashion
4. Evaluation of the results of the framework plan for Campus Life and of the framework agreement on International Relations
5. The Planning and Evaluation Service issues a general report on Research and Education & Training
6. Evaluation/assessment of progress in academic and technological rankings.
7. Evaluation of the international recognition accorded to the new institution
8. Evaluation of the statutes and structures
9. Final decision on the "finished model" target

3 EXECUTIVE SUMMARY

We are creating the University of Grenoble-Alpes

The fourteen institutions which are partners in the GUI+ project undertake to form one university, a university of world standing, a single university based in Grenoble and the Alpine corridor, with the ambition of being placed among the top European universities in the next ten years: the University of Grenoble-Alpes.

The University of Grenoble-Alpes is a pluri-disciplinary university dedicated to innovation and to fundamental research at the highest level. It offers an educational program which is intended to meet the needs of both society and the economy and affords the opportunity to all students to develop their talents through appropriate course offerings, with links between programs and multidisciplinary courses.

The present strength of these fourteen partners is such that we consider that this objective is within our reach. To attain it, we have today decided to create an institution which will allow us to build this university, to exert its influence, to develop its strategy and organize its operational activities and to prepare the finished model of one university. Being a public institution (and not a “foundation”), it will be able to award its first degrees in 2012.

This new establishment will be responsible for the *Investissements d’avenir*. It will concentrate its strengths on a perimeter of excellence defined by its capacity to exert world influence and to dynamize our potential for innovation. This perimeter will be at the heart of our strategic undertaking and its performance will be rigorously monitored. Benefiting from the contribution of internationally recognized experts, it will integrate a mechanism for emergence, creating an impetus for a constant renewal of this perimeter of excellence.

Our strategic plan is a global one. Going beyond the IDEX, it is a strategy which provides the framework for the strategies of each of its partner components. It is given concrete form in a plan of action which can only be implemented thanks to the efforts of all its partners, with further financial support obtained in the program *Investissements d’avenir*. IDEX, IRT, Labex, Equipex, etc. This strategic plan guides our structural development and dictates our ambitious plans for successive transformations leading to the University of Grenoble-Alpes.

The University of Grenoble-Alpes is made up of 65,000 students and 16,000 staff and has an annual budget of € 1.5 billion.

The University of Grenoble-Alpes is the leading university for doctoral studies in France

For already more than one year, all Grenoble doctoral students receive the same degree: the Doctorate of the University of Grenoble. This is already a considerable common identity, an ideal vehicle for establishing our public image. Because the Doctorate exists precisely at the interface between education and research and is the flagship degree program of higher education, resourced as it is by researchers from the universities as well as from the national research organizations, we plan to create one division, **the Doctoral Division**, bringing together our 13 doctoral schools and with one overall strategy concentrating on:

- International influence
- The professional insertion of Doctors
- The reinforcement and development of the doctoral schools in the Division

Moreover, the theme-based international schools (summer schools) contribute strongly to the international influence of the Grenoble region. Each year, they attract to Grenoble doctoral students and young researchers from the entire world. The objective of the Doctoral Division will be to make this a key factor in our international standing.

The first plan of action of the Doctoral Division will be to fix as its principal objectives:

- The optimization of the performance of the doctoral schools
- The valorization of the Doctorate in socio-economic circles of influence
- The provision, following a system of aptitude tests, of complementary high-level training and professional preparation for each doctoral student
- The reinforcement of the existing international schools (summer schools), with more emphasis on practical skills.
- The creation of several new international schools (Safety & Sustainability in Civil Engineering, Innovation and Mountain Territories, etc.)

The IDEX will contribute an annual budget of € 4 million to the Doctoral Division, including the funding of 40 new doctoral grants each year to add to those already existing. The total budget will be about € 20 million. **This is therefore a budget which is 5 times greater than the IDEX contribution which will be managed in conjunction with it.**

The University of Grenoble-Alpes is a research university of world rank

The University of Grenoble-Alpes is a university open to outside society. As an indication of its exceptional activity in technology transfer, it registers the largest number of patents of any university in Europe. Our research and technology transfer strategy is centred on four priority areas, representing major societal issues:

- Innovation and Society
- Health
- Sustainable Planet
- Information

This strategy translates into a plan of action, to apply in 2012 and which will be adapted to circumstances in subsequent years:

- Coordinating the activities of the whole of the perimeter of excellence
- Setting up projects in common
- Implementing emergence projects
- Following and coordinating the awarded *Investissements d'avenir*
- Setting up and managing the calls for projects for funding distribution
- Coordinating the local instruments of valorization and particularly their integration in the activities of the regional SATT.
- Evaluating results in terms of scientific quality, economic impact and overall effects on society.

To implement these goals, the University of Grenoble-Alpes has set up a **Research and Valorization Division**. Its political organ will be the Research Council. The Research Administrative Office will oversee the implementation by the research units of the funded projects and the carrying out of the global strategy and the plan of action by each of the partners. This supervisory role will reach optimal efficiency by 2016. It will cover the whole perimeter of excellence.

The budget which the IDEX will allocate to the Research and Valorization Division will be € 18 million. We estimate at this stage that the Labex part of this budget will be € 9 million. The excellence/emergence (excluding Labex) part will therefore be about € 9 million. These figures include the salaries relating to the IDEX Chairs.

Our total annual budget devoted to Research is close to one billion euros.

The research budget of the IDEX therefore represents around 2% of the research budget of the University of Grenoble-Alpes. The budget corresponding to the perimeter of excellence which is managed in common corresponds to roughly 45% of the global budget. In Research, the IDEX is therefore aimed at steering a policy which represents more than 20 times the budget that it contributes itself.

The partner establishments are committed to doubling the budget which is directly shared. Every effort will be made to obtain equivalent external funding from industrial concerns and from local or region authorities. It is therefore € 54 million which will be managed by the central governance of the university of Grenoble-Alpes (3 times more than the IDEX budget).

The University of Grenoble-Alpes is resolutely committed to achieving a very high success rate for its students

In terms of courses, we are constructing one overall strategy for the whole site. The aim is:

- To form one comprehensive and coherent course offering for the whole of our university
- To promote the implementation of specific high-quality course programs through better use of our perimeter of excellence, with strong links between courses and research
- To promote and develop pedagogical innovation
- To actively prepare our students for post-university working life
- To participate fully in the development of this region
- To promote the international dimension of our course offerings.

This strategy will be translated each year into a plan of action, which will receive the financial support of the IDEX. In particular, this means:

- Developing cross-disciplinary course programs, in areas of study shared between several institutions. Accent will be placed on degree programs mixing aspects of the human and social sciences with scientific and technological subjects.
- Proposing bridges between those courses with selective entrance and the general licence and master's programs.
- Facilitating « tailor-made » course programs, working on the general principle that any course unit in the University of Grenoble-Alpes should be accessible to any student.
- Placing more emphasis on the creation of education-research platforms. A network of such platforms will be created, with further investment in existing ones and the creation of new ones, in particular involving the human and social sciences and on very pluridisciplinary themes (for example: a platform in mountain studies).
- Setting up a Centre for educational innovation and teaching quality, taking advantage of good local practice, promoting innovation and using information and communication technologies, all with international benchmarking.
- Following and coordinating all the training projects in *Investissements d'avenir*, in particular the training components in the Labex.
- Opening access to all sections of the population through the provision of strong life-long learning programs.
- Promoting our training programs on the international level. The Education Division will offer pre-doctoral grants to attract very good foreign students into our master's programs who might wish to continue with Doctoral studies. It will also support international course offerings taught in English, as well as French language and culture courses for foreign students.
- Evaluating our results in coordination with the Planning and Evaluation Service.

This common strategy and plan of action will be drawn up in our **Education Division**.

To achieve this we shall put in place an Education Council (as the political organ of the Division) and an Education Administrative Office which will monitor the implementation of the funded projects and the overall implementation of the global strategy and plan of action by each of the partner institutions.

The IDEX will allocate to the Education Division an annual budget that we estimate for the first year at € 5 million euros (including the training allocations of the Labex, but not including the salaries corresponding to the IDEX Chairs which are included in the research budget).

The annual training budget of the University of Grenoble-Alpes represents more than € 330 million. On the IDEX perimeter, it is about € 100 million.

As in the case of research, the partners are committed to doubling the shared budget. Further funding will be sought externally (through local authorities, industry, etc.) in order to triple the sum, which will bring the budget available to the central authorities to at least € 15 million per year.

The University of Grenoble-Alpes sets up a high-performance organization with transversal management structure

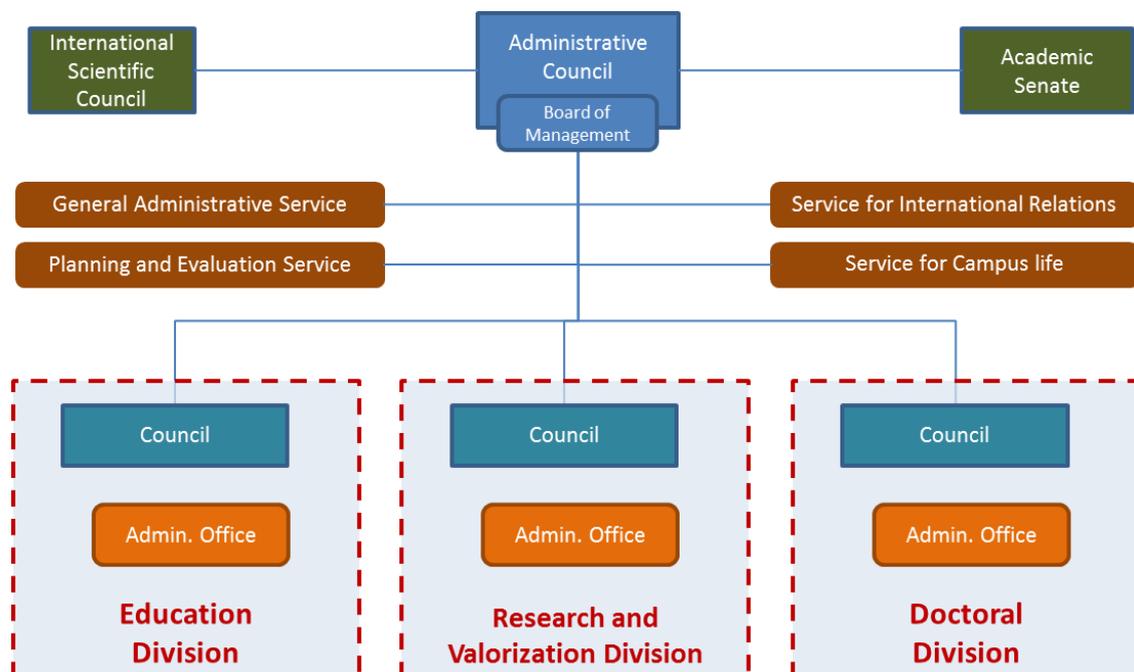
To ensure its success, our organization will set up transversal management services which will intervene in support of the three divisions, under the overall responsibility of the central management:

The Service for Campus Life. As well as through our excellence in research and educational programs, we wish to stand out through the exceptional quality of our campuses. The facilities available for welcoming our different types of public as well as the services available to our researchers and students throughout their university life will be up to the very highest international standards. The service for campus life will be given an organization and funding to match this high ambition. IDEX will devote € 1 million per year to this priority and this will enable us to coordinate a common annual budget of more than € 10 million.

The Service for International Relations. We must proclaim our strong international ambitions. We shall step up our already extensive exchanges with European partners as well as our participation in the European forum of research and higher education. Both in Europe and beyond, we shall favour agreements with other universities for cooperation at the very highest level.

The Planning and Evaluation Service. In order to succeed in its ambition to rank among the top European universities, the University of Grenoble-Alpes must construct and continue developing its strategic plans and orientation, to further develop its knowledge of, and adaptability to, different environments (social, economic, cultural, territorial) in a competitive and rapidly changing world. For this, we will set up a Planning and Evaluation Service which will have the double mission, first of observing and analyzing our performance, and second, of drawing up strategic orientation plans and supervising their implementation by the different partners on site.

The University of Grenoble-Alpes sets up a governance structure to match its ambitions



The new establishment created in 2012 is made up of three large divisions, each one governed by a council and endowed with financial means allocated by a specific central management.

The University of Grenoble-Alpes is administered by an **Administrative Council**, on which each of the partner institutions is represented and on which the **proportion of external personalities is close to 50%**. The operational direction of the whole university is exercised by a **Board of Management of limited size**.

The transversal services and their supports are directly linked to this Board of Management.

The Administrative Council relies on the advice of the **International Scientific Council**, which is composed of ten to fifteen eminent international personalities, and also of the **Senate** in which the main disciplinary communities of the university are represented.

Our human resources

The University of Grenoble-Alpes brings together more than 16,000 people working on the development of research and education in this area. 10,000 of these are researchers and academic research/teaching staff or doctoral students, of which 35% are in our perimeter of excellence.

I dex funding will be responsible for the financing of about 200 researchers, through its Professorial Chairs of Excellence, doctoral and post-doctoral grants. This high-level input will reinforce the potential of the present 3,500 “academics” within the perimeter of excellence.

Whilst the I dex will permit the recruitment of about fifteen staff for management of the site, the central organization will rely on the work of more than 400 administrative and technical staff devoted to various transversal management functions (including those already engaged in inter-university services, campus management, student affairs, services for disadvantaged students, etc.)

The commitment of partner institutions will be progressively implemented through the attribution of human resources to the university’s central management and through further support for professorial chairs and doctoral and post-doctoral grants. This commitment will be gradually increased during the transitional period leading to the finished model of our university.

Between now and 2016, mechanisms will be put in place for all recruiting carried out in the perimeter of excellence to be coordinated by the University of Grenoble-Alpes.

The allocation of funds

The capital endowment requested corresponds to an annual budget of € 31 million, or 2% of the research and higher education budget for the site, or about 5% of the budget of our perimeter of excellence. The commitments made by our partners allow us to estimate that in 2016, € 100 million will be controlled by the central governance of the university (7% of the site budget, 17% of the perimeter of excellence).

The Administrative Council will guarantee the appropriate and effective channelling of this funding. A strict control of its distribution will be instituted, permitting full organizational analysis and the efficiency of spending in terms of targeted objectives. Independent internal audits will be carried out.

The « finished model » for our university

We are fully committed to putting in place a new institution of higher education and of research: a SINGLE UNIVERSITY.

The work is already underway for the definition of the “finished product” for this new institution. Planned for the period 2012-2015, it will bring together the whole of the university community and its partners. The finished model will be finalized in 2016.

The organization of our future university will meet the best international standards. It will be divided into institutional structures (which will eventually be called “*institutes*” together with local branches of national organizations) and also into “*project centres*”.

The *institutes* will result from the reconfiguration of existing establishments of higher education, the objective being to achieve the most comprehensible and effective unitary divisions possible. The perimeter of institutes will be defined in the next three years. The reconfiguration will be facilitated by the increasing awareness in the University of Grenoble-Alpes of the mutualization of resources and the sharing of skills. The statutes of these institutes will ensure significant autonomy allowing a high reactivity. The articulation of their governance with central management of the University of Grenoble-Alpes will be subject to special attention. Their integration into the new university is an effective guarantee of our strategy for the Grenoble site.

The *project centres* will also be essential elements in the re-organization (for example, Centres of excellence in micro-nano-technologies: Minatec; in computer software: PILSI; in biotechnologies: Nanobio; in innovation sciences: G2i, etc). These *centres*, cutting across institutional structures, have greatly contributed to Grenoble’s success story. We shall continue our investment in those which already exist, and further pursue this path by helping to develop new inter-institute centres and organizations.

The matrix *structures x centres* will reinforce our university by breaking down institutional structures and reinforcing the links between them. This will facilitate the optimal management of our activities in education, research and technology transfer.

4 DELTA DOCUMENT

In the following “Delta document”, we summarize the improvements we have made to the dossier. This document provides information which addresses the issues and recommendations that the jury submitted to us during our meetings and in its report.

Many new choices have been concerning:

- the supporting structure of the IDEX (a public institution),
- its governance (which has been simplified),
- the allocation of resources (with a clear repartition between research and education),
- human resources (with the commitment to coordinate all recruitment in the perimeter of excellence),
- our training policy (which highlights multidisciplinary and the links between universities and “Grandes Ecoles”),
- the link between universities and grandes écoles,
- our international strategy,
- our roadmap
- our final vision of the one University of Grenoble-Alpes.

4.1 THE LEGAL STATUS OF THE STRUCTURE CARRYING THE IDEX

In our previous dossier, the legal status of the organization carrying the IDEX was a “foundation for scientific cooperation”. This structure had the advantage of flexibility, but had one major drawback: in France, a foundation cannot deliver national degrees. We have decided that the IDEX will be embodied in an organization that can deliver degrees: an EPCS (*établissement public de coopération scientifique*). From the beginning the University of Grenoble-Alpes is thus truly a university (not just a support structure). It will deliver our PhD degree.

4.2 THE MANAGEMENT OF THE EPCS

On pp. 28-29, we state that:

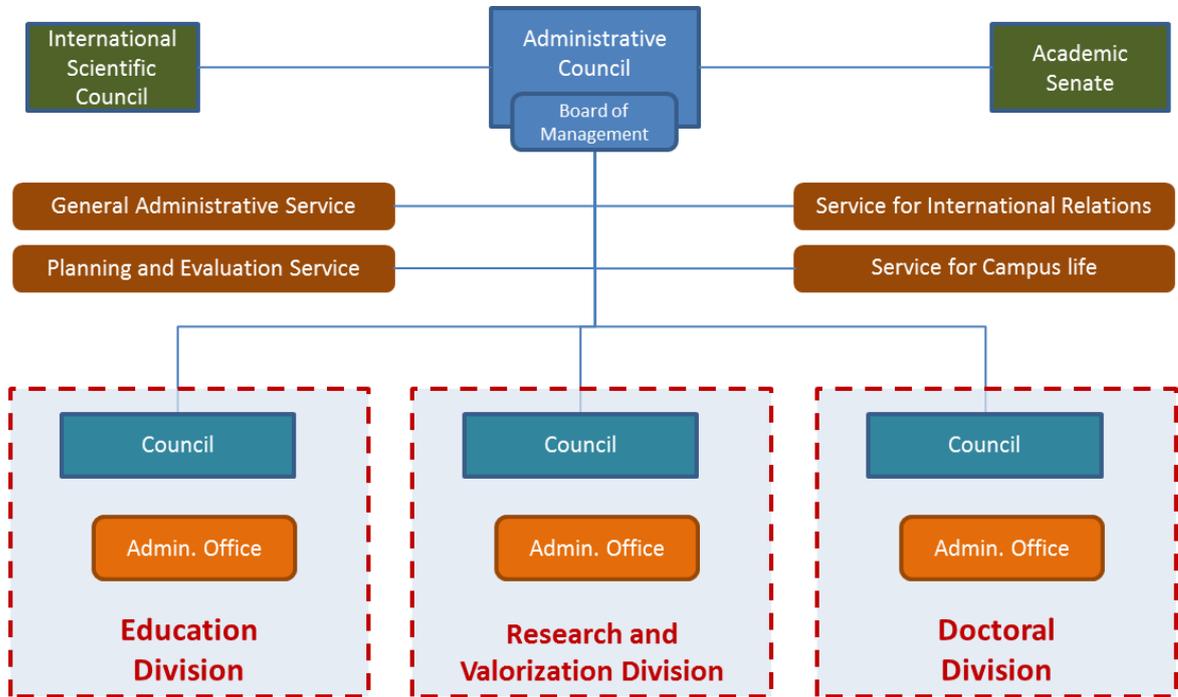
Our overriding endeavour to create the University of Grenoble-Alpes is testified by the creation of a new public institution which will serve to carry the project forward, an institution with a carefully constructed and tightly-knit governance, basing its policy choices on a high-level International Scientific Council and on a Senate representing the major academic disciplinary communities. The new institution’s Board of Management will be aided in its managerial role by a Planning and Evaluation Service and by a general administrative service.

We have modified the global organization of the project. It was previously organized around so-called “Actions” (10 Actions in the previous file). We thought that such an organization fragmented the project too much, especially for the allocation of resources. For this reason, we have now introduced only three main divisions (see p. 78):

*Three divisions will be established: the Division for Education, the Division for Research and Valorization, the Doctoral Division.
The three divisions will receive a budget that will be assigned to them annually by the Administrative Council.
The three councils of the respective divisions will propose (mostly on the bases of calls for proposals) the allocation of these means in the context of the*

strategy defined by the Administrative Council. The choice of the selected projects will largely be based on external expertise.

This leads to a much simpler organization:



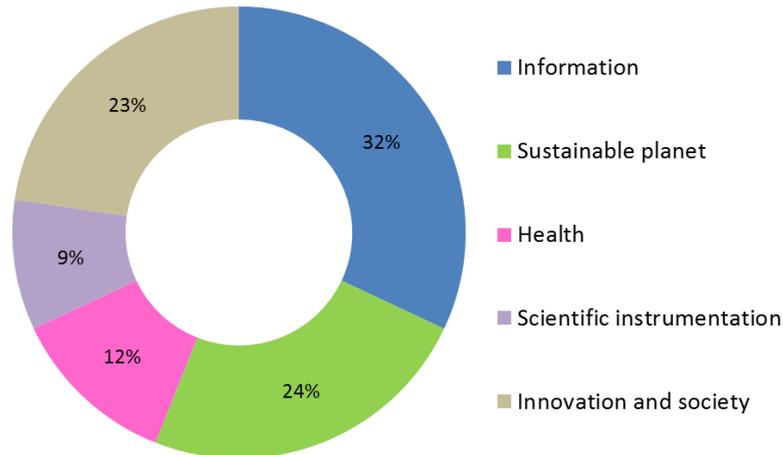
A partition into theme-based projects or priorities has been maintained only to ensure that budget allocation would really help out our areas of excellence. This partition has been maintained as an estimate in the final Tables.

4.3 RESOURCE ALLOCATION

The IDEX budget has been divided between Divisions and Services (p. 83):

- Research Division: € 18 million
- Education Division: € 5 million
- Doctoral Division: € 4 million
- Campus Life: € 1 million
- International relations: € 0.5 million
- Evaluation and Planning: € 0.5 million
- Governance: € 2 million

We must also foresee that our priorities receive a significant share of the budget. That is why we have maintained a breakdown by priority (p. 84). This distribution is approximate and will be reviewed each year.



Another way to look at our budget is to divide it by category (p. 84). We can see then that our major priority is the funding of human resources. Thus the financing of packages represents more than 27% of total expenditure, while investments and real estate expenditure should not exceed 12%. Our goal is also to fund at least 40 new PhD grants and more than 30 post-doc grants each year.

Estimated yearly expenditures by category (in thousands of euros)

	Number	Unitary costs	Total costs
junior chair packages	9	190	1 710
senior chair packages	9	350	3 150
junior tenure position packages	9	120	1 080
senior tenure position packages	9	280	2 520
doctoral grants ^{1,2}	66	41	2 706
post-doc grants ^{1,3}	75	59	4 425
engineers	30	96	2 880
pre-doc grants	40	18	720
operating costs ^{4,5}			6 000
investments, real estate			3 809
governance			2 000
TOTAL			31 000

- ¹ apart from those in packages
- ² total number of doctoral grants including those in packages: ca. 125
- ³ total number of post-doc grants including those in packages: ca. 100
- ⁴ apart from those in packages and operating costs related to doctoral and post-doc grants
- ⁵ total operating costs including those in packages and those related to doctoral and post-doc grants: 8 600 €

The partners have committed themselves to complement the endowments of Idex, so we would not eventually distribute € 31 million but nearly 100 million. This commitment is a clear demonstration of our determination to get to the finished model of our one university.

4.4 HUMAN RESOURCES POLICY

As written above, human resources are our main priority.

On p. 81, we state that:

The University of Grenoble-Alpes must play the key role in staff recruitment, with a triple objective:
 - Identify potential recruits and centralize proposals made by researchers;

- Coordinate the recruitment process,
- Give assistance in the evaluation of applications, all this in order to possess the means to make competitive offers for top researchers on the international market, this for both junior and senior posts supported by the IDEX.
To achieve this, on the one hand "IDEX Chairs of Excellence" will be created, and on the other, the University of Grenoble-Alpes will help in the recruitment of researchers by partner institutions in order to develop a breeding-ground of staff of high potential. The EPCS will also lend assistance in the international recruitment of high-level students, in particular of Ph.D. students.
At the end of the first four-year period it is expected that the EPCS will coordinate and approve all the job profiles proposed by partners in the excellence perimeter.

The most important sentence of this paragraph is of course the last one. Here is the unambiguous affirmation of our commitment to lead a truly common recruitment policy. Because the achievement of such an integration will require several years, we present it as a goal to reach within 4 years. With the decisions that we will take together about the Chairs of the IDEX and on the jobs of the partner institutions that will accompany these chairs, we will test the efficacy of this sharing process. A sharing that will increase during the 4-year period, the IDEX being our flagship on our way to the finished model of the University of Grenoble-Alpes

4.5 TRAINING

We have considerably changed the Training Part of our document.

We highlight:

Innovative platforms (p. 39):

These platforms are a valuable tool for restructuring the higher education component of the site as part of IDEX and beyond. They are places of effective operational cooperation between universities, selective higher education schools, national research agencies, other European facilities (ESRF, ILL) and industrial partners. The strong commitment of research organizations to developing technological platforms allows them to be fully integrated into the process of training. They provide at various levels, the missions of teaching, research and technology transfer, designed to address social issues with an attractive and excellent common project. The research/training continuum they provide is fully exploited due to the proximity between teams, the convergence between research and education teams and the clustering and pooling of resources (equipment and human resources in particular), which allow cross expertise.

With a special focus on a Platform to be created for Mountain Studies (p. 41):

The platform in mountain studies, basically provided by the Institute in Mountain Studies in Chambéry, will be built around three specific units:
(i) Field logistics unit to oversee accommodation and transport in relation to the fieldwork educational activities. This includes having a network of suitable housing to be used for theme-based schools or limited-term intensive courses with a strong fieldwork associated with classroom teaching...
(ii) Special test sites on which specific instrumentation for educational purposes will be maintained. The data thus collected could enable the practical teaching of real time or delayed data processing...

(iii) *A measurement and knowledge storage and enhancement unit, with the necessary equipment to store and archive teaching resources, including audiovisual techniques to allow linkages for teaching purposes between the classroom and the mountain experimental locations. A close link should be set up between this cell and the technical resource center: Mountain@Doc of the Institute for Mountain Studies in Chambéry*

The Centre for Educational Innovation and Teaching Quality (p. 42):

The tasks of the Centre will be:

- *to provide support for online lectures, including for foreign audiences (therefore multilingual),*
- *to develop a common podcast platform,*
- *to support and train teachers for their teaching scenarios for implementation on a Learning Management System (LMS),*
- *to train staff in the use of virtual classroom tools, dissemination of knowledge and social networks, and their animation,*
- *to favour the diversification of our training offer in English,*
- *to develop new distance courses in French as a Foreign Language for students who plan to come and study in France,*
- *to train teachers in online tutoring,*
- *...*

We will also concentrate on the enhancement of the attractiveness of training courses and the employability of students. For this will we will develop (or create):

- Bridges between universities and “grandes écoles”
- “Junior laboratories”, that is giving the opportunity to our students to solve small industrial or societal problems and/or to disseminate scientific expertise towards various socioeconomic stakeholders
- Interdisciplinary weeks (p. 44):

We plan to organize dedicated training weeks at a university-wide scale, for typically one/two weeks at the beginning of each semester, offering high level courses on specific topics. These joint training periods will deliberately seek to bring together students coming from the fundamental and experimental sciences with students from the humanities and social sciences.

- “Hybrid schools”, mixing courses usually taught in various “grandes écoles” or universities
- An Observatory of Professions and Skills
- The internationalization of our courses.

4.6 THE LINK BETWEEN UNIVERSITIES AND SCHOOLS “GRANDES ÉCOLES”

We insist on the decompartmentalization of our training courses. For example (p. 43):

We propose a better integration of the training courses in the universities and in the engineering schools, although many masters training courses are already jointly accredited between the different academic partners of the alpine corridor. The idea is twofold. First, systematically open university diplomas to engineering students, such as Master programs coupled with a training period dedicated to a research project, either in industry or in an academic research laboratory. Second, offer the possibility to students having started a university Master to spend a part of their

curriculum in an engineering school. These two kinds of possibilities should be publicized among the partners of the site and their efficiency would be evaluated by the IDEX board. They could be included in different formal conventions that universities and the schools would sign together.

Such initiatives must bring these schools and universities closer together. They will also allow greater inclusion of social sciences in the scientific program (and vice versa).

In the previous version of our dossier, we proposed an administrative merger of the four universities. This merger had the advantage of simplifying our institutional landscape, but, even if it was open to all academic partners, it could give the impression that the links between universities and schools (including INP) would be weakened. That is why, in addition to insisting on the educational bridge-building, we decided not to consider the merger of the 4 as a necessary step in our progress towards the one university. The decision was taken to work directly on a finished model integrating the 14 partners and taking into account the present existence of eight higher education institutions. This vision will ultimately lead to the reorganization of existing units into the future “Institutes” of the University of Grenoble-Alpes. It rejects the idea that there is an insurmountable barrier between universities and schools. The emphasis put on transversal project centres is consistent with this idea.

4.7 INTERNATIONAL RELATIONS

A part about International Relations has been added. It states that (p. 77):

The effective integration of international perspectives will be a core characteristic of our university. In line with our objective to be one of the top universities of world renown, all international links and partnerships should be specifically aimed at positioning the University of Grenoble-Alpes as a knowledge and education provider of the highest quality.

A list of key points of our international strategy has been introduced. It is supplemented by a list of performance indicators.

4.8 OUR ROADMAP

The public institution (EPCS) that we will create in the spring of 2012 will be the tool for our transformation into the final model of our university.

We have specified, year after year, the steps that will enable us to reach in 2016 the final adoption of the finished model.

This roadmap is presented in the “additional document” (p. 10).

It has been designed to allow an appropriate and informed choice on the finished model in 2016, thanks to the gradual integration of our research and our training programs.

4.9 OUR VISION OF THE “FINISHED MODEL” OF OUR UNIVERSITY

We have clarified the outline of the final model of our university (for instance, in the executive summary p. 17):

*We are fully committed to putting in place a new institution of higher education and of research: a SINGLE UNIVERSITY.
The work is already underway for the definition of the “finished product” for this new institution. Planned for the period 2012-2015, it will bring together the*

whole of the university community and its partners. A decision on the finalized model will be taken in 2016.

The organization of our future university will meet the best international standards. It will be divided into institutional structures (which will eventually be called “institutes” together with local branches of national organizations) and also into “project centres”.

The institutes will result from the reconfiguration of existing establishments of higher education, the objective being to achieve the most comprehensible and effective unitary divisions possible. The perimeter of institutes will be defined in the next three years. The reconfiguration will be facilitated by the increasing general awareness in the University of Grenoble-Alpes of the mutualization of resources and the sharing of skills. The statutes of these institutes will ensure significant autonomy allowing a high reactivity. The articulation of their governance with central management of the University of Grenoble-Alpes will be subject to special attention. Their integration into the new university is an effective guarantee of our strategy for the Grenoble site.

The project centres will also be essential elements in the re-organization (for example, Centres of excellence in micro-nano-technologies: Minatec; in computer software: PILSI; in biotechnologies: Nanobio; in innovation sciences: G2i, etc). These centres, cutting across institutional structures, have greatly contributed to Grenoble’s success story. We shall continue our investment in those which already exist, and further pursue this path by helping to develop new inter-institute centres.

The matrix “structures x centres” will reinforce our university by breaking down institutional structures at the same time as reinforcing the links between them. This will facilitate the optimal management of our activities in education, research and technology transfer.

5 DETAILED DESCRIPTION OF THE PROJECT – SELECTION PHASE

5.1 AMBITION AND STRATEGY OF THE PROJECT: THE UNIVERSITY OF GRENOBLE-ALPES IN THE EUROPEAN TOP10

The *Grenoble-Alps University of Innovation (GUI+) Excellence Initiative* has set a goal of making Grenoble a global point of reference in the areas of higher education, research, and innovation, focusing its strengths on a limited number of actions of excellence that aim to address major societal issues. Above and beyond its academic qualities and contribution to knowledge developments, it demands to be evaluated based on the comprehensive reality of its contribution to society. GUI+ thus exhibits the ambition of a socially-oriented university that is fully aware of its responsibilities. Its territory (the so-called “Alpine corridor”), the heart of which is the Grenoble metropolis, stretches from Valence to the Swiss and Italian borders by way of the Pays de Savoie. It asserts that the diversity of the key players that it brings together is a key advantage of its success.

GUI+ is a group of 14 partners in the area of research and higher education, four universities, four schools and groupings of schools, five national research bodies and the Grenoble university hospital. These 14 partners display their unity through:

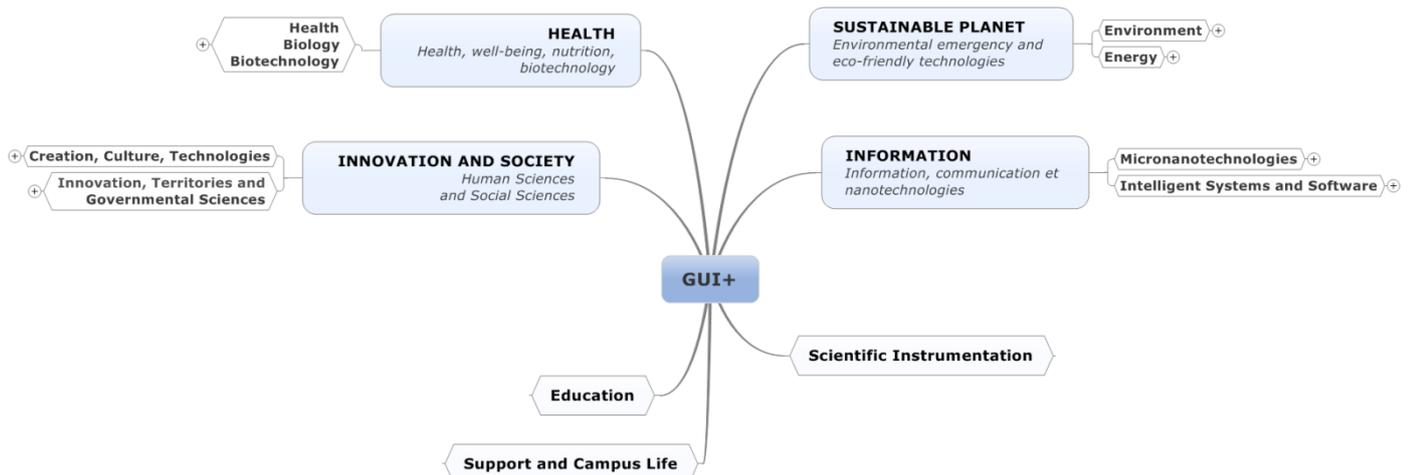
- joint backing of the project,
- the commitments that each partner makes regarding funding for the project,
- the setting-up of a public institution (“établissement public de coopération scientifique”, EPCS), a tool serving their alliance,
- The formal commitment of all partners to drive the changes necessary to create a unique university, finished form of the University of Grenoble-Alpes”.

Our excellence benefits societal issues

The comprehensive strategy of the Grenoble site was implemented in 2008 during the call for proposals for the *Opération Campus*, for which *Grenoble University of Innovation (GUI)* was one of the winners. The planned constructions are now beginning to come to fruition. Our real estate landscape is modeled on our strategy. Our current response is logically consistent with the established GUI approach.

GUI+ is thus, at once, a continuation and a deepening of the GUI vision and is structured around societal issues that have already been defined and will now become our “Priorities of Excellence”:

- **Innovation and society**
- **Information**
- **Sustainable planet**
- **Health**



They are backed by our academic excellence and focus on the disciplines for which Grenoble has already achieved a remarkable level of visibility.

Excellence, in the sense of the word that we are using with regard to GUI+, is thus not a “current condition”. It is a project whose development is ongoing, or multiple projects if we consider our four *Priorities*. It is also the project of a campus better able to meet the expectations of our students and researchers thanks to our “campus life” actions.

Emergence fuels our excellence

The very idea of excellence as a project suggests its renewal. If there is an aim to improve excellence even further, in order to systematically achieve world-class quality, it must also be devoted to its role in on-site training. The eventual objective is to expand our scope of excellence in both research and training at a measured pace and in proportions that do not dilute this excellence excessively.

This is why we have carved out a relatively small “perimeter of emergence” within GUI+ around the initial perimeter of excellence. We have determined the ambition of the emergence projects to be recognized as excellence projects within ten years. To prevent dilution, we have chosen only a relatively small number of projects of emergence, and we have defined them as natural extensions of our excellence. The structure of our governance will ensure an integrative, evolving vision of “excellence-emergence”. The central governing authority will monitor the overall dynamic balance, especially ensuring that the share of the means of the IDEX that is earmarked for the perimeter of excellence never falls below 80%.

This excellence-emergence combination allows for a medium- and long-term vision of a comprehensive dynamic of the site, where aspects currently outside our perimeter of excellence could fuel its emergence while, moreover, establishing the principle that, if a project that emerged when the IDEX was launched has not demonstrated its ability to reach the first level of excellence, then it should be discarded.

Our excellence is governed

Our governance has been designed to facilitate the swift ascent to excellence and our institutional transformation. For us, this means implementing simple, effective, close-knit structures that allow for quick, sure decision-making and shrewd management of our projects. It follows an upward axis from the laboratories up towards the Managing Board, and a strategic axis descending from the Board down towards the researcher.

The commitment made by the 14 partners is evident in the creation of a new public institution. This “EPCS” will be awarded an endowment in capital; it will manage our excellence and ensure the distribution of means. It will be the tool of our alliance toward the University of Grenoble-Alpes.

Our Initiative d’Excellence is consistent with the entire “investissements d’avenir” scheme backed at Grenoble

Other than the IDEX file, the scientific community at Grenoble has responded to a number of calls for proposals within the general context of “*Investissement d’Avenir*”.

Our first nine successful facilities of excellence (Equipex), as well as those which will be successful in the Equipex2 call for proposal, will help us to accomplish our objectives by upgrading our facilities to the top international standard. They will be coordinated by the new institution.

Eight Labex projects from Grenoble have been successful in the Labex1 call for proposals. They are pillars of our strategy and occupy a space within the scope of the strategy of the University of Grenoble-Alpes. Other Labex have been submitted to the Labex2 call. Funding for all those files that are ultimately selected will be contributed by our new institution.

The MINAMED IHU project (technologically targeted micro-nanomedicine) has not been selected by the IHU jury. We have decided to keep only the core of this project in our strategy.

Nanosciences and nanotechnologies lie at the crux of the Grenoble ecosystem. Our IDEX project takes part in their development with a focus on “Micronanotechnologies”. Our IRT “nanoelectronics” (ranked first among successful IRT’s) is a technological project with an economic bent that aims to develop partnership R&D activities while asserting our global leadership in the area.

The solid interactions that we will establish inside the University of Grenoble-Alpes will serve as evidence of Grenoble's success.

Our excellence is within the context of a regional synergy

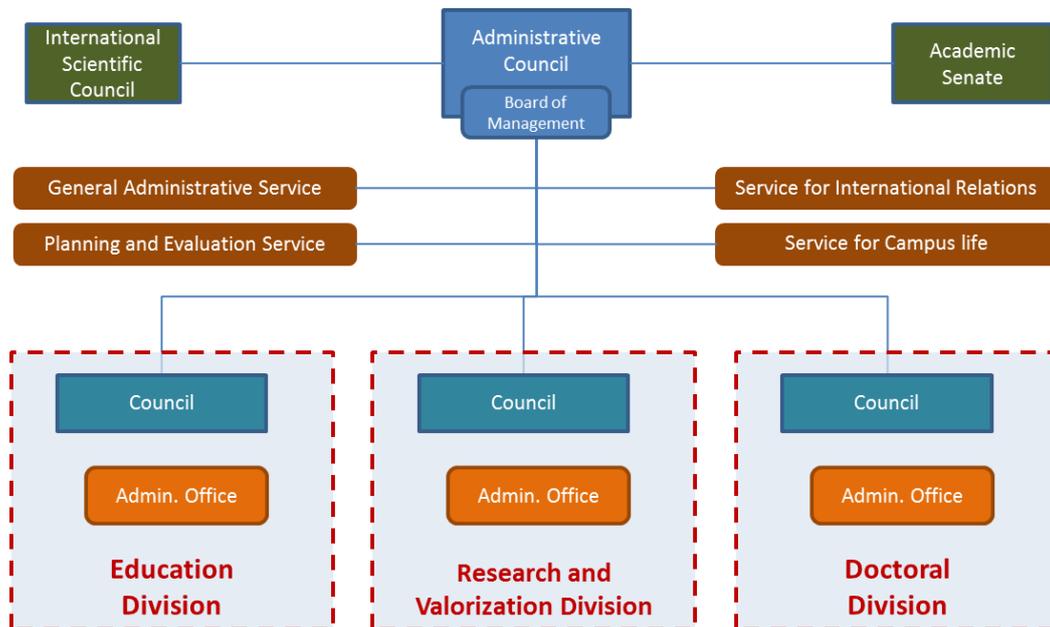
Local authorities (region, departments, towns and cities) have always supported our scientific and academic development at an exceptional level. At a national scale, the Rhône-Alpes region came in second, just after the Paris metropolitan area, in terms of academic, scientific, economic (and demographic) dynamics. It is also a great European region for innovation, and recognized as such, which is home to two leading French university sites: Lyon/Saint-Étienne and Grenoble/Savoie. The fact that there are two clusters serves as an opportunity for the region as a whole and for each of the two university clusters. It justifies the fact that each of the metropolitan sites has lodged IDEX files and many *Investissements d’avenir* projects (as the academic potential is considerable in both cases) and that we have made an effort not to turn this dual-cluster area, which has stimulated a sense of mutual emulation, into a rivalry. Our project has been constructed with the full understanding of our colleagues at Lyon as we aim for synergies and seek a comprehensive dynamic that will benefit the Region.

The SATT that we are building together is a typical example of this spirit of regional cooperation.

Our excellence seeks to establish an enhanced international visibility

Thanks to the quality of research being conducted over a number of years, Grenoble has a significant visibility resulting in particular in our presence in major international rankings. The scientific university of Grenoble (UJF) is ranked in the TOP200 Shanghai rankings (the sixth French higher education institution, the second outside Paris). It is abundantly clear however that Grenoble’s position in the world’s rankings would be considerably higher if all our results and our overall performance, in training as in research and innovation, were effectively and adequately taken into account. It is precisely in order to achieve such integration, which is a *sine qua non* for major international recognition, that we wish to move forward towards one large, very well coordinated, institution. The success of GUI+ will enable us to achieve a quantitative and qualitative step forward towards this ultimate goal and help us to further improve our position by making Grenoble one of the most recognized European universities. Such recognition will promote, as much as it will be promoted through, an ambitious welcoming policy towards foreign students and researchers. It will also be enhanced by our participation in all the major European calls for proposals.

Our excellence drives our transformation



As presented in the executive summary and in the additional document, we are now able to describe precisely our choices for the forthcoming structuration of the Grenoble region scientific landscape:

Once the IDEX is awarded, we shall immediately set up a new institution. This will be the forerunner of the “finished model” of the University of Grenoble-Alpes. The finished model of the single University will be finalized in 2016.

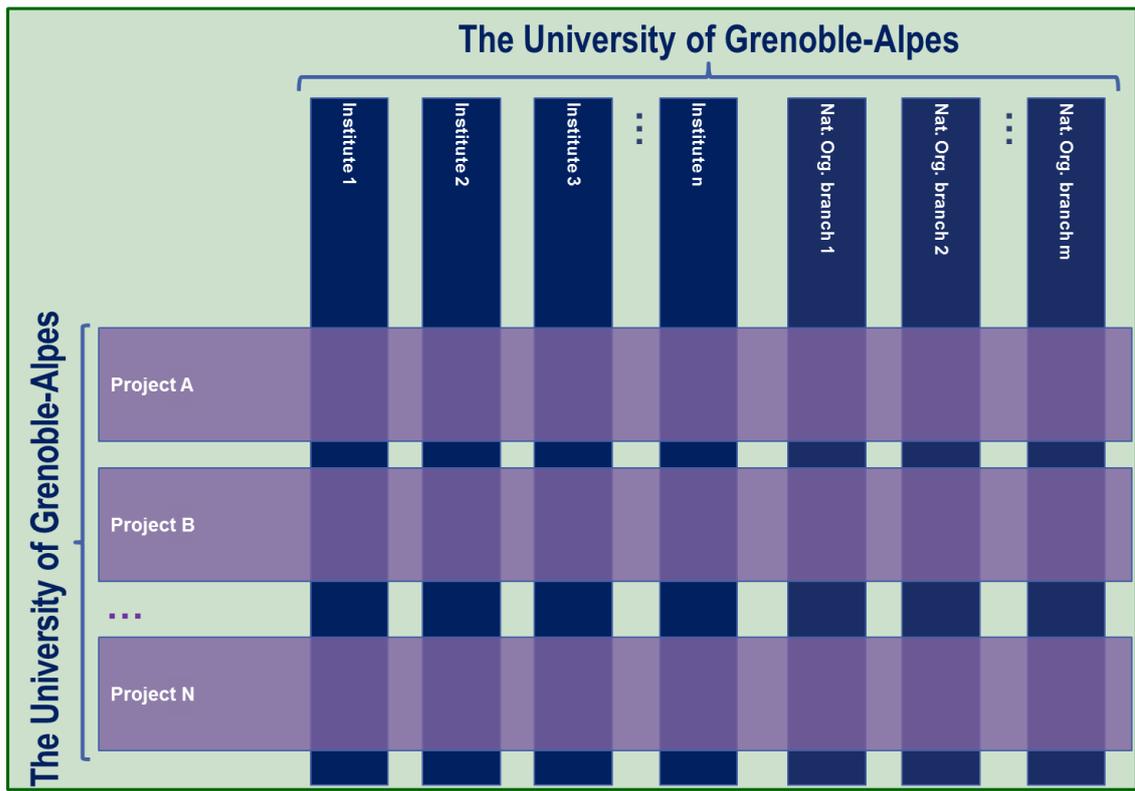
The new institution created in 2012 will be responsible for the *Initiative d'excellence* and will coordinate our commitment to the *Investissements d'Avenir*. It will concentrate its resources on our perimeter of excellence. Its strategy will be a global one. As well as the IDEX (and its funding), it will be the coordinating framework in which the planning strategies of each of its participating components will develop their plans. This will take concrete form in one action plan put in place with the support and funding of each of the participating components, and with the extra funding obtained thanks to the *Investissements d'Avenir*: IDEX, IRT, Labex, Equipex, etc.

A new institution serving as a precursor

Our overriding endeavour to create the University of Grenoble-Alpes is testified by the creation of a new public institution, intended as a necessary step towards the achievement of the final goal. And this university which will serve to carry the project forward, is an institution with a carefully constructed and tightly-knit governance, basing its policy choices on a high-level International Scientific Council and on a Senate representing the major academic disciplinary communities. The new institution's Board of Management will be aided in its managerial role by a Planning and Evaluation Service and by a general administrative service.

The University of Grenoble-Alpes: the “finished product”

And yet this “first” University of Grenoble-Alpes represents only a transitory stage towards a more fully integrated “finished model”. Our objective is the creation of a single University of Grenoble. Its finalized organization will be modelled on the very best international criteria. It will cover both institutional structures (which will eventually be called “institutes”, together with local branches of national organizations) as well as “project centres”. Its governance will take account of these two elements.



The *institutes* will result from the reconfiguration of existing establishments of higher education, the objective being to achieve the most comprehensible and effective unitary divisions possible. The perimeter of institutes will be defined in the next three years. The reconfiguration will be facilitated by the increasing general awareness in the University of Grenoble-Alpes of the mutualization of resources and the sharing of skills. The statutes of these *institutes* will ensure significant autonomy allowing a high reactivity. The articulation of their governance with central management of the University of Grenoble-Alpes will be subject to special attention. Their integration into the new university is an effective guarantee of our strategy for the Grenoble site.

The *project centres* will also be essential elements in the re-organization (for example, Centre of excellence in micro-nano-technologies: Minatec; in computer software: PILSI; in biotechnologies: Nanobio; in innovation sciences: G2i, etc). These *centres*, cutting across institutional structures, have greatly contributed to Grenoble’s success story. We shall continue our investment in those which already exist, and further pursue this path by helping to develop new inter-institute *centres*.

The matrix “*structures x centres*” will reinforce our university by breaking down institutional structures at the same time as reinforcing the links between them. This will facilitate the optimal management of our activities in education, research and technology transfer.

Our ambitions and our confident anticipation of the successive stages in our transformation (starting immediately with the setting up of the new public institution; then in four years’ time, with the mutualization of resources and transfer of spheres of activity; and then finally with the “finished product” of a single University) give us the confidence to affirm with optimism that our common identity will grow steadily in the years to come and that the feeling of belonging to one common university will take hold and be the subject of pride among both staff and students. Our distinctive character will have progressively emerged and taken on its full meaning. This does not imply a lessening of diversity, but rather its true appreciation through shared identities (“The Grenoble-Alpes University Institute of.....” and “The Grenoble-Alpes University Project for”). This recognition of diversity will be part and parcel of our desire to build a common future.

5.2 STRUCTURE AND CHARACTERIZATION OF THE INITIATIVE OF EXCELLENCE

5.2.1 PRESENTATION OF THE PROJECT LEADER

This is a major strategic choice being made by the whole collective to implement this project not only with a portion of its members but rather through a committee bringing together its 14 founding members.

The participating group is therefore made up of:

8 higher education institutions

- Université Joseph Fourier (UJF): Sciences, Health and Technology. Students: 17,500; staff: 3,000.
- Université Pierre Mendès-France (UPMF): Human and Social Sciences. Students : 17,000 ; staff: 1,800
- Université Stendhal: Letters, Languages, Arts, Communication. Students : 6,000 ; staff : 570
- Université de Savoie (UdS): Multi-disciplinary (not including Health). Students : 12,000 ; staff : 1,250
- Grenoble INP: Engineering Sciences. Students : 4,600 ; staff : 1,550
- Institut d'études politiques de Grenoble (IEP), Social and Political Sciences. Students: 1,500; staff: 200.
- Grenoble Ecole de Management (GEM): Business and Management. Students : 5,500 ; staff : 340
- Ecole Nationale Supérieure d'Architecture de Grenoble (ENSAG). Students: 1,000 ; staff : 130

5 national research institutes

- CEA, Commissariat à l'énergie atomique et aux énergies alternatives, staff in Grenoble: 4 000
- CNRS, Centre national de la recherche scientifique, staff in Grenoble: 2 150
- CEMAGREF, Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture (*will be renamed Irstea in 2012*), staff in Grenoble:160
- INRIA, Institut national de recherche en informatique et en automatique, staff in Grenoble: 650
- INSERM, Institut national de la santé et de la recherche médicale, staff in Grenoble: 161

The university hospital centre

- CHU de Grenoble. Physicians: 1,750; non-medical staff: 5,750.

This group of project owners is a foreshadowing of the future establishment being designed to take in the capital endowment and steer our activities. It will take on the status of an EPCS (*Etablissement public de coopération scientifique*).

5.2.2 APPLICATION TO THE ACTIONS OF THE PROGRAM “INVESTISSEMENTS D’AVENIR”

1) Selected Labex

Project	Field	Project manager	Project leader	Implicated partnership
AE&CC	SHS	Thierry Joffroy	ENSAG	ENSAG
AMIES	SIMI	Georges-Henri. Cottet	CNRS	CNRS, INRIA, UG, UJF, Grenoble INP
CEMAM	SIMI	Yves Brechet	Grenoble INP	Grenoble INP, CNRS, EDF, ALCAN, ARCELOR MITTAL, ONERA, RECUPYL
GRAL	SVSE	Rob Ruigrok	Univ. Grenoble	UG, UJF, CEA, LyonBiopôle, RTRA Finovi, Fondation Nanosciences
ITEM	SHS	René Favier	Univ. Grenoble	UG, UJF, UPMF, U. Savoie, IEP, CNRS, Cemagref, Pôle Grenoblois Risques Naturels, Institut de la montagne de Chambéry, Université de St Etienne
LANEF	SIMI	Joël Cibert	Univ. Grenoble	UG, UJF, Grenoble-INP, CNRS, CEA, Alstom, Areva, Bruker, EADS, EDF, FEI, NEXANS, PSA, Renault, Saint Gobain, Schneider Electric, StMicroelectronics, Soitec, Thales, Matelor, ArcelorMittal, Horiba Jobin-Yvon, Hitachi, Toyota, Absolute systems, ACERDE, CEDRAT,CETARAM, Crocus, Cryoconcept, Cyberstar, IRELEC, McPHY, SPEDI, STMS
MINOS	SIMI	Olivier Joubert	Univ. Grenoble	UG, UJF, Grenoble-INP, CEA, CNRS, STMmicro, Soitec
OSUG@2020	SIMI	Henri-Claude Nataf	Univ. Grenoble	UG, UJF, CNRS, Pôle Alpin des risques naturels, Envihônalp, CEMAGREF

2) Other Labex presented in the IDEX project, submitted to the 2nd Labex call

Project	Field	Project manager	Project leader	Implicated partnership
BCI4HANDI	SIMI	Alim-Louis Benabid	CEA	CHUG, UJF, INSERM
TAMIS	SIMI	Natalio Mingo	CEA	UJF, INP
GANEX	SIMI	James Roudet	CNRS	CEA, UJF, INP
C'Nano Net	SIMI	Ariel Levenson	CNRS	OMNT, GIP-CNFM, LNE, CEA
Imagerie ultime	SIMI	Christian Vettier	ESRF	ILL, CNRS, CEA, UJF, IRAM
AMPEL	SIMI	Andrew Harrison	ILL	ESRF, CEA, CNRS, UJF, INP
ARCANE	SVSE	Eric Saint-Aman	Univ. Grenoble	UJF, CNRS, CEA
CAMI	SVSE	Philippe Cinquin	Univ. Grenoble	Sorbonne Universités, Université Européenne de Bretagne, Université Montpellier Sud de France, Université de Strasbourg, CNRS, INSERM, Institut télécom
ENIGMASS	SIMI	Yannis Karyotakis	Univ. Grenoble	UJF, U. Savoie, INP, CNRS, CEA
FOCUS	SVSE	Pierre Kern	Univ. Grenoble	UJF, INP, U. Savoie, CEA, CNRS, Université Paris-Diderot, Université de Provence, MPG, IGN
ISIS	SHS	Isabelle Pailliant	Univ. Grenoble	U. Stendhal, UPMF, U. Savoie, UJF, INP, CNRS, Université Lumière, ENS Lyon
PACE	SVSE	Marc Block	Univ. Grenoble	UJF, INSERM, CNRS
PERSYVAL	SIMI	Marie-Christine Rousset	Univ. Grenoble	UJF, INP, CEA, CNRS, INRIA
SGLab	SIMI	Nouredine Hadjsaid	Univ. Grenoble	INP, UJF, CNRS, CEA, UPMF, Ecole Polytechnique
TECXXI	SIMI	Alain Cartellier	Univ. Grenoble	UJF, INP, CNRS, Cemagref

3) Innovative Training projects to be submitted to the Idefi call for proposals

Project	Project manager	Project leader	Implicated partnership
H-School	Jean-François Fiorina	INP	GEM, IEP
Greap2020	Marie-Paule Balicco	Univ Grenoble	(tbc)
Apprentissage des langues	Monica Masperi	U. Stendhal	(tbc)
CUFVIS	Jean-Paul Romanet	UJF	(tbc)
ENEPS	Pierre Billet	UJF	(tbc)
OPERA	Daniel Beauchêne	U. de Savoie	UJF, UPMF, Stendhal (tbc)
Observatoire des formations	Pascal Mouille	U. de Savoie	UJF, UPMF, Stendhal

4) Selected Investissements d'avenir projects related to the perimeter of Excellence (apart from Labex)

AAP	Project	Field	Project manager	Project leader	implicated partnership
Cohortes	CRYOSTEM	SVSE	R. Peffault De Latour	SFGM-TC	Sté française de greffe de moelle et de thérapie cellulaire, CRB CHU Angers, CRB CHU Dijon, CRB CHU Lille, CHU Lyon, CRB IPC, CRB CHU Nantes, CRB Henri Mondor, CRB AP-HP, HIMIP, CRB CHRU Tours, CRB Rennes, CRB CHU Clermont-Ferrand
Cohortes	OFSEP	SVSE	Christian Confavreux	UCB	Hospices civils de Lyon, INSERM
Cohortes	PSY-COH	SVSE	Marion Leboyer	FondaMental	
Equipex	ECOX	SIMI	Alain Manceau	UJF	CNRS
Equipex	EQUIP@MESO	SIMI	Catherine Rivière	GENCI	UJF, CEA, INRA, CEMAGREF, Ifremer
Equipex	FD SOI	SIMI	Olivier Faynot	CEA	
Equipex	IMPACT	SIMI	Olivier Joubert	UJF	CEA
Equipex	LASUP	SIMI	Geert Rikken	UJF	CNRS
Equipex	NanoID	SIMI	François Tardif	CEA	Université de Marseille, ANSES, INERIS, UJF
Equipex	NOEMA	SIMI	Pierre Cox	CNRS	UJF, Max-Planck, IGN-Espana
Equipex	ROBOTEX	SIMI	Michel de Mathelin	CNRS	Grenoble-INP, UJF, U. Toulouse 1 et 3, U. Lille 1 et 2, Télécoms ParisTech, UTT, U. Nice Sophia Antipolis, INRIA
Equipex	ThomX	SIMI	Alessandro Variola	U. Paris Sud	UJF, SOLEIL, CNRS, ESRF, Thales E.D.
Infr. en bio. et santé	Biobanques	SVSE	Dominique Pella	INSERM	
Infr. en bio. et santé	FRISBI	SVSE	Bruno Klaholz	CNRS	UJF, CEA, EMBL

AAP	Project	Field	Project manager	Project leader	implicated partnership
Infr. en bio. et santé	PROFI	SVSE	Jérôme Garin	CNRS	IPBS
IRT	Nano-électronique	SIMI	Stéphane Siebert	Minalogic	UJF, Grenoble-INP, CEA, CNRS, GEM, ESRF, ILL, EMBL, STMicroelectronics, ST Ericsson, Soitec, Bull, Mentor Graphics, Cadence, Synopsis, ARM, Photonis, Presto engineering, Ulis
Nanobiotechnologies	BITUM	SVSE	Patrick Boisseau	CEA	IAB, SuperSonic Imagine, Laboratoire SERB, U. Bordeaux
Nanobiotechnologies	IBFC	SIMI	Donald Martin	UJF	INP, CEA, CNRS

5) Investissements d'avenir projects related to the perimeter of excellence (apart from Labex and Idefi) submitted or likely to be submitted

AAP	Project	Field	Project manager	Project leader	implicated partnership
Equipex2	CAPCOP	SIMI	Sébastien Dubois	CEA	INL (Insa Lyon), Université de Marseille, Supelec
Equipex2	CLINATEC	SVSE	Alim-Louis Benabid	CEA	CHUG, UJF, XVI/XX, CHU Strasbourg, INSERM
Equipex2	DURASOL	SVSE	Philippe Malbranche	CEA	Insa Lyon, Université de Corse, Université de Marseille, Université de Clermont-Ferrand), PIMENT (La Réunion), EDF R&D
Equipex2	GENEPI	SIMI	Jean-Marie Seiler	CEA	CIRAD, ARMINES
IEED 2	INES2	SIMI	Jean-Pierre Joly	CEA	CNRS, CSTB, Université de Savoie, autres sites dédiés au solaire : Bordeaux, Strasbourg, Marseille, Corse, Cadarache (Megasol), plus de 100 partenaires industriels PME/ETI
Equipex2	AMALIA	SIMI	Geert Rikken	CNRS	INP, UJF, CEA, CNES
Equipex2	CollosEcris	SIMI	Thierry Lamy	CNRS	UJF, INP, CEA, UCBL
Equipex2	CRITEX	SVSE	Jean Riotte	CNRS	UJF, Cemagref, INP, BRGM, U. Montpellier, U. Strasbourg, U. Toulouse, UPMC, CNRS, INRA, IRD, ENS, AgroParisTech, Université Paris-Est, SUPAgro Montpellier, U. Franche Comté
Equipex2	DOMUS	SIMI	Fabrice Piquemal	CNRS	UdS, UJF, CEA
Infr. en bio. et santé 2	OPENSREEN	SVSE	CNRS	CNRS	UJF, CHUG, INSERM, EFS
Equipex2	Resif-core	SVSE	Helle Pederson	CNRS	UJF, INP, IRD, U. Savoie, IFSTTAR, IPGP, U. Strasbourg, U. Nice-Sophia Antipolis, UPMC, CNES, U. Montpellier, U. Nantes, U. Clermont-ferrand, U. Toulouse
Equipex2	SELF-BRICKS	SVSE	Redouane Borsali	CNRS	UJF, INP, CTP
Equipex2	GEI SHS	SHS	Bernard Denni	IEP	UJF, UPMF, Sciences Po Paris ; Sciences Po et Université de Bordeaux, ENS, EHES, Université de Paris 4, Universités de Lille 1 et Lille 2, EPSCP, CNRS
Equipex2	IMAGEN	SIMI	Juan Rodriguez	ILL	CEA, UJF, CETIM
Equipex2	AMIQUAL4HOME	SIMI	James Crowley	INP	UPMF
Equipex2	HYDRALP	SVSE	Joël Sommeria	INP	UJF, CNRS, Cemagref, CNRM (Météo-France Toulouse), Sogreah
Equipex2	PHANATEM	SIMI	Edgar Rauch	INP	UJF, CNRS, CEA
Equipex2	SPEDI	SIMI	Y. Bessanger	INP	CEA, EDF, Schneider Electric
Equipex2	KINOVIS	SIMI	Edmond Boyer	INRIA	UJF, CHUG
Plates-formes mutualisés d'innovation	Pôle écotox	SVSE	Bruno Combourieu	Rovaltain	UJF, UCB Lyon1, Grenoble INP, INSA Lyon, Pôles de compétitivité (Axelera, Trimatec, Minalogic, Plastipolis, Pass, Cosmetic Valley)
Equipex2	CEMBRO	SVSE	Laurent Charlet	U. de Savoie	UJF, CEMAGREF, CNRS
Equipex2	HOME	SIMI	Yannis Karyotakis	U. de Savoie	UJF, CNRS, CEA
Equipex2	MEMBAS	SIMI	Gilles Fraisse	U. de Savoie	Université de Poitiers, ENSMA, CNRS, CSTB
Equipex2	ASTRYO	SIMI	Alain Benoit	UJF	CNRS, CEA
Equipex2	CLEFS	SIMI	Henri Mariette	UJF	CEA, CNRS
Equipex2	EXSTASE 2	SVSE	Serge Aubert	UJF	CNRS, U. Paris XI, EPHE, Newsteo, Adison, Force-A, Majantys
Equipex2	IPICAMI	SVSE	Ivan Bricault	UJF	UJF, CHUG
Equipex2	ISOSPOT	SVSE	Catherine Chauvel	UJF	CNRS, U. Savoie, IRD, IFSTTAR
Equipex2	OI@Grenoble	SIMI	Jean-Luc Coll	UJF	CNRS, INSERM, Floralis
Equipex2	SPINAMAP	SIMI	Jean-Pierre Nozières	UJF	CNRS, CEA
Infr. en bio et santé 2	SYNBIOL	SVSE	Pascal Dumy	UJF	CNRS, universités de Montpellier I et II, Bordeaux II, Rouen, Nantes, Lyon, Toulouse, Lille I, Bourgogne, Lorraine, CEA, institut Pasteur de Lille et l'INSA
Equipex2	WIZOG	SVSE	Nadège Meunier	UJF	UG (UJF, INP, UdS, UPMF, Stendhal), CNRS, IRD, CEMAGREF, Météo France, IFSTTAR, INRIA
Equipex2	BEDOFIH	SHS	Patrice Fontaine	UPMF	HEC Paris, CNRS

5.2.3 EXCELLENCE PERIMETER, ENVIRONMENT, PROSPECTS AND ADDED VALUE

Excellence in research serves society

Our IDEX project provides a structure for a group of universities and research institutions within its territory with more than 65,000 students (4,000 of which are doctoral candidates) and 7,000 faculties for an annual budget of more than one billion Euros.

Its overall quality is widely recognized. A recent study on the excellence of the top 30 French research sites, conducted on the basis of assessments from the AERES (national agency for the evaluation of research and higher education), ranks the Grenoble site:

- Physics: 2nd
- Sciences and information technology: 2nd
- Mathematics: 3rd
- Earth and universe sciences: 4th
- Social Sciences: 4th
- Chemistry: 7th
- Human Sciences and Humanities: 7th
- Engineering Sciences: 8th
- Biology: 9th
- Agronomical and Ecological Sciences: 14th

Here we are choosing to place a focus on our strongest disciplines (Physics, Computer sciences, Mathematics), our specific expertise in Engineering and Earth Sciences, and our strong points in Biology, Social Sciences and the Humanities, all in the service of a cross-disciplinary approach that seeks to provide answers to great societal issues.

Our *excellence perimeter* therefore will not be implemented in terms of disciplines but rather in terms of four Priorities (Innovation and Society; Health; Sustainable Planet; Information) and cross-disciplinary actions that seek to reinforce our effectiveness and attractiveness, both towards students and researchers.

Priority		Nb of academics in the perimeter
INNOVATION AND SOCIETY <i>Human Sciences and Social Sciences</i>	Creation, Culture, Technologies	100
	Innovation, Territories and Governmental Sciences	200
HEALTH <i>Health, well-being, nutrition, biotechnology</i>	Health / Biology/ Biotechnology	350
SUSTAINABLE PLANET <i>Environmental emergency and eco-friendly technologies</i>	Environment	400
	Energy	700
INFORMATION <i>Information, communication and nanotechnologies</i>	Micronanotechnologies	800
	Intelligent Systems and Software	600
	Scientific Instrumentation	350
	Education	16 000 students

Current excellence in each field will be presented in a more detailed fashion in Part 5.

Excellence in education: training activities in relation with the research excellence perimeter

The objective is to make a focus on flagship education programs participating in the Alpine corridor excellence as a result of their characteristics or of the cross-disciplinary character of their structure.

These educational programs, covering the entire set of our *excellence* perimeter, are characterized by the following criteria: selectivity, attractiveness, international openness (in connection with attractiveness and selectivity), ability to implement innovative educational instruction, usefulness of diploma degrees.

These are implemented at the engineering/Master and doctorate levels through certified or labeled educational programs (Erasmus Mundus, for example); international programs (dual degrees, curriculum with a required semester abroad, curriculum constructed and developed to be geared towards a principally foreign audience, etc.); innovative curricula, whether for beginning or continued instruction; European and international schools; etc.

Courses at the Master's Level

It should be stressed that all courses mentioned here are highly selective, with selection rates running from 5% (engineering courses), 10% (medicine) to 20-40% (Erasmus Mundus and international programs).

“Creation, Culture And Technologies”

- CoMundus: European Master of Arts in Media, Communication and Cultural Studies [7 univ.] –Erasmus Mundus label
- TSM: LEA Master Course in Specialised Multilingual Translation –EMT (European Master's in Translation) of the General Delegation for Translation in Brussels of the European Commission
- Master in “Letters and Languages, Italian Studies and French Studies” (dual degree with Padua)
- Master in “French, Foreign and Comparative Literature” (dual degree with Turin and Vercelli)
- UNESCO international Chair in Communications.

“Innovation, Territories and Governmental sciences”

- Programs for engineers: Product Engineering; Supply Chain Engineering (Industrial Engineering)
- Mundus Urbano: Interdisciplinary Erasmus Mundus Master Course in International Cooperation and Urban Development (5 universities throughout the world) –Erasmus Mundus label
- Interreg Franco-Suisse “Tourism Innovation” (3 institutions)
- European Master' Course in “Management of Tourism” (7 European institutions)
- Master Course in “International Hospitality Management and Marketing” (partnership with London and Munich)
- Course in ESTHER: Environment & Space: Transnational History of European Regions –Erasmus Mundus label status being requested (5 European institutions)
- International Master Course in “European Master in Business Administration” (4 European institutions)
- International Master Course in “European Master in Business Studies” (4 European institutions)
- International Master Course in “Public Administration and European Governance” with the University of Konstanz
- Master Course in “Management of Export Areas” (dual degree with Freiberg and Reutlingen)
- Master Course in “Business Economics – International and Logistics Management” (dual degree with Freiberg)
- UNESCO international Chair in architecture

“Health/Biology/Biotechnologies”

- A medical training of excellence at Grenoble
- More than 5,000 students registered in the medical and pharmaceutical curricula. A comparative assessment of the quality of the educational programs of all departments of medicine across France, as based upon the “examen classant national” [national qualifying examination] makes it possible to acknowledge that students from Grenoble are particularly high ranked in this examination each year. Likewise ranked as the 5th highest ranked faculty in France out of 32, according to the AERES [Research and Higher Education Evaluation Agency].
- Numerous foreign doctors (150 per year) come to Grenoble to acquire their specialization.
- BHC: Bio Health Computing (biohealth-computing.org) [5 univ.] –Erasmus Mundus label, to be inaugurated in September 2011
- A Specialized Master Course in Biotechnology Business Management (Advanced Master for Management in Biotechnology)
- Programs for engineers: Systems and Microsystems for Physics and Biotechnologies.

“Environment”

- Engineering degrees : Paper science, print Media and biomaterials ; materials science and engineering ; Electrochemistry and processes for Energy and the Environment ; Hydraulics, Civil and Environmental Engineering
- International Master « Pulp and paper science »
- International Master Hydraulic Engineering
- MEEES: Masters in Earthquake Engineering and Engineering Seismology [7 univ.] –Erasmus Mundus label
- International Master Course in Geomechanics, Civil Engineering and Risks (16 European institutions)
- Master (Honors) Course in “Earth Science and the Environment,” specialization in “water, climate, environment,” dual degree with the University of Thessaly (Greece)
- International Continued Education program in “Safety and Sustainability in Civil Engineering” (8 European institutions) as part of the “Lifelong Learning Program - Curriculum Development Action Line” of the European Commission

“Energy”

- Programs for engineers: Energy and Nuclear Engineering; Electrochemistry and Processes for Energy and the Environment; Electrical Energy Engineering; Mechanics and Energetics; Energy Systems and Markets.
- MaNuEn (Materials in Science for Nuclear Energy): KIC InnoEnergy label – immersion training in close partnership with EDF, CEA
- Specialized Master Course in “Energy Management and Marketing”
- Master (Honors) Course in “Energy Mechanics and Engineering,” international track in “Environmental Fluid Mechanics”
- Advanced Master Course in Marketing and Management applied to Energy, partnership with Schneider.
- Training platform for Solar Power & Buildings as part of the INES framework (initial training including the fields of Environment-Building-Energy engineering, lifelong learning, training for educators)
- International Master Course in Networks and Intelligent Buildings, Management and Energy Efficiency - ERASMUS Mundus “SENS” (Smart Energy Network System), certification underway

“Micronanotechnologies”

- Programs for engineers: Physics, Nanosciences; Integrated Electronic Systems; Electronics, Computing and Systems.
- EMM NANO: Erasmus Mundus Master of Nanoscience and Nanotechnology (www.emm-nano.org) [4 univ.] – Erasmus Mundus label
- FAME: Functionalized Advanced Materials and Engineering (www.fame-master.com) [7 univ.] –Erasmus Mundus label (cross-disciplinary training that is also implemented in the “Energy” area of activities)
- International Master Course in NANOTECH: Master’s degree in Micro and Nanotechnologies for Integrated Systems – joint degree with EPFL and the Politecnico de Turin

“Intelligent systems and Software”

- International Master Course, MOSIG: Master of Science in Informatics at Grenoble
- Engineering programs: Computer Science and Networks; Engineering for Finance; Embedded Software and Systems; Engineering of Informational Systems; Mathematical Modeling, Images and Simulations; Telecommunications; Signal, Image, Communication, Multimedia; Automation, Systems and Information.
- International Master Course in CSE: Master of Science in Communication Systems Engineering – partnership with Politecnico de Turin
- Master (Honors) Course in “Mathematics and Computer science,” “Computer science,” specialization, dual degree with Galatassaray University

“Scientific instrumentation”

- Engineering programs : Systems and Microsystems for physics and biotechnology
- JUAS: Joint Universities Accelerator School (juas.in2p3.fr) [12 European institutions] – international school proposed for Master’s study, unique in Europe (with the support of the CERN, the ESRF, the IN2P3, and the CEA, among others)
- Master (Honors) Course in “Physics,” specialization in “Subatomic Physics and Astroparticles,” dual degree with Karlsruhe

Training at the Doctoral and Post-Doctoral Levels

The Doctoral College

The doctoral college was created in June 2009, at the time of the setting up of the Research and Higher Education Consortium (PRES) *Université de Grenoble*. The doctoral college brings together our 13 doctoral schools and offers educational programs in research in all of these disciplines, both theoretical and applied. It encompasses close to 4,000 students across 90 doctoral fields. 40% of the doctoral candidates are foreigners.

The Doctoral College offers a unique pedagogical and administrative framework: a unique chart of thesis, unified governance, common administrative management, simplified administrative approaches, harmonization of higher learning offers (cross training programs and job placement).

Completing one's doctorate at the University of Grenoble, one benefits from the scientific excellence of the site (instruction through and while performing research in high level scientific laboratories, high quality instruction given by renowned researchers, exceptional scientific surroundings : national organizations, international facilities (CERN, ESRF, ILL, EMBL, GHMFL, IRAM), library services of the first order, a strong industrial context and a close link with competitiveness clusters (Minalogic, Tenerrdis, ...).

The placement of doctors is facilitated by a training program for professional placement which is a national example in its field (Valoridoc, Doctoriales, entrepreneurship training, language certification, seminars in professional job placement,) and a high excellence centre for upper level teacher initiation (2009 assessment) that are incorporated into the Doctoral College. The School of Management is likewise proposing a doctoral training program: PhD and DBA programs in partnership with Webster (USA), Newcastle (UK) and Tsinghua (China).

Erasmus Mundus doctorates

The Erasmus Mundus doctorate program of the European Commission (Erasmus Mundus Joint Doctorate Program) undeniably constitutes an element of international attractiveness and excellence. The objective of this program is to develop a structured, integrated cooperation in higher education in order to conceive and implement common doctoral programs that contribute to the promotion of innovative models for modernizing doctoral studies. The University of Grenoble is currently involved in two Erasmus Mundus doctorate programs:

- IDS-FunMat - International Doctoral School in Functional Materials for Energy, Information Technology, and Health (www.ids-funmat.org) [8 European institutions + Canada]
- IRAP PhD - International Relativistic Astrophysics Doctoral Program (www.irap-phd.org) [10 European institutions + China, India, Brazil]

European and International Schools

Each year, we organize a large number of international thematic schools that are leaders in their fields. These schools are geared towards a public of doctoral candidates, post-doctorates and junior researchers and train 50 to 100 participants per year, coming from all around the world. The training, provided in English by international experts, allows these young researchers to meet experts and other young scientists working in their fields of specialization and thus access to the forefront of research. The length of the sessions (up to five weeks of classes) promotes an in-depth study.

These schools benefit from the close-by facilities and internationally renowned GUI+ laboratories, as well as Grenoble international research facilities: Institut Laue-Langevin (ILL), European Synchrotron Radiation Facility (ESRF), European Molecular Biology Laboratory (EMBL).

Along the years, Grenoble international thematic schools have built up a great attractiveness, which in return participates to our extremely great draw and international renown:

These schools bear witness to the extremely great draw and international renown of GUI+:

- ALERT: Alliance of Laboratories in Europe for Research and Technology (INPG, EPFL, Politecnico Milano)
- ERCA: European Research Course on Atmospheres

Advanced course in Physics and Chemistry of the Atmosphere, Earth Systems and Climate Change, Atmospheric Pollution on Various Scales and the Human Aspects of Environmental Change.

- ESONN: European School on Nanosciences and Nanotechnologies
Course in Nanosciences and Nanotechnologies applied to Physics, Chemistry and Biology, development and classification of nano-objects, experimental methods and techniques for nano-measurement.
- HERCULES: Higher European Research Course for Users of Large Experimental Systems
Upper level instruction in experimental research in the facilities, such as the synchrotron at the ESRF and the neutron source at the Institut Laue-Langevin, set up in Grenoble.
- MIGAS: International Summer School on Advanced Microelectronics
Summer school conceived to develop and promote expertise in emerging subjects and the forefront of microelectronics by offering a yearly forum of detailed presentations.
- Physics School of Les Houches
The world renowned Physics School of Les Houches has maintained an international attractiveness for nearly 60 years. With a rich history including some of the greatest names in modern physics who trained there as young researchers debuting their careers (including some physicists who would later on receive the Nobel Prize in Physics), the school carries on a tradition of excellence all while adapting to new developments in this science.
- Summer School in Mathematics
Mathematics, analytical geometry, arithmetic geometry, topology, probability, etc.

Technology and know-how transfer

The GUI+ project will take place in the context of an environment deeply marked by a tradition of partnership between research, industry and the local authorities. This tradition is based upon a local culture that is particularly founded on multi-disciplinarity, due to the close proximity of researchers in various disciplines within numerous teams of the IDEX partners, or even their cohabitation. The frequently longstanding ties drawn between these research teams and the region's socioeconomic fabric contribute to the overall high performance of the group in terms of innovation.

The players in our project have available to them particularly indicative results in the area of technology and know-how transfer, as illustrated by internationally recognized indicators such as our intellectual property portfolio (patents and software) and the setting-up of start-up businesses using innovative technologies.

With more than 3,400 groups of patents or software, our site holds the most concentrated local patent portfolio in all of France.

With the creation of more than 120 businesses using innovative technology, of which close to 60% have been awardees in creativity-development from the *Concours National d'Aide à la Création d'Entreprises de Technologies Innovantes* [National Competition to Assist with the Creation of Businesses Using Innovative Technology], our site holds the highest rate in France for fostering innovative, high-potential businesses (having raised more than € 1 million or achieved more than € 1 million in activities prior to the 3 year mark). The list of Grenoble's "success stories" is long: Alpao, Fluoptics, Endocontrol, HC Forum, Equitime, PX Therapeutics, Memscap, Recupyl, H3C, Eveon, Tiempo, Soitec, Crocus technology, Tronics, Ulis, Mc Phy ...

This track record remains wholly unique on a national scale.

Grenoble and the Alpine corridor offer a solid basis in terms of facilities devoted to upholding the economic valorization of research and technology transfer. For several years now, the real world involvement of the group of industrial players in the region has conferred the site with a unique situation in France that has already provided proof of its own effectiveness. The industrial players in Grenoble and the Alpine corridor have demonstrated their ability to work together to make use of this potential for regional valuation.

In concrete terms, the existing resources, such as the GRAVIT mutualized system for technology transfer created in 2006, the GRAIN Grenoble Alps Incubation incubator created in 1999 (regrouped in 2009 as the GRAIN2 Association), the Biopolis business nursery created in 2006, and the PETALE start-up accelerator created in 2007 constitute an operational backbone organizing together the entire group of local players involved in technology transfer (universities, graduate schools, research organizations, facilities, UHCs) and make it possible to take advantage of the local potential for maturation, technology transfer and creating businesses using innovative technologies through close interaction with the internal structures devoted to the technology transfer of these establishments (technology transfer section of the CEA, FIST, Floralis, INPG Entreprise SA, ...). To complete the structure of this complex, a SATT is being assembled in a regional context.

Nevertheless, the existence of this technology transfer local network, born of a desire for the approximation and pooling of the resources of local scientific players, with the support of the local and territorial collectivities and the Consular Chamber, which all acknowledge the fundamental nature of their roles in terms of the creation of value, already make it possible for the site to benefit from a particularly promising track record with the possibility of creating a large number of high potential businesses.

Additionally, this network of resources and the associated members have naturally aligned themselves with the competitiveness centers present on the site (the international or internationally-oriented centers: Minalogic, Lyonbiopole, Axelera and the national centers Imaginove and Tenerrdis), which likewise contribute to make more dynamic their innovations and the transfer of technology, participating in the local ecosystem by bringing forth their special expertise for understanding the needs of businesses and how to connect them with laboratories in order to initiate new R&D projects. From among these enterprises, the start-up companies that have emerged from the laboratories, and often fostered by the GRAIN program, have thus found a natural development circuit for their products and services in partnership with the site's laboratories, thus making up a veritably virtuous cycle of innovation.

Finally, in the area of sciences of the territory and the environment, the transfer of research projects is also highly developed and geared towards political decision makers, the local authorities and socioeconomic forces in the territories. This transfer takes on multiple forms: assistance to project promoters, assessment of policies and programs, definition of indicators and information systems, partnership programs for a more sustainable territorial development, expertise in risk management...

In Part 5, the technology transfer aspects will be addressed within the framework of each scientific priority. In the University of Grenoble-Alpes, technology transfer will be supported by the Research and Valorization Division. It will be coordinate and control the evolution of the different tools supporting the transfer of technology on our territory, in connection with the operation of the Regional SATT.

Partners

Industrial companies, Competitiveness clusters

In order to take advantage of its university environment and exceptional research, a number of world ranking businesses have chosen to set up their research center in or near Grenoble: Schneider Electric, France Telecom, Pechiney, Alstom, Air Liquide and of course the leaders in microelectronics and nanotechnologies : ST Microelectronics, Soitec, ...

The laboratories and universities in Grenoble are involved in the competitiveness clusters mentioned above. We have found it desirable for these industrial businesses to be represented, for the purposes of our governance, by means of these clusters.

Furthermore, ARDI (*Agence Régionale du Développement et de l'Innovation* – Regional Agency for Development and Innovation) will contribute to the ambitions of the GUI+ project on different levels thanks to its vast knowledge of innovating SMBs throughout the region. ARDI assists 1,500 businesses per year by means of the SMB plan, the FEDER PULLTECH+ program and the incubators. It will facilitate our relationships with these regional SMBs.

International facilities in Grenoble

GUI+ benefits from the on-site presence of research centers and international facilities:

- European Synchrotron Radiation Facility - Synchrotron Radiation (ESRF)
- Institut Laue-Langevin High Neutron Flux Reactor (ILL)
- European Molecular Biology Laboratory (EMBL)
- Grenoble High Magnetic Field Laboratory - LCMI (GHMFL)
- IRAM (Institute for Millimetric Radio Astronomy)

The location of CERN at the French Swiss border is also a major asset for us.

Our collaborations with these research centers will be pursued and intensified. We have found it desirable that they should be represented by the head director in charge of one of them in our Administrative Council. The leaders of all these international facilities have signed a common letter of support to our project.

European and international positioning

Our ambition is to place the University of Grenoble-Alpes among the premier European universities. It is therefore important that we are able to make a comparison of our institution with some of these universities. Accordingly, Oxford and Cambridge Universities are two inevitable references. Other prestigious universities, such as those appearing in the Shanghai ranking system like the University of Copenhagen (40th), Edinburgh University (54th), and Uppsala University (66th), are interesting examples that we shall seek to be on par with.

Our areas of specialization require us to likewise compare ourselves with the most famous universities of technology: MIT, CALTECH, EPFL.

Grenoble currently enjoys extremely great renown in the field of nanotechnology and nanosciences, as well as in the field of information technology, and in terms of disciplines: physics, computer sciences, mathematics and earth sciences. By building on these strengths, we seek to establish ourselves as a landmark university within the European Union in all the activities of our excellence perimeter. We are going to intensify our efforts in order to develop our presence in all European Union calls for proposals, including those from the ERC (European Research Council), both in research, innovation and training (Erasmus, Erasmus Mundus, Tempus, ...).

Lastly, the successful achievement of our ambitious program to attract foreign professors and our international recruitment of doctoral students will greatly contribute to promote our image.

5.3 PROJECT AND PROSPECTS

5.3.1 TRAINING & EDUCATION (BACHELOR'S, MASTER'S LEVELS)

Our common strategy for higher education (bachelor's and master's degrees)

GUI+ should enable Grenoble to become an indisputable magnet for training in Europe:

- for the excellence of its educational courses and their international focus,
- for its original and innovative curricula, particularly by incorporating exact sciences with human and social sciences, and encouraging collaboration on study courses between universities and *grandes écoles* (mixed curricula, for example),
- for its capacity to guarantee graduate employability

Educational excellence and innovation

1. A network of innovative platforms

GUI+ partners have developed a unique set of high level, integrated and multidisciplinary technological platforms having a dual purpose of Research and Training, and covering all areas of excellence of the site such as applied mathematics, nanoscience and nanotechnology, chemistry and the environment, life sciences and health, etc. They offer training of excellence, largely oriented to the masters and doctoral programs, in strong interaction with laboratories, and an important synergy with the socio-economic and industrial stakeholders.

Indeed, these platforms are a valuable tool for restructuring the higher education component of the site as part of IDEX and beyond. They are places of effective operational cooperation between universities, selective higher education schools, national research agencies, other European facilities (ESRF, ILL) and industrial partners. The strong commitment of research organizations to developing technological platforms allows them to be fully integrated into the process of training. They provide at various levels, the missions of teaching, research and technology transfer, designed to address social issues with an attractive and excellent common project. The research/training continuum they provide is fully exploited due to the proximity between teams, the convergence between research and education teams and the clustering and pooling of resources (equipment and human resources in particular), which allow cross expertise.

Finally, being largely open to the international level, they constitute a unique showcase of Grenoble expertise for a world using the most innovative communication tools. Within GUI+, these platforms will be strengthened in particular to maintain the excellence of human skills and tools at their highest level of technology, to expand their availability to our students, either French or foreign, and to offer them training conditions at the cutting edge of science and innovation in their professional future.

Below, we focus only on a few examples which are characteristic of what is being developed within the Grenoble ecosystem.

a) CIME Nanotech (Inter-University Centre for Microelectronics and Nanotechnology)

Grenoble nanofabrication platforms, such as Nanofab or PTA (Front End Technology Platform), were created by several GUI+ partners (UJF, INP, CEA, CNRS) with the primary objective of meeting the growing needs of research activities in nanoscience. Through a direct contact with the different tools of the platforms, PhD students in nanotechnology thus acquire a wide variety of skills and expertise that they can directly use when they start working in industry, microelectronics for instance. So the close cooperative alliance between education and research is symbolized by the CIME Nanotech, which, beyond its traditional training activity, is now home to some of the facilities of the joint Front End Technology Platform (PTA).

The practical courses of technology in microelectronics benefit from the best technological equipment on which students can work directly. This uncompromising approach to teaching extends from near-field microscopy techniques, with the “Nanoworld” platform, to nano-biotechnology, micro-systems, electrical characterization, each time through dedicated platforms combining research and training. The bio platform of CIME interacts with the “Nanoworld” platform and, to a lesser extent, with clean-room technology. We also receive students from the vocational undergraduate schools (IUT), together with students on life-long learning programs, and even from high schools in the framework of the programme “nano@school”.

The practicals organized at CIME are also intended for students of European schools such as ESONN, for Master’s and engineering students from Grenoble but also from various other French universities whose students travel to Grenoble.

The courses are taught by both teachers and researchers of the universities or engineering schools (UJF, INP) and research organizations (CNRS, CEA).

CIME is a joint project associating universities, engineering schools and national research organisations, exemplary in pooling resources and success. CIME is now a unique training platform in France in its scope and variety of its technological capabilities, being part of the national network of the National Coordination of Education in Microelectronics (CNFM).

Thanks to the IDEX and its funding, beyond its already regional and national renown, CIME will become a major tool for the development of our high-level training promoted at the international level.

b) CUBE (University Centre for Experimental Biology)

In the field of biology, CUBE is an excellent breeding ground for practical training in up-to-date experimental biology:

- Together with internships in laboratories, original educational projects are offered to students at each level of their curriculum. CUBE provides integrated experimental teaching units with the objective of learning technical procedures, methods, experimental approaches, while seeking to promote the development of transversal skills;
- Thanks to a federal structure around poles of excellence in research in biology in Grenoble, CUBE allows the emergence of practical courses, even for small numbers of students, as is often the case in post-graduate courses;
- CUBE facilities are also available for training preparation for diverse types of exams ("*concours*"). CUBE's technical platform is essential for ensuring the large part of experimental teaching in the four vocational Bachelor's degrees in biology (both for full-time and alternating study/work courses). CUBE is also open to high school classes of the "alpine corridor" and participates in the development of the interface secondary/higher education.

As well as these examples, the CUBE platform is associated with a great variety of training courses involving GUI+ academic partners: Bachelor's and Master's degrees, engineering courses, and preparatory courses for teacher-training. Altogether, more than 3,000 students of UJF, UPMF and INP use this platform.

The biotechnology school also operates a pilot platform for research and training in life sciences and health. It builds on the strengths and identified local specificities in research, industrial practice and existing courses in biotechnology and nano-biotechnology. It leans on the CIME and CUBE platforms for experimental aspects and federates training in the fields of biotechnology and nano-biotechnology. It includes all Bachelor-Master programs and articulates with doctoral programs of the site. The courses are taught by experts (faculty members of UJF, INP and GEM, researchers of the CEA, CNRS, Inserm, etc.), whose research is conducted in Grenoble laboratories at the highest international level or in locally based European facilities.

A special effort of the IDEX will be concentrated on the development of CUBE: our ambition is that CUBE becomes for biology a tool similar to the CIME platform in the domain of micro and nanotechnologies.

c) A Platform in Mountain Studies

GUI+ partners are located in the heart of Europe's main mountain range. This is recognized at a national level, but is not necessarily so also internationally. It is indisputable that this results in a special facility to illustrate or to experiment directly in this specific environment.

The mountain is a unique environment which is already the subject of specific courses either in modules in the Bachelor's or Master's degree programs as well as in engineering school, specific "Mountain Studies" courses (e.g. the Master's degree *Applied Sciences in Mountain Studies*). Some teaching courses are provided by outside agencies as part of field work or internships. Training activities directly related to mountain studies are also held regularly by our laboratories and associated structures (PARN Summer Schools, "Natural Hazards in the Mountains" ALERT school at the CNRS center of Aussois, etc....).

The objectives of the "mountain studies" training platform will be to increase the attractiveness of training by acquiring material and technical resources which allow one to better meet the needs related to the mountain environment, and to promote integrated multidisciplinary approaches ranging from the humanities and social sciences to the fields of science, technology and engineering. Based on this platform, training courses in this domain can argue a real practical need. Those students coming to Grenoble and Chambéry to study will not come just because there exist specialists and training courses that address the problems of the mountain, but also because GUI+ provides highly developed in-situ instruction. Such a mechanism is leading inexorably to cross-border agreements (Switzerland, Italy), but also with other countries covering the Alpine range, with the future perspective of providing a European focus on Alpine environmental problems.

Training courses related to mountain studies frequently use a multidisciplinary approach. Two main themes, partly related, are emerging and will initially constitute the main activity of the platform: natural hazards and changes related to climate change. In both areas, beyond the theoretical basis that it is necessary to acquire, the feedback and the experts' statements provide a vital backup which has generally not been available for mountain studies.

Regionally, the need for continuing education (to meet the needs of seasonal workers, as well as consultants and local authorities) and adapted teaching (in sports training and competition) are still largely undeveloped particularly because of the region's relative inaccessibility. These needs are currently identified by the Institute for Mountain Studies in Chambéry which will link applicants and university instructors.

The platform in mountain studies will be built around three specific units:

- (i) Field logistics unit to oversee accommodation and transport in relation to the fieldwork educational activities. This includes having a network of suitable housing to be used for theme-based schools or limited-term intensive courses with a strong fieldwork associated with classroom teaching. Some of these structures already exist, such as the Les Houches School of Physics, CNRS Centre Paul Langevin in Aussois, the Station Alpine located in the Lautaret pass, etc. Other projects, between Lake Geneva and Ardèche, (covering our extensive basic region) deserve to be supported, followed or accompanied.
- (ii) Special test sites on which specific instrumentation for educational purposes will be maintained. The data thus collected could enable the practical teaching of real time or delayed data processing. The use of mobile instruments at high altitude is a resource which could be of use for both teaching/training purposes and also for research, including market research.
- (iii) A measurement and knowledge storage and enhancement unit, with the necessary equipment to store and archive teaching resources, including audiovisual techniques to allow linkages for teaching purposes between the classroom and the mountain experimental locations. A close link should be set up between this cell and the technical resource centre: Mountain@Doc of the Institute for Mountain Studies in Chambéry.

d) Other projects

IDEX will favor the creation of new platforms in other fields, e.g. chemistry, computer sciences, and the development on ongoing projects, e.g. the nuclear platform and the Rovaltain ecotoxicology platform located in Valence.

2. The Center For Educational Innovation And Teaching Quality

The platform network described above falls into a vertical structural pattern, by organizing the training courses (initial, lifelong, alternating work/study and teacher-training) around sets of themes and by a pooling of resources and skills, that would not be possible if partner institutions acted independently. The organization into platforms will also facilitate the development of distance learning. Finally, the platform should also serve as a centre for the dissemination of information to the general public and allow a regular feedback of knowledge and experience from the outside world back to the classroom.

However, this structure must be coupled with a transversal organization which can feed into all the theme-based platforms, enabling them to ensure a training of excellence, in terms of methodology and organization, in terms of effective outcomes with full use of suitable operational tools (teaching scenarios, student feedback, techniques of distance learning, and full use of the latest informational technology) but also in terms of equipping students (soon after their arrival in higher education after the school *baccalauréat*) with an awareness of the links between the classroom and the outside world, an awareness of the links between their studies and the professional activities which these studies lead to, as also an awareness of the links between the "academic learning process" and the world of scientific research.

This Centre for Educational Innovation and Teaching Quality will draw on existing resources and skills, including the pooling of ICT units, and will be strengthened by the recruitment of educational technologists, specialists of scientific communication, as well as computer scientists, specialists in knowledge management and other areas of educational research.

The tasks of the Centre will be:

- to provide support for online lectures, including for foreign audiences (therefore multilingual),
- to develop a common podcast platform,

- to support and train teachers for their teaching scenarios for implementation on a Learning Management System (LMS),
- to train staff in the use of virtual classroom tools, dissemination of knowledge and social networks, and their animation,
- to favour the diversification of our training offer in English,
- to develop new distance courses in French as a Foreign Language for students who plan to come and study in France,
- to train teachers in online tutoring,
- to pilot projects of e-learning in specific subject areas (in some cases in the form of national or international inter-university cooperation),
- to administer LMS and virtual classroom tools,
- to promote awareness of new technological tools and techniques, and disseminate these new tools to teachers,
- to promote good teaching practices and develop a quality charter,
- to encourage networking of educational technology units at a national and international level,
- to maintain the link between the development of practical teaching devices and research, in particular through the evaluation of innovative practices.

3. Enhancing the attractiveness of training courses

Enhancing the attractiveness of the training and the employability of students will be carried out through a better alignment of the training offer, an increased porosity between the curricula, and devices such as gateways, hybridizations, shared/cross teaching methods.

a) **Bridges between universities and other institutions of higher education (“grandes écoles”)**

We propose a better integration of the training courses in the universities and in the engineering schools, although many masters training courses are already jointly accredited between the different academic partners of the alpine corridor. The idea is twofold. First, systematically open University diplomas to engineering students, such as Master programs coupled with a training period dedicated to a research project, either in industry or in an academic research laboratory. Second, offer the possibility to students having started a university Master to spend a part of their curriculum in an engineering school. These two kinds of possibilities shall be publicized among the partners of the site and their efficiency will be evaluated by the IDEX board. They will be included in different formal conventions that universities and the schools will sign together.

b) **“Junior laboratories”**

We also want to promote “junior laboratories” for Master’s and PhD students and offer them the possibility of solving small industrial or societal problems and/or of disseminating scientific expertise towards various socioeconomic stakeholders. This action also includes the introduction of student training periods based on real industrial problems wherein they would use usual research methods to examine, evaluate and solve them. This program, carried out in the platforms, will be an opportunity for socioeconomic partners to train students on up-to-date tools and methods. It will form part of the prospective employer’s assessment of the students. For industrial partners, it is also an opportunity to increase the attraction of their activities to students.

c) **Interdisciplinary weeks**

We plan to organize dedicated training weeks at a university-wide scale, for typically one/two weeks at the beginning of each semester, offering high level courses on specific topics. These joint training periods will deliberately seek to bring together students coming from the fundamental and experimental sciences with students from the humanities and social sciences. This will present the opportunity of educating students in mixed communities through industrially- oriented projects and favor exchanges between future practitioners. It will also make the students aware of the key societal issues that they may confront with during their professional activities. The courses will also be open to a more senior public coming from the working world, these dedicated weeks being part of the training recommended during their professional life. Such weeks will be publicized internationally

and organized in such a way that high level professors (with academic or industrial backgrounds) could be hired specifically for these periods.

d) Hybrid schools

We plan to implement so-called « hybrid schools », as described in the model below. A first example will be built on successful experiences of joint degrees and cooperation in our nanoelectronics IRT: the KIC Innoenergy (Sustainable Nuclear and Renewable Energy Convergence). This school will concern post-Bachelor students, enriching their field of expertise with transverse skills in an original cross-learning path, providing immediate employability in the workplace. Such hybrid schools will offer original methods of recruitment, encouraging atypical careers, and will promote a pedagogical approach through missions in the form of proposals for the development of innovation and ideas, led by students divided into multidisciplinary teams. Students will be encouraged to take control of budget allocation, within an overall course spending limit. This kind of programs will also be open to life-long learning students and other qualification training courses.

e) Observatory of Professions and Skills

We intend to set up an Observatory of Professions and Skills: composed in equal parts of representatives of the universities, of the socioeconomic world (in particular the “competitiveness clusters”) and of the local and regional communities, the Observatory will be devoted to keeping a close eye on the evolution of the employment market. Acting as a think tank, one of its main aims will be to estimate upstream the needs for new training programs to be developed and also to monitor the matching of the current training offer with the mid-term to long-term market trends.

4. Internationalization of our courses

As a main factor of attractiveness, the internationalization of our courses is a declared objective of the GUI+ project.

On the one hand, the access to flexible language-learning opportunities (be they extensive or intensive, blended, online, or tutored courses) allows for the acquisition of language communication skills at any time of the year. Special attention is paid to the publication and circulation requirements of research papers (particularly in English) written by our doctoral students and young researchers.

At the Master’s level, we want to support our students to acquire the required certified B2 level of a foreign language (especially in English), which guarantees international exposure and gauges future employability.

On the other hand, an essential element of the attractiveness is to allow an immediate integration of foreign students in our programs. Programs in English will be developed, on-line and in face-to-face, and generalized for Erasmus Mundus qualification in the next two years at the latest.

For the most attractive master programs, an international label, such as Erasmus Mundus, should be the ultimate goal (and not an initial goal only) of internationalization of our training offer. GUI+ will help to secure the existing international Erasmus Mundus qualification by providing Pre-Doc scholarships which will guarantee the long-term sustainability of these international Masters.

We will do our utmost to secure endorsements and quality certification as a guarantee of excellence, by promoting a more international outlook (Master and Doctorate Erasmus Mundus endorsements, EURACE certification, international dual degrees, increasing the percentage of foreign students, etc.) as well as fostering international socio-economic partnerships to maximize graduate employability.

In the framework of the Center for Educational Innovation and Teaching Quality, we propose to continue and expand the dynamics of our action based on guidance and training in language teaching methodology and curriculum development, by assisting the teaching staff of the site in the design, implementation, monitoring and evaluation of specific language courses.

5.3.2 DOCTORAL STUDIES

Our common strategy for the doctorate

Our ambition is to become the first university in terms of PhD students and doctors in France. This ambition is based on the already structured doctoral studies in the alpine corridor and particularly the award of one single doctoral degree. Our strategy will concentrate on:

- enhancing the international reputation of the Grenoble doctorate,
- guaranteeing employability of PhD graduates, including the development of innovative doctoral programs,
- promoting the doctorate in the socioeconomic world through a labelling policy,
- strengthening European and international schools (summer or winter schools).

Promoting the doctorate through a label policy

In order to better support doctoral students in building their careers and to promote the doctorate in a society whose future depends on its ability to innovate, “labels” will be offered to PhD students. These labels reflect the commitments shown by the founding institutions of the PRES "Université de Grenoble". Scientific, technological, cultural and societal innovation is indeed central to the programs they offer to the Ph.D students. Five labels will be set up:

- Research in Engineering and Industry,
- Business Creation,
- Research and Higher Education,
- Counselling and Expertise,
- Public Authorities and International Organizations..

The main objectives are:

- making innovation a core competence of PhD students,
- developing students' abilities to expand their innovative ideas through applying them to industry or societal concerns,
- putting special emphasis on the international dimension of our PhD training,
- promoting the PhD program among key business, education and community players, by demonstrating the benefits of the PhD's three-year preparation providing graduates with valuable skills for future employers.

These labels will establish a reference framework of competencies for PhD graduates, based on:

- the thesis work itself and the openness, curiosity and capacity for innovation it helps to develop;
- the additional training followed during the preparation of the thesis, that integrates awareness and preparation for innovation and employability,
- experimentation and situation scenarios, where PhD students demonstrate their adaptability and innovative approach to resolving certain problems.

Guaranteeing professional insertion of PhD graduates

PhD students will receive an enhanced quality training which, combined with the cross-disciplinary and professional insertion aspect of the doctoral course, will help to guarantee their professional insertion. We will rely on:

- the synergies at work between all local players: universities, other schools of higher education, research institutes and regional authorities, as a particular feature of the site,
- the quality of training courses to prepare PhD students for professional insertion, all of which rely on close partnerships with the working world,
- the networks that unite the site's establishments and various economic and institutional players in the Rhône-Alpes region: competitiveness clusters (Minalogic, Tenerrdis, Axelera); RTRA "Nanosciences at

the frontiers of nanoelectronics”; RTRS Neurodis, Finovi, the Instituts Carnot (intelligent software and systems, energies of the future).

This involves:

- establishing a “partners club”: businesses/local authorities/universities,
- consolidating the employment observatory,
- introducing a federation of associations for PhD students and PhD alumni..

Developing a European doctoral schools network, strengthening European and international schools

GUI+ will take a leading role in building European doctoral schools. As part of either Erasmus Mundus or Marie Curie EC programs, we will develop veritable networks of specialized doctoral schools, making Grenoble an international reference for excellence in PhD training. For instance, in the field of Physics, projects are presently being set up with Karlsruhe KIT, EPFL at Lausanne and Delft-Leiden Casimir research school.

The pre-doctoral school "Frontiers of Condensed Matter" at Les Houches, launched in 2010, will be developed in collaboration with European partners with the clear objective of attracting and selecting students from all around the world for a PhD at Grenoble University. A similar session on Electrical Engineering is also planned.

As for its international summer schools, we aim at reinforcing their link with our research excellence axes. At ESONN and HERCULES, we will amplify the practical training of attendees on local research facilities and platforms. Moreover, practical training will be introduced in other schools like ERCA or MIGAS.

In addition, new specialized international schools are also being considered or set up, including:

- SASICE Safety & Sustainability In Civil Engineering will be a lifelong learning Erasmus program with 9 European institutions. Its objective is to set up a highly interdisciplinary training plan covering a complete cycle of study and leading to a recognized double or joint degree.
- Summer school on Architected Materials and Materials by Design.
- Summer school on Innovation and Mountain Territories will develop a benchmark and expertise cluster in Human and Social Sciences related to mountain issues and bring new considerations on territorial and environmental challenges from a multidisciplinary viewpoint.

Innovative doctoral programs

Innovative doctoral programs will be favored. The first example we are working on is based on the Labex LANEF (Nanosciences and Energies for the Future). It is a new program in physics, which focuses on:

- International networking: each student will spend at least 2 months in a laboratory outside France, thanks to a network of international collaboration existing within the Labex,
- Interdisciplinary research options, present in most of the PhD subjects; through regular research seminars this experience will be shared within the cohort.
- Exposure to relevant employment sectors outside academia, to be achieved with an internship of at least 2 months in the private sector. The cohort will also benefit from contacts with the private sector through seminars.
- Quality assurance: the entire doctoral program is thoroughly structured and supervised by the Labex members, including representatives of the international partners as well as from the private sector. Hiring will be competitive, including an evaluation of both the student’s scientific achievements and personal objectives. Students will follow at least one European school, attend national and international conferences and follow a selected series of seminars.
- Final evaluation: A final workshop will be organized. Each PhD student of the cohort reports on his/her scientific activity as well as on the various skills achieved. The conclusions of this workshop will be particularly focused on an assessment of the weaknesses and benefits of the program, in view of its possible extension and generalization on a longer term as a model for the doctorate at the University of Grenoble.

This kind of program will provide an attractive institutional environment offering doctoral students the conditions needed to become independent researchers, thereby inviting them to take responsibility at an early stage for the scope, direction and progress of their project, including career development opportunities. Based on this example, other innovative doctoral programs supported by our IDEX will be created.

Developing international host centers

Based on the models of the “International Centre for High Energy Physics and Astrophysics” (CIPHEA) at Annecy, and the Grenoble Centre for Theoretical Physics, we will establish or provide support to international host centres. All will be united by model initiatives with extensive international visibility:

- reinforcement of their training role, taking advantage of the presence of internationally-renowned researchers, with the potential for offering world-class courses.
- organization of summer schools combining courses with in-situ research, which can be designed in tandem with the major laboratories (CERN, ESRF, ILL, EMBL, etc.) and as a supplement to existing school study courses.
- organization and coordination of PhD and post-PhD courses, also supported by the Erasmus Mundus Joint Doctorate programs.

5.3.3 RESEARCH AND INNOVATION

5.3.3.1 INNOVATION AND SOCIETY PRIORITY

By uniting all players involved in the fields of technological and scientific innovation, right through to those involved in social, cultural and political innovation, the aim of this Priority is clear: to rebuild the social sciences provision on the site, with a view to turning the Alpine corridor into a European reference space. Thanks to the synergy with the exact sciences and engineering sciences, plus high social demand, innovation sciences, arts and knowledges will be able to grow here, just as they do on the highest performing overseas campuses. Because this approach offers support, instrumentation, critical analysis, modeling and evaluation, this Priority is a defining pivot which is designed to elevate a broad and evolving spectrum of scientific fields to the most rigorous standard: social sciences, human sciences, culture, management, management sciences, economic sciences, political and territorial sciences, law, architecture, etc. This ambition is developed through two Actions of excellence and emerging initiatives which, lasting four and ten years, should be on course to achieve objectivized excellence.

Creation, Culture and Technologies

Culture and creation play an important role in the National Strategy for Research and Innovation (SNRI). The general report clearly emphasizes the risks of instrumentalizing Humanities and particularly of confining them to the issue of society’s ability to accept scientific discoveries and new techniques.

One main objective is to use the concepts of culture and creation in the innovation process. It is thus in line with the national strategy since “it comes back down to social and human sciences, specifically, to devise new scales of time and space that will redesign social practices, the economy and scientific practices, and enrich public debate, through which the link between science and society is built”. Our main goal here is to strengthen relations between the fields of creation, culture and innovation: considering, on one hand, that culture and creation are factors in social change and in generating social links and, on the other hand, in view of the fact that the development of a culture of innovation is an instrument for the success and competitiveness of territories, ultimately producing interfaces and mechanisms for mediating between the disciplines as well as between the different scientific activities and fields of social activity.

Excellence research axes

Grenoble’s excellence is manifest on several fronts in all of these fields.

In the industries of culture and communication, the Grenoble school specializing in cultural and creative industries has demonstrated that the industrialization process – and not just merchandizing - has been key in bringing profound change in information, culture and communication. Established since the 1970's, it has developed increasingly since early this century, particularly as regards certain phenomena: the development of ICTs and emergence of new media, deregulation-reregulation, the spread of media and non-media information, trends in personalized consumption and practices, and the globalization of flows and exchanges. The issue of creative industries and its very recent emergence in cultural policies, and resistance to deindustrialization in European countries, raises the need to study the relationship between cultural industries and creative industries. Excellence is thus linked to the fact that research conducted in this sector originated in Grenoble and is now recognized internationally.

In the field of corpuses, publishing and digital publishing, Stendhal University research laboratories are working to put manuscripts, specialized works, publications and documents online, making them accessible not only to the scientific community but also to the general public. Researching and publishing this diverse range of documents online is based on linguistic analysis as well as studies conducted by literary scholars in textual genetics; analysis of practices and information searches by specialized researchers; tracking information on users' site usage; and lastly, organizing educational and cultural tours to reach non-specialized audiences.

Lastly, the issue of innovation, and more particularly its implications on social issues, has occupied and still occupies the minds of social science researchers, and penetrates the working relations they have fostered with physical and biological science researchers, architects, engineers and technologists.

Our project has three major aspects:

- It unites researchers from very diverse disciplines and at once clearly places the concept of pluridisciplinarity at the heart of scientific innovation. It is in line with the SNRI's recommendations which encourage interaction among the different Human and Social Sciences themselves and with other scientific fields, prompting a "decompartmentalization of the ecosystems of innovation".
- It puts researchers in contact with "thinkers" who supply the experimental situations: involved are CEA-Leti, the Grenoble Science Center, the Hexagone - scène nationale de Meylan, the Musée Dauphinois, the Centre Erasme d'expérimentation multimedia... The aim is thus to establish the Laboratory as the contact point for local authorities, businesses and cultural structures, offering expertise, analysis and test comparisons and assisting with industrial and public policy projects.
- It builds links with study courses in three ways:
 - o by enriching existing courses with training modules on the "creation, heritage and innovation" dimension;
 - o by designing specialized courses specifically for new professions in the fields of creation and innovation (e.g. "creation engineering");
 - o by establishing an institute for higher studies in creation and innovation, targeting professional audiences (company R&D managers, researchers and laboratory heads or advanced-level students). This would be achieved with the support of art schools and the Ecole Nationale Supérieure de Création Industrielle.

Emergence project

1. Science in society

In this *emergence project*, we intend to both promote a research center on "science in society" and to structure methods for the social transparency of scientific activities and, more particularly, to publicize them. The initiative comprises three main lines of research, to conduct and study tests on science in society:

- **science's relationship with the City**: the emergence of social concerns over technological risk, citizens' watchfulness over their environment and their demands vis-à-vis democracy, call for new tools to be implemented. The question thus being asked refers to the emergence of citizen's uncertainty over scientific activities in their relations with businesses and political powers.
- **science's relationship with non-specialized audiences**: this dimension already exists (with cultural institutions such as the Grenoble Science Center or via events such as the Fête de la Science). Making

science entertaining is a good way of popularizing it. These kinds of events must be developed and diversified, using innovative devices to present work and circulate knowledge within the territory.

- **Relations between sciences within the scientific community itself:** the obvious pluri-disciplinarity of GUI+ requires new procedures for sharing knowledge and accepting inputs from various disciplines. Cross-sectional seminars organized around generic themes are ideal occasions to promote different approaches. Issues specific to the scientific activity itself must also be addressed: ethics, scientific commitment, etc.

2. Know-how transfer

We will strengthen the existing transfer practices: development of scientific activity both within the peer community and within public audiences (continuing education), upgrading by developing multimedia productions. Beyond the goal of creating innovative companies in the field of cultural and creative industries, the introduction of measures to exploit innovative and experimental projects will reverse the process by considering the valuation techniques forms as cultural forms and not as a mere acculturation of social actors to technology.

4-year and 10-year objectives

	4-year objectives	10-year objectives
Intellectual and scientific production	Invent a new mean of presenting, consulting, analyzing and interpreting objects of artistic, cultural and scientific heritage Identify, observe and analyze scientific and social practices in the field of digital usage by establishing a scientific observatory of digital content and corresponding practices (scientific, professional, cultural) Establish a digital space for inventions, tests and analyses of usage in the field of digital corpuses (publications, manuscripts and documents that are either public domain, such as the press, or professional, e.g. in the medical field, and introduce a specific methodology). Increase publications and publications in English Establish an observatory Establish a space for testing and usage	Build a framework of excellence, defined by its close link between knowledge production and political, social, cultural and industrial activity.
Valorization, partnership, EU presence and international projects	Develop an European theatrical design institute implies combining practice with theory, or applied research with theoretical research, where the scenery and platform are available to make this combination possible. Practices in scenery, developing equally well in a void as they are amid technological sophistication, through a direct relationship between actor and spectator, rather than via more extensive research into the materials, images and sounds, requires a study of these different methods of scenic mediation Develop inter-disciplinary responses to national and international invitations to tender (ANR, FP7, etc).	Establish an international benchmark in the field of creation and its interfaces, and develop close and lasting partnerships between the laboratory of excellence and socio-economic players.

Innovation, Territories and Governmental sciences

Since we face multiple challenges such as environmental change, the deindustrialization of territories, social divides, housing shortages, industrial and natural risks, health challenges, the sustainable management of natural resources and technological bottlenecks, etc., innovation sciences must take on a new dimension. They have to re-think the practices, contexts and methods of management and administration, asking new questions about the methodologies of investigation, and the modeling and theorization of value creation processes and the time scales within which these operate. Hence the imperative of using a multidisciplinary approach to question innovation times and cycles, but also to question the norms, forces and forms of production on which they are based, the expectations and resistances which they crystallize and the evaluation processes, transformations and representations which define them.

Excellence research axes

1. Innovation(s)

The creation of the research federation INNOVACS (Innovation, Knowledge and Society) was the first step in organizing the response of the social sciences to the challenges associated with innovation. Taking full advantage

of this dynamic, this scientific line of research is able to foster new synergies between players on the Grenoble campus who are keen to integrate the economic and social challenges of innovation into their work. The combination of different scientific approaches will bring about a stimulating reflective framework.

The aim is to question the very conditions of innovation by comprehending how it fits into history, or by studying the socio-cognitive processes which shape creative activities at the heart of companies or organizations. Studying the socialization of inventions and technological progress entails understanding design as a structured set of relationships and service provisions based on the development of knowledge and skills which are both collective and individual. Another aim is to improve the ability to model, manage and evaluate innovation by bringing together the disciplines of management sciences, experimental economics, the sociology of usage, history, as well as cognitive psychology and the study of public policy formation.

2. Territorie(s)

Mountain territories have often been perceived as marginal and even peripheral to innovation work, although for a long time they have succeeded in developing original mechanisms for adaptation and innovation, economically, socially and culturally, etc. In view of this exemplary nature, and as a consequence of the intensity of the emerging socio-economic mutations, current environmental changes and high institutional, scientific, socio-economic and political expectations, it is vital to establish a pole of reference and expertise in the social and human sciences examining issues associated with the mountain environment. This is the case in our Labex ITEM.

Other territorial challenges will be tackled such as metropolitan dynamics, conflicts resulting from collective mobilizations, the promotion and development of cultural heritage, both material and immaterial, transport and travel issues and the symbolic representation of "countries" and "spaces", often viewed in a general way as "fragile" subjects. Around ten A and A+ rated research laboratories at Grenoble university and Cemagref will be mobilized, supported by partner bodies (INNOVACS, the Institut de la Montagne, MSH-Alpes, the Pôle Alpin des Risques Naturels) in a resolutely interdisciplinary perspective.

3. Sustainable development

Our AE&CC Labex (Architecture, Environment and Constructive Cultures) is focused on the study, characterization, promotion and development of resources, know-how and local expertise in the domain of the "habitat" and cultural heritage in reply to the social demand and critical importance of sustainable development in specific environmental situations. It is positioned at the heart of the big issues concerning climatic change and the multiplication of natural disasters, but also addresses issues of cultural diversity, whilst centering its reflections on urban and architectural organization aimed at ensuring social development, improving living conditions and maintaining or increasing employment.

4. Risks

Several programs confirm the excellence of the studies of risk undertaken by the social and human sciences in Grenoble (the "Collective Crises and Risks" axis, "Sciences and Society" program, the "Social History of Risk" and the network "Crises and Risks"). We want to develop a high level of expertise in nanotechnologies, relationships between risks, decisions and territories, industrial and chemical risks, but also, on a more theoretical level, in terms of the construction of "public issues" which refer to it. In terms of the interface between earth sciences and social sciences surrounding "natural" risks (floods and seismic events), the Labex OSUG@2020 provides support for this line of research which is dedicated to governance instruments on a local scale and to mechanisms which are designed to increase the resilience of collectivities and institutions.

5. Governmental sciences

The research theme concerns the major tensions and changes which transform the democratic and territorial organization of contemporary societies by focusing the analysis on three major social challenges: rationalization of public policies, knowledge concerning public opinion and efficiency within and of organizations. Any social issue can be debated publicly or require "overall regulation", which is the specific property of "organizational and political systems". Therefore, the knowledge amassed in Grenoble in terms of government science, is being applied in the GUI+ perimeter of excellence. Collective questions brought up by innovation and the management of technologies,

climate change, energy, the environment or sustainable growth are of interest to us insofar as they demand public policies and the redefinition at the national, European and international level of collective norms and institutions; they bring into play democratic mediation (interest groups, associations, media, forms of deliberative democracy...); they concern private or public organizational arrangements; they are linked to the changing values of citizens and lead to public controversies which structure opinions, modifying social and political behavior, even voting.

6. Technology management

This scientific axis involves looking at organized processes, but also those processes which are open to new technology production methods, and harnessing them within organizations in order to integrate them into the strategic objectives and to create value. We focus on four programs:

Wide ranging expertise – Ecological and pragmatic approach: This program focuses on the concrete arrangements for comparing and testing knowledge and expertise.

Accountability – From the political fabric to accountability cultures: The aim here will be to report on the experimentation field opened up by accountability practices, based on empirical studies of the local and situated forms of governance, regulation and rationalization.

Market innovations and infrastructures: This program supports the hypothesis that an in-depth understanding of the role of "infrastructures", their socio-technical properties and their mode of regulation, can open up new ways of thinking about the governance of markets.

Processes of innovation, development and production of new technologies: The exigencies of the (globalized) market of advanced technologies leads to particular emphasis placed on collaborative methods in the innovation, development and production processes, as well as on the reliability of products and the necessity of "doing it right the first time", with a controlled environmental impact and taking into account specific usages.

7. Health: public policy and society

The whole question of health services constitutes another area for the application of innovation processes. This concern has led to the creation of a federated research structure, Health and Society, which brings together researchers from eight university laboratories and six research units of the Grenoble University Hospital Center. A training unit has been set up at the Grenoble Political Studies Institute (IEP) in Grenoble, accompanied by a preparation course for the hospital administrative assistant competitive examination and another for head of division doctors in the Rhône-Alpes region. Besides innovations in terms of medication and treatment, it entails developing a teaching- and research-based ensemble concerning the issues of longevity, ageing, disability or the autonomy of individuals. Hence, a strong program in the field of risk prevention, management of hospital reforms, territorialization of care facilities, issues surrounding mental health or the improvement of social health conditions, research which fully dovetails with our Health priority.

Emergence projects

1. "Cité des territoires"

The main aim of this "Cité des Territoires" is to facilitate and accelerate the international recognition of an open dynamic being undertaken with major partners: the Region, local authorities, chambers of commerce and industry, as well as the companies involved in territorial planning and urban policies. The project includes the most recent developments, the central thrust of which is not so much the territorial space itself but the harnessing of the processes of conception, production, administration, management and governance of the area. The action plan selected is of a federative "pooling platform" type to organize the following: international theme-based schools, theme-based calls for proposals in order to internationalize scientific cooperation projects, support (tools and instruments) for international research calls for tender, invitations for applications for Chairs of Excellence and a few joint investments on a larger scale than those which social and human sciences usually generate. Transversely to the scientific fields which are well demarcated by the work of laboratories, three types of intervention will be supported: knowledge and research; social applications; actuation.

2. Recomposition of the social and cultural worlds

Welfare reforms and social inequalities. The starting point is based on the achievements of the researchers organized within the Technological Research Team “Observatoire du non-recours” with a two-fold finding. The mediation introduced by the current welfare reforms constitutes a challenge because it is causing a “non-use of public services” phenomena - something which increases or adds inequalities to those which already exist. Territories adopt a logic of selectivity or encouragement specific to these reforms with a view to strengthening social cohesion.

Discrimination. Directives relating to equality without any distinction based on race or ethnic origin, to equal treatment in terms of employment and work and to equality between men and women all lead to the main asset of non-discrimination being confirmed as a social living standard guaranteed by the public authorities in the EU member states. This program sets out to show how these "high European policy standards" are applied by different member states and by their public and private organizations.

Transfer of knowledge and know-how

This program is in complete harmony with the objectives of the National Research and Innovation Strategy (SNRI), particularly through the “Environmental urgency and eco-technologies” research axis and the “Social and human sciences” dimension. Without attempting to be exhaustive, we point out the importance of the following:

- The importance of the partnerships forged by the Institute of Mountain Studies in Chambéry;
- The commitment of Cemagref to expand exchanges with socio-economic and politico-institutional players.
- Active partnerships of the Labex AE&CC with UNESCO, UNHabitat, the Red Cross, OXFAM are given concrete expression through actions in the field in numerous countries throughout the whole world.
- The ITEM Labex has made use of a broad range of partnerships with public players (ARDI [Regional Agency for Development and Innovation], FNSP [National Foundation of Political Science], Grenoble Chamber of Trade and Industry, Mountain Industry Cluster...
- In terms of energy issues, ADEME is a major interface between companies, public collectivities and citizens. It is clearly committed to the SEED project.

4-year and 10-year objectives

	Indicators	2011	4-year objectives	10-year objectives
Training	Masters programs just created or to be created in the excellence perimeter	4	+7	
	% of foreign students in these Master programs	10%	25%	40%
	Joint supervision thesis	65 (2010)	+20%	+50%
	Thesis with partnerships	20	+20%	+50%
Intellectual and scientific production	Summer schools	Organization of semi-annual summer school in transverse fields	Organization of semi-annual summer school in transverse fields	Organization of semi-annual summer school in transverse fields
	Post-docs		2/year /axis	5/year /axis
	Full time researchers	~40	+1/year /axis	+1,5/year / axis
	Excellence chairs		3 new chairs per year and per action	3 new chairs per year and per action
	ANR projects	20	+25%	+50%
Valorization, partnership, international projects	PCRD (as main coordinator or manager)	4	2	5
	Platforms setting up		3 technical / experimental platforms setting up	
	International Publication	15%	30%	50%
	IUF	3	+4	+10

5.3.3.2 HEALTH PRIORITY

Health/Biology/Biotechnology

Excellence in Biological and Health Research within GUI+

Deciphering the complexity and diversity of life in order to understand the processes that sustain life allows us to address key challenges that our society faces in the areas of health and the environment. At Grenoble, research in biology has evolved over the past few decades by means of innovative approaches interfaced with physics, chemistry, mathematics, computer science, engineering, and technology, thus covering all levels of biological organization. In the future, one of the major challenges facing biological sciences will be the integration of molecular and structural knowledge within the context of the cell and the organism placed within their environment at various levels of resolution in space and time, which corresponds to the emerging approach of systems biology. GUI+ objectives in this direction are (a) to strengthen its international positioning, (b) to innovate within the area of biotechnologies for sustainable health and a sustainable environment, and (c) to set up a center of excellence dedicated to high-level teaching. Furthermore, a remarkable characteristic of Life Sciences at Grenoble is the quality of its interfaces with all national and international research bodies, such as EMBL, ESRF (synchrotron), ILL (neutrons). Thus, GUI+ will encourage synergies amongst all regional key players, especially with regard to the integration of research projects in the areas of biology and technology, a source of innovations for health and the environment.

From molecule to ecosystems: Using the most modern physics tools, research in the area of structural biology aims to dissect the key agents (essentially proteins) and molecular mechanisms that control biological functions. The implementation, in 2002, of the Partnership for Structural Biology (PSB), which has gathered together all of the site's partners, has had a major structuring effect, thus allowing for the creation of an outstanding set of platforms for integrated structural biology. The excellence of our work on the structure of viruses and their interactions with host cells, on mechanisms that enable bacteria to infect cells, and on organisms that survive in extreme conditions, and on membrane proteins has been widely acknowledged. Moreover, Grenoble is one of two French clusters that are part of the European ESFRI-INSTRUCT infrastructure.

In parallel, blending structural biology and nanosciences, chemistry research at Grenoble that describes the structure, chemical reactivity, and regulation of biological systems (proteins whose reaction center contains transition metals) has led to the development of molecular systems that are biomimetic or bioinspired and to the emergence of new concepts. Work in bioinorganic chemistry, which is unique in Europe, has opened up new prospects in green chemistry, for alternative energies and in the areas of health and toxicology. A group of very high-level projects have crossed a variety of technological approaches that, at Grenoble, have been developed to the point where they reflect the state of the art (proteomics, cell- and RNAi-based screening, cellular and molecular imaging, bioinformatics, nanobiology, etc.). These approaches have paved the way for remarkable advances for research into cell structures and functions (cytoskeleton, vesicular traffic, targeting, compartmentation, gene expression regulation), especially with regard to plants (chloroplast). Thus, major contributions have been made to such fundamental issues as flowering and the study of epigenetic control mechanisms in spermatogenesis, mitosis or apicomplexan parasites.

Scientific objectives in the area of ecology/environment have included the understanding of the functioning of Alpine species and ecosystems and an interest in predicting their responses to natural or anthropogenic changes by using and developing methods and concepts reflecting evolutionary biology and ecology. Concerning ecotoxicology, the Rovaltain platform will be a major tool that we intend to develop.

Neurosciences, cancer, and infectiology: Work undertaken by GIN teams in the areas of brain development, neurodegenerative disorders, cerebral microvascularisation, and functional and pathological neuronal circuits has been pursued in conjunction with the neurosurgery, neurology, and psychiatry departments and the MRI department and Clinical Research Centre of the CHU. This proximity facilitates interactions with researchers and clinicians, especially those focusing on neuro-oncology and neurodegenerative diseases, two areas in which Grenoble biomedical research efforts have excelled. Similarly, IAB research has been integrated with the study of tumor initiation and progression, focusing on the diagnosis and treatment of malignant hemopathies, lung cancer, liver cancer and melanomas. Research about issues concerning infectiology has benefited from strong interaction

with the *Lyonbiopôle* world competitiveness cluster in which teams from Grenoble play a key role (IRT project). In these areas, they have made original contributions thanks to an interface with technology, especially nanobiotechnology, which aims to develop innovations in diagnostics and therapeutics. Our molecular chemistry, with its competencies in biomolecular energy and molecular recognition, is also at the very heart of these issues.

Engineering for health: Undertaken by multidisciplinary teams (LSP, 3SR, LIP, Rheology, LMGP, TIMC, LTM, LETI/DTBS, iRTSV) in close interaction with CHU, GIN and IAB teams, these projects have implemented tools and methods from the areas of nanosciences, materials sciences, chemical engineering, and soft matter physics. Issues concerning physiopathology have been tackled at various levels (morphogenesis, adherence, cell motility in cancer, cardiovascular pathologies) from data processing to biomedical engineering (new materials, biocompatible medical systems). With the help of the *Nanoscience Foundation*, interactions with the Minalogic world competitiveness cluster and a tight partnership with microelectronics, imagery, and robotics teams have allowed for the introduction of miniaturized tools able to modulate the functioning of cellular networks using physical, electrical, or magnetic approaches or even the highly focused use of synchrotron radiation (medical beamline at ESRF). This has led to powerful therapeutic tools capable of providing a functional correction able to restore near-normal functioning and to suppress very serious symptomatology in some patients, as in motor diseases (Parkinson's disease, dystonias, etc.) or diseases that can affect emotions and motivation, as well as abnormal psychiatric behavior (compulsive syndromes, schizophrenia, etc.).

Technology transfer: Life sciences at Grenoble have effectively developed close interactions with industry. Of the success stories, the most telling example is that of Taxotère®, one of the most active and most widely sold anti-cancer agents: DCM researchers are amongst the “co-discoverers” of Taxotère®, in collaboration with ICSN (CNRS), and the *Rhône-Poulenc Rorer* group (now *Sanofi Aventis*).

A number of start-ups have been created from the activity of academic laboratories in technologies for health, biotechnologies, diagnostics, environment, and biomaterials. The case of PX'Therapeutics is rather exemplary: created in 2000, this biotech company is a spin-off from the IBS; it has now about sixty employees and has led to the creation of a number of jobs in the Rhone-Alps region.

Biology/Health research projects of GUI+

Based on this recognized excellence, the two main actions identified for the GUI+ *Health Priority* aim at deciphering the complexity and the diversity of Life and developing innovative, integrated and ethical approaches for Healthcare. Both address key issues in the areas of infectiology, cancer and neurosciences. A common feature of these two actions is that they are developing multidisciplinary and multi-scale approaches to implement integrative and systemic strategy. In addition, interactions with clinicians to foster an innovative and internationally competitive translational research are a key issue.

1. Deciphering the complexity and the diversity of Life

The Labex GRAL (the Grenoble Alliance for Integrated Structural Cell Biology) represents the core of the research in this action as three institutes (IBS, UVHCI, and IRTSV) have pooled their competencies and expertise to develop a convergence of cellular and structural biology aimed at understanding the underlying molecular mechanisms supporting biological functions within their specific cellular context. GRAL (evaluated A+) is made of world-class integrated structural biology infrastructures, as well as very up-to-date cellular biology resources and platforms. Its strength is its integration within a structural biology center that is the only one of its kind in Europe. Combining structural and cellular biology approaches (imaging, proteomics, screening, and modeling), two main research axes have been identified as flagships of the GRAL project: host-pathogen (viruses/bacteria) interactions and intracellular compartmentalisation of metabolism & functions (chloroplast).

2. Developing innovative, integrated and ethical approaches for Healthcare

The aim of this action is to develop technologically targeted therapies that should eventually change - and perhaps revolutionize - the way medicine is practiced, making it more highly personalized by targeting pathological processes at an early stage and using less invasive approaches. This action involves a tight partnership between CHU, UJF, Inserm, CNRS, and CEA/LETI and takes its roots on the expertise of teams (at TIMC-IMAG, GIN, IAB, DCM) rated

A+ by AERES. It relies for translational research on the CIT803 devoted to the demonstration of medical benefits delivered by medical devices. Focusing on three main actions, GUI+ action for healthcare will connect fundamental research groups and translational research. The convergence between these different domains is a very natural movement, as they share several methods and potential applications, and this will create conditions for exchanges of expertise opening the way for enhancing collaboration on specific objectives.

Molecular engineering for diagnostic and drug delivery: Our goal is, in an integrative manner, to design molecules and nano-assemblies able to interface selectively with a targeted function of the living and subsequently triggering a set of tailor-made functions thus providing devices with increasing complexity. On the one hand, our strengths lie in the production of a wide range of molecular building blocks encoding functions (organic mols, metal complexes, polymers, biomols...) whose chemical engineering provides bottom-up designed systems embedding recognition and effector properties. On the second hand, our propensity to interact dynamically with biology, physics, medicine and technology allows for the rational design, the characterization and the validation of such systems with integrated tailor-made properties and paves the way to more elaborate applications beyond the limits in the field of biotech area such as molecular imaging and tailor-made medicine.

Optimized implantable micronanotechnologies: This action aims to develop applications of the micro-nanotechnologies for health, to meet the needs for medicine to find new solutions for the treatment of the neuro-degenerative diseases, cancers, and the handicaps. A "project hotel" is being set-up for the creation and development of innovative devices for neurostimulation and functional compensation, biopsies and drug delivery for cancer. The objective is to gather within Cinatec all equipment and competences enabling to test the robustness, the compliance and the biocompatibility of new diagnostic tools and new therapeutic devices (stimulation, infusion, compensation). The micro-nanotechnologies are expected to offer new solutions, opening the way to breakthrough innovations with less invasive, more targeted, better tolerated and more powerful tools and concepts, and at a better cost. A testing platform such as Cinatec, unique in the world, is expected to fill in the gap between research and industrialization: it is a booster and a catalyst in the pursuit of proof of concept.

Augmented interventions in medicine: Our medical objective is to augment the benefit/risk ratio such as earlier diagnosis, wider indications for interventional radiology or endoscopic procedures, more efficient and safer actions, resulting in a significantly enhanced Delivered Medical Benefit. This turns into scientific and technological challenges. Augmenting the perception by the physician of data required for a good decision-making and strategy performance will benefit from innovative results in terms of functionalized nanoparticles, miniaturized spectrometers and other innovative imaging techniques. Augmenting the capability of the physician to choose the best possible strategy will benefit from expertise in mechanical modeling and efficient high power computing. Augmenting the quality of performance of the strategy will benefit from expertise in human-machine interface, in capacities to develop micro-robots capable to work inside a human being and to scavenge their energy from the glucose present in its biological fluids.

Emergence projects

Initiatives offering promising results have been identified at the interfaces of biology and health with mathematics, chemistry, physics and technology, and social sciences.

Towards systems biology: For approximately ten years, research in the area of biology has become more integrative, shifting from one level of integration to another (from molecule to ecosystem), integrating heterogeneous data (transcriptome, proteome, etc.), with a dynamic vision in space and time (including evolutionary data). Systems biology is a further development in this integrative vision, and its scope of action is immense: from the identification of multifactorial causes of diseases to the development of personalized medicine. Within a technological context, it is also possible to design and construct biological systems with new properties through the use of modular components (synthetic biology). Most importantly, the emergence of systems biology requires the significant strengthening of interactions between the biological health research community and that of mathematicians and computer scientists, among which those who have conducted research at Grenoble are renowned for their proven excellence. Several teams are developing multidisciplinary and multi-scale approaches beyond the boundaries of existing laboratories in order to study molecular integration in humans and in ecosystems and the complexity of multi-scale processes (from physiology to pathology). An increasing number of projects are being proposed at the biology/mathematics/computer science interface, ranging from studies of

bacterial regulation networks to the development of a simulation platform dedicated to systems biology applications, digital medicine, and ecology that allows for the implementation of principles developed by project modelers and user interfaces in a programming environment for multi-level modeling (Multi-level adaptive modeling of biological systems or MAMBOS project). This last project involves a multidisciplinary consortium of more than 60 researchers and is part of joint strategy for the Universities of Lyon and Grenoble, which also includes the systems biology initiative within the funded IRT LyonBioTech.

Nanobiotechnologies: The local context provides a unique framework (LETI, iRTSV, GIN, IAB, LSP, TIMC, LMGP, Neel Institute, DCM, CHU, Nanosciences foundation) that is especially conducive to solid interactions among experimental biologists and theoretical physicists, mathematicians, chemists and engineers in order to develop engineering for biology, especially at the cellular level. Many projects rely upon these interactions and illustrate the emergence of a new area of excellence. For instance, a unique expertise at the merger between material science and cell biology is being developed; its aim is to develop “knowledge-based” innovative biomaterials, which can be employed for tissue engineering and regenerative medicine. A pilot project integrating state-of-the-art nanotechnologies aims to design a biosensor that relies on architectural and mechanical cellular parameters, with the ambition of predicting the metastatic potential of an individual tumor based on cellular morphology.

4-year and 10-year objectives

	Indicators	Current situation	4-year objectives	10-year objectives
Intellectual and scientific production	Scientific objectives	World-class institutes and platforms in structural biology Excellence in Cell biology with state-of-the-art platforms Interface with mathematics, physics, chemistry and technology Technological Innovation Center and platforms for clinical research	Achieve the convergence between structural and cellular biology. Establish a network for systems biology Establish research platforms for cellular engineering Upgraded experimental platforms for customized micro-nanomedicine	Convergence between structural and cellular biology extended to all research institutes. Industrial developments of novel instruments for medicine, imaging methods and diagnostics. Intelligent implantable medical devices based on micro-nano technologies
	Publications	~ 1000 articles/year in peer-reviewed journals	~ 1100 articles/year in peer-reviewed journals	~ 1200 articles/year in peer-reviewed journals
	Impact factor (IF)	average IF ~ 5 - 5.5	15% with IF >7	20% with IF >7
	Joint publications (between institutes)	10 %	15%	20%
	IUF members	5	10	20
	Scientific distinctions ¹	10	15	20
Attractiveness, scientific animation	Chairs of excellence	3 /year	10 /year	10 /year
	Scientific meetings and workshop	Mostly dispersed within institutes	Workshops (1/year) and lectures Health priorities	International Workshop on regular basis in Grenoble
Technology transfer and partnership	Patents	15 /year	20 /year	20 /year
	Companies created	3 /year	5 /year	5 /year
	Industrial contracts	2 M€	2.5 M€	3 M€
	Interaction with Industry	Worldwide competitiveness clusters; IRTs	Creation of new joint Laboratories (University-Industry)	Creation of new joint Laboratories (University-Industry)
Training	Initial training programs in biotech	Training Institute for Health Care Professions Erasmus Mundus Biohealth Computing European master's degree	Extend development of training programs to research fields of excellence and to health and society programs	Masters Pro for Biotechnology Industrial founded chairs
	Students joining industry after PhD	30% Training in Management for Biotechnology (GEM)	40% 20% of joint PhD/Management formation	60% 40% of joint PhD/Management formation
	Life-long training	International Schools (Esonn, Hercules, EMBO) e-learning initiatives (structural biology, bioinformatics)	Topical international schools on topics of excellence Extend e-learning initiatives	Topical international schools on topics of excellence Extend e-learning initiatives

¹ Including Young Investigation Awards and Funding (ERC, ANR Chairs of excellence, ...)

5.3.3.3 SUSTAINABLE PLANET PRIORITY

Environment (observations, technologies, society, earth, universe, engineering)

In a context of economic growth, with the inevitable limitations on resources and the reality of climate change, there is global consensus that humanity must fully commit to the furtherance of sustainable development. GUI+ is committed to an approach favoring coordination with four objectives, based on our current expertise and the international reputation of our research and educational programs:

- (i) development of clean production processes of intensified technologies, eco-efficient processes of extraction and use of natural resources, and remediation of damaged environments (water, soil, air);
- (ii) sustainable management of natural and industrial hazards and the rational use of resources;
- (iii) understanding, mitigation of climate change at the regional scale, as well as evolving biodiversity;
- (iv) durable and sustained development of means for observing the Earth and its environments.

Our project addresses coordinated research and education activities of a consortium of more than 430 researchers working in the fields of astrophysics, geophysics, ecology, and engineering. It fosters public/private partnership and support to regional, national and international policies. It will contribute to enhancing attractiveness of higher education in the above-mentioned fields by establishing a single framework to host all general courses in Earth and Environmental sciences, civil, mechanical as well as bio-mechanical engineering. One accepted Labex completes this structure (OSUG@2020) and will develop links with Environmental Engineering (Federation Galileo-Galilei de Grenoble – Fed3G). Two successful Equipex (Eco-X and EQUIP@MESO) will reinforce the analytical and computational capacities. The “Environment” project will also serve as the center for emerging projects with development potential in coming years.

Our “Environments” project has embarked on an approach favoring coordination within the Rhône-Alpes region through the Envirhonalp “Groupement d’Intérêt Scientifique” that links national research organizations and universities and favors the construction of shared research infrastructures.

Relevant players and strengths

1. Research

The project will be based on a network of top-class laboratories comprising 430 academic researchers, primarily from the LEGI, LECA, LTHE, LGGE, ISTERRE, IPAG, 3SR, LGP2, Rheology Lab and Cemagref. These have been high-growth (x2) sectors for around a decade. 7 of 9 laboratories have been ranked A+ in the last AERES assessment. This community has received worldwide acclaim in the form of numerous awards (2007 Nobel Peace Prize received by the GIEC, Blue Planet Prize, CNRS gold and silver medalists, science academy members and prizewinners, 25% of members of the *Institut Universitaire de France*, in the field of Earth and Universe Sciences, are working in Grenoble).

2. Technology transfer

Around 23% of the resources for the “Environment” action come from direct contracts with industry. Numerous examples of applications help developing the economic fabric:

- oil and strategic metals extraction, CO₂ storage, hydrogen production, nuclear waste storage;
- improvement and new industrial systems such as cross-flow marine turbines, hydraulic turbines, heat exchangers, fog jet nozzles for fire extinction, and atomizers for combustion;
- intensified industrial processes notably for pulp and paper industry, in chemical and in food engineering, and metallurgy;
- advanced civil engineering including new materials, technical designs, and risk assessment;
- soil depollution using phytoremediation techniques, optimized biofilters, ecotoxicology studies;

- developments in instrumentation, notably high resolution sensors being used in telescopes and satellites probing the solar system (some of them being commercialized by start-ups).

The laboratories particularly assist activities involving expertise in the public sector: seismic risk, gravity hazards, glacial hazards, chronic pollutions in air, water and soils, and climate and global change. One particular structure “*Pôle Alpin des Risques Naturels*” integrates the results of this research to aid public decision-making and to promote development of tools with small companies.

Scientific project and issues

1. Environmental engineering and intensified clean processes

The focus here is to develop a competitive and responsible industry, one that is capable, beyond the objectives of efficiency and productivity, of designing cleaner practices, not only in the production phase but also during the recycling and waste treatment phases and the extraction of natural resources. Such developments imply methodologies that are linked with numerical modeling, measurements on laboratory installations, and testing on pilots. They require pluri-disciplinary and multi-scale approaches, from micro scale (at fluid/fluid or fluid/solid interface scale), through to the overall performance of entire systems (i.e. plants or industrial devices), to be incorporated in advanced simulation tools for engineers and decision makers.

Activities focused on developing clean production processes (clean-tech) and depollution, recycling and remediation processes (eco-tech) have numerous fields of application, ranging from the development of clean practices in chemical engineering (separative techniques, soil cleaning), paper engineering (de-inking), thermal engineering (exchangers, fouling), or geo-mimetic processes of metal extraction.

2. Stability of works, country planning, hazards and natural resources

The socio-economic challenges associated with development arise from the difficulty in guaranteeing the sustainability of natural resources, land developments, and man-made objects. These challenges, or hurdles that must be overcome, primarily represent certain gray areas that remain over evaluating our natural resources, quantifying potential demand and analyzing the behavior of natural systems and artificial structures on which such demand is made. To overcome such hurdles, we recommend:

- intensifying the efforts to collect scientific observational data on the different types of behavior;
- developing new 4D imaging techniques (3D + time) to detect potential warning signs of natural disasters (earthquakes, volcanic eruptions, landslides), and monitoring our natural resources;
- encouraging new channels for open-modeling at international level through an enhanced appreciation of complexity: multi-physical couplings, multi-scale approaches;
- promoting integration between the various researches conducted in separate application programs (hazards, civil, petroleum and hydraulic engineering, mechanics of materials, biomechanics) via the common denominator of mechanics, physics and geophysics (e.g. ERC Whisper Program).

3. The changing climate

As shown in the last report of the GIEC, in which several colleagues from Grenoble participated, the regionalization of climate change has become the new frontier in the next decade. Grenoble has a unique expertise in this area as several laboratories are in charge of the nationally-approved Observation Services, documenting climate variation and corresponding water cycles in the Alps/Mediterranean region, and other sensitive areas (Andes, West Africa, Himalayas, Antarctica). This line of research encompasses three core ideas:

- Coordinate all research conducted on understanding regionalization of climate change and its impact on the quality of air, water resources, and environment and society;
- Develop the suited multidisciplinary approach on global change issues to bring such research more closely in line with demands made by society. Joint scientific activities will be grouped in the new “Maison Climat-Planète” with 2000 m² of offices and laboratories for regional climate change activities. A new Data Center will offer more open and efficient use and management of the information acquired through observation and

calculation tools at the pinnacle of international research in this field. Because this data center encompasses the entire Observatory community, it will help bringing together the scientific community as a whole.

4. Observation of Earth and Space and fundamental understanding of natural processes

The excellence of strategies and methods of observation developed at Grenoble is based on various situational elements:

- support for the observation strategy provided to very high-level research groups and the capacity to build and defend observation strategies both nationally and internationally;
- interfacing between observations and numerical and experimental simulations;
- understanding the need of decision makers and the general public to have access to data;

This also implies the intensive development of basic research in astrophysics, earth sciences, ecology and engineering, where fundamental processes occurring in Nature are studied. For example, the development of compared planetology and exo-planetology will provide invaluable new boundary conditions for Earth models.

5. Emerging projects

Initiatives offering promising potential for knowledge and technology transfers in the near future have been identified in, at least, three fields:

- Imaging and biomechanics through the application of geophysical and engineering methods on the human body: new acoustic imaging techniques with resolution in time in soft matter, time reversal; biomechanics; extended life of medical prostheses.
- Development of methods for exploiting massive satellite data to observe planets. An emerging community is developing new techniques for extracting more precise information from such data.
- Capacity for continued sustainable development at local and regional level and society’s ability to adapt to change: resilience after a disaster, economic change, territorial change.

4-year and 10-year objectives

	Indicators	Current result	4-year objectives	10-year objectives
Scientific and intellectual production	Academics	432	450	490
	Scientific publication / year	940 articles ISI (2.2/year/researcher)	1030 articles ISI (2.3/year/researcher)	1220 articles ISI (2.5/year/researcher)
		13 articles in Nature/ Science	15 articles	20 articles
	% labs ranking A+ and A	78% labs ranking A+ 22% ranking A	90% A+ 10% A	100% A+
Valorization, partnership and international projects	Patents (per year)	7	8	11
	Industrial credits / year	3.4 million €	3.5 million €	4.2 million €
	ANR or EU credits / year	11 million €	12 million €	14 million €
Training	Companies created / year	1	2	3
		3 international Masters degrees including a Master Erasmus Mundus	A second Master Erasmus Mundus All Masters include study time abroad	Doubling the course-hours completed by foreign visitors compared to 2010

Energy

Energy: A 21st-century economic and societal challenge

The challenge posed by energy represents a key socio-economic and environmental issue for the coming decades. The work of the Grenelle Environment Round Table has indeed led to the adoption of the “3x20” commitment established by the European Council with the goal of being met by 2020 (20% reduction in energy consumption, 20% reduction in greenhouse gas emissions, 20% renewable energies used in energy consumption). Above and beyond these political ambitions, the strategic, economic, and financial issues, as far as

France is concerned, are enormous: the control of energy dependence, an even trade balance with regard to investments planned over the next few years, and consequences for the job market.

The positioning of France regarding these major societal issues depends on its ability to conduct research, to train professionals, and to transfer competencies to industry. The Grenoble site, which currently offers a number of advantages, aims to reinforce its credibility and global visibility concerning these three aspects.

Energy in the Grenoble basin

Benefiting from significant experience that goes back to the earliest developments in hydroelectricity, and following a radical transformation over the past few years, the Grenoble site now boasts an environment that is booming in the area of energy. Over the next few years, these advantages are expected to be strengthened even further and to become firmly established as the site's excellence in teaching and research is even more widely recognised.

Today, the key players involved in energy research at Grenoble are covering the entire value chain: from materials to research into political, economic, and environmental issues, from renewable energies to nuclear energy, from components and processes used for energy to bulk power grids, while considering the electricity, hydrogen and heat carriers.

Excellence in energy research at Grenoble

Although these key players often position their excellence individually on segments of the chain, structures such as the Carnot Institute's "Energies of the future" allow for full-scope coverage by bringing together key players at the Grenoble site (university, CNRS, CEA-LITEN), which represent about 1400 researchers, engineers, doctoral students, and technicians in the energy sector. The areas and strategic axes that are covered are as follows:

area	Challenges
Photovoltaic solar	Increase efficiency, grid integration and power electronic interfacing, recycling & eco-design, architectural integration
Hydrogen branch	Kinetic processes of hydrogen production, durability of fuel cells, catalyser, storage, recycling & eco-design
Severe ambiances and Nuclear safety	Corrosion, durability of materials for current reactors, new technologies and new materials for futures reactors, testing en retrofit of existing reactors, natural risks and nuclear safety
Biomass	Wood branch for the 2 nd generation
Marine energy & Hydraulics	Refurbishment, efficiency, aging, submarine hydro turbines
Energy storage	Hydraulic, reservoirs, thermal, electrochemical Durability, reliability and battery safety, recycling & eco-design
Smartgrids	Massive integration of renewable energies and plug-in hybrid vehicules, grid distributed intelligence, new protection and architectures, smart demand response and energy services
Energy efficiency	Building (envelope, energy management, modeling, passive architecture) Processes (efficiency, industrial Processes)
Sustainable mobility	Transportation (actuators, autonomy, charging, bi-directional plug-in)
Micro-sources and nomad energies	Micro batteries, fuel cells, recuperation of energy

Research in the area of energy is also taking place in joint private/public research structures, such as GIE IDEA, which, for the past ten years, has brought together the efforts of Schneider-Electric, EDF and G2ELAB.

At the Grenoble site, synergies are everywhere: synergies regarding objectives and means between the CEA, university, and the CNRS; synergies of scale between laboratories and leading physics facilities, topical synergies between Minatec's micro- and nanotechnologies, smart systems and software solutions pertaining to the Minalogic cluster and other regional key players, such as the competitiveness cluster represented by TENERRDIS, CSTB, INES, and CEMAGREF. A multidisciplinary approach, which brings together researchers in the social sciences, earth sciences, and engineering sciences, is also one of the site's strong points. Backed by the unflagging support of local authorities, this concentration of key players is yielding unique potential that is expected to be synonymous with significant development over the next few years.

Finally, this research force is clearly positioned with an international focus. Teams from Grenoble have been distinguished through their involvement in the European arena (projects FP5, FP6, FP7) and by the selection of the Grenoble site as a "Co-location Centre" for the EIT (European Institute of Technology) *KIC InnoEnergy* with

regards to carbon-free energies and smart grids, as well as large-scale international projects, such as the “111” project, which involves the efforts of Grenoble INP, NCEPU (North China Electric Power University), Virginia Polytechnic Institute & State University, HongKong University and Pacific North National Lab (DOE-USA) and focuses on the security of power grids and smart grids. Similarly, the *Carnot Institute* has naturally been developing special relationships with European RTOs, especially *Fraunhofer Society* institutes. Moreover, Grenoble INP is, for example, a leader in the International CRIS Institute in the area of critical infrastructures (energy and information/communication technologies).

Several indicators of this excellence, combined with a domestic and international partnership-oriented strategy, have been considered on various levels:

- 141 dissertations defended in 2010 (485 PhD and 86 post-doctoral students)
- Consolidated budget of €80 M, with €42 M in contracts
- 667 scientific publications of “A” rank per year
- 158 new patents submitted in 2010
- AERES evaluation: A+: G2ELAB, LEGI, SIMAP, LPSC, I Neel, ISTerre, 3S-R ; A: LEPMI, LGP2, LMGP

The economic sector

The energy sector lies at the heart of economic development, supporting the development of other sectors of activities and, at the same time, serving as a linchpin for economic growth due to the activities that it represents and the expected development potential. Indeed, this sector is included within a new cycle of investments with new technologies, which have closely associated energy systems and information systems (revitalisation of nuclear power units, advent of smart meter and protection systems, decentralised production with the penetration of renewable energies, the emergence of energy demand management technologies, etc.).

Rhône-Alpes is home to two-thirds of French renewable energy companies. The region understands the issues associated with energy and has adopted exemplary initiatives to develop research and generate jobs in this area, creating two coordination and support structures: the *Energy research cluster* and the *Energy economic cluster*.

The ambition of the research project

The research structuring project in the area of energy has made significant headway at Grenoble in association with INES at Chambéry and with the site's “environment and sustainable development” cluster. Our positioning is based on an analysis of our strengths and weaknesses with consideration given to the context in questions and to energy issues, significant trends over the next 20 years in this area, key technologies and the “National Research and Innovation Strategy”.

Thus, our ambition, which is legitimate with regard to our competencies and our strength, is to tackle key scientific and technological challenges in the area of future energies:

- **The challenge posed by energy production and its conversion through power electronics**
 - Renewable energies: photovoltaics, hydrogen field and fuel cells, biomass, and hydraulics
 - Nuclear energy: fourth-generation nuclear power, from nuclear physics to the system vision, including materials and models
 - Fossil fuels: new problems related to the extraction of fossil fuels in conjunction with geotechnologies
- **The challenge posed by energy storage**
 - Micro sources of energy and mobile energy sources
 - Reliable, effective storage solutions (hydrogen, electrical, chemical, etc.) in conjunction with the development of intermittent renewable energies
- **The challenge posed by energy management and policies**
 - Integration of distributed production/renewable energy in major power grids
 - Security of supply, constraints on greenhouse gas emissions and medium- and long-term energy strategies

- **The challenge posed by energy uses**
 - Energy-positive buildings and Eco-Habitat (architecture, city and country), transport systems of the future (entire system component field), propulsion systems
 - New industrial processes optimizing energy savings and the use of resources
 - The behavior of key players and the adoption/distribution of new technologies
- **The challenge posed by the environmental impact**
 - Management of nuclear waste, waste management and clean-up processes, CO2 storage
 - Eco-design.

4-year and 10-year objectives

	Indicators	Current situation	4 year objectives	10 year objectives
Scientific and intellectual production	« A » rank scientific publications	667	740	860
	Patents	158	187	240
Attractiveness, scientific animation	invitations to prestigious conferences		20	30
	visiting top international researchers		10	15
	organization of major international conferences at Grenoble		4	6
	participations in international scientific committees of prestigious conferences		30	50
Valorization, partnership, EU presence and international projects	Industry partnership contracts	€ 42 M	€ 62 M	€ 85 M
	innovative start-ups		5	8
	EU projects and international projects		8	12
Training	number of students coming from prestigious foreign universities		10%	20%
	% of employment 6 months after graduation		95%	98%
AERES	% of partner labs with A+ grade	70%	80%	90%

5.3.3.4 INFORMATION PRIORITY

Micronanotechnologies

With more than 1,000 scientists involved in nanosciences and nanotechnologies, Grenoble reaches a critical mass providing high international visibility in this field. This gives Grenoble a solid continuum between major institutions in basic research, unique large instrument facilities (ESRF and ILL), forefront technological research actors and worldwide known industrial partners.

The “nano” tropism of Grenoble laboratories has been popularized by the creation of Minatec in 2002. The last few years were a very fruitful period, allowing for the creation of new laboratories. SPINTEC has been launched to develop R&D in spintronics. The creation of the startup CROCUS followed in 2004. Then, in 2007 the integration of the nanoscience activity has been boosted by the creation the RTRA (*Réseau Thématique de Recherche Avancée*) focused on "Nanosciences at the frontiers of nanoelectronics". This network including 32 laboratories² across the various research institutions based in Grenoble is supported by the Foundation Nanosciences which goals are to foster world-class nanosciences research by encouraging collaborative and multidisciplinary projects and extending the international reputation of Grenoble as a leader in the nanosciences field. Today the key fields of applications related to the network are:

² CERMAV (CNRS/UJF), DCM (CNRS/UJF), G2ELab, (CNRS/INP/UJF), GIN (UJF/INSERM/CEA /alpha), IAB (UJF/INSERM /alpha), INAC (CEA), INAC-SCIB (CEA/UJF), INAC-SP2M (CEA/UJF), INAC-SPSMS (CEA/UJF), INAC-SPrAM (CEA/CNRS/UJF), INAC-SPINTEC (CEA/CNRS/UJF), IBS (CEA/CNRS/UJF), Institut Fourier (CNRS/UJF), IMEP (CNRS/INP/UJF), Institut Néel (CNRS/UJF), LCBM (CEA/UJF), LNCMI (CNRS/UJF), LEGI (CNRS/INP/UJF), LBSIV (CNRS/EMBL/UJF), LAOG (CNRS/UJF), LEPMI (CNRS/INP/UJF), LETI (CEA), LIG (CNRS/INP/ UJF), LITEN (CEA), LJK (CNRS/INP/UJF /UPMF), LMGP (CNRS/INP, LPMCC (CNRS/UJF), LSP (CNRS/UJF), LTM (CNRS/INP/UJF), SIMAP (CNRS/UJF/INP), TIMC (CNRS/UJF/INP), TIMA (CNRS/UJF/INP)

Information technology and communications: Nanoelectronics, nanophotonics and spintronics are set to take over from microelectronics and yield more miniaturization, more computing power, more memory storage capacity. Any research project related to these fields will reinforce the set of high-level skills found in Grenoble;

Healthcare and medicine: Nanosciences will provide new tools that will enable to develop new diagnostics, therapeutics, and preventives;

Energy and environment: Innovative nanotechnologies will contribute to improve energy harvesting from renewable sources and creating new ways of recycling or reusing water and wastes.

Meantime, new platforms were built from the idea that it is absolutely necessary to put together teams and high-level equipment to fulfill the needs of laboratories in terms of technology and characterization. The PFNC (*Plateforme de Nano-Characterisation*) and the PTA (*Plateforme Technologique Amont*) are direct consequences of this. More recently, the Néel Institute was created in 2007 with a staff number over 400, almost 2/3 of it being dedicated to nanosciences, including spintronics, III-V and II-VI semiconductors, quantum nanoelectronics and information, laser and photonics, local probes... with a special focus on extreme instrumentation and metrology. Another strong synergy was initiated by the project NANOBIOS which aims to boost the design of new tools for biology and medicine emerging from nanosciences and from microfabrication techniques. This pluri-disciplinary project associates chemistry, physics, biology, medicine and aims to stimulate the specific developments coming from MINATEC in the fields of biology, health and food production.

The large majority of the laboratories involved in RTRA got an A+ grade following the recent AERES evaluation. This results from a worldwide first class research, but also from an active dissemination policy with an important number of publications in refereed journals (roughly 1200 each year) and more than 400 invited talks in international conferences each year. A major strength of nanoscience activity is the development of large patent portfolio, including today more than 200 patents for microelectronics, biological, medical and energy applications.

Labex in Nanosciences and nanotechnologies

The research strategy in nanoscience and nanotechnology addresses major research, technological, economical and societal challenges by establishing a unique environment enhancing the cross-fertilization between the different areas (physics, materials science, electrical engineering, chemistry and biology) and bridging the gap between basic research, R&D, and industrial developments.

Our activities in nanoscience and nanotechnology cover the whole spectrum from highly fundamental research through large-scale industrialization. Grenoble, as an industrial pole, is considered a national model of competitiveness. Only in France in nanoelectronics, it brings together global manufacturers of semiconductor equipment manufacturers, silicon specialists and tens of SMEs. The projects proposed, Equipex, Labex (LANEF and MINOS) and IRT "nanoelectronique", are a complete set of tools to boost the all range of activity with a highly interactive coordination to increase the speed of innovation transfer.

Nanotechnology developments require more research in materials as well as co-integration of various diversified components. The ICT work program of the European commission declares one of its major challenges the "further miniaturization and increased performance in electronic and photonic components, in micro/nanosystems integrating functionalities like sensing, actuating, communicating, in alternative routes to new components and systems"... and strengthens its "future and emerging technology" scheme. The European Nanoelectronics Initiative Advisory Council (ENIAC) strategic Research Agenda has fixed its 2013-2020 research priorities as i) developing a physical understanding of the fundamental limits of ultimate CMOS transistor structures and ii) preparing the co-integration of CMOS with novel 'Beyond CMOS' structures. From these considerations and following on the GUI+ strategy, Grenoble scientists are focusing in two complementary challenges: the investigation of technological ruptures envisioned for the scaling of nanoelectronics devices and the development of an integrative basic research network groundbreaking R&D as the wellspring of innovation. First challenge is the main driving force of the Labex MINOS, whereas the second one is integrated inside another Labex, LANEF, which field is however larger than nanosciences.

1. *Laboratory of Alliances on Nanosciences and Energy for the Future – LANEF*

LANEF addresses major challenges: ICT, energy & electricity, and health & wellness. Groundbreaking R&D is the wellspring of innovation and a major challenge is to build a unique environment where basic multidisciplinary research (with an emphasis on physics and electrical engineering) will be integrated in a larger campus for research & innovation, which is the GIANT project. LANEF is the reservoir of basic research in nanosciences and materials research for the integrative network of Grenoble, within the frame of the new national strategy and the IRT "Nano-microelectronics". Thanks to their exceptional international position acquired over the long term, the teams of LANEF will facilitate access to forefront research for hundreds of students, R&D engineers, SMEs and start-up companies.

Grenoble is the place to develop such an integrative network since it hosts major basic research laboratories, which will be partners of LANEF, a unique combination of large instrument facilities (ESRF and ILL), technological research centers and industry. When combined, Grenoble's Minatec and GIANT reach the critical mass needed to ensure national and international visibility. This provides a favorable environment for research and innovation.

The project identifies nine major research fields where LANEF provides a critical mass and fore-front expertise to produce significant breakthroughs: Photonics and semiconductors, Spintronics and nanomagnetism, Quantum nanoelectronics, Electrical energy, Advanced superconductivity, New frontiers in cryogenics, Nanosensors and nanomaterials for health and biology, Theoretical and Computational Physics and Facilities.

2. *Minatec Novel Devices Scaling Laboratory - MINOS Lab*

The international competition and the heavy level of investment have led, worldwide, to an extreme concentration of the major players in the field of microelectronics. Only few, among them STMicroelectronics, are still present in this competition. Concentration of technical means and highly skilled people are required to keep a role in the extreme miniaturization of nanoelectronics devices. In Grenoble, research on the most advanced technological nodes, disruptive technologies are developed on CEA-LETI and STMicroelectronics 300 mm platforms in cooperation with three academic laboratories i.e. IMEP-LAHC, LTM and LMGP located on the Minatec site. Our objective is to create one of the strongest research laboratories in Europe to reinforce France's competitiveness in close cooperation with IRT Nanoelectronics.

The unique feature of MINOS Lab lies in its capacity to federate research all along the continuum of Minatec platforms in order to accelerate the introduction of disruptive concepts and new materials into prototypes that can be transferred to industry. MINOS Lab will provide to the nanoelectronics IRT high level upstream research open to international cooperation, attracting the best students, and anticipating the next steps of nanoelectronics development.

3. *Labex Nano-Security (resubmitted to Labex2)*

Nanotechnology cannot continue to thrive if potential risks to workers, consumers and the environment are not fully controlled and their impact on health, whatever their shape and chemical nature, identified. The creation of a database founded on expertise and metrology coupled with a strong multidisciplinary interface between researchers, medical doctors and experts on risk prevention is a solution to achieve the objective of controlling the potential of nanotechnology. The Labex Nano-security constituted by the Nano-Platform Security (Campus Plan) aims to disseminate knowledge already collected through Nano-INNOV, through an innovative educational project to both the level of initial training, lifelong training and awareness of the general public. CEA and INERIS, two experts in the field of risk prevention heavily involved in the development of nanoparticles will provide the expertise of produced data. This Labex will interface with many laboratories in France working on different scientific themes.

Emergence projects

The manipulation of individual molecular objects, the decreasing of analysis scales, the miniaturization of devices, the information storage and information transfer at the molecular level are fundamental questions to the chemistry interface with nanoscience. The ambition of Grenoble's chemistry is to bring his research in this direction, in a very multidisciplinary approach. As an example, molecular electronics, including organic electronics will be one of the emerging projects in nanosciences with purpose to design new molecular architectures which can be used as active components in electronic devices such as transistors, switched systems and storage memories. The challenge is to connect the molecular level to the macroscopic world through the integration of molecular assemblies in a solid

surface device without loss of specific properties. Another application of nano-chemistry lies within the development of very original nanostructured catalytic compounds like organometallic polymers with metal-metal bonds or coordination bonds, with potential applications: decomposition of water for energy storage, conversion of chemical energy for example in batteries or even transformation of carbon dioxide into useful compounds.

4-year and 10-year objectives

	Indicators	Current	4-y objectives	10-y objectives
Scientific and intellectual production	Scientific articles in international reviews	1200	1300	1400
	Nature Group and Science publications per year	35	40	50
Attractiveness, scientific animation	IUF members or equivalents	5	7	8
	Invited high level scientific Chairs (per year)	4	6	8
	Organisation of international workshops	30	40	50
Valorization, partnership, EU presence and international projects	Active patents and licences	180	240	300
	Start-up creation per year	3	4	5
	Industrial contract	30	40	50
	Direct industrial support in M€	3	4	7
Training	International students in nanotechnology and nanoscience Masters	20	30	50

Intelligent systems and software

Information and Communication Technologies (ICT), through the emergence of new applications and innovations such as the Internet, social networks, mobile devices, embedded systems, ambient intelligence, and others, have affected our way of life in many aspects in the last decades, and present us with opportunities that were unimaginable only a few years ago. ICT is also an important economic driver, both directly through new products and services, and indirectly by increasing productivity and innovation through digital organization and management, and computer-aided design. Our society will continue to face major socio-economic challenges during the next decade: improving healthcare and well-being services, sustainable transportation and infrastructures, energy efficiency and environment sustainability, climate change, technology, and economic competitiveness.

The development of intelligent systems requires new approaches to systems design and implementation that break with traditional approaches. These suffer from a separation between the concerned scientific disciplines: computing science, control theory, signal processing, and mathematics. Developing holistic approaches to intelligent systems based on the convergence of software, hardware and nanotechnologies, and mathematical modeling and numerical simulation is a key objective of the Intelligent systems and software (ISS) research axis. Another key objective consists in supporting the increased use of numerical simulation techniques together with mathematical modeling and high performance programming in order to develop innovative approaches that allow to understand, predict and control physical phenomena through multi-disciplinary actions that bring together mathematicians, computer scientists and researcher and engineers from other disciplines such as nanosciences, environment sciences, physics, etc...

Research

ICT are a major economic driver for the region of Grenoble. They have already generated many jobs (direct and indirect, low end and high end) and a high level education system:

- Jobs in ICT Industry: 34 000
- Jobs in Research: 5 000
- Universities & High Schools: 7 000 students in ICT
- Yearly degrees: 3 000
- Local Patents in ICT: 415 in 2009

The table below summarizes the employment growth in ICT industry for the last 10 years besides the important number of companies in the area.

		2009	1999	jobs	
ELECTRONICS	80 companies	10 100	11 300	- 1 200	- 11 %
MICROELECTRONICS	130 companies	12 100	5 250	+ 6 850	+ 130 %
SOFTWARE	275 companies	12 050	8 200	+ 3 850	+ 46 %
TOTAL	485 companies	34 250	24 750	+ 9 500	+ 38 %

Grenoble represents the second center of academic research, according to a DGSIP/DGRI report, behind the greater Paris region (Ile de France), in ICT in terms of critical mass and publications; the Rhône-Alpes region is ranked 9th in Europe for the number of patents in this sector.

The scientific area has 8 CNRS-University joint units, 1 INRIA center and 1 CEA research laboratory (LIALP). This represents about 700 faculty members and researchers, 300 post-docs and 640 doctoral students. Though, all of them are member of research laboratories evaluated A+/A, the research program proposed in this action directly concerns 230-250 faculty members and researchers.

Although the excellence of Grenoble in research and education in the concerned scientific disciplines is regularly and constantly reflected in evaluations, we mention that this scientific community that has obtained many national and international awards among them the most prominent ones:

- Turing Award (Joseph Sifakis)
- Eurographics (François Sillion)
- Longuet-Higgins (Roger Mohr, Cordelia Schmid)
- 7 Members of Academies (Academy of Technology, Academy of Sciences, the Academia Europaea, American Academy of Arts and Sciences, ACM CHI Academy)
- 6 senior members of the IUF and 5 junior members
- 2 CNRS silver medals and 2 CNRS bronze medals
- Numerous awards and fellowships (ASE Fellow-IEEE/ACM, ECCAI Fellows, Eurographics, French Academy of Science, Royal Academy of Belgium, MICCAI, French Mathematical Society, French Society of Statistics, Irène Joliot-Curie Society French Operational Research, IFAC Fellow, IEEE CSS Distinguished Lecturer, Life Achievement Award, SEE NMO, IEEE Fellow Award Charasse)

Our scientific output in 2009 is 668 articles, 806 papers in A-ranked international conferences, over 45 patents. More than 25 start-ups have been created on the basis of our work.

Research rationale

Information technologies are critical to meeting the needs of society and the economy. They are mandatory for advancing science and technology (modeling, numerical simulation, prediction, access to information, data mining, cooperation, etc.), for increasing productivity and innovation (not only are they innovation providers but they also provide the tools for other sectors' innovation and productivity) and for enhancing services to society (health care, education, mobility, etc.). However, information technologies are changing rapidly, driven from the top by new needs and applications and from the bottom by advances in software, hardware and nanotechnologies.

The following trends are fundamentally changing the nature of IT systems and the role of modeling, optimization, and simulation, not only for these systems but also for engineering and science, in general:

1. **The fusion of information processing with the physical world**, enabled through the increased ubiquity of sensors, actuators, and embedded systems, leads to systems that combine discrete and continuous time, concurrency, predictability, robustness, and both best-effort and worst-case requirements. According to Google, there are over 500 million devices on the Net —not counting servers, not counting laptops, personal digital assistants, or mobiles. According to Nokia Siemens Network figures, 5 billion people will be connected by 2015 and according to Wireless World Research Forum, there will be 7

trillion wireless devices serving 7 billion people in 2017. The Internet is a highly unpredictable, best-effort, discrete system, interconnected with hard real-time, safety critical devices such as transportation systems and assisted living systems.

2. **The rate of growth of available data**, the increased variety of forms it takes, the complete shift of how it is constructed, and the diversity of usages encountered, leads to **an explosion of the digital universe**. According to an IDC report, individuals create 70% of the digital universe, but organizations are responsible for the security, privacy, reliability, and compliance of 85%.
3. **Increased sustainability awareness and energy sparseness** heightens the need to abandon over-engineering practices that lead to over-dimensioned wasteful systems, in favor of resource-driven, energy and carbon footprint aware system engineering. According to a report by McKensey & Company, the amount of energy consumed by data centers doubled between 2000 and 2006, and today the average data center consumes as much energy as 25,000 households.
4. **Modeling and simulation are now an essential scientific methodology** in nearly all areas of engineering and in many branches of the sciences. An NSF report underlines this by saying that “computer simulation is central to advances in biomedicine, manufacturing, homeland security, microelectronics, energy and environmental sciences, advanced materials, and product development”. However, new advances are needed to develop mathematical models, tools, and computer simulation techniques that enable researchers to study and predict physical events, as an extension of their theoretical investigations. Although, the strategic importance of using high performance computing has led several countries to develop ambitious investment policies towards petaflops and exaflops facilities (in particular France since the creation of GENCI in 2007, within the European Partnership PRACE), this does not allow us to elude the need to develop new advanced in mathematical models, numerical simulation and high performance programming. To the contrary, there is a need to develop new computational paradigms to optimize the use of these resources.

To address these issues, we need

- A new system theory and system design principles that are based on firm mathematical foundations and that emerge from the convergence of the sciences of computing, embedded systems, control theory, hardware, and systems architecture. In fact, only a few locations, world-wide, have the critical mass, excellence, infrastructure and the needed experience in multi-disciplinary research for taking such a challenge and taking this endeavor.
- New approaches to the digital universe and the future of the internet that go beyond storage-centric approaches. They must be able to deal with information creation, storage, management, security, retention, disposal, and usage.
- New models, simulation algorithms, optimization, and visualization techniques that deal with multi-scale, multi-physics models and massive and distributed simulation data on large scale computational resources.

Excellence projects

1. Pervasive human-centric computing

The Information Technology landscape is rapidly evolving towards multi-scale computing and communicating infrastructures that interconnect heterogeneous devices: database servers, high-performance computing facilities, business and organization information systems; mobile devices such as mobile phone, PDAs; and sensors and actuators swarms. The Internet of things/objects is probably the best example to illustrate this trend. Such systems are the result of the convergence between embedded systems, internet-based computing facilities, typically cloud computing and information systems, and human-centric services, provided through ambient intelligence infrastructures. Developing PHCC systems breaks with traditional computing systems engineering, because such systems must meet difficult technical needs such as adaptivity to the context and available resources, reactivity to satisfy required performances, autonomy to provide aliveness, robustness to guarantee minimal services, scalability and genericity to guarantee reusability and efficiency of design and development.

2. Information and cognition

Mastering the huge and complex digital universe is a major challenge. Indeed, information is at the heart of modern business, medicine, and design; it is critical to industry; and it impacts every through the web, news, learning and entertainment, social networking, etc. This excellence project focuses on developing new algorithms and data structures for the representation, extraction, interpretation and use of information and digital content across modalities and languages, and on engineering information-centric artificial cognitive systems and robots. Key issues are:

- making low level signal interpretation more reliable
- devising richer forms of interaction with virtual information
- enabling scalable access to complex dynamic information sources
- defining cognitive-level architectures that can adaptively marshal diverse sources of information to accomplish complex tasks

The project includes 4 tasks: 1.) Modeling and Interpreting Natural Signals, which covers advanced methods for low-level signal and image understanding, 2.) Creating and Interacting with Virtual Worlds and Intelligent Information Access, which covers the mid-level challenges of creating, organizing and interacting with massive amounts of complex virtual content and structured information 3.) Cognitive Systems, which covers the high-level challenge of building deeper cognitive models of humans and artificial agents and 4.) Robotics, which integrates results from all of these areas to design intelligent robotic systems.

3. Modeling and numerical simulation

Mathematical modeling and simulation are now essential. An NSF report underlines this by saying that “computer simulation is central to advances in biomedicine, manufacturing, homeland security, microelectronics, energy and environmental sciences, advanced materials, and product development”. However, new advances are needed to develop mathematical models, tools, and computer simulation techniques that enable researchers to study and predict physical events, as an extension of their theoretical investigations. Indeed, simulation-based engineering and science require significant advances in mathematical models, simulation methods, scalable algorithms, and their implementations. This is caused by the increased complexity of systems involving multiple and coupled physics models, large numbers of parameters and variables, and wide ranges of time and spatial scales. The following challenges need to be addressed:

- uncertainty quantification, rigorous validation and verification to enable simulation-based decision and optimization;
- multi-scale modeling, and implementation on large-scale, multicore architectures for high-dimensional problems;
- processing large and noisy datasets requiring new data representations and data-mining algorithms;
- implementing numerical simulation for multi-scale applications (Earth and Planetary sciences, climate change, bio-medical, turbulence, complex fluids...) on large-scale multicore architectures requires new development, analysis, and software implementation techniques.

In order to address these challenges, an innovative structure MaiMoSiNE (“Maison de la Modélisation pour les Nanosciences et l’Environnement”) has been set-up in Grenoble end 2010. The mission of this structure is two-fold: 1.) allow the emergence of multi-disciplinary teams that bring together modeling and simulation experts on one hand and researchers and engineers in nanosciences, biology, medical sciences, physics, and environmental sciences on the other hand, in order to solve complex modeling and simulation problems, 2.) set-up innovative training courses in modeling and simulation. In particular, MaiMoSiNE has the ambition to promote mathematical modeling and numerical simulation in industry.

4. Monitoring and control of complex and intelligent systems

Monitoring and control are omnipresent in most modern information systems. The development of new architectures for efficient monitoring and safe control of physically or geographically distributed systems, such as large-scale critical infrastructures (transportation systems, energy systems, environmental systems) will strongly depend on the ability of designing new communication architectures and algorithms that renders mandatory new

multi-disciplinary researches based on computation, communication and control system technologies and theories. Indeed, several features make complex dynamic systems difficult to monitor and control: e.g., strong coupling, presence of combinatorial aspects of decision making, high dimensionality coupled to partial information availability, and the presence of nonlinearities/constraints inducing nonconvexity. New fundamental, computational and practical research challenges have emerged from recent advances in networks and technologies, in parallel with new societal issues, such as sustainable development, energy saving and the related environmental concerns.

5. Reinforcing long-term industrial collaborations

In December 2009, the CEA, CNRS, INRIA, Grenoble INP and UJF decided to set up the PILSI CRI (*PILSI Centre de Recherche Integrative*), whose mission is to support long-term collaborative research with industrial partners. The center, which is led by the 2007 Turing awardee J. Sifakis, is organized in technology programs defined with industrial partners. Joint teams are then set up to execute these programs.

Currently, about 40 researchers and engineers are involved in the first Program “Multi-core-programming” with STMicroelectronics. With a view to launching them by early 2011, we are currently investigating the following programs: Intelligent Habitats and ICT for health care with Orange labs, Design Platform for Technologic Nodes under 22 nm with Mentor Graphics.

PILSI CRI is an important and innovative tool for transferring innovations and knowledge from research laboratories to industry. In order to make PILSI CRI highly reactive to industrial needs and flexible, we target to build a pool of highly qualified engineers. The target size of this pool at 4 years is 10 engineers and 20 at 10 years.

Emergence projects

1. ICT for energy distribution and management

The development of alternative sources of energy, the increase of process efficiency, and a better management of energy systems through an intensive use of new available technologies (networks, sensors and information system) are key elements in taming the energy consumption crisis. Energy systems are Complex Dynamic Systems due to the spread of source diversity (energy mix), network agility (smart grid), and context variability (dynamic pricing and security of energy supply). Such systems require a three-layer improvement: planning to improve medium-term management, supervision to improve short-term performance, and control to get the best use of new devices. ISS will address new control-related challenging issues for smart energy: Energy Management in Smart Buildings and Smartgrids.

4-year and 10-year objective

	Indicators	Current situation	4 year objectives	10 year objectives
Scientific and intellectual production	Articles in journals and conferences ranked A	1500 /year	1700 /year	2000 /year
Attractiveness, scientific animation	Summer schools	3 unrelated summer schools	Federated Summer Schools/yearly, 300-400 participants	Federated Summer Schools/yearly, 300-400 participants
	Short-term visits 1-3 months		40 months/year	40 months/ year
	Junior chair		1 /year	1 /year
	Senior chair		1 /year	1 /year
	International master grant	<5/year	30 /year	30 /year
	Graduated students	746	800	1000
Valorization, partnership, EU presence and international projects	Industry partnership contracts	18 M€/year	20 M€/year	22 M€/year
	Participation in research laboratories abroad	3	5	8

5.3.3.5 SCIENTIFIC INSTRUMENTATION

Excellence of Grenoble in the field

The Alpine corridor, hosts a unique collection of instrumental laboratories and large-scale scientific facilities such as particle accelerators, observation equipments, underground laboratories, light and neutron sources or very high magnetic fields. Their scientific visibility and reputation result from the high-quality output and skills in instrumentation and technology, which push back existing limits of observation scales, energy of accelerated beams or in cosmic rays detection, extreme conditions to probe new states of matter, materials characterization and system integration. Two Nobel prizes were awarded for work done entirely (Physics 1985) or partly (Chemistry 2009) in the Grenoble large-scale facilities.

Numerous scientific and technological projects have successfully applied to the *Equipex* and *Labex* calls. The aim of this unifying *action* is to provide additional impetus to develop and disseminate the excellence of scientific & technological research projects, sources of innovation in terms of Scientific Instrumentation at the very frontiers of technology. The partners laboratories involved in this initiative often have the leadership and responsibility for constructing or managing key elements in numerous major large scale detectors (ATLAS, ALICE, and LHCb for the LHC; HESS, CTA, Edelweiss; Herschel, Planck, Rosetta in space; NAOS, SPHERE, AMBER and PIONIER for the VLT and the VLTI) and for the operation of experimental platforms (LSM, LNCMI, etc.) or of beam lines (at ILL, ESRF). It involves end results in terms of scale (networked detectors or detectors with a large number of channels), technological limitations (integration, speed, storage or data transfer, procedures and materials), or having to work under extreme conditions. Facilities may be installed in international centers, or in individual laboratories. The contributions from Grenoble laboratories to space missions since the '80s should be noted. The most recent are Herschel, Planck, and Rosetta. The accumulated experience includes work in large collaborations (often international, sometimes with more than 1000 people) and management of projects stretching over periods exceeding a decade and budgets amounting to several M€.

Scientific instrumentation is a highly transversal and cross-disciplinary theme. In the Grenoble region, it is bolstered by the presence of a remarkable set of high technology industries. Through this action, GUI+ will be able to unify the scientific and technical efforts of a very strong community, with a large common denominator. The experimental projects involving "the physics of the two infinities", in the field of physics of origins, in life sciences and biology, condensed matter physics, materials and process engineering, environmental science, etc., rely strongly on this issue of instrumentation. Scientifically speaking, this will strengthen the remarkable position of Grenoble in this highly interdisciplinary area **and will also give rise to projects shared by multiple research bodies** (Universities, CNRS, CEA, CEMAGREF, etc.) **and European large-scale scientific facilities** (ILL, ESRF, LNCMI, IRAM, LS Modane, EMBL, etc.).

Scientific Instrumentation main objectives

Instrumentation is a major theme in several scientific communities in Grenoble. New ambitious shared objectives and synergies emerge. GUI+ will provide to the four poles that we propose, the means to grow, and promote new interdisciplinary projects. This action will also have a driving effect on teaching and technology transfer and unify the community and establish a scientific life via the organization of dedicated workshop and conferences.

Instrumentation pole for the Physics of the Origins and Infinities

The understanding of the origin and evolution of our universe is addressed by a large community in Grenoble. Accelerator-based experiments and powerful ground or space observatories give a complementary tool to address these fundamental questions. Most of the projects in this field are large-scale international experiments (AMBER, ATLAS, AUGER, D0, HESS, NAOS, PIONIER, SPHERE, Rosetta mission) operated worldwide, and even in space. They involve international collaborations and R&D's held in a competitive and highly challenging environment. New

ideas, conceptual designs, small-scale prototypes emerge in the partner's laboratories before becoming ambitious international programs.

1. Instrumentation for large scale detectors and future particle physics facilities

The LHC accelerator has successfully started operation and gradually gets to the designed performance and the partners laboratories participate to 3 out of 4 of its main experiments. It is already clear that an upgrade of the LHC luminosity by an order of magnitude is necessary and beyond LHC an e+e- collider at high energy is mandatory for precision measurements. This implies innovative developments and cutting end technologies on accelerator and detector instrumentation, also presented in the HoMe project:

- Scenarios including, in particular, elliptical (conventional) and compact (required at LHC) crab cavities. The LHC also needs improved cryogenics including modeling and controlling.
- Present solid state technology allows building units at power up to 50-60 kW at costs considerably lower than vacuum tube based units and an increase in power up to 300kW is technically possible. Moreover, solid-state amplifiers have higher reliability and are interesting for Accelerator Driven Systems Linacs or for spallation sources (ESS).
- Conceptual design and prototyping for the CLIC (Compact Linear Collider) e+e- collider. The particle acceleration will use an innovative double beam technique and the main challenges address sub-nanometer beam stabilization and nanometer beam diagnostics issues. The future machine require polarized beams with challenging specifications
- The upgrade of the ATLAS inner tracker. A 'massless' and highly segmented Si pixel detector under study drives innovative techniques in material science and 3D electronics.

2. Instrumentation for ground based telescopes and space probes

Photons and particles, created and accelerated from our locations in solar system to the edge of the universe are fundamental messengers on its origin and evolution, that ground and space based observatories aim to unfold.

These large-scale telescopes and space probes involve innovative and complex instrumentation. Inventing and providing the next generation of instruments and systems for the future ground based very large telescopes and space probes requires a strong implication into forefront technological developments. After SPHERE on the VLT, the next European 40 m multi-mirror giant eye (E-ELT) will require a new generation of fast and high contrast adaptive optics to image terrestrial planets around nearby stars (EPICS instrument). In complement of the E-ELT, imaging by interferometry will be the only way to access to sub-milli-arcsec resolutions on 200 m baselines. We will develop integrated optics devices in the NIR and the visible, with 8 to 10 telescopes recombination capabilities. These recombination devices will be coupled with integrated spectroscopic systems like the SWIFTS. The ultimate sensitivity needed to reach the scientific goals will require integrating photon-counting detectors like RAPID. Remote earth sensing and in-situ space probes, as planned by the ESA Cosmic Vision plan (EJSM, Marco Polo, NEAT) will require R&T in collaboration with CNES, subsystems developments, and specialization of new technologies as well as tests in analog chambers and laboratory experiments. Such cutting edge developments are and will be part of a virtuous circle. Adaptive optics researches (NAOS, SPHERE) have given birth to the ALPAO Spin-off, SWIFTS will soon be associated to another, and the fast camera development in astrophysics has direct application on airport runways monitoring (DROP project).

3. Instrumentation Pole for Large Scale European Facilities

Large-scale facilities are a prominent part of the Grenoble research landscape. Many thousands of external users yearly come to these facilities and contribute enormously to the international visibility and reputation of Grenoble. With a scientific output of over 1400 publications per year, this pole has a very large impact worldwide. Apart from providing access, these facilities have strong instrumentation development programs to continuously improve their performance and attractiveness. These developments are carried by in-house scientists and engineers, and very often in close collaboration with staff from other Grenoble laboratories excelling in vital techniques, like cryogenics and high pressures (Néel, INAC) or microelectronics for detectors (LETI).

4. Instrumentation under Extreme Conditions for Condensed Matter Physics and material characterization

Grenoble has in particular acquired a strong international reputation for the development of instrumentation under extreme conditions of very low temperatures, high magnetic fields and high pressures for condensed matter physics, and particularly, for the exploration of new states of matter in strongly correlated systems (High-Tc cuprates, heavy fermions, low dimensional magnets, manganites..., at Néel & LNCMI CNRS, SPSMS-INAC-CEA, and ILL as well as ESRF). For instance:

- In large facilities, like the LNCMI-CNRS or Collaborating Research Group (CRG) spectrometers located at the ILL (INAC) and ESRF (Néel, INAC). For the case of the LNCMI, recent developments include the development of NMR in fields above 30 T. In the case of neutron scattering, recent developments include unique equipments, often developed in collaboration with ILL, like spherical neutron polarization analysis (CRYOPAD), resonant neutron spin-echo option (allowing for the study of dispersive excitations, Larmor diffraction as well as modulated neutron beams), a fully non-magnetic diffractometer (D23) for studies up to 15T.
- A remarkable example of collaboration between the large facilities are the X ray and neutron scattering experiments developed on ILL and ESRF beam lines in pulsed high fields up to 30 T, with planned extensions up to 40T.

Instrumentation Pole for Life Science and Health

1. Technology and Instrumentation for integrated structural and cell biology

One of the main challenges in biology consists of imaging whole cells in space and in time at a quasi-atomic resolution. In Grenoble major efforts are made to push the instrumentation at their limit in terms of sensitivity (single molecule detection), spatial resolution (reach and possibly break the optical diffraction barrier), parallelism (simultaneous measurements at several points of interest), specificity (development of fluorescent labels).

2. Technology and Instrumentation for diagnosis, imaging and therapy

Cancer, neurology and surgical applications are among the main fields addressed by the development of instrumentation for medical applications in Grenoble. Several laboratories are developing original and unique devices for cancer like the measurement of dose and size/shapes of beams in radiotherapy or the Positron-Electron Tomography for tumor Imaging. In the domain of the hadrontherapy, accelerator developments but also simulation and tests on innovative concepts are an active field for some partners of GUI+. This is either at the level of the R&D or can lead to constructions by well-established companies in close collaboration with the laboratories. New techniques in the domain of optics are also important due to their properties of being little or non-invasive, and their specificities in terms of diagnosis. For this field, the innovative research in laboratories is an essential input and involves various technologies (accelerators, detectors, electronics, and data acquisition at high rates).

Instrumentation Pole for Material Sciences and Engineering

In Material Science and Engineering (MSE) including mechanics and processes, the development of instrumentation has always been a critical aspect to improve our knowledge in fundamental phenomena and to accelerate technological innovation. The understanding of how processing and microstructures influence material properties most often according to the operating conditions and imposed stresses is the basis of MSE. This means that Instrumentation plays a crucial role by providing access to information about the dynamics of materials behavior and their defects, but also to identify interactions at different scales for many systems like geomaterials, turbulence in fluids or between multidisciplinary processes (e.g. coupling in flows between chemistry or biochemistry). The ability to characterize and manipulate materials from the nanoscale (nm) to the microscale (μm) offers promise of breakthrough discoveries and large-scale use of new materials. The same challenge holds for geomaterials (from μm to m) and transport phenomena like confined industrial flows (from mm to m) and for geophysical and environmental flows (from m to km).

This activity of advanced characterization methods based on imaging techniques is developing both in laboratory instruments and in large-scale scientific facilities. In both cases, GUI+ is at the cutting edge of this technology.

- **Expertise of the Grenoble laboratories in 2D and 3D imaging characterization**, through the use of novel devices developed within the laboratories and/or in tight connection with ESRF. This expertise is used in areas of application linked to energy, environment, and the interface with health, which requires a characterization with spatial resolution ranging from the nanometer to the millimeter.
- **In terms of laboratory devices**, four important activities can be cited for characterization: (i) the nano-characterization which accompanies the race for ultimate scales with the development of techniques for analyzing local orientations in TEM-FEG (Transmission Electron Microscopy) and the association of a nano-indentator will make it possible the link between the microstructure and the mechanical performance. (ii) In situ and/or in operando characterization based on X-ray diffractometry techniques make it possible to monitor the structural changes associated with the development or use of new materials. (iii) 3-D characterization based either on tomography or linking a MEB/FIB with the chemical analysis (EDS) and/or crystallographic analysis (EBSD). (iv) the development of advanced techniques for scanning field variables including deformation, velocity, passive scalars... (stereogrammetry, 3D particle image velocimetry giving access to full velocity vectors, laser doppler interferometry, laser induced fluorescence, acoustic velocimetry and interferometry) both in laboratories and in field experiments.
- **In terms of large scale facilities**, the main contribution is being able to perform highly accurate resolutions in space, to analyze transformation kinetics in situ and to measure the response to an external demand in real-time. This assumes instrumentation developments, which take place in close partnership with the large-scale facilities in Grenoble (Imaging beam lines (ID15, ID19 and ID11) and scattering beam lines (D2AM)) in terms of diffraction techniques (particularly SAXS, SANS, GISAX) as well as in terms of tomography linked with image processing and fast prototyping. These recent developments are making it possible to tackle basic questions (about the kinetics of precipitation, recrystallization mechanisms, solidification defects, oxidation constraints..) but also about industrial problems (concerning the gradients of structures and welding constraints, constraints in integrated circuits, etc..)

4-year and 10-year objectives

	Indicators	Current situation	4-year objectives	10-year objectives
Scientific and intellectual production	Publication	high rates and impact, but in the main thematic of the laboratories	Improved rates in cross-disciplinary domain, set specific indicator of scientific impact	High level publications with multi-partners including industrial ones
Valorization, partnership, EU presence and international projects	Technology transfer	good patent and know-how transfer rates	“Single entry point” for partners Collaborative experimental platforms network to host/foster industrial partnership	Creation of a club of industrial partners Structures to merge industrials and lab. teams New business units and start-ups
Training	Masters and school	Masters on Instrumentation, but dispersed Master in nuclear science and energy International Schools (Large Scale Facilities, accelerators)	Focused instrumentation Master with industrials. Upgraded experimental Platforms: nuclear, accelerator and engineering science. Medical physics European school	Master “instrumentation for space” Topical international school on instrumentation and R&Ds. Industry founded chairs “ERASMUS MUNDUS” labeling of a master on instrumentation
Attractiveness Scientific animation	Scientific animation	Instrumentation theme started with the calls for IDEX, Labex and Equipex	Workshops (1/year) and lectures on Instrumentation (1/month)	International Workshop on regular basis in Grenoble
	Physics of the Origins and Infinities	Existing facilities and expertise in accelerators and large telescopes Expertise in large scale detector design and construction	High power solid state amplifiers Proof of principle on the new crab cavities, nanometer stabilization and polarized electron photogun Conceptual design and prototyping of the large CTA telescope	Accelerator science pole in Grenoble of international impact Participate to LHC upgrades and next generation experiments Major implication in the CTA large scale telescope
	Large Scale European Facilities	Realizing high field projects through collaborations between LNCMI /CNRS, INAC/CEA, ILL, ESRF	Pulsed high fields (40T) operating on CRG beamlines notably at ILL, and high-speed multidetectors and neutron focalizing optics. High-Tc cuprates technology for DC high fields applications	Producing DC fields above 30T with “all superconducting technology”, for use both at LNCMI/CNRS and at ILL and ESRF

	Life Science and Health	<ul style="list-style-type: none"> - Functionalized 2D patterns for cell biology research - Platforms for functional optical imaging, in vitro and in vivo - Technological innovation clinical research center 	<p>3D patterns for synthetic tissues cultures</p> <p>Demonstration of new super resolution optical imaging techniques and combination with electron tomography in cryo-mode</p> <p>Research platform for micro-nanomedicine</p>	<p>Industrial developments of novel instruments for medicine, imaging methods and diagnostics, intelligent implantable medical devices based on micro-nano technologies</p>
	Center for materials and processes imaging	<p>2D SEM charact. + FIB</p> <p>Carto MET 2D (res. > 10nm)</p> <p>Lab. Tomo. (res. > 5µm)</p> <p>ESRF fast 3D Tomo. (t≈1s) + NanoTomo. (res. 100nm)</p> <p>Velocimetry (optical & acoustic techn. - 1, 2 and 3D)</p>	<p>Gains in resolution :</p> <p>Spatial: Carto MET 2D res. >1nm ; TOF SIMS ; Lab. Micro Tomography res. 1µm ; ESRF Nano Tomo res. 50nm</p> <p>Temporal: fast ESRF Tomo at 10Hz</p> <p>Spatial and temporal: High resolution Field Veloc. (optical and acoustic)</p>	<p>Spatial resolution (Lab. Nano Tomography res. 0.1µm ; ESRF Nano Tomography res. 20nm)</p> <p>Time resolution (Ultra fast 2D Tomography at 5kHz, res. <1mm; Fast ERSF Tomo at 100 Hz)</p>

5.3.4 SUPPORT AND CAMPUS LIFE

Although excellence in training and research and their integration into the economic network are prerequisites, in isolation they do not suffice to differentiate between major university campuses. Whether foreign students, itinerant researchers or project partners are visiting our campus for just an hour or staying for six months, their memories about its quality, relative attractiveness and the excellence of its laboratories and training programs will also be influenced by the quality of the time they spend here. In a strategy of distinction and service, new arrivals are prioritized, with special attention being paid to the initial reception, first impressions, support in settling in and post-departure follow-up: memories, established and maintained networks, recommender status, reputation relay.

Of course, reception facilities are necessary, but what will really make a difference are a good service strategy and the general surroundings (both professional and personal). Although Grenoble has taken up its position as one of the hubs of higher education and research, the administration, services and surroundings must be up to the same standards as other campuses around the world.

The campus strategy is being developed along two pathways of progress:

- The quality of the campus and the social environment
- The service provision, the support given in terms of professional and personal life

Benefits and achievements. Quality that has already been recognized.

- Rated the number one "Student town" by l'EXPRESS and l'Etudiant magazines (first place in 2008 and 2010, second place in 2009, and first place in 2010)
- In excess of 2000 student associations, two students' unions
- Over 400 events each year
- Pilot disability services at a national level
- One in two students practices an organized sport
- France's premier public transport network with three tram routes serving the campus, plus a cycling network characterized by many incentives
- The most beautiful campus in France, boasting 30,000 trees and numerous artworks

The quality of the campus, the social environment and human relations

As a result of the success of GUI in the "Operation Campus", novel construction projects are setting the scene for our renewal. Thanks to GUI+, they will be supplemented by financial support for decentralized initiatives and programs, through the funding of a program of initiatives with a low relative cost and a high impact on everyday life. This program will have to be devised based on the communities (laboratories, student associations, etc.)

closest to the site and users. Recent initiatives, or those seen elsewhere, show the multiplicity of forms this may take: mentoring; meeting and greeting of new arrivals at the station by student associations; loan of equipment and support service for the use of digital tools; decentralized administration formalities; layout of local living environments; “neighbors’ day”; morning short talks which are open to all doctoral students; assistance in the production of alumni directories, and so on. There are many aims: integration and socialization; decentralization in order to expand and adapt to the terrain and individual circumstances; inspiring initiatives.

Promoting intellectual openness and the link with the city

The intellectual and social stimulation, cultural practices and provision, community life, art and appropriation of the facilities by users all combine to create a rich campus life. GUI+ will promote initiatives that will make our campus an “intellectually exciting” place, extending even beyond the science practiced there. Student initiatives will not only be supported in terms of their creation, but also in terms of their dissemination beyond the campus.

Service, reception and support

The quality of everyday life, the wealth of personal contacts, opportunities for intercultural and interdisciplinary interaction and leisure opportunities (sports, outings, get-togethers, etc.) must all be included in our package. This package will be even more effectively supported by sustained offers of novel services, the setup of premises and pedagogical programs, support upon arrival and during stays (particularly for those individuals undertaking short stays which require rapid integration and therefore support) and will not be limited to supporting professional activity alone. Making it easier for students to become involved in the work of the “Campus Life” services is also a focus for development, particularly by increasing the number of jobs available to students to help run these services.

5.3.5 INTERNATIONAL STRATEGY

‘Internationalization’ is the process of integrating an international or intercultural dimension into our teaching, research and service functions in order to support and build our capacity and capability in education, research, enterprise and knowledge exchange.

The effective integration of international perspectives will be a core characteristic of our university. In line with our objective to be one of the top universities of world renown, all international links and partnerships should be specifically aimed at positioning the University of Grenoble-Alpes as a knowledge and education provider of the highest quality.

We deeply believe that all our students, French and foreign, will be intellectually stimulated by a curriculum that is appropriately international in its content and experience.

Attracting the best students worldwide to study with us. One way to attract and retain international students is to develop services packages with clear standards for especially targeted groups of international students. This service will include offers of accommodation, assistance with residence permits, introductory courses, French lessons, career guidance, etc... Another way to attract talented international students is to develop a sufficient number of degree programs in English. Indeed, we wish to increase the number of subjects offered in English. Of course, teachings offered in English must comply with the same quality standards as other degree programs. Of course, the IDEX pre-doc and doctoral grants will help us to reinforce this policy.

World-renowned research that attracts the best academics worldwide to work with us. These academics will have the opportunity to take part in the international programs offered by UG. IDEX Chairs will be a major tool of our attractiveness. Of course, the pursuit of innovative interdisciplinary research is the absolutely prime characteristic. Without it, a university cannot claim to be attractive. The presence at Grenoble of international facilities (ESRF...) will help us to reach a high level of internationalization among our researchers.

Strategic alliances. A review of all international collaboration agreements should be undertaken. We should give priority to agreements of strategic importance and a satisfactory level of activity. In the coming years, UG will focus on establishing and further developing its collaboration with elite universities especially in Europe. UG

needs to develop a wide spectrum of 'deep partnerships' with such universities such as joint degrees or joint projects.

Student mobility. UG wishes that its students develop a global outlook, intercultural understanding and language skills. Therefore, UG will aim at increasing student participation in study or work abroad in the coming years.

Internationalization at home. UG must recognize the presence of international students at the university and integrate them into the life of the home campus (e.g.: better recognition of international festivals). Home students should also be encouraged to publicize their study abroad experience.

We also wish to increase the incentives for international mobility of the university's PhD students and academic staff. This will be ensured by focusing on international experience when recruiting staff, by allowing stays abroad to count as year of service. In addition, the PhD degree program should include a period abroad to the greatest extent possible.

European calls for proposals. We must intensify our efforts in order to develop our presence in all European Union calls for proposals, including those from the ERC (European Research Council), both in research, innovation and training (Erasmus, Erasmus Mundus, Tempus, ...).

Diversification. Given the volatility of the global economy and the rapidity of market change, we should strive to ensure that both the nature and the global spread of its international activity are sufficiently diversified, going beyond the academic world.

Indicators of achievement for our international activity

- a) International university rankings
- b) Notoriety of our brand outside France, especially in Europe and other countries of strategic focus
- c) % of students experiencing some form of overseas placement
- d) Diversity of international student population (number of countries represented...)
- e) % of foreign staff
- f) % of staff with abroad visiting professorships
- g) Number of students successfully completing degrees through transnational programs
- h) Number of international students
- i) Number and quality of degree offered in English
- j) Number of European projects selected

5.4 GOVERNANCE, ORGANIZATION AND MANAGEMENT

5.4.1 GOVERNANCE

The success of our project will involve the immediate establishment of a new institution, "Etablissement Public de Coopération Scientifique" (EPCS), which will replace the present PRES. The 14 partners of the GUI+ project will be members of this EPCS. The choice of an EPCS structure rather than a foundation has been made in order to allow the award of diplomas directly by the institution that carries the project (award of national diplomas by foundations is not possible in France).

The new institution will be administered by an **Administrative Council** which is made up of representatives of the founding members, local authorities, the competitiveness clusters, the European research facilities present in Grenoble, researchers and academic staff involved in the perimeter of excellence, as well as other prominent individuals. The percentage of external members of the Administrative Council will be as close as possible to 50%.

This Administrative Council will adopt the strategic plan and its development policies, vote the annual budget of the Institution and its allocation of funds to the various activities. It elects the **President** of the University of Grenoble-Alpes.

The Administrative Council designates from among its own members a **Board of Management** of strictly limited size. This Board of Management is responsible for the implementation and the monitoring of decisions taken; it manages the regular business of the Institution.

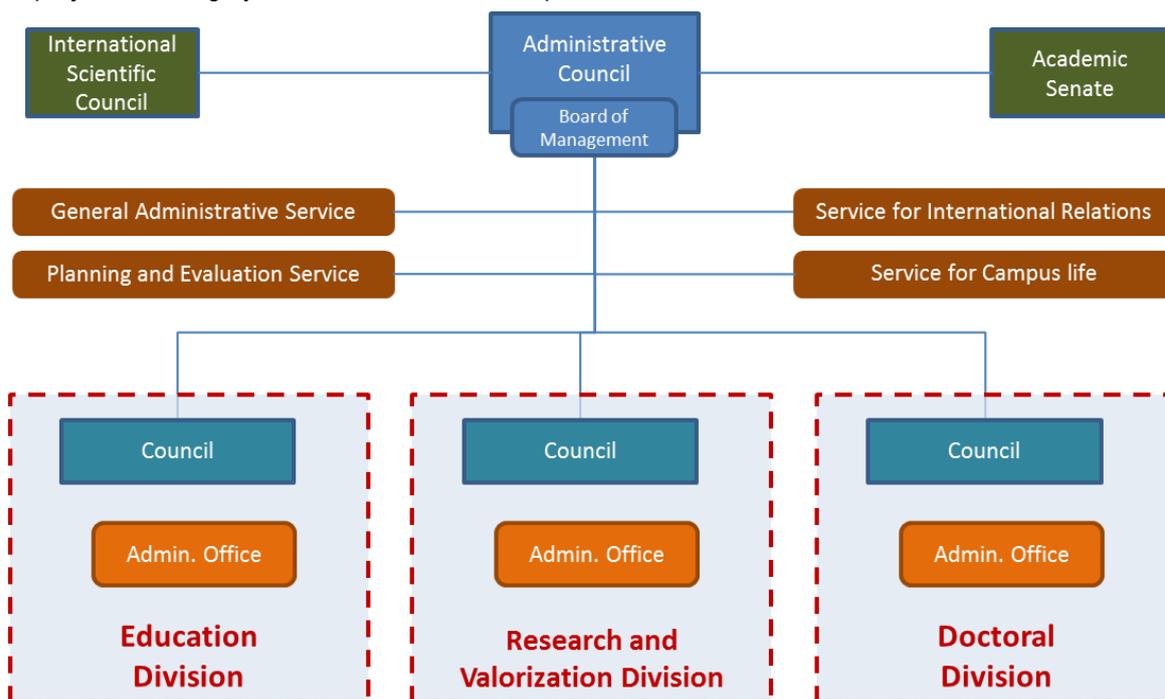
In making its scientific and strategic decisions, the Administrative Council will be supported by

- **An Academic Senate**, made up of prominent representatives of the different scientific disciplines. The Senate will formulate propositions concerning general policy orientation and the evolution of objectives and updating of the strategic plan.
- An **International Scientific Council** made up of ten or so renowned external scientific personalities, chosen for their outstanding competence in the scientific domains covered in our perimeter of excellence. This Scientific Council will be consulted on a regular basis on the major scientific orientations and on the programs of the University of Grenoble-Alpes with regular evaluation of projects. It will make recommendations and suggestions on research, training and partnership activities which can be financed by the Institution.

Three divisions will be established: the Education Division, the Research and Valorization Division, the Doctoral Division.

The three divisions will receive a budget that will be assigned to them annually by the Administrative Council.

The three councils of the respective divisions will propose (mostly on the basis of calls for proposals) the allocation of these means in the context of the strategy defined by the Administrative Council. The choice of the selected projects will largely be based on external expertise.



After the first 4 years, this governance will be assessed in detail and decisions will be made on the finished governance model of the University of Grenoble-Alpes.

5.4.2 ORGANIZATION AND MANAGEMENT

The new institution University of Grenoble-Alpes makes the following provision for effective governance:

A strategic management function

This function will be under the close control of the Managing Board. It will:

- supervise the implementation of the strategic plan,
- ensure that the choices made by the Divisions are in agreement with strategic orientations,
- bring up to date the strategic plan of the Institution.

The strategic plan will be based on data provided by the Evaluation and Long-Term Planning Office charged with monitoring indicators, and also on the audits provided by the Auditing Committee and on the long-term forecasts emanating from the policy reflections of the International Scientific Council and of the Senate.

An internal control system

Internal control requires a range of systems applied by personnel at all levels to demonstrate control over the way their activities are carried out.

The internal control system has as its objective the formalization of the management processes of the Institution, defining for each action the way it is dealt with, those responsible for it, and the points of control. The following procedures will be formalized as a priority:

- Producing proposals for a Call for Projects
- Issuing a Call for Projects
- The allocation of resources
- The monitoring of the use of funds allocated
- Evaluation of projects resulting from Calls for Projects
- Recruitment of personnel

Steps taken for internal auditing

Methods of internal auditing will be drawn up and put in place in order to evaluate the management processes of the Institution and more particularly the processes for allocation and management of resources.

This internal auditing must be carried out independently of the *Division Councils* and will be controlled directly by the Managing Board.

Putting in place such a system requires carrying out the following tasks:

- Creating an audit committee
- Drawing up an auditing charter
- Drawing up a pluri-annual audit plan on the basis of a systematic risk analysis. The audit plan is to be approved by the Managing Board and the audit committee and reviewed annually
- Carrying out audits on the basis of the audit plan in order to evaluate in an independent and objective fashion, the quality of the internal control system and to make recommendations for improvement where necessary
- Monitoring the implementation of the recommendations and actions for progress formulated by the audit reports and accepted by the structures audited
- Drawing up an annual report of auditing activity

Steps taken for impact evaluation

Indicators for the monitoring of objectives are established in order to ensure the efficient running of the overall organization. These indicators will facilitate a careful monitoring of the Institution's activities, comparing its

development with that of international groups with which the University of Grenoble-Alpes wishes comparisons to be made. Among these indicators, we consider the following to be important:

- A quality assessment index of publications (based on internationally recognized citation indexes)
- Distinctions obtained by our researchers (international prizes, election to the *Institut Universitaire de France*, etc.)
- The number and quality of foreign researchers recruited
- The list of researchers of international renown welcomed to Grenoble (in particular those coming from the leading world universities) and the impact of their interaction with the IDEX projects
- The number and quality of foreign doctoral students recruited
- The list and importance of employment obtained by our engineering graduates and by our graduates with Master's and Doctorate degrees
- The number of our quality-labeled course and training programs
- The economic impact: job creation, the creation of start-ups
- The number of patents taken out
- The number of partnership contracts

5.5 A POLICY OF EXCELLENCE FOR HUMAN RESOURCES

The central concern of our human resources policy is to attract and retain talent at the highest level. Our policy for excellence can be articulated in four ways:

- The development of the site's attractiveness for academics and researchers
- Particular attention to be paid to high-potential recruits
- The implementation of "packages"
- Rendering human-resource policy more dynamic in research and higher education establishments

The policy of pursuing high-level excellence in managing human resources will be targeted by the management of the University of Grenoble-Alpes for which this will constitute one of its principal missions. It will draw on the **Human Resources Offices** which will be charged with the validation, the implementation and the control of this policy, under the responsibility of the Managing Board.

The University of Grenoble-Alpes must play the key role in staff recruitment, with a triple objective:

- Identify potential recruits and centralize proposals made by researchers;
- Coordinate the recruitment process,
- Give assistance in the evaluation of applications, all this in order to possess the means to make competitive offers for top researchers on the international market, this for both junior and senior posts supported by the IDEX.

To achieve this, on the one hand "IDEX Chairs of Excellence" will be created, and on the other, the University of Grenoble-Alpes will help in the recruitment of researchers by partner institutions in order to develop a breeding-ground of staff of high potential. The EPCS will also lend assistance in the international recruitment of high-level students, in particular of Ph.D. students.

At the end of the first four-year period it is expected that the EPCS will coordinate and approve all the job profiles proposed by partners in the excellence perimeter.

IDEX Chairs of Excellence

The founder members of the University of Grenoble-Alpes will welcome guest professors for short-term stays (several months). For longer periods (from one to five years), junior and senior fixed-term Chairs of Excellence will be created by the EPCS and will enable Grenoble to attract top-flight foreign researchers for whom the EPCS

will be in a position to offer “packages”, including resources, facilities and staff help (professional research assistants, doctoral and post-doctoral assistantships). The founding members of the EPCS will then be in a position to commit themselves, according to their recruitment requirements, to offering permanent posts to integrate the best researchers who will have confirmed their wish to pursue their career in Grenoble. Such recruitments could then be helped by the EPCS following the criteria for permanent recruitment described below.

In the next four years, we envisage appointments to twenty or so Chairs of Excellence, and, over the next ten years, from sixty to one hundred foreign researchers will have benefited from a Chair of Excellence under the auspices of the IDEX.

This program will have a very dynamic effect on the whole university site. Members of the EPCS will be encouraged to prioritize recruitment to our themes of excellence, and this could lead to the permanent settlement of top researchers who first came for a Chair of Excellence and who will revitalize the whole University.

Managing high-potential researchers

The operational success of our University depends largely on its capacity to constitute, develop and nurture its own “seed-bed” of top-level researchers, teachers and engineers who can become the spearhead of our quest for world status. Such a breeding-ground for excellence, involving no doubt a hundred or so persons, should include:

- Young graduates (aged roughly 25 to 35) who demonstrate by their present activity the potential to become future leaders of our research and higher education institutions.
- More experienced middle-rankers (aged 35 upwards), already occupying posts of significant responsibility, who are succeeding very well in fulfilling their present assignments and who are the sort to respond well to the great challenges that tomorrow’s world will offer.

It is the strong wish of all the partners united in this initiative to cultivate and invigorate this breeding ground of excellence and thereby contribute to the long-term development and optimization of this area’s human resources. It is our role to make sure that researchers of high potential benefit to the maximum from the resources at the disposal of the University of Grenoble-Alpes.

The EPCS will therefore organize, every two years, a **specific campaign** to recruit, throughout the world, the right persons to contribute to this breeding ground of researchers of high potential.

With strong support from the media, this campaign can attract high-level profiles from beyond our traditional spheres of influence, not only casting our net further in terms of the person’s origins but also by favoring the mobility of the world of enterprise towards the university world. The holders of the fixed-term Chairs of Excellence sponsored by the EPCS will be encouraged to take part in the selection of these new recruits.

Organized under the form of an “assessment centre”, this operation will involve two aspects:

- Personalized information to shortlisted candidates on the careers and functions which will be proposed in research and higher education
- Careful selection of candidates who are finally selected

Concerning the more experienced middle-rankers with high potential, it is above all appropriate to take an individualized approach, coordinating professional and personal considerations and laying emphasis in particular on “packages” which could be offered.

The offerings of “packages” for the recruitment of permanent staff

As well as the “packages” attached to the “IDEX Chairs of Excellence” (which are not for immediate recruitment of permanent staff), the EPCS will finance a specific form of aid to partner institutions which will enable them to make appointments to permanent posts by going beyond normal criteria, particularly on the financial level. Depending on the case, aid would be available to be given by the EPCS to the recruiting institution or even directly to a candidate concerned. Such a system of aid would involve a contract with the institution concerned and would be awarded only after careful examination by the Human Resources Office.

The aid available would be of two types:

- Aid towards recruitment
 - Payment of removal expenses
 - Payment of transport charges linked to mobility
 - Payment of temporary accommodation expenses
 - Expenses linked to help employment prospects of spouse
- Recurring financial aid (at least for the first five years)
 - Helping to bridge the salary gap between the “market value” of the person concerned and the standard university salary scales
 - Helping towards the payment of bonuses or allowances
 - Helping towards financing team research available to the candidate concerned

The recruitment of students

The potential for scientific development of the University of Grenoble-Alpes is linked to the guarantee of a doctoral teaching program of high quality, the reputation of which will draw to it the best students at the international level. One of the objectives of the new institution is to reinforce its international visibility in terms of doctoral teaching. The EPCS will decide on the necessary funding and resources to attract the best students on the international market and will make these available to the training programs concerned. The EPCS will make proposals to facilitate access to doctoral studies by making three-year financial grants available to foreign students selected on criteria of excellence. A significant part of these grants will be included in our fixed-term Chairs of Excellence and our permanent recruitment packages.

The University of Grenoble-Alpes will allocate ca. 40 three-year doctoral grants each year. Over a ten-year period, approximately four hundred doctoral students will have benefited from our grants.

The Doctoral Division will be in charge of the distribution of more than 200 grants per year, including grants presently available in our Doctoral Schools.

The University of Grenoble-Alpes will also be in a position to offer “pre-doctoral” grants to very exceptionally gifted young foreign students to allow them to follow our Master’s programs. Nearly fifty grants will be created for this purpose.

5.6 MEANS

We have requested a capital contribution of € 908 million, which corresponds to an annual budget of € 31 million, which will support our strategic program, the overall yearly investment of which is estimated at € 680 million.

Consistency of the requested means with the stated strategy

Our financial requirements have been carefully calculated and our budget will be divided between our three Divisions and central offices.

- Research Division: € 18 million
- Education Division: € 5 million
- Doctoral Division: € 4 million
- Campus Life: € 1 million
- International relations: € 0.5 million
- Evaluation and Planning: € 0.5 million
- Governance: € 2 million

The GUI+ project is constructed around our excellence perimeter. It is thus essential for us that our priorities are adequately financed. A global distribution between these priorities is also proposed:

With regard to the exact sciences, because the international reputation of Grenoble is strongly linked to the themes “Micro or nanotechnologies” and “Intelligent Systems and Software”, we have taken the decision that these scientific domains should be our top priorities by assigning a massive investment in our Priority **Information** with **32% of the annual funding** for theme-based activities.

Our **Sustainable Planet** Priority will receive 24% of annual funding.

Our Priority **Health** will represent 12% of annual funding.

The development of **Scientific Instrumentation** is a continuation of our current excellence in this area and should help remove the scientific stranglehold in all the associated major scientific themes. We intend to allocate **9% of annual funding** to this area.

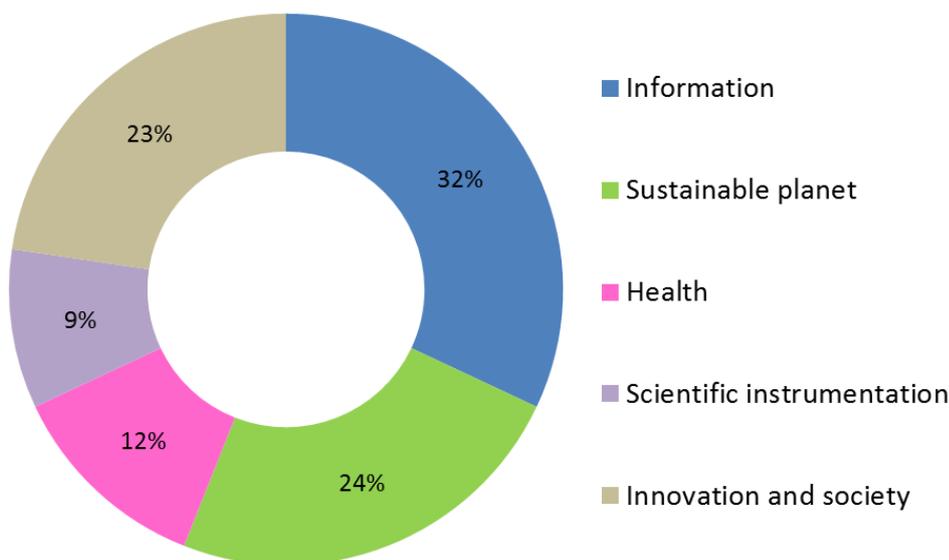
Innovation is at the heart of our project and conceptual outlook and must be approached in its entirety. That is why we choose to devote a significant portion of our resources to the social sciences in the “Innovation and society” domain. Therefore the Priority **Innovation and Society** will receive **23% of annual funding**.

The distribution of funding summarized above is based on choices at the present time (December 2011). It will follow the strategic plan evolutions.

It is understood that nationally approved Labex funding will be guaranteed.

This financial distribution integrates an estimate of the sharing out between our priorities of human resource needs described in the following paragraph.

Distribution of annual funding of our scientific priorities



We have estimated expenditures by category on the basis of an endowment of 31 million euros. The following table summarizes these estimates. We have focused on human resources by proposing:

- to operate yearly on average 18 fixed-term chairs of excellence and to contribute to a significant amount of recruitment on tenure positions (27% of total amount),
- to allocate numerous doctoral and post-docs grants, significantly linked with Chairs,
- to permit the recruitment of high-skilled engineers,
- to attract very gifted master students to Grenoble.

The total operating cost represents 28% of total amount. Investments and real estates have been limited to 12%.

Estimated yearly* expenditures by category (in thousands of euros)

	Number	Unitary costs	Total costs
junior chair packages	9	190	1 710
senior chair packages	9	350	3 150
junior tenure position packages	9	120	1 080
senior tenure position packages	9	280	2 520
doctoral grants ^{1,2}	66	41	2 706
post-doc grants ^{1,3}	75	59	4 425
engineers	30	96	2 880
pre-doc grants	40	18	720
operating costs ^{4,5}			6 000
investments, real estate			3 809
governance			2 000
TOTAL			31 000

- ¹ apart from those in packages
- ² total number of doctoral grants including those in packages: ca. 125
- ³ total number of post-doc grants including those in packages: ca. 100
- ⁴ apart from those in packages and operating costs related to doctoral and post-doc grants
- ⁵ total operating costs including those in packages and those related to doctoral and post-doc grants: 8 600 €

* These figures will be valid since year 3. For instance, only a third of the grants and packages will be run on year 1, and two third during year 2.

This endowment will provide an important leverage as seen in the final tables (§ 6). The fundings not directly resulting from the IDEX are considerable. Indeed, the 14 partners already largely fund excellence topics. We will ensure that IDEX will induce a concentration effect: the partners will be encouraged to concentrate a significant portion of their resources on the perimeter of excellence. This can be guaranteed by requiring them to bring additional funding to selected projects. This will be done automatically for the recruitment on tenure positions, since the institutions will pay the major part of the salary of the recruit. We will also ask institutions to provide through their doctoral schools additional thesis grants on all the chairs and to supplement the operating funds. This way, a doubling of total expenditure related to packages will be looked for.

The links between research and business is one of the acknowledged strengths of Grenoble. The resulting co-financing is very important especially in areas such as nanotechnology, but also for example, in environmental science and biotechnology. Competitiveness clusters have signed letters of support to our project. Additionally, the success of our IRT Nanoelectronics will lead to a strengthening of our cooperation in this key area of Grenoble. The IDEX will support joint projects between the University and companies. Associated with co-funding from founder members, this will further multiply the funds available for projects selected by the Alliance.

Moreover, local authorities, already heavily involved in the “Opération Campus”, will continue their efforts. The Rhône-Alpes region is the most dynamic region of France for the funding of research and higher education. Many projects that we develop here (energy, environment, territory...) are among its priorities. Significantly, eleven local authorities have signed a joint letter of support for our project.

It is reasonable to estimate that **the direct leverage from IDEX investments in its selected projects will be more than three times, transforming the 31 million into 100 million.** During the first 4-year period, partners will be asked not only to support granted projects, but to progressively transfer the global decision to the EPCS, so that for 2016, the EPCS will completely manage 100 million euros.

Overall, the investments of the founder members on priorities of GUI+ are much higher. We estimate them at **€ 370 million per year.** According to studies previously conducted in Grenoble, the economic impact will reach several billion euros. **The University of Grenoble-Alpes will conduct a periodic evaluation of this economic impact.** It will be a key information for the management of our university strategy development and will constitute a major element of the evaluation of IDEX success.

6 KEY DATA AND FINANCIAL PLANNING

Table 1: Proportion of faculty and students involved in the excellence Initiative

Table 1.1	Excellence perimeter	All partner institutions of the Idex
Number of academics	3 500	10 000
Table 1.2	Idex training programs students	All Idex partners students
Number of students ³	16 000	65 000

Table 2: Capital grant requested

Capital grant requested	908 million euros
Yearly expected interests from the capital grant (based on a 3.413% rate)	31 million euros

Table 3: Resources and expenses of the actions of the perimeter of excellence of the Idex – total over 4 years (in millions of euros).

Action	Resources				Spending		
	Idex grant	Other grants related to « Investissements d'avenir »	Contributions of all partner institutions of the Idex based on their own budget	External resources	Investments including real estate	Operating costs	Staff
Innovation and society	24	12	66	9	10	20	81
Health	12	63	202	106	44	109	230
Sustainable planet	25	64	502	228	89	250	480
Information	34	49	567	555	200	330	675
Scientific Instrumentation	9	26	130	15	23	15	142
Education (transversal)	8	6	8				22
TOTAL	112	220	1475	913	366	724	1630

Table 4: Presentation of the resources and spending of the other Idex actions - total over 4 years (in millions of euros)

Action	Resources				Spending		
	Idex grant	Other grants related to IA	Contributions of the Idex partners	External resources	Investments including real estate	Operating costs	Staff
Support / Campus Life	4		4			4	4
Central Governance	8					1	7
TOTAL	12	0	4	0	0	5	11

³ The Idex training programs are the ones described in the Idex project in paragraph 3.3.

Table 5: Total budget over 4 years – resources and spending (in millions of euros)

	Resources mobilized for the actions of the Idex project	Total of the resources of the Idex partners
Ressources obtenues de <i>Investissements d'avenir</i>		
Investissements d'avenir : amount of the requested funding for the Idex	124	n/a
Other fundings within Investissements d'avenir which could affect the Idex	220	n/a
Funding obtained	92	n/a
Pending fundings (1st and 2 nd wave)	128	n/a
Contribution of the higher education Idex partners		
UJF	400	1 200
UPMF	33	540
Stendhal	16	168
Université de Savoie	56	400
INP	163	624
IEP Grenoble	8	88
Grenoble EM	0,5	144
ENSAG	1,5	32
Total	678	3 196
Contribution of the research institutes within the Idex partners		
CEA Grenoble	167	1 880
INRIA Grenoble	66	104
Cemagref Grenoble	39	60
CNRS Grenoble	489	800
INSERM Grenoble	25	54
Total	786	2 898
Contributions of other partners		
CHU Grenoble	15	2 420
Total	15	2 420
Contribution of the territorial authorities		
10 local authorities	33	n/a
Total	33	n/a
Contribution of the private sector		
Industrial partners	580	n/a
Total	580	n/a
Other contributions (H)		
EU, ANR...	300	n/a
Total	300	n/a
TOTAL		
TOTAL of the resources mobilized for the actions of the Idex project	2 736	n/a

Table 6: Distribution of the expenses according to the nature of the 4 year budget (in millions of euros)

	Requested funding for the Idex	Resources mobilized for the actions of the Idex project
HR (including permanent staff)	72,5	1 634
Equipment	16,9	367
Operating costs	34,6	735
Total	124	2 736

Table 7: Distribution of the expenses by activity of the 4 year budget (in millions of euros)

	Requested funding for the Idex	Resources mobilized for the actions of the Idex project
Research	60 *	1700
Training	36	400
Development of results and relations to the economic sphere	12 *	300
Governance	8	116
Campus life	4	120
Other	4	100
Total	124	2736

(*) : Estimated from the global funding requested for Research and Innovation (72 million)

Etablissement :

Prénom :

Nom :

Qualité :

Ayant le pouvoir d'engager juridiquement l'établissement ci-dessus, je déclare

- avoir pris connaissance du dossier de sélection du présent projet et du règlement relatif aux modalités d'attribution des aides « Initiatives d'excellence » et souscrire aux obligations qui en découlent, notamment à des fins d'évaluation globale de l'action ;

- m'engager à mettre en œuvre tous les moyens nécessaires à la réalisation du projet dans les conditions prévues par le règlement relatif aux modalités d'attribution des aides « Initiatives d'excellence ».

Date :

Signature :

Acronyme du projet d'Idex	GUI+
Titre du projet en français	Initiative d'excellence Grenoble-Alpes Université de l'Innovation
Project title in English	Excellence Initiative Grenoble-Alps University of Innovation
Personne responsable de la coordination du projet	Nom : Yannick Vallée Adresse : yannick.vallee@grenoble-univ.fr PRES Université de Grenoble bât. les Taillées - 271 rue de la Houille Blanche 38400 Saint Martin d'Hères – France
Institution leading the project (Project leader)	Nom : Comité GUI+
Dotation en capital demandée en millions d'€	908

Composition du groupement de partenaires constituant l'Idex

Etablissements d'enseignement supérieur et de recherche	Organismes de recherche	Autres
Université Joseph Fourier	CNRS	CHU Grenoble
Université Pierre Mendès-France	CEA	
Université Stendhal	INRIA	
Institut Polytechnique de Grenoble	Cemagref	
IEP Grenoble	INSERM	
Université de Savoie		
Ecole Nationale Supérieure d'Architecture de Grenoble		
Grenoble École de Management		

RESUME OPERATIONNEL

Nous construisons l'université de Grenoble-Alpes

Les quatorze institutions partenaires du projet GUI+ s'engagent à constituer sur leur territoire une université de rang mondial, université unique sur le site, ambitionnant de se positionner parmi les toutes meilleures universités européennes dans les dix années à venir : l'université de Grenoble-Alpes.

L'université de Grenoble-Alpes est une université pluridisciplinaire, tournée vers l'innovation, et s'appuyant sur une recherche fondamentale de premier plan. Elle propose une offre éducative qui répond aux besoins de la société et de l'économie, et qui permet à chaque étudiant de développer ses talents en proposant des parcours adaptés, des ponts entre les cursus, ainsi que des cursus multidisciplinaires.

La force que représentent actuellement ces quatorze partenaires permet de considérer que cet objectif est à notre portée. Pour l'atteindre, nous décidons aujourd'hui de créer un établissement qui nous permettra de bâtir cette université, en portant son rayonnement, en élaborant sa stratégie, en organisant ses actions opérationnelles et en préparant le modèle abouti de l'université unique. Etant non pas une fondation, mais un établissement public (un EPCS), elle pourra délivrer ces premiers diplômes dès 2012.

Ce nouvel établissement portera l'Initiative d'excellence et coordonnera l'engagement de notre territoire sur les Investissements d'Avenir. Il concentrera ses forces sur un périmètre d'excellence défini par sa capacité à rayonner mondialement et à dynamiser notre potentiel d'innovation. Ce périmètre sera au cœur de notre démarche stratégique, sa performance sera rigoureusement évaluée. Bénéficiant de l'apport d'experts internationalement reconnus, il intégrera un mécanisme d'émergence créant un effet d'entraînement qui permettra de renouveler ce périmètre d'excellence.

Notre stratégie est une stratégie globale. Au-delà de l'Idex, elle est le cadre dans lequel s'inscrivent les stratégies de chacun des acteurs. Elle se concrétise par un plan d'action mis en œuvre grâce aux moyens de tous les partenaires, en bénéficiant des financements supplémentaires obtenus dans le cadre des Investissements d'avenir : Idex, IRT, Labex, Equipex... Elle guidera nos évolutions structurelles. Elle appuiera les transformations successives menant à l'université de Grenoble-Alpes telle que nous l'ambitionnons.

L'université de Grenoble-Alpes représente, en 2012, 65 000 étudiants, 16 000 personnels et 1,5 milliards d'euros de budget annuel.

L'université de Grenoble-Alpes est la première université doctorale de France

Depuis plus d'un an déjà, tous les doctorants grenoblois reçoivent le même diplôme : le Doctorat de l'Université de Grenoble. C'est un bien commun considérable, véhicule idéal de notre image de marque. Parce que le Doctorat est situé à l'interface entre la formation et la recherche, qu'il est le fleuron de la formation supérieure, bénéficiant de l'implication des enseignants-chercheurs universitaires et des chercheurs des organismes, nous créerons un département, le **Département Doctoral**, intégrant nos 13 écoles doctorales et dont la stratégie globale se concentrera sur :

- le rayonnement international
- l'insertion professionnelle des docteurs
- le renforcement et l'évolution des écoles doctorales du Département

Par ailleurs, les écoles thématiques internationales (dites parfois "écoles d'été") que nous portons participent fortement au rayonnement scientifique de notre territoire. Elles attirent chaque année sur notre territoire des doctorants et jeunes chercheurs du monde entier. La stratégie du Département Doctoral intégrera ce facteur clé de notre notoriété internationale.

Le premier plan d'action du Département Doctoral se fixera comme principaux objectifs :

- l'optimisation du fonctionnement des écoles doctorales
- la valorisation du Doctorat auprès des acteurs socio-économiques
- l'apport, dans le cadre d'un référentiel de compétences, de formations complémentaires et de mises en situation professionnelles pour une formation riche et de haut niveau pour chaque doctorant.
- le renforcement des écoles thématiques internationales existantes (écoles d'été), en permettant aux formations de s'appuyer davantage sur des travaux pratiques.
- la création de quelques nouvelles écoles thématiques (Sécurité et Durabilité en Génie Civil, Innovation et Territoires de Montagnes...)

L'Idex apportera un budget annuel de 4 M€ au Département Doctoral, dont le financement d'environ 40 bourses de Doctorat qui viendront compléter les bourses déjà existantes. Le budget total sera d'environ 20 M€. **C'est donc un budget 5 fois plus important que l'apport de l'Idex qui sera ici piloté en commun.**

L'université de Grenoble-Alpes est une université de recherche de rang mondial

L'université de Grenoble-Alpes est une université ouverte sur la société. Par exemple, son activité exceptionnelle de transfert de technologie en fait l'université déposant le plus grand nombre de brevets en Europe. Notre stratégie de recherche et de transfert de technologie est engagée sur quatre priorités répondant à des enjeux sociétaux majeurs :

- Innovation et société
- Information
- Santé
- Planète durable

Cette stratégie se décline en un plan d'action, mis en place dès 2012 et qui évoluera année après année :

- Coordonner les activités de l'ensemble du périmètre d'excellence
- Porter les projets communs
- Piloter la mise en place de projets d'émergence
- Suivre et coordonner l'ensemble des Investissements d'avenir obtenus
- Mettre en place et gérer des appels à projets pour la distribution des moyens
- Articuler les instruments locaux de valorisation et notamment leur implication dans les activités de la SATT régionale
- Evaluer les résultats en termes de qualité scientifique, d'impact économique et globalement de retour vers la société.

Pour cela l'université de Grenoble-Alpes se dote d'un **Département Recherche et Valorisation**. Son organe politique sera le Conseil de la Recherche. La Direction de la Recherche suivra la mise en œuvre par les unités de recherche des projets financés et de la déclinaison de la stratégie globale et du plan d'action par chacun des partenaires. Ce pilotage global se renforcera pour être optimal d'ici à 2016. Il intégrera tout le périmètre d'excellence.

Le budget que l'Idex affectera au Département Recherche et Valorisation s'élèvera à 18 M€. Nous estimons à ce stade la part Labex de ce budget à 9 M€. La part *excellence/émergence* hors-Labex sera donc d'environ 9 M€. Ces budgets comprennent les salaires relatifs aux chaires de l'Idex.

Notre budget annuel global pour la Recherche est de près d'un milliard d'euros.

Le budget Recherche de l'Idex représente donc environ 2% du budget Recherche de l'université de Grenoble-Alpes. Le budget correspondant au périmètre d'excellence piloté en commun correspond à environ 45% du budget global de l'UG. En Recherche, l'Idex a donc vocation à guider une politique qui représente plus de 20 fois le budget qu'elle apporte.

Les établissements partenaires s'engagent à doubler le budget directement partagé. Tous les efforts seront faits pour obtenir des financements extérieurs équivalents auprès des industriels, des collectivités territoriales... Ce sont donc 54 millions d'euros qui seront pilotés par la gouvernance centrale de l'université de Grenoble-Alpes (3 fois plus que le budget IDEX).

L'université de Grenoble-Alpes s'engage résolument pour le succès de ses étudiants

Nous construisons pour l'ensemble du site une stratégie globale en matière de formation. Elle vise à :

- mettre en totale cohérence notre offre de formation, pour en faire une offre proprement « université de Grenoble-Alpes »,
- favoriser la mise en place et le développement de parcours d'excellence en utilisant au mieux notre périmètre d'excellence, avec un fort lien recherche – formation,
- promouvoir et développer l'innovation pédagogique,
- préparer activement nos étudiants à l'entrée dans la vie active,
- participer pleinement au développement de notre territoire,
- internationaliser nos parcours.

Cette stratégie sera déclinée chaque année en un plan d'action, qui bénéficiera du support financier de l'IDEX. Il s'agira en particulier de :

- Développer des formations transdisciplinaires, assises sur des domaines répartis entre plusieurs établissements. L'accent sera mis sur des diplômes mixant des aspects de sciences humaines et sociales avec des aspects scientifiques et technologiques.
- Proposer des ponts entre les cursus des filières sélectives à l'entrée (comme ceux des écoles) et les filières de licence et master.
- Faciliter les parcours « à la carte » sur le principe général : toute unité d'enseignement donnée dans notre université est, a priori, accessible à chacun de nos étudiants.
- Amplifier notre effort sur les plateformes formation - recherche. Un réseau de ces plateformes sera créé. Nous poursuivrons nos investissements sur les plateformes existantes et nous en créerons de nouvelles, en particulier autour des sciences humaines et sociales et sur des thèmes très pluridisciplinaires (par exemple : plateforme montagne).
- Structurer le Centre pour l'innovation pédagogique et la qualité de l'enseignement. Il s'agira de faire fructifier les bonnes expériences locales, de réaliser un benchmarking international, de bénéficier des meilleures innovations, de favoriser l'utilisation des technologies de l'information et de la communication.
- Suivre et coordonner tous les projets formation des Investissements d'avenir, en particulier les volets formation des Labex,
- Permettre un accès de tous les publics à une puissante offre de formation tout au long de la vie.
- Promouvoir nos formations à l'international. Le Département Formation bénéficiera de bourses pré-doctorales pour attirer dans nos masters de très bons étudiants étrangers intéressés par une poursuite d'étude en Doctorat. Il facilitera la mise en place de parcours internationaux enseignés en anglais.
- Évaluer nos résultats, en s'appuyant sur la Direction de la prospective et de l'évaluation.

Cette stratégie commune et ce plan d'action seront élaborés au sein de notre **Département Formation**.

Pour cela, nous mettrons en place un Conseil de la formation (organe politique du Département) et une direction de la Formation qui suivra la mise en œuvre des projets financés et la déclinaison de la stratégie globale et du plan d'action par chacun des partenaires.

L'Idex dotera le Département Formation d'un budget annuel que nous estimons pour la première année à 5 M€ (y compris les parts formation des Labex, mais sans les salaires correspondant aux chaires de l'Idex qui sont inclus dans le budget recherche).

Le budget formation annuel de l'université de Grenoble-Alpes représente plus de 330 millions d'euros. Sur le périmètre de l'Idex, il est d'environ 100 millions d'euros.

Comme pour la recherche, les partenaires s'engagent à doubler le budget partagé. Des moyens seront recherchés à l'extérieur (collectivités territoriales, industries) pour le tripler, ce qui amènera le budget à la disposition des instances centrales de l'université de Grenoble-Alpes à au moins 15 M€ par an.

Notre université met en place une organisation performante avec des directions transversales

Pour assurer sa réussite, l'organisation de l'université de Grenoble-Alpes comprendra des directions transversales et support qui interviendront en appui aux trois départements, sous la responsabilité du management central :

La Direction de la vie de campus. En plus de notre excellence en recherche et en formation, nous voulons pouvoir nous distinguer par la qualité exceptionnelle de nos campus. Les dispositifs d'accueil pour les différents publics ainsi que les services qui accompagnent les chercheurs et les étudiants tout au long de leur séjour seront aux plus hauts standards internationaux. Leur qualité sera garantie et fera l'objet de certifications. La Direction de la vie de campus sera dotée d'une organisation et des moyens à la hauteur de cette ambition. L'Idex consacrera 1 M€ par an à ces priorités et permettra à notre université de coordonner un budget commun de plus de 10 M€ annuels consacrés à la vie de campus.

La Direction des relations internationales. Notre université doit affirmer son ambition internationale. Nous intensifierons nos échanges avec des partenaires européens et notre participation à l'espace européen de la recherche et de l'enseignement supérieur. En Europe et au-delà nous privilégierons des accords avec des universités au plus haut niveau.

La Direction de la prospective et de l'évaluation. Pour réussir à s'imposer parmi les tous premiers acteurs européens, notre université devra construire et faire évoluer ses orientations stratégiques, développer sa connaissance sur ses différents environnements (sociaux, économiques, culturels, territoriaux, concurrentiels...) et leurs évolutions, maîtriser la conduite des changements qu'induiront les évolutions et transformations. Pour cela, nous mettrons en place une Direction de la prospective et de l'évaluation qui aura la double mission d'une part d'observer et analyser la performance, d'autre part d'élaborer les orientations stratégiques et de suivre leur mise en œuvre par les différents acteurs du site.

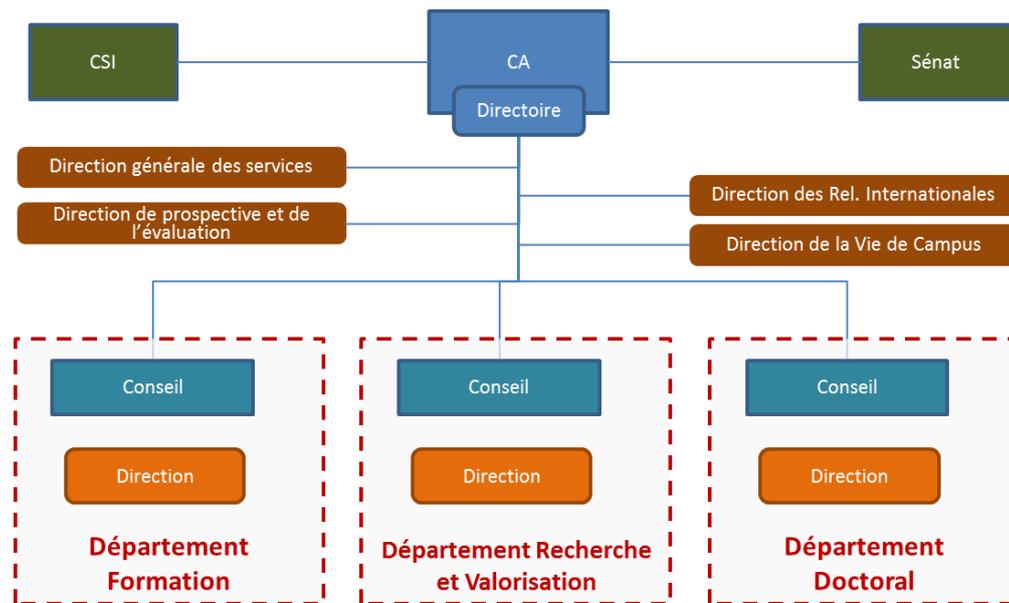
Notre université met en place une gouvernance à la mesure de ses ambitions

L'établissement (EPCS) créé en 2012 comprend trois grands départements, gouvernés chacun par un conseil et dotés de moyens mis en œuvre par une direction opérationnelle dédiée.

L'EPCS est administré par un Conseil d'Administration, où chacune des institutions partenaires est représentée, et où la part des personnalités extérieures est proche de 50%. La direction opérationnelle est exercée par un directoire resserré.

Les directions transversales et support sont directement rattachées à ce directoire.

Le Conseil d'Administration s'appuie sur les avis du Conseil scientifique international, composé de dix à quinze éminentes personnalités internationales et du Sénat où sont représentées les grandes communautés disciplinaires de l'université Grenoble-Alpes.



Nos ressources humaines

L'université de Grenoble-Alpes réunit plus de 16 000 personnes travaillant au développement de la recherche et de la formation sur notre territoire. 10 000 sont chercheurs, enseignants-chercheurs ou doctorants, dont 35% œuvrent dans notre périmètre d'excellence.

Les moyens de l'Idex permettront de financer directement environ 200 chercheurs, grâce aux chaires d'excellence, aux allocations de thèse, aux bourses post-doctorales. Ces personnes de très haut niveau viendront renforcer le potentiel des actuels 3 500 « académiques » du périmètre d'excellence.

Par ailleurs, alors que l'Idex permettra le recrutement d'une quinzaine de personnes pour le pilotage du site, l'organisation centrale s'appuiera sur le travail de plus de 400 personnes se consacrant aux différentes fonctions transversales (directions et services communs, y compris ceux déjà mutualisés en inter-universitaire : aménagement, vie étudiante, handicap...).

L'engagement des partenaires se concrétisera par l'affectation de ressources humaines déléguées à la direction centrale ou dédiées au renforcement des chaires, à la création de bourses doctorales et post-doctorales. Cette affectation sera croissante sur la période de transition vers le modèle final de notre université.

D'ici à 2016, des mécanismes seront mis en place pour que tous les recrutements effectués dans le périmètre d'excellence soient coordonnés par l'université de Grenoble-Alpes.

L'allocation des moyens

La dotation en capital qui est demandée correspond à un budget annuel de 31 millions d'euros, soit 2% du budget recherche et enseignement supérieur du site, environ 5% du budget de notre périmètre d'excellence. Les engagements des partenaires nous permettent d'estimer qu'en 2016, 100 millions d'euros seront pilotés par la gouvernance centrale de l'université (7% du budget du site, 17% du périmètre d'excellence).

La direction de l'université de Grenoble-Alpes garantira une allocation de ces moyens pertinente et suffisamment concentrée. Un contrôle de gestion sera mis en place. Il nous permettra l'analyse de l'activité de notre organisation et la conformité de l'allocation des moyens aux buts visés. Des audits internes indépendants seront menés.

Un modèle abouti pour notre université

Nous nous engageons à mettre en place un nouvel établissement d'enseignement supérieur et de recherche : une UNIVERSITÉ UNIQUE.

Le travail est entamé dès aujourd'hui pour la définition du modèle abouti de ce nouvel établissement. Prévu sur la période 2012-15, il associera l'ensemble de la communauté universitaire et ses partenaires. Le modèle finalisé sera défini au plus tard en 2016.

L'organisation de notre future université répondra aux meilleurs critères internationaux. Elle sera divisée d'une part en structures institutionnelles (des instituts et les implantations locales des organismes), d'autre part en centres de projets.

Les *instituts* résulteront de la reconfiguration des établissements d'enseignement supérieur actuels, l'objectif étant d'obtenir le découpage le plus pertinent possible. Le périmètre des instituts sera défini dans les quatre années à venir. La reconfiguration sera facilitée par la montée en puissance au sein de l'université de Grenoble-Alpes de la mutualisation de moyens et du partage de compétences. Les statuts de ces instituts leur assureront une autonomie suffisante pour garantir une approche réactive. L'articulation de leur gouvernance avec le management central de l'université sera optimisée. Leur intégration à l'université garantira la mise en œuvre effective de notre stratégie de site.

Les *centres de projets* seront des éléments essentiels dans cette reconfiguration. Ces *centres*, transversaux aux structures institutionnelles (centres d'excellences en micro-nano-technologies - Minatec, en logiciel - PILSI, en biotechnologies - Nanobio, en sciences de l'innovation - G2i...), sont pour beaucoup dans la réussite grenobloise. Nous poursuivrons nos investissements dans ceux qui existent déjà, et nous nous poursuivrons sur cette voie en facilitant le développement de nouveaux centres inter - instituts et organismes.

La matrice « *structures x centres* » renforcera l'université de Grenoble-Alpes en décloisonnant les structures institutionnelles et en renforçant les liens entre elles. Elle permettra un pilotage optimal de nos activités de formation, de recherche, et de transfert de technologie.