CAMPUS MONTEGANCEDO:
The ICE oriented towards international technological Innovation

I2_Tech

Project sponsored by:
Ministerio de Ciencia e Innovación

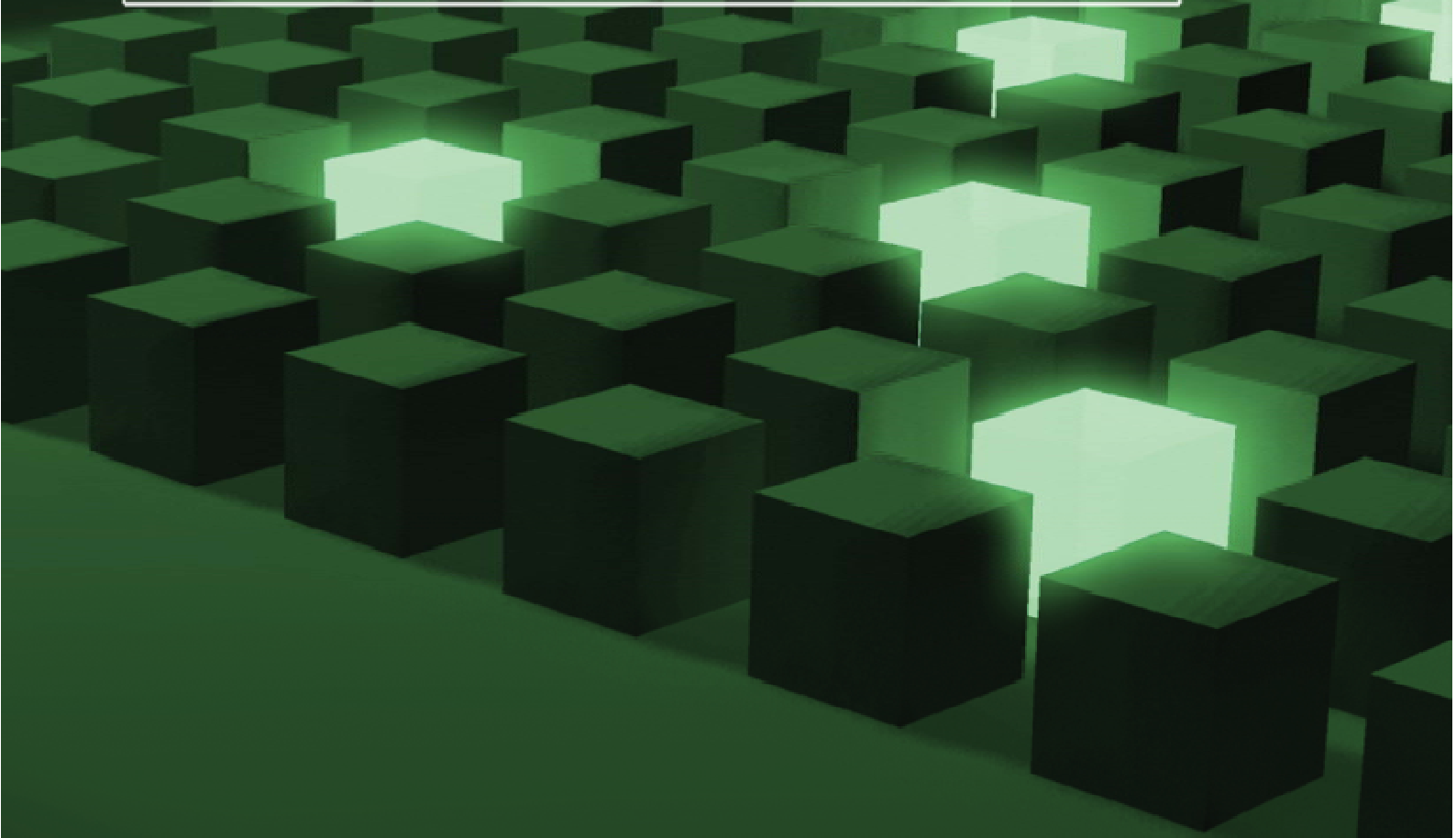
TECHNICAL AND ECONOMIC REPORT

Call for subsidies 2010 for R&D&I initiatives and Knowledge Transfer through the INNOCAMPUS Programme, within the CEI Programme

Madrid, 8th September 2010

GOBIERNO DE ESPAÑA
MINISTERIO DE CIENCIA E INNOVACIÓN

I2Tech- CAMPUS MONTEGANCEDO
Universidad Politécnica de Madrid | INNOCAMPUS 2010



ACRONYMS

ANECA: National Quality and Accreditation Evaluation Agency **AAPP:** Public Administration
APTE: Spanish Scientific and Technological Parks Association
CA: Autonomous Community
CAIT: Support Centre for Technological Innovation
CBGP: Biotechnology and Plant Genome Centre
CCAA: Autonomous Communities (Regional Government)
CDTI: Industrial and Technological Development Centre
CEDINT: Integral Home Automation Centre
CEI: International Campus of Excellence
CEVISMA: Supercomputing and Visualization Centre of Madrid
CIIET: Innovation Technical Education and Research Centre
CITA: Aerospace Technology Research Centre
CRUE: Rectors conference of Spanish Universities
CSIC: Informatics and Information Security Research Centre
CTB: Biomedicine Technology Centre
DEFE: Spanish Delegation of the European Foundation for Information Society and electronic Government
EEES: European High Education Area
EEI: European Space Research
EOI: Industrial Organisation School
f3I: Future of Internet
FP: Vocational Training
GATE: Tele-education Group
GIE: innovative Education Teams
R&D: Research and Development
R&D&I: Research, Development and Innovation
ICE: Sciences Education Institutes
ICEX: Spanish Institute of International Trade
ICT: Information and Communication Technology
IDR: Ignacio de la Riva University Research Institute
EIT: European Institute of Technology
IMDEA Software: Madrid Institute of Advanced Software Studies
ISFOC: Concentrated Photovoltaic Systems Institute
ISOM: Optoelectronics and Micro technology Systems Institute
KIC: Knowledge and Innovation Communities
LC: Science and Technology Law
LES: Sustainable Economy Act
MEC: Ministry of Education
MICINN: Ministry of Science and Innovation
O.M: Ministerial Order
OEPM: Spanish Patent and Trademark Office (SPTO)
OTRI: Research Results Transfer Office
OTT: Technology Transfer Office
PAS: Services and Administration Personnel
PBL: Project Base Learning
PDI: Research and teaching personnel
PIF: Research Personnel on Training
RD: Royal Decree
HR: Human Resources
SIGC: Internal Quality Services
ULAB: European Laboratory for modelling the Technical Research University of Tomorrow
UPM: Technical University of Madrid
USOC-E: Spanish Users Support and Operations Centr

Index:

INNOCAMPUS Programme

Call for 2010 grants for R & D & I and Transfer of Knowledge programme under the International Campus of Excellence frame

1. BACKGROUND

The International Campus of Excellence Programme developed jointly with the Ministry of Education (MEC) and the Ministry of Science and Innovation (MICINN) seeks to improve the quality of our universities. It aims to lead to excellence the foremost campuses for the benefit of society as a whole through the aggregation, specialization, differentiation and the internationalization of the Spanish university system.

MICINN's objectives are to transform our production model into a sustainable knowledge economy, which has been defined by the Spanish government. In order to maintain the national welfare state, it is essential to introduce innovation in all aspects of our economic and social system. Only those countries, whose economy and growth is based on innovation and knowledge, will be able to compete with emerging countries.

MICINN has developed the state's innovation strategy E2I, based on five areas of action, which work in an integrated manner to accelerate the innovation process and to position Spain in the ninth place for global innovation in 2015.

These areas comprise the so-called "Innovation Pentagon" (fig. 1) which is comprised of: 1) establishing a favourable financial environment for innovation, 2) ease innovative markets through regulation and public procurement, 3) integrate territorial policies to promote innovation, 4) internationalize activities and 5) strengthen Human Resources through the incorporation of talent and innovative capacity in the productive sector.

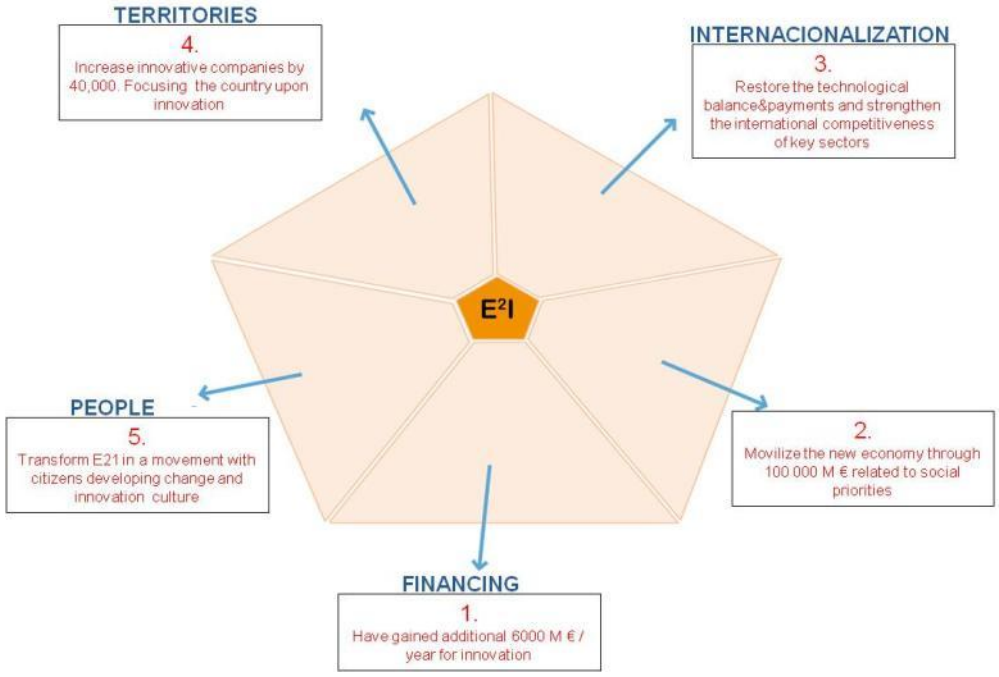


Fig. 1: "Innovation Pentagon "

The State Innovation Strategy for the 2009-2011 period is reflected in the "Plan Innovacción". The Innocampus call for incentives and grants is one of the instruments of "Plan Innovacción"

In this context the INNOCAMPUS Programme is the contribution of the Ministry of Science and Innovation involvement in the International Campus of Excellence Programme. Its aim is to identify and support projects that improve quality and encourage the orientation of universities towards excellence in Science and Innovation. The principal objectives are: specialization, differentiation and internationalization of the Spanish university system.

During 2009 the Campus Montegancedo was recognized as a Promising CEI 2009 in the MEC call. Prior to that, it achieved the status of "Excellence in ICT and technology transfer" during the first phase supported by MICINN. For the 2010 call, the UPM seeks the CEI 2010 certification with the aim of obtaining the seal of excellence. For that purpose, it wishes to strengthen and build on the internationally recognized excellence present already in the Campus, with further support and assistance in specific aspects.

The Campus Montegancedo, due to its focus as **Campus orientated towards technological Innovation**, will launch measures to accelerate the innovation process. This desire is meant to point out the institutional commitment with specific actions to support the innovation strategy.

The Montegancedo Campus is associated with three factors that make its campus particularly attractive:

1) An institutional will to focus on international postgraduate activity combined with a limited pressure of undergraduate students.

2) **An organizational structure dominated by R&D&I centres**, easing the implementation and internationalization of initiatives aimed at the exploitation of research results.

3) **Plenty of space** in the site for the location of new centres and aggregations enabling future developments on campus.

The Campus is committed to promoting the development of sustainable technology innovation focused on ICTs. In the future, more than 1,000 researchers will investigate on campus within the following lines of research: ICT, plant genomics, home automation, virtual reality, energy efficiency and bioclimatic architecture. Currently, aside from the IT School, the Campus houses: The CITA research institutes (including the USOC-E and the Institute of Microgravity Ignacio de la Riva), CBGP(Biotechnology and Plant Genome Centre), CESVIMA (Supercomputing and Visualization Centre of Madrid) & CEDINT (Integral Home Automation Centre) with a further two, the CTB and IMDEA Software Centre, currently under construction.

CTB Buildings

IMDEA Software Building

Fig. 2: Buildings under construction in Montegancedo Campus (july 2010)

The current Campus Montegancedo **structure** is reflected in Fig. 2 and is focused around the three corners of the knowledge triangle.

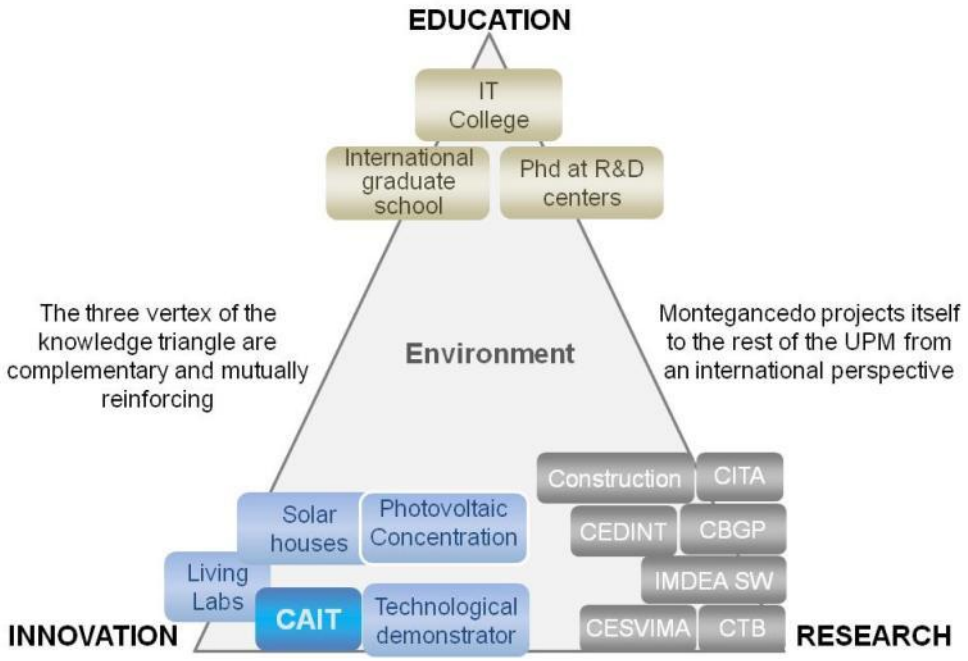


Fig. 3: Units located in Campus Montegancedo

The primary idea is the integration of research, innovation, education and international excellence transfer.

2. GENERAL INTRODUCTION

In order to highlight the relevance of knowledge gathering as the key for competitiveness, we briefly introduce the key aspects that led the Campus to become a Spanish and International reference in technological innovation.

During the past decade, the governments of developed countries have sought to give **universities** a decisive role in the modernization of their economic system and the transformation process into a knowledge-based economy. This has been recognized by the Council of the European Union (EU), *"European universities are at the forefront of 'Europe's drive to create a knowledge-based society and economy and improve its competitiveness"* (European Council Resolution, 2007).

Within the context of this process, the European Commission has encouraged the "modernization" of the university, specifically those whose research is used as a principal source of knowledge for the business sector.
The Campus Montegancedo project strives to achieve an "user driven open innovation" model, and promote technological innovation primarily in the field of ICTs.

The Campus vision fits with the results of a recently published EU analysis, "Assessing Europe's University-Based Research" (EUR 24 187 EN, 2010), which proposes a vision of an inclusive research role at the University covering from basic research guided by curiosity (curiosity-driven blue sky) to applied research, led and based on a practical research (user-led/practice based). The study advocates the use of a wider range of indicators to assess the activities of European universities.

This has led to an enlargement of the role of the University within the "knowledge triangle" in which "research", "higher education" and "innovation" (addressed along in what is commonly called "knowledge policy ") develop and complement each other, in order to achieve greater competitiveness for society as a whole. Fig. 4 shows schematically the interaction among them.

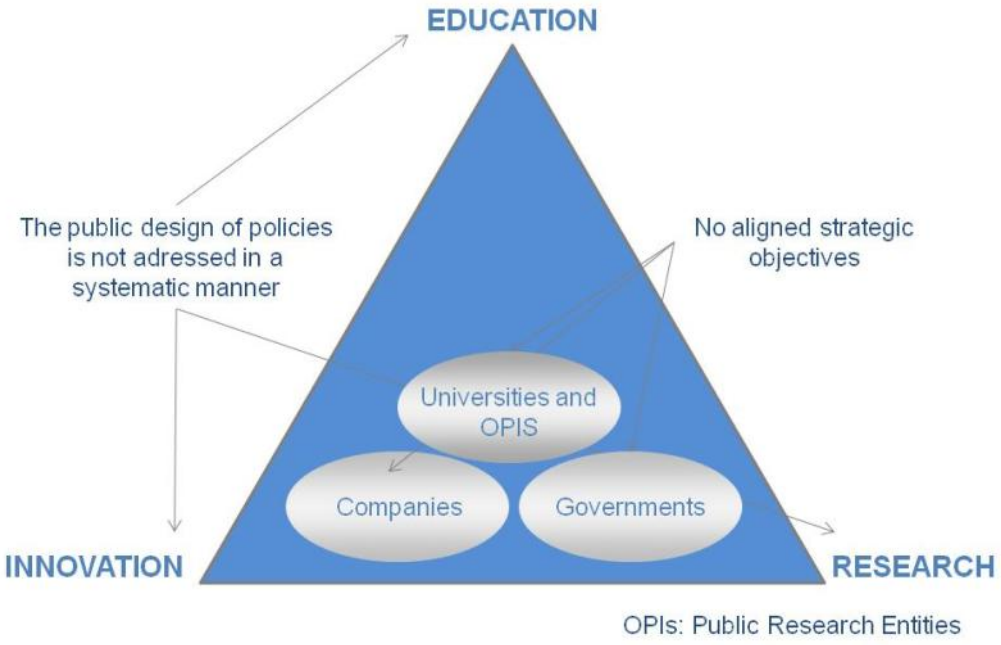


Fig. 4: The knowledge triangle

Fig. 4 shows that the public administrations (AAPP) do not always achieve an integrated design, which can lead to the fragmentation of objectives, programmes and actions. Additionally, the primary agents involved such as universities, public research organizations (PROs in Spain), corporations and governments (both national and regional) often do not have aligned strategies to provide cooperation and complement one another. The role of universities in this context is especially relevant since its activity is based on the three pillars of the knowledge triangle.

From a conceptual point of view, the **mission of the University and the Campus Montegancedo is clearly multifaceted** (see Fig. 5) It combines it teaching function in professional education (mainly the Montegancedo graduate school) with the generation of new knowledge related to their **research** (and also the postgraduate teaching, mainly PhD) and the **transfer of knowledge** acquired in close cooperation with the companies and their administrations. A fourth function of **diffusion** of this knowledge to society is even less important on both personal and institutional levels.

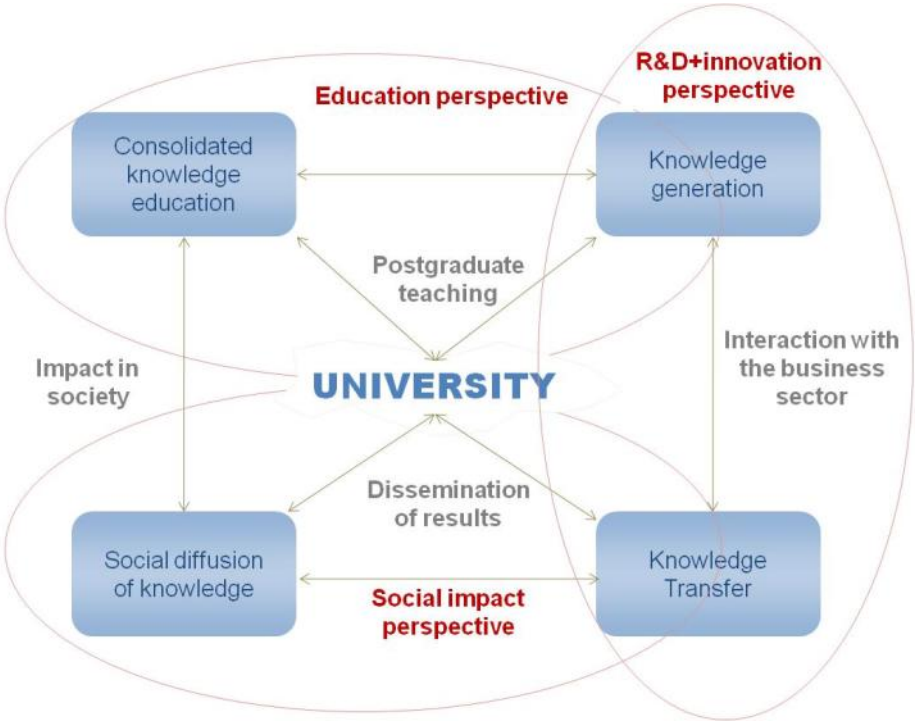


Fig. 5: Multifaceted perspective of the University

The integration of these perspectives is also clear in Campus Montegancedo.

For a campus orientated towards **technological** innovation the explicit support of **knowledge transfer** allows for an effective connection of applied research activities with advanced training (especially graduate) on issues of interest to companies and the administration. It also allows developing strategies to support the commercialization of the results of the research activity in products, processes and advanced services closely linked to technological innovation. This relates with the triangle of knowledge mentioned above, prioritizing the interaction between the generation and transfer of knowledge and a strong feedback into the training process.

From the technological point of view, as shown in Fig. 6, the innovation process may require the implementation of several **complementary actions in close interaction with business.** From the perspective of the business knowledge transfer (along with the teaching process and

knowledge generation) universities have developed in the past years, with the support of the AAPP, a set of instruments as shown in Fig. 5.

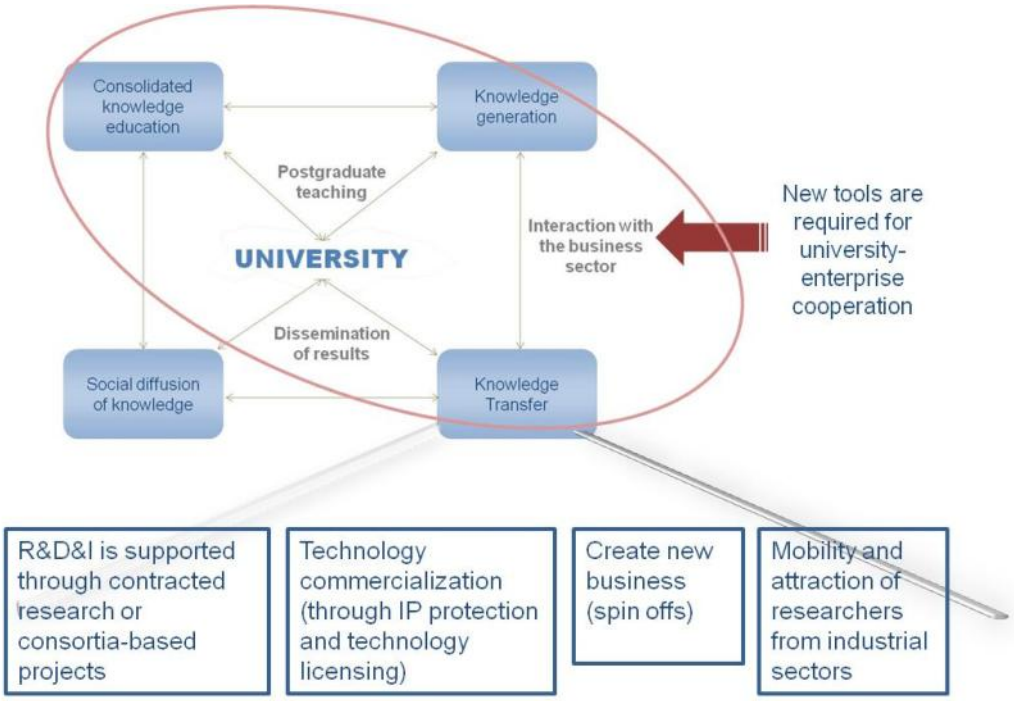


Fig. 6: Areas for knowledge transfer from universities

Campus Montegancedo is a clear example of a trend whereby innovation actions are a key mechanism to improve performance**. These varied actions aim to impact society through a solid R&D agenda. (see fig. 6)**

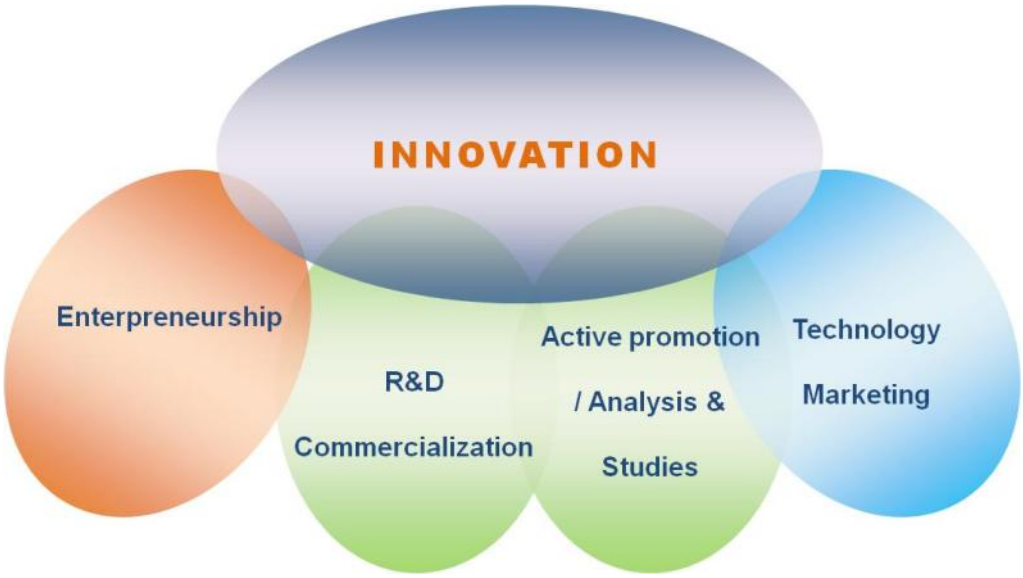


Fig. 7: Areas of support for innovation in universities

This gradual transformation of the university institutional agenda is complemented by an emphasis on the exploitation of intellectual and industrial property or the recognition and protection of their "know-how "through licensing, sale of rights, or the creation of a new business network". Additionally the promotion of mobility of researchers to and from the industrial sector, whether related or not to their doctoral thesis or joint R & D projects is encouraged.

The UPM as a technology leader in Spain.

Founded in 1971 by the merger of centuries-old engineering colleges, the UPM is the largest technological university in Spain. Based in the Region of Madrid, it operates out of five Campus and several locations in different districts of the city of Madrid.

Fig. 8 shows schematically the **distribution of colleges within the different campuses**. As shown in Fig. 8, the UPM campus combines schools and colleges, research centres, R&D& Innovation service centres and technological business incubators.

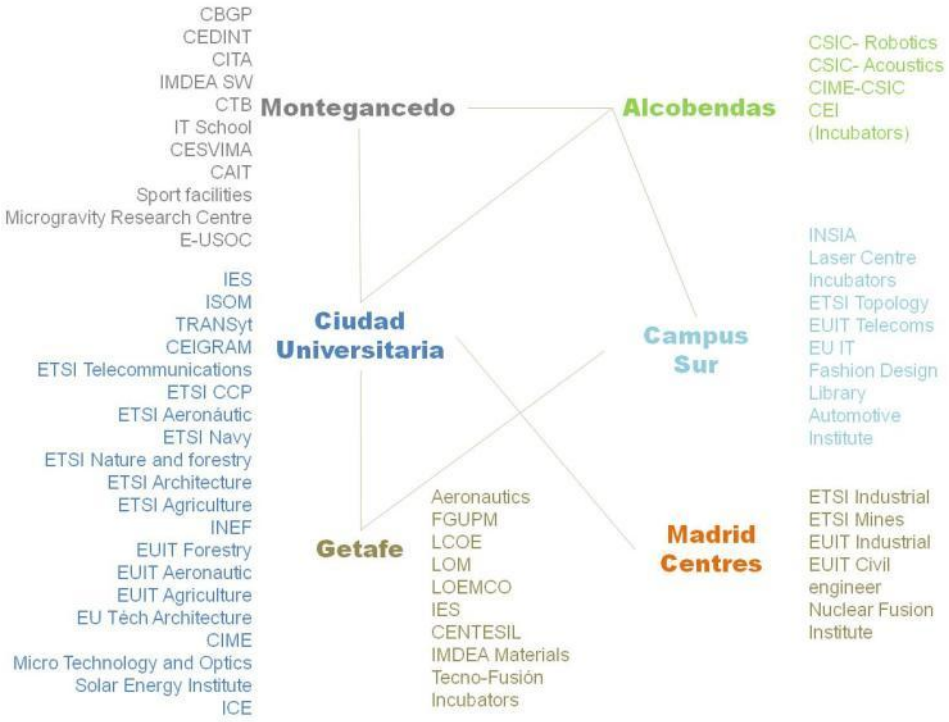


Fig. 8: Location of the centres of the UPM

The UPM has adopted a **pragmatic approach, prioritizing complementary activities in the different campuses** with the idea of locating in each of them different types of units (teaching and research) without overemphasizing thematic specialization. This structure responds to the strategic desire to combine, if possible, all the basic functions of the UPM, seeking mutually reinforcement. Some of them originated as sites of UPM Science and Technology Parks (cases like Tecno-Getafe or Valdelacasa) while others combine their role as the headquarters of the Park with other university teaching activities.

Following the recent **amendment of the UPM rules** completed during 2010, the R&D centres and university research institutes can also be responsible for graduate programmes without professional responsibilities and, with the agreement of departments, schools and colleges, carry out certain teaching activities of other programmes.

3. ACTION OBJECTIVES

The Ministry of Science and Innovation (MICINN), INNOCAMPUS programme of aims to ensure that Spanish university campuses acquire a level of excellence and internationalization allowing them to become an international reference.
Its essential objective is also to consolidate and strengthen the activities defined in the strategic plan presented last year, specifically in the subprogram R&D&I and knowledge transfer rewarded with a € 4M Grant by MICINN.

Thus the specific objectives pursued are:

a. Strengthen R&D&I activities **in the Campus by consolidating the current R&D&I centres: Food Health Initiative of the Centre for Plant Genomics and Biotechnology (CBGP), the implementation of the Biomedical Technology Centre (CTB) and activities of the Research Centre for Aerospace Technology (CITA)**

b. Develop R&D&I structures associated with ICT**, including the expansion of CESVIMA, consolidation of IMDEA Software or the Centre for Spanish users in the International Station E-USOC.**

c. Promote knowledge transfer by supporting the creation of a Support Centre for Technological Innovation Support (CAIT), **the establishment of living labs and enabling the introduction of technological demonstrators in the field of photovoltaic, solar homes and sustainable modular architecture.**

d. Enhance the supply of postgraduate and doctoral training in close collaboration with the R&D Centres present on campus.

e. Internationalize the campus by increasing the attractiveness of resources and talent.

These basic objectives are integrated into the innovation strategy plan designed by the UPM for the Montegancedo International Campus of Excellence programme.

We summarize in a table the actions taken by UPM in the last 4 years and the actions to be taken during the period 2010-2012.

ACTION	CURRENT SITUATION	CURRENT ACTIONS	FUTURE ACTIONS
Create an institutional innovation strategy	Lack of an integrated strategy across the UPM but innovation activities are accepted institutionally and individually.	Creating certified laboratories for certification of products using several entities (foundations or certified laboratories)LCOE activities e.g. LOM, LOEMCO, IDR, INSIA, etc. in Test.	Institutionally supported innovation indicators Use of pre-competitive procurement in ICTS, living labs, pilot plans or new buildings
Solving the level of immaturity in the technologies generated by universities	Not possible to mature technologies in university laboratories without exposing them to market	Technology transfer and spin-offs patents e.g.: Agreement with Marcelino Botin Foundation for the commercialization of patents in fabric engineering	Strategic partnerships to support R & D lines in order to develop joint projects with joint units
Industrialization of prototype products or processes	Most of the prototypes generated through UPM R & D do not allow for a direct process of marketing and incentives in this phase are not enough to help this process.	Cooperation with the business sector for the commercialization of technologies. e.g.: CENTESIL pilot plant for silicon solar cells purification processes.	Joint laboratories with the business sector with possible direct presence in other countries
Create technological demonstrators and living labs	The incorporation of end users during the R&D phase is very weak or nonexistent, and their opinion is not used to guide the research activity	Implementation of technological demonstrators to attract the attention of potential users or companies for future developments. Ex: Technological demonstrator in domotics in CEDINT Establishment of living labs for testing with end users e.g.: Health Living Lab e.g.: Photovoltaic solar homes as a result of Solar Decathlon	Incorporation of new demonstrators with emphasis on the integration of technologies Ex: Technological demonstrator of photovoltaic concentrator Creation of new Living labs (under negotiation) e.g. 3D Living Lab e.g. Future Banking Living Lab e.g. Retail distribution Living Lab
Help the process of creating EBTs: Pre-incubation of EBTs	Many potential spin-offs are undermined by the absence of incentives in the period (six months to one year) prior to its formal establishment	Assignment of shared space in incubators or in colleges for companies not yet established	Assigned space in the Montegancedo Business Centre and specifically designed services for them
Mobility focused on the innovative process	Difficulty in promoting public-private mobility	University-enterprise chairs	Joint R&D centres with businesses provided staff

Table 1. UPM's initiatives to support technological innovation

The actions described in this table represent the general direction to be taken by the UPM to accelerate the innovation process, specifically in the Campus Montegancedo. Among these activities are proceedings for which additional funding is needed.

By using this table, we list the R&D activities requiring strengthening in this new edition of the Campus of Excellence. These are aligned with UPM's strategic R&D plan designed during the previous call. Each of these new actions will be assigned to one of both 2010 calls and their respective ministries.

		ASSIGNMENT		
	R & D + i activities	INNOCAMPUS	CEI	Other
1.	Improve Supercomputing Research : Strengthen CESVIMA R & D in some areas focused activities			
2.	**Development of Food and Health Initiative (new area): new line of research activity in CBGP.**			
3.	**Promotion of activities related to solar photovoltaic energy**			
4.	**Development and promotion of solar housing**			
5.	**Improve and strenghten R & D activities.** Become a eference center for image based diagnosis			
6.	**Development of 3D TV Demonstrator**			
7.	**Creation and deepening of R & D activities in sustainable modular construction**			
8.	**Support patent generation and maintenance**			
9.	**CAIT equipment**			

Table 2. R&D action allocation by program

4. TYPE OF ACTIONS

The Campus of Montegancedo Innocampus activities presented in the programme, focus on promoting international excellence in Science and Innovation and are framed within the strategic plans for conversion to CEI 2010. Specifically, this project aims to focus in the following activities:

1. Strengthen R&D&I structures associated with ICT and its activity in R & D in the field of supercomputing, enabling new facilities and expanding the CESVIMA centre.

2. Develop new R&D&I initiatives in the Campus and consolidate existing centre's through the development of the Food and Health Initiative (BioTech).

3. Promote knowledge transfer establishing living labs in the new Support Centre for Technological innovation (CAIT) and enabling the launch of technological demonstrators:

3.a. Installation of solar homes with photovoltaic technology

3.b. Development of a 3D TV demonstrator

3.c. Support patent generation and maintenance

Each of these four actions addresses and relates to one or more of the seven criteria that are incentivized by the programme INNOCAMPUS. Below we show the relationship between the type of measures and criteria for the incentive.

		TYPE OF ACTION				
		Strengthen R & D + i structures associated with ICT	Development of new R & D initiatives	Transfer of knowledge through demonstrators and living labs		
	INCENTIVICED ACTIONS	Enhance Supercomputing through new equipment and expansion of CESVIMA	Development of Food and Health Initiative (BioTech)	Install a boost technology demonstrator of photovoltaic solar housing construction	Development of 3D TV demonstrator	Support patent generation and maintenance
A	Research of international excellence, enabling development of technological innovation activities of high socio-economic impact.					
B	Research orientation towards the production of new products or services, in global emerging markets, and impact on international standards.					
C	Protection of research results through the mechanisms of industrial and intellectual property, international commercialization and production					
D	Technological innovation programs and actions for the transfer of knowledge and research results to society and business.					
E	Technology based entrepreunership program with focus on internacionalization and results explotation					
F	Actions aimed at attracting international research excellence, both postdoctoral and predoctoral level.					
G	Implementation of mechanisms to ensure the universities international leadership in their strategic lines of action.					

Involves activities related with the aids for actions

Table 3: Relation between incentives and actions

The future development of the Campus Montegancedo is conditioned by the funding obtained of both applications. The current petition under the programme INNOCAMPUS complements the CEI 2010 one, and develops the Strategic Plan in the areas outlined during the first phase of the call CEI 2010.

The request to the Ministry of Education is mainly focused on complementing the construction and fit-out of the Support Centre for Technological Innovation (CAIT), which is described in further detail in the Campus of Excellence technical report.
The request in the programme INNOCAMPUS focuses on the acquisition of scientific equipment, installation and commissioning within the lines of research mentioned above.

5. PROJECT FRAME

The various projects and actions presented throughout this document are part of the INNOCAMPUS programme as part of the Strategic programme presented in the call of Excellence programme of Campus International EDU/1069/2010 order of the Ministry of Education, for those universities that have not achieved the certification as an International Campus of Excellence (CEI).
The various actions proposed are an integral part of the CEI Montegancedo strategic plan.

6. PROJECT JUSTIFICATION

Below we describe the actions briefly explained above, according to the various evaluation criteria of the call.

6.a. Opportunity and international excellence of project deliverables in Science and Innovation

6.a.a Strategic Objectives

- Develop international excellence research activities to enable further development of technological innovation activities. Continue the strengthening process of R&D units and structures to increase their research quality. This process should be delivered at the same time it seeks to involve these units in postgraduate education (research oriented master's degree programmes and PhD) and innovation oriented knowledge transfer activities.

- Create technological innovation programmes and actions to transfer knowledge and research results, to society and industry.

- As a high impact and long term institutional bet, enable the new research centres to implement ambitious R&D programmes built around the great scientific and technological initiatives of the UPM.

- Keep on significantly enhancing the transfer of knowledge to the business sector through four complementary approaches:
  A) Increase research activity,
  B) Increase and exploit UPM's portfolio of intellectual property,
  C) Expand the business network through the creation of technology based companies or participation in business entities,
  D) Enable teaching staff mobility between Academia and Business and vice versa

6.a.b Description of main activities and expected impacts

In this call the Campus Montegancedo requests support for the specific actions mentioned below:

1**. Strengthen R&D&I structures associated with ICT and its activity in R & D in the field of supercomputing,** enabling new facilities and expanding the CESVIMA Centre.

2. **Develop new R&D&I initiatives** in the Campus and consolidate existing centres through the development of the Food and Health Initiative (BioTech).

3. **Promote knowledge transfer** by establishing living labs and enabling the launch of technological demonstrators:

3.a. Installation of solar homes with photovoltaic technology

3.b. Development of a 3D TV demonstrator

3.c. Support patent generation and maintenance

These are described below emphasizing goals, tasks to be performed, budgets and impacts.

1. Strengthen R&D&I structures associated with ICT and its activity in R & D in the field of supercomputing, enabling new facilities and expanding the CESVIMA.

Objectives of the action:

a) Transform the CESVIMA centre, located on the Montegancedo Campus , in the Madrid node of the Barcelona directed and MICINN supported Supercomputing National Centre.

b) Specialize CESVIMA as a user support entity centred around two international activities:

- Supercomputing Laboratory of Techno Fusion's singular and technological installation.
  3D visualization of medical imaging used in international projects.

Implementation of the action

a) In order to achieve this ambitious goal, the UPM team needs to acquire a similar equipment (but smaller) to the technology replacing the Mare Nostrum (being the Supercomputing Centre in Barcelona) super computer, allowing both machines to have the same architecture and performance level. The obsolescence of computing equipment is very fast. Generally, in three years supercomputing equipment is considered obsolete.

b) However, this option, with the advantages of an improved performance, security, reduced consumption, etc. has the disadvantage of requiring a larger investment only justified if the UPM uses this investment as an opportunity to substantially improve CESVIMA's structure and positioning.

The supercomputer used by CESVIMA, Magerit, is based on "blade" IBM SJ2 and SJ21 processors. Their component origin goes to Mare Nostrum (Barcelona supercomputer BSC), other previously acquired UPM's investments and some recent peripheral equipment (such as tape robot) attributable to the incentives obtained by the UPM in the 2009 CEI call.

The last major extension of Magerit occurred two years ago with the arrival of the processors from Mare Nostrum (50% of the previous machine). Therefore the current processors in Magerit are four to five years old. As a result of which, if we conclude that if **the Mare Nostrum technology is outdated, Magerit is even more so**.

Mare Nostrum is pending of a complete equipment rehaul that requires an agreement between the Generalitat de Catalunya and the Ministry of Science and Innovation, this process has commenced, however the deal is still pending finalization.

The first option for Magerit is to wait for the replacement of Mare Nostrum in Barcelona and take, if an agreement is reached between the governments, a percentage of the current processors (potentially 50% as in the previous case). However this situation has several drawbacks:

- **Inability to set a concrete date**, while the current problems of maintenance and obsolescence continue to grow.
- In the event the processors are received, they will be four years old, without any guarantees and with high maintenance costs.
- 20-30% increase in the power needed for an **enlarged cooling capacity and increased power consumption** (currently it already accounts for 600,000€/ year).
- The machine will not be first class compared to the one in Barcelona.

Another option will imply the acquisition of new equipment. Under this scenario, negotiations have started with **IBM Research to establish a joint research centre on parallel processors for visual displays.** This is a line of research currently not investigated in Barcelona.

- **Research in Madrid on parallel processors for display**

To undertake these actions, it is necessary to habilitate extra space in the CESVIMA/ CEDINT building encompassing an additional area of 300 m2.

Budget: Infrastructure needed

The budget of this action revolves around several components:

Requirements		Investment
Equipment and Installation		€2,5M
Facilities fitting out		€0,25M
HR	Visual display area	€1,2M
	Techno Fusion area	

Table 4: Equipment budget for CESVIMA

In this call, only the amounts related to the equipment and its installation (€ 2.75M) will be requested. HR will be provided the UPM.

Acquisition of new equipment

The undertaken analysis suggests the replacement of the current processors with a system costing 2,5 M € and with the following technical characteristics:

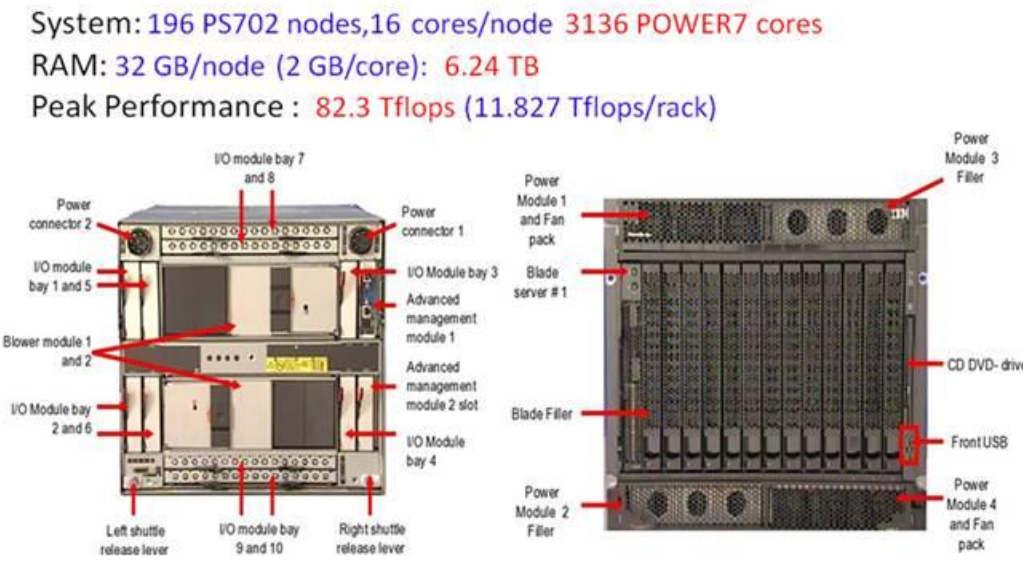


Fig. 9: New System Magerit 2

The processors have the following characteristics:

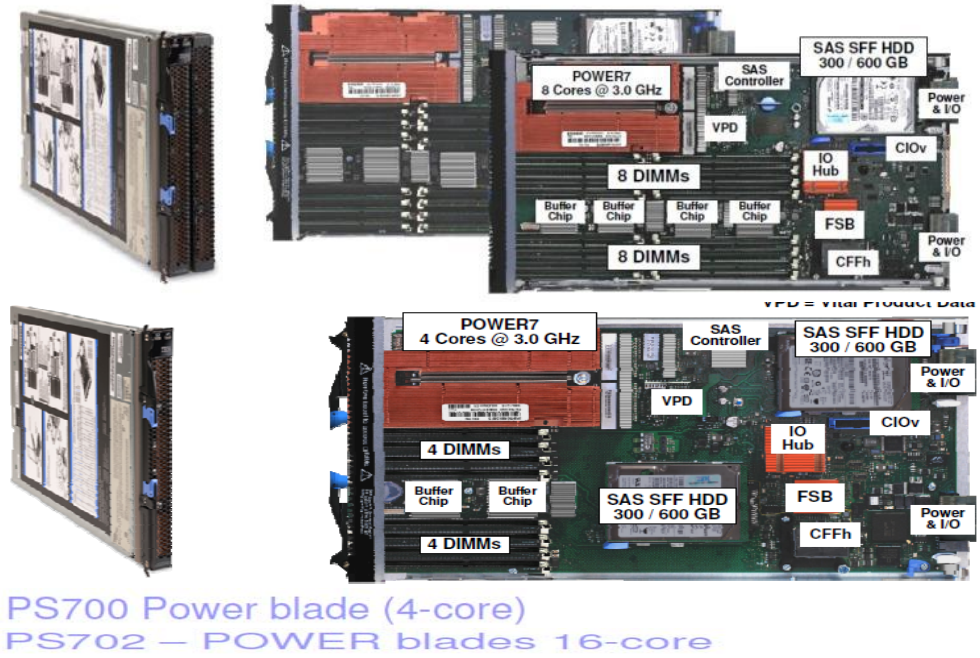


Fig.10: Proposal for Magerit's new processors

With an initial budget of 2,5 M € it is possible to replace the current processors with Power 7 processors while keeping the peripherals and the installation of the current site.

While new equipment has lower fuel consumption and do not require further cooling capacity a possible increase will depend on the decision taken with the current equipment.

Facilities fitting-out

The fitting out of the new space needed for the human resources programme in CESVIMA requires an investment of 0.25 M €.

Human Resources

Although not requested in the INNOCAMPUS call, the UPM considers it necessary to simultaneously initiate a human resources programme in the field of supercomputing. It should be considered that the conversion of CESVIMA into a research centre specialized in the above indicated fields will involve an effort to attract international talent in the 2010-2012 period.

With a total cost of 1,2 M € (0.4 M € per year in the period 2010-2012) it is possible to undertake actions in the following fields:

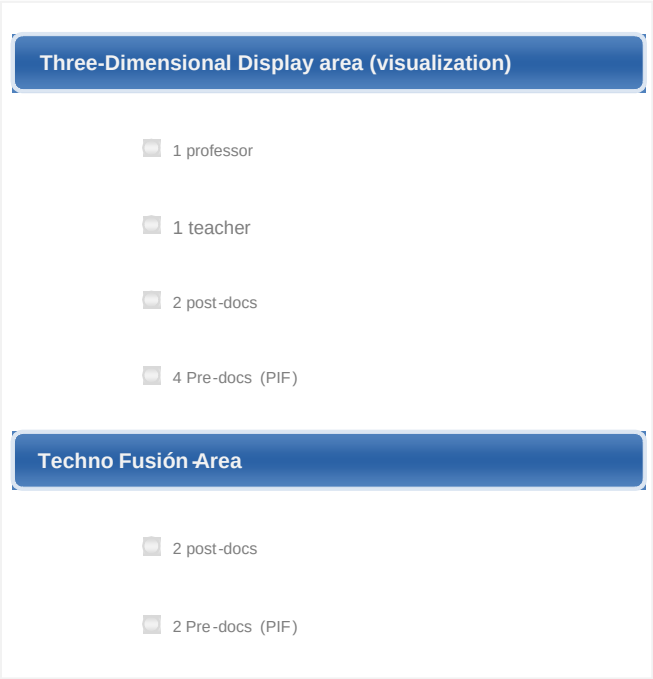


Fig.11: Human resources

Action Impact

- Strengthen national and international research in the field of ICT. Promote the Spanish Supercomputing Network.
- Generate recurring revenues from the Supercomputer research results.
- Generate Income through airtime rental of new equipment for the execution of complex calculations.
- Attract and retain international talent specialized in these research areas with a specific training programs for doctors.

The UPM is confident that this research activity will generate enough resources to help the repayment of loans post 2012 after the three-year grace period.

2. Develop new R&D&I initiatives in the Campus and consolidate existing centres through the development of the Food and Health Initiative (BioTech).

Activity description

Responding to a social demand the improvement of food quality and safety is a priority for the agrifood industry. It contributes to the development, wellness and healthy living of citizens. In our neighbouring countries there's a growing awareness of the relation between food and health, along with a need to improve the nutritional quality of food and reduction of potential health risks.

Plant genomics and biotechnology provide a great potential of tools to meet these challenges by acting on different stages of the food production chain. This includes from plant breeding developing new products varieties with high added value, tailored to the market needs, to the identification of food allergens, the development of detection methods and biohealth strategies able to mitigate its effect on the quality of consumer's life.

The **Centre for Plant Genomics and Biotechnology** (CBGP, UPM-INIA) has a scientific base and technological capacity to address these new challenges from the Agrifood industry. This initiative aims to develop this research area.

Fig.12: CBGP Building in Montegancedo Campus

Objectives

- Establish new lines of research in the food quality and safety areas, taking advantage of the synergies of research currently undertaken by the CBGP, facilitating significant interactions with new productive industries.
- Research and develop the use of cultivated plants for the production of new compounds with pharmacological activity:

This project is based on five pillars:

1. Food Allergies
2. Nutritional quality of strategic crops
3. Development of new methods of analysis and detection of molecules in food
4. Molecular Pharming
5. Computational Biology Platform

Action Execution

1. Food Allergies

Food allergens affect 10% of the world population. The identification of the molecular nature of the compounds present in foods, mainly proteins, with allergenic activity is the first step to reduce their impact on the population. The characterization of these molecules is necessary to understand its allergenic properties and characterize the epitopes responsible for the interaction with immunoglobulin, e.g. triggers for the allergic reaction. This identification will allow for the development of diagnostic methods for the causes of allergies, fast HTS detection methods to prevent the entry of allergens into the food chain, and the development of new methods of immunization / vaccination to protect allergic population.

Moreover, the identification of molecules that cause food allergies is needed for food production aimed at specific population sectors (risk groups), with increasing demand. Crops can be manipulated to obtain a product which prevents the accumulation of allergens, either by stable modification of their genomes or transitory alteration by gene slicing.

2. Nutritional Quality of strategic crops

Improving the quality of food is a priority for plant breeding companies that are expanding in tandem with the availability of varieties resistant to pathogens and abiotic stresses. The aim is to obtain products with high added value, such as a higher content of vitamins, sugars, and new nutritional molecules

Within the nutritional quality improvements there's a strong interest in the increased concentration of antioxidant compounds in food, helping to reduce free radical activity generated by breathing and through common practices in the developed countries population such as intense exercise, fat rich diets, uncontrolled exposure to solar radiation or environmental pollution. The harmful effects of free radicals include increased risk of developing cancers, degenerative diseases and cardiovascular diseases. Among the most prominent antioxidants in plant based foods are vitamins E and C, carotenoids, polyphenols and sulphur compounds, which are found in strategic crops products such as cereals, oilseeds, fruits and vegetables.

3. Development of new methods of analysis and detection of molecules in food

Quality and food safety requires the development of HTS methods for food analysis throughout the different stages of the food chain for the molecule detection (such as allergens), toxins and human pathogens. The analysis methods used and available by the food industry are expensive and do not exploit the new genomic technologies potential. This project aims to develop methods to detect molecules and food borne pathogens based on modern omics technologies. Metabolomics platforms, to be developed genotyping one's (see Axis 2) and existing proteomics will provide the necessary infrastructure.

4. Molecular Pharming

A major worldwide challenge is the production of effective and affordable drugs. The global pharmaceutical industry is worth around $500 Billion and grows at a rate of 10% per annum. The pharmacologically active ingredients (API) produced by chemical synthesis are typically small molecules, while the fermentation or synthesis in cell culture also allows the collection of macromolecular APIs (peptides or proteins). Recombinant drugs account for 30% of the drugs marketed in the U.S. and the EU.
The production of these molecules in plants or plant cell cultures (molecular pharming) has a high potential use in human and animal health, within the pharmaceuticals areas, diagnostics and vaccines. The development of such research in the CBGP involves a further opportunity to interact with the health sector.

5. Platform for Computational Biology / Structural

This platform will allow data integration from HTS generated in the different project activities. It will also help the development of structural models he demanded molecules (e.g. Allergens)

Categories	Total	Men	Women	Spanish	Foreigner
Permanent Positions					
Professor	5	4	1	5	0
Lecturer	10	6	4	10	0
Substitute Lecturer	3	0	3	3	0
Lecturer hired with doctorate I3	11	6	5	9	2
Lecturer hired with doctorate	1	0	1	1	0
INIA researcher	3	1	2	3	0
INIA resident researcher	6	4	2	6	0
Researchers from Other Institutions - CSIC	1	1	0	1	0
Main researcher IMDEA	1	1	0	1	0
Postdoctoral					
Ramón y Cajal researcher	2	1	1	2	0
Juan de la Cierva researcher	6	1	5	6	0
Other Postdoctoral	18	5	13	15	3
Predoctoral					
Predoctoral labs	36	12	24	26	10
Other predoctoral	13	4	9	10	3
PAS					
Technicians and Administrative	33	10	23	32	1
Students					
Master student	32	8	24	25	7
Final year student.	20	10	10	17	3
Visiting Student	3	0	3	0	3
Totals:	201	74	127	172	29

Table 5: CBGP Staff

Budget: Required infrastructure FfH-CBGP

Equipment and Installation	€ 0.78 M
Facilities renovation	included
Human Resources	
Researchers	€ 0.1 M
Technicians	€ 0.1 M

In this call, only the amounts related to the equipment and its installation are requested, € 0.78MM

CBGP REQUIRED INFRASTRUCTURE			EXPECTED INVESTMENT	
Equipment and installation	Metabolomics Platform	GC-MS/MS equipment and accessories	120.000	€0,78M
		Team LC-MS-MS and accessories	320.000	
	Genotyping platform (Illumina)		45.000	
	High Resolution Melting platform (Roche)		65.000	
	Real-time quantitative PCR equipment(ABI Prism)		35.000	
	Proteomics laboratory: HPLC, GC, FPLC, lyophilized samples		90.000	
	Cell culture	Animal cells incubators	30.000	
		Controls marked with radioisotopes and other materials	75.000	
Facilities set up				included
F_fH-CBGP Human Resources *	Researchers	Food Allergies	Available in UPM	€0,1M
		Metabolomics	Available in CBGP	
		Proteomics	Available in CBGP	
		Genomics (Doctor with +5 years of experience)	50.000 x 2 years	€0,1M
	Technician	Metabolomics (FPII)	25.000 x 2 years	€0,05M
		Genomics (FPII)	25.000 x 2 years	€0,05M

Table 6: CBG Required infrastructure and expected investment

Figure13: CBGP Equipment

Action Impact

- Implement new technologies in the CBGP, including those necessary for the separation of molecules (HPLCs, GC, etc.), which will be combined with technologies from MS / MS and MALDI-TOF.
- Allow interaction with the research topics of human health sector, both in its provision of care (hospitals) and business (pharmaceutical industry).
- Establish within the CBGP a functional genomics programme new metabolomics and genotyping platforms that along with the available proteomics platform will accelerate the improvement process and market introduction of plant varieties that produce foods with added value. The platforms combination of metabolomics / proteomics with genotyping one would benefit the business sector and through R&D projects could improve the sectors competitiveness in market areas where the current competitiveness is threatened.
- Through the available platforms develop methods to detect molecules / food-borne pathogens that are based on modern omics technologies.
- Substantially improve pharmacological options for diagnosis and vaccines by creating macromolecules. The development of this kind of research provides a new opportunity for interaction with the health sector.
- Integrate data and design/ model development by adopting a computational platform

Schedule

Activity	**2011**				**2012**			
Food Allergies								
Nutritional quality of strategic crops								
Development of new methods of analysis and detection of molecules in food								
Molecular Pharming								
Computational Biology Platform								

A square equals a trimester

Table 7: Schedule BIOTECH

Fig. 14: New Lab at INIA

3. Promote knowledge transfer establishing living labs and enabling the launch of technological demonstrators:

3.a. Installation of solar homes with photovoltaic technology

3.b. Development of a 3D TV demonstrator

3.c. Support patent generation and maintenance

I. Installation of solar homes with photovoltaic technology as part of research in modular and sustainable construction

Activity description

The UPM has already begun proceedings with respect to the enhancement of permanent facilities for the demonstration of different architectural solutions in modularized and self-sufficient construction.

During 2010 various self-sufficient solar photovoltaic energy homes were installed in the Montegancedo Campus. These were designed by the UPM and built for the Solar Decathlon competitions in the U.S. in its 2005, 2007 and 2009 editions.

The initial basic installation has been financed with resources from the call CEI 2009 (Subprogram B, Ministry of Science and Innovation). These works have prepared an area providing basic services: water, electricity and draining.

However, in its current status there are no capacities to use the homes as a research centre.

Objective of the action:

Create a demonstrator in conjunction with companies in the construction sector of modular and energy saving solutions applying Self Sufficient and Bioclimatic Architecture.

This implies transforming the existing solar homes into living laboratories ("living labs") in order to test solutions and habilitate an additional module for services.

Execution of the Action

This action seeks to reuse the self-sufficient solar houses submitted by the UPM to various "Solar Decathlon" competitions (2005, 2007 and 2009) and the one constructed for the "Solar Decathlon Europe" out of competition, turning them into new modular solutions demonstrators. The main objective is twofold:

1) Probe the effectiveness of modular design in the different aspects of sustainability that affect them, namely:

    • Modular design Rationality

    • Feasibility of industrialization

    • Efficiency of new building material, applied systems, assembly processes and "deconstruction" processes

    • Maintenance optimization

    • Energy efficiency

    • Ease of use of home automation solutions

    • Environmental Impact Study

2) Understand the degree of interior comfort, considering the following aspects:

    • Thermal comfort

- Lighting comfort

- Acoustic comfort

- Ventilation

A constant monitoring with various types of sensors is required, to obtain timely data and correlations needed to achieve conclusions that will enable decision-making for the researched solutions.

Also it should be considered as an opportunity to keep the modules for residential use in order to function as "living labs", providing valuable architectural and life style data.

Budget performance

These activities should be carried out over a number of years, depending on the work plans established. It involves a series of initial installation charges and other maintenance costs to renew the monitoring equipment, updating it according to the data search and/ or market supply. We forecast the following costs

1. Additional installation costs 100. 000 €

2. Monitoring of four modules with sensors, 100.000 €

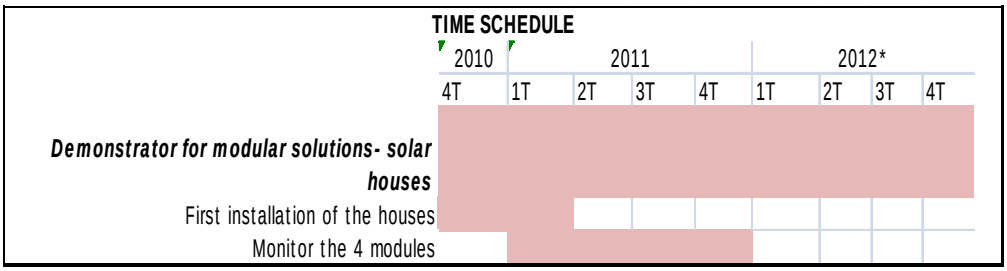
Action Impact

The installation of solar homes is complementary to the creation of a "Research Centre of Sustainability in Architecture", as the modules essential to ensure that researched theoretical works have a practical testing place to make them valid for further development.

In this connection, it should be borne in mind that research in the field of architecture must always be complemented by the appropriate development in order for the results to become and innovation that can be used in the sector.

This ensures that the credibility of UPM's proceedings in that research centre is maintained at the highest level, resulting in an increased demand for scientific and technical advice from multiple industry players and public administrations.

Fig.15: Photovoltaic homes



II. Development of a 3D TV demonstrator

Activity description

The three-dimensional television (3DTV) is the current frontier of research on television, since the distribution of visual information that allows for the depth perception is crucial in the evolution of audiovisual systems. Although there is an excellent mature technology with high quality available, there is increasing demand for new research and developments that help new applications based on depth perception such as: international standards for 3D video, methods for the conversion of 2-D materials into 3D, common measures of 3D quality, content adaptation to the new monitors, etc.

Therefore, the CEI Montegancedo plans the development the UPM 3DTV research platform.

Firstly it will establish a working laboratory for the processes of acquisition, characterization, compression, distribution and display of 3D audio-visual materials.

Secondly it will consider the distribution of content. Hereby the Campus Montegancedo will strengthen its position as a leader & Campus of Excellence in advanced telecommunications services, where new concepts of TV consumption converge to the 3DTV, where the combination of high resolution and immersive 3D produce a new sensation to the viewer, and where the ubiquity for content reception becomes a reality.

The 3D TV demonstrator lab will focus mainly on distribution and production. Following the "user driven open innovation methodology ", the lab is conceived to attract activities of research groups and companies, domestic and international, large and small, and to actively participate in standardization bodies such as MPEG.

Within audio systems there is currently an extended global trend to provide visual information that allows depth perception of the observed scene. There are many possibilities, from the widely known "shape from motion" (perception of forms by the movement of the camera), achieved with monocular camera to the construction of "complex caves (caves complete with video display in all walls) showing a complete surround audiovisual information. Lately, this trend has reached the consumer electronics market in cinemas first and then on TV.
So, on one hand, cinemas are updated to 3D formats as a result of the decision by major Hollywood producers to produce 3D movies, on the other hand, there has been a vast improvement in 3D TVs with a high picture quality. Unlike previous attempts, there now exists a mature technology that offers excellent quality.

Fig.16: Simulation of a monitor allowing depth perception

However, there is an even greater demand for R&D to support the development of new applications based on the depth perception. Therefore, there is an urgent need for global standards for encoding, video compression and transmission of 3D visual communications. Moreover, the content demand with depth perception cannot be met by the creators of content (either in Hollywood or elsewhere), so we must convert 2D material into 3D. Finally, the new monitors require specific manipulation to adapt the information received to its display capabilities. These are just some examples of a wide range of opportunities that open up new fields of research and development in areas related to 3DTV.

Fig. 17: Stereoscopic camera

The main objective of this proposal is to have an infrastructure serving as support for research, development and testing facilities for the acquisition, characterization, compression, distribution and viewing of media that provide depth perception.

Although there is a common goal, the results are applicable to different scenarios classified according to the type of information delivered. Thus, in terms of depth perception , there are two main types of formats:

• Video-only formats that include Classical Stereo Video (CSV) with two views, Mixed Resolution Stereo video (MRS) with a spatially sub-sampled view, and Multi-View Video (MVV) with more than two views.

• Depth-enhanced formats including Video plus Depth (VD), Multi-view Video plus Depth (MVD), and Layered Depth Video (LDV).

Also there are more variations depending on (a) monitor and (b) of the interaction with the user. So if we anticipate the evolution of the current television scenario, there are different ways of uni-directional distribution services as:

• Three-Dimensional Television (3DTV): provision of information left-view/right-view (CSV, MRS) and texture depth (VD, LDV) to advanced monitors stereoscopic or auto-stereoscopic.

• Multi-View Video (MVV): provision of a range of views that the user can select at will. If the user can choose a virtual viewpoint different from the location of either camera is called Free View-point Video (VVF).

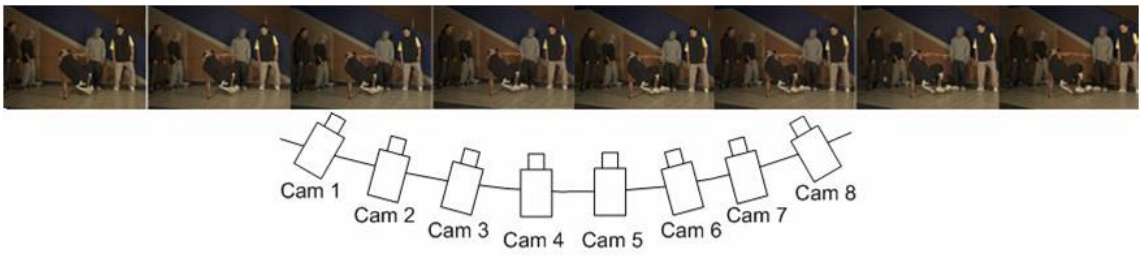


Fig. 18: Multiview sequence example (MVV): Break dance generated by Microsoft

However, there are many different situations depending on the number and location of all cameras, ranging from linear and circular equidistant arrays (e.g. bullets scene in the movie Matrix) to the irregular placements of dense and scattered ones.

Fig.19: Bullet scene in the movie Matrix

However, if we consider other scenarios such as interactive services (bidirectional), information flows from both ends and immersive services (or semi-immersive) can be deployed, permitting personal communications with presence sense. So in the new generation of communication systems the distance feeling between speakers disappears due to the depth perception and, therefore due to the size of the observed.

Finally, the current audio-visual communications are deployed over IP networks (e.g. Internet) and the potential for depth perception can be integrated into a wide range of services creating the so-called "3D Internet." This will be based upon new generation IP networks (IP Next-Generation Networks - NGN) and will allow the multidimensional use of the network where information will flow in all directions. The considered technologies can be used both at the technical level to improve the efficiency of the transmission or at a user level to provide an enriched experience. Although current research efforts are aimed at the television or related systems, it is evident that the development of video processing technologies pave the way for the 3D Internet.

Objective of the action:

Aim is to have an infrastructure that serves as support for research, development and testing of three-dimensional television sets, including the complete chain of signal handling, comprising:

- Acquisition: A system of cameras to acquire visual information in multiple views
- Representation: A set of common and joint procedures and standards for the characterization of signals enabling their exchange, storage and transmission
- Coding: A set of procedures and standards aimed at reducing the volume of data required to represent the signals achieving an efficient storage and transmission.
- View: A display system of signals, which offers different images depending on the position of each viewer, allowing them to perceive visual information with depth and perspective

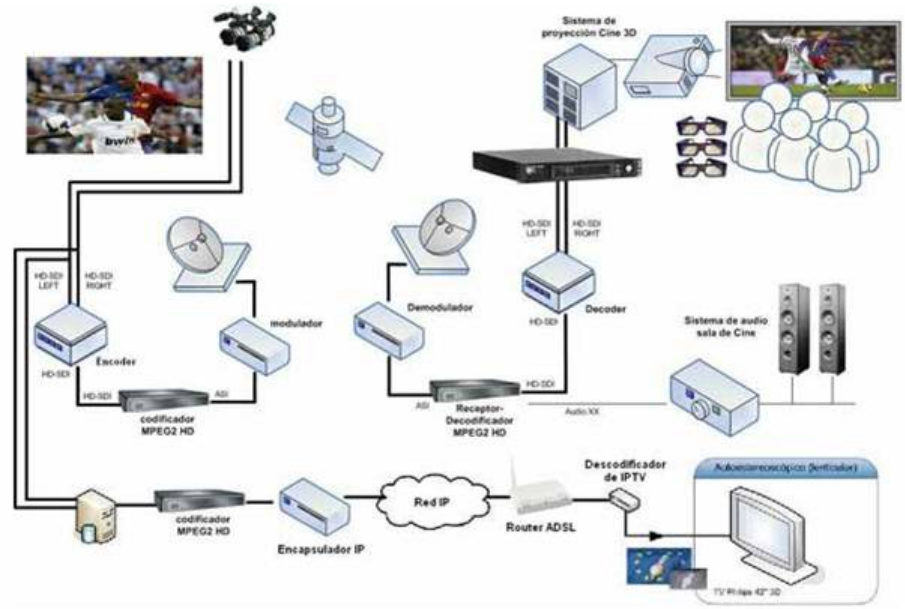


Fig. 20: Complete 3DTV System

The infrastructure will provide a platform for the demonstration of R&D results and for the testing of three-dimensional television equipment, permitting work on new schemes:

- Acquisition of content that provides depth perception
- Production, management and monitoring of contents
- Post-production with special emphasis on the treatment of depth
- Analysis of Quality of Service (QoS) by considering separately the generation of signals and their distribution.
- Analysis of quality of experience (QoE) perceived by users
- Multiformat presentation including a natural and synthetic video mix

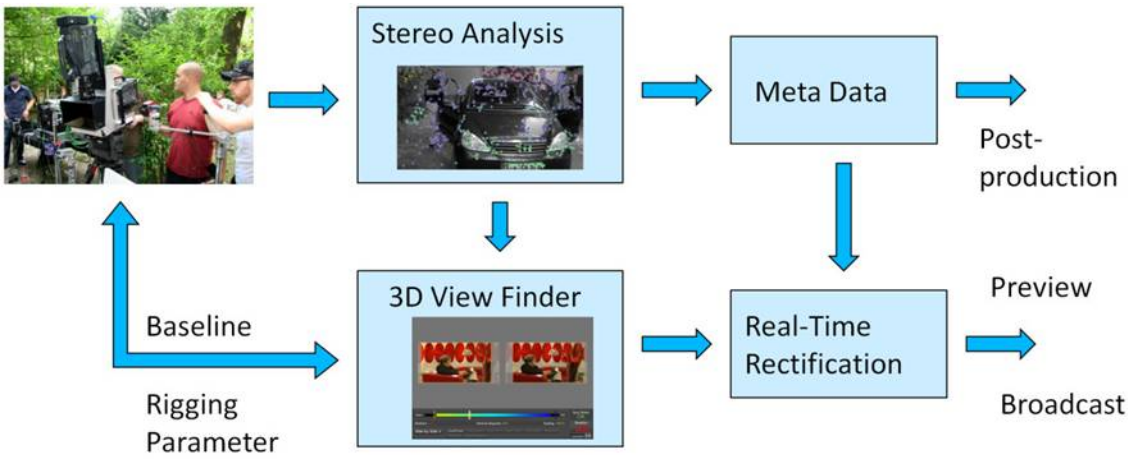


Fig. 21: STAN technology architecture for stereo acquisition

Execution of the Action

In the Campus there is equipment available for the acquisition, handling and storage of three-dimensional visual information signals, but it must be complemented with some visualization and three-dimensional visual information systems.
We propose to set up a 3DTV demonstrator lab that offers R&D results demonstration by providing a complete set of equipment on which following services are performed:
• Complete system use for staff training in 3DTV
• Partial or complete system use for R&D activities, primarily for the presentation of results for the integration of specific developments
• Integration of developments carried out by companies in the audiovisual sector

The collaboration with companies in the audiovisual sector is part of the theme of "user driven open innovation" involving users in all stages of the innovation process. We aim to establish with the audiovisual sector, partnerships to generate cross-fertilization with research groups in order to achieve synergies similar to those considered in the Living Labs.

The mentioned research fields have the backing of previous activities carried out inside the UPM, such as the Dimensional TV Laboratory (Lab-3DTV) an infrastructure to support research, development and testing of 3DTV equipment, developed by the ETS Telecommunications Engineers, in cooperation with Spanish firms.

Schedule

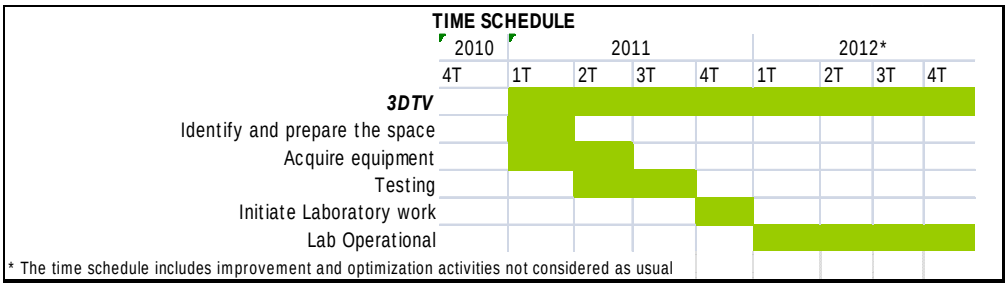


Table 8: Transference phases time schedule

Budget

The budget required for this action is 250,000€, distributed as follows:

- Facilities fit out € 50.000
- Acquisition of equipment €140.000
- Other costs € 60.000
- Total € 250.000

The equipment considered includes:

- 1920x1080 resolution cameras for 3D and multiview capture
- Additional accessories required to operate the cameras
- Optical lens for cameras
- CMOS cameras with Ethernet interface and 3D and multiview capture
- 6mm and 9mm optical lens for the cameras
- A range camera able to obtain the depth maps for 3DVideo
- Timers for camera synchronization
- Multiview & 3D video Storage Systems
- Post-production equipment
- Real-time encoding equipment of the signal captured by the cameras
- Real-time decoding equipment for compressed signal from the encoders
- Digital transmitters and receivers
- Video projector 3D display using active glasses
- 3D display Monitors using active glasses
- Handheld 3D visualization equipment

The other costs include direct costs of implementation, procurement, outsourcing or other activities. Of special relevance is the installation of a perimeter cage for the set up of cameras and lights to capture synchronized 3D video.

III. Support and patent generation and maintenance

Support the generation and maintenance of patents: As an intrinsic part of the transferral and protection of knowledge, we are looking for financing to develop these activities, alongside our close collaboration with the new university chair, Clarke y Modet, facilitating the internationalization of some of the UPM's patents and technology vigilance studies.

Budget

The budget is estimated at € 60.000

6b. Project expected results and feasibility to promote international excellence in Science and Innovation.

Objectives

The main programme objective is to continue strengthening Campus R & D activities by enhancing the link between research centres and industry as a way to improve the innovation process, and achieve excellence in research results, placing the campus as an international and national reference in the selected lines of research. The specialization and differentiation objectives are to be achieved by the reinforcement of R&D&I activities.

Table 9 displays the level of R&D&I funding during the last two years... To assess the relative importance of these figures it should be noted that the budget of the UPM in 2009 was 412 M €. Particularly relevant are the amounts of the national programmes that include many programmes led by the business sector as well as resources obtained in the calls for science and technology parks. In the case of European programmes, the UPM is the Spanish university with the largest number of projects and level of funding in the Seventh Framework Programme-7FP (2007-2009) and CENIT programme.

Table 9 also includes R&D&I contracted through UPM's foundations (13 in total). Significantly the General Foundation of the UPM (FGUPM) has been appointed as managing and promoting entity of the UPM Park:

SOURCE	TYPES OF ACTIONS	2008	2009
European Programmes	Marco y ESA Programme	9,63	9,61
National Programmes	Research, CENIT, AVANZA	51,35	64,55
Regional Programmes	few calls	2,56	0,2
OTT Contracts	R&D with companies and Public Administration	28,8	21,07
Foundations Contracts	R&D with companies and Public Administration	24,75	24,89
Total R&D&i		117,09	120,32

Table 9: R&D& Innovation expenditure

Of special significance is the fact that from this data, approximately 65% of the contracted quantities are conducted in collaboration with the business sector. Basic research activity does not exceed 10%, applied research accounts for about 50% and 40% is associated with actions in support of technological innovation.

The four lines of research areas presented are estimated to have the following effects in 2012:

EXPECTED RESULTS UNTIL 2012	Enhance Supercomputing through new equipment and expansion of CESVIMA	Development of Food and Health Initiative (BioTech)	Install Technology demonstrators of photovoltaic solar housing	Development of 3D TV demonstrator
Increased publications per professor	30%	60%	25%	25%
Development methodology and project monitoring	PRINCE II/PMI	PRINCE II/PMI	PRINCE II/PMI	PRINCE II/PMI
Co-financing provided by the institution or other institutions to the project development en actividades complementarias	IBM	Illumina, Roche, AbiPrism	BUILDING INDUSTRY	AUDIOVISUAL INDUSTRY
Assessing the feasibility of obtaining results	HIGH	HIGH	VERY HIGH	HIGH
Funds generated by art.83 with companies	YES	YES	YES	YES
Direct research job creation	12	3	2	4
Private investment	YES	YES	YES	YES
Private companies created (EBT)	1	3	0	1

Table 10: Expected results until 2012

6c. Scientific and innovation levels of excellence of the aggregations

Objectives

Excellence in science and innovation can only be achieved through collaboration between the public and private sector. The collaboration between University research centres and industry is critical to a successful exploitation of research results spurring a development and revitalization of the innovation process. A typical distinctive characteristic from the campus is the active involvement of business in R&D activities

The Ministry of Education and the Ministry of Science and Innovation encourage the Campuses of Excellence to "add" aggregations open to establish tie knots with the University and develop joint common strategies. The UPM has addressed this goal in Montegancedo through a complementary and unique approach: **select aggregations with private entities able to strengthen their commitment to technological innovation.**

During last year's 2009 CEI call, Montegancedo stood out due to the high number of agreements signed with public and private entities. Noteworthy were the 22 aggregations agreements signed with private entities[1] who believed in a new model and way of working. This model surpasses the traditional scope of mere business relations or straight R&D collaboration by entering the field of technological innovation through stable partnerships.

All aggregations regarded the UPM as a **"strategic partner for technological innovation."** Even aggregations with public entities[2] main objective was the focus on applied research as a way to feed the innovation process.

The specific agreements started during 2010 were (see Fig. 22 & 23).:

- **Banco Santander** under the frame of the Blue Brain project and with an agreement with Santander Group's **Produban** Company to support supercomputing. The agreements was extended to two additional areas: the creation of the Living Lab: Bank of the Future Living Lab; and management training
- **BICG / Fraunhofer Institute IAO:** Creation of a joint strategy within the international research project Office 21 for the launch of two Living Labs: One in the retail sector (presumably with the el Corte Inglés as a tractor company) and the other one in the catering business

[1] Aggregations were signed with the following private entities: DEIMOS, GE, GMV, INDRA, ATOS, IBM, ZEISS, ROCHE, T-SYSTEMS, TELEFÓNICA I+D, ELEKTA, FRAUNHOFER, BICG, SANTANDER, FENIM, VODAFONE, ISFOC, LPI, ZETA SEEDS, ACCENTURE, CLARKE&MODET, AETIC.

[2] Aggregations with public entities were: EOI, IMDEA SOFTWARE, INIA, IEO, FUNDACIÓN ONCE

- **Clarke and Modet: Sponsoring of** a university industry chair in Montegancedo Campus orientated towards intellectual and industrial property, technology surveillance and patents scrutiny in technological areas of common interest.
- **T-Systems:** Agreement for the joint exploitation **of the virtual r**eality cave with third parties and development of processing data SW.
- **Zeiss:** Development of software for the automation of neural imaging capture through cross-beam microscopy systems of dual-beam.
- **IBM:** Extend the agreement on the supercomputer Magerit and future agreement on the development of Cloud Computing. A university-industry chair with IBM Rational, has also been signed
- **Elekta**: MEG installation and subsequent exploitation

UPM's objective is to develop interim arrangements during the rest of 2010 relating to several on-going projects Graduate School with CTB(GE, INDRA, GMV, DEIMOS Space-Tech and the School of Doctoral and Graduate Studies), will be signed.

Additionally, the UPM has expanded these kind of agreements with new entities that help the implementation of new demonstrators, living labs and postgraduate training. So Boeing, MIT, El Corte Inglés and Madri + d FOUNDATION join the suite of aggregations mentioned above.

In relation with the **Entrepreneurship and Innovation programme** agreements were implemented with the following firms: Accenture (Innovation, Entrepreneurship and ICT) Digital Ideas Factory (Internet and Business Creation); Savior Venture Capital (Business Creation); Rousaud Costas Duran (Entrepreneurship), Bancaja (Entrepreneurship), Microsoft (Entrepreneurship), FLUOR (Entrepreneurship) Emprendedores Magazine (Entrepreneurship); EOI (Entrepreneurship); Axon Capital (Entrepreneurship); Global Incubator (Business Creation.

In a different area, the **coordination of a network of European technological universities** (Paris Tech, Politecnico di Torino, Oxford University and Technical University of Munich) in an institutional project funded by the European Commission, which will allow for the identifying and adapting of R&D best practices and spread them to all European universities. This will be carried out taking advantage of the resources of the Vice President for Research and the structure associated with CAIT.

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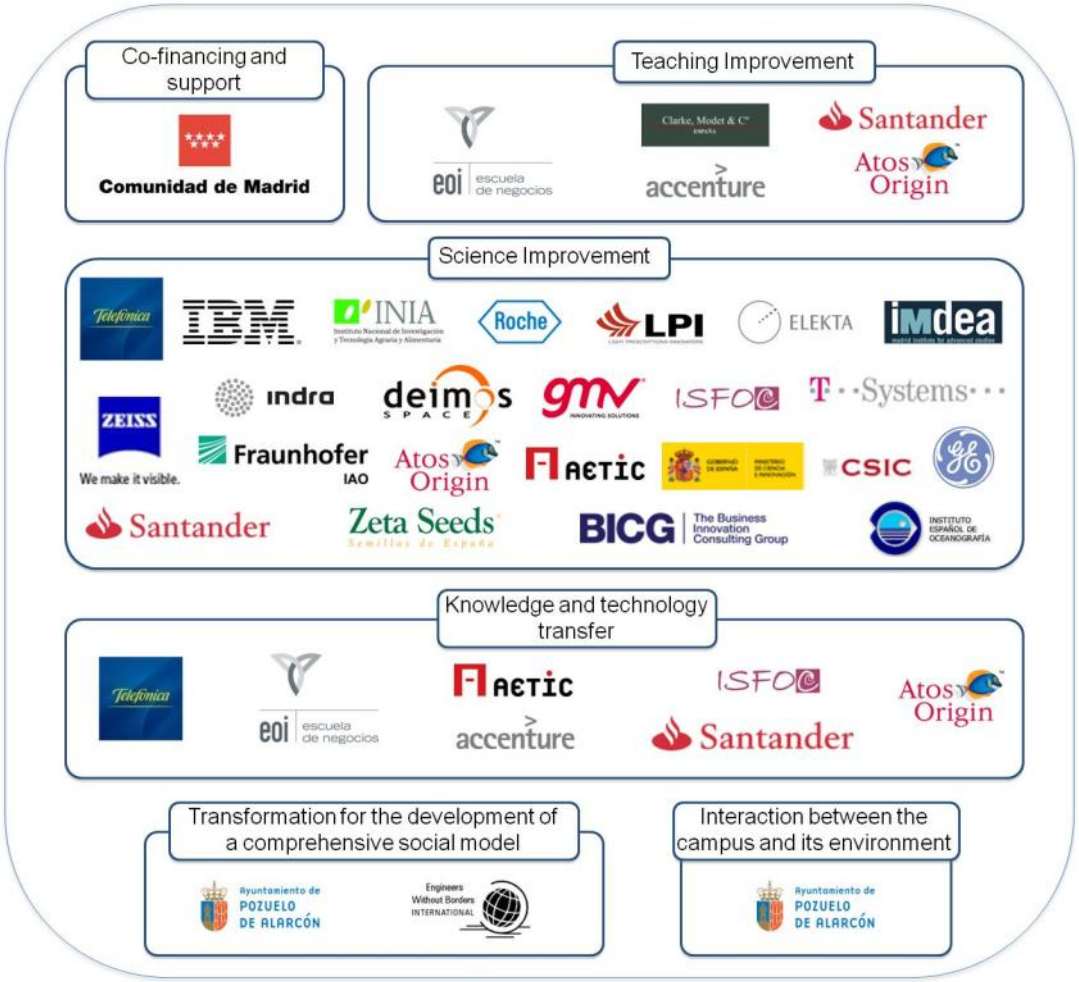

Fig. 22: 2009 Aggregations

Fig. 23: Extended aggregations

The next figure 24 provides an **overview of Montegancedo centres and their relation to the innovation process** (position on the vertical axis according to the innovative intensity of the activity). The figure represents not only the Living Labs (LL) or current technological demonstrators (or those available in the very near future) but also other technological services offered by the R&D&I centres. Lines shown indicate the relationship between management and leadership of a centre with a particular service or demonstrator.

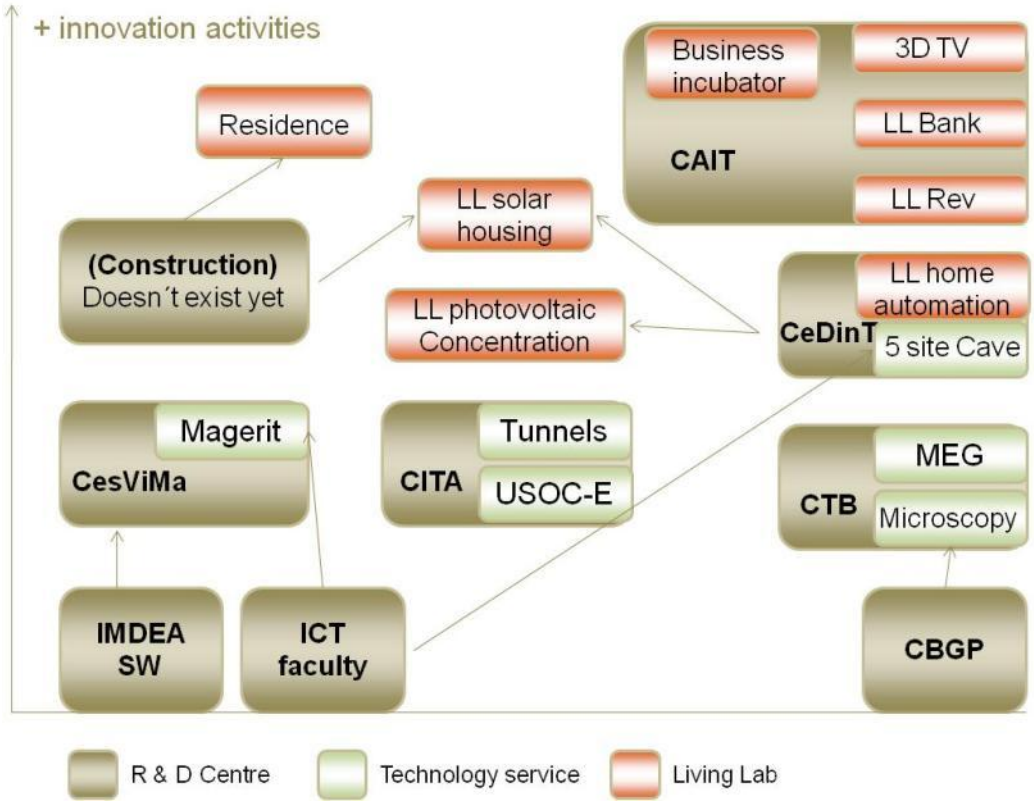

Fig. 24. Campus Montegancedo from the perspective of innovation

This figure is complemented by a permanent presence of multiple companies in many of the displayed units (not shown in Fig. 24). Aside from CAIT (both in the incubator and in LLS) it is quite remarkable to see that in the CeDinT, space is enabled for LPI (Boeing strategic partner in the concentration LL) and T-Systems (management of the 5 sides cave). In the case of CTB, apart from the MEG management agreements with Elekta and microscopy with Zeiss, the centre has gone a step further: A floor of the new CTB building will be used to locate R & D units of companies entering strategic agreements with the UPM in the thematic activities of the CTB.

6d. Previous capacity and attraction programme for researchers and technologists

Objective

One of the most important goals of the Campus in the coming years is to strengthen the policies aimed at the attraction and retention **of human resources devoted to research and innovation. One objective is to increase** the incorporation of new researchers coming from other institutions within and outside Spain.

The concept of a *multi-disciplined research group,* which incorporates diverse kind of staff with different origins is a key element to ensure their competitiveness.

Fig. 25 provides a scheme of the different origins and sources of teaching & research staff within any of the UPM's R & D units.

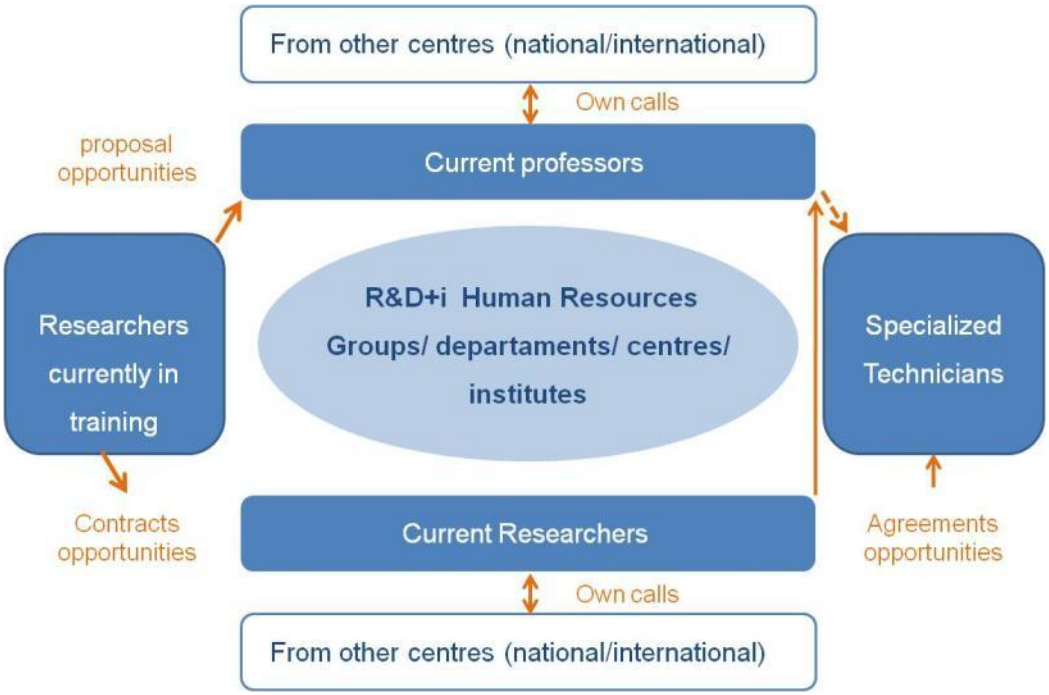

Fig. 25: Structure of human resources for R & D & Innovation

To achieve this objective, the UPM must act simultaneously on several classes of research staff, facilitating their incorporation in a flexible way: from research staff in training, to senior researchers from outside the national system of innovation. Also the participation in the programme will be allowed to persons not currently part of the UPM as long as they perform their activities in the Campus, irrespective of the fact that they remain part of their original institutions.

Such an approach should allow reconciling the existence of permanent teaching and research staff with other staff in training or hired for a fix term. This diversity, while affecting the integration of members of a research group, provides accommodation to the business and economic constrains.

With this in mind, the UPM has launched several in house HR programmes that reinforce the institutional interest in having research doctors recruited to complement the doctor teaching staff (assistant doctors, doctors, lecturers and professors) and offer the development of a attractive and recognized **"research career"** in UPM.

Here we present four doctors and one researcher recruitment programmes that complement the activities of the public administration. Although these programmes are general for all UPM, the Montegancedo centres will benefit from it. The following outlines the impact on the Campus Montegancedo

1. Isaac Peral.

   In this regard, we have selected for the CTB two senior researchers in the framework of the **Isaac Peral Programme** in Computational Systems Biology and Structural Biology

2. Hiring of I3 Doctors

   The programme has enabled an increase of 4 doctors performing research in Montegancedo (2009-2010).

3. Recruitment of UPM's Juan de la Cierva UPM

   Calls for **Juan de la Cierva and Ramon y Cajal of MICINN** have increased the number of researchers by 7.

4. Employment of young doctors

5. Approved PIF scholarships / contracts

During June 2010, calls were opened for the Marie-Curie Programme to incorporate researchers from the European Union and other Countries. These resources are added to the actions derived from this programme.

	Professor	Lecturer	Doctor	PIF	Technician	Total
Enhance supercomputing through new equipment and expansion of CESVIMA	1	1	4	6		12
Development of Food and Health Initiative (BioTech)			1	2		3
Install technology demonstrator of photovoltaic solar housing			1		1	2
Development of 3D TV demonstrator			1	1	2	4

Table 11: HR resources identified with related investigations to the activities of the call

UPM INTERNATIONAL GRADUATE SCHOOL - Campus Montegandedo

In support of a strategic policy based upon the incorporation of researchers of excellence, the educational model has been reformed, putting more emphasis on master's and doctorates. The Campus Montegancedo has made an effort in the internationalization and consolidation of master's and undergraduate degrees closely related to the R & D centres based on the Campus.

Among these improvements are the accelerated implementations of the doctoral and graduate school focused on ICT. The particularity of the School lies in the implementation of innovative teaching techniques, its virtual character and an original master's offer closely related to current R & D centres. Multiple disciplines, globalization and educational quality are their main objectives. Likewise it will have an inter-university character with strong ties to Campus Moncloa (UCM-UPM).

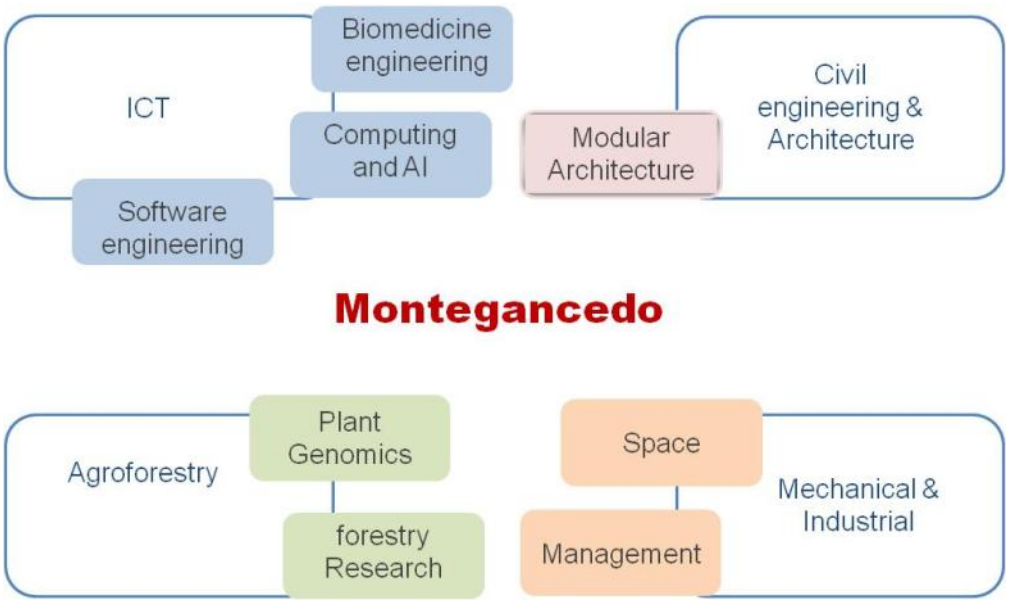

Fig. 26: Various areas of the International Doctor and Graduate School

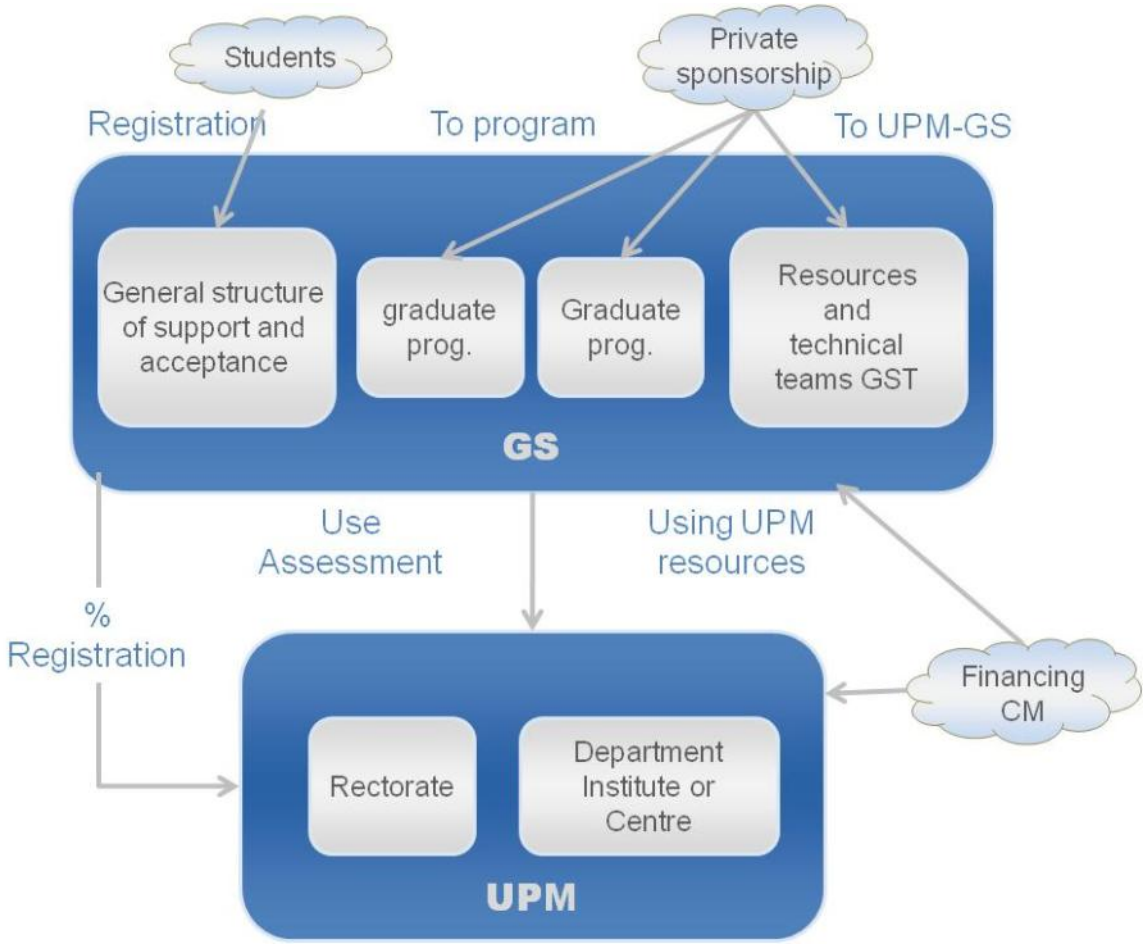

Fig. 27: Proposed structure of the UPM International Graduate School

Fig. 28: UPM Graduate School classrooms

The school was founded with the idea of creating a school with a strong focus on technology management and innovation supported by UPM's partnership and alliances. The school differentiates itself from other existing business and technology management schools. Driven by the change in the university governance rules whereby the R&D centres could have their own graduate programmes, there has been a strong orientation towards offering activities related to R & D centres on campus.

To reinforce the international dimension, agreements with schools in other countries are under study (MIT, EPFL, ETH, Cambridge, etc.)

Masters	R&D Center attached to Montegancedo	2010	2012
Biomedical Engineering	CTB	48	55
Agroforest Biotechnology	CBGP	34	39
Plant Genetic Resources	CBGP (partially)	20	23
Advanced Forest Research	CBGP (partially)	27	31
Photovoltaic Solar Energy	CEDINT (partially)	38	44
Aerospace Engineering	CITA (partially)	85	98

Table 12: 2010 Master pre-inscriptions related to R&D centres linked to Montegancedo

Doctorates	R&D Center attached to Montegancedo	2010	2012
Biomedical Engineering	CTB	28	32
Biotechnology and genetic resources of plants and agroforest microorganisms	CBGP	8	9
Advanced Forest Research	CBGP (partially)	18	21
Photovoltaic Solar Energy	CEDINT (partially)	13	15
Aerospace Engineering	CITA (partially)	15	17

Table 13: 2010 Doctor pre-inscriptions related to R&D centres linked to Montegancedo

The Campus offer is completely adapted to the RD1393 (Royal Order 1393), including the Master's in Software Engineering ERASMUS MUNDUS, in Advanced Computing, Computer Engineering and Software, Systems and Artificial Intelligence.

Also, Master's in biomedical engineering along with its associated doctorate, and Master's in biotechnology and plant genetic resources have been implemented successfully, strengthening an integrated vision with the R&D centres.

Finally, we have to highlight the aggregations that support the launch of the International Doctoral and Graduate School.

Figure 29: Public and private aggregations related to the International UPM Graduate School

6e. International Leadership

Introduction

Nowadays no ***public or private entity*** *has all the knowledge required to develop new products, processes or advanced services that allow them to maintain their global competitiveness. Not even the universities. This shortfall requires identifying partners and expanding the geographical scope of action around the world.*

The ***internationalization process*** *is not limited to education. It simultaneously affects research in its aspect as a scientific and knowledge generator and innovation as a stimulator of the transfer of knowledge in an international context. These are the three pillars of the so-called* ***knowledge triangle*** *in which universities must act.*

The internationalization of Spanish universities requires not so much a deep legislative change but rather a substantial ***change in mentality, governance and concrete priorities****. To do this, universities must be willing to eliminate internal barriers and open up to a world based on the recognition of internal weaknesses. The challenge of international competitiveness requires a dilution of national boundaries in pursuit of greater efficiency in the multi-faceted mission of the university.*

In the case of the ***Polytechnic University of Madrid,*** *regardless of the factors in favour of cooperation among existing doctoral and graduate schools, the internationalization process is also conditioned by the need to* ***better serve the international interests of business.*** *The aim is to* ***anticipate the consequences of the gradual internationalization*** *of enterprises' knowledge obtaining networks not limited anymore to a nearby university. Many of the companies with which UPM collaborates on R & D are multinational companies with fewer pre-established links to particular universities.*

This framework implies the internationalization process around four complementary axes (education, innovation, research and governance) and five progressive levels of institutional commitment to achieve integration in the structure and strategy of the university.

Fig. 30:. Progressive levels of institutional commitment

On the above-mentioned scoring system, the UPM has reached comfortably Level 2 and has achieved Level 3 in significant actions. The institutional challenge is to adopt a strategy and a set of measures permitting the attainment of higher levels in the 2010-2015 period. To achieve this, it will try to strengthen international cooperation mainly associated with the third cycle.

The strategy to follow will have to address simultaneously the international education of doctors, researchers and doctor's mobility, stable strategic alliances and long-term public private commitments.

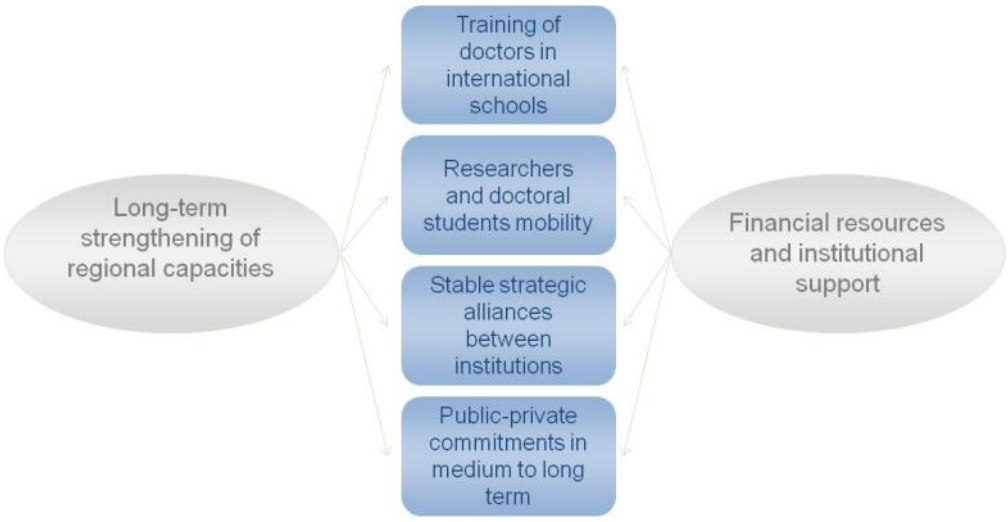

Fig. 31: UPM's institutional strategy

The UPM operates or wishes to act combining different kinds of actions simultaneously within a particular country.

In an international partnership arrangement, the search for suitable partners in other countries becomes a key element to ensure success.

Most relevant objectives and internationalization actions

1. *Set **measurable targets of internationalization in students**, teaching, research, academic staff, economic resources and international presence. This, realistically, will enable the UPM to had achieved level 4 and in some actions level five by 2015. Additionally it will permit the creation of a process of regular monitoring and reporting to the public administrations.*
2. *Select three or four **academic partners** around the world to **establish institutional arrangements** covering the three core areas of the knowledge triangle forcing concrete action commitments.*
3. *Develop a financially incentivized **plan for** master's and doctor alumni **attraction,*** permitting an increase in numbers and UPM's visibility
4. *Actively participate in **international networks of universities**.*
5. *Tackle the **permanent presence** in other countries through the establishment of self-financed joint centres in the areas of greatest strength and international recognition of UPM. In the period 2010-2015 two centres could be created: one focused on R & D activities and the other focused in teaching activities.*
6. *Develop a recruitment and retention plan for **researchers.** Provide competitive payments channelled through annual international open calls.*
7. *Support UPM's participation in large **international scientific facilities** from their initiation*
8. *Support a **joint presence between Spanish companies** and the UPM to cooperate internationally through actions with local members.*
9. *Create the appropriate **internal structures** to accommodate international students and teaching and research staff.*
10. *Increase the current teaching and research staff presence in international projects valuing it for their professional promotion.*

The proposed measures cannot be achieved immediately and they each have different implantation difficulty levels. In the 2010-2015 period many of the proposed actions must be prioritized.

Table 14 summarizes schematically the relation between all the elements identified with reference to the level of internationalization to which they relate.

LEVEL	GOVERNANCE	TEACHING	RESEARCH	INNOVATION
N1	Alumni comitee	Mobility Agreements	Technological platforms Org. Conferences	
N2	Welcome office International Networks Projects Office	Students stays Attract students	Institutional participation in R & D projects Participation support	Institutional participation in innovative projects
N3	Develop Statutes English Information	Research staff attraction Master Recognition. Double degree	Hire research & teaching staff	Broker Agreements international labs
N4	Administrative staff fluent in English	Doctoral Schools Former foreign students Registration fee	lab creation along with non spanish companies	Support for foreign companies New incubators
N5	Statutes for admin. Staff in English	Campus international	Campus international	Campus international

Table 14: Overview of the proposed measures

On the next pages we will focus our attention on international governance aspects related to R&D. International teaching actions will be highlighted and explained in the CEI 2010 report

International governance and structure actions

Main mission is to help the implementation of the internationalization strategy with two key temporal milestones: 2012 and 2015.

Objectives

1. Consolidate or create stable structures in the rectorate, schools and colleges to support the internationalization of the university.
    a. The aim is to increase the visibility of UPM's international strategy with a reflection on the UPM organizational structure and decision-making:
2. Implement actions to level 4 in 2012
    a. Increase the overall level of internationalization of the UPM in order to be recognized in all Spanish universities and the AAPP:

b. Election of three or four universities that can become strategic partners in UPM's internationalization. This should increase the level of cooperation around the three main pillars: teaching, research and innovation.
c. Selection of three or four Spanish business groups with a strong international presence to reach strategic agreements.

3. Implement Actions to level 5 in 2015
    a. Create an integrated approach to maximize the results achieved to date.
    b. Establish a linkage with UPM's overall strategy on Development **Cooperation** to allow teaching and knowledge transfer of students in support of developing countries.

International governance actions:

1. Formal adoption of the **UPM Internationalization's Strategy** by the Governing Council and later presentation to the Board of Trustees.
    a. The aim is to obtain institutional support for the internationalization strategy and separate it from any particular board team as it needs to be address as a long term process
2. Analyze and adjust the **regulations development of the UPM statutes** to suit the goals of internationalization.
    a. It is intended that the development of the Statute has an international perspective in all its aspects, thereby avoiding internal barriers in the implementation of strategic development measures.
3. Create an **Internationalization Advisory Commission** (CAI), 8-10 members from the business sector or other entities that help to define actions in this field.
    a. The aim is to provide information and feedback by taking an external point of view.
4. Create the UPM **non-Spanish Student Committee.**
    a. There is a proposal to create a Commission composed of non-Spanish undergraduates, masters and doctoral Alumni in order to meet their particular needs and problems and support them explicitly.
    b. The aim is to have representation of this group in all the UPM Students Delegations.
5. **Monitor and analyze indicators of international activity**.
    a. The goal, once defined, is to have a scorecard that allows a tracing of the success of measures implemented and if necessary take necessary corrective actions. It is also intended that this report has an annual basis and make it public within the academic community.

International structure actions.

1. Create the **International Welcome Office** (OAI) depending on the International Relations vicerectorate
    a. This Initiative has to emerge from the currently existing unit but with a distributed structure with a presence in schools and colleges.
2. Strengthen the **European Project Office** (OPE)
    a. The OPE's goal is to consolidate its existence beyond the Euroscience programme and extend its scope to the human resource activities from international researchers (Not just limited to projects in the strict sense of the term)
3. Adapt the **international relations sections** of schools and colleges to address all aspects of internationalization.
    a. The aim is to share this international vision with schools and colleges
4. Participate in **institutional networks** with other European universities to take a proactive role in the implementation of the UPM actions of interest.
    a. Priority should be given to participation in networks of technological universities.
    b. The case of ULAB (with Oxford, Paris Tech, Politécnico de Torino and the Technical University of Munich) can be a good example.
5. Have all the **UPM information in English**
    a. This effort should be strengthened both on the website as on paper information used to disseminate activities and academic offer.
    b. Preparation of consistent, unified and integrated institutional material to support the presence of the UPM in fairs, exhibitions and international conferences.
6. Increase the **percentage of support staff with English proficiency** to 20% in order to make feasible its introduction.

This performance is necessary for the services that will directly relate to international aspects: Department for International Relations, doctoral and postgraduate, research, and related services in schools and colleges

International actions in research

Objectives

1. Improve the **international rankings position** specifically the Shanghai ranking.
2. Increase the **resources obtained through participation in international projects** annually, with the aim of 20% of the resources obtained in R&D&I in 2015.
3. Attract **non-Spanish researchers** in order to reach a 10% of the research staff doctors in 2015.

4. Establish **two laboratories or R&D joint ventures with other non-Spanish entities by** 2012 (either in Spain or outside).
    a. The cases of Brazil and China can be particularly interesting for the UPM.

Key Actions in the research process

1. **Institutional participation in R&D projects** allows for an increase in the international visibility of the UPM
    a. Participate primarily in large projects following the experience of Blue Brain or Hipper.
    b. These actions can complement the participation in PM or the ESA calls in which the weight and person-years should be increased.
2. **Institutional participation in technology platforms** or other forums in cooperation with the industry
    a. It would be important to have a role in their governance. The experience with "The Future Internet" may be relevant.
3. Support the **organization of congresses, seminars. of international character** in the UPM facilities
    a. Redefine the current call with a new focus on international conferences.
4. **Support the participation in European R & D programmes** including programme management
    a. It would be necessary to strengthen the services offered by OPE.
    b. Continue the Finnova programme 2 aimed at recruiting international project managers
5. **Recruit researchers** from other countries
    a. Continue and strengthen the UNITE programme part from the COFUND scheme in the People programme.
6. **Establish joint laboratories or research centres** with selected partners in other countries and, if possible, with the participation of multinational Spanish companies.
    a. One possible option may be plant genomics in Latin America

In the context of international R&D cooperation one must distinguish UPM's situation with that of the existing one in other EU countries. In EU (or European), the UPM participates in all international R&D programmes (PM, ESA, EUREKA, EDA) but the most important economically is the FP (Framework programme) where we obtained better results than the rest of the Spanish universities. The data available up to July 2010 indicates that UPM has submitted 589 proposals, with 130 having been accepted, as shown in Table 15.

From January 2007 until now	July 19th 2010
Number of internacional projects proposals	730
Number of proposals in 7th Frame Program	589
coordinated by UPM	121(20,5%)

From January 2007 until now	July 19th 2010
Number of internacional projects granted	193
Number of proposals in 7th Frame Programs projects granted	130
Coordinated by UPM	22(16,9%)
Total grant UPM in FP7	33.805.717 €
Number of international proposals to be evaluated	54(36 of FP7)

Table 15: Participation in R & D International programmes

The rest of the international R&D projects are distributed in the corresponding European Space Agency (ESA) and other EU programmes. Annually, since 2007 figures are valued at about 10 M €.

Outside of international programmes, UPM should be noted for its qualitative and quantitative importance with its participation in the international Blue Brain Project funded through the Ministry of Science and Innovation with a budget that exceeded one million Euros annually for 10 years. UPM's participation in the in the HiPER project (scientific infrastructure design contained in the ESFRI roadmap) and funded by the Government of the United Kingdom, should also be noted.

UPM International Cooperation with Spanish businesses. In the current situation, there is minimal cooperation in R&D's FP (in most of the pools no Spanish company is involved or there is limited cooperation with UPM).

The UPM considers necessary to increase its cooperation with Spanish businesses in other countries, seeking a better synergy in global R & D & innovation, particularly Europe and Latin America

It would be desirable to have agreements with local entities in geographic areas in which the interests of Spanish industry allow it to establish relations with an institutional presence.

International actions in innovation

Objectives:

1. Reach 25% of patents with international extensions
2. License technology in other countries to increase this revenue stream.
3. Support Spanish companies in international relations
4. Support the internationalization of UPM's spin-offs

Proposed actions on the innovation process:

1. **Institutional participation in international innovation** projects in cooperation with businesses
    a. Implement UPM's technological demonstrators (or living labs) in other countries. The limited experience with one of the solar houses in Beijing can be used.
2. Reach **agreements with intermediaries** (brokers) to exploit the technology developed by the UPM in other countries.
    a. Need to identify 2-3 field experts.

3. Promote the **internationalization of testing services** through agreements with organizations in other countries.
    a. Build upon the growing efforts of internationalization made by UPM's official laboratories (e.g. LOM with ANCA in the U.S.).
4. Use of official **research centres to support Spanish companies in their internationalization** process by establishing branches in other countries.
    a. It may help the certification of products or services
5. Open the **UPM's incubator** to spin-offs from other partner institutions.
    a. On a reciprocal basis it may help the internationalization of UPM's spin offs.

On this topic and to promote the internationalization of activities related to incubators, the aim is close agreements with foreign incubators in order to exchange information, experiences and best practices. One of the activities to be undertaken will be to host spin-offs that appreciate the opportunity to open new markets (customer and investors). Business incubators can perform the role of "host" for companies that come from other countries and vice versa. The immediate actions are:

o Access to a physical space.
o The possibility of agreements with local companies installed in the incubator.
o Access to networks of investors with business interests in spin-offs and start-up.

In this regard, the European project led by the UPM U-Lab will act as a driver and allow the contact with European universities including Oxford, TÜM, ParisTech and the Politecnico di Torino**.**

In relation to International patent extensions these are made based on the real possibilities of exploitation through agreements with other entities (controlled costs). In July 2010 the number of international patent extensions filed during the current year was 18.

There has been limited success in relation to the internationalization of the spin-offs from an institutional point of view. The entrepreneurship programme and the use of incubators are aimed at Spanish companies (predominantly related to UPM).

Finally, there is an area linked to knowledge transfer in developing countries where UPM is particularly active. Firstly, it covers the direct activity of "international projects" with their own calls and secondly there is a relation with two NGOs: **EHEA** (Enlace Hispano de Salud) and **Engineers Without Borders**.

.6f. Governance commitments towards Science and Innovation

The UPM and by extension the Campus Montegancedo have strong governance structures.

Internationalization oriented governance

We consider it necessary to have a university governance profile oriented towards internationalization in order to be successful and achieve higher levels than in the previously presented scoring system

The international governance profile of a university may be summed up in eight basic factors.

1. Attract external funding
2. International presence
3. International teacher and researcher recruitment
4. Stable partnerships with other entities
5. International focus on innovation
6. Basic research oriented
7. Specialized research units
8. Multi-annual strategic planning

Figure 32 represents the case of two universities with different profiles. The red profile university corresponds to the case of a more conventional university prioritizing research, while the blue one has an international focus.

Fig. 32: International governance factors

The message to transmit is that the governance of intense international cooperation should go beyond the responsibility of a specific unit in the UPM & should rather **permeate the whole university**. In this way all the vice-rectors and sections of schools, colleges, institutes and R&D&I centres (each within their competence) must assume specific responsibilities related to international cooperation.

To prevent issues, such as lack of coordination and overlaps of activities, this model should be based on a **flexible information exchange** with a fluent reporting on actions taken or considered in the governing agencies. Of Importance would be the board's regular meetings with the centres managers.

From an execution standpoint, the UPM is currently at the "support the implementation of major projects" stage as indicated in Figure 33:.

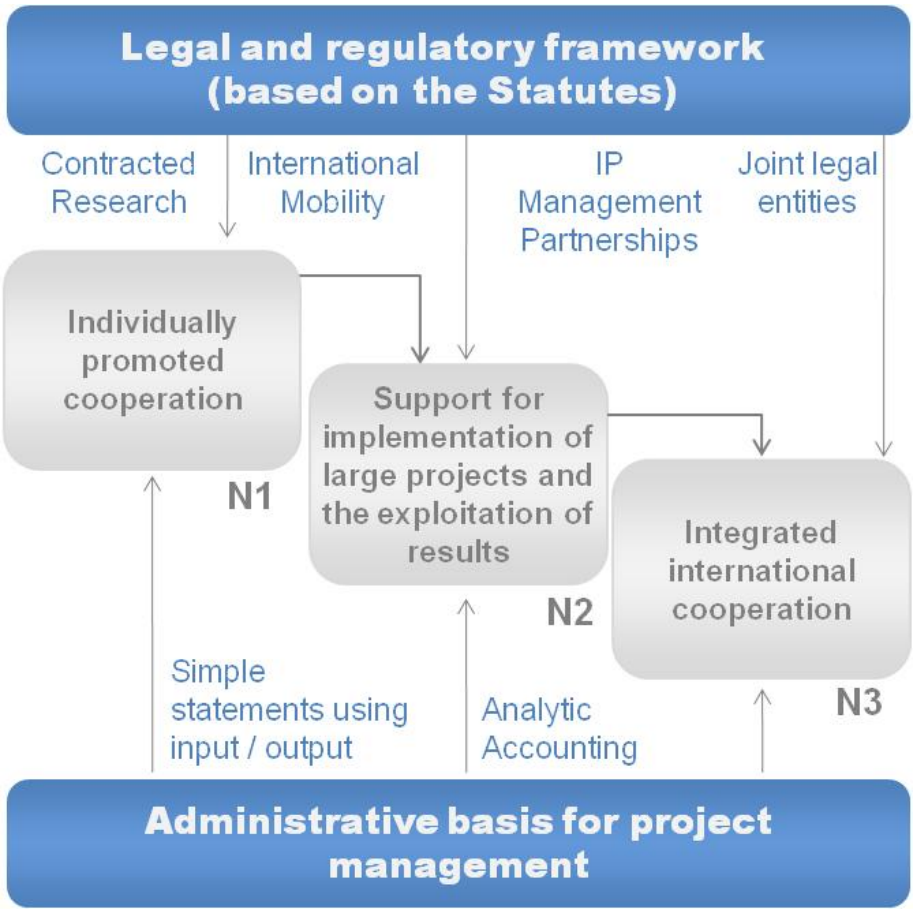

Fig. 33: Evolution towards an integrated international cooperation

Governance oriented towards Science and Innovation: Research Quality Plan

During last year a significant change in UPM statutes occurred, as newly research centres are permitted to have their own masters. This allows a strong academic offer around research lines present in the Campus.

Although the results presented on several aspects of the results exploitation are high relative to all Spanish universities, UPM is aware of the **need to improve the process by involving more intensely UPM R & D units** (groups research, research centres, university research institutes, approved laboratories or university-industry chairs) in the exploitation of results.

It is not enough to adopt an institutional approach based on the dissemination and subsequent reactive support in cases where the researchers decide to act: it also requires appropriate incentives to guide and accelerate their willingness to act. This policy is attached to the **UPM Quality Research Plan.**

The UPM has introduced into its governing structure diverse measures as well as developing an internal normative, which like its statute, values and prioritizes aspects relating to research and investigation.

As a result of this process, in the past 5 years, diverse normatives reflected in the figure 34, have consolidated the development of their statutes.

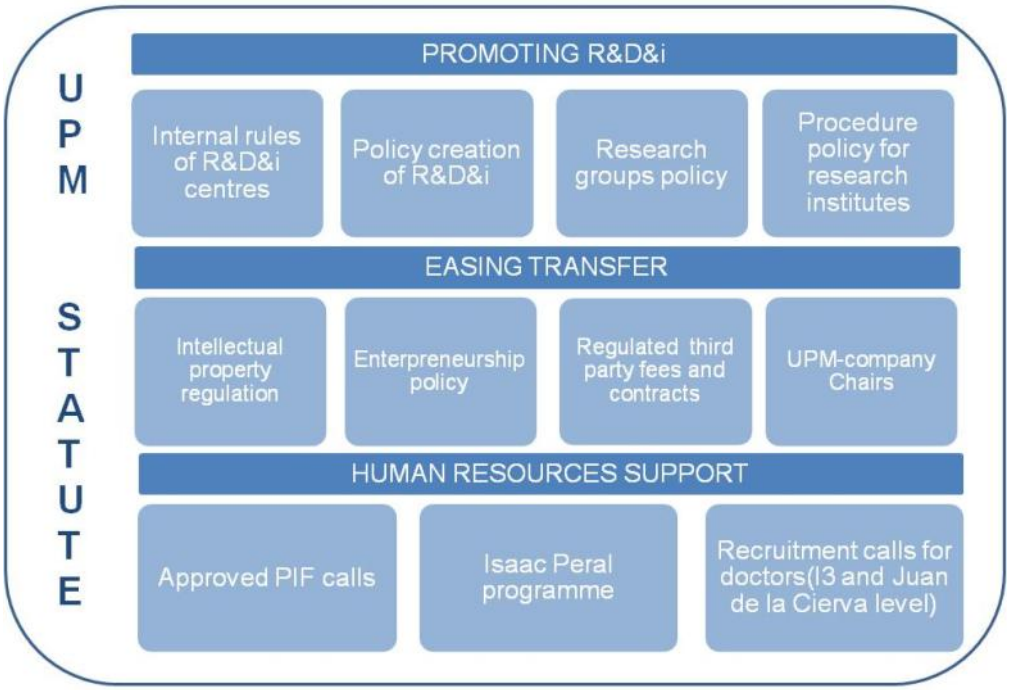

Fig. 34: Normative development

As you can see, the developed normatives have been classified into three distinct areas: 1) normatives governing the promotion of R&D activities oriented towards the creation of new units; 2) normatives governing the ease of transfer results, oriented to the exploitation of results; 3) Normatives linked to HR in the area of researchers.

It should be noted as the global commitment of the UPM, **that all the normatives have been approved by the government council.**

Other less important normatives (that are not present in the figure), which have also been approved are:

- Normative for associations, governing research structure
- Normative for the hiring process of public and private entities
- Normative for entities associated with R&D centres and institutes

Diverse rectorate resolutions have been developing the cited normatives and, in certain cases, publishing calls related to them.

In addition, and also with the government council consent, the UPM commenced an **UPM Institutional Quality Plan** (2005). It is a generic plan and affects all areas of the university, however it has a specific focus on research (including aspects related to research).

The application of the Institutional Research Quality Plan, is carried put through a group of indicators, which are applied annually to research groups, centres and R&D&I institutes (applicable to all effects, except those of creation and elimination, which are established in the LOU), These indicators refer to the following aspects.

- Generation of economic resources
- Researcher training
- Diffusion of research results
- Exploitation of results and technology transfer
- Recognition of merit (every six years)

The evaluation is performed through the application of the following formula:

$$Y_i = K_i \frac{T}{\sum_j PDI_j * K_j}$$

Y_i is the quantity per **PDI** of the unit i
K_i is the weight of the unit i
T is the total quantity to repart
PDI_j is the number of **PDI**(doctors) of the unit j
K_j is the weight of the unit j

As part of the Quality Plan and as a set commitment, the UPM has initiated it own policy to equip its own EFQM Quality Certificates for the groups within the UPM. Its is notable that the European Foundation for Quality Management, has confirmed in their oral report, the concession of the EFQM stamp in its 400+ level to the Technical Architecture University School of the UPM. It is the first Centre in the UPM to receive as silver stamp (400+) from the EFQM.

The support for institution quality is reinforced within the education field through the prioritization of the doctorate programmes and ERASMUS MUNDUS, at the initiation of the UPM International Doctorate School.

In addition to this, they aim to improve the research management with the training programme “management and promotion of international R&D&I programmes”, during the formation of a unique specialist degree supported by the MICINN (CDTI, Carlos III and the International Cooperation General Management). With this, they aim to create managers, who will aid in the

improved participation in European R&D Programmes (principally the EU R&D Framework Programme).

Internal diagrams for the distribution of resources according to objective criteria, based on quality and excellence indicators of the performed research

The resources that the UPM will divide according to the selected criteria fall into two groups: researcher and contract grant worker (these are discussed in the HR section) periods and economic resources for R&D activities related to public calls.

Annual call, to support research groups recognized by the UPM (including consolidated groups, as well as groups in a consolidation phase)

Annual budget 2010: €750,000

Annual call, in support of R&D Centres and University Research Institutes, in function to their obtained results in the Quality Plan

Annual budget 2010: €850,000

Call for the presentation of communications in international conferences

Annual budget 2010: €300,000

Call for the cooperation development projects

Annual budget 2010: €500,000

RESOURCES DISTRIBUTION AND STRATEGIC ASSESSMENT OF ACTIVITIES

The annual academic resource allocation based on the Quality of the Research Plan is distributed in accordance with the results obtained in the previous year. In the case of R & D Centres and Institutes, a **triennial "programme-contract"** is signed establishing values of certain indicators that involve a mutual commitment given the differences of each these centres. Again, these aspects have an important weight in distributing economic resources. Therefore it is not a support programme based on action proposals but results achieved.

CENTRALIZED SUPPORT SERVICES RESEARCH

Finally, UPM with the support of his Social Board, launched a software tool, **" R & D &I Observatory ",** capable of providing information to external parties about R&D &I activity of groups, centres, schools, departments, scientific-technological areas, etc. interactively with the support of several search engines. Several tools allow to generate comparatives, interest lists or, in some cases, direct access to information.

Fig. 35: shows Centre homepage (http://www.upm.es/institucional/Investigadores/ObservatorioIDi

Internal outline for incentives and promotion in the excellence activities of sciences and innovation

Establish tri-annual contracts with each individual R&D&I Centre and Institute within the UPM, so that each one of them may outline the objectives to be bettered. The benefits will be distributed annually, according to the objects. This information will be used in the annual reports of the research groups, departments, R&D&I Centres and university institutes.

Own resources and the Universities strategy to achieve the set objectives in: HR, their policies, equipment & spaces, budgets, etc.

These resources cover all the UPM's policies. Specifically:

Annual calls in the hiring of doctors:

They are distributed in function of the proposals criteria, with priorities for R&D&I Centres and University Institutes

Annual budget of:

Annual calls for research personnel in training (PIFs)

In their own programme, financed by the UPM

In the endorsed co-financed programmes for research groups

Annual budget of:

Co-financing from the R&D management (FINNOVA) calls

In equipment and spaces

Prioritization for the construction of diverse R&D centres, as well as the development of science and technology parks.

Policy for the creation of common spaces in business centres, libraries, etc., which do not depend on any specific school or faculty and can be used publically.

Some schools divide their space between departments in function of their needs, indicators, projects or contracted personnel; these spaces are managed flexibly and are re-evaluated and adapted every three years.

In relation to budgets and rules

The UPM's annual budget originating from annual research budgets, has grown massively in the past few years. In the last 5 years the R&D&I investement has been €771 M.

Established a general norm of 13% for the group of projects in the Article 83 of the UPM

Established a reduced norm of 6.5% for international projects

Existence of scientific and/or international industrial committees that inspire and evaluate programme strategies, actions and quality controls for the objectives

The member organs for the UPM's R&D&I are defined in the following commissions:

- Research Commission (defined in the University Statute) and comprised of doctors
- Commission for the Activities of the Social Council
- Commission for the external Evaluation of the R&D&I Centres and Institutes
- International Commission for calls in the I3 and Isaac Peral Programmes

6g. Innovation capacity and transfer of knowledge and research results to society

Objectives

a) Results of transfer of knowledge generated in the R&D&I programme

The need to improve the UPM's support policies in the R&D&I results exploitation led to **three kinds of complementary initiatives** tests this year, however it is still too early to assess their results:

1. **Use of external entities in the international exploitation of the knowledge generated in a particular line of research.** An example is the signed agreement with the Fundación Marcelino Botin in relation to fabric engineering performed by a research group from the Centre for Biomedical Technology.
2. **Establish a University-Business chair on intellectual and industrial property with** Clarke & Modet, to improve training of the interested PDIs and carry out technological surveillance studies in areas of interest to assist the internal positioning.
3. **Agreement with the Regional Employment Service** of the Region of Madrid

As an overall assessment, data submitted on level of contracting of R & D with industry, filing patents, or creating spin-offs indicate the correct path initiated by the UPM and may suggest that there is a need to keep just the current programmes and incentives. Unfortunately, corporate policies mentioned have, so far had a limited effect. Many of the results generated in national or international projects, beyond academic journals, have not been highly valued.

From an institutional point of view there is **a lot of room for improvement** to ensure an adequate exploitation of results. For this it is necessary to **address existing problems in order to strengthen innovation activities from an integrated perspective in UPM's set of actions**, both in its teaching and in applied research.

UPM believes it will be necessary to tackle **other innovative actions** to facilitate the **exploitation** of results obtained with partner companies and eliminate or reduce some of the existing barriers. These actions are justified and presented in the following section.

b) Strategies for technology-based firms

Another basic element in the exploitation of the results strategy of R&D is provided by the **Entrepreneurship Programme**. Figure 36 shows the main steps repeated annually. From the conception of **"business ideas"**, presented by teams of students and teachers, to creating business plans that lead to the creation of a company, to several support and training activities are developed.

Institutional support for all these stages is a priority for the University which has the support of several corporate sponsors and the participation of a large number of teachers.

Fig. 36: Steps of the Entrepreneurship Programme

This support is combined with **specialized and individualized training** to selected groups according to their ideas expectations (up to 70 groups this year). This is supported by the Regional Employment Service of the Region of Madrid and several corporate sponsors.

As an overall assessment, the results obtained in the last two years by UPM as shown in Figure 27 are very positive and higher than those from other Spanish universities in 2009. There is a growing trend in both the growing **number of business ideas** and the **technology-based companies created.** The figures **show a mentality change towards an entrepreneurial university** higher than those found in other Spanish universities. It should be noted that in the first half of 2010 9 spin-offs have been created and it is expected to exceed the 2009 figure by the end of the year.

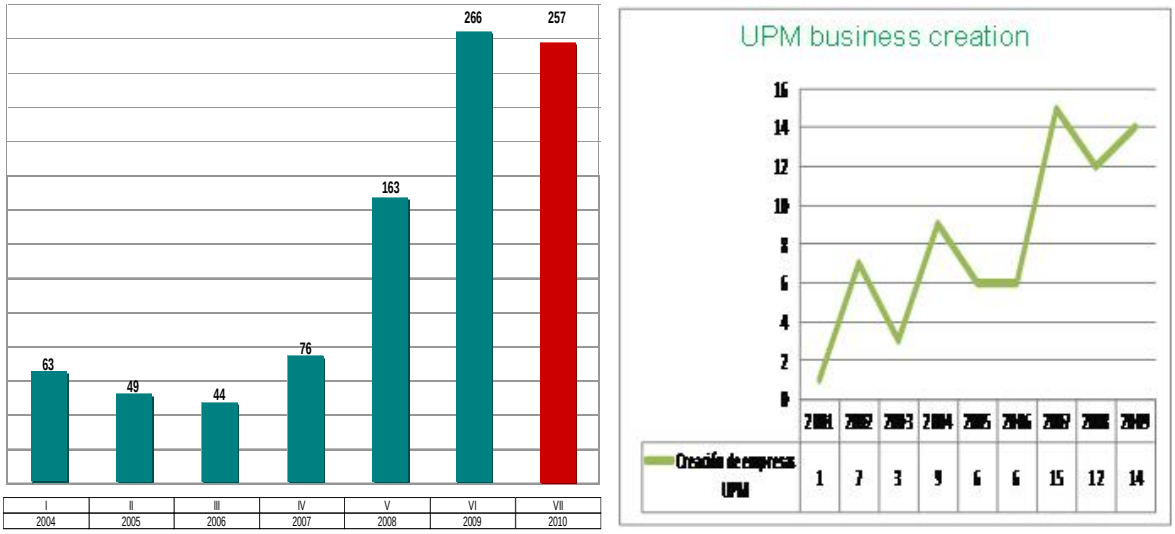

Fig. 37. Results of the Entrepreneurship Programme

From a historical perspective, the UPM created companies that became leaders in their respective domains. For example, GMV in the space sector with over 1,000 employees and Isofoton in photovoltaic solar energy sector also has more than 1,000 employees. Since 1998, 88 active spin off were generated with an 85% survival rate. 60% of them were founded since 2007 with an inversion of €13.7M2004,

The UPM's strategy regarding spin-offs is not to become a shareholder. Aim is to support them and avoid conflicts of interest in the boards.

This does not prevent the **participation in business entities participating in other business,** through UPM General Foundation, if the objectives are consistent with the exploitation of knowledge generated in UPM. Currently, UPM is part of Axon Capital with a set of investors, CENTESIL with Isofoton, Tecnicas Reunidas, DC Wafers and Universidad Complutense de Madrid, AIDIT (with UPC) or in 2 AEIE (Group with economic interests) for Air Traffic Control (AENA) and Automotive (with IMADE).

c) Knowledge transfer infrastructure support. Science Park, Business Incubators and support centres for Innovation

Campus Montegancedo hosts one brach of the **UPM Science and Technology Park**, entity focused on supporting applied research and innovative process strongly linked to the business sector. This facilitates the knowledge transfer (see figure 38).

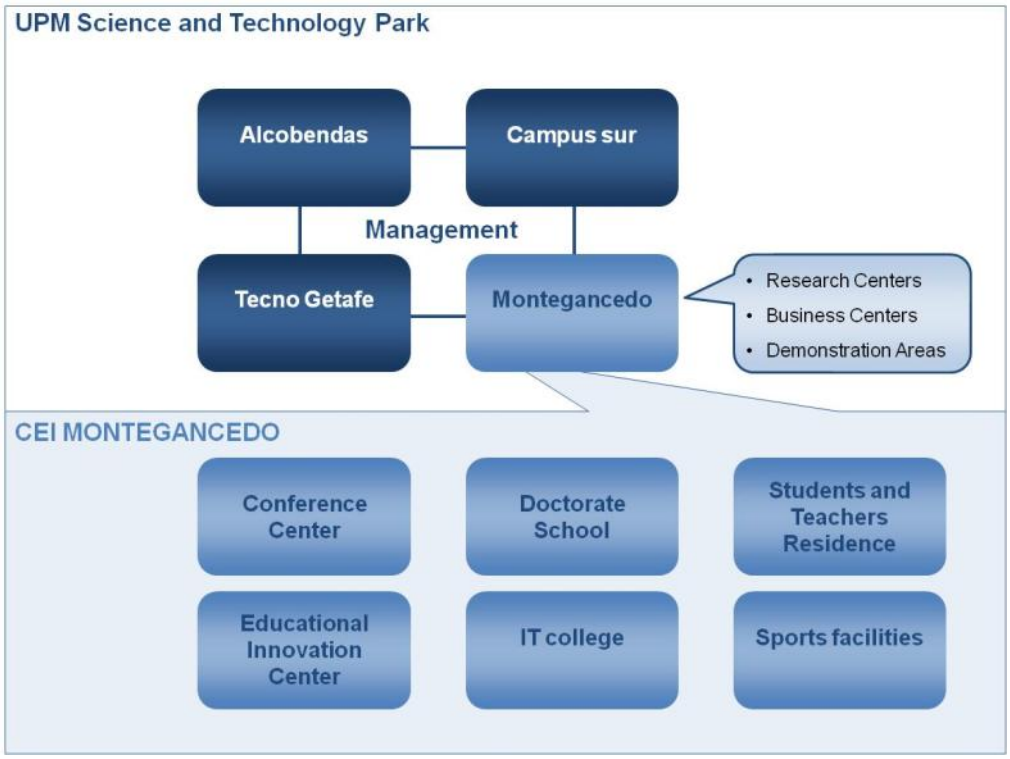

Fig. 38: Links between Science & Technological Park and Campus

The UPM has three business incubators (in Campus Montegancedo, Tecno-Getafe and Campus Sur). Two of them are active (Figure 39 is a view of the Business Centre Montegancedo launched in 2009). However UPM strategic goal is to create technology based companies and not incubators. Experience shows that it is not necessary to force the presence of created spin-offs in specific UPM locals but rather foster their development and encourage the location in more suitable places to their business and networking.

Fig. 39. Business Centre at Montegancedo

CAIT, more than a physical environment

The success of the technological innovation process and the transfer of knowledge requires the design and use of new institutional initiatives to enhance the value of effort placed in R&D, The UPM is planning to use this opportunity, for the creation of the CAIT (Support Centre for Technological Innovation) a concept that leaves behind the traditional centres of innovation and incorporates a **deep transformation of processes and culture**. CAIT incorporates the current business centre extending their activities.

Fig. 40: Transformation of the Business Centre to CAIT

a. Scope of the CAIT

CAIT will have an **essential role in the conversion to a Campus of Excellence**. Its multidisciplinary character will ease the coordination with the productive sector and the different research centres. Through CAIT activities in the campus will be internationalized and the limits with Campus Moncloa (UPM-UCM) tighten.

The CAIT will have an especially close relation with the new **UPM Graduate School** and make an effort to have spaces as defined by EHEA and use teaching methods that promote interaction.

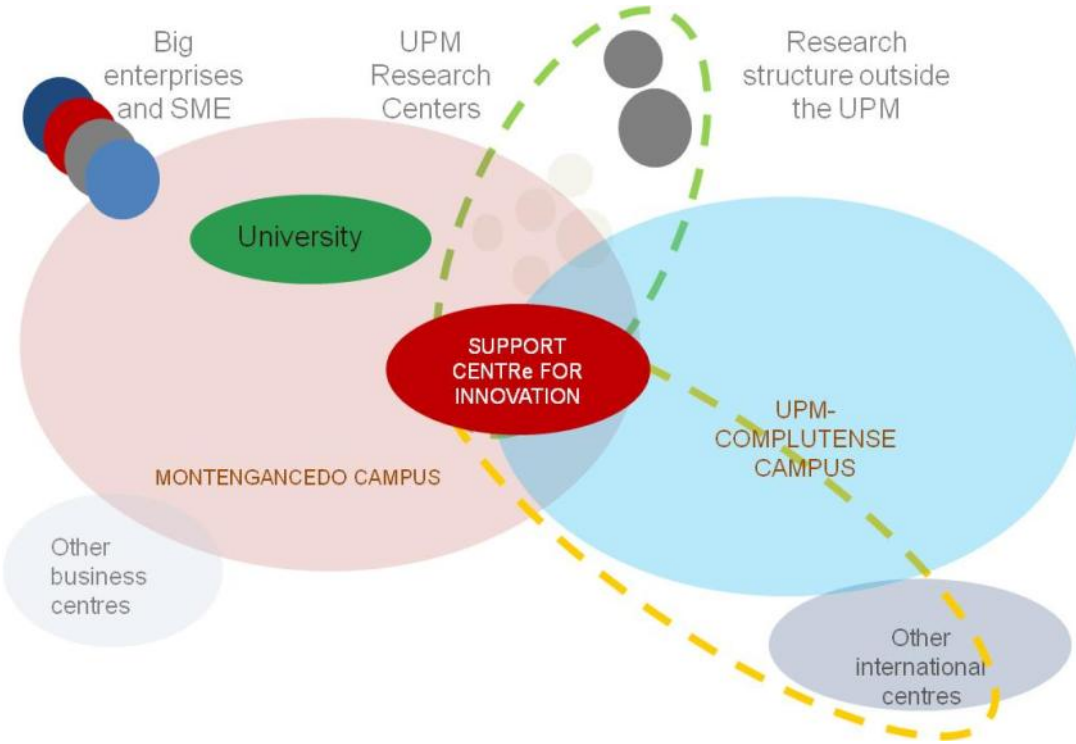

Fig. 41: CAIT scope

b. CAIT objetives

CAIT main objectives are:

- ***Exploitation of results and improving knowledge transfer*** from the academic to the business world. Provide visibility to the actions.
- ***Increase the exploitation of technological research results.***
- ***Promote the concept of technological demonstrators and living labs***, attracting strategic aggregations around key lines of research.

- ***Promote innovation*** by creating a factory of ideas and creativity**.**
- Promote ***entrepreneurship*** in technology-based companies.
- Integrate the various fields of action, with ***ICT as the backbone***.
- Use the CAIT as a ***lever of change*** for a cultural transformation and strategic collaboration around innovation.
- Promote the **campus internationalization** to attract talent, aggregations and participate in international programmes.

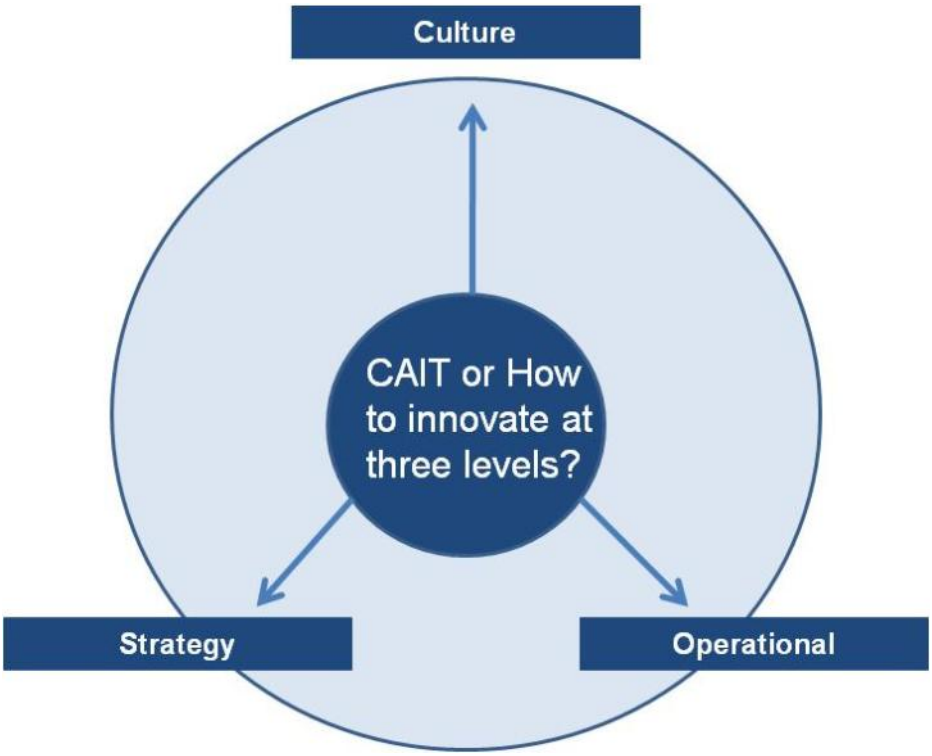

Fig. 42: CAIT as a lever for change

The new CAIT is aligned with goals outlined in the LC (Science Law) and LES (Economic sustainability Law): support for the dissemination of knowledge, creating environments that stimulate the demand for knowledge, encouraging public-private initiatives and encouragement of scientific productivity and knowledge transfer.

c. CAIT Beneficiaries

The CAIT will impact the entire value chain of the innovation process, by promoting entrepreneurship in its early stages, and supporting the process of exploitation of research results in the later stages. The CAIT will affect all the UPM members from the students to the entrepreneurs.

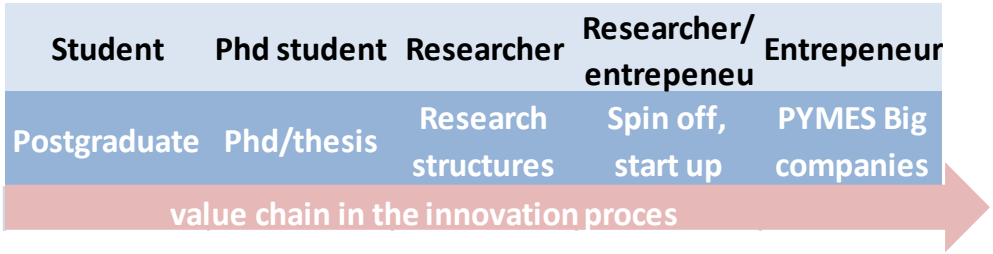

Fig. 43: CAIT Beneficiaries

1. CAIT Activities

CAIT components are the following (see fig.44)

A- Factory of innovation and marketing.

B- Entrepreneurship Centre.

C- Technological demonstrator.

- Technological simulation
- Living Labs
- Demonstrators.
- Technological marketing
- Prototyping Industrialization

Fig. 44: CAIT: Activity areas

Being aware that the success of the technological innovation process and transfer of knowledge requires the design and use of new institutional initiatives to enhance the value of effort placed in R&D, the UPM uses the opportunity of the CEI to support the creation of the CAIT. CAIT is created to respond to these challenges and promote the exploitation of results and entrepreneurship in technology-based firms

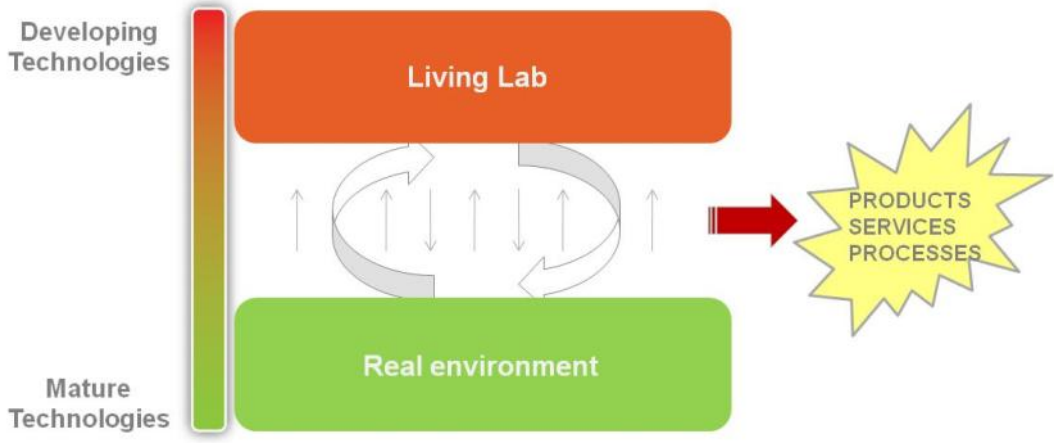

Fig. 45: Illustration of the Living Lab Concept

Labs and Technology Demonstrators

In the context of technological demonstrators, the UPM considers the **creation of Living Labs** and its knock-on effect with companies of great importance**. The Living Lab concept, as a distinctive aspect of the campus, is a tool to promote the public private partnership** to develop new products or services and to promote and facilitate knowledge transfer and technology. Living Labs allow **end users** to become involved in testing the demonstrators, leading to the creation of a community of **open innovation.** It promotes know-how and facilitates the ease of commercialization. Internationalization by the adhesion to the Living Labs European network, the co-creation, technology risk reduction and business are some of the benefits.

In a first phase, the campus will host 3 living labs located at the CAIT and various R&D centres. It focuses on different themes:

- **Bank of the Future Living Lab:** collaboration agreement to design a Living Lab for **Banco Santander** on the Bank of the Future inspired directly from the Living Lab Banking Future (Media Lab) at MIT with Bank of America
- **Living Lab Office 21**, the future of work: cooperation agreement with **BICG / Fraunhofer** for the establishment of a Living Lab project inspired by the International Research Project Office 21

Living Labs in a more advanced process of creation are the following:

- **Living Lab automation:** living labs located in CeDint (Centre for Integrated Automation) reproduce a house where one can experiment with technologies related to advance home automation.
- **Solar Living Lab:** solar housing located on Campus arises from UPM participation in the **Solar Decathlon project** (involving 150 people including teachers, students and professionals from different sectors). These houses represent a good example of how to tackle in space and time the challenge of efficient use of energy in a domestic context.

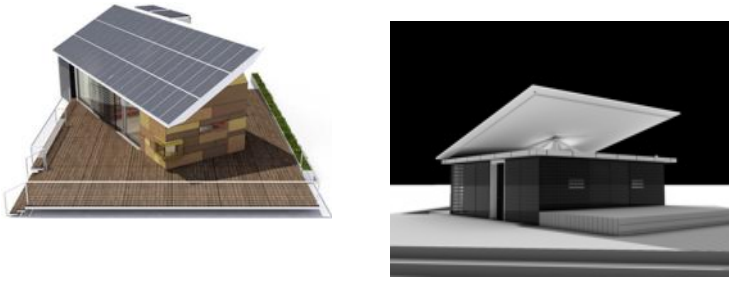

Fig. 46: Solar House 2007, Magic box 2005

- **Living Lab 3D:** Create a research pla**tform 3D-HDTV 2.0 UPM**

6h. Gender indicators

Key priority is the attraction of female teachers and students in order to achieve equality in various boards and institutions. Noteworthy is the roll out of various coaching and mentoring programs as “The program focused on providing support to women led spin offs.

7. METHODOLOGY AND WORK PLAN

7.a WORK METHODOLOGY

- The Innocampus program will be coordinated out of the Vicerrectorate of research. The daily coordination and project management office is jointly responsibility of the assistant to the Vice President of Research and the Director of the Science Park in Montegancedo. The various initiatives will be managed independently and separately but coordinated by the PMO.

- For the entire project the UPM uses a programme and project management. This methodology is based on Prince 2, but includes relevant components of other methodologies such as PMI or APM. Likewise, adapting the templates to the customer needs, being flexible in its action and presentation.

- PRINCE2 is a flexible and adaptable project management method that has become standard for organizing, managing and controlling projects. Its generic approach, based on "best practice", is used to manage all kinds of projects. Each process is defined with key inputs and outputs, along with specific objectives to be achieved and activities to be carried out. The PRINCE2 method describes how a project can be divided into manageable stages, enabling efficient resources control and regular monitoring of the project progress. The method enables regular reviews of the project progress, flexible decision points, involvement of management and stakeholders at appropriate points and encourages open communication. The framework emphasizes a management by exception method.

- The methodology will place special emphasis on the following aspects:

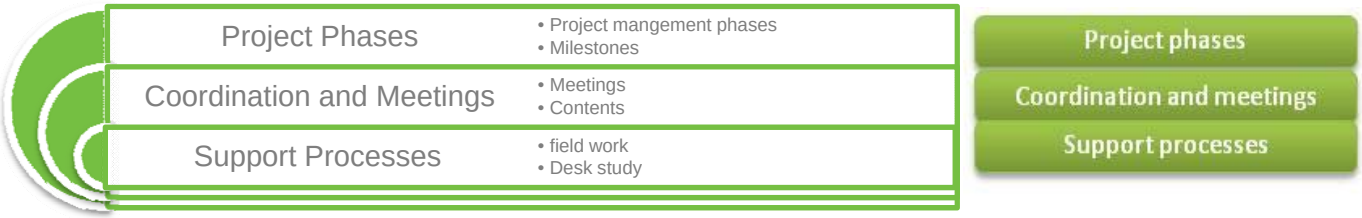

Fig. 47: highlights aspects from the work methodology

The methodology is based upon **close cooperation** with members in meetings to define and delimit the proposal scope taking into account the strategic priorities.

In this project will promote the **agile work strategy**. This new approach to the way we work is oriented to provide the maximum value in an early stage supported on a set of values and principles, which are set out in the Agile Manifesto.
The purpose is to better manage the changing and complex environment facing many innovation projects today. The objectives of these methods promote:

1. A leadership philosophy that encourages **teamwork and individual responsibility.**
2. A project management that encourages **adaptation** to change.
3. A set of best practices that facilitate the **fast and high quality delivery.**
4. An approach to the project that **aligns development with customer needs** and objectives of the organization.

In an initial stage, a review of the project submitted will be performed and adapted to the UPM's needs, emphasizing those key points and adjusting the timing and means of communication for the project.
The project will be supported by a virtual platform. The access to this platform is limited to the project duration. The Vicerrectorate for Research will handle the virtual platform management. He will create different user profiles and will act as administrator.

Platform objectives:

1. Establish mechanisms for communication and information exchange in addition to email and telephone communications and / or verbal.
2. Acting as a documentation repository, accessible to users.

3. Creating a secure environment with limited access, where they can share files within the workgroup.
4. Allow fast access and full content for any new member or partially limit access according to need.
5. Establish mechanisms to monitor changes and versions of the several documents.
6. Clear and transparent administration of documentation and deliverables.
7. Promote innovative and automated ways of communication, allowing a better spread of information.

One of the project key points is the collection, synthesis and information analysis, communication between the involved actors and the subsequent dissemination of results and best practices obtained throughout the project development. We consider it essential to create a virtual community for the proper management and involvement of all stakeholders.

Fig. 48: Coordination mechanisms in the UPM

/.b Action Plan

Below its shown the main phases of the programme to display the various schedules

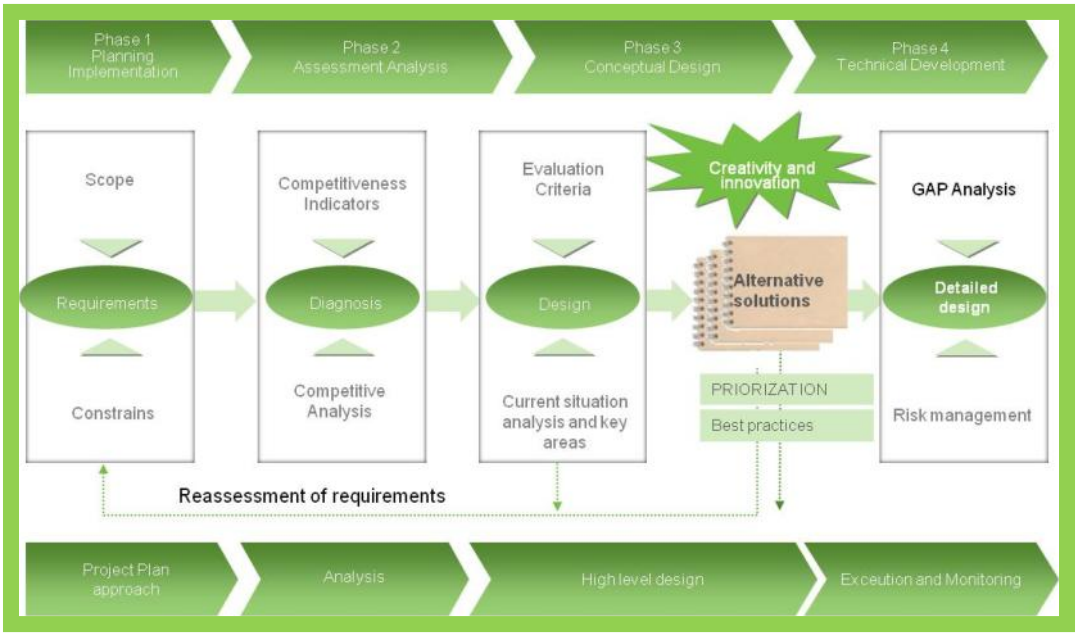

Fig. 49: work plan

8. PERFORMANCE INDICATORS, BENEFITS AND ACTION DIFFUSSION

8.a Result Indicators

Indicators	UPM	2012	Δ (%) (Start - 2012)	2015	Δ (%) (Start-2015)
N º of ISI scientific journals in 2009	1.348	1.500	11	1.800	33,5
Number of ISI scientific publications over the past 5 years (2005-2009 inclusive)	5.310				
No. Permanent Teachers (31st-Dec-2009) *	2.621	2.700	3	2.750	4,9
Number of Permanent Women Teachers (31st-Dec-2009) *	648	660	2	690	6,5
Staff employed in R & D in EICs in 2009 (as defined in INE R & D survey)	4.100	4.500	10	5.000	22
Women employed in EICs R & D in 2009 (as defined in INE R & D survey)	940	1.100	17	1.800	91,5
Total number of six year terms allowed at the University until December 31, 2009 (total number of all researchers in the relevant integrated university regardless of category)	2.055	2.500	22	3.000	46
Maximum Number of six year terms according to regulation(theoretical value), until December 31, 2009 (total number of all researchers in the relevant integrated university regardless of category)	2.840				
R & D funding indicators					
Total internal expenditure on R & D in 2009 (according to INE R & D survey definition) in Euros	174.651.948	190.000.000	9	200.000.000	
Total internal expenditure on R & D over the past five years, period 2005-2009 (according to INE survey definition) in Euros	771.397.078				
No. of R & D projects with national public funding in 2009	389	450	16	500	28,5
R & D projects with national public funding in 2009 in Euros	64.550.000	80.000.000	24	90.000.000	39,4
No. of R & D projects with national public funding, last five years (2005-2009 inclusive)	737				
R & D projects with national public funding, last five years (2005-2009 inclusive), in Euros	229.760.000				
No.of International Programs R & D Projects in 2009	62	70	13	80	29
Budget of International Programs R & D Projects in 2009 in euros	9.961.661	11.000.000	10	14.000.000	40,5
No. of international programs R & D projects, last 5 years (2005-2009 inclusive)	228				
No.of International Programs R & D Projects in 2009, last five years (2005-2009 inclusive), in Euros	41.288.985				
Total number of contracts art.83 in 2009	1.835	2.000	9	2.200	19,9
Total amount of contracts art.83 in 2009 in Euros	45.960.000	55.000.000	20	65.000.000	41,4
Total number of contracts art.83 (R & D, consultancy, services) over the last five years (2005-2009 inclusive)	8.135				
Total budget of contracts art.83 (R & D, consultancy, services) over the last five years (2005-2009 inclusive), in Euros	258.790.000				

Fig. 50: Table of indicators of productivity, quality and excellence in research and innovation

Indicators	UPM	2012	Δ (%) (Start - 2012)	2015	Δ (%) (Start-2015)
Technology transfer indicators					
Total number of art.83 contracts for R & D in the past five years (2005-2009 inclusive)	6.077				
Total amount art.83 contracts for R & D during the past five years (2005-2009 inclusive), in Euros	155.274.023				
Total number of art.83 contracts for consulting in the last five years (2005-2009 inclusive)	2.096				
Total Amount art.83 contracts for consulting during the last 5 years (2005-2009 inclusive), in Euros	38.818.102				
Total number of art.83 contracts for Technology Services in the last five years (2005-2009 inclusive)	1.478				
Total amount of art.83 contracts for Technology Services during the past five years (2005-2009 inclusive), in Euros	5.822.755				
Number of technology licensing contracts in the last five years (2005-2009 inclusive)	40				
Amount of technology license agreements during the last five years (2005-2009 inclusive), in Euros	806.795				
Number of University-Industry Chairs	85	90	6	100	17,6
Number of national patents applied in the past five years (2005-2009 inclusive)	190				
Number of requests to internal extend (PCT) in the last five years (2005-2009 inclusive)	59				
Number of registered intellectual property titles in the last five years (2005-2009 inclusive)	56				
Spinoff No. /Technology Based Companies created in the last five years (2005-2009 inclusive)	42				
Internacionalization indicators					
Total number of students enrolled in official masters during 2009-2010 academic year	1.708	2.500	46	6.000	251,3
Number of foreign students enrolled in official masters during the academic year 2009-2010	320	600	88	1.200	275
Total number of students enrolled in official masters during the past five academic years (2005-2006 to 2009-2010)	3.713				
Number of foreign students enrolled in official masters during the past five academic years (2005-2006 to 2009-2010)	701				
Total number of students enrolled in Ph.D. in 2009-2010 (number of thesis projects registered)	2.023	2.200	9	2.500	23,6
Number of foreign students enrolled in Ph.D. in 2009-2010 (number of thesis projects registered)	503	700	39	800	59
Total number of students studying a doctorate in the last five academic years (2005-2006 to 2009-2010) (number of thesis projects registered)	2.638				
Total number of foreign students studying a doctorate in the last five academic years (2005-2006 to 2009-2010) (number of thesis projects registered)	658				
Number of doctoral thesis passed in 2009	176	200	14	250	42
No.doctoral thesis passeed during the last five years (2005-2009 inclusive)	891				

INDICATORS AS PER ORDER CIN/2035/2010 FROM THE 26TH OF JULY 2010 IN THE CAMPUS OF INTERNATIONAL EXCELLENCE FRAMEWORK PROGRAMME

Indicator Name	Average 2005-2009	2009	2012	Δ (%) (2009-2012)	2015	Δ (%) (2009-2015)
Annual number of scientific journals (according to evaluation criteria established by CNEAI for six year term) per permanent teacher	0,41	0,51	0,56	8,02	0,65	27,27
Six year term on its permanent teachers. Six year term can be understood as the quotient between the number of six year term of a teacher and the number of six year term that the teacher could have according to the current legislation. This indicator will be provided for all the staff, not only according to the past five years	ND	0,72	ND	ND	ND	ND
Funds raised annually by permanent teacher. This indicator will be provided broken down as detailed below *	40.492	45.964	54.074	17,64	61.455	33,70
R&D&I Project Funds for competitive European programs. In this section, funds from art.83 subcontracts directly linked to such projects shall be considered	8.257.797	9.961.661	11.000.000	10,42	14.000.000	40,54
R&D&I Project Funds for competitive national and regional programs. In this section, funds from art.83 subcontracts directly linked to such projects shall be considered	45.952.000	64.550.000	80.000.000	23,93	90.000.000	39,43
Enterprise contract income art.83. In this section, funds from art.83 subcontracts directly linked to competitive European, national or regional R&D&I projects shall not be considered	51.758.000	45.960.000	55.000.000	19,67	65.000.000	41,43
Income from the exploitation of Industrial and Intellectual Property (Patents, license agreements...)	161.359	ND	ND	ND	ND	ND
Number of Spin off/EBT created annually from University for every 100 permanent teacher	0,08	ND	ND	ND	ND	ND
Number of students obtaining a Ph.D. annually, for every 100 permanent teacher	1,78	1,76	2	13,64	2,5	42,05
Percentage of students from the Ph.D. programs with foreign nationality	24,94%	24,86%	31,82%	27,97	32,00%	28,70

* For the calculation of the total funds raised annually by permanent teacher using the data from year 2009, the amount of income from the exploitation of Industrial and Intellectual Property (Patents, License agreements...) is not included

8.b. Expected benefits

After the description of the 5 solicited financing requirements, their expected benefits were listed. See TYPE OF ACTION.

8.c Diffusion Plan

The UPM has generated a new web page for the Montegancedo Campus, in which all the relevant proposal documentation can be located (INNOCAMPUS & CEI 2010). This website will also document all taken actions. Thus it will be possible to follow the development of the project, through this site. The site will be in both English and Spanish.

Additionally, the “Salon de Actos” (events hall) in the Business Centre and other existing locations in the Campus (Informatics Faculty, CEDINT and CBGP), will be used for meetings and themed presentations on a specified annual basis. In addition to this the UPM will also generate explicative brochures and Campus signage with actions taken.

9.ECONOMIC REPORT

9.a Budget

Montegancedo Campus was awarded by the CEI (International Campus of Excellence) 2009 MEC (Ministry of Education) call the “Promising project” certification, after achieving the status of "excellence in ICT and technology transfer" during the first stage of the call, sponsored by MICINN (Ministry of Science and Innovation)

The 2009 proposal submitted by the UPM for Montegancedo Campus was awarded a total of € 8.2M incentives, distributed in €4M for the R&D program, € 0.2M for the conversion plan and finally €4M linked to the granting of the status of Promising Campus. On this second year, during the June 2010 call, an initial grant of € 0.390 M was gained, mainly for project activities aimed at the construction of a new residence for professors and doctoral students and tools to promote EHEA and improve teaching.

In this Innocampus 2010 call, the UPM plans to expand their R&D and transfer of knowledge activities. It seeks the CEI 2010 certification. To achieve this; the university wants to build its strategic plan upon the current internationally recognized experience and Excellence available on Campus, requiring some support and assistance on specific aspects.

These new initiatives focus on actions closely related to the Campus Strategic Plan for Excellence. In general, there is the intention to reuse and optimize the current infrastructure, focusing mainly the incentives on the acquisition of new scientific and technological equipment for the R&D centres.

The progressive development of Montegancedo Campus must be realistic. The UPM is aware that you cannot address all the proposed actions and not everything can be done simultaneously. In order to initiate this journey, we have to obtain economic resources such as the one´s of this call for INNOCAMPUS 2010 and other funding sources including UPM´s budgets linked to the Montegancedo Campus.

In this context, it is noteworthy the location of the Campus at one of the four sites of UPM´s Science and Technology Park. This enables privileged access to finance loans based on Chapter 8 of the State Budget in the relevant calls for the General State Aid to Science Parks. In this regard, it has been submitted a proposal in the 2010 call for additional complementary actions to those provided herein.

Campus Montegancedo in the process of reclassification has applied for grants in each of the different options that have been presented in this call.

In anticipation of the outcome of the call, there is a formal commitment by the Region of Madrid to collaborate and co-finance Campus activities related to the Agreement with the Autonomous Regions.

Finally, these amounts are added up to the existing UPM´s budgets and public and private aid currently obtained, or to be requested during the next years.

a) Budget 2010-2012

Investment budgets considered under this call will mainly be used in

- Strengthen supercomputing through new equipment and expansion of CESVIMA research centre
- Development of the Food and Health Initiative (Bio Tech)
- Create a technological demonstrator in the photovoltaic field by renovating and installing the solar houses build by the UPM for the Decathlon competition over the years
- Develop the 3DTV technological demonstrator
- Support generation and maintenance of patents

Within these activities is also necessary to consider the recruitment of staff that may handle some of the initiatives being considered. These needs are not included in the current grant applications related to INNOCAMPUS program and will be covered by funds from UPM. Table 16 shows the main investments incurred.

The total investment amounts to € 4.06 million.

TOTAL BUDGET	2.010	2.011	Subtotal
New scientific and technical equipment required for the project	195.000	3.085.000	**3.280.000**
R&D Building and Infraestructure expenses required for the project	50.000	490.000	**540.000**
Subcontracts related to the project and mandatory to the project	-	180.000	**180.000**
Other direct addittional expenses linked to the project such as generation costs, patent maintenance originated through the project technological development	-	60.000	**60.000**
TOTAL BUDGET	245.000	3.815.000	4.060.000

Table16: Forecasted Budget 2010-11 Actions part of Innocampus program

CESVIMA SUPERCOMPUTING INITIATIVE	2.010	2.011	Subtotal
New scientific and technical equipment required for the project	-	2.500.000	**2.500.000**
R&D Building and Infraestructure expenses required for the project	-	250.000	**250.000**
Subcontracts related to the project and mandatory to the project	-	-	-
Other direct addittional expenses linked to the project such as generation costs, patent maintenance originated through the project technological development	-	-	-
TOTAL BUDGET	-	2.750.000	2.750.000

Development of the Health and Food Initiative (Bio Tech)	2.010	2.011	Subtotal
New scientific and technical equipment required for the project	195.000	585.000	**780.000**
R&D Building and Infraestructure expenses required for the project	-	-	-
Subcontracts related to the project and mandatory to the project	-	-	-
Other direct addittional expenses linked to the project such as generation costs, patent maintenance originated through the project technological development	-	-	-
TOTAL BUDGET	195.000	585.000	780.000

3D HDTV DEMONSTRATOR	2.010	2.011	Subtotal
New scientific and technical equipment required for the project	-	-	-
R&D Building and Infraestructure expenses required for the project	50.000	200.000	**250.000**
Subcontracts related to the project and mandatory to the project	-	-	-
Other direct addittional expenses linked to the project such as generation costs, patent maintenance originated through the project technological development	-	-	-
TOTAL BUDGET	50.000	200.000	250.000

Create a technological demonstrator in the photovoltaic field by renovating and installing the solar houses build by the UPM for the Decathlon competition over the years	2.010	2.011	Subtotal
New scientific and technical equipment required for the project	-	-	-
R&D Building and Infraestructure expenses required for the project	-	40.000	**40.000**
Subcontracts related to the project and mandatory to the project	-	180.000	**180.000**
Other direct addittional expenses linked to the project such as generation costs, patent maintenance originated through the project technological development	-	-	-
TOTAL BUDGET	-	220.000	220.000

Support generation and maintenance of patents	2.010	2.011	Subtotal
New scientific and technical equipment required for the project	-	-	-
R&D Building and Infraestructure expenses required for the project	-	-	-
Subcontracts related to the project and mandatory to the project	-	-	-
Other direct addittional expenses linked to the project such as generation costs, patent maintenance originated through the project technological development	-	60.000	**60.000**
TOTAL BUDGET	-	60.000	60.000

Table 17: Actuaciones previstas 2010-11 en el Programa Innocampus

9.b Aid Declaration

Following directives of paragraph n, article 9.2 of the call, we list the perceived and requested aid related to the each of the actions of this proposal

1. Strengthen supercomputing through acquisition of new equipment and expansion of CESVIMA research centre

   Aid obtained:

   Out of last year's awarded grants in the CEI 2009, €128,732 were allocated to the acquisition of some peripheral equipment (tape robot)

   Aid requested:

   None existing plans to request further aids

2. Development of the Food and Health Initiative (Bio Tech)

   Aid obtained:

   None received.

   Aid requested:

   None existing plans to request further aids

3. Develop the 3DTV technological demonstrator

   Aid obtained:

   Project: "TEC2010-20412 Adding Depth-Perception to Visual Communications (Enhanced 3DTV)"
   Finance Institute: Plan Nacional de I+D+i - Subprograma TCM
   Main researcher: Narciso García Santos
   Duration: 3 años (2010-2013)
   Budget: 311.300 Euros

Aid requested:

None existing plans to request further aids

4. Create a technological demonstrator in the photovoltaic field by renovating and setting up the solar houses build by the UPM for the Decathlon competition over the years

Aid obtained:

Out of last year's awarded grants in the CEI 2009, €95,430 was allocated to the preparation and landscaping of the plot of land identified for the installation of the solar houses.

Aid requested:

None existing plans to request further aids

Actions	Obtained Aid	Future Aid	Aid Requested (Innocampus)
CESVIMA SUPERCOMPUTING INITIATIVE	128.732	-	2.750.000
Development of the Health and Food Initiative (Bio Tech)	-	-	780.000
3D HDTV CENTER	311.300	-	250.000
Create a technological demonstrator in the photovoltaic field by renovating and setting up the solar houses build by the UPM for the Decathlon competition over the years	95.430	-	220.000
Support generation and maintenance of patents	-	-	60.000
TOTAL	535.462	-	4.060.000

Table 18: Aid Summary

9.c Planned Financing Plan

Table 19 summarizes the expected financing plan during 2010-25 for the actions described in the program Innocampus, taking into account all possible resources. The origin of the funds will come mainly from UPM, with a small percentage coming from the private initiative.

FORECASTED FINANCING PLAN			
ACTIONS	Aid Requested	Financing origin	Financing Forecast
CESVIMA SUPERCOMPUTING INITIATIVE	2.750.000	UPM & private sector	20% private sector, 80% UPM
Development of the Health and Food Initiative (Bio Tech)	780.000	UPM	100% UPM
3D HDTV CENTER	250.000	UPM	100% UPM
Create a technological demonstrator in the photovoltaic field by renovating and setting up the solar houses build by the UPM for the Decathlon competition over the years	220.000	UPM & private sector	25% private sector, 80% UPM
Support generation and maintenance of patents	60.000	UPM	100% UPM
TOTAL	4.060.000	-	mixed

Table 19: Forecasted financing plan

9.d Loan repayment Plan

The aid repayment plan consists of constant annuities from 2013 to 2025. Funding for these returns will come mainly through the UPM

ACTIONS	2010	2011	TOTAL
CESVIMA SUPERCOMPUTING INITIATIVE	0 €	2.750.000 €	2.750.000 €
Development of the Health and Food Initiative (Bio Tech)	195.000 €	585.000 €	780.000 €
3D HDTV CENTER	50.000 €	200.000 €	250.000 €
Create a technological demonstrator in the photovoltaic field by renovating and setting up the solar houses build by the UPM for the Decathlon competition over the years	0 €	220.000 €	220.000 €
New scientific and technical equipment required for the project	0 €	60.000 €	
TOTAL	245.000 €	3.815.000 €	4.060.000 €

LOANS 2010	4.060.000
INTEREST RATES	1,17%
TOTAL DURATION(YEARS)	15
Grace Period in years	3
Constant annuality	-377.560 €
Request	100% COSTES
initial amount	4.060.000
Interests 2011	47.502
Interests 2012	48.058
Interests 2013	48.620
Capital and Interests	4.204.180

		Finance
Year 0	2010	4.060.000
Year 1	2011	Grace Period
Year 2	2012	Grace Period
Year 3	2013	Grace Period
Year 4	2014	-377.560 €
Year 5	2015	-377.560 €
Year 6	2016	-377.560 €
Year 7	2017	-377.560 €
Year 8	2018	-377.560 €
Year 9	2019	-377.560 €
Year 10	2020	-377.560 €
Year 11	2021	-377.560 €
Year 12	2022	-377.560 €
Year 13	2023	-377.560 €
Year 14	2024	-377.560 €
Year 15	2025	-377.560 €
	Principal	4.060.000
	Interest	470.724 €

Tables 20 & 21: *Loan repayment plan*

10.TIME SCHEDULE

Table 22 summarizes schematically the major milestones and phases in the development of the activities mentioned above.

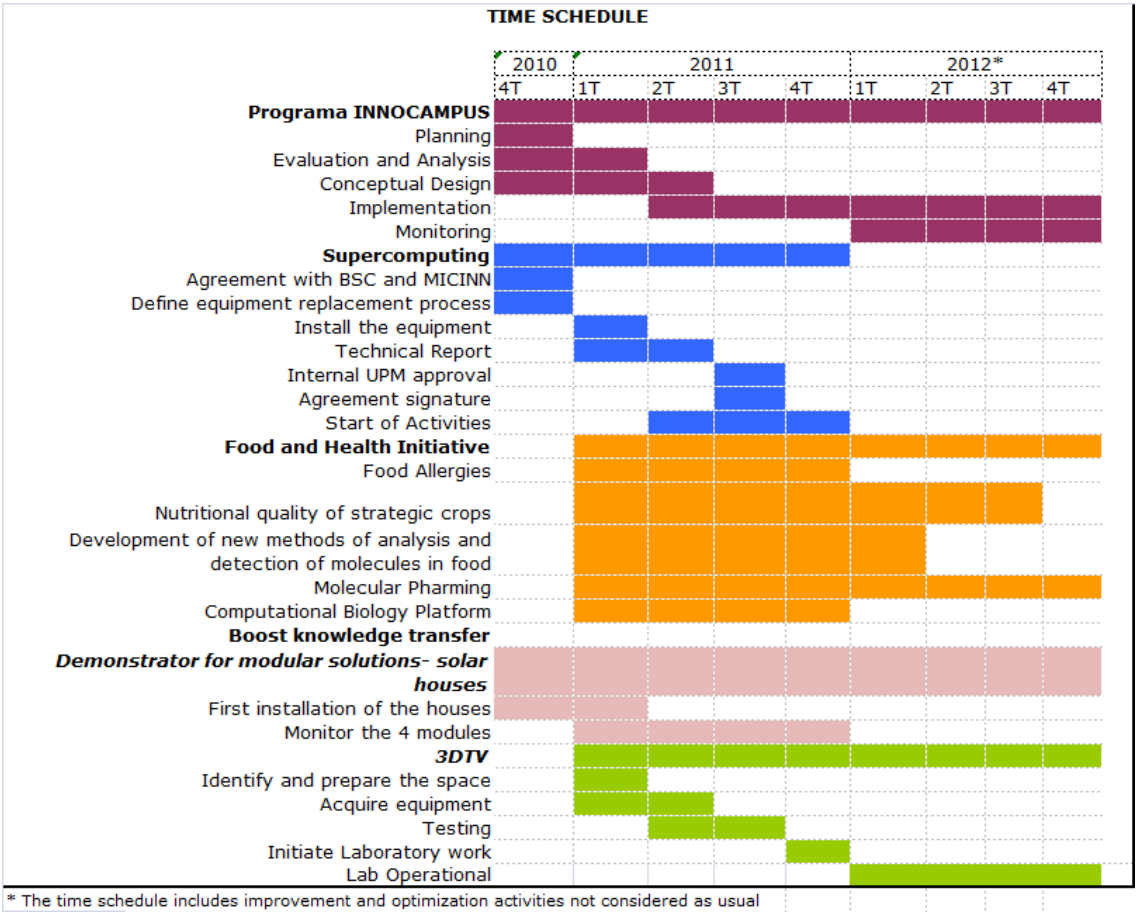

Table 22: *Time Schedule of actions*

11. CONCLUSIONS

The present proposal aims to convert the Montegancedo Campus into a Campus of International Excellence oriented towards open technological innovation. The various actions within the INNOCAMPUS 2010 Programme form the spearhead needed to achieve this objective.

This long-term strategic objective, will affect the entire UPM and have an impact on its international role in innovation.

In 2009, the ministry acknowledged Montegancedo's excellence in the area of ICTs and their applications. Today the UPM hopes to strengthen certain aspects linked to the transfer of knowledge and innovation with the aim of making the most of the innovative spirit and achieve the seal of a Campus of International Excellence.