CAMPUS MONTEGANCEDO:
The ICE oriented towards international technological Innovation

I2_Tech
Project sponsored by:
Ministerio de Ciencia e Innovación

EXECUTIVE SUMMARY

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 Centre

1. PROJECT TITLE

Campus of International Excellence Montegancedo-UPM:
Campus oriented towards international technological innovation.
I2-TECH

2. BACKGROUND

The Campus is dedicated to spurring **the sustainable development of technological innovation** through the use of ICT's as a differentiator factor. In the not so distant future, more than 1,000 researchers (800 in 2012 and 1000 in 2015) will investigate on campus within the following lines of research: ICT, plant genomics, home automation, virtual reality, energy efficiency and modular & sustainable architecture. Currently, in addition to the IT Faculty, the Campus houses: The Centre for Aerospace Technology (CITA) (including the USOC-E and the Institute of Microgravity Ignacio de la Riva), Biotechnology and Plant Genome Centre (CBGP), Supercomputing and Visualization Centre of Madrid (CESVIMA) & Integral Home Automation Centre (CEDINT) with a further two, the Biomedicine and Technology Centre (CTB) and the Madrid Institute of Advance Software Studies (IMDEA), currently under construction.

The Montegancedo Campus, with its focus as a **Campus oriented towards technological innovation,** will implant innovative initiatives to accelerate the open innovation process. Under this guise their intention is to show institutional interest, through concrete actions, underpinned by an innovation strategy with close relations to the teaching activities of the postgraduate students and applied research. The Campus's principal focus is to create **a user driven open innovation model** through an institutional vision, sustained and supported by their aggregates.

The Montegancedo Campus has received the recognition "promising project" CEI 2009 (Campus of International Excellence) in the MEC call, after receiving the distinction "Excellence in ICT and the Transfer of Technology", during the first phase of the call sponsored by MICINN. With the 2010 call, the UPM would like a re-assessment of their 2009 bid, with the intention of being awarded a seal of excellence. To achieve this they would like to strengthen and continue to build on the pre-existing international excellence, within the Campus and seek help with specific measures that need further improvement. This is the objective of the current proposal for the INNOCAMPUS call.

The current Montegancedo **structure**, can be seen in figure 1

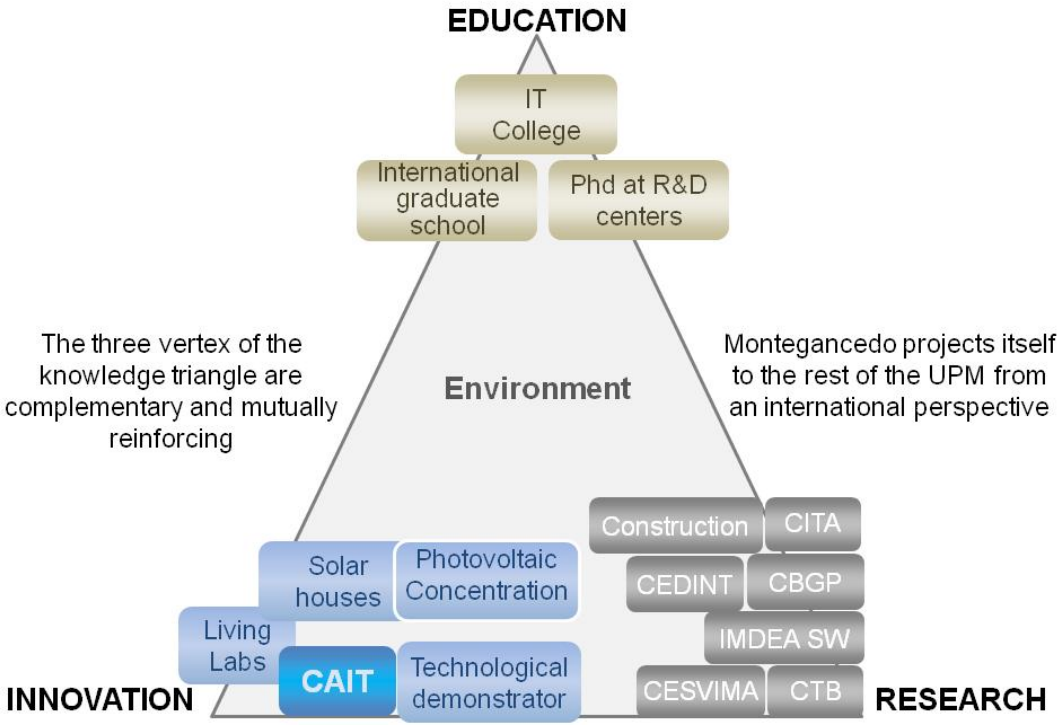


Figure 1: Distribution of the Campus members according to the vertices of the knowledge triangle

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

3. ACTION OBJETIVES

The Ministry of Science and Innovation (MICINN), INNOCAMPUS programme's primary objective is to ensure that Spanish university campuses acquire a level of excellence and internationalization positioning them as an international reference. The objectives of the Montegancedo project are aligned with the call's scope of actions. The following figure illustrates the alignment of objects considered of help by the INNOCAMPUS Programme with the proposed actions. (See fig. 2)

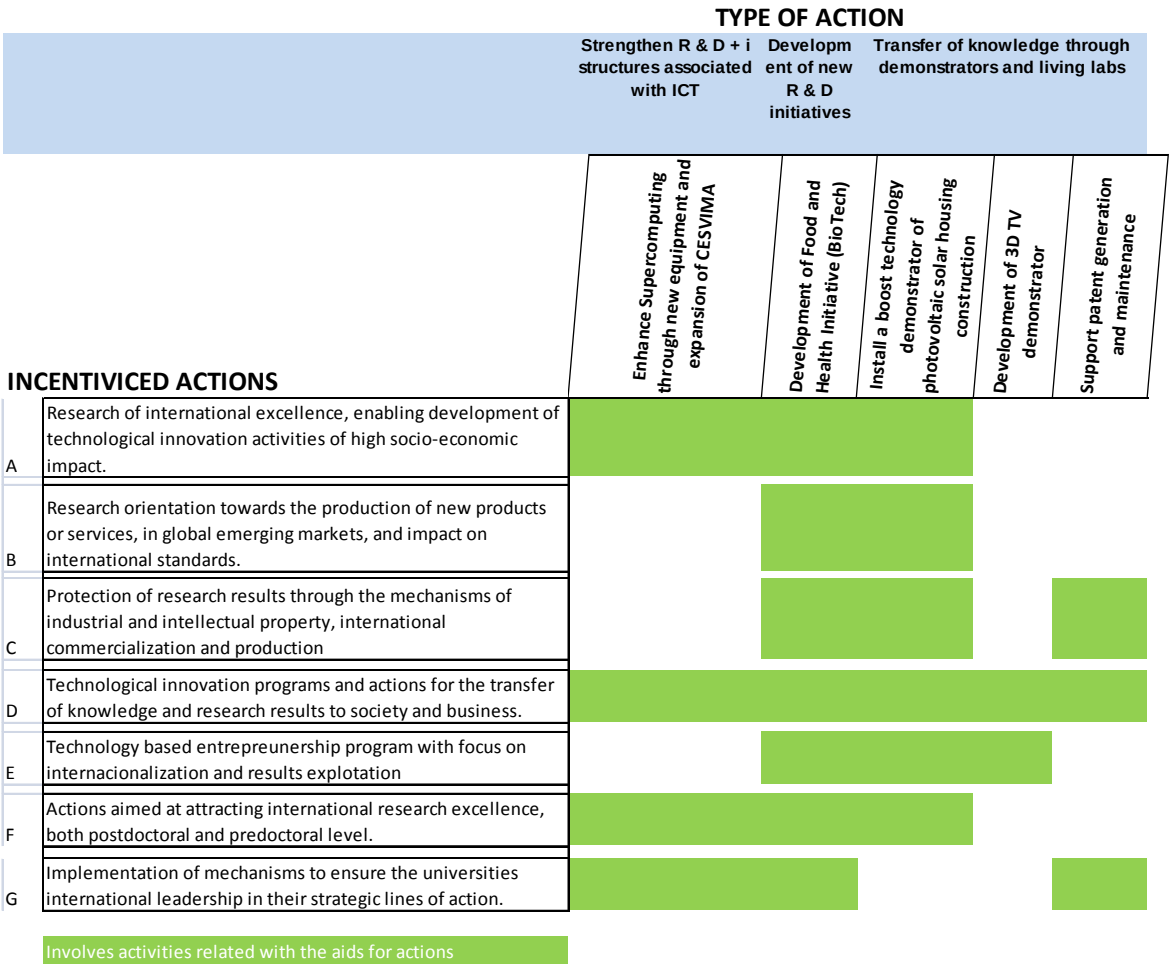


Figure 2: The relation between the type of action and actions in object of aid

Thus the **primary objectives** are:

a. **Strengthen the Campus R&D&I activities by consolidating the current R&D&I centres:** "Food & Health" Initiative from the Centre for Plant Genomics and Biotechnology (CBGP), the implementation of the Biomedical Technology Centre (CTB) and activities from 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 Technological Innovation Support Centre**, the establishment of **living labs** and the introduction of technological photovoltaic **demonstrators**, solar homes and sustainable modular architecture.

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

e. **Internationalization of the campus** by increasing the capacity to attract resources and talent.

These basic objectives are integrated into the innovation strategy plan designed by the UPM for the **Montegancedo International Campus of Excellence (CEI 2010)** Programme, which follows the same basic structure as the 2009 proposal.

The strategic objective of technological innovation has been developed over the past 4 years, through synergies in the knowledge triangle. In the following table we schematically summarize the actions currently underway as well as the intended ones. The Montegancedo Campus is a pilot and catalyst for these actions.

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: Technological innovation support initiatives

4. TYPES OF ACTIONS

The **Montegancedo Campus actions** presented in the INNOCAMPUS programme focus around promoting international excellence in Science and Innovation and are framed within the strategic plans for the conversion to a CEI 2010. Through the realization and strengthening of the researcher based activities defined in R&D&I Sub Programme (presented at the 2009 call), we will be a step closer to excellence.

In the following table, we will list the Campus's most pertinent R&D&I activities, which help to demonstrate the international scientific excellence of the Montegancedo Campus. These activities are allocated to the programmes INNOCAMPUS, CEI 2010, and others, such as the Parks call or the Region of Madrid Calls.

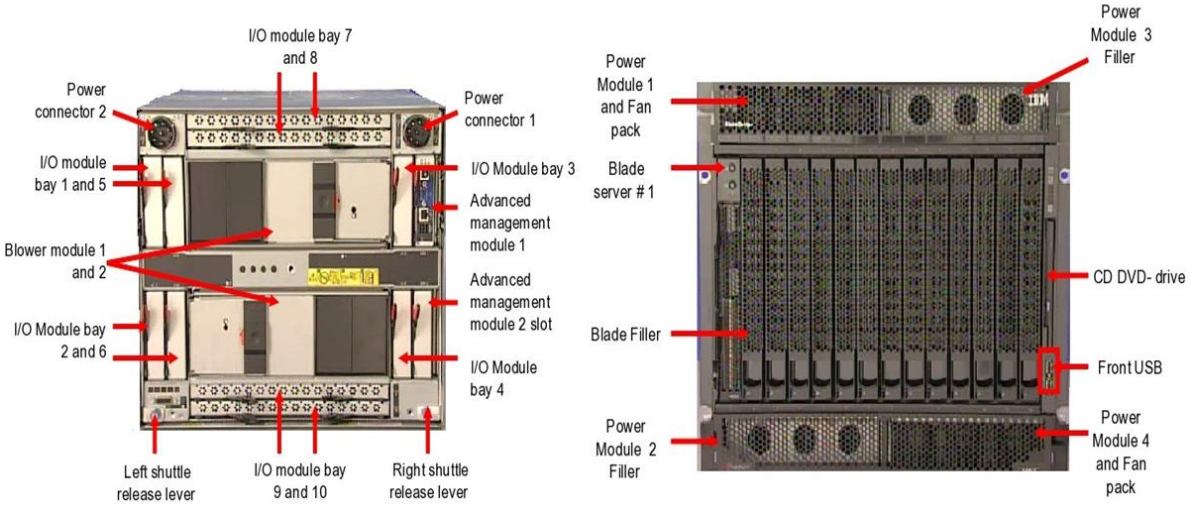
		ASSIGNMENT		
	R & D + i activities	INNOCAMPUS	CEI	Other
1.	Improve Supercomputing Research : Strengthen CESVIMA R & D in some areas focused activities			
2.	**Development of Food and Health Initiative (new area): new line of research activity in CBGP.**			
3.	**Promotion of activities related to solar 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**			

In the INNOCAMPUS project, our focus is the petition for funds, to support of the following activities:

1. **Strengthen R&D&I structures associated with ICT and its R&D activities in the field of supercomputing**, through new equipment and the expansion of the CESVIMA.

a) Transform the **CESVIMA**, located on the Montegancedo Campus, into the Madrid node of the Barcelona directed and MICINN supported Supercomputing National Centre. Provide the CESVIMA with a computer with the following characteristics, similar to those in the Barcelona node.

System: 196 PS702 nodes, 16 cores/node 3136 POWER7 cores
RAM: 32 GB/node (2 GB/core): 6.24 TB
Peak Performance : 82.3 Tflops (11.827 Tflops/rack)



b) Specialize the CESVIMA as a **user support entity** centred around two international activities, with which the UPM is present:

- Supercomputing Laboratory of Scientific Technical Singularities of **Techno Fusion** and support in the participation of the **ITER and HiPER** projects
- **3D visualization** for medical imaging, for use in international projects (Blue Brain, MIT)

c) Initiate negotiations with **IBM Research** to create a **joint research facility**, centred on parallel processors for visualization.

The budget for the requested aid is estimated at €2.75m

Action Impact:

a) Spearhead national and international research in the field of ICT. Promote the Spanish Supercomputing Network. Attract and retain international talent. Consolidate the CESVIMA equipment, so that it is equipped with a competitive system

b) Support the use of the super computer within the Spanish business sector. Generate revenues through the research performed on the supercomputer.

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

a. Establish **new lines of research in the field of food quality and safety**, taking advantage of the synergies from research currently undertaken by the CBGP and develop significant partnerships with new productive industries, under the UPM's BioTech initiative.

b. **Research and develop uses for cultivated plants** in the production of new compounds with pharmacological activity:

The budget for the requested aid is estimated at €0.78M & is based around 5 pillars

1. **Food Allergies: Develop diagnostic methods, for the causes of food allergies**. Develop **HTS detection methods**, to prevent the infiltration of allergenics into the food chain. Develop **new vaccines** to protect the allergy prone population.
2. **Nutritional quality of strategic crops: Obtain products** with a high added value, for example with a higher percentage of vitamins, sugars, or new nutritional molecules.
3. **Develop new methods for the analysis and detection of food molecules: new molecule/pathogen detection** methods for foods, which are based within the modern omics technologies.
4. **Molecular Pharming: Produce pharmacologically active ingredients** (API's) through chemical synthesis, as they are typically small molecules. **The production of these molecules in plants or cell structures has** a vast potential use in human and animal health, within the pharmaceutical areas of diagnostics and vaccines.
5. Computational Biology Platform: Create a platform, which allows for the integration of HTS data, generated in the distinct project activities, such as the development of structural models mapping the molecules of interest (e.g. allergens)

Principal Impact of the action:

a) **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.

b) Allow for an **interaction with the research topics of the health sector**, both in its provision of care (hospitals) and business (pharmaceutical industry).

3. **Promote knowledge transfer establishing living labs and enabling the launch of technological demonstrators. Some of the living labs are described below, others jointly with the public and private aggregations.Support the generation and maintenance of patents.**

a. Create a **living lab** in the **photovoltaic field, through the installation of solar houses:** with the aim of creating a **demonstrators** in conjunction with companies in the construction sector of modular and energy saving solutions, by 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. 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" and turn them into new modular solution **demonstrators**. The primary objective is to test the effectiveness of modular design & the different aspects of sustainability that affect them, and secondly to evaluate the interior comfort level, taking into account the characteristics, which define them.

The initial budget is estimated at €0.25m

b. **Develop a 3D TV demonstrator**: Develop the UPM3DTV research platform.

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 of the acquisition of visual information, representation & characterization of signals, coding and visualization. The proposal includes the installation of a 3DTV demonstration laboratory, equipped with a complete set of machines, which will enable you to do the following:

- 3D television training
- Presentation of results for the integration of specific developments
- Integration of developments carried out by companies in the audiovisual sector

The budget for the requested aid is estimated at €0,25M

c) **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.

The budget for the requested aid is estimated at €0,06M

5. PROJECT JUSTIFICATION

The following section will deal with the scope of actions, in relation to the 7 evaluation areas of the call.

a) Opportunity and international excellence of project deliverables in Science and Innovation

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.

- **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 eminent **scientific and technological initiatives** of the UPM.

- Continue enhancing the transfer of knowledge to the business sector through four complementary approaches: Increased **research activity**; Increase and **exploit UPM's portfolio of intellectual and industrial property**; Expand the business network through the **creation of technology based companies** or through **participation** with business entities; Enable teaching staff and researcher **mobility** between academia and business and vice versa.

The strengths and importance of the 5 selected actions have been described in the previous section.

b) Expected results and project feasibility to promote international excellence in sciences and innovation.

The primary objective is to continue strengthening Campus's R&D activities by **enhancing the link between the Montegancedo research centres and industry**. The expected results are excellence in research results, placing the campus as an international and national reference in its selected lines of research. The specialization and differentiation objectives are to be achieved by the reinforcement of R&D&I activities.

The 4 presented research fields are expected to have the following results 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 2: Expected results up until 2012

c) Levels of excellence in science and innovation of the integrated entities

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[1] entities that 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 managing the field of technological innovation through stable partnerships.

All of our aggregations regarded the UPM as a "strategic partner for technological innovation." Even aggregations that are public[2] entities have a main objective, the use of applied research as a way to feed the innovation process.

During 2010, the following additional partnerships have been formed. (See figure 3b):

- **Santander Bank:** the creation of the *Bank of the Future* ***Living Lab*** and management training
- **BICG / Fraunhofer Institute IAO:** Two **Living Labs**: One in the retail sector (presumably with the *el Corte Inglés* as a tractor company) and the other in the catering business

In addition to these, they have also signed the following agreements (See figure 3b)

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 reality 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 Magerit supercomputer agreement and develop future agreements on the development of Cloud Computing. A university-industry chair with IBM Rational, has also been signed
- **Elekta**: MEG installation and subsequent exploitation

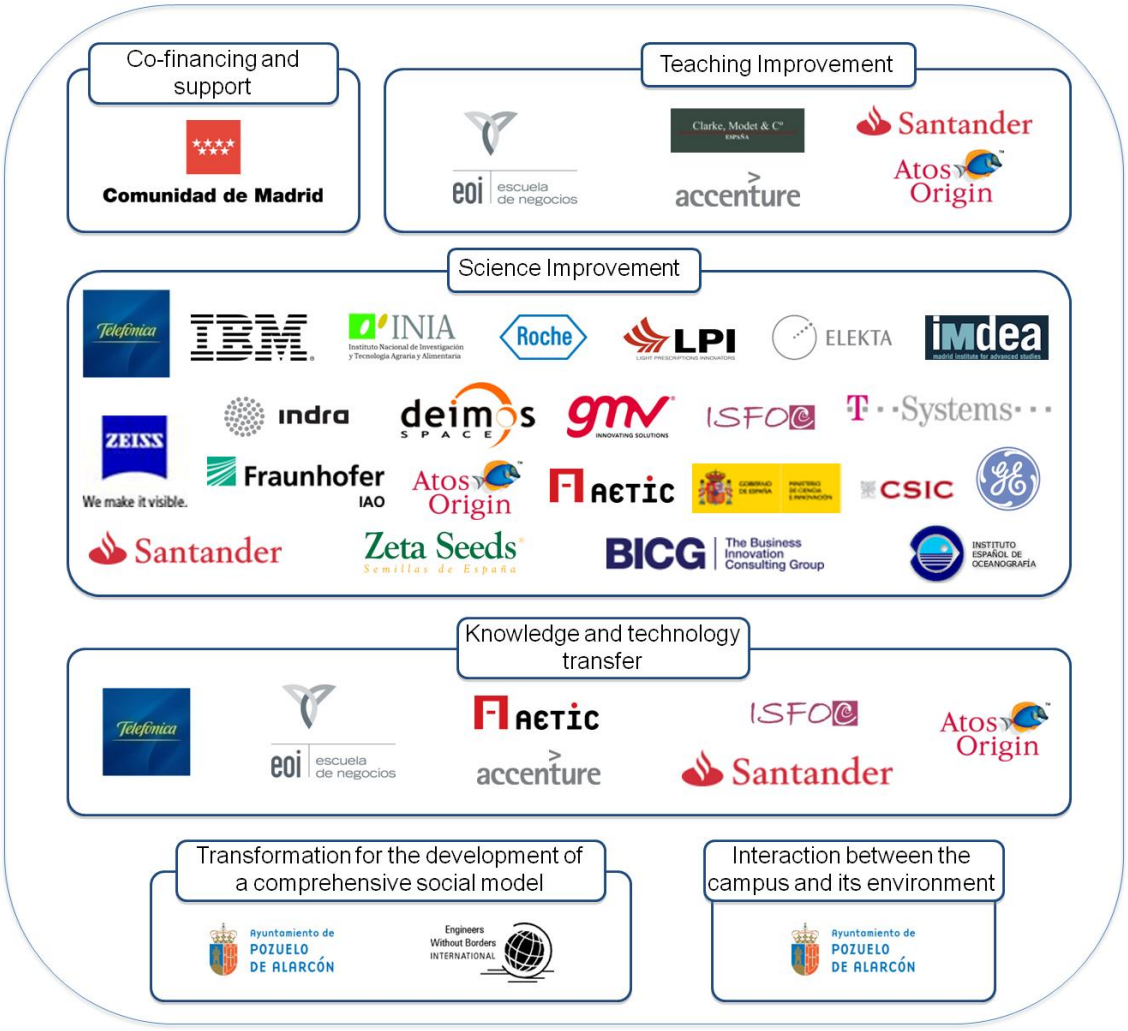


Figure 3a: Aggregations Programme CEI 2009

Figure 3b: Expansion of the aggregations 2010

d) Previous capacity and attraction programmes for researchers and technologists

One of the most important Campus goals 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 of Spain and facilitating their medium and long-term professional development, aligned with the top themes.

The figure 4 illustrates the different avenues of entry for teaching staff and researchers, from any of the R&D units at the UPM.

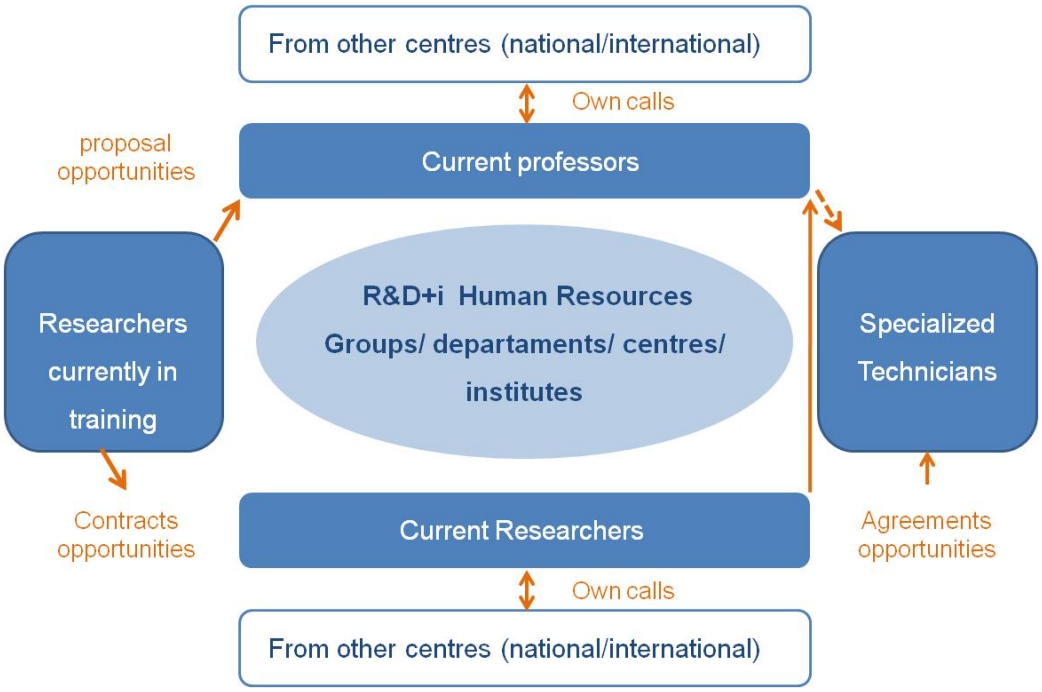


Figure 4: Origin of research and lecturer personnel

These HR will be provided for by the UPM; through their own calls

	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 3: Relation of researcher HR linked to the call activities

Doctorate and Master's programmes

UPM International Graduate School.

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, the accelerated implementation of the doctoral and graduate school focused on ICT.

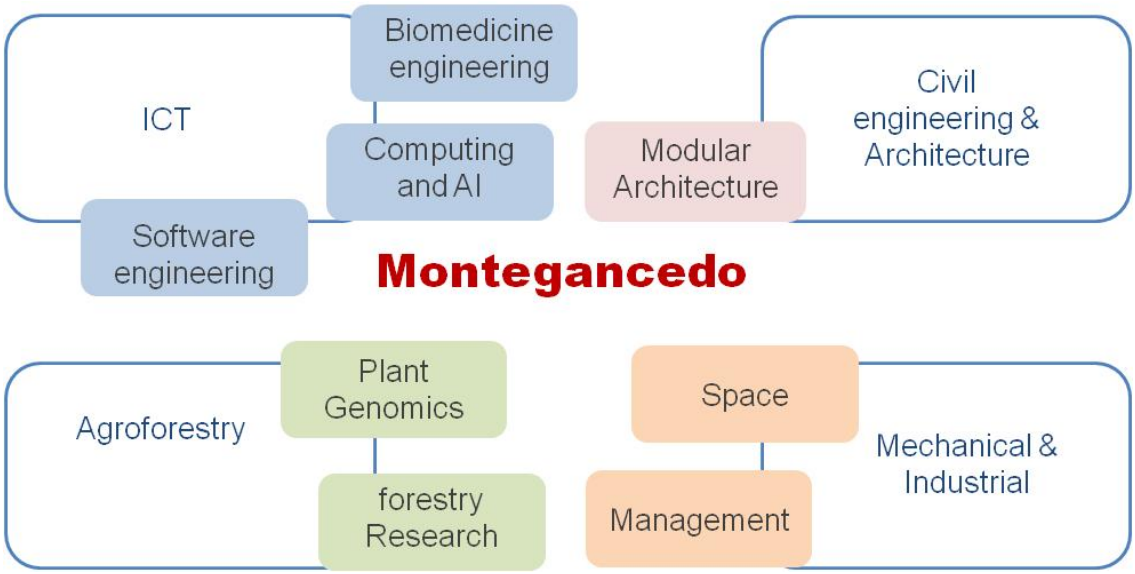


Figure 5. :The Montegancedo programmes which are located within the general structure of the International doctorate School

e) International Leadership

The internationalization of Spanish universities requires a **substantial change in mentality, governance and concrete priorities**. The Montegancedo campus has bet on converting itself into an international campus oriented to technological innovation. Diverse and fragmented initiatives are starting to achieve that progressive internationalization in diverse fields (increased number of foreign postgraduate students in the informatics faculty and the R&D&I centres). The definition of concrete objectives for an effective internationalization of the campus is necessary. (See fig. 6)

Figure 6: Progressive levels of institutional commitment

Objectives and actions in internationalization are:

1. Set **measurable internationalization targets** for students, teaching, research, academic staff, economic resources and international presence. This realistically, will enable the UPM to achieve a level 4 and some level five actions by 2015. Additionally it will permit the creation of a regular monitoring process and reporting to the public administrations.

2. Select three or four **academic partners** around the world to **establish institutional agreements** 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 university networks**.

5. Enable **permanent presence** in other countries through the establishment of self-financed joint centres within the UPM's areas of strength and international recognition. In the 2010-2015 period two centres could be created: one focused on R&D activities and the other focused around 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 & research staff.

10. Increase the current teaching and research staffs' **presence in international projects** & enable them to be valued by these for their professional promotion.

The table 12, summarizes the relationship between all the indicated elements, in reference to the level of internationalization, to which they respond.

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 4: Internationalization scoring

f) Governance commitments with an orientation towards science and innovation

Governance oriented towards internationalization

The international governance profile of a university can be summarized into 8 basic factors. We have highlighted the UPM's valorisation of these.

BASIC FACTORS OF INTERNATIONALIZATION	LEVEL OF ACCOMPLISHMENT LOW MEDIUM HIGH
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	

The UPM would like to focus its attention on all of these, through actions focused on strengthening the interaction in the decision making between the UPM and its aggregated entities. In order to achieve this, it will establish industrial committees linked to the R&D centres and institutes located on Campus.

Governance oriented towards Science and Innovation: Research Quality Plan

Since 2006, the UPM has formally adopted a Quality Plan with the aim of improving the UPM's performance in several aspects. One of these is related to R&D&I. The aim is to assess the research group's activity, the R&D&I centres and the university institutes on several aspects (publications, teaching of research staff, funding through competitive calls & Article 83 contracts, and in results exploitation). Exploitation of results includes patents, SW registrations, company start-ups, technology licensing, etc.

University governance policies leading quality and excellence regarding science and innovation

The UPM has been gradually modifying its governing decisions, diverse measures and have developed an internal normative, which like its statute, values and prioritizes aspects relating to research and innovation.

The following section will highlight the approved rules over the past few years. (Figure 7).

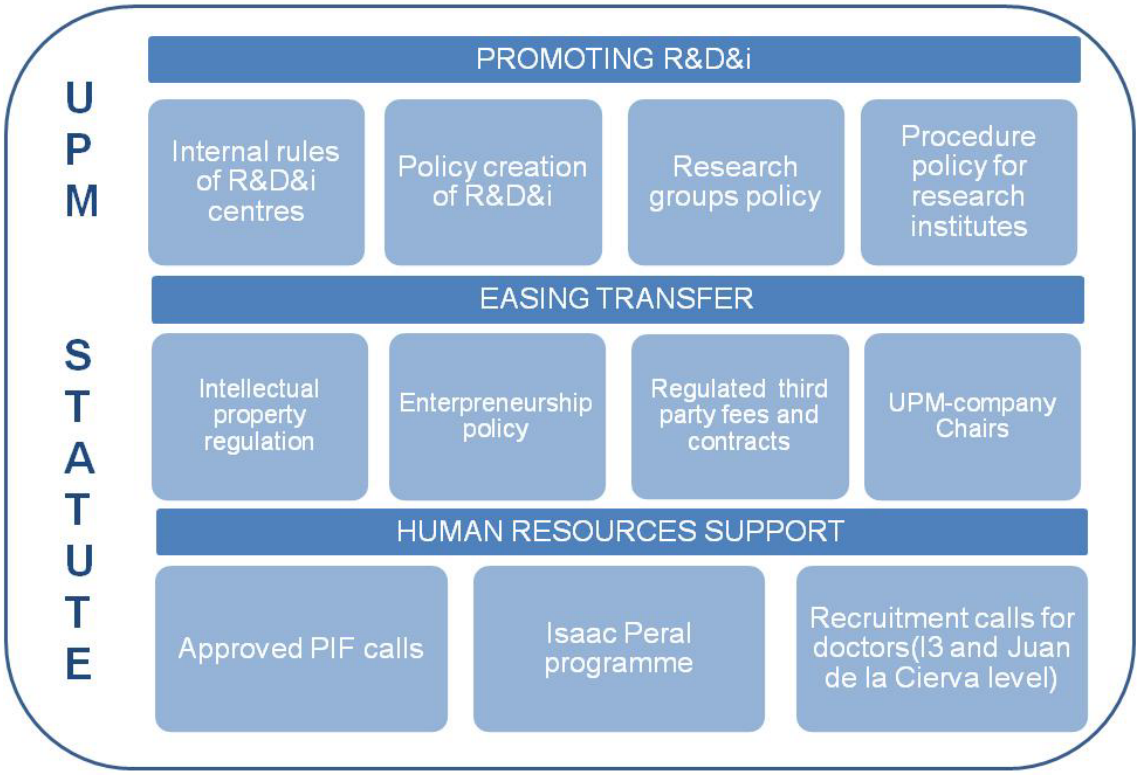


Figure 7: Development of the statutes (2004-2010)

The rules have been divided into three sections: 1) legislation governing the promotion of the R&D activities oriented towards the creation of new units; 2) legislation governing the transfer and exploitation of results 3) legislation linked to HR in the field of researchers.

g) Innovation capacity and knowledge transfer and research results to society

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

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

1. **Use of external entities in the international marketing of the knowledge generated in a particular line of research.** An example is the signed agreement with the Fundación Marcelino Botin in relation to tissues engineering performed by a research group from the Centre for Biomedical Technology(CTB)

2. **Establish a chair in intellectual 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 for the

creation of companies by last year students.

The UPM has achieved a series of brilliant results in transfer related aspects. During the past 5 years, they filed for 190 patents applications and have registered 56 intellectual property titles. The article 83 contracts brought in a revenue of €258m. These are just a few examples of the enormous University potential (See indicators).

Strategies for the creation of technology based companies

Another basic element in the exploitation of the R&D results strategy is provided by the **Entrepreneurship Programme.** During the past 5 years, 42 spin-offs have been created.

Institutional support for all stages (see below, fig. 8) is a priority for the University, which in turn has the support of several corporate sponsors and counts on the participation of a large number of teachers.

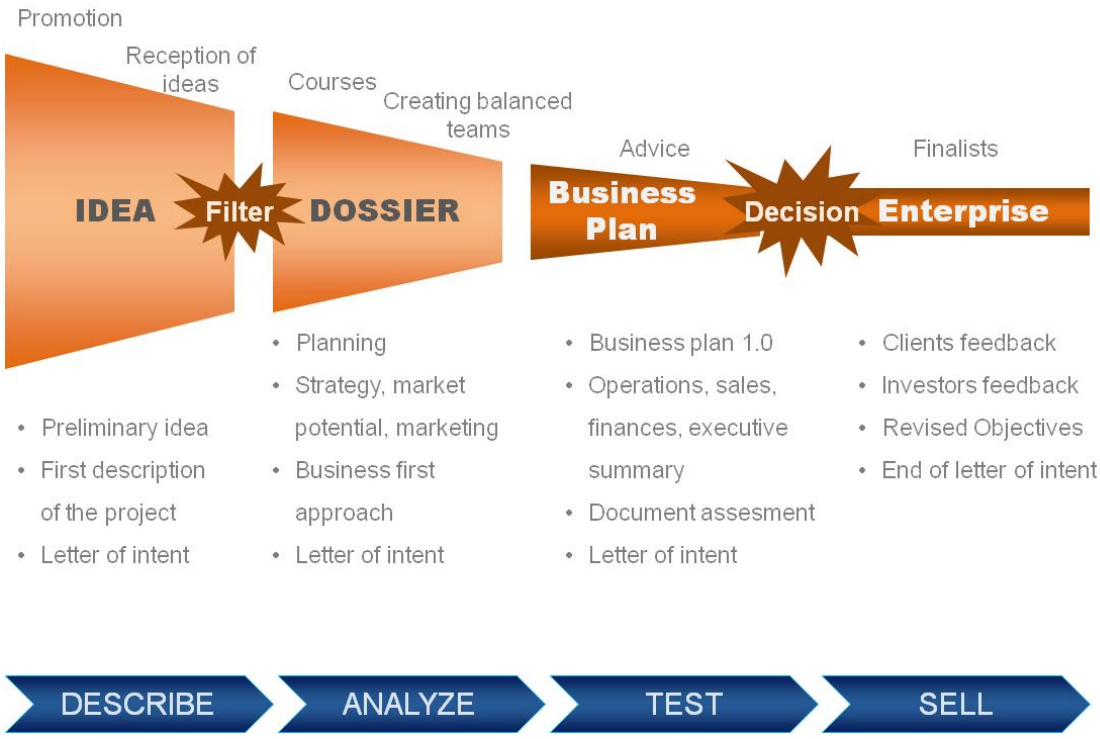


Figure 8: Phases in the Business Creation Programme

Infrastructure to support the transfer. Science Park, Business Incubators and Innovation Support Centres

Campus Montegancedo hosts one of the **UPM Science and Technology Park** offices. The Park is oriented to applied research and offers support for the innovative process through strong links to the business sector. This facilitates the knowledge transfer from the centres (See figure 9).

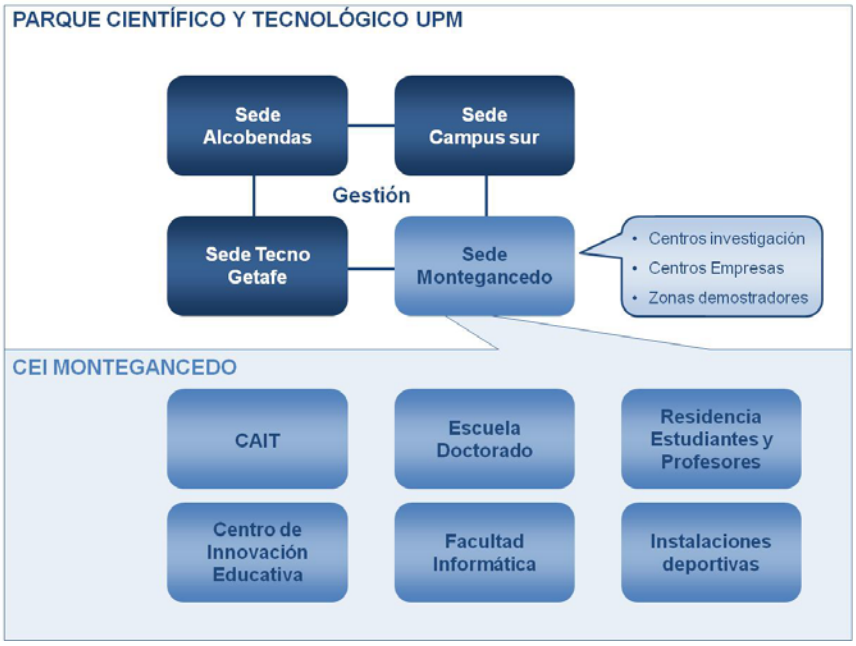


Figure 9: Campus – Park relation

CAIT, beyond the physical environment

Being aware that 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, 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, while extending its activities. (See fig. 10)

Figure 10: Transformation of the Business Centre into the CAIT

The CAIT will have an **essential role in the conversion to a CEI**. Its multidisciplinary character will help its coordination with the productive sector while facilitating their needs and research structures within and outside the campus. Through the CAIT, companies will be enhanced by the **internationalization of their activities and their link to the Campus Moncloa** (UPM-UCM). The CAIT will have an especially close relationship with the **new UPM Graduate School** and make an effort to use teaching methods that promote interaction and which are in accordance with the spaces defined by the EHEA.

Living Labs and Technology Demonstrators

In the context of technological **demonstrators**, the UPM considers the creation of **Living Labs** and their subsequent 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, to promote & facilitate knowledge & technology transfer**. **Living Labs** allow end users to become involved in the testing of **demonstrators**, leading to the creation of an open innovation community that promotes know-how and facilitates the ease of commercialization.

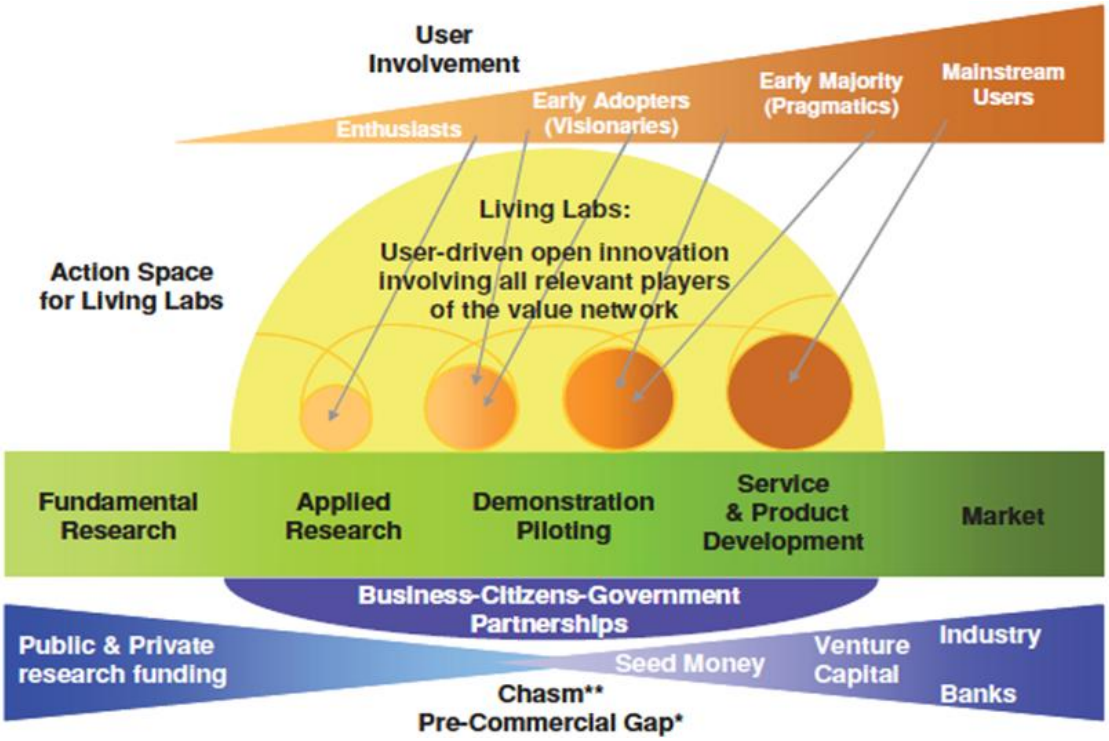


*Figure 11. : Illustration of the **Living Lab** concept*

h) Gender indicators

The UPM has established gender equality as a priority. It has recently introduced mentoring and coaching programmes for woman; support programmes in the creation of spin-offs for woman and special promotion programme within the various University departments. The Montegancedo Campus is characterized by its high percentage of female PHD students, which is well above the university average.

6. METHODOLOGY AND WORK PLAN

Work methodology

The coordination of the various actions will be controlled from the office of the Vice president of research. The direction of the programme and project office with be overseen by the assistant to the vice rector of research alongside the Director of the Montegancedo Science Park. Each project will be managed individually by a project director, and will be coordinated through the project office.

For the entire project, the UPM will use a personalized project and programme methodology.

This methodology uses Prince 2 as its base; however it also includes aspects from other methodologies such as PMI. The methodology will have a special emphasis on the following aspects:

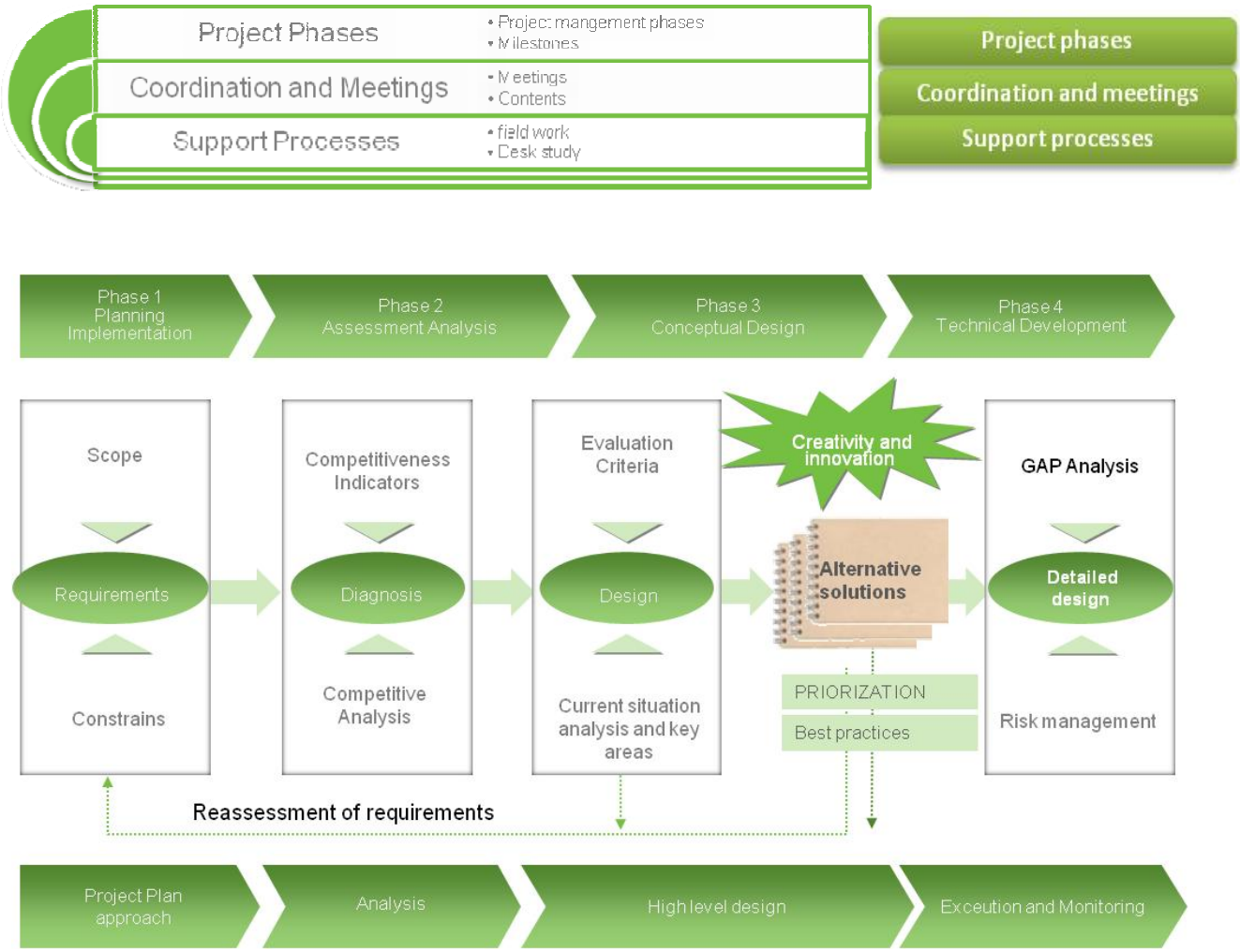


Figure 12: Work Methodology

7. INDICATORS, EXPECTED BENEFITS AND DIFFUSION PLAN

Indicators	UPM	2012	Δ (%) (Start - 2012)	2015	Δ (%) (Start-2015)
Nº 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				

Table 5: CEI 2010 Indicators

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

EXPECTED ACTION BENEFITS

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

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 Events hall in the Business Centre and other existing locations in the Campus (IT 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.

8. ECONOMIC REPORT

Montegancedo Campus was awarded by the CEI 2009 MEC 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.

The 2009 proposal submitted by the UPM for Montegancedo Campus was awarded a total of € 8.2 M 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 achieved, mainly for project activities aimed at the construction of a new residence for professors and doctoral students and funds to promote EHEA and improve teaching.

In this 2010 call, the UPM seeks the CEI 2010 certification with the intention of obtaining the seal of excellence and expand the R&D initiatives and transfer of knowledge through the Innocampus program. To do 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 specific actions closely related to the Campus Strategic Plan for Excellence. In general, there is the goal 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.

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.

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
- Development of the Food and Health Initiative (Bio Tech)
- 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
- 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 1 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

Table 1. 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

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:

   Proyect: "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 were 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 2: Aid Summary

c) Financing Plan

Table 3 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 3: Forecasted financing plan

d) Loan repayment plan

The plan for repayment of the aid consists of constant annuities from 2013 to 2025. Funding for these returns will come as described in the previous

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	4.000.000
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 4& 5: Loan repayment plan

9. TIMESCALE

Table 6 summarizes schematically the major milestones and phases in the development of the activities mentioned above, one overall one and others with more specific plans for each performance

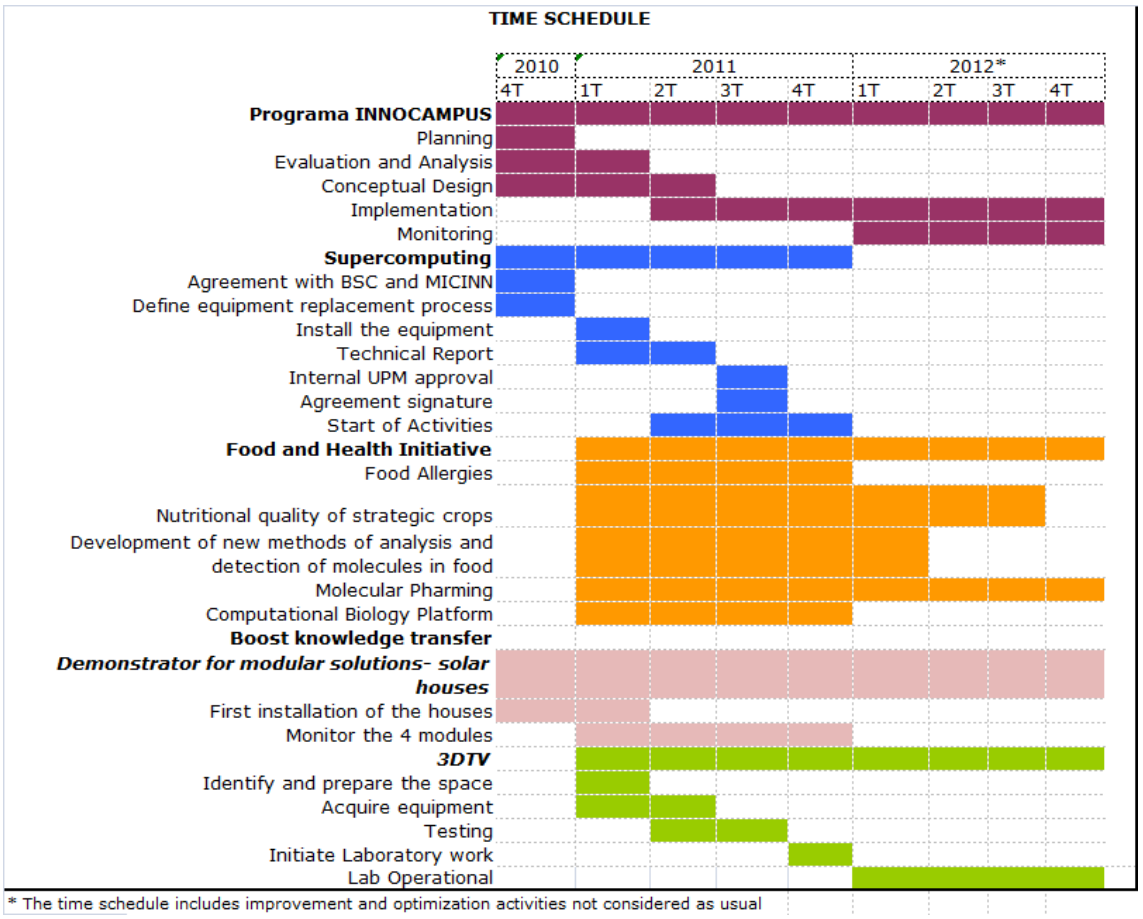


Table 6: *Time Schedule of actions*

10. 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.

On this summary we have provide a brief overview of actions required to make the Campus a reality.