UC3M and Airbus Group:
Airbus and UC3M rocketing the Spanish Aeronautic industry

Madrid, Spain

General Information

Title	Best practices UC3M-Airbus Group
Pitch	Airbus and UC3M rocketing the Spanish Aeronautic industry
Organisations	University Carlos lll Madrid, Airbus Group
Country	Spain
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Nature of interaction

- ☑ Collaboration in R&D
- ☑ Commercialisation of R&D results
- ☑ Mobility of staff
- ☐ Academic entrepreneurship
- ☐ Governance
- ☐ Lifelong learning
- ☑ Joint curriculum design and delivery
- ☐ Mobility of students
- ☐ Student entrepreneurship
- ☐ Shared resources

Supporting mechanism

- ☑ Strategic
- ☑ Structural
- ☑ Operational
- ☐ Policy

Summary

A formal UBC agreement between University Carlos lll Madrid (UC3M) and the Airbus Group has been in place since 2008. It covers education, R&D, knowledge transfer and innovation in the aerospace industry. A key element of the agreement is the Airbus-UC3M Joint Centre for Aeronautic Systems Integration, situated at the UC3M Science Park. The Joint Centre hosts 38 research groups which reflect the match between the multi-disciplinary demands of the aerospace sector and the engineering and systems capabilities of UC3M. Direct collaboration of interdisciplinary teams on R&D projects drives the competitiveness of Airbus Group technology.

Introduction & Overview

1. BACKGROUND

The first UBC agreement between University Carlos III Madrid (UC3M) and the Airbus Group was signed in 2008. This agreement covered financial support and internships for students in industry settings, the development of a joint Masters course, and the establishment and promotion of a joint R&D Centre.

The Airbus-UC3M Joint Centre for Aerospace Systems Integration opened in 2008 within the UC3M Science Park.

The Masters in Aircraft Systems Integration (MASI) course started in 2009. The course received sponsorship to support an initial intake of 200 students, a cohort who graduated in 2010.

In 2012, a second agreement between UC3M and Airbus was expanded to include a Joint Doctorate training programme.

In 2013, UC3M was invited to join the Airbus Global University Board, comprising 22 other higher education institutions worldwide. The UC3M-Airbus collaboration in Madrid was introduced to the Global Board as a good practice case.

In 2015, UC3M became part of the Airbus Group University Partner Programme.

2. OBJECTIVES AND MOTIVATIONS

The Joint Centre for Aerospace Systems Integration is a joint undertaking of AIRBUS Group, UC3M, business and other stakeholders that aims to promote innovation, and the generation and transfer of knowledge and technology in the aerospace industry. The mission of the Joint Centre is the development of technology for Airbus Group and the integration of aeronautic and space systems to improve the competitiveness of Airbus. Fulfilling this mission entails the objective of improving the competitiveness and productivity of the aerospace sector, enhancing economic and social development.

Airbus Group has established its University Partner Programme with the dual underlying motivations of investing in education and promoting passion for science and aerospace; and of supporting the development of globally minded students with the skills it has identified as essential for its future business.

3. STAKEHOLDERS

Stakeholders in the Joint Centre include students seeking careers in aerospace systems and related engineering and technology fields.

UC3M staff members teach engineering disciplines, technical systems and other STEM fields that provide the primary basis for the talent formation that is supplied to the UBC agreement.

The management of the Airbus-UC3M Joint Centre seeks to maximise opportunities and outcomes for all stakeholders, with a particular focus on opportunities to produce new and industrial relevant knowledge for Airbus and the aerospace systems industry more generally.

Airbus provides resources and access to industrial processes essential to the UBC relationship, driving the demand-side orientation of the overall collaboration.

Businesses embedded in the aerospace systems industry seek to link in as partners, suppliers or contractors.

Implementation

4. INPUTS

Students in a range of engineering and research field contribute to the projects and innovation in the Joint R&D Centre and the UC3M Science Park more broadly. A small fraction of the applicants to the highly competitive entry process for the MASI course form a key cohort of emerging highly skilled talent that contribute across the Airbus-UC3M alliance and beyond.

Professionals in the aerospace and other related industries contribute knowledge and experience to projects, join postgraduate courses and contribute to teaching and consulting.

Academics at UC3M provide teaching and conduct research in applied engineering disciplines relevant to the highly interdisciplinary field of aerospace systems including telematics engineering, informatics, aerospace engineering, electronics, systems engineering and automation.

UC3M hosts the Airbus-UC3M Joint R&D Centre within the infrastructure provided at the UC3M Science Park.

The Airbus Group provides investment, training opportunities, sponsors joint research projects (including open innovation doctorates) and provides career pathways to some MASI graduates.

5. ACTIVITIES

Actions designed to fulfil the UBC agreement objectives and bring about the desired outcomes are organised along four lines: education; research and knowledge transfer; valorisation and entrepreneurship.

Education. The initial phase is the professional development of students and young engineers, promoting their knowledge of the aeronautics industry and the realisation of company internships. Students are able to undertake internships at Airbus.

The advanced phase of education is the Masters in Aircraft Systems Integration (MASI), which has been designed specifically for graduate engineers and for current professionals who wish to develop and lead projects in systems integration. The course is taught in English by internationally recognised experts who are leaders in the aeronautics business. These experts are drawn from all relevant sectors, including industry, university, government and regulation. Students conduct research projects as part of their studies within the Joint Centre.

Research and knowledge transfer. The Airbus-UC3M Joint R&D Centre for Aerospace Systems Integration currently hosts 38 research groups. The Centre is particularly notable for its interdisciplinary composition. Knowledge generation and transfer are channelled through joint doctorates, patents, research projects, participation in European project consortia, and direct contracts with firms. The sharing of space and formal and informal interactions are important for building intangible elements of collaboration and the sharing of 'sticky' or tacit components of knowledge. Advanced research training is also available through a joint doctoral programme, built on an 'open innovation' model, in which the thesis is developed while working on research problems or needs of Airbus.

Valorisation. Collaborations between Airbus and UC3M on research and technology-driven projects are common and have led to the commercialisation of results (patents).

Entrepreneurship. Entrepreneurship training and development is a more recent development that will also be linked to the UBC agreement. The objective of this activity is to generate new ideas and challenges for the company, which can be jointly worked on and developed by Airbus, students, university researchers in the Joint Centre and through university start-ups.

6. OUTPUTS

Since the agreement between Airbus and UC3M was signed in 2008, a total of 1,150 internships have been completed by UC3M students.

Airbus Div.	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Operations	132	132	65	72	35	17	51
Helicopters	6	3	0	2	3	4	0
Defence & Space	128	119	119	71	54	95	55
Total	**266**	**254**	**184**	**145**	**92**	**136**	**96**

MASI programme

The full-time MASI course involves 12 months instruction in Airbus and UC3M followed by a final Project that takes 6 months. A total of 40 places are available in the MASI each year. Applications for places in the course have risen dramatically from around 100 in 2009 to 1,400 in 2014.

Doctoral theses

The first five doctorates led and funded by Airbus have been completed. Three of these doctorates resulted from an 'open innovation' project call led by the Airbus Defence & Space.

Joint R&D Centre

The Airbus-UC3M technology matrix shows 25 areas of technology need distributed across the former five industrial divisions, - Cassidian, Airbus, Airbus Military, Eurocopter and Astrium - and 38 UC3M research groups with relevant knowledge and expertise. These groups are organised into five laboratories designed to meet Airbus knowledge requirements: Identification Systems test lab; Information Security lab; Communications Systems for Security and Space lab, Spectral Sensors lab; and Aeronautic Structures Impact lab. These R&D Centre relies on basic funding support to work on technology development at the request of Airbus. From 2009 to date, more than 40 joint projects have been developed in the Centre.

Other outputs include joint projects at national and European levels, several European project proposals, sponsored Chairs and direct contracts with external firms usually requiring an interdisciplinary problem-solving approach.

Work at the Airbus-UC3M Joint R&D Centre has had concrete technology impacts in the form of patent applications and concessions. Both Airbus and UC3M are potential beneficiaries of this intellectual property.

Patent Title:	Procedimientos de control activo para la conexión de cargas altamente capacitivas mediante SSPCs (Active control procedures for the connection of high capacity loads using solid state power contollers)
Inventors:	Daniel Izquierdo Gil (EADS); Andrés Barrado Bautista, Clara Marina Sanz García, Rob-erto Carlos Hernández Morgado (UC3M)
Owners:	50% EADS (Airbus), 50% UC3M

Patent Title:	Métodos y sistemas para realizar análisis de estanqueidad en depósitos de fluidos. (Methods and systems for performing leakage analysis in fluid reservoirs.)
Inventor:	Fernando López
Owner:	EADS Construcciones Aeronáuticas, S.A.

7. IMPACTS

Graduates of the MASI programme have enjoyed high levels of subsequent industry employment. In earlier years of the course, between half and three-quarters of MASI graduates were employed by Airbus, although this level has declined more recently.

UC3M has received an ever-increasing demand for enrolment in the MASI course and sustained investment in a wide variety of basic and applied research that is in part catalysed by the partnership with Airbus.

R&D services companies in Madrid have also benefit from being able to link into the activities of the Joint Centre as suppliers and partners.

Support & Influencing factors

8. SUPPORTING MECHANISMS

The agreement(s) between Airbus Group and UC3M are strategic in their long-term vision to create a hub for UBC that produces human capital, knowledge and technology that is oriented specifically to the needs of the aerospace industry. Each agreement is also a structural instrument that puts specific curriculum, formation, research and career mechanisms in place within the framework of the agreement between the two organisations.

Since 2013 an important element of the governance of the Joint R&D Centre has been a Steering Committee made up of seven representatives of different parts of Airbus and six from different fields of applied engineering at UC3M and the UC3M Science Park. This Steering Committee meets at least twice a year to identify opportunities for collaboration within the Joint R&D Centre.

9. BARRIERS AND DRIVERS

A factor that is perhaps more of a temporary limitation than a fully-fledged barrier to UBC, has been the global financial and economic crises that effected major investments of companies and governments world-wide created short to medium strains on aerospace industry, including at the level of employment for highly skilled workers.

The driver of the UBC arrangements is industrial demand, but this depends on a continued level of quality assurance, development of trust, and responsiveness to emergent needs through the UBC relationship.

For UC3M, the UBC arrangements are driven by the interwoven opportunities to develop top quality and industry-ready human capital, to collaborate on research projects which develop the in-house capabilities of faculty members, to develop innovations and IP with potential commercial value, and to participate in a global exchange of education practices through the Airbus cooperative programme.

10. FUTURE CHALLENGES

The next phase of development of the agreement will additionally seek to integrate a more comprehensive approach to the formation of entrepreneurial capabilities among students and other participants within the Airbus-UC3M UBC ecosystem.

11. CONTEXT

The Airbus-UC3M UBC agreement reflects the global strategy of a major industrial organisation across multiple areas of interest include skill formation, talent identification, knowledge advance and technological innovation. The capacity of the university to meet multi- and inter-disciplinary knowledge demands at this globally competitive level, in areas of both teaching and research, provides the scale of institutional endowment also required to power the UBC context.

12. KEY SUCCESS FACTORS

The key success factor for the Joint Centre is the development of a R&D culture of interdisciplinary knowledge sharing and experimentation. This is essential for keeping pace with the cutting edge of the complex knowledge and technology bases of the aeronautics and aerospace systems integration fields.

A strong commitment to future opportunity identification and exploitation by both partners is essential to Airbus maintaining its competitiveness in the high stakes aeronautics industry.

Further Information

13. MONITORING AND EVALUATION

UC3M monitors the employment outcomes of the MASI course. In the period 2009-15, MASI graduates were fully employed, 58% in AIRBUS Group, 27% in AIRBUS subcontractors, 10% in other aerospace companies and 5% in other companies.

14. SUSTAINABILITY MEASURES

The latest agreement between Airbus and UC3M (2016) extends collaboration until 2020.

15. TRANSFERABILITY

The UBC model characterising the agreement between UC3M and Airbus is a variation on a model used successfully by the Airbus Group to develop collaborations with universities across the globe. UC3M has become progressively more closely integrated into the global level administration and direction of this programme. Elements of the specific collaboration developed at UC3M have migrated into the global knowledge base, just as other elements have been transferred in to UC3M.

16. AWARDS AND RECOGNITION

In 2014, the Airbus-UC3M Joint R&D Centre received the network of Spanish University Foundations (redFUE) prize for best practices in UBC. The prize was awarded for the successful development of a high quality ecosystem of innovation and entrepreneurship.[i]

17. LINKS

Masters Course in Aircraft Systems Integration http://masi.edu.es

University Carlos lll Madrid Science Park http://www.uc3m.es/ss/Satellite/UC3MInstitucional/en/PortadaMiniSiteA/1371207248804/Science_Park

Centro de Integración de Sistemas Aeroespaciales AIRBUS-UC3M http://portal.uc3m.es/portal/page/portal/investigacion/parque_cientifico/centros_idi/Sistemas_Aeroespaciales_EADS_UC3M

Airbus University Partner Programme http://www.airbusgroup.com/int/en/people-careers/commitment-to-education.html

18. CONTACT PERSONS

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19. REFERENCES

[1] http://www.redfue.es/premios-universidad-empresa/pagina.php?id=00148