

## ISA STUDENT SECTIONS IN SPAIN: CONNECTING ACADEMIC AND INDUSTRY FOR EDUCATION

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**Abstract.-** This paper presents the experiences of three Student Sections of the Instrumentation Systems and Automation Society (ISA). Currently, three Spanish universities offering a wide range of studies participate through these Sections in the ISA. In each case, the goal of the Student Section is to approach the students to the industrial reality while still at the university. An increasing number of students has found an enormous motivation participating in the activities of the ISA-Student Sections, as members and as part of the management staff. The university authorities welcome these associations and they integrate the associational activities within their curriculum by acknowledging this work in the form of credits. The history, evolution, activities and challenges of each one of these Student sections are described below, summarized by a common aim under the ISA Organization.

**Keywords:** Education, Student Association, Automation.

### 1.-INTRODUCTION

The enhanced efforts of ISA to extend industry knowledge, have long contributed to the successful development of activities made by ISA Student Sections. Many student Sections have been constituted throughout the world who follow the ISA model as a way to step from the academic world into the professional automation and control sector.

ISA Student Sections provide important career opportunities, broaden the knowledge and expose students to the world of automation.

The sections below describe the ISA Organization in the world and the general aims of their

Student Sections, with special mention to the experience in Spain. In the following sections each Student Section describes its own experiences, features and objectives.

### 2.- ISA IN THE WORLD AND ITS STUDENT SECTIONS

ISA, the Instrumentation, Systems and Automation Society, is the most important association in the field of automation. Founded in 1945 and with over 30,000 members, ISA develops standards, certifies industry professionals, provides education and training, publishes books and technical articles, and hosts a large number of conferences and exhibitions for automation professionals.

Its members come from 110 different countries and it is active in a wide variety of industries that include petrochemicals, pharmaceuticals, automotive, energy, etc.

Between the main and differentiating values of ISA are its permanent and intense relation to industry and the practical application of the instrumentation, systems, and automation theory. Most of the members of ISA are working within the industry, thus the recommended practices, standards, training courses as well as organized activities focused on the needs of the industry.

Besides the professional member ISA Sections throughout the world, there are over 175 ISA Student Sections.

Student Sections are devoted to those students who are interested in the field of instrumentation, systems and automation, and want to improve their knowledge on these subjects, and want to have a closer contact with their industrial application.

ISA International offers a very reduced membership fee to students and access to almost all the same services available to regular members. Accordingly, they receive InTech magazine on a monthly basis, they have special discounts on books and other training material, and can participate in international student contests. They can also apply for a special grant to continue their studies.

### 3.- GENERAL ASPECTS OF THE STUDENT SECTIONS IN SPAIN

ISA Spain started in 1998. From the very beginning, it was interested in promoting contacts and collaboration between industry and universities. An effective way to accomplish this goal was to form Student Sections.

Right now, we have three active Student Sections: Universidad de Valladolid, Universidad Complutense de Madrid, and Universidad Politécnica de Madrid.

ISA Spain (the professional section) helps the Student Sections by inviting the students to attend its activities, thereby fostering students contacts with the experienced professionals and face the day to day challenges faced by the professionals. Special grants are offered to allow participation in the non-free training courses and conferences.

We also help to get hands-on training temporary jobs in companies related to automation, which is a very important professional and personal experience for the students.

A special prize for the best student academic work is given once a year.

The Student Sections are encouraged to organize their own activities: training courses, conferences, visits to industrial plants, etc. ISA Spain cooperates with them providing contacts to facilitate the organization.

From an organizational point of view, one of the members of ISA Spain Executive Committee is in charge of relations with the Student Sections. This is important to obtain effective coordination. This officer and two volunteers maintain regular meetings with the Section Advisors (University professors who help the student section) and the Section Committees.

In ISA Spain, we believe this is a worthy effort. Student Section activities help to facilitate contacts between industries and universities, it is useful to achieve a greater visibility of the Automation industry in the Society and it is important to attract outstanding students to the profession.

### 4.- THE EXPERIENCE AT THE UNIVERSIDAD DE VALLADOLID

The first ISA student section in Spain was created at the Universidad de Valladolid, hosted by the System Engineering and Automatic Control department. Previous personal contacts between people from the department and people from ISA-Spain made possible the proposal. At that time (year 2000), students from chemical engineering were very active and interested in instrumentation and process control areas. Francisco Díaz-Andreu (from Repsol-YPF and member of ISA-Spain) and two professors from the System Engineering and Automatic department (Jesús M. Zamarreño and Miguel A. García) made the proposal to the students to start an ISA student section.

The first steps to succeeding in this project were diffusion of the student section in local press and among the students from engineering, physics, computing, etc. Support from ISA International (Laura Crumpler), ISA Europe (Alex Bobovitch) and ISA Spain (Francisco Díaz-Andreu) were essential for starting the student section.

Student activities include courses, some visits to nearby industries, conferences from industry

experts, etc. Students also have the possibility to attend courses organized by the professional ISA Section at Madrid and also the ISA Spanish annual conference. Students also participate in activities with other European sections such as competitions, meetings and publishing papers. The section owns a small library with books demanded by the students. The information of our activities (courses, conferences, ...) is made through posters, the web page (<http://estudiantes.isa.cie.uva.es>) and the e-mail list. Exclusive announces for members such as meetings, job offers, etc. are made only by e-mail. As specific examples of daily life in the section, the following activities were performed last year (2005):

- Annual Meeting in February
- One student participates in an ISA Student European Competition presenting a paper published in "Education for All" event (April)
- Conference "Industrial buses: Application in cryogenic control system, in LHC" by Enrique Blanco (CERN)
- Conference "Safety and control in the process industry" by Almudena Alvarez (Honeywell)
- Course "Matlab and their applications in Science and Engineering" in October
- Course "Advanced Matlab" in November
- Course "Processes Simulation with EcosimPro language" in November
- Renewal of Section Officers in December

This University-Industry cooperation has made possible two important events at the Universidad de Valladolid such as the First and Second Meeting ISA University-Industry in 2002 and 2003. At these events, companies supporting ISA Spain have gathered curriculums from students and some of them have got their first job thanks to ISA. Once a year, ISA Spain gives an award to the Best Work on Instrumentation, Automation and Control. In this way the students can show their works and results obtained at the University to the Industry.

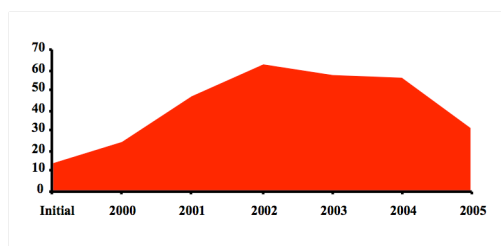


Fig. 1. Membership evolution at the University of Valladolid

Having an ISA student section in our University has made known the instrumentation and control field among the students. Courses organized by the section have made possible a better knowledge of some subjects by the students, such as robotics, PLCs, Matlab, LabView, SCADAs, OPC, etc.

The main problems in maintaining the section are the renewal of the Section Officers (students are reluctant to become presidents) and the participation in international competitions with other ISA student sections. For solving these problems, the role of the advisor is important.

To sum up, the creation of an ISA student section at the Universidad de Valladolid 6 years ago has made possible a direct link between the students and the industry. Both parts have got feedback from each other. Students who participate actively in the section get confidence on their expertise and usually find a job in some of the ISA associated industries.

#### 5.- THE EXPERIENCE AT THE UNIVERSIDAD COMPLUTENSE DE MADRID

The ISA Students Section of the Universidad Complutense de Madrid (ISA-UCM) was established in 2003 by Undergraduate and PhD students of the Chemical Engineering Department. It was founded with the help of the present Advisor of ISA-UCM, Dr. José Manuel Aragón, Associate Professor of Chemical Engineering, Dr. José Antonio López, Associate Professor of Automation in Physical Sciences and professional people belonging to ISA-SPAIN and ISA-USA.

The headquarters of the association are in the Chemical Engineering Department at the Chemical Sciences School but it has lately come close also to Physical Sciences, and Chemical Sciences.

Since it was established, ISA-UCM has been involved in setting up activities, which provided considerable prestige to this association. Because of this, the number of associates is increasing every year, reaching now 63 members.

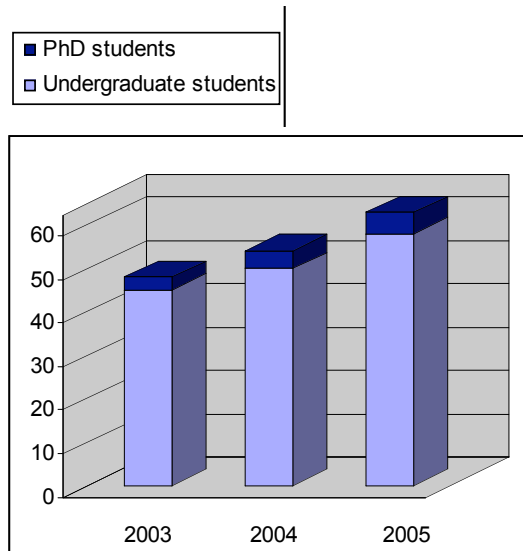


Fig. 2. Number of members (PhD and Undergraduate students) of ISA-UCM

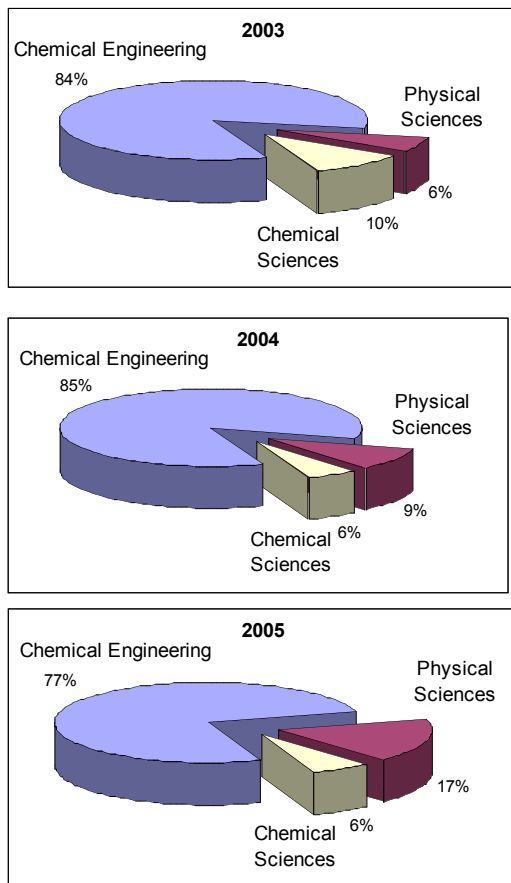


Fig. 3 Evolution of members' profile.

To attract students to our association, we follow several ways, such as classroom presentations, offering free activities for members or even including the membership fee in the registration courses promoted by our association.

Although many new members keep joining the association, our main problem is finding people to participate in the committee. Students like to attend our activities, but not much to organize them. We try to overcome this difficulty by explaining to the new members how belonging to a work group facilitates to develop management skills (very useful nowadays), as well as provides an occasion to meet important people within the field of Instrumentation and Control.

The main goal of the association is to serve as a link between the University and this industrial sector. ISA-UCM wants to provide a practical and real value from this technical world. To this purpose:

- During our 3 years of activities the Association offered 10 internships and 5 jobs in private companies. In several cases, members of ISA-UCM were hired in companies like Emerson Process or Invensys.
- The association facilitates the participation of students in the only Master of Instrumentation and Control existing in Spain, which is organized by ISA-SPAIN in collaboration with the High Institute of Energy (ISE), of the Repsol Foundation.
- Courses with a very practical focus and a clear interest on professional matters are organized, such as "Project Management using MS Project" and "P&IDs representation with MS Visio applied to control strategies". One of the distinctive characteristics of these courses is that teachers are always professional people with a high experience in the field, such as engineers of companies like AIRBUS or INITEC. Additionally, students taking these courses can get scholarships credits.
- Conferences about the I&C day-by-day world are given, focusing mainly on hot topics and the looking for the first job issues.
- Members can also use the association library, where books, magazines and documents of ISA-SPAIN can be found.
- Opportunities are given to students to visit factories and research centres, like the Technologic Center of Repsol or

the Institute of Industrial Automation (I. A. I.).



Fig. 6. S.S. of UCM visits the I.A.I

By becoming members of our association, students with similar technical interests have an opportunity to share their ideas and to improve their background as future professional as well as their abilities for team and collaborative work. All of these increase their chance to find a job later on.

To participate in our activities and have a closer view of the association, students can enter the web page of ISA-UCM (<http://www.ucm.es/info/isaucm/>) and use an e-mail list for contact and exchange of information.

The present purpose of ISA-UCM is to promote the participation of students in the various activities of ISA-INTERNATIONAL, such as The Second Paper Contest of ISA European Students.

#### 6.-THE EXPERIENCE AT THE UNIVERSIDAD POLITÉCNICA DE MADRID

The third Student Section of ISA-Spain, was founded on November 2004 at the Escuela Técnica Superior de Ingenieros Industriales (ETSII) at the Universidad Politécnica de Madrid (UPM). It was the result of the combined effort of a group of professors of the Department of Systems and Automation Engineering, and a group of student very keen in the advances of Automation, Control and Robotics. Both with the support of ISA-International and ISA-Spain.

The student's section ISA-UPM, has its office in an emblematic historic building of the UPM in Madrid-Spain. During its first year of activities, the Student Section of ISA-UPM reached the number of 51 associates, most of our mem-

bers have chosen the Engineering studies of Automation and Electronics, and some of our members are also PhD. students.

Presently the ISA Student Section offers the following services to its student members: seminars, courses, visits to industries, technical meetings, scholarships and employment trainships. Focused on the relevance of staying updated in all control techniques, the organization of many seminars and courses is giving our members a further training on the control and automation industrial environment. Another way of achieving these objectives is by organizing visits to several related industries.

An important issue of the Student Section is the fact that the members can actively participate in the activities to be organized by e-mail, web pages and regular meetings; this increases the effectiveness of the activities and the orientation of the UPM ISA-Student towards a more active participation of its members.

In our short history we feel optimistic seeing the achieved goals:

1. Around 50 members in just two years.
2. Free elective course credits to those members who attend to our activities.
3. Many of our members have often attended to the organized activities (visits to industries, technical conferences, technical meetings of ISA-Spain) organized during these two years.

In a constant effort to make our members aware of real situations faced by the industry and involve them into the actual needs of the industry, we are focusing on increasing seminars, courses and visits to industries. So this way we provide them with the necessary tools and skills to face the actual challenges of the professional world.

At ISA-UPM we found that these activities are the most effective way to involve students and joining them within the Student Section, These activities must be focused on the personal interests of the students related to their contact with the industry. In order to achieve this, we have developed a survey that gives us an important feedback from our members of the level of satisfaction and their opinion of the developed activities.

As the areas of knowledge covered by ISA are so broad, our future efforts are going to be focused on increasing the number of members of other fields of engineering studies at our school such as Chemistry, Manufacturing, Mechanics, Energetics, etc. and expand to the remaining

technical schools of our university which develop their activities within the field of instrumentation, control systems and automation.

This year we are increasing our relations with other Students Sections within the networking spirit promoted by ISA. Working together we are extending the number of activities to our members who can apply for them no matter from which ISA Student Section they are. All of this in order to continue as a source of technical and human resources not only for our members and students, but also for all the people interested in broadening their skills in the field of automation, control and instrumentation.

#### 7.- REFERENCES

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