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Message
from the President

Message from the President



Unfortunately, as in the previous year, the Academy in 2009 suffered the irreparable loss of a Member: Academician José Luis López Ruiz, who passed away on April 20, 2009. The Institution held an event in his memory on June 23, at which Members and other leading figures recalled, with a sentiment shared by all in attendance, various aspects of his personal and professional life, highlighting, to everyone's agreement, his outstanding qualities, in particular his graciousness and good judgment.

The Solemn Opening Act was held on January 27 with the masterful presentation by Academician Elías Muñoz Merino of the Inaugural Lecture titled "New Semiconductors, New Dimensions, New Lights. Illumination by Chips in the 21st Century", which was followed with great interest by the large audience in attendance.

On that same morning, in response to the Members' interest in the economic downturn that was afflicting so many countries, including Spain, Academician Juan-Miguel Villar Mir offered a brilliant and enlightening conference on "The Economic Crisis, Its Origins and Characteristics. The Way Forward", which garnered the attention of many individuals, in addition to the Academy's members.

During 2009, the Institution held eight Plenary Sessions and ten meetings of the Board of Directors, in addition to numerous other Commission and Section meetings. A summary of the most relevant issues addressed by the Plenary Sessions is presented in the corresponding pages of this Annual Report, though it is worth mentioning here that at the May 26 session, three new Permanent Members were elected: Dr. José Manuel Sanjurjo Jul - who accepted his post on October 27 with his Induction Speech titled "Reflections on Technology and Defense in the 21st Century. The Digital Combatant", the reply to which was offered by Academician Ricardo Torrón Durán -, Prof. Dr. Ramón Agustí Comes and Dr. Manuel Hita Romero, with the acceptance ceremonies for the last two being scheduled for the first months of 2010. During the same session, a vote was held to cover three Corresponding Member positions, as had been decided at a plenary session on the opening of the new year. As a result of the vote, Dr. Andrés Tierno Abreu, President of Uruguay's National Academy of Engineering, and Prof. Dr. Baltasar Mena, from Mexico's National Autonomous University and Member of said country's Academy of Engineering, were admitted to the select group of Corresponding Members that is a source of well-deserved pride for this Institution. Also on the same date it was agreed to fill four new Permanent Member positions, with the associated voting being scheduled for early 2010.

Over the course of the year, Medals were presented to three previously elected Corresponding Members: Prof. Dr. Zdrnekez Bazant on March 24; Prof. Dr. Christopher M. Bishop on May 26; and, finally, on July 7, Prof. Dr. Francisco José Sánchez Sesma.

The task of drafting the new Statutes was pursued in 2009 with great commitment by Academicians Luis Castañer Muñoz and Enrique Castillo Ron. The process to propose amendments was initiated before the close of the year and is expected to conclude in the first half of 2010.

It is a great satisfaction for this Royal Academy to be able to enjoy the attention and favor of the members of the "Pro Rebus Academiae" Foundation, who so wisely and actively offer suggestions for organizing and holding new and relevant activities. The ten conferences and sessions detailed in subsequent pages stem from our cooperation with the Foundation. I would be remiss not to mention here the Institution's acknowledgment of each and every one of them. I especially wish to extend a cordial welcome to the Foundation's new members: Abengoa, the Society of Naval and Ocean Engineers and the Society of Telecommunications Engineers, as well as the Office of Sustainable Rural Development of the Ministry of the Environment and Rural and Marine Affairs, which provides us support with identical objectives. Also, a Cooperative Framework Agreement was signed on December 1 with Spain's Institute of Engineering.

The "Academiae Dilecta" Prize with which this Institution annually awards an organization for excellence in an engineering concept or application was bestowed in 2009 on Apia XXI, a young company - founded in 1987 - with university roots and headquartered in Santander, for basing its corporate activity on the technical quality of its staff and engaging in engineering in the service of society through the realization of unique infrastructures and the diversification of its business lines. The award ceremony was held at the Palacio de la Magdalena in Santander, and was attended by Mr. Miguel Ángel Revilla Roiz, the President of Cantabria, Mr. Iñigo de la Serna Hernáiz, Mayor of Santander and Prof. Dr. Federico Gutiérrez-Solana Salcedo, Rector of the Autonomous University of Cantabria.

The year 2009 saw the Academy's first Declarations and its first Study, similar to the statutory Dictums and Reports, respectively, but born of the Institution's own initiative and, in the case of the latter, soliciting cooperation from external experts and organizations. The Academy made its opinion heard by way of two Declarations on matters of vital importance: the closing of the Garoña nuclear power plant and the planned cutback in public funding earmarked for R&D in 2010. The Study "The Contribution of ICTs to Sustainability in Transport in Spain" offered a methodical presentation of important contributions in the field, thanks to the tireless efforts of its editors, Academician José Ignacio Pérez Arriaga and Dr. Ana Moreno. This widely distributed and influential study was awarded the Madrid government Mobility Foundation's "Muévete Verde" (Go Green) Prize.

The Studies, Declarations and many other of the Academy's activities served to raise the media's awareness of this corporation considerably, resulting in interviews and reviews in such glowing terms and with such frequency that they would have been difficult to foresee just a short time ago. The dedicated and relentless efforts of the Press Office manager, Ms. Paloma Larena, have played no small role in this success.

Last year saw yet again the many distinctions bestowed on our Members, far too many to list here. The Academy should be congratulated for these richly deserved recognitions.

The Academy continues to devote much attention to international relations, which it considers to be of indisputable import. In addition to our notable presence in managing and organizing of CAETS and Euro-CASE activities, mainly as a result of the efforts and devotion of the Vice-President, Academician Pere Brunet Crosa, and of Academician Manuel Márquez Balín, we must once again mention our cordial and fruitful relationship with Latin American Engineering Academies, with which a "Declaration on the Teaching of Engineering" was drafted on the occasion of the 3rd Meeting in Lisbon on September 24 and 25. This Declaration offered general and joint recommendations adaptable to current requirements and is in the process of being ratified by the Latin American academies. This Academy, on March 27, also had the pleasure of hosting Prof. Charles Vest, President of the National Academy of Engineering of the United States, to discuss possibilities for cooperation.

Last year also saw progress in our efforts to write the Dictionary of Engineering under the careful oversight of Academician Antonio Colino Martínez and the expertise of the team of lexicographers coordinated by noted expert Dr. Rafael Rodríguez Marín. As we proceed to the phase requiring input by technical experts, we hope to make significant advances toward concluding this work in the next year.

It was the efforts of all Academy Members and personnel and of so many and such distinguished supporters that allowed 2009 to be a year in which the Academy yet again benefitted society through the pursuit of its statutory mandates. I have every confidence that this upcoming year will see us take another resolute step in the same direction.

Aníbal R. Figueiras Vidal
PRESIDENT

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Government bodies

2. GOVERNMENT BODIES AND COMMISSIONS

2.1. BOARD OF DIRECTORS

The Board of Directors, which consists of the following Members, was elected at the Extraordinary Plenary Session held on January 23, 2007:

PRESIDENT: Dr. Aníbal R. Figueiras Vidal,
VICEPRESIDENT: Dr. Pere Brunet Crosa,
GENERAL SECRETARY: Dr. José Antonio Martín Pereda,
SUPERVISOR: Dr. José Ignacio Pérez Arriaga,
TREASURER: Dr. Ramón Argüelles Álvarez,
LIBRARIAN: Dr. Enrique Cerdá Olmedo,

2.2. COMMITTEES

Their creation was approved by the Plenary Session of March 14, 2000. During 2008, the following committees were active:

2.2.1. Standing committees

Library Committee: formed by Dr. Javier Aracil Santonja, Dr. Enrique Cerdá Olmedo (President), Dr. Manuel Elices Calafat, Dr. Gabriel Ferraté Pascual, Dr. José Antonio Martín Pereda (Secretary), Dr. Elías Muñoz Merino, Dr. José Alberto Pardos Carrión, Mr. Javier Rui-Wamba Martija, Dr. Manuel Silva Suárez, and Dr. María Vallet Regí.

Steering Committee: formed by Dr. Ramón Argüelles Álvarez, Dr. Luis Castañer Muñoz, Dr. Enrique Castillo Ron, Dr. Aníbal Figueiras Vidal (President), Dr. Josefina Gómez Mendoza, Dr. Emilio Llorente Gómez, Dr. José Antonio Martín Pereda (Secretary), Dr. Andrés Ripoll Muntaner and Dr. Jaime Torroja Menéndez.

Treasury Committee: formed by Dr. Ramón Argüelles Álvarez (President), Dr. Adriano García-Loygorri y Ruiz, Dr. José Antonio Garrido Martínez, Dr. José Antonio Martín Pereda (Secretary), Dr. Jaime Torroja Menéndez, and Dr. Ricardo Torrón Durán.

Awards Committee: Standing Committee formed by Dr. Manuel Elices Calafat, Dr. Amable Liñán Martínez, Dr. Antonio Luque López. -Commission for Prizes "Academiae Dilecta": Dr. Enrique Alarcón Álvarez and Dr. Juan-Miguel Villar Mir-Joung Investigator Prize: Dr. Javier Aracil Santonja and Dr. Mateo Valero Cortés.

International Liaison Committee: formed by Dr. Pere Brunet Crosa (President), Dr. Enrique Castillo Ron, Dr. Elías Fereres Castiel, Mr. Luis Lada Díaz, Dr. Manuel Márquez Balín, Dr. José Antonio Martín Pereda (Secretary), Dr. Andrés Ripoll Muntaner and Dr. Manuel Silva Suárez.

2.2.2. Temporary committees

Likewise, during 2009, the following previously-created temporary Committees were active:

Candidacy Planning Committee: formed by Dr. Pere Brunet Crosa (President), Dr. Pilar Carbonero Zalduegui, Dr. Joaquim Coello Brufau, Dr. Amable Liñán

Martínez, Dr. Andrés López Pita, Dr. Emilio Llorente Gómez, Dr. José Antonio Martín Pereda (Secretary), Dr. José Alberto Pardos Carrión, and Dr. María Vallet Regí.

Committee for the drafting of the Engineering Dictionary: formed by Dr. Antonio Colino Martínez (Secretary), Dr. José Luis Díaz Fernández, Dr. Aníbal R. Figueiras Vidal (President), Dr. Javier Jiménez Sendín, Dr. Manuel Márquez Balín, Dr. José Alberto Pardos Carrión, Mr. Javier Rui-Wamba Martija, Dr. Jaime Torroja Menéndez, Dr. Ricardo Torrón Durán and Dr. María Vallet Regí.

Headquarters Committee: formed by Dr. Enrique Alarcón Álvarez, Dr. Joaquim Coello Brufau, Dr. Antonio Colino Martínez, Dr. José Luis Díaz Fernández, Dr. Aníbal R. Figueiras Vidal (President), Mr. Luis Lada Díaz, Dr. Manuel Márquez Balín, Dr. José Antonio Martín Pereda (Secretary), Dr. Luis Alberto Petit Herrera, Dr. José Ignacio Pérez Arriaga, Mr. Javier Rui-Wamba Martija, Dr. Jaime Torroja Menéndez, Dr. Juan-Miguel Villar Mir and Dr. María Vallet Regí. This committee was established to help in adapting the public portion of the Palace of the Marquis of Villafranca to the needs of the Royal Academy of Engineering.

Committee to prepare RAI Tributes, edition 2010, dedicated to Engineer Jorge Juan y Santacilia: formed by Dr. Javier Aracil Santonja, Dr. Ramón Argüelles Álvarez, Dr. Joaquim Coello Brufau, Dr. Antonio Colino Martínez, Dr. Luis Alberto Petit Herrera, Dr. José Manuel Sanjurjo Jul, Dr. Jaime Torroja Menéndez and Dr. Ricardo Torrón Durán.

2.3. DEPARTMENTS

The Plenary Session held on February 25, 2003 approved the creation of the following departments, chaired as indicated below:

Scientific and Technical Activities Department, Dr. José Ignacio Pérez Arriaga.

Training and History Department, Dr. José Antonio Martín Pereda.

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Academic bodies

3. ACADEMIC BODIES

3.1. FULL MEMBERS AND SENIOR MEMBERS

3.1.1. Ranking of Full Members by Seniority

CONSTITUENT MEMBERS

CONSTITUENT MEMBERS PER MINISTERIAL ORDER DATED 01-12-94

Medal nº I

Dr. Eugenio Andrés Puente

(Senior Member for statutory reasons as of January 1, 2003)

Medal nº II

Dr. Javier Aracil Santonja

Medal nº III

Dr. Ramón Argüelles Álvarez

Medal nº IV

Dr. José Luis Díaz Fernández

(Senior Member for statutory reasons as of January 1, 2005)

Medal nº V

Dr. Gabriel Ferraté Pascual

(Senior Member for statutory reasons as of January 1, 2008)

Medal nº VI

Dr. José Antonio Garrido Martínez

Medal nº VII

Dr. José Ramón Irisarri Yela

(Senior Member for statutory reasons as of January 1, 2004)

Medal nº VIII

Dr. Antonio Luque López

Medal nº IX

Dr. Emilio Lorente Gómez

(Senior Member for statutory reasons as of January 1, 2009)

Medal nº X

Dr. Manuel Márquez Balín

(Senior Member for statutory reasons as of January 1, 2007)

Medal nº XI

Dr. José Antonio Martín Pereda

Medal nº XII

Dr. Elías Muñoz Merino

Medal nº XIII
Dr. Luis Alberto Petit Herrera
(Senior Member for statutory reasons as of January 1, 2003)

Medal nº XIV
Dr. Rafael Portaencasa Baeza

Medal nº XV
Dr. Andrés Ripoll Muntaner
(Senior Member for statutory reasons as of January 1, 2009)

Medal nº XVI
Dr. Enrique Sánchez-Monge Parellada
(Senior Member for statutory reasons as of June 18, 1998)

Medal nº XVII
Dr. Jaime Torroja Menéndez
(Senior Member for statutory reasons as of January 1, 2009)

Medal nº XVIII
Dr. Mateo Valero Cortés

Medal nº XIX
Dr. Enrique Alarcón Álvarez

Medal nº XX
Dr. Eduardo Alonso Pérez de Ágreda

Medal nº XXI
Dr. Antonio Barrero Ripoll

Medal nº XXII
Dr. Pere Brunet Crosa

Medal nº XXIII
Dr. Luis Castañer Muñoz

Medal nº XXIV
Dr. Elías Fereres Castiel

Medal nº XXV
Dr. Francisco García Olmedo
(Voluntarily Senior Member as of October 19, 2000)

Medal nº XXVI
Dr. Manuel Elices Calafat

Medal nº XXVII
Dr. José Antonio Fernández Ordóñez († 03-01-2000)

Medal nº XXVIII
Dr. Amable Liñán Martínez

Medal n° XXIX
Dr. Adriano García-Loygorri y Ruiz

Medal n° XXX
Dr. Manuel Valdivia Ureña
(Senior Member for statutory reasons as of January 1, 2004)

Medal n° XXXI
Dr. Enrique Castillo Ron

Medal n° XXXII
Dr. Avelino Corma Canos

Medal n° XXXIII
Dr. César Dopazo García

Medal n° XXXIV
Dr. Rafael Moneo Vallés

Medal n° XXXV
Dr. Ignasi de Solá-Morales i Rubió († 12-03-2001)

Medal n° LX
Dr. Ángel Ramos Fernández († 02-01-1998)

ELECTED FULL MEMBERS

Medal n° XXXVI
Mr. Javier Rui-Wamba Martija
(He took up his position: March 17, 1998)

Medal n° XXXVII
Dr. Juan Ramón Sanmartín Losada
(He took up his position: June 18, 1998)

Medal n° XXXVIII
Dr. Juan-Miguel Villar Mir
(He took up his position, April 27, 1999)
(Senior Member for statutory reasons as of January 1, 2007)

Medal n° XXXIX
Dr. Juan José Martínez García
(He took up his position: June 15, 1999) († 06-08-01)

Medal n° XL
Dr. Miguel Ángel Lagunas Hernández
(He took up his position: October 25, 1999)

Medal n° XLI
Dr. Aníbal R. Figueiras Vidal
(He took up his position: May 30, 2000)

Medal nº XLII
Dr. Enrique Cerdá Olmedo
(He took up his position: October 20, 2000)

Medal nº XLIII
Dr. Miguel Ángel Losada Rodríguez
(He took up his position: September 29, 2000)

Medal nº XLIV
Dr. Manuel Silva Suárez
(He took up his position: November 14, 2000)

Medal nº XLV
Dr. Roberto Fernández de Caleyá y Álvarez
(He took up his position: October 30, 2001) († 23-01-04)

Medal nº XLVI
Dr. Jaime Domínguez Abascal
(He took up his position: November 27, 2001)

Medal nº XLVII
Dr. Ricardo Torrón Durán
(He took up his position: February 26, 2002)

Medal nº XLVIII
Dr. José Alberto Pardos Carrión
(He took up his position: April 29, 2003)

Medal nº IL
Dr. Pilar Carbonero Zalduegui
(She took up her position: June 3, 2003)

Medal nº L
Dr. Joan Margarit i Consarnau
(He took up his position: September 25, 2003)

Medal nº LI
Dr. José Ignacio Pérez Arriaga
(He took up his position: October 28, 2003)

Medal nº LII
Dr. María Vallet Regí
(She took up her position: February 18, 2004)

Medal nº LIII
Dr. José Luis López Ruiz
(He took up his position: March 22, 2004) († 20-04-09)

Medal nº LIV
Dr. Andrés López Pita
(He took up his position: April 29, 2004)

Medal nº LV
Dr. Antonio Colino Martínez
(He took up his position: December 14, 2004)

Medal nº LVI
Mr. Joaquim Coello Brufau
(He took up his position: March 29, 2005)

Medal nº LVII
Dr. Javier Jiménez Sendín
(He took up his position: February 14, 2006)

Medal nº LVIII
Dr. Josefina Gómez Mendoza
(She took up her position: March 21, 2006)

Medal nº LIX
Mr. Luis Lada Díaz
(He took up his position: June 6, 2006)

Medal nº LX
Dr. Manuel Doblaré Castellano
(He took up his position: June, 17, 2008)

Medal nº XXVII
Dr. Luis Alfonso Gil Sánchez
(He took up his position: September, 23, 2008)

Medal nº XVI
Dr. Jaime Conde Zurita
(He took up his position: October, 28, 2008)

3.1.2. Ranking of Members by order of attendance at Plenary Meetings

- Plenary meetings held since the founding of the Royal Academy of Engineering: 109

- Plenary meetings held during 2009: 8

1. Dr. Luis Alberto Petit Herrera	(102)	34. Dr. Eduardo Alonso Pérez de Ágreda	(38)
2. Dr. José Ramón Irisarri Yela	(101)	35. Dr. Antonio Colino Martínez	(35)
3. Dr. Enrique Castillo Ron	(98)	36. Dr. Pilar Carbonero Zalduegui	(34)
4. Dr. Enrique Alarcón Álvarez	(97)	37. Dr. María Vallet Regí	(34)
5. Dr. Manuel Márquez Balín	(96)	38. Dr. Andrés López Pita	(30)
6. Dr. Jaime Torroja Menéndez	(96)	39. Dr. José Luis López Ruiz († 20-04-09)	(30)
7. Dr. Emilio Llorente Gómez	(92)	40. Dr. Miguel Ángel Losada Rodríguez	(29)
8. Dr. Andrés Ripoll Muntaner	(91)	41. Dr. José Ignacio Pérez Arriaga	(29)
9. Dr. Elías Fereres Castiel	(86)	42. Dr. José Antonio Garrido Martínez	(28)
10. Dr. José A. Martín Pereda	(86)	43. Dr. Francisco García Olmedo	(27)
11. Dr. Ramón Argüelles Álvarez	(83)	44. Dr. Juan-Miguel Villar Mir	(23)
12. Dr. Pere Brunet Crosa	(83)	45. Dr. Roberto Fernández de Caleyá Álvarez († 20-04-09)	(20)
13. Dr. Aníbal R. Figueiras Vidal	(80)	46. Dr. Gabriel Ferraté i Pascual	(19)
14. Dr. Javier Aracil Santonja	(77)	47. Mr. Joaquim Coello Brufau	(17)
15. Dr. Antonio Barrero Ripoll	(74)	48. Dr. Avelino Corma Canos	(17)
16. Dr. Elías Muñoz Merino	(73)	49. Mr. Luis Lada Díaz	(17)
17. Dr. César Dopazo García	(70)	50. Dr. Josefina Gómez Mendoza	(15)
18. Dr. Enrique Cercá Olmedo	(68)	51. Dr. Javier Jiménez Sendín	(15)
19. Dr. Amable Liñán Martínez	(64)	52. Dr. Rafael Portaencasa Baeza	(14)
20. Dr. Luis Castañer Muñoz	(62)	53. Dr. Joan Margarit y Consarnau	(13)
21. Mr. Javier Rui-Wamba Martija	(59)	54. Dr. Enrique Sánchez-Monge Parellada	(13)
22. Dr. Ricardo Torrón Durán	(59)	55. Dr. José A. Fernández Ordóñez († 03-01-00)	(11)
23. Dr. Jaime Domínguez Abascal	(57)	56. Dr. Manuel Valdivia Ureña	(11)
24. Dr. Antonio Luque López	(57)	57. Dr. Juan José Martínez García († 06-08-01)	(10)
25. Dr. Manuel Elices Calafat	(55)	58. Dr. Luis Alfonso Gil Sánchez	(8)
26. Dr. Adriano García-Loygorri y Ruiz	(51)	59. Dr. Ignasi de Solá-Morales i Rubió († 12-03-01)	(6)
27. Dr. Manuel Silva Suárez	(51)	60. Dr. Jaime Conde Zurita	(4)
28. Dr. José Alberto Pardos Carrión	(50)	61. Dr. Manuel Doblará Castellano	(4)
29. Dr. Miguel Ángel Lagunas Hernández	(49)	62. Dr. José Manuel Sanjurjo Jul	(1)
30. Dr. José Luis Díaz Fernández	(44)	63. Dr. Rafael Moneo Vallés	(0)
31. Dr. Eugenio Andrés Puente	(40)		
32. Dr. Juan Ramón Sanmartín Losada	(40)		
33. Dr. Mateo Valero Cortés	(39)		

3.1.3. Alphabetical listing of Full Members

Dr. Enrique Alarcón Álvarez

Medal nº XIX
Civil Engineer, PhD
Professor
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Dr. Eduardo Alonso Pérez de Ágreda

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Dr. Javier Aracil Santonja

Medal nº II
Industrial Engineer, PhD
Professor
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School of Engineering - University of Seville
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Dr. Ramón Argüelles Álvarez

Medal nº III
Forestry Engineer, PhD
Professor
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Dr. Antonio Barrero Ripoll

Medal nº XXI
Aeronautical Engineer, PhD
Professor

Dr. Pere Brunet Crosa

Medal nº XXII
Industrial Engineer, PhD
Professor
Universitat Politècnica de Catalunya
Department of Computer Languages and Systems
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Dr. Pilar Carbonero Zalduegui

Medal nº IL
Agronomy Engineer, PhD
Professor
Department of Biotechnology
Center for Plant Biotechnology and Genomics
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Dr. Luis Castañer Muñoz

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Dr. Enrique Castillo Ron

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Dr. Enrique Cerdá Olmedo

Medal nº XLII
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Profesor
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Mr. Joaquim Coello Brufau

Medal nº LVI

Naval Engineer

Member of the Board and Managing Director

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Dr. Antonio Colino Martínez

Medal nº LV

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Nuclear Security Board

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Dr. Jaime Conde Zurita

Medal nº LVI

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Dr. Avelino Corma Canos

Medal nº XXXII

PhD in Chemistry

Professor

Institute of Chemical Technology - CSIC

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Dr. Manuel Doblaré Castellano

Medal nº LX

Industrial Engineer, PhD

Professor

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Edificio Betancourt

María de Luna, s/n. 50018 - Zaragoza

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Dr. Jaime Domínguez Abascal

Medal nº XLVI

Industrial Engineer, PhD

Professor

Department of Mechanical and Materials Engineering

School of Engineering - University of Seville

Camino de los Descubrimientos, s/n. 41092 - Sevilla

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Dr. César Dopazo García

Medal nº XXXIII

Aeronautical Engineer, PhD

Professor

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Dr. Manuel Elices Calafat

Medal nº XXVI

Civil Engineer, PhD

Professor

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Ph.: 91 336 66 79 - Fax: 91 543 78 45

E-mail: melices@mater.upm.es

Dr. Elías Fereres Castiel

Medal nº XXIV

Agronomy Engineer, PhD

Professor

University of Córdoba

ETSI Agrónomos y de Montes - Dpto. Agronomía

Institute for Sustainable Agriculture (CSIC)

C/ Alameda del Obispo, s/n. 14071 - Córdoba

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Dr. Aníbal R. Figueiras Vidal

Medal nº XLI

Telecommunications Engineer, PhD

Professor

Department of Signal and Communications Theory

Universidad Carlos III de Madrid

Avda. de la Universidad, 30. 28911 Leganés (Madrid)

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3.1.4. Alphabetical Listing of Senior Members

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Dr. José Luis López Ruiz

Aeronautical Engineer, PhD
Professor
Senior Member for statutory reasons as of January 1, 2008
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Dr. Manuel Márquez Balín

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3.2.1. Alphabetical listing of Corresponding Members

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4

Activities of the Academy

4. ACTIVITIES OF THE ACADEMY

4.0. INTRODUCTION

The year 2009 saw the Academy has held, in addition to the meetings associated with the **8** Committees and **2** Departments, **10** meetings of the Board of Directors, **8** Plenary Sessions and **4** Public Sessions to which were invited, among others, the **42** Full Members and the **16** Senior Members.

In addition, thanks to the financial support of the "Pro Rebus Academiae" Foundation, **10** Public Sessions were held featuring **48** speakers and an average attendance of **55** experts in the different fields addressed by each of the Sessions, so the experts could participate in the debates that made up part of each meeting's program. The Foundation had **43** contributing members which held **2** joint sessions throughout the year, in addition to the **2** sessions at which the Foundation's Board convened.

The totality of all the Public Sessions resulted in the production of **2,000** DVDs whose distribution was especially directed toward those interested in the topics covered.

The Academy publicly presented the publications "The Headquarters of the Royal Academy of Engineering. History of the Palace of the Marquis of Villafranca", "The Contribution of ITCs to Sustainability in Transport in Spain", and Volume III of the Tributes series on "Las Médulas".

These activities were publicized through the preparation of **9,200** leaflets, which helped promote the Academy's public image. The sessions were held in Madrid and Santander.

The new website, which has been operational since late 2007, has drawn special interest. In the twelve months of 2009, it received **349,471** visits.

Each Public Session was the object of an average remittal of 4 messages to the almost **424** agencies which the Academy's Press Office keeps informed, given the Institution's increasing awareness of the need to recognize the strategic role played by communications in all of its organizational processes.

Finally, we note the efforts of the Academy's administrative office in carrying out these activities and which translate, for example, into the sending of some **2,000** emails every month.

So as to comply with the Academy's objectives, as listed in Art. 3 of its Statutes, the Corporation has undertaken as many activities as possible given its resources, these being essentially provided by the Ministry of Education and Science as specified by the Agreement under which the Academy receives its subsidies from the State.

It is within this context, then, that the Academy has:

- 4.1. Held Formal Public Sessions (Art. 3d) of the Statutes)
- 4.2. Held Private Sessions (Art. 3d) of the Statutes)
- 4.3. Held Regular Public Sessions (Art. 3d) of the Statutes)
- 4.4. Issued Statements (Art. 3c) of the Statutes)
- 4.5. Published written material (Art. 3d) of the Statutes)

- 4.6. Awarded Prizes (Art. 3e) of the Statutes)
- 4.7. Liaised with other Institutions (Art. 3f) of the Statutes)
- 4.8. Progressed in drafting a Spanish language Dictionary of terms relative to Engineering (Art. 3g) of the Statutes)
- 4.9. Carried out other activities in line with the Academy's function (Art. 3h) of the Statutes).
- 4.10. Activities receiving external support
- 4.11. Institutional Relations
- 4.12. Member Activities
- 4.13. Awards and distinctions received by Members

4.1. FORMAL PUBLIC SESSIONS

4.1.1. Opening Session

The Opening Session of the Academic Year was held on January 27 in the Auditorium at the Royal Academy of Engineering headquarters at 10 Don Pedro Street, chaired by its President, Academician. Aníbal R. Figueiras Vidal.

After the reading of the 2009 Report of Activities by the Secretary, Academician José Antonio Martín Pereda, Academician Elías Muñoz Merino read his lecture titled *"New Semiconductors, New Dimensions, New Lights. Illumination by Chips in the 21st Century"*.

In his speech, Academician Elías Muñoz Merino described the use of light-emitting diodes for general lighting, that is, "having new [solid-state] lights and bulbs", luminous semiconductor chips to light homes, offices and streets. He proposed the feasibility of this thanks to a new family of InGaAlN semiconductors, first developed some fifteen years ago, and to the use of nanotechnology and nanoscience.

He noted the increasing importance of the interaction between semiconducting devices and light, or optoelectronics. In 1962 it was shown how a p-n GaAs junction could emit stimulated radiation (laser) in the infrared, and that a GaAsP p-n junction emits red light at ambient temperature (light-emitting diode, LED). Shortly thereafter, using GaAsPIn-based families of semiconductors, LEDs that gave off red, amber and green light were developed. In the 1970s epitaxial growth techniques were used that afforded nanometric control of the thickness with a very low concentration of defects and contaminants. Thus was born the quantum device, in which the confinement of electrons, holes and photons resulted in very important advantages and in new concepts involving the properties of optoelectronic devices.

Despite this extensive technological and scientific background, it was not until the late 90s that blue LEDs lasting thousands of hours became available. Prior to that, there was no known way to manufacture p-n junctions for optoelectronics in the blue and ultraviolet range using nitrides. Thus was born solid-state lighting, or "semiconducting lamps". Academician Elías Muñoz Merino described how the credit for these achievements goes to Prof. Isamu Akasaki at Nagoya University and to Prof. Shuji Nakamura, now at the University of California, Santa Barbara.

He then noted how the lack of suitable substrates for the epitaxial growth of nitrides results in devices with a high density of dislocations. He discussed the research conducted to determine their influence on the operating lifetime of these blue and UV emitters, and how their performance can be improved, by describing the progress made in the lighting efficiency and the total quantum efficiency of LEDs versus traditional light sources. Very recently, laboratory trials were able to yield a light output of 169 lumens/W and internal quantum efficiencies in excess of 75%. The advantages of solid-state lighting are evident: significantly longer lifetimes than classic light sources, no moving parts or fragile bulbs, reduced size, distributed lighting and the potential for pulsed electronic lighting control. The energy efficiency currently being attained in the laboratory is greater than 60%, versus the 4% or the 25-40% in commercial incandescent or fluorescent lamps.

He indicated the possible paths toward a white solid-state light, the most widely used nowadays being the use of a blue (or UV) LED to excite a suitable phosphor converter. He described the energy savings that would result from the worldwide use of solid-state lighting. As an example, he cited how a 1 mm² chip drawing 1A of current can generate 330 lumens, and a 3A chip 570 lumens, which exceeds the light output of a 40W fluorescent tube.

As for when we can expect to see the en masse implementation of solid-state lighting using nitride chips, he noted how LEDs based on low dimension, or quantum, structures is the best that physics has to offer us. He also warned of the human factor, wondering whether LED lighting will have the desired color quality and psychological effects to make it acceptable, and with it its adoption for use in homes and offices in the near future.

4.1.2. Member Inductions

The induction ceremony for new Permanent Member **Dr. José Manuel Sanjurjo Jul** took place during the **Plenary Session held on June 17** at the Auditorium of the Royal Academy of Engineering. Said session was chaired by the President of the Royal Academy of Engineering, Academician Aníbal R. Figueiras Vidal, the Chief of Staff of the Navy, Admiral Manuel Rebollo García, the Ministry of Defense's Managing Director of Armaments and Materiel, Lieutenant General José María García Sieiro, and the Vice-President and Secretary of the Royal Academy of Engineering, Academicians Pere Brunet Crosa and José Antonio Martín Pereda.

As part of his acceptance of the 25th Medal, Academician José Manuel Sanjurjo Jul read a speech titled *"Reflections on Technology and Defense in the 21st Century. The Digital Combatant"*.

In it, the new Member, Vice-Admiral and Director of Naval Military Construction for the Navy, provided an in-depth analysis of the spectacular technical advances that will be made in this century. In his own words: *"It's not a cliché to say that the world is changing! We are in the midst of the greatest scientific and technical transformation in the history of mankind, a transformation without precedents in terms of its scope, the nature of the changes and the speed with which they are taking place... Technology, the paradigm of this transformation, affects every sphere of human activity: it controls our health, our money, our communications, it educates our*

children, it provides our leisure, it has become essential to the development of our professional lives and it safeguards our defense".

He stated that the digital revolution will continue to drive huge technical changes over the course of this century and that the exponential growth in processing capacity will be the determining factor behind the extraordinary advances in science, technology and engineering. He then went on to analyze the impact of the digital revolution in the area of defense, indicating how the combatant's competitive edge in this century will rely on the use of technology across every spectrum. The only option combatants will have when facing the most varied and unpredictable scenarios will be offered by those technologies that ensure their survival and the success of the mission. But of all the technologies that will be incorporated into the armed forces throughout this century, only those that are capable of adding value to information and knowledge will play a key role because it is those that will gradually but radically change how war is waged.

Dr. Sanjurjo Jul then discussed the new concept of an integrated combat space and noted how technical advances will make inroads into a new concept, that of a virtual integrated combat space, which will emerge as a consequence of the broad use of digitalization and information technologies on the battlefield. This concept will grow ever more complex as technology advances and practical experience is gained on its operational use.

As for the platforms of the future (submarines, ships, aircraft and combat vehicles), the new Member predicted that the integrated combat space concept will require enlarging the volume that is controlled, minimizing the number of platforms. This will mean a shift to the use of unmanned vehicles versus manned ones. The concept of a host platform and associated unmanned robot platforms, in turn, will lead to the design of basic families of multivision and multimission ships and aircraft whose configuration depends on the scenario, with the addition and integration of various unmanned platforms to extend and complement their sensors and weapons. As for land-based platforms, the challenge will be to design multimission and multisenario vehicles capable of combining transportability, speed, armor and firepower. For individual combatants, the main technical objective will be to equip them with an exoskeleton that provides protection against a wide range of weapons while preserving their mobility and adapting to weather extremes.

This was followed by a discussion of technical frontiers in robotization. Academician José Manuel Sanjurjo stated that *"the robotization of the battlefield has already started. Robots will play an increasingly prominent role in the digital battle space. In coming decades, we will witness the appearance of new prototypes and new generations of already existing robots that will fight and operate alongside manned platforms. We will see vast advances in this area during this century"*. He continued by pointing out that the speed with which military robots are implemented will be conditioned by the advances achieved in artificial (synthetic) intelligence and the processing power that can be packaged into them. The evolution of the robots' "brain" power will most likely follow along the lines taken by nature. Bearing in mind the current estimates for the human brain's capacity, and assuming that Moore's Law continues to hold and the energy consumption problem is solved, the processing power and memory needed to emulate the human brain could

be available by 2030 or 2040, or before the second half of the century at any rate. It is very possible that with sufficient funding and a critical mass of engineers devoted to the project, a project to develop a walking android could be viable by the second half of this century.

As for energy sources, the new Member reported that the problem would not be pressing in the first half of the century, save for a sudden destabilization of oil-producing areas. But in preparing us for the inevitable, he expressed his belief that we should be fully committed to applying superconductivity to the development of new electric motors and generators, to hydrogen technologies, to fuel cells and to new generation batteries.

The Vice-Admiral declared that nowadays an army with the most advanced weapons systems cannot remain operational without support from a solid technical industrial base, a base that must encompass every source of knowledge, from universities to public and private research centers and industry. He noted how *"It is strategically essential to maintain an efficient national industrial base, equipped with advanced technology and economically viable, capable of designing and building future platforms and incorporating complex weapons systems into them"*.

The new Academician said that even in the digital battle space, combat, for someone at some time, will bring confusion, fear, anxiety and uncertainty. Above bits will stand courage, loyalty, discipline, camaraderie, a sense of honor and duty. It is these that will, at some point, mean the difference between victory and defeat.

Lastly, insofar as the ethical and moral dilemmas are concerned, he stated: *"Today, more than ever, we need to promote a sweeping and constant debate in society on the enormous ethical implications that will be posed by scientific and technological advances in this century. Where do we draw the line that we as humans must never cross?"* He conveyed his conviction that the Royal Academy of Engineering can contribute to the debate in those areas that concern it, and that its respected opinion could serve as a reference for society and for those institutions responsible for legislating such vital affairs. And in light of these final reflections, from which we infer a commitment to keeping Man at the center in an environment whose consequences are the exact opposite of dehumanizing the individual, Member Sanjurjo wondered if what we need today *"might be a neo-enlightenment that can harmonize technical progress and humanism"*.

The **Reply** was delivered by **Academician Ricardo Torrón Durán** who, after expressing his appreciation to the President and fellow Royal Academy members for having been named to respond to Vice-Admiral Sanjurjo, Ph.D. in Naval Weaponry, conveyed his satisfaction for the inclusion of such a prestigious and deserving new member from the world of Defense Engineering.

Before describing his own background and brilliant professional career, he devoted the first part of his speech to highlighting the history and vicissitudes of the Corps to which the new Member belongs, whose origins date back to 1717, and whose mission, tasks and activities fulfill that aspiration expressed by Jorge Juan that Spain have "a navy of learned men".

In the subsequent *laudatio*, he detailed the various assignments of José Manuel Sanjurjo, noting his stint as Program Chief for the marvelous F-100 frigates, pride of Spain's naval military engineering, and concluding with his current assignment as Director of Naval Construction, highlighting his responsibilities and involvement in projects to design, build and test new systems and to manage the navy's various weapons systems procurement programs and R&D projects.

He then went on to comment on the new Member's speech, noting how it provided an ample source of ideas for new lines of research, study and action on current and emerging technologies in the world of security and defense, which is directly and indirectly affected by the digital revolution in which we are so immersed. In particular, he underscored the current R&D program called the Combatant of the Future, which considers said combatant as a system of systems. He described in some detail the information and communications system developed by the company GMV, 2004 *Academiae Dilecta* award winner.

He finished his exposé by emphasizing Vice-Admiral Sanjurjo's outlook as evidenced during his speech, in which he reflects and explores, but does not predict, doing so with a global and systematic approach that relies on a bountiful use of the imagination. He concluded by congratulating the new Member on his admission to the Royal Academy of Engineering, where his experience, knowledge and concerns will help it play the important social role that befits it as an Institution.

4.2. PRIVATE SESSIONS

Eight Plenary Meetings were held in 2009, ten meetings of its Board of Directors, as well as various meetings of its different Sections and Commissions.

Among the more significant acts carried out by the Plenum of the Royal Academy of Engineering, we note the following:

January, 27

Opening of three Corresponding Member positions.

Presentation of modifications to voting procedures for Permanent and Corresponding Members positions.

Query regarding the appropriateness of having the Royal Academy of Engineering publish undergraduate-level textbooks.

March, 31

Vote to determine, from among the nominees presented at the plenary meeting of January 27, 2009, the recipient of the 2010 RAI Tribute.

Approval of the modifications to the voting procedures for Permanent and Corresponding Member positions presented at the plenary meeting of January 27, 2009.

Approval of the Account Statement for 2008, of the Balance Sheet as of December 31, 2008 and of the Activities and Financial Oversight Report.

Presentation of the document "*Relations between the Royal Academy of Engineering and the Authors of its Publications*".

Approval of the 2008 International Relations Report.

April, 21

Presentation of calendar of activities in the third quarter of 2009.

May, 26

Presentation and defense of candidatures nominated to occupy the three Permanent Member Positions corresponding to medal numbers XXV, XXX and XXXIX, convened by the Resolution of January 8, 2009 (BOE 27 of 31/01/2009). Recommendations of the Candidature Commission.

Presentation and defense of candidatures presented to occupy the three Corresponding Member Positions, convened by the Resolution of February 2, 2009 (BOE 51 of 28/02/2009). Recommendations of the Candidature Commission.

Approval of the document *"Relations between the Royal Academy of Engineering and the Authors of its Publications"*.

June, 23

Voting for candidates to fill three Permanent Member Positions, corresponding to medal numbers XXV, XXX and XXXIX, convened by the Resolution of January 8, 2009 (BOE 27 of 31/01/2009).

Elected were Dr. Ramón Agustí Comes, Dr. Manuel Hita Romero and Dr. José Manuel Sanjurjo Jul.

Voting for candidates to fill three Corresponding Member Positions, convened by the Resolution of February 2, 2009 (BOE 51 of 28/02/2009).

Elected were Dr. Andrés Tierno and Dr. Baltasar Mena.

Proposal and approval to convene four Permanent Member Positions.

September, 22

Report on International Relations and agreement to hold the annual Euro-CASE conference in Spain in 2011.

Proposal to establish a cooperative agreement between Spain's Institute of Engineering and the Royal Academy of Engineering.

Draft of activities calendar for the first half of 2010.

Call for decision on the Royal Academy of Engineering's stance regarding the historical setting of Numancia.

October, 27

Presentation of and debate on the *"Proposed Statutes of the Royal Academy of Engineering"*.

2009 Academiae Dilecta Award.

Proposal to modify the regulations for granting the Academiae Dilecta Award.

Approval of the Royal Academy of Engineering's meeting agenda for 2010.

November, 23

First round for presenting amendments to the *"Proposed Statutes of the Royal Academy of Engineering"*.

Report on conclusion of work to refurbish the headquarters building.

Presentation and, if appropriate, approval of budget for FY 2010.

Proposal for Agreement of Cooperation between Spain's Institute of Engineering and the Royal Academy of Engineering.

Presentation of plan for Euro-CASE.

All of these acts were the result of prior deliberations held with members of the Board of Directors at their monthly meetings, as well as of recommendations by the corresponding Sections and Commissions. Some of the most representative discussions concerning the debates and decisions of these bodies involved the guidelines for conducting the election of new Permanent Members, the characteristics of the Royal Academy of Engineering Tributes, how this Royal Academy can more effectively attain its founding objectives, an analysis of the Declarations by the international engineering academies to which this Academy belongs, the decision to commission studies on engineering topics of interest to society and the reform of its statutes. The remaining meetings focused on matters related to various areas of competence and on drafting the associated documentation.

4.3. REGULAR PUBLIC SESSIONS

On April 20, 2009, the Royal Academy of Engineering lost one of its most esteemed members, Academician José Luis López Ruiz, holder of Medal number LIII. His unique spirit and optimistic outlook on life will be remembered always by those who were privileged and lucky enough to have shared with him countless public and private acts. On June 23, the Academy held a memorial event to recount the multiple facets of his productive life. Taking part in the event were Academicians Amable Liñán and Antonio Barrero, Mr. Manuel Abejón, Assistant Director of AIRBUS Dr. Manuel Hita, Director of Infrastructure at MALOG/DFR Mr. Enrique Rivera from the Headquarters of the Air Force, and Mr. Manuel Mulero, Director of the Radiofrequency and Electronic Technologies Group at INTA.

This session was continued at another event held in 2009, with the launch of an activity that we hope will continue in the future. The first public session was held on the morning of the day that saw the Inaugural session of the 2009 Academic Year. The purpose of this public session was to analyze the topic that is of the utmost concern not only in our country but throughout the world: the economic situation. Academician Juan-Miguel Villar Mir gave a conference titled *"The Economic Crisis, Its Origins and Characteristics. The Way Forward"*, this session being one with the strongest impact, both in terms of attendance and media coverage, of all those given by the Academy.

Also in 2009, Corresponding Members Prof. Dr. Zdenek Bazant, Prof. Dr. Christopher M. Bishop and Prof. Dr. Francisco José Sánchez Sesna received their medals, after which they read their acceptance speeches. Prof. Bazant lectured on *"Size and Risk: Scaling of Quasibrittle Structure Strength and Lifetime Based on Atomistic Fracture Mechanics"*, Prof. Dr. Bishop did so on *"The Future of Learning Machines"*, and Prof. Dr. Sánchez Sesma on *"Diffuse Fields in Seismic Engineering and Seismology: Theory and Applications"*.

4.4. DECLARATIONS

The first dealt with the closing of the Garoña Nuclear Power Plant. It was believed that this topic, which was also covered during one of the "RAI Tuesdays", was worthy of a more concrete opinion that could be disseminated to the media. On the initiative of Academician César Dopazo, a Document was drafted that, once debated, was instantly endorsed by a significant number of Members and submitted for dissemination.

The second was a Declaration, signed by a large majority of RAI Members, concerning the cutbacks in R&D spending in the 2010 budget. The Document aroused a great deal of interest and was covered by various media outlets.

4.5. PUBLICATIONS

In terms of the Publications issued over the course of 2009, the most significant from among those carried out as part of its statutory commitments were the following:

Induction Speeches:

Academician José Manuel Sanjurjo Jul, *"Reflections on Technology and Defense in the 21st Century. The Digital Combatant"*. Replied to by Academician Ricardo Torrón Durán.

Opening Speech for 2009:

Academician Elías Muñoz Merino, *"New Semiconductors, New Dimensions, New Lights. Illumination by Chips in the 21st Century"*.

The Academy also published its Activities Report for 2008, as well as a report on the Act in memory of Academician José Luis López Ruiz, celebrated in June 2009.

Likewise, as part of a commitment promised to the previous owners of the Royal Academy of Engineering's current headquarters, the Academy published *"The Headquarters of the Royal Academy of Engineering. History of the Palace of the Marquis of Villafranca"*, which was spearheaded by the previous President of this Royal Academy, Academician Enrique Alarcón Álvarez. Under the guidance of Academician Josefina Gómez Mendoza, a team of researchers carried out the complex task of unearthing the secrets that 10 Don Pedro Street, today the headquarters of the Royal Academy of Engineering, had held hidden for so many years. Its pages will serve to welcome visitors to the building and display the history the Royal Academy of Engineering wants to inherit and take into the 21st century.

Equally noteworthy is the publication resulting from a study conducted by a large number of Royal Academy of Engineering members, in collaboration with experts in different fields, and born out of an initiative by Academician José Ignacio Pérez Arriaga, the purpose of which was to combine two of the most important technologies to the cultural and economic development of any country, that of Transportation and Information and Communications. The result was the volume titled *"The Contribution of ICTs to Sustainability in Transport in Spain"*, which, after its presentation, was honored with the Madrid government's Mobility Foundation "Muévete Verde" (Go Green) Award. As noted during the proceedings, the award was bestowed for "its analysis of technology's contribution to sustainability in transport in Spain".

Finally, the book associated with the RAI Tribute to *"Las Médulas"* was also published in 2009. On this occasion, it was divided into two volumes, one with the unabridged texts of the conferences given by some of the participants, and another with details on the events held, the involvement of all the figures taking part in them and the coverage given to them by the media.

Lastly, as in previous years, the Academy issued DVDs with the contents of all the public sessions held during 2009.

4.6. AWARDS

4.6.1. "Academiae Dilecta" Award

The Academy bestowed its Award in 2009 to the **APIA XXI Group** for grounding its corporate activity on the technical quality of its staff. Since its inception in 1987, APIA XXI, incubated at the University of Cantabria, has distinguished itself by developing a type of engineering that is at the service of society. It has done so through unique infrastructure projects and by diversifying its business base.

For the first time in the history of the award, the presentation did not take place at the RAI headquarters. The Royal Academy of Engineering wanted for an autonomous community that had had no previous contact with academy activities to be exposed to one, so it organized a Plenary Session in Santander, with the award ceremony being held in the Palacio de la Magdalena Auditorium. The event was attended by Mr. Miguel Ángel Revilla Roiz, the Region's President, by Mr. Iñigo de la Serna Hernáiz, the Mayor of Santander and by Excmo. Sr. D. Federico Gutiérrez-Solana Salcedo, the Rector of the University of Cantabria. The President of the APIA XXI Group (Mr. Marcos Jesús Pantaleón Prieto) accepted the award on behalf of his organization.

4.7. LAISED WITH OTHER INSTITUTIONS

Relations in 2009 continued along the same lines as in preceding years. Previous Annual Reports highlighted the Royal Academy of Engineering's outside involvement through its participation in CAETS and Euro-CASE, institutions that bring together the engineering academies of the most advanced countries, and the RAI's relationship with the engineering academies of China and Latin American countries. These activities continued essentially unchanged in the last year. In the case of Euro-CASE, the Royal Academy of Engineering's representatives were the same as last year's, namely, Academicians Manuel Márquez Balín and Pere Brunet Crosa, the latter of whom is also the representative to CAETS.

The biannual CAETS Congress was held in Calgary in July 2009. The theme for the meeting was *"Our Heritage of Natural Resources: Management and Sustainability"*, and involved energy, forest, water and mineral resources. The Royal Academy of Engineering took part in two presentations, one by Academician José Ignacio Pérez Arriaga titled *"Regulatory Instruments for Deployment of Clean Energy Technologies"*, and the other by Academician José Alberto Pardos Carrión, presented by Academician Pere Brunet Crosa, on *"Forestry in Spain: Sustainable Management and Protection"*. A new CAETS Statement was issued on *"Global Natural Resources - Management and Sustainability"*, which is awaiting approval by the CAETS member academies.

As for Euro-CASE, the November meeting, held in Stockholm, featured the two already familiar parts: an annual conference and the meeting of the Euro-CASE board. One of the topics that aroused the most attention was the interest shown by children and teenagers in the studies on *"Science, Technology, Engineering and Mathematics"*. This is because such attention is notably lacking in developed countries but high in developing countries. The delegations present concurred that we are on the cusp of a new age in which engineers must once again play a prominent role in decision-making processes. Engineers, as noted at the meeting, should lead the process of changing our mentalities as we look to the future.

In terms of our relations with engineering academies in Latin American countries, the most significant event was the annual meeting that has been held on a regular basis since the first such meeting in Madrid. On this occasion, the meeting took place in Lisbon on September 24 and 25 and resulted in a *"Declaration on Teaching in Engineering"*, which must be ratified by all member academies.

In the past year, the Royal Academy of Engineering welcomed delegations from the Mexican Engineering Academy and hosted the President of the Uruguayan Academy of Engineering. In both cases, issues involving collaboration between the corresponding academies were discussed at meetings with members of the Board of Directors.

The President of the National Academy of Engineering (United States) and former President of MIT, Prof. Charles Vest, also visited our Academy's headquarters.

4.8. SPANISH LANGUAGE DICTIONARY OF TERMS RELATIVE TO ENGINEERING

Of note is the establishment of the structure necessary to fulfill one of the missions that, since its creation, was assigned to the Academy by the legislative body. Article III of its founding Statutes states that one of the Academy's purposes is to *"Write and maintain updated a Spanish-language lexicon of engineering terms"*.

The task of preparing the materials necessary to draft the **Spanish Dictionary of Engineering** proceeded on course in 2009, with the proposal of topics for the corpus, a manual redaction of lists, collation of proposed topics from a corpus of reference works and, finally, sending of forms for review to the specialists in every field to be covered by the dictionary. The fields being worked on are as follows: Aerospace (1000), Automation and Robotics (1000), Naval Engineering (2000), Mechanics (2000), Land Vehicles (1000), Ground Transportation and Infrastructure (2000), Agronomy (2500), Forestry (2500), Materials (3000), Construction (2000), Civil Engineering (2000), Textile and Paper (1000), Computer Science (2000), Telecommunications (2000), Platforms (500), Systems (1000), Chemistry (3000), Mining (2000), Mineral and Energy Resources (1000), Energy Management (1000), Prostheses and Implants (1000), Modeling and Simulation (1000), Instrumentation and Equipment (1000), Biology and Chemistry (1000). The figure in parentheses is the approximate number of entries each topic will include.

4.9. OTHER ACTIVITIES

The main objective behind the event in Cantabria was fulfilled with the visit of Academy members to the head office of the APIA XXI Group, to the Solvay company in Torrelavega and to ENSA (a nuclear equipment company) in Maliaño. On every visit

the contact between members of the Academy and company executives resulted in a dialogue that promoted a common understanding between the parties involved.

The Royal Academy of Engineering website, designed in 2007, provides updated information on all academy activities, as well as on its members. The site features both public and private access areas.

4.10. ACTIVITIES FOR WHICH OUTSIDE SUPPORT WAS RECEIVED

In an effort to comply with Sections a) and b) of Art. 3 of its Statutes, the Academy, thanks to the support and financial backing of the "Pro Rebus Academiae" Foundation, was able to engage in a series of public activities that enabled the public to catch a glimpse of the inner workings of the Academy.

And as part of its duty to society, the Royal Academy of Engineering continued to keep a high profile in society through its usual "RAI Tuesdays" event. These public sessions were used to analyze some of the most relevant issues of the day. The vast majority of these sessions were endorsed by the "Pro Rebus Academiae" Foundation(*)

As expected, energy was one of the main topics at these sessions, with three being devoted to it. The first, "**Energy Efficiency**", analyzed the possibilities of reducing energy use in three key industries: electricity generation, transportation and construction.

In the second, "**Energy Mix**", an analysis was made of coal, hydrocarbons, nuclear energy and renewable energies from the standpoints of vulnerability, cost and the environment.

Finally, the third session introduced one of the most controversial topics of recent years: "**Prolonging the Life of Nuclear Power Plants?**" Four experts analyzed the possibility of a decision to extend the life of the Garoña nuclear power plant in light of the current energy situation, of the plant's situation and of that in surrounding countries.

And if energy is a problem that affects us everyone, then no less a concern is the world around us. That is why three other sessions were devoted to analyzing three different aspects of the settings that surround us: the coasts, rural areas and our artistic heritage.

The first, titled "**The Future of Spain's Coasts**", provided a short- and medium-term analysis of our coasts in light of the modifications to relevant legislation and their physical variability as a result of global warming.

The second, "**Rural Areas and a Sustainable Economy**", considered rural planning, the technical management of forests and obtaining biomass to generate electricity.

Finally, the third session in this group focused on "**Historical Heritage**". On this occasion, the topics proposed were covered over an entire day, with morning and afternoon sessions, and was organized by our Academy on the occasion of its 15 anniversary. Three interwoven cases were presented from the perspectives of three different geographical settings - Italy, China and Spain - comprising everything from prehistoric caves to Romanesque and Baroque structures.

(*) The details on the participants and on the titles of their presentations for each of the sessions are given in 5. "Pro Rebus Academiae" Foundation.

Finally, three other sessions were devoted to three sectors involving what the media has come to know as New Technologies.

The first, *"The DTV Landscape within a Year of the Analog Switch-off"*, considered the full transition to DTV, to take place before April 3, 2010.

While the ICTs are the heart of the information superhighway, the Royal Academy of Engineering would be remiss to ignore the "other" highways. The transportation infrastructure for tomorrow's society was the topic of *"Intelligent Infrastructure: The Highways of the Future"*.

Finally, if the 20 Century was, in part, the century of space, the 21 will surely continue being so. The Royal Academy of Engineering held a session on *"Planetary Protection"* to discuss possible collisions and impacts of objects from outer space with the Earth's surface.

On a different topic, and on the occasion of the anniversary of the *"Expansion Plan for the City of Barcelona"*, developed by Ildelfonso Cerdá and approved in June of 1859, the Academy held a Tribute Session entitled *"Remembering Ildelfonso Cerdá"*, at which leading experts on his work spoke about the most significant aspects of his personality.

4.11. INSTITUTIONAL RELATIONSHIPS

4.11.1. Relationships with American Engineering Academies

The 3rd Meeting with Latin American Engineering Academies took place on September 24 and 25 in Lisbon, and was attended by the President and Vice-President of the Royal Academy of Engineering. The most significant outcome was a *"Declaration on the Teaching of Engineering"*, to be ratified by all member academies and which, although of a very general nature, clearly lays out the way forward in this arena.

The electronic portals of all the academies, as well as their press departments, continue to provide, through the corresponding links, information on the activities in which each is involved.

4.12. MEMBER ACTIVITIES

The presence of the Royal Academy of Engineering in the mass media saw a notable increase in 2009. Most of the activities and public sessions held at its headquarters were covered by a significant number of media outlets, both written and digital. Likewise, on the occasion of some of these public sessions, the Academy Members involved were interviewed by different radio stations and, in some cases, interviews with these members were printed in national and specialized publications. News of these events was given regularly at Plenary and Board of Directors meetings and was recorded in the corresponding minutes.

4.13. AWARDS AND DISTINCTIONS RECEIVED BY MEMBERS

Academician Enrique Castillo Ron was named Permanent Member of the Royal Academy of Exact, Physical and Natural Sciences.

Academician Avelino Corma Canos was conferred the title of Doctor "Honoris Causa" by the Jaime I University in Castellón.

Academician Manuel Doblaré Castellano received the "*Aragón Investiga*" [Aragón Researches] Award from the Autonomous Community of Aragón.

Academician Manuel Elices Calafat was bestowed the "*Allan B. Dove Memorial Medal*". He also received the "2009 Outstanding Civil Engineer Award", granted by the Madrid branch of the Association of Civil Engineers.

Academician Luis Lada Díaz was awarded the "*Vodafone*" Prize in recognition of his professional achievements.

Academician Miguel Ángel Lagunas Hernández was named Corresponding Member of the Academy of Rhineland-Westphalia.

Academician José Antonio Martín Pereda was conferred the title of Doctor "Honoris Causa" by the Polytechnic University of Cataluña.

Academician Luis Alberto Petit Herrera was also honored at the same event as a graduate of its first graduating class.

Academician Rafael Portaencasa Baeza was named honorary Forestry Engineer.

Academician Mateo Valero Cortés was conferred the title of Doctor "Honoris Causa" by the University of Las Palmas.

Academician María Vallet Regí received the "*Leonardo Torres Quevedo*" Prize for Engineering.

Academician Juan-Miguel Villar Mir received the 6th annual "*Diálogo*" Prize, awarded by the French-Spanish Friendship Society, as well as an award from the EOI Business School in celebration of the 50th anniversary of its alumni association.

5

“Pro Rebus Academiae”
Foundation

5. "PRO REBUS ACADEMIAE" FOUNDATION

The "Pro Rebus Academiae" Foundation was created by virtue of the Founding Charter of May 9, 2005 and recorded in the Ministry for Education and Science's Foundations Registry by Order number 827 dated July 1, 2005.

The goal of the Foundation is to collaborate with the Royal Academy of Engineering in promoting and developing all those activities which help to encourage and to spread technology, especially as it applies to the world of business and to society at large. The Foundation's objectives, therefore, include the following:

to support, insofar as it is able, all those activities legally constituting the objectives or goals of the Royal Academy of Engineering and to cooperate in their development

to help broaden the activities of the Royal Academy of Engineering

to collaborate in improving and developing engineering.

The Foundation's financial support enables the Royal Academy of Engineering to organize those activities which are in keeping with its Statutes. As previously indicated, the pursuits engaged in by this Academy and which were made possible by the Foundation's support focused on public sessions held throughout 2009. The goal of these sessions, as on previous occasions, was to showcase projects and to publicize those subjects that are particular relevant and topical to Engineering.

The Foundation is located in the headquarters of the Royal Academy of Engineering.

5.1. THE FOUNDATION'S BOARD

The following Members sit on the Foundation's Board:

President: Dr. Aníbal R. Figueiras Vidal, President of the Royal Academy of Engineering

VicePresident: Dr. Jaime Torroja Menéndez. Academician of the Royal Academy of Engineering

Miembros:

Official Association of Industrial Engineers of Madrid, represented by Mr. Jesús Rodríguez Cortezo.

Endesa, represented by Mr. Andrea Brentan.

IDOM, represented by Mr. Rafael López González.

OHL, represented by Dr. Juan-Miguel Villar Mir.

Politechnic University of Madrid, represented by Dr. Javier Uceda Antolín.

Mr. Joaquim Coello Brufau, Academician of the Royal Academy of Engineering.

Mr. Luis Lada Díaz. Academician of the Royal Academy of Engineering.

Mr. Javier Rui-Wamba Martija, Academician of the Royal Academy of Engineering.

Secretary: Dr. Luis Alberto Petit Herrera, Senior Member and Managing Director of the Royal Academy of Engineering.

The Board held all required meetings, taking those measures necessary to foster many of the Academy's activities.

5.2. SPONSORS

Abengoa	ƒ2j2
Acciona	Fundación ACS (Vías y Construcciones)
Asociación Mutualista de Ingeniería Civil (AMIC)	Fundación Iberdrola
Applus Corp	Fundación Jorge Juan
Caja Ingenieros	Fundación Universidade de Vigo
Colegio Nacional de Ingenieros ICAI	Grupo Apia XXI
Colegio Oficial de Ingenieros Aeronáuticos	Grupo Comsa
Colegio Oficial de Ingenieros de Caminos, Canales y Puertos	Grupo Tecnológico e Industrial GMV
Colegio Oficial de Ingenieros Aeronáuticos	Grupo Villar Mir
Colegio Oficial de Ingenieros Industriales de Madrid	Iberia
Colegio Oficial de Ingenieros Navales y Oceánicos	IBM
Colegio Oficial de Ingenieros de Telecomunicación	IDOM
Colegio Oficial de Ingenieros Técnicos de Telecomunicación	INTA
Compañía Logística de Hidrocarburos	OHL
Consejo General de Colegios Oficiales de Peritos e Ingenieros Técnicos Industriales	Repsol YPF
Consejo Superior de Colegios de Ingenieros de Minas	Sener, Ingeniería y Sistemas
EADS/CASA	Telefónica
Endesa	Talgo
Ericsson	Unión Fenosa
Esteyco	Universidad Carlos III de Madrid
	Universidad Politécnica de Cartagena
	Universidad Politécnica de Cataluña
	Universidad Politécnica de Madrid
	Universidad de Zaragoza

The group of sponsoring organizations meets periodically with members of the trust, which results in exchanges of information and in the formulation of proposals for new Academy activities.

Members display their interest in developing and improving engineering and take part in the debates organized by the Royal Academy of Engineering, which bring together the business, academic and professional worlds.

5.3. ACTIVITIES SUPPORTED BY THE FOUNDATION

The "Pro Rebus Academiae" Foundation, in keeping with its founding objectives, backed a significant number of activities undertaken by the Royal Academy of Engineering throughout 2009. The details of these activities are shown below and are consistent with the "Program of Activities" as approved by the Royal Academy of Engineering and the Foundation.

All of the activities listed below were inaugurated by the President of the Foundation, Dr. Aníbal R. Figueiras Vidal.

All of the presentations made at the Sessions mentioned were followed by a debate-colloquium.

The content of each of the Sessions was also made available on widely distributed DVDs.

5.3.1. RAI Tuesdays

These sessions were carried out either as conferences or as round-tables on issues of particular technical or business importance.

The programs for the various sessions held are listed below:

February, 27

"ENERGY EFFICIENCY"

Opening:

Dr. Aníbal R. Figueiras Vidal, President of Royal Academy of Engineering

Session presented by:

Dr. José Luis Díaz Fernández, Academician of the Royal Academy of Engineering

Mr. José Arrojo del Amo, Director of Technology and Innovation at Endesa

Speakers:

"Technologies for Optimizing Energy Efficiency at Thermal Power Plants"

Mr. José Eduardo Santos Martínez, Vice-President for Engineering and R&D at Endesa

"Energy Efficiency in the Transportation Industry"

Mr. Eduardo Romero Palazón, Director of Technology, Refining and Marketing of LGP at Repsol

"Energy Efficiency in Construction"

Ms. María Rosario Heras Celemín, Head of the Construction Energy Efficiency Research Unit at CIEMAT

March, 4

"ENERGY MIX"

Opening:

Dr. Aníbal R. Figueiras Vidal, President of Royal Academy of Engineering

Session presented by:

Dr. José Luis Díaz Fernández, Academician of the Royal Academy of Engineering

Mr. Jesús Rodríguez Cortezo, Dean of the Association of Industrial Engineers of Madrid

Speakers:

"Coal as a Fuel Source"

Mr. Santiago Sabugal Segura, President of the Platform for the Capture and Sequestration of CO₂

"Hydrocarbons (Petroleum and Gas)"

Mr. Ignacio Egea Krauel, Executive Director of Trading and Transportation at Repsol's Downstream Department

"Nuclear Energy as an Energy Source"

Mr. José Emeterio Gutiérrez Elso, President of Spain's Nuclear Society

"Renewable Energy as an Energy Source"

Mr. José María González Vélez, President of the Association of Renewable Energy Producers

Closing recommendations:

Mr. Pedro Rivero Torre, President of UNESA

June, 9

"PROLONGING THE LIFE OF NUCLEAR POWER PLANTS?"

Opening:

Dr. Aníbal R. Figueiras Vidal, President of Royal Academy of Engineering

Session presented by:

Dr. José Luis Díaz Fernández, Academician of the Royal Academy of Engineering

Dr. Francisco Beltrán, PhD in Civil Engineering, Lead Engineer at IDOM

Speakers:

"The Cost of Nuclear Generated Electricity"

Mr. Carlos Sallé, Director of Regulation at IBERDROLA

"Safeguarding the Investment and Security of Nuclear Power Plants"

Mr. René Fernández, Director of Engineering at NUCLENOR

"Prolonging the Life of Nuclear Power Plants"

Dr. Francisco Beltrán, Lead Engineer at IDOM

"The Closed Cycle of Nuclear Fuel"

Ms. Carolina Almert, Director of the Nuclear Engineering Department at UPM

June, 23

"PLANETARY PROTECTION"

Opening:

Dr. Aníbal R. Figueiras Vidal, President of Royal Academy of Engineering

Session presented by:

Dr. Jaime Torroja Menéndez, Academician of the Royal Academy of Engineering

Speakers:

"Bodies in Near-Earth Orbits"

Dr. Álvaro Jiménez Cañete, PhD in Physical Sciences, Director of the Astrobiology Center at INTA

"Strategies for Avoiding or Mitigating Collisions"

Dr. Álvaro Azcárraga Arana, PhD in Aeronautical Engineering, Consultant at SENER

September, 8

"THE DTV LANDSCAPE WITHIN A YEAR OF THE ANALOG SWITCH-OFF"

Opening:

Dr. Aníbal R. Figueiras Vidal, President of Royal Academy of Engineering

Presentation of the Session:

Mr. Francisco Mellado García, Dean-President of the Association of Telecommunications Engineers

Speakers:

"From Analog Switch-off to Digital Turn-on"

Mr. José Antonio Quintela Gonçalves, Director of the National Office for the Transition to DTV

"The Implementation of DTV and the Deployment Problem"

Mr. Josep Ventosa Freixedes, Director of Business Strategy and Development at ABERTIS TELECOM

"Broadcasters on the Digital Stage: New Services and Business Models"

Ms. Carmen Rodríguez Marín, Director of Regulatory Affairs and Institutional Relations at ANTENA 3

Closing:

Mr. Bernardo Lorenzo Almendros, General Manager of Telecommunications of the Ministry of Industry, Tourism and Commerce's State Secretariat for Telecommunications and the Information Society

November, 10

"INTELLIGENT INFRASTRUCTURE: THE HIGHWAYS OF THE FUTURE"

Opening:

Dr. Aníbal R. Figueiras Vidal, President of Royal Academy of Engineering

Presentation of the Session:

Dr. Enrique Alarcón Álvarez, Academician of the Royal Academy of Engineering

Mr. Manuel Villén Naranjo, Director of Innovation and Development at the OHL Group

Speakers:

"Oasis Project: Operating Safe, Smart and Sustainable Highways"

Mr. Federico García-Linares Fontes, Director of R&D at OHL Concessions and Coordinator of the OASIS Project

"Advanced Public Systems. A Practical Application of the Bicentennial Viaduct in Mexico City"

Mr. Alonso Bautista Trovo, Director Of Toll Systems at INDRA

"GNSS and Pay-Per-Use Infrastructures"

Ms. Sara Gutiérrez Lanza, Coordinator of the Engineering and Navigation Applications Division at GMV. Director of the GINA Project (GNSS for Innovative Road Applications)

December, 15

"RURAL AREAS AND A SUSTAINABLE ECONOMY"

Opening:

Dr. Pere Brunet Crosa, VicePresident of the Royal Academy of Engineering

Presentation of the Session:

Ms. Paloma López-Izquierdo Botín, Vice-President for Equality and Modernization, Office for the Sustainable Development of Rural Areas of the Ministry of the Environment and Rural and Marine Affairs

Dr. José Alberto Pardos Carrión, Academician of the Royal Academy of Engineering

Speakers:

"The Rural Landscape and Planning"

Mr. Rafael Escribano Bombín, Professor in the Planning and Projects Department at the Polytechnic University of Madrid

"Use of Forests in Rural Areas"

Mr. Álvaro Picardo Nieto, Advisor for the Environmental Office of the Board of Castilla y León

"Agro-Energy, the Engine of Rural Development"

Mr. Jesús Fernández González, Professor in the Department of Vegetal Production, Botany and Vegetal Protection at the Polytechnic University of Madrid

5.3.2. RAI Conferences

These sessions require a more in-depth analysis since they cover various aspects of a single subject.

April, 21

"HISTORICAL HERITAGE"

Morning session: Perspectives on Preserving Our Historical Heritage

Opening:

Dr. Aníbal R. Figueiras Vidal, President of the Royal Academy of Engineering

Presentation of the Session

Mr. Francisco Menor, Director of the ACS Foundation

Mr. Xosé Luis García-Canido, Director of Projects, SECC

Speakers:

"Historical Heritage and Its Preservation in Italy"

Ms. Clara Baracchini, Soprintendenza peri I Patrimonio, Pisa

"Preservation, Study and Museological Preparation of Romanesque Wall Paintings in Spain"

Mr. Manuel Castiñeiras, MNAC, Barcelona

"A Case Study in Restoring Our Heritage: Supreme Court Building in Madrid"

Mr. José Luis Cedillo, Architect

Afternoon session: The New Technologies in Preserving Our Historical Heritage

Presentation of the Session:

Dr. Pere Brunet Crosa, VicePresident of the Royal Academy of Engineering

Speakers:

"Acquisition, Representation and Digital Archiving of Historical Monuments"

Mr. Roberto Scopigno, CNR, Pisa

"The Preservation of Historical Heritage and of Caves in China"

Mr. Dongming Lu, Zhejiang University

"Microbiology and Preserving Visitable Caves"

Mr. Cesáreo Sáiz, CSIC, Seville

September, 22

"THE FUTURE OF SPAIN'S COASTS"

Opening:

Dr. Aníbal R. Figueiras Vidal, President of the Royal Academy of Engineering

Presentation of the Session:

Dr. Miguel Ángel Losada Rodríguez, Academician of the Royal Academy of Engineering

Speakers:

"Climate Variability, Littoral Processes and the Evolution of Coasts. To Protect, Relocate or Restore?"

Dr. Miguel Ángel Losada Rodríguez, Professor of Hydraulic Engineering at the University of Granada

"The Coastal Law of 1988: The Reasons, Requirements and Balance of the Law. Modify, Reinforce or Demand?"

Mr. Fernando Palao Taboada, President of INECO

"Coastal Management According to Spain's Constitution, the Coastal Law, the Statutes of Autonomy and Other Laws. Medium- and Long-Term Consequences?"

Mr. Ángel Menéndez-Rexach, Professor of Administrative Law at the Autonomous University of Madrid

5.3.3. RAI Tributes

These are public events held as tributes intended to recognize and socially publicize professional engineering accomplishments by eulogizing the figure being honoured.

October, 13

"REMEMBERING ILDEFONSO CERDÁ"

Opening:

Dr. Aníbal R. Figueiras Vidal, President of the Royal Academy of Engineering

Speakers:

"The Cerdá Years"

Mr. Javier Muñoz Álvarez, Civil Engineer

"The Plaza de las Glorias: the Heart of the Expansion. A Brief Visual History"

Mr. Javier Rui-Wamba Martija, Academician of the Royal Academy of Engineering

"The Internal Reform of Cities"

Dr. Josefina Gómez Mendoza, Academician of the Royal Academy of Engineering

"Beyond the Grid"

Dr. Fernando de Terán Troyano, Academician of the San Fernando Royal Academy of Fine Arts

6

Headquarters

6. HEADQUARTERS

This point is related to Clause V of the Terms and Conditions that form part of the Ministerial Order dated 31/05/2005 from the Ministry of Education and Science, through which the Office of the Undersecretary of Economy and Taxation placed an encumbrance on the Royal Academy of Engineering's use of the building at 10 Don Pedro Street.

In 2009, the Academy concluded the necessary work to refurbish its headquarters. The Ministry of Education and Science authorized the project on January 25, 2007. The Royal Academy of Engineering funded the work after mobilizing the necessary funds with a contribution made by the Ministry of Development from its 1% cultural program, as well as by some of the member companies of the "Pro Rebus Academiae" Foundation, in particular the Villar Mir Group, Telefónica and Repsol YPF. The purpose of the work was not only to refurbish the building's offices, but to return all the artistic elements to their original state, making it possible for the history that took place in its rooms to be seen through 21st century eyes.

As a complement to the above task, in 2008 Academician Enrique Alarcón Álvarez oversaw the editing of a book that compiled the history of the building and presented its evolution through the years. The work was publicly debuted on May 26, 2009, and summarizes the hurdles that had to be faced by the second Board of Directors of the Royal Academy of Engineering before being granted the use of the building. It also presents a rigorous historical study of the building's construction. This study was carried out in 2008 by three students of Academician Josefina Gómez Mendoza: Ángela García Carballo, Gonzalo Madrazo García de Lomana and Juan Francisco Mato Miguel. It is comprised of four chapters: "The Pre-19th Century Urban Setting of the Palace of the Marquis of Villafranca", "Construction and Consolidation of the Palace of the Marquis of Villafranca", "New Nobiliary Stage in the Palace on Don Pedro Street" and "Disintegration of the Property".

The history of the Headquarters shows the progressive urbanization of the location starting from its medieval wall, to its selection by the Houses of Infantado and Villafranca and to the evolution of the urban layout up to the 19th century. The palace, built between 1717 and 1734 under the direction of architect Francisco Ruiz, coincided with the progressive relocation to Madrid of the Álvarez de Toledo, this House reaching its highest splendor after joining the Houses of Medina Sidonia and Alba through the marriage of the 11 Marquis, José Álvarez de Toledo, and Cateyana de Silva. After this stage, the 19th century saw the rise of a new noble class based on farming and industrial successes and, in particular, those of Pérez de Seoane and Roca de Togores, Barons of Riudoms, elevated to Duke of Pinohermose by Charles IV in 1790 and in 1794 to Grandee of Spain. This family acquired the palace in 1872 and was responsible for the stylistic arrangement that survives to this day, a prominent role in which was played by architect Arturo Mérida, and whose primitive splendor has been returned by the current restoration. The 20th century saw the progressive deterioration of the property and the sale of its noble section to the "Puerta de Moros" restaurant, which held it until 1989, at which time the "Olive Oil Council" transformed it into a bureaucratic services center until May 12th, 2005, when the Royal Academy of Engineering moved into the building.

7

Academy Staff

7. ACADEMY STAFF

Dr. Luis Alberto Petit Herrera PhD

Senior Member of the Academy.
Named Managing Director in February 2004.

Mrs. María Flora Herrerros Hidalgo

Deputy Managing Director.
Industrial Engineer. (U.P. Comillas). Hired in September 2007.

Mrs. María Elena Martínez Rey

Head of Administrative Services.
Law graduate. (U.P. Comillas). Hired in April 2000.

SECRETARIAT

Mrs. Ana Balmaseda Llorens

Secretary. Hired in April 2003.

Mrs. María del Mar Leyva Leal

Secretary. Hired in January 2006.

Mrs. Ana Isabel Pérez Vicent

Secretary. Hired in August 2007.

Mrs. María José Santos García

Secretary. Hired in June 2006.

PRESS OFFICE

Mrs. Paloma Larena Larena

Journalist graduate. Hired in September 2007.

WEBMASTER

Mr. Francisco Javier Grande Ruiz

Student Intern. Hired since October 2008 till June 2009.

D. Daniel Cardeña Pulido

Student Intern. Hired in October 2009.

8

Appendix:
the founding, goals and
history of the Royal
Academy of Engineering

8. APPENDIX

THE FOUNDING, GOALS AND HISTORY OF THE ROYAL ACADEMY OF ENGINEERING.

8.1 FOUNDING

The Academy of Engineering was chartered by Royal Decree 859/1994, dated 29 April, as a Public Law Corporation with its own legal status and governed by its Statutes and Internal Regulations.

On July 14, 2003 H.M. King Juan Carlos I deemed it fitting to grant the title of Royal to the Academy of Engineering.

Royal Charter

ROYAL DECREE 859/1994, dated April 29, created the Academy of Engineering.

Ministry of Education and Science

Engineering constitutes a field of human endeavor with a decisive influence on society's well-being, and its contributions to the proper and correct use of technology are highly significant.

In our country, the last few decades have seen a gradual increase in the number of institutions dedicated to technical education and research, as well as significant developments in engineering which have highlighted the need to create an institution that is most capable of advising and guiding the State and society on questions of technology.

Therefore, and considering that Academies of Engineering exist in neighboring countries, it is considered fitting to create an institution of this nature in Spain.

By virtue of the above, as proposed by the Minister of Education and Science, on the advice of the Spanish Institute, after deliberation by the Board of Ministers in their meeting of April 29, 1994,

I HEREBY STIPULATE

Sole article.

That an Academy of Engineering be created and governed by the Statutes inserted below.

Signed in Madrid this 29 of April, 1994.

KING JUAN CARLOS

Minister of Education and Science

GUSTAVO SUÁREZ PERTIERRA

8.2 OBJECTIVES

The goals of the Academy shall be listed clearly in Article 3 of its Statutes, as reproduced below:

Article 3: The Academy shall have the following goals:

- a) To promote quality and competency in Spanish engineering, fostering study, research and progress in those sciences on which it is based, in the techniques required by its applications and in the methods that encompass its creative activity.

- b) To comprise an active and qualified entity in the critical evaluation and analysis of scientific and technological progress both domestically and abroad, that is able to advise on these matters to whosoever may request or require it, in particular to those institutions dedicated to the education of engineers.
- c) To issue reports and mandates on specific relevant topics requested of it by State bodies and other entities, whether of a national, regional or international nature, as appropriate, independently of those reports issued on its own initiative in the public interest.
- d) To hold public or private sessions on pertinent topics and to promote the publications of works written by Academy members or presented to it for its consideration, as well as of the periodic reports detailing those scientific and technological advances of relevance to engineering.
- e) To sponsor awards that recognize the merit achieved by persons and institutions in the field of engineering or related activities or sciences, as well as contests that encourage the development and advancement of engineering.
- f) To collaborate with other Academies and similarly-oriented institutions, whether located in Spain or other countries, as well as with those of an international nature, on matters and programs of common interest.
- g) To draft and keep current a Spanish language dictionary of engineering terms.
- h) Any other purposes that may be deemed suitable and consistent with the nature and attributes of the institution.

These goals notwithstanding, the Statutes also stipulate the conditions that must be met by the Members as well Government Bodies so as to ensure the proper management of the Academy.

8.3 HISTORY

The Academy of Engineering, the most modern in our country at the time of its founding, is the first national Academy created under the reign of H.M. Juan Carlos I. Under an agreement with the Ministry charged with its oversight, this Royal Academy, national in character, receives a subsidy from the General State Budget.

The first 36 Constituent Members were named by a Ministerial Order dated December 12, 1994.

Following the first years of operations in which - among other activities - the Internal Statutes and Regulations were elaborated by the Constituent Academic Members, new members were elected, till to fill the maximum number of 60 Full Members, through calls for applications, from among engineering professionals whose contributions and careers are especially relevant to technological, industrial and economic development, and to the development of engineering in the country.

The Royal Academy of Engineering consists of Members from the different branches of Engineering.

Twenty three Full Members hail from outside the Autonomous Community of Madrid, which gives one an idea of their significant distribution throughout the country.

The Royal Academy has merited international accolades and is a member of CAETS, the International Council of Academies of Engineering and Technological Sciences,

and of Euro-CASE, the European Council of Applied Sciences, Technologies and Engineering.

Of special relevance were the commemorative events held on the 10th Anniversary of the Academy's creation, which took place in different cities around the country and focused on issues such as energy, the environment, infrastructure, transport, computer technology and telecommunications.

On May 9, 2005, stemming from an initiative by the Royal Academy of Engineering, the "Pro Rebus Academiae" Foundation was founded, for the essential purpose of backing, as much as its capacities allow, the activities of the Academy, whose Board is made up of Dr. Aníbal R. Figueiras Vidal (President), Dr. Jaime Torroja Menéndez (Vicepresident), D. Jesús Rodríguez Cortezo (COIIM), Mr. Joaquín Coello Brufau, D. Andrea Brentan (Endesa), Mr. Rafael González López (Idom), Mr. Javier Rui-Wamba Martija, Mr. Luis Lada Díaz, Dr. Javier Uceda Antolín (UPM) and Dr. Juan-Miguel Villar Mir (OHL), with Dr. Luis Alberto Petit Herrera, Academic and Managing Director of the Academy, serving as Secretary.

On June 7, 2005 the Patrimony of the State, through the Ministry of Education and Science, granted the Royal Academy of Engineering the public section of the Palace of Marqués de Villafranca (which forms part of Spain's Historic Patrimony) as its Headquarters, where the corporation initiated its services and the performance of its activities.

At the same time, refurbishment work on the facility was initiated, with all that this represented in terms of the necessary recovery and renovation of the premises which, due to their precarious state, posed safety issues and called for structural reductions and the refurbishment of the Arab wall, dating from the second enclosure of 12th century Madrid, upon which the rear part of the building rests, in order to leave as much as possible of the wall exposed.

