

CURRICULUM VITAE of
**LUÍS MANUEL BRAGA DA COSTA
CAMPOS**

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Books	B.1 to B.9	Patents	G.1 to G.2
Papers:	C.1 to C.148	Math. Revs	H.1 to H.19
Communications:	D.1 to D. 254	Book Rev.	I.1 to I.4
Projects:	E.1 to E.42	Classifications:	J.1 to J.7
Activities:	F.1 to F.158	Relations:	K.1 to K.5.4

Chronology **L.1 to L.2**

September 2016

A. Summary of Activities

A.1 - Author of 9 books:

- *Análise Aplicada e Campos de Força* (550p,1989).
- Author of Aerospace articles in *Enciclopédia Verbo* (246 entries,1996-2001)
- *Aircraft Design Integration and Affordability* (103p,1998)
- *Forms of Existence* (643p,1998)
- *Mecanica Aplicada I*(624p,2003)
- *Mecanica Aplicada II*(840p,2004)
- *Complex Functions with Applications to Flows and Fields* (1029p,2011)
- *Transcendental Representation with Application to Solids and Fluids* (898p, 2012)
- *Generalized calculus with applications to matter and forces* (893p,2014)

A.2 - Published 147 scientific papers in 60 journals:

- 1 – Acta Astronautica: 2009.
- 2 – Acustica: 1992, 1996, 2014.
- 3 – Advances in Space Research: 1990,1991,1993.
- 5 – Aeronautical Journal: 1984, 1986, 1989a,b, 2004, 2014, 2016.
- 1 – Aeronautics and Astronautics: 2011
- 1 – Aerospace : 2014
- 1 – Aircraft Engineering and Aerospace Technology: 2011
- 1 – American Institute of Aeronautics and Astronautics Journal: 2010
- 2 – Applied Mechanics Reviews: 2007a,b
- 1 – Communications in Statistics: 2004
- 1 – Computational Mechanics: 1988.
- 1 – Encyclopedia of Mathematics: 1997.
- 2 – European Journal of Mechanics: B, Fluids: 1993, 1994.
- 6 – Geophysical and Astrophysical Fluid Dynamics: 1985, 1988, 1990, 1991, 1999, 2008, 2015
- 2 – IMA Journal of Applied Mathematics: 1984, 1986.
- 6 – Integral Transforms and Special Functions: 1993, 2000, 2001a,b, 2003a,b.
- 3 – International Journal of Acoustics and Vibration: 2006, 2008, 2009.
- 13–International Journal of Aeroacoustics: 2007a,b, 2011, 2012a,b;2013;2014a,b,2016a,b.
- 1 – International Journal of Engineering Science: 2010.
- 2 – International Journal of Mathematics and Mathematical Sciences: 1990a,b.
- 1 – International Journal of Mechanical Sciences: 2014.
- 1 – International Journal of Modern Physics: 2015.
- 1 – Journal de Acoustique: 1992
- 2 – Journal of the Acoustical Society of America: 1996, 2004.
- 1 – Journal of Aerospace Engineering: 2016
- 4 – Journal of Aircraft (AIAA): 1997a,b, 2001, 2007.
- 1 – Journal of Computational and Applied Mathematics: 2001
- 5 – Journal of Fluid Mechanics: 1977, 1978a,b, 1995, 2000.
- 1 – Journal of Fluids and Structures: 1999.
- 1 – Journal of Fractional Calculus: 1993.
- 1 – Journal of Inequalities and Special Functions: 2012
- 1 – Journal of Mathematical Physics: 2011.
- 1 – Journal de Mécanique Théorique et Appliquée: 1983.
- 1 – Journal of Modern Physics B, 2016
- 2 – Journal of Physics: 1983, 1988.
- 5 – Journal of Plasma Physics: 1992, 1999, 2000, 2002,2004.
- 1 – Journal of the Royal Institute of Navigation: 2002.
- 14 – Journal of Sound and Vibration: 1984, 1986, 1987, 1988, 1996, 1999a,b, 2001, 2003, 2004a,b,2011, 2016a,b.

- 1 – Journal of Vibration and Acoustics (ASME), 1999.
- 1 – Matematiki Vesnik: 1986,2015.
- 1 – Memorie della Societa Astrofisica Italiana: 1984.
- 5 – Monthly Notices of the Royal Astronomical Society: 1984, 1989, 1995, 2011a,b.
- 2 – Non-linear Studies: 2011, 2012.
- 1 – Philosophical Transactions of the Royal Society: 1998.
- 1 – Physics of Fluids. B: Plasma Physics: 1992.
- 5 – Physics of Plasmas: 1999a,b, c, 2003,2014.
- 2 – Portugalizæ Mathematica:1982, 1985.
- 2 – Portugalizæ Physica: 1983a,b.
- 2 – Proceedings of the Royal Society: 1978,2014.
- 3 – Progress in the Aerospace Sciences: 1985, 1995, 1997.
- 4 – Progress in Industrial and Applied Mathematics: 2007, 2010a,b,c.
- 1 – Recent Advances in the Fractional Calculus: 1993.
- 2 – Reviews of Modern Physics: 1986, 1987.
- 2 – Revue d'Acoustique: 1983, 1992.
- 1 – SIAM Journal of Applied Mathematics: 2004.
- 2 – SIAM Journal of Mathematical Analysis: 1989a,b.
- 2 – Solar Physics: 1983, 2000.
- 1 – Springer Lecture Notes on Physics: 1999.
- 1 – Theoretical and Computational Fluid Mechanics: 1998.
- 6 – Wave Motion: 1983, 1988, 1992, 1993, 2002, 2003.
- 1 – Zeitschrift fur Flugwissenschaften und Weltraumforschung: 1984.

A.3 - Patents

- GB 2291388 B “A fail-safe towing bracket”
- US 6705547 “An active noise reducing nozzle”

A.4 - Research Projects

- European Union -22: Helinoise, Asanca, Acoufat, Amaks, Snaap, Helishape, Asanca II, Apian, S-Wake, Enable, Jean, Silencer, Rosas, Vela, X-noise, Vela, Nefa,Nacre,Friendcopter,Sefa, Cosma.
- Networks - 4: X-Noise, X2-Noise, X3-Noise, X-Noise EV
- Other International –1: Efedal (Eurocontrol);
- Aerospace Facilities -3: Basic Aircraft for Flight Research, National Flight Test Facility, Research Simulator Facility;
- National Scientific -6: acoustics of inhomogeneous and moving media; special functions in mechanics of continua; solar physics; solar wind, solar-terrestrial physics, solar atmosphere;
- National Aeronautical - 4: Fiat G.91R, SA330 Puma, A-7P Corsair II, P-3P Orion.

A.5 - Refereed scientific papers for 35 journals:

- 1 – Aeronautical Journal M the Royal Aeronautical society
- 2 – Aerospace Engineering (Journal of the Institution of Mechanical Engineers)
- 3 – Applicable Analysis
- 4 – Aerospace Science and Technology
- 5 – Applied Mathematics Letters
- 6 – Archiv of Acoustics
- 7 – Astronomy & Astrophysics

- 8 – Astrophysics & Space Science
 9 – European Journal of Mechanics, B: Fluids
 10 – Geophysical and Astrophysical Fluid Dynamics
 11 – International Journal of Acoustics and Vibration
 12 – International Journal of Aeroacoustics
 13 – International Journal of Mathematics and Mathematical Sciences
 14 – Journal of the Acoustical Society of America
 15 – Journal of Aerospace Engineering
 16 – Journal of Computational and Applied Mathematics
 17 – Journal of Engineering Mechanics (American Society of Civil Engineers)
 18 – Journal of Fluid Mechanics
 19 -- Journal of Mathematical Analysis and Applications
 20 – Journal of Physics A
 21 – Journal of the Royal Aeronautical Society
 22 – Journal of Sound and Vibration
 23 – Journal of Traffic and Transportation Engineering
 24 – Journal of Vibration and Acoustics (American Society of Mechanical Engineers)
- 25 – Mathematical Reviews
 26 – Monthly Notices of the Royal Astronomical Society
 27 – Physica scripta
 28 – Physics of Plasmas
 29 – Proceedings of the Royal Society
 30 – Progress in Electromagnetic Research
 31 – Real Annalysis Exchange.
 32 – Reliability Engineering and System Safety
 33 – Shock and Vibration
 34 – Solar Physic
 35 – Wave Motion

Contributor to 11 Mathematical Reviews since 2010: 2539326, 2666138, 26664248, 2748750, 27776464, 2832198, 2844753, 2918511; 2888604; 3019362; 3019777; 3076838,

A.6 - Degrees:

- Mechanical Engineer, Instituto Superior Técnico, 1972;
- Ph.D. on “Waves in Fluids”, Engineering Department, Cambridge University, 1978;
- Habilitation on “Applied Mathematics and Mechanics”, Lisbon Technical University, 1982.

A.7 - Awards:

- Senior Rouse Ball Scholar, Trinity College, Cambridge, 1977-8;
- Van Karman Medal, 2002, Research and Technology Organization.

A.8 - Present Positions:

- Full Professor, Instituto Superior Técnico (IST), Lisbon Technical University (UTL);
- Coordinator of Aerospace Engineering Degrees (Bachelor, Mester and Doctorate), IST/UTL;
- Coordinator of the scientific area Applied and Aerospace Mechanics,

Engineering Department, IST/UTL.

- Director of Center for Aeronautical and Space Science and Technology (CCTAE), affiliated to the Associated Laboratory for Energy, Transport and Aeronautics (LAETA), and supported by the Foundation for Science and Technology (FCT) of the Portuguese Ministry of Science and Higher Education.

A.9 - Some Past Activities:

- Senior Visitor, Department of Applied Mathematics and Theoretical Physics, Cambridge 1982-4;
- Alexander von Humboldt Scholar, Max-Planck Institut für Aeronomie, Katlenburg – Lindau, 1991/2;
- Member of Board, Portuguese Academy of Engineering 1998-2002.

A.10 - Memberships

- **Member of Editorial Board of:**
 - Progress of Aerospace Sciences
 - Air & Space Europe
 - International Journal of Aeroacoustics
 - Aerospace
- **Member Honorary Committee:**
 - Integral Transforms and Special Functions;
 - Revue d'Acoustique.
- **Life Member of:**
 - European Astronomical Society
- **Fellow of:**
 - Cambridge Philosophical Society;
 - Royal Astronomical Society;
 - Royal Aeronautical Society.
- **Associated Fellow of:**
 - American Institute of Aeronautics and Astronautics.
- **Founding member of:**
 - European Society of Astronomy,
- **Member of the:**
 - Acoustical Society of America,
 - American Astronomical Society,
 - American Mathematical Society,
 - American Society of Mechanical Engineers,
 - Committee on Space Research (COSPAR)
 - European Society of Mathematics,
 - International Astronomical Union,
 - London Mathematical Society,
 - Société Française d'Acoustique,
 - Society for Industrial and Applied Mathematics.
- **Has participated or participates in:**
 - Flight Test Techniques Working Group of AGARD (Advisory Group for Aerospace Research and Development);
 - Space Science Committee of ESF (European Science Foundation);
 - Committee on Data Management and Computation of the Space Science

Board of the NSF (National Science Foundation, USA);

- Working Group on Air Traffic Control Automation of Aerospace Committee of IFAC (International Federation of Automatic Control);
- Management Committee of Aeronautics Program of European Union;
- Commission on Peaceful Uses of Outer Space (copuos), of the United Nations;
- International Council of Aeronautical Sciences (ICAS);
- Space Advisory Committee (SAC) of European Union.
- Council of the European Space Agency (ESA);
- Aeroacoustics Specialist Committee the Council of European Aeronautical Societies (CEAS);
- Board of Trustees of the Council of European Aeronautical Societies (CEAS);
- Council of Pegasus group of European Universities teaching aerospace engineering.
- Program Board Launchers (PB-LAU) of the European Space Agency (ESA);

• **Has been:**

- Vice-Chairman and Chairman of Flight Mechanics Panel (FMP) / Flight Vehicle Integration Panel (FVP) of Advisory Group for Aerospace Research and Development (AGARD);
- Vice-Chairman of Aeronautical Research and Technology Advisory Committee (ARTCO).
- Vice-Chairman, Systems Concepts and Integration Panel, Research and Technology Organization.

A.11 - Presented communications to symposia, made conferences or scientific or technical visits in (up to 1996; henceforth omitted):

Amsterdam (1980, 1984, 1986), Anaheim (1994), Ankara (1986, 1995), Athens (1983), Barcelona (1989), Beijing (1987), Bedford (1982), Belgrade (1989), Bologna (1988), Braunschweig (1982, 1989, 1993, 1995), Brussels (1983, 1988-1995), Budapest (1997, 2000) Budva (1986), Burbank (1996), Cannes (1994), Catania (1983, 2000), Cambridge (1974, 1982, 1985), Chalkidiki (1997), Copenhagen (1984), Cranfield (1982), Creta (1992), Crimea (1981), Delft (1982), Dusseldorf (1992), Edinburg (1976, 1992), Edwards (1988), Eindhoven(2000), Farnborough (1998), Florence (1981, 1999), Fort Worth (1982), Freiburg (1984), Friedrichshafen (1998), Garmisch-Partenkirchen (1985), Geilo (1989), Gottingen (1984, 1985, 1989, 1992, 1993, 1997), Hague (1990, 1993, 2000), Hamburg (1994), Hartford (1993), Helsinki (1988), Herceg-Novi (1988), Honolulu (1988), Jerusalem (1988), Hull (1977), Karlsruhe (1986), Kiev (1991), Kijkduin (1993), Kortrijk (1991), Koryama (1984, 1989), Leuven (1987, 1993), Liège (1984), Linköping (1997), Lisbon (1982, 1994), London (1984, 1994), Lyon (1981), Macau (1985), Manchester (1975, 2000), Munchen (1984, 1995), Nice (1998), Naples (1993, 1996), Noordwijk (1984, 1986), Ottawa (1996), Paris (1980, 1983, 1987, 1988, 1992-1995), Palmdale (1995), Patuxent River (1992) Prague (1987), Ravello (1996) Rome (1986, 1988), St. Andrews (1984), Salisbury (1989), Seattle (1989), Stockholm (1991), Smirna (1982), Southampton (1991), St. Petersburg (1993), Stuttgart (1987), Tallahassee (1996), Tenerife (1988), Thessaloniki (1985), Tokyo (1984, 1989), Torino (1994, 1999), Toronto (1980, 1984), Toulouse (1982, 1984, 1986, 1987, 1988, 1990), Tucson (1988), Utrecht (1984), Venice (1986), Vienna (1994, 1995), Warsaw (1983), Washington (1991, 1996), Zurich (1982).

A.12 - Languages (3 = good, 2 = average, 1 = limited)

LANGUAGE	Read	Speak	Write	Total (≤ 9)
English	3	3	3	9
French	3	3	2	8
Spanish	3	2	2	7
Italian	2	1	1	4
German	1	1	1	3
Portuguese	3	3	3	9
Total (≤ 18)	12	13	12	37(<54)

A.13 - Biographical listings in:

- Who's Who in the World, since 1987
- Who's Who in Science and Engineering since 1994
- Who's Who in America, since 2011

B. BOOKS

- B.1** - "*Análise Aplicada e Campos de Força*", 550 pages,
Calouste Gulbenkian Foundation, Lisbon 1988.
- B.2** - "*Enciclopédia Verbo*", Second Edition, Lisbon, 1996-2000.
Editor of Aerospace topics: 246 articles.
- B.3** - "*Aircraft design integration and affordability*", 103 pages,
Agardograph AGARD-R-826, AGARD, Paris, 1997, Published November 1998.
- B.4** - "*Forms of existence*", 643 pages,
Minerva Press, London, 1998.
- B.5** - L.M.B.C. Campos, "*Mecânica Aplicada. Volume 1: Estática, cinemática e dinâmica tensorial*", 624 Pages Escolar Editora 2003.
- B.6** - L.M.B.C. Campos, "*Mecânica Aplicada. Volume 2: Dinâmica variacional e geometria diferencial*", 840 pages, Escolar Editora 2004.
- ***B.7** - L.M.B.C. Campos, "*Complex functions with application to flows and fields*",
989+xl=1029 pages, CRC Press, 2011.
- ***B.8** - L.M.B.C. Campos, "*Trasncendental representations with applications to solids and fluid*", 845+li=898 pages, CRC Press, 2012.
- ***B.9** – L.M.B.C. Campos, "*Generalized calculus with applications to matter and forces*",
835 + lviii = 883 pages, CRC Press, 2014.
- * **Volumes 1,2 and 3** of a multi-volume series "*Mathematics and Physics in Science and Engineering*", published by CRC Press.

b - EDITIONS

- b.1** - L.M.B.C. Campos, & W. Schroeder (Guest Editors), "*CEAS/AIAA Combustion Noise Workshop*", International Journal of Aeroacoustics, Volume 8, pages 1-176, 2008

C. SCIENTIFIC PAPERS

138 papers: 76 single-author, 61 first author, 1 second author.

In books: C.53, C.66, C.75; C.105; C.115-117; C. 124.

Review Articles: C.5, C.11, C.12; C.20; C.22, C.27; C.64; C.67; C.75; C.102; C105, C107.

Papers: 138 of which 76 single-author, 61 first author, 1 second author.

- 1977** C.1 - L. M. B. C. Campos, "On the generation and radiation of magneto-acoustic waves",
II.1 *Journal of Fluid Mechanics*, volume 81, part 3, pages 529-49.
R.1
- 1978a** C.2 - L. M. B. C. Campos, "On the emission of sound by an ionized inhomogeneity",
III.1 *Proceedings of the Royal Society of London, Series A*, volume 359, pages 65-91.
R.2
- 1978b** C.3 - L. M. B. C. Campos, "The spectral broadening of sound by turbulent shear layers.
III.2 Part I: The scattering by turbulence and random interfaces", *Journal of Fluid*
R.3 *Mechanics*, volume 89, part 4, pages 723-749.
- 1978c** C.4 - L. M. B. C. Campos, "The spectral broadening of sound by turbulent shear layers.
III.3 Part 2: The application to experimental and aircraft noise", *Journal of Fluid*
R.4 *Mechanics*, volume 89, part 4, pages 751-783.
- 1982** C.5 - L. M. B. C. Campos, "On anisotropic, dispersive and dissipative wave equations",
I.1 *Portugaliæ Mathematica*, volume 41, Fasc.1-4, pages 13-32.
R.5
- 1983a** C.6 - L. M. B. C. Campos, "On three-dimensional acoustic-gravity waves in model non-
III.4 isothermal atmospheres", *Wave Motion*, volume 5, pages 1-14.
R.6
- 1983b** C.7 - L. M. B. C. Campos, "On magnetoacoustic-gravity waves propagating or standing
II.2 vertically in an atmosphere" *Journal of Physics, Series A, Math. Gen.* Volume 16,
R.7 pages 417-437.
- 1983c** C.8 - L. M. B. C. Campos, "On waves in non-isothermal, compressible, ionized and
II.3 viscous atmospheres", *Solar Physics*, Volume 82, pages 355-368.
R.8
- 1983d** C.9 - L. M. B. C. Campos, "On viscous and resistive dissipation of hydrodynamic and
III.5 hydromagnetic waves in atmospheres", *Journal de Mécanique Théorique et*
R.9 *Appliquée*, volume 2, n° 6, pages 861-891.
- 1983e** C.10 - L. M. B. C. Campos, "Sur la propagation du son dans les écoulements non-
III.6 uniformes et non-stationnaires", *Revue d'Acoustique*, number 67, pages 217-233.
R.10
- 1983f** C.11 - L. M. B. C. Campos, "Modern trends in research on waves in fluids. Part I:
III.7 Generation and scattering by turbulent and inhomogeneous flows", *Portugaliæ*
R.11 *Physica*, Volume 14, Fasc. 3-4, pages 121-143.
- 1983g** C.12 - L. M. B. C. Campos, "Modern trends in research on waves in fluids. Part II:
II.4 Propagation and dissipation in compressible and ionized atmospheres", *Portugaliæ*
R.12 *Physica*, Volume 14, Fasc. 3-4, pages 145-173.
- 1984a** C.13 - L. M. B. C. Campos, "On a theory of solar spicules and the atmospheric mass
II.5 balance" *Monthly Notices of the Royal Astronomical Society*, volume 207, pages
R.13 547-574.

- 1984b** **C.14** - L. M. B. C. Campos, "On the propagation of sound in nozzles of variable cross-section containing a low Mach number mean flow" *Zeitschrift für Flugwissenschaften und Weltraumforschung*, Band 8, Heft 2, seite 97-109.
III.8
R.14
- 1984c** **C.15** - L. M. B. C. Campos, "On the heating of the solar chromosphere by hydromagnetic waves with a five-minute period", *Memoire della Societa Astrofisica Italiana*, volume 55, pages 267-272.
II.6
R.15
- 1984d** **C.16** - L. M. B. C. Campos, "On the influence of atmospheric disturbances on aircraft aerodynamics", *The Aeronautical Journal of the Royal Aeronautical Society*, Paper 1085, June/July, pages 257-264.
IV.1
R.16
- 1984e** **C.17** - L. M. B. C. Campos, "On a concept of derivative of complex order with applications to special functions", *IMA Journal of Applied Mathematics*, volume 33, pag. 109-133.
I.2
R.17
- 1984f** **C.18** - L. M. B. C. Campos, "Some general properties of the exact acoustic fields in horns and baffles", *Journal of Sound and Vibration*, volume 95 (2), pages 177-201.
III.9
R.18
- 1985a** **C.19** - L. M. B. C. Campos, "On vertical hydromagnetic waves in a compressible atmosphere under an oblique magnetic field", *Geophysical and Astrophysical Fluid Dynamics*, volume 32, pages 217-272.
II.7
R.20
- 1985b** **C.20** - L. M. B. C. Campos, "On the fundamental acoustic mode in variable area, low Mach number nozzles", *Progress in the Aerospace Sciences*, volume 22, pages 1-27.
III.10
R.21
- 1985c** **C.21** - L. M. B. C. Campos, "On rules of derivation with complex order for analytic and branched functions", *Portugalixæ Mathematica*, volume 43, fascicle 3, pages 347-376.
I.3
R.22
- 1986a** **C.22** - L. M. B. C. Campos, "On waves in gases. Part I: Acoustics of jets, turbulence and ducts", *Reviews of Modern Physics*, Volume 58, pages 117-182.
III.11
R.25
- 1986b** **C.23** - L. M. B. C. Campos, "On linear and non-linear wave equations for the acoustics of high-speed potential flows", *Journal of Sound and Vibration*, volume 110 (II), pages 41-57.
III.12
R.26
- 1986c** **C.24** - L. M. B. C. Campos, "On a systematic approach to some properties of special functions", *IMA Journal of Applied Mathematics*, volume 36, pages 191-206.
I.4
R.27
- 1986d** **C.25** - L. M. B. C. Campos, "On aircraft flight performance in a perturbed atmosphere", *The Aeronautical Journal of the Royal Aeronautical Society*, paper 1305, October, pages 301-312.
IV.2
R.28
- 1986e** **C.26** - L. M. B. C. Campos, "On extensions of the Laurent's theorem in the fractional calculus with applications to the generation of higher transcendental functions", *Mathematikhî Vesnik*, volume 38, pages 375-390.
I.5
R.29
- 1987a** **C.27** - L. M. B. C. Campos, "On waves in gases. Part II: Interaction of sound with magnetic and internal modes", *Reviews of Modern Physics*, volume 59, N° 2, pages 363-462.
II.8
R.31
- 1987b** **C.28** - L. M. B. C. Campos, "On longitudinal acoustic propagation in convergent and divergent nozzle flows", *Journal of Sound and Vibration*, volume 117 (I), pages 131-151.
III.13
R.32

- 1988a** C.29 - L. M. B. C. Campos, "On the properties of hydromagnetic waves in the vicinity of critical levels and transition layers", *Geophysical and Astrophysical Fluid Dynamics*, volume 40, pages 93-132.
II.9
R.34
- 1988b** C.30 - L. M. B. C. Campos, "On generalizations of the Doppler factor, local frequency, wave invariant and group velocity", *Wave Motion*, volume 10, pages 193-207.
III.14
R.35
- 1988c** C.31 - L. M. B. C. Campos & J. F. P. G. Leitão, "On the computation of special functions with applications to non-linear and inhomogeneous waves", *Computational Mechanics*, volume 3, pages 343-360.
I.6
R.36
- 1988d** C.32 - L. M. B. C. Campos, "On oblique Alfvén waves in a viscous and resistive atmosphere", *Journal of Physics*, Series A, volume 21, pages 2911-2930.
II.10
R.37
- 1988e** C.33 - L. M. B. C. Campos & A. J. P. Santos, "On the propagation and damping of longitudinal oscillations in tapered visco-elastic bars", *Journal of Sound and Vibration*, volume 126, pages 109-125.
III.15
R.38
- 1989a** C.34 - L. M. B. C. Campos, "On the branch-point operator and annihilation of differintegrations", *SIAM Journal of Mathematical Analysis*, volume 20, pages 439-453.
I.7
R.42
- 1989b** C.35 - L. M. B. C. Campos, "On a generalized Mittag-Leffler theorem and implicit differintegration", *SIAM Journal of Mathematical Analysis*, volume 20, pages 454-467.
I.8
R.43
- 1989c** C.36 - L. M. B. C. Campos & A. J. M. N. Aguiar, "On the inverse phugoid problem as an instance of non-linear stability in pitch", *Aeronautical Journal*, paper 1559/1, September, pages 241-253.
IV.3
R.44
- 1989d** C.37 - L. M. B. C. Campos, "On a pitch control law for constant glide slope through windshears and other disturbances", *Aeronautical Journal*, paper 1559/2, October, pages 290-300.
IV.4
R.45
- 1989e** C.38 - L. M. B. C. Campos, "On oscillations in sunspot umbras and wave radiation in stars", *Monthly Notices Royal Astronomical Society*, volume 241, pages 215-229.
II.11
R.46
- 1990a** C.39 - L. M. B. C. Campos, "On the solution of some simple fractional integrodifferential equations". *International Journal of Mathematics and Mathematical Sciences*, Volume 13, pages 215-229.
I.9
R.49
- 1990b** C.40 - L. M. B. C. Campos, "On the propagation of Alfvén waves in a doubly-diffusive atmosphere", *Advances in Space Research*, Volume 10, number 9, pages 5-15.
II.12
R.39
- 1990c** C.41 - L. M. B. C. Campos, "On the dissipation of Alfvén waves in uniform and non-uniform magnetic fields", *Geophysical and Astrophysical Fluid Mechanics*, Volume 48, pages 193-215.
II.13
R.50
- 1990d** C.42 - L. M. B. C. Campos, "On generalizations of the series of Taylor, Lagrange, Laurent and Teixeira", *International Journal of Mathematics and Mathematical Sciences*, Volume 13, pages 687-708.
I.10
R.51
- 1991a** C.43 - L. M. B. C. Campos & R. Saldanha, "On oblique magnetohydrodynamic waves in an atmosphere under a magnetic fields of arbitrary direction", *Geophysical and Astrophysical Fluid Dynamics*, Volume 56, pages 237-251.
II.14
R.56

- 1991b** C.44 - L. M. B. C. Campos, "On two-dimensional magneto-acoustic-gravity waves", *Advances in Space Research*, Volume 11, number 1, pages 237-245.
II.15
R.58
- 1992a** C.45 - L. M. B. C. Campos, "Effects on acoustic fatigue loads of multiple reflections between a plate and a turbulent wake", *Acustica*, 76, 109-117.
III.16
R.59
- 1992b** C.46 - L. M. B. C. Campos, "On cut-off frequencies for magneto-atmospheric waves", *Wave Motion*, Volume 15, pages 103-119.
II.16
R.57
- 1992c** C.47 - L. M. B. C. Campos, "On the Hall effect on vertical Alfvén waves in an isothermal atmosphere", *Physics of Fluids B: Plasma Physics*, B4, 2975-2982.
II.17
R.60
- 1992d** C.48 - L. M. B. C. Campos & C. M. Macedo, "On the prediction of the broadband noise of helicopter rotor from the impulsive component", *Journal d'Acoustique*, Volume 5, pages 531-542.
III.17
R.61
- 1992e** C.49 - L. M. B. C. Campos & N. L. Isaeva, "On vertical spinning Alfvén waves in a magnetic flux tube", *Journal of Plasma Physics*, Volume 48, part 3, pages 415-434.
II.18
R.62
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D. COMMUNICATIONS TO SYMPOSIA

Planary Address: D.127, D.146, D.154

- Jul. 1976**
VII.1 – T.1
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2000
VIII.18** D.124 - L. M. B. C. Campos, "On the wave vortex hazard and aircraft safe separation", Session 1.10 – Airport/weather, *22nd Congress of ICAS* (International Congress of Aeronautical Sciences), Harrogate.

- Sept.
2000
VII.41** D.125 - L. M. B. C. Campos, "Comparison of prediction and measurement on propeller noise at an angle-of-attack", Session 3.9 – Aircraft Noise, 22nd Congress of ICAS (International Congress of Aeronautical Sciences), Harrogate.
- Sept.
2000
VII.42
T.65** D.126 - L. M. B. C. Campos & F. J. P. Lau, "On an analytical model for blade-vortex interaction noise", 26th European Rotorcraft Forum, Hague.
- Oct.
2000
VII.43** D.127 - L. M. B. C. Campos, "Transmissão sonora em fluidos", invited conference, // Congresso Ibero-Americano de Acústica, Madrid.
- Nov.
2000
VII.44** D.128 - "On a relation between the spectrum of sound and the spectrum of noise at radiates", *Euromech Fluid Mechanics Conference*, Eindhoven.
- Mar.2001
VIII.19
T.67** D.129 L. M. B. C. Campos, "On the calculation of collision probabilities as a contribution to safety metrics", *CARE Innovative ATM Workshop*, Eurocontrol, Brussels.
- Mar.2001
VIII.20
T.68** D.130 L. M. B. C. Campos, "On the calculation of safe separation distances between aircraft due to wake effects". 5th Wavenet Workshop on *Wave turbulence and the airport environment*, Deutsch Flugsicherung (DFS) Akademie, Langen.
- May.
2001
VI-51** D.131 L. M. B. C. Campos, "On the coupling of magnetosonic and Alfvén waves in an isothermal atmosphere under an uniform horizontal magnetic field", *INTAS Workshop of MHD Waves in Astrophysical Plasmas*, Palma de Maiorca.
- June
2002
VI-52
R.110** D.132 L. M. B. C. Campos & P.M.V.M. Mendes "On the effect of anisotropic resistivity on solar atmospheric heating", *SOLMAG: Magnetic Coupling of the Solar Atmosphere*, IAU Coll. 188, Santorini, ESA SP-505, pages 373-376.
- June
2002
VI-53
R.111** D.133 L. M. B. C. Campos & N.L. Isaeva "On the critical layer of Alfvén waves in the solar wind", *Solmag: Magnetic Coupling of the Solar Atmosphere*, IAU Coll. 188 Santorini, ESA SP-505, pages 369-372.
- Sept.
2002
VII-45** D.134 L. M. B. C. Campos & J.M.G.S. Oliveira "On the effect of non-uniform wall impedance on the acoustics of nozzles", 23rd Congress, of the International Council of Aeronautical Sciences, Toronto.
- Sept.
2002
VII-46** D.135 L. M. B. C. Campos & M.H. Kobayashi "On the transmission of sound across a non-isothermal boundary layer" 23rd Congress, of the International Council of Aeronautical Sciences, Toronto.
- Sept.
2002
VIII-21** D.136 L. M. B. C. Campos & J.M.G. Marques "On wake vortex response for several combination of leading and following aircraft", 23rd Congress, of the International Council of Aeronautical Sciences, Toronto.
- Sept.
2002
VIII-22** D.137 L. M. B. C. Campos & J.M.G. Marques "On the calculation of collision probabilities as an assurance of safe separation between aircraft", 23rd Congress, of the International Council of Aeronautical Sciences, Toronto.

- May 2004**
VI.47
T.70 **D.138** L.M.B.C. Campos & F.J. Lau “On the shielding of engine noise by an aircraft wing”, 10th AIAA/CEAS Aeroacoustics Conference, Session AA-11 *General Acoustics*; Derby.
- May 2004**
VII.48
T.71 **D.139** L.M.B.C. Campos & P.G.T.A. Serrão “On the acoustics of unbounded and ducted vortex flows” 10th AIAA/CEAS Aeroacoustics Conference, Session AA-23 *Duct Propagation*, Derby.
- May 2004**
VII.49
T.72 **D.140** L.M.B.C. Campos & J.M.G. Oliveira “On the optimization of circumferentially non-uniform acoustic liners in annular ducts”, 10th AIAA/CEAS Aeroacoustics Conference, Session AA-35 *Noise control in ducts*, Derby.
- Aug. 2004**
VII.50 **D.141** L.M.B.C. Campos & F.J. Lau “On the shielding of engine noise by an aircraft wing”, 24th *International Congress of Aeronautical Sciences*, Paper 2.2.3, Yokohama.
- Aug. 2004**
VII.51 **D.142** L.M.B.C. Campos & M.H. Kobayashi “On the generation of sound in a shear flow”, 24th *International Congress of Aeronautical Sciences*, Paper 3.4.5, Yokohama.
- Aug. 2004**
VII.52 **D.143** L.M.B.C. Campos & J.M.G. Oliveira, “On sound attenuation in a nozzle with non-uniform lining”, 24th *International Congress of Aeronautical Sciences*, Paper P.25, Yokohama.
- Sept. 2004**
VI.54 **D.144** L.M.B.C. Campos & N.L. Isaeva, “On the modeling of Alfvén waves in the solar wind”, *Jenam-2004* Session “The sun and the planetary systems”, Granada.
- Sept. 2004**
VI.55 **D.145** L.M.B.C. Campos “On the generation of waves in the solar atmosphere”, *Jenam-2004* Session “*The sun and the planetary systems*”, Granada.
- July 2005**
VII.53 **D.146** L.M.B.C. Campos “Aeroacoustics research on the reduction of the environmental impact of aircraft noise”, Keynote address, *International Congress of Sound and Vibration ICSV12*, Lisbon.
T.73
- July 2005**
VII.54 **D.147** L.M.B.C. Campos & J.M.G.oliveira, “On sound generation in cylindrical nozzles with non-uniform impedance”, *International Congress of Sound and Vibration ICSV12*, Lisbon.
- July 2005**
VII.55 **D.148** L.M.B.C. Campos & P.G.T.A. Serrão “ On the scattering of sound by on exponential boundary layer”, *International Congress of Sound and Vibration ICSV12*, Lisbon.
- July 2005**
VII.56 **D.149** L.M.B.C. Campos & F.J.P.Lau “ Analytical blade-vortex interaction model of an helicopter rotor”, *International Congress of Sound and Vibration ICSV12*, Lisbon.
- July 2005**
VII.57 **D.150** L.M.B.C. Campos & J.M.G.Oliveira, “Sound propagation in a parabolic shear flow”, *International Congress of Sound and Vibration ICSV12*, Lisbon. (2005)

- Aug.
2005
VII.58** **D.151** L.M.B.C. Campos & M.H.Kobayashi "On the emission of sound by a source in a shear flow", *Internoise*, Rio de Janeiro.
- May 2006
VII.59** **D.152** L.M.B.C. Campos & F.J.P. Lau "On propeller acoustic design synthesis using source distributions along the blade span", 12th AIAA/CEAS *Aeroacoustics Conference*, Boston, Massachussets. (2006)
- May 2006
VI.56** **D.153** L.M.B.C. Campos "On an analytical model of the aerothermodynamics of fluid-struture interaction", 5th *European Workshop on Thermal Protection Systems and Hot Structures*, ESTEC, Noordwijk, Holland. (2006)
- July 2006
V.15** **D.154** L.M.B.C. Campos "On wave propagation and generation in fluids" Plenary Conference, *European Conference an Mathematics for Industry (ECMI)*, Madrid.
- Sept.
2006
VIII.23** **D.155** L.M.B.C. Campos & J.M.G. Marques "On an absolute safety criterion for the probability of collision between aircraft", 25th *Congress of the International Council for Aeronautical Sciences (ICAS)*, Hamburg.
- Sept.
2006
VII.60** **D.156** L.M.B.C. Campos & J.M.G.S. Oliveira "On the correlation of acoustic modes in a nozzle and in the far-field" 25th *Congress of the International Council of Aeronautical Sciences (ICAS)*, Hamburg. (2006)
- Sept.
2006
VIII.24** **D.157** L.M.B.C. Campos & J.M.G. Marques "On the effect of damping and controls on an aircraft wake encounter", 25th *Congress of the International Council for Aeronautical Sciences (ICAS)*, Hamburg.
- Oct. 2006
VIII.25** **D.158** L.M.B.C. Campos & J.M.G. Marques "On lateral-longitudinal coupling and unsteady aerodynamics for airplane stability and control", 1st *NACRE Workshop*, Technische Universitat Munchen, Garching.
- Oct. 2006
VII.61** **D.159** L.M.B.C. Campos "On three modelling methods for acoustic shielding and installation effects", 1st *NACRE Workshop*, Technische Universitat Munchen, Garching. (2006)
- May.
2007
VII.62** **D.160** L.M.B.C. Campos "On 36 linear and non-linear acoustic wave equations in potential flows and inhomogeneous media", 13th AIAA/CEAS and 28th AIAA *Aeroacoustic Conference*, Rome, *AIAA paper 2007-3570*. (2007)
- May.
2007
VII.63** **D.161** L.M.B.C. Campos & P.G.T.A. Serrão, "On the noise of hot or cold turbulent jets". 13th AIAA/CEAS and 28th AIAA *Aeroacoustics Conference*, Rome, *AIAA paper 2007-3629*. (2007)
- May.
2007
VII.64** **D.162** L.M.B.C. Campos & P.J.S. Gil, "Conical wave harmonics with application to sound diffraction and shielding", 13th AIAA/CEAS and 28th AIAA *Aeroacoustics Conference*, Rome, *AIAA paper 2007-3674*..(2007)
- June.
2008
VIII.26** **D.163** L.M.B.C. Campos & J.M.G. Marques "On alternative safety metrics for the probability of collision between aircraft", *European Congress of Mathematics for Industry ECMI 2008 University College*, London. (2008)
- June.
2008
V.16** **D.164** L.M.B.C. Campos "On the trajectories of transatmospheric vehicles", *European Congress of Mathematics for Industry ECMI 2008 University College*, London.

- June.
2008
VII.65** **D.165** L.M.B.C. Campos & P.G.T.A. Serrão “On sound propagation and generation with non-uniform swirl”, *European Congress of Mathematics for Industry ECMI 2008 University College, London.*
- June.
2008
VII.27** **D.166** L.M.B.C. Campos & J.M.G. Marques “On aircraft response and control during a wake encounter”, *European Congress of Mathematics for Industry ECMI 2008 University College, London.*
- July.
2008
VII.66** **D.167** L.M.B.C. Campos & P.J.S. Gil “On noise shielding by conical surfaces”, *NACRE 2nd Workshop an new aircraft concepts*, Greenwich University. (2008)
- July.
2008
VIII.28** **D.168** L.M.B.C. Campos & J.M.G. Marques “On cruise trim with minimum drag”, *NACRE 2nd Workshop an new aircraft concepts*, Greenwich University
- Sept.
2008
VIII.29** **D.169** L.M.B.C. Campos & J.M.G. Marques “On the minimization of cruise drag due to pitch trim for flying-wing configuration”, *International Congress of Aeronautical Sciences ICAS 2008 Anchorage, Alaska.*
- Sept.
2008
VII.67** **D.170** L.M.B.C. Campos & J.M.G.S Oliveira “On the effects on noise of ground reflection and atmospheric absorption”, *International Congress of Aeronautical Sciences ICAS 2008 Anchorage, Alaska.* (2008)
- Sept.
2008
VIII.30** **D.171** L.M.B.C. Campos & J.M.G. Marques “On the probability of collision for climbing and descending trajectories relevant to air traffic management”, *International Congress of Aeronautical Sciences ICAS 2008 Anchorage.*
- Oct.
2008
VII.68** **D.172** L.M.B.C. Campos “On sound generation in axisymmetric sheared and swirling mean flow, 12th CEAS-ASC & 3rd X3-Noise workshop on “Turbomachinery broadband noise” *Bilbao, Spain.* (2008)
- Jul.
2009
VII. 69** **D.173** L.M.B.C. Campos & P.G.T.A. Serrão “On the scattering of sound by junctions of bent and twisted tubes”, *16th International Congress of Sound and Vibration*, 5-9 July 2009, Krakow. (2009)
- Jul. 2009
VII. 70** **D.174** L.M.B.C. Campos & P.G.T.A. Serrão “On the discrete and continuous spectrum of waves in a sheared swirling inhomogeneous flow”, *16th International Congress of Sound and Vibration*, 5-9 July 2009, Krakow. (2009)
- Jun.
2010
VII. 71** **D.175** L.M.B.C. Campos & M.H.Kobayashi “On the propagation of sound in a sheared and swirling flow”. *16 th AIAA/CEAS Aeroacustics conference*, 7-9 June Strockhlem.
- Jun.
2010
VII. 72** **D.176** L.M.B.C. Campos & P.G.T.A. Serrão “On the continuous spectrum of sound in sheared and swirling flows. *16 th AIAA/CEAS Aeroacustics conference*, 7-9 June Strockhlem.
- Jun.
2010
VII. 73** **D.177** L.M.B.C. Campos & F.S.R.P. Cunha “Acoustic signal distorsion by atmospheric turbulence”, *Internoise 2010*, Lisbon 13-16 Jun. 2010.
- Jun.
2010
VII. 74** **D.178** L.M.B.C. Campos & P.G.T.A. Serrão “Effect of wind on noise propagation”, *Internoise 2010*, 13-16 Jun. 2010

- Jun.
2010
VII. 75** **D.179** L.M.B.C. Campos & LF.J.P. Lau. "Shielding of engine noise by aircraft structure", *Internoise 2010*, 13-16 Jun. 2010.
- Jun.
2010
VII. 76** **D.180** L.M.B.C. Campos & A.R.A Fonseca. "Building effects on airport noise", *Internoise 2010 Lisboa*, 13-16 June 2010.
- Jun.
2010
VII. 77** **D.181** L.M.B.C. Campos & J.M.G.S. Oliveira. "Ground effects on helicopter noise", *Internoise 2010*, 13-16 June 2010.
- Jun.
2010
VII. 78** **D.182** L.M.B.C. Campos & P.G.T.A. Serrão. "Outdoor to indoor transmission of aircraft noise", *Internoise 2010*, 10-13 June, Lisbon.
- July
2010
VII.79** **D.183** L.M.B.C. Campos & F.S.R.P. Cunha "On the distorsion of acoustic spectra due to propagation through turbulence". *16th European Conference on Mathematics for Industry*, July 26-30, Wuppertal.
- July
2010
VIII.31** **D.184** L.M.B.C. Campos & J.M.G. Marques "On aircraft separation, navigation accuracy and airways". *16th European Conference on Mathematics for Industry*, July 26-30, Wuppertal.
- July
2010
VII.80** **D.185** L.M.B.C. Campos & P.G.T.A. Serrão "On the discrete and continuous spectrum of waves in a sheared and swirling flows". *16th European Conference on Mathematics for Industry*, July 26-30, Wuppertal.
- July
2010
V.16** **D.186** L.M.B.C. Campos "On the torsion of a prism with non-equilateral cross-section". *16th European Conference on Mathematics for Industry*, July 26-30, Wuppertal.
- July
2010
VIII.32** **D.187** L.M.B.C. Campos & J.M.G. Marques "On safe separation distances between aircraft due to turbulent wakes", *16th European Conference on Mathematics for Industry*, July 26-30, Wuppertal.
- July
2010
VIII.33** **D.188** L.M.B.C. Campos & J.M.G. Marques "On the minimization of trim drag for aircraft with multiple control surfaces", *16th European Conference on Mathematical for Industry*, July 26-30, Wuppertal.
- Septemb
er
2010
VI.57** **D.189** L.M.B.C. Campos "On generation of magneto-acoustic-gravity-inertial waves in stars". *Joint European and National Meeting in Astronomy*, September 6-10, Lisbon.
- Septemb
er
2010
VI.58** **D.190** L.M.B.C. Campos "Relations between properties of magnetic and rotating stars". *Joint European and National Meeting in Astronomy*, September 6-10, Lisbon.
- Septemb
er
2010
VI.59** **D.191** L.M.B.C. Campos "On Alfvén waves in the solar wind". *Joint European and National Meeting in Astronomy*, September 6-10, Lisbon.

- September 2010**
VIII.34
- D.192 L.M.B.C. Campos & J.M.G. Marques. "On three-dimensional collision probabilities relevant to air traffic management", *27th International Congress of Aeronautical Sciences* 19-24 September, Nice.
- September 2010**
VII.81
- D.193 L.M.B.C. Campos & M.H. Kobayashi "On the propagation of sound in high-speed non-isothermal shear flows", *27th International Congress of Aeronautical*, 19-24 September, Nice
- September 2010**
VIII.35
- D.194 L.M.B.C. Campos & J.M.G. Marques. "On maximization of control power in low-speed flight for a flying wing configuration", *27th International Congress of Aeronautical Sciences* 19-24 September, Nice.
- October 2010**
VII.82
- D.195 L.M.B.C. Campos & F.J.P. Lau "On the generation of sound by moving surfaces in a potential flow", *14th Confederation of European Aeronautics Society – Aeroacoustics Sub-Committee (CEAS-ASC) Workshop*, October 7-8, Warsaw.
- July 2011**
VII.83
- D.196 L.M.B.C. Campos & J.M.G. Oliveira "On the acoustic modes in a duct containing a parabolic shear flow", *18th International Congress of Sound and Vibration*, Rio de Janeiro
- July 2011**
VII.84
- D.197 L.M.B.C. Campos & F.J.P. Lau "On sound generation by moving surfaces", *18th International Congress of Sound and Vibration*, Rio de Janeiro
- July 2011**
VII.85
- D.198 L.M.B.C. CAMPOS & F.S.R.P. Cunha "On the power spectra of sound transmitted through turbulence", *18th International Congress of Sound and Vibration*, Rio de Janeiro
- July 2011**
VII.86
- D.199 L.M.B.C. Campos & F.J.P. Lau "On propeller acoustic design synthesis with application to angular inflow", *18th International Congress of Sound and Vibration*, Rio de Janeiro
- Sept 2012**
VIII36
- D.200 L.M.B.C. Campos & J.M.G. Marques "A probability assessment of flight safety relevant to collision avoidance", *28th International Congress of Aeronautical Sciences*, Brisbane.
- Sept 2012**
VII.87
- D.201 L.M.B.C. Campos & F.J.P. Lau "On sound generation by moving surfaces and convected sources in flow", *28th International Congress of Aeronautical Sciences*, Brisbane.
- Sept 2012**
VIII.37
- D.202 L.M.B.C. Campos & A.C. Marta "Analytical flutter frequencies of tapered wing", *28th International Congress of Aeronautical Sciences*, Brisbane.
- June 2013**
VII.87
- D.203 L.M.B.C. Campos & M.H. Kobayashi "On an Hamiltonian for sound waves in boundary layers", *International Conference on Structural Engineering Dynamics*, Sezimbra.
- June 2013**
VII.88
- D.204 L.M.B.C. Campos "On a law of intensity of radiation for acoustic-vortical waves", *International Conference on Structural Engineering Dynamics*, Sezimbra.

- June
2013
VII.89** D.205 L.M.B.C. Campos & F.S.R.P. Cunha "On shock waves in a chemically reacting gas", *International Conference on Structural Engineering Dynamics*, Sezimbra.
- June
2013
VII.90** D.206 L.M.B.C. Campos & J.M.G. Oliveira "On the effect on far-field noise of a non-uniform liner in a nozzle", *International Conference on Structural Engineering Dynamics*, Sezimbra.
- June
2013
VIII.38** D.207 L.M.B.C. Campos & J.M.G. Marques "On the relation between air traffic capacity, separation and safety", *Integration in air Transport*, Ecole Nationale de L'Aviation Civile, Toulouse.
- June
2013
VIII.39** D.208 L.M.B.C. Campos & J.M.G. Marques "On wake vortex separation distances: theory compared with regulations", *Integration in air Transport*, Ecole Nationale de L'aviation Civile, Toulouse.
- Sept
2013
V.17** D.209 L.M.B.C. Campos & F.S.R.P. Cunha "On torsional vibrations of a rod with non-equilateral triangular cross-section", *11th International Conference on Vibration problems ICOVP-2013*, Lisbon.
- Sept
2013
V.18** D.210 L.M.B.C. Campos "On a non-linear theory of buckling of elastic beams", *11th International Conference on Vibration Problems I.COVP-2013*, Lisbon.
- Sept
2013
V.19** D.211 L.M.B.C. Campos "On four types of elastic instabilities of bars", *11th International Conference on Vibration Problems ICOVP-2013*, Lisbon.
- Sept
2013
VII.91** D.212 L.M.B.C. Campos & P.G.T.A. Serrão "Sound refraction by stratification and wind in an atmosphere" *17th ASC-CEAS/X-NOISE EV Workshop*, Seville.
- Sept
2013
VII.92** D.213 L.M.B.C. Campos & F.S.R.P. Cunha "On the modification of the acoustic power spectra by atmospheric turbulence". *17th ASC-CEAS/X-NOISE EV Workshop*, Seville.
- Sept
2013
VII.93** D.214 L.M.B.C. Campos, A.A Fonseca & J.M.G. Oliveira "Effect of building and rough ground on airport noise". *17th ASC-CEAS/X-NOISE EV Workshop*, Seville.
- Nov
2013
VIII.40** D.215 L.M.B.C. Campos, J.A.M.G. Marques "On runway capacity and wave vortex safe separation distance" (SSD), *3rd Sesar Innovation Days*, KTH. Stockholm.
- Sept.
2013
VII.94** D.216 L.M.B.C. Campos, C. Legendre & C. Sambuc "On sound absorption by an acoustic liner with bias flow", *29th international Congress of Aeronautical Sciences*, St. Petersburg, Russia.
- Sept.
2013
VII.95** D.217 L.M.B.C. Campos & F.S.R.P. Cunha "On the internal structure of shock waves in a relaxing gas", *29th international Congress of Aeronautical Sciences*, St. Petersburg, Russia.
- Sept.
2013
VIII.41** D.218 L.M.B.C. Campos, & J.M.G. Marques "On aircraft response and control during a wake vortex encounter" *29th International Congree of Aeronautical Sciences*. St. Petersburg, Russia.

- Nov.
2013
VIII.42** D.219 L.M.B.C. Campos, & J.M.G. Marques "On runway capacity and wave vortex safe separation distance (SSD)" *Sesar Innovation Days*. KTH, Stockholm.
- May
2014
VIII.43** D.220 L.M.B.C. Campos & J.M.G. Marques "On the loss of roll control induced by the wave vortex hazard", *Wakenet-Europe Workshop*, May 2014, Eurocentrol Experimental centre, Bretgny, France.
- July
2014
VII.95** D.221 L.M.B.C. Campos "On wave generation in a sheared and swirling mean flow", *ICNPAA Congress Narvik. on Mathematical Problems in Engineering, Aerospace and the Sciences*, narvik.
- July
2014
VII.96** D.222 L.M.B.C. Campos & P.G.T.A. Serrão, "On the discrete and continuous spectra of acoustic-vortical waves". *ICNPAA (Congress on Mathematical Problems in Engineering, Aerospace and the Sciences)*, Narvik.
- July
2014
V.20** D.223 L.M.B.C. Campos "On a generalized Bessel differential equation and associated functions", *ICNPAA Congress on Mathematical Problems in Engineering, Aerospace and the Sciences*, Narvik.
- July
2014
VII.97** D.224 L.M.B.C. Campos & F.J.P.Lau "On the stability of a uniform flow with rigid body rotation. *ICNPAA Congress on Mathematical Problems in Engineering, Aerospace and the Sciences*, Narvik.
- Sept.
2014
VII.98** D.225 L.M.B.C. Campos & F.S.R.P. Cunha "On the internal structure of shock waves in a relaxing gas", *29th congress of the International Council of Aeronautical Sciences*, St. Petersburg.
- Sept.
2014
VIII.99** D.226 L.M.B.C. Campos & C. Legendre, "On sound absorption by an acoustic liner with bias flow", *29th Congress of the International Council of Aeronautical Sciences*, St. Petersburg.
- Sept.
2014
VIII.44** D.227 L.M.B.C. Campos & J.M.G. Marques, "On aircraft response and control during a wave vortex encounter", *29th Congress of the International Council of Aeronautical Sciences*, St. Petersburg.
- Set.
2014
VII.100** D.228 L.M.B.C. Campos & J.M.G.S. Oliveira, "On sound generation in a duct with non-uniform wall impedance, *Forum Acusticum*, Krakow.
- Set.
2014
VII.101** D.229 L.M.B.C. Campos & P.G.T.A. Serrão, "On waves in a nozzle with sheared and swirling mean flow", *Forum Acusticum*, Krakow
- Set.
2014
VII.102** D.230 L.M.B.C. Campos "On the propulsive and aerodynamic noise of aircraft", *Forum Acusticum*, Krakow.
- Set.
2014
VII.103** D.231 L.M.B.C. Campos F.J.P. Lau & J.M.G. Oliveira "On active noise reduction in aircraft cabins and engine nozzles", 4th X-noise-EV Scientific Workshop, Vilnicie, Estonia.
- Oct.
2014
VIII.45** D.232 L.M.B.C. Campos, "On parametric analysis of the aerothermodynamics of fluid-structure interaction", 65th *International Astronautical Congress*, Toronto.

- Nov.
2014
VII.105** D.233 L.M.B.C. Campos & J.M.G.S. Oliveira, "On the enhanced sound absorption of non-uniform liners", *Internoise 2014*, Melbourne.
- Nov.
2014
VII.106** D.234 L.M.B.C. Campos, C. Legendre & C. Sambuc, "On the effect of shear and bias flows on the performance of acoustic liners", *Internoise 2014*, Melbourne.
- Nov.
2014
VII.107** D.235 L.M.B.C. Campos, "On the reduction of engine and aerodynamic noise of aircraft", *Internoise 2014*, Melbourne.
- Mar
2015
VIII.46** D.236 L.M.B.C. Campos, "On an analytical model of thermal coupling of a viscous fluid and an elastic wall with ablation", *8th European Conference on Aerothermodynamics for Space Vehicles*, Instituto Superior Técnico, Lisbon, Portugal.
- June
2015
VII.108** D.237 L.M.B.C. Campos, "On new criterion for combustion stability", *Clean Air Conference*, Instituto Superior Técnico, Lisbon, Portugal.
- June
2015
VII.109** D.238 L.M.B.C. Campos & A. Marta, "On the stability of a compressible, vortical, non-isentropic mean flow", *Clean Air Conference*, Instituto Superior Técnico, Lisbon, Portugal.
- Jul.
2015
VII.110** D.239 L.M.B.C. Campos & P.G.T.T.A. Serrão, "On sound propagation in a thermally stratified atmosphere over an impedance ground", *International Congress of Sound and Vibration ICSV22*, Florence, Italy.
- Jul.
2015
VII.111** D.240 L.M.B.C. Campos & J.M.G.S. Oliveira, "On the effect of non-uniform liner impedance on sound radiation from a nozzle", *International Congress of Sound and Vibration ICSV22*, Florence, Italy.
- Jul.
2015
VII.112** D.241 C. Legendre & L.M.B.C. Campos, "On the effects of shear and bias flows on the performance of acoustic liners", *International Congress of Sound and Vibration ICSV22*, Florence, Italy.
- Sept.
2015
VIII.47** D.242 L.M.B.C. Campos & J.M.G. Marques, "On the minimization of cruise drag due to pitch trim", *5th Air and Space Conference of the CEAS (Council of European Aerospace Societies)*, Delft.
- Sept.
2015
VII.113** D.243 L.M.B.C. Campos & Marta, A.C.M. "On acoustic-vortical-entropy waves and thermo-acoustic flow instabilities" *5th Air and Space Conference of the CEAS (Council of European Aerospace Societies)*, Delft.
- Sept.
2015
VII.114** D.244 L.M.B.C. Campos & F.S.R.P. Cunha, "On the aerodynamic noise of wings and wakes", *19th Workshop of the Aeroacoustics Specialist Committee (CEAS) on "Broadband noise of rotors and airframe"*, la Rochelle.
- Sept.
2015
VIII.48** D.245 L.M.B.C. Campos & J.M.G. Marques, "On the coupling of longitudinal-lateral airplane stability with application to flying wings", *Aircraft Noise and Emissions Reduction Symposium (ANERS)*, la Rochelle.
- Sept.
2015
VII.115** D.246 L.M.B.C. Campos, "On the extension of Lighthill's eighth-power law of aeroacoustics to sheared and swirling mean flows", *Aircraft Noise and Emissions Reduction Symposium (ANERS)*, la Rochelle.

- Marc.
2016
V.20** D.247 L.M.B.C. Campos, "On the non-linear buckling with large slope of elastic beams", *1st International Conference on Vibrations and Buckling*, Porto.
- Marc.
2016
V.21** D.248 L.M.B.C. Campos, "On the buckling of on elastic beam supported on springs", *1st International Conference on Vibrations and Buckling*, Porto.
- Marc.
2016
V.22** D.249 L.M.B.C. Campos, "On the non-linear coupling of bending and in-plane stresses in a plate", *1st International Conference on Vibrations and Buckling*, Porto.
- Marc.
2016
VII.116** D.250 L.M.B.C. Campos & C. Legendre, "On the interaction of an acoustic liner with a boundary-layer and cross flow", *22th AIAA/CEAS Aeroacoustics conference*, Lyon.
- Marc.
2016
VII.116** D.251 L.M.B.C. Campos, "On the generalization of Lighthill's eighth power law to acoustic-vortical waves", *22th AIAA/CEAS Aeroacoustic Conference*, Lyon.
- June.
2016
VII.49** D.252 L.M.B.C. Campos, "On novel aircraft configurations: beyond the tube and wing". Opening plenary lecture, *Congress on Engineering Mechanics (CEM)*, Porto.
- Sept.
2016
VII.117** D.253 L.M.B.C. Campos & F.J.P. Lau, "On the annalysis and synthesis of noise from low-and high-speed propellers", *30th Congress of the International Council of Aeronautical Sciences (ICAS)*, Daenjeon, Korea.
- Sept.
2016
VII.118** D.254 L.M.B.C. Campos & A.C. Marta, "On acoustic-vortical entropy waves in propulsions systems", *30th Congress of the International Council of Aeronautical Sciences (ICAS)*, Daenjeon, Korea.

E. RESEARCH PROJECTS

Funded by European Union: E.7, E.8, E.9, E10, E 11, E.12, E.13, E.20, E.25, E.26, E.27, E.28, E.29, E.30, E.31, 32, E.34, E.35, E.36

E.0. Partners in Projects (leader is underlined>)

*IST

leader in - Bafr, Nftf, E.14, E.15, Efedal, Rsf, Aerolis, AAWT, SVI,
 partner in - Helinoise, Asanca, Acoufat, Amaks, Snaap, Helishape, Asanca II, E.16,
 E.17, Apian, Aewt,
 S-Wake, Enable, Jean, Silence®, Rosas, X-Noise, Sefa, Friendcopter

*Aircraft Industry

AER MACCHI	- Silencer
AIRCELLE	- Silencer
ALENIA	- Acoufat, Asanca, <u>Snaap</u> , Asanca II, Apian, Enable, Silencer, X-Noise
AEROSPATIALE	- Acoufat, Snaap, Asanca II, <u>Apian</u> , Silencer
AIRBUS France	- Rosas, Vela, X-Noise, Nefa
AIRBUS Deutschland	- Rosas, Vela, X-Noise, Nefa
AIRBUS Espana	- Vela, Nefa
AIRBUS UK	- Rosas, X-Noise
AGUSTA	- Helinoise, Helishape, Friendcopter
BRITISH AEROSPACE	- Acoufat, Silencer
CASA	- Asanca II, Apian
DAIMLER-CHRYSLER AEROSPACE	- <u>Asanca II</u> , S-wake, Enable, Silencer
DASSAULT AVIATION	- <u>Acoufat</u> , <u>Enable</u> , Jean, Silencer, X-Noise
DEUTSCHE AIRBUS	- Acoufat
DORNIER	- <u>Asanca</u> , Acoufat, Snaap, Apian, Enable, Silencer, X-Noise, <u>Sefa</u>
EADS	- Sefa
EADS Deutschland	- Friendcopter
EUROCOPTER	- <u>Helishape</u> , <u>Friendcopter</u>
EUROCOPTER Fance	- Helishape
FOKKER	- Asanca, Acoufat, Snaap, Asanca II, Apian, Silencer
MTU	- Silencer, X-Noise
MBB (Messerschmitt-Bolkow-Bohm)	- <u>Helinoise</u> , Acoufat
PZL Swidnik	- Friendcopter
ROLLS-ROYCE	- Jean, Silencer, Rosas, X-Noise
ROLLS-ROYCE Deutschland	- Silencer, Rosas
SAAB	- Asanca, Acoufat, Asanca II, Silencer
SABCA	- Acoufat
SHORTS	- Silencer
SNECMA	- Jean, Silencer, Sefa
SONACA	- Silencer
TURBOMECA	- Silencer, Friendcopter
VOLVO AERO CORP	- Jean
WESTLAND	- Helishape, Friendcopter

*Research Centres

ARA (Aircraft Research Association)	- Snaap
CIRA (Centro Italiano Ricerce Aerospaziale)	- Helinoise, Snaap, Helishape, Asanca II, Apian, Enable, Rosas, X-Noise, Friendcopter
CERFACS	
DLR (Deutsche Forschungsanstalt für Luft- und Raumfahrt)	- Nftf, Helinoise, Helishape, Apian, S-Wave, Silencer, ...Rosas, Vela, Nefa, Sefa, Friendcopter
DNW (Dutch-German Wind Tunnel)	- Helinoise, Snaap, Apian
DERA (Defence Evaluation and Research Agency)	- Helishape, Aewt, Enable, Jean, Silencer
FFA (SWEDEN)	- Asanca II, Enable

IABG (Ottobrunn)	- Acoufat
IFADO (Forschungsgesellschaft für Arbeitsschutz und Arbeitsphysiologie)	- Sefa
IMFL (ONERA-Lille)	- Helishape
INTA	- Vela, Nefa
INRETS (Institut National de Recherche sur les Transports et leur Sécurité)	- Sefa
ISQ (Instituto de Soldadura e Qualidade)	- Aerolis, Friendcopter
ITAP (Institut für Angewandte Physik)	- Sefa
NLR (National Lucht- und Ruimtevaart Laboratorium) Holland	-Bafr, Snaap, Helishape, <u>E.16</u> , <u>E.17</u> , Apian, S-Wake, Enable, Silencer, Rossas, Vela, X-Noise, Friendcopter
ONERA (Office National des Etudes et Recherches Aérospatiales))	-Acoufat, Helishape, Snaap, Apian, S-Wake, Jean, Silencer, Rosas, X-Noise, Nefa, Sefa, Friendcopter
QINETIQ	-X-Noise
TNO-IAP (Institute of Applied Physics)	- Asanca, Asanca II

*Universities

BERLIN TU	- S-Wake
BRAUNSCHWEIG TU	- Bafr, S-Wake, Vela, Nefa
BRISTOL	- Helinoise, Helishape, Vela
BUDAPEST	- X-Noise, Sefa
CERGY- Pontoise	- Sefa
CITY (London)	- Friendcopter
CHALMERS	- Jean
COPENHAGEN DENMARK TU	- Helishape
DELFT, TU	- Rsf
ECL (Ecole Central de Lyon)	- Enable, Jean, Silencer
HELSINKA	- Nefa
INSA (Lyon)	- Nefa
ISTRAM	- Acoufat
GREENICH	- Vela
KALRSKRONA	- Asanca II, Enable
LAUSANNE(EFPC)	- Silencer
LE MANS	- Silencer
LEUVEN, Katholick Universiteit	- Asanca, Acoufat, Asanca II
MARSEILLE (CNRS-LMA)	- Asanca, Asanca II
MANCHESTER	- X-Noise
MILANO	- Friendcopter
MUNCHEN	- Vela
NAPOLI	- Asanca II, Enable, Sefa
OLDENBURG	- Friendcopter
PATRAS	- Asanca, Asanca II, Friendcopter
PRAGUE	- X-Noise
RIGA	- Friendcopter
ROMA III	- Acoufat, Sefa, Friendcopter
SOUTHAMPTON (ISVR)	- Enable, Silencer, Jean, Sefa
STOCKHOLM (KTH)	- Jean, Sefa, Friendcopter
STUTGART	- Helishape
TRINITY COLEGE DUBLIN	- Asanca, Snaap, Asanca II, Apian, <u>Jean</u> , Rosas, X-Noise
UNIVERSITY COLLEGE GALWAY	- Snaap, Apian
ZURICH, ETH	- Asanca II

*Companies

AIR TECH	- Apian
ALFAPI (Greece)	- Helinoise, Helishape
AI Systems (Belgium)	- <u>Amaks</u>
ANOTEC	- X-Noise, Friendcopter
ASR	- Rosas

ATECA	- Silencer
C.R.F. Societa Consortile per Azioni	- Sefa
DAHER Lottelier Technologies	- Friendcopter
BA (British Airways)	- S-Wake
B & K (Bruel & Kjaer)	- Helinoise, Silencer
DFS (Deutsche Flugsicherung)	- S-Wake
DOWTY	- Snaap, Apian, Silencer
Flight Data Company	- S-Wake
Free Field technologies	- X-Noise, Friendcopter
FORMTECH	- Friendcopter
GAPTEC (Ireland)	- Asanca
GAMESA	- Friendcopter
GECI International	- Aerolis
GFIC	- X-Noise
HEGAN	- Silencer
HISPANO-SUIZA	- Silencer
HOFFMAN	- Snaap
HUREL-HISPANO	- Rosas, Friendcopter
IA (Industrienlagen-Betriebsgesellschaft)	- Acoufat
IBK (Ingenieur Buro Kretschmar)	- Snaap, Apian, Vela
IET (Ingenieria et Economia del Transporte)	- Friendcopter
INASCO	- Enable, Silenceer, X-Noise
ISDEFE	- Friendcopter
INDECON (Spain)	- Amaks, Inasco-Enable
LMS (Leuven Measurement Systems)	- Asanca, Asanca II, Sefa, Friendcopter
MATRA CAP SYSTEMES	- Asanca, Asanca II
METRAVIB (Lyon)	- Asanca, Asanca II, Silencer, Sefa
OMS (Spain)	- Amaks
PEDECE	- Vela, Nefa
PER UDSEN (Denmark)	- Acoufat
RATIER-FIGEAC	- Snaap, Apian
RESON SYSTEMS (Denmark)	- Asanca
SASS Acoustic Research	- Sefa
SENER	- Vela
SITRA (Ferland)	- Silencer
TURBOMECANICA (Romania)	- X-Noise
VERTAIR	- Friendcopter
VIBRATEC	- Silencer
VTT (Ferland)	- Silencer
ZF	- Friendcopter

***National Organizations**

ANA (Aeroporos e Navegação Aérea)	- Efedal
CNRS	- Jean
COMOTI (Romania)	- Jean, Silencer
DFS (Deutsche Flugsicherung)	- S-Wake
FAP (Portuguese Air Force)	- Bafr, Nfft, E.14, E.15, E.16, E.17, Efedal
KNL (Dutch Air Force)	- E.17
Meteo France	- S-Wake
OGMA (Oficinas Gerais de Material Aeronáutico)	- Bafr
NATS (National Air Traffic Services)	- S-Wake
UKMO (UK Meteo Office)	- S-Wake

***International Organizations**

EUROCONTROL	- Efedal, X-Noise
ESA (European Space Agency)	- TVTC

- 1988-1992**
XII.1 **E.1 -** BAFR (*Basic Aircraft for Flight Research*): Conversion of a CASA 212 Aviocar, of the Portuguese Air Force, to flight test aircraft, using part of 0.5 million US dollars worth of flight test equipment offered by NLR (National Aerospace Laboratory of the Netherlands). Other contributors: AGARD – funding of travel and consultants under support Project P45; BTU – Braunschweig Technical University – training of engineers in flight test techniques at Institut für Flugführung; OGMA – installation of instrumentation and cabling (6 Kms) in aircraft; JNICT – National Board for Scientific and Technical Research: funding for set-up of Aeronautics Laboratory at IST; FAP – Portuguese Air Force – certification of modifications and operation of aircraft.
- 1988-1990**
XI.1 **E.2 -** “*Acoustics of Inhomogeneous and moving media*”, funded by JNICT, Programa Mobilizador.
- 1988-1990**
IX.1 **E.3 -** “*Special Functions and Mechanics of Continua*”, funded by JNICT, Programa Mobilizador.
- 1988-1990**
X.1 **E.4 -** “*Solar Physics*”, funded by JNICT, Programa Mobilizador.
- 1990-1992**
XII.2 **E.5 -** NFTF (*National Flight Test Facility*): addition of telemetry and further recording capability to BAFR (**E.1**). Support from AGARD project P87, involving DLR (Deutsche Versuchsanstalt für Luft-und-Raumfahrt) in Braunschweig.
- 1990-1992**
X.2 **E.6 -** “*Solar Physics*”, funded by JNICT, under program PESO – Portugal joining European Southern Observatory
- 1990-1992**
XI.2 **E.7 -** HELINOISE: *Helicopter Rotor Noise Reduction*: Industrial Research Project, funded by European Community, under 2nd Framework Programme, Pilot Programme Aeronautics; leader: MBB – Messerschmitt-Bölkow-Böhm; partners – see table **F.0**; role of IST – prediction of broadband component of rotor noise and comparison with full scale helicopter tests.
- 1990-1992**
XI.3 **E.8 -** ASANCA: *Advanced Study of Active Noise Control in Aircraft*; Industrial Research Project, funded by European Community under 2nd Framework Programme, Pilot Programme Aeronautics; leader: Dornier GmbH; partners: see table **F.0**; ; role of IST – optimization of position and characteristics of anti-noise sources, for installation in Dornier Do 228 aircraft.
- 1990-1992**
XI.4 **E.9 -** ACOUFAT: *Acoustic Fatigue of Composite and Advanced Structures*; Industrial Research Project, funded by European Community, under 2nd Framework Programme, Pilot Programme Aeronautics; leader: Dassault Aviation; Partners: see table **F.0**; role of IST: analytical prediction of correlation of acoustic pressures induced by turbulent wakes on nearby structures, and comparison with wind tunnel tests at ONERA Modane S1 transonic tunnel.
- 1991-1993**
XII.3 **E.10 -** AMAKS: “*Applications of Multi-Agent Knowledge-Based Systems*”; Esprit Exploratory Action, funded by European Community, as leader: AI Systems; partners – see table **E.0**; role of IST – automated analysis of flight test data.
- 1992-1994**
XI.5 **E.11 -** SNAAP: *Study of Noise and Aerodynamics of Advanced Propellers*; Industrial Research Project, funded by European Community, under 3rd Framework Programme, Intermediate Aeronautics Programme; leader: Alenia; partners: see table **F.0**; role of IST – prediction of noise radiation of a propeller with angular inflow, and comparison with wind tunnel tests performed at ARA (Aircraft Research Association), Bedford and DNW (Dutch-German Wind Tunnel) in Nordpolder, Holland.

- 1992-1994**
XI.6 **E.12 -** HELISHAPE: *Helicopter Aerodynamics and Aeroacoustics*; Industrial Research Project, funded by European Community, under 3rd Framework Programme, Intermediate Aeronautics Programme; leader: Eurocopter Deutschland GmbH; partners: see list F.0.; role of IST – prediction of impulsive and broadband noise of a rotor and comparison with tests of a scale model rig at DNW wind tunnel.
- 1993-1995**
XI.7 **E.13 -** ASANCA II: *Advanced Study of Active Noise Reduction in Aircraft*, part II; Industrial Research Project, funded by European Community, under 3rd Framework Programme, Intermediate Aeronautics Programme; leader: Daimler-Benz Aerospace; partners – see list E.0.; role of IST – optimization of anti-noise sources and anti-vibration actuators for ground rig and flight tests of Dornier Do 328, Fokker 100, Saab 2000 and Aerospatiale/Alenia ATR 42 regional aircraft.
- 1993**
XII.4 **E.14 -** Flight tests of SILABO external store, combining a fuel tank with a decoy dispenser, for the *Fiat G-91R* of the Portuguese Air Force.
- 1993**
XII.5 **E.15 -** Flight tests of hover performance of *Aerospatiale SA.330 Puma* medium lift helicopter, in search-and-rescue mission over heavy seas, for the Portuguese Air Force.
- 1994**
XII.6 **E.16 -** In-flight measurement of structural loads and engine wear on *Ling-Temco-Vought A-7P Corsair II* and its Pratt & Whitney TF30-P-6 turbofan; leader – NLR (National Aerospace Laboratory) of Holland; role of IST – verification of sensor installation, data conditioning, a recording and analysis methods, and conduct of test flights; funded by Portuguese Air Force;
- 1994**
XII.7 **E.17 -** In-flight measurement of structural loads on *Lockheed P-3 Orion* maritime patrol aircraft of Dutch (P-3C) and Portuguese (P-3P) Air Forces; leader – NLR of Holland; role of IST – testing on P-3P, similar to that on P-3C.
- 1995-2000**
XII.8 **E.18 -** EFEDAL (*European Flight Experiments on four-Dimensional Approach and Landing*); funded by Eurocontrol; partners – see table F.0.; role of IST – leader, overall project management, design of flight test hardware, and interfaces and software, flight test data handling.
- 1996**
XII.9 **E.19 -** RSF (*Research Simulator Facility*); transfer of 3 degree-of-freedom, night-vision flight simulator from Flight Control Group, Aerospace Engineering Department, Delft University of Technology; support for travel and consultants from AGARD program P111.
- 1996-2000**
XI.8 **E.20 -** APIAN (*Advanced Propulsion Integration of Aerodynamics and Noise*); Industrial Research Project, funded by European Union, under 4th Framework Programme, Industrial and Materials Technology/Aeronautics sub-programme; leader – Aerospatiale; partners – see table F.0.; role of IST – prediction of noise radiation from advanced counter-rotation propellers, and comparison with scale tests at DNW and ONERA S1 wind tunnels.
- 1997-2000**
X.3 **E.21 -** *Solar Wind*, funded by FCT, under program PESO – Portugal and European Southern Observatory.
- 1997-2000**
X.4 **E.22 -** *Solar-Terrestrial Physics*; Computational Infra-structure, funded by FCT, under program PESO – Portugal European Southern Observatory.
- 1997-2000**
X.5 **E.23 -** *Solar Physics*, funded by FCT, under program PESO – Portugal European Southern Observatory.
- 1998**
XII.10 **E.24 -** AEWT (*Aeroacoustic Wind Tunnel*), Industrial Research Project, funded by FCT, transfer of aeroacoustic wind tunnel, maximum speed 60 ms, and open 1.5m test section in anechoic chamber, from RAE (Royal Aircraft Establishment) / DRA (Defence Research Agency) / DTEA (Defence Technology and Evaluation Agency) in Farnborough.

- 2000-2003**
XII.11 **E.25 –** S-WAKE (*Assesment of Wake Vortex Safety*); Industrial Research Project, funded by European Union, under 5th Framework Programme, 1st call, Promoting Competitive and Sustainable Growth/Key Action Aeronautics; leader – NLR; partner: see table F-0; role of IST – establishment of analytical formulas to predict safe separation distance between aircraft, based on aerodynamic, control and flight parameters and atmospheric conditions, and comparison with computer models, piloted simulations and flight tests.
- 2000-2003**
XI.10 **E.26 –** ENABLE (*Environmental Noise Associated with Turbulent Boundary Layer Excitation*); Industrial Research Project, funded by European Union 5th Framework Programme, 1st call, Promoting Competitive and Sustainable Growth/Key Action Aeronautics; Leader-Dassault; partners: see table F-0; role of IST-prediction of sound generation by turbulence in a boundary layer and of the correlation of the acoustic pressure induced on the fuselage of an aircraft.
- 2001-2004**
XI.11 **E.27 -** JEAN (*Jet Exhaust Aerodynamics & Noise*); Basic Research Project funded by European Union, under 5th Framework Programme, 2nd call, Promoting Competitive and Sustainable Growth/Key Action Aeronautics; Leader – Trinity College Dublin; partners: see Table F-0; role of IST – research on (1) the relation between the spectrum of turbulence and the spectrum of noise it radiates, and (2) on the transmission of sound in a shear layer.
- 2001-2005**
XI.12 **E.28 -** SILENCER [*Significantly Lower Community Exposure to Noise (Reduction)*]; Large-scale demonstration project, funded by European Union, under 5th Framework Programme, 2nd call, Promoting Competitive and Sustainable Growth/Key Action Aeronautics; leader – SNECMA; partners: see Table F0; role of IST: optimization of non-uniform circumferential and longitudinal impedance distribution in engine ducts.
- 2002-2005**
XI.13 **E.29 -** ROSAS (*Research on Silent Aircraft Concepts*); Industrial Research Project, funded by European Union, under 5th Framework Programme, 3rd call, Promoting Competitive and Sustainable Growth/Key Action Aeronautics; leader – EADS; partners: see Table F0; role of IST: modeling the effect of the wing in shielding the noise from the engines.
- 2002-2005**
XII.12 **E.30** VELA (*Very Efficient Large Aircraft*); Industrial Research Project, funded by European Union, 5th Framework Programme, 3rd call, Promoting Competitive and Sustainable Growth/Key Action Aeronautics; leader – EADS – Germany; partners: see Table F0; role assessments of the stability of flying wing aircraft.
- 2002-2005**
XI.14 **E.31 -** X-NOISE (*Aircraft External Noise Network*), Phase II, funded by European Union, 5th Framework Programme, 3rd call, Promoting Competitive and Sustainable Growth/Key Action Aeronautics; leader: Snecma-France; partners: see Table 0; role of IST: support task 5: Scientific Exchanges (e.g. rapporteur of workshop on “Aeroacoustics of supersonic transport”)
- 2003-2005**
XII.13 **E.32** NEFA (*New Empenage For Aircraft*) funded by European Union, 5th Framework Programme, 3rd call, Promoting Competitive and Sustainable Growth / Key Action Aeronautics; leader: Airbus France; partners: see table 0; role: assessment of coupling of longitudinal and lateral stability.
- 2003-2004**
XII.14 **E.33** AEROLIS, *Comissão de Coordenação Regional de Lisboa e Vale do Tejo (CCR-LVT)*, Programme LisAction, leader: IST; partners: ISQ and GECl. Instalation of aerodynamic wind tunnel at aeronautics Laboratory of IST.
- 2004-2006**
XI.15 **E.34** SEFA (*Sound Engineering For Aircraft*), funded by European Union, 6th Framework Programme 1st call, key Action Aeronautics; leaden: Dornier; partners: see table 0; role of IST: model of aircraft noise and effects of atmospheric propagation.

2004-2009 XI.16	E.35	<i>FRIENDCOPTER (Integration of Technologies in support of a passenger and environmentally friendly helicopter), funded by European Union, 6th Framework Programme, 1st call, Action Aeronautics; leader: Eurocopter; partners: see table 0; role of IST: model of helicopter noise and ground effects.</i>
2005-2010 XII.15	E.36	<i>NACRE (New Aircraft Concepts Research), funded by European Union, 6th Framework programme, 2nd call, Action Aeronautics, leader:Airbus; partners :see table 0; role: airframe noise shielding and cruise drag minimization.</i>
2005-6 XII.16	E.37	<i>TAA (Aerodynamic and Aeroacoustic Wind Tunnel)- Installation of anechoic chamber at aerodynamic wind tunnel at Aeronautics Laboratory at IST, together with force and moment balance, fluid dynamics and acoustic instrumentation and data acquisition system; funding from Foundation for Science and Technology-Equipment Programme.</i>
2005-6 XII.17	E.38	<i>SVI (Research Flight Simulator) – Installation of a 6 degree-of-freedom research flight simulator with Fokker F.27 Friendship cockpit in Aeronautics Laboratory at IST; funding from Foundation for Science are Technology, Equipment Programme.</i>
2007-10 XI.17	E.39	<i>X3-NOISE (Aircraft Noise Network) – Phase III, funded by the European Union, under the 6th Framework programme, 1st call, European Research Area/Aeronautics; leader-SNECMA-France; Partners-see table 0; role of IST: Support task 5: Scientific exchanges (e.g. organization of “Combustion Noise” workshop in Lisbon, September 2007, guest editor with W. Schroeder of special issue of International Journal of Aeroacoustics).</i>
2007-8 XII.18	E.40	<i>FLPP (Future Launchers Preparatory Programme): - Phase 2, step 1, funded by European space agency; leader: Astrium GmbH; sub-contact to: Deimos: role of IST: calculation of trajectories of reusable launch vehicles (RLVs) including lift in atmospheric flight and its effect on orbital insertion.</i>
2009-2011 XI.18	E.41	<i>COSMA (Community Oriented Solutions to Minimize aircraft noise annoyance), funded by European Union, 7th Framework Programme, 2nd Call, Aeronautics; leader: EADS-Innovation Works; partners: see Table 0; role of IST: models of: (i) propagation in atmospheric turbulence and wind; (ii) effects of ground and obstacles on sound (iii); jet and turbine noise source components for engines.</i>
2011-2014 XI.19	E.42	<i>X-NOISE EV (Aircraft Noise Network) – Phase IV, funded by the European Union, 7th Framework Programme, 3rd Call. Leader-SNECMA, France.</i>

F. CAREER AND FUNCTIONS*Degrees – F.1, F.4, F.16**Career – F.2, F.3, F.6, F.7, F.26, F.60, F.69, F.91,**Awards – F.5, F.17, F.60, F.127**Chairmanships – F.9, F.19, F.50, F.59, F.74, F.100**Organizer – F.22, F.32, F.36, F.40, F.42, F.93, F.130, F.136, F.141**Memberships – F.44, F.63, F.94, F.95, F.105, F.120, F.126, F.127**Representative – F.27, F.30, F.31, F.34, F.46, F.48, F.58, F.59, F.77, F.79, F.83, F.128**Supervisions – F.62, F.65, F.68, F.85, F.86, F.110, F.112, F.116, F.118, F.134, F.135, F.142*

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|----------------------------|--------|--|
| 1967-72
XV.1 | F.1 – | Lisbon Technical University, Instituto Superior Técnico, <i>Diploma of Mechanical Engineer</i> , final mark: 17 out of 20 (very good, with distinction). |
| 1970-2
XIV.1 | F.2 – | Exercises classes: monitor of <i>General Physics</i> . |
| 1972-4
XIII.1 | F.3 – | Theoretical classes: assistant of <i>Applied Mathematics</i> . |
| 1974-7
XIV.2 | F.4 – | <i>Doctorate (Ph.D.)</i> : Cambridge University, Department of Engineering, thesis "On Waves in Fluids". |
| 1977-8
XIII.2 | F.5 – | Prize: Trinity College, Cambridge: <i>Senior Rouse Ball Scholarship</i> ; Department of Applied Mathematics and Theoretical Physics: post-doctoral research. |
| 1978-80
XV.2 | F.6 – | <i>Auxiliary Professor</i> : Instituto Superior Técnico, applied mathematics for undergraduates and post-graduates. |
| 1980
XV.3 | F.7 – | <i>Associate Professor</i> : Tenure confirmed in 1985. |
| Dec. 1980
XV.4 | F.8 – | "Supporting research of international standard in Portuguese Universities" (in portuguese), Communication to the Congress <i>The Portuguese University in the Eighties</i> , 15 pages. |
| 1981-82
XV.5 | F.9 – | Vice-Chairman of Scientific Council of <i>Instituto Superior Técnico</i> : participation in management of school with 6000 students, 800 teaching staff, 150 auxiliary, and 50 associate and 50 full professors; coordinator of Curricular Revision, which became law, and encompasses all 8 branches of Engineering (civil, mechanical electrical, mining, chemical, materials, physical and mathematical), with 15 sub-branches, of which 2 new branches and 5 new sub-branches. |
| Aug. 1981
XV.6 | F.10 – | "Teaching at Portuguese Universities compared with international standards" (in portuguese), communication to congress <i>The Portuguese Universities in the eighties</i> , 16 pages, reprinted in <i>Técnica</i> , 1981, volume 42, number 462/463, pages 146-149. |
| Nov. 1981
XVI.1 | F.11 – | Organization of the visit, conference and consultant mission of Prof. Dr. O.H. Gerlach, <i>Chairman of AGARD 1982-5</i> , to Portugal, to advise on the developments of aeronautical activities at Lisbon Technical University. |

- 1982 XVI.2 F.12 - with F.N. Stoliker - Chairman of Session III of Symposium on "*Aircraft Handling Qualities*", at Fort Worth.
- Mar 1982 XVI.3 F.13 - *Visit* to the Universities of Braunschweig and Delft, and to the D.F.V.L.R. (Deutsche Forschung und Versuchsstalt für Luft - und Raumfahrt) Center at Braunschweig, and N.L.R. (National Luft und Ruintevaart Laboratorium) siege at Amsterdam, under sponsorship of the F.M.P. of AGARD, 24 page report, 43 references.
- May 1982 XVI.4 F.14 - *Visit* to R.A.E. (Royal Aircraft Establishment) - Bedford, C.I.T. (Cranfield Institute of Technology - College of Aeronautics, Hartfield Polytechnic, and to ONERA (Office Nationale des Etudes et Recherches Aerospatiales) - Chatillon et Chalais - Mendom, Paris et CERT (Centre d' Études et Recherches Techniques) - Toulouse, and to ENSAE (École National de l'Aeronautique et de l'Espace - Toulouse), to assess aeronautical activities, 53-page report, 112 references.
- Sep. 1982 XIV.3 F.15 - "Renewal and expansion of education at the Instituto Superior Técnico" (in portuguese), *Diário de Notícias*.
- 1982 XV.7 F.16 - Public examination for *D.Sc. degree*: Applied Mechanics and Mathematics; approved unanimously by 8-man jury.
- 1982-4 XIV.4 F.17 - *Sabbatical leave*: Department of Applied Mathematics and Theoretical Physics, Cambridge University: Senior Visitor.
- 1984 XVI.5 F.18 - with D. Kohlman - Chairman of Session III of Symposium on "*Active Control Technology*", Toronto.
- 1984 XV.8 F.19 - *Secretary*: (1984/5) Research Center for Automation of Lisbon Technical University: overall management. Coordinator (1981-) of research group 4: Applied Mechanics and Mathematics.
- 1984 XIII.3 F.20 - Consultant and conference at Department of Applied Mathematics, *St. Andrews University*.
- 1984 XIV.5 F.21 - Participant in discussion meeting: Rotation in the Solar System. *Royal Society*, London.
- 1984 XVI.6 F.22 - Local organizer, Symposium on "*Flight Test Techniques*", 150 participants from 10 countries, Lisbon.
- May 1984 XVI.7 F.23 - Organizer of a cycle of ten conferences on "*Windshear and Flight Testing*", over two days, by 9 specialists from 10 countries, at Instituto Superior Técnico.
- Feb. 1985 XVI.8 F.24 - *Visit* to MBB (Messerschmitt-Bolkow-Bohm) - Ottobrunn, near Munich, and NLR (National Luft-und-Ruimtevaart Laboratorium) - Amsterdam, to finalize plans for Germany - *The Netherlands-Portugal Cooperation Programme* on flight testing.
- 1985 T.21 XIV.6 F.25 - Consultant and conference at Freiburg *Institut für Sonnenphysik* and Gottingen Universitat *Sternwarte*.
- 1985 XV.9 F.26 - *Full Professor*: mathematical and physical modeling of technology processes (group of 7 subjects): elected by unanimous vote of 8-man jury against competition.
- 1985 XV.10 F.27 - Member of *Council of Applied Science and Technology*: National Institute for Scientific Research: advice on allocation of resources among University Research Centers on mechanical engineering, with a total of 150 researchers.

- July 1985** F.28 - *"Principles for a policy on scientific research"* (in Portuguese), report to the chairman of the National Institute for Scientific Research, 10 pages.
XIV.7
- Sep. 1985** F.29 - Organizer of two-week course on *"Fundamentals of Flight Testing"*, by D. Bruner and P. Vorsmann, from the Institut fur Flugfuhrung, Braunschweig University, at the Complexo Interdisciplinar, Instituto Superior Técnico.
XVI.9
- Feb. 1986** F.30 - Member of *Commission on evaluation of scientific research*, at the I.N.I.C. (National Institute for Scientific Research).
XV.10
- Mar. 1986** F.31 - Member of *Commission on Aeronautical Development*, appointed by the Ministeries of Transportation, Defense, Industry and Education.
XVI.10
- Abr.1986** F.32 - with J.M. Duc and D.L. Key, Technical Program Committee for the AGARD FMP Symposium on *"Helicopter Design for Operations"*, chairman of session III (with R.B. Lynn) and chairman of closing round-table discussion, Toulouse.
XVI.11
- May 1986** F.33 - Host of 2-week visit and conference on *"Fractional Calculus and Applications"*, by professor B. Ross of the University of New Haven, Connecticut, at Instituto de Física-Matemática, Lisbon.
XIII.4
- Jun. 1986** F.34 - Member of negotiation team on *Franco-Portuguese cooperation in aeronautics*, 6 page report.
XVI.12
- Jul. 1986** F.35 - *Visit to European Space Agency (ESA) Research Centres: ESTEC (European Space Technology Centre), Noordwijk, ESOC (European Space Operations Centers), Darmstadt, and ESRI (European Space Research Information Network), Frascati, to advice on feasibility of Portuguese membership (with J.C. Salema and M.T.V.T. Lago).*
XVI.13
- Set.1986** F.36 - Member of Organizing Committee, chairman of session III, author of paper in session I, in *"2nd International Symposium on Aviation Safety"*, Toulouse.
XVI.14
- Oct. 1986** F.37 - *"Perspectives for the development of aerospace engineering"* (in portuguese), 16-page report to the Scientific Council of Instituto Superior Técnico.
XVI.15
- Nov. 1986** F.38 - "On the teaching of mathematical and physical modeling to engineering students" (in portuguese), communication to the Congress on *The education of engineering students*, 10 pages.
XIII.5
- Dec. 1986** F.39 - Proposer of the award of the degree *Doctor Honoris Causa*, to Sir James Lighthill, by the Technical University of Lisbon.
XIV.8
- Jul. 1987** F.40 - European Coordinator, Technical organizer with C.E. Adolph and E.V. Laitone, of AGARD Lecture Series 153 *"Integrated Design of Advanced Fighters"*, in London, Lisbon and S. Francisco.
XVI.16
- Oct. 1988** F.41 - Member of Organizing Committee and Chairman of the 1st session of *3rd International Symposium on Aviation Safety*, Toulouse, Sept. 1988.
XVI.17
- May 1988** F.42 - Local organizer of meeting of *Flight Test Techniques Working Group*, Sintra and Alverca.
XVI.18
- Jan. 1989** F.43 - *Report to the CEC on Research & Development in Aeronautics in Portugal*, 125 p.
S.1
XVI.19
- Feb. 1989** F.44 - Member of *Aeronautical Research and Technology Advisory Committee (ARTCO)* of the EEC
XVI.20

- May 1989** F.45 - Invited conference: "*Acoustics of Flows*", in spring meeting in Lisbon of ERCOFACTS (European Community Research on Flow, Turbulence and Combustion).
XV.11
- Jun. 1989** F.46 - Representative of Portugal, nominated by JNICT, at the Management Committee of the *BRITE/EURAM Area 5 (Aeronautics)* of CEC 2nd Framework R&D program.
XVI.21
- Jul. 1989** F.47 - *Visit* to Deutsche Luftraumfahrt Laboratorium in Braunschweig, and Institut fur Flugmechanik of Carolo-Wilhelmina Universitat.
XVI.22
- Aug. 1989** F.48 - Member of the *International Council of Aeronautical Sciences (ICAS)*, and of the Program Committee (1995).
XVI.23
- Dec. 1989** F.49 - Preliminary Report to CEC on "*The Participation of Portugal in the EC Aeronautics Programme*", 88p.
S.2
XVI.24
- F.50 - *Vice-Chairman*, of representing Universities, Small and Medium Enterprises and Small Member States in ARTCO (Aeronautical Research and Technology Committee of EC).
- May.1990** XVI.25
- Jun. 1990** F.51 - Member of Commission de Patronage de *Revue d'Acoustique*.
XV.12
- July 1990** F.52 - Chairman of Session 4.2 of *Symposium on Physical Acoustics*, K.U. Leuven, Campus Kortrijk.
XV.13
- Sep. 1990** F.53 - Chairman of Session on "Slipstream and Jet Interference" in 17th *Congress on Aeronautical Sciences*, Stockholm.
XV.14
- Oct. 1990** F.54 - Elected vice-chairman of *Flight Mechanics Panel (FMP)* of AGARD (Advisory Group for Aerospace Research and Development)
XVI.26
- Oct.1990** F.55 - Report to CEC on "*Aeronautics Activities in Portugal*", 116 p.
S.3
XVI.27
- Nov. 1990** F.56 - Participant in Session III on "Experiences with BRITE/EURAM projects", and in Session IV on "European experiences and lessons", in the *Eurotech'Air Forum*, Toulouse, (*L'Aeronautique et l'Astronautique*, number 146, pages 22-23)..
S.4
XVI.28
- Nov. 1990** F.57 - Member of Organizing Committee of *Atelier sur le Controle du Traffic Aérien*, and chairman of Session II "Le Role des Technologies de Pointe", Toulouse.
XVI.29
- Dec. 1990** F.58 - Nominated representative of Portugal in the *Commission for Peaceful Uses of Outer Space (COPUOS)*, of the United Nations Organization.
XVI.30
- April.1991** F.59 - Representative of Portugal in Regulatory Committee of Industrial and Materials Technology - *Area 3 - Aeronautics* of CEC, 3rd framework R&D program.
XVI.31
- May.1991** F.60 - *Alexander von Humboldt Scholar* with Sabbatical at *Max-Planck Institut für Aeronomie*, Katlenburg-Lindau.
XIV.9
- Nov. 1991** F.61 - Supervisor of M. Sc. Thesis of R. Saldanha on "*Hydromagnetic waves in isothermal atmospheres*", approved very good with distinction.
XIV.11
- Jan. 1991** F.62 - Chairman of Flight Mechanics Panel (FMP) and the Flight Vehicle Integration Panel (FVIP) of Advisory Group for Aerospace Research and Development (AGARD).

- April 1992** F.63 - Member of *Space Advisory Panel*, to the European Commission by Roy Gibson, report: "Europe and Space: the way ahead".
S.6
XVI.32
- May.1992** F.64 - Conference "*Acoustics of free and ducted potential flows*", Max-Planck Institut für Stromungsforschung, Göttingen, invitation of Dr. W. Mohring.
T.37
XV.15
- May.1992** F.65 - Supervisor of M. Sc. Thesis of P. M. V. M. Mendes on "*Heating of the solar chromosphere by waves*", approved very good with distinction.
XIV.12
- Jun. 1992** F.66 - Conference "*Acoustic fatigue and spectral broadening associated with turbulent flows*", Deutsche luft and Raumfahrt Versachanstalt, Göttingen.
T.38
XV.16
- Jul. 1992** F.67 - Conference "*Hydromagnetic waves in dissipative and non-dissipative atmospheres*", Institut für Physik, Dusseldorf Universität, invitation of Prof. K. Suchy.
T.39
XIV.13
- F.68 - Supervisor of M. Sc. Thesis of J. M. G. S. Oliveira on "*Sound propagation in shear flows*", approved very good with distinction.
- Oct. 1992**
XV.17
- Oct. 1992** F.69 - *Coordinator of Aerospace Engineering Course* at Instituto Superior Técnico, Lisbon Technical University.
XVI.33
- F.70 - Member of Editorial Board: *Integral Transforms and Special Functions*, an International Journal, Pergamon Press.
- Sep. 1992**
XIII.6
- Mar. 1993** F.71 - Visit to DLR *wind tunnels* in Göttingen and Braunschweig hosted by Dr. Lawaczek.
XVI.34
- April 1993** F.72 - "*Low Altitude High-Speed Flight Simulation*", presentation to National Delegates Board of AGARD.
S.7
XVI.35
- April 1993** F.73 - "FMP Response on Lessons Learned from the Gulf War", presentation to National Delegates Board of AGARD.
S.8
XVI.36
- Aug. 1993** F.74 - Chairman of working group nominated by Secretary of State of Research to propose a "*Science and Technological Research Program in the Aerospace Field*".
S.9
XVI.37
- Set. 1993** F.75 - Member of opening round table discussion, and Chairman of session on "Aircraft interior noise", at *Aerodays 93* Conference, Naples, 4-6 Sept..
XV.18
- Oct. 1993** F.76 - Conference at United Technologies Research Center, Hartford Connecticut, on "*Analytical modeling of active noise reduction*", invitation of Dr. R. H. Schlinker.
XV.19
- Nov. 1993** F.77 - Portuguese representative together with Vice-Admiral A. C. Júnior, in the *Space Advisory Group* of European Union.
XVI.38
- Feb. 1994** F.78 - Chairman of working group preparing the implementation under the program Praxis XXI 1994-9 of a "*Research and Development Program in the Field of Aerospace Technology*".
S.10
XVI.39
- April 1994** F.79 - Representative Secretary of State of Science and Technology, of Ministry of Planning and Research in the *National Aerospace Board* of Portugal.
XVI.40

- April 1994** F.80 - "Activities of FVP of relevance to NATO technology need", presentation to National Delegates Board, *Highlights*.
S.11
XVI.41
- May 1994** F.81 - Current Problems in Aeroacoustics, *Seminar*, Instituto Superior Técnico
T. 43
XV.20
- June 1994** F.82 - Co-organizer of the Air Force week at IST, presenter of communication "On six research projects on aeroacoustics supported by the European Union", and closing address on "*Aerospace Activities in Portugal - capabilities and potential*".
T.44
S.12
XVI.42
- July 1994** F.83 - Portuguese representative in Regulatory Committee of *Industrial and Materials Technologies II* of CEC - 4th Framework R&D program.
XV.21
- Set. 1994** F.84 - Visit to wind tunnels of Defense Research Agency, at Farnborough, hosted by Dr. D.S. Woodward.
XVI.43
- Feb. 1995** F.85 - Supervisor of M. Sc. Thesis of P. G. T. A. Serrão on "*Sound propagation in boundary layers*", approved very good.
XV.23
- Jun. 1995** F.86 - Supervisor of M. Sc. Thesis of F.J.P. Lau on "*Sound propagation in non-uniform nozzles*", approved very good.
XV.24
- Set. 1995** F.87 - "Analytical methods of optimization of active vibration suppression", Asanca II workshop, Napoli.
T.45
XV.25
- Set. 1995** F.88 - "Active noise reduction in a cylindrical enclosure", Asanca II Workshop, Napoli.
T.46
XV.26
- Nov. 1995** F.89 - "Sobre o desenvolvimento da indústria aeroespacial em Portugal", II Encontro Nacional da Indústria Automóvel, 16-17.11.95, Centro Cultural de Belém.
T.47
S.13
XVI.44
- 1995 – 97** F.90 - Participant in AGARD "Aerospace 2020" study.
XV.22
- Mar. 1996** F.91 - Coordinator of "Applied and Aerospace Mechanics" Section, of Department of Mechanical Engineering, of IST.
XVI.45
- Set. 1996** F.92 - Organizer of one-day presentation on *Flight testing in western countries*, including NASA, USAF, USN, France, Britain, Germany, Holland and Portugal; at Air Force Academy, Granja do Marquês, Sintra
XVI.46
- Set. 1996** F.93 - Local organizer of Symposium "*Advances in flight testing*", Flight Vehicle Integration Panel, (AGARD), Calouste Gulbenkian Foundation, Lisbon.
XVI.47
- Feb. 1997** F.94 - Elected Member of the Academy of Engineering of Portugal.
XVI.48
- May. 1997** F.95 - Elected Member of Board of Directors of Academy of Engineering of Portugal.
S.14
XV.23
- July 1997** F.96 - Member of Round Table "Future Trends in Aerospace Research and Industry". And co-charman of session "Powered Lift II" in Workshop on *Aerospace and Powered Lift Technologies*, Covilhã.
XVI.49
S.14

- July 1997**
T.48
S.15
XVI.50
- F.97 - Conference at TAP/Air Portugal "Aerospace Sector in Portugal - Today's reality and tomorrow's potential".
- Sept.1997**
XVI.51
- F.98 - Member of "Systems Concepts and Integration Panel" of the *Research and Technology Organization* of NATO.
- Oct. 1997**
XVI.52
- F.99 - Member of organizing committee of *Conference on Unconventional Flight*, UNCONF 97, Budapest.
- May 1998**
XVI.53
- F.100 - Vice-Chairman of "Systems Concepts and Integration Panel" of the *Research and Technology Organization* (RTO).
- June 1998**
XVI.54
- F.101 - Invited Conference "Aeronautical Engineering in Portugal-Capabilities and Perspectives", Senior "New Technologies", Congress of Portuguese Engineering Association (*Ordem dos Engenheiros*), Lisbon.
- Sept.1998**
XVI.55
- F.102 - Organizer of Joint IST/Eurocontrol *Seminar on Air Traffic Management*, Instituto Superior Técnico.
- Sept.1998**
XVI.56
- F.103 - Chairman of Session 2.3, "Aerodynamic Optimization, Transports", 21st Congress of *International Council of Aeronautical Sciences*, Melbourne, Australia.
- Oct. 1998**
T.56
S.16
XVI.57
- F.104 - Presentation of "Aeronautics Group" to the *Advisory Committee* of Institute of Systems and Robotics.
- Jan. 1999**
XVI.58
- F.105 - Member of the Editorial Board of *Air & Space Europe*.
- Feb. 1999**
S.17
XVI.59
- F.106 - Texts for Evaluation of Aerospace Engineering Degree of Instituto Superior Técnico.
- Apr. 1999**
S.18
XV.24
- F.107 - General Plan to develop an independent self-supporting flight test capability from the start. *Research and Technology Organization* report, Ankara.
- Sept.1999**
T.57
XV.25
- F.108 - Research visitor at Solar Physics Group, Department of Applied Mathematics, University of St. Andrews, talk on "*The role of hydromagnetic waves in the solar-terrestrial system*".
- F.109 - "On the education of Aerospace engineers in Portugal", *Air & Space Europe*, Volume 2, Number 1, pages 105-108.
- Feb. 2000**
S.19
XVI.60
- F.110 - Supervisor of Ph. D. Thesis "*Acoustics of nozzles, propellers and rotors*", by Fernando José Parracho Lau, Doctorate in Aerospace Engineering, Instituto Superior Técnico
- Apr. 2000**
S.20
XV.26
- F.111 - "The role of 'transatlantic cooperation' in air-to-air missile programmes", *Air & Space Europe*, Volume 2, Number 2, pages 4-6.
- Jun. 2000**
XV.27
- F.112 - Supervisor of Ph. D. Thesis "*Alfvén waves in inhomogeneous and moving media*" by Paulo Jorge Soares Gil, Doctorate in Aerospace Engineering, Instituto Superior Técnico.

- Sept.2000** F.113 "On the aeronautical sector", Conference in meeting on "Aeronautical and Defence Industries in Portugal", Lisbon, 21 September 2000.
T.62
XVI.62
- Sept.2000** F.114 "Teaching and Research on Aeronautics", in Session of the Aeronautics Specialization, Congress of the *Association of Engineers* of Portugal, Porto, 22 September 2000.
T.63
XVI.63
- Sept.2000** F.115 "Aerospace Technology and Industry", talk at the *Academy of Engineering* of Portugal, 25 September 2000.
T.64
XVI.64
S. 21
- Nov. 2000** F.116 - Supervisor of Ph. D. Thesis "*Hydromagnetic waves in the solar-terrestrial system*", by Natália Livovna Isaeva, Doctorate in Aerospace Engineering, Instituto Superior Técnico.
XV.28
- Nov.2000** F.117 Interview in special aeronautics issue of *Ingenium*, magazine of Ordem dos Engenheiros (Portuguese Engineering Society), pages 22-26.
S.22
XVI.65
- Dec. 2000** F.118 - Supervisor of Ph. D. Thesis "*Dissipative Alfvén waves in application to the solar atmosphere*", by Pedro Matoso e Vasconcelos Miranda Mendes, Doctorate in Aerospace Engineering, Instituto Superior Técnico.
XV.29
- Dec. 2000** F.119 - "The role of Universities" Workshop of Aeronautical Research Establishments in Europe, Brussels.
T.66
S.23
XVI.66
- Mar.2001** F.120 Member of Editorial Board of *Progress of Aerospace Sciences*.
XVI.67
- June.2001** F.121 "Is there an Alternative to the Joint Strike Fighter?", *Air & Space Europe*, Volume 3, Nº 112, pages 5 – 8.
S.24
XVI.68
- June.2001** F.122 "On the Competition Between Airbus and Boeing", *Air & Space Europe*, Volume 3, Nº 112, pages 11 – 14.
S.25
XVI.69
- August 2001** F.123 Local Organizer, Meeting of Program Committee of 23rd Congress of International Council of Aeronautical Sciences, 60 participants, Sintra.
XVI.70
- May 2002** F.124 Presentation on "Calculation of Aircraft Separation from Wake Vortex Effects and Collision probabilities"; Technische Universitat Munchen, Garchin.
XVI.71
- May 2002** F.125 Closing presentation "Aerospace Engineering at IST and EU-funded research projects on aeroacoustics and flight dynamics", 1st Aerospace Engineering week, organized by APAE.
XVI.72
- Oct. 2002** F.126 Member of *Advisory Group in Aeronautics*, of European Commission.
XVI. 73
- Nov. 2002** F.127 Receptient of *Von Karman Award 2002* of Research and Technology Organization.
XVI.74

Jan. 2003 XVI.75	F.128	Member of <i>Independent Review Committee of Ariane System (IRCAS)</i> , European Space Agency.
April 2003 XVI.76	F.129	Adviser to the Portuguese Delegation to the <i>Council of the European Space Agency</i> .
Nov. 2003 XVI.77	F.130	Rapporteur of Closing Session of workshop " <i>Aeroacoustics of supersonic transport</i> ", Prague.
Jan. 2004 XVI.78	F.131	Member of Portugal-ESA (European Space Agency) working group on <i>Açores Satellite Tracking Station</i> .
Feb. 2004 XVI.79	F.132	"Strategy for Research and Technology in Aeronautics", <i>Workshop on R&D and Defence</i> , Lisbon.
Mar. 2004 XVI.80 S. 26	F. 133	"Strategy for research, technological development and innovation in aeronautics", <i>Workshop in Research and Development in Defence</i> , Institute of High Military Studies. Lisboa
Sept. 2004 XV.30	F.134	Supervisor of Thesis of J.M.G. Oliveira " <i>Sound propagation in nozzles with non-uniform wall impedance</i> " for Doctorate in Aerospace Engineering.
Sept. 2004 XV.31	F.135	Supervisor of Thesis of P.G.T.A. Serrão " <i>Sound propagation in vortical flows and curved tubes</i> " Doctorate in Aerospace Engineering.
May. 2005 XVI.81	F.136	Chairman of Symposium on " <i>Advanced sensor payloads for Unmanned Air Vehicles (UAVs)</i> ," Sensors and Electronics Panel, Research and Technology Organization, Lisbon. 2-3 May 2005.
July. 2005 XV.31	F.137	Chairman of Aeroacoustics Session in <i>International Congress of Sound and Vibration ICSV12, Lisbon</i> .
July. 2005 XVI.82 S.27	F.138	"Returns of the Space Shuttle", interview with magazine " <i>Diferencial</i> " of student association of IST.
Nov. 2005 XVI.83 S.28	F.139	"Potential for the development of aerospace sector in Portugal", in Conference on <i>EADS and regional strategies for southwest Europe</i> , Lisbon.
Jan. 2006 VI.84 T74	F. 140	"Organization of Airbus-Spain meeting on research cooperation and outline proposals", IST, Lisbon.

- May 2006**
XV.32 F.141 Co-chairman of 12th AIAA/CEAS Aeroacoustics Symposium, Boston, Massachussets, chairman of session.
- Dec. 2006**
XVI.85 F.142 Supervisor of thesis of J.M.G. Marques, "Aspectos da dinâmica de voo relacionadas com a gestão do tráfego aéreo", Doutoramento em Engenharia Aeroespacial
- Sept. 2007**
XV.33 F.143 Organizer with: W. Schröder "Combustion noise workshop", X3-Noise network/AIAA/CEAS, 27-29 September 2007, Instituto Superior Tecnico Lisboa
- Sept. 2008**
XIII.6 F.144 Contributor to *Mathematical Reviews*.
- Oct. 2008**
XVI.86 F.145 Member of Council of the PEGASUS group of European Universities teaching aeronautics
- Oct. 2008**
XV.34 F.146 Co-guest editor with W. Schröder: Special Issue, *Journal of Aeroacoustics, Combustion Noise, Workshop*, Volume 8, nos. 1-2, pages 1-172.
- 2009**
XV.35 F.147 Contribution to "Aeroacoustic Research in Europe: the CEAS-ASC report on 2008 highlights". Editor D. Juvé. Section 8.1, page 239. *Journal of Sound and Vibration* volume 328, pages 213-242.
- May. 2010**
XVI.87
T.75 F.148 Participation in Debate-Meeting at Geographical Society of Lisboa: "The new Lisbon airport and the evolution of air traffic".
- June. 2010**
XV.36 F.149 Chairman of session: "General acoustics", 10th AIAA/CEAS Aeroacoustics Conference, 7-9 June, Stockholm.
- June. 2010**
XV.37 F.150 Chairman of session: "Airport Noise", *Internoise 2010*, 13-16 June, Lisbon.
- June. 2010**
XVI.88 F.151 Member of the Juri for the Student Contest at the Aerospace Department of Delft University, 23-24 June.
- March 2011**
XVI.89 F.152 Member Scientific Advisory Committee (SAC) of Aerodays 2011, Madrid, Sponsored by the European Union.
- June 2011**
XV.37 F.153 Contribution to "Aeroacoustic research in Europe: The CEAS-ASC report on 2010 highlights". Editor A.R. Nagy. Section 9.4, page 25, *Journal of Sound and Vibration*.
- Sept. 2011**
XVI.90 F.154 Member of the Juri for the Student Contest of the Aerospace Department of Delft University.
- 2012**
XV.38 F.155 "Aviation noise research network", S.N.Y. Gerges, D. Collin, D. Dimitriu & L.M.B.C.Campos, VII Congresso Ibero-Americano de Acoustica, Evora.

- June 2013**
XVI.91 **F.156** “Member of the jury for the student contest at the Aerospace Department of Delft University.
- July 2013**
XVI.92 **F.157** Chairman of session “Risk assessment II” in *International Conferences on Air Transport*, Ecole Nationale de L’Aviation Civile (ENAC), Toulouse.
- Jan 2014**
XVI.93 **F.158** Member of Scientific board of “Transactions of the Institute of Aviation” ,Poland.
- May 2015**
XVI.94 **F.159** “On the combined teaching of mathematics, physics and engineering”, *Jornadas “Cultura Organizacional no Técnico”*, Instituto Superior Tecnico, Lisbon.

G. REGISTERED PATENT

- Nov.1997**
R.83 **G.1** - British patent GB 2 291 388 B, “A fail safe towing bracket”, filed 10 May 1995, granted 19 November 1997.
- March 2004** **G.2** United States patent 6705547 “*On an active noise reducing nozzle*”, filed 2 January 2002, granted 16 March 2004.

H. MATHEMATICAL REVIEWS

- Feb. 2010** **H.1** - “Derivatives of any order of the Gaussian hypergeometric functions, ${}_2F_1(a,b;c;z)$ with respect to the parameters a,b,c,” L.U. Ancarrani and G. Gasaneo, *Journal of Physics A: Mathematical and Theoretical* 42 (2009), 1-10 (MR 2 539 326)
- Dez. 2010** **H.2** - “Fractional calculus and infinite order differential operators”, Akira Asada *Yokohama Mathematical Journal*, 55 (2010), 129-147 (MR 2666 138).
- Feb. 2011** **H.3** - “On roots of hypergeometric function”, Katsuo Takano, *Roma J.* 1 (2005), 193-200. (MR 2 664 248)
- Jun. 2011** **H.4** - “Exact solutions of triple-order time-fractional differential equations for anomalous relaxation and diffusionI: the accelerating case”, Ram K. Saxena, Gianni Pagnini, *Physica A* 390 (2011), 602-61 (MR 2 748 750)
- Jul. 2011** **H.5** - “Concavity with respect to Hölder means involving the generalized Grötzsch function”, *Journal of Mathematical Analysis and Applications* 379 (2011), 200-204 (MR 2 776 464).
- Feb. 2012** **H.6** - “Inequalities associated with Chebyshev functional for Saigo fractional differential operator”, R.K. Saxena, J.Ram, J.Paiya, T.K. Pogámy, *Integral Transforms and Special Functions* 22 (2011). 671-680 (MR 2 832 198)

- May. 2012** **H.7** - "Os integrais de Mellin-Barnes e a função de Fox", F.S. Costa, J. Vaz, E.C. Oliveira, F.F. Camargo", *Tendencias Mathematica Aplicada e Computacional* 12 (2011), 157-169 (MR 2 844 753).
- Jul. 2012** **H.8** - "Computing two special cases of Gauss hypergeometric function", Marjed-Jamei, M.Koepf, W., *Creative Mathematics and Informatics* 20 (2011), 137-146 (MR 2 918 511).
- Aug. 2012** **H.9** - "Sharp Kolmogorov-type inequalities for norms of fractional derivatives of multivariate functions", V.F. Babenko, N.V. Parfinovych, S.A. Pichugov. *Ukrainian Mathematical Journal* 62 (2010), 343-357 (MR 2 888 604).
- Jun. 2013** **H.10** "Turan type inequalities for tricom confluent hypergeometric functions", A. Braicz, M.E.H. Ismail, *Constructive Approximation* 37 (2013), 195-221 (MR 301 9777).
- Jun. 2013** **H.11** "A new Leibnitz rule and its integral analogue for fractional derivatives", R. Tremblay, S. Gaboury , B.J. Fougere, *Integral Transforms and Special Functions* 24 (2013), 111-128 (MR 3019362).
- Sep. 2013** **H.12** "Basic bilateral eighth order mock theta functions and continued fractions", B. Srivastava, *Mathematical Science Research Journal* 16 (2012), 260-267 (MR 3076838).
- Mar. 2014** **H.13** "On fractional hyperbolic functions and their generalizations" J. V. Devi, S. Nagamani *Non – linear studies* 20 (2013), 331-348 (MR 311 4464).
- June. 2014** **H.14** "Mapping properties of mixed fractional integro-differentiation in Hölder space" T. Mamatov, *Journal of concrete and applicable mathematics* 12 (2014), 272-290 (MR 3184429).
- Sept. 2014** **H.15** "The geometric and physical interpretation of fractional order derivatives of polynomial functions", M.H.Tavassoli, A. Tavassoli & M.R.O. Rahimi, *Differential Geometry Dynamical Systems* 15 (2013), 93-104 (MR 3073076).
- Oct. 2014** **H.16** "A further investigation of generating functions related to pairs of inverse functions with applications to generalized degenerate Bernoulli polynomials", S. Gabouri & R. Tremblay, *Bulletin Korean Mathematical Society* 3 (2014), 831-845 (MR 3214250).
- Mar. 2015** **H.17** A Chen-type modification of Hadamard fractional integro-differentiation", *Advances and applications* 242 (2014), 325-339 (MR 3243300).
- Oct. 2015** **H.18** "Fractional variable of Holderian functions", D. Prodanov, *Fract. Calc. Appl. Anal.* 18 (2015), 580-602 (MR 3351489).
- Mar. 2016** **H.19** "On chain rule for fractional derivatives", Tarasov, V.E., *Communications Non-linear Science and Numerical Simulation* 30 (2016), 1-4 (MR3420022).

I – BOOK REVIEWS

- Apr. 2014** **I.1** *“Mechanics and electrodynamics of magneto and electrostatic materials”*, R.W.Ogden & D.J. Steigmann (eds), CISM courses and lectures 527,2011, Springer.
- Apr. 2014** **I.2** *“Waves and structures in Nonlinear nondispersive media”*, S. N. Gorbatoov, O.V. Rudenko & A. I. Sichev, 2011, Springer
- May. 2015** **I.3** *“Delay differential equations”*, B. Balachandran, T.K.Nagy & D. E. Gilsinn (eds), 2009, Springer.
- May. 2015** **I.4** *“Linear isentropic oscillations of stars”*, P. Smeyers & T.V. Hoolst, 2010, Springer

J – CLASSIFICATION BY SUBJECT**J.1 - Table A: Scientific Papers**

Year	review	Single author	With co-author	total	commulative
1977	-	1	-	1	1
1978	-	3	-	3	4
1982	1	-	-	1	5
1983	2	5	-	7	12
1984	-	6	-	6	18
1985	1	2	-	3	21
1986	1	4	-	5	26
1987	1	1	-	2	28
1988	-	3	2	5	33
1989	-	4	1	5	38
1990	-	4	-	4	42
1991	-	1	1	2	44
1992	-	3	2	5	49
1993	1	5	-	6	55
1994	-	1	-	1	56
1995	1	-	2	3	59
1996	-	1	2	3	62
1997	2	1	1	4	66
1998	1	-	1	2	68
1999	1	2	7	10	78
2000	-	1	3	4	82
2001	-	2	3	5	87
2002	-	-	3	3	90
2003	-	-	4	4	94
2004	-	-	6	6	100
2005	-	-	1	1	101
2006	1	-	-	1	102
2007	3	-	3	6	108
2008	-	1	1	2	110
2009	-	1	1	2	112
2010	-	-	5	5	117
2011	1	2	4	7	124
2012	-	-	4	4	128
2013	-	-	2	4	132
2014	-	-	6	7	139
2015	1	-	1	2	141
2016	-	3	3	6	147
sums	19	57	71		147

J.2 – Table B: General

	Subject	Sum	Mathematics	Physics	Mechanics	Aeronautics
Table	includes		Special Functions Fractional Calculus Mathematical Methods Applications to Solids	Magnetohydrodynamics Solar Physics Astrophysics Cavitation and Particles	Aeroacoustics Fluid Dynamics Waves Vibration	Flight Dynamics Stability Control Rockets
	Total	505	44	114	181	153
B	Books	6	1	1	2	2
C	Articles in books Review papers Research Papers	124	I.1-22	II.1-41	III.1-42	IV.1-19
D	Communications to Symposia	195	V.1-16	VI.1-59	VII.1-82	VIII.1-33
E	Research projects EU-ESA- National Industrial	42	IX.1	X.1-3	XI.1-19	XII.1-18
F	Career Activities Supervisions Awards	149	XIII.1-6	XIV.1-12	XV.1-39	XVI.1-84
G	Patents	2	0	0	1	1

J.3 - Table C: Books

Area Subject	I Mathematics	II Physics	III Mechanics	IV Aeronautics
Books (B.4)	B.1	B.7	B.5 B.6	B.2 B.3
6 = 1+	1	1	2	2

Series: *“Mathematics and Physics applied to Science and Technology”*: B.7-B.9

J.4 - Table D

Scientific papers	C. 5 C.17 C.21 C.24 C.26 C.31 C.35 C.36 C.40 C.42 C.53 C.54 C.55 C.81 C.83 C.85 C.88 C.105 C.114 C.119 C.122 C.128 C.133 C.145	C. 1 C. 7 C. 8 C.12 C.13 C.15 C.19 C.27 C.29 C.32 C.34 C.39 C.41 C.43 C.44 C.45 C.47 C.49 C.50 C.51 C.52 C.56 C.58 C.59 C.66 C.67 C.69 C.74 C.75 C.76 C.77 C.78 C.79 C.80 C.84 C.89 C.90 C.96 C.98 C.106 C.109 C.120 C.121 C.135 C.141	C. 2 C. 3 C. 4 C. 6 C. 9 C.10 C.11 C.14 C.18 C.20 C.22 C.23 C.28 C.30 C.33 C.46 C.48 C.60 C.61 C.62 C.64 C.68 C.70 C.71 C.72 C.73 C.82 C.93 C.94 C.95 C.99 C.101 C.103 C.104 C.111 C.118 C.125 C.126 C.127 C.129 C.130 C.131 C.132 C.134 C.136 C.138 C.139 C.140 C. 142 C.143 C.146 C.147	C.16 C.25 C.37 C.38 C.57 C.63 C.65 C.86 C.87 C.91 C.92 C.97 C.101 C.103 C.111 C.115 C.116 C.117 C.123 C.124 C.137 C.145 C.148
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J.5 - Table E: Communications

Area Subject	V Mathematics	VI Physics	VII Mechanics		VIII Aeronautics
Communications to symposia	D. 9	D. 2	D. 1	D. 175	D.19
	D.15	D. 4	D. 3	D. 176	D.28
	D.17	D. 6	D. 5	D. 177	D.37
	D.24	D. 7	D. 8	D. 178	D.40
	D.26	D.10	D.12	D. 179	D.44
	D.27	D.11	D.14	D. 180	D.48
	D.35	D.13	D.25	D. 181	D.55
	D.38	D.16	D.29	D. 182	D.60
	D.45	D.18	D.30	D. 183	D.65
	D.46	D.20	D.32	D. 185	D.66
	D.61	D.21	D.33	D. 193	D.78
	D.67	D.22	D.34	D.195	D.82
	D.77	D.23	D.41	D.196	D.83
	D.119	D.31	D.47	D.197	D.95
	D.154	D.36	D.49	D.198	D.96
	D.164	D.39	D.50	D.199	D.99
	D.186	D.42	D.51	D.201	D.100
	D.209	D.43	D.54	D.203	D.124
	D.210	D.52	D.57	D.204	D.129
	D.211	D.53	D.59	D.205	D.130
	D.223	D.56	D.63	D.206	D.136
		D.58	D.64	D.212	D.137
		D.62	D.72	D.213	D.153
		D.68	D.73	D.214	D.155
		D.69	D.74	D.216	D.157
		D.70	D.79	D.217	D.158
		D.71	D.80	D.221	D.163
		D.75	D.81	D.222	D.164
		D.76	D.84	D.224	D.166
		D.85	D.86	D.225	D.167
		D.87	D.90	D.226	D.169
		D.88	D.92	D.228	D.171
		D.89	D.97	D.229	D. 183
		D.91	D.105	D.230	D. 184
		D.93	D.106	D.231	D.187
		D.94	D.108	D.233	D.188
		D.98	D.109	D.234	D.192
		D.101	D.117	D.235	D.194
		D.102	D.118	D.237	D.200
		D.103	D.120	D.238	D.202
		D.104	D.121	D.239	D.207
		D.107	D.125	D.240	D.208
		D.110	D.126	D.241	D.215
		D.111	D.127	D.243	D.218
		D.112	D.128	D.244	D.219
		D.114	D.134	D.246	D.220
		D.115	D.135	D.250	D.227
		D.116	D.138	D.251	D.232
		D.122	D.139	D.253	D.236
		D.123	D.140	D.254	D.242
	D.131	D.141		D.245	
	D.132	D.142		D.252	
	D.133	D.143			
	D.144	D.146			
	D.145	D.147			
	D.153	D.148			
	D.189	D.149			
	D.190	D.150			
	D.191	D.151			
	D.202	D.152			
	D.247	D.156			
	D.248	D.160			
	D.249	D.161			
		D.162			
		D.165			
		D.168			
		D.170			
		D.172			
		D.173			
		D.174			
174	16	59	82		33

J.6 - Table F: Projects

Area Subject	IX Mathematics	X Physics	XI Mechanics	XII Aeronautics
Research Projects	E.3	E. 4 E. 6 E.21 E.22 E.23	E. 2 E. 7 E. 8 E. 9 E.11 E.12 E.13 E.20 E.26 E.27 E.28 E.29 E.31 E.34 E.35 E.39 E.41 E.42	E. 1 E. 5 E.10 E.14 E.15 E.16 E.17 E.18 E.19 E.24 E.25 E.30 E.32 E.33 E.36 E.37 E.38 E.40
35	1	3	19	18

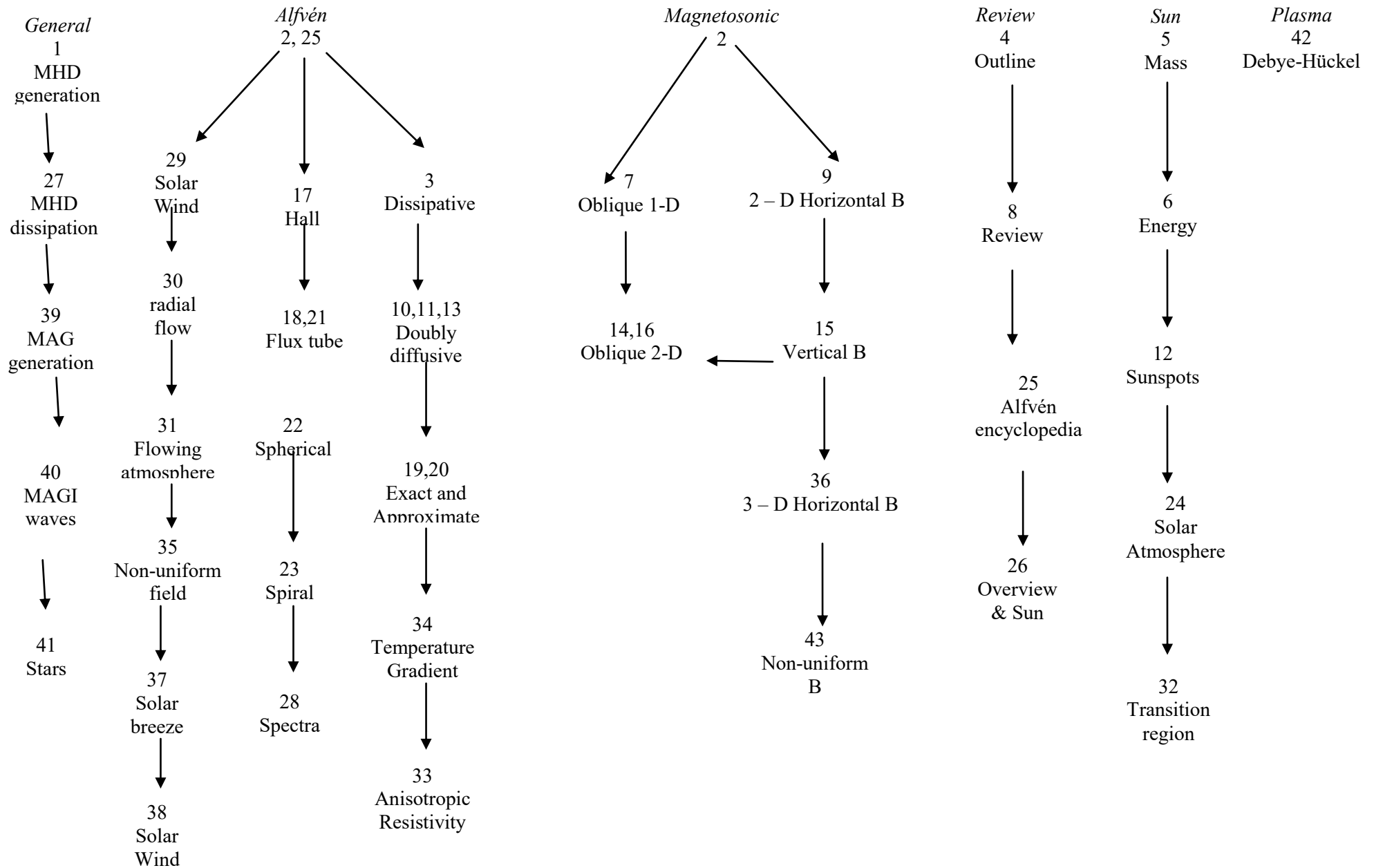
J.7 - Table G: Career and Functions

Area Subject	XIII Mathematics	XIV Physics	XV Mechanics	XVI Aeronautics	
Career and Activities	F. 3	F. 2	F. 1	F.11	F.115
	F. 5	F. 4	F. 6	F.12	F.117
	F.20	F.15	F. 7	F.13	F.119
	F.33	F.17	F. 8	F.14	F.120
	F.38	F.21	F. 9	F.18	F.121
	F.70	F.25	F. 10	F.22	F.122
	F.141	F.28	F. 16	F.23	F.123
	F.144	F.39	F. 19	F.24	F.124
		F.60	F. 26	F.29	F.125
		F.61	F. 27	F.31	F.126
		F.62	F. 30	F.32	F.127
		F.65	F. 45	F.34	F.128
		F.67	F. 51	F.35	F.129
		F.147	F. 52	F.36	F.130
			F. 53	F.37	F.133
			F. 64	F.40	F.136
			F. 66	F.41	F.137
			F. 68	F.42	F.138
			F. 75	F.43	F.139
			F. 76	F.44	F.140
			F. 81	F.46	F.142
			F. 83	F.47	F.145
			F.85	F.48	F.148
			F.86	F.49	F.151
			F.87	F.50	F.152
			F.88	F.54	F.154
			F. 90	F.55	F.155
			F. 95	F.56	F.156
			F.107	F.57	F.157
			F.108	F.58	F.158
			F.111	F.59	F.159
			F.112	F.63	
			F.116	F.69	
			F.118	F.71	
			F.134	F.72	
			F.135	F.73	
			F.143	F.74	
			F.146	F.77	
			F.147	F.78	
			F.148	F.79	
			F.150	F.80	
			F.153	F.82	
			F.155	F.84	
				F.89	
			F.91		
			F.92		
			F.93		
			F.94		
			F.96		
			F.97		
			F.98		
			F.99		
			F.100		
			F.101		
			F.102		
			F.103		
			F.104		
			F.105		
			F.106		
			F.109		
			F.110		
			F.113		
			F.114		
141	6	13	39		84

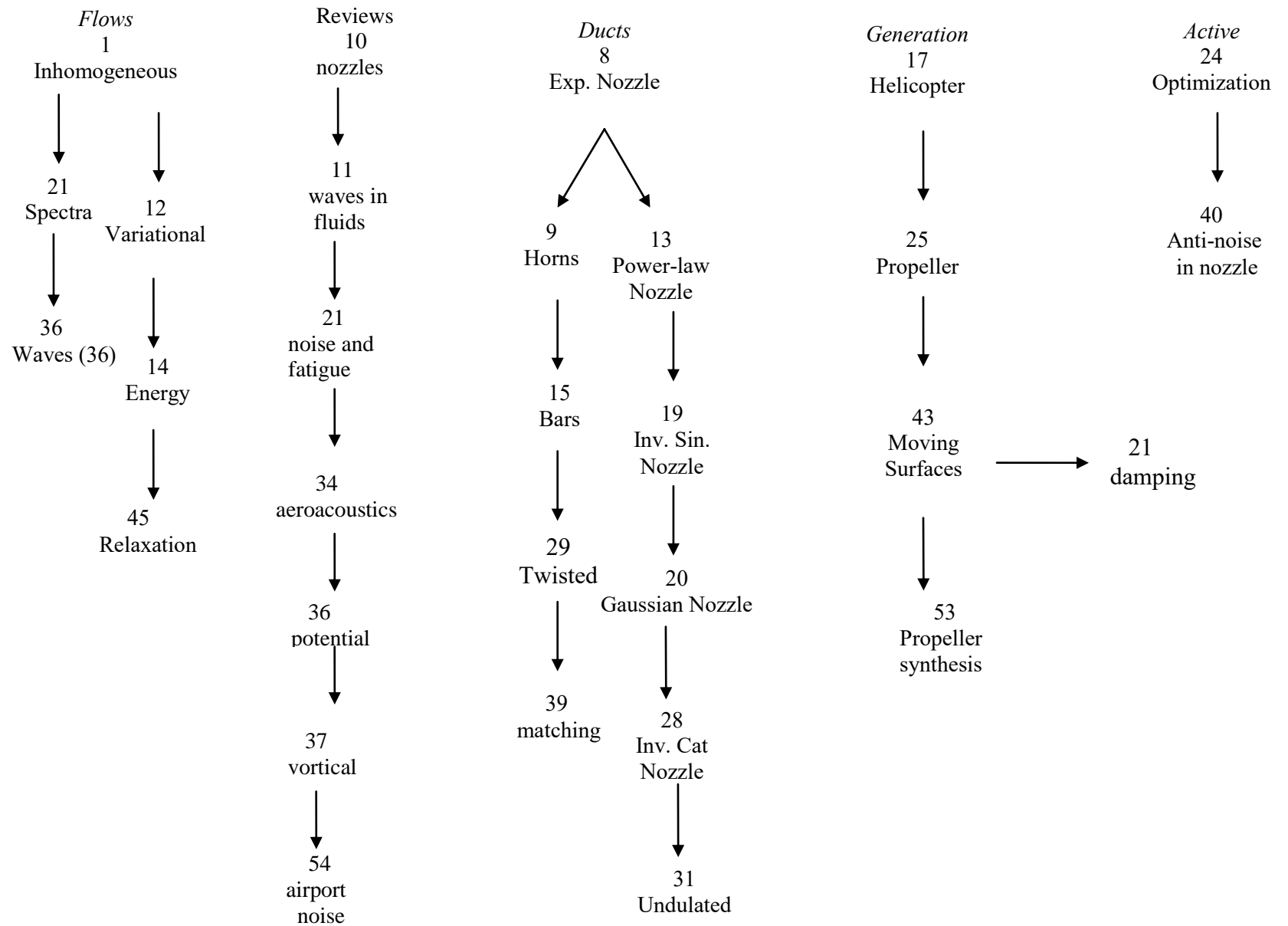
J.8 - Table H: Patents

Area	Mathematics	Physics	Mechanics	Aeronautics
Patents			G.1	G.2
2	-	-	1	1

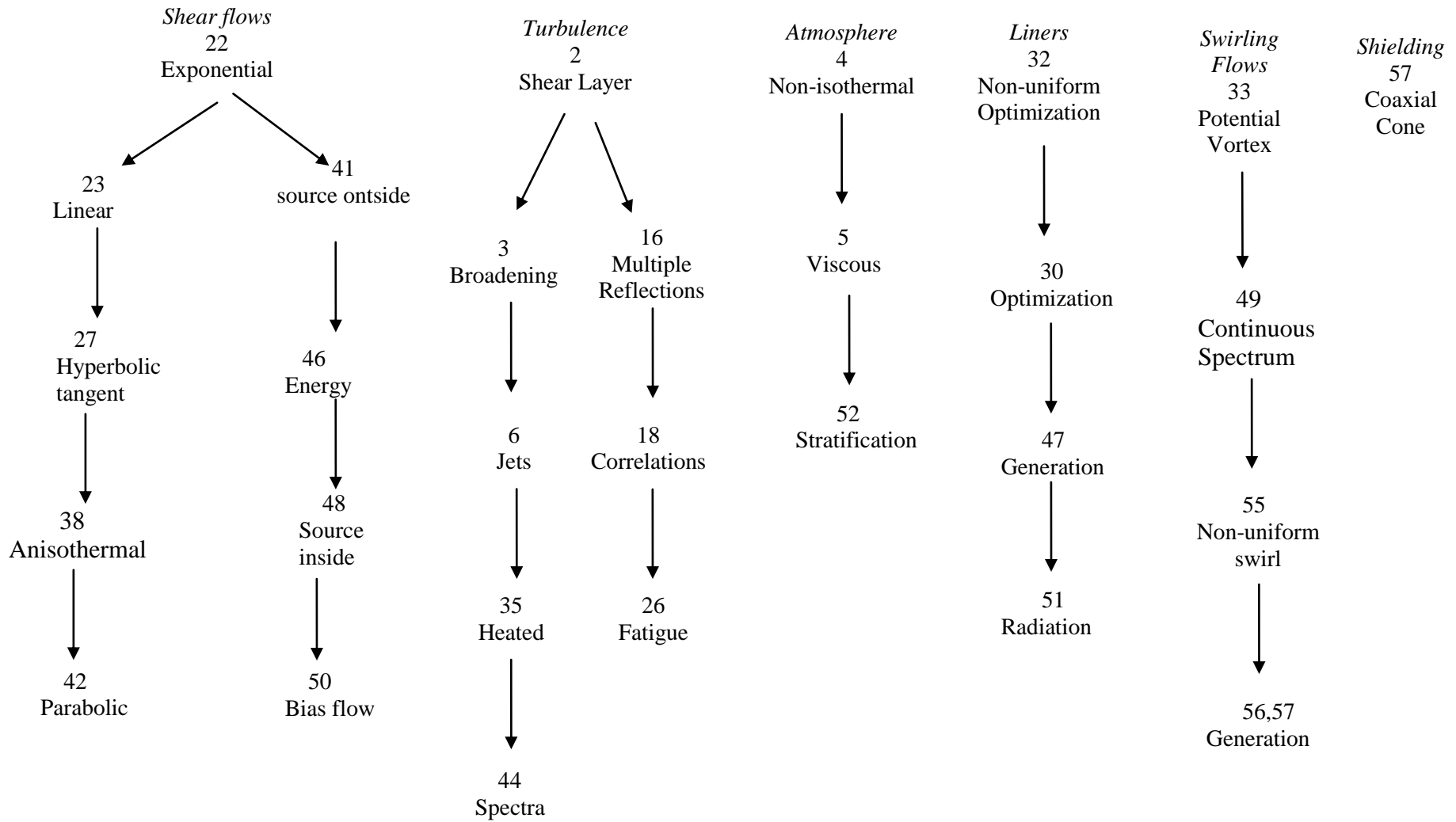
K.2 - II: MAGNETOHYDRODYNAMICS



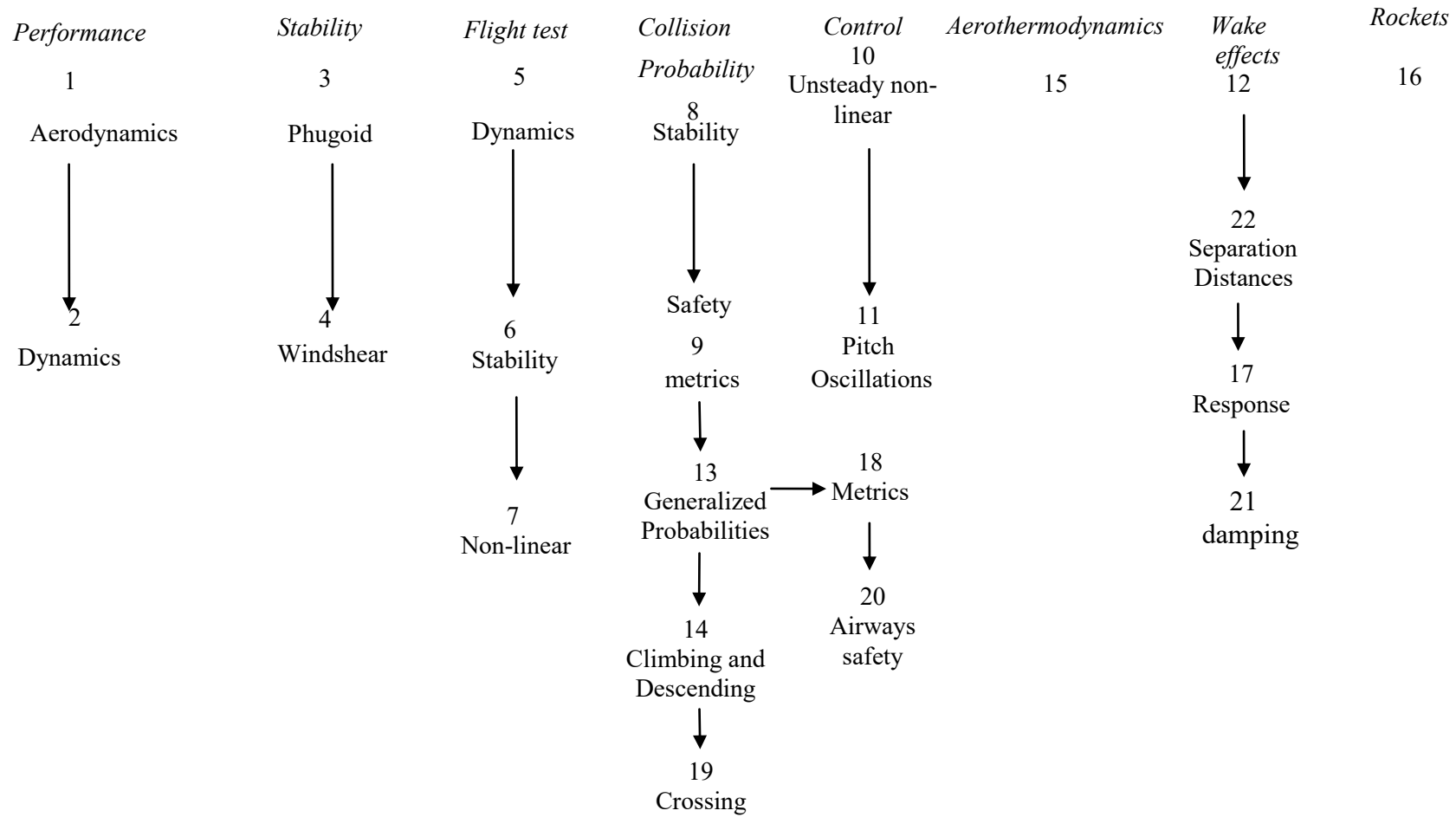
K.3 – IIIA: ACOUSTICS



K.4 – IIIB: INTERACTIONS



K.5 – IV: FLIGHT



L.1 - CHRONOLOGICAL ORDER up to 1999)

Classifications	B	C	D	E	F	G	R	S	T	A
Years	Books	Papers	Communications	Projects	Functions	Patents	Reprints	Reports	Transparencies	Total
≤ 1976	-	-	1	-	4	-	-	-	1	6
1977	-	1 (1)	+ 1 = 2	-	+ 1 = 5	-	1	-	+ 1 = 2	+ 5 = 11
1978	-	+ 3 = 4 (+3=4)	+ 1 = 4	-	+ 1 = 6	-	+ 3 = 4	-	+ 2 = 4	+ 11 = 22
1979	-	-	-	-	-	-	-	-	-	-
1980	-	-	+ 2 = 6	-	+ 2 = 8	-	-	-	+ 2 = 6	+ 7 = 29
1981	-	-	+ 2 = 8	-	+ 3 = 11	-	-	-	+ 2 = 8	+ 6 = 35
1982	-	+ 1 = 5 (+1=5)	+ 4 = 12	-	+ 6 = 17	-	+ 1 = 5	-	+ 3 = 11	+ 16 = 51
1983	-	+ 7 = 12 (+7= 12)	+ 3 = 15	-	-	-	+ 7 = 12	-	+ 1 = 12	+ 18 = 69
1984	-	+ 6 = 18 (+ 6 = 18)	+ 6 = 21	-	+ 6 = 23	-	+ 7 = 18	-	+ 5 = 17	+ 30 = 99
1985	-	+ 3 = 21 (+ 3 = 21)	+ 4 = 25	-	+ 6 = 29	-	+ 5 = 24	-	+ 3 = 21	+ 21 = 120
1986	-	+ 5 = 26 (+ 5 = 26)	+ 3 = 28	-	+ 10 = 39	-	+ 6 = 30	-	+ 2 = 23	+ 26 = 146
1987	-	+ 2 = 28 (+ 2 = 28)	+ 6 = 34	-	+ 1 = 40	-	+ 3 = 33	-	+ 3 = 26	+ 15 = 161
1988	1	+ 5 = 33 (+ 4 = 32)	+ 8 = 42	4	+ 2 = 42	-	+ 8 = 41	-	+ 1 = 27	+ 30 = 181
1989	-	+ 5 = 38 (+ 4 = 36)	+ 7 = 49	-	+ 7 = 49	-	+ 7 = 48	2	+ 2 = 29	+ 30 = 221
1990	-	+ 4 = 42 (+3 = 39)	+ 7 = 56	+ 5 = 9	+ 9 = 58	-	+ 7 = 55	+ 2 = 4	+ 1 = 30	+ 34 = 225
1991	-	+ 2 = 44 (+ 1 = 40)	+ 7 = 63	+ 1 = 10	+ 4 = 62	-	+ 3 = 58	-	+ 2 = 32	+ 20 = 275
1992	-	+ 5 = 49 (+ 3 = 43)	+ 8 = 71	+ 2 = 12	+ 8 = 70	-	+ 6 = 64	+ 2 = 6	+ 7 = 39	+ 37 = 312
1993	-	+ 6 = 55 (+ 6 = 49)	+ 3 = 74	+ 3 = 15	+ 7 = 77	-	+ 6 = 70	+ 3 = 9	+ 3 = 42	+ 31 = 343
1994	-	+ 1 = 56 (+ 1 = 50)	+ 5 = 79	+ 2 = 17	+ 7 = 84	-	+ 1 = 71	+ 3 = 12	+ 2 = 44	+ 21 = 364
1995	-	+ 3 = 59 (+ 0 = 50)	+ 3 = 82	+ 1 = 18	+ 6 = 90	-	+ 3 = 74	+ 1 = 13	+ 3 = 47	+ 20 = 384
1996	+ 1 = 2	+ 3 = 62 (1 = 51)	+ 4 = 86	+ 2 = 20	+ 3 = 93	-	+ 3 = 77	-	+ 2 = 49	+ 18 = 402
1997	-	+ 4 = 66 (+ 3 = 54)	+ 10 = 96	+ 3 = 23	+ 6 = 99	-	+ 4 = 82	+ 2 = 15	+ 4 = 53	+ 33 = 435
1998	+ 2 = 4	+ 2 = 68 (+ 1 = 55)	+ 8 = 104	+ 1 = 24	+ 5 = 104	1	+ 1 = 83	+ 1 = 16	+ 4 = 57	+ 23 = 458
1999	-	+ 10 = 78 (+ 3 = 58)	+ 8 = 112	-	+ 4 = 108	-	+ 9 = 92	+ 2 = 18	+ 1 = 58	+ 31 = 490

2000	-	+ 4 = 81 (+ 1 = 59)	+ 16 = 128	+ 2 = 26	+ 11 = 119	-	+ 11 = 103	+ 4 = 22	+ 8 = 66	+ 58 = 548
2001	-	+ 5 = 87 (+ 4 = 63)	+ 3 = 131	+ 2 = 28	+ 4 = 123	-	+ 1 = 104	-	+ 2 = 68	+ 14 = 562
2002	-	+ 3 = 90 (+ 4 = 62)	+ 6 = 137	+ 3 = 31	+ 4 = 127	-	-	-	-	+ 17 = 579
2003	+ 2 = 6	+ 4 = 94 (+ 0 = 63)	-	+ 1 = 32	+ 3 = 130	-	-	-	-	+ 10 = 589
2004	-	+ 6 = 100 (+ 0 = 63)	+ 8 = 145	+ 3 = 35	+ 5 = 135	+ 1 = 2	-	-	-	+ 25 = 614
2005	-	+ 1 = 101 (+ 0 = 63)	+ 6 = 4151	+ 3 = 38	+ 4 = 139	-	-	-	-	+ 14 = 628
2006	-	+ 1 = 102 (+ 1 = 64)	+ 8 = 159	+ 0 = 38	+ 2 = 141	-	-	-	-	+ 11 = 639
2007	-	+ 6 = 108 (+ 3 = 67)	+ 3 = 162	+ 2 = 40	+ 1 = 142	-	-	-	-	+ 10 = 649
2008	-	+ 2 = 110 (+ 1 = 68)	+ 10 = 172	+ 2 = 40	+ 2 = 144	-	-	-	-	+ 15 = 664
2009	-	+ 2 = 112 (+ 1 = 69)	+ 2 = 174	+ 1 = 41	+ 1 = 145	-	-	-	-	+ 6 = 670
2010	+ 1 = 7	+ 5 = 117 (+ 0 = 69)	+ 21 = 195	-	+ 4 = 150	-	-	-	-	+ 27 = 692
2011	+ 1 = 8	+ 7 = 124 (+ 4 = 73)	+ 4 = 199	+ 2 = 42	+ 3 = 153	-	-	-	-	+ 16 = 708
2012	-	+ 4 = 128 (+ 0 = 73)	+ 3 = 202	-	+ 1 = 154	-	-	-	-	+ 8 = 716
2013	-	+ 4 = 132 (+ 0 = 73)	+ 16 = 218	-	+ 2 = 156	-	-	-	-	+ 22 = 738
2014	-	+ 2 = 134 (+ 1 = 74)	+ 16 = 234	-	+ 1 = 157	-	-	-	-	+ 19 = 757
2015	-	+ 6 = 140 (+ 3 = 77)	+ 11 = 245	-	+ 1 = 158	-	-	-	-	+ 18 = 775

L.2 – chronological order (starting 2000)