

Curriculum Vitae of Dr. Rajkumar S. Pant

Official Address:

Associate Professor,
Aerospace Engineering Department,
Indian Institute of Technology Bombay
Mumbai 400 076, India
Phone: +91(0)22-25767127 / 25720257
Fax: +91(0)22-25722602
Mobile : +91(0)9820084502
E-mail : rkpant@aero.iitb.ac.in



Current Address (till 31st May 2011)

Visiting Associate Professor,
Virginia Tech
Aerospace & Ocean Engineering,
215 Randolph Hall 0203,
Blacksburg, VA 24061, USA

Date of Birth: 22nd June 1962

Areas of Expertise:

Aircraft Design:

Design and Development of Lighter-Than-Air Systems, Conceptual design of Unmanned Aerial Vehicles, Conceptual design studies of Commuter and Regional transport aircraft, Effect of morphing in aircraft configurations.

Air Transportation:

Airline Network Optimization, Modelling of ATC Systems, Airspace capacity estimation and congestion studies, ATC workload estimation using eye-ball tracking, development of algorithms for conflict detection and resolution in free flight, operational issues in air transportation, and Airport layout and configuration design.

Optimization:

Application of stochastic and evolutionary optimization methods to solve complex, multidisciplinary real-life problems.

Professional Qualifications

Ph.D. in Design, Structures and Systems from College of Aeronautics, Cranfield University, UK, 1997.

Thesis: Generalised cost minimisation of Commuter & Regional aircraft including airport considerations.

Master's Degree in Aeronautical Engineering from Indian Institute of Technology, Madras, India in 1986, with CGPA of 8.36/10.00.

Thesis: Development of software for transport aircraft design.

Bachelor's Degree in Aeronautical Engineering from Punjab Engineering College, Punjab University, Chandigarh, India in 1983, with overall 76 % marks.

Thesis: Conceptual design of short-haul regional transport business aircraft.

Practical & Professional training undertaken:

Practical Training:

- Vikram Sarabhai Space Centre, Trivandrum, 1981, 6 weeks. Carried out initial calibration studies of the hypersonic heat transfer wind-tunnel.

- Indian Airlines New Engg. Complex, Bombay, 1982, 4 weeks. Studied the line maintenance procedures for Airbus A-300-B4 series aircraft.

Professional Training:

- Hindustan Aeronautics Limited, Bangalore, 72 weeks as Design Trainee, 1983-84, (Including Basic Management Program at HAL Staff College)

Employment History:

Current:

Member of Faculty of Aerospace Engineering, Indian Institute of Technology Bombay since 1st December 1989.

Previous:

05 years in the Design & Engineering Department of Hindustan Aeronautics Limited:

- November 1984 to March 1988 at Kanpur Division, Liaison with shop-floor and production planning departments in structural design, modifications and repairs of Dornier Do-228 series aircraft and HMG-1 motorised glider.
- April 1988 to November 1989 at Nasik Division, Liaison with shopfloor and production planning departments in Flight Testing and Aerodynamics of MiG 21 & 27-M series aircraft.

Courses Taught:

1. Introduction to Flight
2. Aircraft Component Design
3. Performance of Aerospace Vehicles
4. Helicopter Aerodynamics
5. Aircraft Design (and Aircraft Design Laboratory)
6. Wing Design
7. Landing Gear Design
8. Air Transportation
9. Engineering Design Optimization

Initiatives towards developing new courses or laboratories:

- Prepared course material for an elective course on Design & Development of Lighter-Than-Air Systems in 2010.
- Set up Aircraft Design and Computing Laboratory in 2009, which houses several PCs and professional software for Aircraft Conceptual Design, and Engineering Analysis.
- Set up Lighter-Than-Air Systems Laboratory in 2004, which houses several PCs for R&D in LTA systems, as well as facilities for design and fabrication of LTA systems.
- Introduced a new PG elective course on Introduction to Air Transportation in 1999.
- Prepared a video lecture titled *Introduction to the V-n Diagram* for UG/PG students.

Post Graduate Thesis Supervision:

Supervised 24 students at Masters' level (Refer Appendix 1 for details)

Sponsored R&D Projects:

05 projects sponsored by Aeronautics R&D Board, Ministry of Human Resources Development, Department of Science & Technology, and One World South Asia. (Refer Appendix 2 for details).

Consultancy Projects:

15 projects sponsored by private sector organizations viz., Blue Dart Express Ltd., Jahagirdar Aero Products, Innovative Design Engineering Animation Pvt. Ltd., NRB Bearings Limited, government agencies viz., Technology Information Forecasting and Assessment Council, Air Traffic Controllers' Guild (India), and DRDO laboratories viz., DRDL, ADRDE and SASE. (Refer Appendix 3 for details)

Publications:

Refereed Journals: 12 (Refer Appendix 4 for details)
International Conferences: 35 +12 (Refer Appendix 5 for details)
National Conferences: 28 (Refer Appendix 6 for details)

Books Edited / Contributed Articles in Books:

1. *Transportation of goods and passengers to remote areas using airships*, Chapter in G. Williams and S. Brathen, eds., *Air Transport Provision in Remoter Regions*, Ashgate Publishing Limited, 2010. (in press).
2. *Soft Computing In Engineering Design And Manufacturing*, P. Chawdhry, R. Roy, and R. K. Pant, eds., Springer Verlag London Limited, ISBN 3-540-76214-0, 1998.

Professional Programs and Workshops conducted:

- Conducted 08 courses under Continuing Education Program, (CEP), Management Development Program (MDP), and Quality Improvement Program (QIP)
- Organised 02 International Conferences (Refer Appendix 7 for details)

Membership of Professional bodies:

- Life Member of The Aeronautical Society of India
- Life member of Indian Society of Technical Education
- Member of American Institute of Aeronautics & Astronautics, USA
- Associate member of The Royal Aeronautical Society, UK
- Member of The Airship Association, UK
- Member of The Naval Airship Association, USA

Special recognition, scholarships, awards and prizes:

- Visiting Associate Professor at Virginia Tech, Aerospace & Ocean Engineering, for one year starting 1st June 2010.
- Adjunct Faculty at Department of Aeronautical Engineering at Manipal Institute of Technology for a period of two years starting 10th October 2009.
- Short-listed for award of USD 8000 for a short visit to Department of Aerospace Engineering, Purdue University, USA under the VICS (Visitors from India and China) Scheme, 2008.
- Elected as International member of Lighter-Than-Air Systems Technical Committee of American Institute of Aeronautics & Astronautics, USA since June 2007.
- Short-listed for the award of ICAS/McCarthy prize for the best paper presented by research students at the 20th Congress of the International Council of Aeronautical Sciences held at Sorrento, Italy in September 1996.

- Educational Grant of GBP 500 from The Hammond Trust, GBP 300 from the Churches Commission on Overseas Students, and Mountbatten memorial grant of GBP 250 from Sir Ernest Cassel Educational Trust, UK, in 1996
- Commonwealth Scholarship for pursuing doctoral studies in the U.K., 1993-1996.
- Jamsetji Tata Grant of Rs. 10,000 for academic excellence, September 1993.
- Silver medal for overall proficiency as a Design Trainee at HAL Bangalore, 1984.
- Commendation Prize for technical paper presented at the students' seminar conducted during the Silver Jubilee celebrations of the Aeronautical Association of Madras Institute of Technology, Chennai in April 1984.
- Team Leader of the best Undergraduate Design Project titled Conceptual Design of Short Haul Regional Transport Business Aircraft carried out at the Department of Aeronautical Engineering, Punjab Engineering College, Chandigarh, 1983.

Participation in educational, fraternal, civic, professional and other organizations.

- Member of the Executive Committee of the Mumbai branch of The Aeronautical Society of India from 1997 till date. Honorary Secretary of the Mumbai Branch during 1998-99. Currently, the Vice-Chairman.
- Paper setter and External Examiner for various subjects for the B.E. (Aeronautical) examinations of Punjab University, Chandigarh, and the Graduate examinations conducted by The Aeronautical Society of India.
- Member of the Aeronautical Advisory Committee of SICOM/MIDC joint venture project on development of five new airports at MIDC sites in Maharashtra, 1997-98.
- President of the Asian Society of Cranfield University, UK, 1994-96.

APPENDIX 1

Details of Post Graduate Students supervised

Sr. No.	Name	Title of Thesis	Year	Co-Guide (if any)
1	L. Venkatakrishnan	Calculation of critical field length for jet flapped aircraft	1991	A. K. Sinha
2	J. K. Singh	Preliminary design and structural analysis of landing gear	1991	R. P. Shimpi
3	Pankaj Arora	Techno-economic conceptual design study of an Air-Taxi aircraft system	1992	S. D. Gogate
4	Rajesh Bajaj	Development Of Methodologies For Conceptual Design Of Turbofan Engine Transport Aircraft	2001	None
5	V. Ev. Jayakrishnan	Model For Fighter Aircraft Life Cycle Cost Estimation	2001	K. Sudhakar
6	Tushar Kanikdale	Optimization Of Airship Envelope Shape Using Computational Fluid Dynamics	2004	A. G. Marathe
7	Devendra Khitoliya	Development Of A Control System For Remotely-Controlled Non-Rigid Airship	2005	None
8	Akshat Goyal	Controller Design For Remotely Controlled Airship	2006	R. D. Gudi
9	Debashish Bagg	Capacity Modelling Of Terminal Airspace	2006	None
10	C. Vijay Ram	Shape Optimization Of Aerostat Envelopes	2006	None
11	Asmita Rai	Application Of Control System Techniques For Airport Capacity Optimization	2007	None
12	Ajeet Singh	Studies In Airline Network Scheduling And Optimization	2007	None
13	Burri Chandu	Modelling And Simulation Plan For Precision Navigation Based On Pseudolites Mounted On Airships	2007	K. Moudgalya
14	Kashyap Bhargava	Control of Traffic Systems	2007	M. Belur
15	Anshul Sharma	A Methodology For Airport Sizing And Estimation Of Capital Costs For Infrastructure	2008	None
16	Ch. A. Sainadh	Studies In Morphing In Aircraft Design Including Propulsion System	2008	None
17	Vimal Misra	Improved Methodology For Shape Optimization Of Aerostat Envelopes And Fins	2009	None
18	Rajeev Shastri	Design Optimization Of Unmanned Aerial Vehicles	2009	None
19	Varun Parikh	Studies In Cargo Airline Network Optimization	2009	None
20	Prateek Gupta	Studies In Optimization Of Surface Movement In Air-Side Area Of Airport	2009	None
21	Tannishtha Sanyal	Optimization Studies Related To Spatial And Temporal Aspects Of Maintenance Scheduling For Airlines	2009	N. Rangarajan
22	Aadil Shah	Studies in Airline Cargo Network Optimization	2010	None
23	M. Dineshkumar	Design Optimization Of Medium Altitude Unmanned Aerial Vehicle	2010	None
24	Abhishek Sathe	Conceptual Design Studies of an Unmanned Combat Aerial Vehicle	2010	None

APPENDIX 2

Details of Sponsored Projects

1. **Up-gradation of Lighter-Than-Air system Laboratory**, sponsored by Department of Science & Technology, Ministry of Science and Technology, Government of India, under Fund for Improvement of S&T Infrastructure in Higher Educational Institutions (FIST), 2010-ongoing.
2. **Design, Fabrication, and Field Trials of a prototype of a tethered Aerostat for Long Distance Wireless Communication for rural connectivity**, sponsored by One World South Asia, under their Ek-Duniya Grassroots Innovation Fellowship on Technology (EGIFT) initiative, 2006-08.
3. **Dynamic Neural Networks and its hardware implementation for control of an airship**, sponsored by Ministry of Human Resource Development under Thrust Areas in Technology Scheme, 2004-06.
4. **A Comparative Analysis of Software for Conceptual & Preliminary Design of Transport Aircraft**, sponsored by Aerodynamics Panel of the Aeronautics R&D Board, India, 1999-04.
5. **Flow Visualisation of a Powered Lift Aircraft Model**, sponsored by Aerodynamics Panel of the Aeronautics R&D Board, India, 1992-93

APPENDIX 3

Details of Consultancy Projects

1. **Sizing and Optimization of High Altitude Airship Platform**, sponsored by National Aerospace Laboratories, Bangalore, 2008-10.
2. **Cargo Airline Route Network Optimization- Phase-II**, sponsored by Blue Dart Aviation Ltd., Chennai, 2008-10.
3. **Conceptual Design of unmanned aerial vehicle for operation at High Altitudes**, sponsored by Snow & Avalanche Study Establishment, DRDO, Government of India, 2008-09.
4. **Design of an aerostat for aerial observation at Dhundi**, sponsored by Snow & Avalanche Study Establishment, DRDO, Government of India, 2008-09.
5. **Conceptual study of unmanned aerial platforms for real-time monitoring of avalanche parameters**, sponsored by Snow & Avalanche Study Establishment, DRDO, Government of India, 2008-10.
6. **Technical vetting of the design of VN Mk-II unmanned aircraft** sponsored by Messrs. Jahagirdar Aero Products Pvt. Ltd., Ahmadnagar, 2008-09.
7. **Design Review of Hyperthrust Project**, sponsored by Innovative Design Engineering Animation Pvt. Ltd., Ahmedabad, 2008-ongoing.
8. **Cargo Airline Route Network Optimization: Phase-1**, sponsored by Blue Dart Aviation Ltd., Chennai, 2007.
9. **Workload Assessment study for ATC Units**, sponsored by Air Traffic Controllers Guild, New Delhi, 2007-09.
10. **Pre-feasibility study of powered Hot Air Balloon for Multipoint River Ferry**, sponsored by Department of Scientific & Industrial Research (DSIR), Government of India, (in association with National Aerospace Laboratories, Bangalore), 2006-09.
11. **Shape Optimization of Aerostat Envelopes** sponsored by Aerial Delivery R&D Establishment, DRDO, 2004-07.
12. **Feasibility study of Stratospheric Airships as a High Altitude Platform for High Integrity Psuedolite Based precision Navigation System**, sponsored by Defense R&D Laboratory, Hyderabad, Government of India, 2004-05.
13. **Design and Development of airships for transportation of goods and passengers in Uttaranchal**, sponsored by Technology Information Forecasting and Assessment Council, Department of Science & Technology, New Delhi, 2001-03.
14. **Production Planning and Scheduling of Heat Treatment Process** sponsored by NRB Bearings Limited, Thane, 2000-02.
15. **Technical vetting of the design of Vihang Netra MK-I unmanned aircraft** sponsored by Messrs. Jahagirdar Aero Products Pvt. Ltd., Ahmadnagar, 1999-2000.

APPENDIX 4

Details of Publications in refereed Journals

1. **Multi-disciplinary Shape Optimization of Aerostat Envelopes**, Technical Note, AIAA Journal of Aircraft, Vol. 47, No. 3, May-June 2010. Co-authored by Mr. C. Vijayram, IIT Bombay.
2. **A Comparative Study of Cognitive Strategies Used to Resolve Air Traffic Conflict between Air Traffic Controllers and General population using Eye Tracking Machine**, Journal of Psychosocial Research, to appear in July-Dec 2010, co-authored by Dr. A. Taukari, Asst. Prof., Department of Psychology, K. J. Somaiya College, Mumbai, and Amit Kumar Garg, IIT Bombay.
3. **Comparison of blowby characteristic of Conventional and Winged aerostats**”, Communications in Aerospace System Design & Engineering, Vol.1, No. 1, online journal, www.casde.org, co-authored by Mr. A. Kanoria, SVIT Vasad, India, 2010.
4. **Design of an Aerostat Recovery Device (ARD) in case of Accidental Breakage of Tether**, Communications in Aerospace System Design & Engineering, Vol.1, No. 1, online journal, www.casde.org, co-authored by Mr. C. S. Bhat, BITS Pilani, India, 2010.
5. **Constraint Analysis of a Transport Aircraft using Optimization**, Communications in Aerospace Systems Design & Engineering, Vol. 1, No. 1, online journal, www.casde.org, co-authored by Mr. K. Moolchandani, PEC University of Technology, Chandigarh, India, 2010.
6. **A methodology for arriving at the baseline specifications of a non-rigid airship**, Technical Note, AIAA Journal of Aircraft, Vol. 45, No. 6, Nov-Dec 2008.
7. **Constraint Analysis and Initial Sizing of a Transport Aircraft by Simulated Annealing**, Journal of Iranian Aerospace Society, Vol 2, No. 2, June 2005, pp. 43-47
8. **Flow Visualisation of an Upper Surface Blown Unmanned Aircraft**, Journal of the Aeronautical Society of India, Vol. 52, No. 4, November 2000, pp. 239-245. Co-authored by Prof. S. D. Sharma, IIT Bombay.
9. **Aircraft Configuration And Flight Profile Optimization Using Simulated Annealing**, Aircraft Design, Vol. 2, 1999, pp. 239-255, Elsevier Science Limited, UK, Co-authored by Prof. J. P. Fielding, Cranfield University, UK.
10. **A Model For Estimation Of Airport Related Costs Of Commuter And Regional Aircraft**, Journal of The Aeronautical Society of India, Vol. 51, No. 2, May 1999, pp. 83-92.
11. **CRISTO: A Code For Integrated Synthesis And Trajectory Optimization Of Commuter And Regional Aircraft**, Paper 975542, Journal of Aerospace, Section 1, Transactions of SAE, pp 1504-1514, ISBN 0-7680-0296-6. Also presented at the AIAA/SAE World Aviation Congress, Anaheim, CA, USA, October 1997. Co-authored by Profs. J. P. Fielding and J. Snow of College of Aeronautics, Cranfield University, UK.
12. **Economic Parameters In The Conceptual Design Optimization Of An Air-Taxi Aircraft**, AIAA Journal of Aircraft, Vol. 32, No. 4, July-August 1995 pp. 696-702. Co-authored by Mr. S. D. Gogate, IIT Bombay and Mr. P. Arora, Tata Consultancy Services, India.

APPENDIX 5

Details of papers in International Conferences

Accepted for presentation

1. **Multi-criteria Optimization of Unmanned Aerial Vehicle for Snow studies over Himalayas**, 13th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, 13th -15th September 2010, Fort Worth, Texas, Co-authored by M. Dineshkumar, IIT Bombay.
2. **Multidisciplinary Optimization of Aerostat Envelope Shape**, 13th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, 13th -15th September 2010, Fort Worth, Texas, Co-authored by J. Shah, NITK Surathkal and A. Mour, IIT Bombay
3. **Multidisciplinary design optimization studies of a UCAV**, 10th AIAA Aviation, Technology, Integration, and Operations (ATIO) Conference, 13th -15th September 2010, Fort Worth, Texas, Co-authored by A. Sathe, IIT Bombay.
4. **Local precision navigation system based on pseudolites mounted on a swarm of UAVs**, 10th AIAA Aviation, Technology, Integration, and Operations (ATIO) Conference, 13th -15th September 2010, Fort Worth, Texas, Co-authored by V. Chaugule, IIT Bombay.
5. **Trade-off between facility utilization and service level of an airline MRO**, 10th AIAA Aviation, Technology, Integration, and Operations (ATIO) Conference, 13th -15th September 2010, Fort Worth, Texas, Co-authored by T. Sanyal, and N. Rangaraj, IIT Bombay.
6. **A Two-Level Scheme for Network Selection and Schedule Optimization of Cargo Airlines**, 10th AIAA Aviation, Technology, Integration, and Operations (ATIO) Conference, 13th -15th September 2010, Fort Worth, Texas, Co-authored by F. Maul, TU Munchen and M. Agrawal, IIT Bombay.
7. **Generation of Optimized Routes and Schedules for Surface Movement of Aircraft on Taxiways**, 10th AIAA Aviation, Technology, Integration, and Operations (ATIO) Conference, 13th -15th September 2010, Fort Worth, Texas, Co-authored by P. Gupta and H. Subramaniam, IIT Bombay.
8. **Investigation of Strategies used by Air Traffic Controllers to reduce Cognitive Workload**, 10th AIAA Aviation, Technology, Integration, and Operations (ATIO) Conference, 13th -15th September 2010, Fort Worth, Texas, Co-authored by K. Sharma, Airports Authority of India.
9. **Design Fabrication and Operation of Low Cost Remotely Controlled Airship**, 18th AIAA Lighter-Than-Air Systems Technology Conference, Seattle, Washington, USA, 4th-7th May 2009, Co authored by A. Gawale, A. A. Raina, IIT Bombay and Y. Jahagirdar, RIMA, Ahmednagar.
10. **Low Cost Trans-river Aerial Ferry**, 18th AIAA Lighter-Than-Air Systems Technology Conference, Seattle, Washington, USA, 4th-7th May 2009, Co-authored by S. Banerjee, A. A. Raina, Project Engineer, IIT Bombay.
11. **Conceptual Design of an Airship using Knowledge Based Engineering**, 18th AIAA Lighter-Than-Air Systems Technology Conference, Seattle, Washington, USA, 4th-7th May 2009, Co-authored by R. Joshi, and A. A. Raina, IIT Bombay.
12. **Dynamic Stability Analysis of a Tethered Aerostat**, 18th AIAA Lighter-Than-Air Systems Technology Conference, Seattle, Washington, USA, 4th-7th May 2009, Co-authored by A. Rajani and K. Sudhakar, IIT Bombay.

Presented / Appeared in Conference Proceedings

1. **Optimal Collaborative Airborne Separation in Free Flight**, Proceedings of the IISc Centenary International Conference and Exhibition on Aerospace Engineering (ICEAE 2009), 18th-22nd May 2009, IISc, Bangalore, India. Co-authored by Mr. Vishal Chaugule, IIT Bombay and Dr. S. Gomez, National University of Mexico.
2. **Airships for connecting remote communities in the lower Himalayas**, invited talk delivered at 6th International Forum on Air Transport in Remoter Regions, 28th -30th April 2009, Bergen, Norway.
3. **Optimum Configuration Design for an unmanned aerial vehicle for snow cover evaluation**, Proceedings of International Symposium on Snow & Avalanches (ISSA-09), 6-10 April 2009, Manali, India. Co-authored by Mr. Kansal, J., and Dr. Sarwade, R. N., SASE, Chandigarh.
4. **Conceptual Design Of A High Altitude Aerostat For Study Of Snow Pattern**, Proceedings of International Symposium on Snow & Avalanches (ISSA-09), 6-10 April 2009, SASE, Manali, India. Co-authored by Raina, A. A., and K. M. Bhandari, IIT Bombay.
5. **Low Cost Wireless Internet Access for Rural Areas using Tethered Aerostats**, Proceedings of 2008 IEEE Region 10 Colloquium and the Third International Conference on Industrial and Information Systems, 8th -10th December 2008, IIT Kharagpur, Co-authored by A. A. Raina, P. Bilaye, V. N. Gawande, and U. B. Desai, IIT Bombay.
6. **Design and Fabrication of an Aerostat for Wireless Communication in Remote Areas**, Proceedings of AIAA 7th AIAA Aviation, Technology, Integration, and Operations (ATIO) Conference and 17th Lighter-Than-Air Systems Technology Conference, September 2007, Belfast, Northern Ireland, UK, Co-authored by A. Gawale, Project Engineer, IIT Bombay.
7. **Multidisciplinary Shape Optimization of Aerostat Envelopes**, Proceedings of AIAA 7th AIAA Aviation, Technology, Integration, and Operations (ATIO) Conference and 17th Lighter-Than-Air Systems Technology Conference, September 2007, Belfast, Northern Ireland, UK, Co-authored by C. Vijayram, Sr. Engineer - Advanced Engineering, Ashok Leyland, Chennai, India.
8. **Precision Navigation of Airborne Vehicles Using Pseudolites Mounted on Stratospheric Airships**, Proceedings of AIAA 7th AIAA Aviation, Technology, Integration, and Operations (ATIO) Conference and 17th Lighter-Than-Air Systems Technology Conference, September 2007, Belfast, Northern Ireland, UK, Co-authored by B. Chandu, IIT Bombay.
9. **Investigation of Strategies for Optimal Collaborative Airborne Separation in Free Flight** Proceedings of AIAA 7th AIAA Aviation, Technology, Integration, and Operations (ATIO) Conference and 17th Lighter-Than-Air Systems Technology Conference, September 2007, Belfast, Northern Ireland, UK, Co-authored by V. Chaugule, IIT Bombay.
10. **Airline network optimization and the application of Grey Theory**, Proceedings of AIAA 7th AIAA Aviation, Technology, Integration, and Operations (ATIO) Conference and 17th Lighter-Than-Air Systems Technology Conference, September 2007, Belfast, Northern Ireland, UK, Co-authored by A. Singh, IIT Bombay.
11. **Application of control systems techniques for airport capacity optimization**, Proceedings of 11th World Conference on Transport Research (WCTR), 24-28 June 2007, WC Berkeley, USA. Co-authored by A. Rai, IIT Bombay.
12. **Life Cycle Cost Modelling of Fighter Aircraft**, Invited presentation in International Seminar on Trends in Product Life cycle Modelling, Simulation & Synthesis (PLMSS-06), 18-20 December 2006, Indian Institute of Science, Bangalore, India.

13. **A methodology for determination of profitable range of operations of short-haul transport aircraft**, Proceedings of ATRS-2006 World Conference of Air Transport Research Society, 26-28 May 2006, Nagoya, Japan. Co-authored by S. Choudhuri, IIT Bombay and A. Singh, IIT Bombay.
14. **Improved model for estimation of terminal airspace capacity**, Proceedings of ATRS-2006 World Conference of Air Transport Research Society, 26-28 May 2006, Nagoya, Japan. Co-authored by D. Bagg, IIT Bombay.
15. **Evaluation of air network for short-haul travel - A case study based on heuristic approach**, Proceedings of ATRS-2006 World Conference of Air Transport Research Society, 26-28 May 2006, Nagoya, Japan. Co-authored by B. Kodanda, NAL Bangalore.
16. **Generic Methodology for Determination of Drag Coefficient of an Aerostat envelope using CFD**, Proceedings of AIAA 16th Lighter-Than-Air Systems Technology Conference and Balloon Systems Conference, September 2005, Arlington, USA. Co-authored by S. M. Kale and P. Joshi, IIT Bombay.
17. **Developing an air traffic complexity metric for Indian en-route airspace using a simulation model of controller workload**, Proceedings of AIAA 16th Lighter-Than-Air Systems Technology Conference and Balloon Systems Conference, September 2005, Arlington, USA. Co-authored by A. Majumdar, and O. W. Ochieng, Imperial College London and K. Sharma, AAI, Mumbai.
18. **FALCCM: A fighter aircraft LCC model for Indian conditions**, Proceedings of AIAA 16th Lighter-Than-Air Systems Technology Conference and Balloon Systems Conference, September 2005, Arlington, USA. Co-authored by V. Ev. Jayakrishnan, ADA, Bangalore.
19. **Multidisciplinary optimization of airship envelope shapes**, Proceedings of 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, 30th August - 1st September 2004, Albany, New York. Co-authored by T. Kanikdale and A. G. Marathe, IIT Bombay.
20. **Structural Design of Mooring Mast for Remotely Controlled Airship**, Proceedings of 5th International Convention of the Airship Association, August 2004, Oxford, England. Co-authored by S. M. Kale, IIT Bombay.
21. **Design Studies of a Power plant System of Non-Rigid Airship**, Proceedings of 5th International Convention of The Airship Association, August 2004, Oxford, England. Co-authored by A. C. Gawale, IIT Bombay.
22. **Emerging Issues and Current Trends in Short haul Air Transportation**, Proceedings of ATRS-2004, World Conference of Air Transport Research Society, July 2004, Istanbul, Turkey. Co-authored by B. Kodanda, NAL Bangalore.
23. **Structural Design of Mooring Mast For Remotely Controlled Airship**, 5th International Convention of The Airship Association, Oxford, England, August 2004, Co-authored by Mr. S. M. Kale, Project Engineer, IIT Bombay.
24. **Design Studies Of a Power plant System of Non-Rigid Airship**, 5th International Convention of The Airship Association, Oxford, England, August 2004, Co-authored by Mr. A. C. Gawale, Project Engineer, IIT Bombay.
25. **Emerging Issues and Current Trends in Short haul Air Transportation**, Accepted for presentation at ATRS-2004, World Conference of Air Transport Research Society, July 2004, Istanbul, Turkey.
26. **Application of Stochastic Optimization Techniques in Aircraft Conceptual Design**, Keynote Address delivered at AERO-2004, 2nd International conference of the Iranian Aerospace Society, February 2004, Isfahan, Iran.
27. **A Methodology for Determination of Baseline Specifications of a Non-Rigid Airship**, AIAA 3rd Aviation Technology, Integration and Operations (ATIO) Forum, November 2003, Denver, USA.

28. **Modern Developments in Short-Haul Air Transportation**, Keynote Address delivered at AERO-2000, 1st International conference of the Iranian Aerospace Society, December 2000, Tehran, Iran.
29. **Constraint Analysis And Initial Sizing Of A Transport Aircraft By Simulated Annealing**, Proceedings of AERO-2000, 1st International conference of the Iranian Aerospace Society, December 2000, Tehran, Iran.
30. **On Generating Optimum Configurations Of Commuter Aircraft Using Stochastic Optimization Techniques**, Proceedings of the Second On-line World conference on Soft Computing in Engineering Design and Manufacturing, June 1997. Co-authored by Ir. C. M. Kalker-Kalkman, Delft University of Technology, The Netherlands.
31. **Optimization of Regional Aircraft Configurations from Passengers Perspective**, Proceedings of the 20th Congress of the International Congress of Aeronautical Sciences, September 1996, Sorrento, Italy.
32. **Optimal Trajectory And Configuration Of Commuter Aircraft With Stochastic And Gradient Based Methods**, Proceedings of the 9th European Congress on application of Mathematics in Industry, June 1996, Copenhagen, Denmark. Co-authored by Ir. C. M. Kalker-Kalkman, Delft University of Technology, The Netherlands.
33. **Application Of Stochastic Techniques For Aircraft Conceptual Design And Optimisation**, Proceedings of the First World Congress on Structural and Multidisciplinary Optimisation, May-June 1995, Goslar, Germany.
34. **Incorporation of Some Cost and Economic Parameters in the Conceptual Design & Optimization of an Air-Taxi Aircraft**. Proceedings of the 5th AIAA / USAF / NASA / ISSMO Conference on Multi-disciplinary Design and Optimization, September 1994, Florida, USA. Co-authored by Mr. S. D. Gogate, IIT Bombay and Mr. P. Arora, Tata Consultancy Services.
35. **Flow visualisation of a USB unmanned aircraft**, Proceedings of the CEAS European Forum on High Lift & Separation Control, Bath, June 1994, UK, co-authored by Prof. S.D. Sharma, IIT Bombay.

APPENDIX 6

Details of papers presented in National Conferences

1. **Application of Airships for Anti-Submarine Warfare**, National Seminar on Emerging Technologies for Anti-Submarine Operations, 17-18 Nov 2009, ASW School, Southern Naval Command, Kochi, India.
2. **Cognitive Workload Assessment of ATC Units: A case study in Mumbai Enroute airspace**, National Seminar on ATM-Airlines-Airports Strategies to meet Safety, Economic and Environmental Challenges, 20-21 October, 2009, New Delhi.
3. **Evaluation of High Altitude Unmanned Aerial Vehicle using RDS-Professional**, Proceedings of the AEROTECH 2008 National Seminar on Recent Advances in Aerospace Technologies, Maintenance and Optimization, 14-15 November 2008, Chandigarh. Co-authored by M. S. Rodrigues, IIT Bombay and A. Munshi, TIET, Patiala.
4. **A Methodology For Airport Sizing And Estimation Of Costs For Infrastructure**, Proceedings of 21st National Convention of Aerospace Engineers on Infrastructure Development and Augmentation for Ground and Flight Testing of Aerospace Vehicle and Airport Services, 16th-17th November 2007, IIT Kanpur. Co-authored by A. Sharma and T. Thampy, IIT Bombay.
5. **Multi-disciplinary Shape Optimization of Aerostat Envelopes**, Keynote Address delivered at National Seminar on Strategic Applications of Lighter-Than-Air (LTA) vehicles at High Altitudes (SALTA-07), 12th-13th October 2007, SASE, Manali.
6. **Design, Fabrication and Field Testing of an Aerostat system**, Proceedings of National Seminar on Strategic Applications of Lighter-Than-Air (LTA) vehicles at High Altitudes (SALTA-07), 12th-13th October 2007, SASE, Manali. Co-authored by A. A. Raina, and A. Gawale, IIT Bombay.
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8. **A Critical Review of Global Regulations for Certification and Operation of Airships**, Proceedings of National Seminar on Strategic Applications of Lighter-Than-Air (LTA) vehicles at High Altitudes (SALTA-07), 12th-13th October 2007, SASE, Manali. Co-authored by A. C. Gawale, IIT Bombay.
9. **An MDO Approach to Shape Optimization of Aerostat Envelopes**, DREAMS Conference, John Welch Technology Center, March 2007, Bangalore Co-authored by C. Vijayram, IIT Bombay.
10. **A Methodology for Estimation of Capacity of Terminal Airspace**, National Systems Conference, 16-17 December 2005, IIT Bombay, Mumbai. Co-authored by D. Bagg, IIT Bombay.
11. **Critical Technologies for development of Stratospheric airships**, National Conference on Strategies and Action Plan for development of Stratospheric Airship Technologies, June 18, 2005, Aerial Delivery R&D Establishment, Agra
12. **Computer Based Models for evaluating ATM Systems & Concepts**, National Seminar on Synergizing ATC-Airports-Airlines to Meet Contemporary Challenges In Civil Aviation, November 1 & 2, 2004, New-Delhi.
13. **A Critical Review of Global Regulation for Certification and Operation of Airships**, National Seminar on Military Aircraft Airworthiness, August 20-21, 2004, Co-authored by Mr. A. C. Gawale, IIT Bombay.

14. **GIMTEP, A Generic Interpolation Model For Parametric Sizing Of Turboprop Engine Performance**, 55th Annual General Meeting of The Aeronautical Society of India, Bangalore, December 17-18, 2003.
15. **Structural Design Of Mooring Mast For Remotely Controlled Airship**, 55th Annual General Meeting of The Aeronautical Society of India, Bangalore, December 17-18, 2003, Co-authored by Mr. S.M. Kale, YCCE, Nagpur.
16. **Design Studies Of a Power plant System of Non-Rigid Airship**, 55th Annual General Meeting of The Aeronautical Society of India, Bangalore, December 17-18, 2003, Co-authored by Mr. A. C. Gawale, IIT Bombay.
17. **Design, Fabrication And Flight Testing Of Remotely Controlled Airship**, National Conference on LTA Technologies, Aerial Delivery R&D Establishment, Agra, October 2002. Co-authored by Mr. A. C. Gawale, IIT Bombay.
18. **A Comparative Evaluation of Operation of Airships and Helicopters in Uttaranchal**, National Conference on LTA Technologies, Aerial Delivery R&D Establishment, Agra, October 2002. Co-authored by Mr. R.P. Gazder, IIT Bombay.
19. **Airships as a Low Cost Alternative to Communication Satellites**, National Conference on LTA Technologies, Aerial Delivery R&D Establishment, Agra, October 2002. Co-authored by Mr. S. Relekar, IIT Bombay
20. **Estimation of Aerodynamic Characteristics of Un-Symmetrically Finned Bodies of Revolutions** presented at the 28th Fluid Mechanics & Fluid Power Conference, Chandigarh, India, December 2001. Co-authored by Mr. P. Gill, IIT Bombay, and Mr. S. Malik, ADRDE, Agra.
21. **Flow Visualisation of an Upper Surface Blown Unmanned Aircraft Configuration**, Proceedings of the National Aerodynamics Conference of The Aeronautical Society of India, Vikram Sarabhai Space Centre, Thiruvananthapuram, India, June 1999. Co-authored by Prof. S. D. Sharma, IIT Bombay.
22. **Land And Water Based Microlight Aircraft For Hobby Flying**, Proceedings of the National Seminar on Aerodynamic and Mechanical Decelerators and Inflatable Systems, Aerial Delivery R&D Establishment, April 1999, Agra. Co-authored by Mr. S. D. Gogate, IIT Bombay.
23. **Estimation Of Airport Related Costs Of Commuter And Regional Aircraft**, Proceedings of the Technical Session of the 49th Annual General Meeting of The Aeronautical Society of India, Mumbai, January 1998.
24. **Flow Visualisation of an Upper Surface Blown Cruise Missile**, Proceedings of the 19th National Conference on Fluid Mechanics and Fluid Power, December 1992, Bombay, India.
25. **Preliminary Feasibility Study Of An Upper Surface Blown Regional Transport Aircraft**, Technical Session of 43rd Annual General Meeting of The Aeronautical Society of India, December 1991, Hyderabad
26. **Preliminary Aerodynamic Design Studies of Stretching of a Turboprop Commuter Aircraft**, 5th National Conference on Aerodynamics, June 1990, Pune. Co-authored by Prof. K. A. Damodaran, Aerospace Engineering Department, IIT Madras.
27. **Periodical Flight Testing Of A Multi-Role Supersonic Combat Aircraft**, Presented at the 1st National Seminar on Flight Testing, 1990, ASTE, Bangalore.
28. **Computerised Weapon Integration Analysis System For Multi-Role Combat Aircraft**, Proceedings of the National Conference on Application of Computers in Engineering, April 1990, Amravati, India.

APPENDIX 7

Details of Professional Programs conducted and Conferences organised:

1. MDP on **Civil Aviation in India Today- Emerging Trends of Network Competition** conducted in conjunction with Shailesh J. Mehta School of Management, IIT Bombay on 22nd and 23rd October 2007, for 28 participants.
2. CEP on **Current Issues and Trends in Airports and Air Traffic Management Systems**, April 9-10, 2007, for 35 participants.
3. CEP on **Current Issues and Trends in Air Transportation**, conducted at IIT Bombay between 4th and 6th January 2005, for 50 participants.
4. International Seminar on **Challenges in Aviation Technology, Integration and Operations (CATIO-05)**, conducted on behalf of Aeronautical Society of India, Mumbai at Grand Hyatt, Mumbai, 3rd December 2005.
5. CEP on **Air Transportation for Working Professionals**, conducted at IIT Bombay from 21st August to 17th November 2000, for 17 participants.
6. CEP on **Air Transportation for ONGC executives**, conducted at IIT Bombay between 10th and 12th September 1999, for 35 participants.
7. CEP on **Introduction to Air Transportation** conducted at IIT Bombay between 18th to 20th September 1998, for 37 participants.
8. QIP Short Course on **Engineering Optimization**, conducted at IIT Bombay in December 1997, for 40 participants.
9. 2nd On-Line World Conference on **Soft Computing in Engineering Design and Manufacturing (WSC2)** hosted on Internet, June 1997. Co-organised by Dr. P. Chawdhry, University of Bath, UK and Dr R. Roy, CIM Institute, Cranfield University, UK.
10. CEP on **Conceptual Design of Commuter and Regional Aircraft** conducted at HESA Institute of Aeronautical Research, Shahin-Shahr, Isfahan, Iran, 19-31 July 1997, for 25 participants.