

Curriculum Vitae of Rajkumar S. Pant

Contact Address

Associate Professor, Aerospace Engineering Department,
Indian Institute of Technology, Bombay 400 076, India
TeleFax: +91(0)22-25767127
E-Mail : rkpant@aero.iitb.ac.in

Date of Birth and Nationality

22nd June 1962, Indian

Professional Degrees Obtained

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

Thesis title: *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 title: *Development of software for transport aircraft design.*

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

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

Current Employment

Member of Faculty of Aerospace Engineering, Indian Institute of Technology, Bombay, since December 1989. Involved in research & teaching in the area of Aircraft Design, Aerodynamics, Optimization and Air Transportation.

Previous Employment

Five years in the Design & Engineering Department of Hindustan Aeronautics Limited (November 1984 to November 1989):-

- a) 3½ years 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.

b) 1½ at Nasik Division, Liaison with shopfloor and production planning departments in Flight Testing and Aerodynamics of MiG 21 & 27-M series aircraft.

Research Experience

Co-investigator of a project titled "*Long Distance Wireless Communication for Rural Connectivity, using tethered Aerostat*" under Ek-Dunia Innovation Funding for technology (E-GIFT) initiative of OneWorld South Asia., 2006 - ongoing

Principal Investigator of a software project titled "*Shape Optimization of Aerostat Envelopes*" sponsored by Aerial Delivery R&D Establishment, DRDO, Government of India, 2004-2006.

Principal Investigator of a software project titled "*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, 2004-2006.

Principal Investigator of a software project titled "*A Comparative Analysis of Software for Conceptual & Preliminary Design of Transport Aircraft*" sponsored by Aerodynamics Panel of the Aeronautics R&D Board, India, on 1999-2004.

Principal Investigator of an experimental project *Flow Visualisation of a Powered Lift Aircraft Model* sponsored by Aerodynamics Panel of the Aeronautics R&D Board, India, on 1992-1993.

Industrial interaction & Consultancy

Conceptual Design studies of Trans-Brahmaputra Airship Ferry, a study for DSIR New Delhi (2007-ongoing)

Phase-I of *Route Optimization Module*, a study for Blue Dart Express Ltd. Mumbai, (2007-ongoing)

Workload Assessment Study for Air Traffic Control units, a study for Air Traffic Controllers' Guild (India), western region (2007-ongoing)

Phase-I of *Design and Development of Stratospheric Airships as a high altitude platform for high integrity Psuedolite based Precision Navigation System*, a study sponsored by Defence Research & Development Laboratory, Hyderabad, 2004-2005

Phase-I of Program on *Design and Development of airships for transportation of goods and passengers over mountainous terrains*, a study sponsored by Technology Information Forecasting and Assessment Council, New Delhi, 2001-2003.

Production Planning and Scheduling of Heat Treatment Processes, a study for NRB Bearings Limited, Thane, 2000-2002

Technical Vetting of the design of an unmanned aircraft developed by Jahagirdar Aero Products, Ahmadnagar. 1999

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

List of Publications, books, and professional courses conducted

Publications in Journals

1. **Constraint Analysis And Initial Sizing Of A Transport Aircraft By Simulated Annealing**, *Journal of Aerospace Science & Technology*, Iranian Aerospace Society, Vol. 2, No. 2, June 2005, pp. 43-47.
2. **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 S. D. Sharma, IIT Bombay.
3. **Aircraft Configuration And Flight Profile Optimization Using Simulated Annealing**, *Aircraft Design*, Vol. 2, 1999, pp. 239-255, Elsevier Science Limited, UK, co-authored by J. P. Fielding, Cranfield University, UK.
4. **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.
5. **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 J. P. Fielding and J. Snow of College of Aeronautics, Cranfield University, UK.
6. **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 S. D. Gogate, IIT Bombay and P. Arora, Tata Consultancy Services.

Papers in Conference Proceedings

International Conferences

1. **Design and Fabrication of an Aerostat for Wireless Communication in Remote Areas, (to appear in)** *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 Amol Gawale, Project Engineer, IIT Bombay.
2. **Multidisciplinary Shape Optimization of Aerostat Envelopes, (to appear in)** *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.
3. **Airline Network Optimization and the Application of Grey Theory, (to appear in)** *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 Ajeet Singh, M. Tech. Student, IIT Bombay.

4. **Precision Navigation of Airborne Vehicles Using Pseudolites Mounted on Stratospheric Airships, (to appear in) *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. Burrichandu, M. Tech. Student, IIT Bombay.**
5. **Investigation of Strategies for Optimal Collaborative Airborne Separation in Free Flight, (to appear in) *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 Vishal Chaugule, B. Tech. Student, IIT Bombay.**
6. **Life Cycle Cost Modeling Of Fighter Aircraft**, invited talk delivered at *International Seminar on Trends in Product Life cycle Modeling, Simulation & Synthesis (PLMSS-06)*, Dec. 18-20, 2006, Indian Institute of Science, Bangalore, India.
7. **A Methodology For Determination Of Profitable Range Of Operations Of Short-Haul Transport Aircraft**, *Proceedings of World Conference of Air Transport Research Society, ATRS-06*, May 26-28, 2006, Nagoya, Japan.
8. **Improved Model For Estimation Of Terminal Airspace Capacity**, *Proceedings of World Conference of Air Transport Research Society, ATRS-06*, May 26-28, 2006, Nagoya, Japan, Co-authored by Debashish Bagg, M. Tech. Student, IIT Bombay.
9. **Evaluation Of Air Network For Short-Haul Travel, A Case Study Based On Heuristic Approach**, *Proceedings of World Conference of Air Transport Research Society, ATRS-06*, May 26-28, 2006, Nagoya, Japan, co-authored by B. Kodanda, Scientist, NAL Bangalore.
10. **A Generic Methodology For Determination Of Drag Coefficient Of An Aerostat Envelope Using CFD**, *Proceedings of AIAA 5th Aviation, Technology, Integration, and Operations Conference (ATIO) and 16th Lighter-Than-Air Systems Technology Conference and Balloon Systems Conference*, September 2005, Crystal City, Arlington, USA, Co-authored by Sagar M. Kale and Pankaj Joshi, Project Engineer, IIT Bombay.
11. **A Methodology For Initial Sizing And Sensitivity Analyses Of Stratospheric Airship As A Platform For Pseudolite Based Precision Navigation System**, *Proceedings of AIAA 5th Aviation, Technology, Integration, and Operations Conference (ATIO) and 16th Lighter-Than-Air Systems Technology Conference and Balloon Systems Conference*, September 2005, Crystal City, Arlington, USA, Co-authored by Amol Gawale, Project Engineer, IIT Bombay
12. **Developing An Air Traffic Complexity Metric For Indian En-Route Airspace Using A Simulation Model Of Controller Workload**, *Proceedings of AIAA 5th Aviation, Technology, Integration, and Operations Conference (ATIO) and 16th Lighter-Than-Air Systems Technology Conference and Balloon Systems Conference*, September 2005, Crystal City, Arlington, USA, Co-authored by Arnab Majumdar and Washington Ochieng, Imperial College, London, UK, Keshava Sharma, Airports Authority of India, Mumbai.

13. **FALCCM: A Fighter Aircraft LCC Model For Indian Conditions**, *Proceedings of AIAA 5th Aviation, Technology, Integration, and Operations Conference (ATIO) and 16th Lighter-Than-Air Systems Technology Conference and Balloon Systems Conference*, September 2005, Crystal City, Arlington, USA, Co-authored by V. Ev. Jayakrishnan, IBM Global Services, Bangalore.
14. **Multidisciplinary Optimization Of Airship Envelope Shape**, *Proceedings of 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Albany, New York, 30th August - 1st September 2004, Co-authored by Tushar Kanikdale and A. G. Marathe, IIT Bombay.
15. **Structural Design Of Mooring Mast For Remotely Controlled Airship**, *Proceedings of 5th International Convention of The Airship Association, Oxford, England, August 2004*, Co-authored by Sagar M. Kale, Project Engineer, IIT Bombay.
16. **Design Studies Of A Powerplant System Of Non-Rigid Airship**, *Proceedings of 5th International Convention of The Airship Association, Oxford, England, August 2004*, Co-authored by Amol C. Gawale, Project Engineer, IIT Bombay.
17. **Emerging Issues And Current Trends In Short Haul Air Transportation**, *Proceedings of World Conference of Air Transport Research Society, ATRS-04*, July 2004, Istanbul, Turkey, co-authored by B. Kodanda, Scientist, NAL Bangalore.
18. **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.
19. **A Methodology For Determination Of Baseline Specifications Of A Non-Rigid Airship**, *Proceedings of AIAA 3rd Aviation Technology, Integration and Operations (ATIO) Forum, November 2003*, Denver, USA.
20. **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.
21. **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.
22. **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 C. M. Kalker-Kalkman, Delft University of Technology, The Netherlands.
23. **Optimization Of Regional Aircraft Configurations From Passengers' Perspective**, *Proceedings of the 20th Congress of the International Congress of Aeronautical Sciences*, September 1996, Sorrento, Italy.
24. **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 C. M. Kalker-Kalkman, Delft University of Technology, The Netherlands.

25. **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.
26. **Incorporation of Some Cost and Economic Parameters in 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 S. D. Gogate, IIT Bombay and P. Arora, Tata Consultancy Services.

National Conferences

1. **A Methodology For Estimation Of Capacity Of Terminal Airspace**, National Systems Conference-2005, December 16-17, IIT Bombay, Co-authored by Debashish Bagg, IIT Bombay.
2. **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
3. **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.
4. **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 Amol C. Gawale, Project Engineer, IIT Bombay.
5. **GIMTEP, A Generic Interpolation Model For Parametric Sizing Of Turbo-prop Engine Performance**, 55th Annual General Meeting of The Aeronautical Society of India, Bangalore, December 17-18, 2003.
6. **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 Sagar M. Kale, Senior Undergraduate Student, YCCE, Nagpur.
7. **Design Studies Of A Powerplant System Of Non-Rigid Airship**, 55th Annual General Meeting of The Aeronautical Society of India, Bangalore, December 17-18, 2003, Co-authored by Amol C. Gawale, Project Engineer, IIT Bombay.
8. **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 Amol C. Gawale, Project Engineer, IIT Bombay.
9. **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 Ryan P. Gazder, Undergraduate Student, IIT Bombay.

10. **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 Sandeep Relekar, Project Engineer, Program on Airship Design & Development, IIT Bombay.
11. **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 Praveen Gill, Sr. Undergraduate Student, IIT Bombay, and Sandeep Malik, Scientist ADRDE, Agra.
12. **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.
13. **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 Center, Thiruvananthapuram, India, June 1999. Co-authored by Prof. S. D. Sharma, IIT Bombay.
14. **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 S. D. Gogate, IIT Bombay.
15. **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.
16. **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.
17. * **Periodical Flight Testing Of A Multi-Role Supersonic Combat Aircraft**, Presented at the 1st National Seminar on Flight Testing, 1990, ASTE, Bangalore.
18. * **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.
19. * **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.

* *Papers that were presented in conferences, but do not appear in the proceedings*

Books

1. **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.

Short term courses / workshops / seminars organised

International Workshop on *Current Issues and Trends in Airports and Air Traffic Management Systems (CITAAMS-07)* conducted at IIT Bombay on 9th and 10th April 2007.

International Workshop on *Current Issues and Trends in Air Transportation (CITAT-05)* conducted at IIT Bombay from 4th to 6th January 2005.

International Seminar on *Challenges in Aviation Technology, Integration and Operations (CATIO-05)*, conducted at Grand Hyatt, Mumbai, 3rd December 2005.

Short course on *Air Transportation for Working Professionals*, conducted at IIT Bombay between 21st August to 17th November 2000.

Short course on *Air Transportation for ONGC executives*, conducted at IIT Bombay between 10th and 12th September 1999.

Short-course on *Introduction to Air Transportation* conducted at IIT Bombay between 18th to 20th September 1998.

Short-course on *Conceptual Design of Commuter and Regional Aircraft* conducted at HESA Institute of Aeronautical Research, Shahin-Shahr, Isfahan, Iran, 19th to 31st July 1997.

2nd On-Line World Conference on Soft Computing in Engineering Design and Manufacturing (WSC2) hosted on Internet. Co-organised by Dr. P. Chawdhry, University of Bath, UK and Dr R. Roy, CIM Institute, Cranfield University, UK, June 1997

Special recognition, scholarships, awards and prizes

Elected as International member of Lighter-Than-Air systems Technical Committee of American Institute of Aeronautics & Astronautics, USA in 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 500 Pounds from The Hammond Trust, 300 Pounds from the Churches Commission on Overseas Students, and Mountbatten memorial grant of 250 Pounds 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, Panjab Engineering College, Chandigarh, 1983.

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

Member of The Royal Aeronautical Society, UK, The Airship Association, UK, and American Institute of Aeronautics and Astronautics, USA.

Life Member of The Aeronautical Society of India and Indian Society of Technical Education.

Member of the Executive Committee of the Mumbai branch of The Aeronautical Society of India, since April 1997. Honorary Secretary of the Mumbai Branch during 1998-99.

Paper setter and External Examiner for various subjects for the B.E. (Aeronautical) examinations of Punjab University, Chandigarh, and the Graduateship examinations conducted by The Aeronautical Society of India.

President of the Asian Society of Cranfield University, UK, 1994-96.