

# GRZEGORZ KAWIECKI

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## EDUCATION

- **West Virginia University**; Morgantown, WV, USA  
Ph.D., Aerospace Engineering; 1991. Dissertation topic: "Helicopter Rotor Dynamics with Bilinear Formulation." Developed an improved method to analyze the aeroelastic stability of a bearingless helicopter rotor in forward flight using the finite element approach.
- **Warsaw University of Technology**; Warsaw, Poland.  
M.Sc., Aerospace Engineering; 1983. Double Major: (1) Helicopter Engineering, (2) Aircraft Guidance and Control. Master's Thesis title: "The Study of Tilt Rotor Aircraft Configuration and Experimental Verification of Scaled Model."

## PROFESSIONAL EXPERIENCE

- 03/2022 to present      **Universidad Carlos III de Madrid**, Spain, agreed to be my Host Institution if the "Green Energy Module" proposal I have submitted to the European Research Council Advanced Grants Program is funded.
- 08/2020 to 02/2022      **Self-employed**, used the Covid lockdown to design, build and test a prototype of a novel, more efficient Vertical Axis Wind Turbine, see "Development\_of\_Efficient\_Vertical\_Axis\_Wind\_Turbines" at <https://github.com/gmkawiecki/gkawiecki>.
- 09/2007 to 07/2020      **Boeing Research & Technology Europe (BR&TE)**, Madrid, Spain  
**Associate Technical Fellow (top 3% of Boeing Sci/tech staff)**  
**Leadership Excellence Acceleration Program (LEAP), 2012-2014, graduate**
  - Co-directed a large-budget internal program for rapid wildfire extinguishment using Boeing VTOL Autonomous Vehicles - based on his "Wildfire arrest and prevention system" patent EP2689809A1.
  - Developed main concepts and structures of winning proposals for R&D projects with a total budget of more than euro 18.5M, funded by Spanish government.
  - Contributed to the development of Autonomous Vehicles control systems based on AI/Bayesian Networks.
  - Boeing R&D Director – Poland, 2010-2016:
    - Set up and helped to coordinate three joint R&D projects: on:
      - Continuous Descent Approach,
      - Bulk Metallic Glasses modeling, and
      - Natural Fiber Composite Materials.
    - Developed and maintained relationships with airline customers, peers, and stakeholders.
  - Boeing Technical Journal Associate Editor, 2017-2020.
  - Managed a collaboration with Munich University of Technology on rotary wing aircraft efficiency improvement.
  - Contributed to a program to develop a fuel cell-powered Unmanned Aerial Vehicle: configuration selection, performance, and stability analysis, launch system design, data acquisition system integration, flight testing program design and execution.
  - Chaired Conference Sessions: "Sensors-design and solutions/Piezo-material based sensors," 4<sup>th</sup> European Workshop on Structural Health Monitoring, Krakow, Poland, 04/07/2008; "Aerospace Supply Chain," 3<sup>rd</sup> International Conference "Supply on the wings" International Aerospace Supply Fair, 12/11/2008, Frankfurt, Germany.
  - Member of a proposal review panel for the 2<sup>nd</sup> call of 7th Framework Program, European Commission.
  - Reviewer for the Journal of Structural Control and Health Monitoring.
  - Reviewer for the 50<sup>th</sup>, 51<sup>st</sup> AIAA/ASME/ASCE/AHS/ASC Conferences.
- 02/2002 to 08/2007      **Aernnova Engineering Solutions/Gamesa Desarrollos Aeronáuticos**, Madrid, Spain  
**R&D Group Leader**
  - Created a R&D Group in Madrid's Aernnova Engineering Solutions/Gamesa Desarrollos Aeronáuticos affiliate, with the following achievements:

- Successfully acquired resources for R&D Group activities - won approximately four million euro in external R&D funding over five years – including fiscal deductions.
- Developed and managed a five-million-euro budget ARTIMA (“Aircraft Reliability Through Intelligent Materials Application”) project involving ten partner organizations from six European countries. This project resulted, among others, in the development of a piezo-based helicopter rotor blade icing detector and in the development of a practical Health Monitoring system based on the detection of damage-related anomalies in propagation of piezo-generated elastic waves. Excellent project management had been recognized on numerous occasions.
- Supervised research on the application of Shape Memory Alloys for helicopter rotor blade active twist control and on the application of Active Constrained Layer Damping method for noise attenuation in helicopter interiors. Resulted in papers “Acoustic cavity with Active- Passive Segmented Constrained Layer Damping Treated panels” presented at ISMA 2008 - Sept 2008 and “Helicopter blade twist control through SMA technology: optimal shape prediction, twist actuator realization and main rotor enhanced performance computation,” presented at 35th European Rotorcraft Forum 2009, ERF 2009, Hamburg, Germany, co-authored by R&D Group staff.
- Managed a program to develop and obtain certification of a 6 m span, 60 kg MTOW Unmanned Aerial Vehicle.
- **Co-winner of Airbus prize for a most practical work in Health Monitoring.**
- Supervised two Capstone Design projects dedicated to autogiro rotor aerodynamics and dynamics.

02/2001  
to  
02/2002

**EADS CASA - SPACE DIVISION/PROTOS**, Madrid

***Scientist/Engineer R&D***

Applied smart materials to control vibrations transmitted from launch vehicles to payload. Developed an elegant, simple and inexpensive solution offering a ten-fold improvement over classical methods.

1990  
to  
2001

**UNIVERSITY OF TENNESSEE, Dept. of Mech. and Aero. Eng.;** Knoxville, TN, USA

***Assistant Professor (1990-1996), Associate Professor with tenure (1996-2001)***

Won over half a million dollars in external funding from National Science Foundation, DARPA Advanced Technology Office, NATO, and Lockheed-Martin.

Maintained contacts with US Army Research Office and Air Force Office of Scientific Research.

Directed research groups and managed projects funded, among others, by DARPA Advanced Technology Office, National Science Foundation, NATO and Lockheed-Martin.

Developed techniques for control of torsional, bending, and axial vibrations in thin-walled structural elements using piezoelectric and piezoviscoelastic elements – with the application to active control of helicopter rotor blades.

Developed methods for Health Monitoring based on detection of anomalies in propagation of elastic waves produced and collected by arrays of piezo-transducers and processed by neural networks.

Developed very efficient techniques for active control of low frequency vibrations in flexible robotic manipulators, long-span floors and building frames using piezoviscoelastic treatments.

Developed a method for active control of vibrations in flexible robot manipulators using piezoelectric and piezoviscoelastic elements. Supervised the design and fabrication of a test stand for experimental verification of vibrations reduction effectiveness.

Developed an improved method for vibration testing of guided missiles for Raytheon Co.

Developed a smart control system for controlled-trajectory bullets.

Taught courses in Advanced Mechanics of Materials, Theory of Vibration of Mechanical and Structural Systems, Structural Analysis of Aerospace Structures and Engineering Analysis. Coordinated Aerospace Engineering and Mechanical Engineering Laboratories.

Reviewed papers for American Institute of Aeronautics and Astronautics Journal, AIAA Journal of Spacecraft and Rockets, Composites Engineering Journal, Finite Elements in Analysis and Design, Journal of Intelligent Material Systems and Structures, Transactions on Control Systems Technology, Shock and Vibration Journal and Smart Materials and Structures.

Reviewed proposals submitted to the National Science Foundation Sensors Program (2000) and SBIR (1996, 1998).

Co-edited a Special Issue of the Composites Engineering journal devoted to Smart Composites.

Co-organized a NATO Advanced Research Workshop, June 16-19, 1998, Pułtusk, Poland.

Developed and chaired a Symposium on Smart Composites, a portion of the Second International Conference on Composites Engineering held in New Orleans, August 21-24, 1995. The Symposium on Smart Composites consisted of four sessions and 25 presentations.

06/1994  
to  
08/1994

**LOCKHEED-MARTIN;** Oak Ridge, TN, USA

***Adjunct Scientist***

Investigated characteristics of a NASA Variable Loading Cam Mechanism.

12/1993  
to  
01/1994

**ROTORCRAFT EDUCATION AND TECHNOLOGY CENTER;** College Park, MD, USA

***Visiting Research Associate***

Developed an analytical model for bending-torsional response of thin-walled piezo-actuated beams – with an application to twist control of composite rotor blades. Resulted in the following papers: Hu, C., Kawiecki, G., Chandra, R. and Chopra, I., "Structural Modeling of Beams with Skewed Piezoactuators," " AIAA Paper 95-1124-CP, Proceedings of the AIAA/ASME/ASCE/AHS/ASC 36th Structures, Structural Dynamics, and Materials Conference, New Orleans, Louisiana, April 10-14, 1995, Kawiecki, G., "Bending-Torsion Response of Open-Section Beams Actuated by Skewed Piezo-elements," Proceedings of the International Society for Optical Engineering 1996 Symposium on Smart Structures and Materials, San Diego, California, 26-29 February 1996, Kawiecki, G., Smith, W. P. and Hu, C., 1995, "Feasibility Study of a Torsional-Bending Piezoelectric Actuator," Journal of Intelligent Material Systems and Structures, Vol. 6, No. 4, July, pp. 465-473.

1985  
to  
1990

**West Virginia University, Dept. of Mech. and Aerospace Eng.;** Morgantown, WV, USA

***Research Assistant***

Developed an improved helicopter rotor blade dynamic response and stability analysis method based on the finite element approach, for possible application to enhance UMARC - University of Maryland helicopter rotor aeroelasticity analysis software.

Designed and built an award-winning plastic cable bending fatigue at below ambient temperatures testing facility and developed a theory of nonlinear plastic buckling of a tape in a metal channel for a project investigating drag in motion transfer systems.

1983  
to  
1985

**Aviation Institute;** Warsaw, Poland

***Research Engineer***

Participated in wind tunnel testing of scaled bearingless composite helicopter rotors. Developed instruments for blade characteristics measurement.

## CONTINUOUS EDUCATION

- CS 230, "**Deep Learning**," Stanford University, 2018-2019 Winter, part of a Graduate Certificate Program in Artificial Intelligence. Earned a grade of A.
- CS 228, "**Probabilistic Graphical Models: Principles and Techniques**," Stanford University, 2019-2020 Winter, part of a Graduate Certificate Program in Artificial Intelligence. Earned a grade of A.
- "**Probabilistic Graphical Models: Representation**," Stanford University via Coursera, 08/11-09/15/2020, [earned 92.70%](#)
- "**Aerial Robotics**," Penn State via Coursera, 08/11-09/15/2020, [earned 96.20%](#)
- **Boeing Project Management Program**; September 20-22, 2016.
- "**Architecture of Complex Systems**", MIT on-line course, September-October, 2016.
- **Boeing "Learning to Fly" (First Line Managers) Program**; December 5-8, 2014.
- **Boeing Leadership Excellence Acceleration Program (LEAP)**, 01/2012 – 12/2014. Selected LEAP components: Project Management, Communications, Facilitation, Business Acumen, Emotional Intelligence, Management Skills, Strategy and Innovation, Executive Mentoring.

## CONSULTING

- Millennium Materials, 1998-2000, modal analysis.
- Wright Industries, 1999-2000, stress analysis, design.

## PUBLICATIONS AND PATENTS

Authored or co-authored over **forty journal and conference articles**, including papers in American Institute of Aeronautics and Astronautics Journal and Journal of Sound and Vibration, and **seventeen patents and patent applications** (EP2689809A1 (B1), US2019077501A1, US2006101918A1, US2006123914A1, EP1826558A1, EP1803962A2 (A3), EP3508869A1, EP2871128A1 (B1), US2019061934A1, US2015294564A1 (B2), EP3370386A1 (B1), ES2746980T3, US2012203474A1 (B2), EP3614223A1 (B1), EP2902320A1, EP3736211A1, EP2186728A1). Please see the **APPENDIX** for details.

## AWARDS

- **Eight Boeing Achievement Awards.**
- **Airbus "Most Practical SHM Application" Award** for an article and a practical presentation "Advanced Phased Array System for Structural Damage Detection," 3<sup>rd</sup> European Workshop on Structural Health Monitoring.
- University of Tennessee Ray Thompson, Senior Professor in Mechanical Engineering.
- University of Tennessee Allen & Hoshall Engineering Faculty Award.
- Keynote Lecture titled: "Piezogenerated Elastic Waves for Structural Health Monitoring," NATO Advanced Research Workshop, June 16-19, 1998, Pułtusk, Poland.
- University of Tennessee Professional Development Award for "Wind Turbine Composite Rotor Dynamics Analysis," 1995.
- University of Tennessee Professional Development Award for "Active Damping of Torsional and Bending Vibrations in Thin-Walled Structural Members using Piezoelectric Elements," 1994.
- University of Tennessee Research Award for "Active Control of Vibrations in Thin-Walled Beams" project. Second place among 133 applicants, 1993.
- The James F. Lincoln Arc Welding Foundation Merit Award, 1989.

## PROFESSIONAL ORGANIZATIONS

- American Helicopter Society.
- American Institute of Aeronautics and Astronautics.
- Member, AIAA Adaptive Structures Technical Committee: 2010-2015.
- Member, European Workshop on Structural Health Monitoring: 2004-2015.

## IT SKILLS

- Python: *intermediate*
- Matlab: *intermediate*
- C++: *basic*
- Fortran: *intermediate*
- MS Office: *intermediate*

## LANGUAGE ABILITY

- Spanish: *speaking* - excellent, *writing* - good, *reading* - excellent
- English: *speaking* - excellent, *writing* - excellent, *reading* - excellent
- French: *speaking* - fair, *writing* - fair, *reading* - good
- Polish: native
- Russian: *speaking* - fair, *writing* - fair, *reading* - good

## APPENDIX:

### Publications

Vidal I., Fransoy A., Valls E. and Kawiecki G., 2020, "Loss of Power Management," 2020 Boeing Technical Excellence Conference.

Den Boer M., Criado A. and Kawiecki G., 2019, "Preliminary study of a STOL sUAS platform in all-lifting configuration," accepted for the AIAA Sci-Tech Conference, San Diego, CA.

Rodriguez, R. M., Kudela P., Ostachowicz W. and Kawiecki G., 2010, "Analytical Modeling for Active Rosette Piezotransducers Evaluation," Proceedings, Fifth European Workshop on Structural Health Monitoring.

Rodriguez, R. M., Kudela P., Ostachowicz W. and Kawiecki G., 2009, "Feasibility Study of Rosette Transducers," Proceedings of the 7<sup>th</sup> International Workshop on Structural Health Monitoring, Stanford University.

Peña-Macias J., Pérez M. C., Martínez-Oña R., Gómez-Ullate Y., Montero de Espinosa and Kawiecki G., 2008, "Phased-array transducers for damage detection in aircraft structures," *Fatigue&Fracture of Engineering Materials&Structures*, Vol. 31, Issue 11.

Kawiecki, G., 2006, "ARTIMA: Aircraft Reliability Through Intelligent Materials Application," Proceedings of the Third European Workshop on Structural Health Monitoring, Granada, Spain, July 5-7.

Peña, J., Melguizo, C., Martínez-Oña, R., Ullate, Y. G., de Espinosa Freijo F. M., and Kawiecki, G., 2006, "Advanced Phased Array System for Structural Damage Detection," Proceedings of the Third European Workshop on Structural Health Monitoring, Granada, Spain, July 5-7.

J. Peña, G. Kawiecki, Y. G. Ullate, F. M. de Espinosa and C. P. Melguizo, 2004, "Low-cost, low – frequency phased array system for damage detection in panels," Ed. C. Boller and W. Staszewski, Proceedings of the Second European Workshop on Structural Health Monitoring, Munich, Germany, July 7-9, pp. 1227.

G. Kawiecki, J. Peña and A. Guemes, 2004, "Strain monitoring using FBG optical transducers in a mechanical test of an aeronautical structure," Ed. C. Boller and W. Staszewski, Proceedings of the Second European Workshop on Structural Health Monitoring, Munich, Germany, July 7-9, pp. 500.

Kawiecki, G., Peña, J., Martín, F., Pérez, C., Martínez-Oña, R., Gómez, Y. and Montero, F., 2004, "Industrial Applications of Smart Materials," Third International Conference on new manufacturing trends for aeronautical industries, November 8-9, Bilbao, Spain.

J. P. Macías, A. Guemes and G. Kawiecki, 2003, "Cure monitoring using networks of piezoceramic transducers," ed. Fu-Kuo Chang, Proceedings of the 4<sup>th</sup> International Workshop on Structural Health Monitoring, Stanford University, Stanford, CA, September 15-17, pp. 1223.

Kawiecki, G. and Amiryants, G. A., 2003, "Adaptive Selectively Deformable Structures Analysis," Proceedings of the International Forum on Aeroelasticity and Structural Dynamics, June 4-6, Amsterdam, The Netherlands.

Kawiecki, G., 2002, "Smart materials for efficiency improvement," Second Conference on new manufacturing trends for aeronautical industries, November 19-20, Bilbao, Spain.

Cento, P. and Kawiecki, G., 2002, "Finite Element Modeling of Segmented Active Constrained Damping Layers including Bonding Layer Effect," *Journal of Vibration and Control*, vol. 8 issue 6.

Kawiecki G. and Jesse S., 2002, "Rosette piezotransducers for damage detection," *Smart Materials and Structures*, Vol. 11, No. 2.

Cento, P. F. and Kawiecki, G., 2001, "Evaluation of segmented active constrained layer damping treatments that include bonding layer strain energy," Proceedings Volume 4326, *Smart Structures and Materials 2001: Modeling, Signal Processing, and Control in Smart Structures*, SPIE's 8th Annual International Symposium on Smart Structures and Materials, 2001, Newport Beach, CA.

Kawiecki, G., "Modal Damping Measurement for Damage Detection," *Smart Materials and Structures*, August, 2000.

Kawiecki, G., 2000, "Modal Damping Measurement for Damage Detection," Proceedings of European COST F3 Conference on System Identification & Structural Health Monitoring, Universidad Politécnica de Madrid, Spain, 6-9 June.

Kawiecki, G., and Jesse S., 2000, "Damage Detection in Plates using Arrays of Distributed Piezotransducers," Proceedings of European COST F3 Conference on System Identification & Structural Health Monitoring, Universidad Politécnica de Madrid, Spain, 6-9 June.

Ostachowicz, W., Krawczuk, M. and Kawiecki, G., 2000, "Detection of Delaminations in Cantilevered Beams using Soft Computing Methods," Proceedings of European COST F3 Conference on System Identification & Structural Health Monitoring, Universidad Politécnica de Madrid, Spain, 6-9 June.

Kawiecki, G., 1999, "Application of Neural Networks to Defect Detection in Cantilever Beams with Linearized Damage Behavior," Journal of Intelligent Material Systems and Structures, Vol. 10, No. 10.

Gatscher, J. A. and Kawiecki, G., 1999, "Effect of Infinite Impedance Testing on Equipment Supported by a Structure of a Comparable Mass," Journal of Sound and Vibration, 223-5.

Kawiecki, G., 1999, "Bending-Torsion Response of Rib-Reinforced Cantilever Plates," ASCE Journal of Engineering Mechanics, October, Vol. 125, No. 10, pp. 1213-1217.

Ostachowicz, W. M. and Kawiecki, G., 1999, "Vibrational Response of Aero-Excited Composite Plates Subjected to Damage Growth," Structural Health Monitoring 2000, Fu-Kuo Chang, ed., Technomics 1999, pp. 1038-1047.

Kawiecki, G., 1999, "Piezogenerated Elastic Waves for Structural Health Monitoring," Smart Structures, J. Holnicki-Szulc and J. Rodellar (eds.), Kluwer Academic publishers, pp. 133-142.

Kawiecki, G., 1998, "Feasibility of Applying Distributed Piezotransducers to Structural Damage Detection," Journal of Intelligent Material Systems and Structures, Vol. 9, March, pp. 189-197.

Kawiecki, G., 1998, "Finite Element Study of Open-section Beams Actuated by Skewed Piezoelements," Smart Materials and Structures Journal, Vol. 7, No. 1, February, pp. 85-94.

Kawiecki, G., and Seagle, A., 1998, "Feasibility of Applying Distributed Piezotransducers to Structural Damage Detection," Proc. of the Maintenance and Reliability Conference, May 12-14, Knoxville, TN.

Britton, C. L., Hamel, W. R., Kawiecki, G. et al., 1998, "Projectile Control Utilizing Micro-Electro-Mechanical Systems," Workshop on Precision Guidance of Small Diameter Weapons, March 3-4, Redstone Arsenal, Alabama.

Kapadia, R. and Kawiecki, G., 1997, "Experimental Evaluation of Segmented Active Constrained Layer Treatments," Journal of Intelligent Material Systems and Structures, Vol. 8, No. 2, February, pp. 103-111.

Kawiecki, G., "Application of Neural Networks to Damage Detection in Turbine Blades," Structural Health Monitoring, Current Status and Perspectives, Fu-Kuo Chang, ed., Technomics 1997, pp. 456-465.

Kawiecki, G., "Structural Failures Detection and Prevention," Proceedings of US/Central Europe Workshop on "Civil Infrastructure Systems for the Next Century: A Global Partnership in Research," Krakow, Poland, October 2-4, 1996.

Kapadia, R. and Kawiecki, G., "Low Frequency Vibration Attenuation Using Segmented Active Constrained Layer Damping Treatments," Proceedings of the First European Conference on Structural Control, Barcelona, Spain, May 29-31, 1996.

Kawiecki, G., "Bending-Torsion Response of Open-Section Beams Actuated by Skewed Piezoelements," Proceedings of the International Society for Optical Engineering 1996 Symposium on Smart Structures and Materials, San Diego, California, 26-29 February 1996.

Gatscher, J. A. and Kawiecki, G., 1996, "Comparison of Mechanical Impedance Methods for Vibration Simulation," Shock and Vibration Journal, Vol. 3, No. 3, pp. 223-232.

Kawiecki, G., Smith, W. P. and Hu, C., 1995, "Feasibility Study of a Torsional-Bending Piezoelectric Actuator," Journal of Intelligent Material Systems and Structures, Vol. 6, No. 4, July, pp. 465-473.

Gatscher, J. A. and Kawiecki, G., "Comparison of Mechanical Impedance Methods for Vibration Simulation," AIAA Paper 95-1341-CP, Proceedings of the AIAA/ASME/ASCE/AHS/ASC 36th Structures, Structural Dynamics, and Materials Conference, New Orleans, Louisiana, April 10-14, 1995.

Hu, C., Kawiecki, G., Chandra, R. and Chopra, I., "Structural Modeling of Beams with Skewed Piezoactuators," AIAA Paper 95-1124-CP, Proceedings of the AIAA/ASME/ASCE/AHS/ASC 36th Structures, Structural Dynamics, and Materials Conference, New Orleans, Louisiana, April 10-14, 1995.

Kawiecki, G. and Smith, W. P., "Piezoelectric Actuator Capable of Inducing Torsional and Bending Control Loads with no Structural Coupling," AIAA Paper 94-1736-CP, Proceedings of the 35th Structures, Dynamics and Materials AIAA/ASME/ASCE/AHS/ASCE Conference, April 22 - 24, 1994.

Kawiecki, G. and Sivaneri, N. T., 1994, "Bilinear Formulation Applied to the Response and Stability of Helicopter Rotor Blade," American Institute of Aeronautics and Astronautics Journal, Vol. 32, No. 10, October, pp. 2036 - 2043.

Smith, W. P. and Kawiecki, G., "Twist and Torque Generating in Thin-Walled Composite Members Using Piezoelectric Elements," Proceedings of the 7th Technical Conference on Composite Materials, October, 1992, Pennsylvania State University, University Park, PA.

Kawiecki, G., Sivaneri, N. T. and Janik, T., "Comparison Between Imposed-Periodicity and Marching-in-Time Solutions of Helicopter Rotor Blade Steady-State Response Problem," AIAA Paper No. 92-2256-CP, Proceedings of the 33rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, April, 1992, Dallas, TX.

Kawiecki, G., Sivaneri, N. T. and Janik, T., "Effect of Initial Conditions on the Response of Nonlinear Dynamical Systems with the Application to Helicopter Rotor Dynamics," Proceedings of the South-East Conference on Theoretical and Applied Mechanics, April, 1992, Nashville, Tennessee.

Kawiecki, G. and Sivaneri, N. T., "Bilinear Formulation Applied to the Stability and Response of Helicopter Rotor Blades," Proceedings of American Helicopter Society International Technical Specialists' Meeting on Rotorcraft Basic Research, March 25-27, 1991, Atlanta, Georgia.

Sivaneri, N. T. and Kawiecki, G., "Forward Flight Aeroelasticity of a Hingeless Rotor Blade By Bilinear Formulation," AIAA Paper 89-1233, AIAA/ASME/ASCE/AHS/ASC 30th Structures, Structural Dynamics and Materials Conference, April 3-5, 1989, Mobile, Alabama.

Kawiecki, G., "Helicopter Rotor Blade Dynamics with Bilinear Formulation," Ph.D. dissertation, Dept. of Mechanical and Aerospace Engineering, West Virginia University, January 1991.

## Patents and patent applications

**Kawiecki Grzegorz**, 2019, "A system and method for enhanced altitude control of an autogiro," EP3736211A1.

Negro Vadillo Jaime, **Kawiecki Grzegorz**, Esteban Campillo David, 2018, "Method, system and emergency control device for traffic management of autonomous vehicles in emergency situations," EP3614223A1.

**Kawiecki Grzegorz**, 2017, "System and method for vertical take-off in an autogiro," US2019077501A1.

Perez Villar Victor, **Kawiecki Grzegorz**, 2017, "A system and computer-implemented method for machine-to-machine authentication of an apparatus," EP3370386A1.

**Kawiecki Grzegorz**; Hardt Michael, 2017, "Systems and methods for winged drone platform," US2019061934A1.

Fucke Lars, **Kawiecki Grzegorz**, 2017, "Lightweight radar system," EP3508869A1.

Perez Villar Victor, **Kawiecki Grzegorz**, Fucke Lars, 2014, "System and Method for Surface Vehicle Trajectory Description," US2015294564A1.

Alfredo Criado, **Kawiecki Grzegorz**, Lemus Martin José L., Ferreyra Eduardo, Pereira Mayan Sergio, 2014, "UAV take-off method and apparatus," EP2902320A1.

Alfredo Criado, **Kawiecki Grzegorz**, Valero Omar, 2014, "Unmanned Aerial Vehicle," US2015210388

**Kawiecki Grzegorz**, Alfredo Criado, 2013, "Energy Recovery Turbine System for an Aircraft," EP2871128A1.

**Kawiecki Grzegorz**, 2012, "Wildfire arrest and prevention system," EP2689809A1.

**Kawiecki Grzegorz**; Rodriguez Rosa Maria, Kudela Pawel, Ostachowicz Wieslaw, 2011, "Structural Health Monitoring System," US2012203474A1.

Gómez-Ledesma Ramón, **Kawiecki Grzegorz**, 2008, "Unmanned air vehicle recovery system," EP2186728A1.

**Kawiecki Grzegorz**, Peña Macías Julio 2005, "Active/passive stand-alone devices for vibration control and damage detection," EP1803962A2.

**Kawiecki Grzegorz**, Peña Macías Julio, 2005, "Active/passive devices for vibration control and damage detection," EP1826558A1.

Peña Macías Julio, **Kawiecki Grzegorz**, 2004, "System and method for monitoring the curing of composite materials," US2006123914A1.

Peña Macías Julio, **Kawiecki Grzegorz**, 2004, "Piezotransducer device," US2006101918A1.