36th Conference Program

Sunday, June 2, 2019

18:00 – 20:00 Registration
Opening Reception at Holiday Inn Krakow City Center

Monday, June 3, 2019

08:00 Registration
08:30 Welcome Address: Antoni Niepokólczycki - *ICAF 2019 Chairman;* Jerzy Komorowski - *ICAF 2019 Chairman*
09:00 Opening Address: Marcel Bos - *General Secretary of ICAF*

09:15 National Review - USA: Ravi Chona

10:00 – 10:30 Coffee Break & Exhibition Visit

10:30 – 12:00 Session 1; Chair: Luigi Lazzeri

10:30 National Review - France: Thierry Ansart
11:00 National Review - Switzerland: Michel Guillaume
11:30 National Review - Sweden: Zlatan Kapidzic

12:00 – 13:00 Lunch Break & Exhibition Visit

13:00 – 14:30 Session 2; Chair: Min Liao

13:00 National Review - China: Degang Cui
13:30 National Review - Brazil: Carlos E. Chaves
14:00 National Review - Finland: Tomi Viitanen

14:30 – 15:00 Coffee Break & Exhibition Visit

15:00 – 16:30 Session 3; Chair: Elke Hombergsmeier

15:00 National Review - Australia: Phil Jackson
15:30 National Review - Italy: Luigi Lazzeri
16:00 National Review - Russia: Boris Nesterenko

Tuesday, June 4, 2019

08:00	Registration
08:10 – 10:00	Session 4; Chair: Thierry Ansart
08:10	National Review - Japan: Shigeru Machida
08:40	National Review - Germany: Elke Hombergsmeier
09:20	National Review - Canada: Min Liao
10:00 – 10:30	Coffee Break & Exhibition Visit
10:30 – 12:40	Session 5; Chair: Tomi Viitanen
10:30	National Review - UK: David Hallam
11:10	National Review - The Netherlands: René Alderliesten
11:40	National Review - Israel: Yuval Freed
12:10	National Review - Poland: Antoni Niepokólczycki & Krzysztof Dragan
12:40 – 13:40	Lunch Break & Exhibition Visit

30th Symposium Program

Tuesday, June 4, 2019

13:40 – 15:30 Session 1 – **Fatigue Life Enhancement Methods, Repair Solutions and Structural Health Monitoring;**
Chair: Antoni Niepokólczycki

13:40 Pre-opening Address

13:50 **Bonded Repairs of Composite Panels Representative of Wing Structure**
John G. Bakuckas, Jr.[1], Reewanshu Chadha[1], Paul Swindell[1], Michael Fleming[2], John Z. Lin[3], J.B Ihn[3], Nihar Desai[4], Erick Espinar-Mick[4], Mark Freisthler[5]
[1]FAA William J. Hughes Technical Center, Atlantic City, NJ, USA
[2] Boeing Research & Technology, Ladson, SC, USA
[3] Boeing Research & Technology, Seattle, WA, USA
[4] Boeing Commercial Airplane, Everett, WA, USA
[5] FAA Transport Standards Branch, Des Moines, WA, USA

14:15 **The Research of Aircraft Structure Health Monitoring System based on Big Data Analysis**
Zhinan Zhang, Yu Ning, Xinbo Wang, Bintuan Wang
The First Aircraft Design and Research Institute of AVIC, Xi'an, China

14:40 **Structural Integrity Control Technology based on Structural Damage Monitoring**
Yuting He, Teng Zhang, Binlin Ma, Xianghong Fan, Xu Du
Air Force Engineering University, China

15:05 **Application of Laser Shock Peening to Aircraft Wing Material to Improve Fatigue Performance**
Marco Pavan, Niall Smyth, Michael Fitzpatrick
Coventry University, UK

17:00-20.00 Social Event:
Walking tour of the Kraków Old Town

Wednesday, June 5, 2019

07:30 Registration

08:00 – 09:30 Session 2 – **Plantema Lecture**

08:00 **Welcome Address**: Antoni Niepokólczycki - *ICAF 2019 Chairman;* Jerzy Komorowski - *ICAF 2019 Chairman*

08:15 **Introduction**: Marcel Bos - *General Secretary of ICAF*

08:25 Plantema Memorial Lecture:
Last Diamond: An Appeal for Holistic Regulatory Leadership
Steve Swift

09:20 Presentation of the Plantema Medal

09:30 – 10:00 Coffee Break, Poster & Exhibition Visit

10:00 – 12:05 Session 3 - **Full Scale Fatigue Testing of Aircraft and Aircraft Component**; Chair: David Hallam

10:00 **Bombardier Global 7500 Fatigue Test Cycle Rate Commissioning to ¼ Life**
Christopher Andre Beltempo[1], Alexandre Beaudoin[2], Robert Pothier[2]
[1]National Research Council, Canada
[2]Bombardier Aerospace, Canada

10:25 **Full Scale Fatigue Testing for Mitsubishi Regional Jet**
Koji Setta, Toshiyasu Fukuoka, Kasumi Nagao, Keisuke Kumagai
Mitsubishi Aircraft Corporation, Japan

10:50 **Combined Static and Fatigue Tests of Full-scale Structure of Transport Aircraft**
K.S.Shcherban[1], A.A. Surnachev [1],M.V. Limonin[1], A.G. Kalish[2], O.V. Chuvilin[2]
[1]Central Aerohydrodynamic Institute, Zhukovsky, Russia
[2]Ilyushin Aviation Complex, Moscow, Russia

11:15	**Testing Approach for Over Wing Doors using Curved Fuselage Panel Testing Technology** Mirko Sachse[1], Matthias Götze[1], Silvio Nebel[1], Sven Berssin[2], Christian Göpel[2] *[1]IMA Materialforschung und Anwendungstechnik GmbH, Dresden, Germany* *[2]Airbus Operations GmbH, Hamburg, Germany*
11:40	**Hawk Mk 51/51A/66 Tailplane Full-Scale Fatigue Tests** Risto Laakso[1], Jussi Kettunen[2], Juha Lähteenmäki[2] *[1]VTT Technical Research Centre of Finland* *[2]Patria Aviation Ltd, Finland*
12:05 – 13:00	Lunch Break, Poster & Exhibition Visit
13:00 – 15:05	Session 4 - **Full Scale Fatigue Testing of Aircraft and Aircraft Component**; Chair: Carlos E. Chaves
13:00	**Analysis Prediction and Correlation of Fiber Metal Laminate Crack Growth in Semi-Wing Full-Scale Test** Willy R. P. Mendonça, Danielle F. N. R. da Silva *Embraer S.A., Brazil*
13:25	**Full-Scale Fatigue Testing From a Structural Analysis Perspective** Derk Daverschot[1], Paul Mattheij[1], Mathias Renner[2], Yudi Ardianto[1], Manuel De Araujo[3], Kyle Graham[4] *[1]Airbus Operations GmbH, Germany* *[2]Airbus Defence & Space, Germany* *[3]Airbus Operations SAS, France* *[4]Airbus Operations Ltd, United Kingdom*
13:50	**Progress on the Pathway to a Virtual Fatigue Test** Ben Dixon[1], Madeleine Burchill[1], Ben Main[1], Thierry Stehlin[2], Raphael Rigoli[2] *[1]Defence Science and Technology Group, Australia* *[2]RUAG Aviation, Switzerland*

14:15 **Application of Optical Fiber-Based Strain Sensing for the Full-Scale Static and Fatigue Tests of Aircraft Structure**
U. Ben-Simon[1], S. Shoham[1], R. Davidi[2], N. Goldstein[1], Iddo Kressel[1], M. Tur[2]
[1]IAI Engineering Division, Ben-Gurion International Airport, Israel
[2]School of Electrical Engineering, Tel-Aviv University, Israel

14:40 **Changing the Philosophy of Full-Scale-Fatigue-Tests derived from 50 Years of IABG Experience towards a Virtual Environment**
Gerhard Hilfer, Olaf Tusch, Don Wu, Michael Stodt
IABG mbH, Ottobrunn, Germany

15:05 – 15:35 Coffee Break, Poster & Exhibition Visit

15:35 – 17:40 Session 5 – **Additive Manufacturing**; Chair: Ravi Chona

15:35 **On the Development of Fatigue and Damage Tolerance Framework for Additively Manufactured Parts**
Michael Gorelik
Federal Aviation Administration, Scottsdale, AZ, USA

16:00 **Fatigue in Additive Manufactured Aircraft - the Long Way to Make It Fly**
Ivan Meneghin, Goran Ivetic, Matthias Stiller, Gianluca Molinari, Vjola Ristori, Sara Della Ratta, François Dumont
Premium Aerotec GmbH, Augsburg, Germany

16:25 **Strain Controlled Fatigue Testing of Additive Manufactured Titanium Alloy Ti-6Al-4V**
Rob Plaskitt, Andrew Halfpenny, Michelle Hill
HBM Prenscia, United Kingdom

16:50 **Function Integration Impact on Failure Rates in Additive Manufactured Parts**
Przemysław Czapski, Bartłomiej Świątek
HBM Prenscia, Warsaw, Poland

17:15 **High Cycle Fatigue and Fatigue Crack Growth Rate in Additive Manufactured Titanium Alloys**

Xiang Zhang[1], Abdul Khadar Syed[1], Romali Biswal[1]
Filomeno Martina[2], Jialuo Ding[2], Stewart Williams[2]
[1]*Coventry University, Coventry, UK*
[2]*Cranfield University, Cranfield, UK*

19:30-21.00 Social Event:
Symposium Cocktail Reception,
Plac Wszystkich Świętych 3-4, Kraków

Thursday, June 6, 2019

07:30 Registration

08:00 Introduction: Marcel Bos - *General Secretary of ICAF*

08:05 Invited Lecture:
Fatigue and Damage Tolerance from Aeronautics to Astronautics
Tommaso Ghidini
European Space Agency

08:45 – 10:00 Session 6 **– In-service Experience, Life Extension and Management of Aging Fleets;**
Chair: René Alderliesten

08:45 **Evaluation of a PC-9/A Wing Main Spar with Misdrills using Enhanced Teardown at Resonance**
Ben Main[1], Keith Muller[3], Michael Konak[1], Michael Jones[1], Sudeep Sudhakar[2], Simon Barter[1]
[1] Aerospace Division, Defence Science and Technology Group, Fishermans Bend, Australia
[2] Defence Aviation Safety Authority, Melbourne, Australia
[3] Royal Melbourne Institute of Technology, Bundoora, Australia

09:10 **Holistic Approach for Determining a Helicopter's Airframe Interval for Depot Induction**
Brooks, Craig L.[1], Benavides, Samuel[2]
[1]Analytical Processes/Engineered Solutions (APES), Saint Louis, Missouri, USA
[2]USCG Aviation Logistics Center, Elizabeth City, NC, USA

09:35 **Nondestructive Evaluation for Damage Tolerance Life Management of Composite Structures**
Eric A. Lindgren[1], John C. Aldrin[2], David H. Mollenhauer[1], Mark D. Flores[1]
[1] Air Force Research Laboratory, Wright-Patterson AFB, OH, USA
[2]Computational Tools, Gurnee, IL, USA

10:00 – 10:30 Coffee Break, Poster & Exhibition Visit

ROOM A

10:30 – 12:10	Session 7 **– Fatigue Crack Growth and Life Prediction Methods;** Chair: Phil Jackson
10:30	**Nearly Identical Twins or Distant Cousins, Revisited. Weibull or Log-Normal Distributions to Characterize Fatigue Life Scatter – Which is Recommended?** Abraham Brot *A. Brot, Engineering Consultants, Israel*
10:55	**A Specimen to Evaluate Susceptibility of Aluminum Alloys to L-S Crack Deviation** Erembert Nizery, Jean-Christophe Ehrström, Guillaume Delgrange, Bruno Wusyk *Constellium Technology Center, Voreppe Cedex, France*
11:20	**Assessment of Aircraft Structural Service Life using Generalized Correction Methodology** Hongna Dui, Xiaodong Liu, Jiang Dong, Lixin Zhang *Chengdu Aircraft Design & Research Institute, China*
11:45	**A Framework to Implement Probabilistic Fatigue Design of Safe-Life Components** Joshua Hoole[1], Pia Sartor[1], Julian Booker[1], Jonathan Cooper[1], Xenofon V. Gogouvitis[2], Amine Ghouali[3], R. Kyle Schmidt[4] *[1]Faculty of Engineering, University of Bristol, United Kingdom* *[2]Safran Landing Systems, Gloucester, United Kingdom* *[3]Safran Landing Systems, Vélizy, France* *[4]Safran Landing Systems, Ajax, ON, Canada*
12:10 – 13:00	Lunch Break, Poster & Exhibition Visit

13:00 – 15:05 Session 8 **– Fatigue Crack Growth and Life Prediction Methods;**
Chair: Degang Cui

13:00 **Stress-Intensity Factor Solutions for Tapered Lugs with Oblique Pin Loads**
James C. Sobotka, Yi-Der Lee, R. Craig McClung, Joseph W. Cardinal
Southwest Research Institute, San Antonio, Texas, USA

13:25 **A Multiaxial Fatigue Damage Model for Isotropic Materials**
Mauricio V. Donadon[1], Mariano A. Arbelo[1], Paulo Rizzi[1], Carlos V. Montestruque[1], Lucas Amaro[1], Saullo Castro[2], Marcos Shiino[3]
[1]Technological Institute of Aeronautics, São José dos Campos, Brazil
[2]Delft University of Technology, The Netherlands
[3]São Paulo State University, São José dos Campos, Brazil

13:50 **Fatigue Crack Growth Prediction and Verification of Aircraft Fuselage Panels with Multiple Site Damage**
Su Shaopu, Liao Jianghai, Zhang Wendong, Dong Dengke
Avic Aircraft Strength Research Institute, Shaanxi, China

14:15 **Novel Methods for Measuring the Mode I and Mixed Modes I/II Interlaminar Fracture Toughnesses of Composite**
W. XU, Z.Z. Guo, Y. Yu, X.J. Zhang
School of Aeronautics and Astronautics, Shanghai Jiao Tong University, Shanghai, China

14:40 **Effect of Crack Length and Reference Stress on Variable Amplitude Fatigue Crack Growth Rate**
Emiel Amsterdam
Netherlands Aerospace Centre (NLR), The Netherlands

15:05 – 15:35 Coffee Break, Poster & Exhibition Visit

15:35 – 17:15	Session 9 **– Fatigue Crack Growth and Life Prediction Methods;** Chair: Yuval Freed
15:35	**Probabilistic Reliability Assessment of a Component in the Presence of Internal Defects** Nikolai Kashaev, Fedor Fomin *Institute of Materials Research, Materials Mechanics, Helmholtz-Zentrum Geesthacht, Geesthacht, Germany*
16:00	**Fatigue Life Prediction at Cold Expanded Fastener Holes with ForceMate Bushings** Yan Bombardier, Gang Li, Guillaume Renaud *National Research Council Canada, Ottawa, Canada*
16:25	**Fatigue Crack Growth in Pin Loaded Cold-Worked Holes** Luisa Boni[1], Daniele Fanteria[1], Domenico Furfari[2], Luigi Lazzeri[1] *[1]University of Pisa, Pisa, Italy* *[2]Airbus Operations GmbH, Hamburg, Germany*
16:50	**A Numerical Approach to the Disbonding Mechanism of Adhesive Joints** Nicola Zavatta, Enrico Troiani *University of Bologna, Forlì, Italy*
19:00	Social Events: Wieliczka Salt Mine Tour Symposium Gala Dinner in Wieliczka

ROOM B

10:30 – 12:10 Session 10 – **Structural Health and Structural Loads Monitoring;**
Chair: Krzysztof Dragan

10:30 **A Machine Learning Approach to Load Tracking and Usage Monitoring for Legacy Fleets**
Catherine Cheung[1], Srishti Sehgal[1], Julio J. Valdés[2]
[1]*National Research Council Canada, Aerospace Research Centre, Ottawa, Canada*
[2]*National Research Council Canada, Digital Technologies Research Centre, Ottawa, ON, Canada*

10:55 **Machine Learning Application on Aircraft Fatigue Stress Predictions**
Eugene O'Higgins[1], Kyle Graham[2], Derk Daverschot[1], Julien Bar[3]
[1] *Airbus Operations GmbH, Germany*
[2]*Airbus Operations Ltd, United Kingdom*
[3]*Airbus Operations SAS, France*

11:20 **Evaluating the Influence of SHM on Damage Tolerant Aircraft Structures Considering Fatigue**
Dominik M. Steinweg, Mirko Hornung
Bauhaus-Luftfahrt e.V, Taufkirchen, Germany

11:45 **Flight Testing of an Ultrasonic Based SHM System**
Hideki Soejima[1], Takuya Nakano[1], Makoto Yokozuka[1], Yoji Okabe[2], Nobuo Takeda[3,4], Noriyuki Sawai[5]
[1]*Aerospace Company SUBARU CORPORATION, Japan*
[2]*The University of Tokyo, Japan*
[3]*R&D Institute of Metals and Composites for Future Industries, Japan*
[4]*Aeronautical Technology Directorate, Japan Aerospace Exploration Agency, Japan*
[5]*R&D Institute of Metals and Composites for Future Industries, Japan*

12:10 – 13:00 Lunch Break, Poster & Exhibition Visit

13:00 – 15:05 Session 11 **– Structural Health and Structural Loads Monitoring;**
Chair: Shigeru Machida

13:00 **A Guidance to Derive Statistical Data for Asymmetrical Maneuvers on Transport Operation**
Juliana Diniz Mattos, Diego Silva Peixoto, Frank Machado
Embraer, São José dos Campos, Brazil

13:25 **Substitute Models for Structural Components Loads Estimation Based on Flight Parameters and Statistical Inference Methods**
Michal Dziendzikowski[1], Wojciech Zielinski[1], Piotr Reymer[1], Marcin Kurdelski[1], Piotr Synaszko[1], Witold Klimczyk[2], Andrzej Leski[2], Krzysztof Dragan[1]
[1]Air Force Institute of Technology, Warsaw, Poland
[2]Institute of Aviation, Warsaw, Poland

13:50 **Research on the Scatter of Structural Load-time History in a Fleet**
Tang Li, Yongjun Wang, Hongna Dui, Jiang Dong
Chengdu Aircraft Design & Research Institute, Chengdu, China

14:15 **Real-time Stress Concentration Monitoring of Aircraft Structure during Flights using Optical Fiber Distributed Sensor with High Spatial Resolution**
Daichi Wada[1], Hirotaka Igawa[1], Masato Tamayama[1], Tokio Kasai[1], Hitoshi Arizono[1], Hideaki Murayama[2]
[1]Japan Aerospace Exploration Agency, Tokyo, Japan
[2]The University of Tokyo, Japan

14:40 **Perspective of Structural Health Monitoring for Military Aviation in Poland**
Krzysztof Dragan, Michał Dziendzikowski, Artur Kurnyta, Kamil Kowalczyk
Air Force Institute of Technology, Warsaw, Poland

15:05 – 15:35 Coffee Break, Poster & Exhibition Visit

15:35 – 17:15 Session 12 – **Structural Health and Structural Loads Monitoring and Other Considerations**
Chair: Boris Nesterenko

15:35 **Smarter Testing Through Simulation for Efficient Design and Attainment of Regulatory Compliance**
Steven A. Chisholm, Jack F. Castro, Brandon D. Chapman, Kazbek Z. Karayev, Andrea J. Gunther, Mohammed H. Kabir
Boeing Commercial Airplanes, Everett, WA, USA

16:00 **Is the Civil Aerospace Industry Ready to Implement Laser Shock Peening into Maintenance Environment? Questions to be Answered and Minimum Requirements from Aircraft Manufacturer's Perspective**
D. Furfari[1], U. C. Heckenberger[2], V. Holzinger[2], E. Hombergsmeier[2], J. Vignot[3], N. Ohrloff[1]
[1]Airbus Operations GmbH, Hamburg, Germany
[2]Airbus Defence and Space GmbH, Ottobrunn, Germany
[3]Airbus SAS, Toulouse, France

16:25 **Fatigue Crack Growth Approach for Fleet_Monitoring**
Olivier Gillet, Bastien Bayart
DGA Aeronautical Systems, France

16:50 **Investigation of GTE Compressor Blades Vibration due to Blade–Casing Rubbing**
S.Y. Danilkin, V.V. Shkurov, T.I. Mazikina, D.A. Redkin, A.L. Kurakov.
Baranov Central Institute of Aviation Motors (CIAM), Moscow, Russia

19:00 Social Events:
Wieliczka Salt Mine Tour
Symposium Gala Dinner in Wieliczka

Friday, June 7, 2019

08:00 Registration

08:30 – 10:00 Session 13 – **Jaap Schijve Award Session & Airworthiness and Other Considerations;**
Chair: Jerzy Komorowski

08:30 Announcement of the winner: Marcel Bos - *General Secretary of ICAF*

08:40 **Jaap Schijve Award Lecture**

09:10 **Risks of Initial Assumptions in Fatigue and Damage Tolerance of Small Aircraft Development Programs**
Dejan Romančuk[1] and Juan Ocampo[2]
[1]Lucerne University of Applied Science and Arts, Horw, Switzerland
[2]St. Mary's University, One Camino Santa Maria, San Antonio, USA

09:35 **An Ultrafast Crack Growth Lifing Model to Support Digital Twin, Virtual Testing, and Probabilistic Damage Tolerance Applications**
Juan Ocampo[1], Harry Millwater[2], Nathan Crosby[2], Beth Gamble[3], Christopher Hurst[3], Michael Reyer[4], Sohrob Mottaghi[4], Marv Nuss[5]
[1]St. Mary's University, San Antonio, TX, USA
[2]University of Texas at San Antonio, San Antonio, TX, USA
[3]Textron Aviation, Wichita, KS, USA
[4]Federal Aviation Administration, Atlantic City, NJ, USA
[5]NuSS Sustainment Solutions, USA

10:00 – 10:30 Coffee Break, Poster & Exhibition Visit

10:30 – 12:10 Session 14 **– Airworthiness and Other Considerations;**
Chair: Michel Guillaume

10:30 **Breaking the Testing Pyramid with Virtual Testing, Hybrid Simulation, and Model Assisted Testing**
Shawn You, X. Shawn Gao, Arlin Nelson
MTS Systems Corporation, Eden Prairie, MN, USA

10:55 **Demonstration of an Airframe Digital Twin Framework using a CF-188 Full-Scale Component Test**
Guillaume Renaud, Min Liao, Yan Bombardier
National Research Council Canada, Ottawa, Canada

11:20 **Analytical and Numerical Investigation of the Effect of Secondary Bending in Hard-point Joints**
Yuval Freed, Lior Sagi Machnes, Orel Magidish
Israel Aerospace Industries, Ben Gurion International Airport, Israel

11:45 **Fatigue Considerations in the Development and Implementation of Mechanical Joining Processes for Commercial Airplane Structures**
Robert Jochum[1], Antonio Rufin[2], Tanni Sisco[3], Frederick Swanstrom[4]
[1]*Structural Damage Technology, Boeing Commercial Airplanes, Everett WA, USA*
[2]*Structural Damage Technology, Boeing Commercial Airplanes (Retired)*
[3]*Product Development, Boeing Commercial Airplanes, Everett, WA, USA*
[4]*Advanced Developmental Composites, Boeing Commercial Airplanes, Seattle WA, USA*

12:10 – 13:00 Lunch Break, Poster & Exhibition Visit

13:00 – 13:25 Session 15 **– Airworthiness and Other Considerations;** Chair: Marcel Bos

13:00 **Russian Practice to Provide Safe Operation of Airplane Structures with Long-Term Operation**

Boris G. Nesterenko[1], Grigory I. Nesterenko[1], Victor V. Konovalov[2], Vitaly Ya. Senik[2]
[1]National Research Center " Zhukovsky Institute", Moscow, Russia
[2]Central Aerohydrodynamic Institute n.a. Professor N.E. Zhukovsky, Zhukovsky, Russia

13:25 – 15:05 Session 16 **– Advanced Materials and Innovative Structural Concepts;** Chair: Marcel Bos

13:25 **Assessment of Emerging Metallic Structures Technologies Through Test and Analysis of Fuselage Structure**

John G. Bakuckas, Jr.[1], David Stanley[1], Yongzhe Tian[1], Kevin Stonaker[1], Mike Kulak[2], Po-Yu Chang[2], Mark Freisthler[3], Marcelo R. B. Rodrigues[4], Carlos E. Chaves[4]
[1] FAA William J. Hughes Technical Center, Atlantic City, USA
[2] Arconic Technical Center, Pittsburgh, PA, USA
[3] FAA Transport Standards Branch, Des Moines, Washington, USA
[4] Embraer S.A., São José dos Campos, Brazil

13:50 **Assessment of Fatigue Behavior of Advanced Aluminum Alloys Under Complex Variable-Amplitude Loading**

Kevin Stonaker[1], David Stanley[1], John G. Bakuckas, Jr.[1], Mike Kulak[2], Po-Yu Chang[2], Gongyao Wang[2], Mark Freisthler[3]
[1]FAA William J. Hughes Technical Center, Atlantic City, NJ, USA
[2]Arconic Technical Center, Pittsburgh, PA, USA
[3]FAA Transport Standards Branch, Des Moines, WA, USA

14:15	**Ply Curving Termination to Suppress Delamination in Composite Ply Drop-Off** Shu Minakuchi, Nobuo Takeda *The University of Tokyo, Japan*
14:40	**Studies on the Fatigue Damage Behavior of Active Jet Engine Chevron** Bingfei Liu, Shangyang Jin, Shaozhe Dong, Zhenyu Feng *Civil Aviation University of China, Tianjin, China*
15:05 – 15:35	Coffee Break, Poster & Exhibition Visit
15:35 – 16:50	Session 17 – **Joints & Additive Manufacturing & Other Considerations**; Chair: Zlatan Kapidzic
15:35	**Fatigue Characteristic of Linear Friction Welded Ti-6Al-4V Joints** Hiroshi Kuroki, Yukihiro Kondo, Tsukasa Wakabayashi, Kenji Nakamura, Kikuo Takamatsu, Koji Nezaki, Mitsuyoshi Tsunori *IHI Corporation, Tokyo, Japan*
16:00	**Durability and Damage Tolerance of Additive Manufacturing Polymer Parts for Aerospace Application** Hayat El Fazani, Jeremy Laliberté *Carleton University, Ottawa, Canada*
16:25	**Improvement of Fatigue-Crack Resolution and Prediction via DFEM for Metallic Helicopter Airframes** David Dayan, Teddy Sebag, Nicolas Genelot, Sandrine Coste-Routhiau, Laurent Girard *AIRBUS HELICOPTERS Marignane, France*
16:50	Symposium closure