



Elbit
Systems



Israel Aerospace
Industries



Technion – Israel Institute of Technology
Faculty of Mechanical Engineering
Internal Combustion Engines Lab



Directorate of Defense Research
& Development (DDR&D)
Aeronautical Division



Association of Engineers, Architects
and Graduates in Technological
Sciences in Israel

6th Conference on Propulsion Technologies for Unmanned Aerial Vehicles

Conference Program

Thursday, January 26, 2017

Shirley and Manny Ravet Auditorium, D. Dan and Betty Kahn Building
Faculty of Mechanical Engineering, Technion, Haifa

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| 8:30 – 9:00 | Welcome and Registration |
| Opening session | Chairman: Leonid Tartakovsky, Technion |
| 9:00 – 9:30 | Welcome: <i>Daniel Rittel</i> , Deputy Senior Vice President, Technion <i>Yoram Halevi</i> , Dean, Faculty of Mechanical Engineering, Technion <i>Uri Zvikel</i> , Head, Propulsion Branch, Directorate of Defense Research & Development, MAFAT <i>Emanuel Liban</i> , Chairman, Israel Society of Mechanical Engineers |
| 9:30 – 10:00 | Keynote lecture: Pushing the efficiency of internal combustion engines and UAV systems <i>Robert Wagner</i> , Director, Fuels, Engines, and Emissions Research Center, Oak Ridge National Laboratory, USA |
| Morning plenary session | Chairman: Yitzhak (Itche) Hochmann, Edmatech (the session will be held in English) |
| 10:00 – 10:25 | UAV platforms in IDF – current usage issues and future trends <i>Shlomi K.</i> , Head, UAV Department, Air Force, IDF |
| 10:25 – 10:50 | Orbital FlexDI: Providing reliable and efficient heavy-fuel IC engines for the UAV industry <i>Geoff Cathcart & J.H. Tubb</i> , Orbital, Australia |
| 10:50 – 11:15 | Coffee break |
| Noon plenary session | Chairman: Hemi Oron, Elbit Systems (the session will be held in English) |
| 11:15 – 11:40 | Boosting technologies– a theoretical study about limits for small combustion engines <i>Roland Baar</i> , Chair of Combustion engines, Technical University Berlin, Germany |
| 11:40 – 12:05 | Reduction of Development Time and Number of Suppliers using Development Kits for Individual Complete Propulsion Systems <i>Karsten Schudt</i> , Managing partner, 3W International GmbH, Germany |

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| 12:05 – 12:15 | Best Student Poster Award Ceremony |
| 12:15 – 13:40 | Lunch |
| Session "New Concepts " | Chairman: Jacob Feldman , Israel Aerospace Industries (the session will be held in English) |
| 13:40 – 14:00 | A New Hydrogen-Based PCM Open-Cycle Micro Engine <i>Eran Sher, A. Lidor, A. Zibitsker and D. Weihs</i> , Technion, Israel |
| 14:00 – 14:20 | High efficiency split-cycle engine <i>O. Tour, H.B.Tour and Ehud Sivan</i> , Tour Engine Inc., Israel - USA |
| 14:20 – 14:40 | XMv3 High Efficiency Cycloidal Engine demonstrator <i>A. Shkolnik, Nick Shkolnik</i> , LiquidPiston, Inc., USA |
| 14:40 – 15:00 | HCCI combustion process in Wankel engine <i>Guy Ben Haim & L. Tartakovsky</i> , Technion, Israel |
| Session "Engine Design & Performance – 1" | Chairman: Michael Shapiro , Technion (the session will be held in English) |
| 13:40 – 14:00 | Speed reducers design for piston engines <i>Luca Piancastelli</i> , Department of Industrial Engineering, University of Bologna, Italy |
| 14:00 – 14:20 | Study of knock in a UAV engine <i>Ran Amiel & L. Tartakovsky</i> , Technion, Israel |
| 14:20 – 14:40 | High-Speed Infrared Imaging for Analysis of a Diesel Engine Supplied with a Premixed Methane-Air Charge <i>M-A. Gagnon¹, E. Mancaruso², L. Sequino², P. Tremblay¹, S. Savary¹, J. Giroux¹, Vincent Farley¹ and F. Marcotte¹</i> , 1 – Telops, Canada; 2 – Instituto Motori, Italy |
| 14:40 – 15:00 | Control system of a small UAV engine <i>Idan Biner</i> , Aeronautics Defense Systems Ltd., Israel |
| 15:00 – 15:20 | Coffee break |
| Session "Engine Design & Performance – 2" | Chairman: Gil Finder , Israel Defense Forces (the session will be held in Hebrew) |
| 15:20 – 15:40 | Engineering design considerations in UAV fuel systems <i>Ron Raz</i> , Elbit systems Ltd., Israel |
| 15:40 – 16:00 | Pollutants emission implications of a hybrid propulsion system <i>Erez Mosafi</i> , Ledico – Bosch, Israel |
| 16:00 – 16:20 | The Independent Modular Drive based on Axial Flux Electric Motors <i>Alexander Sromin</i> , ALBUS Technologies Ltd., Israel |

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| 16:20 – 16:40 | UAV Integrated Propulsion system guidelines & consideration <i>Hanan Kapara</i> , Elbit systems Ltd., Israel |
| Session "Alternative Propulsion Technologies" | Chairman: Ariel Dvorjetski , Directorate of Defense Research & Development, MAFAT (the session will be held in English) |
| 15:20 – 15:40 | Fuel cell technologies for UAV applications <i>Ehud Galun</i> , Directorate of Defense Research & Development, MAFAT, Israel |
| 15:40 – 16:00 | Electrical Power Sources for Elbit SUAV Family <i>Vladimir Livshits</i> , Elbit systems Ltd., Israel |
| 16:00 – 16:20 | Energy Case Based on Hydrogen Generator <i>O. Dahan, I. Dayee, A. Schechter, <u>Idit Avrahami</u></i> , Ariel University, Israel |
| 16:20 – 16:40 | A novel hydrogen production method for UAVs fed with fuel cells <i>Guy N. Michrowski</i> , Terragenic, Israel |
| Closing remarks 16:40 – 16:50 | Leonid Tartakovsky , Chairman Organizing Committee |

* The Program is subject to changes

Posters session

1. Power Watch Algorithms for Drone Li-ion Batteries

Alex Nimmerger & Niles Fleischer, Algolion Ltd.

2. Multifunction Micro Turbine Generators (MiTG) based on mass production turbocharger

B. Arav¹, R. Shulman¹, V. Kaminsky², R. Kaminsky², A. Filippov², A. Lazarev², 1 – TurboGEN Technology, Tel-Aviv, Israel; 2 – Turbotekhnika, Moscow, Russia

3. Using Morphological Research to improve Micro Turbine Generators (MiTG)

B. Arav¹, S. Besedin², V. Kaminsky³, R. Kaminsky³, 1 – TurboGEN Technology, Tel-Aviv, Israel; 2 – Microturbine Technology, St. Petersburg, Russia ; 3 – Turbotekhnika, Moscow, Russia

4. Long Distance Airborne UAV

Shemer Slaav, Technion – IIT, Israel

5. Powertrain for the 2017 SAE Student Car

T. Lipshitz, D. Brudner, I. Hirsh, A. Sacks, A. Asraf, M. Abraham, D. Jacobson, P. Moscovitz, D. Alfisi, O. Kozlovsky, O. Marksheid, P. Ruff, D. Buntin, D. Zadok, R. Baltzan, Technion – IIT, Israel

6. Effects of diesel particle filter on nanoparticle emissions and energy efficiency of in-use buses

R. Fleischman, R. Amiel, L. Tartakovsky, Technion – IIT, Israel

7. Air pollution by nanoparticles in diesel-propelled passenger trains

V. Abramesco, Technion – IIT, Israel

8. Lubricant oil pressure in a Formula-SAE Student race car

N. Dabush, Technion – IIT, Israel

9. Reforming-controlled HCCI process

A. Eyal, Technion – IIT, Israel

10. Design of an optically accessible research single-cylinder engine

N. Dekel, O. Gur, A. Asraf, T. Almogi, D. Epstein, Y. Lung, A. Ben Ari, Technion – IIT, Israel

11. Stagnation-point ignition of a fuel spray-oxidant mixture

G. Kats & J. B. Greenberg, Technion – IIT, Israel

12. Optimization of Extinguishing Powder Dispersal

A. Shalel, T. Bar, D. Katoshevski, Ben-Gurion University of the Negev

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** A posters session will be open for audience during the whole Conference day. Poster presenters will make a 2-min presentation of their work at 08:00. The best student poster will be awarded by a certificate and a prize of 1000 NIS donated by the Association of Engineers, Architects and Graduates in Technological Sciences in Israel.

An exhibition will take place in the Conference lobby, where the leading industries will demonstrate their latest developments in the field of UAV propulsion.

Participation in the Conference is free of charge, however early registration is required (email to meruthi@technion.ac.il).

Conference Chairman:

*Leonid Tartakovsky, Faculty of Mechanical Engineering, Technion – Israel Institute of Technology.
Email address: tartak@technion.ac.il*

Conference Secretary:

Mrs. Ruthie Bouscher, meruthi@tx.technion.ac.il Phone: +972-4-8292065, Fax: +972-4-8295711

Best Student Poster Selection Committee:

Emanuel Liban, Israel Society of Mechanical Engineers – *Chairman*

Jacob Feldman, Israel Aerospace Industries

Yitzhak (Itche) Hochmann, Edmatech

Nir Geva, Elbit Systems

Michael Shapiro, Technion

Daniel Budianu, Israel Aerospace Industries

Ariel Dvorjetski, MAFAT