

Program of the XXIII Conference of the Italian Association of
Aeronautics and Astronautics - AIDAA 2015

PROVISIONAL VERSION

Politecnico di Torino and Oval Lingotto, Torino, Italy

16-19 November 2015

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Massimo Sorli, Politecnico di Torino
Franco Tortarolo, Avio Aero

Tuesday, 17 November 2015, Politecnico di Torino

Tuesday Morning / 17 November / Polito - Sala Consiglio di Facoltà
0730 - 0830 Registration

Tuesday Morning / 17 November / Polito - Sala Consiglio di Facoltà

0830 - 0850 Opening Ceremony
Welcome Address by
TBA
TBA

Tuesday Morning / 17 November / Polito - Sala Consiglio di Facoltà

0850 - 1020 Plenary Talks

0850 - 0920 Aldo Frediani
Università di Pisa
IDINTOS: the first prototype of an amphibious Prandtl-Plane-shaped aircraft

0920 - 0950 Giuseppe Davì
Università di Palermo
Sulla trave multistrato in materiale composito

0950 - 1020 Paolo Luchini
Università di Salerno
*Ruolo del rumore termico nella generazione di instabilità
dello strato limite su di un profilo alare*

Tuesday Morning / 17 November / Polito

1020 - 1050 Coffee-Break

Tuesday Morning / 17 November / Polito

1050 - 1255**Parallel Sessions**

Tuesday Morning / 17 November / Polito

Session S8**Composites**

1050	1115	1140	1205	1230
Microwave analysis of nanostructured composite shell structures for advanced RAS applications	Analysis of stiffened composite plates by pb - 2 Rayleigh Ritz method	Distorted similitudes for the frequency response of composite plates	Some examples of "multi-physical" fatigue of organic matrix composites for aircraft applications	High thickness kevlar/carbon nanostructured composite for impact protection
Roberto Pastore, Antonio Vricella, Davide Micheli, Mario Marchetti	Vincenzo Oliveri, Andrea Alaimo, Alberto Milazzo	Sergio De Rosa, Francesco Franco, Elena Ciappi, Viviana Meruane	Marco Gigliotti, Yannick Pannier, Marie Christine Lafarie-Frenot, Jean-Claude Grandidier	Antonio Vricella, Davide Micheli, Roberto Pastore, Mario Marchetti

Tuesday Morning / 17 November / Polito

Session MS7**Green and Great:
A leap of research collaboration network
for more environmental friendly engine**

1050	1115	1140	1205	1230
A leap of research collaborative network	Building strategic supply chain for R&D purposes*	Aviation goes green	Multidisciplinary numerical developments for LPT design*	Electron beam melting of gamma-TiAl alloys for aerospace applications
F. Tortarolo	N. Atzei	G. De Poli	M. Marconcini, M. Giovannini, F. Poli, L. Pinelli, F. Bertini	S. Biamino, G. Baudana, M. Terner, F. Pelissero, S. Sabbadini, M. Pavese, P. Fino, C. Badini

Tuesday Morning / 17 November / Polito

Session S12**Space Structures**

1050	1115	1140	1205	1230
Semi-analytical orbital parameters description for thermal fatigue analysis	A new advanced structural panel sandwich for reentry systems	Accurate analysis of reinforced space structures using refined beam models	Mechanical architecture and loads definition for the design and testing of the Euclid spacecraft	Thermal effect on the modal characteristics of FGM plates with temperature-dependent materials
Paolo Gasbarri, Riccardo Monti	Marta Albano, Samantha Ianelli, Roberto Viotto, Mario Marchetti	Erasmus Carrera, Tommaso Cavallo, Enrico Zappino	Adriano Calvi, Patrizia Bastia	Fiorenzo Fazzolari

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Session S15**Student Session**

1050	1105	1120	1135	1150	1205	1220
On orbit refueling for low-thrust based geosynchronous satellites	Titan mission feasibility study for bi-static SAR mapping of the planet by formation flying	A simulation facility for vision-based planetary landing systems	A hazard detection and avoidance system for autonomous planetary landing	Stereo-vision to estimate uncooperative objects pose, motion and inertia tensor	Earth-Mars fuel depots to support fast and heavy manned mission to Mars	Variational approach to the problem of optimal propeller design
Lorenzo Bucci, Andrea Capannolo, Francesco Cavenago, Michèle Lavagna	Tommaso Guffanti, Matteo Losacco, Roberto Travaglini, Michèle Lavagna	Paolo Lunghi, Marco Ciarambino, Michèle Lavagna	Paolo Lunghi, Marco Ciarambino, Michèle Lavagna	Vincenzo Pesce, Michèle Lavagna	Simone Flavio Rafano Carnà, Alessandro Serboli, Matteo Baiguera, Michèle Lavagna	Francesco Torrigiani, Antonio Dipace, Aldo Frediani

Tuesday Morning / 17 November / Polito

Session S10**CFD**

1050	1115	1140	1205	1230
Overdriven detonation and bidimensional stability for an explosive mixture with symmetric reaction	Numerical simulation of fluidic thrust-vectoring	Simulation of in-flight ice accretion based on the exact solution of the Stefan problem	RANS prediction of the flap unsteady aerodynamics using dynamic mesh	CFD simulation of flame penetration test - Calibration phase
F. Carvalho, G. M. Kremer, W. Marques Jr., M. Pandolfi Bianchi, A. J. Soares	Michele Ferlauto, Roberto Marsilio	Giulio Gori, Gianluca Parma, Marta Zocca, Alberto Guardone	Serena Russo, Giovanni Paolo Reina, Carlo de Nicola	Mario Panelli, Luigi Cutrone, Gaetano Mirra

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Session S4**Flight Mechanics**

1050	1115	1140	1205	1230
Dynamic model design for an on board multi-purpose precise orbit determination scheme	Modeling spacecraft formation dynamics including aerodynamic drag	Inverse dynamics particle swarm optimization for spacecraft minimum-time maneuvers with constraints	Magnetic spacecraft attitude stabilization via output feedback with separation between measurement and actuation	A new, general perturbative guidance for space vehicles
F.Menzione, A.Renga, M.Grassi, G.Campolo	Silvano Sgubini, Giovanni B. Palmerini	Dario Spiller, Fabio Curti, Luigi Ansalone	Fabio Celani	Mauro Pontani

Tuesday Morning / 17 November / Polito

**Cooperation in Aeronautics and Aerospace R&D between Russian Federation and Europe
Teleconference with Russian Scientists**

1050 - 1130Round TableLeonardo Lecce
Erasmus Carrera
Franco Persiani**1130 - 1230**Parallel Session:Innovative manufacturing technologies and materials for Air & Space vehicles

Tuesday Afternoon / 17 November / Polito

1300 - 1400**Lunch**

Tuesday Afternoon / 17 November / Polito

1400 - 1605**Parallel Sessions**

Tuesday Afternoon / 17 November / Polito

Session S8**Composites**

1400	1425	1450	1515	1540
Design and manufacturing of new advanced 3D preform for carbon-carbon structures	Experimental analysis of a piezoelectric based SHM system for delamination detection	Discontinuous mechanical problems studied with a peridynamics-based approach	Development of three-dimensional beam models for accurate free vibration analysis of beams with various cross sections and boundary conditions	A beam theory for layered composite subjected to uniformly distributed load
Andrea Delfini, Giulio Rubini, Marta Albano, Roberto Pastore, Fabrizio Volpini, Mario Marchetti	Andrea Alaimo, Antonio Esposito, Calogero Orlando	Mirco Zaccariotto, Giulia Sarego, Daniele Dipasquale, Arman Shojaei, Teo Mudric, Matteo Duzzi, Ugo Galvanetto	Fiorenzo A. Fazzolari	Andrea Alaimo, Giuseppe Davì, Alberto Milazzo, Calogero Orlando

Tuesday Afternoon / 17 November / Polito

Session MS7**Green and Great:
A leap of research collaboration network
for more environmental friendly engine**

1400	1425	1450	1515	1540
Machining and machinability of turbine blades made of a gamma-TiAl intermetallic*	Low oil consumption solution for next gen engines	Carburizing and direct quenching trials on AMS6308 (Pyrowear 53) and AMS6265 (AISI 9310) steel*	P_BEAR, analytical tool for planet bearing robust preliminary design conditions*	Mesh adapter tool development used in fluid dynamic flow path seals optimization process
A. Romiti, E. Mariano, M. Bianciotto, P.C. Priarone	L. Bucchieri, D. Coutandin	C. Dell'Oste, A. Colosimo, L. Rigo	A. Cappadona, M. Giardino, F. Dellavalle, M. Gravina	Massimo Damasio, Luca Fattore, Daniele Coutandin

Tuesday Afternoon / 17 November / Polito

Session S2**Materials**

1400	1425	1450	1515	1540
Grain level modeling of fatigue in polycrystalline materials	Tests of sapphire optical fiber sensors for strain monitoring in high temperature environment	Very-high-cycle fatigue response of a high-performance steel	Space C/C TPS electromagnetic characterization in reverberation chamber	Mechanical and microstructural characterization of electron beam melted Ti-6Al-4V specimens
Vincenzo Gulizzi, Alberto Milazzo, Ivano Benedetti	Claudio Paris, Cristian Vendittozzi, Antonio Paolozzi, Ferdinando Felli	Andrea Tridello, Davide S. Paolino, Giorgio Chiandussi, Massimo Rossetto	Davide Micheli, Roberto Pastore, Andrea Delfini, Marta Albano, Mario Marchetti	Stefania Franchitti, Carmine Pirozzi, Rosario Borrelli, Nicola Paletta

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Session S15

Student Session

1400	1415	1430	1445	1500	1515	1530
High efficiency regional aircraft conceptual design and on-board systems preliminary study	MASCOT-2 landing opportunities using three-body solutions for asteroid impact mission*	Tumbling space debris capturing via tethered-nets mechanism: multibody dynamics analysis and in flight experiments*	Dynamics of the separation of an air-launched rocket by parachute	Project Caurus "Nibbio- A novel tilt rotor concept for very high speed	Global optimization of relative configurations between spacecraft near Lagrangian point orbits*	Flight dynamics model for preliminary design of PrandtlPlane wing configuration with sizing of the control surfaces
Cesare Graziano, Matteo Cappelletti, Gesumino Fiore, Giacomo Montesoro, Luca Boggero, Roberta Fusaro	Fabio Ferrari, Michèle Lavagna	Riccardo Benvenuto, Michèle Lavagna	Lucio Gradoni, Paolo Teofilatto	Luca Sala, Gianluca Alitta, Davide Berbenni, Carlo Capocchiano, Andrea Fugazza, Sebastian Rojas, Stefano Sangalli, Andrea Scaringello, Paterson Waffo, Lorenzo Trainelli	Fabio Ferrari, Michèle Lavagna	D. Zanetti, F. Oliviero, V. Cipolla

Tuesday Afternoon / 17 November / Polito

Session S10

CFD

1400	1425	1450	1515	1540
The use of RANS approach for predicting transition	Thermal investigation of a nacelle internal and external fields in pusher configuration	Numerical and experimental transition prediction on a realistic laminar swept wing	Numerical assessment of flap effectiveness for winged re-entry vehicles	Numerical simulations of the HEXAFLY-INT experimental vehicle
Serena Russo, Donato de Rosa, Carlo de Nicola, Raffaele Salvatore Donelli	Antonio Carozza, Giuseppe Mingione, Gennaro Serino, Giuseppe Pezzella	Diego Giuseppe Romano, Donato de Rosa, Raffaele S. Donelli	Donato de Rosa, Giuseppe Pezzella, Raffaele S. Donelli	Pietro Roncioni, Giuseppe Pezzella, Marco Marini, Johan Steelant

Tuesday Afternoon / 17 November / Polito

Session S4

Flight Mechanics

1400	1425	1450	1515	1540
Mediterranean aeronautics research & training academy: a new facility for human factor research	Optimal design of agricultural and environmental aerial mission profiles	Indirect optimization of ascent trajectories	Automatic take-off or landing path following in turbulent air for UAS, an EKF based procedure	Accurate positioning of a payload suspended to a quadrotor unmanned aircraft
Giovanni Tesoriere, Andrea Alaimo	Samuele Draghi, Lorenzo Trainelli	Lorenzo Casalino, Dario Pastrone	Caterina Grillo, Fernando Montano	Giulio Avanzini, Alessandra Bottazzi, Fabrizio Giulietti, Guido De Matteis

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Session S13

Space Exploration and Missions

1400	1425	1450	1515	1540
Wireless sensor network with vibrational energy harvesting - an efficient solution for space transportation and exploration vehicles telemetry	Synthesis model for real time dynamic analysis of planetary rovers	Dynamic model of a sampling tool mechanism for low gravity bodies	Robotic system study for a LEO orbiting vehicle payload capturing	Design of thermal exchange, a microgravity experiment on-board the international space station*
Alessandro Rapisarda, Daniele Renzoni, Emanuele Pensavalle	Giancarlo Genta, Marco Dolci	Giacomo Gori, Pierluigi Di Lizia, Franco Bernelli-Zazzera, Rolando Gelmi, Piergiorgio Magnani, Edoardo Re	Marco Dolci, Simona Ferraris, Giancarlo Genta, Pasquale Pellegrino, Daniele Richiardi, Genny Scalise	Nicole Viola et al.

Tuesday Afternoon / 17 November / Polito

1605 - 1630**Coffee-Break**

Tuesday Afternoon / 17 November / Polito

1630 - 1810**Parallel Sessions**

Tuesday Afternoon / 17 November / Polito

Session S8**Composites**

1630	1655	1720	1745
Analysis of tapered structures by means of refined 1D models Enrico Zappino, Andrea Viglietti, Erasmus Carrera	Postbuckling Analysis of Cracked Stiffened Composite Plates by pb-2 Rayleigh Ritz Method Vincenzo Oliveri, Andrea Alaimo, Alberto Milazzo	Hygro-thermal analysis of multilayered structures by means of MITC9 shell finite elements based on the CUF M. Cinefra, E. Carrera	Coupled and uncoupled thermoelasticity solution for a rotating disk using an analytical method Mohammad Ali Kouchakzadeh, Ayoob Entezari, Erasmus Carrera

Tuesday Afternoon / 17 November / Polito

Session S5**Propulsion**

1630	1655	1720	1745
Definition and optimization of the supercharging architecture for an aircraft two stroke diesel engine A. Paolo Carlucci, Antonio Ficarella, Domenico Laforgia, Gianluca Trullo	Flame image processing and analysis in an ultra-lean liquid fueled combustor Maria Grazia De Giorgi, Aldebara Sciolti, Stefano Campilongo, Antonio Ficarella	"Greening the propulsion": a comparative analysis of advanced more electric solutions for aircrafts Maria Grazia De Giorgi, Teresa Donateo, Stefano Campilongo, Luigi Spedicato, Antonio Ficarella, Giuseppe Giliberti	Propellant metal-component contributions in rocket motor aeroacoustic instability growth rate* Giuseppe Lombardo

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Session S9**Aeroelasticity**

1630	1655	1720	1745
Analysis of non-classical aileron buzz M. Irfan Zafar, Francesca Fusi, Giuseppe Quaranta	Design and manufacturing of an aero-servolastic wind tunnel model for experimental validation of gust load alleviation technologies Alessandro De Gaspari, Sergio Ricci, Stephan Adden, Matteo Martegani	Design and realization of the control surfaces actuation system within the glamour project Alessandro De Gaspari, Andrea Mannarino, Paolo Mantegazza	Aeroelastic rotorcraft-pilot couplings: problems and methods Giuseppe Quaranta, Pierangelo Masarati, Jacopo Serafini, Massimo Gennaretti

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Session S1**Aircraft Design**

1630	1655	1720	1745
Preliminary assessment of effect of heating on structure mass	Topology optimization of the regions surrounding large fuselage cutouts	Dynamic response analysis of pressurized cabins subjected to decompression loadings	Aerodynamic optimization of a large Prandtlplane configuration
Zhijin Wang, Binbin Jiang, Anatoly Kretov, Sheng Huang	Valerii A. Komarov, Andrey V. Boldyrev	Alfonso Pagani, Erasmus Carrera	Lorenzo Cappelli, Vittorio Cipolla, Giulio Costa, Aldo Frediani, Fabrizio Oliviero, Emanuele Rizzo

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Session MS4**Drag reduction & Flow Control**

1630	1655	1720	1745
Flow separation control applied to simplified car	Development of a numerical model for a PSJ actuator	Analyses of non local effects of riblets	Investigation of plasma actuators for flow separation control on a low pressure turbine blade at low Reynolds number
Costantino Sardu, Salvatore Sedda, Gaetano Iuso	Matteo Chiatto, Luigi de Luca	Benedetto Mele, Renato Tognaccini, Pietro Catalano	Maria Grazia De Giorgi, Elisa Pescini, Fedele Marra, Antonio Ficarella, Luca Francioso

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Session S4**Flight Mechanics**

1630	1655	1720	
Comparative analysis of the docking systems for the space tug project "STRONG"	Performance analysis of a hybrid airplane through a flight simulator	Operation oriented path planning strategies for RPAS	
Tharek Mohtar, Stefano Pastorelli, Stefano Mauro, Alberto Cernusco, Massimo Sorli	Fabrizio Oliviero, Vittorio Cipolla, Michele Franchi	Giorgio Guglieri, Alessandro Lombardi, Gianluca Ristorto	

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Session S13**Space Exploration**

1630	1655	1720	1745
SEEDS, the international post-graduate master program for space exploration	A feasibility study for a short duration human mission to the martian surface	The SpaceTrips project: space thermoacoustic radioisotopic power system	MarsTEM: the temperature sensor of the DREAMS package onboard Exomars2016*
Nicole Viola, Eugenio Gargioli, Piero Messidoro, Ernesto Vallerani	Samuel Brown, Oliver Hardy, Rachel Henson et al.	Maurice-Xavier Francois, Antoine Alemany, Emmanuel Roy, Janis Freibergs, Gerard Poli, Eleonora Zeminiani, Gunter Gerbeth	Giacomo Colombatti et al.

Tuesday Afternoon / 17 November / Polito - Sala Consiglio di Facoltà	
1810 - 1910	Plenary Talks
1810 - 1840	<u>Francesco Marulo</u> Università di Napoli Federico II <i>Aircraft Community Noise: The Revenge of a Neglected Problem</i>
1840 - 1910	<u>Carlo Barbieri</u> Università Ambrosiana <i>TBA</i>

Tuesday Afternoon / 17 November / Polito	
1910 - 2030	Apericena
