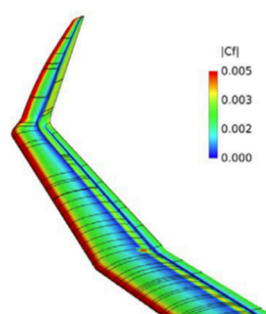




# XXXIII OSTIV CONGRESS

8 - 13 January 2017  
Benalla, Victoria, Australia

## Congress Program and Proceedings



Welcome to the OSTIV Congress 2017 in Australia. Every two years the Congress offers new information and latest research results in soaring and sailplane technology to scientists and engineers from all over the world. The meeting presents unique opportunities for scientific exchange and coordination of future activities.

This year the Congress is hosted by the Gliding Federation of Australia, along with the 34<sup>th</sup> FAI World Gliding Championships, in Benalla, Victoria. We are thankful that the OSTIV Congress can take place in the Benalla Performing Arts Centre (BPACC) near the club house at Benalla Airfield.

We thank our industrial sponsors, Alexander Schleicher Segelflugzeugbau, GP Gliders, Jonker Sailplanes, and Schempp-Hirth Flugzeugbau, who made it possible for us to offer free access to the Congress and give special support to participating students.

The Call for Abstracts issued by OSTIV generated response by engineers and scientists from 11 countries worldwide. The received extended abstracts were reviewed, and they are published in this proceeding booklet. We believe that a varied program has been generated this way. For their efforts in recruiting high-quality contributions we acknowledge the members of the Program Committee:

Zafer Aslan, Turkey	Götz Bramesfeld, Canada	Helmut Fendt, Germany
Mark Maughmer, USA	Judah Milgram, USA	Ian Oldaker, Canada
Lukáš Popelka, Czech Republic	Rolf Radespiel, Germany	Gerard Robertson, New Zealand

Preparing the Congress took endless hours of work by the Organizing Team, consisting of Murray Stimson, Australia, Stu Smith, Australia, Rolf Radespiel, Germany and Britta Schlenker, Germany. We are very thankful for their efforts. Our thanks also go to Alexander Barklage and Tim Landa of Technische Universität Braunschweig for booklet editing.

The OSTIV Congress is the perfect setting to bestow the OSTIV Prize 2017 and the OSTIV Best Student Paper Awards. We look forward to the Opening Ceremony and the Congress Closing Dinner for presenting the Award Winners.

We wish all Congress participants an exciting and rewarding week in Benalla.

Prof. Rolf Radespiel

Prof. Mark Maughmer

OSTIV President

OSTIV Vice President

OSTIV acknowledges support provided by



ISTANBUL AYDIN  
UNIVERSITY



### Welcome to Benalla for the XXXIII OSTIV Congress

Benalla is a town of around 10,000 people situated 200km NE of Melbourne on the main Melbourne-Sydney train line and freeway (the "Hume"). It has been a significant regional town since European settlement the 1840s. The original inhabitants are the Taungurong people, who must have had abundant resources with the rivers, swamps, plains and hills in this rich area. Today Benalla's resources for eating, entertainment and accommodation are greater than a town of its size due to it having a major Motor Racing circuit at Winton used most weekends except mid-summer, and Australia's premier gliding club, GCV, to keep it busy over the summer. Benalla also boasts a major regional Art Gallery, many fine parks, a "must-see" local museum, 2 Golf Clubs, a wide range of shops, cafés, restaurants and hotels.

### The Great OSTIV BUS TOUR of North East Victoria

Wednesday 11th Jan. 2017

OSTIV delegates are invited to join in on this fun tour. Doug Hamilton of Precision Airmotive at Wangaratta has generously offered to allow us a special viewing of his Warbird Restoration business. Current aircraft include P-40 Kittyhawk, PT-22 Ryan, Lockheed 12, Harvard and many others in and around his business. P-40 construction is in progress. Doug expects to soon offer P-40 rides too!



From "Wang" the tour continues east to Milawa for a morning tea stop at this village bakery (user pays, not included in price). Passing through Myrtleford (quickstop) we head up to the Alpine plateau of Mt Buffalo for cool air and a scenic spot for lunch. You'll get a good view of the alpine soaring conditions in the WGC contest area. We then descend and head to the Warby Ranges for wine tasting of our best Reds, Muscat, Tokay and Port, at a personal favourite, Baileys of Glenrowan, est. 1870. After a leisurely tipple, the tour picks up again and heads for the Winton Wetlands, a natural depression with much Australian birdlife. From there we'll have you back at the airfield in time to see the finishing gliders.

Cost: \$30 per person includes lunch and wine tasting.

Departs: Benalla Airfield near BPACC. Meet 8.45am for a strict 9:00am departure

Please pay at registration time. OSTIV wishes to thank our Tour Partners:

Precision Airmotive & Classic Air Adventures – Doug Hamilton  
Absolutely Delicious – lunch cuisine from Sue & Kelly

Baileys of Glenrowan  
Benalla Bus & Coach Lines

### OSTIV Congress Dinner @ North Eastern Hotel

Friday 13th January 2017

After the fascination of a solid week of technical presentations, all OSTIV Speakers, Delegates, family and friends of OSTIV are invited to enjoy a relaxed and friendly dinner together at the North Eastern Hotel in Benalla. (1Nunn St, near the Benalla Railway Station) from about 7:00 for 7:30 pm. This is really a lovely restaurant, disguised as a classic old Aussie country hotel. You'll find excellent quality cuisine and a great range of wines. Drinks from the bar, pay as you go, and order meals off the menu, so you can eat light, or have couple of courses, or have 3 or more. No set fee, you pay for what you order. We'll almost take over the whole place, so it could go late! It is centrally located and therefore walking distance to most accommodation. You can spend \$20 eating very light or \$100, but allowing \$50-60 each would be roughly two courses with a couple of drinks.

Please advise attendance and numbers at Registration desk when you register.

Stu Smith and Murray Stimson

	<b>Sunday, 8 January 2017</b>	
	Rotunda in the Rose Garden, Botanical Gardens, Bridge St, Benalla VIC 3672	
15:45 - 16:30	Opening Ceremony and Presentation of OSTIV-Prize 2017	
	<b>Monday, 9 January 2017</b>	
	Benalla Performing Arts Centre (BPACC), 57 Samaria Rd, Benalla VIC 3672	
08:00 - 10:00	registration	BPACC Room 3
	<b>Aging Sailplane Structures</b> Chair: Helmut Fendt	BPACC Room 1+2
09:00 - 09:30	PIK-20D GLIDER FATIGUE REVIEW. E. Soinne , Helsinki, Finland.	
09:30 - 10:00	RISK OF FLUTTER IN AGING SAILPLANES. U. Kopp, J. Gross, Braunschweig, Germany.	
10:00 - 10:30	A CASE STUDY IN GELCOAT CRACK PROPAGATION BELOW PU PAINT. R. Hanbury, Broadmeadows, Australia.	
10:30 - 11:00	coffee break	
	<b>Sailplane Safety</b> Chair: Helmut Fendt	BPACC Room 1+2
11:00 - 11:30	IS IT NECESSARY TO UPDATE SPIRAL DIVE REQUIREMENTS? G. Waibel, Bad Hindelang, Germany.	
11:30 - 12:00	PERCEPTUAL ERRORS IN THE TURN FROM BASE TO FINAL. D. Johnson, Menomonie, Wisconsin, USA.	
12:00 - 12:30	COMPARATIVE STATISTICAL ANALYSIS OF FATAL SPIN ACCIDENTS FOR TRAINING GLIDERS. S. Smith, M. G. Stimson, Melbourne, Australia.	
12:30 - 14:00	lunch break / registration	
	<b>Electric Propulsion</b> Chair: Helmut Fendt	BPACC Room 1+2
14:00 - 14:30	ELECTRIC PROPULSION FOR GLIDING - STATE OF THE ART AND FUTURE. A. Lange, Zweibrücken, Germany.	
14:30 - 15:00	SIDE-BY-SIDE FLYING WITH E-POWER: INDEPENDENT AND SAFE. L. Muth, Wildau, Germany.	
15:00 - 15:30	coffee break	
	<b>Medical Factors</b> Chair: Stu Smith	BPACC Room 1+2
15:30 - 16:00	FIELD PHYSIOLOGY: INFLIGHT MEASUREMENTS TO MONITOR OXYGEN SATURATIONS OF PILOTS DURING HIGH-ALTITUDE GLIDER FLIGHTS OF THE MOUNTAIN WAVE PROJECT IN THE HIMALAYAN REGION AND THE FRENCH ALPS. C. Ledderhos, R. Heise, Ch. Gamel, A. Gens, Fürstenfeldbruck, Germany.	
16:00 - 16:30	LOW-ALTITUDE HYPOXIA. D. Johnson, Menomonie, Wisconsin, USA.	
	<b>Evening Session</b> Chair: Stu Smith	BPACC Auditorium
20:00 - 20:30	FES TECHNOLOGY DEVELOPMENT MILESTONES. L. Žnidaršič, Logatec, Slovenia.	
20:30 - 21:30	INITIATIVE PROSEGELFLIEGER - A PACKAGE OF MEASURES FOR THE EFFECTIVE ENHANCEMENT OF PASSIVE SAFETY OF SAILPLANES. M. Volck, Wiener Neustadt, Austria.	

	<b>Tuesday, 10 January 2017</b>	
	<b>Benalla Performing Arts Centre (BPACC)</b>	
08:00 - 09:00	registration	BPACC Room 3
	<b>Boundary Layers</b> Chair: Mark Maughmer	BPACC Room 1+2
09:00 - 09:30	INFLUENCE OF ZIGZAG-TAPE ON PROFILE DRAG AT LOW REYNOLDS NUMBERS. T. Hofmacher, P. Scholz, Braunschweig, Germany.	
09:30 - 10:00	LAMINAR-TURBULENT TRANSITION ON WINGS WITH 3D FLOW EFFECTS. F. Muñoz, R. Radespiel, Braunschweig, Germany.	
10:00 - 10:30	VALIDATION OF NUMERICAL MODELS FOR TRANSITIONAL FLOWS ON AIRFOILS. J. Příhoda, P. Straka, J. Fürst, L. Popelka, D. Šimurda, Praha, Czech Republic.	
10:30 - 11:00	EFFECTS OF STRUCTURAL MOTION ON SEPARATION AND SEPARATION CONTROL: AN INTEGRATED INVESTIGATION USING NUMERICAL SIMULATIONS, THEORY, WIND-TUNNEL AND FREE-FLIGHT EXPERIMENTS. H. Fasel, S. Hosseinverdi, J. Little, A. Gross, Tucson, USA.	
11:00 - 11:30	coffee break	
	<b>Sailplane Performance</b> Chair: Murray Stimson	BPACC Room 1+2
11:30 - 11:50	SPEED-TO-FLY THEORY #1: INSIGHTS ON THE IMPLICATIONS OF FLYING INCORRECT SPEEDS WITH QUADRATIC AND NON-QUADRATIC POLARS. M. Steckner, Beachwood, USA.	
11:50 - 12:10	SPEED-TO-FLY THEORY #2: IMPLICATIONS OF FLIGHT TEST DATA VARIABILITY. M. Steckner, Beachwood, USA.	
12:10 - 12:30	SPEED-TO-FLY THEORY #3: POTENTIAL ISSUES WITH MODERN SAILPLANES WITH NON-QUADRATIC POLARS. M. Steckner, Beachwood, USA.	
12:30 - 14:00	lunch break	
	<b>Atmospheric Waves</b> Chair: Zafer Aslan	BPACC Room 1+2
14:00 - 14:30	USING DATA FROM HIGH-ALTITUDE SAILPLANE FLIGHTS TO STUDY ATMOSPHERIC MOUNTAIN WAVES. R. Millane, N. Zhang, E. Enevoldson, J. Murray, Christchurch, New Zealand and Edwards, USA.	
14:30 - 15:00	THE HARZ-FOEHN-PROJECT - EMPIRICAL RESEARCH ON MOUNTAIN WAVES IN AN NORTHERN GERMAN LOW MOUNTAIN RANGE. K.-H. Dannhauer, Leipzig, Germany.	
15:00 - 15:30	coffee break	
	<b>Atmospheric Convection</b> Chair: Rick Millane	BPACC Room 1+2
15:30 - 16:00	HEAT TRANSFER BY CONVECTION FROM THE GROUND TO A TYPICAL AUSTRALIAN THERMAL. D. M. Wilson , Glen Iris, Australia.	
16:00 - 16:30	INVESTIGATION OF THE VEGETATION EFFECTS ON CONVECTION BY USING COSMO-CLM. N. Akataş, S. Yeşilköy, Z. Aslan , Istanbul, Turkey.	

	<b>Wednesday, 11 January 2017</b>	
08:00 - 09:00	registration	BPACC Room 3
	Departing Benalla Air Field, Carpark BPACC	
09:30 - 17:00	<b>Excursion to North East Victoria region</b>	
	Wangaratta Warbirds, Mt Buffalo / Victorian Alps, Baileys Winery, Winton Wetlands	
	<b>Benalla Performing Arts Centre (BPACC)</b>	
	<b>Evening Session</b>	BPACC Auditorium
	Chair: Rolf Radespiel	
20:00 - 21:30	FUTURE OF THE OPEN CLASS. Panel Discussion: Loek Boermans, Tilo Holighaus, Atti Jonker, Axel Lange, Gerhard Waibel.	

	<b>Thursday, 12 January 2017</b>	
	<b>Benalla Performing Arts Centre (BPACC)</b>	
	<b>Configuration Aerodynamics</b>	BPACC Room 1+2
	Chair: Rolf Radespiel	
09:00 - 09:30	SAILPLANE WINGLETS: HOW MANY TIPS ARE TOO MANY TIPS? T. Krebs, G. Bramesfeld, Toronto, Canada.	
09:30 - 10:00	INVESTIGATING DESIGNS OF AUTONOMOUS GLIDER EXPLORATION OF OUTER SOLAR SYSTEM ATMOSPHERES. C. Colletti, R. P. LeBeau, G. Bramesfeld, Saint Louis, USA.	
10:00 - 10:30	THE USE OF COMPUTATIONAL FLUID DYNAMICS ANALYSIS IN WING-WINGLET DESIGN. M. D. Maughmer, J. G. Coder, University Park, PE, USA.	
10:30 - 11:00	coffee break	
	<b>Sailplane Loads</b>	BPACC Room 1+2
	Chair: Götz Bramesfeld	
11:00 - 11:30	ON THE GUST LOAD OF SAILPLANES. L. M. M. Boermans, Delft, Netherlands.	
11:30 - 12:00	LIFETIME CONSIDERATIONS ON SAILPLANES. C. Kensche, J. Wassenaar, Bruchsal, Germany.	
12:00 - 13:30	lunch break	

	<b>Soaring in Atmosphere</b> Chair: Zafer Aslan	BPACC Room 1+2
13:30 - 14:00	DO NOT GET CAUGHT-ON-TOP! E. Hindman, Wurtsboro, USA.	
14:00 - 14:30	GRAVITY WAVE OVER FLAT TERRAIN. D. Johnson, Menomonie, Wisconsin, USA.	
	<b>Meteorology Poster Session</b> Chair: Edward Hindman	BPACC Room 1+2
14:30 - 14:40	COMPARISON OF FIELD MEASUREMENTS AND MODIS ALBEDO DATA AND ITS EFFECT ON LATENT HEAT FLUX. S. Yeşilköy, N. Akataş, L. Şaylan, F. Bakanoğulları, Z. Aslan, Istanbul, Turkey.	
14:40 - 14:50	ATMOSPHERIC CONVECTION AND SEA SURFACE TEMPERATURE. İ. Osanmaz, Istanbul, Turkey.	
14:50 - 15:00	CLIMATE CHANGE, AVIATION AND GLIDING. A. Tokgözlü, K. Temurçin, K. Yasdıman Uysal, İnönü-Eskişehir, Turkey.	
15:00 - 15:10	HIGH EVAPOTRANSPIRATION AND HUMIDITY ON THE AVIATION AND SOARING. F. Dökmen, Z. Aslan, Kocaeli, Turkey.	
15:10 - 15:30	Poster Discussions	
15:30 – 16:00	coffee break	
	<b>OSTIV Meteorology Panel Meeting</b> Chair: Zafer Aslan	
16:00 - 18:00	Contributions by Edward Hindman; Loek M. M. Boerman; René Heise, Thorsten Reinhardt, Peter Frei, Ralph Paul; Bruno Neining, David Braig, René Heise and Frank Janser; Rick Millane and Morgan Sandercock; Fred Kucharski, Zafer Aslan, Uğur Şener; Ramazan Çağlar, Serhat Şeker, Jelena Dikun, T. Çetin Akıncı, Emel Önal, Emine Ayaz.	
	New developments in weather forecasting models for soaring flights, new trends in mountain wave analyses, short - term forecasting of soaring parameters, wind speed, wind shear, turbulence, high altitude sailplane flights, ABL.	
	<b>Evening Session</b> Chair: Murray Stimson	BPACC Auditorium
20:00 - 21:30	THE FIRST YEAR IN ARGENTINA WITH THE PERLAN 2 GLIDER. M. Sandercock, Bend, USA.	

	<b>Friday, 13 January 2017</b>
	<b>Benalla Performing Arts Centre (BPACC)</b>
	<b>Sailplane Propulsion</b> <span style="float: right;">BPACC Room 1+2</span> Chair: Götz Bramesfeld
09:00 - 09:30	ELECTRIC PROPULSION IN GLIDERS IS MORE THAN AN ALTERNATIVE TO TRADITIONAL COMBUSTION ENGINES. R. Klein, Mosbach, Germany.
09:30 - 10:00	INVESTIGATIONS INTO THE DESIGN OF A TWO-SEAT SELF-LAUNCHING MOTOR GLIDER. R. Taouk, K.C. Wong, Sydney, Australia.
10:00 - 10:30	SOARING MEETS CRUISING – OPTIMAL STRATEGIES IN POWERED FLIGHT. T. Mörssel, P. Scheffel, Strausberg, Germany.
10:30 - 11:00	MEASUREMENT AND SIMULATION OF POTENTIAL ELECTROMAGNETIC INTERFERENCE SOURCES IN SMALL AIRCRAFT. M. Fröhner, R. Geise, B. Neubauer, Braunschweig, Germany.
11:00 - 11:30	coffee break
	<b>Simulation</b> <span style="float: right;">BPACC Room 1+2</span> Chair: Bernald Smith
11:30 - 12:00	THE USE OF SIMULATION IN GLIDING: CURRENT STATE AND FUTURE DIRECTIONS. G. Robertson, New Zealand.
12:00 - 13:30	lunch break
	<b>Performance and FAI Class</b> <span style="float: right;">BPACC Room 1+2</span> Chair: Mark Maughmer
13:30 - 14:00	FLIGHT PERFORMANCE MEASUREMENT OF GLIDERS WITH GNSS-SYSTEM. K. Rohde-Brandenburger, Braunschweig, Germany.
14:00 - 14:30	REINFORCEMENT LEARNING ALGORITHMS FOR SOARING FLIGHT IN TURBULENT ENVIRONMENTS G. Reddy, J. Wong-Ng, A. Celani, T. Sejnowski, M. Vergassola, La Jolla, California, USA.
14:30 - 15:00	ASPECTS OF FAI 13.5M CLASS. H. Fendt, Braunschweig, Germany.
	<b>North Eastern Hotel, 1 Nunn Street, Benalla</b>
19:00	<b>Congress Closing Dinner</b>