Technical Soaring



The Scientific, Technical and Operational Journal of the Organisation Scientifique et Technique Internationale du Vol á Voile

EDITOR Prof. Dr. Edward (Ward) Hindman

OSTIV PRESIDENT Prof. Ir. Loek M. M. Boermans *The Netherlands*

OSTIV VICE PRESIDENT Dipl. Ing. Christoph Kensche *Germany*

MEMBERS OF THE OSTIV BOARD

Dipl. Ing. John Ashford - Australia Prof. Dr. Edward Hindman – USA Prof. Dr. Mark Maughmer – USA Dipl. Ing. Ian Oldaker - Canada Dr. Ing. Michael Rehmet – Germany Dr. Hermann Trimmel - Austria

CHAIR, SCIENTIFIC SECTION METEOROLOGICAL PANEL and ASSOCIATE EDITOR Dr. Hermann Trimmel

CHAIR, TECHNICAL SECTION and ASSOCIATE EDITOR Prof. Dr. Mark Maughmer

CHAIR, SAILPLANE DEVELOPMENT PANEL and ASSOCIATE EDITOR Dr. Ing. Michael Rehmet

CHAIR, TRAINING AND SAFETY PANEL and ASSOCIATE EDITOR Dipl. Ing. Ian Oldaker

> Publications staff: Edward Hindman, Bernald Smith

Layout/Printing – The Hub Print and Copy Center Ft. Lee NJ 07024 – USA

Distribution – International Mail Express (IMEX) Clifton NJ 07011 – USA

© 2007 Organisation Scientifique et Technique Internationale du Vol á Voile All rights reserved ISSN #0744-8996

Editor's comments	35
Fundamentals of Energy Extraction from	
Natural Winds	
Peter Lissaman	36
Verification of Thermal Forecasts with Glider Flight Data	
Olivier Liechti, Erland Lorenzen, Ralf Thehos,	
Bernt Olofsson and Esbjörn Olsson	42
Wind Energy Extraction by Birds and Flight Vehicles	

Volume 31, Number 2

The objective of *Technical Soaring* is to document recent advances in the science, technology and operational aspects of motorless aviation.

Technical Soaring is published quarterly by the Organisation Scientifique et Technique Internationale du Vol á Voile (OSTIV); Kluyverweg 1, NL-2629 HS Delft, The Netherlands, tel:+ 31 15 278 6387, fax: + 31 15 278 3533, e-mail: 1.m.m.boermans@lr.tudelft.nl

Subscription is restricted to OSTIV members only. Rates/calendar year, based upon surface bulk delivery, are Euro 45 for Individual/Local club membership; Euro 80 for Scientific/Technical Organisation/Library Membership and Euro 250 for Active Members (National Aero Club Members of FAI). First class or airmail delivery may be arranged for an extra fee.

Submitted papers will be subjected to a scientific, technical and/or operational review before being accepted for publication. Guidelines for preparation and submission of manuscripts can be found at www.ostiv.fai.org

The name *Technical Soaring* and its cover layout are fully rights-protected and belong to the Soaring Society of America (SSA); they are used by permission.