International Symposium
Light Weight Unmanned Aerial Vehicle Systems and Subsystems

www.uas-lw.com
11 – 12 – 13 March 2009
Flanders Aerospace Center (VLOC)
Oostende - Belgium

Organized by the
Royal Flemish Aerospace Engineering Society

Scope

An international symposium on the subject of Light Weight Unmanned Aerial Vehicle Systems (UAS-LW), including associated subsystems, will be held on 11-13 March 2009 at Flanders Aerospace Center (VLOC) in Ostend, Belgium.

This symposium is co-organized by the Royal Flemish Aerospace Engineering Society of TI-KVIV and the Catholic University College Bruges-Ostend (KHBO). The event is open to persons and organisations of all countries.

The conference objectives are to identify:
- the requirements relating to aerial vehicles lighter than 50 kg and their associated sub-systems.
- applications of civil UAS
- requirements for integration into non-segregated airspace
- the shortfalls in science and technology
- research strategies to meet the requirements

Topics

The technical program will focus on flight physics of fixed, rotary and flapping wings, low Reynolds number effects, engines and micro motors including fuel cells and solar cells, performance and stability, miniaturized avionics, low energy consumption, payload, sensors and communication, air traffic management, sense and avoid, certification of UAS, applications, flying outside the segretated airspace and human factors.

Scientific commitee

Chairman: Prof. em. dr. ir. Roland Decuypere, KHBO/RMA, president Royal Flemish Aerospace Engineering Society, BE
Members: visit www.uas-lw.com/scientific_commitee

Venue

VLOC (Flanders Aerospace Center)
Nieuwpoortsesteenweg 945 C
B-8400 Oostende – Belgium
Visit www.uas-lw.com/venue for more information.

Conference fees

Prices include lunches, coffee or refreshments, conference papers & cd-rom, transportation hotel-VLOC-hotel.
- **Presenter:** € 150 + VAT 21% (only 1/paper)
- **Observer:** € 400 + VAT 21%
- **Observer member of KVIV:** € 325 + VAT 21%
- **Students:** € 55/day + VAT 21% (lunch NOT included)
- **Optional:** Conference Dinner on Thursday 12 March at € 55 + VAT 21%

Please complete and fax back the enrolment form (see www.uas-lw.com) **before 26th February 2009**.

Accommodation

Visit www.uas-lw.com/accommodation for more information about the recommended accommodation.
Please reservate before **22th February**.

12.00 **Registration, Coffee**
13.45 **Welcome & General Information** - R. Decuypere & R. Defever
14.00 **Challenges of Light Weight UAS** - R. Decuypere

Session 1: Design including Fuel cell implications
14.30 **About the use of fuel cells onboard UAVs** - P. Hendrick, V. Delcour, I. Calvo and D. Verstraete, Université Libre de Bruxelles, Dept. ATM, Brussel, BE
15.00 **The advantage of a joined-wing configuration for fuel cell and solar powered UAVs** - D. Verstraete and P. Hendrick, Université Libre de Bruxelles, Dept. ATM, Brussel, BE
15.30 **Break / Networking**
16.00 **Conceptual design of a demonstrator fuel-cell UAV** - J. Steimes, P. Hendrick and D. Verstraete, Université Libre de Bruxelles, Dept. ATM, Brussel, BE
16.30 **Safety oriented design and operation of light UAS** - P. Cosyns, Gatewing bvba, Gent, BE
17:00 **UAV design for rapid prototyping: confirguration optimization by genetic algorithm** - A. Ceruti and G.M. Saggiani, University of Bologna, DIEM, Forli, IT
17.30 **An aerodynamic design method for UAV propellers** - P. Strzelczyk, Rzeszow University of Technology, Rzeszow, PL

Thursday 12 March 2009

09.00 Invited Paper: Tjien-Khoen LIEM, Scientific Officer, European Commission
STREAM A
Session 2: Flapping Wings
09.30 **Vortex topology on a flapping airfoil** - D.F. Kurtulus, Midde East Technical University, Dept. Of Aerospace Eng., Ankara, TR
10.00 **Design of a lift measuring set-up for a four-wing hovering MAV** - M. Kilic, D.F. Kurtulus and Y. Yazicioglu, Midde East Technical University, Ankara, TR
10.30 **Break / Networking**
11.00 **Numerical investigation of pure plunge and pitch/plunge motions at low Re number** - E. Gunaydinoglu and D.F. Kurtulus, Midde East Technical University, Dept. Of Aerospace Eng., Ankara, TR
11.30 **Unsteady aerodynamic computations of different sinusoidal flapping motions** - B. Akay, TU Delft, Fac; of Aerospace Eng., Delft, NL
D.F. Kurtulus, Middle East Technical University, Dept. Of Aerospace Eng., Ankara, TR
12.00 **Towards an engineering tool for the wing design of a micro air vehicle** - K. Evers, Katholieke Universiteit Leuven and Katholieke Hogeschool Brugge-Oostende, BE, D. Vandepitte and D. Reynaerts, Katholieke Universiteit Leuven, BE
12.30 **Flight dynamics of flapping wings micro aerial vehicles** - K. Sibilski, Air Force Institute of Technology, Warsaw, PL
13.00 **Lunch break**

Session 3: Control, Stability and Navigation
14.00 **Control and stability mechanisms of insect flight_application to micro air vehicles** - A. Roshanbin, C. Collette and A. Preumont, Université Libre de Bruxelles, Dept. Of Mechanical Engineering and Robotics, Brussel, BE
14.30 **GNSS Technology for light weight UAVs** - J. Leyssens, Septentrio Satellite Navigation, Leuven, BE
15.00 **Coupled GPS/INS integration for unmanned aerial vehicle applications** - F. Giulietti and M. Turci, University of Bologna, Forli, IT
15.30 **Break / Networking**
16.00 **A conception of navigation and control system for a small UAV** - G. Kopecki, T. Rogalski, P. Rzucidlo, A. Tomczyk and J. Pieniazek, Rzeszow University of Technology, Rzeszow, PL
16.30 **Sample control algorithms improving control quality of control system for medium size flying target** - G. Kopecki and T. Rogalski, Rzeszow University of Technology, Rzeszow, PL
17.00 **The ICARO autopilot: a project at the university of Pisa** - L. Pollini, M. Innocenti, M. Cellini, M. Franchi, R. Mati and V. Niccolai, University of Pisa, Dept. Of Electrical Systems and Automation, Pisa, IT

STREAM B
Session 4: Applications
09.30 **Design philosophy and realization of an experimental aircraft supporting UAV applications (VUT 001 Marabu)** - A. Pistek, T. Urik and P. Zikmund, Brno University of Technology, Inst. Of Aerospace Engineering, Brno, CZ
10.00 **Equipment, systems and installations for experimental aircraft supporting UAV applications (VUT 001 Marabu)** - J. Hlinka, M. Splichal and J. Finda, Brno University of Technology, Inst. Of Aerospace Engineering, Brno, CZ
10.30 **Break / Networking**
11.00 **Use of a micro UAV for the determination of atmospheric stability in accidental air dispersion modelling** - N. Smeets, F. Lefebre and G. Cosemans, VITO, Mol, BE, L. Carpentier, D. le Garlantezec and P.-N. Hutin, Thales, FR, O. Pérez, R.F. Pérez and E. González, GMV, ES
11.30 **Real-time UAV image and video registration for disaster management using speed up mutual information** - K. Douterloigne, Ghent University, IBBT-Telin-IPI, Gent, BE
12.00 **Unmanned underwater, ground and aerial vehicles: different applications with technical similarities** - J. Peuteman, J. Daem and P. De Witte, Katholieke Hogeschool Brugge Oostende, Dept. IW&T, lab ECOREA, Oostende, BE
12.30 **Selected problems of VTOL flight in hovering conditions** - J. Grzybowski, Rzeszow University of Technology, Dept. Of Avionics and Control, Rzeszow, PL
13.00 **Lunch break**

Session 5: Simulation
14.00 **Hardware and software-in-the-loop simulation of an unmanned aerial vehicle** - E. De Angelis, F. Giulietti and M. Turci, University of Bologna, Forli, IT
14.30 **MAST Integrated Design, Analysis and Simulation (MIDAS)** - S. Dufresne, Georgia Institute of Technology, Atlanta, US
15.00 **Design and testing of a piezo fan for MAV propulsion** - M. Ahmadi Bidakhvidi and S. Vanlanduit, Vrije Universiteit Brussel, BE
J. Ceusters and T. De Troyer, Erasmushogeschool Brussel, BE

Friday 13 March 2009

Session 6: Sensing
09.00 **Laboratory tests of the MEDUSA high resolution camera system** - B. Delauré, T. Van Achteren, J. Everaerts and K. Nackaerts, VITO, Mol, BE
09.30 **Using simple airborne video to provide forest firefighters with high resolution geo-referenced images in real-time via web-services** – Dr. Nocolas Lewyckyj, Vito, Mol, BE
10.00 **Image processing in Flanders** – Jo Van Valckenborgh, AGIV, Gent, BE
10.30 **Break / Networking**

Session 7: Regulations
11.00 **Activities on European level to set up a legal framework for certification and use of UAS** – Erika Billen, BCAA, Brussels, BE
11.30 **Challenges for UAS-operations in segregated and non-segregated airspace** – Paul Hopff, Belgocontrol, Brussels, BE

Session 8: Target drones
12.00 **Unmanned aerial target: ULTIMA** - N. Hendrickx, Belgian Defence, 14 Regiment Air Defence Artillery, Nieuwpoort, BE
12.30 **Information on the visit to Lombardsijde**
12.40 **Closure of Symposium UAS-LW**
13.00 **Lunch break**
13.30 **Departure to Lombardsijde**