

News from EurAgEng

Summer 2014

Precision Agriculture

Thanks to those members who provided a few notes on Precision Agriculture in their country for a report for the European Parliament.

I sent the request only to those members who list an interest in 'Precision Agriculture'. (You can update your Field of Interests via the Member Login).

Although that report is not yet available publicly I thought that it would be useful to give some references to information that I found; especially as several EurAgEng members sent me various bits of information, especially about what was happening in their country.

Firstly the text book, '*Precision in Crop Farming*' Edited by Hermann Heege is a comprehensive, 350 page, text-book and was useful to check current technologies. Go to <http://link.springer.com> and then search for 'Precision in Crop Farming' to see details of chapters with options to buy the e-book or hardcover and also individual chapters. Prof Heege says to let him know of any errors!

I also used '*Precision Agriculture '13*' edited by John Stafford. It has the papers presented at the 2013 European Conference on Precision Agriculture and the 820 pages cover current research. Go to www.wageningenacademic.com and then search for 'Precision Agriculture '13' for hard-copy and e-book options.

I also used the CABI Agricultural Engineering Abstracts (which includes some full texts) to look for other information. These CABI searches are available FREE from the EurAgEng Member Login page.

So here are only a few comments and references that I had:

There is an apparent lack of general information about the use of Precision Agriculture.

J Lowenberg-DeBoer, in his keynote paper for the 9th European Conference on Precision Agriculture (2013), also gives a warning that there is sparse data with no country regularly collecting data on PA use and that the manufacturers and dealers rarely reveal sales data.

The Global Navigation Satellite System (GNSS) Business in European agriculture is mentioned in two recent GNSS Market Reports by The European GNSS Agency, in 2012 and 2013, and indicates that agricultural use is relatively small, only expecting to be 1.4% of the cumulative core revenue for 2012-2022. The 2013 Report says that there

is increasing use of PA in developed countries, in larger farms for crop production but it is set to accelerate in less industrialised regions.

Between 2006 and 2012 global shipments and installed base more than tripled in agriculture, particularly in the US. European shipments and installed base about doubled. Auto-steering and variable rate technology (VRT) are considered to be the main agriculturally used technologies to generate GNSS revenue as they are likely to grow much faster than previously estimated and could provide nearly 80% of GNSS revenues. The European GNSS Agency 2012 Market Report estimates that GNSS penetration into EU tractors will rise from around 7.5% in 2010 to 35% in 2020 with sales rising from 100,000 units pa in 2010 to more than 500,000 in 2020 with tractor guidance and VRT being the main drivers.

Falling prices of the equipment and GNSS/RTK services will be an important driver for the uptake of PA over the next decade and ESA 2013 estimates the average device price will drop from 3300Euros in 2012 to 2400Euros in 2022. In Europe future growth is expected to be increasingly driven by uptake of GNSS technologies in Central and Eastern Europe where penetration is currently low.

Research on Precise Point Positioning (PPP) has aimed at levels of accurate positioning similar to RTK but without relying upon a base station correction and potentially with lower capital and running costs. Recently this has been commercialised by Trimble as Centrepont RTX™ (Leandro et al., 2011) and provides an accuracy of 3.8 cm within 1 minute or 30 minutes depending on option. It is expected to be popular in areas such as Central and Eastern Europe, where there is limited RTK infrastructure, and the arable crops grown do not require the higher RTK precision.

US Survey of Dealerships

A recent major survey of US dealerships, including 88% of who provided custom services, has been undertaken by Holland et al. (2013) of Purdue University. The data relates to the US and is from 171 dealerships and is still under review so caution is needed in transferring the results to European agriculture but the trends are likely to be indicative for Europe.

It includes the use of various precision technologies over time and they found that precision services offered and manual control



(lightbar) guidance have been the most used until recently when the rapid rise in autosteer guidance use has brought it to a similar level. Remote sensing and mapping have steadily increased as have soil electrical conductivity mapping and GNSS for logistics.

But how do farmers decide what to buy? There is no easy source of independent information but the UK's Home Grown Cereals Authority (HGCA) funded some research (Knight et al; 2009) in order to provide some independent figures, which it included in a training programme for farmers to help them decide whether to use PA technologies and what sort to buy.

I hope that this helps some of you.

David Tinker

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Holland J.K., Erickson B., Widmar D.A. (2013) *Precision agricultural services dealership survey results. (Under Faculty Review)* Dept. of Agricultural Economics, Purdue University, West Lafayette, Indiana 47907-2056, USA.

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Knight, S.; Miller, P.; Orson, J. (2009). *An up-to-date cost/benefit analysis of precision farming techniques to guide growers of cereals and oilseeds*. HGCA Research Review 2009 No. 71 pp. 115 pp.
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EurAgEng is the European Network for Engineering and Systems in the Rural Sector

From the Secretary General

Gearing up for AgEng2014 - DAVID TINKER



Firstly before you throw away the cover that this arrived in, make a note of the number on the address; it is your membership number and is needed to login and increasingly to get the EurAgEng discount when registering for a conference.

If you use the Members' Login you can use it to:

- Find a member (for that H2020 proposal or to arrange to meet for a beer in Zurich)
- Update your membership details (particularly email address - so that we can find you)
- Apply for subscription to *Biosystems Engineering* (see the article on BE)
- Log in to CABl (to search the Agricultural Engineering Abstracts for free)

CIGR-AgEng2016 in Aarhus, Denmark, is getting closer and if you are thinking of organising a conference, seminar, or project related workshop then

consider running it as a parallel session within that major conference booked for 26-29 June 2016.

It includes CIGR (International Commission of Agricultural and Biosystems Engineering) so there will be agricultural engineers from all around the world there and will be a great dissemination opportunity. It is worth a reminder that all EurAgEng members are automatically members of CIGR and can attend CIGR conferences and seminars at the CIGR registration rate.

AgEng conferences are popular and there are organisers arranged for 2018 (Wageningen, Netherlands), 2020 (Lisbon Portugal) and onwards. Also EurAgEng is able to co-sponsor your seminar or conference; just contact secgen@eurageng.eu If you do run an event with published papers, or write a report (in any language) then to send it to j.osborn@cabi.org CABl to be included in the Abstracts for all of us to find.

Unfortunately I have got some sad news;

Thorsten Lang has died. A member of Technical University of Braunschweig many of us will remember him as the organiser of the excellent Land.Technik-AgEng conferences in Hanover. I am sure that all in EurAgEng will wish to extend to his family, friends and colleagues our greatest sympathy.

Finally, before everyone is off for summer holidays, I hope to meet up with many of you in the next few weeks; firstly at the Field Robot Event (17-19 June at the DLG-Feldtage in Bernburg-Strenfeld, Germany) and then in Zurich for AgEng2014 - need I say any more.

David Tinker

Publishing your papers, meetings and reviews: Biosystems Engineering

Biosystems Engineering, the official journal of EurAgEng, has recently established a run of Special Issues. The editors believe this is an important innovation that will focus research interest and take important subject areas forward.

Recent Special Issues are on Operations Management (April 2014), Image Analysis in Agriculture (January 2014), Emissions from Naturally Ventilated Livestock Buildings (November 2013) and Sensors in Agriculture (April 2013). Further Special Issues are being edited and planned. The editors would be pleased to receive proposals for further topics, particularly where important workshops and meetings are being planned. If workshop organisers are interested in a Special Issue they should contact the editors at an early stage to discuss their ideas since planning ahead is key to a successful publication.

Another innovation for Biosystems Engineering will occur at AgEng 2014 in Zurich. The editors and publishers (Elsevier) of Biosystems Engineering will present a workshop on how to publish research in peer review journals. The three-part workshop will enable researchers to better understand the world of scientific publishing and give them the opportunity to discuss how to present their work in the most effective way.

Reading the papers:

Biosystems Engineering is available to members online for 90 euro + VAT. Contact me at secgen@eurageng.eu. Don't forget that EurAgEng members have free access to the CAB 'Agricultural Engineering Abstracts', which includes many full text papers. It covers reports and papers from various sources and gives English translations. Use the members' login.

Here are three abstracts; one a research paper, one from a Special Issue and the last a Review for a Special Issue:

Biosystems Engineering

Volume 121, May 2014, Pages 12-24

Sensitivity analysis of mechanistic models for estimating ammonia emission from dairy cow urine puddles

Dennis J.W. Snoek, Johannes D. Stigter, Nico W.M. Oginik, Peter W.G. Groot Koerkamp, Farm Technology Group, Wageningen University, the Netherlands

Department of Mathematical and Statistical Methods, Wageningen University, the Netherlands
Wageningen UR Livestock Research, Lelystad, the Netherlands

Ammonia (NH₃) emission can cause acidification and eutrophication of the environment, is an indirect source of nitrous oxide, and is a precursor of fine dust. The current mechanistic NH₃ emission base model for explaining and predicting NH₃ emissions from dairy cow houses with cubicles, a floor and slurry pit is based on measured data from a limited number of studies. It requires input values for numerous variables, but the empirical equations for the model parameters in the literature vary. Furthermore, many of the input variables cannot be assessed accurately, and their actual influence on the prediction is unknown. We aimed to improve NH₃ emission modelling, by assess-

ing the contribution to the variation in NH₃ emission of each input variable and each model parameter related to a single urine puddle. We did so for 27 candidate models, created by each possible combination of three equations per model parameter: the acid dissociation constant, Henry's law constant, and the mass transfer coefficient. After analysing each candidate model with a Global Sensitivity Analysis we found that at least 71% of the model variation in NH₃ emission for each candidate model was explained by five puddle related input variables: pH, depth, area, initial urea concentration and temperature. NH₃ emission was not sensitive to the other four variables: air temperature, air velocity, maximum rate of urea conversion and the Michaelis-Menten constant for urea conversion. Based on these results we recommend simplifying the model structurally and reducing the number of input variables.

Biosystems Engineering Volume 120, April 2014, Pages 2-14

Special Issue: Operations Management in Bio-production Systems

Energy inputs and GHG emissions of tillage systems

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Different tillage systems result in different resource uses and environmental impacts. Reduced tillage generates savings in direct energy input and the amount of machinery items needed. As the basics for holistic Life Cycle Assessments, both the influencing direct and indirect energy as sources of greenhouse gas emissions are required. Life Cycle inventories (LCI) were aggregated for a number of optimised machinery systems and tillage scenarios integrating a four crop rotation consisting of spring barley, winter barley, winter wheat and winter rape seed. By applying Life Cycle Assessments to a number of tillage scenarios and whole field operations sequences, the energy efficiency and environmental impact in terms of greenhouse gas emissions (GHG) were evaluated. Results showed that the total energy input was reduced by 26% for the reduced tillage system and by 41% for the no-tillage system. Energy used for traction and machine construction contributed between 6 and 8% of the total GHG emission per kg product. The total emission of GHG was 915 g CO₂ equivalents per kg product by using the conventional tillage system, 817 g CO₂ equivalents for the reduced tillage system and 855 g CO₂ equivalents for the no tillage system. The no tillage system was expected to yield 10% less. The mineralisation in the soil contributed the most (50-60%) to this emission, while the fertiliser production contributed with 28-33%. The results stress the importance of applying a systems approach to capture the implications of, for example, sustained yields as otherwise the environmental benefits can be compromised.

Biosystems Engineering

Volume 116, Issue 3, November 2013, p214-220

Special Issue: Emissions from Naturally Ventilated Livestock Buildings

Airborne pollutant emissions from naturally ventilated buildings: Proposed research directions

Hisamitsu Takai, Sven Nimmermark, Thomas Banhazi, <http://www.sciencedirect.com/science/article/pii/S1537511012002267> - off3 Tomas Norton, Larry D. Jacobson, Salvador Calvet, Mélynda Hassouna, Bjarne Bjerg, Guo-Qiang Zhang, Soeren Pedersen, Peter Kai, Kaiying Wang, Daniel Berckmans

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University of Copenhagen, Frederiksberg, Denmark

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Katholieke Universiteit Leuven, Leuven, Belgium

The present article describes the current research focus and the future research trends associated with investigating emissions from naturally ventilated buildings as identified at the technical session entitled "Emission from naturally ventilated buildings (Measurement, modelling, reduction and assessment)", that was held during the International Commission of Agricultural and Biosystems Engineering (Commission Internationale du Génie Rural, CIGR) World Congress in Quebec, Canada, between the 13th and 18th June 2010.

Current knowledge and measurement techniques can only provide reasonable estimates of emissions from naturally ventilated livestock buildings. Thus, further research and development are required. The goal is a point where measurements are precise enough to validate simulation models and to obtain more consistent and accurate emission estimates. To achieve this, better synergy between mathematical modelling, physical modelling and field measurements of ventilation rates in naturally ventilated livestock buildings is required.

The review of research presented at the Quebec meeting identified the following intermediate goals:

1. Investigate and determine error sources and measurement inaccuracies. Error analysis might be necessary to interpret results and establish research priorities.

2. Develop intelligent ventilation control systems that can handle highly fluctuating ventilation conditions in naturally ventilated livestock buildings. 3. Develop practical field methods that can be used as reference standards.

4. Establish a dedicated facility that could be used to obtain precise reference measurements of ventilation rates in naturally ventilated building. To enable this, a parallel development of new technologies (instrumentation and methodology) is required.

Integrated technology for working on protected wetlands

In 2009, the PIMR agricultural engineering group in Poznan, Poland focused on developing vehicles, tools and technological options for working on wetlands, particularly to protect the peat-lands in Polish national parks. The main target was to implement integrated technology to stop unwanted greenery (grass, reeds, bushes and small trees) and to restore the breeding areas of endangered species of birds.

Polish farmers on these peat-lands mainly use two types of vehicles: 1) wheeled tractors with agricultural trailers and 2) adapted snow groomers (piste bashers or 'ratracs') and similar tracked machines for cutting, collecting and transporting biomass. After years of use these vehicles and machines, that should just work in the two summer months of August and September, are not as environmentally friendly as they should be.

Wheeled vehicles, such as agricultural tractors, either alone or with a trailer, particularly when loaded with biomass bales, are causing degradation of the peat-land by wheels forming deep ruts. Ratracs are even worse because the wide tracks designed for working in snow are smashing the top layer of roots and level the uneven terrain in such a way that protected areas look like airport runways; not natural peat-land! The poorly adapted 'ratracs' are also dangerous for the environment because they use mineral, non-bio-degradable, engine and hydraulic oils that are environmentally unfriendly when spilt or leaked onto the peat-lands.

PIMR'S OPTIONS FOR REMOVING BIOMASS ON WETLANDS

Three technological options have been tested - 1) hovercraft vehicles designed as a double vehicle-with a tool carrier and a trailer; 2) amphibious tracked vehicle unit; 3) biomass train made up by towing round biomass bales directly on the ground.

Hovercraft technology

A project on hovercraft proved their ability to cut biomass, especially on those wetlands covered by a layer of water.

Trailers were not good enough to collect and transport the biomass efficiently but they could be used in the winter for harvesting biomass as fuel for power plants.



Prototype of the Hovercraft Tool Carrier at PIMR.

The tests of the prototype hovercraft tool carrier showed that it needed further improvement - a bigger engine (200-400kW) for its 2100 kg weight and a much deeper aircushion to give a ground clearance up to 50-70 cm. The main advantage of potentially using the hovercraft technology is that there is practically no physical impact on the protected wetlands.

Amphibian tracked vehicle unit (ATVU)

In 2013 further research funds allowed PIMR to design a prototype ATVU that is dedicated to harvesting and transporting biomass. The prototype unit was a collaboration with Hydromega, an SME from Gdynia.

The innovative tracked vehicle unit operates on boggy terrain as well as on lakes and canals. Tracked vehicles can drive on boggy terrains, but they can get stuck if a shallow layer of water hides a ditch or hollow. An amphibious unit can minimise the risk of these threats and overcome such situations and continue to work.

The ATVU should have a minimal impact on the ecosystem with better environment protection thanks to biodegradable oils and lubricants, a diesel engine with Stage III emission standard, innovative tracks which have differential speeds during turns to reduce



ATVU during preliminary field tests

churning of the ground. A single vehicle both harvests and transports the biomass on wetlands, especially those in National Parks and Nature 2000 areas. The ATVU has different tool modules for cutting, shredding and transporting the biomass.

The preliminary results of the field tests (harrowed field, grassland, peat-land, snow) show good trafficability without the negative impact on the ground as seen with a snow grooming vehicle's (ratrac) chassis. The diameter of a sharp turn is around 9-10m. In the next two years more advanced field tests will be run for assessing mowing, cutting, shredding and transporting biomass as well as of the ATVU's impact on peat land.

Biomass-train technology for transporting biomass bales directly on the ground

Biomass-train technology is an alternative for transporting biomass to warehouses outside protected wetlands.

The system has already been patented in Poland and Europe and is based on special steel adapters that are used to form a biomass-train of round bales and transport it, with the bales rolling on the ground, behind a towing vehicle such as an agricultural tractor with wheels or tracks, the tracked tractor of the ATVU or medium size trucks and pickups equipped with delta track modules or 4x4 wheels.

A biomass-train should reduce the cost of biomass transport as it should be possible to tow 8-10 bales without any impact on the ground making it a very efficient and environmentally friendly technology, especially on peat land and protected wetlands.

Developed, and patented by PIMR, the special adapters and methods of forming a biomass-train is practically ready for demonstration type projects and for market implementation.

For more information please contact:

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When vines meet cutting-edge technology

A test bed that mimics natural vines and measures pesticide use and sprayer performance: this innovation by Irstea and the French Institute for Vine and Wine (IFV) was shown at the International Exhibition for the Vine & Wine, Fruit & Vegetable and Olive growers (SITEVI) last November in Montpellier where it won a Silver Medal.

Could the performance of sprayers used to apply pesticides over vines be tested? "When we run in-field tests, we were faced with various problems: we needed to find appropriate plots of land for measurements, mobilise farmers, have good weather conditions etc. It wasn't easy", explains Bernadette Ruelle, Deputy Director of the Information, Technology and Environmental Analysis for Agricultural Processes (ITAP) Research Unit at the Irstea Montpellier Centre.

To overcome these difficulties, researchers at the French Institute for Vine and Wine and at Irstea had an ingenious idea: to develop an artificial vine! This has led to: EvaSprayViti.

Decoding an artificial vine

"We designed this test bed so that it would mimic the rows of vines and leaves as closely as possible", continued Bernadette.

The test bed is made up of 4 parallel nets, each 10 metres long which copy the layout of vine rows. Sensors, which move realistically when blown by the wind, replace leaves. They are the heart of the innovative measuring system.

Depending on the number of sensors used, researchers can test the vine in several different growth stages which require different products and at different doses. Thus 120 'leaves' are used to represent early vegetation, 440 for mid-vegetation and 840 for full vegetation.

In 2012, researchers from IFV and Irstea compared measurements taken from a natural vine and from the artificial vine and found the results to be very comparable.

"With this test bed we can measure the amount of deposit left on the leaves and get an overview of losses into the soil and air", explains Bernadette Ruelle. These losses are one of the negative aspects of spraying pesticides.

Several studies have looked at the effects: a significant amount of sprayed product, sometimes more than half, does not reach the plant as the spray is dispersed into the air or falls onto the ground. This is caused by poor quality spraying material as well as incorrect settings or a mismatch between the treatment process and the vegetation. Spacing between rows, foliage height and the surface being treated can also vary between two sites as well as from season to season.

According to the specialist, "with the artificial vine, we can play with all these parameters. For example, vines in Burgundy are spaced at around one metre intervals, while those in Languedoc are at 2.5 metre intervals. Technically, it is possible to simulate these details and, by adjusting the settings, study the spraying performance of various materials".



An agro-environmental test bed. This customisable artificial vine will objectively measure pesticide application by spraying during the vine's main growing stages and the evaluate the performance of various materials



also easily set up their experiments to run at different times to measure the differences caused by changes in weather conditions (temperature, moisture content, wind speed, etc.).

Among the tests already completed is the comparison between an innovative sprayer with recovery panels and fan and air injection nozzles and an older pneumatic arch sprayer that remains common among French vineyards. The verdict from the trials with the artificial vine showed that the new innovative sprayer directed 85% of the pesticide onto the leaves while the conventional sprayer managed only 55%.

This test bed will help in applying 'Ecophyto' which is the French action-plan to reduce pesticide use in compliance with the Sustainable Use directive.

"Ecophyto requires a reduction of up to 50% in pesticide use in France by 2018 if possible. This test bed will allow us to repeat many tests, which will help us to determine which sprayer characteristics provide the best performance", notes Bernadette Ruelle.

See it action at www.youtube.com/watch?v=nAqYak8Em4g
See also the video at <http://itap.irstea.fr/?p=7356>
and contact Jean-Paul Douzals (jean-paul.douzals@irstea.fr) or Bernadette Ruelle via the same link.

Second Livestock: A virtual reality world for poultry

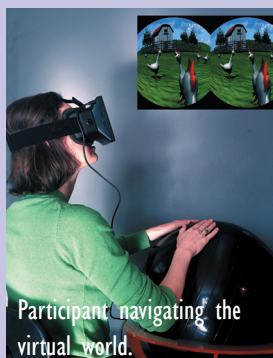
Austin Stewart is an artist, microcontroller programmer and circuit designer. Here he has put together an idea which seems pretty surreal, even pure fantasy, but art is meant to start discussions - and this idea certainly got me thinking that it is something for EurAgEng members to consider, if only briefly perhaps, while having a beer with others at AgEng2014.

About 25 years ago, in a previous career at Silsoe Research Institute, there was a vacation student trying to see if a Virtual Reality package could show how a chicken or duck would see around obstacles, notice a dog or respond to a robot. Perhaps if we had today's electronic equipment we would have developed something like this, as a tool to help people understand issues in certain animal welfare research projects, and how best to use engineering solutions.

Anyhow as Austin says, "Second Livestock is a virtual reality world for conventionally farmed chick-

ens. Under the guise of providing a solution to maintain the profitability of conventional chicken farming while allowing the chickens to be 'free range,' Second Livestock engages the ethical debates of contemporary animal husbandry and humanity's increasing immersion into virtual worlds. The audience experiences the work as a PowerPoint presentation and live demonstration of the CCI (Chicken-Computer Interface).

The aesthetics of the presentation are intentionally poor-mirroring the presentations frequently given at technology conferences and tradeshows. The live demonstration does not use a chicken; instead a volunteer from the audience straps on a human-scale VR headset and places their hands on a treadmill. Though scaled in size,



Participant navigating the virtual world.

the virtual cameras are still aligned at the angles that correspond to the anatomical position of a chicken's eyes. This proves to be quite disorienting for the volunteer, but forces him or her to experience the world as a chicken".

Below are a few images from the presentation. For more information and images on this visit: www.SecondLivestock.com or for other works see www.theaustinstewart.com. Thanks to Austin Stewart for letting us use this to start some discussion.

You can also check out the SRI 'Robotic Sheepdog' project at www.cs.sfu.ca/~vaughan/papers/vaughan_biorobotics97.pdf

David Tinker



Virtual reality chickens



Chicken with Virtual Reality headset.

Parlour Safe

by **ROGER LANE-NOTT**
CEO Agricultural Engineers Association



TECHNICIAN RECOGNITION IN THE UK

Given the complexity of agricultural machinery and the need for service technicians to be very well skilled, the UK's Agricultural Engineering industry, with the backing of the major manufacturers of landbased and milking equipment developed the Landbased Technician Accreditation scheme (LTA).

The organisations involved included the Agricultural Engineers Association, and the Milking Equipment Association, in conjunction with Institution of Agricultural Engineers (IAgrE), and support from BAGMA.

The objectives of the schemes are to provide a nationwide means of benchmarking, monitoring and assessing the competence of technicians employed within the sector. The LTA schemes also provide encouragement and recognition for both employers and technicians who voluntarily commit to continual professional development in pursuit of technical support excellence.

There are two distinct schemes designed for different parts of the sector, one covering milking equipment (described below) and one for other fixed and mobile equipment (such as tractors, combine harvesters, mowers and turfcare machinery) distributed through agricultural and grounds care dealerships.

PARLOUR SAFE - AN INTRODUCTION

In the dairy industry, nothing is more important than the health of the herd and the quality of their milk.

In a further step to support these priorities, the Milking Equipment Association has taken a leading role in setting up and pro-

moting Parlour Safe, an accredited training scheme for milking system service technicians.

Parlour Safe has the support of the major manufacturers - Boumatic, DeLaval, Fullwood, GEA Group, and Lely who are founder members of the MEA and of the Parlour Safe scheme. The aim is to set the standard for parlour equipment installation and servicing, which are crucial in maintaining milk quality and animal health, by providing the required training for the estimated 500 technicians in the UK.



As well as covering the specifics of machinery maintenance, Parlour Safe training also guides engineers and technicians through broader details of the dairy industry, including herd management; parlour ergonomics; legislation, standards and best practice; animal health and its effect on milk quality; milk cooling and transport.

The Parlour Safe scheme is available to all milking system dealers who will then provide

an improved service to their customers. Routine checks by an accredited engineering technician will avoid the downfalls commonly found with incorrectly serviced equipment, such as over-used liners resulting in milk loss and health problems in cattle stock; poor milking performance caused by split pulse tubes; the transfer of mastitis-causing pathogens from badly maintained clusters; and blocked air bleeds preventing adequate attachment of the cluster.

Correctly serviced milking equipment gives cows a longer productive and healthier life, providing dairy farmers with a better return on their investment. This also benefits the supply chain so that retailers are assured of an improved quality and quantity of milk and consumer interests are better protected.

Before long, the Parlour Safe standards are expected to be adopted industry-wide for both robotic and conventional milking systems.

The training program gives dealers the chance to display the competency of their technicians, demonstrating knowledge of the dairy industry and its products. As they follow the course, technicians gain the confidence and experience to deal with any potential problems arising when servicing customers' milking systems.

With minimal qualifications required to enter the training scheme, the MEA hopes to encourage young technicians and college leavers to embark upon the course and build a rewarding career.

For more information see www.iagre.org/lta/intro or www.milkingsystems.co.uk/parlour-safe/introduction or contact the EurAgEng Secretary General (secgen@eurageng.eu) who will forward your query to the right contact.

Correctly serviced milking equipment gives cows a longer productive and healthier life

Report on the 42nd International Symposium

Actual Tasks on Agricultural Engineering

25 - 28 February 2014, Opatija, Croatia

Prof. Silvio Kosutic, Convenor of the Symposium

Prof. Daniele De Wrachien, Past President of EurAgEng

The 42nd International Symposium **Actual Tasks on Agricultural Engineering** was held on 25th-28th February 2014 in Grand Hotel 'Adriatic' Opatija, Republic of Croatia.

The principle Organiser, the Agricultural Engineering Department, Faculty of Agriculture, University of Zagreb, was supported by the following frameworks: Department of Agricultural Engineering, Faculty of Agriculture, University J.J.Strossmayer, Osijek, Department of Bio-systems Engineering, Faculty of Agriculture, University of Maribor (Slovenia), Agricultural Institute of Slovenia, Hungarian Institute of Agricultural Engineering Gödöllő and Croatian Agricultural Engineering Society.

In addition, CIGR, EurAgEng, AAAE bestowed their support and endorsement on the Event.

This year 56 participants from 9 countries attended the Symposium.

It consisted of an Opening Session and six Topic Sessions covering all the broad subject-areas that fall under the scope of Agricultural Engineering.

At the Opening Session **Prof. Dr. Daniele De Wrachien**, former president of the EurAgEng, in his speech highlighted briefly the main historical steps of the symposium emphasising its significant role as a gathering event for scientists, engineers and dealers from south-east European countries and brought the greetings of EurAgEng and CIGR.

Prof. dr. sc. Zoran Grgic, vice dean of Faculty of Agriculture, University of Zagreb addressed the audience bringing them greetings and good wishes for successful work and emphasising the long tradition, high quality level and the importance of the symposium within the south European area.

The Convenor, **Prof. dr. Silvio Kosutic**

ended the Opening Session with the greetings of the Croatian Society of Agricultural Engineering to the audience.

A number of lectures followed, among which are worth mentioning:

- **'Modelling jet flow in sprinkler irrigation systems: Classical and Bohmian water droplet trajectories'** presented by **Prof. Dr. Daniele De Wrachien** from Italy
- **'Fuel consumption working with economy PTO'** given by **BSc Peter Vindis** from Slovenia
- **'Canopy adapted orchard spraying'** presented by **BSc Aljaz Osterman** from Slovenia
- **'Controlled stems cutting module for SRC nurseries'** featured by **Prof. Dr. Dumitru Tucu** from Romania
- **'Potato processing into fried products - an effect of growing technology on acrylamide precursor content into potato tubers'** performed by **BSc Jaroslav Cepl** from Czech Republic
- **'Air temperature and relative humidity distribution in the different greenhouse construction'** delivered by **Doc. Dr. Aleksandra Dimitrijevic** from Serbia
- **'Potentials, opportunities and barriers for biogas production and utilisation in Autonomous Province of Vojvodina'** proposed by **Dr. sc. Djordje Djatkov** from Serbia
- **'Carbon footprint of conventional and ecological crop production'** introduced by **Dr. sc. Viktor Jejcic** from Slovenia
- **'Lower fuel consumption as new challenge for sustainable agriculture and smaller carbon footprint'** highlighted by **MSc Tomaz Poje** from Slovenia and

- **'Mitigation of peak loads with solar energy in an enterprise'** presented by **Allo Allik** from Estonia.

In the Topic Sessions, each starting with a review report, 46 papers were discussed, in oral presentation.

At the Closing Session the Convenor emphasised the role of EurAgEng and CIGR in the ecologically sustainable development of agriculture and in the preservation of the rural cultural heritage within the East-European countries.

Participants were given electronic copies of the Proceedings consisting in volumes of 488 pages, containing 46 papers all peer reviewed. Papers from the Proceedings have been indexed in Thomson Reuters (*The Conference Proceedings Citation Index, a Web of Science® database*) since 1997.

Maziva Zagreb d.d.-INA group (national petrol company) presented its latest palette of bio-degradable oils emphasising the progress made in keeping pace with well known worldwide competitors.

Especially interesting was an Open debate titled **'CAP of the EU: The role of mechanisation in the viability and development of agriculture in the Republic of Croatia'** that gathered many Croatian experts from middle range agricultural enterprises and representatives of famous machinery producers.

Coordinator of this Open Debate was **Ruzica Gelo**, director of the EU Center within Croatian Commerce Chamber who made a remarkable introduction presentation.

Downloadable electronic version of proceedings of the 42nd symposium is available at symposium's web site <http://atae.agr.hr/proceedings.html> Information regarding the 43rd Symposium in the year 2015 will soon be available at the web site: <http://atae.agr.hr>

EVENTS

EURAGENG EVENTS

JULY 2014

- 6-10 AgEng2014 Engineering for Improving Resource Efficiency**
Zurich, Switzerland
www.ageng2014.ch
including RumiWatch & Animal Monitoring Workshop

NOVEMBER 2015

- 6-7 Land.Technik AgEng 2015**
Hannover, Germany
www.vdi.de/landtechnik-ageng

JUNE 2016

- 26-29 4th CIGR International - AgEng Conference 2016 - Robotics, Environment and Food Safety**
Aarhus, Denmark

SPONSORED EVENTS

JUNE 2014

- 17-19 Field Robot Event at DLG-Feldtage**
Bernbrugg-Strenfeld, Germany

SEPTEMBER 2014

- 3-6 ADAGENG 2014 International Congress on Agricultural Mechanisation and Energy**
Nevsehir Turkey
www.adageng2014.com
- 16-19 The XVIII CIGR World Congress 2014 on Agricultural & Biosystems Engineering - Upgrading Our Quality of Life**
Beijing, China
www.cigr2014.com
- 23-25 International Symposium on Animal Science 2014**
Belgrade Serbia
<http://www.livestocksym.com/>

OCTOBER 2014

- 15-17 SPISE- 5th European Workshop on Standardized Procedure for the Inspection of Sprayers in Europe**
Montpellier, France
<http://spise.jki.bund.de/index.php?menuid=32>
- 30-31 ISB-INMATEH 2014 Agricultural and Mechanical Engineering**
Bucharest, Romania
www.inma.ro/symposia/ISB-INMATEH-2014

NOVEMBER 2014

- 19-20 72 Internationale Tagung LAND>TECHNIK Agrartechnik im Dialog mit Politik und Gesellschaft**
Berlin
www.vdi-wissensforum.de/en/nc/events/detailseite/event/12TA001014/

DECEMBER 2014

- 4-6 The European Pilgrimage Routes for Promoting Sustainable and Quality Tourism in Rural Areas**
Firenze Italy
www.epr2014.unifi.it

FEBRUARY 2015

- 24-27 43rd International Symposium Actual Tasks on Agricultural Engineering**
Opatija, Croatia
http://latae.agr.hr/Zbornik_2014.pdf - for last year's proceedings

OTHER EVENTS

JUNE 2014

- 16-18 Agrifuture Days 2014 ICTs enabling Family farming**
Villach, Austria
www.progis.com/events/coolagrifuturedays2014.html

- 24-25 Transmissions in Mobile Machines**
Friedrichshafen, Germany
<http://www.vdiwissensforum.de/en/nc/events/detailseite/event/01K0807014/?cHash=3a2bde5c9786e5cb8a460c4aefa1e21b%2F>
- 25-27 ISTRO 7th International Conference Soil Management in Sustainable Farming Systems**
Krtiny near Brno, Czech Republic
www.istro.cz

JULY 2014

- 13-16 Canadian Society of Biosystems Engineers CSBE Joint International Meeting with ASABE**
Montreal, Canada
www.asabemeetings.org/

SEPTEMBER 2014

- 3-6 12th International Congress on Mechanization & Energy in Agriculture**
Cappadocia, Turkey
www.adageng2014.com/

- 9-12 4ISEBE International Symposium on Environmental Biotechnology and Engineering**
Mexico City
<http://isebe.cinvestav.mx/>

- 14-16 22nd ICID Congress and 65th IEC Meeting**
Kwangju, Korea
www.icid.org/conf_congress.html

- 15-17 18th International Conference on Information Systems for Agriculture and Forestry**
Jelgava, Latvia
<http://isaf2014.info/>

- 29- 2/10 9th Conference of the Asian Federation for Information Technology in Agriculture - 2014 AFITA 2014**
JPerth, Australia
<http://asicta.org/AFITA2014/>

NOVEMBER 2014

- 24-25 Agromek and NJF Joint Conference. Future Arable Farming and Agricultural Engineering**
(Baltic Nordic countries)
Herning, Denmark

www.njf.nu/site/seminarRedirect.asp?intSeminarID=477&p=1004

MAY 2015

- 6-7 XXXVI CIOSTA CIGR V Conference 2015 Environmentally Friendly Agriculture and Forestry for Future Generations**
St Petersburg, Russia
info@ciosta2015.org

JULY 2015

- 12-16 10th ECPA meeting 'Precision agriculture for efficient resources management under changing global conditions'**
ARO Volcani Centre, Israel
www.ispag.org/Events/9thECPA/
- 19-23 GreenSys 2015'**
Evora, Portugal
www.greensys2015.uevora.pt



EurAgEng Outstanding Paper Awards 2014

Publishing high quality papers in peer-reviewed journals is a vital component in research, and EurAgEng recognised this, by adopting *Biosystems Engineering* as its Official Scientific Journal in 1994.

In 2008, for the first time, some of the best papers published in the journal were recognised through the **EurAgEng Outstanding Paper Award**. The Award is sponsored by the IAgRE, the UK national society, and winners will be announced at the EurAgEng Open Meeting and Award Ceremony at AgEng 2014 in Zurich on Monday 7th July 2014.

The editors and the Editorial Board of *Biosystems Engineering* have considered all the papers published in the journal in 2012 and 2013 in order to identify three that will be presented with the EurAgEng Outstanding Paper Awards at AgEng2014 Zurich.

Below is the shortlist from which the final selection will be made:

- **Tractor-based Real-time Kinematic-Global Positioning System (RTK-GPS) guidance system for geospatial mapping of row crop transplant.** Manuel Perez-Ruiz, David C. Slaughter, C. Gliever, Shrini K. Upadhyaya., *Biosystems Engineering* 111 (1), Pages 64-71, 2012
- **A CFD greenhouse night-time condensation model.** Davide Piscia, Juan I. Montero, Esteban Baeza, Bernard J. Bailey,

Biosystems Engineering 111 (2), Pages 141-154, 2012

- **Simulated performance of a greenhouse cooling control strategy with natural ventilation and fog cooling.** Federico Villarreal-Guerrero, Murat Kacira, Efren Fitz-Rodríguez, Raphael Linker, Chieri Kubota, Gene A. Giacomelli, Avraham Arbel, *Biosystems Engineering* 111 (2), Pages 217-228, 2012
- **Transport phenomena modelling during produce cooling for optimal package design: Thermal sensitivity analysis.** Jalal Dehghannya, Michael Ngadi, Clement Vigneault, *Biosystems Engineering* 111 (3), Pages 315-324, 2012
- **Finite element method model of the mechanical behaviour of *Jatropha curcas* L. seed under compression loading.** Michal Petru, Ondrej Novák, David Herák, Satya Simanjuntak, *Biosystems Engineering* 111 (4), Pages 412-421, 2012
- **A coupled mathematical model for simultaneous microwave and convective drying of wheat seeds.** Mohamed Hemis, Ruplal Choudhary, Dennis G. Watson, *Biosystems Engineering* 112 (3), Pages 202-209, 2012
- **Improvement of air distribution in a fixed-bed dryer using computational fluid dynamics.** Franz Román, Vitus Strahl-Schäfer, Oliver Hensel, *Biosystems Engineering* 112 (4), Pages 359-369, 2012
- **The development of a hyperspectral imaging method for the detection of *Fusarium*-damaged, yellow berry and vitreous Italian durum wheat kernels.** Silvia Serranti, Daniela Cesare, Giuseppe Bonifazi, *Biosystems Engineering* 115 (1), Pages 20-30, 2013
- **E2D-ROPS: Development and tests of an automatically deployable, in height and width, front-mounted ROPS for narrow-track tractors.** Tomás Ballesteros, Ignacio Arana, Amaya Pérez Ezcurdia, José R. Alfaro, *Biosystems Engineering* 116 (1), Pages 1-14, 2013
- **Methods for measuring gas emissions from naturally ventilated livestock buildings: Developments over the last decade and perspectives for improvement.** N.W.M. Ogink, J. Mosquera, S. Calvet, G. Zhang, *Biosystems Engineering* 116 (3), Pages 297-308, 2013

Winners will be announced at the EurAgEng Open Meeting and Award Ceremony at AgEng 2014 in Zurich, 7th July

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Sad news

The German agricultural engineering community and his European colleagues are grieving for Thorsten Lang who died suddenly on April 24th 2014 at the age of 48 years.

Prof. Dr. Ing Lang studied Mechanical Engineering at the Technical University of Braunschweig and had been at the department for Agricultural Machinery and Fluid Technique since 1997. Professor Lang's research was focused on mobile hydraulics and cooperative machine operations. He was also the organiser of the Field Robot Event in 2008 in Braunschweig.

Apart from his research and work in academic education, he was very active in the AgEng community. At the VDI-Max-Eyth-Society, he was the Chairman of the Program Committee for the LandTechnik AgEng conferences from 2008 to 2013. His effective organisation contributed to the conference success. Under his management the conference attendance exceeded of 1000 participants.

The participants will remember him as the closing speaker giving a concise and impressive resume of the conference. We are indebted to Thorsten Lang and he will be remembered with honour.

