Institution of Agricultural Engineers

South East Midlands Branch

Notice of Branch AGM to be held
19.00 Monday 08 February 2021
via Zoom

AGENDA

1. Apologies for absence
2. Minutes of the AGM held on 04 February 2020
3. Matters arising
4. Chairman's report
5. Election of Officers for 2021/22
6. Message from the Institution President
7. AOB
8. Date of next meeting. 08 February 2022

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Student Research Presentations Competition (before AGM)

Lotachi Vivian Agbonghae – Cranfield University

Okelani Aworabhi – Cranfield University

Sophia Bahddou – Cranfield University

Joseph Martlew – Cranfield University

Lucie Maskova - Cranfield University

INSTITUTION OF AGRICULTURAL ENGINEERS
South-East Midlands Branch

Minutes of Annual General Meeting

Monday 03 February 2020
at 7.00 pm in Maulden Church Hall

1. **Apologies**

Alex Ansell.

2. Minutes of the AGM held on 04 February 2019

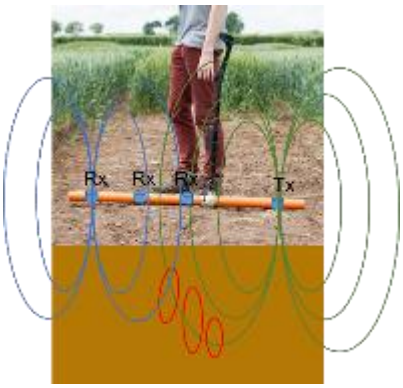
The minutes of the AGM were accepted as a true record. (proposer:C Butlet-Ellis, seconder:G J Hunter)

3. Matters arising
None

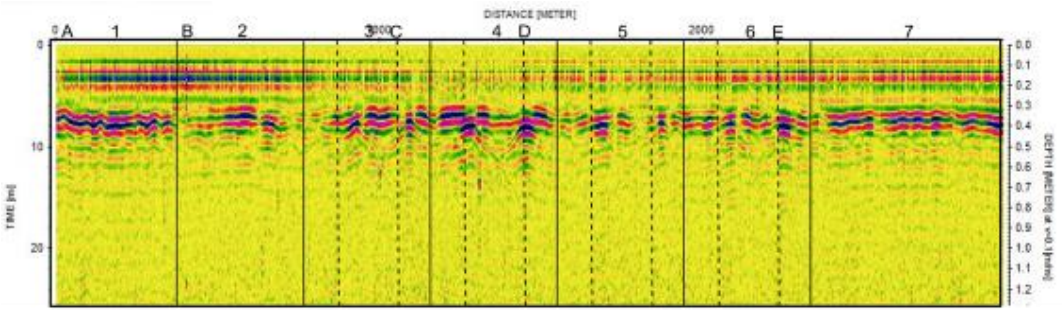
4. Chairman's Report 2019/20

As usual, the year started with the Branch AGM together with our student presentations competition. This year we were fortunate to attract 5 university students, two from Harper Adams and one each from Lancaster, Nottingham and Cranfield.

Guillaume Blanchy from Lancaster kicked off the evening on the subject of Hydrogeophysics, a topic that needed immediate explanation – namely how soil moisture is distributed and changes at a field scale indicated by electrical properties. Guillaume explained that this was important because it provides a measure of how different crops and varieties cope with droughty seasons. He concluded that the technique was both rapid and non-invasive and provided results that reflected actual soil conditions. Care had to be taken however to allow for soil textural differences.

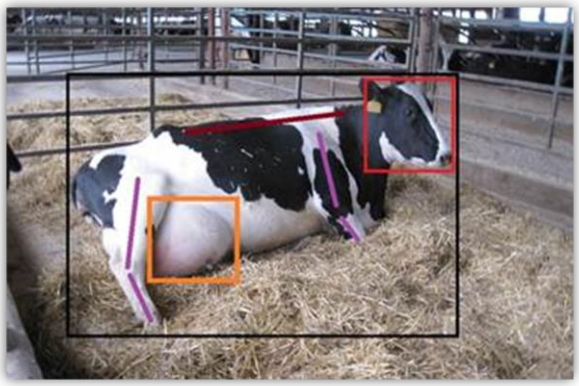


Magdalena Dolowy from Harper reported on the tillage and traffic trial that had been running at the University since 2011, concentrating on the controlled traffic (CT) aspect of the trial. Although neither controlled traffic nor tillage had a statistically significant effect on plant establishment, shallow versus zero tillage and CT vs standard pressure tyres resulted in marginally greater establishment. Similarly, CT resulted in greater root biomass and crop yield compared with standard tyre pressure treatment.

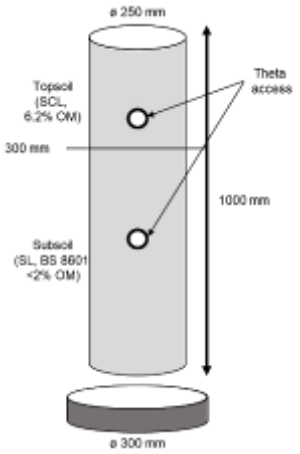


Przemek Dolowy described his research on non-invasive means of assessing soil compaction. The project run by UCD but primarily based at Harper Adams investigated the use of ground penetrating radar (GPR), EC scanning and multispectral aerial imaging. GPR works on the principle of reflectance caused by boundaries in the soil and his main tasks have been "ground truthing" the results of measurements taken in the Soil Hall at Harper and on different field sites, including the tillage and traffic trial.

Dimitris Mallis from Nottingham University is working on a new approach to monitoring the health of animals, namely "Landmark Localisation". This uses computer vision to create "landmarks" that define the pose of an animal as a surrogate for detecting ill health. The novel thing about Dimitris's research is achieving this with the minimal amount of manual input or annotated samples.



Joe Martlew's research at Cranfield is aiming to quantify and establish means of alleviating subsoil compaction in arable soils. Until recently, mechanical alleviation could reach to the soil depths affected, but machines are now so heavy that this is no longer the case. The risk factors were identified in the 1990s as well as evidence of persistent yield loss and other negative outcomes. On the one hand Joe is quantifying the problem using traditional methods such as bulk density, porosity and aggregate stability and on the other, assessing the effectiveness of loosening techniques, including plant roots. The latter is being explored in a polytunnel using mini-rhizotrons while a field trial with 12 consecutive years of treatments is being monitored for changes in penetration resistance, electrical conductivity and soil structure.



Our three judges, Bob Evans, Mike Stephenson and Richard Jones awarded the presentation prize of £75? to **Guillaume Blanchy** from Lancaster.

The first technical meeting of the year was addressed by **Ben Smith** of Hummingbird Technologies on the subject of Drones in Agriculture. This was a fascinating insight into the rapid development of these "unmanned aerial vehicles" (UAVs) over the past decade or so. Payloads now range from 100 g for a basic UAV to 700 g for dedicated machines or even 5 kg for heavy lift options. Flight times have also risen from around 10 minutes to 90 minutes for the professional machines as has the sophistication of sensors fitted to them. The latter now provide a resolution of 0.2 cm per pixel at 100 m altitude and are hyperspectral and lidar capable but at a starting cost of around £30,000. Orthomosaic processing that stitches images together is also a key technology and amongst numerous other fascinating facts Ben concluded with an overview of regulations and the efficiency with which farms could be surveyed. The latter ranged from 400 ha per day to 200 ha where fields were very scattered. Future developments were likely to be around larger platforms and autonomous drones capable of working "beyond visual line of sight" or BVLOS. These would be able to survey a single farm from a remote base station. Spraying with drones will require deregulation.

In April, **Clare Butler-Ellis** from the internationally renowned Silsoe Spray Applications Unit at Silsoe spoke to the subject "Engineering for Pesticide Application – the science and the politics". Clare gave us her personal view of the technical and political influences on the evolution of crop spraying equipment commonly used on farms today. Looking back over her 25 years involvement in developing and assessing equipment and techniques to improve the accuracy and efficacy of application of pesticides, Clare highlighted the major milestones in developments of technology, chemical formulations and controls. These included LERAP- from the early basic improvements in nozzle design, with CDA and air-induction increasing accuracy and limiting drift, through sprayer design and boom stabilisation, enabling faster and ever-wider booms.
Finally, Clare was keen to remind us (and the rest of the world) that SSAU is still 'in business' and keen to help identify problems and solutions.

In May our field trip was a visit to **Perkins Engines at Peterborough**, ably organised by Mike Stephenson. We were given the "grand tour", visiting areas not usually open to visitors, including the engine test bays. These multi-million-pound facilities are in constant use and are sound-deadened to the extent that one was hardly conscious of engines running at full power only a few metres away! The range of engines being sold globally was impressive with constant technological improvements, not only in their performance and emissions but in the manner in which they are designed.

The latter includes the use of 3-D printing to create a plastic replica of an engine to check for ease of access for servicing for example.

Our winter 2019/20 session started with a visit to Bicton Industrial Park, where the former AS Communications now operate under the banner of **Vantage England & Wales**. Vantage are a Trimble distributor and offer not only a wide range of auto-steer options but also data management, variable rate spraying, yield mapping and variable rate planting. **David Bowman and Andrew Williams** outlined their range of products including what I believe is unique to Trimble, namely their CenterPoint RTX. This delivers repeatable positioning to ± 4 cm via satellites or a mobile phone. Some initialisation time is needed and lengthy shading behind trees of buildings can still be an issue, but this is a much cheaper solution than investing in one's own base station to deliver an RTK correction.

Alex Vickers of the Institute of Groundsmanship spoke to the unusual subject of "Building an international cricket square in Rwanda to ICC requirements" at our November meeting. Alex's presentation demonstrated the need to have a sound understanding of soil physical properties and state of the art construction methods to achieve a satisfactory outcome. The project was also an example of how agricultural engineers can have a wider social impact on a community. Alex's fundamental knowledge gained from his research at Cranfield back in 1989 and his experience in a wide range of locations since, was essential to the success of the project. A sustainable pitch was 'topped off' with Bermuda Grass, ideally suited to the environment. However, this was only part of the story. The project supports Rwanda's "Cricket Builds Hope" initiative, bringing the local community together to help fight against the devastating dual impacts of disease (particularly Aids) and genocide in the country.

Daniel Hefft of Birmingham University posed the question "**where is Food Engineering in the UK going, or *Quo Vadis*?** Never has there been a greater emphasis on food safety than at the present and Daniel in his talk attempted (and succeeded) to raise awareness of the importance of the food engineering discipline as a change agent for the food industry. There is constant revolution, and this poses many challenges in keeping the industry focused on the really important issues that maintain the standards that everyone has come to expect.

To complete the calendar year, **Kit Franklin** of Harper Adams University spoke about their "Hands Free Hectare" project, in which a hectare of land was cultivated, sown, tended and harvested without a human operator entering the field or interacting with the vehicles in real time. This collaboration between Harper Adams and Precision Decisions was funded by Innovate UK and was prompted by the lack of precision and damaging compaction associated with large machines. The aim was to do everything on a small scale and address the work-rate and labour cost issue by doing everything autonomously and without agronomists walking the field. With a dedicated and enthusiastic team, often thinking outside the box, great things were achieved on a budget of just £200k. The project gained world-wide publicity as a "first" and through Kit's promotional activities. All was achieved with a 38 hp tractor, 6 m sprayer, 2 m combine harvester and a mixture of telemetry, RTK correction, multi-channel video, radio and WiFi.

Such was the success of the project that the team won the Food and Farming Award and more funding has been acquired to create a "Hands Free Farm" consisting of 7 variably shaped fields on the Harper farm.

At the end of this year we say a sad “au revoir” to Mike Stephenson, a long-standing member of the committee and supporter of the Branch. We wish Mike well in his new home in Norfolk and hope that he may join us for the occasional meeting if he happens to be in this area.
Wholehearted thanks also to the committee as a whole for a job well done. Our two committee meetings a year to set things in motion are always enjoyable occasions with much banter and many laughs all around! Thanks also to members who attend our meetings and make them lively and interesting occasions.
Who knows what this year will bring as a result of our changed European status!

W.C.T. Chamen
30 January 2020

The meeting accepted the report. (proposer:R Godwin, seconder:P Redman)

5. Election of Officers for 2019/2020

Chairman: W C T Chamen
Vice Chairman: J Hunter
Secretary/Treasurer: J V Stafford
Ordinary Members: A Ansell, R Jones, A Plom, J Rickson, N Tillett, D Tinker, C Watts

The meeting expressed gratitude for all the work that our chairman, Tim Chamen, puts in running the branch.

6. Message from Institution President– presented by J Rickson. There followed discussion on how to recruit more females into the profession.

7. **Any Other Business**
None

9. Date of next Annual General Meeting
01 February 2021

The student presenters were Xavier Albano (Cranfield), Raymond Kirk (Lincoln), Maria Pimenta-Ocampo (Cranfield). The winner was Raymond Kirk.

John Stafford

Branch Secretary & Treasurer
04 February 2020