

# ICT-Agri Forschungsverbund

## *ICT-Agri Research Consortium*



Prof. Dr. Engel F. Hessel,  
Georg-August-Universität Göttingen

# ERAnet ICT-Agri – PigWise

- Optimizing performance and welfare of fattening pigs using High Frequent Radio Frequency Identification (HF RFID) and synergistic control on individual level



University of Göttingen, Department Animal Sciences, Division Process Engineering, Germany (GAUG)



Katholieke Universiteit Leuven, Department of Biosystems, Division of Mechatronics, Biostatistics and Sensors (MeBioS), Belgium (KUL)



Institute for Agricultural and Fisheries Research (ILVO) –Technology and Food Science Unit – Agricultural Engineering – Livestock Precision Farming, (ILVO)



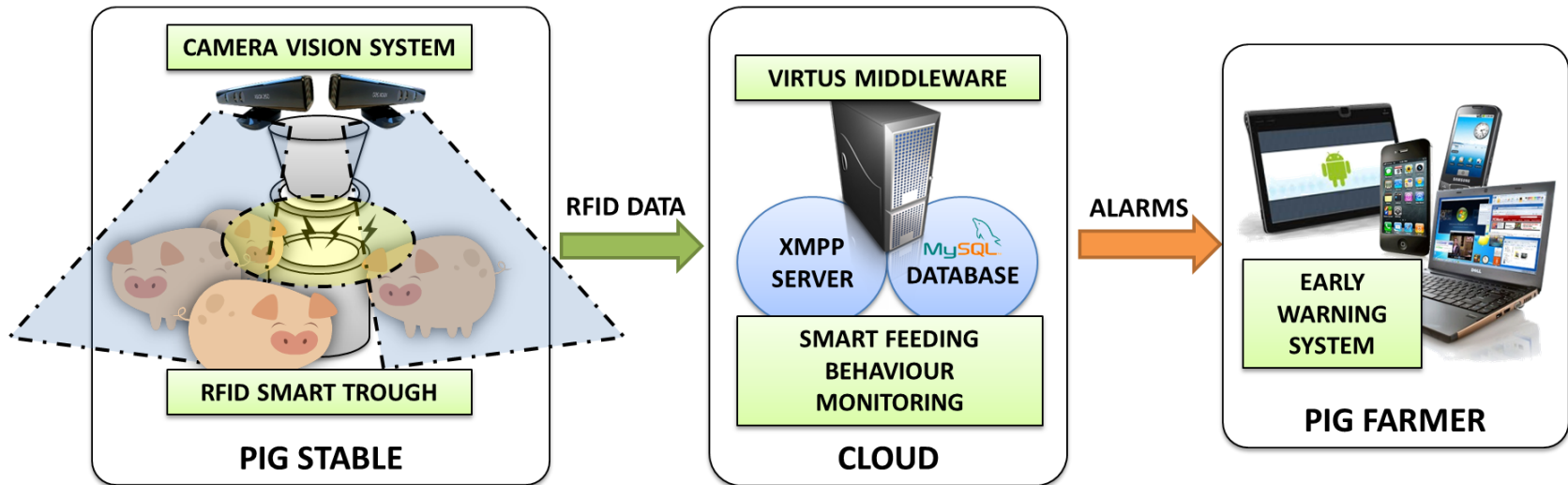
Institut Superiore Mario Boella (ISMB), Service and Application Laboratory, Italy (ISMB)



Aarhus University School of Engineering, Denmark (AU)

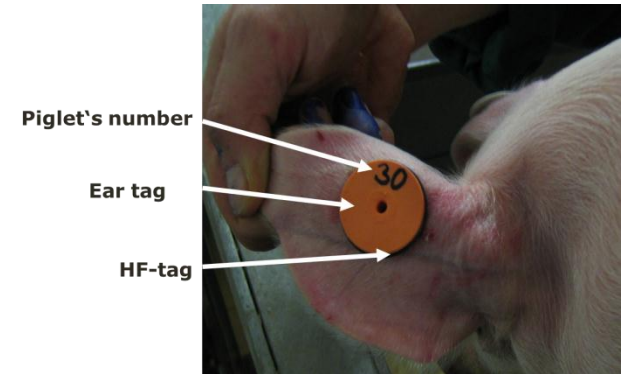
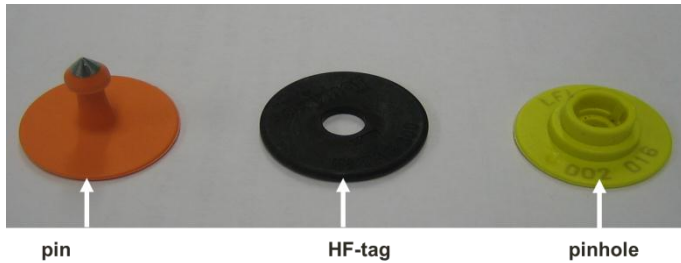
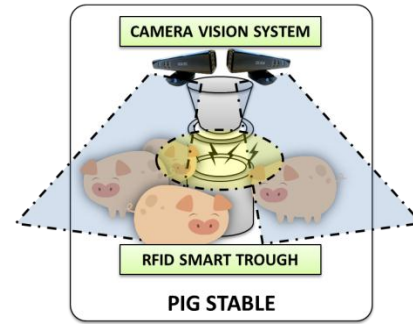
# Aim of PigWise

- Development of an ICT based tool that can be used to monitor performance and welfare of pigs at the individual level in order to detect problems at an early stage and hence preventing economical losses.

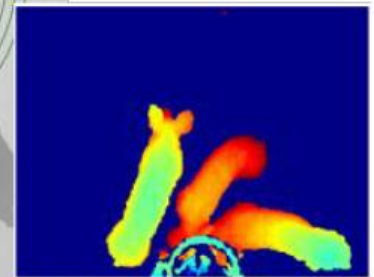
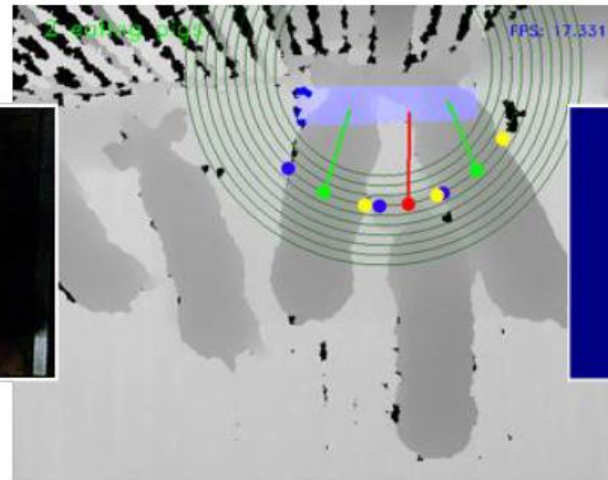
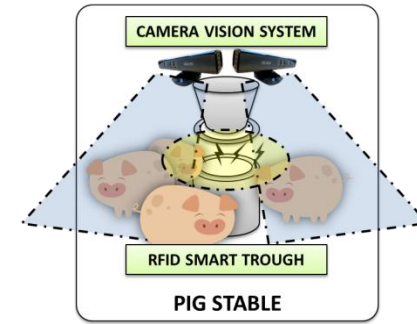


# RFID Smart Trough (GAUG)

- **HF RFID technology** → behavioural related data of group-housed animals can be recorded in real time **simultaneously**, for every individual animal, continuously, and online.



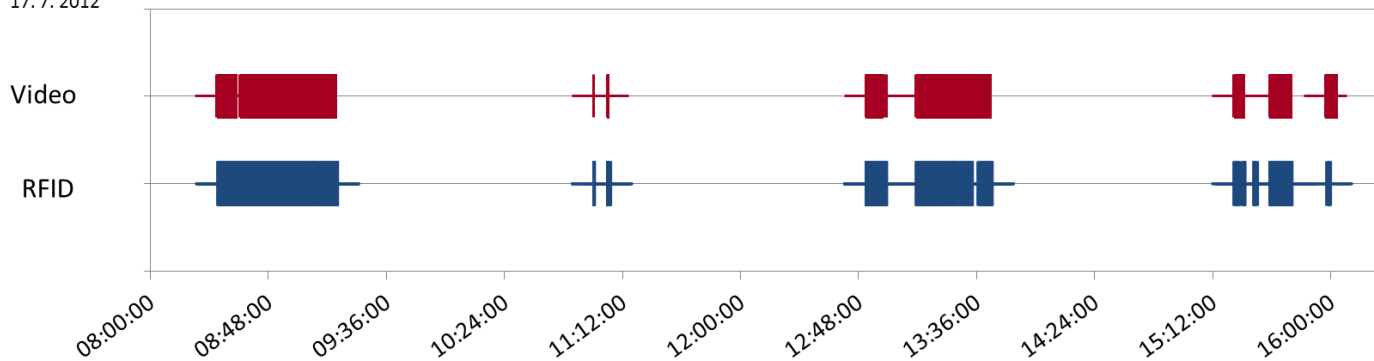
# Camera Vision (IHA)



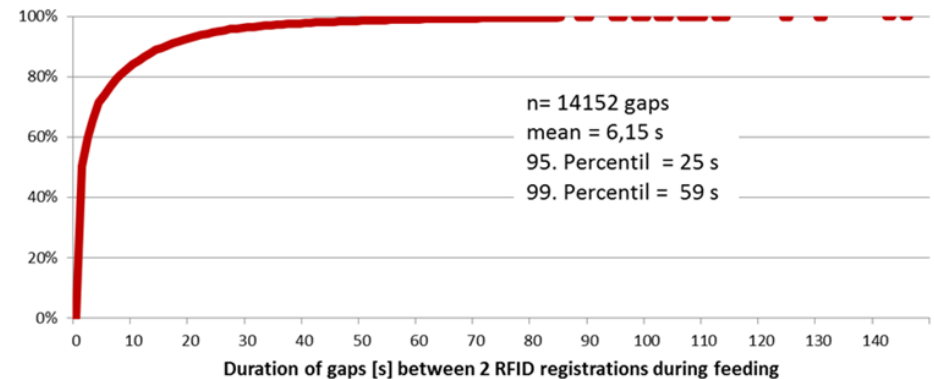
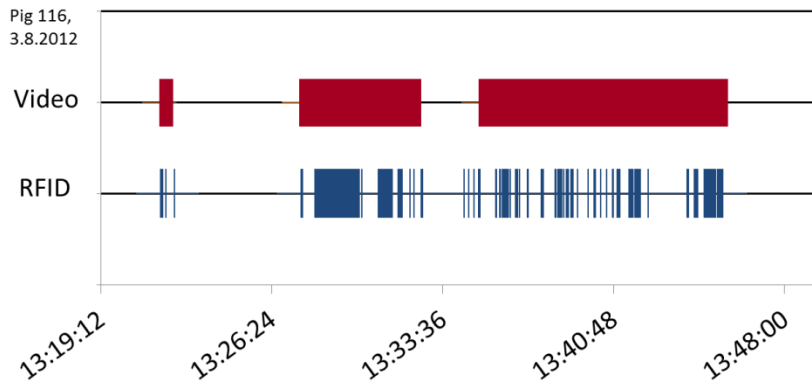
# Accuracy of the RFID system (GAUG)

- Pigs' feeding behaviour was recorded and analysed with the aid of videotapes.
- Trough visits were automatically registered with the aid of the HF RFID-technology

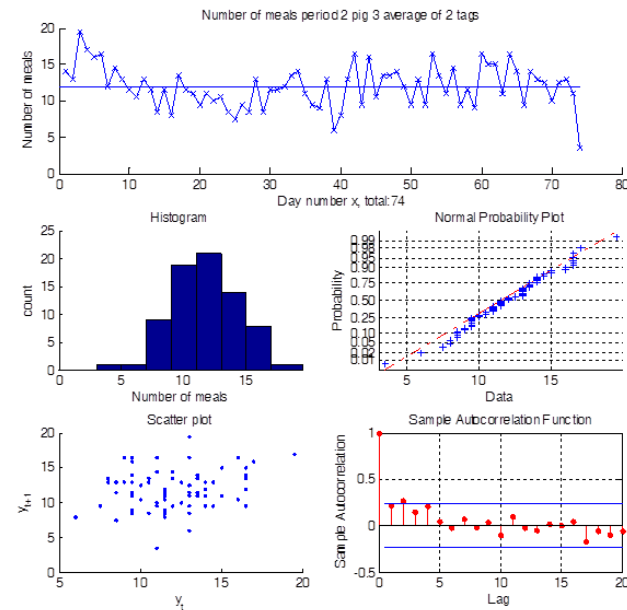
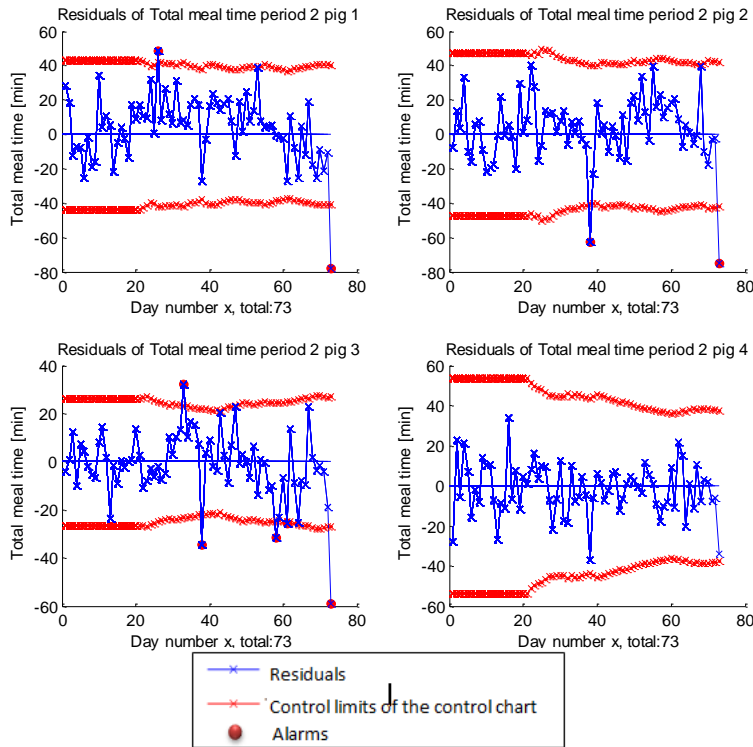
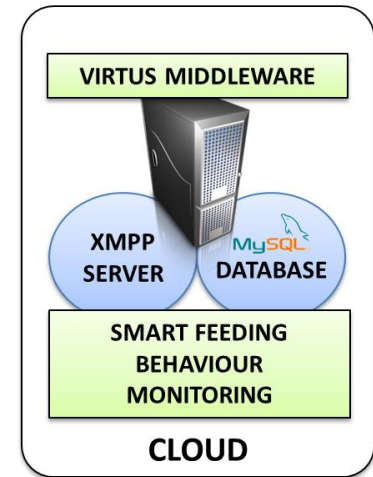
Pig 116,  
17. 7. 2012



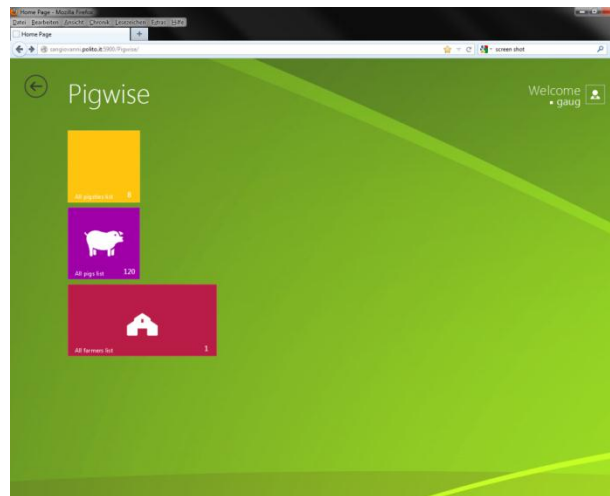
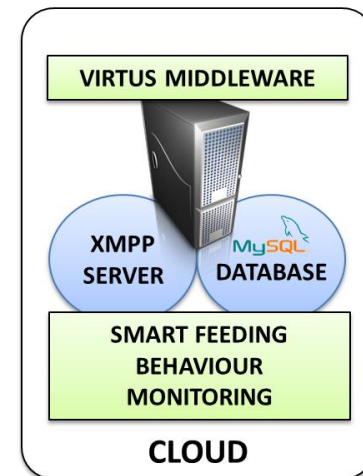
Pig 116,  
3.8.2012



# Smart feeding behaviour monitoring (ILVO & KUL)

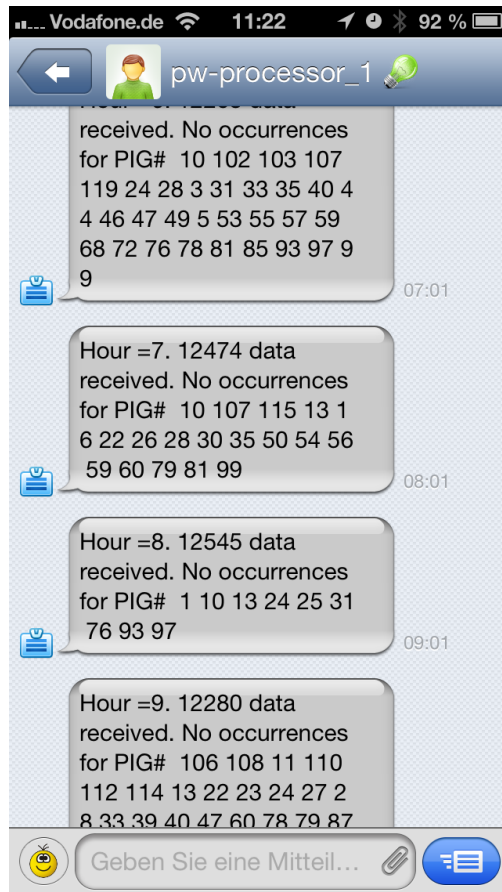
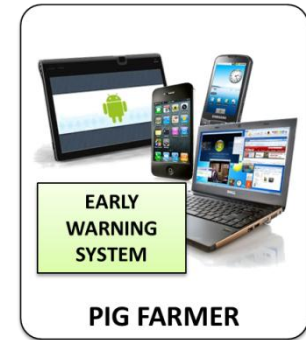


# Virtus Middleware (ISMB)





# Early Warning System (all PigWise partners)



<p>Pig 1 Status: OK Number of meals: 21 Duration of meals: 67,517</p> <p>Farmer: Drantum, Location: Stall 1</p>	<p>Pig 2 Status: OK Number of meals: 27 Duration of meals: 138,133</p> <p>Farmer: Drantum, Location: Stall 1</p>	<p>Pig 3 Status: OK Number of meals: 14 Duration of meals: 113,4</p> <p>Farmer: Drantum, Location: Stall 1</p>
<p>Pig 4 Status: OK Number of meals: 23 Duration of meals: 69,817</p> <p>Farmer: Drantum, Location: Stall 1</p>	<p>Pig 5 Status: OK Number of meals: 19 Duration of meals: 48,6</p> <p>Farmer: Drantum, Location: Stall 1</p>	<p>Pig 6 Status: OK Number of meals: 28 Duration of meals: 119,183</p> <p>Farmer: Drantum, Location: Stall 1</p>
<p>Pig 7 Status: OK Number of meals: 22 Duration of meals: 68,267</p> <p>Farmer: Drantum, Location: Stall 1</p>	<p>Pig 8 Status: OK Number of meals: 27 Duration of meals: 81,483</p> <p>Farmer: Drantum, Location: Stall 1</p>	<p>Pig 9 Status: OK Number of meals: 20 Duration of meals: 68,467</p> <p>Farmer: Drantum, Location: Stall 1</p>
<p>Pig 10 Status: OK Number of meals: 19 Duration of meals: 95,033</p> <p>Farmer: Drantum, Location: Stall 1</p>	<p>Pig 11 Status: OK Number of meals: 30 Duration of meals: 89,667</p> <p>Farmer: Drantum, Location: Stall 1</p>	<p>Pig 12 Status: OK Number of meals: 27 Duration of meals: 153,033</p> <p>Farmer: Drantum, Location: Stall 1</p>
<p>Pig 13 Status: OK Number of meals: 24 Duration of meals: 88,983</p> <p>Farmer: Drantum, Location: Stall 1</p>	<p>Pig 14 Status: OK Number of meals: 27 Duration of meals: 110,483</p> <p>Farmer: Drantum, Location: Stall 1</p>	<p>Pig 15 Status: OK Number of meals: 43 Duration of meals: 74,9</p> <p>Farmer: Drantum, Location: Stall 1</p>

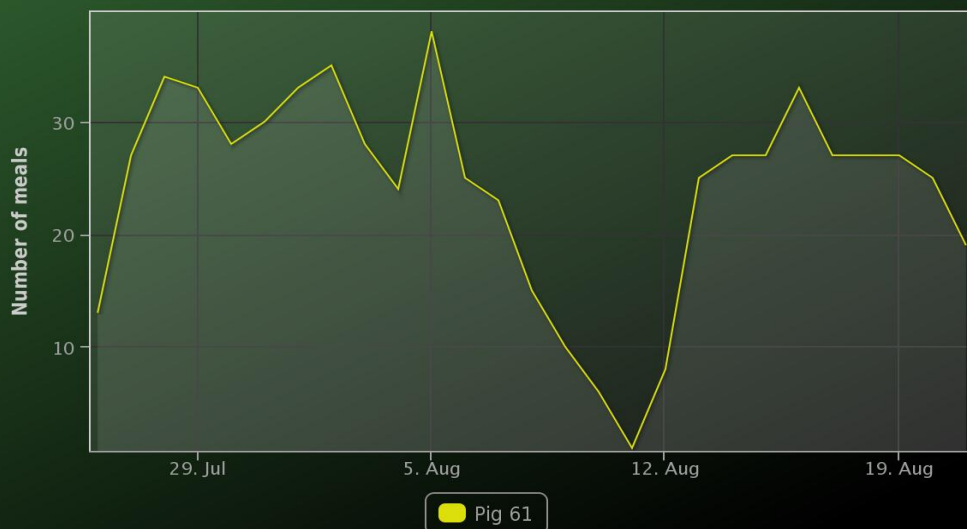
# Early Warning System



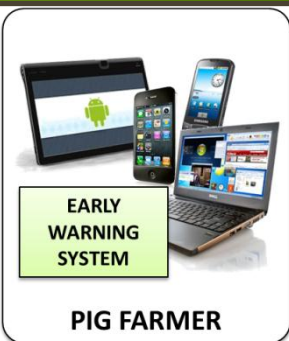
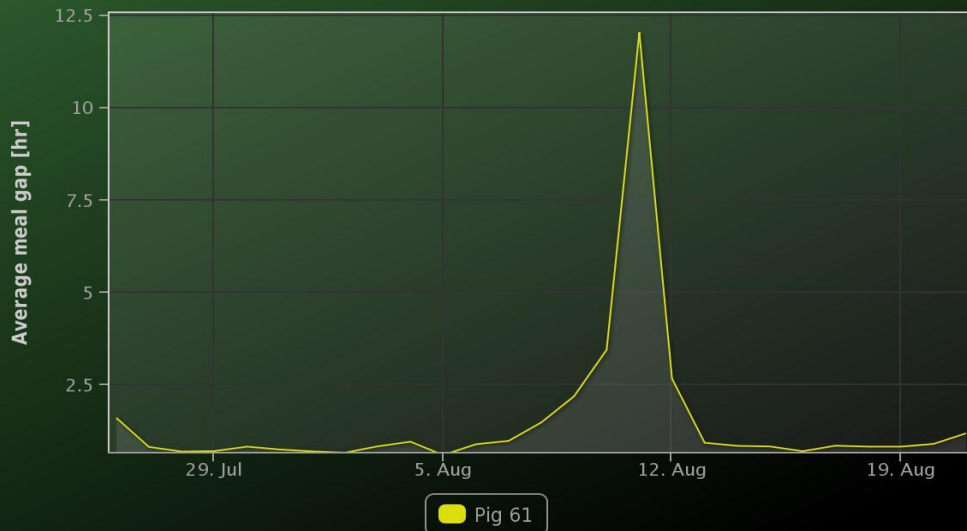
 <p><b>Pig 74</b>                  Status: Warning                  Number of meals: 2                  Duration of meals: 12,583</p> <p>Farmer: Drantum, Location: Stall 5</p>	 <p><b>Pig 1</b>                  Status: OK                  Number of meals: 12                  Duration of meals: 59,733</p> <p>Farmer: Drantum, Location: Stall 1</p>	 <p><b>Pig 2</b>                  Status: OK                  Number of meals: 21                  Duration of meals: 113,033</p> <p>Farmer: Drantum, Location: Stall 1</p>
 <p><b>Pig 3</b>                  Status: OK                  Number of meals: 10                  Duration of meals: 38,65</p> <p>Farmer: Drantum, Location: Stall 1</p>	 <p><b>Pig 4</b>                  Status: OK                  Number of meals: 14                  Duration of meals: 18,333</p> <p>Farmer: Drantum, Location: Stall 1</p>	 <p><b>Pig 5</b>                  Status: OK                  Number of meals: 15                  Duration of meals: 18,617</p> <p>Farmer: Drantum, Location: Stall 1</p>



Numbers of meals  
Number of meals for Pig 61



Average gap between meals  
Average gap between meals for Pig 61



# Successful treatment after an alarm!

# Getting to know the partners

- New consortium
- Partners did not collaborate before PigWise
- ICT-AGRI Meta Knowledge Base & Internet “Dating” for Researchers



# Who are we?



Kristof Mertens (until Dec. 12), Woulter Saeys



Annelies Van Nuffel, Jarissa Maselyne



Paolo Brizzi, Andrea Scalera



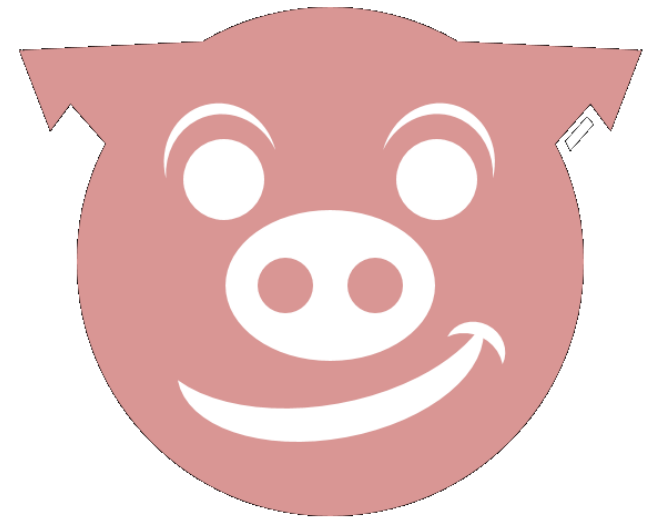
Torben Gregersen, Peter Ahrendt



Engel Hessel

# PigWise Publications

- Gregersen T., Jensen, T., Andersen, M.R., Mortensen, L., Maselyne, J., Hessel, E., Ahrendt, P. 2013. Consumer Grade Range Cameras for Monitoring Pig Feeding Behaviour. ECPLF 2013 – 6th Joint European Conference on Precision Livestock Farming, 10. - 12. September 2013
- Gregersen, T., Jensen, T., Andersen, M.A., Mortensen, L., Maselyne, J., Hessel, E. 2013. Computer vision based monitoring of performance of an RFID based eating registration system. BTU 2013 - 11th International Conference Construction, Technology and Environment in Farm Animal Husbandry, 24.-26. September 2013, Vechta, Germany
- Hessel, E. F. , Van den Weghe, H. F.A. 2013. Simultaneous monitoring of feeding behaviour by means of high frequent RFID in group housed fattening pigs. ECPLF 2013 – 6th Joint European Conference on Precision Livestock Farming, 10. - 12. September 2013
- Hessel, E. F., Hömmen, A., Van den Weghe, H. 2013. Accuracy of an innovative high-frequency (HF) RFID system for monitoring feeding behaviour of fattening pigs under practical conditions. BTU 2013 - 11th International Conference Construction, Technology and Environment in Farm Animal Husbandry, 24.-26. September 2013, Vechta, Germany
- Maselyne J., Saeys W., De Ketelaere, B., Mertens, K., Vangeyte, J., Hessel, E. F. ,Millet, S., Van Nuffel, A. 2013. Validation of a High Frequency Radio Frequency Identification (HF RFID) system for registering feeding patterns of growing-finishing pigs. Compiuter and Electronics (submitted)
- Maselyne J., Van Nuffel, A., De Ketelaere, B., Mertens, K., Sonck, B., Hessel, E., Saeys, W. 2013. Individual pig health monitoring based on automated registration of feeding pigs and synergistic control. BTU 2013 - 11th International Conference Construction, Technology and Environment in Farm Animal Husbandry, 24.-26. September 2013, Vechta, Germany
- Maselyne, J., Saeys, W., Van Nuffel, A., De Ketelaere, B., Mertens, K., Millet, S., Gregersen, T., Brizzi, P., Hessel, E. 2013. A health monitoring system for growing-finishing pigs based on the individual feeding pattern using Radio Frequency Identification and Synergistic Control. ECPLF 2013 – 6th Joint European Conference on Precision Livestock Farming, 10.- 12. September 2013
- Maselyne, J., Van Nuffel, A., De Ketelaere, B., Mertens, K., Hessel, E., Sonck, B., Saeys, W. 2013. Range measurements of a Radio Frequency Identification System for registering growing-finishing pigs near a feed trough. ECPLF 2013 – 6th Joint European Conference on Precision Livestock Farming, 10. - 12. September 2013
- Scalera A., Brizzi P., Tomasi R., Gregersen T., Mertens K., Maselyne J., Van Nuffel A., Hessel E., Van den Weghe H. 2013 The PigWise project: a novel approach in livestock farming through synergistic performances monitoring at individual level. EFITA2013, Sustainable Agriculture through ICT innovation, Turino 23-27. Juni 2013
- Scalera, A., Conzon, D., Brizzi P., Tomasi, R., Spirito, A. M., Hessel, E. 2013. An Internet of Thing-based approach for single animal monitoring in a distributed farms environment. BTU 2013 - 11th International Conference Construction, Technology and Environment in Farm Animal Husbandry, 24.-26. September 2013, Vechta, Germany
- Scalera, A., Conzon, D., Brizzi, P., Tomasi, R., Spirito, A. M., Mertens, K. 2013. From animal monitoring to early warning systems through the Internet of Things. ECPLF 2013 – 6th Joint European Conference on Precision Livestock Farming, 10. - 12. September 2013



Thanks for your  
attention!