

EU-PLF

Deliverable 2.1

Definition of implementable systems

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Dissemination level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

The deliverable is an overview of existing and new technologies that have the potential to measure biosignals from the animal that can be linked to the KIs determined in WP1.

Fancom systems

Fancom has a range of products to collect data on and around animals. There are different products for pigs and poultry. Below, a description is given regarding the application of each product.

The new *eYeNamic* system will be installed on the 15 farms selected for the EU PLF project.

Farms were selected in such a way that the other systems (feed, climate, weight and water) are present in most of the farms. Data from all systems will be collected at farm level by Data Management software.

eYeNamic

eYeNamic is a system used both in pig and poultry farms. It's a camera system that performs measurements of the activity and the distribution of the animals. Top view cameras generate a visualization of the floor area. The analysis software translates acquired images into indexes of distribution and activity. These indexes are a measure of animals position and movement and thus of animal behavior.

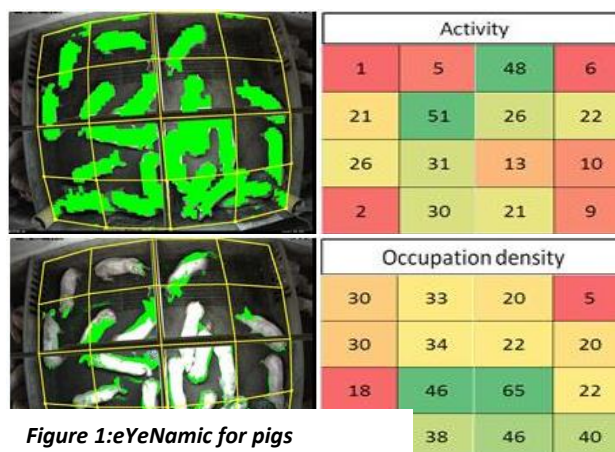


Figure 1: *eYeNamic* for pigs

Measurements:

- Activity
- Distribution



Figure 2: *eYeNamic* for poultry

Feed supply system

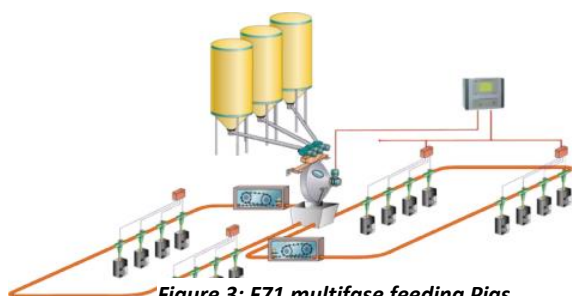


Figure 3: F71 multifase feeding Pigs

The feed supply systems offer the freedom to decide on a specific feeding strategy: it delivers the right amount of food at the right moment to all the feeding places. The feed changes as the animals grow older and the transition to another feed type is possible with less medication and less feed. This saves time, cuts feed costs and gives control over the production performance.

Measurements:

- Feed supply

Climate control system

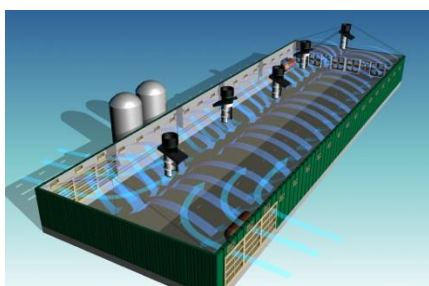


Figure 6: F38 MTT Ventilation for poultry

Animals are the living capital of the farmer; the environment they live in has an influence on their development. The optimal climate is beneficial to the growth and health of the animals resulting in cost saves for feed, water and energy.

Measurements:

- Temperature
- Humidity
- Ventilation rate
- CO2

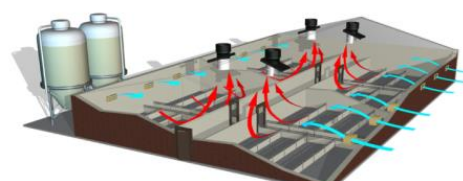


Figure 7: F21 Easy Flow for pigs

Bird weighing

Bird weighing is a weighing system for Poultry. The system consists of a control computer with one or two scales that weighs a significant number of animals in one house. Continuously weighing animals provides an up to date overview of the growth process in the house. Deviations from a standard show up quickly, so the farmer can take timely intervention to improve his results. Additionally, he can accurately predict the end weights to avoid sanctions from the slaughterhouse.

Measurements:



Figure 8: F47 Bird weighing

- Weight

eYeScan

eYeScan is an automatic growth monitor for fattening pigs. *eYeScan* obtains the pigs weight using video image recognition. The system includes a computer with a special image processing module to which a maximum of 4 cameras can be connected. The analysis software delivered with the system enables continuous growth monitoring of a group of animals.

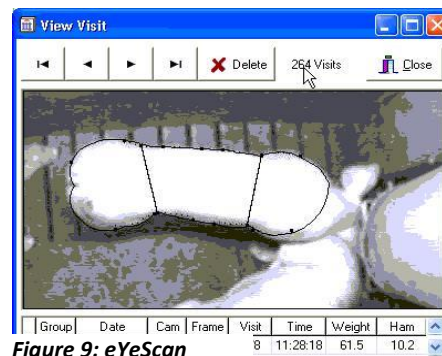


Figure 9: eYeScan

Measurements:

- Weight

Water monitor

Water consumption monitor is one of the simplest and most effective tools that a farmer can use to monitor the performance of the animals.

The system provides accurate information about water usage of the animals and gives the possibility to monitor performance of the animals in a simple and effective way.



Figure 10: Watermeter

Differences among the respective water lines and between expected and measured water consumption are immediately visible, enabling to respond in time before any abnormalities can affect the welfare or health of the animals.

Moreover, the system warns when crossing the minimum and maximum flow per house/pen any leakages are noticed at a very early stage.

Water registration also helps in proper vaccination, in fact, vaccines for animals are usually distributed by the water and for this reason it is important for farmers to know exactly when the water consumption is at the highest level.

Measurements:

- Water supply

Data Management

It's impossible for the farmer to be physically present in the animal houses the whole day; however, he has the necessity of monitoring his animals' development continuously. Data Management software makes possible to have access to the control computers on the entire farm, 24 hours a day, anywhere in the world. In the process of total house management, data management is the linking element. Data obtained from climate conditions, feeding strategy and other sensors is converted into knowledge. Resulting in facts and figures that indicate where improvements can be made.

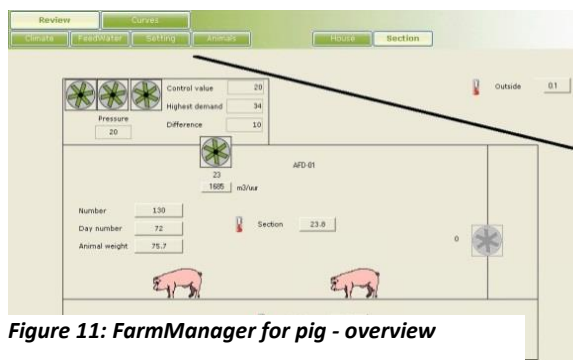


Figure 11: FarmManager for pig - overview



Figure 12 FarmManager for poultry - overview

SoundTalks systems

SoundTalks has developed a monitor to detect respiratory infections in fattening pigs. The monitor records sounds and a dedicated algorithm detects the number of coughs that occur in the compartment with pigs. Below, a description of the *Pig Cough Monitor* is given.

The *Pig Cough Monitor* will be installed in each of the 4 compartments on each of the 10 pig farms selected for the EU PLF project.

The hardware of the *Pig Cough Monitor* will also be installed in the 5 poultry houses that are selected in the EU PLF project, and also in the Irish Teagasc institute where a group of young calves will be housed. The idea is to widen the application of cough monitoring in fattening pigs, towards the automated monitoring of stress in poultry houses and the monitoring of respiratory infections in young calves.

Pig Cough Monitor

The **Pig Cough Monitor** is a turnkey solution for continuous monitoring of pig coughs in the compartment with the aim to react quickly to upcoming respiratory diseases. Using microphones, recorded data is transferred via a farm computer to the *SoundTalks* online application. Online graphs of the cough index enable the farmer to evaluate whether an increase in coughs is natural or rather an emerging respiratory disease.

Supported by this technology farmers can treat their animals early, which is crucial for quick and full recovery of all animals. The faster is the detection of respiratory diseases, the lower are veterinary costs, moreover the less is the disruption of growth and the higher is the lean-meat percentage.

In the compartment

The microphones and the *SoundTalks* computer are protected against the harsh environment of commercial pig houses. Both are connected via cable to ensure a stable connection. The computer is programmed with an algorithm that filters pig coughs from the recorded sounds and sends it to the *SoundTalks* online database. Each microphone records the coughs of 100 to 150 pigs in one compartment.



Figure 13. SoundTalks computer



Figure 14. SoundTalks computer installed in a farm

On the Internet

SoundTalks chose to base its *Pig Cough Monitor* system on an online application to ensure that farmers can access their data wherever they may be. Of course, the access to the online application is granted only to registered users, with username and password, in order to protect individual data

Furthermore, to ensure major security to data, the system logs out those users that resulted inactive for more than 1 hour.

SoundTalks' interactive graphs offer six different timeframes for monitoring pig coughs (1 day, 3 days, 10 days, 1 month, and 3 months) providing them with the tools to identify respiratory diseases early. The data is updated every five minutes.

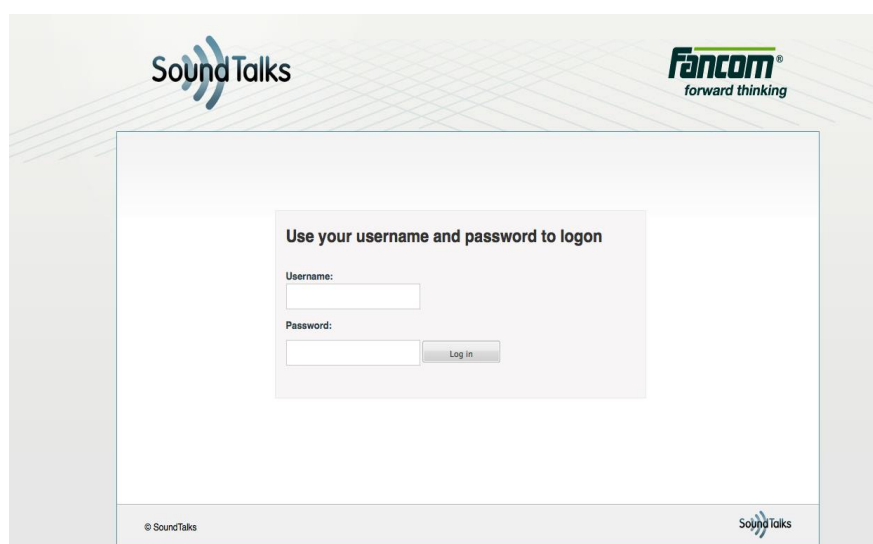


Figure 15. SoundTalks log-in page



Figure 16. SoundTalks interactive graph

Key facts:

- Fast detection of respiratory diseases
- Data available on the internet 24/7
- Graphs in 6 timeframes
- 1 Microphone for 100 – 150 animals
- Updates database every five minutes
- Secure data storage by *SoundTalks*

In the poultry houses

In the poultry houses, the hardware of the pig cough monitor will be reused in this project for the continuous recording of sound. In each of the 5 selected broiler houses, 4 microphones will be installed over the length of the house. The recorded sounds will be analyzed in this project, in order to come up with new monitoring applications based on sound.



In Teagasc (calves)



In the Irish Teagasc institute, a group of young calves will be monitored with 4 microphones. The existing hardware of the pig cough monitor will be reused, as it is able to resist the harsh environment that occurs in a house with cattle. The goal of the project is to adapt the existing pig cough monitoring software to an algorithm that can detect cough of calves from a continuous recording of the sound in the house.