TECH CARE

Integrating innovative **TECH**nologies along the value Chain
to improve small ruminant welf**ARE** management

Newsletter - Issue 15

July 2025

The **TechCare** project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement N°862050.

SUMMARY

TechCare Final Conference in Brussels! - *by C. Morgan-Davies (SRUC)*

The final conference of the TechCare project took place in Brussels on the 17-18th June 2025. Over 86 people attended the 2 days, both online and in person from over 16 different countries. The event was a great opportunity to take stock after 5 years of exciting research across Europe on the use of innovative technologies for small ruminants welfare management, with proofs of concept, prototypes, pilot trials and large-scale studies to leverage technologies and data to identify useful early indicators for farmers in their management of the welfare of their animals both indoors & outdoors, and also during transportation.

The first day was dedicated to the project with an overview from the project coordinator, Claire Morgan-Davies (SRUC), followed by presentations from 4 other EU funded projects (DECIDE, ClearFarm, Digi4Live, aWISH) to give their experience from their project's perspective. This was followed by presentations from Cathy Dwyer (SRUC) on the work done on welfare assessments and priorities in small ruminant systems. Germain Tesniere (IDELE), with the help of Leticia Riaguas (Oviaragon) presented the work done with the technologies tested in the pilot trials and large-scale studies, whilst Gerardo Caja (UAB) and Cathy Dwyer (SRUC) showed results of the transportation trials by road and by boat. Fiona Kenyon (MRI) then chaired the session showcasing some of the platforms developed during the project: Francesco Martini (Abinsula) showed the platform developed and calibrated with the AGRIS partners in Sardinia, to collate information and propose alerts on their pilot dairy sheep farm, whilst Gerardo Caja (UAB) presented the THIcare phone app developed in partnership with Sosein SA (Spain) using indoor sensors to alert farmers if shed conditions become an issue. Finally, Evangelia Sossidou and Sotiris Patsios (ELGO-DIMITRA) explained the participatory work carried out with the stakeholders in all partners' countries during the project. The day concluded with a panel discussion with Ester Alaez-Pons, from DG-Santé, Cathy Dwyer, Germain Tesniere, Pol Llonch (Advisory Board member & coordinator of ClearFarm) and Michail Kakanis (Advisory Board member). They discussed issues around welfare data and

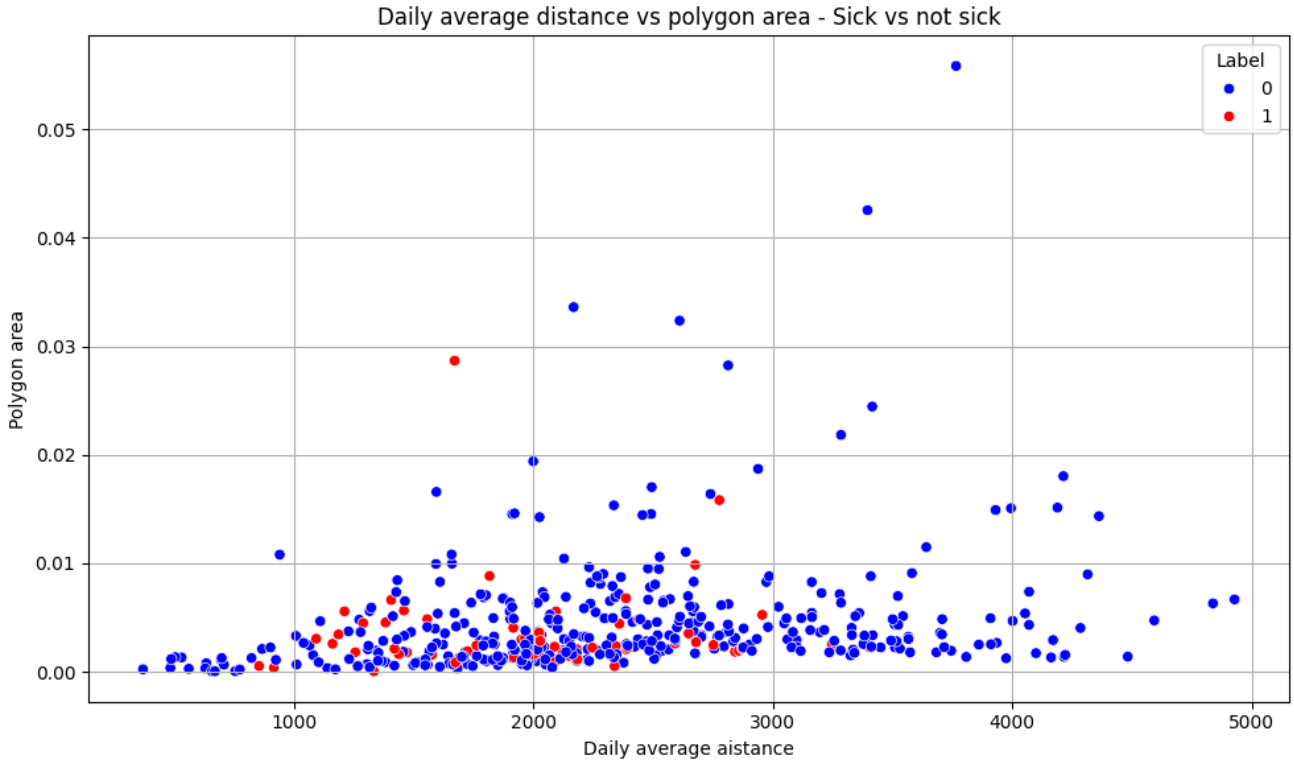
alerts, and how thresholds can be identified or not. The need for meaningful alert was raised, as well as the need to identify change from 'normal pattern' in combination with thresholds. It was noted that the EU commissioned projects to develop more welfare indicators, as they believe that will be important going forward. Farmers' engagement and motivation for PLF tools and welfare was also debated, as well as the need to train or at least engage further with consumers to raise awareness of welfare in sheep and goats' systems. Finally, regarding the future of PLF tools in small ruminant systems in 10 years' time, the ambition is to have something universally used, helping farmers in the decision-making, with technology more affordable for everyone, to improve animal welfare and help an improve standardisation of welfare standards.

The second day was dedicated to the future, with a first presentation from Victor Miguel (Oviaragon), focused on the feedback from the large-scale studies farmers who tested some of the technologies identified by the project to monitor welfare. Five promising innovations, investigated and developed during the project, were then presented, in a session chaired by Lise Grøva (NIBIO). Eliel Gonzalez-Garcia (INRAE) explained their work on the Walk over Weigh, followed by Ilan Halachmi (ARO) who showcased their system of automated weighing and water intake (TroughAI). James Wright (Breedr) showed their company application and platform, with the welfare assessment module specially developed for the project to be used by partners and translated in the project' languages. Florian Gimbert (PageUP) then presented the application they have developed for their system using Ultra High Frequency ear-tags, and finally, Claire Morgan-Davies presented the work done at SRUC looking at Bluetooth Low Energy tags and readers for proximity to resources and ewe-lamb relationships. Presentations by Ilan Halachmi (ARO) on closing the loop between welfare intervention and technologies, and by Nuphar Katzman (Spark) on potential business models, concluded the discussions. The day finished with a panel discussion featuring Alessandro Mazette (Advisory Board member), Michael Odinstov (EAAP PLF industry representative), Francisco Pietro (Sosain SA) and Eliel Gonzalez-Garcia. The panel discussed how to go from prototypes/innovations towards a market application. Challenges to explain the worth of technological solutions in the long-term were raised, as well as the need for R&D to provide final easy-to-use versions. Data information from the technologies and sensors was found to be the greatest value for the reputation of the farming products to the market and the consumer. The need for technical support was also raised, as service, retention of the product and long-term use are important metrics. How to encourage tech companies to invest in technologies designed for small ruminant systems was another point discussed by the panel, with the difficulty to transition from university/research state to product state being raised. As volume is important for the tech business to allow investment, it would be crucial to point out the size of the small ruminant sector, as well as the other factors and services the sector potential provides (e.g. cultural, ecosystems, environmental). The need for a multidimensional approach when marketing technologies was viewed an interesting approach by the panel.

The two-days were rich in results and discussions and provided an excellent way to conclude the project's work. Thanks to all who participated and made this event a success! Stay tuned: Replay is online here.

Idun Syvertsen master's thesis - *by L. Grøva (NIBIO)*

Master student Idun Syvertsen submitted her thesis in Computer Science at NTNU in June 2025 (Norwegian University of Science and Technology (NTNU), Faculty of Information Technology and Electrical Engineering, Department of Computer Science). Title of thesis: "*Using deep learning on GPS trajectories to identify abnormal behaviour in sheep//Classifying abnormal behaviour in sheep using CNNs and GPS data//Identifying distress in sheep using GPS data and machine learning"*. The main idea behind this work was to investigate if and how GPS data could be used to identify distress in sheep. Position data from GPS collars (here Telespor) were linked with individual sheep data from The Norwegian Sheep Recording System (NSRS) (i.e. Sauekontrollen). The dataset consisted of 62 sick sheep and 383 not sick sheep; this being fewer data than anticipated due to a number of data mining and linking challenges. Distance walked and polygon area used was calculated for healthy and sick ewes. Further, machine learning was considered, and the following tools were selected; K Nearest Neighbors (KNN), Support Vector Machines (SVM), and Random Forest. Also training a CNN-model (Convolutional Neural Network) was tested. Below is a scatter plot showing the distribution of the final labelled data against polygon area and daily average distance for each ewe. Although, data were too few to be conclusive we think there is potential for these data to detect abnormal behavior in sheep.



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Aimee Walker PhD – *by C. Morgan-Davies (SRUC)*

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Aimee Walker (SRUC/University of Glasgow) successfully passed her PhD viva in March and graduated in Glasgow in July 2026. Her PhD was funded by the TechCare project. Aimee's thesis explored the use of Bluetooth Low Energy (BLE) technology as a precision livestock farming (PLF) tool for monitoring sheep in grazing systems. While PLF tools are widely used in intensive systems (e.g., pigs, poultry, dairy cattle), their adoption in sheep farming has been limited due to challenges like large grazing areas, sheep size, and cost constraints.

Her research involved developing a prototype BLE system and testing it through three main objectives:

1. Characterising BLE signal strength and distance in outdoor environments.
2. Assessing BLE for sheep localisation using multilateration and GNSS validation.
3. Investigating BLE for monitoring sheep contact patterns and relationships, especially around lambing.

The key findings in Aimee's thesis related to:

- **Signal Calibration**: BLE signal strength decreased with distance and was influenced by device height and sheep behaviour. Sheep posture affected signal detection and range.
- **Localisation**: BLE could localise sheep with moderate accuracy (mean error ~19–23 m). High reader density would be needed for effective coverage.
- **Behaviour Monitoring**: BLE effectively tracked ewe–lamb and ewe–ewe interactions. Contact patterns changed with lamb age and ewe lameness, offering insights into welfare and management.

Aimee's work showed that BLE is promising for monitoring sheep behaviour and welfare, especially in detecting social interactions and potential issues. However, limitations in signal reliability and range mean it may be best used alongside other technologies for comprehensive livestock monitoring. Aimee's PhD thesis is available here.

TechCare highlighted in "Pâtre" magazine - *by G. Tesnière (IDELE)*

A 10-page feature article in the national magazine "Pâtre" from the Réussir Group, dedicated to news from the sheep industry in France. The main results of the TechCare project were presented in a comprehensive and illustrated feature! Discover it in issue no. 726 of the magazine for this summer! (ISSN 1638-4830).

dossier

Des nouvelles technologies pour le bien-être animal

« TechCare »[1] est un projet financé par la Commission européenne, dans le cadre du programme européen de recherche et d'innovation Horizon 2020. Ce projet réunit un consortium de neuf pays (Espagne, France, Grèce, Irlande, Israël, Italie, Norvège, Roumanie et Royaume-Uni) avec dix-neuf partenaires. Coordonnées par le Scotland's Rural College (SRUC), au Royaume-Uni, ses actions ont débuté en septembre 2020 et s'achèveront en août 2025. Les objectifs du projet sont donc de concevoir des technologies innovantes et peu coûteuses, utiles pour les éleveurs de petits ruminants dans la gestion du bien-être au sein de leurs troupeaux.

(1) *Integrating innovative TECHnologies along the value Chain to improve small ruminant welfARE management.*

CÔTÉ WEB
- Site du projet en français : techcare-project.eu/francais/
- Chaine YouTube : youtube.com/@techcareproject5398
- Facebook : facebook.com/TechCareproject

22 Bien-être animal et outils prometteurs

23 Essais en fermes pilotes de technolgies innovantes

26 Tests à plus grande échelle chez les éleveurs

28 Applications innovatrices pour alerter l'éleveur

31 Indicateurs du bien-être animal quantifiables

20 | RÉUSSIR PÂTRE n° 726 juillet-août 2025

NEUF PARTENAIRES EUROPÉENS POUR LE BIEN-ÊTRE ANIMAL

TechCare réunit neuf pays représentant la diversité des systèmes de production de petits ruminants et de conditions climatiques en Europe : la production ovine allaitante de l'Europe du Nord, avec des conditions de pâturage à l'herbe assez difficiles et en extérieur (Norvège, Royaume-Uni, Irlande), les ovins viande en zone méditerranéenne (Espagne, France, Israël), les ovins laitiers en Europe continentale (Roumanie) et méditerranéenne (Espagne, France et Italie) et la production caprine laitière en Méditerranée (Espagne, Grèce) et dans le Nord (Norvège) ; à la fois dans des systèmes très extensifs ou plus intensifs en engraissement en bâtiment. Les partenaires viennent du secteur de la recherche (France, Écosse, Grèce, Irlande, Espagne, Roumanie, Italie et Israël), mais aussi de l'industrie (Royaume-Uni, Israël, Italie, France), des organismes d'éleveurs (France, Espagne), et une organisation non gouvernementale (ONG) italienne.

Les neuf pays formant le consortium TechCare participent via différents types d'organismes pour les filières ovines lait et viande et caprine

L'élevage de précision est largement adopté par les éleveurs bovins (davantage en production laitière) ou par les éleveurs de monogastriques (porcs, volailles), mais ce n'est pas le cas des petits ruminants, ou des systèmes plus extensifs. Pourtant, ces types de production pourraient bénéficier grandement des avantages que l'élevage de précision pourrait apporter en matière de bien-être animal, de productivité et de conditions de travail.

Les objectifs du projet TechCare sont d'identifier, tester ou concevoir des technologies innovantes et peu coûteuses, utiles pour les éleveurs de petits ruminants (ovins lait, viande et caprins lait) afin de leur permettre d'améliorer la gestion du bien-être au sein de leurs troupeaux. Les technologies doivent être adaptées aux méthodes de production des petits ruminants, et pouvoir couvrir toute la chaîne de production (y compris le transport), et, si possible, produire des systèmes d'alerte adaptés.

DES TECHNOLOGIES TESTÉES

Le projet comprend cinq grandes étapes, qui vont être d'identifier et prioriser les facteurs de risque du bien-être animal par pays et filière. Vient ensuite l'identification et la priorisation des technologies potentiellement intéressantes pour gérer ces facteurs de risque, par pays et filière. Ces technologies (existantes ou nouvelles - prototypes) ont été testées dans des fermes pilotes et différentes conditions d'élevage, cela permettant de valider les technologies les plus prometteuses à grande échelle chez des éleveurs intéressés, dans les trois filières. Enfin, TechCare a développé des approches innovantes afin de créer des alertes liées à ces technologies pour les éleveurs. Un des objectifs était aussi de s'assurer que les choix stratégiques du projet coïncident avec les attentes et besoins des éleveurs et des filières. C'est pourquoi dès le départ, le consortium a mis en place dans chaque pays des ateliers et a réuni des groupes d'acteurs pour leur présenter le projet, les informer régulièrement de ses avancées, les consulter et solliciter leurs avis lors d'ateliers de discussion. Cette démarche multi-acteurs est au centre du projet, afin de s'assurer de sa pertinence et de son impact.

UNE DIVERSITÉ DE COMPÉTENCES

Le consortium TechCare rassemble une diversité de compétences et d'expertises nécessaires pour réaliser le travail, et les participants se complètent mutuellement et construisent ensemble une équipe de projet pluridisciplinaire avec une grande expérience dans les projets européens et la collaboration internationale. Les expertises du consortium reposent tout d'abord sur le bien-être animal, en particulier celui des petits ruminants, et les nouvelles technologies. Le consortium s'est également intéressé aux actions d'innovation (prototypage, test, démonstration, expérimentation, validation de produit à grande échelle et réplication sur le marché) dans divers environnements opérationnels, l'application de la science des données pour développer des systèmes d'alerte précoce afin d'améliorer la gestion du bien-être animal, et enfin, l'engagement auprès des éleveurs et des filières.

Germain Tesnière (Idele), Noémie Litalien (CNBL) et Claire Morgan-Davies (SRUC)

Les expertises du consortium reposent tout d'abord sur le bien-être animal

n° 726 juillet-août 2025 | RÉUSSIR PÂTRE | 21

TechCare Partner Team: PageUp

Page Up is a French SME specialized in Mobile solutions development, including mobile applications and web platforms. It involves high level skills in developments, UX/UI designs, maintenance and projects management. Some of our projects also need to interact with external devices, or even with embedded device. We then have a team able to integrate barcode scanners, bluetooth or I/O boards into smartphones and other mobile devices.

Page Up is mainly working in the following sectors:

- Assets traceability: working with the most important delivery companies in France, Page Up is a specialist of real-time data collection and transmission with several thousands of terminals deployed on field.
- Agricultural: Page Up is working the several institutional teams on Agricultural projects, all of them including animal identification using LF and UHF technologies. Our integration skills allow us to develop innovative platforms such as our RFID-enabled weighing and notebook platform.

Public transportation: Available in several cities in France, Page Up is also developing a generic solution for tickets controls and verbalization support for public transport companies.

Role in the project - Page Up brings to the project two main expertise:

- RFID UHF applied to animals: Our long-term work with our partners Datamars and Institut de l'élevage testing and deploying UHF tags and readers to sheep farms using our home-made UHF box and its sample app. We helped answering questions about reading locations, antennas count and position, reading field…
- Software development: We worked with our teams on software development, including mobile & web solution and low-level data collection system.

Short profile of the team involved in the TechCare project:

Florian Gimbert, working at Page Up, France, for more than 10 years now. He has a significant background in Software conception and development, very interested and involved in R&D Projects. After his studies in Grenoble university, he joined a big company in RFID technologies and after a few years, he jumped into Page Up adventure, starting as a developer, then as project manager and eventually, as CTO. Florian is mainly responsible of technical concerns but also heavily involved in the teams' management. Within TechCare, he is leading the team developing UHF readers and Cloud platform to provide easy and reliable tools to exploit RFID UHF in welfare management.

TechCare in the news

List of past and upcoming events with TechCare partners attendance.

Event	Date	Location	Partner
←			
Animal Production Conference – AIDA 2025: "THIcare app: an innovative tool for assessing environmental welfare on livestock farms" (G. Caja) "The use of sensors to assess environmental welfare conditions on dairy sheep and goat farms" (A. ElHadi) "The use of automatic scale for the management of dairy sheep and goat farms" (A. ElHadi)	3 – 4 June 2025	Zaragoza, Spain	UAB
Royal Welsh Show SRUC has a stand and will showcase the latest results of the project.	21 - 24 July 2025	Builth Wells, Wales, UK	SRUC
→			
ISAE 58th Congress of the International Society for Applied Ethology	4 – 8 August 2025	Utrecht, The Netherlands	SRUC
76th EAAP Annual Meeting	25 -29 August 2025	Innsbruck, Austria	SRUC, IDELE, UAB, CNBL, UNOTEC, Service Elevage de Confédération Générale de Roquefort
Tech-Ovin IDELE, CNBL and CIIRPO will have a stand to communicate about technologies and an oral presentation during conference: "Individual production data and heat stress: exploring new indicators for managing dairy sheep flocks?"	3 – 4 September 2025	Bellac, France	IDELE, CNBL, CIIRPO

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For more information visit our website:

www.techcare-project.eu

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