

April 21th 2021

Royal Danish Embassy, Japan

DESAMIS Co., Ltd.

NTT TechnoCross Corporation

A Test of AI Driven Cattle Behavior Monitoring System U-motion®

has been completed in Denmark.

SEGES reported U-motion® is useful for detecting heat in cow and getting pregnant cows.

DESAMIS Co.,Ltd. (hereinafter referred to as "DESAMIS"; Headquarters: Aomi, Koto-ku, Tokyo; President and CEO: Koji Seike) and NTT TechnoCross Corporation (hereinafter referred to as "NTT TechnoCross"; Headquarters: Shibaura, Minato-ku, Tokyo; President: Kazuhiko Kushima) have completed a demonstration experiment of the cattle behavior monitoring service "U-motion®", which was conducted jointly with SEGES, an agricultural research institute in the Kingdom of Denmark (hereinafter referred to as "Denmark") (Note 1). As a result, SEGES reported that U-motion® is useful for detecting heat in cow and getting pregnant cows.

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DESAMIS and NTT TechnoCross, together with SEGES, conducted a FarmTest (Note 2) in Denmark in December 2019 to verify the effectiveness of U-motion® for heat and disease alerts. The one-year FarmTest was completed in December 2020, and SEGES reported that the functional accuracy of the U-motion® met certain quality standards. For cows equipped with U-motion®, the accuracy of heat alerts, which detect signs of heat based on behavioral data, was more than 80% (the standard is to meet 75%), and the accuracy of heat alerts for cows that led to pregnancy was 96.5% (the standard is to meet 90%). It was concluded that "U-motion® is effective for obtaining pregnant cows, detecting cows in heat, and performing artificial insemination."

We also conducted interviews with the farmers who participated in the demonstration experiment and obtained the following answers.

- The heat alerts were very accurate and we were also able to detect abortion.
- By checking the U-motion® twice a day, morning and evening, we were able to prevent missing the heat period.
- In addition to the alert function, the ability to visualize the heat period on a graph was very helpful to perform the artificial insemination on appropriate time.
- Acute rumen acidosis (Note 3) and diarrhea were also detected by the disease alert function.

(Note 1) SEGES, a Danish agricultural research organization, is an organization that provides consultation to farmers with the aim of making Danish dairy and agricultural production more efficient and competitive, while taking into consideration the environment, hygiene, and animal welfare.

(Note 2) Among the consultations conducted by SEGES, there is a program called FarmTest, which examines and supports the introduction of new technologies and methods on behalf of farmers.

(Note 3) This is a condition in which the amount of lactic acid and other substances produced in the first stomach

(rumen) of a cow increases and the pH level decreases.

### **Outline of the demonstration experiment**

Period: December 2019 - December 2020

Region: Denmark

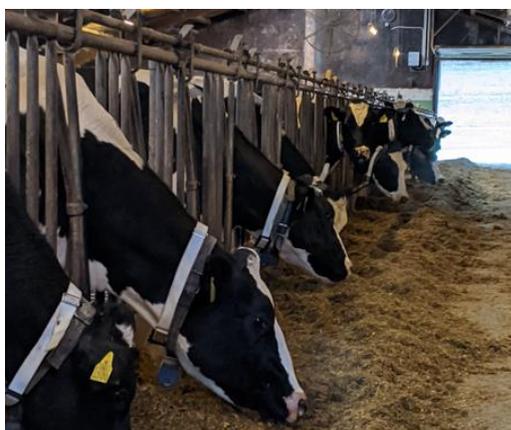
Scale: 655 cows (conducted at three different farms)

Conditions: All Holstein breeds, free stall barns

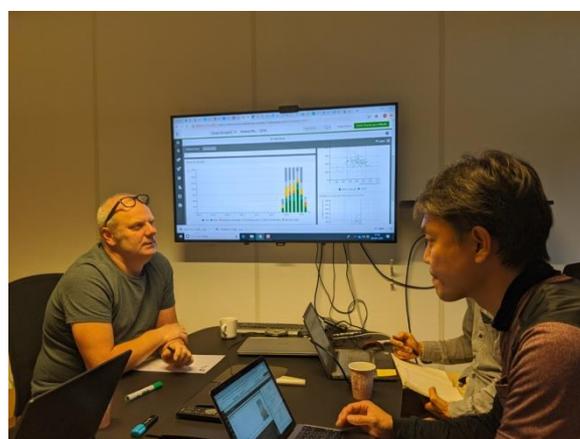
Hypothesis: U-motion detects more than 75% of the expected heats within the period from 40-150 days after calving.

U-motion detects more than 90% of the heats, where an insemination result in a pregnancy.

The proportion of cows with 8-17 days between two heat alarms is less than 5% of the cows.



Herds with U-motion® in FarmTest



Checking U-motion® data

### **Future Plan**

The effectiveness of U-motion® has been recognized in Denmark through this FarmTest, and have received many comments from SEGES and farmers, saying that it is useful for detecting heat and disease. DESAMIS and NTT TechnoCross plan to expand U-motion® to Europe and other regions.

### **About U-motion®**

U-motion® is a service that monitors the behavior of cattle in real time. The sensor attached to the cow collects behavioral data such as feeding, drinking, standing, lying, walking, and ruminating for 24 hours a day. Even in situations where there is not enough time for observation, the system supports farm management by detecting signs of heat and health conditions through artificial intelligence analysis of the huge amount of data accumulated.

\*"U-motion®" is a registered trademark of DESAMIS CO.,LTD.

\*The cattle behavior analysis technology used in "U-motion®" is one of the technologies that consist of the NTT Group's AI "corevo®".

\*"corevo®" is a registered trademark of Nippon Telegraph and Telephone Corporation.

(<https://www.ntt.co.jp/corevo/>)

\* Company and product names mentioned in this document are trademarks or registered trademarks of respective companies or organizations.

### **Royal Danish Embassy**

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### **DESAMIS Co.,Ltd.**

DESAMIS provides IoT and consulting business for livestock, mainly the cattle behavior monitoring system "U-motion®". By providing technology to farmers and consulting service based on the data, we will solve management issues and revolutionize agriculture from Japan to the world. (<https://www.desamis.co.jp/en>)

### **NTT TechnoCross Corporation**

NTT TechnoCross creates optimal solutions for customers' business scenes by combining the cutting-edge technologies of NTT Laboratories at its core with superior commercial products from Japan and overseas based on its extensive experience and know-how. We will continue to contribute to the realization of a prosperous future society with solutions that are ahead of their time. (<https://www.ntt-tx.com/>)

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