Specifications
Instruments:
Rumination and Activity Monitoring System

GENERAL INFORMATION

1.0 <u>Scope of Work</u>:

- The Dairy Forage Research Unit requires the purchase of 48 pedometers and 48 halters for activity and behavior monitoring for ruminant research.

2.0 <u>Background</u>:

- These halters and pedometers are part of an automated system for activity and behavior monitoring of ruminants for research. The equipment is optimal for research due to it specificity, giving per-minute data, compared to neck-mounted accelerometers that provide summed behavior over an hour or more basis, depending on the system. The equipment has the additional ability to identify feeding behaviors that have not been evaluated as extensively in relation to confinement dairy cattle emission research. The collars evaluate eating minutes, rumination minutes, drinking minutes, minutes chewing per bolus in a timeseries fashion. The data collected will be used for routine evaluation of behavior in dairy cattle research in the Dairy Forage Research Unit. Additionally, the data from the collars will be used to evaluate if emissions can be predicted from feeding behavior measurements or other opportunities for reducing emissions and improving animal health and productivity using feeding behavior data. The information will be part of the data inputting to improve precision nutrition practices on-farm.

- Future experiments that will require this equipment include:
    - Identify feeding behaviors and activity related to methane emissions and nitrogen excretion
    - Feeding behaviors versus cow milk production and composition
    - Feeding behaviors and forage properties – nutrient composition, digestibility
    - Diurnal feeding behaviors and rumination patterns related to partial mixed ration research
    - Feeding behaviors versus milking frequency and productivity on automatic milking systems

CONTRACTOR REQUIREMENTS

3.0 Technical Requirements/Tasks:

Technical Specifications that best meet our needs

- Must provide specific, per-minute data for research dairy cattle
- Must effectively obtain ingestive and rumination behaviors
- Must effectively obtain drinking versus eating behavior
- Must provide detailed analysis of lying, standing, walking and lameness behavior
- Must provide pressure, acceleration and temperature sensing
- Must capture high-resolution raw data logging and real-time analysis at 10 Hertz resolution,
- Must provide full raw data accessibility via built-in storage device
- Must provide wireless transmission of behavior summaries
- Must provide options for user-defined post-processing of measured data

4.0 Government Furnished: N/A

5.0 Deliverables / Schedule:

To be delivered as soon as possible from date of order.

6.0 Travel: N/A

7.0 Contractor's Key Personnel: N/A

8.0 Security Requirements: N/A

9.0 Data Rights: N/A

10.0 Section 508 – Electronic and Information Technology Standards: N/A