

Time for Technology

Where is Bessie and Where has she been?

Jack Rodenburg, DairyLogix



In recent years declining cost and increasing capabilities of video technology have resulted in some wonderful spin off benefits for the dairy industry. Small inexpensive cameras, mounted under the roof, able to rotate 360 degrees and zoom in with sufficient clarity to read an ear tag in the far corner of the barn are a common sight in today's freestall barns. Remote observation is valuable today, and as we adopt other labour saving technologies, it will become ever more important. Automation means less time in the barn and that also means less direct observation of cows, making cameras or other systems for monitoring behaviour absolutely essential.

Most camera systems have wired or wireless connections to TV sets in the farm home and office. While "gazing into the maternity pen" may not seem like the most exciting thing to do in the bedroom, on a cold and stormy night it sure beats getting out of bed and going to the barn to physically check on that calving cow. As an illustration of how far this technology has come, take a look on the net at www.roboticdairy.com/cameras.htm#. Here you can monitor Max and Evelyn Warren's robotic milking shed. Best to check at night though because during Canadian daylight hours it's pretty dark in this unlit shed in Winnindoo, Australia!

And that illustrates an important point for anyone installing a camera system in a new or existing barn. Although today's cameras can provide quite impressive picture quality in low light conditions, to my knowledge they cannot see in the dark. In barns areas you want to monitor on a 24 hour basis, you will need to plan the lighting system so that there is just enough low intensity light for good observation during periods of darkness. The camera that can look through or around a concrete wall is also yet to be invented. In new barn construction, consider using fewer concrete walls, and keeping them lower, especially in close up and maternity areas. In existing barns, it may be better to pay for two cameras than suffer the frustration of not being able to see what is happening.

Those of us interested in cow behaviour have also learned a great deal from camera systems, particularly when they are attached to time lapse video recorders. Likely every farmer in Ontario has been entertained and enlightened by Dr. Neil Anderson's videos of "high speed" cows interacting with stalls, mangers, water troughs and with each other. In research studies,

these videos have given us a much better understanding of the cow's time budget. Today we understand the need for 14 hours of rest, 6 hours at the feed bunk and some opportunity for grooming and socializing and we have a much clearer picture of what kind of facilities make these goals achievable. We have also learned how valuable behaviour monitoring can be in improving health, and productivity. But current technologies don't give us a practical system to monitor cow behaviour on an ongoing basis. Time lapse video is fun to watch in a producer meeting, accompanied by Dr. Anderson's witty commentary, but it is far too tedious and labour intensive for routine behaviour monitoring.

Enter several companies that are developing "positioning" technologies that can provide real time data about any moving object, including a dairy cow. These systems can also tell you where a cow is right now, and in larger robotic milking herds, where recognizing and locating the cow that has to be fetched for milking is part of the daily work routine this will be valuable information. I recently spent some time with staff of a European company called Abatec (www.abatec-ag.com) that is winning awards for its innovative cow tracking system. Using sophisticated electronics, they can identify the location of any animal at any time and track it using computer software. As is often the case the front line market for these new tools is not the dairy farm. This company has extensive experience using this technology in motor sports, locating racing vehicles, measuring their speed and changes in speed in real time, and instantly directing camera systems to points of interest along the track based on these measurements). They also use it in soccer and speed skating, including incorporation of heart and respiration rate data with motion analysis and field location. With transponders the size of a cigarette pack (mostly battery) mounted on each animal, 4 stationary readers, 3 in a plane and a fourth at a different height, and a computer with special software, this system can position livestock in a free span open barn space of any size or in a square field up to 10 hectares with an accuracy within 10 cm. Hence they can distinguish between standing and lying cows and perhaps even identify a mounting cow from her higher than normal head position. Real-time tracking can be displayed as linear movement in time or as a measurement of time spent in specified areas such as a freestall, at the feed manger or in a specified area of the barn. Such a system will be very valuable in animal behaviour research, and will eventually have practical application in monitoring cows on commercial dairy farms as well. The biggest technical limitation I saw on this system was the need to change batteries and recharge them on a charger every three or four days. Current cost estimated at CAN\$150,000 for a system with 50 collars is prohibitive for commercial applications but well worthwhile for research settings.

Manufactured en mass, the actual components of such a system do not have to be very expensive. Since there appear to be widespread applications outside agriculture, it is likely that prices will come down fairly quickly. If such a system becomes cost effective in future it can be used to locate individual cows for fetching long milking interval cows in robotic herds. It can

also be used to identify abnormal behaviour such as failure to go to the feed bunk or abnormal lying times, for both individual cows and for monitoring changes on a group basis. There are likely numerous other management benefits we have not even thought of yet. So while it may seem farfetched today, twenty years from now your computer may be able to locate Bessie for you with a single keystroke. And before you go and look her up, lying in the fourth stall from the end in the middle row, you can print her time budget and a barn map tracking her movements in the last 24 hours as well.