



Using drones to improve estimates of dairy pasture and crop yields

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Estimating pasture and crop yield on-farm is time consuming using our current methods. We have pasture rulers, rising plate meters and even more elaborate pasture meters mounted on ATV's. However, they all rely on farmers to walk or drive across paddocks to take multiple measurements to estimate forage yield.

At the Gatton Research Dairy, DAF scientists are working on an alternative tool to measure pasture and crop yields using drones that fly over paddocks and take pictures of crops while the user waits for the drone to return. These pictures are then processed using software that first combines them or "stitches" them together like a big map of the pasture or crop photographed.

The software program then goes through a second process called photogrammetry, that produces three dimensional maps that the researchers can assess and determine crop and pastures yields in the paddock. If drone photos are taken pre-and post-grazing, utilisation rates and grazing behaviour can ultimately be assessed using certain calibration equations.

The accuracy of these maps of yield and utilisation are dependent on the quality of the drone's camera and its geo-referencing ability. Geo-referencing describes how the farms location is matched to the GPS co-ordinate system. This is done with a series of GPS referenced ground targets that are visible on the path of the drone (see picture above). In the C4Milk project's

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most recent lucerne grazing experiment, the geo-referencing of treatment plots was calibrated and tested using a number of targets. These targets allow the software to accurately size and position our new map with respect to earth creating accurate pictures, and hence, measure the areas and heights of plots being grazed.

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DAF scientists are hopeful of refining this technology in the next 10 months for the use in future experiments to measure pre-

and post-grazing height and accurately determine pasture consumption. This technology could have other applications on-farm such as estimating crop yield for silage production, measuring feed inventories in paddocks, and determining land topography for irrigation and erosion prevention. ■

