

TECHNOLOGY'S ROLE IN LEAST-COST COTTON SYSTEMS

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Abstract

The use of the global positioning system and inertial navigation system GPS/INS for auto-steering of tractors and other agricultural vehicles was introduced to California's San Joaquin growers during the 2000 crop season. Many growers are successfully utilizing this new technology to reduce capital expenditures and variable input costs.

Introduction

As government crop subsidy payments are being minimized, growers competing in the global world cotton market must continue to find ways to improve the return on investment and net margins to survive. The GPS technology introduced to agriculture through the use of the Department of Defense GPS satellite system has come on the scene this year in the Central Valley of California in the form of semi-robotic tractors.

Discussion

These agricultural vehicles are now capable of receiving sub-inch differential global positioning system (DGPS) signal from base stations located on or near the growers' fields. These tractors can be operated without marker arm devices day, night, and in foggy conditions. Growers can now accomplish one of the primary operations of listing the seedbeds with sub-inch accuracy, without actually driving the tractor down the row during the operation. One of the greatest benefits of this technology is the reduced number of tractors and equipment required because of the enhanced day and night capability. Growers are also realizing a twenty-five to thirty-five percent increase in operating efficiency from this newly retrofitted GPS/INS guided tractor. Growers have documented increased ground speed and equipment width; reduced fuel and fuel related emissions, labor hours per acre, tractor hours per acre, number of passes in the field and related field compaction, and overall time to complete the required operations during the very critical fall period. Growers are adopting the improved accuracy with a changed mind set of actually cultivating and harvesting across the guess rows. This capability improves growers' ability to utilize the horsepower of the tractor fleet to the greatest ability and efficiency by not having the guess row width as a limiting constraint. Many farming operations like listing, incorporating, planting, cultivating, applying band applications of herbicide and pesticides, and harvesting across the guess row can be done with improved efficiency and reduced input costs.

Summary

The challenge to survive the cost/price squeeze in cotton production may have a light at the end of the season with this new technology. At least many growers in California have been pleasantly encouraged with the newfound capabilities and payback of the technology in less than one season.