



TAPPING TECHNOLOGY FOR SMART AGRICULTURE

From plant planning to growth based harvesting, connected through smart agriculture systems and digital twins

CONNECTED SEED TRIALS AND MARKET-BASED E-COMMERCE SOLUTION FOR QUALITY CHECKS, GROWTH MONITORING, AND QUICKER TIME-TO-MARKET OF HARVESTED CROPS.

Problem Statement

The agricultural industry has very different technological needs than other industry sectors, mainly because it deals with 'live material'. An iterative or agile approach to this material can be complex, as there is very little room to action corrective measures during live seed trials and other trial-oriented planning processes. This has created the need for IoT, analytics, and digital twin based solutions to provide real-time support for agri-processing industries and innovative producers. This is so that they can support global objectives such as hunger management, predictability, carbon dioxide emission, and other population-related challenges.

Our client, a global provider of agricultural science and technology for seeds and crop protection products, wanted to resolve core issues such as low yield in seed trials due to lack of intelligence on highly consumed crops like soya, corn, and more. They required an end-to-end solution with digital twin solution to address all their processes, right from nursery operations and confirmatory trial planning to qualifying new varieties of crops and seeds to be beneficiary for producers and thereby, all consumers.

HARMAN understands the need to conduct the seed trial processes in a way that planning, readiness, and processing of the seeds is done at the right time to maintain their genome status. Further, we also understand the needs of providers to contract suitable farm plots for maximum planting coverage, actively track the growth of plants, and harvest them for suitable outcomes.

Enabling smart planning and monitoring of field practices and seed processing with design-led thinking

HARMAN created a Farm-to-Command-Center solution with a design-led thinking approach that covered the end-to-end process of seed trials, backed by HARMAN expertise in digital twin technology for automated seed processing line (APL) and smart field practices.

This resulted in improved operational efficiency, reduced downtime, and enhanced asset utilization.

The smart agricultural solution landscape was executed in two phases -

Phase 1 : Setting the foundation

A three-step approach was followed, including building an agri IoT core platform on AWS and a digital twin platform to automate processing lines located across nine locations in North and South of America. Finally, a consolidated dashboard to show live status of seeds at different processing stages, machine health, and CXO-level view of plant locations in real-time was also built. Moreover, these platforms provided administrative and user-level functionality that could be managed and maintained by both business users and machine operators.



This helped them take corrective measures with the right information at the right time. The solution transformed the client's overall remote operations to become both seamless and standardized.

Phase 2: Analytics

In order to make timely decisions on machine and process statuses, HARMAN added the analytics component at edge while complying with all OT cybersecurity norms and guidelines. Further, time series data was collected and analyzed on cloud with the help of configurable business policies. This helped meet key objectives like effective seed trial management, machine and process productivity, and saving loss of material, time and cost.



Benefits

Transforming the future of farming with end-to-end management of seed trials

Due to the perishable nature of the commodities in the agricultural business, time is of utmost value when making process-related decisions during seed trials and its lifecycle, or the business ends up having to wait for the next season to bring the same to the market.

HARMAN created an end-to-end solution along that addressed geospatial data and statistics, GIS, genome analytics, phenotyping, image processing, weather, water, soil, and market-based sensing. It linked enablers to give the client complete view and control of their seed trial process, from plant planning to market-linked and growth-based crop harvesting. HARMAN also provided experience roadmaps to cover solution areas like smart field practice with digital twins that cover the lifecycle of the seed trials.

With this solution, seed trial management and market-linked crop e-commerce was made more:



Technology-led



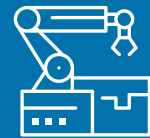
Timely



Productive



Standardised



Automated

HARMAN smart field practice solution helped the client reduce their operational costs by 15% and improve their asset utilization by 25%. The foundation was further extended to implement the rest of the solution blocks on-field, where the outcome of APL lines in seeds could be planted, monitored, and harvested effectively.

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