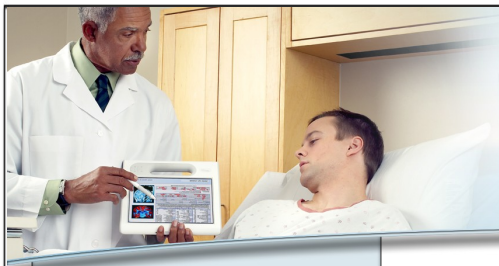

White Paper

Motion Computing®

MERCK

Pharmaceutical Company Projects Over $1 Million in Annual Lab Savings with the Motion C5

Overview

Region: International
Industry: Pharmaceutical Research and Healthcare

Customer Profile
Established in 1891, Merck develops, manufactures and markets vaccines and medicines for both human and animal use.

Business Situation
Faced with mountains of waste, stacks of paper and hundreds of hours lost to inefficiencies in the lab, Merck sought a solution that would both improve data collection methods and effectively reduce paper and other waste materials.

Solution
Merck concluded the Motion C5 MCA could provide significant reductions in process analysis and protocol approval time, and potentially save the company millions of dollars annually by enabling them to redeploy many full-time employees onto other valuable projects.

Benefits and Results

- Reduced waste
- Sealed case for easy disinfecting and cleaning
- Integrated RFID and barcode readers
- Built-in Camera and Wi-Fi
- Estimated $1M+ in annual savings
- Reduced cycle times

"The integration of the C5 with the electronic notebook was a successful proof-of-concept experiment. Scientists had more time to focus on value added work in labs and data integrity and document sensitivity compliance increased. Records became 100 percent electronic, promoting full ELN adoption."

MRL-IT Innovation Team, Merck & Co.

The Merck Research Lab's Information Technology (MRL-IT) Innovation team in West Point, Pennsylvania was tasked with evaluating the Motion Computing C5 Mobile Clinical Assistant (MCA) for the Merck Biochemistry and Pharmacology labs. Their goal was to find a solution that would improve the way the labs collected data at their work benches.

MRL-IT Technology Innovation members and Motion worked together to develop an experiment to test the notion that a mobile convergence device will lead to increased productivity and workflow optimizations, while reducing waste when deployed in the research laboratory environment. In the end, the MRL-IT Innovation Technology Team concluded the Motion C5 MCA could provide significant reductions in process analysis and protocol approval time, and potentially save the company millions of dollars annually by enabling them to redeploy many employees onto other valuable projects.

This paper describes the lab challenges addressed by the Motion C5 MCA, as it showed the ability to save time and money by eliminating paper-based processes and providing numerous previously unavailable capabilities.

"The MRL-IT team calculated a potential savings in excess of $1 million"

About MRL-IT Technology Innovation

MRL-IT Technology Innovation team is a new group within Merck Research Lab's Information Technology organization. As part of one of the world's most innovative pharmaceutical companies, the MRL-IT Innovation team is responsible for exploring new technologies for improving Merck's products and services. When addressing business problems, the team considers both internally and externally developed advancements after first identifying business issues and examining current workflows. The team then presents the most suitable technology for resolution.

Workflow Challenges

Before the MRL-IT Technology Innovation experiment, the Merck Biochemistry and Pharmacology labs relied heavily on paper-based workflows. Protocols were printed and carried into the labs. Researchers performed experiments, made notations on paper printouts, and later manually input information into the ELN. The process was time consuming, and all required calculations were done manually.

The MRL-IT Innovation team wanted to determine if the C5 would increase productivity and optimize workflows in the research environment. Initially the team tested select users through time trials to develop baselines for evaluating productivity gains. Users then received the C5s and the wireless network was installed. After the test period the time study was repeated and updated metrics and process changes were noted. Finally, the team conducted user surveys for additional data.

Mobility and Flexibility

The converged PC tablet option selected by the MRL IT Technology Innovation group, the Motion C5 MCA is specifically designed to meet the demands of the healthcare and clinical markets. The mobile device features a sure-grip handle, a sealed case for easy cleaning and disinfecting, a lightweight design (3.1lbs) for portability, a 10.4 inch XGA screen for easily viewing information with minimal scrolling, durable construction that minimizes the impact of dropping the device, and pen and stylus input so users can enter text and navigate the software without being tied to a keyboard. Additionally, the C5 includes several advanced features that enable active data capture and usability in the R&D environment, including integrated barcode and RFID readers, an integrated camera, and built-in Wi-Fi* and Bluetooth* for wireless connectivity.

Wireless Network

To access thin client application software from the C5, a wireless network was required. Administrators knew that an efficient wireless setup would be critical to the successful deployment of the mobile devices. The lab configuration, however, presented unique challenges because it differed from a typical office space. Each lab has concrete walls with stainless steel covering. Doors are steel and use wire mesh window frames. The area had scientific equipment that potentially interferes with the wireless setup. In addition, the lab houses test animals and researchers wanted to avoid disrupting them. Finally, researchers needed to maintain their ability to hose off walls and ceilings.

To overcome these restrictions, the MRL-IT Innovation team consulted closely with Motion Mobility Solutions, a group within Motion focused specifically on helping clients maximize mobile workforce productivity. Together, they developed a wireless infrastructure and successfully provided the areas with seamless integration into Merck's standard wireless network.

Experiment Analysis Before the C5

The C5 was tested in two environments: the PCR Experiment Protocol and the Binding Assay Protocol. Both settings depended heavily on paper-based processes and calculations were performed manually. The PCR setting required researchers to print all required protocols from the ELN. Scientists input results back into the ELN while conducting manual paper-based analysis. For the biochemistry binding assay protocol, the process was further complicated, the staff wore gloves, removing them to access the paper reference sheets.

Additionally, the PCR experiment protocol relied on taking photographs. But when researchers were ready to photograph they would leave the bench area to retrieve a camera in one area and film in another., then it took about 30 seconds to develop. Scientists would then scan the photo into a PC via a flatbed scanner. These devices resided on the lab bench and took up considerable space and time.

Experiment Analysis with the C5

With the C5 both experiment protocols experienced significant reductions in paper-based dependencies. When scientists replaced their paper process with the C5, 100 percent of the experiment record was captured in real time and maintained electronically for both protocols. Having ELN access through the complete process improved analysis functions and information

"Using the C5, scientists spent less time referencing protocols and more time at their stations."

access. Having complete access to electronic records increased a researcher's ability to later search for specific information, such as identifying patents, which also led to reduced cycle times. Also, researchers were able to consolidate multiple tools into one device, reducing the need for a printer, scanner, Polaroid camera, film, paper, separate desktop PC, and more.

Using the C5 scientists spent less time referencing protocols and did not need to remove their gloves. Because they had computer access at the lab bench, scientists used the ELN while working, reducing the number of trips to various machines. All records were immediately accessible over the network. Finally, moving to an electronic version of the Contamination Monitoring Report simplified workflows and increased accessibility.

The C5's integrated camera proved highly efficient and streamlined the picture taking process. Previously photographing amplified gels was a multi -step process requiring nine minutes for a single image. Through the deployment of the C5, researchers were able to reduce the manual 12 step process down to just three simple steps. Researchers were able to reduce the time it took to capture and store pictures of amplified gels from nine minutes to just over one minute.

Cost Savings

Overall, the MRL-IT Innovation team examined multiple processes in the biochemistry lab area and concluded an average overall PCR experiment protocol submission time was reduced from two weeks to one day. Additionally, the team calculated that before the C5, researchers spent 32.89 minutes for a typical process, compared to 8.33 minutes with the C5. An average protocol required three to four work months but only two days with the C5. Reducing paper and disposable gloves contributed to a green savings as well, reducing paper by 48,600 sheets per protocol and gloves by 54,000. Overall, the MRL-IT team calculated a potential savings in excess of one million dollars annually, based on these experiments alone.

Results of the C5 with Wireless

The MRL-IT Innovation team's testing of the C5 and supporting wireless network proved the technology improved data collection processes in the test labs. Scientists were able to focus on value-added lab research, inefficient processes were reduced, and protocol submission time decreased. Because the technology promoted 100 percent electronic record utilization, the ELN investment was maximized.

Electronic Lab Notebook (ELN)

The MRL-IT Innovation team concluded the C5's perceived performance was positive, especially when compared with currently deployed platforms. Users found the wireless connection to be consistently reliable. Scientists noted that referencing protocols during experiments was easier and access to the ELN was much faster with the integrated fingerprint reader. The device provided some beneficial new capabilities including wireless mobile access to the ELN within the labs and handwriting to text conversion within protocols. The researchers' note-taking increased because of input ease. Additionally, incorporating photographs into the protocols was significantly faster using the integrated camera.

Overall Conclusions

The MRL-IT Innovation team concluded the integration of the C5 with the electronic notebook was a successful proof-of-concept experiment. Scientists had more time to focus on value added work in labs and data integrity and document sensitivity compliance increased. Records became 100 percent electronic, promoting full ELN adoption. Now, with the labs supporting a standard mobile device, MRL-IT can standardize in a non-standardized environment and retire legacy vendor image lab computers. The team noted the technology created significant process improvements including an over 90 percent reduction in overall ELN protocol submission times, a reduction in wasted time and energy spent walking to networked devices, and improved productivity by more easily storing and searching for important information.

The C5 and wireless network provided instant network access, resulting in significant green savings by eliminating glove, paper, and toner waste. Having the technology at the lab bench enabled a fully electronic record that supported more efficient analysis and easier note taking. Overall, researchers found that the benefits and process improvements achieved using a highly mobile device within the lab workflows could potentially save the lab in excess of $1 million annually by reducing the use of costly materials, and improving productivity which would allow valuable researcher resources to be redeployed onto other projects.