Lockheed Martin's Data Capture System Processes 148 Million Census Forms With Record Speed And Accuracy

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Population data reported recently by the U.S. Census Bureau was captured and processed as quickly and accurately as any Census in history, thanks in part to Lockheed Martin's Data Capture System 2000 (DCS 2000). In what has been termed the largest, most complex data capture project in history, the DCS 2000 read the nation's handwriting from nearly 148 million Census forms, processing the information quickly, effectively, and with an accuracy rate of better than 99 percent.

The DCS 2000 supported the entire Census processing effort, from the time completed forms arrived at processing centers until the final captured data was collected and archived on Census Bureau computers. It used cutting-edge optical character and optical mark recognition technologies to convert the hand-written text on paper forms into digital information that was ready to be compiled and analyzed.

"This was not only the most extensive use of technology to process a Census, it was also the first time the Census has used automated recognition technology to read handwriting. The DCS 2000 helped the Census Bureau capture more data in less time and with greater accuracy than ever before," said Terry Drabant, president of Lockheed Martin Mission Systems.

Census data is indispensable to a variety of government and commercial pursuits. It helps determine where over $100 billion in federal funds are spent, including the placement of new schools, roads, hospitals, libraries, and more. Businesses use Census figures when deciding where to build everything from factories and office buildings to restaurants and supermarkets.

"The Census is really a very important resource for government and citizens alike, so of course it's important that the data be as accurate and complete as possible. That's why we developed not only a highly sophisticated data capture system, but also a world-class quality assurance system," said Richard Taylor, DCS 2000 system architect. "Sometimes forms come in damaged or torn, or they can be accidentally run through the system incorrectly or not at all. We wanted to make sure that every form that came into one of the four national processing centers was scanned and accounted for."

Every Census form has a unique bar code identification. When the forms arrived at the processing centers, each one was scanned and "checked in." Then, as each form passed through the DCS 2000, the captured data was matched to that form's bar code. If the hand written data could not be captured, the system alerted an operator who removed the form to determine the problem. Some forms needed to be keyed by hand, while others just needed to be run through again. Before the forms left the center, each one was scanned once more and "checked out." The computer checked to make sure it had captured all of the data from that particular form. If not, it alerted a human operator who would pull the form and re-run it through the system. In all, 0.8 percent or about 1.2 million of the 148 million forms were re-run through the system to ensure that all of the data was captured off of each form.

The overall Census processing was divided into two "passes." The first pass captured the basic data needed for apportionment, while the second pass captured more detailed social and economic data.

During the first pass, the DCS 2000's accuracy rate for the critical optical mark recognition (OMR) was 99.89 percent, well above the 99 percent standard established by the Census. For optical character recognition (OCR), the system boasted a 99.4 percent accuracy rating, again far exceeding the 98 percent requirement. The second pass resulted in 99.88 percent accuracy for OMR, and 99.7 percent for OCR. The accuracy rates for manual keying of data were greater than 97.6 percent, once again above the 96.5 percent goal.

The system's accuracy also led to significant cost savings. "This system is so dependable and efficient, we reduced the number of human operators needed to support manual keying by as much as 75 percent," said Taylor. "That reduced our customer's labor costs substantially."

A leader in mission critical systems integration and information operations, Lockheed Martin Mission Systems serves U.S. and international defense and civil government agencies. Mission Systems employs about 2,600 at major facilities in Gaithersburg, Md., Colorado Springs, Colo., and Santa Maria, Calif., and is a business unit of

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