LAWRENCE
LIVERMORE
NATIONAL
LABORATORY

LLNL-TR-746382

Video Compression Routines Final Report CRADA No. TSB-1183-95

C. Y. Fu, J. E. Tope

February 15, 2018

Disclaimer

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Video Compression Routines

Project Accomplishments Summary
CRADA No. TSB-1183-95

Date: February 24, 1999 Revision: 1

A. Parties

The project was a relationship between the Lawrence Livermore National Laboratory (LLNL) and Nova Management, Inc.

University of California
Lawrence Livermore National Laboratory
7000 East Avenue, L-795
Livermore, CA 94550

NOVA Management, Inc.
400 Camino Agujito
Monterey, CA 93940

B. Background

The purpose of this CRADA was to establish a framework for LLNL and NOVA Management, Inc. to cooperatively develop video compression routines to be used to condense maintenance documentation provided on computers issued to Army mechanics to help them diagnose and repair equipment faults. In the past, paper technical manuals were the only means of communicating fault isolation, diagnostics, and repair action information to maintenance personnel. The need for this information was at the weapon system itself as well as at the maintenance depot.

This project addressed the need for a means of efficient storage and retrieval of video (bandwidth issue) by maintenance personnel as they moved through the diagnostic procedures.

Several research and development projects have employed interactive stored video as a means of providing maintenance information to the soldier. The problem with this approach was the massive data storage requirement.

The SBIR solicitation topic "Video Compression Routines" sought potential new routines and techniques for use on the Army Contact Test Set (CTS) III computer. NOVA Management was awarded an SBIR grant to do research on this topic. If this project was successful, the Army would be relieved of the burden of carrying and using large quantities of paper maintenance manuals.

NOVA Management, Inc. had assessed what was available in physical storage device technology as well as the state of video and sound compressing techniques and found

that the Lawrence Livermore National Laboratory was the recognized leader in this software technology. LLNL developed methodologies in connection with their weapons work that had direct application to the Army data compression problem. Because of that and because the Government was encouraging the transfer of defense related technology to industry, NOVA Management requested support from LLNL on this project.

C. Description

The overall objective of the project was to develop fast decompression and playback routines for full motion, color video. A survey was done of existing standards and potential new routines and techniques for video compression and playback to determine which were suitable for use on the CTS. Playback speeds were preferred to be at 30 frames per second on the target architecture. Compression ratios were expected to store several minutes of synchronized video in 1 MB. Playback routines were Windows 3.1 compatible. Identification of any hardware upgrades associated with playback were made when necessary. A demonstration of existing LLNL algorithms for still frame decompression which represented a current benchmark of data compression performance was completed.

NOVA Management and LLNL used some of the compression technologies developed or currently being developed at LLNL to address the requirements of this SBIR. LLNL started by evaluating current compression technologies or combinations thereof to estimate the best compression ratio LLNL could achieve at this stage. LLNL ported some of our software from the SUN workstation environment to the PC or equivalent environment (e.g., MAC) so as to closely match the computer environment suggested by the Army. Finally, LLNL designed and outlined new algorithms to meet the desired video compression of CTS.

The responsibilities between the Lab and its partner were divided in the following manner:

1) LLNL was responsible for the development of the video compression/decompression routines.

2) NOVA Management was responsible for the design of the audio compression and the necessary window interface.

D. Expected Economic Impact

The Industrial Partner: The immediate benefit to the small business was the establishment of a foundation for developing a prototype compression and playback system that can be used by the Army for equipment maintenance. The compression technology, when commercialized would give NOVA Management a new product that would give them a unique niche in the marketplace.

The U.S. Economy: This technology would make interactive video possible for on site combat vehicle maintenance. This would reduce maintenance time and errors. The technology also had wide application in interactive commercial television and the Information Super Highway.

E. Benefits to DOE

This project enhanced the Laboratory's competency in image compression/decompression techniques which were important for a variety of weapon-related projects and programs including ADAPT and ASCI.

F. Industry Area

Video Compression

G. Project Status

The six-month project was completed in February 1996.

H. LLNL Point of Contact for Project Information

Chi Yung Fu
Phone: 925-423-1175
Fax: 925-422-7309
Email: fu1@llnl.gov
Mailcode: L-271

I. Company Size and Point(s) of Contact

Company annual sales are less than $10 million, and the company employs less than thirty people.

The contact for this small business CRADA is:
John E. Tope
Nova Management, Inc.
400 Camino Agujito
Monterey, CA 93940
Tel: (408) 373-4544
Fax: (408) 373-4517

J. Project Examples

None.

K Subject Inventions

This small value contractual mechanism did not anticipate any generation of Intellectual Property (IP) including subject inventions. To the best of our knowledge no IP was created.

☐ Yes ☒ No _____

If yes, list all IP created under this agreement

L. Release of Information

I certify that all information contained in this report is accurate and releasable to the best of my knowledge.

Karena McKinley, Director
Industrial Partnerships
and Commercialization — Date 2/3/00

RELEASE OF INFORMATION

I have reviewed the attached Project Accomplishment Summary prepared by Lawrence Livermore National Laboratory and agree that the information about our CRADA may be released for external distribution.

John F. Tope, ~~Vice~~ President
Nova Management, Inc. — Date 1/24/00