20 June 1980

MEMORANDUM

From: NSWC/F105 (W. Keiner)
To: MAT04T1 (G. Neumann)

Subj: Assessment of LOGMOD System

Ref: (a) Congressional ltr. from Honorable S. I. Hayakawa and Honorable William E. Dannemeyer of 24 April 1980

1. Reference (a) requests the evaluation of an engineering design and maintenance troubleshooting tool, LOGMOD, developed by Dr. Ralph DePaul of Villa Park, California. An attachment to reference (a) included an evaluation of LOGMOD by an interservice Technical Manual group which recommended that LOGMOD be incorporated into the Joint Logistic Commanders (JLC) Automatic Test Program, chaired by MAT04T.

2. The recommendation was considered by the Testability Task Group at the JLC Program Review on 11 June 1980 at which time Dr. DePaul presented his approach to the group. This was followed by a visit to Villa Park by Phil Writer (NOSC 921) on 18 June for an in-depth technical briefing. In addition, two Air Force personnel, James Saporito (RADC/RBRT) and George Konomos (ASD/AEGB), have received briefings on LOGMOD prior to the JLC meeting. Finally, several attendees outside the Testability Task Group had some previous experience with LOGMOD. A summary of their impressions is included in the following paragraphs.

3. P. Writer was specifically asked to assess the applicability of LOGMOD to Design for Testability requirements. Mr. Writer concluded from the briefing that LOGMOD had significant application as a design tool during early system design phases. In particular,

a. LOGMOD provides guidance toward the optimum placement of test points within a unit. This is extremely useful when the number of connector pins is restricted as is usually the case. LOGMOD identifies redundant or marginally-effective test points for deletion in favor of more effective test points.

b. LOGMOD analyzes the structure of a complex circuit, identifying feedback loops and sneak paths.

c. LOGMOD determines, mathematically, the minimum number of tests required for full fault coverage.

d. LOGMOD develops an optimum test strategy which makes the test generation process (whether manual or automatic) a much simpler task.

e. LOGMOD is applicable to digital and analog electronics, mechanical systems, etc. LOGMOD is particularly good for electromechanical systems.

4. Mr. Tillmann Chu, Code 38310, NAVAIR Engineering Support Office (NESO), North Island has awarded a contract to Dr. DePaul to evaluate a Shop Replaceable Assembly (SRA) used in the E-2C aircraft avionics. The SRA contains both analog and digital circuitry and is supported by an existing test program. Dr. DePaul submitted his LOGMOD analysis to NESO on 19 June 1980 which included the following major points:

a. LOGMOD identified several components within the SRA which the existing test program did not test at all.

b. LOGMOD indicated that much better fault resolution could be achieved than is provided by the existing test program.

c. A partial test program was derived from the LOGMOD analysis (computer listings) and used to demonstrate a successful troubleshooting procedure on the SRA using the DETEX Test Set.

d. NESO may contract DETEX to evaluate a larger unit, a VAST Building Block (number 26, function generator).

e. Mr. Chu feels that the analysis data provided by LOGMOD is sufficient to direct a Test Program Set (TPS) contractor to produce a comprehensive and efficient program.

5. Paul Giordano, of Giordano Associates, has had dealings with Dr. DePaul over the years, primarily in the area of documentation automation. In addition to Giordano, two other points of contact in maintenance manual automation are:

William Andre
US Army Research and Technology Lab Moffett
Field, California

S. C. Rainey
David Taylor Naval Ship Research and Development Center
Carderock, Maryland

Mr. Giordano believes that the biggest potential for LOGM0D lies in the area of Analog Automatic Test Program Generation (AATPG). The Air Force (G. Konomos) will be initiating a comprehensive AATPG project shortly and is aware of LOGMOD and is aware of its potential in this area.

6. Frank Refalo, Lockheed, is currently evaluating the use of LOGMOD on equipment in the Navy FBM program. The assessment is not complete but Mr. Refalo is optimistic that LOGMOD will prove useful. Mr. Refalo sees the disciplined design enforced by LOGMOD as a important positive factor.

7 James Saporito, RADC, is the point of contact for JLC subtask 30304, Testability Improvement Program, and is supportive of the LOGMOD approach. (The interservice Technical Manual Group in reference (a) specifically-recommended that LOGMOD be evaluated through the Testability Improvement Program.) Mr. Saporito is agreeable to supporting LOGMOD evaluation under subtask 30304.

8. In summary, all of the people contacted reported good experience with LOGMOD or felt that it had good potential in several testability areas. It is recommended that the LOGMOD approach be integrated into JLC tasks 302 and 303 and its evaluation be continued in the context of being a part of those existing programs.

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Congress of the United States
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Washington, D.C. 20515

April 24, 1980

Mr. George Neuman
Chairman, Joint Logistics Comnand,
Automatic Testing Panel
Headquarters, Naval Material Comnand
Crystal Plaza (CP-5), Roan 654
2211 Jefferson Davis Highway
Arlington, VA 20360

Dear Mr. Neuman:

We understand that you will chair a panel to "further assess the merits of LOGMOD," a system for designing and troubleshooting high technology hardware as developed by Dr. Ralph DePaul who lives in the 39th Congressional District.

Dr. DePaul was pleased with the recent final report frail the Air Force which states, "(LOGMOD methodology) offers an opportunity to perform accurate condition diagnosis and troubleshooting in a way that is not limited by the size and complexity of the system.... this method can provide substantial savings in both cost and time compared to other less flexible approaches." While the findings in the report are favorable, Dr. DePaul is concerned that further evaluation not be duplicative but progress toward an appropriate opportunity to implement the system's full capacity. What do you hope to accomplish that has not been proven by previous assessments and applications

We would like to know how your panel intends to approach the LLOGMOD system and by that date you plan to issue any findings. Your assistance in this matter is appreciated.

Sincerely,

S. I. Hayakawa
Hon. S. I. Hayakawa, U.S. Senator

Bill Dannemeyer
Hon. William E. Dannemeyer, Member of Congress

WED:sr
Enclosures
cc: Hon. Jack Edwards