S&T II

BOLT BERANEK AND NEWMAN INC

CONSULTING • DEVELOPMENT • RESEARCH

Report No. 1887

Job 11400

QUARTERLY MANAGEMENT REPORT (final)

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK

PERIOD: 1 July 1969 - 30 September 1969

Principal Investigator: Mr. Frank E. Heart
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Sponsored by
Advanced Research Projects Agency
ARPA Order No. 1260

Contract No. DAHC15-69-C-0179
Effective Date: 2 January 1969
Expiration Date: 28 February 1970
Contract Amount: $1,077,727.00

Submitted to:

Director
Advanced Research Projects Agency
Washington, D.C. 20301

Attn: Dr. L. G. Roberts

BOLT BERANEK AND NEWMAN INC
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10 October 1969

Director
Advanced Research Projects Agency
Washington, D.C. 20301

Sir:

This is the third in a series of management reports that Bolt Beranek and Newman Inc. will submit quarterly to ARPA. The report outlines progress in the development of Interface Message Processors (IMPs) for the ARPA computer network, under Contract Number DAHC15-69-C-0179. Under this contract, BBN is responsible for the design, fabrication, test, and delivery of IMPs to four ARPA sites, and for initial network testing of the resulting four-node test network. Both standard and special design IMP hardware are being supplied by the Honeywell Computer Control Division under subcontract to BBN.

BBN Proposal P70-IST-1 dated 15 July 1969 proposes an extension of our contract to include delivery of IMPs to a total of ten ARPA sites; although this contract has not yet been negotiated, BBN has received authorization and release of funds to initiate hardware procurement. From a technical point of view, BBN is now proceeding on the assumption that this extension will be negotiated.

We are adhering closely to the program plan summarized in BBN Report #1765 and described in detail in BBN Proposal P69-IST-5, Proposal Amendment P69-IST-5A, and Proposal P70-IST-1.

This report covers the period 1 July 1969 - 30 September 1969. Within this period, we have:

1. Accepted delivery from Honeywell of production IMPs 1, 2, and 3. With Honeywell's help, extensive debugging, fault correction, and modification of these units was performed at BBN. In support of this effort, it was necessary for us to improve and extend the capabilities of our hardware test programs.

2. Shipped production IMP No. 1 to UCLA *on time*; the IMP was operational immediately after arrival, and, in cooperation with Honeywell, AT&T, and Host personnel, the Host and modem connections were in full operation within one week.

3. Issued several revisions to BBN Report No. 1822 (the "Host specifications") and worked with Host personnel at several sites.

4. Interacted extensively with AT&T in connection with circuit installations at the sites.

5. Completed an initial version of the operational IMP program and delivered that program with the UCLA IMP. As part of this version of the program, an initial implementation of a statistics measurement program was completed.

6. Studied techniques for failure recovery, and, in particular, placed attention on techniques for loading an IMP program via the network.

7. Continued investigation of a Host/IMP interface capable of driving long cables.

8. Studied the theoretical performance of an IMP, based upon the logic and timing of the current operational program.

After a major delay on production unit No. 1, Honeywell is now delivering IMP units to us on schedule. Unfortunately, a combination of haste and marginal quality control on their part and some continued changes in the design have required intensive BBN efforts on the IMP units after delivery to BBN. We have been trying to obtain an adequate level of Honeywell assistance to relieve this burden and are hoping the situation will improve with subsequent deliveries.

Our first experience with the West Coast 50 kilobit circuit installations was somewhat discouraging since the actual installations did not very closely resemble AT&T's promised design and the circuits were not operational on the scheduled dates. After some difficulty, the circuits became operational; we have been trying to obtain better AT&T cooperation with regard to installation design.

At this time, BBN is planning to deliver the remaining IMPs on schedule.

For the next quarter, we plan to:

1. Deliver IMPs to SRI, UCSB, and Utah and initiate network test operations.

2. Continue software development and test.

3. Formulate detailed plans and subcontract arrangements for IMP deliveries in calendar 1970.

4. Continue investigation of driving long Host cables.

The fiscal status of this contract* to date is:

Amount of contract #DAHC15-69-C-0179 to BBN exclusive of fee -	$ 992,727
Funds committed by BBN including BBN subcontract #25658 -	$ 800,201
Estimated funds required to complete work -	$ 192,526

Very truly yours,

BOLT BERANEK AND NEWMAN INC.

Frank E. Heart

Frank E. Heart, Director
Computer Systems Division

FEH:nlg

*NOTE: Since a contract extension has not yet been negotiated, the fiscal status report does not include funding in supplemental agreement P001, nor do estimated costs to complete include costs related to the delivery of six additional systems proposed.