A History of the ETA-10Q Acceptance Tests at NAS

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This paper will briefly recount the events concerning the two unsuccessful attempts by CDC/ETA to have an ETA-10Q Piper system at NAS pass a 30 Day Acceptance Test. Successful passage would have implied acceptance of the system by the Government as one of the HSP-2 systems, and would have started billing for the system. Both attempts failed; the system was never accepted. A list of key dates relating the Government's involvement with ETA is Attachment 1.

The Pre-shipment test was performed in St. Paul on Wednesday, March 30, 1988. The test was less than what had been called for in the contract, but it was agreed that the details not attended to at that time would be done at the installation test at NAS. The test included native compilation and execution of C code, execution of previously compiled (not natively) Fortran, and communications functionality (telnet and ftp). Attachment 2 is a memo concerning the Pre-shipment test, with details about what was actually demonstrated. The system was delivered to Ames on April 4; the Installation, or Post-shipment test occurred on April 13.

Although the system was unable to perform the contractually required test, it was decided that the appropriate course of action was to proceed with the 30 day acceptance test, with the understanding that any problems with the system would be fully exposed. The first acceptance test started on Thursday, April 14, 1988, as documented in Attachment 3. The system ran very poorly from the start, as the following comments will show. The machine crashed frequently, as is shown in Attachment 4, a log of uptime/downtime for the period of April 14-25. On April 24, for instance, the system crashed 15 times.

The Government found it difficult to construct a Fortran workload to test the system, since there was no native Fortran compiler. In order to obtain an executable for a Fortran program, it was necessary to submit the source to a local CDC/ETA analyst, and have them transfer that source to St. Paul. An ETA employee would then transfer the source to a Cyber 205, where it would be cross-compiled, and the executable would start back to Ames via the same path. This took over a week. A workload of jobs in C was constructed, but that workload was difficult to run because of shortcomings in the shell. All of the shell scripts which had been prepared beforehand by the NAS staff, and debugged to run on any Unix system at NAS, would not run on the ETA system.

The technique for testing the system was to have the executable run, check its results, and then resubmit. The shell was in such bad shape that the scripts written by the analysts prior to arrival of the system would not function. CDC/ETA did offer to compile our Fortran source on their Cyber 205 at St. Paul using their cross-compiler, but did not return running binaries in a timely fashion. NAS constructed a rudimentary workload with a single job written in C doing matrix multiplies. Memory management problems surfaced, and the severity of the difficulties led to to frequent reboots. These problems involved the system losing track of where pages of memory had been swapped out by the virtual memory manager. When this occurred, the wrong pages were swapped back in, and a crash would result. The frequency of crashes of the system was such that at ETA's request the system was considered down on April 25 until further notice, as Attachments 5 and 6 describe.

On April 27 a patch was supplied by CDC/ETA allowing the system to run without crashing, although at a decreased level of performance. Attachment 7 is from ETA/CDC, formally returning the system. On May 6 it was discovered that it was impossible to run any two Fortran jobs simultaneously without crashing the system. The details are described in Attachments 8, 9 and 10. The Government subsequently declared that the system was down because it was unable to run the Government-supplied workload. As a consequence, the system quickly accrued sufficient down time to insure that it had failed its Acceptance Test. This is documented in Attachment 11, a memo sent on May 17, which formally notifies the Contracting Officer that ETA/CDC was in contractual default as a result of not passing the acceptance test. CDC/ETA then requested that they be allowed a second attempt to pass a 30 day acceptance test starting in October, with the system remaining at NAS in the interim, at no cost to the Government. NAS accepted this offer.

On Tuesday, October 4, the second 30 Day Acceptance Test started. Attachment 12 shows that during the first nine days of this test many Fortran codes failed to compile; of those that compiled, many ran very slowly, and of those that completed, many gave incorrect results. A package of documents, Attachment 13, was prepared on October 28 which gives the status of the Test as of that date.

Memory management problems were causing the system to thrash. As an indication of this thrashing, during a representative 8 hour time period with only 3 compute bound jobs on the system, only 6 minutes of CPU time were delivered to these jobs, for instance. Although ETA claimed to install fixes for this problem, subsequent testing always showed the problem to persist, as the November 1 memo, Attachment 14, describes. Although a patch was applied on November 3 which raised the measured user time delivered to 40 minutes per hour, the patch did not change the fact that five of the Fortran codes in the benchmark suite did not run correctly. The conditions of the 30 day acceptance

test required that the system be up for 90% of 30 consecutive days, and that this must be satisfied within 60 days of the start of the test. It accumulated enough downtime by November 14 to make that impossible, for it had accumulated more than 3 days total downtime within the last 30 days of the 60 day window. The system was therefore found to be in default. Attachment 16 is the memo from the COTR to the Contracting Officer formally declaring this default. The system was thrashing so badly that it was unable to complete any of the large memory jobs which were part of the supplied workload.

Even the local CDC/ETA analysts admitted that the system could not perform on large jobs, and that there was no way that the system could run those large memory jobs, given the hardware and software available. The official CDC/ETA stance was to dispute the Government's claim that the system was down, however. On November 15, the Contracting Officer sent a Show Cause Notice to ETA, in Attachment 17, announcing that the Government considered the system to have failed the 30 day acceptance test, and that the contract was in default. CDC/ETA had disputed that the system was down for much of the downtime that the Government claimed, and at the time of the November 15 Show Cause, there was still dispute as to the failure. The amount of undisputed downtime continued to accumulate, however, and by November 21, CDC/ETA had admitted to enough downtime to remove any possible dispute over the failure of the 30 Day Acceptance Test, as Attachment 18 attests.

On November 22, the next phase of the relationship was entered, when ETA requested that the contract be rescinded, in a FAX which is attachment 19. The rescindment was finally signed on January 4, 1989, and is Attachment 20. This ended the contractual relationship of ETA/CDC with NAS. ETA/CDC refused to take the Piper away, despite repeated requests by NAS to do so. After ETA folded on April 17, 1989, no further attempts were made by the vendor to justify keeping the system at NAS. On June 9, it was finally removed.

Attachment 1.

17 FEB 87 RFP issued for HSP-2
4 MAR Pre-proposal Bidders conference
4 MAY Due date for proposals from vendors for HSP-2
11 MAY Extended due date for proposals
15 JUN Source Evaluation Team completes its report
30 JUL SET package complete
24 AUG Source selection of CRI and ETA
30 MAR 88 Pre-shipment test of ETA-10Q in St. Paul
1 APR Contract signed with ETA
4 APR Delivery to NAS
13 APR Post-shipment test
14 APR 30 day acceptance test starts at 8 am.
25 APR System declared down due to memory management problem
27 APR System returned to Test
6 MAY Discovered that 2 Fortran jobs cannot run simultaneously
System declared down by Government
17 MAY 30 day acceptance test discontinued
4 OCT 2nd 30 day acceptance test begun
15 NOV Show Cause memo sent by Contracting Officer to ETA
21 NOV ETA admits uncontested failure of acceptance test
5 JAN 89 Contract with ETA rescinded at ETA's request
17 APR ETA defunct as corporation
9 JUN ETA-10Q removed from NAS by CDC

Table of other Attachments

Attachment 2:
11 APR 88 memo concerning Pre-shipment test
Attachment 3:
14 APR 88 memo from ETA concerning start of Acceptance test.
Attachment 4:
25 APR 88 Running uptime/downtime log for Piper's Acceptance Test.
Attachment 5:
25 APR 88 Memo from ETA removing system from acceptance till further notice.
Attachment 6:
27 APR 88 memo describing status of Acceptance Test to date.
Attachment 7:
27 APR 88 memo from ETA returning Piper to Acceptance Test.
Attachment 8:
4 MAY 88 memo describing difficulties of test.
Attachment 9:
6 MAY 88 memo describing difficulties of test.
Attachment 10:
7 MAY 88 memo describing difficulties of test.
Attachment 11:
17 MAY 88 memo declaring failure of 30 Day Acceptance Test.
Attachment 12:
12 OCT 88 memo on Piper Acceptance Test.
Attachment 13:
28 OCT 88 cover memo and set of documents on status of Acceptance Test.
Attachment 14:
1 NOV 88 memo on memory management problems.
Attachment 15:
7 NOV 88 memo on status of Test.
Attachment 16:
14 NOV 88 memo to Contracting Officer declaring default.
Attachment 17:
15 NOV 88 Show Cause Notice from Contracting Officer to ETA.
Attachment 18:
21 NOV 88 memo announcing that undisputed downtime over 10%, so that ETA no longer disputed default.
Attachment 19:
22 NOV 88 request by ETA to rescind contract.
Attachment 20:
1 JAN 89 Modification to contract rescinding it.