WCO INTER-OFFICE MEMORANDUM

DE90 013469

To: Plans and Budget Office

Revised April 27, 1990

From: Benjamin H. Vine

Subject: FOREIGN TRAVEL TRIP REPORT - DRAFT FOR EDITING

Summary

a. Traveler:

B. H. Vine, Image Tube Design Physicist, Telephone number (617) 935-5564, EG&G Energy Measurements, Woburn CRT Operations (WCO). Traveling with N. S. P. King and M. Wilke of Los Alamo National Laboratory. Date of report March 20, 1990.

b. Dates of trip and destination:

March 5, 1990 B. V. Delft Electronishen Production Company, Roden, Netherlands.

March 7, 1990 Instrument Technology Limited, St. Leonards on Sea, England.

March 9, 1990 Delta Development Company, Peterfield, England

c. Purpose of trip:

One of EG&G's customers is attempting to find a manufacturer to make the 40/30 mm gated image intensifier tube. A request for quotation had been sent out to a number of manufacturers. The tube performance required was not fully defined and the replies, as expected, came back with caveats to cover the areas of uncertainty. The trip was undertaken to discuss the project, to more clearly define the areas of uncertainty and to evaluate the capabilities of the manufacturers.

Comprehensive and detailed report

The 40/30 mm gated intensifier was designed, at WCO, starting in 1986. It was to have a large 40 mm input size (diagonal measurement) and to have at least a 29 mm output which could be fiber-optically coupled to the most promising read-out tube - the Amperex type 88XQ vidicon. A stock of parts to build 25 tubes was procured and is on hand. Difficulties have been encountered at WCO in fabricating the smaller 25/18 mm gated tubes. It therefore was decided to have the 40/30 mm tube assembled by a commercial manufacturer and several have expressed an interest in doing the work. Potential European manufacturers were visited on this trip.

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Visit to Delft Electronishen Producten (DEP):

They described their organization and facilities. I discussed the 40/30 tube design with their technical people, Mr. Lieuwe Boskma and Mr. Jan de Groot. They had a major concern about the use of a curved grating mesh. It was clear that we will have to furnish them with the mesh already curved and bonded to its ring. In fact, we will probably have to furnish them with the four metal-ceramic subassemblies already brazed and as well as the frit-sealed output fiber optic assembly. These parts will have to be leak checked before shipment.

They also expressed concern about the design of the fritted seal of the output fiber optic plate to its metal flange. I had planned to use a fiber optic plate without a shoulder and to use the braze fixture to locate the flange. This sets the microchannel plate-to-phosphor spacing and I had planned to adjust this spacing by modifying the fixture rather than the shoulder height. I believe that this design will work satisfactorily.

A difference was noted in processing methods. They melt the Indium soldering alloy into the photocathode faceplate support ring by radio frequency (RF) heating the ring in vacuum using a weighed amount of Indium. My system calls for heating in hydrogen with an oxidized stainless steel mold to define the proper amount of alloy. This problem is likely to be easily resolved but I will want to design a shield cover for the mesh to prevent it from picking up an excess amount of the RF power.

For electron scrubbing of the microchannel plate (MCP) they use an electron gun to give a radially flowing flood beam. I use an emitting filament above the mesh and make the mesh a few volts positive so that a space charge of electrons forms above the mesh. Electrons passing through the mesh holes are then accelerated by several hundred volts applied between the anode cone and the MCP input to strike the MCP. I believe that this is satisfactory to scrub the MCP when there is a mesh on the top of the tube. They proposed focussing their scrubbing beam but I believe that my method is much simpler and equally effective.

We were shown around the factory. DEP is a large production oriented organization. They showed us elaborate specialized systems for processing goggle tubes. They will modify one of their less specialized processing stations to accept the 40/30 mm tube and they will modify their RF station for Indium alloy application. There appears to be no reason why they can not do the job and they were low bidder on the initial request for quotation.

Visit to Instrument Technology Limited

ITL is a much smaller organization than DEP and more directed toward research work. They have general purpose equipment but none of the elaborate production systems. I talked with their engineer, Mr. John Howarth and with Mr. Ralph Powell. Their processing procedures were similar to those at DEP. They expressed an additional concern that my 40/30 mm tube design had insufficient insulation space between opposite sides of the MCP to avoid voltage breakdown. This seemed to be a valid concern and their suggestion was to add a machined spacer of macor. I agreed with this suggestion and expect to add it to the tube design.

We were shown their facility. It appeared to be adequate and they will need less modification to their existing equipment than does DEP.

Visit to Delta Development Company

The owner, Mr. Julian Edwards met with us in the living room of his home in a rural area near Peterfield, southwest of London. The discussion was mostly unrelated to the 40/30 mm tube but was about infra-red spectrometers with pyroelectric linear readout for the infrequently used wavelength region around 4 micrometers. The discussions, primarily of interest to the Los Alamos Laboratory persons present, centered on wavelength bandwidth and band switching schemes and on ways to minimize the effects of slit image tilt. We were not shown the factory.

Energy posture of the countries visited

No information was collected concerning the energy posture of the Netherlands or the United Kingdom.

Security related concerns - None

Appendix

Full itinerary

March 1 - March 2 New York to Amsterdam
March 3 - March 5 Amsterdam to Roden - meetings at DEP in Roden
March 6 Roden to Amsterdam to London
March 7 Train to ITL in St. Leonards and return
March 8 London
March 9 Train to Delta Development in Peterfield and return
March 10 - March 17 Personal travel in England & the Netherlands
March 18 Return flight to New York

Persons Contacted

At DEP Mr. Tony Cochrane, Assistant to the Directors of Old
 Delft, the parent organization of DEP
 Ir. (engineer) Jan de Groot, Technical Manager
 Ir. Lieuwe Boskma, Project Manager

At ITL Mr. John Howarth, Engineer
 Mr. Ralph Powell, Engineer

At Delta Mr. Julian Edwards, Owner

Literature Acquired - color brochures of Company products

BHV/jc

cys: Mary Blaylock Y-1
 John Trabert Y-7
 Yvette Dempsey WCO

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ABSTRACT

One of EG&G's customers is attempting to find a manufacturer to make the 40/30 mm gated image intensifier tube. A request for quotation had been sent out to a number of manufacturers. The tube performance required was not fully defined and the replies, as expected, came back with caveats to cover the areas of uncertainty. The trip was undertaken to discuss the project, to more clearly define the areas of uncertainty and to evaluate the capabilities of the manufacturers.

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ERA ☐
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WDA ☐
CRA ☐

INS ☐
RIP ☐
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AUGMENTATION:

DESCRIPTORS

Title

FLAGS

Manufacturing of the 40/30 mm
Gated Image Intensifier Tube