

JUSTIFICATION FOR OTHER THAN FULL AND OPEN COMPETITION

Procurement of a High Power, High Efficiency Q-Band (37.0 to 42.0 GHz) Space Traveling Wave Tube (TWT)

I. Description of the Procurement

The next generation satellites to be launched by the U.S. Government Agencies and the U.S. commercial SATCOM industry will require a new design for the radio frequency (RF) transmitter for returning large quantities of data on the order of multi-Gbps directly to Earth. Recently, a high-power, high-efficiency, space traveling wave tube (TWT) design was developed and demonstrated under a NASA Glenn Research Center (GRC) contract with L-3 Communications, Electron Technologies Inc (ETI). The test data show that this helical TWT design has very wide bandwidth and can cover the entire Ka-Band and in addition deliver RF output power on the order of 200-watts. To meet the new performance requirements of the U.S. Government Agencies and the U.S. commercial SATCOM industry, the above design has to be optimized for the 37.0 to 42.0 GHz frequency range of operation and with RF output power of 200-watts.

It is recommended that NASA GRC negotiate only with L-3 Communications, ETI, for this effort. The initial cost to NASA GRC for this work is estimated to be \$500K, \$300,000 of which is available for obligating this FY with the remainder to follow in the next FY.

II. Statutory Basis for Other than Full and Open Competition

The statutory authority permitting other than full and open competition is 10 U.S.C. 2304 (c) (1), only one responsible source and no other supplier or services will satisfy the agency requirements.

III. Rationale for Selection of Statutory Basis

L-3 Communications, ETI, is the only U.S. designer and manufacturer of the high power, high efficiency, Ka-band space TWT, which is designated as the Model 999HA and capable of delivering in excess of 180-watts output power. The Model 999HA TWT was developed under NASA GRC contract, number NNC04CB13C. As such, L-3 Communications, ETI, has proprietary knowledge of the essential and critical design details for manufacturing the space TWT. Optimizing the frequency of operation from Ka-band to Q-band (37.0 GHz to 42.00 GHz) and increasing the output power from 180-watts to 200-watts requires knowledge of the TWT internal design and construction that only this contractor has. Foreign companies were not considered for this award because by providing this precise set of specifications we may inadvertently transfer sensitive technology, which is prohibited by International Traffic in Arms (ITAR) and the Export Administration Regulations (EAR).

An operational space traveling wave tube amplifier (TWTA) requires both a TWT and an electronic power conditioner (EPC). The EPC is less challenging than the TWT. This contract will use a readily available space qualified EPC from L-3 Communications, ETI, with minor modifications, which satisfies the requirements of the Q-band TWT SOW. The space qualified EPC was developed under a contract from NASA JPL. L-3 Communications, ETI, has delivered

several thousand EPCs meeting requirements to numerous commercial space programs, which demonstrates considerable flight heritage. To bring another vendor up to the equivalent level of experience as L-3 Communications ETI, would unnecessarily duplicate the work already done under NASA contracts. Furthermore, to mate an EPC meeting Q-band TWT SOW requirements, if available, from another vendor to the TWT developed by L-3 Communications, ETI, would involve increased performance, cost and schedule risk.

L-3 has accumulated a wealth of proprietary knowledge on the design and manufacture of space TWTAs over the course of two to three decades and also owns several patents for their processes.

IV. Description and Results of Market Survey

A market survey was conducted for a Q-band (37.0 to 42.0 GHz) space TWT to meet the U.S. commercial SATCOM industry performance specifications. It was determined that there are none available from any other vendor within or outside the U.S. Hence, L-3 Communications, ETI, is the only manufacturer of high-reliability, high power, high efficiency, space-qualified TWTAs that meet the requirements of NASA as well as the U.S. commercial SATCOM industry.

V. Determination of Fair and Reasonable Cost

A cost and price analysis of the proposal indicates that the price is fair and reasonable. The proposed cost and fee are commensurate with historical pricing data obtained from past involvement with the Contractor.

VI. Actions to Remove or Overcome Barriers to Competition

We are not able to come up with any actions which would overcome the advantage this company has in this industry. Currently, no other companies are in this business.