

Flexible Manufacturing Environment for Millimeter Wave Transceivers



PROBLEM / OBJECTIVE

The purpose of this ManTech effort was to develop and demonstrate an Integrated Product / Process Development (IPPD) flexible manufacturing methodology to reduce the cost of the Millimeter Wave (MMW) transceivers to support production of multiple band/types of transceivers in the 35 to 95 GHz frequency range for use in missiles such as the Longbow Hellfire.

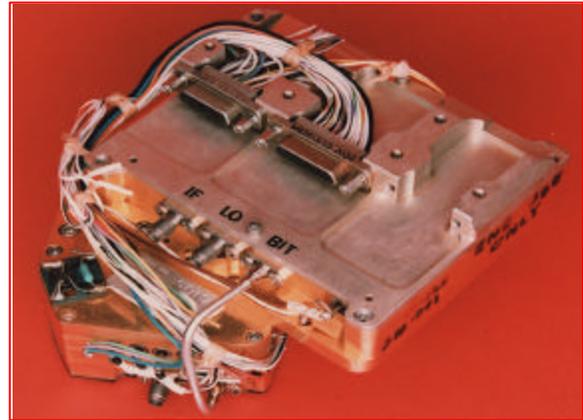
ACCOMPLISHMENTS / PAYOFF

Process Improvement: The ManTech process improvements and automation developments to date have demonstrated an 80% reduction in touch labor and 50% reduction in manual tune and test times for Longbow Hellfire missile transceivers. ManTech developed design for manufacture and simulation / modeling improvements have demonstrated a 40% reduction in cost for BAT P3I transceivers. Additional benefits include the improvement of the electrical, mechanical and thermal modeling during the design process.

Industry Acceptance: This IPPD methodology is established as an on the shop floor strategy for Longbow Hellfire missile production by Lockheed Sanders and Stellex Microwave and TRW for the BAT P3I power amplifier module.

Implementation/Technology Transfer: All of the improved manufacturing processes are completed and in place, and are currently being used during the current build of the Longbow Transmitter. The IPPD tool is adaptable to any product domain. Currently Longbow Hellfire and BAT P3I are targeted systems for this technology. Selected process improvements are being used in the fabrication such as the Patriot PAC-3 and THAAD missiles, the F-22 Raptor, X-33 Venture Star and the Defense Meteorological Satellite Program. The ongoing Design Environment Improvement effort has resulted in two patent applications.

Expected Benefits: A projected \$40M cost avoidance to the Army for the Longbow Hellfire missile production program. The ManTech designed BAT P3I power amplifier module continues to enable the BAT P3I submunition to meet program milestones. Over 80 power amplifier modules have been furnished as GFE to the BAT P3I prime contractor.



Longbow Missile Transceiver



BAT P3I Power Amplifier Module

TIMELINE / MILESTONES

Start Date: May, 1995
End Date: September, 2001

FUNDING

ManTech Funding:

Army ManTech investment: \$9.05M

Cost Sharing:

Aviation Rockets and Missiles Project Office (Longbow): \$12.4M

Army TACMS-BAT Project Office (BAT P3I): \$3.05M

DARPA MAFET* - W-band chips and CAD/CAE: \$500K

* DARPA's Microwave Analog Front End Technology Program

PARTICIPANTS

Lockheed Martin
Lockheed Sanders
TRW Incorporated
Stellex Microwave