



CAD/C

Computer Aided Design with Cost

Lockheed Martin Aerospace Fort Worth (LM Aero) has developed an application called Computer Aided Design with Cost (CAD/C) using the Adaptive Modeling Language (AML) developed by TechnoSoft, Inc. This program was developed by the Virtual Product Development Initiative from Lockheed Martin Aeronautics (LM Aero).

CAD/C has several major software modules or packages: 1) Manufacturing Analysis Package (MAP), 2) Trade Study Support Package and 3) Cost as an Independent Variable (CAIV) Package. All packages use underlying functions written in AML and C++ to put major aircraft program product data, including geometry, into the Common Computational Environment (CCE) of AML. Users can view geometry and product data in associated windows so that data integration is accomplished in context with specific product building knowledge.

The flow of Joint Strike Fighter design to manufacturing concept are seamlessly integrated within MAP. At a very early stage, sufficient detail can be extracted to form a detailed Gantt chart showing the most probable manufacturing span time. An associated block diagram displays an approximation of a critical path of the movement of the manufacture of the airframe from one manufacturing workstation to the next. Resources and part

delivery at each workstation are also displayed. MAP makes use of industrial engineering standards, proven over many years of data collection and evaluation to derive discrete manufacturing tasks that are then rolled up into larger aggregations. Any user can then probe the system for all underlying assumptions and calculation methods.

Labor hour calculations are provided by MAP that are then a key to cost estimates. Material and vendor costs are added in a common data hierarchy within CAD/C to give the design and manufacturing engineers, approximate cost differences for alternative designs. CAD/C has been integrated with a multi-site product data manager and is inter-operative with several simulation routines for optimizing factory operations.

AML has been a significant support to the CAD/C development and LM Aero continues to purchase ever more AML licenses. TechnoSoft, Inc. has been a superior development partner.