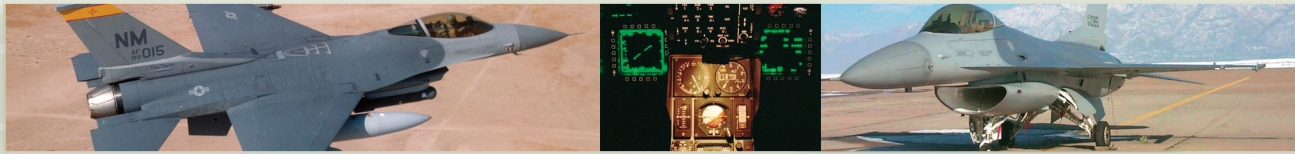


# Lockheed Martin Aeronautics Company: F-16 and Fighter Enterprise

**Formtek Business Application Solution:  
Engineering Data Management**



## A Formtek Customer Story

# Lockheed Martin Aeronautics Company: F-16 and Fighter Enterprise



In the early 1990's, Lockheed Martin Aeronautics Company (then Lockheed Fort Worth Company) faced significant downsizing and consolidation because of declining Department of Defense spending. In an effort to remain competitive and maintain sales, Lockheed Martin Aeronautics Company (LMAC) launched a number of important initiatives to review essential processes and identify opportunities. In the short term, LMAC sought to improve two critical processes that directly affected the F-16 program. In the long term, as the foundation of the Lockheed Martin Fighter Enterprise, LMAC required an integrated document management solution that would grow as they redefined their business focus for new opportunities. Formtek, Inc. solved both of these needs.

Lockheed Martin's Fighter Enterprise bridges historical company boundaries to involve all entities necessary to develop and manufacture superior fighter aircraft in support of Lockheed Martin's customers – domestic and foreign. LMAC plays a key role in the Fighter Enterprise by supporting over seventeen nations in more than five separate aircraft programs, including the F-35 Joint Strike Fighter (JSF), F/A-22 and F-16 Programs.

The F-16 remains the most widely deployed advanced fighter jet in the world today. For over 20 years, 19 countries' Air Forces have successfully used F-16 jets. Lockheed Martin expects to produce F-16 jets for another 10 years and service them beyond the year 2020.

### The Business Challenge

Generating, storing, managing, releasing, and distributing complex information for the entire F-16 fighter jet community represents one of the largest information management challenges in the aerospace & defense industry. The F-16 Program alone involves hundreds of thousands of drawings, change notices, and engineering specifications. LMAC looked at two opportunities to improve processes and cut costs:

1. Internal release and distribution of aperture cards; and
2. Elimination of the division standards drawing manual.

### Aperture Cards

Traditionally, LMAC stored and retrieved hundreds of thousands of engineering drawings and related documents on aperture cards. Aperture cards, combination computer cards containing microfilm frames, held engineering drawings, aero-equipment instructions, project data, technical orders, processing standards, material standards, company standards and other engineering documentation for each project.

Eleven manned document-control booths at LMAC provided engineers with access to these documents. Before Formtek, LMAC's existing method of releasing engineering data could take up to 21 days before users could access information. The manufacturing implications could be staggering – if cards were misfiled or not updated in a timely fashion, errors in fabrication resulted, causing substantial production delays and rework costs.

## Engineering Change Proposals (ECP's) could take up to two years depending on the size and nature of the changes.

### The Change Process

LMAC groups configuration changes in blocks to keep track of product status on the production line. However, a given block may contain different versions of the same product. Some capabilities or technical orders must be retrofitted after the airplanes leave the factory. For instance, the Dutch Air Force requires different functionality than would the Thunderbirds air demonstration team. Execution of Engineering Change Proposals (ECP's), including detailed engineering descriptions, development tasks, support impact, costs, and schedules could take up to two years, depending on the size and nature of the changes.

### The Formtek Solution

To define and implement the systems necessary to eliminate the use of aperture cards and improve the ECP process, LMAC created a cross-functional team called the Electronic Document Management System (EDMS) Team.

In 1994, the EDMS Team partnered with Formtek to implement a system that dramatically changed the method by which LMAC released, distributed and utilized engineering information across the company. FORMTEK:TDM software, the predecessor to today's flagship product suite, Formtek | Orion™ software, evolved into an integrated, transparent, web-enabled solution based on the Oracle relational database. Formtek delivers client/server and web-based solutions that allow enterprise users

to easily store, access, collaborate, distribute, and manage all types of information in a secured electronic repository, replacing aperture card booths and file cabinets. Formtek |

Orion software now supports over 8,000 users located across the country. Due to the multi-platform, modular architecture of Formtek's software products, the solution scales easily to expand to new projects and applications.

### The Results

Today, in addition to supporting the F-16 Fighter Community, LMAC has successfully deployed the Formtek | Orion software solution to the F/A-22, F-2, KTX2, F-117, F-35 JSF, C-5, C-27, and C-130J programs. The LMAC implementation of Formtek | Orion software now supports over 8,000 users located across the country and manages over 4,500,000 documents.

### Using Formtek, LMAC

- Eliminated 11 aperture card booths and the manual upkeep of legacy data on a 20-year-old program. F-16 and F/A-22 manufacturing access all build package information directly from the factory floor by using Formtek | Orion software as the primary source.
- Stores over 500,000 engineering drawings online and eliminates aperture card usage. A unique bar-code system used with the AL/PL's ensures that if any drawing listed is superseded by another in the last 24 hours, the user may retrieve and use the latest drawing release from the Formtek | Orion system immediately.
- Reduced the timespan for data release from 21 days to within 24 hours.
- Enabled ISO 9001 re-certification.

### Formtek Business Application Solution:

#### Engineering Data Management

Provides flexible yet secure access to your engineering information.

Call toll-free  
**1.800.FORMTEK**  
or visit our website at  
[www.formtek.com](http://www.formtek.com)  
for more information.

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## About Formtek

For over two decades, Formtek has been providing mission-critical Enterprise Document and Content Management solutions and services to some of the most demanding industrial operations in the world. Our capabilities and experience, particularly in the areas of engineering drawing management, technical document management, and secure collaboration, have helped both small organizations as well as large global enterprises manage their most important information assets. Formtek solutions address real, day-to-day document management, content management, and records management requirements for worldwide customers in manufacturing, aerospace, defense, telecommunication, utility, and government.

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## Integration with Legacy Systems

Because of the flexible, modular structure of Formtek's solution, the Formtek system also interfaces with all departmental and legacy data systems. This resulted in considerable savings and timespan reductions. The implementation of the technology also lays a foundation of core technology that enables other significant improvements.

## Weekly Updates

LMAC leverages Formtek software to output digital data for delivery to the F-16 program's Air Logistics Center (ALC) at Hill Air Force Base. The entire F-16 drawing package was uploaded in digital format directly into the U.S. Air Force (USAF) system. All new and revised F-16 drawing deliveries transfer electronically to the Hill AFB on a weekly basis. This change in process reduces the delivery span time from quarterly to weekly, increases the timeliness and accuracy of the ALC's files, and creates significant savings to the ALC and its customers. Previously, this laborious process involved literally pallets of documents, and weekly updates were not only financially implausible, but physically impossible to achieve.

## CITIS

In response to the DoD's goals of CITIS technology usage, LMAC used the system as the launching point to deploy a web-based CITIS solution for the F-16 Program. In 1997, LMAC implemented its CITIS solution, Electronic Data Delivery/Retrieval (EDDR), to affect electronic data deliveries for all contractually required data. EDDR users, located across the country, used the Internet or dedicated lines to access program data in a secure environment – reducing delivery times from 10 to 14 days to same day delivery.

EDDR created cost savings of \$1.1 million for the USAF customer.

## International Capabilities

Formtek | Orion software changed the method by which LMAC delivers data to international suppliers and co-producers. LMAC exports data stored in the electronic vault to digitally deliver F-16 data to suppliers and co-producers in over six countries. LMAC writes the data to CD-ROM or transfers it electronically to in-place systems at producer/supplier facilities overseas. This process improvement contributes to additional savings in the life cycle of the F-16 Program.

**Formtek solutions have been instrumental in making significant improvements in the generation, control, and dissemination of data across the Fighter Enterprise.**

## Single Process Initiative

Without the Formtek | Orion software foundation, LMAC's recently developed Enhanced Data Management Single Process Initiative (SPI) might not exist. The Enhanced Data Management SPI replaces MIL-STD-1806, which required the company to submit data according to specified format and content requirements with multiple paper copies being mailed to many users to streamline the data management. Formtek solutions have been instrumental in making significant improvements in the generation, control, and dissemination of data across the Fighter Enterprise. LMAC's modest investment in Formtek products and services continues to reap significant ROI and provides substantial and recurring benefits while fulfilling mission-critical production requirements.