

ATKs Electronic Shop Instructions and Teamcenter Enterprise

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ATK Launch Systems

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Premium Partners:



Microsoft

Presentation Overview

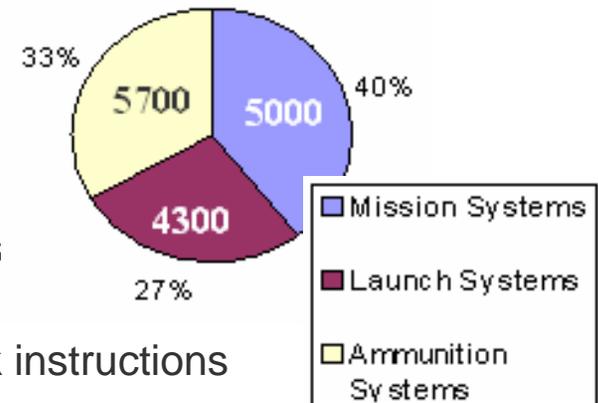
- Introduction to ATK
- Terms
- Interface Overview
- Goals of TcE integration
- Demonstration and discussion of TcE interfaces;
 - Electronic work instruction creation
 - Electronic shop order execution
- Questions

ATK Business mix

- ATK is a \$3.3 billion advanced weapon and space systems company
- 15,000 Employees in 23 states
- Three Business groups
 - **Mission Systems** (advanced weapons; space systems and sensors; propulsion and control systems; integrated aircraft systems; and tactical systems)
 - **Launch Systems** (Launch Integrator, Rocket Motors, Missiles, Aerospace)
 - **Ammunition Systems** (Worlds largest ammunitions entity both military and commercial)

- **Launch Systems**

- Annual sales: More than \$900 million
- 4300 Employees
- Worlds largest Manufacturer of Solid Rocket Motors
- Over 17 years of PDM experience
- 11 years production experience with electronic work instructions



Launch Systems Rockets



Minuteman III



Trident D5



Space Shuttle



Titan IVB



Delta II



Delta III



Delta IV



Taurus



Athena I



Athena II



Atlas IIAS



H-IIA



National Missile Defense



Technology/
Energetics



Pegasus



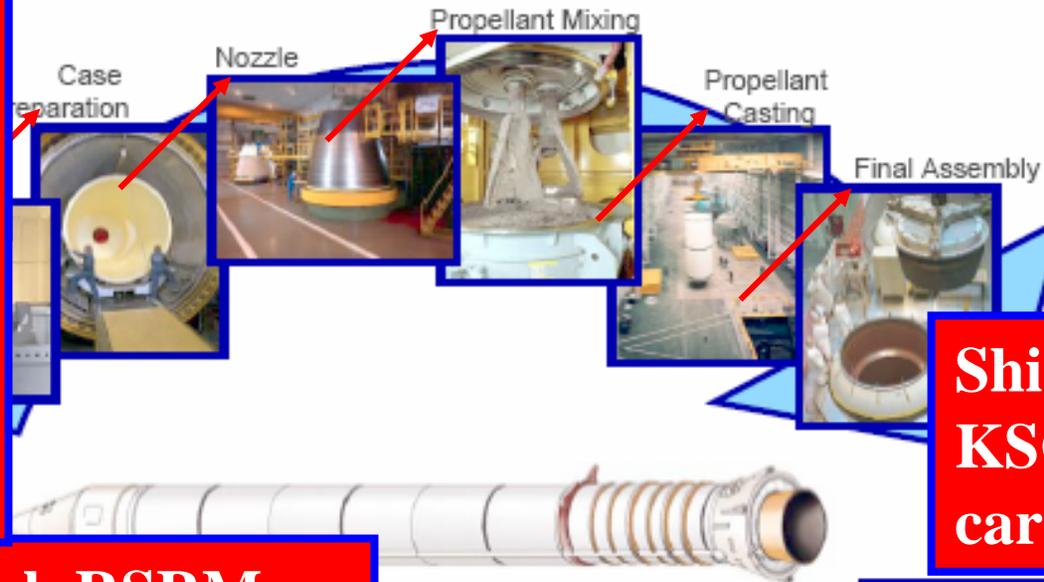
Demilitarization



Ordnance/
Flares

ATK Launch Systems – RSRM / CLV

Each motor is 126 feet long and 12 feet in diameter, 149 feet fully assembled at KSC.

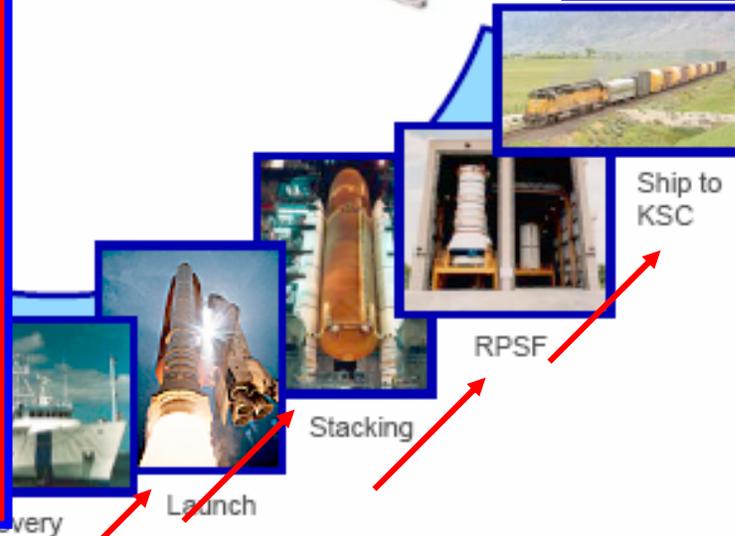


Shipped to KSC on 5 rail cars

Each RSRM generates 2.6 million pounds of thrust or 5.2 million pounds per shuttle flight



Postflight Evaluation



Ship to KSC

RPSF

Stacking

Launch

Recovery

Shipped to KSC on 5 rail cars

Terms

- **Manufacturing plan** – An assembled set of documents identified by the part number they are intended to produce
- **ESI Editor** – ATK's custom xml and data editor used to create manufacturing plans and other electronic work instructions
- **Shop order** – An instance of a Mfg Plan that is assigned a serial number
- **Shop Order Viewer** – ATK's custom electronic shop instruction execution system
- **SFMSII** – Second incarnation of electronic work instructions at ATK
- **OCR** – Operations Change Request
- **OCN** – Operations Change Notice
- **ePIC** – ATK's implementation on TeamCenter Enterprise (TcE)

SFMSII Interfaces

Engineering analysis database receives data from shop instructions

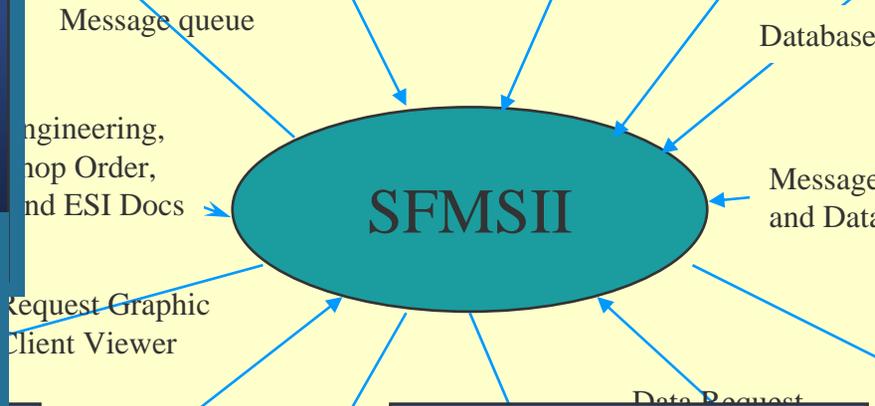
Utilizes SAS software. Retrieves historical data from ADCAR and from the shop instructions.

MRP system

Training certification tracking system

ATKs implementation of TeamCenter Enterprise

Third party vector graphics viewer served up from a web server



Required CES and GMIPs required to be in a mfg plan

All Office document formats can be referenced

Servlet that allows for display of ePIC documents from web page

Various quick links to other ATK web

Currently working to move Shop Floor system to an Oracle database.

Goals of the TcE integration

- Simplify the interface between UGS and ATK applications for efficient use by Users
- Provide services that can be reused by other applications that may need information from TcE
- Reuse document classes as much as possible CN/OCN CR/OCR
- Use TcE for all document control functions while maintaining ATKs custom application for all editing
- Use as much out-of-the-box functionality as possible.
(Developed 150 new APIs)

SHMS



Document
Management By
ePIC



What was accomplished?

The screenshot shows the ESIEdit software interface for editing a manufacturing plan. The window title is "ESIEdit [Plan 60006131 1 OCN = OCN0000000293]". The interface includes a menu bar (File, Edit, Tools, Help) and a tree view on the left showing the plan structure: Plan 60006131, 0002 PIC MATERIALS, 0200 REMOVE CORK, 0300 PAINT TOUCH UP, 0305 THRU HOLE TOUCH UP, 0380 *C* CORK BOND, and GEN INSTRUCTIONS. The main area contains various input fields and buttons:

- Part Number: 60006131 (with a Select button)
- OCN Number: OCN0000000293
- Route Number: 000
- Program: RSRM (dropdown)
- Plan Type: OCN Controlled (dropdown)
- Work Center: Final (dropdown)
- Order Quantity: 1
- Description: BATTERY PACK
- Refurb/Reuse:
- 'A' Code End Item:
- NASA Critical:
- Author: GOODIN C.A.
- Safety: SORRELL L.W. (with a Select button)
- Quality: OWEN E.J. (with a Select button)
- Planner: JOHNSON L.K. (with a Select button)
- Supervisor: LARSEN S.F. (with a Select button)
- Originator: JENSEN R.M. (with a Select button)

At the bottom of the window, there are three status fields: "Editable", "ESI In Work", and "GOODIN C.A."

Created in TcE:

- Mfg plan revision
- OCN
- OCR
- Relationships

Mfg plan
revision
created in
SF database

Search Advanced...

Change Notice

Search

- Lists**
- My Work Lists
 - My Lists
 - My Teams
- Create**
- Data Management
 - Changes
 - General Docs
 - Manufacturing Docs
 - Quality Docs
 - Part
 - Technical Docs
 - Tooling Docs
- Reports**

Generate OCR Validate Files Check Out Item Reports History More Actions...

OCR0000000115,-,1,OCR

Files Properties Related Items Affected Masters Related Changes Summary View Signatures View Si

Name	Rev	Item Type	ECL	Associated Doc.	Title	Program	Class	Creator	Released
OCR0000000115,-,1,OCR	-				BATTERY PACK	RSRM	Operations Change Request	goodica	

- Attaches
- Affects Item Masters
- Is Implemented By Change Item

Search And Add Create and Add Add From Bookmarks Update Relationship View Relationship



- Plan 60006131
 - 0002 Gather materials
 - 0200 Prepare to paint
 - 0300 Paint
 - 0380 Finish painting
 - GEN General Instructions

Part Number:	<input type="text" value="60006131"/> <input type="button" value="Select"/>	OCN Number:	<input type="text" value="OCN0000000327"/>
Route Number:	<input type="text" value="000"/>	Program:	<input type="text" value="RSRM"/>
Plan Type	<input type="text" value="OCN Controlled"/>	Work Center:	<input type="text" value="Final"/>
		Order Quantity:	<input type="text" value="1"/>

Description: <input type="text" value="BATTERY PACK"/>	<input type="checkbox"/> Refurb/Reuse	<input type="checkbox"/> 'A' Code End Item	<input checked="" type="checkbox"/> NASA Critical
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Author:	GOODIN C.A	Safety:	<input type="text" value="SORRELL L.W"/> <input type="button" value="Select"/>
Quality:	<input type="text" value="OWEN E.J"/> <input type="button" value="Select"/>	Planner:	<input type="text" value="JOHNSON L.K"/> <input type="button" value="Select"/>
Supervisor:	<input type="text" value="LARSEN S.F"/> <input type="button" value="Select"/>	Originator:	<input type="text" value="JENSEN R.M"/> <input type="button" value="Select"/>

Where do the changes go?

The screenshot shows the ESIEdit software interface. The title bar reads "ESIEdit [Plan 60006131 3 OCN = OCN0000000327]". The menu bar includes "File", "Edit", "Insert", "Tools", and "Help". The toolbar contains various icons for editing and viewing. The main window is divided into several sections:

- Plan 60006131**: A tree view on the left showing a list of operations: 0002 Gather materials, 0200 Prepare to paint, 0300 Paint (highlighted), 0380 Finish painting, and GEN General Instructions.
- Operation 0300**: The main content area, currently displaying the "Instruction" tab. It shows a list of operations:
 - 0010**: Task: Paint Touch-Up.
 - 0020**: Contact Mfg. Eng. (S. Doe ext. 3865) prior to starting operation. Includes an "MFG" input field.
 - 0025**: (Empty section)
 - Information**: A section with a note: "** NOTE ** Instruction must be followed as outlined."
 - 0070**: Paint Application Instructions. Includes radio buttons for "Req'd" and "Not Req'd", and a note: "Check 'Req'd' if a paint is to be performed." Includes an "MFG" input field.
 - 0120**: Clean area(s) to be painted. Includes an "MFG" input field.

The status bar at the bottom indicates "Editable", "ESI In Work", and "GOODIN C_A".

Instruction changes saved to TcE

Material list created in SF database



- Plan 60006131
 - 0002 Gather materials
 - 0200 Prepare to paint
 - 0300 Paint
 - 0380 Finish painting
 - GEN General Instructions

Part Number: OCN Number:

Route Number: Program:

Plan Type: Work Center:

Order Quantity:

Description:

Refurb/Reuse 'A' Code End Item NASA Critical

Author: GOODIN C.A Safety:

Quality: Planner:

Supervisor: Originator:

- Plan 60006131
 - 0002 Gather materials
 - 0200 Prepare to paint
 - 0300 Paint**
 - 0380 Finish painting
 - GEN General Instructions

0420



Record paint application data:

1. Mix paint.

Paint Temp: ° F (72° F min.)

DATE/TIME

Induction:			
Start:	DATE/TIME	<input type="text"/>	MFG <input type="text"/>
Stop:	DATE/TIME	<input type="text"/>	MFG <input type="text"/>

3. Record the following just before application:

Surface Temp: ° F (65-80° F)

Paint Temp: ° F (72° F min.)

Humidity:

MFG

4. Verify paint is thoroughly stirred prior to application.

5. Paint cure requirements:

Cure paint for one 4 hour minimum.



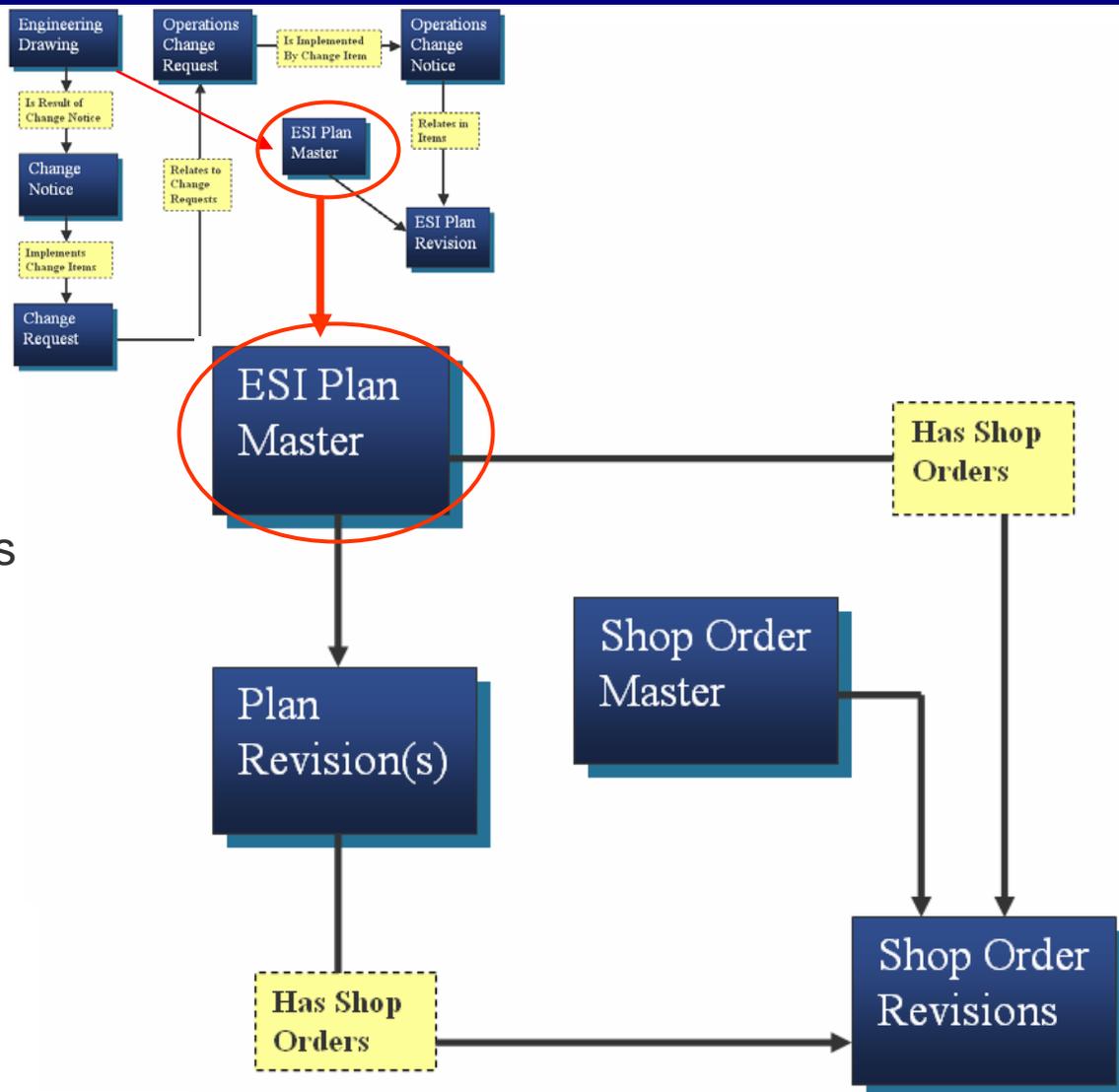
Manufacturing Plan approval

- When the OCN promotes to Approved the Electronic Manufacturing Plan promotes to Approved as well.
- Now the instructions are ready for a Shop Order to to be issued against them.
- After the Shop Order is issued from MRP Operations personnel will execute the shop order.



Summary and Next Steps

- Relate ESI Plans to controlling engineering documents
- Add completed shop orders to TcE
- Why?
 - Easy TcE traceability from engineering docs (CRs or Drawings) to planning docs to as-manufactured documentation
 - ATK wide access to shop orders with or without custom software



Questions

The header features a dark blue background with abstract, semi-transparent geometric shapes in lighter shades of blue, including triangles, circles, and lines, creating a technical or architectural aesthetic.