

The Impact of ATA Spec 2300 on the MMEL Process



TOM ATZERT

MEL Manager, United Air Lines

Chairman, FAA/ATA MMEL Industry Group

JASON BIALEK

Senior Manager - Flight Technical Data, Boeing

Chairman, Flight Operations Interest Group

Presentation Topics

- MMEL IG information
- MMEL / MEL basics
- MMEL / MEL publication & authoring – past, present, future
- The challenge – why the industry needs Spec 2300
- Data specifications comparison
- What Spec 2300 is and is not
 - areas where Spec 2300 is aligned with S1000D
 - the “Flight” Standard Numbering System (SNS)
- An overview of the MMEL, DDG, MEL portion of Spec 2300

FAA/ATA MMEL IG

- Who we are...
 - MMEL/MEL subject matter experts:
 - FAA (HQ; AEG; CMO)
 - ATA
 - Airframe manufacturers
 - Operators (air carrier, part 135, fractional, private)
 - Labor groups
- What we do:
 - Develop industry position and make recommendations to the FAA relating to the MMEL/MEL, MMEL Policy Letters, and FAA Inspector guidance

MEL 101

- What is the Master MEL (MMEL)
 - Developed jointly by the FAA (AEG) & airframe manufacturer, with input from industry
 - Approved & published by the FAA, it lists items of equipment which may be inoperative for dispatch
 - Allows dispatch in non-standard config without requiring recertification
 - An acceptable level of safety is maintained by setting appropriate dispatch conditions and limitations
- What is an MEL
 - FAA (CMO) approved version of MMEL that includes appropriate Flight Crew and Maintenance procedures (from manufacturer's DDG)
 - Intended to permit operation with inoperative items of equipment for a period of time until repairs can be accomplished
 - Controlled and sound repair program including the parts, personnel, facilities, procedures, and schedules to ensure timely repair
- For 2008 the approximate value of the MEL to UAL (cost avoidance) is **\$325 million.**

MMEL Publication History

- FAA Mainframe – BBS
 - Dial-up method of downloading MMELs from FAA
 - Text files (.txt)
 - Extremely cumbersome process to author and upload to mainframe
- FAA MMEL Website Opspecs.com
 - Improved authoring, publication and user access
 - FAA site - non-conforming '.com' website
- FAA FSIMS – Current MMEL repository
 - FAA '.gov' site
 - In addition to MMELs, repository for FAA Orders and Inspector Guidance

MMEL/DDG/MEL Authoring Challenges

- The following slides are sample
 - FAA MMEL item .txt file
 - FAA MMEL item .doc file (authored using MS Word)
 - Boeing DDG item (authored using Framemaker)
 - UAL MEL item (authored using Framemaker)
- MMEL, DDG and MEL authoring tasks are very labor intensive
- Process is improving, but much work is needed due to non-standard format across platforms
- Work is underway by FOIG MMELPT to develop MMEL data exchange specification (based on XML) that will result in authoring and publishing efficiencies

Sample MMEL Item – .txt file

U.S. DEPARTMENT OF TRANSPORTATION

MASTER MINIMUM EQUIPMENT LIST

FEDERAL AVIATION ADMINISTRATION

AIRCRAFT:

BOEING
B-777

REVISION NO: 12 d

PAGE:

DATE: 01/14/2003

24-2

SYSTEM & SEQUENCE NUMBERS	ITEM	1.	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
24	ELECTRICAL POWER				
-21-1	APU Driven Generator System (Generator, AGCU, APB)	C	1	0	(M) (O) May be inoperative provided: a) Procedures do not require use of the APU for electrical power, b) Auxiliary Power Breaker (APB) remains open, c) Both engine driven generator systems operate normally, d) Backup AC power system is verified to operate normally before each departure, and e) Flight remains within 180 minutes of landing at a suitable airport.
					NOTE: APU may be used as a pneumatic source.

Sample MMEL Item – .doc file

U.S. DEPARTMENT OF TRANSPORTATION			MASTER MINIMUM EQUIPMENT		
FEDERAL AVIATION ADMINISTRATION					
AIRCRAFT: BOEING B-777			REVISION NO: 16		PAGE:
			DATE: 09/12/2009		24-1
SYSTEM & SEQUENCE NUMBERS		1. ITEM	2. NUMBER INSTALLED		
24 ELECTRICAL POWER			3. NUMBER REQUIRED FOR DISPATCH		
			4. REMARKS OR EXCEPTIONS		
-21-1	APU Driven Generator System (Generator, AGCU, APB)	C	1	0	<p>(M)(O) May be inoperative provided:</p> <ul style="list-style-type: none"> a) Procedures do not require use of the APU for electrical power, b) Auxiliary Power Breaker (APB) remains open, c) Both engine driven generator systems operate normally, d) Backup AC power system is verified to operate normally before each departure, and e) Flight remains within 180 minutes of landing at a suitable airport. <p>NOTE: APU may be used as a pneumatic source.</p>

Sample Boeing DDG Item



ATA 24

777 Dispatch Deviations Guide

Section 2

24-21-01

APU Driven Generator System (Generator, AGCU, APB)

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- Procedures do not require use of the APU for electrical power.
- Auxiliary Power Breaker (APB) remains open.
- Both engine driven generator systems operate normally.
- Backup AC power system is verified to operate normally before each departure.
- Flight remains within 180 minutes of landing at a suitable airport.

NOTE: APU may be used as a pneumatic source.

MAINTENANCE (M)

Position Electrical Panel (P5) APU GEN switch OFF.

OPERATIONS (O)

- Dispatch is not allowed if the APU is required by other procedures. MMEL dispatch procedures for the following inoperative equipment require APU electrical availability.

Sample UAL MEL Item

24

Electrical Power

777

Minimum Equipment List (MEL)

UNITED

24040

APU Driven Generator System (Generator, AGCU, APB)

(MMEL 24-21-1 Rev 12d)

STD	MIN	DD	OPB	AUTH	CAT	METER	CAT 2-3
1	0	yes		f	C	ACEG	
MEL REF #		DEFERRED POSITION					
2421A							

Reference(s): JRH

SPEC NOTES:

May be inoperative provided:

- A. Procedures do not require the use of APU for electrical power.
- B. Auxiliary Power Breaker (APB) remains open.
- C. Both engine driven generator systems operate normally.
- D. Backup AC power system is verified to operate normally before each departure.
- E. Operations beyond 180 minutes from a suitable airport not authorized.
- F. Polar Operations not authorized.
- G. Advise Station Control that APU electrical power is not available but that APU pneumatic air remains available.

NOTE: APU may be used as a pneumatic source.

NOTE: Dispatching with inoperative APU Generator will normally be avoided unless flight conditions are acceptable to Flight Crew.

(M) MAINTENANCE:

- A. On initial deferral verify that Backup AC power system operates normally.
 - 1. Press the APU GEN switch to OFF.
 - 2. Verify that the following Status and Advisory messages are not displayed before engine start.
 - (a) ELEC BACKUP SYS, ELEC BACKUP GEN L, ELEC BACKUP GEN R

Replacement MMEL

- Lead Airline Process
 - Selected airline represents industry on MMEL changes
 - Assists FAA with MMEL authoring tasks (revisions), and therefore has vested interest in making the process more efficient
- FAA / ATA / Operator Collaboration
 - MMEL IG began discussions about a replacement MMEL in early 2003
 - MMEL IG developed a set of requirements that were submitted to FOWG
- FOIG MMELPT formed to develop MMEL data exchange specification
 - Developing integrated data specification based on XML schema to meet FAA/Industry requirements

MMEL Authoring Efficiencies / Benefits

- FAA
 - Currently exploring basic XML options to gain authoring & publication efficiencies
 - Long-term plan is to adopt ATA MMEL schema/spec
- FOIG MMEL Project Team
 - MMELPT goal is to develop XML schema that will achieve authoring/publication efficiencies and provide data exchange capabilities
 - Active MMELPT participants
 - ATA (facilitator)
 - Boeing, Airbus, Bombardier, Embraer
 - Operator Publications & MMEL/MEL SMEs

Vision / Future of MEL

- Electronic Flight Bag (EFB)
 - XML MEL will facilitate:
 - Publication of MEL to EFB platform
 - Viewing of MEL on EFB display
- Data Exchange
 - XML MEL will allow data exchange between various operator technical manuals and documents
 - Rather than being a standalone document, XML will allow integration of MEL into an operator's suite of technical documents

As Chairman of the Flight Operations Interest Group, Jason Bialek will provide a more in-depth look at the work the FOIG is doing with Flight Operations documents, and the overall impact of ATA Spec 2300 on the MMEL Process

ATA FOIG and Spec 2300

What we will cover:

- The challenge – why the industry needs Spec 2300
- Data specifications comparison
- What Spec 2300 **is** and **is not**
 - areas where Spec 2300 is aligned with S1000D
 - the “Flight” Standard Numbering System (SNS)
- An overview of the MMEL, DDG, MEL portion of Spec 2300

What exactly is our challenge?

- Flight decks and associated airline support processes are **increasingly electronic**
- Compliance and stricter regulatory oversight is driving **more scrutiny**
 - Less tolerance for the errors and inconsistencies introduced as OEM data is transformed on the way to the end user
 - Need for common data structures that support applications that enable support and flight crew to eliminate errors (fewer dispatch irregularities)
 - Demand for quicker and more frequent data updates requiring streamlined update process from OEM, through airlines/vendors and into flight decks
- Support and Flight Crews are **demanding more sophisticated tools and data**

The need for data standards

- There are **numerous** DTDs and schemas resulting in **WASTE**
 - OEMs each have their own
 - Many airlines have their own
 - Solution providers have their own (eDocs, AirBooks, etc.)
- **Multiple transformations** are necessary between the original author and the end user
- Original Equipment Manufacturers (OEMs) provide some but **not all of the data end users require**
 - Airlines often “fill in the gaps”
 - When airlines fill gaps they each use different data structures

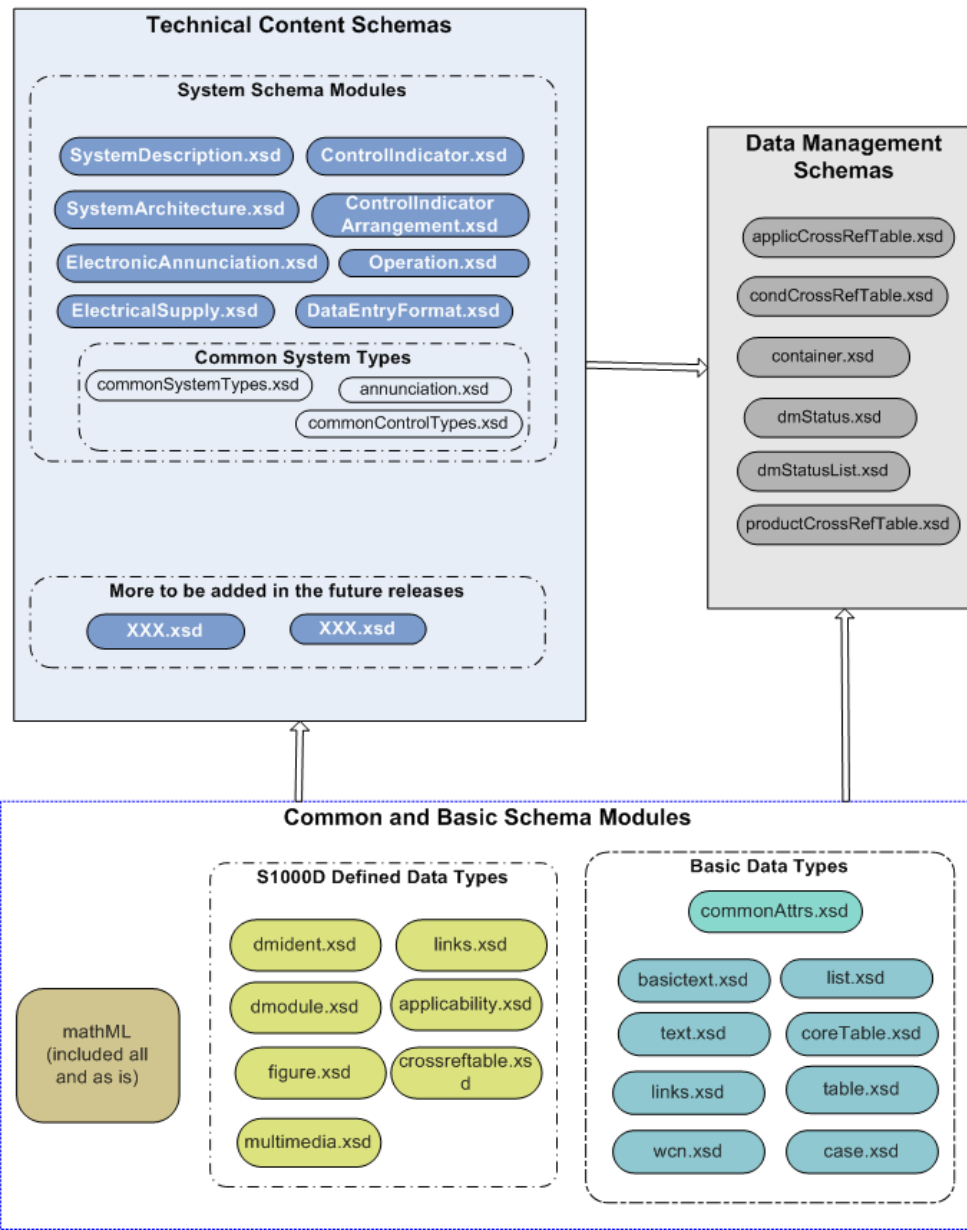
Spec Comparison - Current OEM specs and Spec 2300

	Current OEM Data	ATA Spec 2300
Product Identifier	FCOM Volumes (arrangement differs by OEM)	Systems Description
Data Main Category	Generally by chapters	ATA Systems
Data Sub-Categories	Variable between OEMs Each OEM breaking their content up differently	By Data Modules: <ul style="list-style-type: none"> • Subsystems • Sub-sub-systems • Components • Controls • Indicators • EICAS messages
Unique and Persistent Data Identifier	Generally no. Some OEMs have this in their data, some do not	Based on ATA and S1000D SNS/DMC standard
References	Explicit link has been recently implemented with some OEMs with difficulty and high maintenance	<ul style="list-style-type: none"> • Implicit and Explicit • Among text and graphics
Intelligent Graphic	Not all OEMs	Hotspots support
Interactive and Graphical Navigation	Not all OEMs	SystemArchitecture and ControlIndicatorArrangement Schemas
Multimedia Support	Not all OEMs	Yes

Spec 2300

What Spec 2300 is:

- A **data interchange specification** that will standardize data deliverables from OEMs
 - The first **XML based data interchange** specification for **Flight Operations** data
 - Consistent with **S1000D data principles** and rules wherever possible
 - More data-centric** than any previous Flight Operations data standards
 - Based on a **Standard Numbering System (SNS)** that is **designed for Flight Operations** data



- **FOML – Flight Operations Markup Language is the industry XML vocabulary and language for Flight Operations data**
- **Schemas are written in W3C Schema Language Specification**
- **Highly modularized and extensible**
- **Data-centric and very specific to FO data**
- **“Borrow” from S1000D where applicable**
- **Optimized for data exchange, however, can be integrated into one’s authoring and publishing environment**

Spec 2300

What Spec 2300 **is not**:

- an application for the EFB
- a DTD
- exactly the same as S1000D
- based on the same SNS as S1000D or ATA Spec 2200 (designed for maintenance operations with references to wiring, rigging, and overhaul)

Note: FOIG recognizes there will likely need to be a way to keep MMEL, DDG and MEL data modules associated with the maintenance SNS

ATA Spec 2300 – 2009.1

ATA Spec 2300

*Data Exchange Standard
for Flight Operations*

REVISION
2009.1

*Use of this document is subject to the
warranty provisions and license agreement
contained on pages i, ii, and iii.*



AIR TRANSPORT ASSOCIATION

2009 Publication includes:

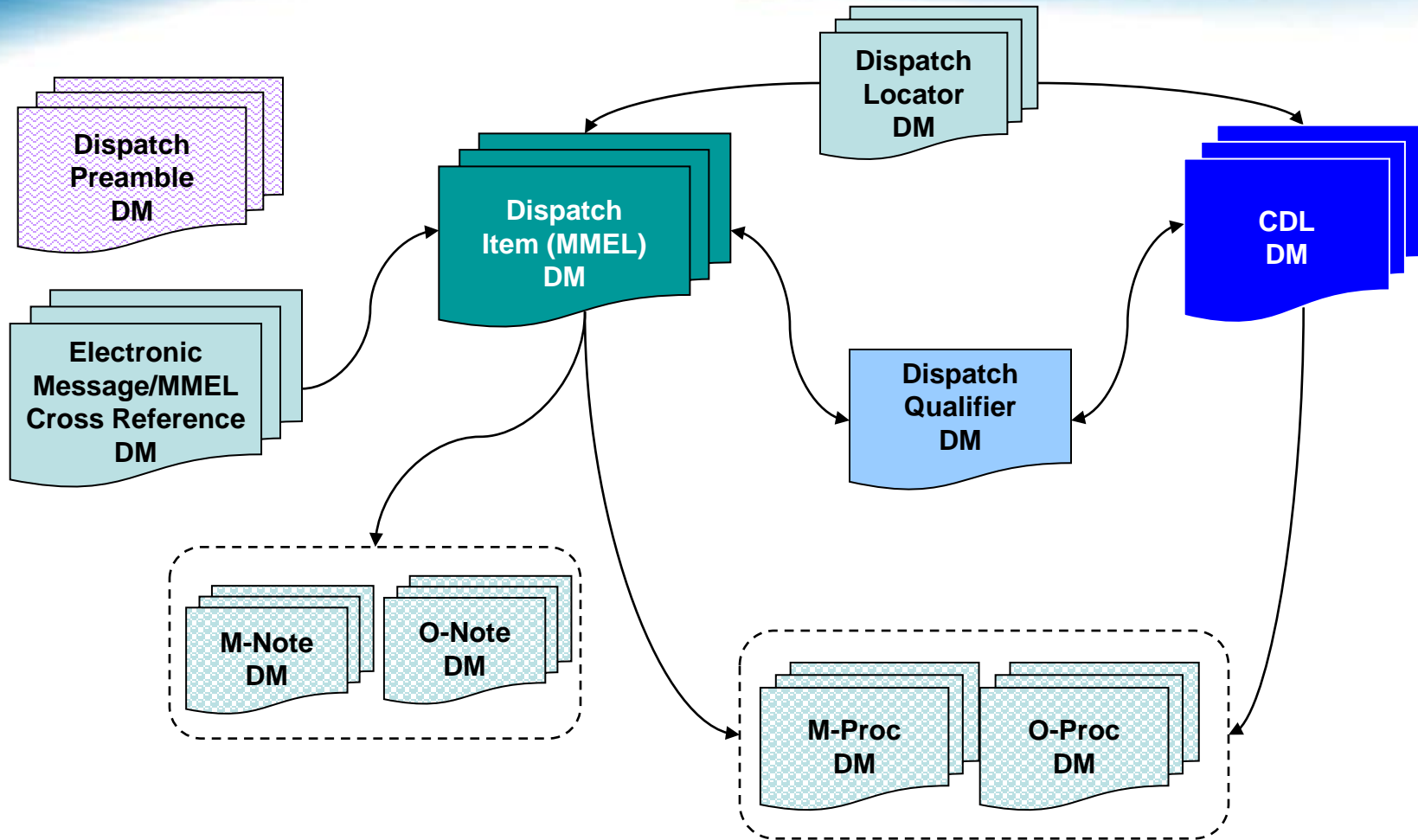
- **Phase of Flight**
- **SNS for Flight Operations and DMC identifier**
- **Revision model**
- **Applicability model**
- **Content model for Systems Description data which includes data modules for:**
 - **System, Sub-System, Function, Component, Mode**
 - **System Architecture**
 - **Control and Indicator**
 - **Control and Indicator Arrangement**
 - **Electronic Annunciation**
 - **Electrical Supply**
 - **Data Entry Format**
 - **Operation**

Future Publication of ATA Spec 2300 – 2010.1

The second Spec 2300 release will be by December 2010 and will include these additional data modules:

- Dispatch Item (MMEL)
- CDL Item
- Dispatch Locator
- Dispatch Qualifier Repository
- M-Procedure and O-Procedure
- M-Note and O-Note
- Electronic Messages Cross References
- Dispatch Preamble
- Acronym and Abbreviation Repositories

Spec 2300 Dispatch Data Module Relationship



Example of an MMEL Item

28-22-02 **Center Tank Fuel Override/Jettison Pumps**
28-22-02A **Scavenge System Operating**

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

May be inoperative provided:

- Inoperative pump is deactivated.
- Fuel scavenge system operates normally.
- Crossfeed valve operates normally.
- Center tank quantity indication operates normally.

Dispatch-Item DM

MAINTENANCE (M)

NOTE: The associated fuel pump motor controller may be removed provided tool number K24002-2 is installed.

Deactivate the inoperative pump (AMM 28-00-001721).

- For left center tank pump inoperative, open circuit breaker OVRD JETT PUMP CTRL-C L and lock with an INOP tag.
- For right center pump inoperative, open circuit breaker OVRD JETT PUMP CTRL-C R and lock with an INOP tag.

Dispatch-Procedure DM

OPERATIONS (O)

For center tank fueled:

- When operative center tank pump switch is on, set crossfeed switch on.
- When operative center tank pump switch is off, set crossfeed switch off.

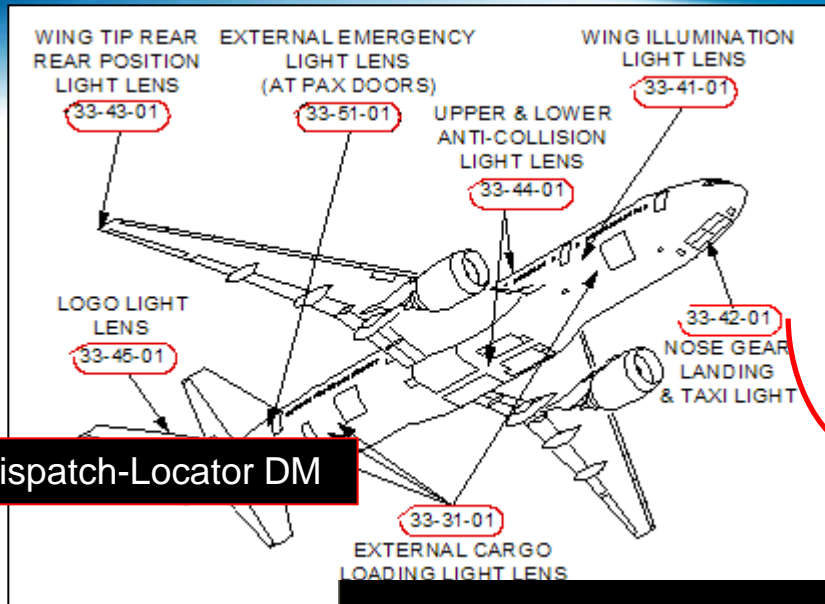
Dispatch-Procedure DM

- An MMEL Item is divided into data components called data modules
- Each DM has its own life cycle for better:
 - Data exchange
 - Data management
 - Data re-use
 - Product management (e.g. MMEL and MEL)
 - Promote data consistency and integrity

Sub-Item?

- **Spec 2300 elevates all Sub-Items up to the Item level**
- **Each Sub-Item is in its own DM like an MMEL Item**
- **Benefits:**
 - **Better data management**
 - **Direct search and access**
 - **Direct reference or link**
 - **Etc.**
- **SNS/DMC can be used to maintain item/sub-item hierarchy and relationship as needed**

Example: Use of Intelligent Graphic



- Dispatch-Locator DM allows the use of intelligent graphic with hotspots
- Interactive access to an MMEL Item

Dispatch-Locator DM

33-42-01 Nose Gear Landing & Taxi Light

Any number may be missing.

Note: For nose gear taxi lights inoperative, dispatch using MMEL Item 33-42-01. For nose gear landing lights inoperative, dispatch using MMEL Item 33-42-02.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
4	No penalty	No penalty

Other Direct References

Message	Level	M MEL Item
CABIN AIR CPRSR L1	Status	21-51-01
CABIN AIR CPRSR L2	Status	21-51-01
CABIN AIR CPRSR R1	Status	21-51-01

- Electronic message and M MEL item cross references

MAINTENANCE (M)

Secure the landing gear in the down position (AMM 32-00-00/721).

1. Install landing gear downlock pins for airplane flight with landing gear in down position.
2. Open the following circuit breakers and lock with an INOP tag:
 - A. MLG DOOR CTRL VLV OPEN-1
 - B. MLG DOOR CTRL VLV OPEN-2
 - C. LG LEVER LOCK

- AMM cross references

Q & A

Thank you for your attention!

For additional info contact:

Jason Bialek

Jason.J.Bialek@boeing.com

Tom Atzert

Thomas.Atzert@united.com