

Terminal Flight Data Manager (TFDM)

Key Capabilities Overview



**Federal Aviation
Administration**

TFDM Key Capabilities

TFDM delivers decision support capabilities for the airport surface, integrating flight, surface surveillance, and traffic management information using System Wide Information Management (SWIM):

- **Electronic Flight Data (EFD):** Electronically processes, updates, and distributes flight data to different control positions in the tower through electronic flight strips
- **Surface Scheduling:** A Surface Management Display (SMD) assists Controllers by providing a departure scheduler with live data offering departure metering capability, runway balancing, and other surface management tools
- **Systems Consolidation:** Combines legacy tower systems to mitigate limited cab space and equipment obsolescence
- **Stakeholder Collaboration:** Enhances collaborative decision making and supports data publishing/ subscribing in real time with NAS stakeholders through data integration



TFDM Systems Configuration & Adaptation

TFDM provides two configurations: Configuration A for large airports with more complex surface environments and Configuration B for smaller airports

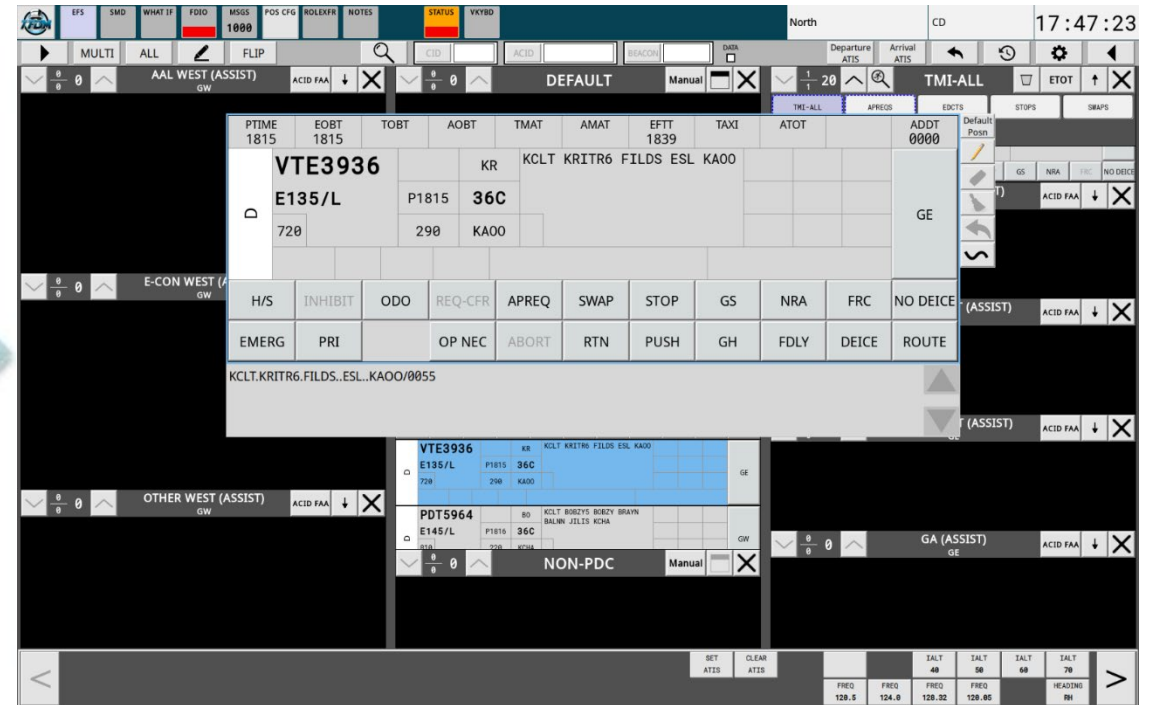
For each site, adaptation maintenance tracks and updates parameters that include both nationally standard settings and tower-specific needs

CONFIGURATION A	CONFIGURATION B
• Electronic Flight Data, including Electronic Flight Strips in towers • Surface Surveillance data integration • Surface Metering (includes full Decision Support Tool) • Traffic Flow Management Data exchange and integration	• Electronic Flight Data, including Electronic Flight Strips in towers • Limited surface management & traffic flow data • Limited airport resource management capability • Limited data exchange with Flight Operator System (FOS)



Electronic Flight Data (EFD)

- The TFDM Electronic Flight Data (EFD) service receives, processes, and displays flight data to operational positions in the ATCT
- TFDM replaces printed flight strips with Electronic Flight Strips (EFS) on the controller's workstations
- The integration of EFD and EFS allows automated updating of the electronic flight strips



System Interfaces / Interdependencies

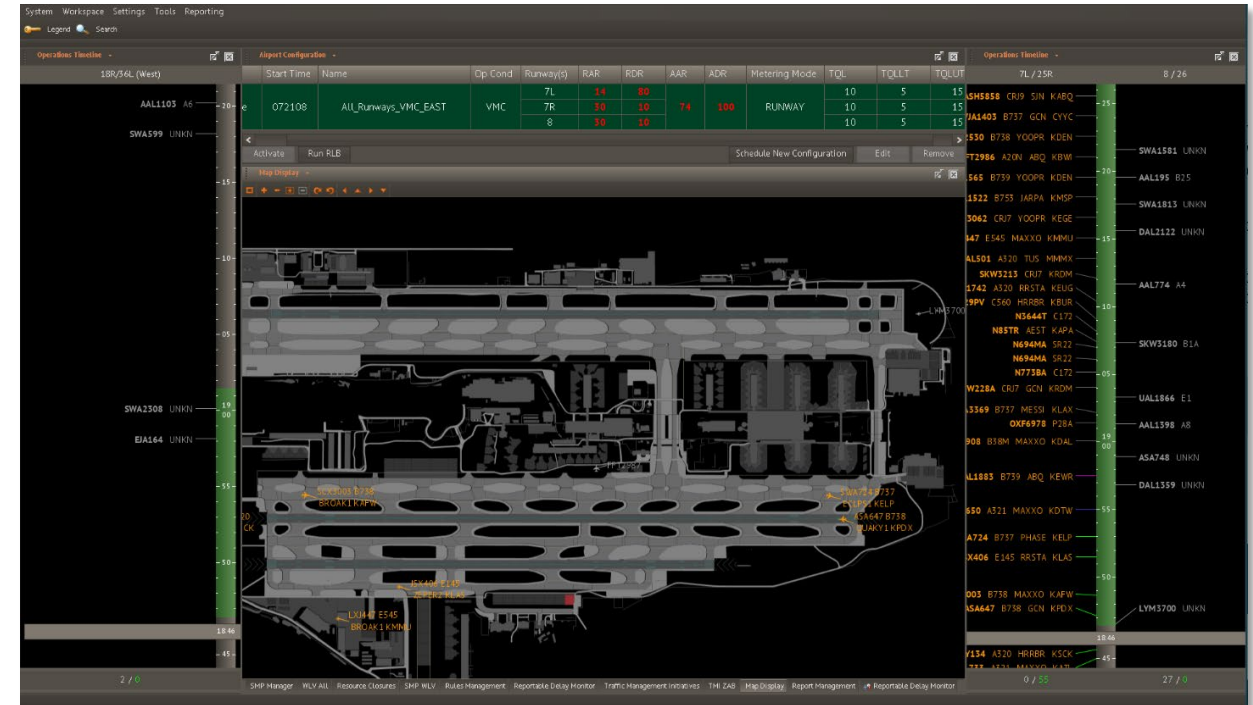
Internal Interfaces	External Interfaces
<u>Two-Way Interfaces</u> • Traffic Flow Management System (TFMS)* • Time-Based Flow Management (TBFM) including Integrated Departure & Arrival Capability (IDAC) integration • Flight Data Input/Output (FDIO) • System Wide Information Management (SWIM) • Remote Monitoring & Logging System (RMLS) via SWIM <i>*TFDM will also have an interface to the future Flow Management Data Services (FMDS) that will replace TFMS</i>	• Flight Operators (via SWIM) • Airport Authorities (via SWIM)
<u>One-Way Interfaces</u> • Airport Surface Detection Equipment Model X (ASDE-X) / Airport Surface Surveillance Capability (ASSC) • Standard Terminal Automation Replacement System (STARS) / Terminal Automation Modernization & Replacement (TAMR) • Tower Data Link Services (TDLS) via FAA Telecommunications Infrastructure (FTI)	



Surface Scheduling – Surface Management Display (SMD) Overview

The SMD provides a set of tools that help controllers:

- Improve schedule efficiencies and block time planning
- Maximize runway, taxiway and gate/stand utilization through surface scheduling and metering
- Decrease delays & heighten performance during irregular operations
- Identify trends and recurring operational problems
- Forecast the impact of future operational events
- Understand usage of airport resources
- Improve post-operational analysis leading to automation or process improvements
- Facilitate long-term planning



TFDM Air Traffic Control Tower (ATCT) High Level Footprint

ATCT Cab



TFDM Controller Workstations with Touchscreen Displays

ATCT Equipment Room

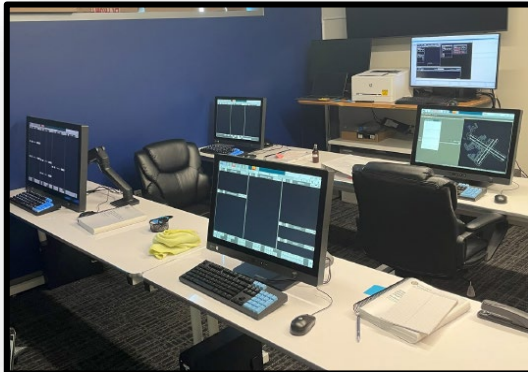


TFDM Equipment Racks



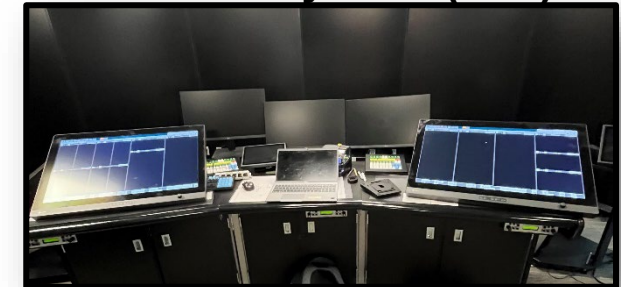
TFDM Monitor & Control (M&C) Workstation, System Support Workstation (SAS-1), OPS and Support Printer

TFDM Training Room



TFDM Training System (TTS1) and System Support Workstation (SAS2)

Tower Simulator System (TSS) Area



TFDM Training System 2 (TTS2)
(TTS2 is co-located but not connected to the Tower Simulation System (TSS))

****if applicable to site****



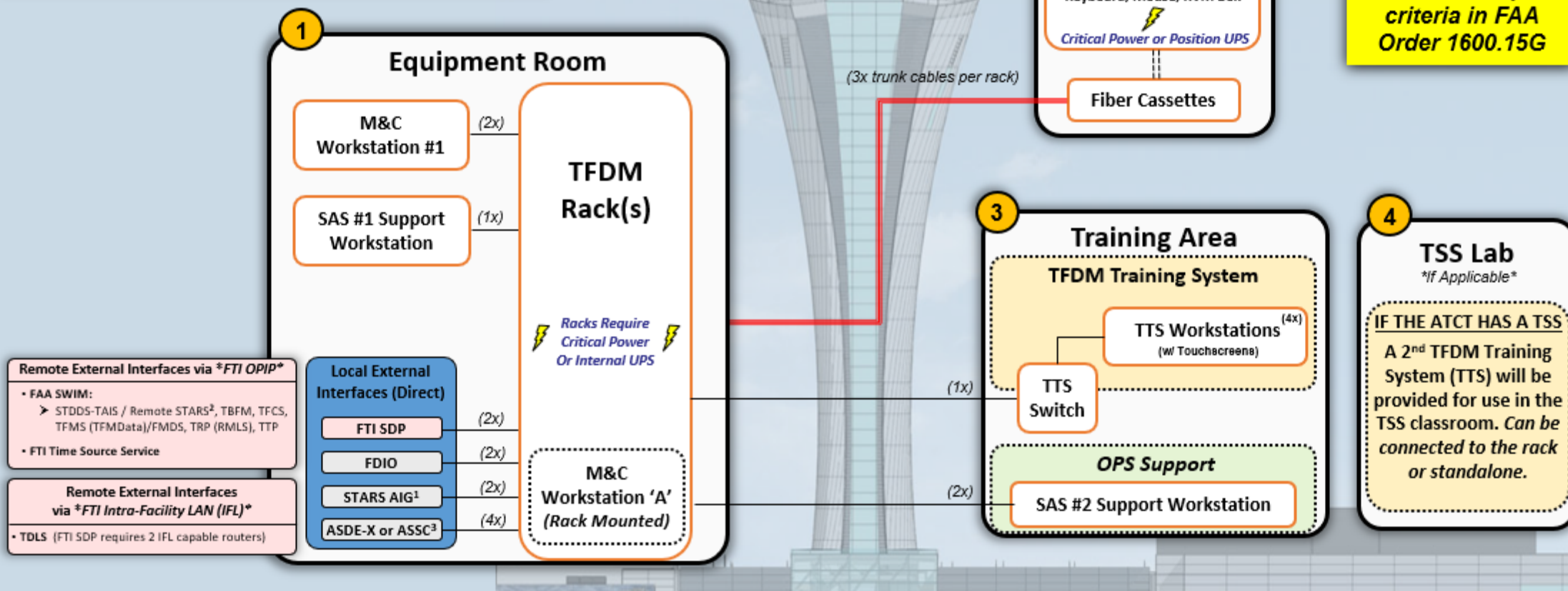
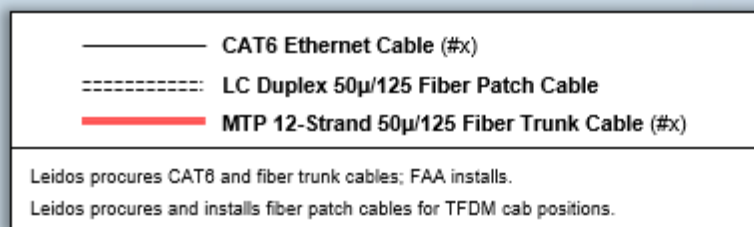
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TFDM Core Hardware Components

Element	TFDM Sites 1-36 Model	TFDM Sites 37 - 89 Model	Vendor	Top Level Vendor Part number
Rack Workstation	HPE DL20 Gen10	HPE DL20 Gen11 (XEON 6000, NVMe)	HPE	P65392-B21
Rack Server	HPE DL360 Gen10	HPE DL320 Gen12 (XEON 6000, NVMe)	HPE	P71437-B21
TTS Server	HPE ML350	HPE DL320 Gen12(XEON 6000, NVMe)	HPE	P71437-B21
TTS Workstation	HP Z2/Z240	HP Z2 Mini G1i	HP	A96ZQAV
TTS Network	Cisco SG300/SG350	Juniper EX4100-F-12T	HPE	EX4100-F-12T-TAA
Ops Network	Aruba 3810M	Juniper EX4400 – 48MP	HPE	EX4400-48MP-TAA
Network Storage	NetAPP FAS2650 15 TB	NetAPP AFA A20, NVMe 67 TB	Netapp	AFF-A20-001
Network Storage	NetAPP FAS2650 30 TB	NetAPP AFA A20, NVMe 67 TB	Netapp	AFF-A20-001
Power	EATON UPS M2 NIC	EATON UPS M3 NIC	Eaton	NETWORK-M3
Power	EATON PDU	EATON PDU – Firmware Update	Eaton	No Part Number Associated to firmware
Printer	HP Laser Jet Pro 200 Color M254DW		HP	NA
Controller Keyboard	WASD	Max Keyboards Nighthawk Z 104-Key	Maxkeyboard	MK-NHZ-BRN-FAA-TFDM
KVM Extender	G&D DP1.2-VISION-FIBER	G&D DP1.2-VISION-FIBER	G&D	A1120309
Rack	Emcor	Emcor	Emcor	AS-150622-36U
Rack KVM	ATEN KVM (LCD)	ATEN KVM (LCD)	Aten	CL6708MW
Controller Display	EIZO 24 Touch Raptor	EIZO 24 Touch Raptor	Eizo	RP2425-009
Controller Display	EIZO 32 Touch Raptor	EIZO 32 Touch Raptor	Eizo	RP3225-001
M&C/Spt WS Display	HP 32 Non-Touch	ViewSonic 32" ColorPro™ 4K UHD IPS Monitor	Viewsonic	VP3256-4K
Fiber Cassette	Blackbox 36:3	FiberTronics 36:3	Fibertronics	UPC-36LCK37S



TFDM Physical Architecture



- ★ Configuration A
- Configuration B

