TFM
Release 5
Unified Delay Program (UDP)

Federal Aviation Administration

Presented to: FSM Users

Date: October 6, 2010

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Agenda

- **Introduction** ⬅
- **TFMS R5 UDP Overview**
- **FSM Release**
- **Summary of R5 CDM ICD Updates for UDP**
- **UDP Testing**
- **Questions**

Release 5

GO

XFS	UDP
• Allow TFMS to issue amendments for pre-departure rerouted flights directly from the TSD • ERAM will identify that a flight is included in a reroute, and will indicate the portion of its route that is "protected"	• Unified (Ground) Delay Program combines the DAS and GAAP GDP types into one. • DAS and GAAP will both still be available in the Release 5

- **Targeted deployment Spring 2011**

UDP Overview

- **UDP is a new "Delay Mode" applicable to GDP and AFP TMIs. Its goal is to improve handling of Pop-Up flights thus increasing the overall equity of delays and the stability of GDP and AFP delay times. UDP based programs should require fewer revisions due to the effect of pop-ups.**

- **Current delays modes of DAS and GAAP will be retained.**
  - DAS – The Original Delay Mode
    - Best used when original demand exceeds capacity.
    - Pop-Ups become additional demand above the Program Rate, thus requiring periodic revisions to bring demand and capacity back into balance.
  - GAAP
    - Best used when original demand is below capacity, but it is anticipated that significant numbers of pop-ups will cause capacity to be exceeded.
    - Pop-Ups given available unassigned slots if available, max delay if no unassigned slots remain. In R5 the DAS delay is applied to the ETA for this determination. Thus if known traffic received delay, then pop-ups will receive delay.

UDP Overview

- **UDP**
  - Suitable for either the DAS or GAAP scenario, or scenarios in which some hours would be better served by DAS and other hours by GAAP.

- **General Premise**
  - A certain amount of capacity is retained for projected pop-ups when the program is originally issued.
    - TFMS/FSM will provide a Historical Pop-Up Projection via the ADL. This projection is based on history for each hour for that day of the week. The projection changes each hour.
    - When the program is modeled, the FSM user specifies a Reserved Rate, which will be used to reserve capacity within the program for projected pop-ups. The user can use one of the provided Historical Pop-Up data, or can modify the estimate based on operational needs (special events, holidays, etc).
    - Program modeling will create unassigned slots based on the reserved rate. It is important to note that the unassigned slots are not necessarily in the same time period as the reserved rate values. The reserved rate specifies when the pop-ups DESIRE to arrive. The unassigned slots created consider the overall amount of delay that is issued to known traffic.
      - Example: If known flights are receiving two hours delays, then the unassigned slots created for a given reserved rate will already incorporate a two hour delay.

UDP Overview

- **General Premise (Continued)**
  - FAA may specify additional parameters to control a UDP
    - Max Delay – The maximum delay a pop-up would ever receive
    - Target Delay / Delay Multiplier – An adjustment to the avg delays issued in the program. If the avg delay within a 15 minute increment is 60 minutes, and the delay multiplier is 1.5, the target delay for a pop-up in the increment would be 90 minutes.
  - As pop-up flights become known to the system they are given unassigned slots based on specific parameters.
    - In a GAAP the flight is given the first available unassigned slot between its (ETA + DAS delay) and its (ETA + Delay Limit). This may result in delays from DAS Delay up to Delay Limit. (Currently a flight in a GAAP might get no delay even if known flights received delay).
    - In a UDP the flight is given the first available unassigned slot between its (ETA + Target Delay) and its (ETA + Delay Limit), where Target Delay = DAS Delay * Target Delay Multiplier. This may result in delays from Target Delay up to Delay Limit.
    - In both cases if no unassigned slot is available then the flight receives the Max Delay.
  - In order to insure that unassigned slots do not go unused, adaptive compression will move up flights if an unassigned slot is at risk of being unused.
  - Exemption criteria no longer applies to pop-ups. ALL pop-ups departing controllable facilities (20 US and Canada) will be treated as Non-Exempt regardless of the exempt status of the program. (This will apply to GAAP and UDP)
  - Pop-Up given an unassigned slot will be sub-able. Pop-up given a DAS delay will not be sub-able.

UDP Overview

- **Automation Issues Users Should Review**
  - Timeliness of Flight Information
    - Since all pop-ups will be non-exempt, it is to the users benefit to get flight data to TFMS prior to the program being issued.
  - Communications of Delays for Pop-Ups
    - When a user does create a pop-up, a delay will be communicated via existing unsolicited message mechanisms. Users should insure that these delays are communicated in the same manner as any other program issued delays.
  - Pop-Ups and Subs
    - Pop-Ups given an unassigned slot will be sub-able.
  - Advisories
    - Advisories will indicate the delay mode of the program (DAS, GAAP, UDP). You may want to consider communicating this to your users, at least until some future time when UDP becomes the norm.
  - OIS
    - In addition to existing DAS delays, OIS will indicate the target delay for each 15 minutes.

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- **FSM Release** ←
- **Summary of R5 CDM ICD Updates for UDP**
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FSM 9.0 Release / Compatibility

- **Due to new modeling capabilities and data structures, UDP requires release of a new FSM.**
  - FSM 9.0 (**Beta**) will be provided to users concurrently with the availability of an R5 test environment. (addressed later in this presentation)
  - Users should be aware that this will NOT be the final deployment build.
  - Additional Beta versions may be released throughout the test cycle should critical issues be identified.
  - A final deployment version will be provided a few weeks prior to R5 deployment.
- **Changes in FSM 9.0.x Include**
  - Display of Historical Pop-UP Values < Directly affects NAS Users
  - UDP Modeling Capabilities < Directly affects NAS Users
  - UDP Monitoring Capabilities < Directly affects NAS Users
  - UDP Parameters Display < Directly affects NAS Users
  - Workflow Changes In Program Issuance < Minimal Effect on NAS Users
  - Changes In Coversheet Displays < Minimal Effect on NAS Users
  - General Bug Fixes

FSM 9.0 Release / Compatibility

- **FSM / OS Compatibility is Unchanged**
  - FSM Formal Test Platforms
    - RHEL 5.4 64bit (Server and Client), utilizing Sun/Orcale JVM 1.5.0_06 32bit
      - (Note that bugs in 5.0-5.3 affect FSM Client)
    - Windows XP 32bit (Client Only), utilizing Sun/Oracle JVM 1.5.0_06 32bit
- **Common Platform Questions (Windows 7)**
  - Current Installer Does Not Support Win7, **This Will Be Resolved**
    - You will have to use the "without JVM install" option and provide your own JVM
  - Java Only Supports Windows 7 Utilizing JVM 1.6.0_14 and later.
    - You must supply your own JVM, FSM installer only provides the test baseline JVM.
  - Win7 is not a formally tested platform, nor is FSM tested on Java 1.6.
    - Multiple NAS users successfully using Win7 and Java 1.6 via manual install
  - Although use of 64bit OSs poses no issues, it is recommended that you use the 32bit JVM even on a 64bit OS.
    - 64bit JVM offers no specific advantage but requires memory heap setting to be double what is used for 32bit JVM.
    - This is an issue that Sun/Oracle plan to address in Java 1.7.

FSM 9.0 Release / Compatibility

- **Use of FSM 8.8 / 8.9 with R5**
  - This is the combination you would be running if you do not update FSM prior to the deployment of R5.
  - Once R5 is deployed FSM 8.8/8.9 will have the following compatibility issues.
    - You will not be able to view the Historical Pop-Up values
    - You will not be able to model a UDP based program
    - You will not in some cases be able to load parameters correctly in GDT mode
    - You will not be able to correctly view parameters associated with a UDP based program
    - You will not get the same results when modeling programs (fairly minor differences)

  - The following capabilities will still work without any problem.
    - You will be able to monitor (time-line/bar-graph) a program, including UDP based programs.

FSM 9.0 Release / Compatibility

- **Use of FSM 9.0 with R4**
  - This is the combination you would be running if you deploy FSM prior to the deployment of R5.
  - Prior to deployment of R5, FSM 9.0 will have the following compatibility issues.
    - You will not get the same results as FAA when modeling programs (fairly minor differences)
    - Dialogs related to Historical Pop-Up Demand will display Zeros.

  - The following capabilities will still work without any problem.
    - You will be able to monitor a program, including UDP based programs.

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- **TFMS R5 UDP Overview**
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- **Summary of R5 CDM ICD Updates for UDP** ←
- **UDP Testing**
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R5 CDM ICD Updates for UDP

Link to R5 CDM ICDs

Before October 15, 2010

http://cdm.fly.faa.gov/ad/CDM-GDP_specs.htm

After October 15, 2010

http://flycdm.org/ad/CDM-GDP_specs.htm

7 CDM ICDs updated to incorporate UDP changes

1. Effective Spring 2011

2. CDM Message Protocol ICD reformatted; NO CHANGES

3. Advisories and General Messages ICD replaces the GDP Advisories.

- **Contains ALL TFMS advisories**

- **Section 1.2 contains Delay Program advisories**

- **Section 1.3 contains Reroute advisories**

4. All other ICDs are formatted as before

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R5 CDM ICD Updates for UDP

ICD	Major R5 Content Change Summary (see ICD Change History for minor changes)
ICD for Substitutions during GDPs, GSs and AFPs v3.2	**Yes** - expanded GAAP Control Type definition to include both GAAP and UDP delay modes; added UBRG control type; added/expanded the following sections to include UDP delay mode - Section 3.3 Delay Computation for Pop-Ups - Section 4.1.8 Substituting Pop-up Flights - Section 7.19 UDP Bridging Update (new) - Section 7.8 GAAP Slot Assignment
ADL File Specification v12.3	**Yes** - added historical pop-up prediction + UBRG control type
FADT file Specification v4.2	**Yes** - added new Delay_Multiplier parameter + UBRG control type + multiple changes to reflect "UDP" Delay_Mode value
FSM ADL Parameters Spec v5.4	**Yes** - added new parameters (Reserved Rate, Delay_Multiplier, Earliest Slot) + added "UDP" as a Delay_Mode value
ADL Delta and Historical File Specification v1.4	**Yes** - added Section 2.4 Historical Popups
CDM Message protocol v2.3	**No** - reformatted but interface has <u>not</u> changed
Advisories & General Messages v1.1 (replaces GDP Advisory 8.2 ICD reformatted and expanded to include Reroute Advisories and General Messages)	**Yes** (see next slide for example of changes) - Expanded Delay Assignment Mode to include 'UDP' - Revised Reroute Advisory to include Protected Segments and TMI ID

R5 Advisory Format Change Summary

Sample GDP Advisory - Proposed
(Line Numbers and Text in Parenthesis for Reference Only)

```
1.    ATCSCC ADVZY ### ATL/ZTL 12/27/2002 CDM PROPOSED GROUND DELAY PROGRAM
2.    CTL ELEMENT: ATL
3.    ELEMENT TYPE: APT
4.    ADL TIME: 1423Z
5.    DELAY ASSIGNMENT MODE: [DAS] or [GAAP] or [UDP]
6.    ARRIVALS ESTIMATED FOR: 27/1600Z – 27/2159Z
7.    ANTICIPATED CUMULATIVE PROGRAM PERIOD: 27/1600Z – 27/21
8.    ANTICIPATED PROGRAM RATE: 92/90/90/80/80/80
9.    ANTICIPATED POP-UP FACTOR: 2/2/2/2/2/2              (Optional)
10a.  FLT INCL: ALL CONTIGUOUS US DEP                    (US Only)
10b.  FLT INCL: CONTIGUOUS US DEP CARRIER xxx ONLY [AND] (US Only)
10c.  FLT INCL: CONTIGUOUS US [JET] or [PROP] DEP ONLY [AND]  (US Only)
10d.  FLT INCL: CONTIGUOUS US DEP OVER ARR FIX <FIX> ONLY (US Only)
11a.  FLT INCL: ALL CNDN AND CONTIGUOUS US DEP           (Canadian Only)
11b.  FLT INCL: CNDN AND CONTIGUOUS US DEP CARRIER xxx ONLY [AND] (Canadian Only)
11c.  FLT INCL: CNDN AND CONTIGUOUS US [JET] or [PROP] DEP ONLY [AND] (Canadian Only)
11d.  FLT INCL: CNDN AND CONTIGUOUS US DEP OVER ARR FIX <FIX> ONLY (Canadian Only)
12.   DEP SCOPE: [distance] or [(keyword) Zxx …]
13.   ADDITIONAL DEP FACILITIES INCLUDED: Zxx …          (Optional)
14.   EXEMPT DEP FACILITIES: Zxx …                       (Optional)
15.   EXEMPT AFP: <FCA> …                                (Optional)
16.   CANADIAN DEP ARPTS INCLUDED: Cxxxx …               (US Only)
17.   DELAY ASSIGNMENT TABLE APPLIES TO: Zxx             (US Only)
18.   DELAY LIMIT: 1234                                  (Optional)
19.   ANTICIPATED MAXIMUM DELAY: 365                     (Optional)
20.   ANTICIPATED AVERAGE DELAY: 91                      (Optional)
21.   IMPACTING CONDITION: impacting condition advisory text
22.   COMMENTS: free text
23.   USER UPDATES MUST BE RECEIVED BY: 27/1500Z
24.   271424-271559
```

Added UDP as option for Delay Assignment Mode.

The following Delay Program advisories are changed:

- **GDP Proposed**
- **GDP Actual**
- **AFP Proposed**
- **AFP Actual**

Reroute Advisory revised for new R5 TFMS-ERAM interface - Execution of Flow Strategies (XFS)

- **Protected segment is used to determine reroute conformance**
- **ERAM automation will not amend *protected segment* portion of route**

Sample Reroute Advisory Message
(Line Numbers for Reference Only)

```
1)  ATCSCC ADVZY 057 DCC 02/28/2003 PLAYBOOK – RQD/FL
2)  IMPACTED AREA: IAH DAS/STROS STAR
3)  REASON: TABLETOP
4)  INCLUDE TRAFFIC: REROUTE ZTL ZDC ZJX ZMA ZME ZID ZOB ZBW ZNY DEPARTURES TO IAH HOU
5)  VALID TIMES: ETD  START: 281700  END: 282000
6)  FACILITIES INCLUDED:/ZJX/ZMA/ZTL/ZDC/ZME/ZID/ZOB/ZNY/ZBW/ZFW/ZKC/ZAU/ZMP/ZAB/ZDV
7)  PROBABILITY OF EXTENSION: LOW
8)  REMARKS:THIS IS THE IAH DAS PLAYBOOK
9)  ASSOCIATED RESTRICTIONS:
10) MODIFICATIONS:
11) ROUTE:
    ORIG    DEST    ASSIGNED ROUTE
    ZTL     IAH     MGM J37 >HRV LLA VUH PSX< GLAND2 IAH
    ZTL     HOU     MGM J37 >HRV LLA VUH PSX< LISSE5 HOU
    ZDC     IAH     GVE J37 >HRV LLA VUH PSX< GLAND2 IAH
    ZDC     HOU     GVE J37 >HRV LLA VUH PSX< LISSE5 HOU
    ZJX     IAH     SZW J2 SJI >HRV LLA VUH PSX< GLAND2 IAH
    ZJX     HOU     SZW J2 SJI >HRV LLA VUH PSX< LISSE5 HOU
    ZJX     IAH     SRQ Q100 LEV >LLA VUH PSX< GLAND2 IAH
    ZJX     HOU     SRQ Q100 LEV >LLA VUH PSX< LISSE5 HOU
    ZMA     IAH     LAL J73 SZW J2 SJI >HRV LLA VUH PSX< GLAND2 IAH

12) TMI ID: RRDCC057
13) 281700-282000
```

- **Protected Segment shown between > <**
- **TMI ID added**

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Test Environments

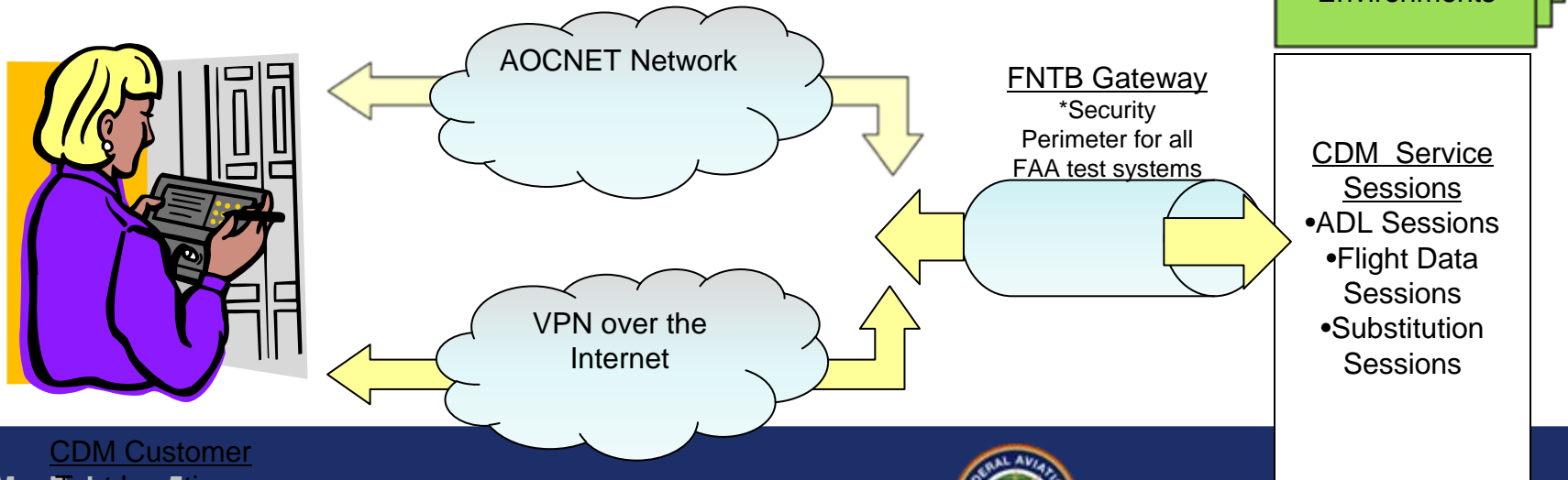- **TAP stands for (TFMS Auxiliary Platform System (TAPS)**
  - Each TAP is a Separate Test Environment loaded with either the current operational version of software (Release 3) or the next version to be released
  - A TAP will be configured with the UDP software for CDM user community pre-production testing
- **The TAPS, by design, are isolated from the operational system**
  - Each is configured to receive live data feed from a message forwarding component of the operational system.
  - One way flow of data (live flight data to a TAP)
  - No data from a TAP is allowed to flow into the operational system
- **Access to the TAPS for CDM customers requires a separate connection to be created**
  - Current Operational CDM network connections (Ops) are not permitted to access the TAPS
  - A separate non-operational service delivery point or gateway (referred to as the FAA National Test Bed or FNTB) provides isolation from the operational system and access to the TAPS

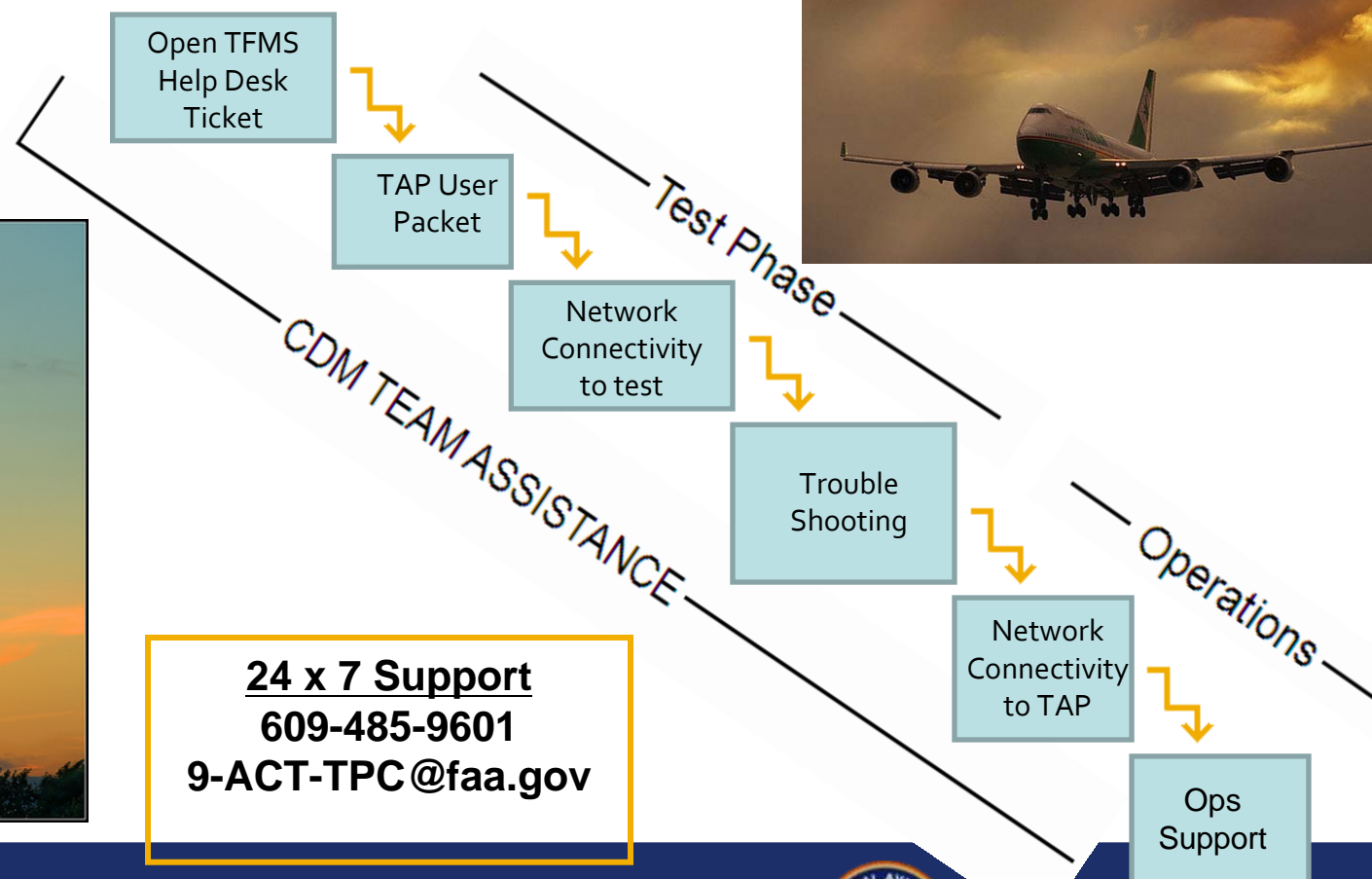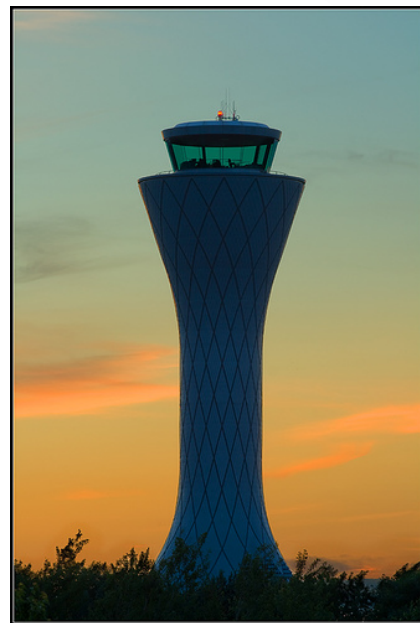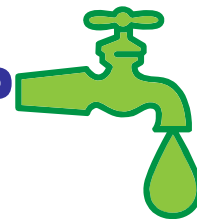# Establishing Network Connectivity to the Test Environments

- **Avoid the rush - Act Now to get test connectivity established !!**
  - Connectivity to the test environments cannot be supported over operational CDM networks
- **Configurations are in place now for the VPN connections to begin**
  - Change request forms that contain the IP addresses of the new services have been distributed to everyone
- **ARINC will be establishing AOCNET customer access to the TAPS**
- **The connectivity decision to use either a VPN or AOCNET is a business decision each CDM participant can make**

Test Environments

AOCNET Network

FNTB Gateway
*Security Perimeter for all FAA test systems

CDM Service Sessions
- ADL Sessions
- Flight Data Sessions
- Substitution Sessions

VPN over the Internet

CDM Customer Test Locations

Specialized CDM Support group:

- Manages administration and documentation for customer connections (CDM, ASDI, new sites)
- Establishes network connectivity
  - FNTB VPN Testing
- Performs data analysis and troubleshooting
- Provides Operational Support

Client Connection Team Support for TAP

Test Phase

CDM TEAM ASSISTANCE

Operations

Open TFMS Help Desk Ticket

TAP User Packet

Network Connectivity to test

Trouble Shooting

Network Connectivity to TAP

Ops Support

24 x 7 Support
609-485-9601
9-ACT-TPC@faa.gov

Test Support Approach

- **TAP to be available 24X7, starting   Jan 3, 2011**

- **Standard delay programs, consisting of DAS, GAAP and UDP types to be input daily**

  - details to be posted Nov 19, 2010

- **Unique requests for delay programs to be coordinated via call to the TFMS Help Desk, allow up to 2 days before setup**
  - Standard ground delay program definitions remain posted
  - Any unique setup is announced and then posted until expired

Software versions

- **Release 5 UDP to be posted on Dec 13, 2010**

Any updates after this date will be accompanied with an email to broadcast the new version number, and list of changes

For More Information

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Administration**