

Airport CDM and the ACDM Toolbox



CDM@USA

Project ACRP 10-27

*Enhancing the Management of Adverse Conditions
with Airport Collaborative Decision Making*

The National Academies of
SCIENCES • ENGINEERING • MEDICINE



TRANSPORTATION RESEARCH BOARD

ACRP | AIRPORT
COOPERATIVE
RESEARCH
PROGRAM

Agenda

- ✈ **What is Collaborative Decision Making?**
- ✈ **Benefits of Airport CDM**
- ✈ **ACDM Operations Process in a Nutshell**
- ✈ **ACDM Planning Process in a Nutshell**
- ✈ **Benefits to Stakeholders**
- ✈ **Examples of Advanced Collaboration**
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- ✈ **The ACDM Toolbox**
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- ✈ **How to Use the Toolbox in Real-Time Ops**
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What is Collaborative Decision Making?

Per the International Civil Aviation Organization (ICAO):

“A process applied to support activities such as demand/capacity balancing. CDM can be applied across the timeline of activities, from strategic planning to real-time operations. CDM is not an objective but a way to reach the performance objectives of the processes it supports.”

Source: ICAO Doc 9971, 2018

Per the Federal Aviation Administration (FAA):

“CDM is an operating paradigm where Air Traffic Flow Management (ATFM) decisions are based on a shared, common view of the National Airspace System (NAS) and an awareness of the consequences these decisions may have on the system and its stakeholders.

There are two central tenets to CDM: that better information will lead to better decision-making, and tools and procedures need to be in place to enable air navigation service providers and the flight operators to more easily respond to changing conditions.”

Source: FAA/Industry CDM Stakeholders Group (CSG)

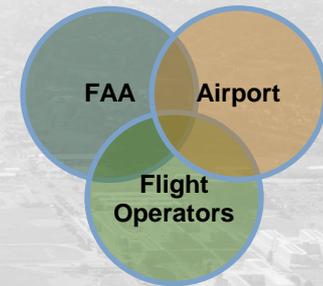
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What is Collaborative Decision Making?

In more practical terms...

CDM is a process with a focus on capacity and efficiency that typically consists of two key ideas:

- 💡 Air Traffic Management (ATM) should be based on the same flight data updated in real-time and shared between the different stakeholders.
- 💡 Decision-making should be coordinated and collaborative, especially during adverse conditions



Without CDM



With CDM

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What is Collaborative Decision Making?

CDM, A-CDM or ACDM?

- **CDM** stands for Collaborative Decision-Making. It refers to the concept of CDM in a general and non-airport specific way. This acronym is used, for instance, for the FAA/Industry “CDM Stakeholders Group” (CSG).
- **A-CDM** stands for Airport Collaborative Decision-making. It is the acronym used by the ICAO and other organizations when talking about the concept of Airport CDM.
- **ACDM** also stands for Airport Collaborative Decision-Making. This acronym was used in ACRP Report 137. It is suggested to use it when talking about Airport CDM in the United States in order to differentiate it from other ACDM initiatives that might be more ATFM-centric (e.g., EUROCONTROL, Toronto Pearson).

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Benefits of Airport CDM

❖ The most significant and powerful aspect of Collaborative Decision Making (CDM) is the **in-depth collaboration** it implies and promotes. Airport CDM offers a framework to:

- **Share information** on operations transparently;
- **Agree on collaborative strategies** to address adverse events;
- **Decide together** on operational issues in real-time; and
- **Continue improvement** through lessons learned process.

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Benefits of Airport CDM

❖ By the way... what is the “silo effect”?

Phil S. Ensor explained in *The Functional **Silo** Syndrome* (1988) about organizational difficulties due to employees working in lack of communication that “people across the organization do not share common goals. Their goals are primarily functional. Communication is heavily top-down on the vertical axis. Little is shared on the horizontal axis, partly because each function develops its own special language and set of buzzwords.”

ACDM helps to mitigate the “silo effect” in airport operations.

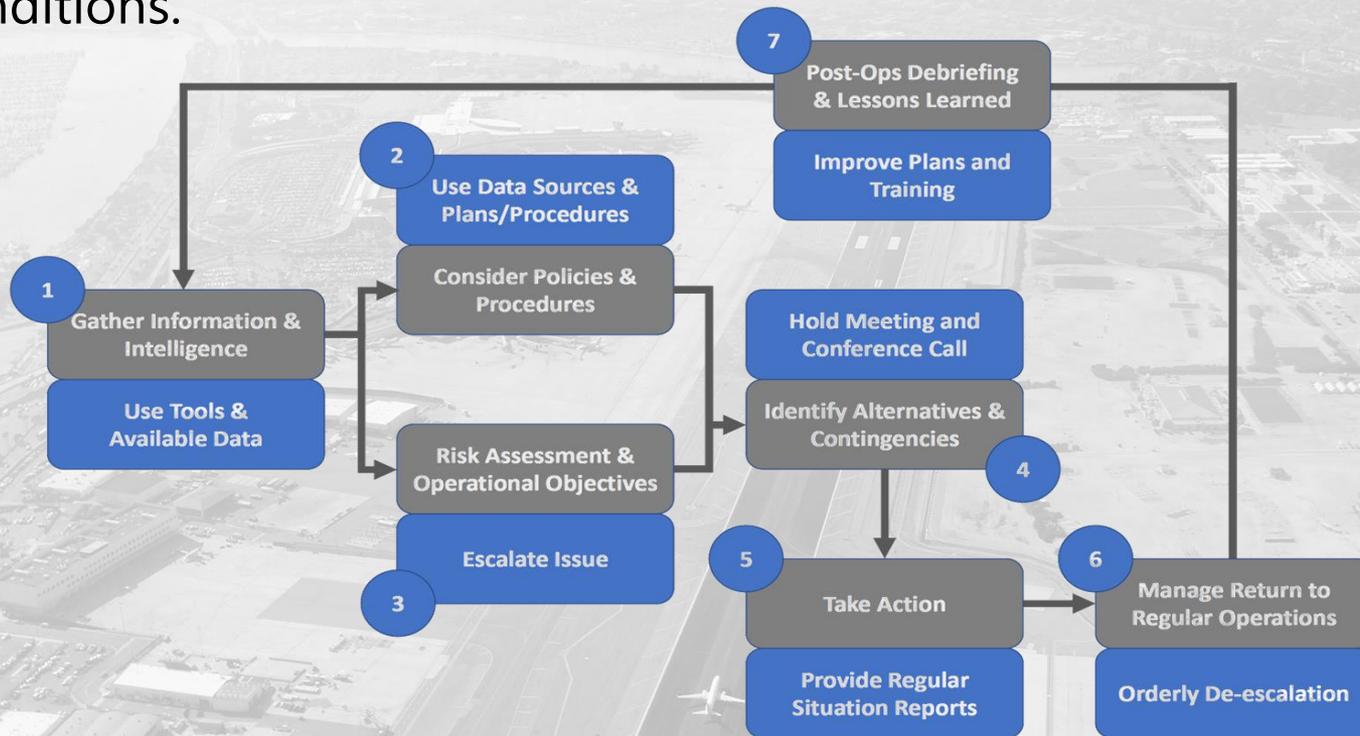
Benefits of Airport CDM

- ❖ The main takeaways of ACDM are the following:
 - It aims to **address operational issues together** rather than in silos.
 - It **brings together** all the internal and external stakeholders.
 - It establishes and strengthens **team building and trust**.
 - It promotes **knowledge and experience sharing**.

ACDM enhances operational resilience and efficiency.

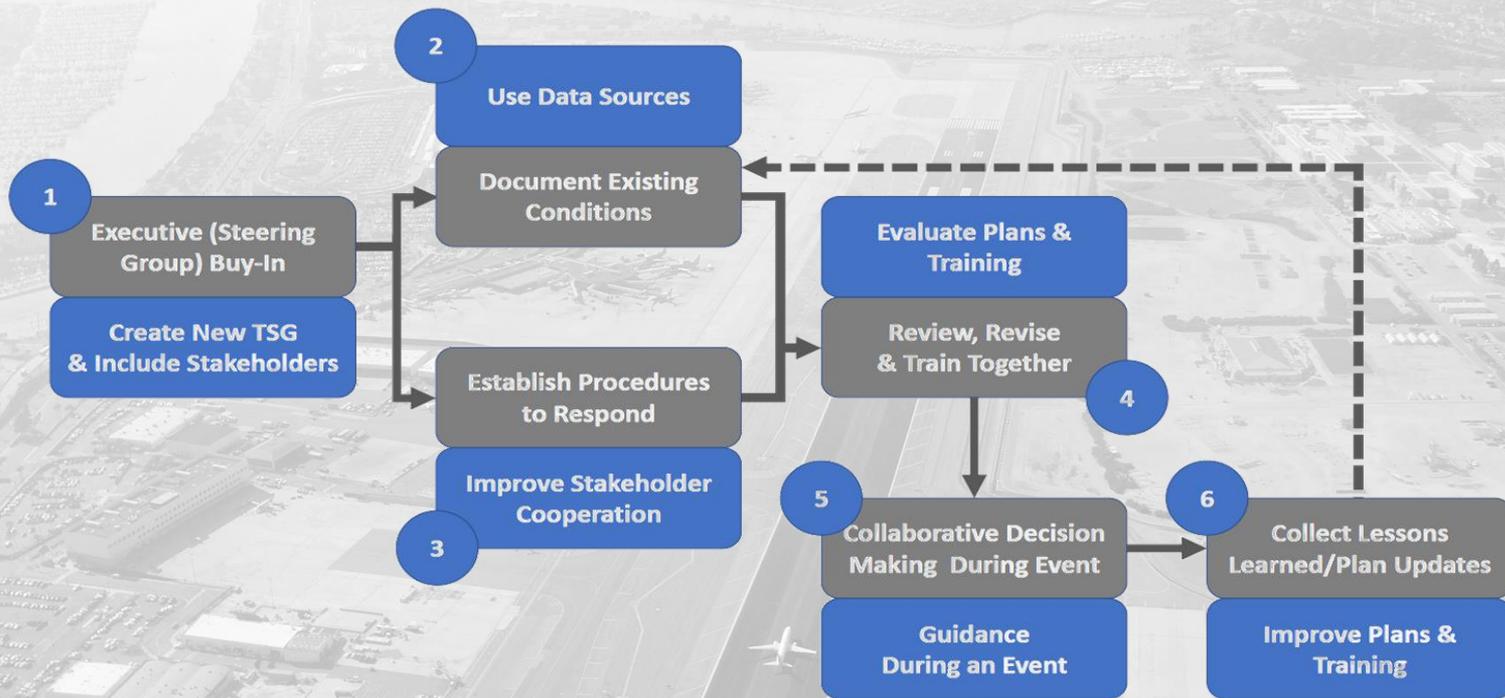
ACDM Operations Process in a Nutshell

- ❖ The ACDM operations process is the way the stakeholders of the real-time operations should interact together to manage adverse conditions.



ACDM Planning Process in a Nutshell

- ❖ The ACDM planning process is an adverse condition contingency planning process to be used for developing and improving event-specific collaborative plans and procedures.



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Benefits to Stakeholders

❖ Main Direct Benefits

- Predictability & resource management
- Early warning and anticipation
- Operations resilience

❖ Selected Indirect Benefits

- Enhanced teamwork (organic resilience)
- Improved operational data
- Mitigation of the construction impacts
- Overall airport brand enhancement

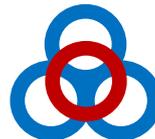


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Examples of Advanced Collaboration

- ✓ **Dallas-Fort Worth Intl. Airport (DFW)** and the airports of the Southwest region susceptible to accommodate flights in diversion share real-time information on their capacities and capabilities for planning and coordination purpose esp. in case of a massive diversion from DFW.
- ✓ **Philadelphia Intl. Airport (PHL)** ATCT and the Airport maintain an airspace and airfield dashboard shared with the stakeholders through a Google document. The dashboard provides a synthesis of the latest information on the status of the airport, weather information, flight information, etc.
- ✓ The **O'Hare Modernization Program (OMP)** and **runway construction projects at JFK** are among of successful "CDM-like" coordination that has smoothed the effects of the construction on operations.
- ✓ **Airport emergency management** is a good example of a mature collaborative process in the U.S. ACRP reports document case studies and provides guidance to a collaborative approach of emergency planning.

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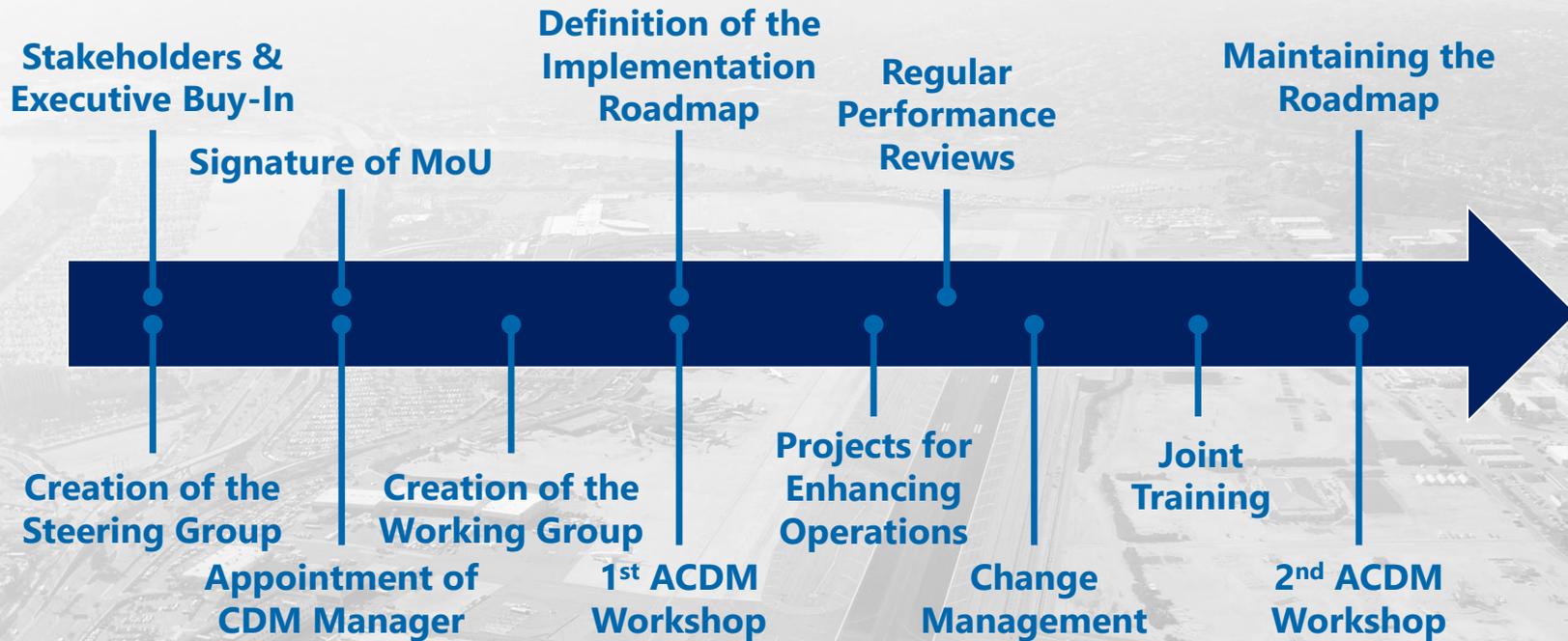
Examples of Advanced Collaboration

What about outside of the United States?

- ✓ [Toronto Pearson](#) is in the process of implementing its Airport CDM process for Air Traffic Flow Management purpose in close collaboration with its main air carriers, ground handling service providers, and NAV CANADA.
- ✓ [CDM@CDG](#) is a successful initiative that was started in 2005 at Paris-CDG on both the ATFM aspects and the management of adverse conditions. The ongoing implementation roadmap CDM@CDG (2nd ACDM roadmap) features over 100 projects from the different stakeholders labeled as “CDM@CDG”.
- ✓ Several hub airports have developed advanced **integrated airport operations centers** to support the ACDM process. These airports include London Heathrow (LHR), Singapore Changi (SIN), and BH Airport (CNF).
- ✓ The internal and external stakeholders should have access to the real-time status of airport facilities and flights, as well as to the ACDM documentation. Many airports have created a **CDM portal or website** for this purpose.

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How to Implement ACDM?



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The ACDM Toolbox contains extensive guidance and various templates to support the implementation effort.

The ACDM Toolbox

What is the **ACDM Toolbox**?

- A **“go-to” material** for **effectively implementing ACDM** to enhance the management of adverse conditions.
- A **support** providing resources and tools to **effectively use** ACDM for planning purposes and during real-time operations.
- A **library** of guidebooks, quick reference sheets, case studies, tools, and templates with a focus on **collaborations in operations**.
- A **“virtual briefcase”** that can be used locally for disseminating collaborating procedures and plans to the stakeholders.

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The ACDM Toolbox

What are the objectives of the **ACDM Toolbox**?

- Discuss the benefits of Airport CDM for mitigating disruptions;
- Present best practices and techniques for engaging stakeholders;
- Provide guidance on how to implement the ACDM process locally;
- Provide guidance on how to foster collaboration in operations;
- Provide tools & templates for communication & decision-making;
- Create a consolidated and comprehensive glossary of terminology.

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Contents of the Toolbox

ACRP 10-27 – Airport Collaborative Decision Making for Enhancing the Management of Adverse Conditions

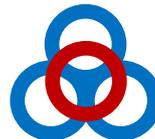
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About the Project

Learn	Implement
Train	Operate

Glossary Abbreviations eLibrary Help



Contents of the Toolbox



About the Project: Basic information about the development of the toolbox.

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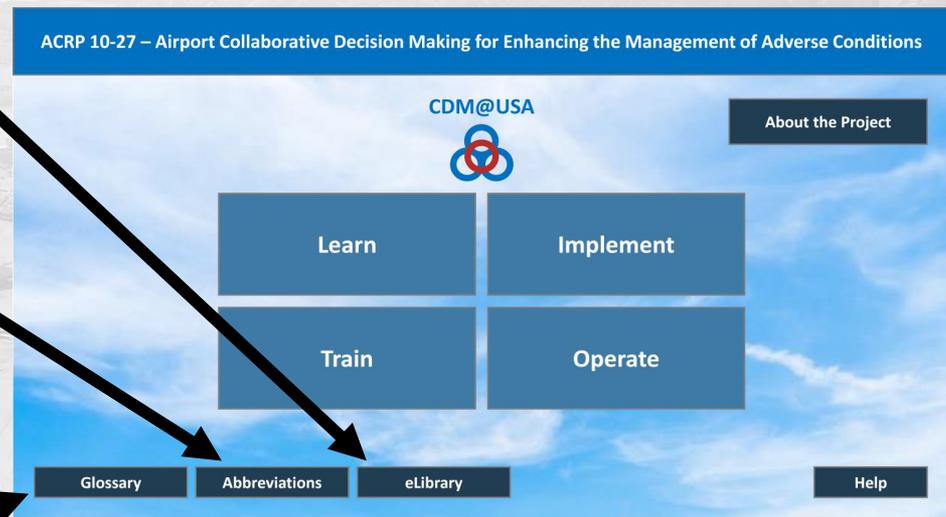
Help: You can find here the user manual of the toolbox.

Contents of the Toolbox

Glossary: This section presents the definition of important terms and concepts used in the toolbox.

Abbreviations: This shortcut provides access to a large inventory of abbreviations used in aviation operations and throughout the toolbox.

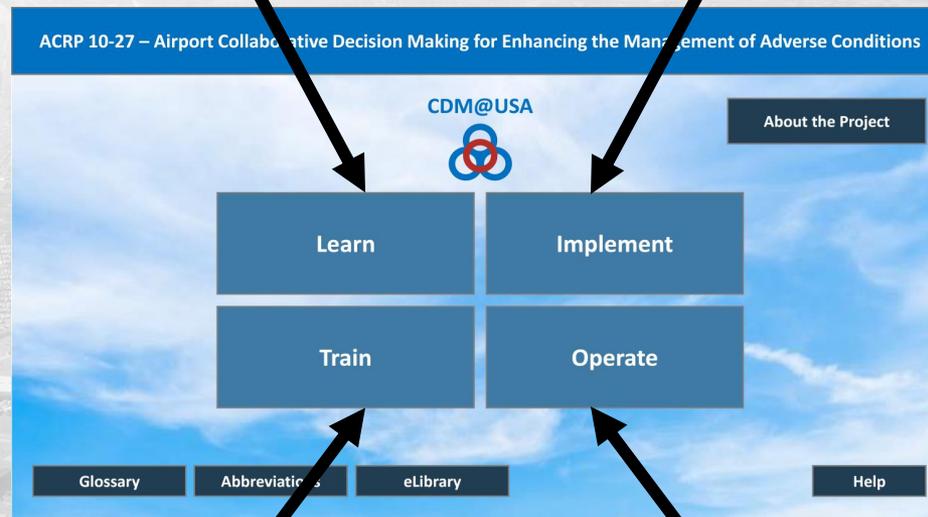
eLibrary: This shortcut provides access to an electronic library featuring documents on adverse conditions and collaboration.



Contents of the Toolbox

Learn presents the basics about ACDM and explains its benefits.

Implement provides guidance on how to implement ACDM at your airport.

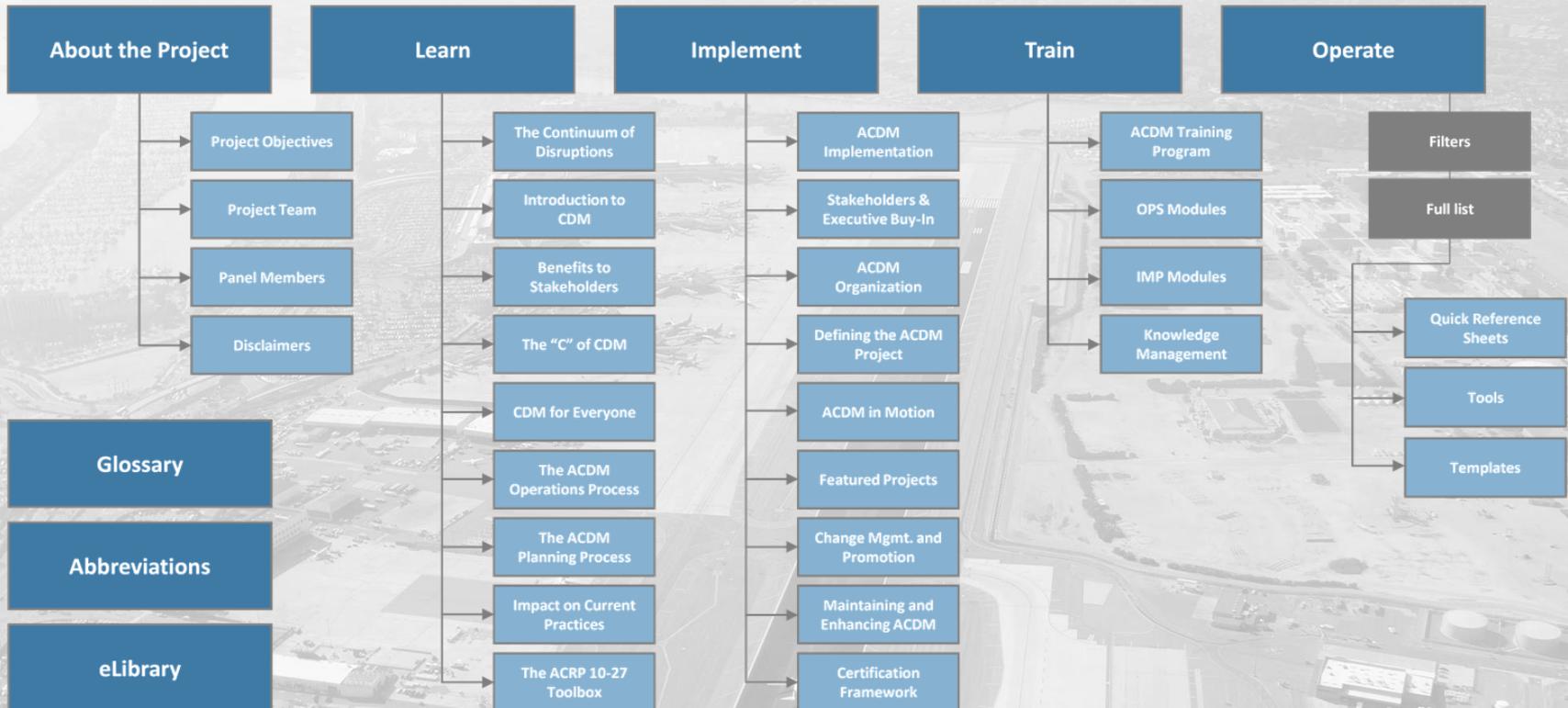


Train provides a training program on ACDM and fostering collaboration.

Operate provides tools, templates, and about 50 QRS (quick reference sheets).

Contents of the Toolbox

Here is a more detailed overview of **the contents of the toolbox**:



How to Use the Toolbox for Planning

- Airport CDM has a specific focus on operations planning as it aims to **enhance operational readiness** and **enable collaborative plans and procedures** across the stakeholders of airport operations.
- The toolbox provides resources for operations planning purpose with:
 - ✓ A high-level **collaborative framework** enabling joint planning;
 - ✓ A **step-by-step process** for ACDM operations planning (see OPS103);
 - ✓ **Quick Reference Sheets (QRS)** with guidance and best practices;
 - ✓ These QRS include **case studies** with insightful lessons learned.

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How to Use the Toolbox in Real-Time Ops

- The **ultimate goal of ACDM is to serve airport operations** by improving real-time operations and, regarding the present toolbox, enhancing the management of adverse conditions.
- The toolbox provides resources for real-time operations with:
 - ✓ A high-level **collaborative framework** enabling joint operations;
 - ✓ A **step-by-step process** for ACDM operations;
 - ✓ **Quick Reference Sheets (QRS)** with guidance and best practices;
 - ✓ **Tools and templates** to foster collaboration and information sharing.

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Selected Quick Reference Sheets

- 2009 and 2017 Intl. Flight Diversions at McGhee Tyson Airport
 - 2011 Aviation Fuel Farm Fire at Miami Intl. Airport
 - 2017 Power Outage at Hartsfield–Jackson Atlanta Intl. Airport
 - 2017 Active Shooting Event at Ft. Lauderdale–Hollywood Intl.
 - 2020 COVID-19 Pandemic
 - Airport Collaboration and Communication Centers
 - Airport Emergency Post Event Recovery
 - Managing Adverse Weather Conditions Collaboratively
 - Managing Collaboratively the Aeronautical Information
 - Role of the Stakeholders in the Airport Triennial Drill Plan
 - Understanding and Assessing Jet Blast Exposure
 - Understanding Business Continuity Planning
- ... And about 40 more QRS.

CDM@USA Collaborative Quick Reference Sheet
2009 and 2017 Intl. Flight Diversions at McGhee Tyson Airport (TYS) (Case Study)

CDM@USA Collaborative Quick Reference Sheet
Understanding and Assessing Jet Blast Exposure

CDM@USA Collaborative Quick Reference Sheet
Understanding and Managing Collaboratively the Aeronautical Information

Continuity Event | **Stakeholder Focus**

Potential Criticality:

- **ADPS**
- **Emergency**
- **Incident/Crisis**

Potential Consequences: Inadequate flight preparation, partial flight briefing, missing critical information on changes to airports and airspace, incursion in restricted airspace, use of obsolete flight procedures, takeoff and landing on closed runways, landing and takeoff on shortened runways using improper runway length, incursion on closed taxiways or taxiways restricted to smaller aircraft.

ACDM Benefits

- Stakeholders are aware of the aeronautical information publication process.
- Changes in airport operating conditions (including runway and taxiway closures) are coordinated with AIRAC cycles to give sufficient notice to flight operators and data providers to inform crews.

Collaborative Approach

1. Educate the ACDM community about the aeronautical information publication processes.
2. Create a workgroup for coordinating airfield construction projects and other changes in the airport operating conditions.
3. Coordinate changes with AIRAC cycles as far as practicable for giving enough notice to flight operators and data providers to incorporate the information and disseminate it to flight crews.
4. Publish a construction bulletin to flight operators and data providers as a reminder of the official aeronautical information.

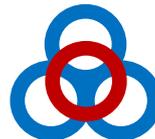
Background

Aeronautical Information (AI) is a comprehensive term that describes the critical information required for the safe operation of the National Airspace System (NAS). According to the Federal Aviation Administration (FAA), examples of AI in the United States include visualization and presentation of navigational and aeronautical data, NOTAMS (frequencies, geospatial information), airport infrastructure (runways, taxiways, geospatial info, etc.), Special Activity Airspace (SAA), Special Use Airspace (SUA), Temporary Flight Restrictions (TFRs), Notices to Airmen (NOTAMs), obstructions, surveys, and procedures.

A Notice to Airmen (NOTAM), according to the FAA, is a notice containing important information essential to the personnel concerned with flight operations but not known far enough in advance to be published by other means. They concern the establishment, condition, or change of any component (facility, service, procedure, or hazard) in the National Airspace System. They are constructed in a standardized order:

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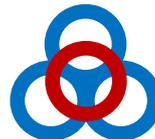
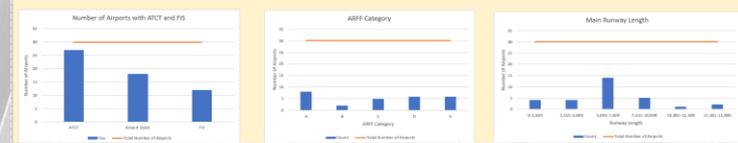
Tools and Templates Available

- Collaborative Decision Sheet (CDS)
- Contact Sheet Template
- Airport Status Report Email
- Airport Construction Notice
- Flight Diversion Form
- Aircraft De-icing Capacity Manager
- Regional Diversion Manager
- Aviation System Dashboard

CDM@USA COLLABORATIVE DECISION SHEET									
BEGINNING OF THE EVENT:			TYPE/NAME OF EVENT:				IMPACTED DOMAINS		
END OF THE EVENT:			LOCATION:				Aircraft Incidents & Accidents Natural Disaster Extreme Weather Infrastructure & Facilities Information Systems Construction Capacity and Delay Business Continuity Public Safety Security & Unlawful Activities		
CRITICALITY	Continuity Event	IMPACTED AREAS	A-Info/A-Notice		LOCATION				
	ICFS		Terminal Area						
	Emergency		Landside						
	Incident/Crisis		Off-Airport						
1 – GATHER INFORMATION & INTELLIGENCE		2 – RISK ASSESSMENT AND OPERATIONAL OBJECTIVES			3 – CONSIDER POLICIES, PROCEDURES & EXTERNAL STAKEHOLDERS		4 – IDENTIFY ALTERNATIVES & CONTINGENCIES		5 – TAKE ACTION & DESIGNATE LEADERS
Time	Detail	Step 1 Assess Risks & Opportunities	Step 2 Prioritize	Step 3 Develop Objectives					
NEXT STEPS RETURN TO REGULAR OPERATIONS					POST-OPERATIONS DEBRIEFING LESSONS LEARNED				

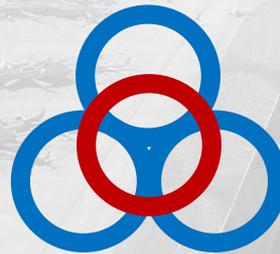
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Date:											
#	Airport	Min. Aircraft Capacity	Gate Capacity	ATCT	ABFF Category	ABFF Category	Main Runway Length	Restriction of Aircraft Services	FDNA	Largest Aircraft	Number of High-Speed
		Length	Runways	Control	Control	Control					
1	Airport			Yes	No	B	4,000		No	0	0
2	Airport			Yes	No	A	5,000		Yes	0	0
3	Airport			Yes	Yes	C	5,000		Yes	0	0
4	Airport			Yes	Yes	D	5,000		Yes	0	0
5	Airport			Yes	Yes	D	4,000		Yes	0	0
6	Airport			Yes	Yes	A	2,500		No	0	0
7	Airport			Yes	Yes	A	4,000		Yes	0	0
8	Airport			Yes	Yes	D	10,000		No	0	0
9	Airport			Yes	Yes	A	10,000		Yes	0	0
10	Airport			Yes	Yes	A	10,000		No	0	0
11	Airport			Yes	Yes	S	6,000		Yes	0	0
12	Airport			Yes	Yes	B	6,000		Yes	0	0
13	Airport			Yes	Yes	B	6,000		No	0	0
14	Airport			Yes	Yes	B	6,000		Yes	0	0
15	Airport			Yes	Yes	C	2,500		No	0	0
16	Airport			Yes	Yes	C	2,500		Yes	0	0
17	Airport			Yes	Yes	C	7,500		No	0	0
18	Airport			Yes	Yes	E	7,500		Yes	0	0
19	Airport			No	No	F	14,000		No	0	0
20	Airport			Yes	No	F	2,500		Yes	0	0
21	Airport			Yes	No	C	7,500		No	0	0
22	Airport			Yes	No	C	2,500		Yes	0	0
23	Airport			Yes	No	D	7,500		No	0	0
24	Airport			Yes	No	D	2,500		No	0	0
25	Airport			Yes	No	D	7,500		No	0	0
26	Airport			Yes	No	A	2,500		Yes	0	0
27	Airport			No	No	A	7,500		No	0	0
28	Airport			Yes	No	A	10,000		Yes	0	0
29	Airport			Yes	Yes	A	12,000		Yes	0	0
30	Airport			Yes	No	B	7,500		No	0	0



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