**Collaborative Decision Making (CDM)**

**For**

**Traffic Flow Management**

**V1.1**

**Effective Date: April 10, 2018**

**Collaborative Decision Making Stakeholders Group Guidelines**

**Leadership, Structure and Process**

**Collaborative Decision Making (CDM)**

**For**

**Traffic Flow Management**

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**1.0 Background**

Collaborative Decision Making (CDM) is a joint Federal Aviation Administration and aviation industry endeavor aimed at improving Traffic Flow Management (TFM) through increased data and information exchange among aviation community stakeholders. TFM is focused on the optimal balance between capacity and demand. CDM is focused on the technologies, processes and procedures associated with TFM.

It is important to note that virtually every Communications, Navigation and Surveillance (CNS)/Air Traffic Management (ATM) initiative has a TFM component.

CDM applies to every facet of the operational construct related to TFM: pre-flight planning, surface activity at point of departure, terminal departure environment, en route, terminal arrival environment, surface activity at destination and post-event analysis.

CDM stakeholders include aviation and aerospace representatives from government, airports, general aviation, business aviation, flight plan service providers and airlines. CDM stakeholders as well as subject matter experts from academia work together to create technological and procedural solutions to the TFM challenges faced both in the National Airspace System (NAS) and on a global scale.

The practice of sharing operational information between FAA and operational Stakeholders continues to be a source of significant benefit to the operation of the National Airspace System. CDM traces its origin to September 1993, when the Federal Aviation Administration (FAA)/Airline Data Exchange (FADE) experiment highlighted the benefits of NAS users providing updated schedule information, allowing for improved decision making by Traffic Flow Managers. In the spring of 1995, the CDM stakeholders agreed upon the CDM roles and responsibilities which are the cornerstone of the CDM program today. CDM is an operating paradigm where TFM decisions are based on a shared, common view of the NAS and an awareness of the consequences these decisions may have on the system and its stakeholders. Through the CDM process FAA and Industry continue to collaborate to provide meaningful recommendations to support operational integration of innovative Traffic Flow Management concepts and procedures.

The central tenets of CDM:

* Collaborative data exchange leads to improved operational decision-making
* Operational integration of emerging capabilities and procedures facilitate planning, execution and analysis of TFM
* Innovation of TFM solutions increases efficiency of the NAS and influences global collaborative decision making for all stakeholders

By sharing operational information, ideologies, and preferences, stakeholders learn from each other and build a common pool of knowledge, resulting in TFM decisions and actions that are most valuable to the system.

1. **Purpose**

The purpose of this document is to describe the leadership, structure and processes that the CDM Stakeholders Group (CSG) has established to support CDM. The CSG is a joint FAA/Industry forum that focuses on operational integration of planned capabilities. The operational concept going forward envisions a NAS populated by high-technology equipped air traffic managers and flight operators. Its goal is a safe, efficient and secure NAS that provides flight operators the flexibility to operate within their own capabilities and economic objectives. CDM supports this future concept through efficient data exchange technologies and processes and through the Collaborative ATM program whereby advanced TFM technologies and procedures are implemented with a goal to accommodate stakeholder preferences to the maximum extent possible.

1. **CDM Operational Data Exchange**

Participation in CDM is limited to qualified aviation and aerospace related entities that support the specific data-sharing criteria defined in a CDM Agreement (**Appendix F**). The CDM Agreement establishes terms and conditions between the FAA and external Stakeholders for the operational exchange of data.

Currently, CDM operational data exchange relates to flight operator intent and it is used to establish common situational awareness that drives traffic flow management decisions. It is expected that new operational data exchange agreements will be required to support other stakeholders and their unique data sets. The data provided must add value to the CDM process, and by extension, TFM. New entrants are expected to join the CDM operational data exchange environment and would require an appropriate CDM Agreement.

1. **CDM Stakeholders Group**

**CDM Stakeholders Group Leadership and Structure**

The CDM Stakeholders Group (CSG) is a jointly sponsored group comprised of FAA and CDM Stakeholders that provide overall strategic direction and coordination for CDM efforts. The CSG establishes strategic objectives for the CDM community. It provides guidelines for CDM stakeholder interaction and engagements. It provides direction, guidance, and process to CSG subteams and subteam activities. The result is an effective and collaborative government-industry communication forum that not only provides a means for enhancing the efficiency of the NAS, but also a pathway for promoting more effective management and leadership throughout the TFM domain.

The purpose of the CSG is to (1) provide the FAA with the industry position on prioritization and tasks related to development, implementation and operation of proposed TFM-related technologies, tools, procedures, etc., that will increase the efficiency of the NAS (**Appendix A** of this document lays out a series of CDM Strategies and Guidelines for properly executing this process*)* and, (2) to oversee the direction and mission of the CSG subteams.

Leadership within the CDM program is shared by the FAA and industry. The FAA CDM Lead is appointed by the FAA and the Industry Lead is appointed by the Airlines for America Air Traffic Management Council.

**CSG leadership and participation consists of:**

**4.1 FAA Representatives:**

(1) FAA Co-Chair of the CSG: Director of NAS Operations, AJR-1, or designee

(2) Air Traffic Control System Command Center Air Traffic Manager, AJR-11, or designee

(3) ATO, Director Air Traffic Systems, AJM-2, or designee

(4) ATO, Director Operational Concepts, Validation and Requirements AJV-7, or designee

(5) FAA CDM Lead: CDM and International Operations Manager, AJR-13, or designee

The main role of the FAA representatives is to act as a focal point for the FAA and engage appropriate FAA organizations and officials to advance the progress of emerging and planned capabilities that relate to CDM.

The FAA CSG representatives coordinate the support and progress of programs and/or changes in procedures from one phase of its lifecycle to another. Engaging the appropriate FAA Organization with primary responsibility for any particular initiative is critical to the success and support of CDM. The FAA CSG representatives are responsible for coordinating the participation of the specific FAA organizations that relate to the program, process or procedure being discussed.

**4.2 Core Industry Stakeholders:** Core Industry Stakeholders include one primary member and one alternate member from each of the following industry representatives:

(1) Airlines for America (A4A) who will serve as Co-chair of the CSG

(2) National Business Aviation Association (NBAA)

(3) Regional Airline Association (RAA)

(4) Industry CDM Lead (one primary representative appointed by A4A)

Core industry stakeholders may submit for the record a position in writing relative to any issue that comes before the CSG.

**4.3 At-large Industry Stakeholders:** The desire is for the CSG to represent the broad spectrum of the aviation community and to ensure appropriate representation is provided by At-large industry stakeholders. At-large industry participation is limited to one primary representative. At-large stakeholders do not have alternates.

Core industry stakeholders have the responsibility to periodically review at-large stakeholders and to accept and recommend for inclusion new at-large stakeholders to the CSG. At-large industry stakeholders can attend and participate fully in CSG meetings and may submit for the record a position in writing relative to any issue that comes before the CSG. The current list of at-large industry stakeholders is included in **Appendix B** of this document.

**4.4 Invited Guests or Subject Matter Experts (SMEs):** CSG stakeholders may invite guests or SMEs who may otherwise have direct association with or influence on a CSG agenda item.

1. **CSG Participation Requirements**

Attendance in CSG proceedings is expected by the FAA representatives, the Core Industry Stakeholders and At-Large Stakeholders. Quorum for any meeting of the CSG requires a minimum of 2 FAA representatives and 2 Core Industry Stakeholder representatives or their designees. The CSG will review the CSG stakeholders on an annual basis and adjust outreach efforts to ensure coverage and representation in the CSG provides a broad spectrum of aviation expertise. Non-participation in CSG activities as determined by the CSG will result in removal from the CSG.

1. **CSG Deliberative Process**

The expectation for CSG interaction includes robust and productive discussion and debate, leading to a consensus outcome. Should consensus not be achievable, as stated above, stakeholders may submit for the record a dissenting opinion in writing to be included in the minutes of the meeting.

**7.0 Bi-Annual Resource Briefing to CSG**

It is imperative that the FAA and industry CSG stakeholders communicate with the highest degree of transparency. In order to efficiently determine level of effort, including expenditures for equipment and staff support—and to ensure industry stakeholders are kept apprised of available resources with which to propose and implement programmatic changes and establish timelines in which these changes are achievable, FAA shall conduct bi-annual Facilities & Equipment and Operations budget briefings to the CSG. The CSG will prioritize and otherwise adjust its work plan based on available resources.

**8.0 CSG Subteams**

At the discretion of the CSG leadership, when it is determined that a certain knowledge base or skill set is required to accomplish further research and/or development of traffic management tools, requirements or concepts, a CSG subteam will be established.

When CSG leadership establishes a CSG subteam, based on the team objectives and the skill set requested by the CSG, (1) the FAA CSG leadership will select FAA representatives of CSG subteams and will appoint an FAA Lead and FAA Alternate Lead and (2) the Industry CSG leadership will select Industry participants for the CSG subteams and will appoint an Industry Lead and Industry Alternate Lead.

FAA and Industry subteam leads and alternate leads will be selected from active CDM participants as determined by CSG industry stakeholders. The alternate leads should work closely with the leads to ensure leadership can be smoothly transferred should one of the leads move on to another position. Subteam participants must be reviewed and validated at the beginning of each fiscal year (FY).

8.1 Subteam Task Assignments

It is expected that a grassroots philosophy of ideas/suggestions be embraced. Innovation is encouraged. The determination of the viability of or prospect of success for a particular proposal must be controlled by the CSG and the determination must be made in a disciplined manner. The following factors are examples of this disciplined approach:

* Is the proposal consistent with FAA Strategic Planning documents and industry strategic goals?
* Is the operational issue that the proposal seeks to address well understood?
* Are there barriers that must be overcome to pursue the proposal?
* Are resources available to pursue the proposal? Is there funding to implement the idea? If not, are there trade-offs that may be made?
* What metrics does the idea move? Is there a positive business case for the idea?

A list of current CSG subteams and associated mission statements, as well as subteam operating principles and logistics are contained in **Appendix C**.

Subteam task requests must be submitted in writing to the CSG **(see Appendix D)** for consideration. After consideration of various factors, the CSG leadership will:

* Accept or modify a proposal and prepare a task assignment or reject the proposal
* Assign the proposal to an existing subteam or establish a new subteam
* Determine what FAA office has primary responsibility
  + Does the idea involve a change in the operational concept or program requirements?
  + Does the idea involve a change in a program baseline (cost and/or schedule)?
  + What are the interdependencies?
  + Is it purely a process or procedural matter?

1. **CSG Outputs**

**Annual Subteam Summary Report**

The CSG will provide a yearly summary of status and progress for relevant elements contained in Appendix A. This annual summary will include:

* CSG Strategic Plan: Consistent with the FAA’s NextGen Implementation Plan and reflective of the Capital Improvement Plan and Operations Budget and focus areas of CDM stakeholder interest.
* Schedule of Activities: Describing key interdependencies and significant subteam milestones.
* Subteam Status, Progress and Accomplishments: Summarize subteam tasks, their status and publish an annual summary of recommendations.

**Review of CDM Data Exchange Agreements**

The CSG will periodically review and maintain a current list of CDM Agreement signatories. Additionally, the CSG will review adherence to the terms and conditions of active CDM Agreements and recommend a necessary course of action to address operational concerns related to the data exchange.

**CSG Meeting Agenda and Proceedings**

The CSG will plan, publish and maintain records of the CSG proceedings. All records will be available on the CDM website: [CDM.FLY.FAA.GOV](http://cdm.fly.faa.gov/)

**CSG Task Database**

The CSG Task Database is updated prior to monthly CSG Meetings. The CSG will maintain a CSG Task Database which will record, at a minimum, the following information on each subteam task:

* Tracking #
* Originator / Date Submitted
* Subteam Brief Title
* Description
* CSG Action Item / Owner
* Status
* Due Date
* Links, as required

1. **CDM Glossary of Terms and Acronyms**

A listing of common CDM terms and acronyms can be found using the following link: <http://cdm.fly.faa.gov/?page_id=285>

**Appendix A: CDM Strategies and Guidelines**

1. The TFM domain is ever-evolving. Unlike many CNS and core automation-related programs, a static, multi-year program implementation plan does not yield optimal results. In order to keep pace with a rapidly evolving global airspace system and to ensure continuous improvement through a process that continually capitalizes on lessons learned, a spiral development plan for TFM is encouraged
2. The CSG will develop a Strategic Plan (2-5 years) that is in agreement with the NextGen Implementation Plan; reflective of the Capital Investment Plan and Operations budgets, as well as CDM stakeholder areas of focus that have been mutually agreed upon. The plan should include goals and work breakdown by subgroup, travel budgets, milestones, and integrated schedules with dependencies (see next bullet). Each subteam would be responsible to update their sections and ensure consistency with the Strategic Plan. The Strategic Plan shall be posted on the CDM website.
3. Develop and maintain an integrated schedule that reflects interdependencies and includes the work of all subteams and outside stakeholder organizations to the extent it impacts the work of CDM.
4. Prioritize work in order to focus FAA and Industry resources on those items that will result in the most benefit for the majority of stakeholders and result in greater system efficiencies.
5. Where it makes economic sense and meaningful work can be accomplished, encourage the sub-teams to meet outside of the “breakout” structure and utilize telephone conferences and virtual meeting technologies.
6. Set agendas as soon as practical prior to each meeting and provide to the FAA and Industry CDM Leads. Meeting summaries must be submitted to the CDM Leads after each meeting.
7. Subteams should present results to the CSG (with backup materials). The CSG will provide feedback to the subteams to assist in completion of subteam tasks. The subteam reporting process should be standardized to the extent practical.
8. At least one CDM meeting per year should take the form of an annual general business meeting to assess accomplishments and refocus/redirect energies to changing conditions. This meeting would also get buy-in to any changes/updates to the Strategic Plan and kickoff the work plan for the coming year.
9. The CSG must ensure follow-up is performed on all new technology and functions to ensure they are performing as expected. Additional tasking may be assigned to accomplish this task.
10. Each subteam should maintain and share lessons learned. The CSG will conduct a joint meeting with all subteam leads at least twice annually to ensure tasks remain aligned with the Strategic Plan.
11. Ensure training is not overlooked in the deployment of new capabilities. Resources are needed to ensure this is done in a way that maximizes the benefits of the new capability. Availability of training resources should be established when the CSG initially approves the proposed task and assigns the task to a subteam.

**Appendix B: CSG At-Large Stakeholders**

1. Airlines for America (A4A)
2. Delta Air Lines
3. Airports Council International – North America (ACI-NA)
4. International Air Transport Association (IATA)

**Appendix C: CSG Subteams**

1. **Current CSG Subteams:**
2. **Flow Evaluation Team (FET)**

The Flow Evaluation Team focus is on new strategies, procedures and tools to increase system safety and throughput, and to provide the flight operators with increased flexibility to manage their business goals and constraints in the NAS. The emphasis is on methods to improve coordination, information sharing and shared situational awareness to more efficiently and effectively manage constraint identification, route coordination and capacity utilization. Previous team projects have included but are not limited to work on capacity estimation, Required Time of Arrival (RTA), the integration of strategic and tactical capacity management tools, improved coordination in the dynamic use of FCAs and AFPs, Trajectory Options Set capabilities, advanced concepts for the design of coded departure routes, applications of early intent information, diversion recovery and the use of pathfinders, improved coordination through the Tactical Customer Advocate (TCA) and design new routes to increase system capacity.

The team’s primary goal, through participation and collaboration, is to assist in increasing throughput and efficiency within the National Airspace System. The team focuses on opportunities to increase efficiencies to Traffic Flow Management and explores concepts and technologies that leverage increasing efficiency in the enroute domain. The team objective is to provide recommendations to the CDM Stakeholders Group on tasks assigned. Timelines are set by the CSG with interim updates as necessary based on the length of the task.

1. **Weather Evaluation Team (WET)**

The CDM community requires common operating weather intelligence so they can effectively implement operating plans for managing and operating in the NAS. To most effectively make this happen, the industry and government weather communities must collaborate to develop this common operating weather intelligence. The overall role of the Weather Evaluation subteam (WET) is to serve as the primary point-of-contact for feedback and recommendations on weather products supporting Traffic Flow Management. In general, the WET has been tasked to: (1) act as the SME for weather integration ATC/CDM tools; (2) provide external outreach to weather products developers and researchers; (3) provide internal coordination with CSG subteams on weather related issues.

Operationally, a relevant metric needs to be established with baseline verification. Measurable goals would include year-over year improvement to weather information used by decision makers. In addition to FAA and Industry membership the CDM WET includes NAV CANADA and Environment and Climate Change Canada because of extensive sharing of weather information between the U.S. and Canada and NOAA’s National Weather Service which is designated by U.S. statute to provide meteorological services for the FAA.

1. **Future Concepts of Flow Management (FCT)**

Precise data as well as a broader source of information sharing between airline operations centers, aircraft, and FAA traffic management tools will enable improved Traffic Management actions. Additionally, innovation on how to present improved information for all parties must also be considered to improve operational predictability which is essential to enhancing efficiency for all stakeholders. It is the purpose of the Future Concepts Team (FCT) to address longer term capabilities integrated into the operation. The FCT will analyze the use of data, procedures, and concepts and the role those concepts will play in the future of traffic management. The FCT participated in the following list of projects which identified shortfalls in the NAS and attempts to correct them in their respective ways ranging from flight planning to traffic management tools and methods.

• Aircraft Access to SWIM (AATS)

• Best Equipped Best Served (BEBS) which included “Capability Aware”

• UFPF

• MiniGlobal

• AEFS Phase 2

• NCR Phase 2

• Advanced Methods- constraint predicting, monitoring, alerting

• AFST formerly (SMFA)

• 4 DT demonstration project

• Advanced Trajectory modeling

• Advanced Methods- Operational response development (ORD)

• Common Support Services (CSS)/ Flight Data

The unpredictable nature of far reaching concepts allows this group to build on existing concepts and extrapolate where technology and the use of that technology will forge into the future. The team’s role is to analyze, provide feedback, and make recommendations for each task as assigned by the CSG. Team member’s subject matter expertise assists in developing real world scenarios to strengthen new concepts.

1. **CDM Training Team (CTT)**

The primary goal of the CDM Training Team is to provide the NAS users with training for CDM tools and procedures to enhance common situational awareness and provide the opportunity to participate effectively in the NAS. CTT actively deploys training for tools and procedures to make sure all parties representing Traffic Flow Management and the Aviation Industry are kept current with changes and enhancements in the NAS. Under the “Training” drop down menu, of the CDM website CTT has links to CDM Spring Training, CDM Update Training, the TFM Learning Center and a link to a list of CDM Acronyms. CTT sends out a CDM Spring Training package every year that includes all the new tools, procedures and policies that have been developed by CDM since the previous Spring. Additionally, CTT includes CDM Subteam updates in the Spring Training package. CTT also sends out update training that is created after the CDM Spring Training package has been deployed. The CTT plays a critical role in ensuring the training of new concepts, tools, procedures, etc., is considered throughout the development phase of new initiatives.

1. **Surface CDM Team (SCT)**

This team was formed to leverage the findings of the previous Surface Management Working Group (SMWG) and the Eurocontrol and Eurocae WG69 ‘Airport CDM’ policies. The SCT supports activities targeted to improve surface operations at selected airports. The SCT also provides expertise in the surface CDM concept maturation and implementation of an automated surface management capability in support of FAA NextGen implementation goals. The SCT ensures work related to surface activity throughout the National Airspace System is consistent with the agreed upon “U.S. Airport Surface CDM Concept of Operations in the Near-Term” document along with tasks assigned by the CSG as they relate to surface operations.

1. **CDM Automation Team (CAT)**

The CDM Automation Team (CAT) reviews the automation processes of air traffic flow management (ATFM) systems in the National Airspace System (NAS) and makes recommendations for improvements to these systems. The NAS ATFM tools and software includes, but is not limited to, the Traffic Flow Management System (TFMS), Time Based Flow Management (TBFM), Terminal Flight Data Manager (TFDM) and the Flight Schedule Monitor (FSM). Previous team tasks include work on the Data Quality (DQ) report card, requirements for surface data metrics, review of ground delay program (GDP) and airspace flow program (AFP) algorithms and interaction, and scheduled departure metering times in TBFM and TFMS.

The CAT reviews the algorithm requirements for the assignment of delays and the management of program slots in traffic management initiatives (TMIs), such as Ground Delay Programs (GDPs), Airspace Flow Programs (AFPs), Collaborative Trajectory Options Programs (CTOPs), and Departure Metering Programs (DMPs). The CAT is tasked by the CSG with 1) determining if current and/or future automation, algorithms and processes meet the needs of the NAS and its flight operators; 2) determining desired behavior of data ingested by ATFM tools and software; and 3) providing recommendations for ways in which the ATFM tools and software can be enhanced or improved.

1. **Use of Subject Matter Experts**

Industry subteam membership is limited to CDM members. However, on a case-by-case basis, subteam Leads at their discretion may arrange for the participation of non-CDM members to act as Subject Matter Experts (SMEs) on specific topics. SMEs may be from academia, government, industry or other disciplines as needed or requested.

In the event CSG subteams require SMEs for specific projects, an approval request must be submitted to the CDM Co-Leads. Requests for SMEs should be submitted via email to the CDM Co-Leads no later than 60 days prior to the date needed.The requesting official should include a description of the project tasking; knowledge, skills and abilities relevant to the project; and the date and duration the SME is required.

The CDM Co-Leads will respond to the requesting subteam leads with a list of available SMEs. The subteam leads will review the list and coordinate subteam participation, as necessary, with the SME’s line of business and the CDM Co-Leads.

1. **Planning and Meetings**

Subteam Meeting Agendas must be provided to the CSG Co-Chairs and CDM Co-Leadstwo weeks prior to each subteam meeting. The meetings should have clear objectives relevant to the CSG-assigned task, with agendas that define meeting goals and discussion topics for all participating attendees. Notes should be taken at each subteam meeting and posted to their respective locations on the CDM web site.

CSG Co-Chairs, CDM Co-Leads, Subteam Co-Leads shall host semi-annual meetings to discuss the direction of CDM as well as the current activities of the subteams. Monthly Leadership Telcons will also be held by this group to maintain communication and interaction among the subteams.

1. **CSG Sub-Team Charter Form**

Subteams receive specific tasks from the CSG and provide the CSG input/recommendations on concepts, requirements and implementation details. Each subteam will have a charter, typically in the form of a tasking paper, with established milestones and timelines which governs the scope of their activities**.** Subteams will be disbanded at the completion of their tasks or when otherwise determined by the CSG.

**Situational Assessment and Purpose Statement:**

[Historic, current and future opportunities related to operational performance, customers and their needs, employees and/or industry and market trends.]

[Problem to be addressed and expected result.]

**Mission and Objectives:**

[What the team must achieve; including measurable goals and timelines.]

[Teams will usually be chartered for a period of two (2) years, after which the CSG will perform a needs assessment for charter extension or subteam disbanding.]

**Composition, Roles and Communication:**

CSG Subteams are established and serve at the discretion of the CSG. Subteams receive specific tasking from the CSG and provide input/recommendations on concept requirements and implementation. CSG Subteam composition, roles and communication requirements are detailed in this document

**Expectation of Team Members:**

[Attendance, participation, courtesy and respect.]

**Resources and Support:**

[Resources available to the team to accomplish its goals.]

1. **CSG Subteam Summary Report Template**

Each month, the active CSG subteams are required to submit a monthly update to the CSG. The CSG update should include updated timelines associated with each of their respective tasks or projects and update as necessary.

**[Subteam Name]**

**[FAA Lead Name]**

**[Industry Lead Name]**

**Situational Assessment and Problem/Need Statement:**

Historic, current and future opportunities related to operational performance, customers and their needs, employees and/or industry and market trends. Describe the problem as it exists today, the intended future state and consequences of status quo.

**Project Description:**

Describe the objectives of the project (CSG Task).

**Research and Analysis:**

Status of the team’s progress to date in relation to the Problem Statement, objectives and CSG Tasking Scope of Work.

**Outcome Overview:**

Define the desired end-state solution from the viewpoint of the organization receiving the benefits.

• for example, the solution as viewed through the eyes of the customer if the goal is to improve customer service

• clearly defined goals, e.g., “reduce taxi out times to 10 min or less, predict convective activity with 70% or greater reliability, single-sourced central information system/or SWIM includes xxx by consolidating information in the following existing systems xxx”

**Outcome Detail:**

Detail all aspects of the strategy

• The organization, people, responsibilities, skills etc.

• The processes

• The support systems

Alternatives examined.

Implications to the stakeholder community if the project is not implemented.

**Benefits:**

Explain how the project furthers the organization’s mission and goals, and categorize benefits into groups for ease in understanding. Benefits may be tangible and/or intangible.

**Implementation Strategy:**

Detail each major step in the implementation process, including development, testing, training, procedures, initial implementation and deployment.

Critical Assumptions and Risk Management

List all project plan assumptions, including factors assumed to be true or anticipated to be in place for the task to be completed. Discuss the risks of the implementation plan and highlight strategies to manage the risk of assumptions not being realized. Discuss the steps that will be taken to minimize or mitigate each risk. Discuss the impact to the stakeholder community if the expected benefits from the project do not come to fruition.

**Conclusion and Recommendation:**

This should summarize the issues and characterize the anticipated benefits of the solution. Convey a sense of urgency and reiterate the goal of the solution.

Candidate requirements or suggested tasks for CSG review may also be included

**CSG Action:**

After reviewing the summary provided by the CSG subteam, the CSG shall: 1) accept the subteam recommendation and take no further action, 2) provide input and ask the subteam to rework the task or, 3) submit a recommendation to the FAA to address the assigned task. The recommendation should be consistent with the CSG Strategic Plan and consider available resources.

**Appendix D: CSG Subteam Task Form**

**Task Name:**

**Task Sponsor:** [CSG or Supporting Organization]

**Date:**

**Submitter:** [CSG or Requesting Organization]

**Situational Assessment and Problem/Need Statement:**

[Historic, current and future opportunities related to operational performance, customers and their needs, employees and/or industry and market trends.]

[Describe the problem as it exists today, the intended future state and consequences of status-quo.]

**Project Description and Scope of Work:**

[Project deliverables with a time line of events, which includes milestones and percentage of completion markers.]

[Period of Performance: identifiable checkpoints or metrics indicating progress and estimated length.]

[Define dependencies; entry and exit criteria.]

**Critical Assumptions and Risk Management:**

[Factors assumed to be true or anticipated to be in place for the task to be completed.

Strategies to manage the risk of assumptions not being realized, control the probability and/or impact of unfortunate events or to maximize the realization of opportunities.]

**What contract vehicles are available to fulfill the task?**

[Mechanisms to support the task.]

**Appendix E: CDM New Entrant Process**

The aviation community is ever expanding. New, non-traditional entrants to the community possess information that is valuable to the TFM process. As new technologies proliferate and useful information becomes available, CDM must have a process to allow for new entrants to participate in the data exchange process with the FAA and evolve the collaborative decision making component of our traffic flow management system. Data exchange is the backbone of CDM and any consideration for new entrants must be focused on the value of the data they propose to provide. New entrants that do not conform to the current CDM Agreement provisions must petition the CSG for consideration to participate in CDM. New entrants will be considered based on the following questions:

* Is the data unique?
* How does the data benefit CDM?
* Are there any costs associated with receiving the data?
* Can the data be distributed to the CDM community?
* What is the impact to the system without the data?
* Who will be responsible for the currency and security of the data?

The CSG will evaluate the petition at the next scheduled meeting of the CSG and provide a response in writing to the applicant.

**Appendix F: CDM Data Exchange Agreement (Sample)**

**Membership Agreement**

**For**

**Collaborative Decision Making (CDM)**

**Exchange of Data**

**Effective Date: January 1, 2015**

1. **Parties**

This Membership Agreement is entered into by and between the Federal Aviation Administration (FAA) and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The parties do hereby agree and obligate themselves to abide by the rights, responsibilities, and other conditions defined in this agreement. Non-compliance with the conditions of this agreement may result in the termination of access to CDM data.

1. **Authority**

The FAA’s authority to enter into this agreement is governed by 49 U.S.C. 106 (l) and (m).

1. **Purpose**

This Membership Agreement: (1) establishes the authority by which the FAA and industry exchange CDM data and (2) identifies the rights and responsibilities of the parties. The exchange of CDM data is solely intended to support FAA and industry flow management decision making associated with the daily management of aircraft flight operations.

1. **Principles**

In the CDM data exchange process, individual industry CDM Members provides specific data elements to the FAA Traffic Flow Management System (TFMS). The FAA: (1) aggregates and processes that data into a form that is appropriate for use in the CDM process and (2) distributes that processed data to all government and industry CDM members. The CDM initiative provides for common situational awareness among participating stakeholders, improved demand predictions, enhanced traffic management decisions and reduced delays.

CDM membership is predicated on a realized systemic benefit to the National Airspace System (NAS) resulting from the exchange of unique flight data between the requesting NAS stakeholder and the FAA. CDM membership applications will be evaluated in part by the benefit provided to the NAS as a whole. This benefit adjudication may include number of unique flights, strategic benefit of unique flight data, or other operational advantages as determined by the FAA.

1. **Definitions**
   1. **Air Traffic Flow Management (ATFM):** The air traffic management operational function that balances the aviation industry demand for air traffic control (ATC) services with the capacities and capabilities of the ATC system.
   2. **Collaborative Decision Making (CDM):** A joint government/industry initiative aimed at improving ATFM by enhancing information flow within the aviation community and adding a customer focus to decision-making. CDM is an operating paradigm where ATFM decisions are based on a shared, common view of the NAS, resulting in ATM decisions and actions that are most valuable to the system.
   3. **National Airspace System (NAS):** The complex collection of personnel, airspace, aircraft, equipment, and any and all other aviation components that comprise the United States’ aviation system.
   4. **NAS User:** A person or organization that operates or manages aircraft operations within the NAS utilizing NAS resources.
   5. **CDM Data:** Industry-generated, unique flight data provided in real time as input to the CDM process; or FAA-generated aggregate information that is based upon the industry data. At the discretion of the agency, CDM data may be expanded to include other FAA-generated elements determined by the agency to enhance customer collaboration.
   6. **CDM Products:** Applications provided to CDM members to enhance situational awareness, including but not limited to: TSD-C, Diversion Recovery web page, Tactical Customer Advocate (TCA) web page, and FAA testing and training systems. Additional information on CDM products may be found at http://www.cdm.fly.faa.gov.
   7. **CDM Member:** A NAS user organization that: (1) provides raw CDM data to the FAA, (2) receives processed CDM data from the FAA, and (3) collaboratively works with the FAA traffic flow management function in responding to NAS demand-capacity imbalances and other system constraints.
   8. **CDM Service Provider:** A vendor under contract to a CDM Member that provides the communications network that enables the exchange of CDM data and information between the FAA and the CDM Members.
   9. **Third Party:** An entity not directly involved in a transaction between the FAA and CDM member.
2. **Roles and Responsibilities**
   1. **Federal Aviation Administration (FAA)**

The FAA shall:

* + 1. provide the CDM Member with specifications, communications protocols, equipment requirements, interface requirements, standards, message formats, and other relevant technical information and support as necessary to transmit, receive, interpret, and analyze CDM data,
    2. provide a point of contact for twenty-four-hour technical support,
    3. encrypt FAA processed CDM data in accordance with the current industry standard,
    4. provide the CDM Member or the Member’s CDM Service Provider with physical access to the encrypted CDM data,
    5. release encrypted CDM data and provide CDM product access to CDM Members only after the CDM Member has demonstrated the capability to provide raw CDM data consistent with the documented data quality standards defined by the FAA,
    6. provide processed CDM data consistent with the accuracy, reliability, maintainability, and availability of the operational traffic management system and/or other processing and communications capabilities,
    7. have the sole right to relocate, upgrade, and/or update the CDM data stream in order to take advantage of advances in technology and for other reasons. The FAA shall provide notice of such changes not less than sixty (60) days prior to their implementation,
    8. have the right to identify and disclose to the CDM Steering Group (CSG), CDM Members not in compliance with, or in violation of, this agreement and may interrupt, or direct the interruption of, the CDM data stream until such time that compliance is demonstrated to the satisfaction of the FAA CDM Point of Contact (POC) identified in paragraph 15.0 below,
    9. have the right, with timely and appropriate advance notification and coordination, to modify and amend this agreement if it is in the interest of the United States Government, the aviation industry, or the general public,
    10. have the right to rate and identify CDM Members not in compliance with the expected level of performance as specified in Appendix B of this agreement.
  1. **CDM Member**

The CDM Member shall:

* + 1. acquire and maintain the hardware, software, communications, facilities, training, and any and all other resources needed to transmit, receive and interpret the CDM data. In the event the CDM data stream is relocated, upgraded, updated, and/or modified, the CDM Member shall be responsible for providing and maintaining the hardware, software, communications, facilities and any and all other resources needed to continue to transmit, receive and interpret the CDM data,
    2. provide unique industry-generated CDM data to the FAA TFMS consistent with the data elements and quality standards as specified in Appendix A of this agreement; and consistent with the accuracy, reliability, maintainability, and availability of the CDM Member’s operational system and/or other processing and communications capabilities,
    3. ensure any third-party accessing CDM data or products for research, development, analyses, conclusions, or other capabilities commissioned by the CDM member abides by the terms of this Agreement. Third party access must be limited to a specific period of performance and not allow for a long-term pass-through of CDM data that circumvents the CDM Membership Agreement or FAA data release processes. The contracting CDM member and/or third party must clearly indicate on any and all outcomes based on CDM data that these products and results are not guaranteed, sponsored, warranted, or endorsed by the FAA,
    4. ensure that all contracts related to CDM data: (a) reflect the rights, responsibilities, exclusion of warranties, limitation of remedies, indemnification, and other conditions defined in this Agreement; (b) prohibit contacting the FAA CDM POC or the Air Traffic Control System Command Center (ATCSCC) in the event of technical or system problems, and (c) prohibit contacting the FAA CDM POC, any FAA air traffic control facility, or the ATCSCC regarding operational traffic flow management matters,
    5. track and report to the FAA on an annual basis any Member-provided third-party access related to CDM data.

1. **Exclusion of Warranties**

All warranties, expressed or implied, are excluded from this agreement and shall not apply to the data or services that the CDM Member, CDM Service Provider, or any other data recipient receives under this agreement. There is no warranty of merchantability or of fitness for a particular purpose for the data or services that the CDM Member, CDM Service Provider, or any other data recipient receives under this agreement.

1. **Limitation of Remedies**

The FAA shall not be liable to the CDM Member, CDM Service Provider, or any other data recipient for any loss, damage, claim, liability, expense, or penalty, or for any indirect, special, secondary, incidental, or consequential damages deriving from the use of the CDM data.

# Indemnification

The CDM Member, CDM Service Provider, and/or any other data recipient agrees to indemnify and hold harmless the Government and their respective officers, employees, and agents, from and against all claims, demands, damages, liabilities, losses, suits, and judgments (including all costs and expenses incident thereto), which may accrue against, otherwise be chargeable to the Government by reason of, or as a direct and proximate result of, that CDM Member’s or CDM Service Provider’s use of the CDM data or software received under this agreement.

Software Data Rights: All data, software, and documentation, furnished by the Government to the CDM Member pursuant to this Agreement, are provided on an “as is” basis.

# Changes and Modifications

Changes and/or modifications to this agreement shall be in writing and signed by the original FAA signatory or his representative, designee, or successor. The modification shall cite the subject Agreement, and shall state the exact nature of the modification. No oral statement by any person shall be interpreted as modifying or otherwise affecting the terms of this agreement.

1. **Disputes**

Where possible, disputes will be resolved by informal discussion between the parties. In the event the parties are unable to resolve any disagreement through good faith negotiations, the dispute will be resolved by the Director, System Operations, ATCSCC. The decision is final unless it is timely appealed to the FAA Administrator, whose decision is not subject to further administrative review and, to the extent permitted by law, is final and binding.

1. **Construction of the Agreement**

This agreement is an "other transaction" issued under 49 U.S.C. 106 (l) and (m) and is not a procurement contract, grant or cooperative agreement. Nothing in this agreement shall be construed as incorporating by reference or implication any provision of Federal acquisition law or regulation.

1. **Termination of this Agreement**

Any party may terminate its participation in the CDM activity under this Agreement by written notice to the remaining parties provided no termination may be effective in less than ninety (90) days from the date of such written notice.

If the CDM Member fails to abide by the requirements of this agreement and its failure is not cured within five (5) working days of the initial notice of noncompliance, the CDM Member’s access to data, information and systems covered under this agreement may be terminated immediately by the FAA for cause.

Whenever written notice of termination is issued by or received by the CDM Member, the CDM Member shall immediately return all Government equipment (if any), software and documentation that the Government issued to the CDM Member under this Agreement.

1. **Duration**

## This agreement shall be effective on the date that the FAA signatory below executes it and shall remain in effect for five (5) years or until terminated, whichever is earlier.

1. **FAA Point of Contact (POC)**

Written notices to the FAA shall be sent to the FAA CDM POC at the address shown below.

Federal Aviation Administration

David J. Hurley Air Traffic Control System Command Center

Director, System Operations

3701 Macintosh Drive

Warrenton, Virginia 20187

ATTN: CDM Point of Contact

1. **Industry Contact**

This Agreement will be updated as needed. Written/electronic notices to the CDM Member will be provided. The mail and electronic address for notices are:

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Address: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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E-Mail address: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Phone: (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Approval Signatures**

|  |  |
| --- | --- |
| **CDM Member** | **Air Traffic Operations** |
| Signature | Signature |
| Name (Printed) | Name (Printed) |
| Title | Title |
| Date | Date |

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**CDM Data Service ProviderAppendix A**

CDM Data Elements

The exchange of flight data is a fundamental tenet of CDM and a requirement for membership. The application, connectivity and protocols used to exchange messages are detailed in the CDM Message Protocol Specification document.

Information that must be exchanged within CDM data exchange includes, but is not limited to:

* Flight Create – Message sent to create a flight.
* Flight Modify – Message to update data, such as times, for a flight.
* Flight Cancel - Message that indicates a flight has been cancelled. Identifies a cancelled flight to ensure that resources are not engaged and/or fully utilized. (CNX)

Information that should be exchanged within CDM data exchange includes, but is not limited to:

* Actual Off-Block Time (AOBT) – The actual time at which a flight has sent a “block out” message from the gate or parking location. This information will be used to help determine the accuracy of light operators’ Earliest Off Block Time (Currently known as OUT time)
* Actual Take Off Time (ATOT) – The time at which a flight lifts off from the runway as reported by the CDM Member via a CDM message. If the CDM member sends more than one value, the most recently submitted time is contained in this field. Otherwise the value is null. (Currently known as the OFF time)
* Actual Landing Time (ALDT) – The Actual time the flight has landed on the runway. Sharing arrival information provides essential information to facilitate gate conflict and demand/capacity imbalance predictions. (Currently known as the ON time)
* Actual In-Block (AIBT) – The Actual time the flight has blocked in at the gate. Sharing arrival information provides essential information to facilitate gate conflict and demand/capacity imbalance predictions for both gate and departure predictions on availability. (Currently known as the IN time)
* Aircraft Tail/Registration - The unique alphanumeric string that identifies an aircraft. Sharing the unique registration number will allow the Surface system to identify possible turn-around conflicts and other departure problems.
* Gate Assignment - Airport Gate that is assigned to a flight. Gate information will lead to more accurate ramp transit time (RTT) calculations and therefore more accurate ETD.
* Earliest Off-Block Time (EOBT) Time when the flight operator plans for an aircraft to push back from its assigned gate. The system can forecast surface demand vs. capacity based on flight operator’s best estimation of push back time. The fidelity of EOBT is required for proper surface predictions and process.
* Flight Intent - The Flight Intent would be limited to Flight Operator plan to push back early during a DMP and hold in the Aircraft Movement Area.
* Initial Off-Block Time (IOBT) - The initial off-block that a flight provided. Used to save the original Off-Block time of the flight. Useful for flight data matching. (Currently known as IGTD).
* Earliest Runway time of Departure (ERTD) - Flight operator Provided Runway Departure Time*.*
* Simplified Substitutions, as necessary for the flight operator and/or member
* Trajectory Option Sets, as necessary for the flight operator and/or member
* Other data elements as detailed in the CDM Message Protocol Specification document.

**Appendix B**

Data Quality

Ensuring data quality is one of the primary concerns of the traffic flow management community. The Data Quality Report Card (DQRC) provides a measure of the quality of the data feed for each CDM member. Poor data quality can negatively impact the system by creating inaccurate traffic demand predictions.

**Data Quality Code of Conduct:**

1. Flight data submitted to the FAA, whether via Official Airline Guide (OAG) schedule data, CDM messages, or individual flight plan, must represent how the flight is planned to operate:
   1. Flights must only be created that have a real intent to operate. Flights shall not be created for the purpose of gaining more slots or better control times.
   2. Operators must submit and update accurate, expected flight operating times. False or inaccurate times or times that do not represent how the flight is planned to be operated shall not be submitted for the purposes of gaining more advantageous slots.
   3. Estimated Time En Route must represent the most accurate time based on the planned route of flight and cruise speed, and forecasted en route winds.
   4. Operators must notify the FAA of maintenance, test or ferry/repositioning flights as soon as they are known via CDM message or normal flight plan filing. Operators will not be permitted to substitute with these flights and they should not be filed for the purpose of gaining more slots or better control times.
2. In order to provide the FAA with strategic route planning capabilities operators are expected to file IFR flight plans, Trajectory Options Sets, and/or early Intent messages at least four hours prior to estimated time of departure.
3. Operators must eliminate and correct data errors.
4. Operators must comply with assigned Expect Departure Clearance Times, FAA assigned routes (i.e., Required Reroute, Collaborative Trajectory Options Program (CTOP) assigned trajectory, or other assigned trajectory) and operate flights in accordance with filed flight plan parameters.
5. Flights must not be filed with the intention of requesting an airborne change of destination or route to avoid delay associated with a traffic management program (Ground Delay Program, Ground Stop, Airspace Flow Program, CTOP, etc.).
6. Delay shall not be allocated, through substitutions, to a flight that cannot or will not absorb that delay (e.g., airborne or international flight).
7. When applying substitutions, SCS must be the preferred method over attempting a 20 minute window substitution.
8. EDCT change requests must be accompanied by an appropriate and accurate reason for the request.
9. Operators should release slots generated by a traffic management program that have been canceled and flagged as “Held” once those slots are no longer useable by the operator, so that other operators or FAA automation can make use of the slots.

**Data Quality Report Card:**

The Data Quality web site and database generate three metrics (time-out cancels, cancelled but flew, and undeclared). Each of the metrics relate directly to the ability of the Traffic Flow Management System (TFMS) to accurately predict traffic demand within the traffic management planning time frame. The DQRC metrics are as follows:

* ***Time-out cancels*** – A time-out cancel is a flight that TFMS expects to operate, but either never does, or operates well after its ETD. TFMS has no alternative but to wait for some time period after the expected departure time and eventually drop the flight from the demand predictions. The current rule is that a flight with a flight plan or a CDM flight create message is time-out canceled by TFMS 90 minutes after its ETD; a flight only with OAG data is time-out canceled 10 minutes after its ETD. A sample scenario of a time-out cancel is: the member submits a CDM create message for a flight, does not operate the flight, and never sends a cancel message for a flight. If a member sends a cancel message for a flight, it will not be considered a time-out cancel. Time-out cancels cause TFMS to over-predict the traffic demand. *For grading purposes, time-out cancels are computed as a percentage of all flights created in the TFMS for the member.*
* ***Cancelled-but-flew flights*** – A cancelled-but-flew flight is a flight that the member cancels but that ends up operating. A sample scenario of a cancelled-but-flew is: the member sends a CDM create message, files a flight plan, sends a CDM cancel message, and then TFMS gets a departure message for the flight from ATC. If the member cancels a flight but re-instates it with a CDM message before it operates, the flight is not considered a cancelled-but-flew flight. Cancelled-but-flew flights cause TFMS to under-predict traffic demand. *For grading purposes, cancelled-but-flew flights are computed as a percentage of all flights cancelled by the member.*
* ***Undeclared flights*** – An undeclared flight is a flight that operates without prior notice to TFMS. The prior notice can be either the flight being in the OAG schedule, or the member sending a CDM create or modify message for the flight. A sample scenario of an undeclared flight is simply a flight that operates and for which a flight plan is the first notification that TFMS received of this flight. Undeclared flights cause TFMS to under-predict the demand. *For grading purposes, undeclared flights are computed as a percentage of all of the member’s flights that operate.*

CDM members are expected to have no unacceptable (F, based on grading criteria detailed below) grades on any metric during the 6-month time span, and would be expected to make corrective actions to improve marginal performance to at least a satisfactory (A, B or C, based on grading criteria detailed below) level. Some month-to-month fluctuation is to be expected, so the primary grade for each category will be a six-month, sliding average. Unacceptable averages for any category will trigger communications between ATCSCC Quality Control resources and the CDM member to develop plans for improvement. Failure of the CDM member to improve the quality of data provided through the CDM process is grounds for termination of the CDM Agreement in accordance with Section 14 of the agreement. The DQRC will be produced monthly and distributed to the industry members of the CSG.

# Grading Criteria

The grading scheme is based on average performance and variability for each metric across all CDM members. Airlines performing significantly better than average (that is, that have a lower percentage score for a metric) will receive good grades, and those performing significantly worse than average will receive marginal or unacceptable grades.

The list below shows the initial criteria for determining letter grades. This data was computed by Volpe and represents a 6-month span from December 2003 through May 2004. The averages and standard deviations of scores for each metric were computed and the following conversion was applied:

A = At least .5 standard deviations better (lower) than average

B = Between .5 standard deviations better and .5 standard deviations worse than average

C = Between .5 standard deviations and 2.5 standard deviations worse than average

F = More than 2.5 standard deviations worse than average.

Based on the criteria above and the computed averages and standard deviations, the following table shows the letter grade criteria:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | A | B | C | F |
| Time Out Cancels  (% of Planned Flights) | % < .8 | .8 < % < 2.5 | 2.5 < % < 6.2 | 6.2 < % |
| Cancels that Flew  (% of Airline Cancels) | % < 1.2 | 1.2 < % < 3 | 3 < % < 6.6 | 6.6 < % |
| Undeclared Flights  (% of Flights that Operated) | % < .7 | .7 < % < 2.1 | 2.1 < % < 4.9 | 4.9 < % |

Table 1. Percent to Letter Grade Conversion Table

The criteria will be re-calculated each January using the available data from the previous 6-month period (July through December). CDM members will be advised of any changes in the grading criteria.