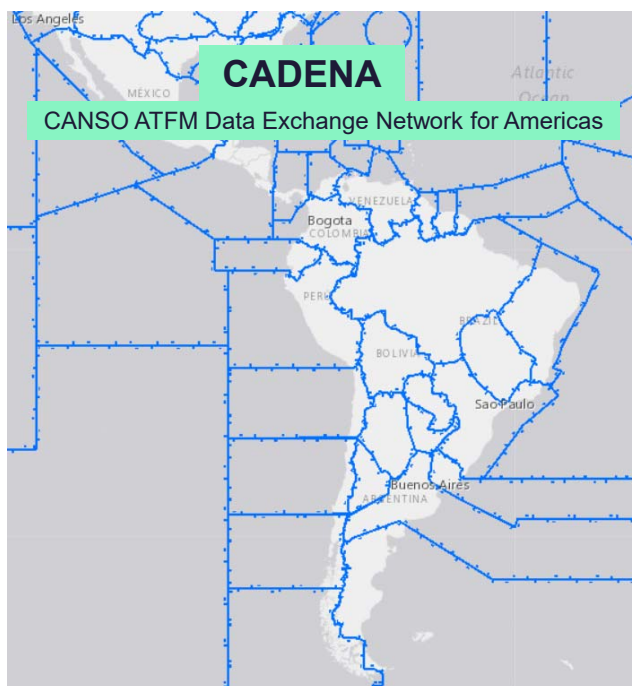


Briefing on CADENA And the Annual Hurricane / Tropical Storm Training

For: Preparing Airports for Disasters Workshop
Date: June 5, 2023
By: CADENA Team - Midori Tanino, Joe Hof, Al Castillo

1



The development of
ATFM and CDM in the
Latin America and
Caribbean Region ...

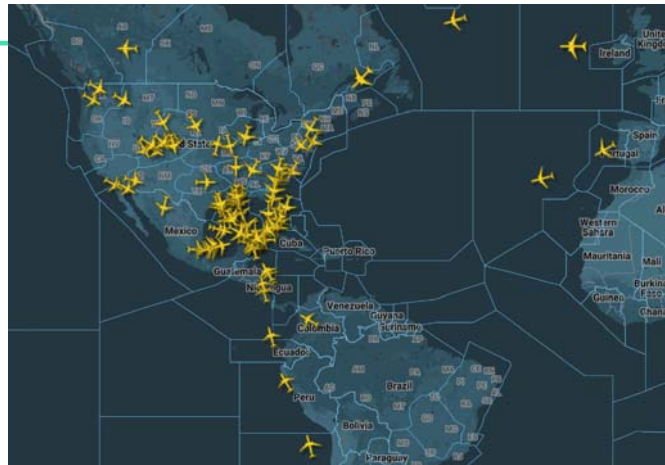
CADENA

- Why?
- How?

2

Why?

- Multiple, relatively small FIRs in the LAC region.
- Lack of an integrated network for common situational awareness.
- Inconsistent ATFM operations across FIR boundaries.
- Significant tropical weather events and volcanic ash situations.
- Very desirable tourist destinations.



Example:
Cancun, Mexico
March 21, 2023

3

CANSO

3

Purpose and Objectives of CADENA

Purpose:

- Establish an operational Regional ATFM/CDM system.
- Facilitate the development of optimized airspace.

Objectives:

- Exchange operational information.
- Promote common situational awareness.
- Enhance operational safety.
- Improve operational efficiency.



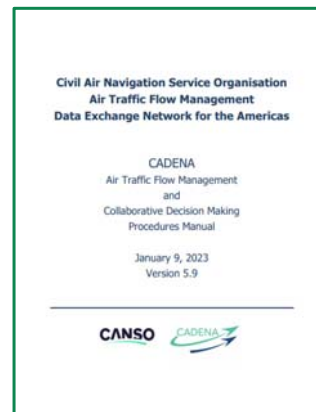
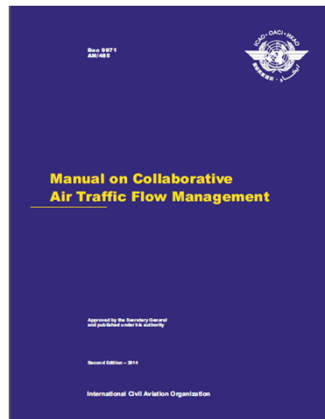
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CANSO

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How? In Concert with ICAO

CADENA is designed to implement the processes and procedures from ICAO DOC 9971.



5

5

How?

Regional ATFM/CDM Operational Planning Web Conferences

- Started in December 2016 as a weekly web conference to plan for each weekend's air traffic volume.
- Transitioned to twice-a-week web conference to cover the entire week starting in January 2023.
- Regional aviation stakeholders actively participate.
- Information is shared, discussed, and the regional operations plan is developed collaboratively.
- **Simple and EFFECTIVE!**

6

6

How? CADENA Operational Information System



<https://www.cadenaais.org> Public domain for read only. Member domain to read and upload information.

Exchange:

- MS documents (Word, PPT, Excel)
- Text, pdf, and picture

Enter:

- ATM Solutions
- Advisories/Notices
- Airport delay
- ATFM Daily Plan
- Calendars
- PASA Route Request

Store:

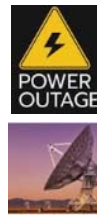
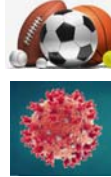
- Routes (PASA, UPR)
- Forms (Contingency)
- Capacity info (Airport/Airspace)

7

7

How? CADENA Ad Hoc Web Conferences

The value of information exchange and collaboration is really recognized during irregular operations.



- CADENA Ad hoc Web Conferences – held on an as-needed basis.
- CADENA Operational Procedures Manual (based on ICAO DOC 9771).
 - ✓ Contingency operational procedures.
 - ✓ 15 unique contingency event forms.
 - ✓ Quarterly contingency event training.

CADENA OIS
supports information exchange

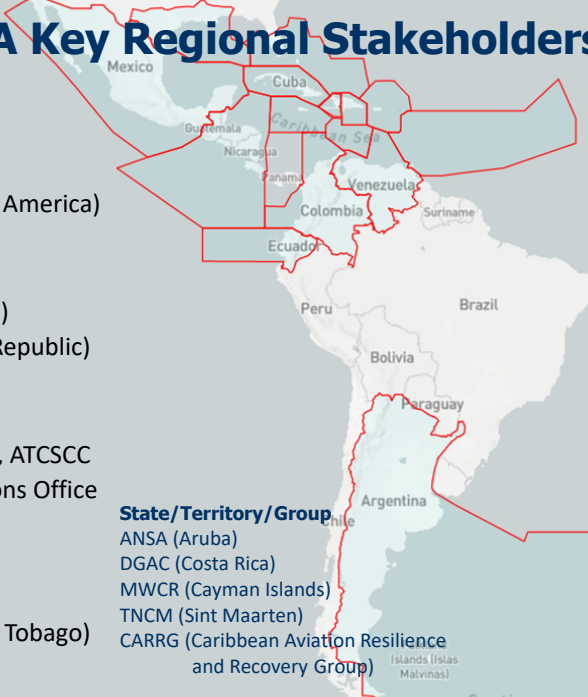
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CADENA Key Regional Stakeholders

ANSPs

- EANA (Argentina)
- BANSA (Bahamas)
- COCESNA (Central America)
- UAEAC (Colombia)
- ECNA (Cuba)
- DC-ANSP (Curacao)
- IDAC (Dominican Republic)
- DGAC (Ecuador)
- FAA (USA)
 - ZMA, SJU, ZHU, ATCSCC
 - Space Operations Office
- OFNAC (Haiti)
- JCAA (Jamaica)
- SENEAM (Mexico)
- TTCAA (Trinidad & Tobago)
- INAC (Venezuela)



State/Territory/Group

- ANSA (Aruba)
- DGAC (Costa Rica)
- MWCR (Cayman Islands)
- TNCM (Sint Maarten)
- CARRG (Caribbean Aviation Resilience and Recovery Group)



9

FMUs Around the Region



IDAC



EANA



CFMU - MEXICO



JCAA



PIARCO



CENAMER



HAVANA



BOGOTA



CGNA



10

10

CADENA Annual Hurricane and Tropical Storm Training – Refresher Training

11

Introduction

CANSO ATFM Exchange Network for Americas (CADENA) conducted its first Hurricane Training for the Latin America and Caribbean region in the spring of 2017. CADENA has continued to provide Hurricane Training for the LAC region once each year. Hurricane Training participants include LAC region ANSPs, airlines, and other stakeholders.

This briefing provides an overview of the CADENA Annual Hurricane Training. The CADENA Annual Hurricane Training consists of two main sections:

- Hurricane refresher training based on the CADENA ATFM/CDM Procedures Manual
- Hurricane exercise

The final section of this briefing provides a partial listing of actual hurricane events in which CADENA activated a hurricane web conference.

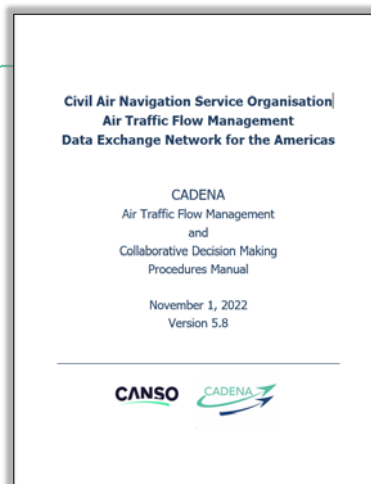


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CADENA Hurricane Refresher Training - Background

- The Hurricane/Tropical Storm refresher training consists of a review of CADENA's training philosophy and the Hurricane/Tropical Storm section of the CADENA ATFM/CDM Procedures Manual.
- Section 3.3 of the CADENA ATFM/CDM Procedures Manual contains Hurricane /Tropical Storm roles/responsibilities and other guidance.
- The CADENA ATFM/CDM Procedures Manual Appendix B – Sample hurricane/tropical storm web conference slides.
- The CADENA ATFM/CDM Procedures Manual Appendix E – Hurricane/Tropical storm contingency event checklists.



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Training Philosophy

Our goal is to train like we respond.

- Operational and personnel safety come first!
- Ensure good communication and teamwork among all the stakeholders.
- Use the capabilities of the CADENA Virtual Support Team (VST).
- Use the procedures in the:
 - ✓CADENA ATFM/CDM Procedures Manual
 - ✓CADENA Hurricane Contingency Event checklist
- Use the capabilities in the:
 - ✓CADENA OIS
 - ✓Flight Radar 24
 - ✓CADENA WhatsApp



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Roles and Responsibilities

- The CADENA ATFM/CDM Procedures Manual roles and responsibilities for each of the following are reviewed:
 - CADENA Virtual Support Team (SVT)
 - FMU
 - ANSPs
 - Hurricane Conference Host
- The roles and responsibilities include pre-hurricane conference responsibilities, hurricane conference responsibilities and post-hurricane conference responsibilities.
- The next section uses the FMU's responsibilities as an example of the training which is provided to each of the participants listed in the first bullet.



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CADENA Hurricane/Tropical Storm Conference: FMU Pre-Conference Responsibilities

The Hurricane Web Conference FMU's pre-conference responsibilities are reviewed as outlined in the Procedures Manual.

CADENA Hurricane/Tropical Storm Conference: FMU Pre-Conference Responsibilities

3.3.4 Participating FMU: Pre-conference responsibilities

Reviews the following areas of concern and inputs the information into the ANSP slide deck template, including pertinent input of operational information provided by underlying ANSPs, TMAs, and airports. The ANSP hurricane slide deck template is shown in Appendix B.

Submits the Hurricane / Tropical Storm slides to the Host by uploading the slide deck through the CADENA OIS ANSP home page. The slide deck shall be submitted at least two hours prior to the scheduled start time of the web conference.

The slide deck should include the following information.

- Projected path.
- Projected duration per affected airport / FIR.
- Projected capacity for airport recovery.
- If airport services are affected, then the priority for recovery.
- Projected airport closures and openings.
- Reports of significant equipment outages.
- Projected route closures and openings.
- Planned TMMs.
- Other issues.

NOTE: Include maps of impacted airways and any other graphics that may help explain the operational situation.

CADENA ATFM/CDM Procedures Manual Section 3.3.4.

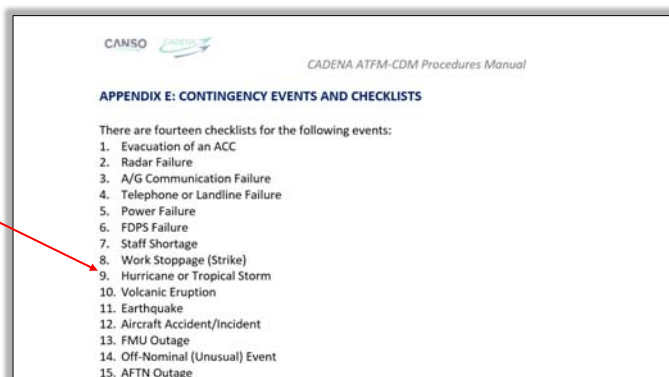


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Hurricane – Tropical Storm Checklist

- The CADENA ATFM/CDM Procedures Manual contains a Hurricane/Tropical Storm Checklist in Appendix E.
- The Checklist is used by FMUs, the CADENA VST, ANSPs and Hurricane Conference Hosts
- The Hurricane/Tropical Storm Checklist is reviewed during the annual training



CADENA ATFM/CDM Procedures Manual, Appendix E



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CADENA ATFM/CDM Procedures Manual Appendix E (1 of 2)

The CADENA ATFM/CDM Procedures Manual Appendix E contains a Hurricane/Tropical Storm checklists for ANSPs and the VST.

The first is an “Initial ATFM Action” Checklist

9: Hurricane or Tropical Storm

Initial ATFM Action

- ☐ FMUs will monitor their tropical weather resources, and when possible, advise CADENA leadership 2 to 3 days before a hurricane or tropical storm will impact their FIR
- ☐ Prepare to gather and report information related to:
 - Projected path
 - Projected duration per affected airport
 - Projected capacity for airport recovery
 - If airport services are affected, then the priority for recovery
 - Projected airport closures and openings
 - Projected route closures and openings
 - Reports of significant equipment outages
 - Staffing issues
 - Planned TMMS

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CADENA ATFM/CDM Procedures Manual Appendix E (2 of 2)

The second checklist is for
“Follow-Up ATFM Actions.”

Follow-Up ATFM Actions

- ☐ Starting 2 to 3 days before landfall at a participating ANSP, CADENA leadership will schedule a daily 1400 UTC (or at the time coordinated) CADENA Hurricane Web Conference
- ☐ The Host will be selected based on the location and the projected path of the hurricane
- ☐ Only those ANSPs affected by the hurricane and its bands, and those where traffic may be rerouted, will be required to participate in the hurricane web conference.
- ☐ Notification of the pending hurricane web conference will be announced through the CADENA OIS
- ☐ Impacted ANSPs will upload the applicable set of PowerPoint slides via the CADENA OIS for the Host by 1200 UTC (during U.S. daylight savings time) each day the hurricane web conference is conducted
- ☐ As a backup, the slides can be emailed to the Host

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CADENA ATFM/CDM Procedures Manual – Appendix E Web Conference Slides

20

HURRICANE (NAME) UPDATE – 1400 UTC – DATE

ANSP Name

PROJECTED PATH IN YOUR AIRSPACE

- THE CADENA HOST WILL ADD A GRAPHIC OF THE PROJECTED PATH
- ADD SLIDES, IF NEEDED
- Recommend a screenshot from: <https://www.nhc.noaa.gov/>



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HURRICANE (NAME) UPDATE – 1400 UTC – DATE

ANSP Name

PROJECTED IMPACT

DAY 1

AIRPORT CLOSING (DATE/TIME)
STAFFING ISSUES
EQUIPMENT OUTAGES

DAY 2

AIRPORT CLOSING (DATE/TIME)
STAFFING ISSUES
EQUIPMENT OUTAGES

WHEN APPLICABLE

AIRPORT RE-OPENING (DATE/TIME)



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HURRICANE (NAME) UPDATE – 1400 UTC – DATE

ANSP Name

IMPACTED ROUTES	PLANNED TRAFFIC MANAGEMENT MEASURES
• ADD GRAPHICS, IF ABLE • ADD SLIDES, IF NEEDED • Recommend a screenshot from a website like: https://skyvector.com/ Use “World Hi” Add layers, if applicable	• FOR EXAMPLE: REROUTES, MIT, MINIT • LIST THE IMPACTED NEIGHBORING ANSPs



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HURRICANE (NAME) UPDATE – 1400 UTC – DATE

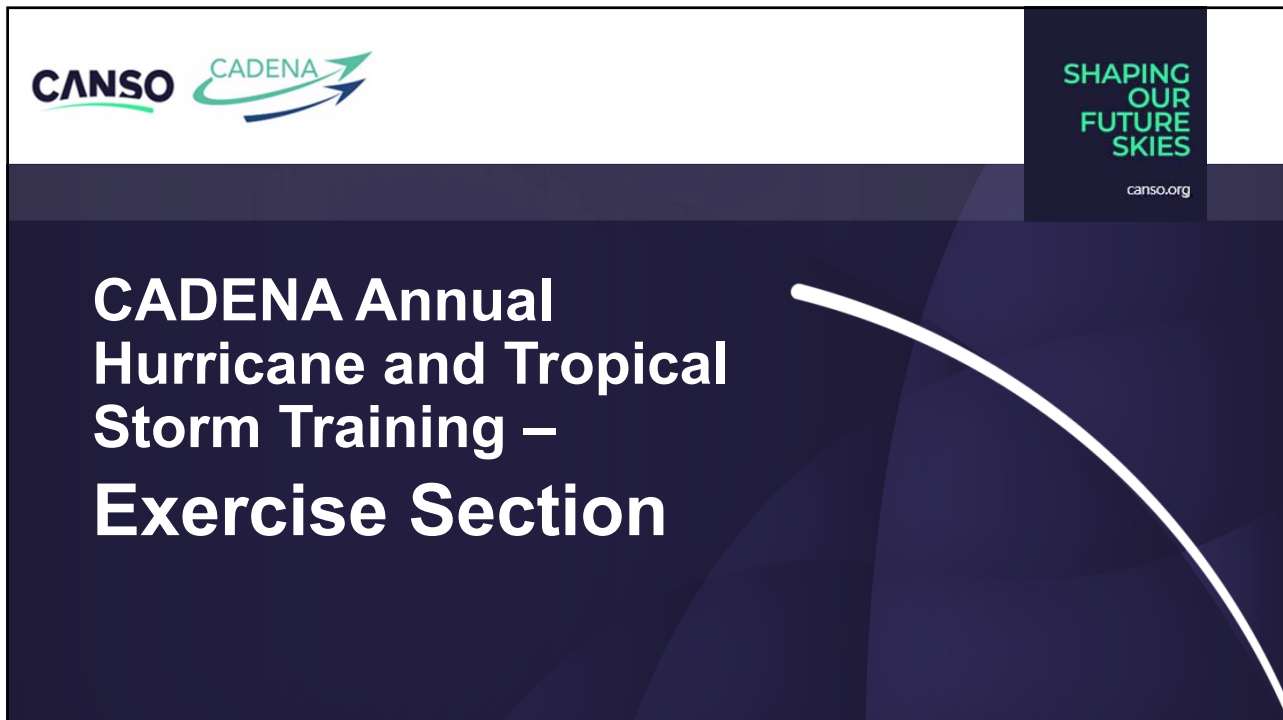
ANSP Name

OTHER ISSUES
• 1 • 2 • 3 “TELL US WHAT WE DO NOT KNOW” “PLEASE KEEP YOUR NOTAMS UP-TO-DATE”



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Background

- Several days before the Hurricane/Tropical Storm exercise, participating ANSPs are provided with the hurricane/tropical storm simulation details:
 - Level of hurricane
 - Projected path
 - Forecasts (timeline), etc.
- The details of the hurricane are based on historical hurricane events.
- Each year, the path of the hurricane is varied to provide an opportunity for other ANSPs to participate.
- Hurricane Web Planning hosts are also alternated from year-to-year.
- Participating ANSPs prepare Hurricane Web Conference slides (CADENA ATFM/CDM Procedures Manual – Appendix E) based on the information provided.
- A day or two before the exercise, the participating ANSPs send the slides to CADENA Headquarters.
- The slides in the following section are from the most recent CADENA Hurricane Exercise held on March 29, 2023.



26

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Examples of Airport Information that can be Included in CADENA Web Conferences

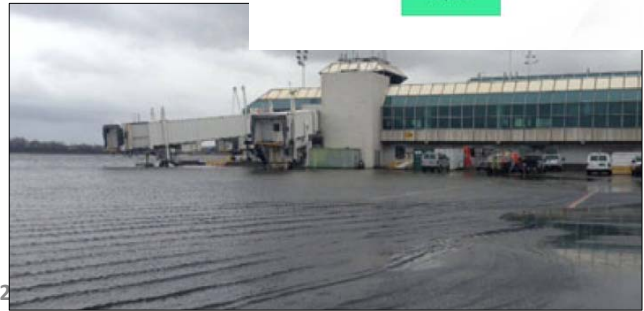
Pre-Hurricane airport information:

- NAVAID and equipment protection protocols
- Planned time of airport closure
- Point of Contact for coordinating and sharing advanced plan information
- Pertinent airport emergency plan information



Hurricane and post-hurricane airport information:

- Airport damage reports / assessments
- Status of runway, taxiway, and ramp surfaces
- Status of NAVAID and equipment
- Number of parking spaces available for humanitarian flights
- Point of Contact for coordinating humanitarian flights
- Estimated time of airport re-opening



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Exercise: CADENA Hurricane Charlie Planning Web Conference

March 29, 2023
1400 UTC

28

Hurricane Charlie



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Hurricane Charlie

- Hurricane Charlie has just passed by Jamaica and is classified as a Category 4 hurricane as it approaches the Yucatan Peninsula
- Hurricane force winds are reported out to 200 NM from the eye of the storm



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EXERCISE**CADENA
Contingency
Form**

Impacted Facility / Sector: Kingston and Mexico FIRs
REF #: Hurricane Charlie Update March 29, 2023 at 1400 UTC

Type of Contingency

☐ Communication ☒ Facility ☐ Surveillance ☐ Staffing ☒ Other

Detail

Hurricane Charlie has passed over Jamaica and is approaching the Yucatan peninsula. The Hurricane is expected to make landfall within the next 24 hours near Cancun

Traffic Management measures

☒ Miles-in-trail (MIT) ☒ Minutes-in-trail (MINIT) ☒ Re-routing
☐ Fix Balancing ☐ Level Capping ☐ Tunnelling
☐ Airborne Holding ☐ Ground Delay Program (GDP) ☐ Ground Stop (GS)

Detail

Expect miles-in-trail, minutes-in-trail to select airports and tactical reroutes in the Kingston and Mexico FIR due to the track of Hurricane Charlie.

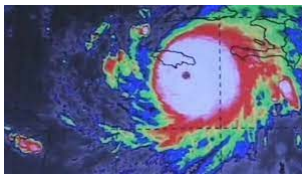
FIRs Affected

☐ TTZP ☐ TJZS ☐ SVZM ☐ TNCF ☐ MDCS
☐ MTEG ☒ KZMA ☐ KZWY ☐ KZHU ☒ MUFH
☒ MKJK ☒ MMFR ☒ MHCC ☐ MPZL ☐ SKEC
☐ SKED ☐ SARR ☐ SACF ☐ SAEF ☐ SAVF



31

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Hurricane Charlie**WEATHER OVERVIEW****Damage is reported in Kingston**

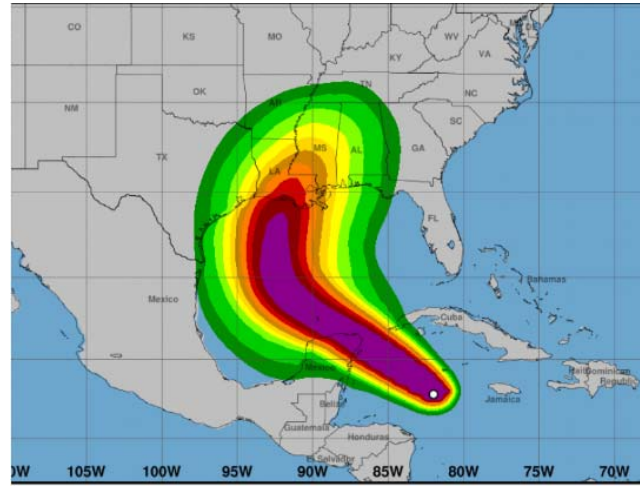
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Hurricane Charlie

WEATHER OVERVIEW

Expected Track

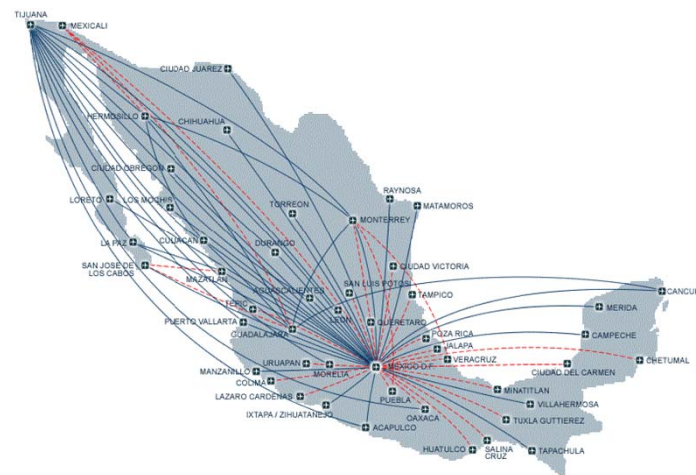


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CADENA

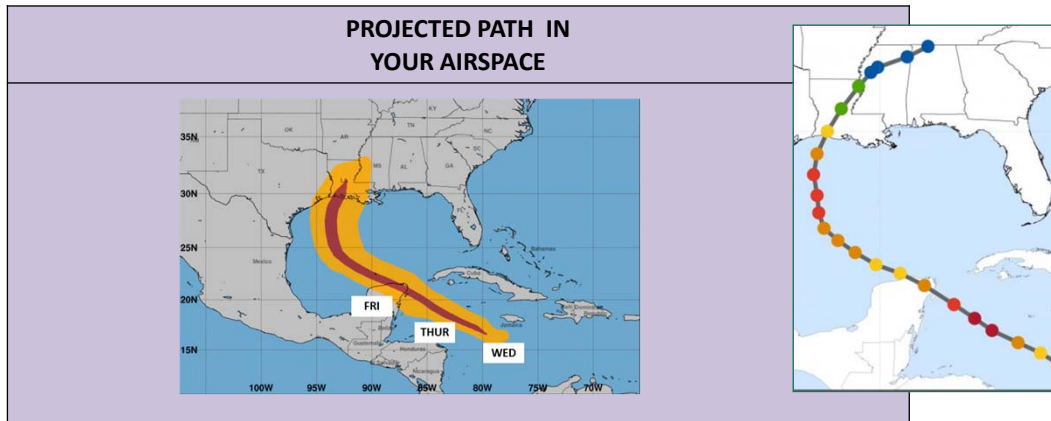


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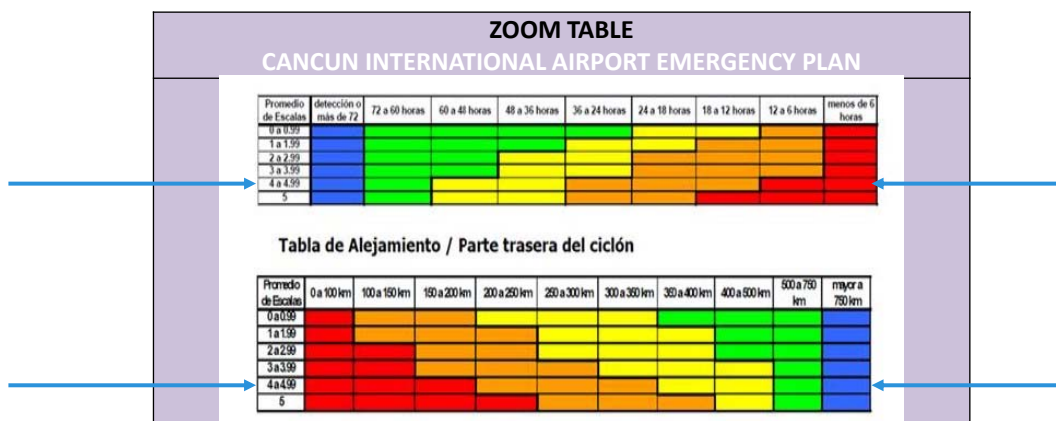
HURRICANE CHARLIE UPDATE – 1400 UTC – MARCH 29, 2023

SENEAM



HURRICANE CHARLIE UPDATE – 1400 UTC – MARCH 29, 2023

SENEAM



HURRICANE CHARLIE UPDATE – 1400 UTC – MARCH 29, 2023

SENEAM

ALERT LEVEL
CANCUN INTERNATIONAL AIRPORT EMERGENCY PLAN
• BLUE ALERT: 72 HOURS BEFORE. MINIMUM DANGER. BULLETINS EVERY 24 HOURS. • GREEN ALERT: BETWEEN 72 & HOURS. LOW DANGER. BULLETINS EVERY 12 HOURS. • YELLOW ALERT: BETWEEN 60 & 12 HOURS. MODERATE DANGER. BULLETINS EVERY 6 HOURS. • ORANGE ALERT: 36 & 6 HOURS. HIGH DANGER. BULLETINS EVERY 3 HOURS. • RED ALERT: LESS THAN 18 HOURS. MAXIMUM DANGER. BULLETINS EVERY 3 HOURS.



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HURRICANE CHARLIE UPDATE – 1400 UTC – MARCH 29, 2023

SENEAM

PROJECTED IMPACT
DAY 1: THU (24 HOURS) CONTACT SENEAM HEADQUARTERS CHECK STAFF INTERNAL PROCEDURES PREPARE STAFFING TEAMS VERIFY SUPPLY OF EMERGENCY PLANTS CHECK NAVAIDS & EQUIPMENT PROTECTION PROTOCOLS



38

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HURRICANE CHARLIE UPDATE – 1400 UTC – MARCH 29, 2023**SENEAM****PROJECTED IMPACT****DAY 2: FRI 0800 UTC**

AIRPORT CLOSURE IS DECLARED

NAVAIDS & EQUIPMENT MUST BE CLOSED

EVACUATE SENEAM STAFF

KEEP FUEL SUMINISTRY TO RESTART OPERATIONS

ADVISE SENEAM HEADQUARTERS

STAY COMMUNICATED WITH LOCAL AIRPORT SECURITY COMMITTEE



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HURRICANE CHARLIE UPDATE – 1400 UTC – MARCH 29, 2023**SENEAM****AIRPORT OPENING****DAY 2: FRI AFTER IMPACT**

CONTACT AIRPORT AUTHORITIES & AIRPORT ADMINISTRATOR TO ASSESS
DAMAGE AND ESTIMATE OPERATION TIME

THE EMERGENCY LEVEL SHOULD NOT BE REDUCED AS LONG AS
OPERATIONS ARE NOT NORMALIZED



40

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HURRICANE CHARLIE UPDATE – 1400 UTC – MARCH 29, 2023

SENEAM

AIRPORT OPENING

DAY 2: FRI 1900 UTC

WHEN AFAC & ASUR REPORT AIRPORT OPERATIVE
MMUN WILL RESTART OPERATIONS



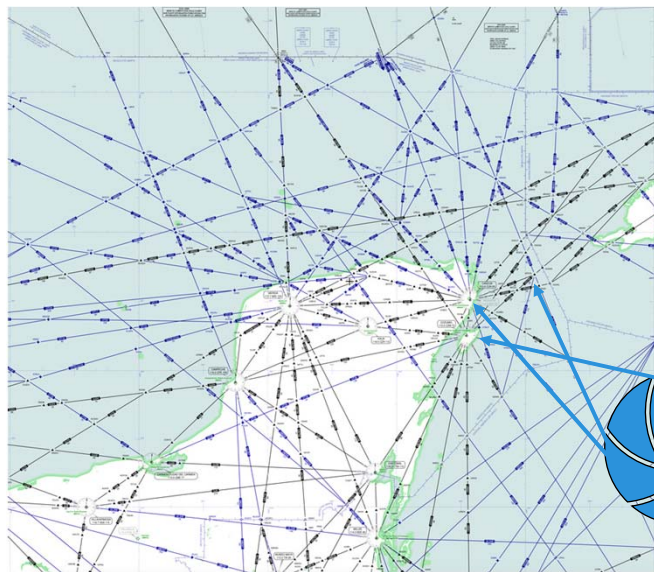
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HURRICANE CHARLIE UPDATE – 1400 UTC – MARCH 29, 2023

SENEAM

IMPACTED ROUTES
DAY 1 THU



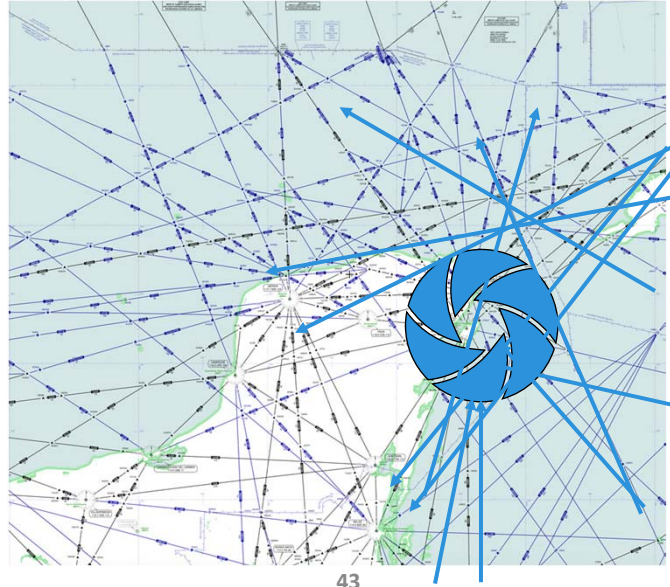
UL333
UL577
UM782

42

HURRICANE CHARLIE UPDATE – 1400 UTC – MARCH 29, 2023

SENEAM

IMPACTED ROUTES
DAY 2 FRI



UL333
UL577
UM782
UB646
UR522
UG521
UG765
UB881
UL674
UM219

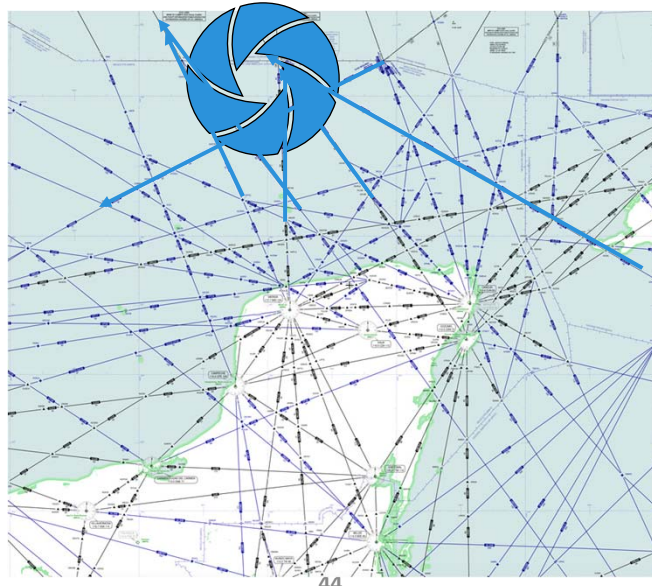


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HURRICANE CHARLIE UPDATE – 1400 UTC – MARCH 29, 2023

SENEAM

IMPACTED ROUTES
DAY 3 SAT



UL674
UA766
UA770
UM209
UL208
UL207
UM580



44

HURRICANE CHARLIE UPDATE – 1400 UTC – MARCH 29, 2023

SENEAM

PLANNED TRAFFIC MANAGEMENT MEASURES

- 20 MIT TO MMUN ALL DAYS
- NO TRAFFIC VIA KEHLI A766/UM782/UT35 DEST MMUN
- OTHER POSSIBLE TMM AFTER MMUN AIRPORT STATUS REPORT (AFP, IN EXAMPLE)



45

45

HURRICANE CHARLIE UPDATE – 1400 UTC – MARCH 29, 2023

SENEAM

OTHER ISSUES

- Humanitarian Flights coordinated via AFAC
- MMMD Main alternate airport for MMUN & MMCZ
- On day 1 big GENAV movement to MMMD
- SENEAM does not close airways, it is up to AFAC to rule over this determination, and to airlines to file best suitable route if needed

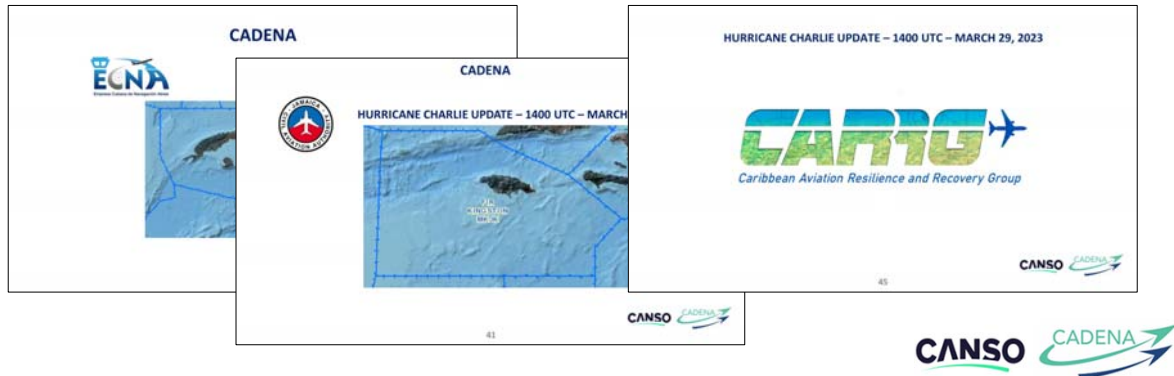


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CADENA Hurricane/Tropical Storm Conference Continued

- After the first ANSP provides their briefing, all other impacted ANSPs and other organizations provide their briefing.
- In our most recent training, SENEAM briefed first followed by ECNA, JCAA and CARRG

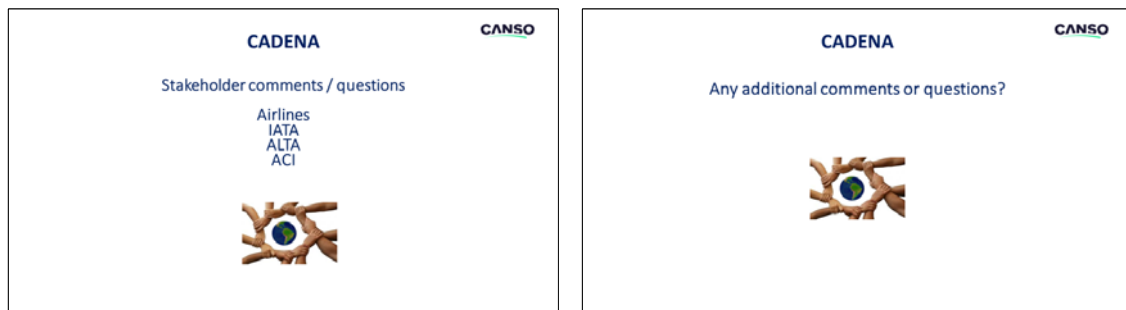


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ANSP/Stakeholder Feedback

- After the exercise, ANSPs and Stakeholders are given an opportunity to provide feedback and ask questions.



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Partial List of Actual CADENA Hurricane/Tropical Storm Web Conferences

- September 4, 2017 – Hurricane Irma
- September 16, 2017 – Hurricane Maria
- June 10, 2018 – Tropical Storm Bud
- September 14, 2018 – Hurricane Isaac
- September 27, 2018 – Tropical Storm Kirk
- October 8, 2018 – Hurricane Michael
- October 8, 2018 – Hurricane Sergio
- August 26, 2019 – Tropical Storm Dorian
- September 20, 2019 – Hurricane Gerry
- September 22, 2019 – Tropical Storm Karen
- June 1, 2020 – Tropical Storm Amanda
- June 2, 2020 – Tropical Storm Cristobal
- July 31, 2020 – Hurricane Isaias
- May 23, 2021 – Tropical Storm Ana
- June 29, 2021 – Tropical Storm Enrique
- July 2, 2021 – Hurricane Elsa
- August 15, 2021 – Hurricane Grace
- September 16, 2022 – Tropical Storm Fiona
- September 26, 2022 – Hurricane Ian
- October 9, 2022 – Hurricane Julia



49

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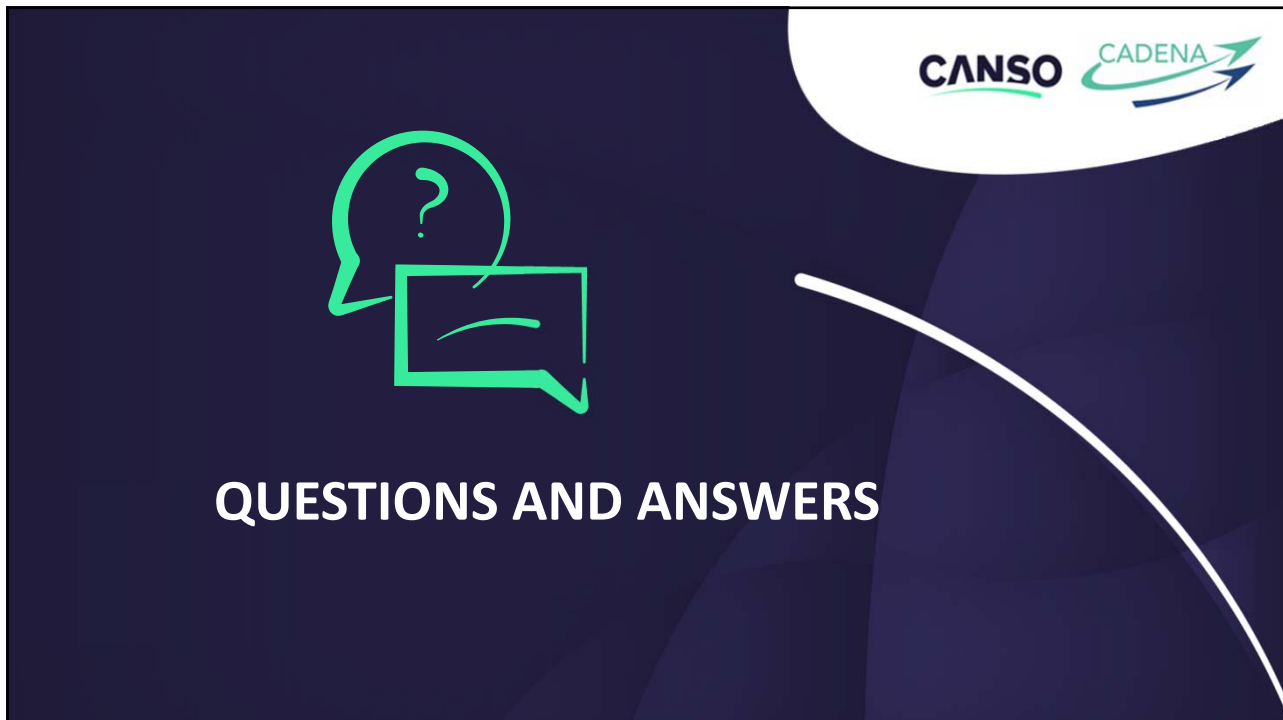
CADENA ATFM/CDM – During Hurricane/Tropical Storm

- Regional ANSP and stakeholder communication, coordination, cooperation and INFORMATION SHARING prior to, during and after Hurricanes and Tropical Storms has resulted in:
 - Airline preparedness (e.g., available routes, airport closures, anticipated TMMs etc.)
 - Adjacent ANSP preparedness (e.g., re-routes established, increased demand anticipated, anticipated TMMs etc.)
 - Improved response time for delivery of humanitarian assistance
 - Regional awareness of impact to airport and ATC capabilities
- CADENA continues to improve regional ATFM/CDM in times of crisis and is willing to collaborate with additional LAC stakeholders who focus on disaster preparedness and humanitarian response

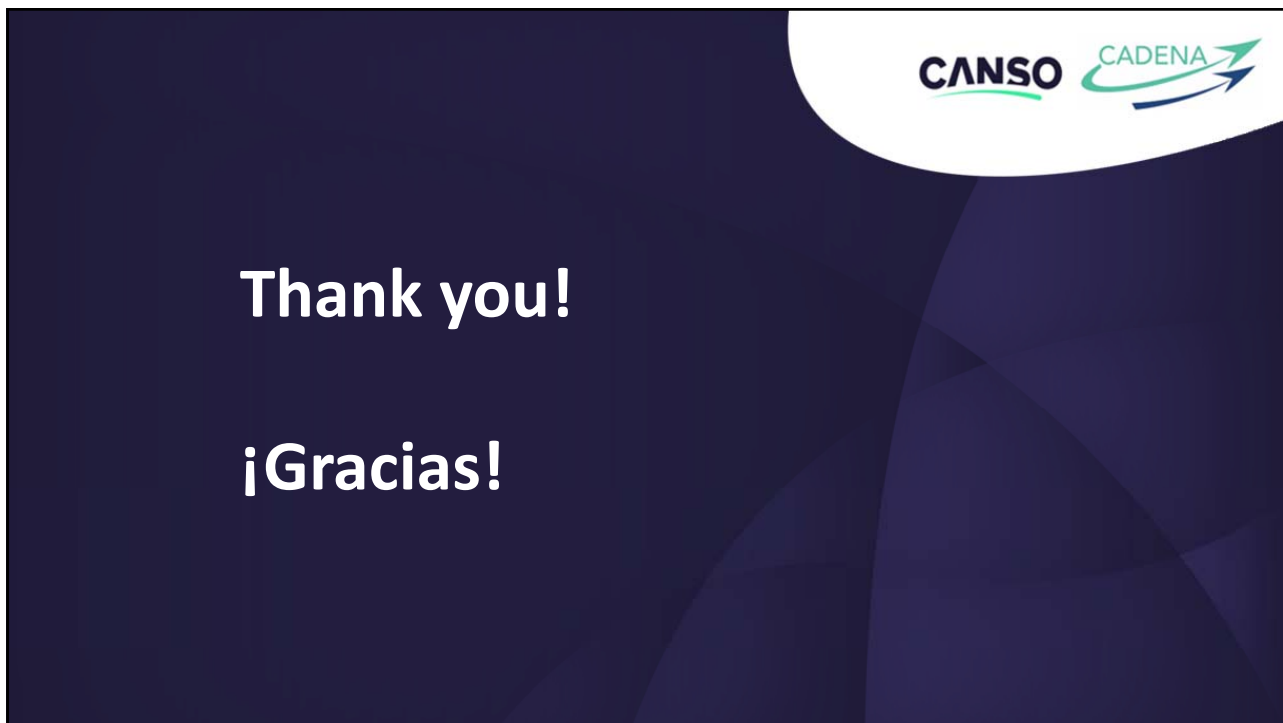


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