

BRAZILIAN AIR FORCE

DECEA

**DEPARTMENT OF AIR
SPACE CONTROL**

A-CDM NATIONAL PROJECT



Our AIM

To present the Brazilian
A-CDM National Project
status



WELCOME TO THE A-CDM GUARULHOS AIRPORT CASE STUDY



Agenda



- Our Aim (goal)
- Brief History
- DECEA Framework
- COOPERATION IN THE FIELD OF AIR NAVIGATION
 - Item 1.1 "Exchange of Updated Flight Plan Data"
 - Item 1.1 EAD x AIM-BR
 - Item 1.2 Performance Measurement
 - Item 1.3 Airport Collaborative Decision Making (A-CDM)
 - A-CDM Framework
- DECEA-ICAO A-CDM Regional Participation
- Bibliographical References



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SIRIUS PROGRAMME

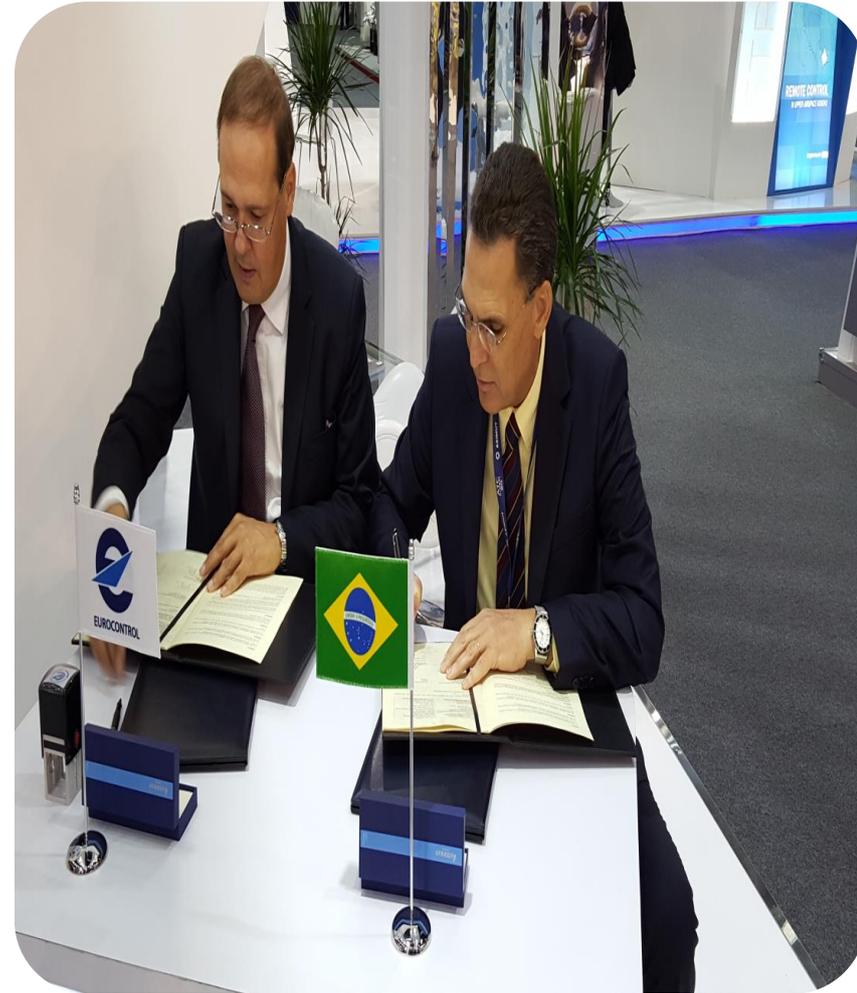
The Strategic DECEA SIRIUS Programme aims are to keep updated the Brazilian Airspace Control System (SISCEAB) and promote the social benefits thru the National ATM system evolution.

SAFETY	
ATM	
COMM, NAV & SURVEILLANCE	
METEOROLOGY	
AIM - BR	
SEARCH & RESCUE	
HUMAN FACTORS	

SIRIUS A aviação do futuro
já começou
BRASIL

BRIEF HISTORY

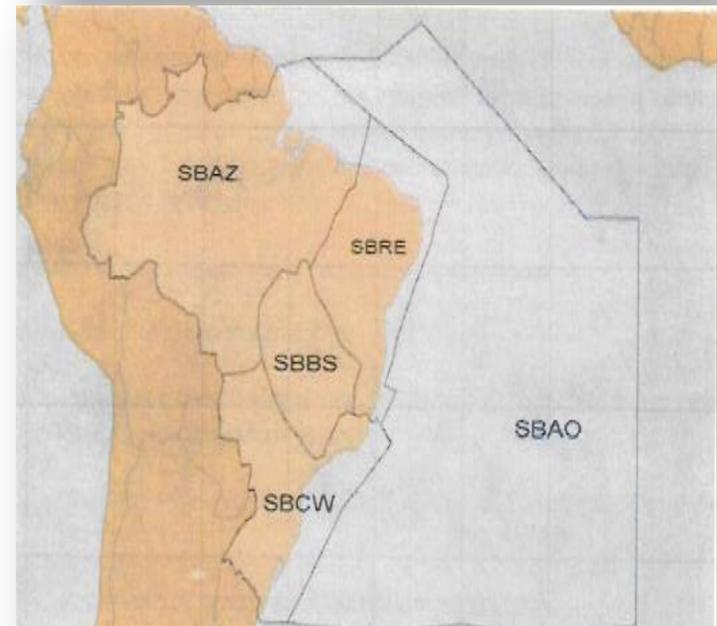
DECEA signed with Eurocontrol "Rostering" (ATCO Sytem), Philosophies and tool agreement and Mutual Cooperation in the Field of "Air Navigation" agreement on Oct 5th 2015.



BRIEF HISTORY

DECEA and EUROCONTROL agreements contain the following the items:

- ❑ Rostering (ATCO) Agreement Tools System - MUAC (Time Zone Technologies)
- ❑ "Air Navigation" Item 1.1 - provision and exchange of updated flight plan data, airport arrival and departure planning information, and flight profile data for flights between the respective areas of responsibility.
- ❑ "Air Navigation" Item 1.2 - Cooperation in the area of Performance Measurement.
- ❑ "Air Navigation" Item 1.3 - Cooperation in the area of Airport Collaborative Decision Making (A-CDM).



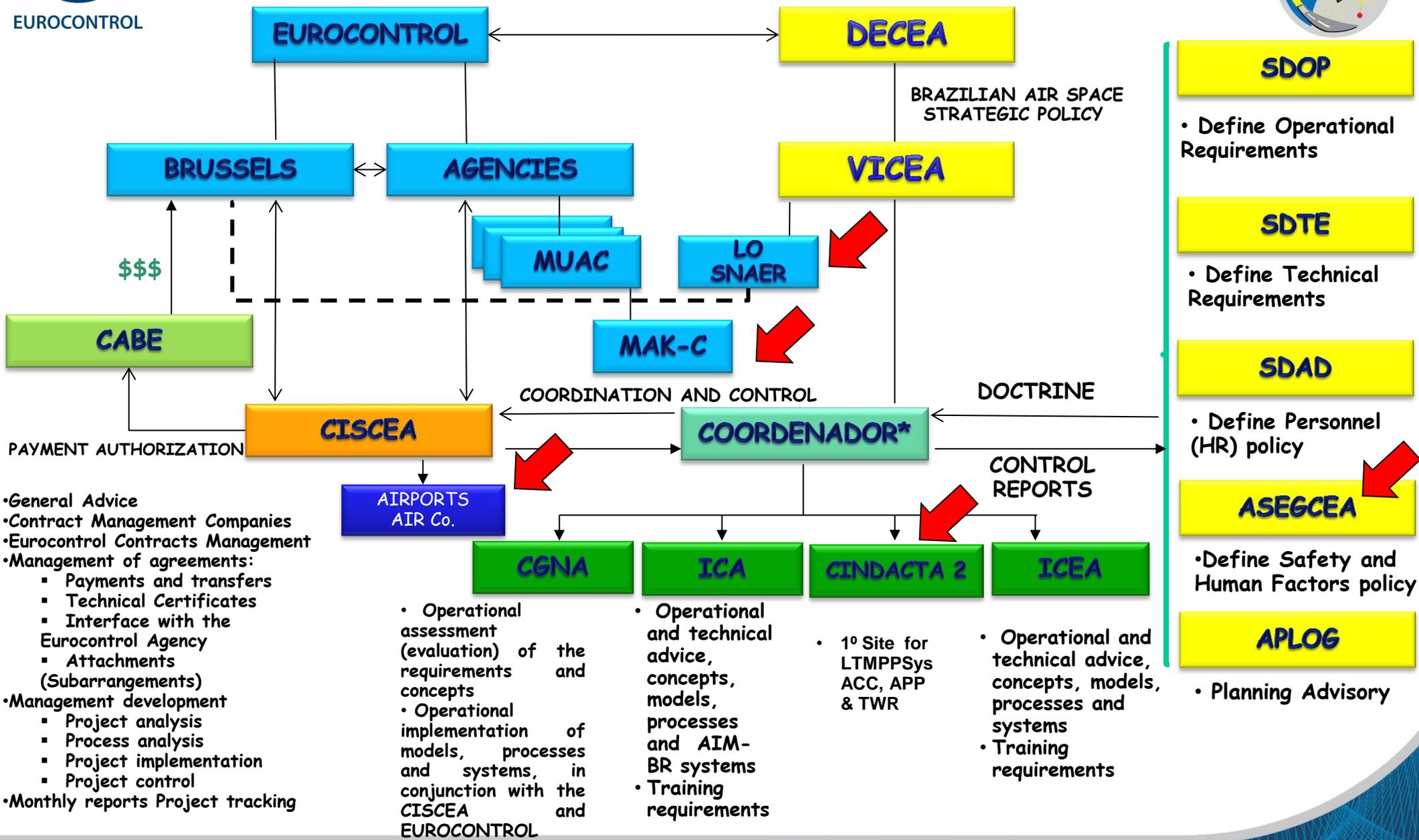
Agenda



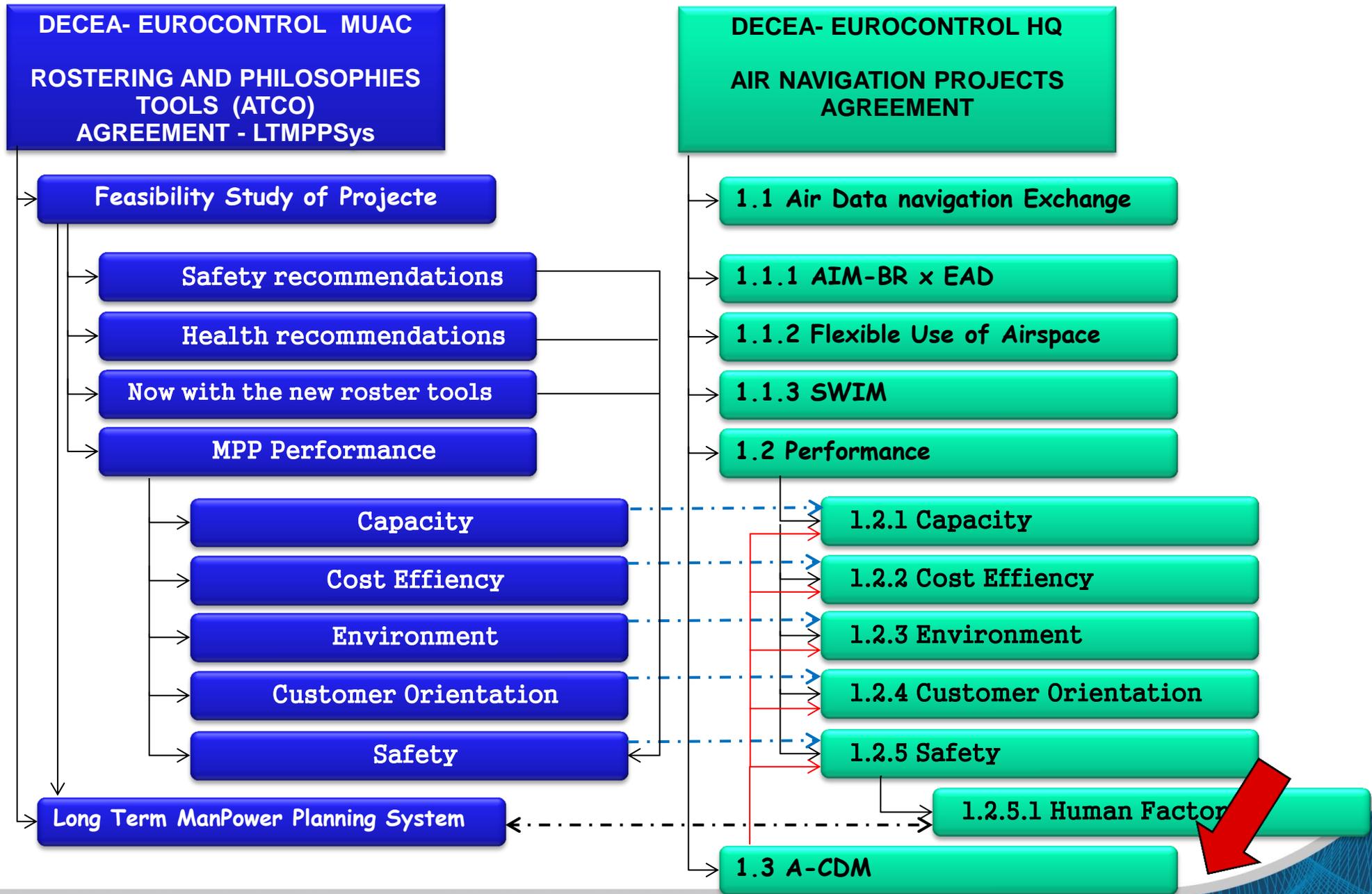
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FRAMEWORK AIRSPACE CONTROL DEPARTMENT - EUROCONTROL



Macro Diagram Program - Functional Context



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WHAT MEANS A-CDM?



The A-CDM Project (Airport Collaborative Decision Making) is a concept that is intended to **improve the Air Traffic Flow and Capacity Management (ATFCM)** at airports by reducing delays, and delivering improved predictability to assertively optimizing the use of available resources.

The A-CDM project allows each partner to **optimize their decisions within the airport environment by supporting the collaboration between partners.** A-CDM insures that preferences and constraints are balanced in both strategic and tactical timeframes.

A-CDM services are **facilitated by the timely and accurate information sharing,** and rearranged processes, mechanisms and tools.

The Real Team Spirit (TRTS)

Working together to keep the takeoff (TTOT)

HOW TO REACH OUR ACISP AIMS?



Airlines' schedule →

Planning information →

Flight progress information →

Predictions messages →

Status messages →

Operational planning information →



Airport CDM Information
Sharing Functions

→ Advisories

→ Alerts

→ Maintenance of environmental information (aeronautical and meteorological)

→ Data recording and archiving



**A-CDM Project Plan Phases
Methodology
EUROCONTROL - Airport CDM Implementation
PHASES**

- 1- Preparing the framework (Feasibility Study)
 - 1.1 - Set the organisation structure
 - 1.2 - Sponsors DECEA and GRU AIRPORT
- 2- 16 Milestones Inventory
- 3- (WP1) Milestone Approach Process Implementation
 - 3.1 Knowing the Differences
- 4 - Signing MoU
- 5 - Set-up A-CDM Project Plan
- 6- KPI Δt_0 GRU AIRPORT
- 7 - Elements: **Variable Taxi Time (VTT); Pre-departure Sequencing; Adverse Conditions and Collaborative Management of Flight Updates**
- 8 - ACISP Platform Requirements
 - 3.1 National Project Customization
 - 3.1.1 Framework - National Steering Board
 - 3.1.2 Framework - Regional Airport Customization
 - 3.1.3 DMAM National Algorithms Concepts
 - 3.1.4 ASM - Airport Services Management
- 9- ACISP Platform development
- 10- ACISP Platform Deployment & WP
- 11- Project risks and mitigation
 - 11.1 Operational Risks: Safety, Human Factor & HMI
- 12- Measuring success (selected KPIs)
- 13- Post Implementation
- 14- Disseminate The Best Practices
 - 14.1 A-CDM CARSAM Community - Proposal



FEASIBILITY STUDY



Concepts & Requirements



Operational Expertise



KPI BENEFITS



A-CDM Conference Rio 22 Feb 2017

AIRPORT CDM - PROJETO BRASIL STRATEGIC PLAN – IMPLEMENTATION

Review the agreed aims

- Establish appropriate performance indicators for the goals
- Performance measurement
- Reporting and feedback mechanisms

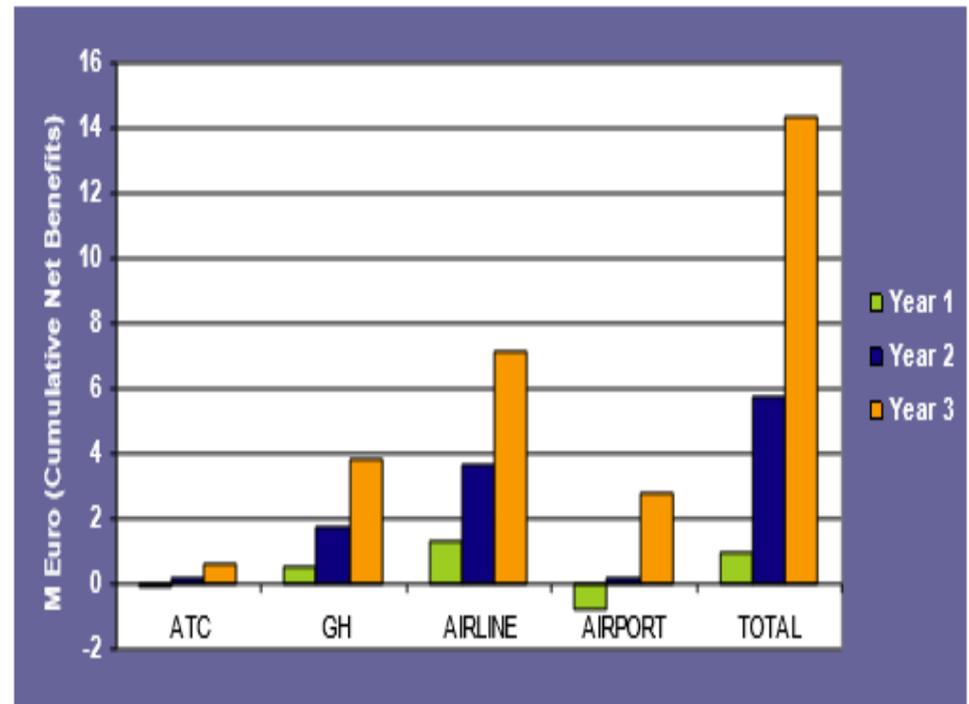


Figure 9: Cumulative Net Benefits (3 years)

“The return of investment in various degrees is available from the second year onwards for all the partners. Airports and ATC achieve their return of investment in the second year of airport CDM implementation; however, the Ground Handlers and Airlines may already achieve it within the first year of implementation.”

AIRPORT CDM – BRAZILIAN PROJECT

HOW TO MEASURE THE PROJECT SUCCESS

5.2 Quantitative and qualitative analysis by partner

The following table below shows the Net Present Value, Benefit to Cost Ratio, Payback Period and the qualitative benefits for each airport partner.

	Quantitative	Qualitative
Airlines	Delay Cost Savings Benefits from avoided cancellations NPV = €M 29.92 B/C = 8 Payback = within year 1	Improved Customer Satisfaction Lower GH Prices
Ground Handlers	Improve Efficiency NPV = €M 16.87 B/C = 14 Payback = within year 1	Improved Customer Satisfaction
Airport	Airport revenue Airport operational efficiency NPV = €M 29.39 B/C = 8 Payback = within year 2	Airport image Airport punctuality rank
ATC	Efficiency increase NPV = €M 3.79 B/C = 6 Payback = within year 2	Improvement in Working Environment Higher Service Quality Network Effects

Figure 10: Results summary table (incl. qualitative benefits)

In the previous example, company ABC had a BCR of 5.77, which indicates that the project's benefits significantly outweigh its costs. Moreover, company ABC could expect \$5.77 in benefits for each \$1 of its cost.

Source: Benefit Cost Ratio - BCR Definition | Investopedia <http://www.investopedia.com/terms/b/bcr.asp#ixzz4QdsnAAZj0000000>

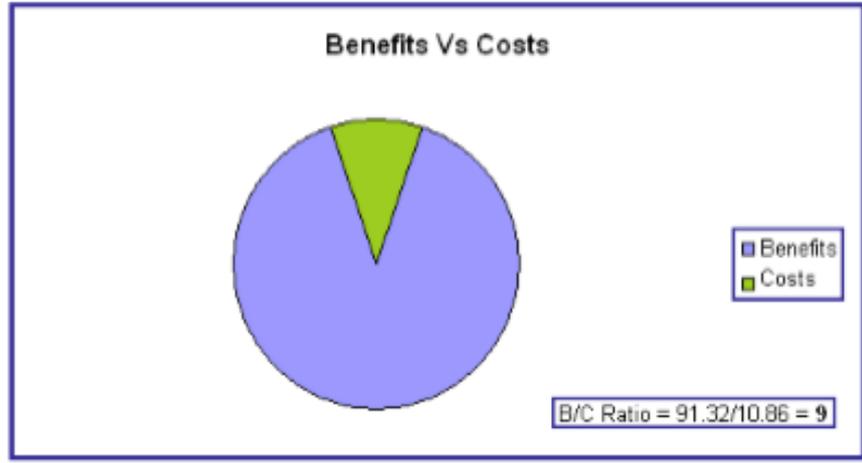
AIRPORT CDM – BRAZILIAN PROJECT STRATEGIC PLAN – IMPLEMENTATION POST-IMPLEMENTATION

- Airport CDM Becomes a Daily Operation
- Continued Education of All Partners
- Preparing for New Functions

Example

The overall cost of the project for all partners together is 10.86 M Euro, distributed as follows:

- ❑ 3.83 M Euro investment spread over 10 years
- ❑ 7.03 M Euro operating costs spread over 10 years



Benefits	91.32 M Euro
Investment Costs	3.83 M Euro
Operating Costs	7.03 M Euro

Fonte:
http://www.eurocontrol.int/sites/default/files/field_tabs/content/documents/nm/airports/acdm-cba.pdf

A-CDM CASE STUDY

Project Plan Phases I, II & III

SCENARIO

WPO

Preparing the framework - Concepts

- National
- Regional
 - Directors Group (DECEA-GRU)
 - Project Managers Group (DECEA-GRU)

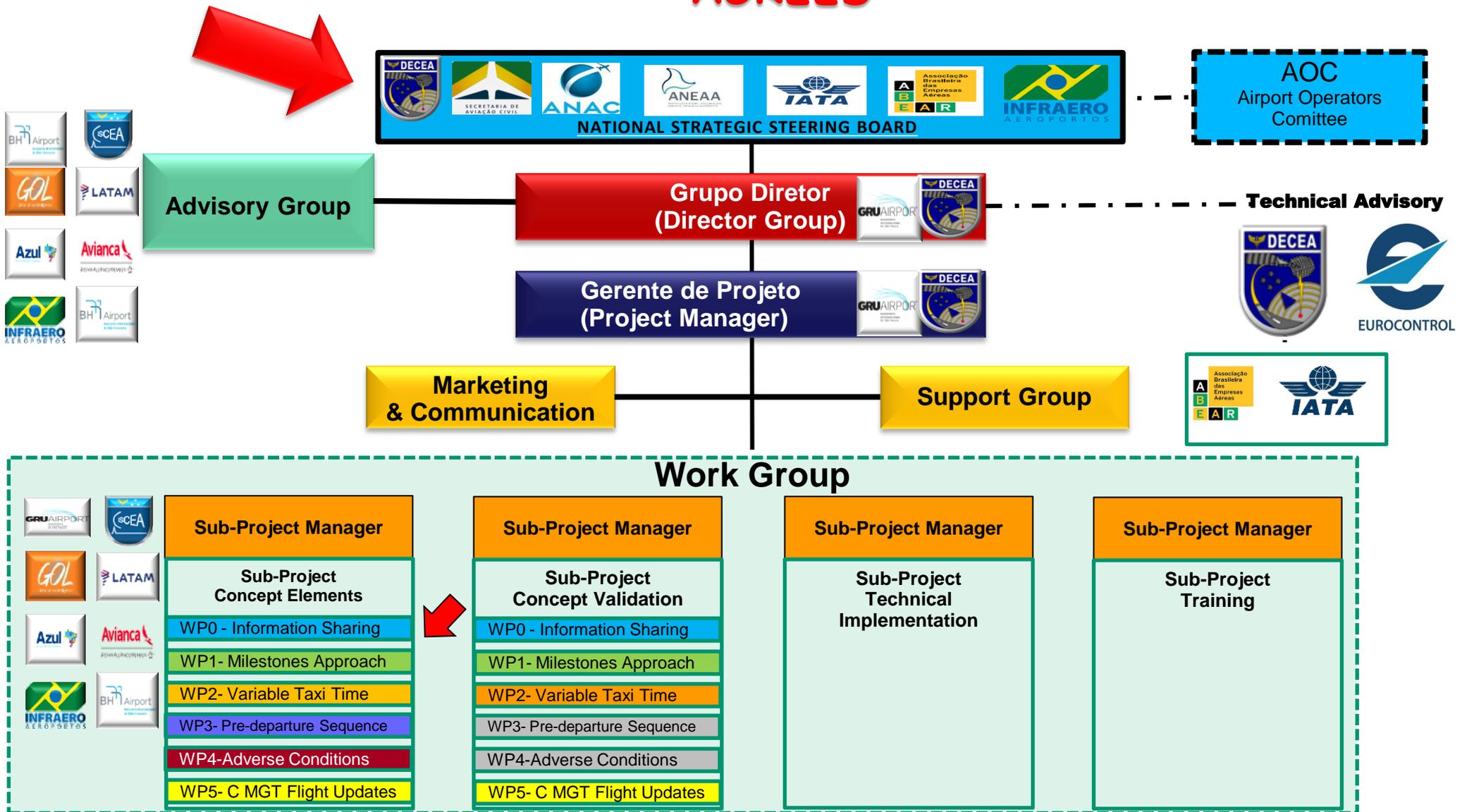


Improving the Airport CDM Information Sharing Platform (ACISP) Knowledge

- ✓ WP1- Milestone Approach
- ✓ WP1.1- Platform deployment requirements
- **WP2- Variable Taxi Time (VTT)**
- **WP3- Pre-departure Sequencing**
- **WP4- Adverse Conditions**
- ✓ WP5- Collaborative Management of Flight Updates (DECEA-EUROCONTROL Agreement Item 1.1)

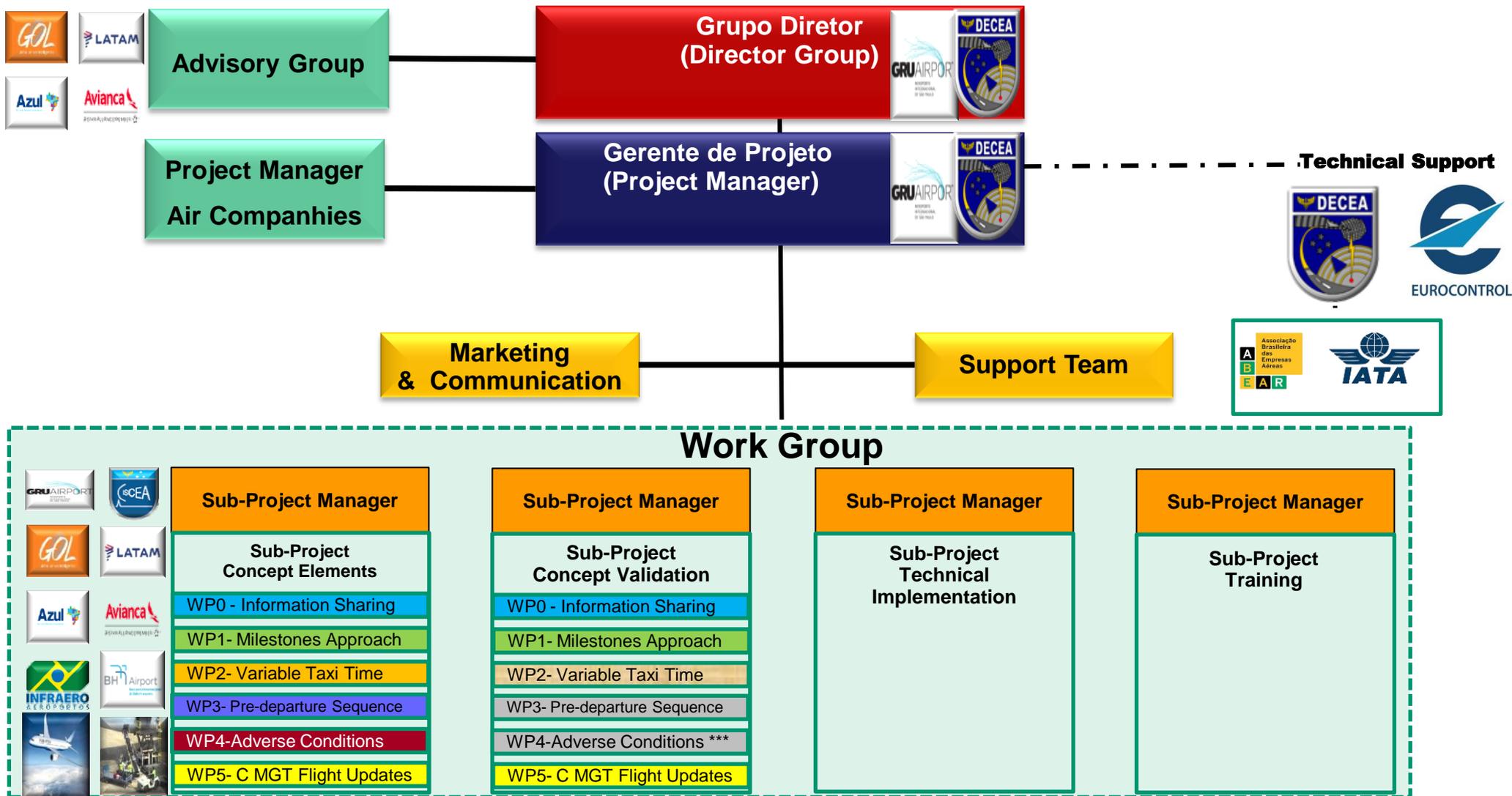
Evaluation & Signing of the MOU (Memorandum of Understanding)

NATIONAL FRAMEWORK AGREED



SAC – Secretariat of Civil Aviation / ANAC - Civil Aviation Agency / ANEEA – National Airports Administrators Association
 ABEAR Brazilian Airlines Association / INFRAERO - Brazilian Infrastructure of Airport Co.

REGIONAL FRAMEWORK GRU AIRPORT MOU STRUCTURE



*** Regional Customization: Snow and Deice by Fog and Rain

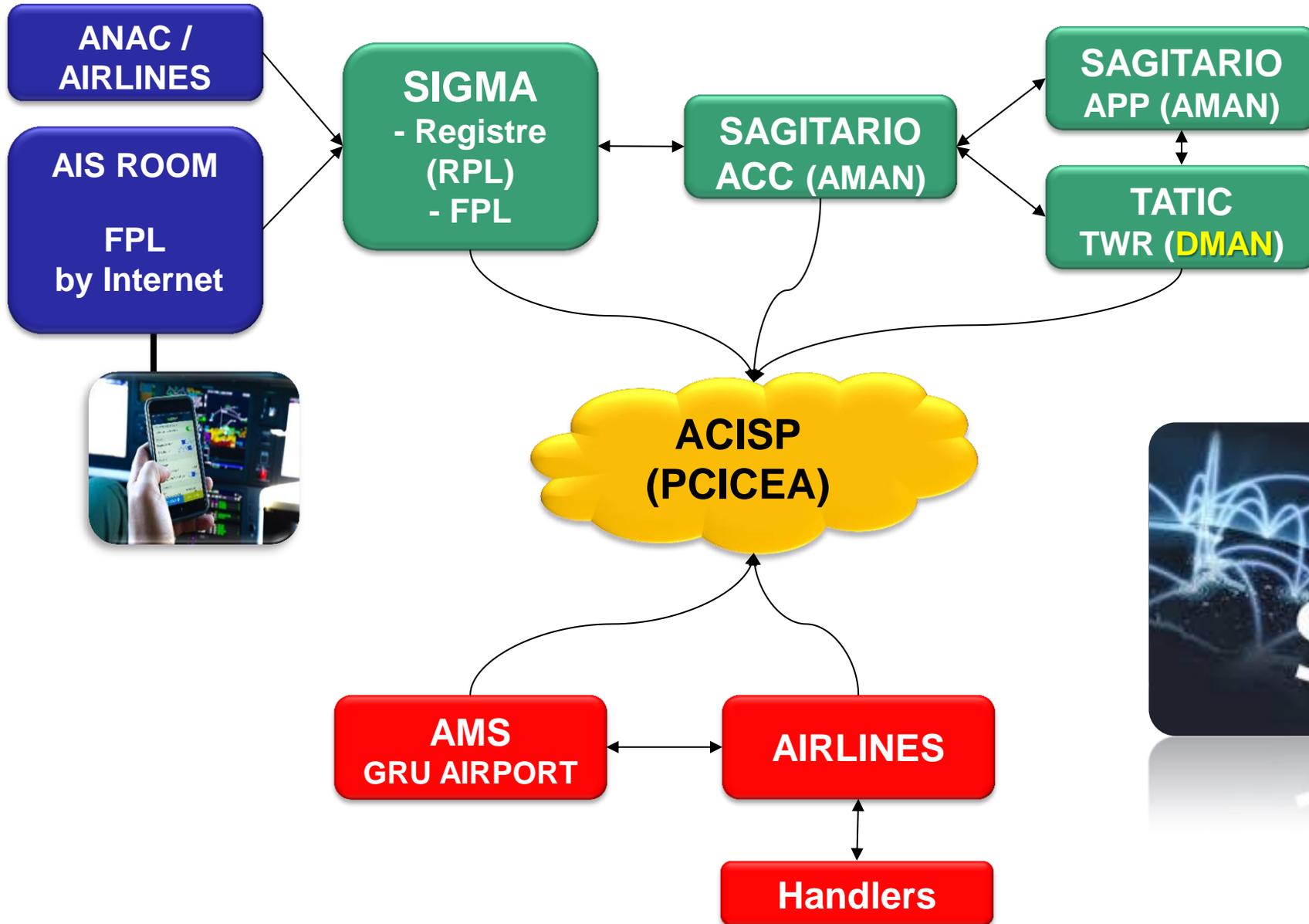
REGIONAL FRAMEWORK GRU AIRPORT



Airport CDM Information Sharing Platform (ACISP)



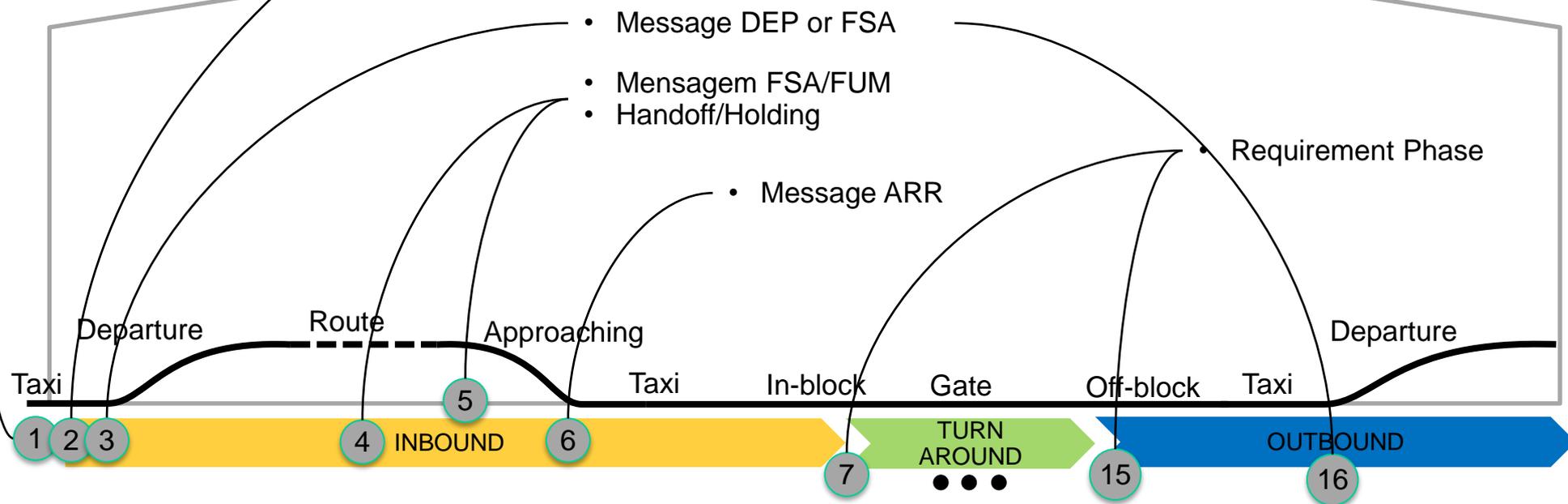
ACISP INTEGRATING SYSTEMS -PCICEA



Interfaces "ASCISP" PLATFORM

Milestones Correlation

- Message Approval ATS (General Aviation)
- Registre - RFPLs availability in (Airlines)
- Activation/Pre-Activation
- Changing (CHG, DLA, CNL)
- Allocated SLOT (Coordinated Airport)
- FPL + Registre
- SLOT Allocation



A-CDM WORK GRU GROUP BASIC STRUCTURE ON THE JOB

Project Manager
Air Companies

Gerente de Projeto
(Project Manager)



WP1 - Milestones Approach

WG - IT
INFORMATION
TECHNOLOGY

WG- ITOP
Information
Technology &
Operational

WG - OP
OPERACIONAL

SWG
devlop

SWG
CYBER
defense

SWG
COMM

SWG
REQ

SWG
Safety

SWG
ELEME
NTS

SWG
KPI

SWG
EXIT
EXOT

SWG
GATE
APRON

GT - SAFETY (HUMAN FACTORS & HMI)

* A-SMGCS- Advanced Surface Movement Guidanc and Control System

Breaking down the Milestones Methodology Phase I



#	Milestones	Timing	Acronyms	Effect	Origin and priority	Action on CDM Operation (ACISP)	Mandatory / Optional for Airport CDM Implementation	Action Item
1.	ATC Flight Plan Activated (ATC Flight Plan activation)	<p>Normally this takes place 3 hours before EOBT, however it may be later. In some cases a repetitive flight plan (RFPL) has been submitted, covering daily or weekly flights. (Estimated Off-Block Time)</p> <p>ACARS - Aircraft Communications Addressing and Reporting System</p>	<p>The estimated time at which the aircraft will start movement associated with departure (ICAO)</p> <p>ELDT - Estimated Landing Time</p> <p>EIBT - Estimated In-EOBT - Block Time</p> <p>Estimated Off-Block Time</p> <p>ETOT - Estimated Take Off Time</p> <p>IFPS - Integrated Initial Flight Plan Processing System</p>	<p>One aircraft turn-round normally includes an arriving and a departing flight, meaning that it will have two related flight plans. For coordinated airports, the outbound flight is already known. The flight plan may be used to update certain information such as type of aircraft. For long distance flights, the ELDT may differ from the airport slot. For non coordinated airports, the flight plan is used to initiate the outbound flight. The flight is ready not later than 15 minutes after the planned EOBT. The DPI process commences the correct messaging with Network Operations (if implemented – see attachment 2 for details)</p>	<p>O Plano de Voo ATC é enviado pelo Operador de Aeronaves e distribuído pelo IFPS. Todas as unidades ATC envolvidas recebem o plano de voo, incluindo os aeródromos de partida e de destino.</p> <p>The ATC Flight Plan is submitted by the Aircraft Operator and distributed by the IFPS. All involved ATC units receive the flight plan, including departure and destination aerodromes</p>	<p>ELDT and EIBT updated for an arrival EOBT and ETOT updated for a departure The DPI process commences (if implemented – see section 3.7.3 for detail)</p>	<p><u>Highly Recommended</u> (P. 3-17)</p>	<p>Air companies report updates:</p> <ul style="list-style-type: none"> - replacement of aircraft - Flight Cancellation - unavailability of airdrome-airport - request airlines for flight changes, such as airports changing etc. - Create a subgroup for the study and regulation of cancellation or alteration of RFPL <p>Study of GRU turn-round timing (EXIT /EXOT)</p>

1 MILESTONE 1 - Ativação do Plano de Voo ATC

Preference time: 3 hours before EOBT

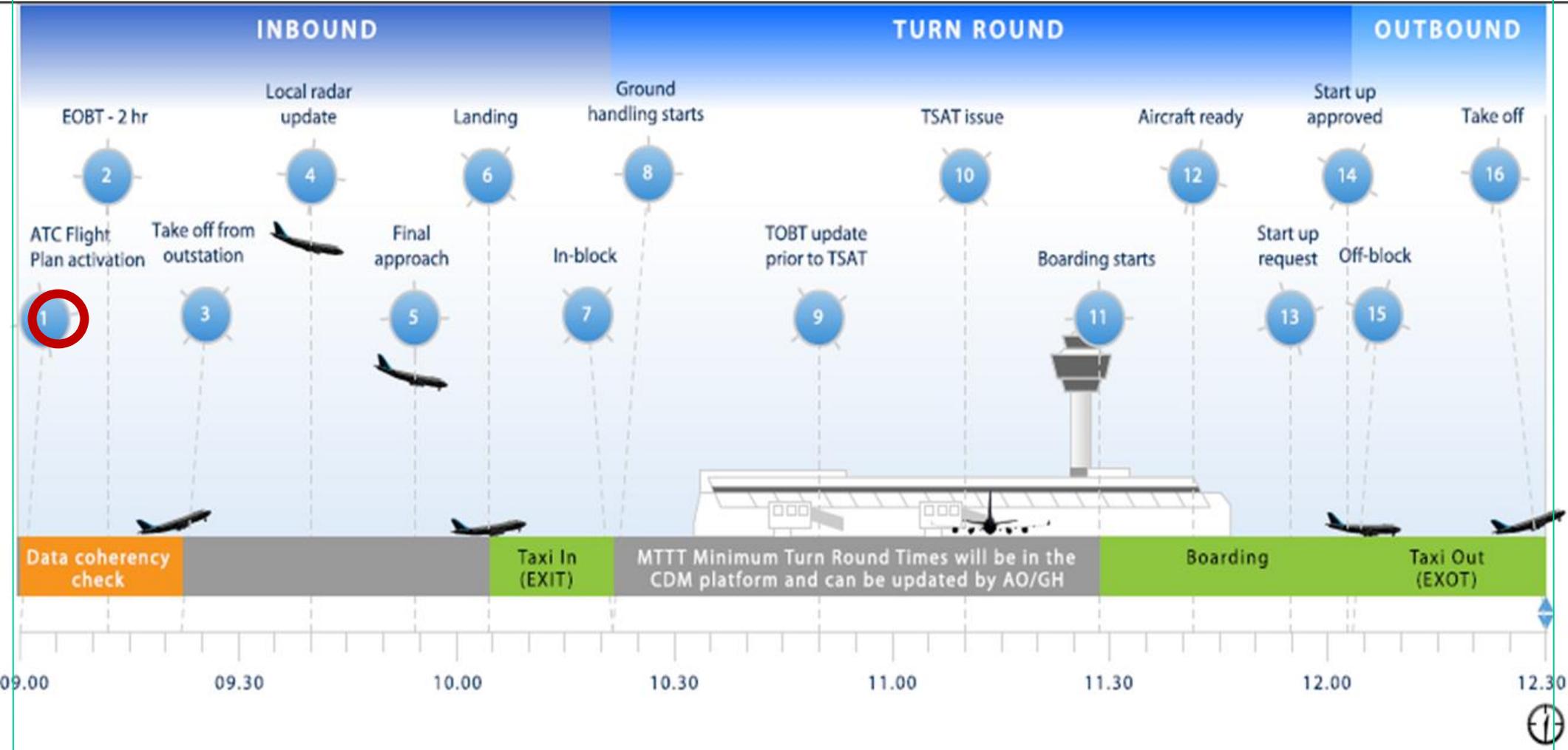
This control must be checked the consistency between the ATC flight plan data of airport slots and airport before the first DPI submitted.
(Este controle deve ser efetuado para verificar a coerência entre os dados do Plano de Voo ATC das faixas horárias do aeroporto e o aeroporto antes do primeiro E-DPI enviado.)

T_0 = RFPL

EIBT e AIBT updated to an arrival

EOBT e ETOT updated to an exit

EIBT = AIBT



Breaking down the Milestones Methodology

Phase I - Simulating Data Sharing

1 ATC Flight Plan Activation										
SISTEMA	EOBT	CTOT	ELDT	EXIT	EIBT	EXOT	ETOT	TOBT	TSAT	TTOT
TWR – TATIC	R	C	R	C	C	C	C	R	C	C
APP/ACC – SAGITÁRIO	R	R	R	-	-	-	R	R	-	R
AIRLINES	R	R	R	R	R	R	R	C	R	R
CGNA – SIGMA	R	R	C	R	R	R	R	R	R	R
AIS – SIGMA	T	R	R	R	R	R	R	R	R	R
AMS-GRU	R	R	R	R	R	R	R	R	R	R
HANDLER	R	R	R	R	R	-	R	R	-	-

Remarks:

Reference Time	Normally this takes place 3 hours before EOBT(Estimated Off-Block Time) ; ACARS - Aircraft Communications Addressing and Reporting System
Acronym	(ICAO): ELDT - Estimated Landing Time; EIBT - Estimated In Block Time; EOBT - Estimated Off-Block Time; TSAT- Target Start Up Approval Time
Effect	EOBT- estimated time on which the aircraft will commence associated movement with departure (ICAO) A aircraft turn-round normally includes a flight arrival and one departure, meaning that there will be two correlated flight plans. For coordinated airports, outbound flight is already known. GRU Turn-roud must be checked by
Data Source	The flight plan FPL is sent by the Aircraft operator and distributed by SIGMA to ACC and TWR. The flight plan RPL are loaded in SIGMA by the HOTRAN file from the ANAC. Each ACC downloads HOTRAN file processed by SIGMA.
Action on CDM Operation (ACISP)	ELDT and EIBT updated to an arrival; EOBT and ETOT updated to an exit; Beginning of the process DPI (if implemented-see section 3.7.3 for details).

ACDM + CDM (ATFM / ATM) - Nationwide

Santos Dumond - Rio



Confins – Belo Horizonte



Guarulhos – São Paulo

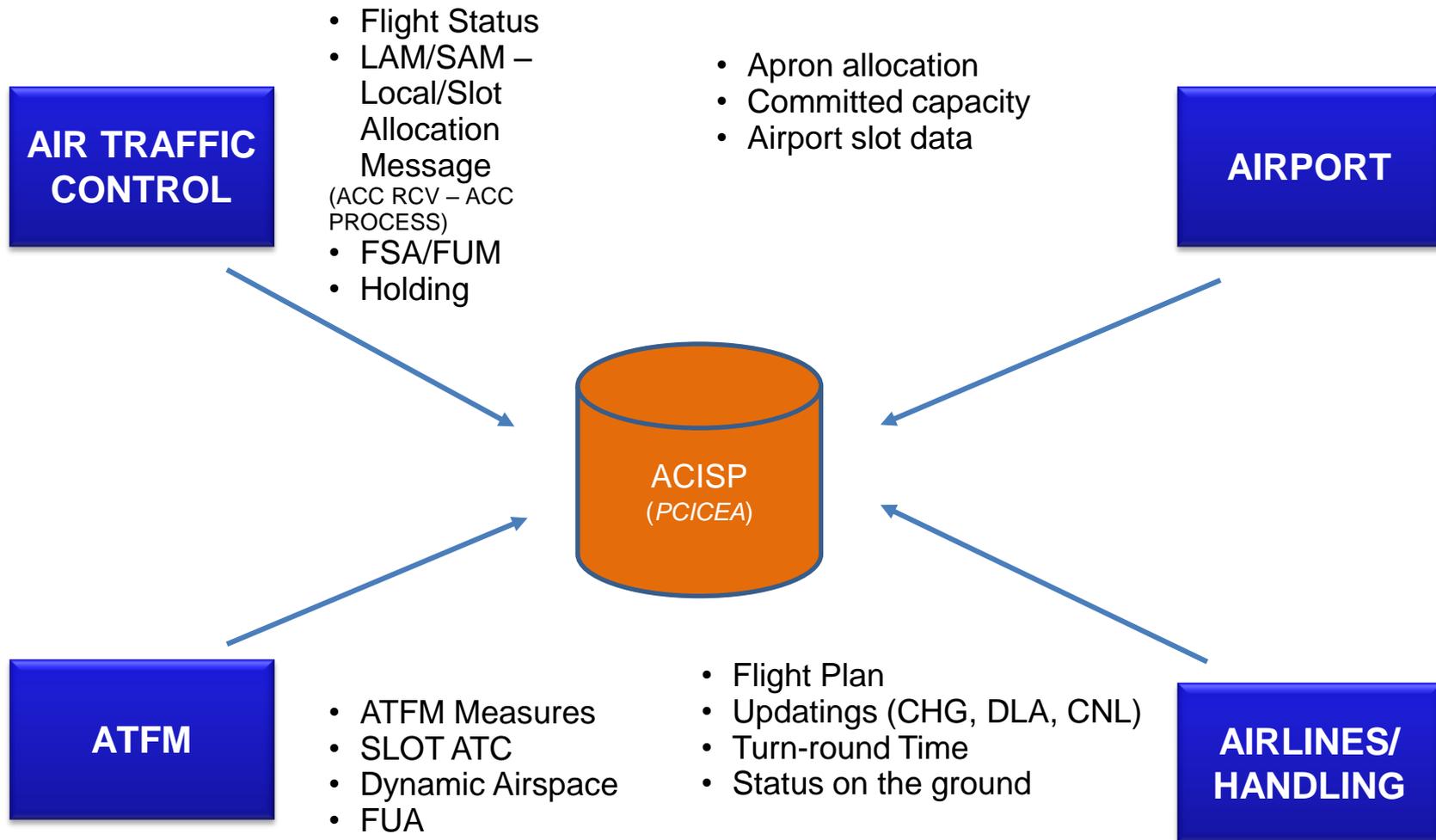


Galeão - Rio

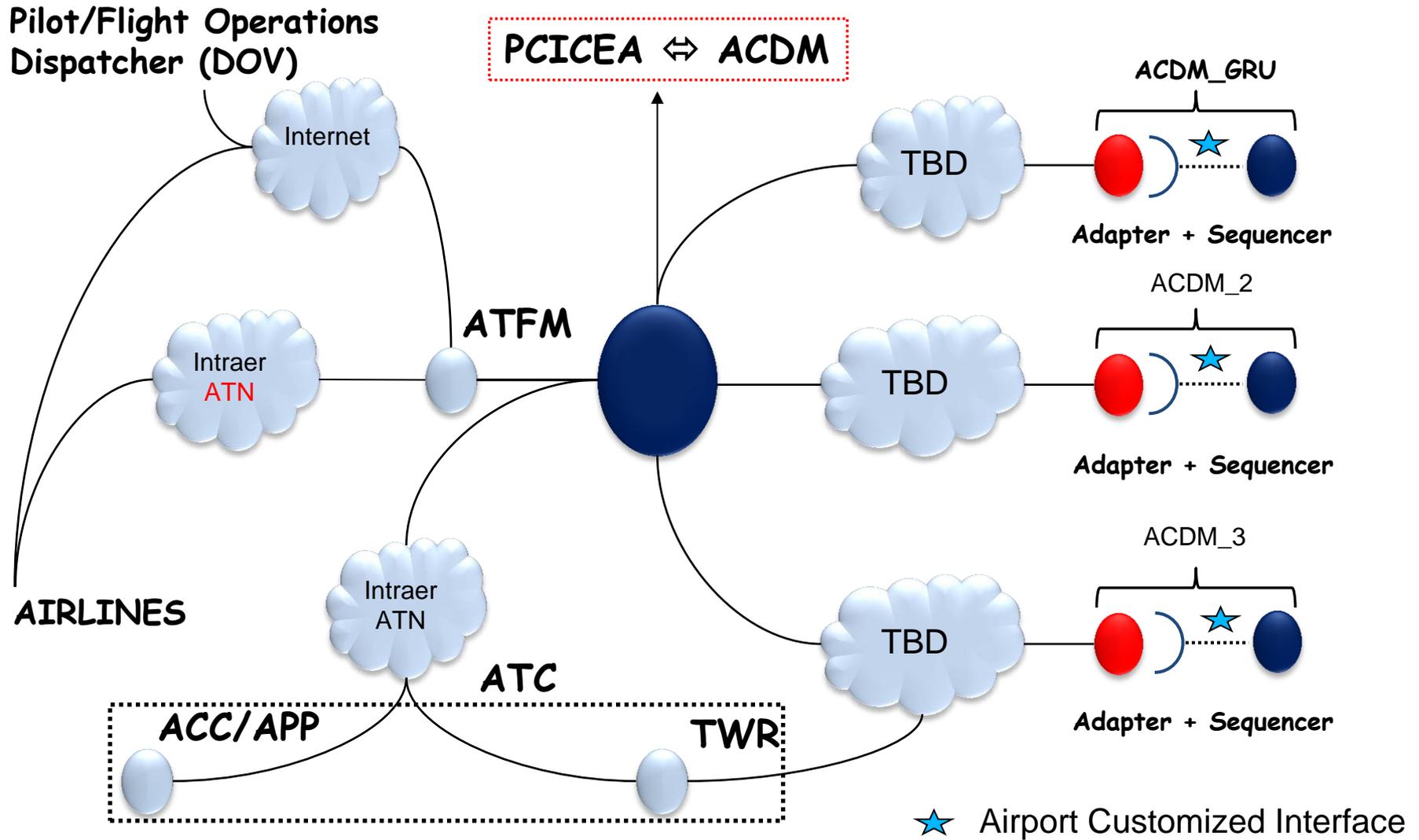


ACISP – improved for SWIM

Strategic View Project Level



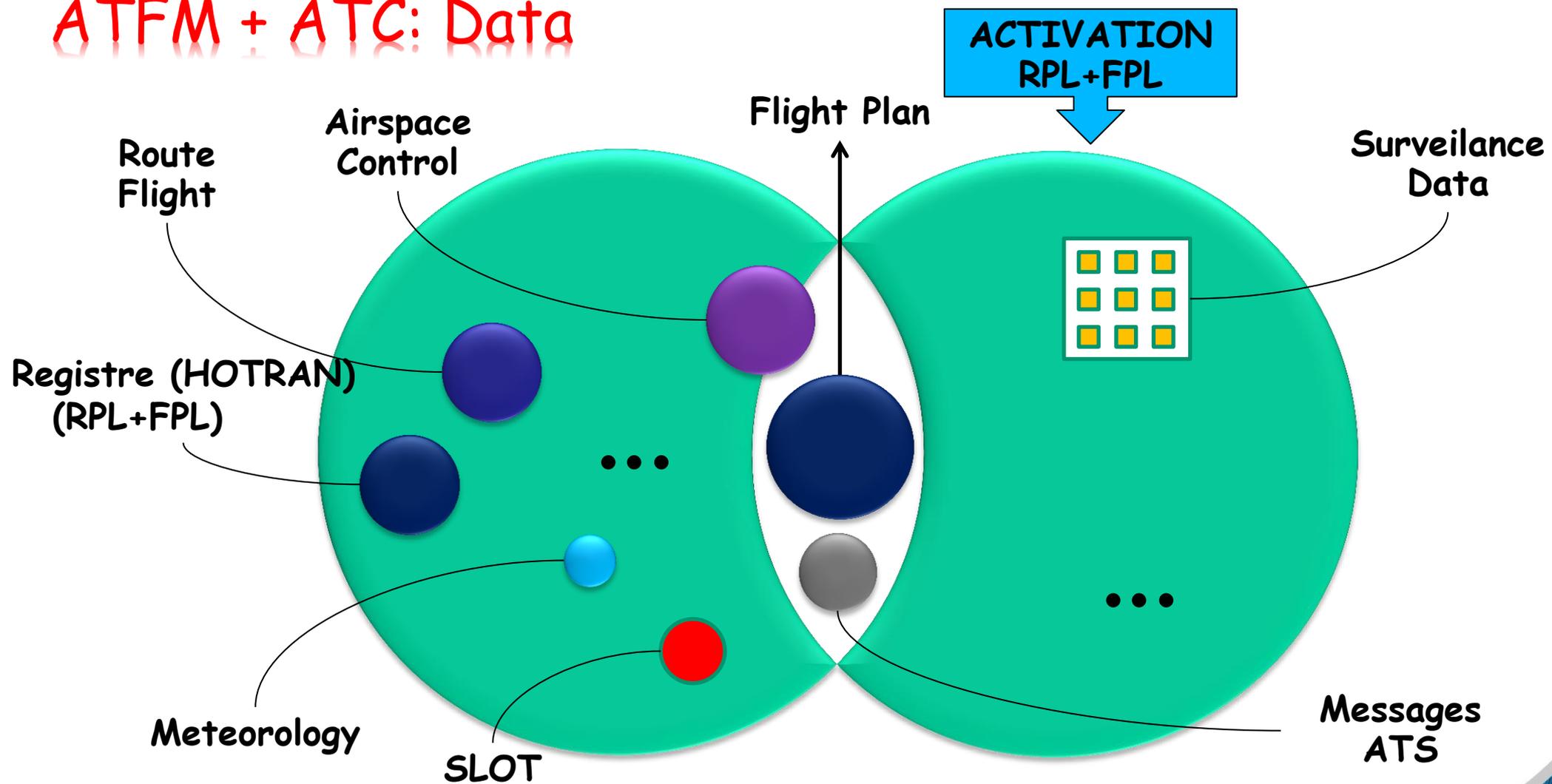
NATIONAL NETWORK ARCHITETURE CUSTOMIZATION



* A-SMGCS- Advanced Surface Movement Guidanc and Control System

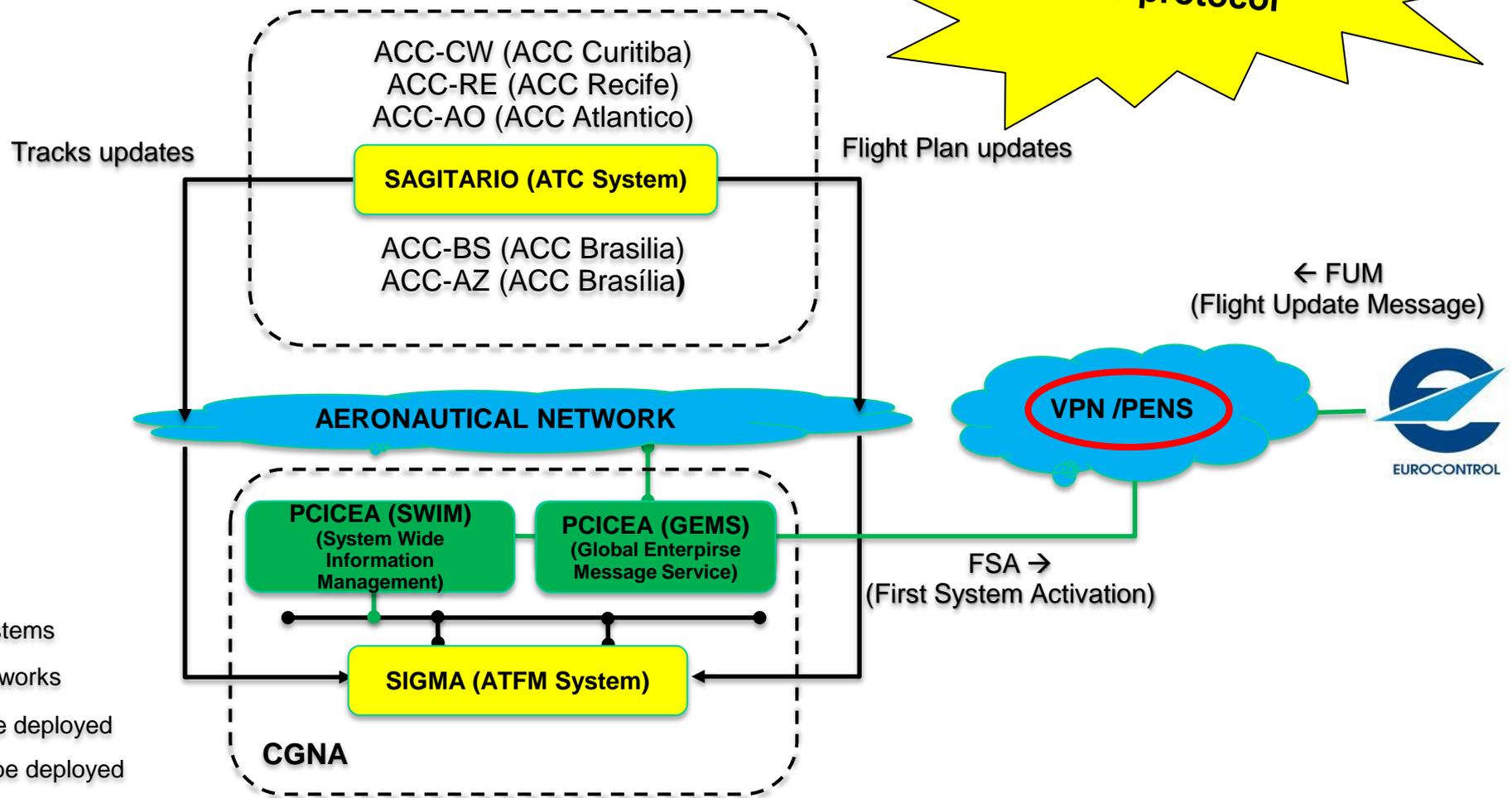
INTERFACES "ASCISP" PLATFORM

ATFM + ATC: Data



PHASE 1: INTEGRATION WITH EUROCONTROL FSA/FUM (Sept/2017)

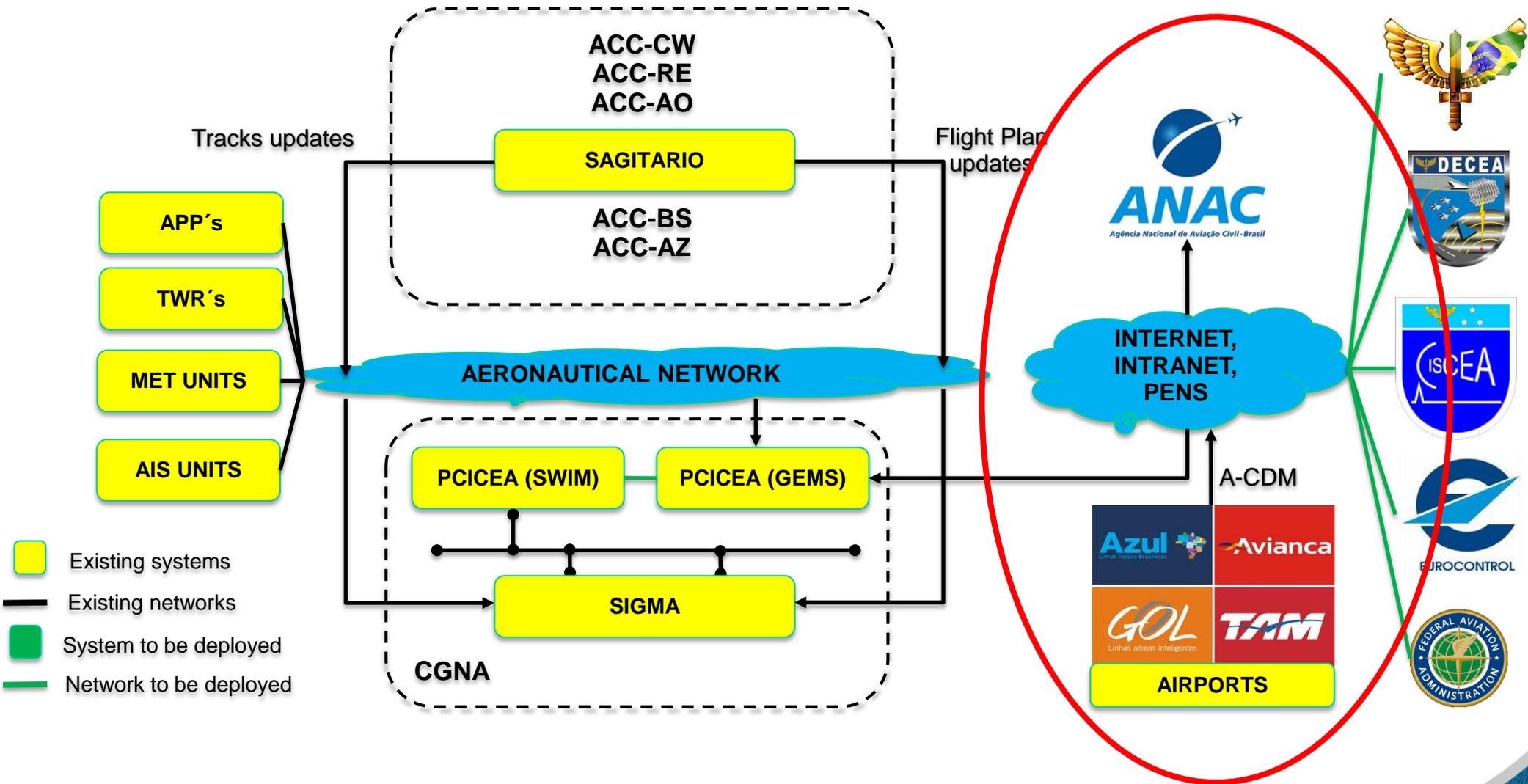
**Needs:
communication
links protocol**



PHASE 3: INTEGRATION WITH OTHERS ENTITIES (2020)

SWIM CONCEPTS

"Interoperability Environment"



SWIM - System Wide Information Management

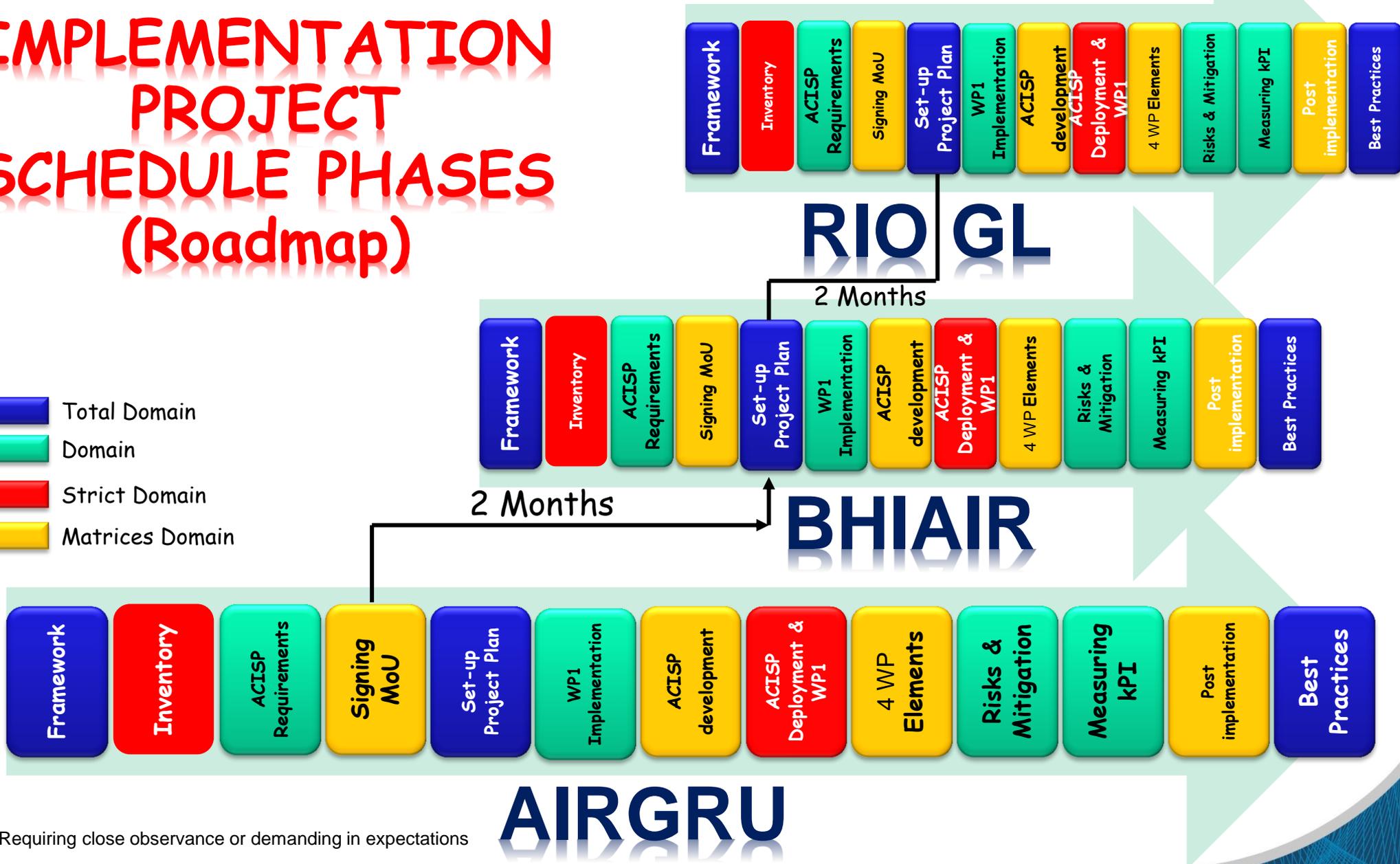
To reach the planned scenario...



Following the Roadmap...

IMPLEMENTATION PROJECT SCHEDULE PHASES (Roadmap)

- Total Domain
- Domain
- Strict Domain
- Matrices Domain



Strict: Requiring close observance or demanding in expectations

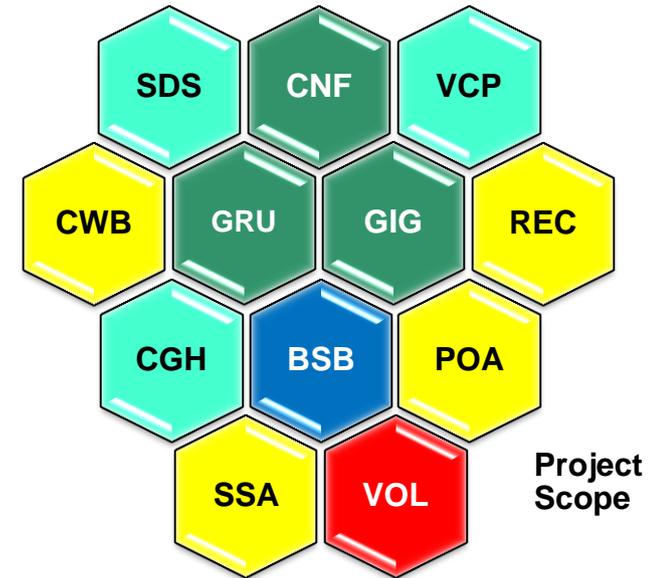
A-CDM Project Steps

➤ Detailing and improving framework

- GRU AIRPORT
- BH Intl Air
- Rio Galeão

➤ MoU Validation

- Garulhos
- BH Intl Air
- Rio Galeão
- Volunteers



➤ The processes study for the A-CDM project implementation, considering the followings:

- Milestones Inventory
- Standardization of metrics
- ACISP Requirements Definition
- ACISP **Deployment**



BRAZILIAN A-CDM PROJECT



Scale 1:35,000,000
Azimuthal Equal-Area Projection

0 500 Kilometers
0 500 Miles

Boundary representation is not necessarily authoritative.

BRAZILIAN A-CDM PROJECT CUSTOMIZATION

✓ FRAMEWORK

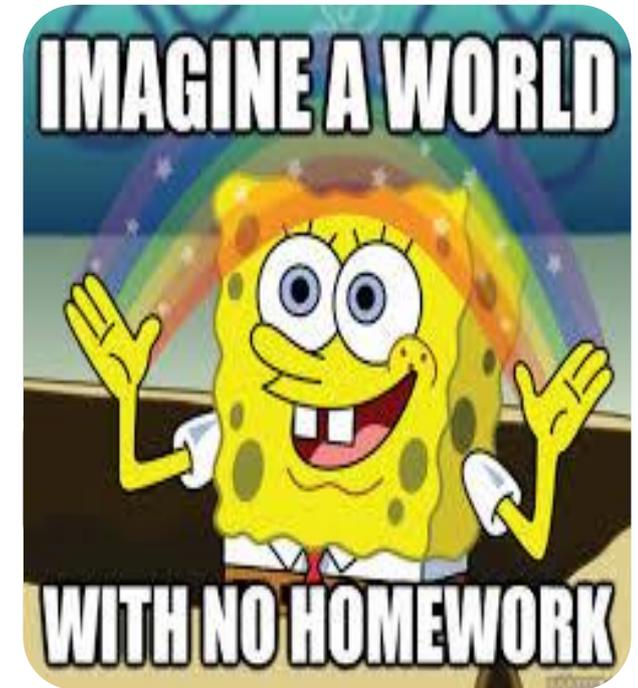
✓ NATIONAL LEVEL

✓ REGIONAL LEVEL

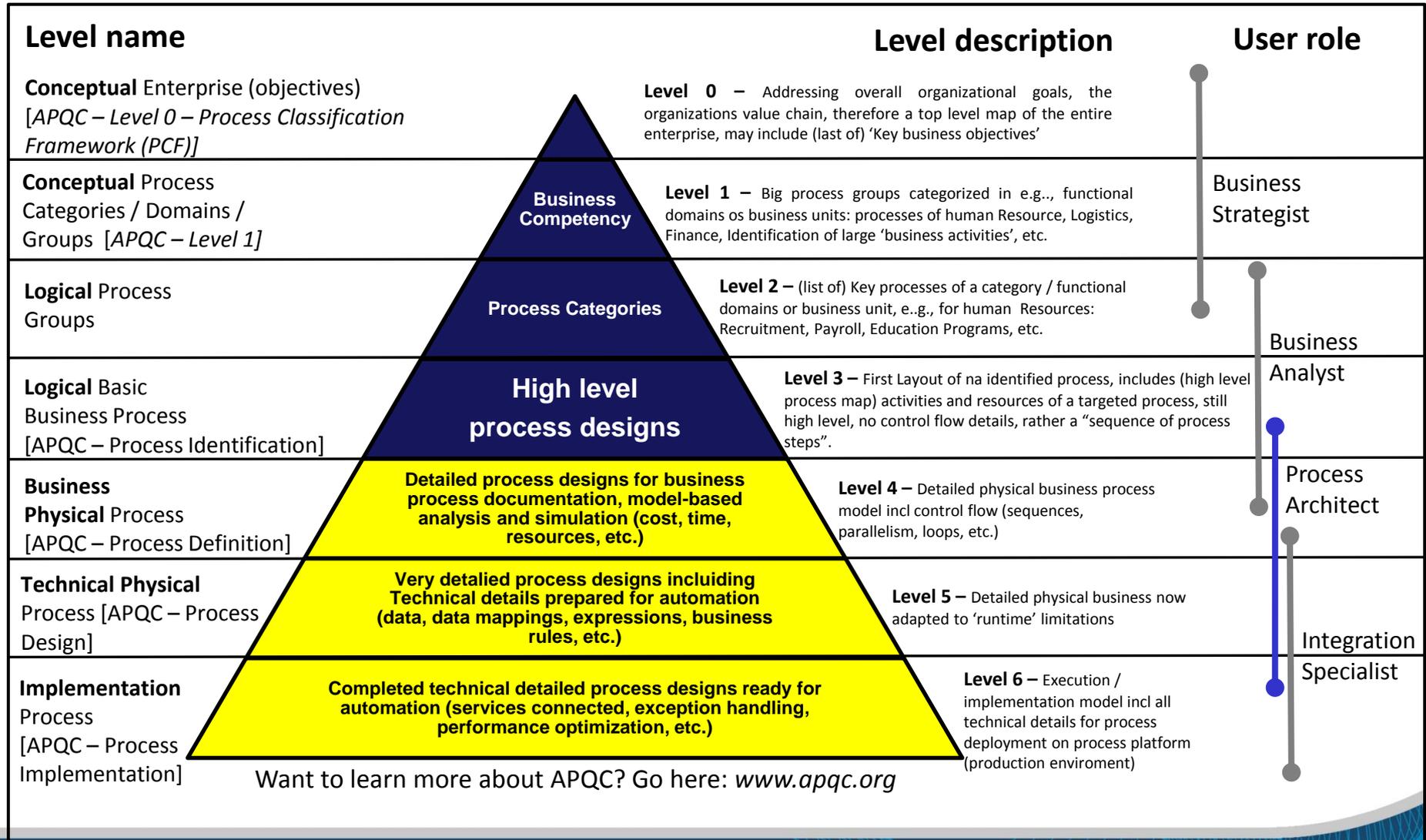
✓ KPI ≠ MILESTONES

✓ De-ice & Snow to Rain & FOG

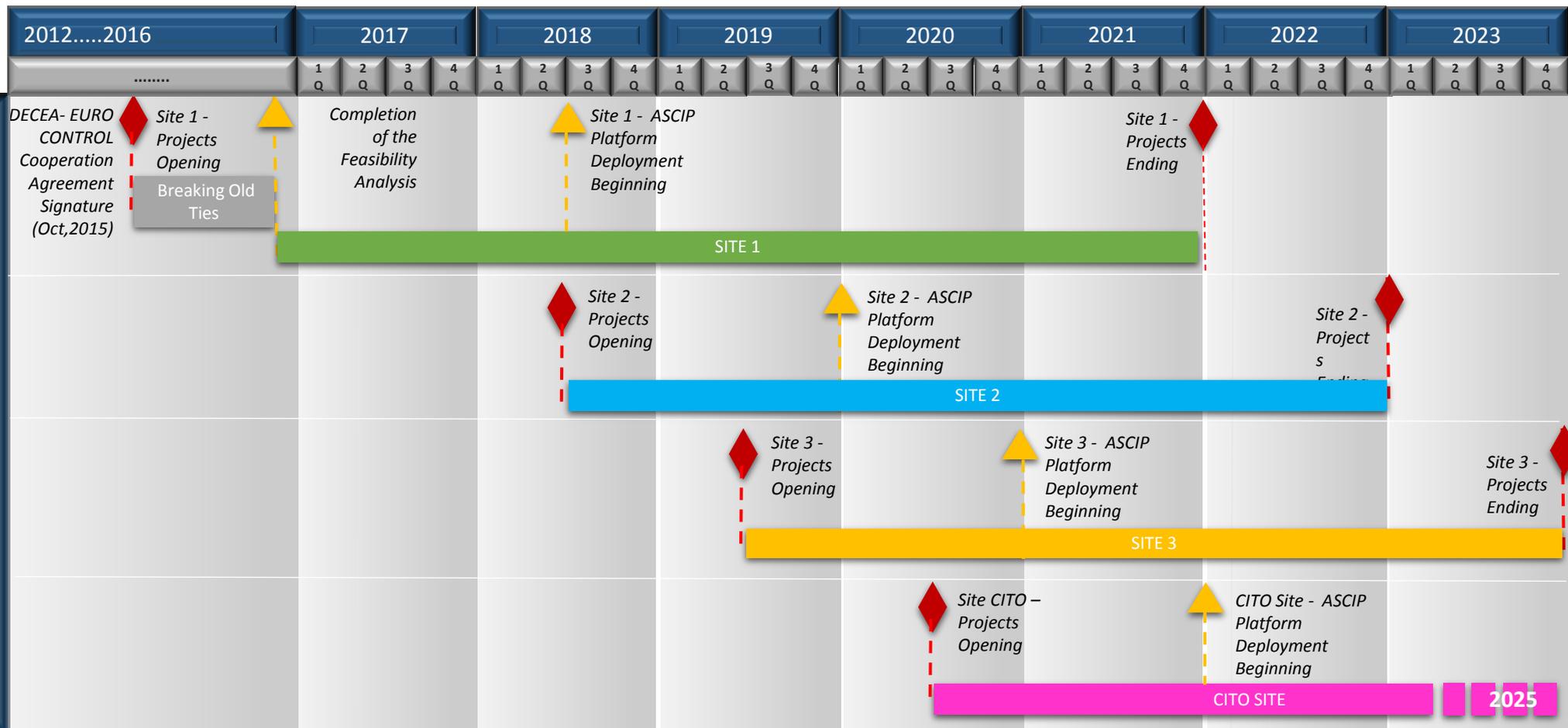
✓ Homework Practices



STATUS PROJECT PHASE



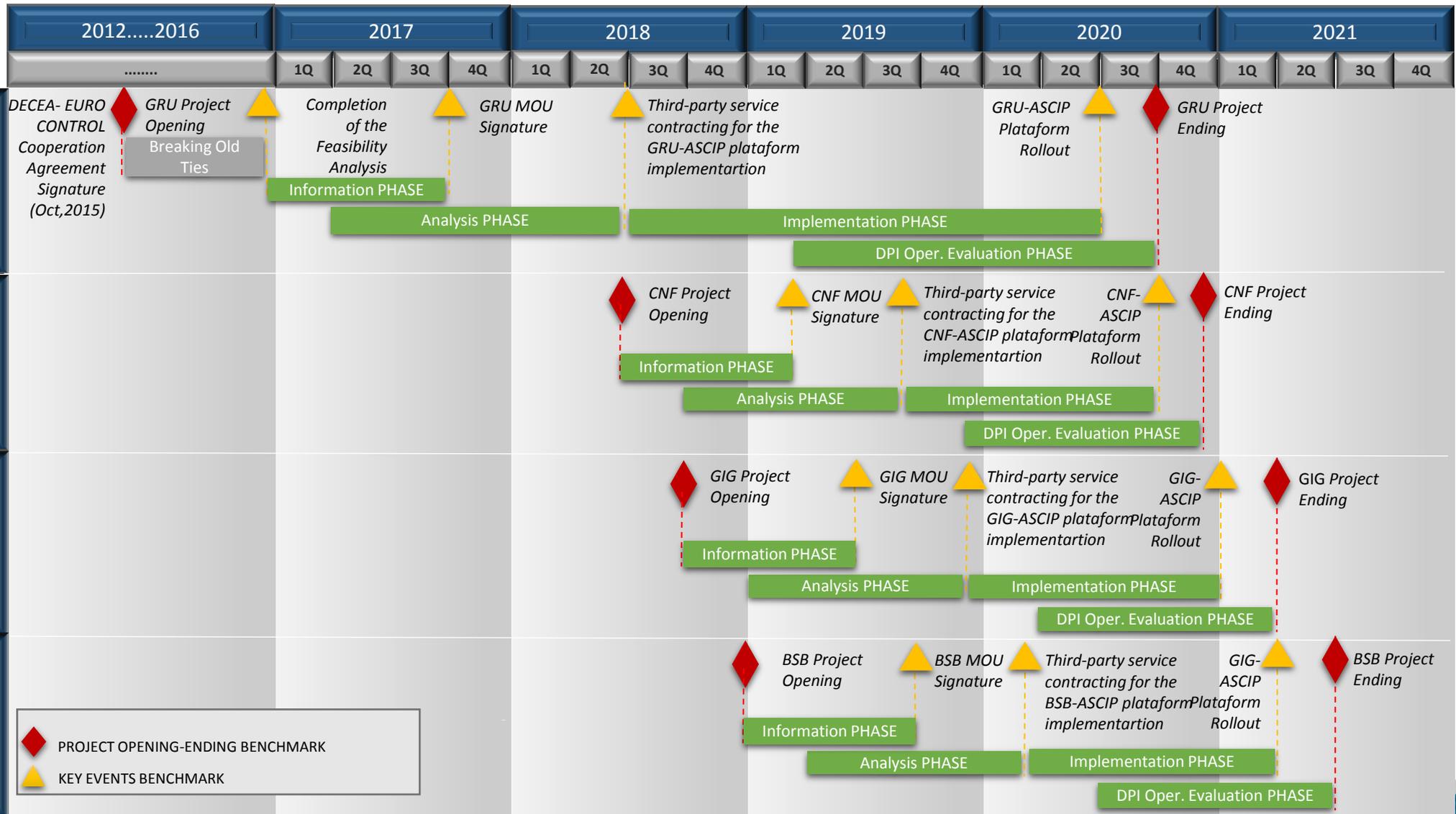
A-CDM Nationwide Program Roadmap - Timeline



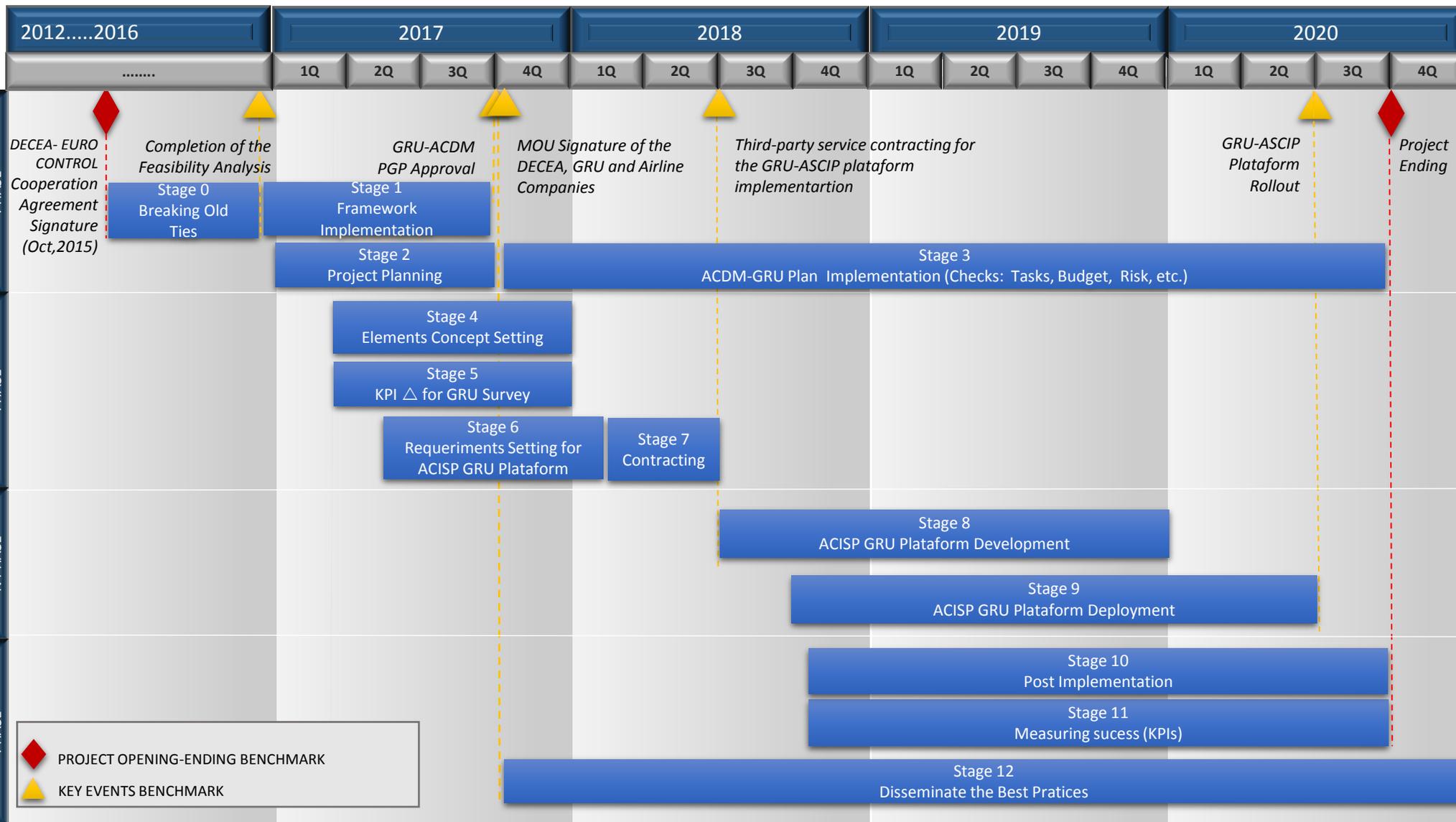
- PROJECT OPENING-ENDING BENCHMARK
- KEY EVENTS BENCHMARK

A-CDM Nationwide Program

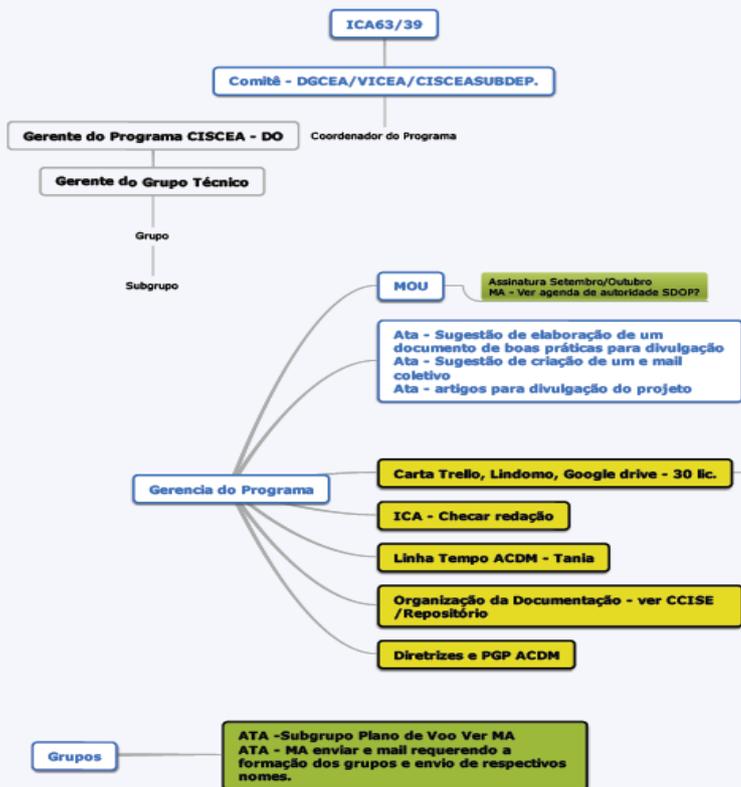
GRU PROJECT



A-CDM GRU PROJECT TIMELINE



Project Management & Communication



Legendas

GC - Grupo Consultivo
GD - Grupo Diretor
GP - Gerente Projetos ACDM (DECEA & GRU)
GT - Grupo de Trabalho

Diretriz para o Gerenciamento de Projetos - ACDM GRU
Objetivo Global 2 - Objetivo Especifico 2.6

Iniciação

Termo de Abertura de Projeto - Gerentes de Projeto (GRU e DECEA) - define decisões operacionais e processuais

Definir Escopo

Cronograma, Riscos

Custo - GD delibera após consulta signatários

PGP - GD delibera a partir de reuniões com signatários com registro em ata.

Templates adequação - Tania

Comunicação - conflitos - Conselho Consultivo delibera
Comunicação - GP reporta ao GD
Subgrupos - GP
Comunicação - Plano de Gerenciamento de Informações (PGI)
Comunicação - GP convoca GT a cada trimestre para exposição dos temas
Comunicação - Informativos de nível estratégico para informar o andamento do projeto

Planejamento

Comunicação - levantamento de necessidades

publicação dos eventos
Chat
Repositório - documentos
Biblioteca

Contratações - Interação com Signatários antes de efetivação - GP

Equipe - Parceiro Gerente ACDM deve ser nomeado pelo Signatário

WBS - Primeiro nível - GT acorda e aprova. Aprovação por parte dos signatários.
WBS - outros níveis - GPs deliberam

Equipe - GT TI - integração das tecnologias
GT OP - conhecimentos específicos ATM
GT TIOP - conhecimentos específicos TI e ATM
GT SAFETY

Risco - Integração dos sistemas das empresas à Plataforma ACISP no que se refere a nomenclatura utilizada por cada uma

ESTRATÉGIA GRUPO PLANEJAMENTO

ROADMAP ACDM

Elaborar Diretrizes para o Gerenciamento e PGP para aprovação formal

Ferramenta - LINDOMO, TRELLO, PODIO

Instruções Aquisição DO

Organização da Documentação /Repositório (ver modelo CCISE e PGP)

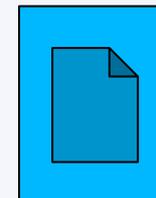
Checar ICA

Estratégia do grupo de planejamento

Definir diretrizes básicas para o gerenciamento de Projetos do Programa (29/09)

Definir documentos básicos de planejamento - PGP (29/09)

Definir ferramenta



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- Bibliographical References



A-CDM FORESIGHT



- ❑ ICAO - LIMA 21-23 Sept 17
 - Roadmap
 - Lessons Learned - Brazilian A-CDM Project
 - Regional Customization
 - A-CDM CARSAM Community

- ❑ Next A-CDM Conference in Brazil (DRAFT PLAN)
 - Belo Horizonte International Airport SEP/OCT 2018

- ❑ Munich Airport Operational Visit
 - GRU A-CDM partners
 - All processes focusing on the Turn-round and Departure Sequencing phases

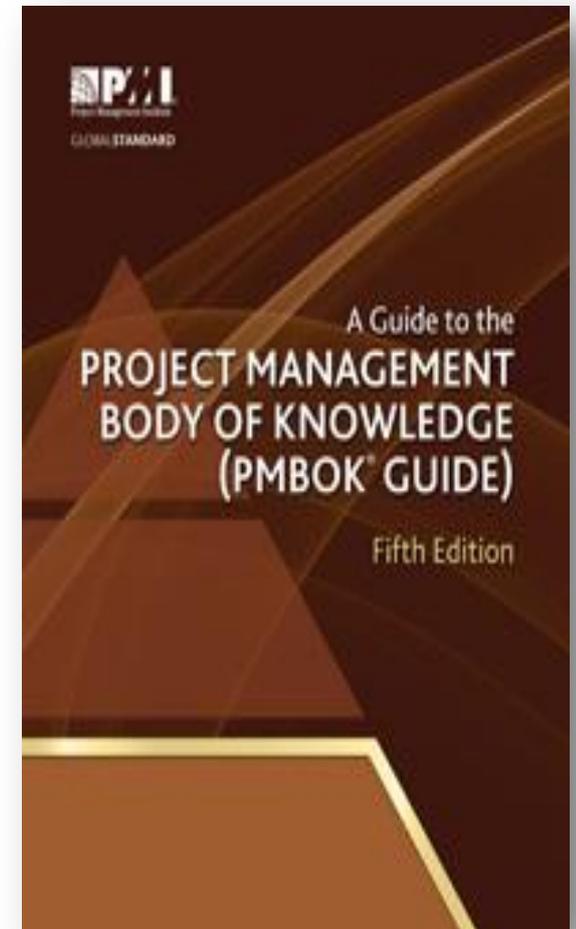
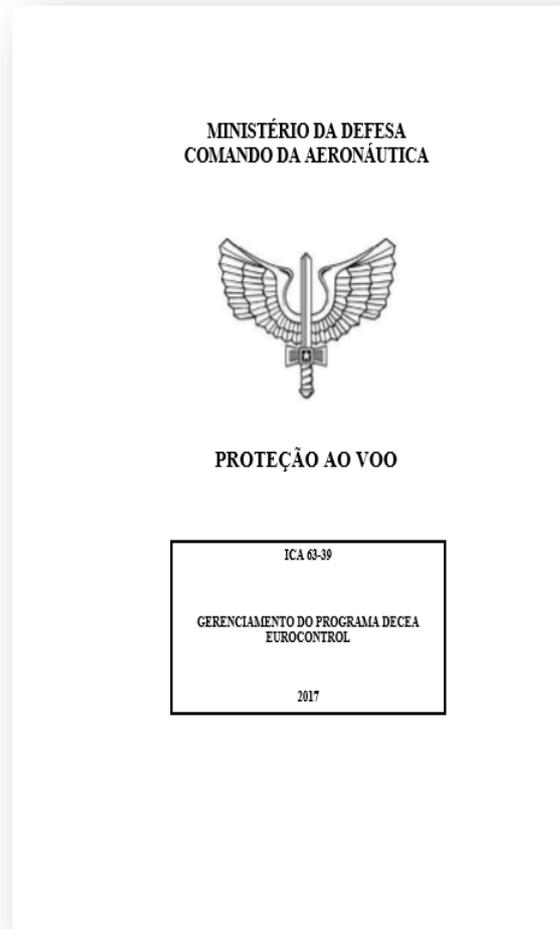
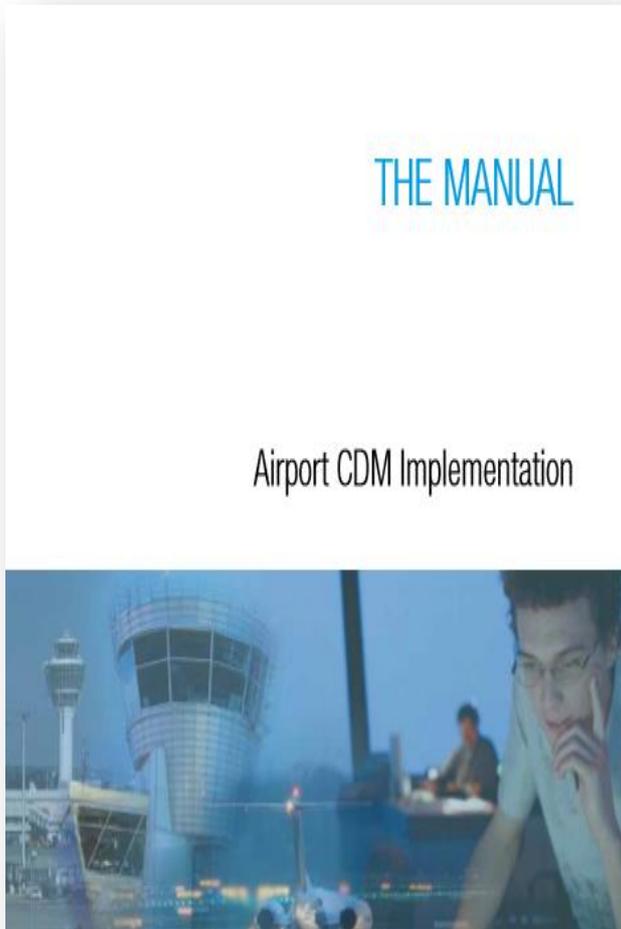
Agenda



- Our Aim (goal)
- Brief History
- DECEA Framework
- A-CDM Framework
- COOPERATION IN THE FIELD OF AIR NAVIGATION
 - Item 1.1 "Exchange of Updated Flight Plan Data"
 - Item 1.1 EAD x AIM-BR
 - Item 1.2 Performance Measurement
 - Item 1.3 Airport Collaborative Decision Making (A-CDM)
- DECEA-ICAO A-CDM Regional Participation
- **Bibliographical References**



REFERENCES





A-CDM TEAM

Muchas Gracias!

Muchas Gracias!



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