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CAR/SAM Regional Planning and Implementation Group (GREPECAS)
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Punta Cana, Dominican Republic, 28 March – 1 April 2011

Agenda Item 3: Performance framework for Regional Air Navigation Planning and Implementation

3.1 Global, inter-regional and intra-regional activities concerning air navigation systems in the CAR/SAM Regions

FLEXIBLE USE OF AIRSPACE (FUA) OPERATION CRUZEIRO DO SUL (CRUZEX V)

(Note presented by Brazil)

SUMMARY

This Working Paper aims to present the Brazilian experience in conducting a large military operation (Operation CRUZEX V) with low impact on civil aviation, in line with the application of the Concept of Flexible Use of Airspace (FUA), facilitated by the military and civil integration in the Brazilian airspace.

1. Background

1.1. CRUZEX V, multinational military air exercise, has assembled Air Force aircraft from Brazil, Chile, U.S., France and Uruguay and simulators from the Army and Navy. The following countries participated as observers: Argentina, Bolivia, Canada, Colombia, Ecuador, Paraguay, United Kingdom and Venezuela. The exercise took place from October 28 to November 19, 2010, in Northeastern Brazil, comprising the states of Ceara, Rio Grande do Norte, Paraiba and Pernambuco. The Natal Air Base received the majority of human and material resources involved in the operation.

1.2. In view of the air scenario of the exercise, close coordination was mandatory between the Air Navigation Management Center (CGNA – ATFM Unit) and the Direction of the Operation (DIREX) in planning and executing stages, to minimize the impacts for the Civil Aviation, such as delays on the landing and departure operations and the en-route deviations. Considering the estimated polygon where the operation was developed, possible impacted air traffic flows were mainly expected to Natal, Recife and Fortaleza airports. The impact on international civil aviation would be minimal, as the air traffic crossings between Europe and South America are concentrated mostly from 23:00 h to 05:00 h.

1.3. Given the need to combine the operations of military and civil aircraft, with the application of the Concept of Flexible Airspace (FUA), allowing the execution of the exercise and reducing impacts to users, the Centre for Air Navigation Management planned the activation of a parallel structure within the area of the exercise and of the involved ATC units, in order to furnish a satisfactory ATFM Service.

2. Analysis

2.1. The evolution of air operations in CRUZEX V consisted of about 100 daily departures from Recife (RBFS) and Natal (SBNT) airports. There were also takeoffs from Fortaleza (SBFZ) airport. From 08:00h to 18:00h, the movement of scheduled flights was about 34 flights on SBNT, 100 on SBRF and 63 on SBFZ. The average number of flights daily within the Recife FIR was approximately 1100 flights.

2.2. The exercise was developed in the area indicated below, from specific areas for refueling operations and air attacks, evolving until FL300, in the western direction of Recife FIR and in the direction to Fortaleza from Natal.

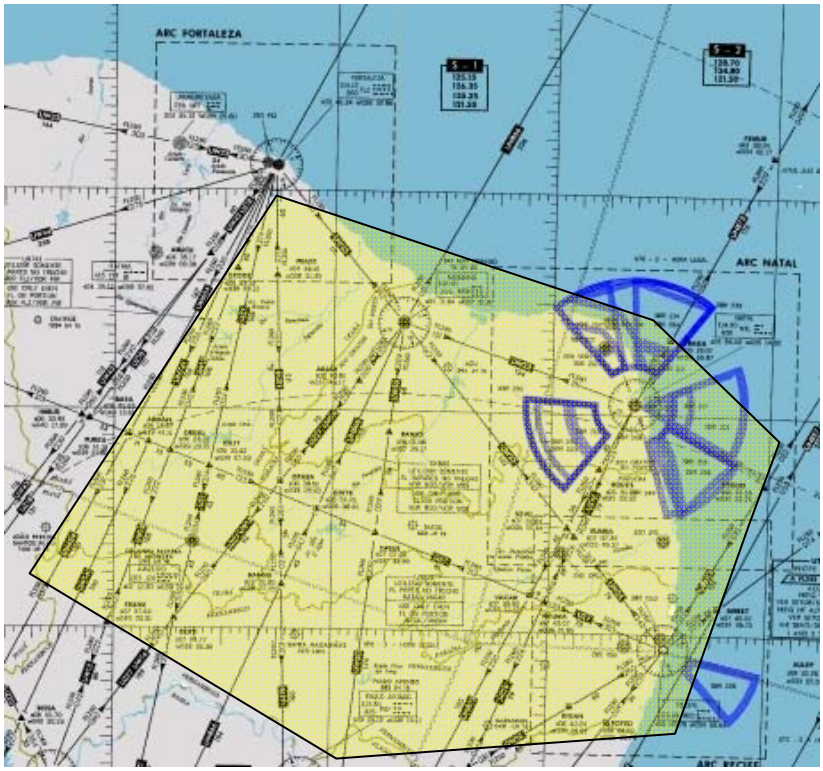
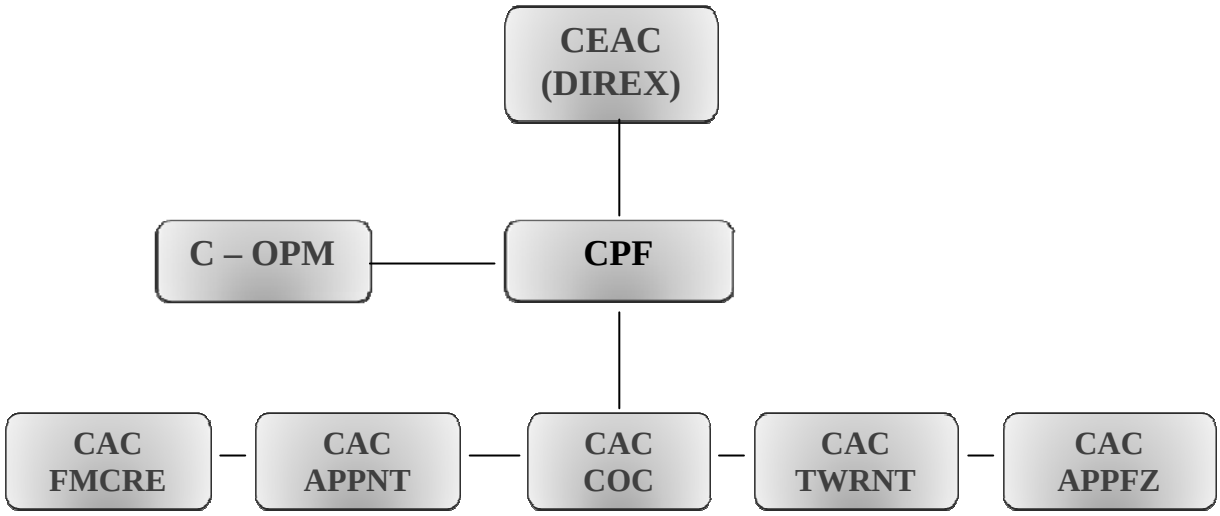


Figure 1 - Area of Air Operations Coverage

2.3. ATFM Support Structure:



Abbreviations:

APPFZ	Fortaleza Approach Control
APPNT	Natal Approach Control
FMCRE	Recife ACC Flow Management Cell
TWRNT	Natal Aerodrome Control Tower
CAC	Current Actions Cell
CEAC	Current Actions Strategic Cell
COC	Current Operations Cell
C - OPM	Military Operations Cell
CPF	Flow Planning Cell

2.3.1. Current Actions Cell

Current Actions Cell is located in the ATC units and in the Current Operations Cell. It is responsible for the tactical actions of the Air Navigation Management Center in military operations, exercises and maneuvers.

2.3.2. Current Actions Strategic Cell

Current Actions Strategic Cell is located in the Direction of the Exercise. It is responsible for planning, organizing, coordinating and controlling all activities of the Air Navigation Management Center in military operations, exercises and maneuvers.

2.3.3. Military Operations Cell

Operational position activated at the Air Navigation Management Center, or remotely, whenever interests the CGNA for coordination of military operations.

2.3.4. Flow Planning Cell

Flow Planning Cell is located in the Air Operations Center. It is responsible for the strategic planning of the Air Navigation Management Center in military operations, exercises and maneuvers.

2.4. ATFM activities

2.4.1. The CEAC, through the Flow Planning Cell, developed strategic worksheets, covering the scheduled and non-scheduled flights and those related to the takeoff and landing flights included in the pack of the operation.

2.4.2. The Flow Planning Cell distributed strategic worksheets to every ATFM support structure CAC and to the C-OPM.

2.4.3. The Flow Planning Cell elaborated tactical worksheets every three hours, including updating the scheduled flights and the flights from the "Coordination Card", in coordination with the DIREX of the Exercise.

2.4.4. Using tactical worksheets, CAC coordinated local actions with ATC units, C-OPM and airlines.

2.4.5. Tactical coordination to allow the Exercise, within the established purposes, and to mitigate the impact to the Civil Aviation, was held between the Current Operations Cell of the Exercise (CAC COC), CEAC, C-OPM and the ATC units CAC in order to make possible the coordination procedures between the Military Air Operations Control Units (OCOAM) and RE-ACC.

2.5. Applied ATFM Measures

2.5.1. Landings at and takeoffs from Natal

2.5.1.1. Natal Airport has concentrated about 80% of all flights of the operation, and the remaining 20% were distributed to Fortaleza and Recife. It must be emphasized that the flights from Natal were shared into four packs throughout the day, or, in other words, two in the morning (takeoff and landing) and two in the afternoon (takeoff and landing). ATFM measures, related to landing and takeoff operations of Civil Aviation, had its focus on the operation of the packs.

2.5.1.2. It was coordinated with DIREX that the departures from the Civil Aviation in Natal, could happen between the departures of the pack, reducing the impact to the takeoff operations. The major concern concentrated on the landings, keeping in mind that the return pack was marked by an aircraft sequencing of the Exercise in specific procedures for military aircraft ("*peel off*"), which initially prevented a mixed sequencing with the Civil Aviation operations. However, despite one of the runways been reduced to 1500m, with the exception of fighter aircraft, the landing of the military aircraft occurred at this runway, facilitating the sequencing of the Civil Aviation aircraft for the main runway. Even with these possibilities, DIREX, at the beginning of activities, updates the Airlines involved, from the C-OPM, on the allocation of the packs, advising that the landings were made in periods outside of the pack, because its duration was around 30 minutes. The minor adjustments were made, through tactical ATFM measures, in coordination with the CAC RE-ACC where the flights could suffer minor delays or advances. It can be stated that when there were delays on the ground or in flight, they were less than 15 minutes on average. In cases of deviations from the route, the coordination was always made to reduce them to a minimum, to prevent the excessive increase in flight time. This was possible only due to the highly collaborative environment that the team from CGNA found on the Direction of the Exercise. Figures 2 and 3 show clearly the result of work that allowed the shared use of airspace in the Brazilian Northeastern Region during CRUZEX V.

FLEXIBLE USE OF AIRSPACE

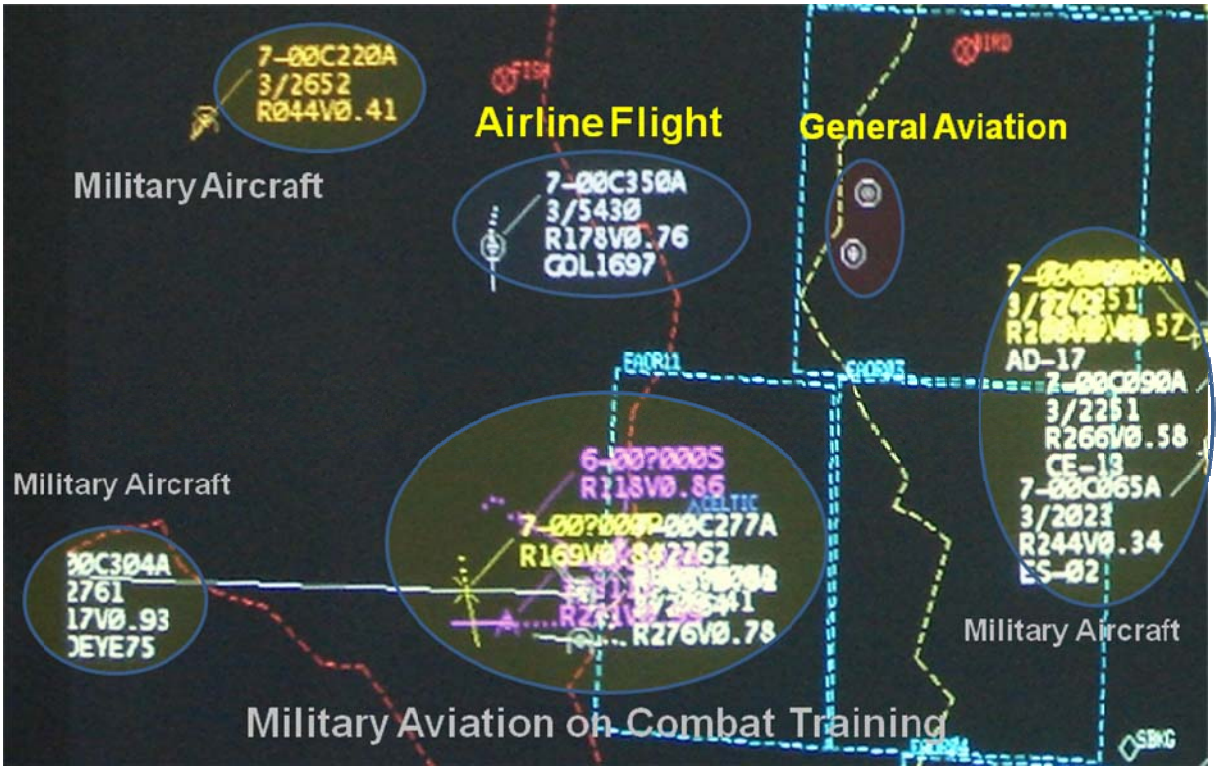


Figure 2: Scheduled and Military Aviation sharing the same airspace.

Figure 3: Scheduled and Military Aviation sharing the same airspace.

2.5.2. Fortaleza - Natal - Recife Flow

This main Civil Aviation flow was accomplished by the coast, avoiding various areas of exercise, but it is emphasized that, when possible and in coordination with DIREX, OCOAM (Coalition) and COC (Current Operations), direct flights were allowed, overflying the exercise areas.

2.5.3. Fortaleza – BS-FIR Flow

En-route deviations (arrival) and the departures of Civil Aviation were accomplished by the southwestern sector of FZ-TMA, considering that the attacking exercises were taking place within the RE- FIR, south of the FZ-TMA. Close coordination was required sometimes to enable the operation of civil aircraft landing and return of aircraft from the operation to Fortaleza. There were events when the departure of those aircraft from the exercise areas was delayed in order to easy the civil aircraft arrival flow. Such procedure was possible under the close coordination with the Director of the Exercise. Sometimes the evolution of Civil Aviation was coordinated within the flight levels above the areas actually in use by military aircraft, really improving the civil and military operations.

2.5.4. International Crossing Air Traffic

The deviations were significantly reduced considering that the international crossing air traffic, during the period of the day when the exercise was accomplished, is small. The period of greatest demand for international air traffic within the RE-FIR is between 02:00h and 08:00h (UTC).

2.5.5. Monitoring of Delays

Delays in scheduled flights from the BS-FIR and involving Recife, Fortaleza and Natal locations were monitored from the coordination between C-OPM and the Airlines.

2.5.6. Measures Related to General Aviation

A restriction to the General Aviation was established during the accomplishment of the Exercise, given the large number of military aircraft in evolution from 500ft to FL300 in the area of the coverage of the Exercise.

2.5.7. Performance of CAC RE-ACC

Several ATFM measures were implemented by RE-ACC in coordination with the CAC RE-ACC and other positions within the CGNA CRUZEX V (DIREX, COC, CAC NT-TWR, CAC NT- APP and CAC FZ TWR/APP).

2.5.8. A table below shows the results obtained by the Current Actions Cell, located in the Recife Area Control Centre.

Day	Range of Hours	CAG	COM	CRUZEX 5 Scheduled Departures	Departures CAC	Holding	Monitoring of Delays	Deviations	Re-router	Ground Stop (GS) General Aviation
09/11	06:00 / 17:00	120	94	54	02	--	--	--	--	--
10/11	06:00 / 17:00	237	97	66	03	--	--	--	--	--
11/11	06:00 / 17:00	223	91	59	05	--	--	--	01	--
12/11	06:00 / 17:00	253	85	45	03	--	--	--	15	12:15/14:30 16:20/19:20
15/11	06:00 / 17:00	287	89	47	02	01	--	--	18	12:50/15:40 16:40/19:00
16/11	06:00 / 17:00	293	91	46	02	01	--	05	15	12:30/14:40 16:30/18:40
17/11	06:00 / 17:00	289	91	54	--	--	--	04	15	12:30/15:00 16:30/19:00
18/11	06:00 / 17:00	293	85	46	03	--	--	01	23	12:30/14:30 16:30/18:50
Total	**06:00 / 17:00**	**1995**	**723**	**417**	**20**	**02**	**--**	**10**	**87**	**--**

Remarks:

Column - CAG: number of civil aviation aircraft in general air flow coordinated by the Current Actions Cell - RE ACC.
Column - COM: number of military aircraft involved with CRUZEX V, coordinated by the Current Action Cell - RE ACC.
Column - GS (Ground Stop - General Aviation): nearly twenty (20) general aviation aircraft were affected by ATFM measures. The survey was conducted by Chiefs and Supervisors from the RE-ACC team. In this column, the hours shown in box are UTC.

2.5.9. Audio Conferences

They were performed daily at 07:30HBV and 17:15 HBV at all parts of the ATFM support structure.

3. Conclusion

3.1. The CGNA participation in CRUZEX V tried to follow up the air operations in real time. DECEA was able to manage the military and civil aviation air traffic flow, being a major objective to share the airspace between civil and military aircraft that took part into the event.

3.2. The philosophy of civil-military integration applied in Brazil has facilitated the planning and execution of military exercise, according to the operational importance of various elements discussed at local, regional and national level and provided the conditions necessary to mitigate possible adverse effects on the Civil Aviation.

3.3. By the results (delays lower than 15 minutes, minimum deviations and shared and flexible use of airspace), we can affirm that the concept of flexible use of airspace can be applied in practice.

4. Action Suggested

4.1. The meeting is invited to:

a) Take note of the information provided in this working paper; and
b) Evaluate mechanisms for exchange about the implementation of the Concept of Flexible Use of Airspace (FUA), considering the practical experience described in this working paper, aiming to optimize the available resources as well as to reassure the operational safety and the efficiency of air navigation in the CAR/SAM Regions.

- END -