



WORKING PAPER

ASSEMBLY — 39TH SESSION

TECHNICAL COMMISSION

Agenda Item 36: Aviation safety and air navigation implementation support

SEARCH AND RESCUE (SAR) EXERCISES

(Presented by Brazil)

EXECUTIVE SUMMARY

From the tragedies of flights AF447, in 2009, and MH370, in 2014, a series of vulnerabilities regarding Aeronautical Distress and Safety were identified. In this context, the GADSS Concept of Operations identifies a number of areas to be addressed and improved. One of these areas relates to the experience in using search and rescue (SAR) procedures to prevent decreased proficiency, and recommends regular drills and exercises to ensure proficiency with applicable procedures.

Brazil recognizes and endorses the importance of regular SAR exercises. To address this matter, Brazilian Aeronautical SAR System performs a comprehensive National SAR Exercise periodically. This paper presents EXERCISE CARRANCA history, planning, execution and evaluation standards, as well as a perspective for future editions. The document also recommends that Administrations perform similar actions in their SRR, to improve Search and Rescue Services, required by Annex 12 — *Search and Rescue* and GADSS ConOp, around the world.

Action: The Assembly is invited to:

- a) note the information herein;
- b) encourage all administrations to perform regular drills to keep their SAR resources up-to-date with SARPs and the *International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual* (Doc 9731) ;
- c) recommend all interested States to share the knowledge obtained from planning, execution and evaluation processes regarding a full-scale National SAR exercise;
- d) engage actions and processes in order to address SAR matters in a systematically manner and with dedicated personnel.

<i>Strategic Objectives:</i>	This working paper relates to the Safety Strategic Objectives.
<i>Financial implications:</i>	
<i>References:</i>	Annex 12 — <i>Search and Rescue</i> Global Aeronautical Distress and Safety System (GADSS) Concept of Operations (version 5.0) Doc 9731, <i>International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual</i> , Volume I Doc 10046, <i>Report of the Second High-Level Safety Conference (2015)</i>

1. INTRODUCTION

1.1 Since 2014, ICAO started to raise the issues regarding Aeronautical Distress and Safety, amidst examples where the aircraft took a much-dilated time to be found, or simply disappeared. From the tragedies of flights AF447, in 2009, and MH370, in 2014, a series of vulnerabilities were identified.

1.2 The AHWG on Aircraft Tracking then developed GADSS Concept of Operations. It was presented by ICAO Secretariat at the Second High-level Safety Conference (HLSC 2015) (HLSC/15-WP/2), by that time, in version 4.1. This document described what an ideal situation would be, and identifies a number of areas to be improved.

1.3 Among the fields of Aircraft Systems, Air Traffic Services, Search and Rescue Systems and Information Management, it is highlighted a list of enhancements that must be achieved through time. One of these areas relates to the experience in using SAR procedures to prevent decreased proficiency, when required, due to low frequency of real SAR situations.

1.4 To address this improvement area, it is recommended that a SRR necessitates regular drills and exercises to ensure that proficiency with applicable procedures, cooperation between all actors and use of systems is maintained. (GADSS ConOps version 5.0 – section 2.3f). This recommendation also aligns with the existing SARP 4.4 of Annex 12 to Doc 7300 – Convention on International Civil Aviation - Contracting States shall provide for regular training of their search and rescue personnel and arrange appropriate search and rescue exercises.

1.5 Brazil recognizes and endorses the importance of regular SAR exercises. In this context, Air Force Department of Airspace Control, central organization of Brazilian Aeronautical SAR System, performs a National SAR Exercise periodically, involving all ARCC, the MRCC and other SAR resources.

2. NATIONAL SAR EXERCISE – EXERCISE CARRANCA

2.1 History

2.1.1 In 2009, right after the AF447 events in June, Brazil identified that a comprehensive review of many procedures was necessary to its SAR personnel. In that context, the first edition of Exercise CARRANCA was performed in October, at Florianopolis AFB.

2.1.2 By that time, it was identified a lack of opportunities for Brazilian Rescue Coordination Centres (RCC) and Search and Rescue Units (SRU) to train together. The Exercise CARRANCA I then was designed to simulate previous real SAR events, and performed trying to achieve a number of objectives, being the first one, as described in its Plan of Operations, the accomplishment of international SAR standards described in Annex 12 — *Search and Rescue*, supplemented by the *International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual* (Doc 9731).

2.1.3 Since then, Exercise CARRANCA had other editions in 2013, 2014, 2015 and 2016. The number of participants evolved from 3 aircrafts and around 80 military personnel, with around 170 flight hours, to more than 440 hours flown by 12 aircrafts, 1 Patrol ship, and more than 400 military and civilian personnel, among Civil Defence authorities and SAR voluntary groups, all of it in a 2-week period.

2.1.4 The name of Exercise CARRANCA refers to the nickname of Dr. Carlos Alberto Santos, M.D., a deceased military medical Officer specialized in SAR operations and emergencies response. During his life, Dr. Carlos Alberto had always been highly committed with proper first aid assistance to accident victims, development of SAR doctrines for PJs and many other SAR matters. His legacy is still in use in Brazilian SAR System.

2.2 Planning, execution and evaluation process

2.2.1 The Planning phase of the exercise takes place 6 to 8 months prior to the exercise beginning. All stakeholders, including SAR Coordination components, Search and Rescue Units (SRU) representatives, Logistic support organizations, Air Traffic Services units and others involved, discuss, in monthly meetings, the aspects of the exercise. From 30 to 60 days before the exercise, a recognition mission in the location of the exercise is required to check the site conditions.

2.2.2 During the Planning phase, the most important guideline to be defined, and lately, to be followed during the course of the drill is the definition of the objectives to be achieved. All of the operational tasks, and therefore the supporting tasks as well, are derived from the main goals of the training.

2.2.3 For all exercises editions, victim simulations and crash scenarios are planned to be based on prior real SAR operations. The events are also stipulated to occur in an increasingly difficulty level. This process has been successfully applied since second edition of the exercise. It has also demonstrated to bring a high level of standards with a proper flight safety.

2.2.4 Exercise CARRANCA has 2 phases: Operational Evaluation (AVOP) and Integrated Exercise (EXINT). During AVOP phase, RCCs and SRUs personnel operates separately, with emphasis on reviewing procedures and doctrines improvements. For EXINT phase, however, emphasis is on the interaction between RCC and SRU, with many simulated scenarios established.

2.2.5 During the course of the exercise, evaluations represent an important aspect of the training, for it's the only way to identify vulnerabilities and weaknesses within the SAR system. Evaluations occur in 3 levels: event coordination, mission execution and victim assistance. For each level, the most experienced professionals in their area of expertise check, in real-time, the performance of on-duty personnel involved (SMCs, Pilots and Rescue professionals).

2.2.6 The planning/execution/evaluation cycle is complete by a reporting system in which the next edition always starts by checking the lessons learned from the previous one. This process ensures that errors are mitigated and successful practices are sustained.

2.3 Last edition

2.3.1 Exercise CARRANCA V was organized by Air Force Department of Airspace Control. The exercise had 410 participants with 3 fixed wings and 9 rotary wings aircrafts, from Brazilian Air Force, Navy and civilian resources, one Navy ship, Civil Defence personnel, Santa Catarina state Police personnel and a civilian group of SAR voluntaries for Mountain Rescue and Human Tracking. To support the operation, the Division of Operational Logistics and Florianopolis AFB provided all infrastructure.

2.3.2 AVOP phase took place in the first week. In this period, there were activities for doctrine development, such as theoretical evaluations, specialists group discussion and conferences. Themes for

the discussions included the use of Remotely Piloted Aircraft Systems (RPAS) and Synthetic Aperture Radar for Search and Rescue.

2.3.3 In the EXINT phase, it was performed 27 simulated SAR Operations. Distributed among these missions, there were 48 total take-offs to assist 90 simulated victims. To dimension these numbers properly, they represent almost 3 times the real SAR operations in which Brazilian Air Force aircrafts are engaged per year.

2.3.4 Events varied in a range from a single victim to multiple cases. Some scenarios had simulated activations of ELT/EPIRB/PLB, detected by BRMCC. There were missions during day and night, with Night Vision Goggles. The simulations were also divided in maritime and aeronautical scenarios. The victims were both real persons and patient care manikins, had been prepared with make-up and ID cards by first-aid specialist medical doctors, to ensure maximum level of realism throughout the scenarios.

2.3.5 Finally, on the last day, a special simulation was performed. Under the nickname ANCHOVA, a Mass Rescue Operation (MRO) was simulated, having started at sunset and performed all night long, until 2 hours after sunrise. This last full-scale exercise used 2 fixed wings aircrafts for Search and On-Scene-Coordination, as well as 3 different helicopters to assist 30 victims, in the context of the Olympic Games Rio 2016.

2.3.6 Benefits of the exercise can be seen in all three levels of SAR system. For the administration level, the exercise allowed to evaluate real level of standards observation by all stakeholders. For coordination level, experience and practical features could be exchanged among SMC of different RCC, i.e. sea drift calculations for SMC that operates mainly in land areas. Finally, for execution level, many procedures were improved, being able to meet modern protocols of assistance. For visual reference, CARRANCA V official video can be accessed at Brazilian Air Force official channel at Youtube: <https://www.youtube.com/watch?v=OweejUrUyNg>.

2.4 Future

2.4.1 Exercise CARRANCA intends to be acknowledged as the reference event for current standard operational procedures and training protocol. In order to do this, it's essential to go further in each drill edition. For future practices, CARRANCA intends to have participation of external observers, possibly from different countries and agencies. It also plans to incorporate new SAR assets in training, such as Brazilian Center for Natural Disasters Monitoring and Alerts.

2.4.2 Finally, the next Exercise CARRANCA VI is being planned to take place in the Amazon region, for it allows SAR assets based on that area to participate with less costs, as well as other assets in other regions to be familiarized with the jungle environment.

3. CONCLUSION

3.1 After the AF447 and MH370 events, it is clear that SAR systems have to be efficiently evolved. Conveniently, the GADSS Concept of Operations identifies a number of areas to be addressed and improved. One of them is the relation between the low frequency of real events with proficiency of SAR services. SAR resources may, over time, lack the experience required to apply standard and recommended practices.

3.2 Exercises and drills test and improve operational plans, provide learning experience and improve liaison and co-ordination skills. If conducted on a realistic basis, they help to demonstrate and assess the true effectiveness of training and the operational efficiency and competence of the SAR service. Exercises will also reveal deficiencies that may exist in SAR plans and enable them to be improved.

3.3 Brazil periodically performs a National SAR exercise called Exercise CARRANCA. It has helped Brazilian SAR administration to track the real level of responsiveness and proficiency of its resources. In this context, Brazil encourages all administrations to perform regular drills to keep their SAR resources up-to-date with SARPs and the IAMSAR Manual;

- a) all interested States to share the knowledge obtained from planning, execution and evaluation processes regarding a full-scale National SAR exercise;
- b) ICAO to engage actions and processes in order to address SAR matters, in a routinely manner and global perspective, and organize related information and efforts from Contracting States.

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