

Jan RAJCHEL

*Siedlce University of Natural Sciences and Humanities (Uniwersytet Przyrodniczo-
-Humanistyczny w Siedlcach)*

SEARCH AND RESCUE SYSTEM IN POLAND

Abstract: *On 25th of January 2018 Civil and Military Aeronautical Rescue Coordination Centre (ARCC) commenced operations in Polish Air Navigation Services Agency (PANSa). PANSa increased significantly its contribution in the domain of coordination of search and rescue activities in ASAR service in the Polish area of responsibility. Up to this date all tasks of ARCC Centre were conducted mainly by Armed Forces of Republic of Poland, which performed coordination function in ASAR (Aeronautical Search and Rescue) service. The bodies responsible were Aeronautical Search And Rescue Centre located in Air Operations Centre – Air Component Headquarter in Warsaw and sub-centre in Gdynia, part of Naval Operations Centre of Naval Component Headquarter.*

According to international commitments resulting mainly from Convention on International Civil Aviation signed on 7th of December 1944 in Chicago and ratified by Poland together with Annex 12 “Search And Rescue”, Poland committed to establish aeronautical search and rescue service called ASAR within Polish region and to assure its operation. ASAR service is the only service in Poland for rescue purposes and is designated to search and rescue of aircraft in distress, provision of help for aircraft crews and passengers and other victims of aeronautical accidents (regardless to nationality of these aircraft and persons). ASAR service tasks include search of designated area to find location of aircraft and victims of aeronautical accidents, determination of their status and commencement of rescue actions at the location using dedicated forces and measures as well as forces and measures of another systems, mainly from State Medical Rescue, National Firefighting and Rescue System and Maritime Search and Rescue Service. ASAR service consists of:

- a) commanding element – Civil-Military Aeronautical Rescue and Coordination Centre,*
- b) executive elements – Aeronautical Search and Rescue Teams (LZPR), and*
- c) supporting elements – alerting points (air traffic services units operating in the framework of alerting service).*

Keywords: search and rescue, aeronautical accidents, aviation, civil and military, Polish Air Navigation Services Agency

1. Introduction

According to international commitments resulting mainly from Convention on International Civil Aviation signed on 7th of December 1944 in Chicago and ratified by Poland together with Annex 12 “Search And Rescue” [1], Poland committed to establish aeronautical search and rescue service called ASAR within Polish region and to assure its operation. ASAR service is the only service in Poland for rescue purposes and is designated to search and rescue of aircraft in distress, provision of help for aircraft crews and passengers and other victims of aeronautical accidents (regardless to nationality of these aircraft and persons). ASAR service is responsible for search and rescue of all aircraft flying within Warszawa Flight Information Region (FIR Warszawa). It acts also over terrestrial area of aeronautical search and rescue region overlapping boundaries of respective flight information regions.

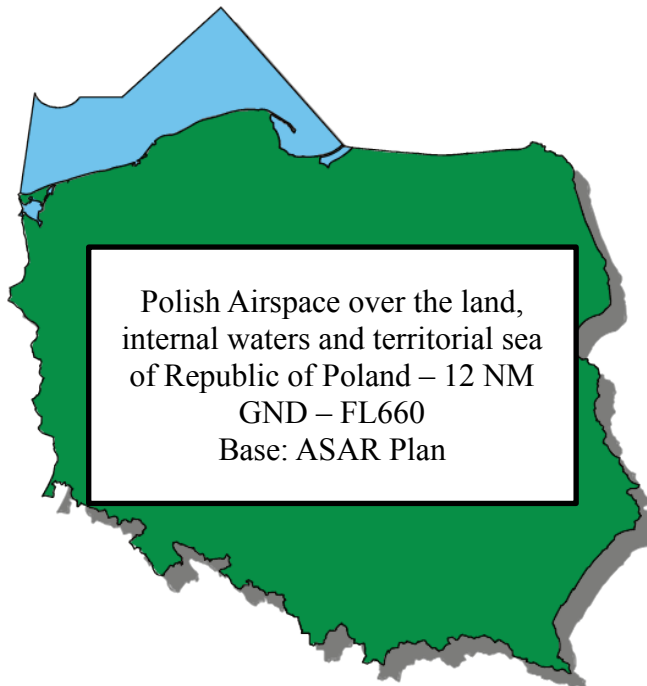


Fig. 1. Flight Information Region (FIR) – Warszawa

ASAR service may also provide help in order to rescue of human-being health and life ASAR in situations other than air accidents or incidents. ASAR service tasks include search of designated area to find location of aircraft and victims of aeronautical accidents, determination of their status and commencement of rescue actions at the location using dedicated forces and measures as well as forces and measures of another systems, mainly from State Medical Rescue [5], National Firefighting and Rescue System [4] and Maritime Search and Rescue Service [2].

ASAR service consists of:

- commanding element – Civil-Military Aeronautical Rescue and Coordination Centre,
- executive elements – Aeronautical Search and Rescue Teams (LZPR), and
- supporting elements – alerting points (air traffic services units operating in the framework of alerting service).

2. Creation of the Centre in PANSА

With effect from 25th of January 2018 PANSА increased significantly its contribution in the domain of coordination of search and rescue activities in ASAR service in the Polish area of responsibility. On that day Civil and Military Aeronautical Rescue Coordination Centre (ARCC) commenced operations in Polish Air Navigation Services Agency (PANSА). Up to this date all tasks of ARCC Centre were conducted mainly by Armed Forces of Republic of Poland, which performed also coordination function in ASAR (Aeronautical Search and Rescue) service. The bodies responsible were Aeronautical Search And Rescue Centre located in Air Operations Centre (COP) – Air Component Headquarter in Warsaw and sub-centre in Gdynia, part of Naval Operations Centre (COM) of Naval Component Headquarter.

When ARCC Centre in PANSА became operational both military elements became so called sub-centres and were included into ARCC Centre structures. ARCC Centre includes the following elements: Rescue Coordination Centre (RCC) located in PANSА and two military sub-centres: Warszawa ARSC (Aeronautical Rescue Sub-Centre) and Gdynia ARSC. However main organizational effort related to assignation of main air rescue forces is still laid on aviation of Armed Forces. Placement of RCC Centre in military structures of Air Operations Centre (COP) and Naval Operations Centre (COM) used in previous solution impeded cooperation with neighbouring rescue systems and extended information flow with air traffic services. The basic advantage of present solution is significantly increased efficiency and effectiveness of activities coordination and shortening of

information flow i.e. cooperation with neighbouring systems and air traffic services due to placement of the Centre in hierarchy of institutions included in air traffic services and rescue services in Poland. According to the Journal of Law on Crisis Management [6], such a solution is valid during peace and crisis. During war time full responsibility of aeronautical rescue system is moved onto Armed Forces. Additionally in Armed Forces Operational Command (DO RSZ) from the structures of which experts were delegated to work in Civil-Military ARCC, works are conducted to prepare Letter of Agreement with Territorial Defence Forces Command, aiming to create land search and rescue groups based on resources being in disposal of Territorial Defence Forces

According to the documents regulating ARCC activities¹, the following main tasks are assigned to the ARCC:

- receipt of information on aircraft safety threats and persons covered by ASAR services activity range,
- analysis of information on aircraft safety threats for aircraft conducting flights within Polish airspace,
- conduction of activities verifying and clarifying information on aircraft safety threats for aircraft conducting flights within Polish airspace,
- supervision of condition and abilities to undertake search and rescue activities by ASAR service units,
- management and coordination of activities of ASAR services units, especially management of Aeronautical Search and Rescue Teams (ASRT) activities,
- on-going analysis and situation assessment and adjustment of undertaken SAR activities including decisions of their suspension and completion,
- notification of cooperating units,
- notification of air defence units and institution providing air traffic services on flights of civil and military aircraft conducting search and rescue activities.

The greatest challenge for the Centre is correlation of activities of several subjects which presently do not have technical compatibility (especially in communication domain) as well as procedural interoperability. ARCC's task is to provide correct coordination of SAR actions and proper cooperation with air traffic services and units of National Firefighting and Rescue System, State Medical

¹ The basic document standardizing ARCC activity is „*PLAN ASAR Plan Operacyjny Poszukiwania i Ratownictwa Lotniczego*”, Minister Infrastruktury i Budownictwa 2017. The basis for operations of military elements of ASAR services over the land and military SAR system in territorial waters and open sea is „*Instrukcja wojskowego ratownictwa lotniczego i morskiego*” MON DORSZ 2017.

Rescue and Maritime Search and Rescue Service. In order to do so ARCC cooperates also with National Headquarters of the Police, National Headquarters of the State Fire Service, Polish Medical Air Rescue, National Headquarters of the Border Guard), Voivode Crisis Management Centres, civil and military aerodrome services (including aeroclubs) and subjects authorized to conduct rescue activities like mountain rescue (GOPR, TOPR) and water rescue (MOPR, WOPR). Moreover ARCC cooperates with services responsible for search and rescue in all neighbouring states (Denmark, Sweden, Russia, Lithuania, Belarus, Ukraine, Slovakia, Czech Republic and Germany).

In order to provide proper coordination between RCC Centre in PANSA and ARSC sub-centres, the following competency division has been introduced:

RCC is responsible for:

- receipt of information on safety threat;
- analysis of information on safety threat;
- conduction of verifying and clarifying activities;
- commencement of search and rescue action;
- coordination of activities with cooperating and neighbouring RCCs.

ARSC sub-centres are responsible for:

- analyse and supervision of capabilities of subordinated ASRTs (Aeronautical Search and Rescue Teams);
- management of activities of subordinated ASRTs);
- notification of air defence units on conducted activities;
- resuming RCC functions in case those capabilities would be lost by PANSA centre.

Present dislocation of duty measures is shown in fig. 2.

ARSC Warsaw:

- ASRT – 1 (1.GPR) – Świdwin,
- ASRT – 2 (2.GPR) – Mińsk Mazowiecki,
- ASRT – 3 (3.GPR) – Kraków,
- ASRT - 4 (1.dlot) – Leźnica Wielka,
- ASRT designated ad hoc.

ARSC Gdynia:

- ASRT – 5 (43. BLotMW) – Oksywie,
- ASRT – 6 (44. BLotMW) – Darłowo,
- ASRT – 7 (44. BLotMW) – Cewice,

ASRT designated ad hoc.

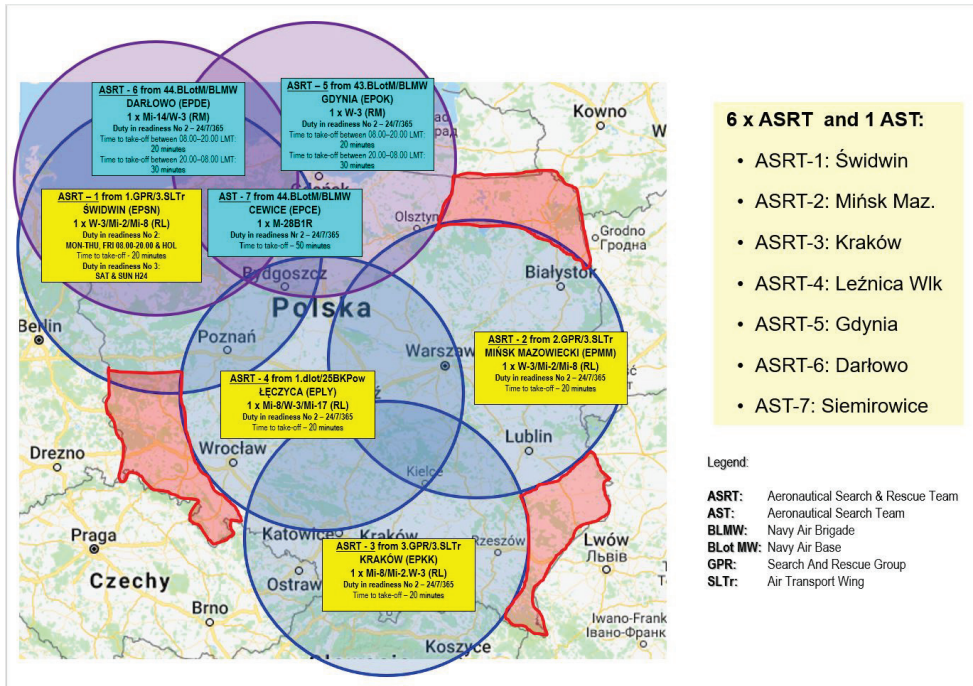


Fig. 2. Operational ranges of particular ASRTs. Source: Armed Forces Operational Command presentation (DO RSZ), PANSA Conference in Jachranka, 2018

Analysis of ASRT dislocation shows uneven placement of measures in Polish territory, resulting from availability of aerodrome network being at disposal of Air Forces. There are places in Poland being in range of even four Aeronautical Search and Rescue Teams, but there are also regions beyond operational range of ASRTs operating from regular aerodromes/bases (especially in southeast, northeast and southwest part of Poland).

In case sub-centres would lost capabilities to manage ASRTs activities during mission, this task is resumed by RCC or indicated by RCC and capable air traffic service unit (appropriate Flight Information Service sector).

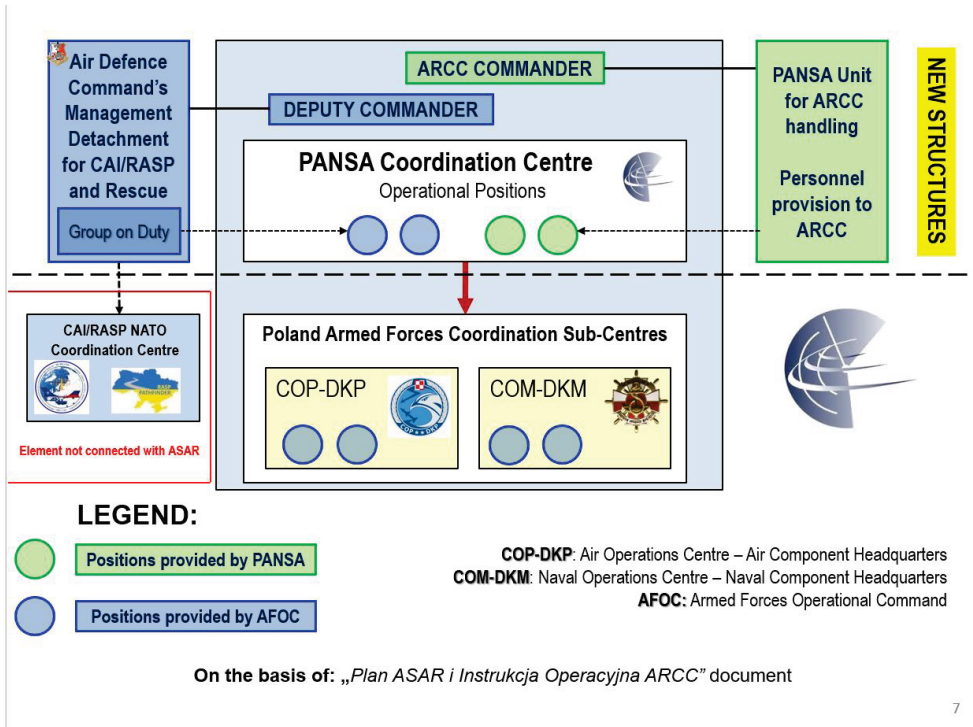


Fig. 3. ARCC Organisational diagram. (Source: *Instrukcja Operacyjna ARCC*, pages 2-3)

Preparations to create ARCC Centre in new structure took several years since coordination of aeronautical search and rescue activities required cooperation of four rescue services subordinated to four Ministers of government of Republic of Poland. Agreements and – in consequence – approval of First Operational Plan of Aeronautical Search and Rescue (PLAN ASAR) by Ministers of Health, Home Affairs and Administration, National Defence and Infrastructure have been completed on October 2017. The ability to use all rescue forces functioning in structures of four Ministers mentioned hereabove during search and rescue actions significantly ease and rationalize activities aiming to provide help victims of air crashes and accidents. Placement of the ARCC Centre in the Ops Room of Air Traffic Management Centre in PANSA, where all services managing air traffic over Poland are gathered is to simplify information flow and – in consequence – to shorten the time needed to commence rescue activities by services capable to provide help for victims.

3. Executive element of ASAR Service – ASRT

Search and rescue actions are conducted by Aeronautical Search and Rescue Teams (ASRT), consisting of aircraft, crews and cabin crew prepared to conduct search and rescue activities. ASRTs are provided by Minister of National Defence from Republic of Poland Armed Forces resources. He is responsible for proper accessory of aircraft and training of ASRTs crews and cabin crews in the scope necessary to perform ASAR service duties. Aircraft of another rescue services, public order enforcement and other services may be called ad hoc to perform search and rescue activities. Minister of National Defence is responsible also for appropriate dislocation of ASRTs enabling provision of ASAR service in SAR and ASRTs operations 24/7, in a way, enabling immediate SAR action after reception of a call from ARCC Centre. ASRTs, after authorisation from ARCC may undertake other activities, especially connected with provision of defensive capabilities, state safety or human-being life rescue. ASRT consists of aircraft equipped in accordance with item 2.6 of ICAO Annex 12 to the Convention on International Civil Aviation. Technical and operational parameters shall enable these aircraft to take-off and land safely from/on places other than aerodrome or airfield. Crews and cabin crews shall include at least one person authorised for provision of the qualified first aid in accordance with Journal of Law dated 8th of September 2008 on State Medical Rescue [3].

4. Cooperation of the Centre with another services

In the scope of coordination of search and rescue actions ARCC Centre personnel cooperates very closely with operational services of Ministry of National Defence, Maritime Rescue Coordination Centre in Gdynia, Polish Medical Air Rescue and other medical services, rescue services of State Fire Service, duty services of Police and Border Guard and organisations providing help such as water rescue (MOPR, WOPR) or mountain rescue (GOPR, TOPR).

During operational and routine verification activities the Centre cooperates with all its counterparts in all neighbouring states and other RCC Centres in all the world. The main element designated to carry tasks of aeronautical ASAR service in Poland are designated by Minister of National Defence Aeronautical Search and Rescue Teams (ASRT) acting for all victims of air or maritime accidents requiring provision of help from rescue services. The Centre is operated 24/7 by professionals of civil air traffic services (ATS), and experienced experts delegated from Air Defence Headquarters from Armed Forces Operational Command (DO RSZ).

Article 140d item 1 of the Journal of Law dated 3rd of July 2002 „Air Law” states that „Organisational units of Polish Navy, State Fire Service, Border Guard, Police, Health Facilities and other subjects able to provide help in the scope of search and rescue are obliged to cooperate with ASAR service to conduct its tasks”. Therefore another subjects may be asked to participate in search and rescue actions, e.g. aeroclubs or private persons which possess useful measures to be used during SAR action. An integral part of Centre activity is also realization of SPOC Poland (Search and Rescue Point of Contact) function. SPOC is an element of international rescue system using Cospas-Sarsat satellite system, receiving distress signals generated by aeronautical Emergency Locator Transmitters (ELT), maritime Emergency Position-Indicating Radio Beacons (EPIRB) or Personal Locator Beacons (PLB). It also initiates and coordinates search and rescue actions based on data received from satellite system.

During first nine months of activity ARCC personnel participated and coordinated rescue activities in eleven serious aeronautical accidents and incidents and supported actions of rescue services in other three situations requiring the use of ASAR service measures. In the same time it received 72 messages from Cospas-Sarsat system. All situations reported in those messages, were to be analysed and clarified, proper actions had to be initiated and return information was expected to be sent to the system.

Most of those situations resulted from improper use of those devices by their owners. Knowledge of the users on proper registration of such devices in Civil Aviation Authority of Poland (ULC) is also very important; not every user is aware of that. There were 579 information on tests of emergency transmitters prepared and sent to interested services; the number of all these activities quickly increased during dynamically growing aeronautical season of 2018. Another important issue are activities undertaken by ARCC personnel in cases of the lack of closure of a flight plan by pilots. Each pilot who decided to file a flight plan (FPL) provides for himself/herself – before a flight is commenced – so called alerting service, provided for that flight by air traffic services (ATS). Lack of notification to air traffic services that a flight plan have been completed and an aircraft landed safely requires ATS to commence alerting activities to such flight even in a situation a pilot resigned from a flight or forgot to cancel it in a system. First air traffic services try to clarify such a case by itself but in case of lack of further information on crew status such a data is transferred to ASAR service – specifically to ARCC Centre. Then ARCC personnel on the basis of data collected from air traffic services, emergency locator transmitter register and all other ways of information gathering on landing of an aircraft commences operational activities which in consequence lead to commencement of SAR action i.e. take-off of SAR helicopter in order to search

and locate lost aircraft. Fortunately most of these 88 reported by ATS to ARCC occurrences was caused by pilot who forgot to close or to cancel a flight plan after safe landing or resignation from a flight. However such events distract personnel's attention from real distress situations and significantly increase workload due to a number of actions to be undertaken in order to clarify these situations. The flow of information is depicted in fig. 4.

On 8th of June 2018 the biggest rescue action conducted in new organisational structures took place. It was not aviation accident but a road accident in a vicinity of town of Treczyn. For the first time from many years the action was participated by SAR service helicopter from ASRT of Kraków. Mi-8 helicopter picked up from a crash site and transferred to the Rydygier's hospital in Kraków seven lightly injured children and one adult. The action was coordinated by Civil-Military Search and Rescue Coordination Centre in Polish Air Navigation Services Agency with Voivode Rescue Notification Centre of Kraków and Polish Medical Air Rescue.

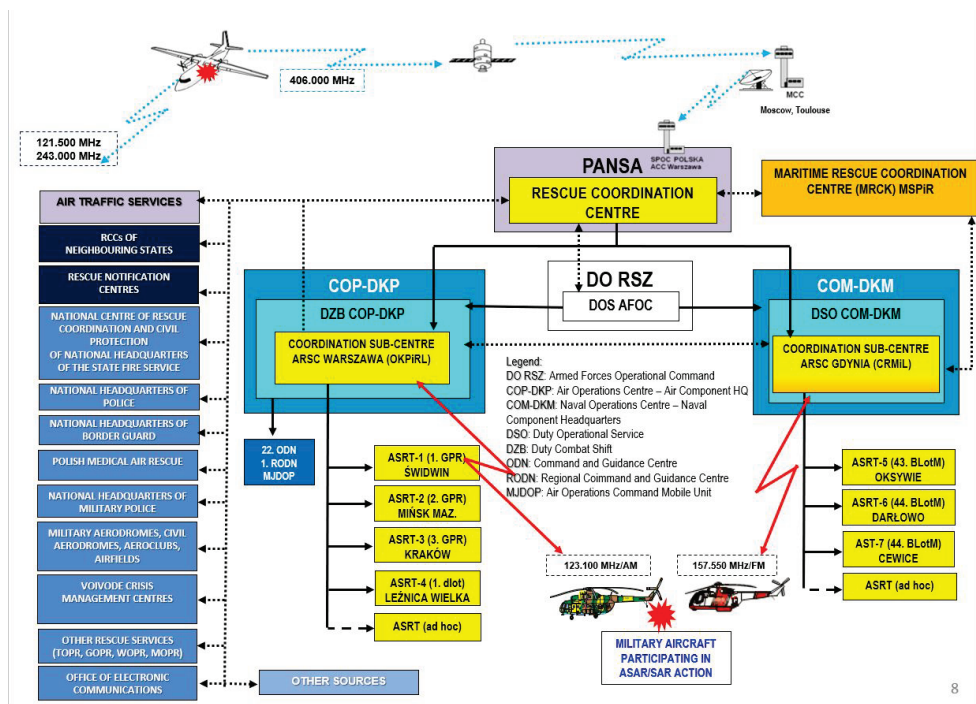


Fig. 4. Organisational diagram and ARCC activities idea. (Source: *Instrukcja Operacyjna ARCC*, pages 2-3)

During relatively short period of functioning of ARCC Centre in PANSA there were another serious aeronautical incidents and accidents including few with fatalities. Information on these events was received by the Centre thanks to very effective operational cooperation with public order services, however often after their occurrence or after helping the victims by ground rescue services. In such cases ARCC becomes a source of information on such events for air traffic services and for State Commission on Aircraft Accidents Investigation. The lack of aeronautical occurrences does not necessarily mean lack of ARCC activity.

Staying in constant readiness to undertake coordination and rescue actions the crew of ARCC conduct daily the following routine activities:

1. 24/7 supervision over readiness of ASAR service forces and measures in Poland to undertake operational activities including analysis of meteorological conditions which may influence actions of these services.
2. Receipt, analysis and clarification of information on use of the emergency locator transmitters and lack of data in air traffic services on safe completion of a flight plan (closure of a flight plan).
3. Receipt, preparation and distribution of notifications of services interested on planned tests of emergency locator transmitters.

Preparation and distribution of ARCC reports related to operational activities performed on duty containing simultaneously statistical elements of Cospas-Sarsat system mentioned hereabove. It allows later to support, develop and proper reactions of the system for new threats showing up in an airspace of entire world.

5. Summary

After many years Poland fulfilled international obligations resulting mainly from Convention on International Civil Aviation signed on 7th of December 1944 in Chicago and ratified by Poland together with Annex 12 "Search And Rescue". According to the Convention Poland committed to establish in its airspace aeronautical search and rescue service called ASAR within Polish region and to assure its operation. It does not mean however that before search and rescue system did not function in Polish airspace. Quite the opposite it was functioning earlier on the basis of Armed Forces of Republic of Poland in an organizational and executive way. Its location in Armed Forces was changing but eventually it always was a subordinate of an appropriate Air Forces commanders. Therefore its functionality and the use of rescue aircraft and other measures was practically limited to provision of help to crews of disabled military aircraft. The only exception was maritime rescue managed in a different way and regulations. It did not mean

automatically that use of military rescue measures was not allowed for help provision to civil crews of disabled aircraft. However procedure to use these measures was quite complicated and it was significantly more easy and faster to use other (civilian) rescue systems. Military system consisted of not only air component but also of appropriately organized command and notification system but – in the first place – ground search and rescue elements. Every air unit maintained so called „emergency groups” equipped with proper technical and rescue equipment and “ground search groups” maintained by another types of Armed Forces units, depending on their location in Polish territory.

Due to the reduction of Armed Forces of Republic of Poland that system was slowly becoming inefficient. In the first place groups of ground search have been terminated in units of other types of armed forces (except air units), then the groups was limited to be on duty only during flights of particular air units. Few years ago those groups were terminated completely. „Emergency groups” are maintained only in a limited scope during conduction of flights by the unit protecting the flights. Air commanders were ordered to undersign appropriate Letters of Agreements with local units of rescue system what caused organizational chaos and rescue system impurity in Poland.

An evidence testifying inefficiency of that system may be for example the way of conduction of last search and rescue action on 18th of December 2017 (before launching ASAR service), after failure of MiG-29 fighter in the vicinity of Mińsk Mazowiecki. Despite notification of all possible services and launching search and rescue action, lack of coordination and appropriate procedures caused that search for pilot who crashed 7 kilometres away from the aerodrome took few hours; the final success was owed to a local community. Moreover it showed that rescue helicopter being at that time on duty on Minsk Mazowiecki aerodrome was not used during action. Since State Commission on Aircraft Accident Investigation did not provide final report of this case it is very difficult to analyse reasons the helicopter was not used. The most probable reason were difficult meteorological conditions which made take-off of rescue helicopter impossible.

Formal launching of ASAR service created organizational and functional basis for much more effective functioning of system and to engage practically all available national rescue services in potential search and rescue actions. Obviously it does not mean solution of all problems related for instance to equipment or training. It should be strived to constant improvement of rescue procedures, training system as well as rescue equipment, in particular the air component, which is the most mobile element of the rescue system. It is possible to indicate a few directions of desired improvements either in short and longer term. In a shorter one in the first place requirements for crews and rescue helicopters should be verified; then it

should be strived to achieve these standards. In a present situation financing system of rescue forces and measures shall be verified, not only from a budget of Ministry of National Defence. In the long term it should be strived in the first place to exchange existing aeronautical rescue equipment to an equipment meeting modern standards of the world. Another issue is reorganization of rescue units structures and restore of structures of so called ground search groups maintained on duty in an appropriate regions. These activities are – as I mentioned earlier – conducted by present authorities of ASAR service and let's hope they will lead us to a happy ending in the next year.

To conclude: creation of ASAR is a first milestone in direction of creation of reliable aeronautical rescue system in Polish airspace

6. References

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3. Journal of Law 2013 Item 757, with later changes Minister of National Defence equips ASRTs with medical products specified in regulations based on Article 34 of the Journal of Law dated 8th of September 2006 on State Medical Rescue, as minimum equipment for resuscitation position; devices enabling two-way and effective communication with ARCC.
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