

LEGAL BASIS OF METEOROLOGICAL PROVISION FOR CIVIL AVIATION

National Aviation University
Liubomyra Husara Avenue, 1, 03680, Kyiv, Ukraine
E-mail: khusanova@gmail.com

Objective: to study domestic legal acts and international standards and rules, which regulates provision of the meteorological services of civil aviation. **Research methods:** formal-dogmatic, documentary analysis and synthesis, comparative analysis, cognitive-analytical, etc. **Results:** it was structured the legal fundamental basis for meteorological provision of civil aviation. **Discussion:** clarified regulatory consolidation of standards and rules in the sphere of meteorological provision of civil aviation, studied the competence of authorized bodies and the content of meteorological services.

Keywords: aviation; meteorological services; Aviation rules; World Meteorological Organization.

Problem statement and its actuality. There is no doubt about the importance of meteorological services in maintaining safe and efficient aviation and the safety of people traveling by air. According to the International Civil Aviation Organization (ICAO), about 20% of aviation events are related to adverse weather conditions, where a third of them are due to adverse weather events [1, p. 5]. It is estimated that there are risks of flight delays at 97 airports around the world every day due to adverse weather conditions [2, p. 19].

Analysis of recent research and publications. Issues of meteorological support of aviation were studied by such scientists as G.P. Ivus, A.B. Semergey-Chumachenko, V.M. Lipinsky, V.I. Osadchiy, V.M. Babichenko, R.A. Petersen. However, it is necessary to make analysis of the legal basis in this sphere, which includes not only domestic normative acts, but also international standards and regulations.

The purpose of the article is analysis of domestic legal acts and international standards and rules, which regulates provision of the meteorological services of civil aviation

Main material. According to the article 1 Air Code of Ukraine meteorological services are services that includes services to provide meteorological forecasts, consultations and

observations, as well as other meteorological information and services provided to aviation entities. Air Code stipulates (Art. 35) that the developing and establishing requirements for meteorological provision of civil aviation, as well as determining the requirements for the procedure of meteorological service at aerodromes and flight routes are provided by authorized body for civil aviation, which also certifies aerodrome meteorological equipment [3].

Authorized body for civil aviation in Ukraine is the State Aviation Service, which is a central executive body, whose activities are directed and coordinated by the Cabinet of Ministers of Ukraine through the Minister of Infrastructure, which implements state policy in the field of civil aviation and the use of airspace of Ukraine [4].

Therefore, in 09.03.2017 State Aviation Services of Ukraine approved the Order № 166 «Aviation rules of Ukraine «Meteorological service of civil aviation»» to establish requirements for the organization and provision of meteorological services to civil aviation in Ukraine [5].

The organization and provision of meteorological services to civil aviation in Ukraine are regulated by requirements, stipulated in the Aviation rules, approved by the Order of the State Aviation Services of Ukraine dated (hereinafter

referred to as Aviation Rules). Aviation Rules are based on the Air Code of Ukraine and Annex 3 to the Convention on International Civil Aviation and has its purpose to improve the meteorological service of civil aviation in Ukraine.

Better known as the Chicago Convention, it created the International Civil Aviation Organization (ICAO) as an agency of the United Nations and provided the mechanism for international agreement on all issues related to civil aviation. The Convention has 18 annexes establishing standards for areas such as air traffic control, navigation systems and communications systems. Important to meteorologists is Annex 3 – Meteorological Service for International Air Navigation [6].

The object of the meteorological service outlined in Annex 3 is to contribute to the safety, efficiency and regularity of air navigation. This is achieved by providing necessary meteorological information to operators, flight crew members, air traffic services units, search and rescue units, airport management and others concerned with aviation. Close liaison is essential between those supplying meteorological information and those using it [7].

To enable international air navigation, Annex 3 to the Convention on International Civil Aviation 1947 (the Chicago Convention), Meteorological Service for International Air Navigation, contains the standards and recommended practices (SARPs) for the provision of aeronautical meteorological (MET) information services by ICAO Contracting States [8].

The regulatory material contained in Appendix 3 is, with some minor editorial exceptions, identical to that contained in Technical Regulations (WMO-No. 49), Volume II, Meteorological Services for International Air Navigation, Parts I and II. The aeronautical meteorological code forms referred to in Annex 3 are developed by the World Meteorological Organization based on the aeronautical requirements contained in this Annex or formulated from time to time by the Council. WMO distributes aeronautical meteorological code forms through its publication «Manual on Codes», Volume I (WMO-No. 306), Volume I «International Codes» [9].

ICAO works closely with the WMO to carry-out and monitor the meteorological issues that impact civil aviation. With a view to coordinating, standardizing, and improving world meteorological activities and to encouraging an efficient exchange of meteorological information between countries in the aid of human activities the contracting United Nation States agreed to establish The World Meteorological Organization. The purposes of the Organization shall be: (a) to facilitate worldwide cooperation in the establishment of networks of stations for the making of meteorological observations or other geophysical observations related to meteorology and to promote the establishment and maintenance of meteorological centers charged with the provision of meteorological services; (b) to promote the establishment and maintenance of systems for the rapid exchange of weather information; (c) to promote standardization of meteorological observations and to ensure the uniform publication of observations and statistics; (d) to further the application of meteorology to aviation, shipping, agriculture, and other human activities; and (e) to encourage research and training in meteorology and to assist in coordinating the international aspects of such research and training [10].

The World Meteorological Organization (WMO) is a specialized agency of the United Nations (UN) and an intergovernmental organization with a membership of 193 Member States and Territories. Established by the ratification of the WMO Convention on 23 March 1950, WMO became the specialised agency of the United Nations for meteorology (weather and climate), operational hydrology and related geophysical sciences a year later. It is the UN system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the land and oceans, the weather and climate it produces and the resulting distribution of water resources. As weather, climate and the water cycle know no national boundaries, international cooperation at a global scale is essential for the development of meteorology and operational hydrology as well as to reap the benefits from their application. WMO provides the framework for such international cooperation. The Organization plays a leading role in international

efforts to monitor and protect the environment through its Programmes [11]. In collaboration with other United Nations agencies and National Meteorological and Hydrological Services, WMO supports the implementation of a number of environmental conventions and is instrumental in providing advice and assessments to governments on related matters. These activities contribute towards ensuring the sustainable development and well-being of nations.

In Ukraine Ukrainian Hydrometeorological Center (UHMC) within its powers is the main organization in the development and implementation of national policy in hydrometeorological according to the Order of the State Emergency Service of Ukraine dated 28.05.2013 № 336 «Provisions on the Ukrainian Hydrometeorological Center of the Civil Service of Ukraine On Emergency Situations» [12].

Department of Aeronautical Meteorology is one of the structured departments of the UHMC, which provides organizational guidance of aerodrome meteorological network of meteorological services for civil aviation meteorological services; development of new projects and improving existing regulations on the organization and implementation of the Meteorological Service of Civil Aviation; facilitating implementation of the state policy in the field of meteorological activity, quality and safety of aeronautical meteorological services with regard to the standards and recommendations of WMO and ICAO [13]. This department interacts with the Ukrainian Aviameteorological Center (UAMC) State Enterprise in civil aviation meteorological service methodological support issues.

The primary UAMC's objective is to provide meteorological support for civil aviation flights and aviation transport operators with actual and anticipated weather condition reports on intercontinental, international and internal air routes, at Kyiv/Boryspil, Kyiv/Zhuliany, Kyiv/Antonov-2, Kyiv/Antonov-1 aerodromes as well as at aerodromes of landing, alternate aerodromes, and also in the flight regions in accordance with the requirements of the regulatory documents effective in Ukraine, standards of the WMO and ICAO [14].

Significant assistance in improving the quality of meteorological support for civil aviation can be provided by well-organized interaction between various meteorological units of the Hydrometeorological Service [15].

The effective implementation of practical tasks of aviation occurs according to the conditions of timely application of meteorological information, which is aimed at maintaining the safety, regularity and economy of air transportation [16].

Meteorological information is exchanged for meteorological support of flights between departure, landing and spare aerodromes. The procedure for conducting weather observations and disseminating meteorological information is determined by the «Manual on meteorological support of civil aviation (NMO GA-90)» [17].

The system of collecting and disseminating meteorological information allows operational units to obtain the necessary information about the actual weather in the areas of flights, air routes and information about dangerous weather events.

Aerodrome meteorological authorities shall provide regular special observations of the weather at the aerodrome [18, p. 35].

Meteorological services include services for the provision of meteorological forecasts, consultations and observations, as well as other meteorological information and services provided to aviation entities. Meteorological service in Ukraine is provided in accordance with the Aviation rules.

Doppler meteorological radars located at Boryspil, Lviv and Kharkiv airfields are used for meteorological service of aircraft flights in the airspace of Ukraine. Radars have the ability to detect foci of dangerous weather events: rainfall, thunderstorms and update information about them with a discreteness of 10-15 minutes.

Meteorological service is provided by meteorological service providers, which are responsible for the meteorological service of civil aircraft flights on flight routes and at aerodromes.

Providers of meteorological services for aircraft flights at Ukrainian airfields include regional and regional centers for hydrometeorology, which include civil aviation meteorological stations (AMSC), located directly at the airfields. They carry out meteorological observations of weather at

the aerodrome, compile reports on actual weather, provide them to Kyiv and international meteorological data banks, compile weather forecasts for aerodromes, warnings for aerodromes about the formation of relevant phenomena and weather conditions, and warnings for wind shear in the area takeoff and landing. The AMC is also responsible for preparing flight documentation and servicing the crews of aircraft departing from the aerodrome. In addition, on a contractual basis, the maintenance of ATS and aerodrome services.

All AMSCs have meteorological aerodrome equipment that is installed along the runways and is used to measure meteorological values at the aerodrome, informing aviation users both in space and time that they must comply with national requirements and ICAO standards.

Meteorological service on flight routes Meteorological service of aircraft flights is carried out by meteorological monitoring bodies (MMB), which are part of UkSATSE. The responsibility of the MMB extends to the meteorological service of aircraft flights by providing meteorological information through air traffic services. MWOs constantly monitor the weather conditions in the area of responsibility, ie the weather conditions in the flight information area (FIA). MMB makes forecasts for aircraft flights in the lower airspace in GAMET format. SIGMET and AIRMET information is issued if weather conditions or weather phenomena that may affect the safety of aircraft are identified or predicted in the area of responsibility [19].

Conclusions. Meteorology and the changing climate play a significant role in the aviation industry. Dangerous meteorological phenomena affect the aviation safety. In the process of technology development requirements for meteorological aviation supplies change, but still remain high, and the value of the accuracy of diagnosis and forecast of meteorological conditions is constantly increasing with increasing air traffic. Thus, aviation remains the most demanding user of meteorological information. To maintain a high level of meteorological support aviation that meets international standards, it is necessary to conduct scientific and applied research with aviation climatology, constantly improve existing methods

of meteorological forecasts, to develop new methods in accordance with the growing technical equipment of operational units and changing requirements for forecasting products and to train highly qualified meteorologists in order to implement meteorological support of aviation in accordance with applicable regulations and international standards.

References

1. Petersen R.A. (2004). Automated meteorological reports obtained from aircraft improved aviation forecasts. ICAO Journal, 59 (4), 4-7.
2. Inadequate weather communication cited in B737 microburst downdraft incident (2004). ICAO Journal, 59 (4), 18-20.
3. Air Code of Ukraine: Law of May 19. 2011 № 3393-VI / Access mode: <https://zakon.rada.gov.ua/laws/show/3393-17> (access date: 29.05.2020).
4. On approval of the Regulation on the State Aviation Service of Ukraine. Resolution of the Cabinet of Ministers of Ukraine, dated October 8, 2014 № 520. Access mode: <https://zakon.rada.gov.ua/laws/show/520-2014-%D0%BF> (access date: 29.05.2020).
5. On approval of the Aviation Rules of Ukraine «Meteorological service of civil aviation». Order of the State Aviation Service of Ukraine, dated 09.03.2017 № 166. Access mode: <https://zakon.rada.gov.ua/laws/show/z1092-17> (access date: 29.05.2020).
6. Annex 3 to the Convention on International Civil Aviation. Meteorological Service for International Air Navigation. Access mode: https://www.wmo.int/pages/prog/www/ISS/Meetings/CT-MTDCF-ET-DRC_Geneva2008/Annex3_16ed.pdf (access date: 29.05.2020).
7. The Convention on International Civil Aviation Annexes 1 to 18. Access mode: https://www.icao.int/safety/airnavigation/nationalitymarks/annexes_booklet_en.pdf (access date: 29.05.2020).
8. Future Aeronautical Meteorological Information Service Delivery White Paper Developed by the ICAO Meteorology Panel. 11 October 2018. Access mode: <https://www.icao.int/>

airnavigation/METP/Panel%20Documents/White%20Paper%20on%20Future%20Aeronautical%20Meteorological%20Information%20Service%20%20Delivry.pdf (access date: 29.05.2020).

9. ICAO aviation documentation. Access mode: <http://www.aviaizdat.ru/news/view/novyy-dokument-ikao.-prilozhenie-3.-izdanie-19> (access date: 29.05.2020).

10. Convention of the World Meteorological Organization. Access mode: <https://treaties.un.org/Pages/showDetails.aspx?objid=0800000280157e8e> (access date: 29.05.2020).

11. World Meteorological Organization. Access mode: <https://public.wmo.int/en/about-us/who-we-are>. (access date: 29.05.2020).

12. Order of the State Emergency Service of Ukraine dated 28.05.2013 № 336 «Provisions on the Ukrainian Hydrometeorological Center of the Civil Service of Ukraine On Emergency Situations» Access mode: <https://meteo.gov.ua> (access date: 29.05.2020).

13. Department of Aviation Meteorology. Access mode: https://meteo.gov.ua/en/33345/aviameteorology/avia_structure_aircraft_meteorologichnoho_service. (access date: 29.05.2020).

14. State Enterprise «Ukrainian Aviation

Meteorological Center» Access mode: http://www.namc.com.ua/?page_id=67&lang=en (access date: 29.05.2020).

15. Ivus G.P. Meteorological service of polar aviation and navigation: Lecture notes. Odessa: Ecology, 2008. 156 p.

16. Modern meteorological observations for the needs of aviation / S. Reshetchenko, K. Chernova, 2018. Collection of scientific works. Kharkiv, 2018. Issue 27. DOI: 10.26565/2075-1893-2018-27-08.

17. On Approval and implementation of the Guidelines for Flights in Civil Aviation of the USSR / USSR authorities; Order, Extract from 08.04.1985 № 77 Access mode: <https://zakon.rada.gov.ua/laws/show/v0077400-85> (access date: 29.05.2020).

18. Ivus G.P., Semergey-Chumachenko A.B. Aviation meteorology: Lecture notes. Dnepropetrovsk: PBP «Economics», 2006. 140 p.

19. Meteorological service (MET) Access mode: <https://avia.gov.ua/meteorologichne-obslugovuvannya-met/> Meteorological service (MET).

ПРАВОВІ ЗАСАДИ МЕТЕОРОЛОГІЧНОГО ЗАБЕЗПЕЧЕННЯ ЦИВІЛЬНОЇ АВІАЦІЇ

Національний авіаційний університет
проспект Любомира Гузара, 1, 03680, Київ, Україна
E-mail: khusanova@gmail.com

Мета: вивчення вітчизняних нормативно-правових актів та міжнародних стандартів і правил, що регулюють діяльність метеорологічних служб цивільної авіації. **Методи дослідження:** формально-догматичний, документальний аналіз та синтез, порівняльний аналіз, когнітивно-аналітичний та ін. **Результати:** були структуровані правовою основою метеорологічного забезпечення цивільної авіації. **Обговорення:** уточнено нормативне закріплення стандартів та правил у сфері метеорологічного забезпечення цивільної авіації, вивчено компетенцію уповноважених органів та зміст метеорологічних служб.

Немає сумнівів у важливості метеорологічних служб для підтримки безпечної та ефективної авіації та безпеки людей, які подорожують повітряним транспортом. За даними Міжнародної організації цивільної авіації (ІКАО), близько 20% авіаційних подій пов'язані з несприятливими погодними умовами, де третина з них пов'язана з несприятливими погодними подіями.

Метеорологія та мінливий клімат відіграють важливу роль у авіаційній галузі. Небезпечні метеорологічні явища впливають на безпеку авіації. У процесі розвитку технологій вимоги до постачання метеорологічної авіації змінюються, але все ще залишаються високими, а значення точності діагностики та прогнозування метеорологічних умов постійно зростає зі збільшенням повітряного руху. Таким чином, авіація залишається найвибагливішим користувачем метеорологічної інформації. Для підтримки високого рівня метеорологічної підтримки авіації, що відповідає міжнародним стандартам, необхідно проводити наукові та прикладні дослідження з авіаційною кліматологією, постійно вдосконалювати існуючі методи метеорологічних прогнозів, розробляти нові методи відповідно до зростаючого технічного оснащення оперативних підрозділів та зміна вимог до продуктів прогнозування та підготовки висококваліфікованих метеорологів з метою здійснення метеорологічного забезпечення авіації відповідно до діючих норм та міжнародних стандартів.

Ключові слова: авіація; метеорологічні служби; авіаційні правила; Всесвітня метеорологічна організація.