Aviation Regulations of Russia: a Transition from One Type to Another

Oleksiy Chernykh
Nanjing University of Aeronautics and Astronautics, College of Civil Aviation
Assistant Professor
29 Jiangjun Avenue, Nanjing, 211106, Jiangsu province, China
alex@nuaa.edu.cn

Mambet Bakiiev
Antonov Company, Department of Fuselage Airframe Computer Projects
Design Engineer
1 Tupolev Street, Kyiv, 03062, Ukraine
mambet12@gmail.com

ABSTRACT

Chinese Aerospace Engineering has lately initiated a wide-body airplane project which has been planned to be designed and built in close cooperation with Russia. This aim has raised the necessity of studying Russian airworthiness management system. The presented paper highlights a transition period in work of Russian aviation authorities, which is conditioned by two types of aviation regulations being in use in the Russian Airworthiness and Operations management system, and continuous reformations of aviation agencies. The two types of aviation regulations used in Russia have been: the Aviation Regulations and the Federal Aviation Regulations. The transition is accompanied with a number of challenges to be dealt with, such as: a non-unified structure of regulations on Aircraft Operation management, various independent agencies responsible for regulation issuance and control instead of one national aviation authority, confusions in naming and referencing. Additionally, the paper offers a list of currently effective Russian regulations of both types as of November 2016.

KEYWORDS: *Russian Aviation Regulations, Russian Federal Aviation Regulations, Aircraft Airworthiness management, Aircraft Operation management*

1 INTRODUCTION

For a long time, China has been an operator of foreign-built aircraft purchased overseas. In recent years, the development trend has been directed towards advancing the works of designing and manufacturing own Chinese aircraft. Namely, the efforts of Chinese COMAC Aircraft Company (中国商用飞机有限责任公司) have been extended to a new long range wide-body commercial airplane (C929/C939) which has been planned in collaboration with Russia. In 2017, it has been announced that a new joint venture named the China-Russia Aircraft International Corporation (CRAIC) involving COMAC Aircraft Company and Russia's United Aircraft Corporation (UAC) has been founded to be in charge of the planned cooperation [1].

A new airplane cannot enter into a serial production and commercial flight operation until a manufacturer has demonstrated the compliance of an airplane with aviation airworthiness regulations under guidance and supervision of a national aviation authority. Aircraft airworthiness substantiation closes the entire aircraft development process. Since the established China-Russia joint cooperation has involved a foreign country as the "second party", Russian aviation regulations have become a challenge for Chinese professionals in Aerospace industry to be additionally taken into consideration during the whole process of aircraft development. This fact has also been put on the basis of further improvement of educational trends in Chinese Aerospace-related universities [2].

The above-mentioned challenge of working with Russian regulations is caused by their principal differences (in structure and content arrangement) from Chinese Civil Aviation Regulations (CCAR) and worldwide known Federal Aviation Regulations (FAR or 14 CFR, being part of Title 14 of the Code of Federal Regulations) of the Federal Aviation Administration (FAA) of the U.S.A. or Certification Specifications (CS) of the European Aviation Safety Agency (EASA) of the European Union.

The Russian aviation regulations consist of two principal types:

- (1) the Aviation Regulations and
- (2) the Federal Aviation Regulations.

The full list of Russian aviation regulations covering documents of both types, to the authors' knowledge, hasn't been found in open English-language sources and hasn't even been provided in Russian-language informative space. However, the regulations themselves can be collected on a number of official websites of Russian authorities.

The Interstate Aviation Committee (IAC), being responsible for issuance of the 1st type of regulations, the Aviation Regulations, lists them on the official website [3]. The 2nd type of regulations, the Russian Federal Aviation Regulations have been issued and handled by separate agencies that manage aviation industry in Russia: the Government of the Russian Federation [4], the Ministry of Transport [5], the Ministry of Defence [6], the Federal Air Transport Agency [7], the State Corporation for Space Activities [8], and the Ministry of Industry and Trade [9]. As a result, the Federal Aviation Regulations have been spread on the websites of those ministries and agencies, unfortunately, in an uncoordinated manner. Each ministry or an agency only offers documents of its own issuance, direct influence and control [2, 4-9]. This is, on the one hand, reasonable, but, on the other hand, it brings extra difficulties when regularly attempting to keep database of currently effective documents updated.

Surprisingly, even though the early Russian Federal Aviation Regulations have started to be issued since 1998 [10], they haven't even been mentioned in the book on certification of Russian aviation products [11] published by Krasotkin, the IAC Aviation Register chairman Advisor, 9 years later in 2007. The book of Krasotkin contains only a short list of the 1st type, the Aviation Regulations, not covering all of them, and no any mentioning of documents of the 2nd type, the Federal Aviation Regulations.

The Federal Aviation Regulations have been in use for almost 20 years. But there has not been composed any fully unified list of the regulations so far. However, it is worth noting, the first attempt to compose such a unified list of all Russian aviation regulations has been made by the Federal State Unitary Enterprise Scientific Research Institute of Standardization and Unification in 2014 resulting in establishment of the Unified System of Aviation Standards [12], but its website hasn't been properly updated since 2014, so it has been found providing regulations which are no more effective.

This paper attempts to bridge the gap offering the full list of Russian aviation regulations (of both types) collected by the authors as of November 2016.

2 AVIATION REGULATIONS (AP)

The Aviation Regulations (AP) [13] have been issued by the Interstate Aviation Committee (IAC) and are effective in all member countries of the interstate Civil Aviation and Airspace Use Treaty [14]. Russia, being a member of the IAC, also adopted this set of regulations since it had signed the Treaty in 1991.

The Aviation Regulations (AP) contents have been published in Russian language exceptionally [13]. The regulations are commonly shortened to a confusing abbreviation *"AP"* (instead of *"AR"*) which has come from a transliteration *"Aviatsionnye Pravila"* of their Russian name *"Авиационные Правила"*. The content has been arranged in Parts with a serial number *"AP-XXX"*. The list and titles of the AP regulations can be found on the official website of the IAC [3] and are given below with explanations (the IAC website's original translation into English):

1. AP-21. Certification procedures for Aeronautical Products, Design Organisations and Manufacturers.
2. AP-23. Airworthiness standards for Light Airplanes. *(invalid in Russia)*
3. AP-25. Airworthiness standards for Transport category Airplanes. *(invalid in Russia)*
4. AP-OLS. Airworthiness standards for Very Light Airplanes. *(AP-VLA – literally)*
5. AP-27. Airworthiness standards for Normal category Rotorcraft. *(invalid in Russia)*
6. AP-29. Airworthiness standards for Transport category Rotorcraft.
7. AP-31. Airworthiness standards for Manned Free Balloons.
8. AP-33. Airworthiness standards for Engines.
9. AP-34. Emission Requirements.
10. AP-VD. Airworthiness standards for Auxiliary Power Units. *(AP-APU – literally)*
11. AP-35. Airworthiness standards for Propellers.

12. AP-36. Noise Certification. *(invalid in Russia)*
13. AP-39. Airworthiness Directives.
14. AP-139. Certification of Aerodromes. *(invalid in Russia)*
    - Volume I – Procedures for Certification of Aerodromes.
    - Volume II – Certification Requirements to Aerodromes.
15. AP-145. Repair Stations.
16. AP-170. Certification of Aerodrome and En-Route Equipment.
    - Volume I – Procedures for Certification of Aerodrome and En-Route Equipment. *(invalid in Russia)*
    - Volume II – Certification Requirements to Aerodrome and En-Route Equipment.
17. AP-183. Aviation Register Representatives. *(invalid in Russia)*

One more example of a transliterated abbreviation found in the list needs to be explained:

- AP-OLS stands for *"Ochen Legkie Samolety"* (Russian: *Очень Легкие Самолеты*) and means *"Very Light Airplanes"*.
- AP-VD stands for *"Vspomogatelnyi Dvigatel"* (Russian: *Вспомогательный Двигатель*) and means *"Auxiliary Power Unit"*.

In general, the Parts of the Aviation Regulations (AP) follow the typical content structure and serial numbers of worldwide commonly accepted structure of regulations (such as, of the American FAR regulations). This has been an outcome of a continuous harmonization process started in 1990s by the Interstate Aviation Committee (IAC) [11]. But it's worth noting that the AP regulations do not have as many parts and do not cover as large scope of topics as the American FAR regulations or European CS rules do. The issued Parts primarily contain Initial Airworthiness matters and are all listed above.

However, it has recently been announced that the seven AP Parts (AP-23, AP-25, AP-27, AP-36, AP-139, AP-170 Volume I, and AP-183) have become ineffective in Russia and the relevant governmental orders have been signed [15,16]. Although, Russia hasn't left the Treaty, still keeping its membership. And the Parts themselves continue to remain effective in all other member countries as the Parts of the AP regulations managed by the Interstate Aviation Committee (IAC).

3 FEDERAL AVIATION REGULATIONS (FAP)

The Federal Aviation Regulations (FAP) [10] have been issued as Orders of various Russian agencies [2, 4-9] working in Aviation field. The abbreviation is shortened as *"FAP"* which has also come from a transliteration "*Federal'nye Aviatsionnye Pravila*" of the Russian name "*Федеральные Авиационные Правила"*. It's worth highlighting, the FAP regulations are considered Russian national regulations being effective in Russia exceptionally.

It has been largely surprised that the name of the Russian regulations sounds completely identical to the American Federal Aviation Regulations (FAR). Such confusion has been due to the fact that the full name of Russia as a country has been *"the Russian Federation"*. This is why all Russian governmental organizations hold the Federal status, and the word *"Federal"* has also come into the name of Russian national regulations. To reduce misunderstanding, the above-mentioned abbreviation *"FAP"* has been established.

The FAP regulations contents have also been published in Russian language only [10], being distributed among numerous separate documents named *"Orders"*. Their numbering has been with a serial number and a year of issuance, such as *"Order XXX (Year)"*. It has been noted above that the full list of the FAP regulations hasn't been found in open sources. Having been collected by the authors, they are listed below according to responsible authorities (the authors' translation into English):

---------- *Orders of the Government of the Russian Federation*

1. *Order 360 (1998).* About Federal Regulations of airspace use and Federal Aviation Regulations.
2. *Order 138 (2010).* Federal Regulations of Russian Federation airspace use.
3. *Order 530 (2008).* Federal Aviation Regulations of search and rescue in the Russian Federation.
4. *Order 303 (2000).* Rules of aircraft accident and incident investigation for Experimental Aircraft.
5. *Order 1329 (1999).* Rules of aircraft accident and incident investigation for Public Aircraft.
6. *Order 609 (1998).* Rules of aircraft accident and incident investigation for Civil Aircraft.

---------- *Orders of the Ministry of Transport*
7. *Order 262 (2015).* Requirements to aerodromes intended for take-off, landing, taxiing, and parking of Civil aircraft.
8. *Order 251 (2015).* Procedure of state registration of Civil Aviation aerodromes and heliports.
9. *Order 250 (2015).* Procedure of landing ground owner's notification on commencement, suspension, or termination of landing ground operation for Civil aircraft flights, and registration in Civil Aviation authority.
10. *Order 216 (2015).* Requirements to juridical persons who implement aeronautical service for aircraft of Russian Federation airspace users.
11. *Order 297 (2014).* Radio communication support of aircraft flights and aircraft electrical communication in Civil Aviation.
12. *Order 60 (2014).* Meteorological information support for aircraft flight management.
13. *Order 32 (2014).* Requirements to Civil Aviation personnel license formatting.
14. *Order 362 (2012).* Implementation of radio communication in Russian Federation airspace.
15. *Order 6 (2012).* Russian Federation airspace use planning and management.
16. *Order 293 (2011).* Air transport management in the Russian Federation.
17. *Order 69 (2011).* Requirements to landing grounds located on land and water.
18. *Order 249 (2009).* Requirements to mandatory certification of natural and juridical persons performing aviation works. Certification procedure.
19. *Order 216 (2009).* Requirements to air traffic dispatchers and parachute instructors.
20. *Order 128 (2009).* Flight preparation and implementation in Civil Aviation.
21. *Order 147 (2008).* Requirements to air crew men, aircraft maintenance engineers, and flight support crew / flight dispatchers in Civil Aviation.
22. *Order 141 (2008).* Rules of dangerous cargo transportation by civil aircraft.
23. *Order 82 (2007).* General Regulations of passenger, baggage, cargo air transportation and requirements to passenger, consignor, consignee service.
24. *Order 142 (2005).* Aviation safety requirements to airports.
25. *Order 31 (2005).* Joint facilities of air traffic implementation.
26. *Order 1 (2005).* Flight checks of ground radio communication equipment, aircraft electrical communication, and light signalling equipment of Civil Aviation aerodromes.
27. *Order 202 (2003).* Technical means for Aviation work implementation. Requirements and certification procedures.
28. *Order 150 (2003).* Certification requirements to juridical persons engaged in airport works in passenger, baggage, cargo and mail service.
29. *Order 149 (2003).* Certification requirements to juridical persons engaged in airport works in electrical light support of flights.
30. *Order 147 (2003).* General Aviation operators. Requirements to General Aviation operators, procedures of registration and inspection of General Aviation operator service.
31. *Order 132 (2003).* Aircraft Example. Requirements and certification procedures.
32. *Order 118 (2003).* Rules of putting single aircraft examples into General Aviation service.
33. *Order 29 (2003).* Aviation safety requirements to General Aviation operators.
34. *Order 19 (2003).* Certification of ground aviation equipment.
35. *Order 126 (2002).* Certification requirements to organizations implementing quality check for aircraft fuel, oils, lubricants and special liquids.
---------- *Orders of the Ministry of Defence*
36. *Order 265 (2009).* Medical support of Public Aviation flights.
37. *Order 60 (2009).* Unification of Public aviation personnel work conditions.
38. *Order 150 (2007).* Federal Aviation Regulations of Public Aviation Navigation.
39. *Order 275 (2004).* Federal Aviation Regulations of Public Aviation flight implementation.
40. *Order 460 (2002).* State registration of Public aircraft.
41. *Order 440 (2002).* State registration of Public Aviation aerodromes.
42. *Order 431 (2001).* Federal Aviation Regulations of ground service organization in Public Aviation.
43. *Order 420 (2001).* Organization of objective supervision in Public Aviation.
44. *Order 412 (2001).* Organization of training centre in Public Aviation.
---------- *Orders of the Russian Air Navigation Agency (abolished in 2009)*
45. *Order 119 (2007).* Placement of marking facilities on buildings, constructions, communication lines, electricity lines, radio equipment and other units installed for aircraft flight safety protection.
46. *Order 116 (2007).* Certification Regulations for joint facilities of air traffic implementation.

------ Orders of the Russian Aerospace Agency (present name – State Corporation for Space Activities)
47. *Order 165 (2003).* Organization of works of experimental aviation medical staff.
48. *Order 164 (2003).* Organization of flight medical centre works for examination of experimental aviation.
49. *Order 80 (2003).* Flight medical examination of experimental aviation flight staff.
---------- Orders of the Federal Air Transport Service (present name – Federal Air Transport Agency)
50. *Order 121 (2000).* Certification requirements to juridical persons who implement airport work in aerodrome support of aircraft flights.
51. *Order 89 (2000).* Certification requirements to organizations of aviation fuel supply for air transportation.
52. *Order 115 (1999).* Certification of juridical persons who implement medical examination of aviation staff.
53. *Order 10 (1999).* Mandatory certification of organizations engaged in supply of onboard food for passengers and air crew.
---------- Collective Order of Russian Ministries
54. *Order 136/42/51 (2002) of the Ministry of Defence, Ministry of Transport, Russian Aerospace Agency.* Federal Aviation Regulations of flights in airspace of the Russian Federation.
---------- Orders commonly referred to as "FAP-XXX" with a serial number
55. "FAP-16". *Order 397 (2007) of the Government*. About the improvement of state regulation of air carriers in air transportation.
56. "FAP-67". *Order 50 (2002) of the Ministry of Transport.* Medical examination of air crew, dispatchers, flight attendants, pilot students, and entrants to schools of Civil Aviation.
57. "FAP-119". *Order 246 (2015) of the Ministry of Transport.* Requirements to juridical persons, private entrepreneurs, who implement commercial air transportation.
58. "FAP-142". *Order 289 (2015) of the Ministry of Transport.* Requirements to educational institutions and organizations preparing aviation specialists of proper level.
59. "FAP-145". *Order 285 (2015) of the Ministry of Transport.* Requirements to juridical persons, private entrepreneurs, who implement maintenance of Civil Aviation aircraft.
60. "FAP-151". *Order 286 (2015) of the Ministry of Transport.* Requirements to operators of Civil Aviation aerodromes.
61. "FAP-173". *Order 270 (1998) of the Federal Aviation Service.* Radio communication support of aircraft flights and aircraft electrical communication. Certification requirements.

It can be found in the list (*e.g.* positions 55-61) that some of the Orders, in addition to their serial number and a year, have commonly been referred to as *"FAP-XXX"* with a separate serial number [17-21]. But it's worth noting that neither of above-mentioned serial numbers *"FAP-XXX"* can be seen in body of a relevant Order, for example [22]. It means that these references *"FAP-XXX"* can just be treated as a professional slang intended to simplify work with the FAP regulations just indicating the corresponding American FAR regulations but NOT having any legal power.
In general, the Russian Federal Aviation Regulations (FAP) are mainly used for Aircraft Operation and Continued Airworthiness management. But the content structure significantly differs from relevant American or European regulations. The FAP regulations display their own content structure [10,22,23] not following typical Aircraft Operation regulations, such as in the American FAR parts [24], or the European CS parts [25], and being very different from the International Civil Aviation Organization (ICAO) regulatory documents [26].
The absolutely non-unified structure of the Russian Federal Aviation Regulations (FAP) is supposed to be a consequence of the distribution of Airworthiness management tasks and responsibilities among a number of independent agencies [2, 4-9] instead of establishing one main national aviation authority that has been a common way in other countries.

4 CONCLUSION

The collaboration between Chinese Aerospace industry and Russia has been found to have certain difficulties in regulation management system. The main reason is that the Russian regulations content is arranged into parts differently from Chinese regulations, not being fully harmonized with unified American or European Union regulations either. The Russian Aerospace industry is currently utilizing two different types of regulations: (1) the Aviation Regulations (AP) and (2) the Federal Aviation Regulations (FAP).
The both types of regulations are still in use within their particular appliance. The 1st type, the Aviation Regulations (AP), contains Initial Airworthiness requirements providing a corresponding

to the worldwide regulations commonly adopted structure of contents. The 2nd type, the Federal Aviation Regulations (FAP), concentrates on Aircraft Operation and Continued Airworthiness requirements. And it has indeed legally been treated as national Russian regulations. The main concern is that the FAP regulations follow unusual arrangement of contents being distributed among numerous Orders which have been managed by a wide range of independent Russian authorities.
Other confusing key issues have also been addressed to be shared among international Aerospace industry professionals in order to minimize risks of misunderstanding the Russian regulations, such as shortening to *"AP"* and *"FAP"* abbreviations which has been caused by transliteration of their Russian names; referring to Orders with an indicating reference of *"FAP-XXX"* that has been advised to avoid such cases keeping to a reference of *"Order XXX (Year)"* exceptionally.
To conclude with, the lists of the Russian regulations of the two types clearly display that the Aviation Regulations (AP) are on the way to become completely ineffective having more and more Parts invalidated. Meanwhile, there are more and more Orders of the Federal Aviation Regulations (FAP) having been issued in recent 5-10 years. However, for instance, there haven't been found any FAP regulations focused on Initial Airworthiness aspects, while appropriate AP regulations Parts have already become ineffective resulting in a fact of confusion caused to interested parties of the Russian Aerospace industry. The Russian Airworthiness and Operations management system is currently going through a difficult transition phase full of reformations from one type of regulations to another.

REFERENCES

1. 2017; "China, Russia Join Hands to Develop Wide-body Jumbo"; http://www.airshow.com.cn
2. O. Chernykh, M. Bakiiev; 2016; "Learning of Russian Aviation regulations by Chinese and international students"; *Asian Workshop on Aircraft Design Education*; Nanjing; October, 8 - 11; pp. 130 - 134
3. 2016; "Interstate Aviation Committee"; http://www.mak-iac.org
4. 2016; "Government of the Russian Federation"; http://government.ru
5. 2016; "Ministry of Transport of the Russian Federation"; http://www.mintrans.ru
6. 2016; "Ministry of Defense of the Russian Federation"; http://mil.ru
7. 2016; "Federal Air Transport Agency of the Russian Federation"; http://www.favt.ru
8. 2016; "State Corporation for Space Activities of the Russian Federation"; http://www.roscosmos.ru
9. 2016; "Ministry of Industry and Trade of the Russian Federation"; http://www.minpromtorg.gov.ru
10. №360; 27.03.1998 (ред. от 18.02.2016); "О федеральных правилах использования воздушного пространства и федеральных авиационных правилах"; *Постановление*; Правительство Российской Федерации
(No.360; 27.03.1998 (ed 18.02.2016); "About Federal Regulations of airspace use and Federal Aviation Regulations"; *Order*; Government of the Russian Federation) (in Russian)
11. А.А. Красоткин; 2007; *Сертификация Авиационной Техники*; Московский Авиационный Институт; Москва
(A.A. Krasotkin; 2007; *Certification of Aircraft*; Moscow Aviation Institute; Moscow) (in Russian)
12. 2016; "Unified System of Aviation Standards"; http://esas.niisu.ru
13. АП Часть 21; 2013; "Сертификация Авиационной Техники, Организаций Разработчиков и Изготовителей"; *Авиационные Правила*; Межгосударственный Авиационный Комитет
(AP Part 21; 2013; "Certification Procedures for Aeronautical Products, Design Organizations and Manufacturers"; *Aviation Regulations*; Interstate Aviation Committee) (in Russian)
14. 25.12.1991; "О гражданской авиации и об использовании воздушного пространства"; *Соглашение*; Минск
(25.12.1991; "Civil Aviation and Airspace use"; *Treaty*; Minsk) (in Russian)
15. №11; 25.01.2016; "Об отмене приказов Министерства Транспорта Российской Федерации"; *Приказ*; Министерство Транспорта Российской Федерации
(No.11; 25.01.2016; "About invalidation of Orders of the Ministry of Transport of the Russian Federation"; *Order*; Ministry of Transport of the Russian Federation) (in Russian)
16. №316; 26.10.2015; "Об отмене приказа Министерства Транспорта Российской Федерации от 06.11.2014 №308"; *Приказ*; Министерство Транспорта Российской Федерации
(No.316; 26.10.2015; "About invalidation of the Order of the Ministry of Transport of the Russian Federation from 06.11.2014 No.308"; *Order*; Ministry of Transport of the Russian Federation) (in Russian)

17. К.Э. Акопян, А.Н. Арепьев, В.С. Шапкин; 2011; "Совершенствование нормативно-правовой и методической базы эксплуатации воздушных судов иностранного производства в авиапредприятиях Российской Федерации"; *Научный Вестник Московского Государственного Технического Университета Гражданской Авиации*; **163**; с. 7 - 13
(K.E. Akopyan, A.N. Arepjev, V.S. Shapkin; 2011; "Perfection of normative-legal and methodical documents of operation of foreign manufacture airplanes in the air enterprises of Russian Federation"; *Scientific Bulletin of Moscow State Technical University of Civil Aviation*; **163**; pp. 7 - 13) (in Russian)
18. М.С. Громов, С.В. Диогенов, В.С. Шапкин; 2009; "Проблемы государственного контроля и регулирования процессов поддержания летной годности и обеспечения безопасности полетов воздушных судов гражданской авиации на современном этапе и пути их решения"; *Научный Вестник Московского Государственного Технического Университета Гражданской Авиации*; **141**(серия Аэромеханика, прочность, поддержание летной годности ВС); с. 14 - 22
(M.S. Gromov, S.V. Diogenov, V.S. Shapkin; 2009; "Problems of state's control and regulating of airworthiness continuing and providing of flight safety of civil aircraft at modern stage and ways of its solution"; *Scientific Bulletin of Moscow State Technical University of Civil Aviation*; **141**(series Aeromechanics, strength, aircraft airworthiness); pp. 14 - 22) (in Russian)
19. А.А. Кулешов; 2009; "Концептуальные аспекты развития и функционирования системы послепродажного обеспечения отечественной авиационной техники на современном этапе"; *Научный Вестник Московского Государственного Технического Университета Гражданской Авиации*; **141**(серия Аэромеханика, прочность, поддержание летной годности ВС); с. 23 - 29
(A.A. Kuleshov; 2009; "Conceptual aspects of development and functioning of system of maintenance of domestic air engineering after sale at the present stage"; *Scientific Bulletin of Moscow State Technical University of Civil Aviation*; **141**(series Aeromechanics, strength, aircraft airworthiness); pp. 23 - 29) (in Russian)
20. И.Г. Кирпичев, А.Ю. Коньков, А.Н. Шарыпов; 2010; "Анализ и перспективы развития системы сертификации организаций-поставщиков АТИ в рамках закона о техническом регулировании"; *Научный Вестник Московского Государственного Технического Университета Гражданской Авиации*; **153**(серия Аэромеханика, прочность, поддержание летной годности); с. 106 - 112
(I.G. Kirpichev, A.U. Konkov, A.N. Sharypov; 2010; "Analysis and perspectives of development the system of procedures of the suppliers of aviation products and parts under the law technical regulation"; *Scientific Bulletin of Moscow State Technical University of Civil Aviation*; **153**(series Aeromechanics, strength, aircraft airworthiness); pp. 106 - 112) (in Russian)
21. М.С. Громов, В.С. Шапкин; 2006; "Особенности поддержания летной годности экземпляра ВС в условиях безремонтной эксплуатации"; *Научный Вестник Московского Государственного Технического Университета Гражданской Авиации*; **103**(серия Аэромеханика и прочность, поддержание летной годности ВС); с. 7 - 13
(M.S. Gromov, V.S. Shapkin; 2006; "Features of maintenance by the validity of an airplane in conditions of operation without repair"; *Scientific Bulletin of Moscow State Technical University of Civil Aviation*; **103**(series Aeromechanics, strength, aircraft airworthiness); pp. 7 - 13) (in Russian)
22. №289; 29.09.2015; "Об утверждении Федеральных авиационных правил "Требования к образовательным организациям и организациям, осуществляющим обучение специалистов соответствующего уровня согласно перечням специалистов авиационного персонала"; *Приказ*; Министерство Транспорта Российской Федерации
(No.289; 29.09.2015; "About ratification of Federal Aviation Regulations "Requirements to educational institutions and organizations preparing aviation specialists of proper level"; *Order*; Ministry of Transport of the Russian Federation) (in Russian)
23. №147; 12.09.2008 (ред. от 16.09.2015); "Об утверждении Федеральных авиационных правил "Требования к членам экипажа воздушных судов, специалистам по техническому обслуживанию воздушных судов и сотрудникам по обеспечению полетов (полетным диспетчерам) гражданской авиации"; *Приказ*; Министерство Транспорта Российской Федерации
(No.147; 12.09.2008 (ed 16.09.2015); "About ratification of Federal Aviation Regulations "Requirements to air crew men, aircraft maintenance engineers, and flight support crew / flight dispatchers in Civil Aviation"; *Order*; Ministry of Transport of the Russian Federation) (in Russian)
24. 2016; "Federal Aviation Administration"; http://www.faa.gov
25. 2016; "European Aviation Safety Agency"; https://www.easa.europa.eu
26. 2016; "International Civil Aviation Organization"; http://www.icao.int