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А.А. Сережкина, М.А. Быкова

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*для студентов III–IV курсов
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Кузнецова Е.В. – ст. преподаватель

Сереекина А.А.

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UNIT 1

ANNEX 1 to the Convention on International Civil Aviation Personnel Licensing

As long as air travel cannot do without **pilots** and other air and **ground personnel**, their competence, skills and **training** will remain the essential guarantee for efficient and **safe operations**. **Adequate** personnel training and licensing also **instill confidence** between States, leading to international **recognition** and **acceptance** of personnel **qualifications** and licenses and greater trust in aviation on the part of the traveler.

Standards and Recommended Practices for the licensing of **flight crew members** (pilots, **flight engineers** and **flight navigators**), **air traffic controllers**, **aeronautical station operators**, **maintenance technicians** and **flight dispatchers**, are provided by **Annex 1 to the Convention on International Civil Aviation**. Related training **manuals** provide **guidance** to States for the **scope** and depth of training **curricula** which will ensure that the confidence in safe air navigation, as intended by the Convention and Annex 1, is maintained. These training manuals also provide guidance for the training of other aviation personnel such as **aerodrome emergency crews**, **flight operations officers**, **radio operators** and individuals involved in other related disciplines.

Today's **aircraft operations** are so **diverse** and complex that protection must be provided against the possibility, however remote, of **total system breakdown** due to either **human error** or **failure** of a system component. The human being is the vital link in the chain of aircraft operations but is also by nature the most **flexible** and **variable**. Proper training is necessary so as **to minimize** human error and provide able, skillful, proficient and competent personnel.

Annex 1 and ICAO training manuals describe the skills necessary to build proficiency at various jobs, thereby contributing to **occupational competency**. The **medical standards** of the Annex, in requiring **periodic health examinations**, serve as an early warning for possible **incapacitating medical conditions** and **contribute to** the general health of flight crews and controllers.

The **Human Factors** program addresses known human capabilities and limitations, providing States with basic information on this vital subject as well as the material necessary to design proper training programs. ICAO's objective is **to improve safety** in aviation by making States more aware of, and responsive to, the importance of human factors in civil aviation operations.

Licensing is the act of **authorizing** defined activities which should otherwise be **prohibited** due to the potentially serious results of such activities being performed improperly. An **applicant** for a license must **meet certain stated requirements** proportional to the complexities of the task to be performed. The licensing examination serves as a regular test of **physical fitness** and performance ensuring **independent control**. As such, training and licensing together are critical for the achievement of overall competency.

One of ICAO's main tasks in the field of personnel licensing is to foster the resolution of differences in licensing requirements and to ensure that international licensing standards are kept in line with current practices and probable future developments. This is ever more crucial as the flight crew will be exposed to increasing **traffic density** and **airspace congestion**, highly complicated **terminal area** patterns and more **sophisticated equipment**. To accomplish this task, Annex I is regularly **amended** to reflect the rapidly changing **environment**.

Vocabulary

Personnel Licensing – выдача свидетельств авиационному персоналу

pilot – пилот

ground personnel – наземный персонал

training – подготовка, обучение

safe operations – безопасная эксплуатация

adequate - соответствующий

to instill confidence – внушать доверие

recognition – признание

acceptance – принятие

qualification – квалификация, навыки

Standards and Recommended Practices – Стандарты и рекомендованные практики

flight crew member – член летного экипажа

flight engineer – бортмеханик

flight navigator – штурман

air traffic controller – диспетчер

aeronautical station operator – оператор аэронавигационной связи

maintenance technician – техник по обслуживанию

flight dispatcher - диспетчер

Annex - приложение

Convention on International Civil Aviation – Конвенция о международной гражданской авиации

manual – руководство, учебник, мануал

guidance – руководство
scope – спектр
curricula – курс обучения
aerodrome emergency crews – спасательные экипажи аэродрома, службы спасания
flight operations officer – лицо, ответственное за обеспечение полетов
radio operators – радист
aircraft operation – эксплуатация воздушного судна
diverse – различный, разнообразный
total system breakdown – полная остановка системы
human error – человеческая ошибка
failure – провал, ошибка
flexible – гибкий
variable – разнообразный
minimize – минимизировать
occupational competency – профессиональная компетенция
medical standards – медицинские стандарты
periodic health examination – регулярное обследование состояния здоровья
incapacitating medical condition – состояние здоровья, не позволяющее что-то делать
to contribute to – способствовать, делать вклад
human factor – человеческий фактор
to improve safety – повысить уровень безопасности
authorizing – авторизация
prohibited – запрещенный
applicant – заявитель
to meet certain stated requirements – соответствовать утвержденным требованиям
physical fitness – физическая форма
independent control – независимый контроль
traffic density – плотность движения
airspace congestion – загруженность воздушного пространства
terminal area – зона терминала
sophisticated equipment – сложнейшее оборудование
to amend – вносить правки
environment – окружающая среда, окружающие условия

Task 1. Please, answer the questions below. Comprehensive answers are welcome.

1. What does Annex 1 to the Convention on International Civil Aviation provide?
2. Why special attention is given to human factor?

3. What does Human Factor program address?
4. What is the subject of licensing and why is it important?
5. What is ICAO's main task in the field of licensing?

Task 2. Please, fill in the blanks.

1. Related training manuals provide guidance _____ States _____ the scope and depth _____ training curricula _____ will ensure _____ the confidence in safe air navigation, _____ intended _____ the Convention and Annex 1, is maintained.
2. The medical standards _____ the Annex, in requiring periodic health examinations, serve _____ an early warning _____ possible incapacitating medical conditions and contribute _____ the general health of flight crews and controllers.
3. Licensing is the act _____ authorizing defined activities _____ should otherwise be prohibited due _____ the potentially serious results _____ such activities being performed improperly.

Task 3. Please, provide synonyms from the text for the following words and expressions.

1. To authorize
2. Flexible
3. Manual
4. To operate
5. Examination

Task 4. Please, provide antonyms from the text for the following words and expressions.

1. To authorize
2. To perform safely
3. Capability
4. Health
5. Air personnel

Task 5. Please, compose five sentences with words and expressions from Vocabulary provided (in written).

UNIT 2

ANNEX 2 to the Convention on International Civil Aviation Rules of the Air

Air travel must be safe and efficient; this requires, among other things, a set of internationally agreed **rules of the air**. The rules **developed** by ICAO - which consist of **general rules**, **visual flight rules** and **instrument flight rules** contained in Annex 2 - apply without exception over the **high seas**, and over **national territories** to the extent that they do not conflict with the rules of the State being **overflown**. The **pilot-in-command** of an aircraft is responsible for **compliance with** the rules of the air.

An aircraft must be flown in accordance with the general rules and either the visual flight rules (VFR) or the instrument flight rules (IFR). Flight in accordance with visual flight rules is permitted if a flight crew is able **to remain clear of clouds** by a distance of at least 1 500 m horizontally and at least 300 m (1 000 ft) vertically and to maintain a **forward visibility** of at least 8 km. For flights in some portions of the airspace and at **low altitudes**, and for **helicopters**, the requirements are less **stringent**. An aircraft cannot be flown under VFR at night or above 6 100 m (20 000 ft) except by **special permission**. Balloons are classified as aircraft, but **unmanned free balloons** can be flown only under specified conditions detailed in the Annex.

Instrument flight rules must be complied with in **weather conditions** other than those mentioned above. A State may also require that they be applied in **designated airspaces** regardless of weather conditions, or a pilot may choose to apply them even if the weather is good.

Most airliners fly under IFR at all times. Depending upon the type of airspace, these aircraft are provided with **air traffic control service**, **air traffic advisory service** or **flight information service** regardless of weather conditions. To fly under IFR, an aircraft must be equipped with suitable **instruments** and **navigation equipment** appropriate to the **route** to be flown. When operating under air traffic control the aircraft must maintain precisely the route and altitude that have been assigned to it and keep air traffic control informed about its position.

A **flight plan** must be filed with air traffic services units for all flights that will cross **international borders**, and for most other flights that are engaged in **commercial operations**. The flight plan provides information on the **aircraft's identity and equipment**, the **point and time of departure**, the route and altitude to be flown, the **destination** and **estimated time of arrival**, and the **alternate airport** to be used should landing at destination be impossible. The flight plan must also specify whether the flight will be carried out under visual or instrument flight rules.

Regardless of the type of flight plan, the pilots are responsible for **avoiding collisions** when in visual flight conditions, in accordance with the **principle of see-**

and-avoid. However, flights operating under IFR are either kept separated by air traffic control units or provided with **collision hazard information**. **Right-of-way rules** in the air are similar to those on the surface, but, as aircraft operate in three **dimensions**, some additional rules are required. When two aircraft are converging at approximately the same level, the aircraft on the right has the right of way except that aeroplanes must give way to airships, gliders and balloons, and to aircraft which are towing objects. An aircraft which is being overtaken has the right of way and the overtaking aircraft must remain clear by altering heading to the right. When two aircraft are approaching each other head on they must both alter heading to the right.

As interceptions of civil aircraft are, in all cases, potentially hazardous, the Council of ICAO has formulated special recommendations in Annex 2 which States are urged to implement through appropriate **regulatory and administrative action**. These special recommendations are contained in Attachment A to the Annex.

All these rules, when complied with by all concerned, help make for safe and efficient flight.

Vocabulary

air travel – авиапутешествие

rules of the air – правила полетов

to develop – разрабатывать

general rules – общие правила

visual flight rules – правила визуального полета

instrument flight rules – правила полетов по приборам

high sea – открытое море

national territory – территория государства

(territory) overflown – территория, над которой выполняется полет

pilot-in-command – командир воздушного судна

compliance with – соответствие чему-либо

to remain clear of clouds – оставаться вне облачности

forward visibility – дальность видимости

at low altitudes – на малой высоте

helicopter - вертолет

stringent – обязательный, точный

special permission – специальное разрешение

unmanned free balloon – беспилотный неуправляемый аэростат

weather condition – погодные условия

designated airspace – обозначенный участок воздушного пространства

air traffic control service – диспетчерское обслуживание
air traffic advisory service – консультативное обслуживание
flight information service- полетно-информационное обслуживание
instruments - приборы
navigation equipment – навигационное оборудование
route – маршрут
flight plan – план полета
international border – международная граница
commercial operation – коммерческая эксплуатация
aircraft's identity and equipment – опознавательный индекс и бортовое оборудование
point and time of departure – место и время вылета
destination and estimated time of arrival – пункт назначения и расчетное время прибытия
alternate airport – запасной аэродром
to avoid collisions – избегать столкновений
principle of see-and-avoid – принцип «вижу – избегаю»
collision hazard information – информация об опасности столкновения
right-of-way rules – право первоочередности
dimension – измерение
regulatory and administrative action – правила и административные меры

Task 1. Please, answer the questions below. Comprehensive answers are welcome.

1. Why did ICAO develop Rules of the Air?
2. What types of flight rules are used and what are conditions for their application?
3. What are the aircraft flying with IFR provided with?
4. How should a flight plan be filed?
5. How are collisions in the airspace avoided?

Task 2. Please, fill in the blanks.

1. The rules developed ___ ICAO - which consist ___ general rules, visual flight rules and instrument flight rules contained __ Annex 2 - apply ___ exception ___ the high seas, and ___ national territories ___ the extent that they do not conflict ___ the rules of the State being overflown.
2. A flight plan must be filed ___ air traffic services units ___ all flights ___ will cross international borders, and ___ most other flights that are engaged in commercial operations. The flight plan provides information ___ the aircraft's identity and equipment, the point and time of departure, the route

and altitude to be flown, the destination and estimated time of arrival, and the alternate airport to be used should landing ___ destination be impossible.

3. When two aircraft are converging ___ approximately the same level, the aircraft ___ the right has the right ___ way except ___ aeroplanes must give way to airships, gliders and balloons, and to aircraft which are towing objects.

Task 3. Please, provide synonyms from the text for the following words and expressions.

1. In compliance with
2. Requirements
3. Instruments
4. Aerodrome
5. Principle

Task 4. Please, provide antonyms from the text for the following words and expressions.

1. Visual
2. Departure
3. Destination
4. Hazard
5. Manned

Task 5. Please, compose five sentences with words and expressions from Vocabulary provided (in written).

UNIT 3

ANNEX 3 to the Convention on International Civil Aviation Meteorological Service for International Air Navigation

Pilots need to be informed about **meteorological conditions** along the routes to be flown and at their **destination aerodromes**.

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.

At international aerodromes the meteorological information is normally supplied to aeronautical users by a meteorological office. Suitable **telecommunications facilities** are made available by States to permit those aerodrome meteorological offices to supply information to air traffic services and search and rescue services. Telecommunications between the meteorological office and control towers or **approach control offices** should be such that the required points may normally be contacted within 15 seconds.

Aerodrome **reports** and **forecasts** are required by aeronautical users to carry out their functions. Aerodrome reports include **surface wind, visibility, runway visual range, present weather, cloud, air and dew-point temperature** and **atmospheric pressure**, and are issued either **half-hourly** or **hourly**. These reports are **complemented** by special reports whenever any **parameter** changes beyond pre-fixed limits of operational significance. Aerodrome forecasts include surface wind, visibility, weather, cloud and temperature, and are issued every three or six hours for a validity period of 9 to 24 hours. Aerodrome forecasts are kept under **continuous review** and amended by the meteorological office concerned, as necessary.

Landing forecasts are prepared for some international aerodromes to meet requirements of landing aircraft. They are appended to the aerodrome reports and have a validity of two hours. Landing forecasts contain expected conditions over the runway complex in regard to surface wind, visibility, weather and cloud.

To assist pilots with their flight planning, most States provide **meteorological briefings** which are increasingly carried out using **automated systems**. Briefings comprise details of **en-route** weather, upper winds and upper-air temperatures, often given in the form of meteorological charts, warnings related to hazardous phenomena en-route, and reports and forecasts for the destination aerodrome and its alternates.

To provide aircraft in flight with information about significant changes in weather, **meteorological watch offices** are maintained. They prepare warnings of hazardous weather conditions, including **thunderstorms, tropical cyclones, severe squall lines, heavy hail, severe turbulence, severe icing, mountain waves, sandstorms, duststorms and volcanic ash clouds**. Moreover, these offices issue aerodrome warnings of meteorological conditions that could adversely affect aircraft or facilities on the ground: for example, warnings of expected snowstorms. They also issue warnings for wind shear for the climb-out and approach paths. Furthermore, aircraft in flight are

required to report severe weather phenomena encountered en-route. These reports are disseminated by the air traffic services units to all aircraft concerned.

On most international routes routine observations are made by aircraft of upper winds and temperatures. They are transmitted by aircraft in flight to provide observational data that can be used in the development of forecasts. These aircraft observations of winds and temperatures are being automated using the air-ground **data link communications**.

As far as route forecasts are concerned, all flights require advance and accurate meteorological information so as to chart a course that will permit them to make use of the most **favorable winds** and **conserve fuel**. With rising fuel costs, this has become increasingly important. Therefore, ICAO has implemented the **World Area Forecast System (WAFS)**. The purpose of this system is to provide States and aviation users with standardized and high-quality forecasts on upper-air temperature, humidity and winds and on significant weather. The WAFS is based on two world area forecast centers which use the most up-to-date computers and **satellite telecommunications** (ISCS and SADIS) to prepare and **disseminate** global forecasts in digital form directly to States and users.

During the past few years a number of incidents have occurred due to aircraft encounters with volcanic ash clouds following **volcanic eruptions**. In order to provide for the observation and reporting of volcanic ash clouds and the issuance of warnings to pilots and airlines, ICAO, with the assistance of other international organizations, has established an **international airways volcano watch (IAVW)**. The corner stones of the IAVW are nine volcanic ash advisory centers which issue advisory information on volcanic ash globally, both to aviation users and meteorological offices concerned.

Automated observing systems are becoming increasingly useful at aerodromes and currently are considered to meet the aeronautical requirements as far as the observation of the surface wind, visibility, runway visual range and **height of the cloud base**, air and dew-point temperature and atmospheric pressure are concerned. In view of the improved performance of fully automated systems, they may now be used, without any human intervention, during non-operational hours of the aerodrome.

Vocabulary

Meteorological Service for International Air Navigation – метеорологическое

обеспечение международной аэронавигации

meteorological conditions – метеоусловия

destination aerodrome – аэродром назначения

regularity – регулярность
search and rescue units – поисково-спасательная служба
airport management – руководство аэропорта
liaison – взаимодействие
telecommunications facilities – средства электросвязи
approach control office – диспетчерский пункт подхода
reports and forecasts – отчеты и прогнозы
surface wind – приземный ветер
visibility – видимость
runway visual range – дальность видимости на ВПП
present weather – существующие условия погоды
cloud – облачность
dew-point – точка росы
atmospheric pressure – атмосферное давление
half-hourly or hourly – каждые полчаса или час
to complement – дополнять
parameter – параметр, измерение
continuous review – постоянное обновление
Landing forecasts – прогнозы для посадки
meteorological briefings – метеорологический инструктаж
automated systems – автоматизированные системы
en-route – на маршруте
meteorological watch office – орган метеорологического слежения
thunderstorm – гроза
tropical cyclones – тропический циклон
severe squall line – мощный фронтальный шквал
heavy hail – сильный град
severe turbulence – сильная турбулентность
severe icing – сильное обледенение
mountain waves – горные волны
sandstorms – песчаные бури
duststorms – пыльные бури
volcanic ash clouds – облака вулканического пепла
data link communication – автоматизированный канал передачи информации
favorable wind – благоприятный ветер
conserve fuel – экономить топливо
World Area Forecast System – Всемирная система зональных прогнозов
satellite telecommunication – спутниковая связь
to disseminate – распространять
volcanic eruption – извержение вулкана

international airways volcano watch – служба слежения за вулканической деятельностью на международных трассах
height of the cloud base – нижняя граница облаков

Task 1. Please, answer the questions below. Comprehensive answers are welcome.

1. Why do pilots need meteorological information?
2. What has ICAO done to provide comprehensive meteorological information?
3. What do aerodrome reports include?
4. Which channels are used for provision of information?
5. How often and how fast reports and forecasts are provided?

Task 2. Please, fill in the blanks.

1. Suitable telecommunications facilities are made available ___ States to permit those aerodrome meteorological offices to supply information ___ air traffic services and search and rescue services. Telecommunications ___ the meteorological office and control towers ___ approach control offices should be such ___ the required points may normally be contacted ___ 15 seconds.
2. ___ most international routes routine observations are made ___ aircraft ___ upper winds and temperatures. They are transmitted ___ aircraft in flight to provide observational data ___ can be used ___ the development ___ forecasts.
3. ___ order to provide ___ the observation and reporting ___ volcanic ash clouds and the issuance ___ warnings ___ pilots and airlines, ICAO, ___ the assistance ___ other international organizations, has established an international airways volcano watch (IAVW).

Task 3. Please, provide synonyms for the following words and expressions.

1. Conditions
2. To permit
3. To carry out functions
4. To transmit
5. Favorable

Task 4. Please, provide antonyms for the following words and expressions.

1. Safe
2. International
3. To land
4. To converse

5. Rising

Task 5. Please, compose five sentences with words and expressions from Vocabulary provided (in written).

UNIT 4

ANNEX 4 to the Convention on International Civil Aviation Aeronautical Charts

The world of aviation, which by its very nature knows no geographical or political boundaries, requires **maps** that are unlike those used in **ground transportation**. For the safe performance of air operations, it is essential that a current, comprehensive and authoritative source of navigation information be made available at all times, and aeronautical charts provide a convenient medium for supplying this information in a manageable, condensed and **coordinated manner**. It is often said that a picture is worth a thousand words, however, today's often complex aeronautical charts may be worth much more. Aeronautical charts not only provide the **two-dimensional** information common in most maps, but also often portray **three-dimensional air traffic service systems**. Almost all **ICAO States** produce aeronautical charts and most segments of aviation make reference to them for planning, air traffic control and navigation purposes. Without the **global standardization** of aeronautical charts, it would be difficult for pilots and other **chart users** to effectively find and **interpret** important navigation information. The safe and efficient flow of air traffic is **facilitated** by aeronautical charts drawn to accepted ICAO Standards.

The Standards, Recommended Practices and **explanatory notes** contained in Annex 4 **define** the **obligations** of States to make available certain ICAO aeronautical chart types, and specify **chart coverage, format, identification and content** including standardized **symbology** and **color use**. The goal is to satisfy the need for **uniformity** and **consistency** in the provision of aeronautical charts that contain appropriate information of a defined quality. When a published aeronautical chart contains "ICAO" in its title, this indicates that the chart producer has **conformed** to both general Annex 4 Standards and those pertaining to a particular ICAO chart type.

The **ICAO Council** first **adopted** the original Standards and Recommended Practices in 1948. Annex 4 has its origins in "Annex J - Aeronautical Maps and Charts" of the Draft Technical Annexes adopted by the International Civil Aviation Conference in Chicago in 1944. Since the adoption of the first edition which

provided specifications for seven ICAO chart types, there have been fifty-three amendments to update the Annex to accommodate the rapid advances in air navigation and **cartographic** technology. The ICAO series of aeronautical charts now consists of twenty-one types, each intended to serve specialized purposes. They range from detailed charts for individual aerodromes/**heliports** to small-scale charts for flight planning purposes and include electronic aeronautical charts for **cockpit display**.

There are three series of charts available for planning and visual navigation, each with a different **scale**. The *Aeronautical Navigation Chart — ICAO Small Scale* charts cover the largest area for a given amount of paper; they provide a general-purpose chart series suitable for **long-range flight** planning. The *World Aeronautical Chart — ICAO 1 : 1 000 000* charts provide complete world coverage with uniform presentation of data at a constant scale, and are used in the production of other charts. The *Aeronautical Chart — ICAO 1:500 000* series supplies more detail and provides a suitable medium for pilot and navigation training. This series is most suitable for use by **low-speed, short- or medium range aircraft** operating at **low and intermediate altitudes**.

The vast majority of scheduled flights take place along routes defined by radio and electronic navigation systems that make **visual reference to the ground** unnecessary. This type of navigation is conducted under instrument flight rules and the flight is required to comply with air traffic control services procedures. The *En-route Chart — ICAO* portrays the air traffic service system, radio navigation aids and other aeronautical information essential to en-route navigation under instrument flight rules. It is designed for easy handling in the crowded space of an **aircraft flight deck**, and the presentation of information is such that it can easily be read in varying conditions of **natural** and **artificial light**. Where flights cross extensive oceanic and sparsely settled areas, the *Plotting Chart — ICAO* provides a means of maintaining a continuous flight record of aircraft position and is sometimes produced to complement the more complex en-route charts.

As a flight approaches its destination, more detail is required about the area around the aerodrome of intended landing. The *Area Chart — ICAO* provides pilots with information to facilitate the **transition** from en-route phase to final **approach phase**, as well as from **take-off** to en-route phases of the flight. The charts are designed to enable pilots to comply with departure and arrival procedures and holding pattern procedures, all of which are coordinated with the information on the instrument approach charts. Frequently, air traffic services routes or **position reporting** requirements are different for arrivals and for departures and these cannot be shown with sufficient clarity on the area chart. Under these conditions a separate *Standard Departure Chart — Instrument (SID) — ICAO* and *Standard Arrival Chart — Instrument (STAR) — ICAO* are produced. The area chart may also be supplemented by a *Radar Minimum Altitude Chart — ICAO* which is

designed to provide the information to enable flight crews to monitor and cross-check altitudes assigned while under radar control.

The ***Instrument Approach Chart*** — ICAO provides the pilot with a graphic presentation of instrument approach procedures, and missed approach procedures to be followed should the crew be unable to carry out a landing. This chart type contains a plan and profile view of the approach with full details of associated radio navigation aids and necessary aerodrome and topographical information. When a visual-type approach is flown, the pilot may refer to a ***Visual Approach Chart*** — ICAO which illustrates the basic aerodrome layout and surrounding features easily recognizable from the air. As well as providing orientation, these charts are designed to highlight potential dangers such as obstacles, high terrain and areas of hazardous airspace.

The ***Aerodrome/Heliport Chart*** — ICAO provides an illustration of the aerodrome or heliport which allows the pilot to recognize significant features, rapidly clear the runway or heliport **touchdown area** after landing and follow **taxiing instructions**. The charts show aerodrome/heliport **movement areas, visual indicator locations, taxiing guidance aids, aerodrome/heliport lighting, hangars, terminal buildings** and aircraft/heliport **stands**, various reference points required for the setting and checking of navigation systems and operational information such as pavement strengths and radio communication facility **frequencies**. At large aerodromes where all the aircraft taxiing and **parking** information cannot be clearly shown on the ***Aerodrome/Heliport Chart*** — ICAO, details are provided by the supplementary ***Aerodrome Ground Movement Chart*** — ICAO and the ***Aircraft Parking/Docking Chart*** — ICAO.

The heights of **obstacles** around airports are of critical importance to aircraft operations. Information about these are given in detail on the ***Aerodrome Obstacle Charts*** — ICAO, Types A, B, and C. These charts are intended to assist aircraft operators in making the complex take-off mass, distance and performance calculations required, including those covering emergency situations such as engine failure during takeoff. Aerodrome obstacle charts show the runways in plan and profile, take-off flight path areas and the distances available for take-off run and accelerate-stop, taking obstacles into account; this data is provided for each runway which has significant obstacles in the take-off area. The detailed **topographical information** provided by some aerodrome obstacle charts includes coverage of areas as far as 45 km away from the aerodrome itself.

Recent developments associated with “**glass cockpit technologies**”, the availability and exchange of electronic aeronautical information, and the increased implementation of navigation systems with high positional **accuracies** and continuous position fixing, have created an environment well suited to the rapid development of viable electronic charts for display in the cockpit. A fully developed **electronic aeronautical chart display** has the potential for

functionality that extends well beyond paper charts and could offer significant benefits such as continuous plotting of the aircraft's position and **customization** of the chart display depending on the phase of flight and other operational considerations.

Annex 4, Chapter 20 *Electronic Aeronautical Chart Display* — ICAO provides basic requirements aimed at standardizing electronic aeronautical chart displays while not unduly limiting the development of this new cartographic technology.

Annex 4 provisions have evolved considerably from the seven original ICAO chart types adopted in 1948. To ensure that aeronautical charts meet the technological and other requirements of modern aviation operations, ICAO is constantly monitoring, improving and updating aeronautical chart specifications.

Vocabulary

aeronautical charts – аэронавигационные карты

map – карта

ground transportation – наземный транспорт

coordinated manner – согласованная форма

two-dimensional – двухмерный

three-dimensional – трехмерный

air traffic service system – система обслуживания воздушного транспорта

ICAO States – страны ИКАО

global standardization – всемирная стандартизация

chart user – пользователь карты

to interpret – интерпретировать, понимать

to facilitate – способствовать, упрощать

explanatory notes – пояснительные заметки

to define – определять

obligation – обязательство

chart coverage – покрытие, охват карты

format – формат

identification – идентификация, определение

content – содержание

symbology – стандартизированные символические изображения

color use – использование цвета

uniformity – единообразие

consistency – согласованность

to conform – соответствовать требованиям

ICAO Council – Совет ИКАО

to adopt – принять

cartographic - картографический

heliport – хелипорт

cockpit display – внутрикабинный дисплей

scale – шкала

Aeronautical Navigation Chart – Аэронавигационная карта

Small Scale – малого масштаба

long-range flight – полет на дальнее расстояние

World Aeronautical Chart – Аэронавигационная карта мира

low-speed, short- or medium range aircraft – полеты на малой скорости, на короткие или средние расстояния

low and intermediate altitudes – малые и средние высоты

visual reference to the ground – визуальное ориентирование по местности

En-route Chart – маршрутная карта

aircraft flight deck – кабина экипажа

natural and artificial light – естественное и искусственное освещение

Plotting Chart – карта для прокладки курса

Area Chart – карта района

transition – переход

approach phase – этап захода на посадку

take-off – взлет

position reporting – передача донесений о месторасположении

Standard Departure Chart – Instrument – карта стандартного вылета по приборам

Standard Arrival Chart – Instrument – карта стандартного прибытия по приборам

Radar Minimum Altitude Chart – карта минимальных абсолютных радиолокационных высот

Instrument Approach Chart – карта захода на посадку по приборам

Visual Approach Chart – карта визуального захода на посадку

Aerodrome/Heliport Chart – карта аэродрома / хелипорта

touchdown area – зона приземления

taxiing instructions – указания по рулению

movement area – зона движения

visual indicator location – расположение визуальных указателей

taxiing guidance aids – средства управления рулением

aerodrome/heliport lighting – аэродромные светотехнические средства

hangar – ангар

terminal building – здание терминала

stand – место стоянки

frequencies – частоты

parking – место парковки

Aerodrome Ground Movement Chart – карта наземного движения

Aircraft Parking/Docking Chart – карта стоянки / постановки на стоянку воздушного судна

obstacle – препятствие

Aerodrome Obstacle Charts – карта аэродромных препятствий

topographical information – топографическая информация

glass cockpit technologies – «стеклянная кабина» (система электронных индикаций)

accuracies – высокая точность

customization – адаптирование

Electronic Aeronautical Chart Display – отображение электронной аэронавигационной карты

Task 1. Please, answer the questions below. Comprehensive answers are welcome.

1. What are aeronautical charts? Why are they important?
2. What are the principles of composing aeronautical charts?
3. Which aeronautical charts can you name?
4. Why are small scale charts used?
5. How do Aerodrome / Heliport charts benefit to safe ground operation?

Task 2. Please, fill in the blanks.

1. ___ a flight approaches its destination, more detail is required ___ the area around the aerodrome ___ intended landing The Area Chart — ICAO provides pilots ___ information ___ facilitate the transition ___ en-route phase ___ final approach phase, as well as ___ take-off ___ en-route phases of the flight.
2. The Aerodrome/Heliport Chart — ICAO provides an illustration ___ the aerodrome ___ heliport ___ allows the pilot to recognize significant features, rapidly clear the runway ___ heliport touchdown area ___ landing ___ follow taxiing instructions.
3. Recent developments associated ___ “glass cockpit technologies”, the availability ___ exchange ___ electronic aeronautical information, ___ the increased implementation ___ navigation systems ___ high positional accuracies ___ continuous position fixing, have created an environment well suited ___ the rapid development ___ viable electronic charts ___ display ___ the cockpit.

Task 3. Please, provide synonyms from the text for the following words and expressions.

1. Authoritative
2. To conform
3. Available

4. To recognize
5. Significant

Task 4. Please, provide antonyms from the text for the following words and expressions.

1. Air navigation
2. Three dimensional
3. Majority
4. Instrument flight rules
5. Approach

Task 5. Please, compose five sentences with words and expressions from Vocabulary provided (in written).

UNIT 5

ANNEX 5 to the Convention on International Civil Aviation Units of Measurement to be Used in Air and Ground Operations

The question of the units of measurement to be used in international civil aviation goes back as far as the origin of ICAO itself. At the International Civil Aviation Conference held at Chicago in 1944, the importance of a **common system** of measurements was realized and a resolution was adopted **calling on States to make use** of the **metric system** as the primary international standard.

A special committee was established to look into the question and as a result the First Assembly of ICAO in 1947 adopted a resolution (A1-35) recommending a system of units to be issued as an ICAO Standard as soon as possible.

Stemming from this resolution, the first edition of Annex 5 was adopted in 1948. This contained an ICAO **table of units** based essentially on the metric system, but it also contained four additional **interim tables of units** for use by those States unable to use the primary table. It was evident from the beginning that the achievement of **standardization in units of measurement** would not be easy, and Annex 5 was initially applicable only to those units used in communications between aircraft and ground stations.

Many attempts to improve the level of standardization were made in the following years and a number of amendments to Annex 5 were introduced. By 1961 the number of tables of units in the Annex had been reduced to two, which remained until Amendment 13 was adopted in March 1979. Amendment 13 **extended** considerably the **scope** of ICAO's role in standardizing units of measurements to cover all aspects of air and ground operations and not just **air-ground communications**. It also introduced the International System of Units, known as

SI from the "Système International d'Unités", as the basic standardized system to be used in civil aviation.

In addition to the SI units the amendment recognized a number of non-SI units which may be used permanently **in conjunction with** SI units in aviation. These include the **litre, the degree Celsius, the degree for measuring plane angle**, etc. The amendment also recognized, as do the relevant ICAO Assembly Resolutions, that there are some non-SI units which have a special place in aviation and which will have to be retained, at least temporarily. These are the **nautical mile** and the **knot**, as well as the **foot** when it is used in the measurement of **altitude, elevation** or **height** only. Some practical problems arise in the termination of the use of these units and it has not yet been possible to fix a termination date.

Amendment 13 to Annex 5 represented a major step forward in the difficult process of standardizing units of measurement in international civil aviation. Although complete standardization is still some time away, the foundation has been laid for resolving a problem which has been recognized by ICAO since its inception. With this amendment a very large degree of standardization has been achieved between civil aviation and other scientific and engineering communities. Amendments 14 and 15 to Annex 5 introduced a new definition of the metre, and references to temporary non-SI units were deleted.

Vocabulary

Units of Measurement to be Used in Air and Ground Operations – единицы измерения, подлежащие использованию в воздушных и наземных операциях
common system – общая система
calling on States – призыв государствам
to make use – использовать
metric system – метрическая система
interim tables of units – временная таблица единиц
standardization in units of measurement – стандартизация единиц измерения
to extend – расширять, распространять
scope - спектр
air-ground communications – связь «воздух-земля»
in conjunction with – в тесной привязке к
litre - литр
degree Celsius – градус Цельсия
degree for measuring plane angle – градус измерения плоского угла
nautical mile – морская миля
knot – узел
foot – фут

altitude – высота

elevation – угол превышения

height – подъем

Task 1. Please, answer the questions below. Comprehensive answers are welcome.

1. What is SI and what was it developed for?
2. Which system is used in aviation?
3. When are non-SI units used?
4. Name at least five SI units.
5. Where can one find all units?

Task 2. Please, fill in the blanks.

1. ___ the International Civil Aviation Conference held ___ Chicago in 1944, the importance ___ a **common system** ___ measurements was realized ___ a resolution was adopted **calling** ___ **States to make use** ___ the **metric system** ___ the primary international standard.
2. Many attempts to improve the level ___ standardization were made ___ the following years ___ a number of amendments ___ Annex 5 were introduced. ___ 1961 the number ___ tables ___ units ___ the Annex had been reduced ___ two, which remained ___ Amendment 13 was adopted ___ March 1979.
3. ___ addition ___ the SI units the amendment recognized a number ___ non-SI units ___ may be used permanently ___ **conjunction** ___ SI units in aviation.

Task 3. Please, provide synonyms from the text for the following words and expressions.

1. Importance
2. Common system
3. To make use
4. To amend
5. A step forward

Task 4. Please, provide antonyms from the text for the following words and expressions.

1. Importance
2. Common system
3. To make use
4. To amend
5. A step forward

Task 5. Please, compose five sentences with words and expressions from Vocabulary provided (in written).

UNIT 6

ANNEX 6 to the Convention on International Civil Aviation Operation of Aircraft (Parts I, II and III)

The essence of Annex 6, simply put, is that the operation of aircraft engaged in **international air transport** must be as standardized as possible to ensure **the highest levels of safety** and efficiency.

In 1948 the Council first adopted Standards and Recommended Practices for the operation of aircraft engaged in international commercial air transport. They were based on recommendations of States attending the first session of the **Operations Divisional Meeting** held in 1946, and are the basis of Part I of Annex 6.

In order to keep pace with a new and vital industry, the original provisions have been and are being constantly reviewed. For instance, a second part to Annex 6, dealing exclusively with **international general aviation**, became applicable in September 1969. Similarly, a third part to Annex 6, dealing with all **international helicopter operations**, became applicable in November 1986. Part III originally addressed only **helicopter flight recorders**, but an amendment completing the coverage of helicopter operations in the same comprehensive manner as aeroplane operations covered in Parts I and II was adopted for applicability in November 1990.

It would be impractical to provide one international set of operational rules and regulations for a wide variety of aircraft which exist today. Aircraft range from commercial airliners to the **one-seat glider**, all of which cross national boundaries into adjacent States.

In the course of a single operation, a **long-range jet** may fly over many international borders. Each aircraft has unique **handling characteristics** relative to its **type** and, under varying environmental conditions, may have specific **operational limitations**. The very international nature of commercial aviation, and of general aviation to a lesser degree, requires pilots and operators to conform to a wide variety of **national rules and regulations**. The purpose of Annex 6 is to contribute to the safety of international air navigation by providing criteria for safe operating practices, and to contribute to the efficiency and regularity of international air navigation by encouraging ICAO's Contracting States to facilitate **the passage over their territories** of commercial aircraft belonging to other countries that operate in conformity with these criteria. ICAO Standards do not **preclude** the development of national standards which may be more stringent than those contained in the Annex. In all phases of aircraft operations, minimum standards are the most acceptable compromise as they make commercial and general aviation viable without prejudicing safety. The Standards accepted by all

Contracting States cover such areas as **aircraft operations, performance, communications and navigation equipment, maintenance, flight documents, responsibilities of flight personnel and the security of the aircraft**. The advent of the turbine engine and associated high performance aircraft designs necessitated a new approach to civil aircraft operation. Aircraft performance criteria, flight instruments, navigation equipment and many other operational aspects required new techniques, and they in turn created the need for international regulations to provide for safety and efficiency.

The introduction of **high-speed, long- and short-range aircraft**, for example, created problems associated with endurance at relatively low altitudes, where **fuel consumption** becomes a major factor. The fuel policies of many of the international civil aviation carriers are required to take into account the need for possible **diversions** to an alternate aerodrome when **adverse weather** is forecast at the **intended destination**. Clearly defined International Standards and Recommended Practices exist in respect of **operating minima** based on the aircraft and the environmental factors found at each aerodrome. Subject to the State of the Operator's approval, the aircraft operator has to take into account the type of aeroplane or helicopter, the degree of sophistication of equipment carried on the aircraft, the characteristics of the **approach and runway aids** and the operating skill of the crew in carrying out procedures involved in operations in **all weather conditions**.

Another development has been the introduction of provisions (generally referred to as **ETOPS**) to ensure safe operations by **twin-engined aeroplanes** operating over **extended ranges**, often over water. This type of operation has arisen because of the attractive economics of the large twin-engined aeroplanes now available.

The human factor is an essential component for the safe and efficient conduct of aircraft operations. Annex 6 spells out the responsibilities of States in **supervising** their operators, particularly in respect of flight crew. The main provision requires the establishment of a method of supervising flight operations to ensure a **continuing level of safety**. It calls for the provision of an operations manual for each **aircraft type**, and places the onus on each operator to ensure that all operations personnel are properly instructed in their duties and responsibilities, and in the relationship of such duties to the airline operation as a whole. The pilot-in-command has the final responsibility to make sure that **flight preparation** is complete and **conforms** to all requirements, and is required to certify flight preparation forms when satisfied that the aircraft is **airworthy**, and that other criteria are met in respect to instruments, **maintenance, mass and load distribution** (and the **securing of the loads**), and **operating limitations** of the aircraft.

Another important aspect covered in Annex 6 is the requirement for operators to establish rules limiting the **flight time and flight duty periods** for flight crew

members. The same Standard also calls for the operator to provide adequate **rest periods** so that **fatigue** occurring either on a flight, or successive flights over a period of time, does not endanger the safety of a flight. An **alert flight crew** must be capable of dealing not only with any **technical emergencies** but with other crew members and must react correctly and efficiently in case of an **evacuation of the aircraft**. Rules such as this must be included in the **operations manual**.

Critical to safe aircraft operations is the knowledge of the operating limits of each particular type of aircraft. The Annex sets out **minimum performance operating limitations**, with respect to aircraft in use today. These Standards take into account a significant number of factors which can affect the performance of a wide range of aircraft: **mass of the aircraft, elevation**, temperature, weather conditions and runway conditions, and include **take-off and landing speed under conditions** which involve the failure of one or more power-units.

A detailed example is included in Attachment C to Annex 6, Part I, in which a level of performance has been calculated and found to apply over a wide range of aeroplane characteristics and atmospheric conditions.

ICAO is actively engaged in efforts to foresee the requirements of future operations such as the recent acceptance of a new set of procedures which revise the **obstacle clearance requirements** and **instrument approach procedures** for all categories of international civil commercial aviation.

Hijacking of civil aircraft has placed an additional burden on the pilot-in-command. The various safety **precautions** that such **acts necessitate**, in addition to precautions of a purely technical nature, have been studied by ICAO and made to cover as many emergency situations as possible.

Part II of Annex 6 deals with aeroplanes in international general aviation.

International commercial in transport operations and general aviation operations in helicopters is covered in Part III. Some international general aviation operations may be performed by crews less experienced and less skilled than commercial civil aviation personnel. Equipment installed in some general aviation aircraft may not meet the same standard as in commercial in transport aircraft, and general aviation operations are subject to less rigorous standards and conducted with a greater degree of freedom than is found in commercial air transport operations.

Because of this, ICAO recognizes that international general aviation pilots and their passengers may not necessarily enjoy the same level of safety as the fare paying passenger in commercial air transport. Part II of the Annex, however, was designed specifically to ensure an acceptable level of safety to third parties (persons on the ground and persons in the air in other aircraft). Thus, operations involving commercial and general aviation aircraft in a common environment are required **to adhere** to the minimum safety standards.

Vocabulary

international air transport – международный воздушный транспорт
the highest level of safety – наивысший уровень безопасности
Operations Divisional Meeting – Первое специализированное совещание по производству полетов
international general aviation – международная авиация общего назначения
international helicopter operations – международные полеты вертолетов
helicopter flight recorder – бортовой самописец, устанавливаемый на вертолете
one-seat glider – одноместный планер
long-range jet – дальнемагистральное реактивное воздушное судно
handling characteristics – технические характеристики
type – тип (воздушного судна)
operational limitations – эксплуатационные ограничения
national rules and regulations – национальные правила и регулирование
passage over territories- пролет над территориями
to preclude – предотвращать
aircraft operations – эксплуатация воздушных судов
performance – выполнение полетов
communications and navigation equipment – связное и навигационное оборудование
maintenance – техническое обслуживание
flight documents – полетная документация
responsibilities of flight personnel – ответственность летного персонала
security of the aircraft – безопасность воздушного судна
high-speed, long- and short-range aircraft – высокоскоростные воздушные суда большой и малой дальности
fuel consumption – потребление топлива
diversion – отклонение
adverse weather – неблагоприятные погодные условия
intended destination – предполагаемый пункт назначения
operating minima – операционный минимум
approach and runway aids – заход на посадку и средства ВПП
all weather conditions – всепогодные условия
ETOPS – безопасность полетов увеличенной дальности самолетов с двумя двигателями (над водным пространством)
twinengined aeroplane – двухдвигательный самолет
extended range – увеличенное расстояние
to supervise – осуществлять надзор
continuing level of safety – обеспечение и поддержание уровня безопасности полетов
aircraft type – тип воздушного судна

flight preparation – подготовка полета
 to conform - соответствовать
 airworthy – годный для эксплуатации в воздухе
 mass and load distribution – центровка и загрузка
 securing of the loads – закрепление груза
 operating limitations – операционные ограничения
 flight time and flight duty periods – полетное время и служебное полетное время членов экипажей
 rest periods – время отдыха
 fatigue – усталость
 alert flight crew – активно действующий летный экипаж
 technical emergencies – аварийная ситуация
 evacuation of the aircraft – эвакуация воздушного судна
 operations manual – руководство по производству полетов
 minimum performance operating limitations – минимальные эксплуатационные ограничения
 mass of the aircraft – масса воздушного судна
 elevation – превышение
 take-off and landing speed under conditions – скорость на взлете и посадочная скорость в условиях отказа
 obstacle clearance requirements – требования к удалению препятствий
 instrument approach procedure – процедура захода на посадку по приборам
 hijacking of civil aircraft – угон воздушного судна
 precautions – меры предосторожности
 acts necessitate – необходимые действия
 to adhere – относиться к чему-либо

Task 1. Please, answer the questions below. Comprehensive answers are welcome.

1. Why are the initial provisions of the Annex 6 are constantly renewed?
2. Why is it impractical to provide one unique set of operational rules?
3. How do ICAO Standards refer to national standards?
4. How are fuel policies implemented?
5. Does hijacking refer to flight safety?

Task 2. Please, fill in the blanks.

1. The introduction ___ **high-speed, long-** ___ **short-range aircraft**, ___ example, created problems associated ___ endurance ___ relatively low altitudes, ___ **fuel consumption** becomes a major factor.
2. Critical ___ safe aircraft operations is the knowledge ___ the operating limits ___ each particular type ___ aircraft. The Annex sets ___ **minimum performance operating limitations**, ___ respect ___ aircraft ___ use today.

These Standards take ___ account a significant number ___ factors which can affect the performance ___ a wide range ___ aircraft: **mass** ___ **the aircraft, elevation**, temperature, weather conditions and runway conditions, ___ include **take-off** ___ **landing speed sunder conditions** ___ involve the failure ___ one ___ more power-units.

3. Some international general aviation operations may be performed ___ crews less experienced ___ less skilled ___ commercial civil aviation personnel. Equipment installed ___ some general aviation aircraft may not meet the same standard ___ in commercial ___ transport aircraft, ___ general aviation operations are subject to less rigorous standards ___ conducted ___ a greater degree ___ freedom ___ is found ___ commercial air transport operations.

Task 3. Please, provide synonyms from the text for the following words and expressions.

1. Purpose
2. Advent
3. Turbine engine
4. Approval
5. To supervise

Task 4. Please, provide antonyms from the text for the following words and expressions.

1. Detailed example
2. To preclude
3. National standard
4. Original provisions
5. Specific

Task 5. Please, compose five sentences with words and expressions from Vocabulary provided (in written).

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Издательский дом Академии имени Н. Е. Жуковского
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Тел.: (495) 973-45-68
E-mail: zakaz@itsbook.ru