The **Boeing 737** air-conditioning system consists of two independent air-cycle cooling systems, a cabin temperature control system, an air distribution system, recirculation system, and a pressurization system. The air-conditioning system is capable of supplying a total ventilation rate of 1,900 cubic feet per minute (CFM) on the 737-300/-500, and 2,100 CFM on the 737-400, up to the maximum certified operating altitude of the airplane. The system has sufficient capacity to maintain adequate cabin conditions to allow dispatch with any one subsystem inoperative. The cabin air cooling portion of the air-conditioning system has two individual cooling packs located in an accessible unpressurized compartment under the wing centre section. Each cooling pack consists of a primary and secondary heat exchanger, modulated ram air duct system, air cooling turbofan, air cycle machine, water separator, anti-icing system and associated controls and ducts. Air from the pneumatic system first passes through the primary heat exchanger where the cooling process begins. The air then enters the compressor of the air cycle machine, is cooled again as it passes through the secondary heat exchanger. On the 737-300/-500 temperature is greatly reduced as the air expands across the turbine stages, which also drives the compressor of the air cycle machine. The excess moisture from the cooled air is removed by the water separator. The water separator is protected from freezing by a thermostatically-controlled warm air supply, which is obtained by by-passing the air cycle machine. On the 737-400 the air passes through the high pressure water separator (condenser, water extractors, and reheater) where the excess moisture is removed prior to entering the turbine, air expands across the turbine greatly reducing the temperature and driving the compressor stage of the air cycle machine. Freezing in the condenser is prevented by passing warm air around the air cycle machine through the stand-by pack temperature control valve. For in-flight operation the heat exchangers are cooled by ambient airflow into the ram-air inlet. For ground operation, or in-flight with the flaps extended, a turbofan in the ram-air duct is driven by pressurized air, from the pneumatic supply, to provide cooling flow. In-flight flow of ram-cooling air is controlled automatically by a control system.

Scientific supervisor: Budko L.V.,
Assistant Professor

UDC 629.73.02 (043.2)

Pidkuyko O.G.
National Aviation University, Kyiv

ENERGY SOURCES IN MODERN AIRCRAFT

All aircraft widely use electrical energy. The power requirements for the simultaneous actuation of the electrical equipment of modern heavy aircraft are up to several hundred kilowatts. The widespread use of electrical energy due to

the fact that it is easy to transmit and distribute a distance between consumers, easy to convert into another form of energy, such as heat energy, light, mechanical. The drive makes it easy to solve problems of remote control and automation makes it possible to continuously adjust the power and speed steps in significant ranges. Radio and electronic aircraft equipment is one of the leading places in the whole complex of the installed equipment. It serves to provide piloting, landing, communication and execution of the flight task. electrics All electrical systems on the aircraft, depending on the nature of their operation and mutual coupling between them can be divided into the sources and consumers of electrical energy bead (electric) network and an electrical ignition system, power sources are on an airplane generators that convert the mechanical energy of the prime mover rotation into electrical energy. In an emergency power source when the primary engine is not operating, as well as an additional energy source during the moments when the system requires power greater than the power of the generator the parallel batteries are used. The distribution of electric power between the consumers is carried out through the electricity network, which consists of wiring, protection and control instrumentation equipment, network sockets and switching and distribution devices. Electric actuators convert electrical energy for a variety of purposes. Generally this conversion is carried out by means of various electric motors transmit motion through mechanical actuators converters movements. Depending on the type of engine that converts electrical energy into mechanical energy, distinguish the electric motor and solenoid drives. The electromagnetic actuator is used mainly in cases where the actuator has a small stroke or requires a small angle of rotation, and without a lot of effort to overcome.

The applied electric power varies in the current race, voltage and frequency. Electrical systems are divided into permanent system, AC and mixed. In systems of direct current electric power is generated and distributed mainly in DC, and only some users are powered by alternating current converters. In DC systems, when several generators are driven by aircraft engines, it is easy to solve the problem of parallel operation; motors have a high starting torque, good performance and make it easy to adjust the speed of a wide range. However, in this system, heavy and undependable DC converters, switching devices are complex, large interference. When electric power transmission is of high power and low voltage it significantly increases the weight of the wires and equipment. At high altitudes engines and dynamos spark, so perishable collectors and brushes. In this connection, in recent years, there is a tendency to transfer the power to the DC variable. To such systems in which the generation and distribution of electric energy is produced mainly in the AC and only a few consumers fed by direct current rectifiers. It is noted that AC system makes it easier to convert the electrical energy of one voltage to another. Electrical systems, in which the generation and distribution of electric energy produced on

DC and AC current, are called mixed. Currently, the domestic aircraft established the following standard voltages: a) for DC systems – 27-28. Some heavy aircraft made a standard voltage of 110 and 220, for special purposes (radio installation) applies a direct current voltage of 250, 750, 1100 and 2500 in; b) for AC systems – 26, 36, 115 for the single-phase current and 208/120 in the three-phase (on some aircraft-in 200/115) of application voltage 5000, 10 000 and 20 000 for individual installations. Standard frequency AC received 400 Hz, and only in some cases, use of frequency 125, 500 and 800 Hz. Electric aircraft network runs on a single, two-wire and mixed schemes.

If a single-circuit is isolated from the mass of the aircraft, only one (positive) wire – a second (minus) wire is a metal framework of the aircraft. In this scheme, the power source and all consumers should have a connection to the body of the aircraft, and to every consumer of electricity supplied through the positive lead. The two-wire network at each source and the consumer has two wires (plus and minus). The plane body is not connected to the network. Mixed networks have a generalized negative cable network, but without the use of the aircraft body. For on-board low voltage networks used wire of a special type (wire, rubber, flexible, airplane) and type BPVL (paper wire, vinyl, coated). For high-voltage on-board network the cables with rubber isolation are used. Significant improvements weights electrical achieved when mounted on a turbojet and turboprop engines, starter-generators.

Scientific supervisor: Yashchuk O.P.,
Lecturer

UDC 629.735.042 (043.2)

Prima A.A.
National Aviation University, Kyiv

IMPROVING SERVICE QUALITY DURING FLIGHT

Service quality isn't a trivial subject for amodern world. Every successful airline company brainstorms on different ways to improve their service, so customers would arrivewith smiles on their faces.

Comfjrtable seats, healthy food and beautiful stewardesses are many options that modern airlines take into account. Aprofit comes from customers if they enjoy their flight trip. In order to keep up with aircraft competitors, service quality should gradually improve.

Is it really enough for customers to have comfortable seats or appetizing food? Absolutely not! People need some entertainment in order to survive long flights. For people that have mobiles, electronic devices or laptops,short flights are not an issue. Imagine, if a trip is five or more hours, modern devices can't withstand