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JPRS L/8327

9 March 1979

PEOPLE'S REPUBLIC OF CHINA SCIENTIFIC ABSTRACTS  
(FOUO 1/79)



CHINA

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AERONAUTICAL KNOWLEDGE

AUTHOR: CAI Shanwu [5591 0810 2976]

ORG: None

TITLE: "The Air Force 'Three Learning Conference'"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 p 2

ABSTRACT: During 10-22 September 1978, the Party Committee of the Air Force sponsored a "Three Learning Conference" in Peking. The conference was attended by Chairman Hua Guofeng and high officials of the Air Force. Other participants included 1500 representatives from Air Force units all over the country and over 2000 local representatives. During the conference, Comrade Zhang Tingfa presented a summary report on the status of the "three learning" movement. Vice Chairmen Fang Yi, Geng Biao and Kan Shi'en were invited to talk about the current political and economical situations at home and abroad as well as the current status of scientific development in China.

AUTHOR: None

ORG: None

TITLE: "News in Civil Aviation Technology"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 p 3

ABSTRACT: This article presents the following news items in the civil aviation community: 1) the installation of an automatic fueling station at Canton's White Cloud Airport; 2) the successful development of directional organic glass by the Civil Aviation No. 101 Factory as replacement parts for windows and windshields on large passenger planes; 3) the development of the "761" detergent by scientists of the Chinese Civil Aviation Bureau and the Peking Household Chemical No. 1 Factory.

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AUTHOR: LIU Zhengdong [0491 2973 2767]

ORG: None

TITLE: "Impressions from a Visit to West Germany"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 4-6

ABSTRACT: A Chinese delegation was sent to the 12th International Aerospace Exhibition which took place from 26 April to 4 May 1978 in West Germany. During their stay in West Germany, the delegation received warm hospitality from the German people, and was invited to visit several West German aerospace research organizations and factories. In this article, the chief delegate Liu Zhengdong summarizes his impressions of the exhibition which included a variety of airplanes, missiles, and spacecraft contributed by more than 300 companies and factories from 13 different countries.

AUTHOR: SHI Hequn [2457 7729 5028]

ORG: None

TITLE: "A Boat with Wings"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 7-9

ABSTRACT: A conventional boat is limited in speed because it is subject to large drag forces when traveling through water. Generally, there are three types of drag forces: frictional drag, wave drag, and turbulent drag. To overcome these drag forces, a new type of boat with wing surfaces (also called hydrofoil) has been developed. The wing surfaces generate sufficiently large lift force when traveling at high speeds so the boat essentially travels above the water surface. In order to ensure stable motion, a mechanism must be provided to control the lift force. On the basis of the lift control mechanism, hydrofoils can be divided into three types: ladder type hydrofoil, V shape hydrofoil, and rotating hydrofoil.

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AUTHOR: WANG Hengbin [3769 1854 2430]

ORG: None

TITLE: "The Problem of Rescuing Helicopters in Distress"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 13-15

ABSTRACT: Statistics show that the number of accidents and casualties for helicopters are much higher than those for fixed-wing airplanes. In an effort to overcome the difficulty of rescuing personnel from a helicopter in distress, the following approaches have been proposed: 1) the use of parachute; 2) the use of ejector seat; 3) the use of rocket propelled emergency escape device; and 4) complete retrieval of passenger compartment using parachutes or inflated descent cones.

AUTHOR: LING Fugen [0407 4395 2704]

ORG: None

TITLE: "Historical Development and Application of Rockets"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 16-18

ABSTRACT: This article presents a summary of the historical development of rockets in ancient China. Specifically, the following historical events are reviewed: 1) the discovery of the reaction principle as a source of propulsion around 300 B.C., 2) the discovery of gun powder in China in 682 A.D. and the first historical record of using rockets for military purpose in 1232 A.D. In addition, historical evidences are also presented to show the existence of certain advanced concepts in rocketry: 1) the use of multiple rockets to deliver heavy payload; 2) the use of multi-stage rockets to increase the total range; and 3) the use of multiple "warheads" to enhance the power of destruction. (to be continued)

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AUTHOR: ZHU Baoliu [2612 1405 3177]

ORG: None

TITLE: "Mathematics and Warfare"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 19-21

ABSTRACT: Throughout the history of human warfare, mathematics has always played an important role in determining military strategies. In this article, simple examples are presented to illustrate the application of probability theory, game theory, and queuing theory to construct mathematical models of modern warfare. It is pointed out however, that mathematical technique can only serve as a reference for making military decisions; it cannot replace the role of human judgement.

AUTHOR: None

ORG: None

TITLE: "News in Aeronautical Technology"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 22-23

ABSTRACT: This article presents the following news items in aeronautical technology: 1) air-dropped anti-tank land mines developed by the U.S. Air Force Weapon Development Center; 2) guided and unguided gas fume bombs used by the U.S. Navy and AirForce; 3) research and development of a satellite based tracking system for tracking long range bombers and cruise missile by the Rockwell International Company; 4) test flight of the French Mirage-2000 airplane; 5) turbo jet propelled subsonic missiles which can be launched from airplanes outside the enemy circle of defense; 6) oceanic surveillance satellite planned by Japan; 7) three prototype fighter planes - the MIG 29, the T-58, and a supersonic fighter bomber being tested by the Soviet Union; 8) the YAH-64 armed helicopter developed by the Hughes Company; 9) laser landing equipment developed by the Soviet Union; 10) new jet fuel being developed by the Lande Company; and 11) a U.S. satellite launched

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(continuation of HANGKONG ZHISHI No 11 Nov 78 pp 22-23)  
in January 1978 to measure ultra-violet radiation from space.

AUTHOR: None

ORG: None

TITLE: "Pictorial Illustration of a Flight Simulator" (Part 2)

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in  
Chinese No 11 Nov 78 pp 24-25

ABSTRACT: The brain and nervous system of a flight simulator is an electronic computer which calculates the motion of an aircraft in response to the pilot's control commands. The calculated motions are converted into signals which are sent to the simulator to change the attitude of the aircraft or to simulate take-off or landing conditions. In conjunction with the simulated motions, signals are also generated to simulate the corresponding engine noise and aerodynamic noise and the corresponding instrument readings on the instrument panel.

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AUTHOR: YUAN Fang [6678 2455]

ORG: None

TITLE: "Applications of Laser in Aeronautics and Space Technology"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 26-28

ABSTRACT: Because of its directivity, intensity, and monochromaticity, laser has found an increasing number of applications in aeronautics and space technology. This article discusses the following laser applications: 1) laser guided bombing system; 2) laser guided missiles and cannon shells; 3) laser communication between satellites; and 4) high power laser weapons for destroying enemy satellites or long range missiles.

AUTHOR: None

ORG: Peking Aeronautical Institute, Radar Training and Research Office

TITLE: "Modern Fighter Airplane and Fire Control Radar"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 28-29

ABSTRACT: The main functions of a fire control radar consist of searching, detecting and tracking enemy planes, and controlling the launch of air-to-air missiles. Since its first introduction in the 1950's, the fire control radar is now in its third generation of development. The modern fire control radar is a product of advanced electronic technologies which include: modern digital signal process techniques which allow the detection of targets under high interference environment, highly stable phase lock loop techniques; and modern recursive filtering techniques which allow the smoothing and prediction of target coordinates in four dimensional space. In the design of a modern fighter airplane, a unified approach is adopted which considers the airplane structure, the aerodynamic characteristics, the control system, the power plant and the fire control system as an entity.

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AUTHOR: None

ORG: None

TITLE: "Prevention of Bird Damage to Aircraft"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 30-31

ABSTRACT: Throughout the aviation history, there have been many incidents of collisions between birds and airplanes, many of which resulted in serious damages to the airplane and loss of human lives. Consequently, measures have been taken by the aviation community to discourage or frighten birds away from airports, to reinforce airplane structure to minimize collision damage, to install microwave, optical, or laser devices on board an airplane to disperse birds along the flight path, and to utilize radar warning system to indicate the position, density, and flight direction of birds.

AUTHOR: YANG Yansheng 2729 3601 3932

ORG: None

TITLE: "How Does a Turbine Type Cooling System Work?"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 31-32

ABSTRACT: Modern airplanes are equipped with air-conditioning systems to ensure that the air pressure and temperature are maintained at a comfortable level. There are three types of cooling systems commonly used on an airplane: air cooling system, evaporation cooling system, and turbine type cooling system. In a turbine type cooling system, the compressed air is accelerated through a series of nozzles and its heat energy is converted into mechanical energy by expanding through the turbine. The main advantages of a turbine type cooling system are as follows: high efficiency; high cooling speed; abundant supply of cooling medium - air; versatility; and ease of maintenance.

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AUTHOR: ZHANG Yimin [1728 6654 3046]

ORG: None

TITLE: "The JT3D Turbo-fan Engine".

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 33-34

ABSTRACT: The JT3D turbo-fan engine is a widely used power plant on many passenger airplanes (e.g., the Boeing 707, 727 and the DC-10) because it satisfies most of the requirements of a modern power plant, i.e., high reliability, high thrust level and low fuel consumption. Its structure has a 15-stage compressor, an annular combustion chamber, and a 4-stage turbine. The first two stages of the low-pressure compressor serve as a fan which considerably improves the efficiency of engine operation. The higher thrust level and the lower fuel consumption of the JT3D enable an airplane to reduce its take-off and landing distance, increase its maximum range, and increase its cruising speed. The disadvantages of the JT3D are its relatively high noise level and pollution level, its heavy weight and bulky size.

AUTHOR: WU Xiekang [0702 3610 1660]

ORG: None

TITLE: "The Function and Characteristics of Airborne Guns"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 35-37

ABSTRACT: Airborne guns refer to machine guns and automatic cannons which are carried by airplanes or helicopters for air-to-air combat and for attacking ground targets. In this article, a brief history of the development of airborne guns is presented. The important role of airborne guns in modern tactical warfare and the advantages of airborne guns over air-to-air missiles are pointed out. In addition, the range of calibers of airborne guns, the special features of the automatic mechanisms, and the types of ammunition used by airborne guns are also discussed.

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AUTHOR: LUO Guocai [5012 0948 2088 ]

ORG: None

TITLE: "Detection of System Leakages of An Airplane"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in  
Chinese No 11 Nov 78 pp 39-41

ABSTRACT: Airplane systems such as fuel system, hydraulic system, air conditioning system, or oxygen system have many conduits and fittings which are subject to leaks. Detection of system leakages is an important procedure in airplane manufacturing because they may cause severe damages to the airplane. Most system leakages are the result of improper assembly procedure or aging and fatigue of components during normal usage. A simple method of detecting leakages is to fill the system with pressurized gas and search for leaks by visual inspection. In recent years, more sophisticated leak detectors have been developed such as heat conduction leak detector, odor sensitive leak detectors, and chemical salt leak detectors. In this article, the basic principles of these detectors are introduced.

AUTHOR: WANG Ginian [3076 5075 1628]

ORG: None

TITLE: "The Use of Sandwich Structures on Model Airplanes"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in  
Chinese No 11 Nov 78 pp 41-44

ABSTRACT: One of the modern innovations in airplane construction is the use of sandwich structures which significantly increase the structural strength and rigidity of airplanes without weight penalties. Within the past decade, sandwich structures have also been used in the construction of model airplanes. The most widely used sandwich structures are cardboard sandwich structures, foam plastic sandwich structures, and honey-comb sandwich structures. In this article, a step-by-step procedure is presented to illustrate the construction of a radio controlled model airplane with cardboard sandwich structures.

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AUTHOR: WANG Chuanshan [3769 0278 0810]

ORG: None

TITLE: "The European Space Agency and Its Activities"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 p 45

ABSTRACT: The European Space Agency (ESA) is an international agency organized by 11 western European countries to serve their joint interest in advancing and applying space technology. The agency has three major centers: 1) the space research center located in Naaldwijk, Holland; 2) the space operation center located in Darmstadt, West Germany, and 3) the space technical information center located in Frascati, Italy. ESA has its own satellite tracking network consisting of four tracking stations. Since 1968, it has launched a total of 13 satellites. Its current activities include the development of a three-stage carrier rocket and the design of a space laboratory to be launched by the U.S. space shuttle in 1980. Recently, there has been an increasing number of interactions between ESA and the Chinese scientific community.

AUTHOR: XIE Chu [6200 2806]

ORG: None

TITLE: "A Manned Balloon Crossing the Atlantic"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 pp 46-48 and 2

ABSTRACT: On 17 August 1978, a manned balloon successfully crossed the Atlantic Ocean for the first time in history and landed near Miserey, France. The balloon, named "Double Eagle-2", was piloted by three Americans: Ben Abruzzo, Maxie Anderson, and Larry Newman; the entire journey took six days and six nights. In this article, a description of the balloon structure and a brief account of the trans-Atlantic journey are presented. Previous attempts to cross the Atlantic ocean by balloons are also summarized. In addition, the historical development of balloons and manned balloon flights are reviewed.

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AUTHOR: None

ORG: None

TITLE: "Pictorial Illustrations"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 11 Nov 78 front and back covers, inside front and back covers

ABSTRACT: The front cover of this issue shows a picture of the first earth satellite launched by China - the "Eastern Red No. 1". The inside front cover shows photographs taken during the Air Force "Three Learning Conference" which was held in September 1978. The inside back cover shows a schematic diagram of the "Double Eagle-2" balloon which carried three Americans across the Atlantic during August 1978. The back covers shows photographs of typical activities conducted by the European Space Agency.

AUTHOR: None

ORG: None

TITLE: "Establishment of an Air Route Between China and Yugoslavia"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 p 3

ABSTRACT: Since 4 May, 1978, a new air route has been established between Beijing, China and Belgrade, Yugoslavia. This air route covers a distance of 9450 km, and passes over four different countries: Afghanistan, Iran, Turkey, and Bulgaria. The total flight time from Beijing to Belgrade is 13 hours. In August 1978, Chairman Hua guofeng traveled along this route to Yugoslavia in a chartered Chinese airliner.



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AUTHOR: YANG Zhongcheng [2799 0022 2052]

ORG: None

TITLE: "The Cosmic Exposition in Tokyo"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 pp 4-5

ABSTRACT: On 16 July 1978, a cosmic exposition sponsored jointly by the Japanese educational and scientific organizations was unveiled in Tokyo. The exposition consisted of three buildings. Building No.1 contained exhibits of Japanese space technologies and activities, including the model M and model N carrier rockets. Building No. 2 contained exhibits of American historical development and achievements in space technologies, including the space shuttle and space lab. Building No. 3 was the Apollo theatre where simulated moon landing was demonstrated by a combination of movie films and real landing equipment and personnel. In addition, a variety of carrier rockets were on display on the open field outside the exposition halls.

AUTHOR: HUANG Yongliang [7806 3057 5328]

ORG: None

TITLE: "The 1978 National Model Airplane Competition"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 pp 5-7

ABSTRACT: The 1978 national model airplane competition was held from 8-22 September at the Taiyuan School of Aeronautics. This competition was the largest in the model airplane history and included the following events: third class tugged model airplane, third class rubber band powered model airplane, second class wire controlled model airplane, and second class radio controlled model airplane. There were also test flights to break national records in several categories and technical sessions to exchange ideas on new model airplanes. The six teams having the highest team scores from this competition were: Shanghai, Sichuan, Henan, Shaanxi, Guizhou, and Shanxi.

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AUTHOR: LUO Ming [5012 2494]

ORG: None

TITLE: "Anatomy of the B-1 Bomber"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 pp 8-10

ABSTRACT: Although production of the B-1 bomber was halted in 1977 by President Carter, its research and development efforts had contributed a great deal to the advancement of bomber technology. Specifically, it incorporated the following new design features: 1) unitized wing and fuselage design; 2) variable-sweep wing design; 3) unique structural design based on fracture mechanics. Its major performance data are as follows: maximum take-off weight--177 tons; maximum payload--27 tons; maximum speed--Mach 2.2 at an altitude of 15240 m, Mach 0.9 at an altitude of 30 m; cruising speed--Mach 0.85 at an altitude of 15240 m; and maximum range--9815 km.

AUTHOR: None

ORG: None

TITLE: "Pictorial Illustration of a Flight Simulator" (Part 3)

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 pp 16-17

ABSTRACT: One of the functions of a flight simulator is to project recorded sceneries in front of the pilot in response to his commanded motion of the aircraft. This article describes a close circuit television simulator system which consists of the following components: the terrain model, the six-degree-of freedom television camera, the scenery control terminal, the simulator command terminal, the measuring and recording system, the flight cabin, the instrument panel, the screen, the computers for simulating the control system and aircraft motion, and the television projector. Such a system can simulate not only various obstacles during flight but also different visibility conditions in order to fully test the flying skills of a pilot.

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AUTHOR: YU Zhenxin [0205 2182 2450]

ORG: None

TITLE: "Cleaning and Dust Prevention for Ground Based Gas Turbines"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 pp 18-20

ABSTRACT: An increasing number of aircraft gas turbine engines are being converted for use on the ground or on ships. This article discusses problems of engine malfunctions due to the presence of pollutants and corrosive materials in the air. In particular, procedures of cleaning the internal parts of the engine and methods of preventing dust particles from entering the engine are introduced. Specific dust prevention devices such as polyester fibre dust filters, inertia dust removal devices, and chemical salt filters are introduced.

AUTHOR: None

ORG: None

TITLE: "Lifting Body"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 pp 20-21

ABSTRACT: Lifting body is a new type of flying vehicle which has a very small aspect ratio and is equipped with vertical plates at the wing tips to achieve high lift forces and to ensure flight stability. The payload capacity of a lifting body is approximately 4.5 times as large as that of a conventional airplane with the same wing span. However, due to the high induced drag suffered by a lifting body, its climb rate is slow and its cruising speed is limited (~95 miles per hour). Because of its special flight characteristics, the lifting body may be developed into a new type of vertical take-off and landing aircraft.

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AUTHOR: ZHANG Taichang [1728 1132 2490]

ORG: None

TITLE: "A Friendly Competition between Chinese and French Paratroopers"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 pp 22-23

ABSTRACT: In mid September of 1978, a friendly competition between the Chinese and French paratroopers was held south of Peking. The competition consisted of four different events: 1000 m. individual and team precision jumping, 2000 m. individual special skill jumping, and four-men pattern formation jumping. The result of the competition was that the French won the individual special skill event but the Chinese paratroopers won the overall team victory by a score of 31 to 16.

AUTHOR: XU Debao [6079 1795 0202]

ORG: None

TITLE: "Communications Satellites Crowding the Synchronous Orbit"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 p 23

ABSTRACT: Because of the large number of communications satellites that are currently in orbit or are scheduled to be launched in the near future, the earth synchronous orbit (35,600 km above the earth) is becoming almost full. It is estimated that the orbit can accommodate 120 satellites while 108 positions have already been reserved. Crowding of the synchronous orbit and saturation of the radio frequency band in communication channels have become recent issues of legal and political dispute among many nations.

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AUTHOR: None

ORG: None

TITLE: "Television Bomb"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 pp 24-25

ABSTRACT: Television bomb is a tactical reconnaissance device designed to monitor enemy activities and equipment behind enemy lines. It consists of a television camera attached to a parachute which is either dropped from an airplane or launched from a cannon. The cannon-launched television bomb also contains a signal converter, a transmitter, an antenna, and a power source which allow the television images to be transmitted back to the tactical commander. The camera in a television bomb must be sufficiently small in size and must be able to withstand large acceleration load during launch and during its flight.

AUTHOR: ZHANG Luqian [1728 1462 6197]

ORG: None

TITLE: "Charge Coupling Device"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 pp 25-26

ABSTRACT: Charge coupling device is a new composite material which consists of a P-type or a N-type semiconductor base, a layer of silicon dioxide insulation, and a series of metallic electrodes. It can be used in television cameras, moving target indication systems, space communications systems, and computer storage units. In this article, the basic principle of the charge coupling phenomenon, the mechanism of transmitting signals to and from the charge coupling device, and the special characteristics of the device are described.

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AUTHOR: SHU Tian [5289 1131]

ORG: None

TITLE: "Man-made Heavenly Palace"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 pp 27-29

ABSTRACT: With the rapid development in space technology, the concept of a "city in the sky" (man-made heavenly palace) has progressed from pure fantasy to the exploratory design stage. Specifically, the following two designs are considered to have a sufficient degree of maturity: 1) the revolving wheel-shaped crystal palace which is expected to accommodate 10,000 inhabitants and weigh over 100,000 tons; 2) the cylindrical twin-city which rotates about its longitudinal axis and is expected to accommodate a maximum population of 20 million. In order to reduce the cost of transporting construction materials into space, it has been proposed to establish a mining facility on the moon and utilize its rich aluminum, titanium, and silicon ores. Both designs are not expected to be realized until late 20th century or early 21st century.

AUTHOR: None

ORG: None

TITLE: "Pictorial Illustrations"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 12 Dec 78 pp front and back covers, inside front and back covers, and color insert

ABSTRACT: The front cover shows a scene in the cockpit of an airplane. The inside front cover shows photographs taken at the 1978 National Model Airplane Competition held in Taiyuan City of Shanxi Province. The inside back cover and back cover show artists' conception of the design of a man-made "Heavenly Palace", i.e., a space station. The color insert is a photograph of young members of different races who participated in the 1978 National Aviation Youth Camp.

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AUTHOR: None

ORG: None

TITLE: "Chairman Hua Visiting A Military Base"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 1-2

ABSTRACT: On 12 October 1978, Chairman Hua Guofeng, vice Chairman YE Jianying, and Vice Chairman Deng Xiaoping arrived at a certain air force base to review a military exhibition exercise by the Chinese Air Force. The exercise included such events as precision flight formation, aerial target shooting, photography by reconnaissance airplanes, destruction of ground targets by fighter bombs, and parachute jumping exhibition.

AUTHOR: YU Quanfu [0205 3123 4395]

ORG: None

TITLE: "1978 Civil Aviation Plan Completed Two Months Ahead of Schedule"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 p 4

ABSTRACT: During 1978, significant progress was made by the Chinese Civil Aviation industry. The volume of air cargo increased by 38 per cent; the volume of air passengers increased by 40 per cent. Special measures were taken to improve flight safety, punctuality, and passenger service. Two new air routes were established: one between Peking and Addis Abeba, Ethiopia; the other between Peking and Belgrade, Yugoslavia. In addition, 66 additional domestic flights were also established to encourage tourism within China.

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AUTHOR: CHEN Zongzong [7115 1350 1350]

ORG: None

TITLE: "Air Cushioned Ferry Boat at Tokyo Bay"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 14-15

ABSTRACT: The MV-PP15 air cushioned ferry boat is the largest Japanese boat of its kind. It weighs 50 tons and is powered by two Avco 2200 horsepower turbo engines. Its maximum speed is 120 km/hr; and its specific fuel consumption is 296 gm/hp/hr. The MV-PP15 is a product of British technology and Japanese ingenuity; it was developed under a cooperative effort between the Mitsui Company of Japan and the Vicks-Armstrong Company of Great Britain. A unique design of the MV-PP15 introduced by Mitsui engineers is the finger shape ejector skirt which reduces drag and increases cushion efficiency.

AUTHOR: JI Yunwen [6855 0336 3080]

ORG: None

TITLE: "The Harrier Fighter Airplane"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 16-19

ABSTRACT: The Harrier is a British vertical and short take-off and landing (V/STOL) fighter airplane designed for low-altitude tactical operations on land as well as over water. In this article, the important flight performance data, physical characteristics, and fire power of the Harrier are described. The advantages and disadvantages of its operation over land and over ocean are discussed. A new method of further reducing the take-off distance by using a ski-jump on a carrier is also introduced. In conclusion, the difficulties of training pilots to fly the Harrier and the rather high accident rate are pointed out.

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AUTHOR: ZHANG Xuegui [1728 1331 2710]

ORG: None

TITLE: "Trainer Airplane"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 19-21

ABSTRACT: Trainer airplane is designed to supplement flight simulators to provide a complete training program for new pilots. It allows the pilot to experience the sensation of flying at high speeds, to understand the complex instruments of a modern airplane, to handle emergency situations, and to learn the high performance high mobility behavior of a fighter airplane. There are four types of trainer airplanes: 1) propeller driven beginning trainer airplane; 2) beginning jet trainer airplane; 3) all-purpose jet trainer airplane; and 4) fighter trainer airplane.

AUTHORS: GUO Yongzhao [6753 3057 6856]  
ZHANG Guangxi [1728 1684 0823]

ORG: None

TITLE: "The Center of Gravity of a Missile"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 22-24

ABSTRACT: An important procedure in missile design is the selection of its center of gravity to ensure good flight stability and good control characteristics. Specifically, its location must be properly selected with respect to the center of pressure of aerodynamic forces and thrust forces to achieve the desired pitching moment during flight. The actual center of gravity of a missile can be determined by measuring its weight distribution using a balance beam, a support frame with weight scales, or a suspension system.

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AUTHOR: WANG Ya [3769 7161]

ORG: None

TITLE: "An Amateur Satellite Monitoring Group"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 24-26

ABSTRACT: This article tells the story of a group of amateur British students and their physics teacher who established an organization to monitor satellite activities throughout the world. Their achievements included detection and tracking of many Soviet and U.S. satellites, and discovery of the secret Soviet launch site Plesetsk. With limited funds and conventional equipment, they have been successfully monitoring satellite activities using the following methods: 1) consistent visual observations with telescopes or naked eyes; 2) careful analysis of satellite orbit; 3) careful analysis of radio signals; and 4) cooperation with other amateur satellite monitoring groups.

AUTHOR: NING Riguang [3942 2480 0342]

ORG: None

TITLE: "An Introduction to Aeronautical Science"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 27-28

ABSTRACT: Aeronautical science plays an important role in the movement of achieving four modernizations in this country. It is based on the fundamental sciences of mathematics, physics, and chemistry, and incorporates many disciplines such as fluid mechanics, aerodynamics, thermodynamics, solid mechanics, information theory, control theory, electric power and electronics, and material science, etc. In recent years, laser technology and computer technology have also become important branches of aeronautical science.

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AUTHOR: ZHOU Qinsheng [0719 5367 3932] WANG Feng [3769 6265]

ORG: None

TITLE: "Cooling of Turbine Blades"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 28-29

ABSTRACT: To achieve the high thrust-to-weight ratio and low specific fuel consumption of a modern gas turbine engine requires very high operating temperatures. In order to ensure reliable engine operation under these conditions, the turbine blades must be made of heat resistant alloys and must be sufficiently cooled. Generally, there are four commonly used methods of cooling: 1) convection cooling; 2) air jet type cooling; 3) air film cooling; and 4) dissipation cooling.

AUTHOR: JIA Chengxiang [6328 2052 4382]

ORG: None

TITLE: "Reflections on the 1978 National Parachute Jumping Contest"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 30-32

ABSTRACT: The 1978 national parachute jumping contest was held during 21-31 October in Anyang City of Henan Province. The events in this contest included individual precision jumping, individual special skill jumping, team-of-four precision jumping, and team-of-four pattern formation jumping. A total of 97 athletes entered the contest and 8 of the men's teams and 3 women's teams broke national records in the team-of-four precision jumping event; 20 male athletes and 13 female athletes broke national records in the individual precision jumping event.

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AUTHOR: None

ORG: None

TITLE: "Passenger Plane of the Year 2000"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 p 33

ABSTRACT: Recently, experts in the international civil aviation community offer the following opinions concerning future development of passenger planes to meet the demands of the 21st century: 1) future technology in passenger planes will be improved in terms of aerodynamic performance, reduced structural weight, and engine performance; 2) new structural materials such as titanium alloys and aluminum alloys will be developed for future jumbo size airplanes; 3) large capacity, long range supersonic passenger planes and short range vertical or short take-off and landing passenger planes will be developed by the year 2000.

AUTHOR: HAN Yunzhong [7281 5686 0022]

ORG: None

TITLE: "The Functions of a Pilot's Earphone"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 34-35

ABSTRACT: The earphone is an essential instrument for the pilot of a modern fighter airplane. Specifically, it serves the following functions: 1) provides communication links between the pilot and the ground radio stations; 2) monitors signals from navigation stations to indicate flight course; 3) monitors flight altitude; 4) receives flag signals from flag stations at the airport during landing; 5) provides warning signals when the airplane is being attacked from the rear; and 6) provides indications to the pilot when the enemy plane is within firing range of the infrared air-to-air missile.

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AUTHOR: TUNG Yi [4547 1744]

ORG: None

TITLE: "How to Measure the Distance from a Star?"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 35-36

ABSTRACT: This article explains the basic principle of parallax to measure the range of a distant object using two sensors separated by a distance. The method of "triangular parallax" is also explained which allows range measurement of a distant star by making use of the annual revolution of earth about the sun.

AUTHOR: JI Zhunsheng [1518 6874 3932]

ORG: None

TITLE: "Advantages of a Flight Simulator"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 36-37

ABSTRACT: In recent years, flight simulators are increasingly being used by civil aviation community, military services, and space training centers to train their pilots and astronauts. As a training tool, the flight simulator has the following advantages over actual flight training: 1) it is more economical in terms of construction cost, operating cost, and utilization rate; 2) by simulating various difficult flight conditions, it allows the pilots to experience these conditions without incurring actual danger; 3) training efficiency is greatly increased by repeated simulations of the same scenario; and 4) actual flight training time can be greatly reduced.

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AUTHOR: CUI Lianxin [1508 6647 0207]

ORG: None

TITLE: "New Developments in Airplane Manufacturing Technology"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 p 37

ABSTRACT: To keep pace with the increasing demands of airplane performance, i.e., higher speed, higher flight ceiling, and larger thrust-to-weight ratio, airplane manufacturing technology has been evolving along the following lines: 1) increased use of titanium alloys over aluminum alloys; 2) increased use of unitized and honey-comb sandwich structures; and 3) increased labor in material processing and machining relative to assembly.

AUTHOR: LI Xingfu [2621 5281 4395]

ORG: None

TITLE: "The Magnetic Cushion Flight Vehicle"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 38-39

ABSTRACT: The magnetic cushion flight vehicle (or magnetic train) is a new type of surface vehicle which travels along a railroad and is supported and propelled by electromagnetic forces. Specifically, the magnetic cushion or lift force is generated by creating a magnetic field in the solenoid attached to the vehicle. The propulsion of the vehicle is generated by a linear induction motor whose rotors and stators are attached respectively to the vehicle and the rails. Compared to conventional surface vehicles, the magnetic cushion vehicle is quieter, generates less pollution, and offers a more stable and comfortable ride. In April 1977, Japan Airline successfully tested its first HSST-02 magnetic cushion flight vehicle.

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AUTHOR: SUN Bin [1327 2430]

ORG: None

TITLE: "On the Topic of 'Thermal Barrier'"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 39-41 and 26

ABSTRACT: The so-called "thermal barrier" refers to the effect of aerodynamic heating on the surface of an aircraft due to deceleration of air stream near the leading edge and due to frictional effects in the boundary layer. Excessive aerodynamic heating has many adverse effects: reduced structural strength, fuel evaporation, discomfort to the flight crew, and distortions or malfunctions in aircraft parts and instruments. To overcome the thermal barrier, the following measures should be taken: 1) applying insulation between the surface skin and the interior; 2) employing cooling devices to reduce surface temperature; 3) using heat-resistant metallic or ceramic materials; 4) flying at higher altitude; 5) reducing speed when flying at low altitude; and 6) keeping the surface skin as smooth as possible.

AUTHOR: LIU Daozhi [491 1418 3112]

ORG: None

TITLE: "Three Dimensional Flow in a Turbine"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 42-44

ABSTRACT: In order to improve the operating efficiency of a modern high performance turbine engine, it is necessary to accurately calculate the flow field inside the turbine. Three dimensional flow theory is a theory which describes the complicated motion of fluid flow in three dimensional space. In this article, the fundamental principles of one-dimensional and two-dimensional flows are explained in terms of turbine blade design. A simplified theory of equilibrium between pressure forces and centrifugal forces along the radial direction of the turbine blade is also discussed (to be continued).

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AUTHOR: ZU Shaoxian [4371 4801 0341]

ORG: None

TITLE: "Aerial Photographer"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp 44-46

ABSTRACT: "Aerial Photographer" refers to a radio controlled model airplane which carries camera equipment for taking aerial photographs. Because of its unique capabilities, it is extensively used by the movie industry to film explorations, activities of animals and birds, dangerous scenes or battle scenes, and difficult scenes in water or in the air.

AUTHOR: None

ORG: None

TITLE: "Pictorial Illustrations"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 1 Jan 79 pp front and back covers, inside front and back covers

ABSTRACT: The front cover and inside front cover of this issue show pictures of Chairman Hua Guofeng and Vice Chairman Ye Jianying and Vice Chairman Deng Xiaoping reviewing an exhibition exercise of the Chinese Air Force on 12 October 1978. The back cover shows: 1) the picture of paratroopers descending during a parachute jumping exercise; and 2) the picture of paratroopers competing during the 1978 national parachute jumping contest which took place from 21-31 December. The inside back cover shows a schematic diagram illustrating the sequence of events which took place during a mid-air collision between a Boeing 727 airplane and a Cessna-172 light plane above the Lindbergh airport of San Diego.

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