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Abstract: The article reviews advances in the development of acoustic and other advanced types of control-and-measuring equipment for industry. Particular attention is devoted in this connection to accomplishments of the Scientific Research Institute of Introscopy in Moscow. This institute's developments are said to include a non-standard ultrasonic thickness gauge no larger than a pocket calculator. This instrument operates with materials ranging in thickness from 1.5 millimeters to 1 meter.

A number of other developments of the Moscow institute are mentioned, including a pulsed X-ray unit which permits the study of various processes taking place at high speeds (such as the operation of a nozzle or the injection of fuel into the combustion chamber of an automotive or aircraft engine). Some of the institute's developments are said to have no foreign counterparts, including an optical reflexometer for monitoring the structure and homogeneity of heat-proof and durable coatings; a multi-parameter eddy-current unit for measuring operating characteristics of products manufactured from several layers of metal; and a vibration diagnostic complex for monitoring the strength of stressed structures in shipbuilding, aviation and other industries. Another original development is an acoustical flaw detector for aircraft building. The zone of a flaw in adhesive joints of multi-layer structures is shown on a panel by this instrument, which is about the size of a cigarette pack. Unlike the best foreign models, the Soviet flaw detector is said to be capable of revealing defects at depths as great as 20 millimeters.

Doctor of Technical Sciences, Professor Vladimir Vladimirovich Klyuyev, the director of the introscopy institute, claimed that the USSR is keeping abreast of the most advanced countries in the fields of nondestructive testing. The Moscow institute has assumed leadership in the development of a number of methods, according to Klyuyev. Many of the approximately 30 instruments developed each year by the institute are said to surpass their foreign counterparts.

Author: Klyuyev, V., Professor, vice-president of the 10th International Conference on Nondestructive Testing

Title: COMMENTS AT CLOSE OF CONFERENCE ON NONDESTRUCTIVE TESTING

Primary source: Izvestiya, August 28, 1982, No. 240 (20221), p. 3, cols. 4-5

Extract: From August 23 to 27, the 10th International Conference on Nondestructive Testing was held at the Moscow International Center of Trade and Scientific-Technical Ties with Foreign Countries. Scientists from 40 countries of the world took part in it.

In our country, a great deal of attention is devoted to the development and introduction of means of nondestructive testing and diagnosis. Specialized institutes have been created: the Scientific Research Institute of Introscopy (Moscow), the Institute of Physics of Metals of the USSR Academy of Sciences' Urals Research Center (UNTS AN SSSR), the Belorussian Academy of Sciences' Institute of Applied Physics, and others. Scientists of the USSR Academy of Sciences, industry research institutes, educational institutions and industrial enterprises are pursuing a broad front of research on methods of nondestructive testing based on the use of all types of physical fields and radiation. We are proceeding to the comprehensive evaluation of the quality of products according to numerous parameters simultaneously, through the use of various physical phenomena and analysis of results by computers.

Held in conjunction with the conference was the international exhibition "Introskopiya-82", in which more than 35 foreign firms that manufacture and develop instruments and equipment for nondestructive testing participated.

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Author: Kulinich, S.

Title: NEW NONDESTRUCTIVE TESTING EQUIPMENT FOR AVIATION AND INDUSTRY

Primary source: Moskovskiy komsomolets, August 31, 1982, No. 199 (13469), p. 4, cols. 8-9

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Institute of Metal Physics in Sverdlovsk, the All-Union Institute of Nondestructive Testing in Kishinev, the Institute of Physics in Minsk, the Institute of Electric Welding imeni Paton in Kiyev and other institutes are collaborating with research centers of member-countries of the Council for Mutual Economic Aid (SEV) in the development and industrial introduction of nondestructive testing methods. NIIIN is coordinating a SEV project entitled "Development of Magnetic and Electromagnetic Methods", for example. Fields of specialization are said to differ from country to country. Bulgaria, for example, is specializing in magnetic-particle flaw detection equipment for analyzing various types of cracks in the surfaces of metal products. No such flaw detectors are being produced in the USSR, according to Klyuyev. He relates that this type of organization of work permitted the implementation of a program for the development of a monitoring and diagnostic instrument-complex in the period 1976-1980. This program included 11 major projects and more than 100 assignments.

Asked about long-range tasks of international cooperation, Klyuyev stresses the importance of developing a new generation of nondestructive-testing instruments capable of detecting product defects at early stages of the production process. They would be compact, high-speed, multipurpose instruments with a wide range of measurements.

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Title: GROMYKO COMMENTS ON STATUS OF ARMS CONTROL TALKS

Primary source: Pravda, February 24, 1983, No. 55 (23581), p. 4, cols. 5-8

Abstract: The article is a lengthy interview in which A. A. Gromyko responded to questions of a Pravda correspondent concerning the correlation of military forces between West and East and negotiations on arms control. The majority of the interview is devoted to a discussion of the status of the Geneva negotiations on limiting medium-range nuclear weapons in Europe.

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Title: GEORGIAN SSR STATE PRIZE FOR SYNCHROTRON STREAMER CHAMBER

Primary source: Zarya Vostoka, February 25, 1983, No. 47 (17523), p. 1, cols. 1-2; p. 3, cols. 1-2

Abstract: The article announces the names and titles of authors, authors' organizational affiliations and titles of works that have been awarded the 1983 Georgian SSR State Prize in the field of science and technology. There are three works in the area of science and one work in the area of technology.

Among the works in the area of science is one with the title: Development and Construction of a Streamer Chamber for the Study of Hadron-Hadron and Hadron-Nuclear Interactions, and Introduction of This Chamber in the Proton Synchrotron of the Institute of High-Energy Physics (Serpuukhov) Within the Framework of the 'Risk' Experiment.

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Leningrad State University, regarding the nature and prospective uses of the method of chemical assembly for obtaining various materials and products. Aleskovskiy and colleagues of his at Leningrad Technological Institute are credited with pioneer work in this field, and this group of scientists has assumed leadership in the development of the chemical-assembly method, it is claimed. Accomplishments in this field are said to open up possibilities for the purposefully directed synthesizing of many compounds, including polymers and semiconductors.

Chemical-assembly technology is already being employed in a number of production facilities, Aleskovskiy reports. In one process, iron products are obtained through the reduction of volatile ferric chloride on a special substrate. Similar processes employing volatile compounds may be used to synthesize semiconductor materials and materials consisting of both metallic and nonmetallic compounds. Low-temperature chemical welding is mentioned as another possible application of the method. Seamless joints can be obtained by the low-temperature method without causing thermal stresses in the materials that are being welded, according to Aleskovskiy.

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Author: Vanke, V., Doctor of Physical-Mathematical Sciences, Professor at Moscow State University

Title: FEASIBILITY OF SOLAR POWER STATIONS IN SPACE

Primary source: Izvestiya, February 25, 1983, No. 56 (20402), p. 3, cols. 1-3

Abstract: The author discusses the technical and economic feasibility of assembling solar power stations in space and transmitting their energy to Earth by microwaves. He says it has been determined that the economically optimum capacity of such a station in geostationary orbit is between 5 and 10 million kilowatts. For a 5-million-kw station, the overall area of the solar collectors would have to be about 50 square kilometers. The panels would have to be film photocells made of either silicon or gallium

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arsenide. The weight of such a station would be between 50,000 and 100,000 tons. Rockets capable of carrying payloads of 200 to 500 tons would be needed to transport the materials. For the microwave transmission of energy, the author says the transmission efficiency would be nearly 100 percent with a transmitting antenna one kilometer in diameter, and a ground receiving system between 7 and 12 kilometers in diameter. The transmitter would have to have a large number of microwave generators with capacities ranging from hundreds of watts to several tens of kilowatts. The author says the efficiency of reception and reconversion of microwave energy on Earth could be as high as 90 percent. The microwave beam would be entirely safe for humans, with the density of its energy flow being less than the intensity of solar radiation on a clear summer day.

The author says that foreign specialists have estimated that a prototype of such a station on a reduced scale could be deployed as early as 10 years from now, and the experience of its operation could make commercial orbiting solar power stations a reality in 20 to 30 years. The author says it would have to be an international project.

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Author: Kulinich, S. (interviewer)

Title: SOCIALIST-BLOC COUNTRIES' COOPERATION IN NONDESTRUCTIVE-TESTING R&D

Primary source: Moskovskiy komsomolets, February 10, 1983, No. 34 (13604), p. 4, cols. 8-9

Abstract: The article is an interview with Doctor of Technical Sciences, Professor Vladimir Vladimirovich Klyuyev, the head of the Moscow Scientific Research Institute of Introscopy (NIIIN), regarding the organization and results of cooperation among socialist-bloc countries in the field of nondestructive testing. NIIIN is credited with numerous accomplishments in this field. It is coordinating work on nondestructive-testing technology.

Klyuyev reports that NIIIN, the

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addition to the oceanographic research, extensive hydrometeorological studies are being conducted as part of the program of the "Poleks--Yug" expedition. In a few days, we expect to put in at the New Zealand port of Littleton.

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Author: Mukhin, Yu. (Noginsk Rayon)

Title: POLYMER COMPOSITES R&D AT CHEMICAL PHYSICS INSTITUTE

Primary source: Leninskoye znamya, October 19, 1980, No. 240 (18460), p. 4, col. 1

Extract: Polymer composite materials -- new man-made materials -- are moving more and more vigorously to the forefront in technology. Their use as structural materials holds particular promise. Scientists of the USSR Academy of Sciences' Institute of Chemical Physics are pursuing major work on the study of composites' properties and methods of obtaining them.

"The rapid advancement of technology has confronted scientists and engineers with the extremely complex task of developing materials with fundamentally new properties," related Doctor of Chemical Sciences B. A. Rozenberg. "Composites possess high strength and reliability, good rigidity and lightness, resistance to corrosion and other valuable qualities. They are polymers reinforced with glass, carbon, boron, organic and other fibers which, possessing the necessary strength, bear the main load in the material."

Major work on the development of new composites is being pursued at the Institute of Chemical Physics under the direction of academician N. S. Yenikolopov, a Lenin Prize laureate. The manufacturing of composite materials by the method of polymerization filling has acquired particularly large importance in recent years.

However, the cost of products made of composites is still very high, owing to the costliness of their source materials -- polymer binding and reinforcing fibers. However, these difficulties will also be overcome eventually.

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Author: Amirkhanyan, A. (Dolgoprudnyy)

Title: NEW HUMIDITY GENERATOR SIMULATES HIGH-ALTITUDE WEATHER CONDITIONS

Primary source: Leninskoye znamya, October 19, 1980, No. 240 (18460), p. 4, cols. 2-3

Abstract: The article reports on the principles and uses of a versatile humidity generator which has been designed by specialists of the Ivanovo Power Engineering Institute and scientists of the Central Aerological Observatory. The generator is used to simulate high-altitude temperature and humidity conditions which determine the density of cloud cover and affect the readings of meteorological instruments. Sensing devices are placed in the unit's working chamber. The sensors absorb vapor-and-air mixture from a saturation chamber. Different pressures and temperatures are created in the chambers for the purpose of simulating the flight of a radiosonde through different layers of the atmosphere. B. P. Zaychikov, a senior science associate of the observatory, demonstrated the use of the chamber to simulate a very high altitude at which clouds form. The humidity generator reportedly has enabled scientists to determine a wide range of changes in humidity at any atmospheric temperature, and consequently to evaluate the precision of relative-humidity calculations made with the aid of radiosonde sensors. The development of industrial humidity-generating units for weather forecasters and aviation meteorological services is planned in the near future.

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Author: Vladimova, I.

Title: PROGRESS OF HOLOGRAPHY R&D IN OPHTHALMOLOGY REVIEWED

Primary source: Leninskoye znamya, October 19, 1980, No. 240 (18460), p. 4, cols. 6-8

Abstract: The article reports results of research on medical applications of holography which is being pursued in the USSR. Particular attention is devoted to the use of holography for diagnostic purposes in ophthalmology. Research in this direction is being

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conducted by Professor Ol'ga Borisovna Chentsova, head of the ophthalmology department of the Moscow Oblast Clinical Scientific Research Institute imeni Vladimirskiy (MONIKI), and L. G. Kopeyko, a science associate of the All-Union Scientific Research Institute of Medical Technology. Assessing the progress of this work, Chentsova reported that research on the safety of the new method has been carried out, a hologram recording scheme has been perfected and the spectral characteristics of all eye structures have been studied. The possibility of beginning the development of fundamentally new holographic technology for ophthalmology has been demonstrated. Chentsova also displayed holograms that are used for the purpose of detecting damage to eye tissues. Kopeyko expressed the hope that in the near future, new holographic technology for eye clinics may be developed as a joint project of MONIKI, the All-Union Scientific Research Institute of Medical Technology and the Introscopy Scientific Research Institute, whose specialists have taken part in this work.

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Author: Izrael', Yu., corresponding member of the USSR Academy of Sciences, chairman of the USSR State Committee for Hydrometeorology and Monitoring of the Natural Environment

Title: ACHIEVEMENTS AND FURTHER TASKS OF ENVIRONMENTAL PROTECTION

Primary source: Izvestiya, February 7, 1981, No. 32 (19708), p. 3, cols. 1-3

Abstract: Izrael' reviews successes of environmental-protection measures that were implemented in the last 5-year plan period, and points out remaining problems which require further efforts in the new 5-year period. One of the problems he notes is the fallibility of reliance on ministries to undertake the anti-pollution measures that are assigned to them. For example, Izrael' explains, when individual ministries in a large city or industrial region implement anti-pollution measures, enterprises that are subordinate to other ministries may continue to pollute, and the average level of

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pollution in the territory is not significantly reduced. Izrael' names a number of ministries that did not use up the capital allocated for environmental-protection measures in the last 5-year plan period. They included the pulp and paper industry, farm machinery industry, chemical industry, and ferrous and nonferrous metallurgy. In view of this, Izrael' says there must be a combination of industry and territorial principles of planning environmental-protection measures.

Izrael' notes that more than 6 billion rubles is to be spent on environmental protection in 1981, with more than 1.7 billion represented by state budget allocations.

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Title: INTERVIEW WITH AIRCRAFT DESIGNER O. K. ANTONOV

Primary source: Izvestiya, February 7, 1981, No. 32 (19708), p. 3, cols. 6-8

Abstract: The article is an interview with general aircraft designer Oleg Konstantinovich Antonov on the occasion of his 75th birthday.

Anticipating a question about the latest achievements of the bureau that he heads in Kiyev, Antonov started talking about the AN-72 and AN-32 transport airplanes and the 17-seat AN-28 passenger plane, all of which were developed in the 10th 5-Year Plan period. The AN-28 is intended to replace the passenger version of the AN-2, which is now 37 years old. Nevertheless, Antonov observed that there are still enough orders for the AN-2 to continue its production through the next five years. Antonov also talked about his bureau's AN-24, which he says is the most widely used airplane in the airline Aeroflot. A decision has been made to increase the service life of the AN-24. This has required extensive calculations and experimental studies of the endurance and durability of the wings, fuselage, aggregates and other parts. Increasing the service life of the AN-24 is expected to yield savings of 88 million rubles annually, according to Antonov.

Antonov also responded to questions about his notions of aircraft of the future, and about ideal qualities of leaders of large groups of specialists.

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