

# NATIONAL AIR INTELLIGENCE CENTER



SCIENTIFIC RESEARCH ORGANIZATIONS ASSOCIATED WITH THE  
CHINESE ACADEMY OF SCIENCES IN THE CHANGCHUN REGION

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19960408 154

**HUMAN TRANSLATION**

NAIC-ID(RS)T-0626-95      8 February 1996

MICROFICHE NR: 96C000069

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English pages: 10

Source: Zhongguo Kexueyuan Yuoukan; pp. 1-5

Country of origin: China

Translated by: SCITRAN

F33657-84-D-0165

Requester: NAIC/TASC/John L. Gass

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Scientific research organizations associated with the Chinese Academy of Sciences began to be set up in the Changchun region in the initial period of liberation. In conjunction with this, they went through two development stages. The first stage is the years 1948-1958. In order to develop China's scientific and technical activities and to support the economic reconstruction of the northeast--with the support of the State Council--a group of returned overseas scholars as well as scientific and technical cadre from such areas as Beijing, Shanghai, and so on, arrived one after the other at Changchun. Under the leadership of such famous scientists as Wu Xuezhou, Wang Daheng, and so on, Academy of Sciences scientific research organizations were set up in Changchun--the Changchun Applied Chemistry Research Institute and the Changchun Optical Precision Mechanical Research Institute. The second stage is the years 1958-1965. Further development was done in such research fields as photoemissions, the earth sciences, satellite observations, and so on, setting up the Changchun Physics Institute dealing mainly with the science of light emissions, the Changchun Geographical Institute dealing mainly with the study of marshes and swamps, as well as the Changchun artificial satellite observation station. Going through several decades of development, they have already formed their own special characteristics in such areas as optics, electrooptical engineering, precision mechanics, high polymer materials, rare earths, ultrapure analysis, the study of light emission, as well as luminescent materials, research on swamps and marshes, as well as economic geography, and so on. Moreover, they have dominance in relatively strong comprehensive research and development.

The Changchun branch academy was set up in May 1978 to act as one of the twelve branch academies of the Chinese Academy of Sciences set up all over China. It includes four institutes and one station. At the present time, it has a total of 5784 staff and workers. Among these, there are 3853 scientific and technical personnel and 835 people possessing high level technical and professional job titles. The missions of the branch academy are, in one area, to aid the Academy in the coordination and management of regional research organizations in the district. In another area--in accordance with the peculiarities of the region--to actively organize combined attacks on key problems, and, during "65" and "75" periods, complete a number of national, Academy, and local key scientific and technical projects--for example, "three rivers plain comprehensive control and rational exploitation", "research on laser separation of uranium isotopes", "investigation of Songhua River system environmental background values and comprehensive river valley control", as well as "development of fluorescent powders for the three basic colors", and other similar projects. Important results have been obtained, and, in conjunction with this, awards have been won. On the basis of the needs of local economic development, organization is done of forces to launch key scientific and technical advances in agriculture, test manufacturing multiple successful types of new technologies to

increase agricultural production--for example, "light assistance elements", "multi-element microfertilizer and complex fertilizer", "soil control optical membranes", "botanical biochemical nutrient elements", and so on. In conjunction with this, they are in widespread use in such places as Jilin Province, Shandong Province, and so forth. In 1991, the Changchun branch academy secured the Jilin Province scientific and technical advanced agricultural promotion unit designation. The branch academy actively organizes the various institutes to strive to attain key "85" tasks and important Academy projects. At the present time, it has already carried out assumed responsibilities for 23 key national projects and 13 important Academy of Sciences projects. The Changchun branch academy assumed responsibility for the launching of the combined operations of the Academy and the No.1 Automotive Vehicle Manufacturing Plant, searching for ways to integrate with large enterprises.

Successive Changchun branch academy heads: Wang Daheng, Wu Yue, Tang Jihua. Current branch academy standing head: Huang Changquan.

#### CHANGCHUN OPTICAL PRECISION MACHINERY RESEARCH INSTITUTE

The predecessor of the Chinese Academy of Sciences Changchun optical precision machinery research institute (simply designated the Changchun photomechanical institute) began to be set up in 1952. It has currently already turned into one of the bases for comprehensive development of China's optics, the study of precision machinery, and electronics. The entire institute currently has 367 high level research technical personnel, 911 intermediate level research technical personnel, 717 initial level research technical personnel, and 1148 technical workers.

The institute in question is primarily engaged with research in such scientific and technical realms as optical glass as well as man made crystals, modern applied optics, optical system design and checks, optics and digital imagery processing, photoelectronics, the optics of thin films, the studies of /2 luminosity and color indices, photoelectric technology, remote sensing technology, optical spectrum technology and optical spectrometry instruments, laser technology and laser devices, gratings and precision calibrations, the study of structures, mechanical drives, mechanical lubrication, mechanical materials, optical engineering, and so on.

Under the institute as a whole, the optical spectrum technology research center as well as 18 laboratories and computer centers are set up, bibliographical information and data research rooms, the national applied optics open research laboratory, the all-China optical and mechanical products quality, supervision, inspection, and test measurement centers, and the Changchun photomechanical institute experimental factory.

The institute in question has throughout parceled out its energies to the setting up of seven units--the Shanghai photomechanical institute, the Changchun academy for

photomechanical studies, the Chengdu photoelectrical institute, the Xian photomechanical institute, the Anhui photomechanical institute, and the Beijing scientific instruments plant--as well as to the transporting of over 2000 scientific and technical personnel, and the making of important contributions to the development of Chinese optics activities.

Since the establishment of the institute, it has brought to fruition a total of 810 scientific research projects. Among these, as far as 344 major completed projects are concerned, there were over 100 projects which gained scientific and technical prizes at the national and Academy as well as departmental committee levels. In the area of fundamental optical technology research, overall, more than 100 optical glass and optical crystal materials were test manufactured, and the greater part are already in wide spread application. As far as optical systems design and optical checks and inspections are concerned, they are pioneering domestic research work. Large amounts of work have been done in all the areas of design methods, image aberration theory, image quality evaluation, as well as opting for the use of automatic electronic computer designs. Research work associated with optical precision increments as well as field graduations were developed earliest domestically. After many years, increments were made in several tens of types of gratings and code panels with over a thousand elements. Large numbers of duplicated optical gratings are utilized in a total of over 100 units throughout China. Optical grating etching technology has already spread to such optical instrument plants as Beijing, Shanghai, Tianjin, and so on. Research associated with code panel optical etching industrial techniques won national invention prizes. The institute in question also developed relatively early research associated with such areas as optical thin films, light intensity standards, photoelectronic components, optical working techniques, and so on. As far as the areas of precision machinery and mechanics are concerned, technological foundations were first of all set up domestically in association with research on the study of structures, mechanical strength, friction, wear, and lubrication. The high precision, small modulus standard gears developed have already reached the levels of products of a similar type outside China. High speed gears are already used on rocket engines associated with launching communications satellites. Development was successful on China's first ruby laser, doing pioneering work for China's laser technology. In the 1980's, there was successful development of high level tunable ring shaped dye lasers and multiple models of picosecond dye lasers. Research associated with optical spectrum instruments as well as components has a relatively long history. In conjunction with this, there has been successful development of multiple types of photoelectric detection devices as well as light sources and multiple optical spectrum cameras, multiple optical spectrum color synthesizers, television color synthesizers, and so on, which have participated in multiple iterations of airborne remote

sensing tests. In the area of photoelectric engineering, in the 1960's, there was successful development of China's first large model optical measurement equipment in astronavigational orbit. After that, there was also successful development of large, medium, and small models of tracking and positioning measurement equipment. During cooperation in the development of China's astronavigational technology, important contributions were made, earning further special national scientific and technical awards.

In recent years, in accordance with the spirit of opening up and reforms, the institute in question--besides assuming responsibility for such important scientific and technical tasks as national and key "75" and "85" projects put down by the Academy of Sciences as well as 863 projects and so on--has also developed a series of high technology products--for example, such series of laser devices as large and medium model as well as medium and small model laser television and motion picture transit theodolites, photoelectric tracking measurement systems, remote sensing systems, solar simulation devices, optical photoelectric data processing devices, Chinese character laser printers, high precision photoelectric etching devices, as well as detection systems, high precision photoelectric goniometers, laser working devices, tunable dye lasers, and so on, along with such numerous types of optical spectrum instruments as vacuum ultraviolet optical spectrometers, harmonic drive precision gear series products, gas flotation slideways, gas flotation bearings, photoelectric axial angle encoding device series, digital display grating scale series, as well as multiple types of optical lenses, various types of optical materials, and various types of diffraction gratings with different dimensions, grating etching devices, as well as detection systems, and so on. Quality was at advanced domestic levels.

The institute in question strengthened international cooperation and exchanges with scientific research organizations and enterprises outside China, aggressively opening up channels of international trade.

This institution set up graduate student departments and was the unit granting the first batch of doctoral degrees and masters degrees approved by the State Council academic degree committee. It had the first group of units in the nation to set up post doctoral floating scientific research stations. Since the 1978 system for restoring graduate students, it has recruited on 12 occasions 230 masters degree graduate students and 12 doctoral graduate students. It currently has over 100 graduate students in studies.

Successive institute heads: Wang Daheng, Tang Jiuhua;  
current institute head: Wang Jiaqi.

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#### CHANGCHUN APPLIED CHEMISTRY RESEARCH INSTITUTE

The predecessor of the Chinese Academy of Sciences Changchun applied chemistry research institute began to be set up in December 1948. In June 1954, it was constructed from an

amalgamation of the Chinese Academy of Sciences Changchun Chinese Academy of Sciences integrated research institute and physics and chemistry research institutes moved from Shanghai to Changchun. The predecessor of the former is the Northeast scientific research institute. The predecessors of the latter are the chemical research institutes of the central research institute. The institute as a whole currently has 1371 staff and workers. Among those, 268 people possess high level job designations. There are 736 people with middle and initial level job designations.

The primary research realms of the institute in question as well as their contents are:

1. High Polymer Chemistry and Physics. Primary research directions include high performance engineering plastics as well as general use engineering plastics, new high polymer separation membrane materials as well as membrane separation processes, electrical conductor high polymers, radial cross linked high polymers, multiple phase embedded copolymers, high polymer liquid crystals, as well as complexing catalysis polymerization associated with dual rare hydrocarbons and  $\alpha$  rare hydrocarbons, and so on.

2. Physical Chemistry. Focal points are such studies as catalysis, electrochemistry, laser chemistry, as well as structural chemistry, and so on.

3. Inorganic Chemistry. Primarily engaged with studies on the solid chemistry of rare earth elements, complex chemistry, the chemistry of separation, the electrochemistry of fused salts, as well as the chemistry and physics of semiconductors.

4. Analytical Chemistry. Stress is on modern new techniques in analytical chemistry, new methods of research, the utilization of multiple types of research means--for example, electroanalytical chemistry, spectrum analysis, and so on--to develop high purity substances, trace elements, as well as analytical methods and basic research in environmental pollution and the life sciences.

The Changchun General Applied Chemistry Science and Technology Company and the Changchun New Materials Research and Development Center were set up to engage in scientific and technological development work.

Within the institute, three open research laboratories for rare earth chemistry and physics, electroanalytical chemistry, as well as high polymer physics were set up, and the national science commission approved the setting up of the "National Electrochemistry and Spectrum Research and Analysis Center", undertaking to edit the two publications--"Analytical Chemistry" and "Applied Chemistry".

In the over 40 years since the establishment of the institute, more than 1000 scientific and technical projects have been brought to fruition. In the years 1970-1991 alone, it attained the fruition of 574 scientific and technical projects and 264 award winning results. Among these, there were 4 national natural science prizes, 11 national discovery awards, 5

national advancement of science and technology awards, 195 Chinese Academy of Sciences prizes, and 25 provincial (departmental) awards. Among the achievements, there were "New Techniques Associated with Butadiene Rubber Industry Production", which won a special class advancement of national science and technology award, "Liquid Rubber Synthesis Expansion Tests and Its Applications in Solid Rocket Propellants", which won a Class I national advancement of science and technology prize, and experiments on the principles associated with the laser separation of uranium isotopes was evaluated as being the big science and technology news for all of China in 1985. In the years from 1988-1991, the institute as a whole published over 2000 articles. In the publishing of articles, for three years running (1988-1990), it took first place among China's scientific research units, setting itself as the head among four domestic and foreign research institutes--ahead, in numbers of articles published and numbers of articles cited, of the other three listed.

The institute in question is a doctoral and masters degree granting unit. It set up post doctoral floating stations, training over the years a total of more than 700 graduate students--among these 118 doctoral students.

In the last 10 years, the institute in question has received over 1400 trips from various types of experts and foreign guests. It has dispatched close to 500 person/trips to participate in international scholarly conferences, to give lectures, or for short term work. It has sponsored or co-sponsored 12 international conferences.

Successive institute heads: Yan Peilin, Wu Heng, Wu Xuezhou, Sun Shuqi, Wang Fosong, Ni Jiazuan; current institute head: Wang Erkang.

#### CHANGCHUN PHYSICS RESEARCH INSTITUTE

The Chinese Academy of Sciences Changchun physics institute takes luminescence and its applications as the primary research direction, at the same time, developing specialized research institutes associated with the study of integrated optics and electronic. Establishment was begun in 1958. The institute as a whole has 740 staff and workers. Among these are included 20 research fellows and 104 assistant research fellows (includes high level engineers and high level laboratory personnel).

Main Research Fields. In the area of basic research, an excited state physics open research laboratory was set up. It uses ultra fast and energy resolution laser spectrum technologies as its primary research means and takes excitation states of coacervation state materials as well as their motions as the primary research direction. The focus of near term research is the excited states of impurities and flaws, optical nonlinearities, and the excited states of organic or biological systems. Materials research is primarily aimed at materials related to rare earths, semiconductor materials, thin film

structure materials, and organic biological materials. Applied research includes light sources and lighting technology, display and imagery technology, photoelectronic components, and applications of light emissions in agriculture and medicine. Primary research is on various types of solid luminous illumination light sources, special use terminal display CRT materials; liquid crystals and electrically caused luminescence as well as luminescent diode flat plate displays and luminescent diode integrated components; MOCVD and MBE preparation III-V families, IV-VI family super crystal lattices, quantum trap materials, optical dual stability materials and components, optical detectors, semiconductor laser devices and amplifiers, new models of optical storage materials, L-B membrane sensors, integrated optical passive wave guide components, integrated optical photoacoustic and photoelectric components and transducers; organic luminous and photoelectric materials; light energy absorption and conversion by biological molecules and active materials as well as their application in the areas of agriculture and medicine; and the acquisition and handling of primary electronic research information.

In the 30 years since the institute was set up, it has brought over 300 scientific research projects to fruition. Among them, a part have won national and Academy awards for their achievements. At the present time, it has undertaken many important national, Academy, and departmental committee tasks--for example, "liquid crystal high clarity image displays", listed as being an important "85" scientific research project. It has also taken responsibility for more than ten "863" high technology projects. Among scientific and technical achievements already developed are alternating and direct current electrically induced luminescent powder materials and components, plastic electrically induced luminous screens, special models of luminous diodes, semiconductor lasers, photoelectric sensors, cathode ray luminous materials used in color television, high projection television, and special types of electron beam tubes, various types of luminous materials used in wave band lamps, compact models of three basic color energy regulation lamps, large and medium screen analog displays with various types of special requirements and matrix display systems, applications of luminescence technologies in agriculture as well as medicine, and so on, and so on. A number of pieces of specialized equipment were developed--for example, MOCVD equipment and cathode ray luminescence test measurement instruments; among electronics products, there were boiler scale cleaners, interest machines, high precision temperature cold traps, and so on.

The institute in question is a doctoral degree and masters degree granting unit. There are 7 doctoral graduates and 54 masters degree graduates. There are 42 graduate students working on their masters degrees.

Successive institute heads: Gou Qingquan, Xu Xurong;  
current institute head: Yu Jiaqi.

## CHANGCHUN GEOGRAPHICAL RESEARCH INSTITUTE

The Chinese Academy of Sciences Changchun geography research institute was created in September 1958. It was a comprehensive geography research structure for the northeast region.

The institute in question currently has 315 staff and workers. This includes 236 scientific and technical personnel. Among these, 71 are high level personnel and 79 middle level personnel.

This institute takes the geography and environment of China's northeast region as well as regional development research and marsh and wetlands research for all of China as its main direction. Research work is concentrated in the four realms below: (1) The swamps and marshes of all of China as well as research on their rational development and protection to include system investigation and classification, forming evolutionary patterns, ecological systems and functions, as well as marsh, swamp, and wetland structures and functions associated with management techniques, along with experimental models utilized in association with marshes, swamps, and wetland management techniques and development. The Three Rivers Plain river flood marsh and swamp ecological test station has already been set up. (2) As far as the structural characteristics, formation, and development processes associated with the geographical environment of the northeast region are concerned, regional systems associated with man-earth relationships, relevant natural resources, arrangements of the forces of production, city and town systems, renovation of national territory, natural disasters and countermeasures to ameliorate disasters, integrated regional development and regional planning, as well as management of fields with medium and low production, and so on. (3) Environmental ecology and environmental protection research to include environmental ecology, environmental changes, the quality of regional environments, environmental evaluations, division into environmental districts, pollution management, as well as the construction of ecological engineering and geographical environments, along with human health, environmental economics, environmental map making, as well as regional influences of global environmental changes. (4) Applications of remote sensing technology and research on the drafting of maps to include remote sensing investigations of resource dynamics, remote sensor monitoring of disasters, remote sensor estimates of crop production, special topic map studies, remote sensing /5 cartography, computer map making, as well as geographical information systems research, microwave remote sensing theory, and the development of active and passive microwave remote sensing devices following in hot pursuit of world microwave remote sensing high technology. The Jingyuetan open remote sensing experimental station has been set up.

The institute in question is responsible for editing the Chinese language publication "Geographical Science" as well as the English language publication "Chinese Geographical Science".

Both are published inside China and abroad.

Since the establishment of the institute, it has won a total of 11 national level prizes for achievements and 77 departmental committee and provincial level awards. Among these, "research associated with airborne three frequency band microwave radiometers and their applications" won a Class I national advancement of science and technology award, "some recommendations concerning Three Rivers plain agricultural and natural resources remote sensing investigations and integrated control" and "a Chinese nature protection atlas, and so on" won Class III national advancement of science and technology prizes. "Songhua River drainage system environmental protection studies" won a Class I Academy of Sciences advancement of science and technology award.

The institute in question is a masters degree granting unit for four branches of learning. Over the years, it has trained a total of 80 graduate students.

In the area of international scholarly exchanges, relationships have already been set up with the research organizations and scholars in over 20 nations. A number of cooperative research projects have also been developed. Joint international scholarly conferences have been convened. Experts and scholars of various nations have been received, and over 250 person/trips have been sent out to participate in international conferences, lectures, study and observation, and short term work.

Successive institute heads: Huang Xichou, Liu Zheming; current institute head: Liu Xingtu.

#### CHANGCHUN ARTIFICIAL SATELLITE OBSERVATION STATION

The Chinese Academy of Sciences Changchun artificial satellite observation station began to be set up in 1958. For professional work, it was subordinate to the Zijinshan astronomical observatory. In the 1960's, it was changed into an independent unit directly subordinate to the Academy. In the 1970's, the station in question had already become a comprehensive artificial satellite ground tracking station which primarily does actual measurements using artificial satellites, and, in conjunction with that, is capable of developing in depth research work on motion theory associated with man made satellites.

The station in question currently has 65 staff and workers. Among these, there are 47 scientific and technical personnel (5 high level personnel, 24 medium level personnel). Three empirical measurement teams and one satellite kinetics research laboratory were set up. They are equipped with optical tracking transit theodolites which have gone through improvements, dual frequency Doppler speed measuring instruments, 60 centimeter high precision artificial satellite range finding systems, and so on.

Optical tracking and observation teams gather large amounts of data associated with satellites inside and outside China.

They have won national defense science committee and Academy of Sciences awards on many occasions. In conjunction with this, they have continued for ten years to win first place in the Academy artificial satellite system observation comparison assessments. At the present time, the teams in question are in the midst of carrying out related tasks in "863".

Laser range finding systems will play an important role in the areas of joint international observations and global kinetics research.

The research work of this institute with regard to artificial satellite motion theory has achieved gratifying success in the last few years. Over 20 articles have been published in periodicals inside and outside China. Among them, "A Type of Suitable Intermediate Orbit" (artificial satellite perturbation theory) won a Class II Chinese Academy of Sciences advancement of science and technology prize. During cooperative projects with the institute in question and other units, there were seven projects which won national level and Academy level scientific research achievement awards.

The institute in question has set up broad contacts with international astronomical circles, participates in joint international measurements and international cooperation. It has received visits from international colleagues on many occasions. In conjunction with this, it participates in international conferences and sends people to lectures or short term work.

Current station head: Li Yulin.

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Microfiche Nbr: FTD96C000069  
NAIC-ID(RS)T-0626-95