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2013年4月,第35届国际环境遥感大会在北京召开,这对于全球遥感界来说具有重大意义。从1962年第一届国际环境遥感大会首次正式使用“遥感”一词算起,至今遥感走过了50年的历程。经过50年的发展,遥感技术已经步入综合、协调和持续的全球综合地球观测与空间信息服务快速发展时期,新模型、新算法、新技术不断涌现,应用领域不断扩大,以数字地球、大数据、云计算为基础的新型服务系统工程开始得到应用,展示出勃勃生机和创新活力。

国际上,美国、俄罗斯、法国、加拿大、德国、日本等国家已全面掌握遥感卫星研制技术,并具备很强的自主获取对地观测数据的能力。印度、巴西、以色列、意大利、韩国、泰国等国家的卫星研发技术也迅速发展,特别是在民用和商用领域的对地观测小卫星的研制方面更具特色。高分辨率传感器的应用日益得到重视,卫星的空间分辨率正在以每10年1个数量级的速度提升,光谱分辨率也已经从20世纪70年代初的微米级提高到纳米级。各国更加重视对地观测综合能力和基础设施的建设,纷纷致力于构建天地一体化的国家和区域级的对地观测系统。国际合作与交流日益广泛,在地球观测组织(GEO)、国际对地观测卫星委员会(CEOS)等国际组织和机构的协调下,全球性的综合、协调、可持续的地球观测系统的建设工作在不断推进。

我国政府十分重视遥感科学与技术的发展。早在20世纪70年代,中国科学院就联合国内70余个单位,先后开展了腾冲航空遥感实验、津渤环境遥感试验、二滩水能开发遥感试验等中国遥感工程的三大战役,在遥感科学与应用领域发挥了示范引领作用。自“六五”开始,国家在相关科技计划中持续支持了一系列遥感技术与应用研究项目。特别是近年来,先后设立了“高分辨率对地观测系统”重大专项、“863”项目

“地球观测与导航”、国家基金项目“对地观测及其信息处理”等研究领域,以进一步提升我国对地观测技术的基础研究和应用能力。经过30多年的发展,我国形成了气象卫星、资源卫星、海洋卫星、环境卫星、导航卫星、对地观测小卫星以及载人飞船等对地观测体系,遥感技术也已广泛应用于国土资源调查、生态环境评价、气象预报、减灾建设等领域,服务于国家生态文明建设。同时,多形式的国际合作研究、国际会议、国际培训等活动架起了中国与国际发展的桥梁,中国的遥感正在影响世界。

温故知新。《中国科学院院刊》“从空间看地球:遥感发展五十年”专辑向读者展示了过去50年来遥感技术、对地观测和数字地球的发展脉络。在庆祝遥感诞生50周年之际,我们对中国和全球遥感事业进行回顾,有助于梳理发展思路,借鉴先进经验,以面对日益严峻的资源和环境形势,更好地利用遥感技术以及在其基础上蓬勃发展的空间对地观测和数字地球科学平台,应对全球变化和可持续发展的挑战。

李维华

Preface II

The convocation of the 35th International Symposium on Remote Sensing of Environment in Beijing in April 2013 is of special importance to the global remote sensing community. It has been half a century since its first symposium took place in 1962. Because of the 50-year development, remote sensing technology has embarked on a fast track toward coordinated, comprehensive, and sustained global Earth observation and spatial information services. As a result, new models, algorithms, and technologies are mushrooming with ever expanding application scopes. Newly engineered services, on the basis of Digital Earth, big data, and cloud computing, have started to become applicable, showing an outburst of vigor, vitality, and creativity.

Internationally, developed countries, like the United States, Russia, France, Canada, Germany, and Japan, have mastered the knowhow for developing remote sensing satellites with strong capacities for acquiring Earth observation data. In addition, rapid growth has been seen in other countries such as India, Brazil, Israel, Italy, the Republic of Korea and Thailand. They are particularly good at developing and building Earth observation mini-satellites for civilian or commercial use. The application of high-resolution sensors has been given more importance. Spatial resolution of satellites, for example, has been raised by an order of magnitude every 10 years while the spectral resolution has been upgraded from the micrometer level in the 1970s to the nanometer level nowadays. Various countries are paying more attention to the enhancement of comprehensive capacity and infrastructure in Earth observation by concentrating their efforts on promoting their spaceborne-ground Earth observation systems at the national or regional level. A new boom is being witnessed in international cooperation and exchanges. Under the coordination of the Group on Earth Observations (GEO), the Committee on Earth Observation Satellites (CEOS), and other international organizations, a comprehensive, coordinated, and sustained Earth observation system is in the pipeline.

The Chinese government gives special importance to remote sensing science and technology development. As early as the 1970s, the Chinese Academy of Sciences joined hands with some 70 R&D units at home to carry out “three campaigns” in this as-



pect. The move played an exemplary and guiding role in the research and multi-faceted application of remote sensing. Since the implementation of the Sixth Five-year Plan for National Social and Economic Development, a series of relevant technologies have received support from national S&T programs. To upgrade China's basic research and application capacities in this regard, some national initiatives have been started in recent years, including a special program for a high-resolution Earth observation system, a project on Earth observation and navigation supported by the National High-tech R&D Program (863 Program), and a project on Earth observation and data processing financed by the National Natural Science Foundation of China. As a result of the 30-year-long development, our country has set up an Earth observation system consisting of meteorological satellites, resource satellites, marine satellites, environmental satellites, navigation satellites, mini-satellites, and manned space crafts. Now our remote sensing expertise has been widely used in the investigation of land resources, appraisal of the eco-environment, weather forecasting, and disaster reduction, offering its wide range of services to the country's ecological progress. Meanwhile, a rich and colorful array of international cooperation activities, conferences, and training sessions bridge the gap between China and foreign countries.

In order to gain new knowledge by reviewing the old, the Bulletin of the Chinese Academy of Sciences has published a special issue. Under the title of "Having a Look at the Earth from Space: 50 Years of Remote Sensing Development", it offers an overview of the development of remote sensing, Earth observation, and Digital Earth. In celebration of the 50th birthday of remote sensing, we made a review of remote sensing undertakings both at home and abroad, straightened out our thoughts, and learned from experience. Facing increasingly grim situations such as depleting resources and a deteriorating environment, we must make good use of remote sensing expertise and science platforms for spaceborne Earth observation and Digital Earth to address the challenges of global change and sustainable development.

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