

Data Integration and Analysis System Program (DIAS-P): Design and Proposal of an Operational DIAS

Shiro IMAWAKI^{1*}, NISHIMURA, Hajime¹, KAKUTA, Shinya¹, KOIKE, Toshio², KITSUREGAWA, Masaru², FUKUDA, Toru³, NOJIRI, Yukihiko⁴

¹Japan Agency for Marine-Earth Science and Technology, ²University of Tokyo EDITORIA, ³Japan Aerospace Exploration Agency, ⁴National Institute for Environmental Studies

Data Integration and Analysis System (DIAS) is intended to create new scientific knowledge and public benefits through integration of various data under collaboration with stakeholders, in order to become a social infrastructure to make new innovations and social growth. DIAS will provide information toward resilient society and mitigation on social problems related to global environment, including resource management, bio-diversity, and natural hazards, by utilizing data on earth observation, climate-variability prediction, socio-economy, and so on.

Data Integration and Analysis System Program (DIAS-P) started in 2011 as the second phase, aiming at (a) designing and proposing an operational scheme (operational DIAS) to realize public benefits through its operational application for global-scale solutions with sustainable scientific cutting-edge advancement, as well as (b) prototyping the operational regime with intelligent infrastructure to create new value, and (c) enabling stakeholders in various fields to together leverage the fusion of super-large-scale various data sets and information.

Japan Agency for Marine-Earth Science and Technology (JAMSTEC) is collaborating with the University of Tokyo EDITORIA, Japan Aerospace Exploration Agency (JAXA), and National Institute for Environmental Studies (NIES) to design the operational DIAS and present a tentative reference model including its roles. The infrastructure and schemes shown in the reference model will be the first practice if realized. This reference model has been designed in consideration with relevant progresses in relating research programs, and will be annually amended.

To achieve the above-mentioned objectives, DIAS comprehensively manages and publishes metadata as an integrated portal to provide and distribute the following data; (1) observation data listed in "Japan Earth Observation Implementation Plan," (2) observation data collected in each state to contribute toward nine social benefit areas of "Global Earth Observation System of Systems" (GEOSS), (3) observation data available in partner states under bilateral or multilateral collaboration, (4) data obtained through Application Workbenches, which are intelligent infrastructure to support projects toward application to each field, and (5) data provided by Function-Improvement Partners, which are inter-organization partnership to sustainably improve functions of DIAS. Their targeted fields include socio-economy, agriculture and fishery, land use and land cover, transportation network on roads and ports, landscape, and hazards. It is to be discussed how to create an environment where archives are acknowledged as research results.

The core infrastructure of DIAS will consist of large-scale storages to archive the data, and of analysis space and tools to analyze large-scale data.

The operational DIAS expects decision-makers (in domestic and developing countries) on resource management, disaster-protection, etc. to be the major users. The major users of integrated data and analysis function of DIAS will be not only researchers (science communities) who provide decision-makers with evidence but also stakeholders who collaborate on Application Workbenches. Moreover, end-users, social movements, and civilian services are also expected to use DIAS through access to the DIAS portal site.

The operational DIAS will gradually extend application fields, by grasping needs of end-users, collecting know-how on best practices through experience, and carrying out continuous prototyping. In the prototyping phase, Application Workbenches develop useful policy tools in collaboration with researchers and relevant decision-makers in each application field. In the following social application phase, the developed system will be installed on undertaking organizations, or undertaking organizations will publish integrated products in the place of DIAS.

Keywords: DIAS, Data Integration and Analysis System Program, operational, data-centric