

# Research Coordination

## 1. Introduction

The research policy of NILIM provides, as a basic attitude, "Aim at new technical development by implementing technical cooperation and integration widely among industry, university and government" and, as preparedness for research, "Establish an efficient research system in cooperation with external organizations while recognizing own strengths and weaknesses." It is also one of the important roles of NILIM to coordinate researches with industry-university-government cooperation. Many researches have been conducted in collaboration / cooperation with administrative organs, private sectors, universities, etc. and this paper introduces typical systems and examples.

## 2. Examples of coordination / cooperation with administrative organs concerned

NILIM conducts many researches with project cost budget etc. that directly lead to policy development in cooperation with the MLIT, etc. As examples that constitute a particularly large-scale research subject, there are comprehensive technical development project (comprehensive project) and administration cost itemization budget. Of the important research subjects concerning construction technologies, comprehensive projects work on particularly urgent subjects covering wide target areas and conduct researches comprehensively and systematically in cooperation of industry, university and government under the leadership of administration departments in promoting projects. Administration cost itemization refers to the budget that is directly assessed by the Ministry of Finance and used to conduct comprehensive researches that lead to creation of government policies. **Table 1** provides the subjects of comprehensive projects implemented in fiscal 2018 and **Table 2** provides the researches based on the administration cost itemization budget.

## 3. Examples of cooperations with private sectors, universities, etc.

Various types of cooperations for obtaining maximum performance with limited research resources are practiced including joint and contract researches, which are typical methods of cooperation, and are classified into the patterns provided in **Table 3**.

Table 3. Patterns of examples of cooperation with private sectors, universities, etc.

<b>I. Research established as a system in the NILIM</b>
(1) Joint research, (2) Contract research (research publicly offered by laboratory), (3) Contract research (research public offered by council), (4) Budget of other ministry / agency (SIP: Strategic Innovation Promotion Program)
<b>II. Research established as a system in other organizations</b>
(5) Technical research association
<b>III. Research not established as system but established to a certain extent</b>
(6) Technical public offering, (7) Social experiment, (8) Workshop / study group
<b>IV. Research conducted by devising ways of operation</b>
(9) Cooperation with policy development by the Ministry, (10) Cooperation with municipal projects, (11) Workshop with university / private sector

**Table 4** shows the number of contract researches ((2), (3)) conducted, **Table 5** provides the number of joint researches ((1)) conducted, and **Table 6** lists typical cooperation examples including contract researches (publicly offered by laboratory)((2)), for fiscal 2018.

Table 4. Number of contract researches conducted in fiscal 2018

Pattern	Name of the council, etc.	Number of cases
Research publicly offered by laboratory		3
Research publicly offered by the Ministry's council		
	New Road Technical Conference	29
	River works technology research and development	10
	Sewerage B-DASH	18
	Next-generation Infrastructure Inspection System Development Examination Committee	1

Table 1. Comprehensive technical development projects implemented in fiscal 2018

Subject	Research period	Department / center in charge	Related article
Technological development contributing to utilization of existing buildings by streamlining fire prevention / evacuation rules, etc.	2016-2020	Building / Urban	
Research on construction productivity improvement with full utilization of ICT	2017-2020	Social capital management	
Development of design / construction technologies for mixed structure buildings using new wood material	2017-2021	Building	
Research on upgrading of construction production systems using AI	2017-2020	Social capital management	
Development of suburban residential area revitalization techniques responding to mature society	2018-2022	Housing / Building / Urban	

Table 2. Researches based on the administration cost itemization budget implemented in fiscal 2018

Subject	Research period	Department / center in charge	Related article
Development of simple performance evaluation methods for wooden housing	2016-2018	Building	
Development of evaluation method of energy reduction effect by automatic control technology of building equipment	2016-2018	Housing	
Research on securing the safety of port area against storm surge disaster	2016-2018	Coastal, Marine and Disaster Prevention	
Research on practical evaluation method for life extension / effective use of existing port facilities	2016-2018	Port	
Research on field productivity improvement in social capital maintenance process	2016-2018	Social capital management	
Research on flood prevention activity supporting technology	2017-2019	River	
Development of equipment improvement technology, etc. for securing the health and safety of disaster victims in shelters	2017-2019	Building	
Research on facade design methods aiming to improve energy consumption performance in buildings	2017-2019	Housing	
Development of urban structure analysis / evaluation techniques considering diversifying life support functions	2017-2019	Urban	
Development of diagnostic techniques of trafficability in case of earthquake / fire	2017-2019	Urban	
Research on prompt inspection / restoration methods for airport pavement in earthquake disaster	2017-2019	Airport	
Research on comprehensive management of sewer pipelines	2018-2020	Sewerage	
Development of pre-analysis method for sediment disaster caused by large-scale earthquake	2018-2020	Sediment disaster	
Development of existing RC member evaluation techniques contributing to life extension / improvement of exterior / waterproofing membrane of buildings	2018-2020	Building	
Establishment of visualization method for barrier-free effect according to life stages	2018-2020	Housing	
Research on quantitative evaluation method for urban environment improving effect of green space, etc.	2018-2020	Urban	
Research on immediate damage estimation methods for port facilities in large-scale earthquake	2018-2020	Port	

Table 5. Joint researches conducted in fiscal 2018

Subject of joint research	Partner organization	Research period	Department / center in charge	Related article
Research on early detection of sediment disasters using observation / monitoring data of mountainous watershed	National Institute of Advanced Industrial Science and Technology	2016-2018	Sediment disaster	
Joint research on state prediction method utilization measures using inspection data of road bridges	Kyoto Prefecture, Kyoto University, Public Works Research Institute	2016-2018	Road Structures	
Research on technical standards etc. in building, housing, and urban fields	Building Research Institute	2016-2021	Building / Housing / Urban	
Joint research on development of sediment disaster monitoring methods using Advanced Land Observing Satellite No. 2 "Daichi No. 2"	Japan Aerospace Exploration Agency	2017-2019	Sediment disaster	
Joint research on technological development for practical use of the next-generation Cooperative ITS	29 entities and 32 organizations including automakers, electrical equipment manufacturers, related foundations, and expressway companies	2017-2019	Road Traffic	
Joint research on seismic performance verification experiment of mixed structure buildings using new wood material	National Research Institute for Disaster Prevention	2017-2021	Building	
Joint research on an international logistics model on a global scale to be established from the positions of shippers and shipping companies	University of Tokyo	2017-2018	Administrative Coordination	
Joint research on utilization of AIS data for port maintenance / use	Service Center of Port Engineering (SCOPE)	2017-2019	Port	
Joint research on utilization of construction management record obtained in seismic restoration of bridges for maintenance	Japan Association of Steel Bridge Construction, Japan Prestressed Concrete Contractors Association	2017-2019	Social capital management	
Joint research on inundation forecast system in Tokyo	Waseda University	2018-2021	River	
Joint research on ETC 2.0 data distribution service	ITS Technology Enhancement Association	2018-2021	Road Traffic	
Joint research on life extension of weather proof steel bridges	The Public Works Research Institute, Japan Association of Steel Bridge Construction, Japan Iron and Steel Federation, Nagaoka University of Technology, Nippon Steel & Sumikin Anti-corrosion Co., Ltd.	2018-2020	Road Structures	
Joint research on upgrading bridge performed evaluation / restoration techniques	The Public Works Research Institute, Japan Association of Steel Bridge Construction, Japan Iron and Steel Federation, Nagaoka University of Technology, Waseda University	2018-2021	Road Structures	
Joint research on maintenance of concrete floor slab bridges	The Public Works Research Institute, Japan Prestressed Concrete Contractors Association	2018-2020	Road Structures	

Table 6. Typical examples of cooperations with private sectors, universities, etc. conducted in fiscal 2018.

Pattern	Subject	Purpose and form of cooperation	Participants	Research period	Department / center in charge	Related article
(3) (4)	Research and development of infrastructure and inspection devices for upgrading inspection of social infrastructure	- Provide fields by utilizing robot technologies developed by private sectors - Utilize expert organizations for technical adaptability	Joint research organization (Public Works Research Institute, private-sector organizations)	2016-2018	Social capital management	
(3)	Breakthrough by Dynamic Approach in Sewage High Technology Project (B-DASH Project)	Utilize local governments, private enterprises, a universities, etc. for practical use of innovative techniques that are not generalized	Joint Research Organization (universities, private enterprises, other national research centers, local governments, etc.)	2011-	Sewerage	
(4)	Strengthening resilient disaster prevention / mitigation functions "Development, introduction, etc. of observation / analysis / forecast techniques for flood disasters"	Utilize expert organizations with advanced meteorological observation and heavy rain forecast techniques for social implementation of heavy rain disaster forecast techniques	National Institute of Information and Communications Technology, Osaka University, National Research Institute for Earth Science and Disaster Prevention (NIED), Japan Weather Association, Railway Technical Research Institute, etc.	2014-2018	River / Sabo	
(6)	Project for introduction / utilization of innovative technologies for drastic improvement of productivity in construction site	Publicly offer a project for improving productivity with new technologies such as IoT and AI by obtaining real-time digital data from construction sites.	Consortium consisting of private enterprises, universities, etc. (33 entities)	2018-	Social capital management	
(8)	Local Road Economic Strategy Workshop and local workshops	- Discuss issues specific to regions and utilize needs of administration and wisdom of university. - Match with administrative needs to promote innovation of road policy.	University, Ministry, Regional Development Bureau	2015-	Road Traffic	
(9)	Cooperation with local governments that implement area measures in research on traffic safety measures for community roads	Technical cooperations in effective implementation of traffic safety measures (local government: Implement measures, NILIM: analysis, technical consultation, etc.)	Yokohama, Hamamatsu, Kurume	2016-	Road Traffic	
(10)	Cooperation with local governments in research on grasping road traffic situation	- NILIM conducts transportation analysis etc., and local government (road administrator) conducts the project and consultation with organizations concerned to solve issues in proper sharing of roles.	Ibaraki Pref.	2013-	Road Traffic	

#### 4. Conclusion

In addition to the above, various types of cooperations and coordinations are conducted, including examples of working for research activities and revision of technical standards in industry-university-government cooperation as committee activity of academic societies and associations and

participation of committee members in various types of technical public offering by the MLIT and Regional Development Bureaus. We intend to continue researches while devising and utilizing various cooperations among industry, university, and government, aiming at better research results and social implementation.