

### **A Study on Strategic Management of Advanced Highway Infrastructure to Prepare for the Era of Automated Driving**

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The deployment of Intelligent Transportation Systems (ITS) in South Korea has accumulated Advanced Highway Infrastructure (AHI) such as vehicle detectors and communication facilities. The domestic AHI has been managed by local governments or road management authorities to provide ITS services of high quality. As the existing infrastructure becomes obsolete with the emergence of new technologies related to ITS, strategies of longer-term perspectives need to be introduced in the management of AHI.

The existing ITS is expected to evolve into C-ITS through increased cooperation between operating objects. To further, advanced countries such as U.S. and Japan have invested in integrating C-ITS infrastructure with vehicle-automation systems to realize the operations of cooperative automated driving. These changes in the ITS paradigm will cause new requirements of AHI related to the collection, processing and provision of traffic information.

For example, the data storages used for traffic management centers need to be expanded and the security of information and communication should be strengthened.

In light of the above this study is intended to investigate newly emerged requirements for AHI by targeting transition periods of the ITS paradigm. In this regard, two main issues are raised in the context of AHI management. One is to investigate the ways to coordinate existing infrastructure with newly introduced C-ITS infrastructure for upgraded or integrated ITS services. The other issue is either to enhance the function of existing AHI or to develop new AHI for the operations of cooperative automated driving. This study puts more focus on the former issue by considering that the role of road infrastructure has been more clearly defined for C-ITS than for cooperative automated driving.

Domestic practices of AHI management turns out to be focused on the prevention or repair of malfunctioning facilities. These maintenance activities of short-term horizon, however, are not sufficient in responding to the changes in the ITS paradigm. To meet the needs of the changing ITS paradigm, the existing tasks related to operations and maintenance of AHI need to be complemented by strategic management to inspect, plan, and revise the overall system of operations and maintenance with longer-term perspectives.

Strategic management of AHI has been rarely implemented in the domestic practices. On the other hand, advanced countries such as U.S. and EU members make efforts to strategically manage AHI by employing asset management frameworks or by mitigating the obsolescence of subject assets in preventive ways. By referring these foreign examples, the present study established a procedure to analyze the requirements of AHI management and then implemented the procedure on the ITS infrastructure of a metropolitan

city, Daejeon. This implementation reveals that (i) hardware requirement such as the control of communication delays or system loads should be addressed in the maintenance management, (ii) operations of AHI need to be linked to its maintenance by incorporating proper evaluation schemes into the existing practices and (iii) infrastructure management in the perspective of software should be introduced for integrated or emerging services enabled by the deployment of C-ITS as well as for existing ITS services.

Finally, this study suggests policy alternatives regarding ‘the improvement of the existing planning framework to facilitate the management of AHI’, ‘the legalization of applying an analytic procedure to AHI management’, and ‘the enhancement and facilitation of evaluating the operations and maintenance related to AHI.’ These alternatives can be supported by diverse strategies with the championship of central and local governments as well as through the collaboration of public-private partnerships.