

## Chapter 3

# Introduction to ITS and NTCIP

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### ABSTRACT

*Intelligent Transportation Systems (ITS) combines high technology and improvements in information systems, communication, sensors, and relevant mathematical methods with the conventional world of surface transportation infrastructure to increase the capacity of transportation systems and to improve the level of services. There are four major goals of ITS, including safety, environmental protection, efficiency, and economy. NTCIP (NTCIP Standard 9001, 2002; DISA et al., 1997) is a set of communications protocols and data definition standards designed for various needs of ITS services and applications. The key goals of the NTCIP open-standards effort are interoperability and interchangeability. Interoperability refers to the ability for multiple devices to work together as a single system and interchangeability refers to the ability to use multiple brands of a device on the same communications channel. Accompanying the social and economic development, traffic congestion and delay have become major issues in most areas around the world. How to use readily available technologies to increase the capacity of transportation systems and to improve the level of service has become one of major solutions to solve transportation problems that people are facing. This is the motivation of Intelligent Transportation Systems development. NTCIP is a set of communications protocols and data definition standards designed for various needs of ITS services and applications. These standards are intended to handle these needs in the two areas: Center-to-Field (C2F) and Center-to-Center (C2C) communications.*

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## INTRODUCTION

Intelligent Transportation Systems (ITS) (ITS Standard et al., 2006; ITE et al., 2003; RITA et al., 2002) combines high technology and improvements in information systems, communication, sensors, and relevant mathematical methods with the conventional world of surface transportation infrastructure.

### Definition of Intelligent Transportation Systems

Intelligent Transportation Systems are defined commonly as follow: systems utilizing newly developed information and communications technology to transportation infrastructure, management systems, and vehicles to improve safety, efficiency, travel time and comforts and reduce vehicle wear, delay, and fuel consumption.

Intelligent transportation systems include several systems using different technologies, such as traffic signal control systems; vehicle allocation and navigation systems; container management systems; changeable message signs (CMS); automatic number plate recognition (ANPR) or law enforcement equipments (speed cameras, CCTV, surveillance cameras, ... etc.) to more advanced applications such as traffic control centers that integrate live data and feedback from a number of sources, such as microwave/infrared vehicle detectors, parking guidance and information systems; weather information sensors, analyze all information through different models and then control the signal systems in the facilities to improve the traffic condition.

### Goals and Benefits of Intelligent Transportation Systems

Intelligent transportation systems provide a set of strategies for the transportation problems related to safety and congestion, while accommodating travel demands of users and freight through the use

of advanced communication, sensing, and information processing technologies. When integrated into the transportation system's infrastructure, and into vehicles themselves, these technologies relieve congestion, improve safety, and enhance productivity.

Overall, the goal of ITS is to utilize advanced technologies to increase the efficiency of limited transportation resources, to increase user convenience and the living quality. The content of ITS includes technologies and policies. The integration of both technologies and policies and the application of the integration are the core of ITS.

There are four major goals of ITS: safety, environmental protection, efficiency, and economy. The details of these major goals are listed in Table 1.

A dedicated website, ITS Benefits, Costs and Lessons Learned Databases (<http://www.benefitcost.its.dot.gov/>) provides updated and comprehensive information about the benefit and cost of ITS. The benefit of ITS can be classified in two application approaches: (1) Intelligent

Table 1. Major goals of ITS

Goals	Objectives
1. Safety	1. reduced incident frequency
	2. reduced incident damages
2. Environmental Protection	1. less air pollution
	2. less greenhouse effects
	3. less noise
	4. less fuel consumption
	5. less new facilities & constructions
3. Efficiency	1. less travel time
	2. increased capacity
	3. reduced operating costs
	4. higher user satisfaction
4. Economy	1. increased industry production
	2. more relevant job opportunities

(Source: Taiwan logistics management yearbook -Intelligent Transportation Systems, 2001)

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