The land of transpor enchantment

Intelligent Transportation Systems in New Mexico have changed beyond all recognition, as **Charles Remkes** reports

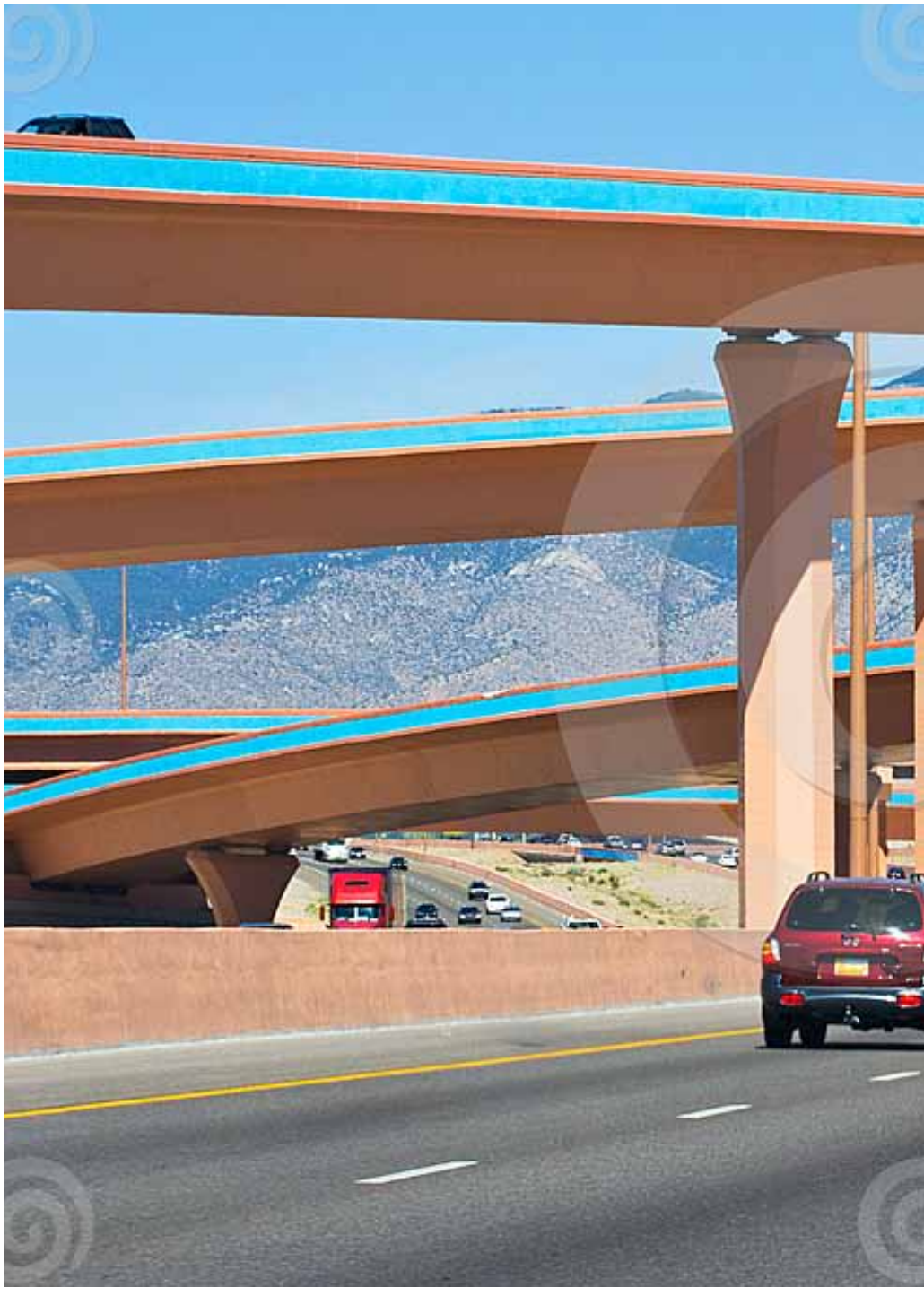
New Mexico's Department of Transportation (NMDOT) began its ITS program in 2000 with the reconstruction of "The Big I", a major freeway interchange in Albuquerque, the state's largest metropolitan area. Utilizing both web applications and local media outlets, ITS information was distributed to the travelling public and enforcement agencies to assist in managing construction-related congestion, incident clearances and rerouting of traffic during construction.

The early system consisted of cameras; eight modular (expandable) dynamic message signs (DMS); four arrow dynamic signs; four all-light emitting diode (LED) portable DMS trailers; four portable traffic management systems, which integrate cameras and DMS on one fully portable unit; and four HAR units, all linked electronically to the temporary Big I TMC. The TMC also dispatched motorist assistance units (known as 'HELP' trucks) to accommodate quick clearances of incidents. Date collection components relied on solar re-chargeable systems for power and included spread spectrum radio, wireless ethernet applications, and cellular digital packet data (CDPD) modems for communications.

SOLAR POWERED MOBILE SENSORS AND BIG I TMC SYSTEM

The successful use of ITS was instrumental in completion of the project well ahead of schedule and with recognition by the FHWA for its use of ITS in Work Zones (see FYI box).

Since then, we've increased our ITS applications far beyond work zone management. We've expanded our infrastructure beyond wireless and cellular communications. We've moved beyond



The Big I: ?????

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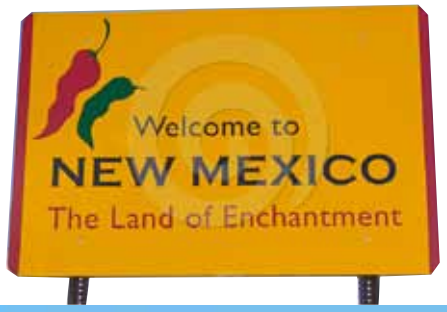

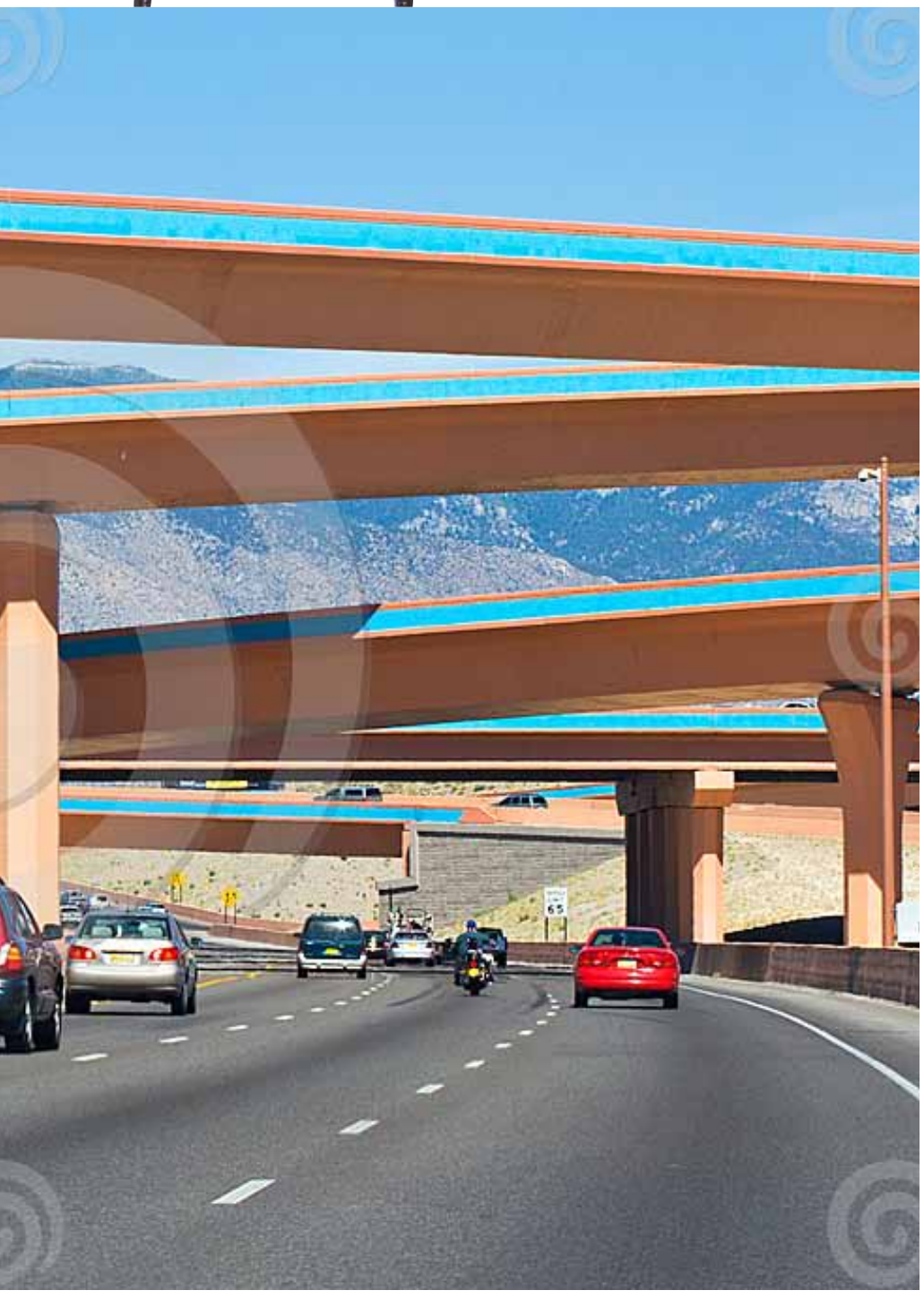

Solar Powered Mobile Sensors and Big I TMC System

using portable equipment and have permanent installations both within the Albuquerque area and throughout the state. We've moved into a new TMC with increased functionality that can better deal with both recurring congestion and unplanned incidents. And we've increased public access to real-time traffic and road conditions information.

METHOD ACTING

These changes didn't occur overnight, but were methodically implemented. We have installed over 75 PTZ cameras, 80 DMS, 60 traffic sensors, five highway advisory radio stations, two roadside weather information systems, over 70 miles of fiber optics, three phases of improvements to our TMC, and three software upgrades to our road conditions website www.nmroads.com. Although most ITS improvements have occurred in the Albuquerque area along the interstate systems, a sizable investment continues to be made in rural deployment, intended to monitor and advise motorists of road conditions during snow and dust storms. Those rural locations have proved challenging, especially with regards to communications. We have to >>>

Current NDMOT TMC

compete with other users for web access via public networks from private service providers, typically in the form of DSL and wireless cellular (CDMA and GSM). At a few locations we also use wireless radio (700 MHz), Wi-Fi, and Wi-Max.

CURRENT NDMOT TMC

As with the Big I TMC, we use our current TMC to collect and distribute information, dispatch HELP trucks) and operate of our field equipment. We use around 60 different applications to support operations, network maintenance and data management. The TMC is manned on extended hours that include weekends. During pro-longed or widespread events, the TMC is staffed 24/7. All operational and support activities hosted at the TMC can be managed remotely should the need arise.

EXCEPTIONS TO THE RULE

Looking ahead, we will continue with the sensible and sustainable growth to our infrastructure, equipment deployment and operations that characterized our approach over the last decade, with a few notable exceptions.

Mobility: Regardless of the type of information, accessing it 'on-the-go' is now the norm. Specific to traffic and road conditions information, if you're not providing it in a mobile environment, you're not meeting public expectations. The NMDOT began making its road conditions website 'nmroads' available as a mobile website in the summer of 2010. Most recently, we've launched an app (for iPhone and Android) to complement our mobile website. Both provide all of the information available on our desktop website, including camera feeds and congestion mapping. In addition to a service provided to the end user, we're moving toward extending mobility's value to our own staff, specifically to those responsible for inputting information into our traveler advisory system.

Hands-Free: All of the larger cities in New Mexico now prohibit using any portable communication device while driving unless it is a 'hands-free' system. To comply, we are developing the nmroads app to operate in that manner. The user will be able to customize information feeds including type of event, segments of specific roadways, time-of-day, day-of-week, GPS based, and even language.

In the Cloud: A winter storm at the beginning of December 2011 more than doubled traffic to nmroads from a previous max of 60,000 visitors a day to over 150,000. Our servers were at capacity. We needed a new approach. We began using a cloud-based server farm that could be expandable as demand increased. A few weeks later another storm hit, this time just before Christmas Eve (each of these storms were 50-year events). Once again, our website saw a dramatic increase in traffic of more than 500,000 visitors. This time there was no denial of service.

Social Media: Though the expandable cloud-based server farm proved successful, additional gains in information delivery can be realized by taking advantage of public networking. Social media sites have been leveraged by other DOTs in reporting events to 'followers'. We are moving in this direction.

Inter-Agency Coordination: Albuquerque's population centers are separated by a river, the Rio Grande. There are a limited number of river crossings, most of them are multi-jurisdictional corridors and all are included in the CMP (Congestion Management Process). While interagency coordination is important in operating these corridors establishment of a networked system is even more critical. A regional approach to collecting information, configuring data, coordinating signal timing and providing alternative routing choices is underway.

Albuquerque stakeholders have been sharing resources (personnel and equipment), providing infrastructure (fiber sharing) and adding support (shared operations of DMSs) to each other for years. We have MOUs in place for this and have collaborated on a concept-of-operations a Regional TMC where staff from our stakeholder agencies would be collocated. We hope to finalize plans for operation in either 2016 and 2017.

Application Integration: Our TMC staff currently use over a dozen different applications to perform their functions. We're consolidating them all into a single GUI and more importantly a single point of entry. It'll ensure consistency of information across the different platforms and will lend itself to a much more manageable environment, especially during stress situations.

Planning: It begins with the ITS architecture. New Mexico has five – a statewide plan and one for each of our larger cities. We refer to it when developing our programmatic funding – it allows us to capture opportunities at the onset. Our different regional ITS Subcommittees have taken the lead(s) for Architecture maintenance. They have a broad stakeholder representation and their familiarity with our architectures has allowed us to better coordinate each of our projects. We've also integrated adherence

"What is available to us now wasn't conceivable 10 years ago. The same thing holds true for the next decade"

to the systems engineering process as part of our project certification requirements. It helps to ensure interoperability and interconnectivity and it avoids redundant costs.

Performance Measures: In accordance with FHWA rules, travel times on interstates in urban areas must be provided by the end of 2014. Though 2014 is still many months away and Albuquerque is not expected to meet the definition of an urban area by then (over 1 million), we will began providing this service anyway. This was only one of many elements included in our Annual Goals and Objectives from which we gauge our performance.

Looking Outside the Department: As a public agency, we often don't have the same flexibility other organizations might enjoy. Lobbying is a case in point. When incidents involving closures occur, the length of closure is determined by the responding agency in charge. If a crime or fatality is involved, it becomes more complicated, and typically the affected roadway remains closed longer. It's a tough scenario to balance, public impatience versus a secure [having a safe] crime scene for investigation. We can't lobby for legislation supporting quick clearances, but we can share our concerns among organizations with common goals, such as ITSNM, the state chapter of ITSA. The local chapter has been very supportive and moves a common agenda forward.

Yet Defined: What is available to us now wasn't conceivable 10 years ago. The same thing holds true for the next decade. These are exciting times within which we can unlock our imaginations, knowing that much of what is conjured up can take hold. The issues we face in New Mexico are not uncommon, and from them emerges an opportunity for ingenuity. We look forward to meeting the new challenges knowing ITS plays a central role in developing the innovations needed for success.

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The Work Zones case study can be found at http://www.ops.fhwa.dot.gov/wz/technologies/albuquerque/index.htm

See Peter BG Shoemaker's article 'Theory Into Practice' on pages xx-xx for more information on NMRoads