

## LOOKING AT THE CRYSTAL BALL: A VISION FOR THE NEW MILLENNIUM

Anthony R. Kane<sup>1</sup>

A unique partnership of FHWA, the U.S. Navy and the steel industry has worked closely together to develop and produce a new high performance steel which should be a prime bridge building material throughout the next one hundred years of our transportation system - my first forecast.

With the change of millennium, we have seen a lot of forecasts, but not as many forecasts of transportation as for other areas. The steering committee for the conference on "*Steel Bridge Design & Construction for the New Millennium*" asked me to help fill the void. I did this comforted by the realization that I will almost surely escape the embarrassment of being proven wrong. Unless I unexpectedly become famous, nobody will remember my forecasts, and in any case I won't be around to see if my prognostications end up being true. This is a different kind of challenge for me, since I am usually asked to talk about very near term developments--like the FY 2001 Federal-Aid Highway Program appropriation level, with its \$3 billion in extra Revenue Adjusted Budget Authority (RABA) - money not forecast when TEA-21 [the Transportation Equity Act for the 21<sup>st</sup> Century] was enacted three years ago. Or I find that I am asked to explain the fact that the highway account balance at the end of TEA-21 will be \$30-\$40 billion-even with RABA spending. Actually, I am seeking some diversion from things like oversight hearings on planning and environmental regulations and battles for funding for the Woodrow Wilson Bridge [the bridge crosses the Potomac River on 1-95, connecting Maryland to Virginia]. Perhaps the luxury of looking past tomorrow and thinking about the day after sounded like such a breath of fresh air that I rushed in where angels fear to tread.

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<sup>1</sup>Executive Director, Federal Highway Administration, United States Department of Transportation

## **Earlier Forecasts**

Even if my forecasts end up being a little off, I take comfort in the fact that I will be in good company. In 1943, Thomas J. Watson, chairman of IBM, said, "I think there is a world market for maybe five computers." In 1977, Kenneth Olsen, chairman and founder of Digital Equipment Corporation, looked into his crystal ball and predicted "there is no reason for any individual to have a computer in their home." Sure, computers have been tough to predict, but consider this hopeful thinking: "In our lifetime, we will wipe out poverty in America"-so said Lyndon Johnson in 1964.

Some forecasters have hit the nail on the head. In 1982, Ronald Reagan predicted the downfall of the USSR and communism. In 1967, Herman Kahn predicted that by the year 2000 we would see widespread use of computers, lasers, pagers, satellite televisions, and organ transplants. In 1863, Jules Verne predicted hydrogen cars, fax machines, and flight to the moon with capsule shapes, escape velocity, and travel times that are very similar to NASA first manned lunar orbit. I wish he were around to pick the right dot-coms to invest in.

Getting closer to home, the Washington Post ran an article in which the authors forecast where transportation will be in 2100. They foresaw battery-powered cars, automated highways, high-speed intercity rail, and ICBM-like trajectory aircraft. More recently, a number of transportation professionals offered their personal forecasts in the Eno Transportation Foundation's winter newsletter. Among other things, they predicted that harmful automotive emissions will be a thing of the past, airports will be completely privatized, high-speed rail services will be available through subsidized, nonprofit organizations, traveler information systems will be available on all roads, transportation organizations will become access providers who see their role as maximizing access-which means minimizing travel by routing it over the shortest distance. Some foresee personal rapid transit, using driver less, electric vehicles operating on narrow guide ways. Others forecast transportable electronic pods-highly equipped mobile stations in which your vehicle has many of the amenities of your home and office.

Fannie Mae recently surveyed 149 known urban planners, historians, and architects to identify the 10 biggest factors that will influence cities in the next half century. They found a wide range of opinions, but came up with this list: growing disparity of wealth, political majority shifting to the suburbs, aging of baby boomers, and emergence of a perpetual underclass in center and inner ring suburbs. The survey also found smart growth, the rise of the internet, deterioration of first ring suburbs-vintage 1945-smaller household size, expanded new outer belts to serve edge cities, and racial integration that yields increasing diversity in suburbs and inner cities.

## **My Forecasts**

But as I peer into my crystal ball trying to conjure up the future of transportation itself, I first pass through a layer of haze that turns out to be the context in which transportation operates. Information technology will continue to explode, e-business will skyrocket, and distribution processes will change to exploit it. The global economy will become as established as our interstate economy today. The population will have a larger proportion of older persons, households will be smaller, and more of the workforce will be made up of temporary and contract workers. People will care more about the quality of life, and will be more concerned about sustainable transportation and livable communities. In this regard, the growing demand for sustained economic growth will not dampen the search for the traditional American dream of individual home ownership with cars to match. There will be new fiscal conservatism, and governments will act like businesses while businesses take on some of government's traditional functions. For example, governments will be more concerned about quality and customer service. They will do asset management and rely more and more on user fees. Businesses will find themselves operating more transportation systems, receiving more public scrutiny, and playing a more proactive role in alleviating environmental concerns. All of this leads to a very different context that will make transportation different. How different? With apologies to David Letterman, here are my top 10:

10. **There will be a revolution in package delivery.** Growth in e-commerce will create additional integration of buyers, sellers, and delivery services. Today's catalog and web-based sales, many of which still treat four-day delivery as fast, will find themselves standing in the dust of faster delivery services stemming from consortiums of delivery firms-B to B [business to business] alliances of service providers, more electronic processing of customers and delivery firms in provider alliances, production economies of scale, and growing customer expectations.

9. **Smart growth, sustainable transportation, and quality of life become real policy drivers.** What began as vaguely envisioned good things mostly outside our reach would grow to be real operational policies. This will lead to in-fill, gentrification, re-population of center cities and urban areas, and growing amounts of reverse commuting and working at home.

8. **There will be new outer beltways and new freeways in inter-city corridors.** Notwithstanding the mounting concerns about smart growth and the like, the automobile will continue to dominate the transportation scene, and continued growth in population and economic activity without major changes in land use control will force continued dispersal of activity and the construction of new roads to serve that activity. I am sure these new facilities will be built with high performance materials.

7. **We will apply a new highway design and construction process and new materials that gives us longer lasting roadways, requiring less reconstruction, and therefore would be less disruptive to traffic.** There will be a great increase in the volume of "in and out construction," pavements that last 50 years, and bridges that last a century. Bridges of the 21<sup>st</sup> Century will be of innovative design and be built with high performance materials such as HPS 70W steel, high performance concrete and even fiber reinforced polymer composites.

6. **The Interstate Highway System will be privatized. Private firms will operate all the services.** manage the facilities, collect the tolls, and provide information to motorists. At the least, rest areas will be privatized. If any of the veterans of the toll roads versus free roads debates of the 1940s are still around, they would be stunned to see private firms in the United States that have gone beyond the Autostrada in Italy- with Benetton stores in the rest areas--running the entire Interstate System.

5. **New revenue sources will be used to pay for highways.** Road user charges will be based on the actual amount of road usage, using distance measurements collected automatically using global positioning systems and on-board vehicle monitors. States will automatically share these fees and exchange appropriate portions using inter-jurisdictional agreements similar to the International Registration Plan (IRP) and the International Fuel Tax Agreement (IFTA) where heavy truck registration and diesel fuel fees are prorated across state lines based on travel in each state. We thought New Zealand and Russia were a little deranged when they began studying this concept in the 1990s, but in 2100 it has become commonplace.

4. **There will be greater integration of transportation modes, thanks to increased electronic interchange of data.** We see the beginnings of this today. For example, in Germany travelers can buy combined air/rail tickets and check baggage through both modes. In international freight transportation, containers can move using a single bill of lading to perform a journey that contains a mix of ocean shipping, truck, and rail links. In some metropolitan areas, a single 'smart card' can give you access to buses, commuter trains, subways, and toll roads. In California, you can buy a hamburger at McDonald's using the same card you use to pay tolls.

3. **Public transit use will increase and transportation will become more personal -** not because automated fixed-route systems will become ubiquitous, but because of a new generation of personal cars-very small, single-person cars that are energy efficient and nonpolluting. These new cars will tie in to rail and express line haul buses, which will offer better hub-and-spoke and better hub-to-hub services. The new automobiles will be available in a variety of ways, including rental cars, fee cars, station cars, or shared car associations such as those springing up in Germany now.

2. **Highways will be safer: There will be zero highway fatalities.** We will have achieved this after widespread citizen concern-similar to that recently seen in Sweden where the Parliament has made the tough target of zero fatalities a top priority for transportation policy. We will get there by designing and manufacturing safer cars, by use of automated, tough enforcement, and by design and construction of more forgiving roads, and also by a turnaround in the citizenry taking this as a national imperative.

1. **Transport proponents and environmentalists will unite on the subject of automobile use.** Automobiles will be environmentally friendly with nonharmful, fuel-based technologies, automated smart vehicle control technologies that minimize damaging crashes to individuals, and better integration with public transit that minimizes auto use, as described in number 3.

As noted earlier, I will not be around to see if these predictions are right, but I am sure that Transportation Quarterly, in the spring edition of the year 2100, will report the results. Enjoy the ride to the next century! Help build those bridge structures that will last at least 100 years!