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A WIDE AREA ROAD USER FEE FINANCING SYSTEM FOR RUSSIAN FEDERAL HIGHWAYS

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Note: the opinions expressed in this paper are solely those of the author and are not intended to reflect US FHWA policy within the United States

ABSTRACT

The US Federal Highway Administration has maintained an office in Moscow since 1994, assisting the Russian Federal Highway Service in their transition from soviet to democratic/free market institutions in the highway sector. One such effort has been to work with the Russians in evaluating a variety of road financing options that advance their development of a national road system while encouraging the transfer of some of the world's newest technologies. One such option is a fully private sector developed and operated system for monitoring the road usage of heavy commercial vehicles.

INTRODUCTION

In the conference materials prepared by the US Trade Development Agency for the USTDA CONFERENCE ON HIGHWAY MARKET DEVELOPMENT IN NEW INDEPENDENT STATES; ST. PETERSBURG, RUSSIA; September 17-19, 1996, the following statement on US Strengths was made on page 8:

“The U.S. is also a world leader in intelligent transportation systems (ITS). Since the enactment of the Intermodal Surface Transportation Efficiency Act (ISTEA) in December 1991, federal funding for research, development, testing, and deployment rapidly increased from about \$2 million in 1989 to well over \$200 million annually during the last five years. Substantial federal funding for ITS programs allowed the U.S. to regain its technology leadership in such areas as electronic toll collection systems, commercial vehicle fleet management, adaptive traffic signal controls, traveler and driver information systems, automated roadside safety inspection equipment, route guidance systems, remote incident detection and management systems, and automated highway design. As the NIS toll road construction begins in the near future, U.S. manufacturers and system integrators of ITS will find attractive export opportunities for goods and services.”

WIDE AREA ROAD USER FEE FINANCING SYSTEM

One such revenue producing alternative is the Wide Area Road User Fee Financing System. It differs from a classic toll road in two principle ways:

1. It covers a wider area or longer route than any single road development project, thus expanding its potential for revenue collection beyond the specific project its funds may be financing, and

2. The assessment of fees is administered by government certified private concessionaires who competitively provide nationally to the trucking industry for a fee, tracking, communication, and accounting services. Subscribing to such a service, and installing an approved electronic licenseplate, is a government requirement for the target road users and/or routes.

Such a system is both applicable at a national level as an additional/alternative revenue source for the national Highway Fund and/or it can be used for specific projects as a user fee collection system.

Raising funds for public works in Russia has been a major problem, particularly in the highway sector where recent studies have indicated that only half of what is required is raised and that the commercial trucking sector is paying a fraction of their use costs of the highway. In order to raise revenues from the commercial trucking fleet, Russia is investigating a nationwide user fee system collection system utilizing private telecommunication firms to track and report vehicle use of the highways. Regulations requiring trucking firms to install approved electronic licenseplate on all commercial trucks would encourage the growth of private subscription services for a wide variety of truck related services, including the reporting of weight and distance information by route. Using the soon to be deployed Low Earth Orbit satellite networks for communications, inexpensive 2-way communications and remote vehicle tracking services can be competitively provided to the trucking industry across the entire expanse of Russia, without any government telecommunication infrastructure or roadside investment.

Current Russian legislation allows the Federal Highway Department to create an autonomous non profit road authority to be responsible for the collection and expenditure of the fees collected on selected routes. With this authority assuming all the developer risk and with the government providing sovereign guarantees for the external financing, a wide area user fee system would raise funds to relieve the Highway Fund of the debt service burden while endowing future developments on the route into perpetuity.

THE USER FEE ADMINISTRATION CONCESSIONAIRE

The collection and accounting of user fees has always been the soft underbelly of what otherwise would appear to be a very robust form of highway financing. For short high volume projects like a bridge, toll booths on either end are the logical effective solution. But in Russia, where volumes are low and the road projects long, the construction, staffing, and maintenance of user fee collection and enforcement facilities on the ground would be uneconomic, highly subject to corruption and evasion and ultimately ineffective at raising funds. Failure to effectively solve the user fee administration problem on the scale needed for Russian highway construction would doom the creation of a Wide Area User Fee, the authorities that would manage them and the business opportunities that they might create.

Currently in Russia, long haul trucking has been experiencing security problems which has demanded the use of advanced western technology; a technology that also holds a promise of solving the wide area user fee administration problem. Today, there are a number of private

firms offering real time and continuous vehicle tracking and communication services to the trucking industry. Private telecommunication firms have been installing by subscription proprietary digital messaging systems on trucks. These truck based systems communicate with international low earth orbit satellite (LEO) systems such as GPS for positioning and ORBCOMM for communications. It is in the interest of the truck owner, and the owner/insurer of the load, that the exact condition and location of the vehicle be known at all times. This just also happens to be the information needed for the user fee administration of a Wide Area User Fee System ([figure 1](#)); it only needs to be reported to the road authority and integrated into a billing and enforcement operation.

The general idea is to encourage private US firms, to get into the business of providing a monitoring service to commercial vehicles. This service will provide both truckers and the government with independent calculation of the distance they have traveled along selected user fee routes. A truck using the user fee route would be required to have an active electronic licenseplate (transponder) and a subscription with an approved reporting service, all other trucks would be stopped and fined. A use of the user fee route might be defined as traveling within 50 meters either side of a center line for at least 10 km within a 24 hour period. Some yet to be designed algorithm would allow for the reduction of the string of GPS positions received from the truck into the distance traveled along the route; this would be the responsibility of the service provider. **Figure 2-typical transponders**

Rates would be set by the user fee agency (may differ by route or route section) and used by the service provider in their calculations of fees owed. The service provider would send a "fee due notice" to a subscriber of the service (trucker) who would then know what to pay to the fee collection agency or institution (usually a government). The agency would also get the service provider's independent report and therefore also know who owes them what and would be responsible for collections. Russian banks could even get involved by issuing commercial credit cards to trucking firms against which user fees would be automatically charged; payment and collection then being handled in the normal course of a credit card bank operation. Delinquent truckers remotely could have their electronic licenseplate made inactive on the order of the government user fee agency to the service provider which would cause the truck to be stopped when found on a user fee road.

The service provider could charge any amount in anyway they feel is economic for providing this service. Competing service providers would set their own pricing and ancillary services in their subscription package, though the service provider would have to be certified by the federal agency as being accurate and reliable for user fee calculations. To help offset the first cost to the trucking industry of conversion to the subscription service and the purchase of an approved electronic licenseplate, the first \$500 of user fees would be foregone.

Thus, conversion to a fully automated use based fee for a national highway system or route would involve no government infrastructure investment, would require no proprietary systems, need no road side facilities, and would be first cost free for the trucking industry. The fact that all monitoring is done by private firms on a subscription contract to individual users removes the threat of government intrusion into private affairs and other legitimate "big bother" fears. In addition, private firms would be free to compete in the pricing and packaging of a variety of useful services to the traveling public, not just user fee computations.

Perhaps the most far reaching impact of implementing such a system in Russia is the likely reaction of other countries with similar problems. Technologically, due to the nature of LEO systems, any such capability provided in Russia would be immediately available for any spot

on the globe. Any country wishing to convert to a user fee based approach to highway financing need only legislate the electronic licenseplate, authorize the telecommunication frequencies, and certify the private service concessionaires. Not only would their highway financing approach the most economically sound and efficient method, but they would also open up their economy for a wide variety of benefits to be provided to the traveling public by these information service providers. Once deployed in a country, it would be highly unlikely such services would ever be withdrawn due the tremendous enrichment they would be providing to the public in terms of personal security and convenience.

A KEYSTONE STEP IN US TECHNOLOGY APPLICATION

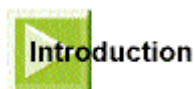
The technology for effective wide area user fee administration is immature and only now approaching commercially availability for field testing, therefore its large scale application has never been tried. The reasons for this are two fold:

1. The satellites in existing LEO systems have insufficient densities for world wide real time continuous service, though satellites are in orbit and realistic field tests have been completed. By the first quarter of 1998, the first LEO service ORBCOMM, plans to have satellite densities sufficient for a wide area user fee collection system application.
2. up to now, no nation has had the user fee problem and the LEO services concessionaire solution come together for consideration within the executive policy making body of a highway development agency, though this moment is rapidly approaching in a number of countries.

Time and the ever expanding adoption of LEO digital communications in private industry will eventually bring this potential solution to the attention of all highway agencies worldwide. However, the US FHWA's current involvement in Russia, and in particular FHWA's cooperative support of Russia's completion of the TransSiberian Highway, has created the opportunity for this problem and solution to be considered today by the Russian Ministry of Transport and Ministry of Finance executives.

A number of private US telecommunications firms have already examined the potential of this new market opportunity and have indicated their extreme willingness to enter the market, if only there was a market which must be created by the Russian Federal Government as part of its implementation of a Wide Area Road User Fee Financing System authority. They are in the Russian market now with selected private trucking firms for vehicle security services and would benefit from expanding the services to all commercial vehicles using primary intercity and transcontinental routes.

Thus a serious consideration for a first application of US LEO and GPS technology to the government business of raising funds for road construction is a keystone in bridging a number of Russia's current highway financing problems and creating a stream of economic opportunities for US firms in the telecommunications, implementation management consulting, highway design, highway construction, highway equipment manufacturing, and roadway materials industries.





Introduction



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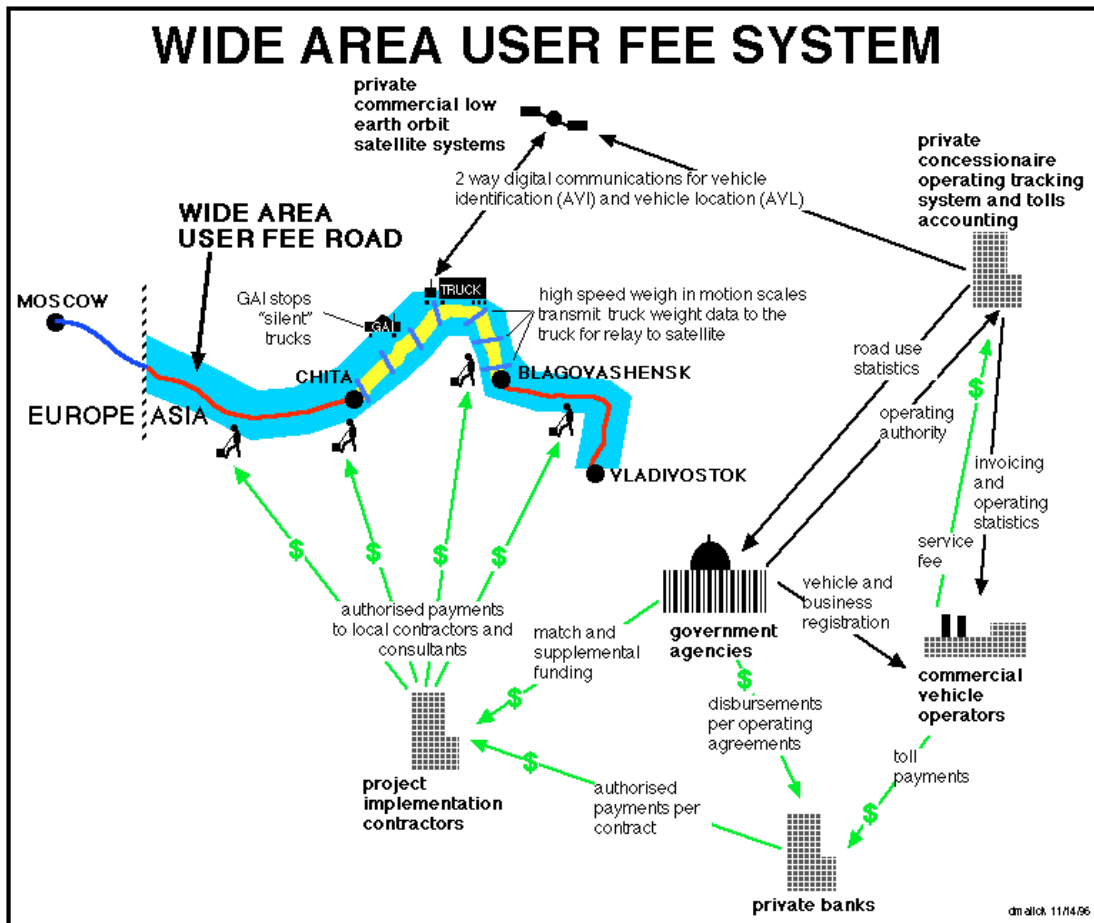


FIGURE 1: schematic diagram of Wide Area User Fee System to fund the construction of the completion of the Trans-Siberian Highway.





FIGURE 2: examples of typical transponders now available for LEO network (courtesy of ORBCOMM)s

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