TravTek Global Evaluation and Executive Summary

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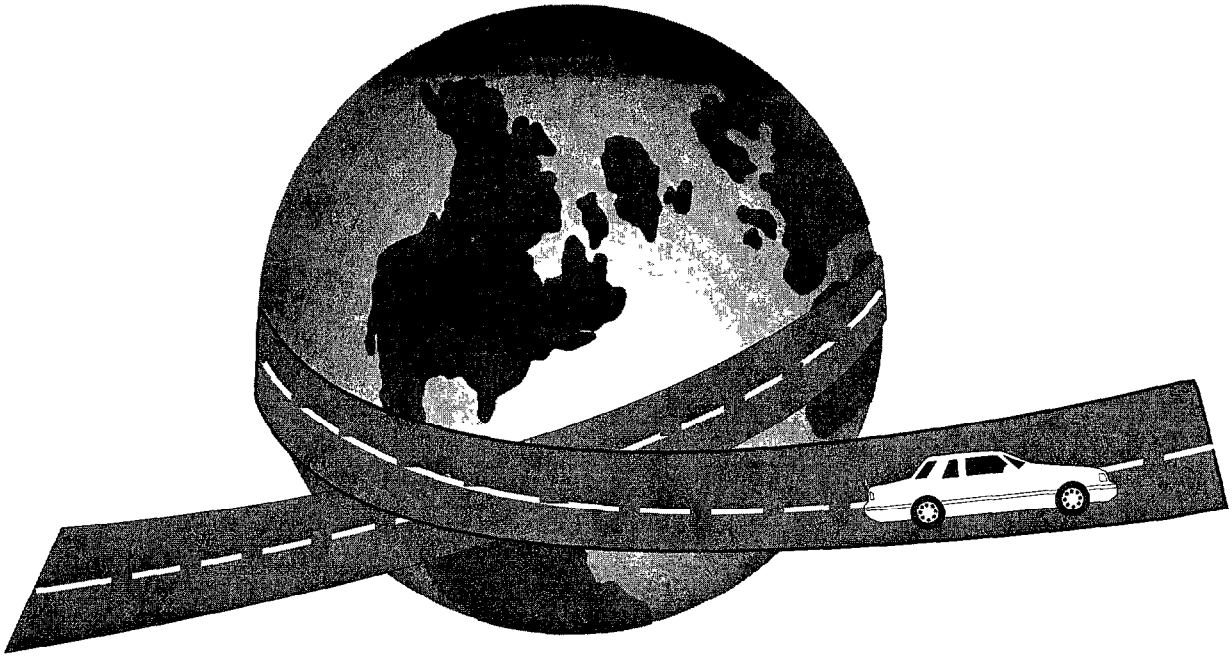

U.S. Department of Transportation

Research and Development
Turner-Fairbank Highway Research Center
6300 Georgetown Pike

FOREWORD

This report is one of eight reports produced as part of the evaluation of the TravTek operational field test, conducted in Orlando, Florida, during 1992-1993. TravTek, short for Travel Technology, was an advanced driver information and traffic management system that provided a combination of traveler information services and route navigation and guidance support to the driver. Twelve individual but related studies were conducted during the evaluation. Evaluation goals and objectives were represented by the following basic questions: (1) Did the TravTek system work? (2) Did drivers save time and avoid congestion? (3) Will drivers use the system? (4) How effective was voice guidance compared to moving map and turn-by-turn displays? (5) Was TravTek safe? (6) Could TravTek benefit travelers who do not have the TravTek system? (7) Will people be willing to pay for TravTek features?

Evaluation data were obtained from more than 4,000 volunteer drivers during the operation of 100 specially equipped automobiles for a 1-year period. Results of the evaluation demonstrated and validated the concept of in-vehicle navigation and the provision of traveler information services to the driver. The test also provided valuable results concerning the drivers' interaction with and use of the in-vehicle displays. This project has made many important contributions supporting the goals and objectives of the Intelligent Transportation Systems Program.

Samuel C. Tignor, Ph.D., P.E.
Acting Director, Office of Safety and Traffic Operations Research and Development

NOTICE

Technical Report Documentation Page

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15. Supplementary Notes

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16. Abstract

TravTek was an operational field test of an advanced traveler information systems (ATIS) and advanced traffic management systems (ATMS) technologies. This paper summarizess the findings from the series of studies that constituted the TravTek evaluation. Two field studies, three field experiments, and four analytical studies are summarized. The Rental User Study and Local User Study were naturalistic field studies of the use of the TravTek system by rental drivers and high-mileage local area residents respectively. The Yoked Driver Study, Orlando Test Network Study, and Camera Car Study were field experiments that empirically assessed the in-vehicle TravTek subsystem with respect to measures of performance that included trip planning time, travel time, subjective workload, wrong turns, glance location, and glance duration. The Modeling Study extrapolated expected system performance from field studies and experiments for various levels of market penetration, traffic conditions not observed in the field, and measures of performance not directly measured in the field. The Modeling Study projected effects on fuel consumption, vehicle emissions, accident risk, and other measures for market penetration levels of 1 to 100 percent. The Safety Study reviewed and integrated safety-related statistics across all TravTek studies and expanded on Modeling Study methods to project safety benefits. The Architecture Study thoroughly documented the TravTek system and evaluated system components that included: communications, data bases, hardware, software, and system staffing.

Study results showed that the TravTek system was reliable. The distributed information processing system was found to be viable. The system helped drivers save substantial trip planning and travel time. It also was effective in helping drivers avoid congestion. Both visitors and local users used the system frequently, and provided a median estimate of the value of the system in a new car of about $1000. The turn-by-turn Guidance Display and Voice Guide were very well received. Visitors and local users used these features for the majority of their trips, and results of field experiments suggest that the Guidance Display and Voice Guide yielded improved driving and navigation performance over navigating to unfamiliar destinations by conventional means. The Safety Study showed that the system was safe, and suggested a small safety benefit for a fully deployed system. The Modeling Study findings suggest that a TravTek system would benefit not only system users, but also non-equipped vehicles that share the road with system users. The TravTek operational test was a success. The TravTek evaluation demonstrated that users found the system useful, easy to use, and safe. Field experiments showed that the system reduced trip planning and travel time, and improved driving and navigation performance. System users indicated that they were willing to pay for a system such as the one they drove during the operational test.

17. Key Words	18. Distribution Statement
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Unclassified	Unclassified	101	

METRIC/ENGLISH CONVERSION FACTORS

ENGLISH TO METRIC

LENGTH (APPROXIMATE)

1 inch (in) = 2.5 centimeters (cm)
1 foot (ft) = 30 centimeters (cm)
1 yard (yd) = 0.9 meter (m)
1 mile (mi) = 1.6 kilometers (km)

AREA (APPROXIMATE)

1 square inch (sq in, in^2) = 6.5 square centimeters (cm^2)
1 square foot (sq ft, ft^2) = 0.09 square meter (m^2)
1 square yard (sq yd, yd^2) = 0.8 square meter (m^2)
1 square mile (sq mi, mi^2) = 2.6 square kilometers (km^2)
1 acre = 0.4 hectares (he) = 4,000 square meters (m^2)

MASS - WEIGHT (APPROXIMATE)

1 ounce (oz) = 28 grams (gr)
1 pound (lb) = .45 kilogram (kg)
1 short ton = 2,000 pounds (Lb) = 0.9 tonne (t)

VOLUME (APPROXIMATE)

1 teaspoon (tsp) = 5 milliliters (ml)
1 tablespoon (tbsp) = 15 milliliters (ml)
1 fluid ounce (fl oz) = 30 milliliters (ml)
1 cup (c) = 0.24 liter (l)
1 pint (pt) = 0.47 liter (l)
1 quart (qt) = 0.96 liter (l)
1 gallon (gal) = 3.8 liters (l)
1 cubic foot (cu ft, ft^3) = 0.03 cubic meter (m^3)
1 cubic yard (cu yd, yd^3) = 0.76 cubic meter (m^3)

TEMPERATURE (EXACT)

[(x-32)(5/9)] ^oF = y ^oC

METRIC TO ENGLISH

LENGTH (APPROXIMATE)

1 millimeter (mm) = 0.04 inch (in)
1 centimeter (cm) = 0.4 inch (in)
1 meter (m) = 3.3 feet (ft)
1 meter (m) = 1.1 yards (yd)
1 kilometer (km) = 0.6 mile (mi)

AREA (APPROXIMATE)

1 square centimeter (cm^2) = 0.16 square inch (sq in, in^2)
1 square meter (m^2) = 1.2 square yards (sq yd, yd^2)
1 square kilometer (km^2) = 0.4 square mile (sq mi, mi^2)
1 hectare (he) = 10,000 square meters (m^2) = 2.5 acres

MASS - WEIGHT (APPROXIMATE)

1 gram (gr) = 0.036 ounce (oz)
1 kilogram (kg) = 2.2 pounds (lb)
1 tonne (t) = 1,000 kilograms (kg) = 1.1 short tons

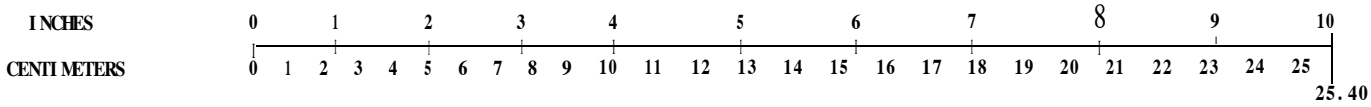
VOLUME (APPROXIMATE)

1 milliliters (ml) = 0.03 fluid ounce (fl oz)
1 liter (l) = 2.1 pints (pt)
1 liter (l) = 1.06 quarts (qt)
1 liter (l) = 0.26 gallon (gal)
1 cubic meter (m^3) = 36 cubic feet (cu ft, ft^3)
1 cubic meter (m^3) = 1.3 cubic yards (cu yd, yd^3)

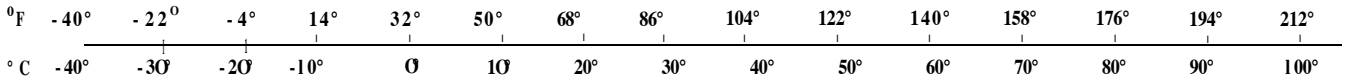
TEMPERATURE (EXACT)

[(9/5) y + 32] ^oC = x ^oF

QUICK INCH-CENTIMETER LENGTH CONVERSION



QUICK FAHRENHEIT-CELSIUS TEMPERATURE CONVERSION



For more exact and or other conversion factors, see NBS Miscellaneous Publication 286, Units of Weights and Measures. Price $2.50. SD Catalog No. C13 10286.

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