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Road Bureau, Ministry of Land, Infrastructure and Transport &
Public Works Research Institute, Ministry of Land, Infrastructure and Transport, JAPAN
Federal Highway Administration, Department of Transportation, U.S.A

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建設省は、平成13年1月6日付けで国土交通省に再編

Proceedings of the 9th U.S.-JAPAN Workshop on Advanced Technology in Highway Engineering

第9回 日米道路科学技術に関する ワークショップ報告書

Synopsis: 要 旨

This technical memorandum describes summaries of presentation and discussion on the 9th U.S.-Japan Workshop on Advanced Technology in Highway Engineering held in Tsukuba from November 28th to December 1st, 2000

本資料は、2000年11月28日～12月1日までつくば市等で開催された第9回日米道路科学技術に関するワークショップにおける発表、討議内容等を取りまとめたものである。

Key Words: U.S.-Japan Workshop on Advanced Technology in Highway Engineering, ITS, AHS,
Smart Cruise 21 Demo 2000

キーワード：日米道路科学技術ワークショップ、ITS、AHS、スマートクルーズ21デモ2000

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第9回日米道路科学技術に関する ワークショップ報告書

2000年11月28日～12月1日

つくば市

平成13年3月

国土交通省道路局、国土交通省土木研究所
アメリカ合衆国運輸省連邦道路庁

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1 ワークショップの概要

1.1 背景と目的

日米道路科学技術に関するワークショップ（以下「日米道路WS」）は、平成4年5月29日、当時の建設省技監三谷浩氏及び米国連邦道路庁（以下「FHWA」）長官トーマス・ラーソン氏が「日米道路科学技術協力の実施取り決め」（以下「実施取り決め」）に署名したことによって始まった。実施取り決めについては、平成9年1月に当時の建設省技監橋本鋼太郎氏と FHWA 長官ロドニィ・スレーター氏との間で新たに締結されている。

この実施取り決めに基づき、毎年、日米交互にワークショップが開催され、道路全般にわたる緊密な情報交換や専門家の交換等が実施された。第6回日米道路WSからは、テーマを限定し、より専門的な研究交流を行うこととした。また、3年に1回、道路全般にわたる包括的な議論を行う会議を開催することとした。

今回の日米道路WSは、「スマートクルーズ21デモ2000」が同じ週につくばで開催されることと、それを踏まえ ITS 技術の現況及び将来についてより専門的な研究交流を促進する必要があることから「ITS」をメインテーマとした。また、今回は3年に1回の道路全般にわたる包括的な議論を行う会議であることから、藤井友竝建設省土木研究所長とデニス・ジュディッキ―FHWA 調査・開発・技術局長出席のもと、これまでの日米道路WSのレビュー及び来年度のWSのテーマを含めた今後の日米協力のあり方について議論した。

1.2 スケジュール

11 月 27 日 (月) 米国側参加者来日

11 月 28 日 (火) スマートクルーズ 21 デモ 2000 開会式

日米道路WS 開会式

挨拶

建設省土木研究所長

藤井友竝

米国連邦道路庁 調査・開発・技術局長 Dennis C.Judycki

基調講演

—“ 21 世紀の交通ニーズへの適応 ”

米国連邦道路庁 調査・開発・技術局長 Dennis C.Judycki

—“PI を導入した「対話型みちづくり」に向けて ”

建設省道路局国道課長 藤本貴也

スマートクルーズ 21 デモ 2000 レセプション

11 月 29 日 (水) スマートクルーズ 21 のセッション

所長主催歓迎レセプション

11 月 30 日 (木) ITS セッション

スマートクルーズ 21 のセッション

12 月 1 日 (金) AHS ワークショップ

総括セッション

日米道路WS 閉会式

挨拶

建設省土木研究所長

藤井友竝

米国連邦道路庁 調査・開発・技術局長 Dennis C.Judycki

記念品の贈呈

12 月 2 日 (土) 鎌倉視察旅行

12 月 3 日 (日) 米国側参加者帰国

※ 斜字は「スマートクルーズ 21 デモ 2000」の関連行事

1.3 会議プログラム

11月28日(火)

13:00-14:00 スマートクルーズ 21 開会式

14:00-15:00 スマートクルーズ 21 試乗会

15:30-16:00 日米ワークショップ開会式 - 土木研究所 8F 会議室 -
挨拶

建設省土木研究所長

藤井友竝

米国連邦道路庁 調査・開発・技術局長

Dennis C.Judycki

16:00-16:30 記念撮影 - 土木研究所 8F 会議室 -

16:30-17:30 基調講演 - 土木研究所 8F 会議室 -

-“ 21 世紀の交通ニーズへの適応 ”

米国連邦道路庁 調査・開発・技術局長 Dennis C.Judycki

-“PI を導入した「対話型みちづくり」に向けて ”

建設省道路局国道課長 藤本貴也

11 月 29 日 (水)

10:20-12:30 SC21 のプログラム - つくば国際会議場 300 会議室 -

12:30-13:30 昼食 - つくば国際会議場 403 会議室 -

13:30-17:30 SC21 のプログラム - つくば国際会議場 300 会議室 -

11 月 30 日 (木)

9:00-12:00 日米ワークショップ (ITS) - つくば国際会議場 302 会議室 -

“ Current ITS Activities in Japan “

菊地 春海, 建設省道路局 ITS 推進室

“ Commercial Vehicles and the Intelligent Vehicle Initiative ”

Steve Barber, 連邦自動車輸送安全庁

“ Requirement of AHS for Implementation Scenarios of AHS Evolution ”

森 昌文, 土木研究所 ITS 研究室

“ Transit IVI – Enhancing Bus Safety and Mobility ”

Edward Thomas, 連邦輸送庁

“ AHS for Snow Removal Vehicles Using Lane Makers ”

新田 恭士, 土木研究所機械研究室

“ Infrastructure Concepts for Intersection Collision Avoidance and IVI
Advanced Snow Plow Research and Testing ”

Raymond Resendes, 連邦道路庁

12:00-13:00 昼食

13:00-17:30 SC21 のプログラム - つくば国際会議場 300 会議室 -

12月1日(金)

8:30-12:00 AHS ワークショップのプログラム

- つくば国際会議場 300 会議室 -

12:00-13:00 昼食

- つくば国際会議場 300 会議室 -

14:30-17:30 日米ワークショップ(総括)

- つくば国際会議場 403 会議室 -

- 政府機関の再構築とそれに伴う研究所の再編
- 研究開発の将来展望と重点研究開発プロジェクト
- 過去のワークショップのレビュー
- 第 10 回と第 11 回ワークショップのテーマ
- 日米協力の将来的なフレームワーク
- 結論のとりまとめ

18:00-18:30 日米ワークショップ閉会式

- つくば国際会議場 403 会議室 -

挨拶

建設省土木研究所長

藤井友竝

米国連邦道路庁 調査・開発・技術局長 Dennis C.Judycki

記念品の贈呈

2 ワークショップの報告

2.1 開会式

藤井友竝土木研究所長は、まず、日米道路科学技術に関するワークショップ（以下「日米道路WS」）が開催されるまでの経緯について述べ、1992年の日米道路科学技術協力の実施取り決め締結後、これまで8回の日米道路WSを開催してきたことを述べた。その中で、第1回から第5回までのワークショップでは、道路行政全体に関する話題についての議論を行い、第6回ワークショップからは、個別のテーマを絞り込んだワークショップを開催し、第6回は環境をテーマ、第7回は舗装を、また第8回は交通安全をテーマとして、より専門的な道路技術に関する議論を行うことができたことを報告した。また、今回の日米道路WSは、3年に一度の節目のワークショップということで、これまでのワークショップのレビューを行ったり、今後の方向性についても議論したい旨述べた。

また、藤井所長は、挨拶に先立ち、これまでに建設省土木研究所から徳山、岩崎、森、菊地及び明嵐が米国連邦道路庁（以下「FHWA」）に派遣され所定の成果を収め帰国していること、また現在派遣中の川崎がFHWAにて大変お世話になっていることに対して、米国側にお礼を述べた。

Judycki FHWA 調査・開発・技術局長は、日米道路WSにおける技術情報の交換は、FHWA側にとっても大きな重要性を持つと述べた。また、過去8回の日米道路WSが大きな成果をあげていることに触れ、今回のワークショップでも大きな成果を期待すると述べるとともに、今後とも日米協力を行っていききたいと述べた。最後に、他の7名の米国側参加者の紹介を行った。

2.2 基調講演

2.2.1 21世紀の交通ニーズへの適応

① 講演者

米国連邦道路庁 調査・開発・技術局長 Dennis C.Judycki

② 講演要旨

我々は、今後数年間の交通トレンドを予測し、交通投資のプライオリティを検討しなければならない。交通需要や技術革新、ライフスタイルの変化、経済条件は、将来の交通ニーズを把握する際の重要な要因である。これらの要因が米国における道路関係の研究開発にどのように影響を与えているのかについてこれから述べる。

FHWA のスレーター長官は「我々は、交通技術の変革の真ただ中におり、これらの技術革新は、鉄道や航空機、インターステートハイウェイがもたらしたのと同様の経済や日常生活の変化をもたらすであろう。」と述べている。

21 世紀の交通システムは、テクノロジーの上に築かれる。米国では、将来の交通システムを維持するために、TEA21 法に基づき、議会から与えられた財源を強力な研究開発プログラムに充てている。とりわけ、FHWA においても、交通技術の研究開発に重点を置いている。なぜなら交通技術の開発は、最近のコミュニケーションやコンピューターテクノロジー発展の観点からも、安全で近代的で効率的な交通システムの確立に不可欠であるからである。

以前は、道路関連の研究開発の予算は FHWA が議会から直接もらっており、この予算の中で重点化を図り研究開発を行ってきた。しかし、1998 年の TEA21 法制定後、全体の道路関連研究開発予算を以前よりの上流段階で配分し、州交通省や大学など FHWA 以外の機関にも研究開発予算を与えた。このため、現在は州政府と自治体は地域固有の交通需要に対応する研究開発プロジェクトがより行い易くなった。この結果、行政間での対話と調和が以前にも増して重要になってきた。

また、研究開発におけるパートナーシップの重要性が増してきた。すなわち、他の連邦機関や州政府、地方自治体、各種団体、大学、民間企業との連携である。

道路関連研究開発予算は、米国では億万ドル産業である。2001 年度予算は、FHWA だけで ITS を含む研究開発に 380 百万ドル、州交通省は 140 百万ドル、大学は 30 百万ドルが割り当てられ、それに民間企業で 100 百万ドルが研究開発に充てられている。合計すると、2001 年度の道路関連研究開発予算としてはおよそ 650 百万ドルが計上されている。また、我々は、AASHTO や TRB などの関係団体とも連携しており、これら団体との連携した研究開発のフレームワークは、ナショナル・リサーチ・アンド・テクノロジー・パートナーシップ・イニシャティブと呼ばれている。このような協力・協調体制は、スレーター長官がしばしばそして強く述べてきた交通ビジョン達成の鍵となるものである。

FHWA では、研究開発と現場での実用のギャップを埋めるために、協調と協力体制

を強く推進・支援している。スレーター長官は、次のように述べている。「技術革新は、発明以上のものである。我々が交通技術の開発のために行っている挑戦は、我々の時間と予算を、単なる発明以上に進歩の可能性をもつ技術開発に投資しているということを確認なものにする。」

このような類の技術革新は、米国における人口動態の変化への対応上も極めて重要である。ご承知のとおり、米国の人口は急速に増え、高齢化し、益々都市部に集中している。このような人口動態の変化は、新たな交通基盤へのニーズとなっている。

現在、米国の65歳以上の人口割合は13%であるのに対し、2025年には19%になる。これまで車社会で生活してきた老人や、旅行に対する願望の強い老人ドライバーの増加といった交通ニーズの変化に適応することは、これからのあらたな挑戦になる。

我々は、これら交通ニーズの変化に適切に対応するために、交通技術の向上に努めている。FHWAでは、より効率的な交通運営を行うことによりモビリティの向上を図るべく、ITSの開発やその応用に重点投資を行っている。米国の首都圏におけるITSインフラの整備は、現在、FHWAにおける5つの重点課題の一つである。我々の目標は、2005年までに国内の75の大きな都市圏に基本的なITSインフラを整備することである。さらには、全土にITS技術を整備することを目標としている。

しかし、重点課題はITSだけではない。ナショナル・ハイウェイ・システムを永続的に維持するために、FHWAはアセットマネジメント、インフラの更新、安全性向上にも重点を置いている。

特に、インフラの更新については技術開発の重要なテーマである。とりわけ、橋梁や舗装の状態を改善するための技術開発に努めているところである。例えば、スーパー舗装システムなどは、新しいアスファルト舗装の設計手法として開発され、成功を収めているところである。スーパー舗装システムでは、耐久性向上だけでなく、年間15億ドル以上の経費節減を実現している。

また、我々は道路工事の現場でのドライバーの安全と工事業者の安全に大変な関心がある。ここ10年間で、8000人以上が工事中の現場での事故で命を失っている。FHWAは、米国交通安全協会などと協力して、工事現場での安全確保に努めるいくつかの方策を実施しており、その一つが、この4月に実施した全国工事現場安全運動である。

交通安全は、21世紀になっても、依然としてFHWAにおける重点課題の一つで有り続けるであろう。交通安全は、設計、建設、管理を統合して達成されるものであり、我々も、事故分析の要素分析モデルや交通安全相互設計モデル、事故回避技術などよりよいツールやモデルを提供できるように、研究開発プログラムに基づいて精力的な取り組みを行っているところである。

これまで、FHWAはそれぞれの時代の変化に対応すべく、絶え間ないチャレンジを行ってきた。インターステートシステムがほぼ完成した今、我々のターゲットは、ポスト・インターステートの時代へと移ってきている。これは、インフラのリニューアル

ルや交通安全の向上、管理の高度化というものを意味している。ITS 技術が現場に導入されたとき、交通安全や交通の高速性、容量拡大など多くの便益が交通の現場にもたらされるであろう。

今週、この日米道路ワークショップにおいて、同時に開催されるスマートクルーズのデモンストレーションと併せて、将来の研究協力などについて様々な議論をし、21 世紀の交通ニーズへの適応に不可欠な情報や技術を共有したいと思う。

2.2.2 PI を導入した「対話型みちづくり」にむけて

① 講演者

建設省道路局国道課長 藤本 貴也

② 講演要旨

わが国では、PI を道路政策に取り込むためにここ数年様々な取り組みを行っている。

日本の道路行政では、政策の意志決定に時間がかかること、また意志決定結果に対して国民の不満が残るケースが多いといったことが PI を道路行政に取り込もうと考えた理由である。

1998 年から新しい道路整備五箇年計画が始まっているが、その数年前から五箇年計画に盛り込む内容について検討を始めていた。その検討の柱の一つが PI である。

民主主義は欧米から導入されたシステムであり、基本は多数決主義であるが、少数意見をいかに大切にすることということも重要である。また、サイレントマジョリティの扱いが問題となってくる。

インフラの整備を行う際には、利害関係者の対立が明確になる。つまり、外部経済を受ける人すなわち受益者、外部不経済を受ける人、費用負担を行う人すなわち納税者が同じグループに属していないという構図がある。このような状況のなかで少数意見も吸収するためには PI が有効なのではないかと考えた。

具体的には、道路整備五箇年計画において、計画の作成段階で PI を導入した。まず、五箇年計画の策定において、国民が道路に対してどういう問題意識を持っているのかを調査するためにキックオフレポートという冊子を作成・配布した。その後、これらの問題意識を踏まえてどういう政策を行えばよいのかをまとめたボイスレポートという冊子を作成した。その間約 13 万人からの意見が届いた。これらの意見をひとつずつ吟味し、できるだけ政策に反映させるように現在の五箇年計画を策定した。

道路政策の計画段階から調査・施工・管理の各段階で PI が必要だと考えるが、本日は主として計画段階での PI について紹介する。

道路計画に対する国民からの声は、都市計画決定レベルで初めて道路計画を知ったという意見や、行政から道路計画を押しつけられているといった声が多い。その結果、道路の計画そのものが環境破壊という意見や、そもそもクルマ型社会は見直すべきで道路はもはや必要ないといった意見が出てくる。

例えば高速道路の計画の場合、その大まかなルートは法律で決まっている。住民サイドから見れば、その次のステップとして、5000分の1レベルの詳細な計画をいきなり示されることとなる。その結果、住民としては、突然自分の家の付近に高速道路が通るという計画を知らされることになる。

この状況を見れば、我々の計画のステップは、計画初期段階から住民に計画を説明するまでのステップがおろそかになっているのではないかと考えた。特に計画段階での住民への説明プロセスが重要である。このため、現在、建設省としても計画段階のPIの試行に努めているところである。但し、PI実施手法は各現場によって様々なやり方もあるし、一律的な定型化は困難であろうと考えている。

先ほど、Judycski氏は、道路管理の重要性を言われた。日本でも道路管理は重要であると考えており、IT技術を駆使した道路管理の高度化やPIを活用した道路管理に取り組んでいるところである。

今後は、道路整備の各段階で、国民と行政との対話を頻繁に行いみちづくりを行っていくスキームを確立したいと考えている。欧米でもPIは導入されているが、歴史・文化の違いなどから一概にどういったPIが優れているかを定めることはできないし、そのまま日本に導入することもできないであろう。

今後PIをシステムとして定着させるためには、以下のような課題がある。

1つ目は、PIに必要なコストや体制を確保する必要がある。

2つ目は、国民、行政側ともに道路整備にPIを導入するというコンセンサスを得ること、またPI実施を事業実施の要件にするなどのインセンティブを与えることが必要である。

3つ目は、大きなプロジェクトになると広域的な調整を行う体制が必要となってくるが、米国のMPOシステムのようなものの導入が必要である。

4つ目は、PI技術者の育成である。PIには様々なシステム、手法が考えられ、幅広い経験が必要となるので、専門的な知識をもつ技術者の育成が必要となってくる。

5つ目は、PIの認知、つまり国民にPIに対する意識を持ってもらうことが必要。特に、道づくり、地域づくりに対する関心をもってもらい、計画に対する参加意識をもってもらわなければならない。

最後に、情報バンクの整備とPI技術の向上である。様々なPIの試みをデータベースとして構築し、それらを活用することが重要である。

日本はコンセンサス社会と言われており、日本人は厳しい議論をすることは苦手だと言われている。しかし、社会資本整備のためには厳しい議論を行わなければならないし、このためには、行政側でもコンセンサス形成のためのいろんな技術の開発が必要だと認識している。

今後とも米国等の制度を参考にさせていただきたいし、そのためには日米協力の強化が益々必要となってくる。

2.3 セッション

2.3.1 ITS セッション

日時 : 11月30日(木) 9:00-12:00

場所 : つくば国際会議場 302 会議室

概要 : 日本側3名、米国側3名による ITS に関する発表が行われたあと、その発表内容について討論が行われた。各発表の概要は次の通り。

(1) スマートウェイプログラムの概要

① 発表者 : 菊池 春海 (建設省道路局 ITS 推進室)

② 発表内容

日本における ITS 活動は、5 省庁と関連団体の支援により進められている。今年 2000 年における建設省の ITS 研究開発予算は、84.6 百万ドルである。ITS アプリケーションの中では、すでに ETC や VICS サービスは実施され、現在はスマートクルーズシステムの開発が行われている。このシステムはスマートカー、スマートゲートウェイ、スマートウェイから構成される。今回「スマートクルーズ 21」の開催には、様々な機能をテストし、2001 年にはシステムアーキテクチャーを含めた標準化とシステム開発を推進し 2015 年のスマートウェイ実現を目指す。

DSRC 5.8GHzs アクティブフォーマットは ETC で使用されているが、これはシステムアーキテクチャーや道路通信標準を基本にして将来道路管理者間で利用されるようになる。

AHS で行われるサービスは車線逸脱防止、衝突防止、安全車間維持走行等を予定する。これらの機能を評価するために SIPA というツールを開発した。このツールではミクロレベルとマクロレベルの2段階の評価が可能になる。ミクロレベル評価は、ドライバーの挙動、経路選択、その他交通状況の評価を行い、マクロレベルでは交通量、渋滞長等を評価する。プレゼンテーションでは上記それぞれの項目の詳細について触れる。

③ ディスカッション

5.8GHz DSRC について義務付けをするのかという質問があり、現時点ではないが、インフラの基盤ができて DSRC を使用しながら OBE を使うことを検討しているという回答があった。

また、DSRC の標準化の状況について質問があり、道路通信の標準化を行っており、またこれは地方建設局間の通信を確保するためのものであるという回答があった。

(2) Commercial Vehicles and the Intelligent Vehicle Initiative

① 発表者 : Steve Barber (連邦自動車輸送安全庁)

② 発表内容

現在 米国の年間交通事故死亡者は4万人に達し、うち5千人は商用車両による事故が原因であるため、連邦車両安全局は安全性向上を目標に掲げ 2010 年まで

に死亡者の 50%削減を目標とした。この目標を達成するために、現在、取り組んでいるトラックに関する 6 つの技術開発研究を紹介する。第 1 は転覆防止技術であり、これは民間との協力により既にフィールドテストの段階にある。第 2 はインフラベースによる障害物の警告であり GPS をベースとするシステムだ。これも民間との協力により 2001 年にはテストを行う予定だ。第 3 は車線逸脱装置のシステムで、これはビデオカメラを使用する。第 4 はドライバーの眠気検知装置であり、ビデオカメラや電子的センサーにより検知する。第 5 は電子的に制御するブレーキシステムそして、第 6 は様々なセンサーの調査でこれにはブレーキセンサー、タイヤの状況に関するセンサー等がある。これらの研究開発には民間との協力が不可欠であることを強調して結論とする。

(3) AHS の展開シナリオ

① 発表者 : 森 昌文 (建設省土木研究所 ITS 研究室)

② 発表内容

交通事故は現代の日本における交通運送開発の上で深刻な問題となっている。交通事故の主な原因は運転者による発見の遅れ、判断ミス、運転ミスが挙げられる。このような交通事故を低減するために建設省は、原因となる各段階において運転者の支援機能を提供する AHS プロジェクトに取り組んでいる。

このシステムは道路インフラと車両間で役割分担をすることにより支援サービスを提供する。特に死角に関する情報サービスを運転者に提供することにより、運転に関する迅速で適切な判断を行えるように支援する。また次の段階として、車両から出された警告に対して運転者が適切な行動を取らなかった場合には、車両は自動的な制御により危険を回避する。

AHS は道路センサーを使用して情報収集を行い、プロセッサで処理した後適当な情報をビーコンから車両に提供する。車両はレーンマーク等により自己車の位置を確認しながら、適当なタイミングで運転者に情報を提供する。AHS を実施するために建設省はシナリオを準備しプレゼンテーションで発表する。

③ ディスカッション

AHS における商用車の機材搭載コストについて質問があり、機材については商用車 1 台当たり 1000 ドル程度と考えているが、詳しい資料があるわけではないという回答があった。

(4) 公共交通 IVI:バスの安全性ともビリティの向上

① 発表者 : Edward Thomas (連邦輸送庁)

② 発表内容

公共交通利用者 (バスと鉄道) は 1995 年から増加し、1999 年には 6%の上昇が見られた。こうした上昇は運転者、歩行者そしてセキュリティに影響を与え、これら

の問題について取り組む必要がある。事故原因としては車線変更、合流、渋滞末尾、交差点、駐車、歩行者が挙げられる。公共交通管理局はサービスの質の向上と範囲の拡大とともに安全管理にも取り組まなければならない、そのためのコストをカバーする資金が問題となっている。保守管理や保険のコストは落ち着いているが、平均的な運行コストは上昇傾向にある。

このような問題に対処するためには、ビジョンを持って公共交通の安全管理とモビリティ向上に務める必要がある。そしてこの目標は、事故による死傷者の削減である。

事故の深刻さを基にして優先エリアを選定したがこの中には、車線変更、衝突警告、乗客と歩行者の事故が含まれている。公共交通 IVI ではこれらの事故傾向とシステム全体のニーズをもとに開発する。

今後の5カ年に公共交通 IVI の開発が進められる。初期段階では衝突防止に取り組み、次にラテラルコントロールと歩行者検知に関するフィールドテストを実施し、最終的には安全技術を統合してバスラピッド・トランジットシステム (BRT) を開発する。BRT ではバスサービスの質とレベルの向上をはかり、より安価な道路交通輸送手段となることをめざす。また最終的な目標としては、資金 70 億ドルの IVI プログラムを本格運用に持っていくことである。

FTA は研究開発をとおして提携を拡大し、車載器システムの統合化、車両とインフラシステムの統合化を行う予定でいる。FTA はシステムの安全性とナショナル ITS システムアーキテクチャとの適合に関して、技術的な支援と管理を行う。

③ ディスカッション

BRT 開発についての米国の動きについて質問があり、現在 195 程度のプロジェクトがありその内の殆どがライトレールを使用するプロジェクトであるが、コストが問題で連邦からの予算だけではまかないきれないのが現状であり、コスト低減が課題になっている。また技術面で ITS 技術導入を検討しているという回答があった。また質問者より、ライトレールの活動は日本でも活発化していて、建設省はレールは作らないが、そのための基礎や停留所の整備を進めているという紹介があった。

(5) 除雪のための ITS アプリケーション

① 発表者 : 新田 恭士 (土木研究所機械研究室)

② 発表内容

日本の雪質の特徴を考慮し開発された除雪車は現在、雪を削り取るためのオーガと、雪を投げるシュートの2段式になっている。除雪車の運行は常に危険がつきものである一方、技術が要求されるが運行が効率的に行えないのが現状である。このような既存の除雪車システムの効率化を図るため2つの型の自動システムが開発された。ロータリー式除雪の自動バケットシステムは、磁気ガイドにそって自動運行

し、集めた雪を一箇所に集めるため雪を集めておく場所が限られている様な場所に最適である。溶雪剤散布機は自動的に散布量を制御することができる。

除雪のために提案する ITS アプリケーションでは、ITS システムにより情報収集を行い、効率的でタイムリーな散布を実現するものであり、ITS インフラを使用することにより完全自動または半自動の運行を実現するものである。詳細な機能やそのための基本要件をプレゼンテーションで発表する。

(6) 交差点衝突回避と IVI 先進除雪機研究実験のインフラストラクチャーのコンセプト

① 発表者 : **Raymond Resendes** (連邦道路庁)

② 発表内容

インフラ協調型アプローチにより効果的なシステム構築を行う。その対象は交差点における事故防止システム分野である。ここでは DOT が直接交差点のインフラを管理していないため展開は少々難しいが、協力して推進することが重要だ。今回特に、特殊車両についてインフラ型協調システムによる衝突防止と車線逸脱防止システムについて検討、評価を行う。

2.3.2 総括セッション

日時 : 12月1日(金) 9:00-12:00

場所 : つくば国際会議場 403 会議室

出席者 : **Mr.Judycki, Mr.Cooper, Mr.Barber and Mr.Paniati from U.S.**

Mr.Fujii, Mr.M.Nakamura, Mr.T.Nakamura, Mr.Yasui, Mr.Yamada,

Mr.Seo, Mr.Mori and Mr.Kenzaka from Japan

議事要旨

(1) 政府機関の再構築とそれに伴う研究所の再編について

- ① 米国側からは、Judycki 局長が「**Organization and Roles in Leveraging Technology and Innovation**」と題して、FHWA の組織と役割について発表を行った。
- ② 日本側からは、藤井所長が「**The Government Reorganization and the Reform of Research Institute**」と題して、日本の省庁再編とそれに伴う土木研究所の組織改革について発表を行った。

(2) 研究開発の将来展望と重点研究開発プロジェクトについて

- ① 米国側からは、Judycki 局長が「**Developing a National Research and Technology Agenda**」と題して、FHWA における技術研究開発についての紹介を行った。
- ② 日本側からは、中村道路部長が「**The New 5-year Program for Road Technology in Japan**」と題して、新道路技術 5 箇年計画についての紹介を行った。

(3) 過去のワークショップのレビューについて

(日本) 瀬尾室長より、過去の WS についての概要を説明。

(米国) 日本側の説明に相違がないことを確認。第 1 回から第 5 回までは幅広いテーマについて議論。第 6 回から第 8 回まではより具体的なテーマを議論し、実施取り決めに定められた内容を実行に移すことができた。WS での議論とともに、現場視察も我々にとって大変有意義であった。

個別のテーマに絞って議論できたことは大変有意義であったし、今後の第 10 回、第 11 回の WS にも大変期待をしている。

(日本) 基調講演について大変有意義な話が聞けてよかった。第 10 回、第 11 回についても、特定のテーマに絞った WS を行ってゆきたい。

(米国) 同意する。

(4) 第 10 回、第 11 回 WS のテーマについて

(米国) 第 10 回 WS については、**Road Traffic Planning** をテーマとし、また現場視察もプログラムに入れたと考えている。

(日本) 実施取り決めに定められたテーマと過去の WS のテーマとを比較すると、橋梁等個別の WS を設けているものを除けば、道路交通計画が唯一残されたテーマと考える。ただ、道路交通計画については、内容が広範囲に及ぶのでトピックを絞る必要がある。

(米国) 来年の WS の会場の候補としてユタ州ソルトレイクシティを考えている。ソルトレイクシティは 2002 年の冬季オリンピックを見越して、10 から 15km に及ぶインターーステートハイウェイの再構築が行われている。特に、ソルトレイクシティの交通マネジメント施策 (**Traffic Management Technique**) として、交通管理センターを見学してもらうことを考えている。

ソルトレイクシティの交通局が了解すれば、交通技術について意見交換の場をセットしたい。ソルトレイクシティは米国の中でも既存交通網の再構築の成功例である。

(日本) 日本としても興味のあるテーマであるので、米国の提案に同意し、ソルトレイクシティでの現場視察及び現地での意見交換に同意したい。ただ、具体的な議論内容については、TDM など幅広いテーマについて議論をしたいと考えており、今後のコンタクトパーソンを定めて、具体的な議論内容について詰めてゆきたい。

(米国) **TDM** については、ソルトレイクシティ以外の都市でも成功を収めている都市がある。開催都市については、ソルトレイクシティ以外の **TDM** 実施都市でも構わない。

(日本) ソルトレイクシティに問題があるといっている訳ではない。開催都市については、ソルトレイクシティで同意する。

(米国) ソルトレイクシティ交通局と次期 **WS** について調整を進めてゆきたい。

(日本) 開催時期についての提案はあるか。

(米国) 冬季オリンピックの開催時期を考慮して決めたい。

(日本) 日本でも 2002 年 1 月に **P I A R C** の冬季大会を札幌で予定しており、これを避けるためには 2001 年の秋が望ましい。

(米国) 2001 年の秋で今後調整したい。

(日本) 第 11 回 **WS** について、何か提案があるか。

(米国) **Asset Management** を提案する。

(日本) 同意する。これについても舗装など幅広い分野を含むので、今後協議を続けたい。

(5) 日米協力の将来的なフレームワークについて

(日本) 今回結論を出す必要はないが、今までの活動は大変有意義であり、2003 年以降の日米協力の継続とそのための新たな実施取り決めの締結を念頭に置いて、今後も協議を重ねる必要があると考える。

(米国) 現在までの協力の枠組みは大変有意義であった。日本側の考えに同意する。

(6) 結論

(日本) 本日の議論を取りまとめると以下のようになると考える。

(1) 今後、第 10 回・11 回の **WS** においてもテーマを特定する方式で行う。

(2) 政策や研究計画に関する基調講演についても必要に応じて行う。

(3) 第 10 回 **WS** のテーマは **Road Traffic Planning** とし、米国ユタ州のソルトレイクシティで開催する。内容については **TDM** などを含む幅広い中から今後協議して決める。

(4) 開催時期は 2001 年秋を念頭に、今後協議して決める。

(5) 第 11 回 **WS** のテーマは **Asset Management** を候補とし、その内容については今後協議して決める。

(6) 2003 年以降の日米協力についても、新たな実施取り決めの締結を念頭に置いて今後も協議を重ねる。

(米国) 同意する。

2.4 閉会式

はじめに、藤井友竝土木研究所長が、今回の日米道路WSは、ITSをテーマとして取り上げられ、最近の技術開発の動向等について、日米両国からの活発な意見交換や情報交換がなされ、実り多きワークショップになったこと、また、これまでの日米ワークショップの総括と今後の方向について議論することができ、大変意義深いワークショップであったと述べた。

次に、Judycki 米国連邦道路庁調査・開発・技術局長が、今回の日米道路WSで実り多い成果が得られたこと、今後も日米両国の理解が深まり、研究協力がますます活発になることを期待していると述べ、次回の日米道路WSは2001年に米国で開催することを述べた。

3 参加者一覧

(米国側)

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Proceedings of
The 9th U.S.-JAPAN Workshop
on Advanced Technology in Highway Engineering

November 28 – December 1, 2000
Tsukuba, JAPAN

March, 2001

- Road Bureau, Ministry of Land, Infrastructure and Transport &
Public Works Research Institute, Ministry of Land, Infrastructure and
Transport, JAPAN
- Federal Highway Administration, Department of Transportation, U.S.A

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1. Outline of the Workshop

1.1 Background and Objectives

The U.S.-Japan Workshops on Advanced Technologies in Highway Engineering started on May 29, 1992, when the Vice-Minister of Construction for Engineering Affairs of Japan, Hiroshi Mitani, and the Secretary of the Federal Highway Administration of the United States, Thomas Larson, signed the agreement for scientific cooperation between Japan and the United States concerning road technologies.

New agreement was signed in January, 1997 by the Vice-Minister of Construction for Engineering Affairs of Japan, Koutarou Hashimoto, and the Secretary of the Federal Highway Administration of the United States, Rodney Slater.

Each year, a workshop has been held alternately in Japan and the United States to exchange general and technical information concerning roads. From the 6th Japan-US Road Workshop, which was held in the United States in 1997 we held workshops for general road affairs every three years and focus on specific and technical subjects in the other workshops.

As the topic for the 9th workshop we selected "ITS", because the Smart Cruise 21 Demo 2000 would be hold in the same week in Tsukuba and we should discuss and exchange technical information concerning ITS and promote future communication after this demonstration.

As this was the special workshop in which we had to discuss general road affairs and future cooperation, a Director-General of Public Works Research Institute, Tomomitsu Fujii, and a Director of Research, Development and Technology, Federal Highway Administration, Dennis Judycki, participated in this workshop, and we reviewed the past workshops and discussed the theme of next workshop and the future cooperation.

1.2 Schedule

- Nov.27 (Mon.) Arrival of the participants from the U.S.
- 28 (Tue.) *Opening Ceremony of Smart Cruise 21 Demo 2000*
Opening Ceremony of the 9th US-Japan Road Workshop
Address:
Tomomitsu Fujii (PWRI)
Dennis Judycki (FHWA)
Keynote Speeches
“ Meeting the Transportation Needs of the 21st Century ”
Dennis Judycki (FHWA)
“Toward an ‘Interactive Road Building’ with Public
Involvement”
Takaya Fujimoto (Road Bureau, MOC)
Reception for Smart Cruise 21 Demo 2000
- 29 (Wed.) *Smart Cruise 21 Session*
Welcome Reception
- 30 (Thu.) US-Japan WS(ITS Session)
Smart Cruise 21 Session
- Dec.1 (Fri.) *AHS Workshop*
US-Japan WS(Summarization Session)
Closing Ceremony
Address:
Tomomitsu Fujii (PWRI)
Dennis Judycki (FHWA)
Presentation of the memorials
- 2 (Sat.) Study Tour in Kamakura
- 3 (Sun.) Departure of the participants from the U.S.
- ※ *Italics indicate the programs of Smart Cruise 21 Demo 2000*

1.3 Workshop program

Tuesday, November 28

13:00-14:00 *Opening Ceremony of Smart Cruise 21 Demo 2000*

14:00-15:00 *Smart Cruise 21 Demonstration*

15:30-16:00 *Opening Ceremony of the 9th U.S.-Japan Road Workshop*

- PWRI Meeting Room 8F -

- Address by Tomomitsu Fujii, Director-General, PWRI, MOC

- Address by Dennis Judycki, Director of Research, Development and Technology, FHWA

16:00-16:30 *Group Photo*

- PWRI Meeting Room 8F -

16:30-17:30 *Key note Speech*

- PWRI Meeting Room 8F -

- "Meeting the Transportation Needs of the 21st Century "

Dennis Judycki, Director of Research, Development and Technology, FHWA

- "Toward an "Interactive Road Building" with Public Involvement"

Takaya Fujimoto, Director for National Highway Division, Road Bureau, MOC

Wednesday, November 29

10:20-12:30 *SC21 Program*

- TICC Meeting Room 300 -

12:30-13:30 *Lunch*

- TICC Meeting Room 403 -

13:30-17:30 *SC21 Program*

- TICC Meeting Room 300-

TICC = Tsukuba International Congress Center

Thursday, November 30

9:00-12:00 US-Japan Workshop (ITS Session)

- TICC Meeting Room 302 -

(10:30-10:45) Coffee Break

“ Current ITS Activities in Japan “

Harumi Kikuchi, ITS Policy and Program Division, MOC

“ Commercial Vehicles and the Intelligent Vehicle Initiative ”

Steve Barber, FMCSA

“ Requirement of AHS for Implementation Scenarios of AHS Evolution ”

Masafumi Mori, ITS Division, PWRI

“ Transit IVI – Enhancing Bus Safety and Mobility ”

Edward Thomas, FTA

“ AHS for Snow Removal Vehicles Using Lane Makers ”

Yasushi Nitta, Mechanical Engineering Division, PWRI

“ Infrastructure Concepts for Intersection Collision Avoidance and IVI Advanced Snow Plow Research and Testing ”

Raymond Resendes, FHWA

12:00-13:00 Lunch

- TICC Meeting Room 302 -

13:00-17:30 *SC21 Program*

- *TICC Meeting Room 300* -

Friday, December 1

8:30-12:00 *AHS Workshop Program*

- *TICC Meeting Room 300* -

12:00-13:00 Lunch

- TICC Meeting Room 300-

14:30-17:30 U.S.-Japan Workshop (Summarization Session)

- TICC Meeting Room 403 -

(15:45-16:00) Coffee Break

- Outline of government reorganization and restructuring of research functions
- Future directions and prioritization of research and development projects
- Review and discussion of past workshops conclusions and actions
- Possible themes and activities of the 10th and 11th workshops
- Outline areas for future cooperation under agreement
- Conclusions

18:00-18:30 Closing Ceremony for the U.S.-Japan Workshop

- TICC Meeting Room 403 -

- Address by Tomomitsu Fujii, Director General, PWRI, MOC
- Address by Dennis Judycki, Director of Research,
Development and Technology, FHWA
- Presentation of Memorials

2. Report of the Workshop

2.1 Opening ceremony

The Director-General of the Public Works Research Institute, Tomomitsu Fujii, described the backgrounds before holding the 9th US-Japan Road Workshop. He mentioned that the 1st -5th workshops had been held to exchange general and technical information concerning roads, and at the time of the 6th workshop we decided to hold workshops which would focus on specific and technical subjects to enhance information exchange, except for the comprehensive meetings to be held every three years, the topic for the 6th workshop was "environment", that for the 7th workshop was "pavement", that for the 8th workshop was "traffic safety".

He added that the past workshops conclusions and future cooperation would be discussed in the 9th workshop for general road affairs every three years.

He thanked to Mr. Judycki for his help for the PWRI members who were sent to the FHWA.

The Director of Research, Development and Technology of FHWA, Dennis Judycki, stated that the US-Japan Road Workshops were significant for FHWA in terms of technical information exchange. He explained that the eight workshops in the past had produced excellent results, and that the 9th workshop would also be fruitful and he would expect to have continuous US-Japan cooperation. He also introduced the other participants from the United States.

2.2 Keynote speeches

2.2.1 Meeting the Transportation Needs of the 21st Century

1)Speaker : Dennis Judycki, Director of Research, Development and
Technology, FHWA

2)Abstract:

Next page

Meeting the Transportation Needs of the 21st Century

(Keynote address by Dennis C. Judycki, Director of Research, Development, and Technology, U.S. Federal Highway Administration, to the participants in the 9th Annual U.S.-Japan Workshop on Advanced Technology in Highway Engineering and the Smart Cruise 21 Demonstration on November 28, 2000, in Tsukuba, Japan.)

Introduction

Over the past year, you have probably heard many presentations about identifying and meeting the transportation needs of the 21st century. I don't profess any great prophetic powers, but I believe that we, as transportation officials who have the task to think and plan strategically, (we) can examine our priorities and observe trends to determine the most probable developments over the next several years. Transportation trends and emerging developments and innovations, lifestyle changes, and economic conditions are prime indicators of future mobility needs. And I would like to share my perspectives about how these indicators are affecting highway-related research and development in the United States.

One does not have to have great prophetic powers to recognize that people in the 21st century will see dramatic and enormous changes in transportation. I am struck by the parallel of the achievements of the past century and the challenges of the next century. When the original predecessor of the U.S. Federal Highway Administration was formed as a two-person office in 1893, the U.S. transportation system consisted of coal-powered railroads, steamboats and barges, and a quasi-network of dirt roads built for horses and horse-pulled vehicles. No one could have imagined the total scope of today's system moving people and goods through the air; underground; and on the surface in modern automobiles, buses, trucks, and trains. The transportation changes of this century will be every bit as dramatic, and the challenges are just as massive.

U.S. Secretary of Transportation Rodney Slater describes it this way: "We are in the midst of a revolution in transportation technologies that will transform our economy and our daily lives as much as the arrival of the railroad, commercial aviation, and the Interstate (Highway) System did."

For most Americans, even some of the current technologies that are just emerging commercially, such as the Intelligent Vehicle Initiative technologies, seem like fantasy. And we know that these technologies are just the tip of the iceberg.

Exploiting Technology Is Essential

The highway system of the 21st century will be founded on technology. To maintain the transportation systems of tomorrow, we, in the United States, will combine the record level of resources provided by our Congress through the Transportation Equity Act for the 21st Century with a strong research, development, and technology program. The Federal Highway Administration supports robust research and technological development because they are absolute necessities for a safe, modern, and efficient transportation system that employs not only the best materials and practices but also takes advantage of the latest communication and computer technology.

Anticipating needs and finding early responses are mandatory, not optional, to us. We must respond to the developing trends that we face — increased demand on roads, population growth, an aging population, urban and suburban sprawl, and communication technology

that will continue to outdo itself at a brisk pace. These trends drive our research program.

Communicating and Collaborating Are the Keys to Progress

Our capability to rapidly disseminate and share information using communication and computer technology and telematics is the principle trend that shapes the incredible speed with which the face of transportation is changing globally. This is true from both the perspective of transportation planning and programs and the perspective of new intelligent transportation systems and products.

Transportation professionals, planners, and decision-makers in the United States have an ever-increasing need for rapid, reliable, and relevant information. This need is made more urgent by the requirement for improved collaboration and by the incredible pace of technological innovation and development. This trend is manifested in the United States in several ways. First, by giving the states more authority in project management and decision-making.

In the past, the Federal Highway Administration typically received most of the highway-related research and technology funding from Congress, and the Federal Highway Administration took the lead in prioritizing needs, developing programs, and expending those funds. Federal Highway Administration researchers actively brought people and ideas together to identify research and technology priorities and gaps. The Transportation Equity Act for the 21st Century enacted in 1998, funded total highway research and technology at slightly higher levels than previous years. But this time, the funds had more strings attached. Congress shifted resources and program flexibility away from the Federal Highway Administration, and gave a higher portion of research and technology funding to others, including state departments of transportation and university transportation research centers. Whereas, in the past, the Federal Highway Administration had the predominant voice, it was now clear that the many diverse voices throughout the transportation community needed to come together in harmony to articulate the overall value and priorities for highway research and technology. The research and technology process needed to be broader and more inclusive.

Also, the Federal-Aid Highway Program operates today with a budget of nearly \$30 billion a year, and our varied funding programs include financial aid for bridges, roadways, scenic byways, and historic transportation facilities. Now state and local officials can select the best mix of projects to address their unique transportation needs. As a result of these management shifts, communication and coordination became even more important and exponentially more complex than before.

This also resulted in an increased emphasis on partnership and collaboration. While partnerships with other federal agencies, state and local governments, municipal planning organizations, associations, universities, and private industry have always been important to the Federal Highway Administration, the dynamics of the highway funding legislation necessitated even more collaboration between all stakeholders interested in transportation infrastructure and research and technology investment.

Highway research and technology is a multimillion-dollar industry in the United States. In fiscal year 2001, the Federal Highway Administration alone will have almost \$380 million for research and technology activities, including intelligent transportation systems. State departments of transportation will spend on the order of \$140 million. The universities program is funded at the \$30 million level, and it is estimated that private industry will spend about \$100 million. From all sources, the total highway research and technology program in fiscal year 2001 is estimated to be approximately \$650 million.

The critical challenge is to bring together the voices of the many, many stakeholders and to establish a unified agenda for highway research and technology. That's why we are very proud to be a major contributing partner with American Association of State Highway and Transportation Officials and the Transportation Research Board in developing a framework for aligning highway research and technology activities throughout the nation. This framework is called the National Research and Technology Partnership Initiative.

This kind of cooperation and collaboration is the key to achieving the vision for transportation so frequently and eloquently expressed by Secretary Slater. The secretary envisions a transportation system that is international in reach, intermodal in form, intelligent in character, inclusive in service, and innovative in scope.

And from the perspective of transportation systems and products, no one needs to explain to you the explosive growth of computer and information technology and the rapidly developing field of telematics. Japanese researchers are among the world's leaders in these areas.

And the incredible pace of technological innovation and development to which I previously referred is fueled by our vastly increasing ability to share knowledge. The rapid dissemination of new discoveries and procedures through the Internet, e-mail, and other communication methods enables researchers to literally learn from the mistakes and successes of others so that we can build on each other's work to make advances that sometimes come so quickly that the state of the practice lags far behind the state of the art.

The Role of Innovation

At the Federal Highway Administration, we strongly encourage and support the collaboration and partnerships that are essential to closing this gap between the state of the art and the state of the practice. Secretary Slater has high expectations for the role that innovation will play in meeting the transportation challenges of the immediate future, but he defines innovation this way: "Innovation requires more than new ideas. It requires bringing these new ideas to the marketplace. ... Innovation is more than invention. Daimler invented the automobile, but Henry Ford had the vision to create a global industry. We must follow the example of leaders like Henry Ford, whose success depended more on innovation rather than invention. The challenge we face as members of the transportation research community is to make sure we are investing our time and resources in technology with the potential to move beyond mere invention."

U.S. Demographics

This kind of innovation is vital to responding the changing demographics of America. Transportation expert and author Alan Pisarski calls transportation "the collision of demography and geography. ... Transportation is a fascinating interaction of sociology, economics, and technology. It is so interwoven with the social and economic structure of all societies, and most conspicuously American society, that its connections and impacts are inextricable from the understanding of the society itself."

I will just briefly mention a few demographic trends that interact with each other and with the increasing demands on our transportation infrastructure. They are: the population of the United States is growing rapidly, the population is growing older, and the population is becoming more and more concentrated in metropolitan areas.

Even though the rate of population growth in the United States is slowing from 1.9 percent in the mid-20th century to 0.9 percent now, our population will still grow by 20 percent by

2020 and by 43 percent by 2050, according to the estimates of the U.S. Census Bureau.

Now, 13 percent of Americans are more than 65 years of age, but by 2025, the projection is 19 percent. And more startling is the estimate that the number of people in their 50s is increasing by 50 percent from 1995 to 2005. Accommodating an increasing number of older drivers, who have always lived in a mobile society and who have a high propensity for travel, will present some interesting challenges.

The United States has become a nation of large, extended metropolitan areas and suburbs. In 1940, 15 percent of the population of the United States lived in suburbs, 32 percent in center cities, and 52 percent in rural areas. By 1990, the suburban and rural percentages were reversed with 47 percent in suburbs, 32 percent in center cities, and 21 percent in rural areas. And suburb-to-suburb commuting in metropolitan areas accounted for about 15 percent of work trips in 1970 and for 44 percent in 1990. The implication of this is that it is getting harder to serve work trips with conventional transit.

More people are traveling more often. Between 1970 and 1990, while the population increased by 29 percent, the passenger miles-traveled increased by 95.3 percent. For trips of more than 160 kilometers, leisure has outrun work trips as the dominant determinant of travel demand.

Meeting the Challenges

We cannot build our way out of our current and projected problems. We must operate more efficiently. Therefore, to respond to these trends and meet these challenges, we at the Federal Highway Administration are working to leverage technology and innovation. We are investing in intelligent transportation systems and technology applications to ensure that we can improve mobility through more efficient transportation operations.

Intelligent transportation systems (ITS) give us the leverage to manage and operate the system. Over the past several years, we have made tremendous strides in deploying ITS around our country and around the world. We are well past the beginning stage in the United States, and deployment of ITS infrastructure in our largest metropolitan areas is now one of the top five priorities of the Federal Highway Administration. Our goal is to have basic ITS infrastructure deployed in the nation's 75 largest metropolitan areas by 2005. It is nearly impossible to envision the next several decades without including the rapid proliferation of ITS applications throughout transportation.

But the focus is not on ITS alone. To ensure the sustainability of our National Highway System, the Federal Highway Administration is also emphasizing asset management, infrastructure renewal, and safety, among other things.

As Tony Kane, the Executive Director of the Federal Highway Administration, said, "We should look at ourselves as a business enterprise, responsible for billions of dollars of assets. (In the United States, we have a very large system more than 6.4 million kilometers of roads with about 500,000 bridges as part of an investment of more than \$1 trillion.) What is your corporate report each year in terms of how well you are serving your customers with those billions of dollars of assets?"

Infrastructure renewal is another major emphasis of our research and technology program. We are working to improve the condition of our bridges and pavements. For example, the Superpave system, a new method for asphalt pavement material selection and design, has been very successful. In 1999, it was used in 35 states and in more than 3,000 construction projects. With Superpave, we have not only achieved a longer lasting, more durable

pavement, but also an estimated savings of more than \$1.5 billion a year. In addition, with Superpave, there are fewer delays and less frequent roadway repairs, meaning increased safety for drivers and highway workers.

We are very concerned about the safety of drivers and highway workers in work zones. In the past decade, more than 8,000 people lost their lives in work-zone crashes. The Federal Highway Administration, in conjunction with the American Traffic Safety Services Association and the Association of State Highway and Transportation Officials, has taken several measures to make work zones safer, one of which was designating a National Work-Zone Safety Awareness Week last April.

Safety will remain a major priority of the Federal Highway Administration in the 21st century. Enhancing safety is an integral part of the design, construction, and operation of our highways. We are working hard through our research program to provide better tools and models, such as finite element analysis modeling for crash analysis, the Interactive Highway Safety Design Model, and crash-avoidance technologies.

Conclusion

Throughout its history, the Federal Highway Administration has met the ongoing challenge of adapting to changing times. With the Interstate System essentially complete, our focus has turned toward the post-Interstate era. This means a focus on infrastructure renewal and improved safety and operations. Through the landmark Intermodal Surface Transportation Efficiency Act of 1991 and its 1998 successor, the Transportation Equity Act for the 21st Century, our emphasis has been updated to meet the demands of an increasingly urban, mobile, diverse, and prosperous society.

Unless we have major technological breakthroughs, highways will probably remain the primary mode for short- and medium-distance intercity travel. Highway traffic will probably still consist of some advanced type of passenger and freight vehicles, but with different fuels and propulsion systems over time. As ITS applications are introduced to highways, benefits such as better safety, higher speeds, and more capacity will result.

This week — both at the Smart Cruise demonstration, when we will be assessing the capabilities of ITS and discussing future applications, and at the workshop on Friday, when we will be discussing future cooperation in research and development — we will be sharing information and working together in a way that is absolutely essential for meeting the transportation demands of our nations in the 21st century.

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2.2.2 Toward an "Interactive Road Building" with Public Involvement

1)Speaker: Takaya Fujimoto, Director for National Highway Division, Road Bureau, MOC

2)Abstract:

Japan, over these last several years, has worked on various measures to better integrate Public Involvement (PI) into its road planning and building.

Japan's public road system administration is marked by the time required to set policy, and by cases of public disgruntlement with the results. Such provided the drive to integrate PI into road management.

While 1998 marked the launch of the latest 5-Yr. Road Improvement & Management Program, the years prior included studies of what the focuses and contents of the program should be. Public Involvement is a primary pillar of the plan.

Our systems of democracy were brought in from the West. The basic principle is that of majority rule but it is also vital to see how we can best respect the views of the minority. Considering the silent majority is also an issue.

The work of building infrastructure clearly reveals what conflicting interests are involved. I.e., the structure is such that those who benefit from externally induced economic activity, a.k.a. the beneficiaries, and those who are deprived by the same external economic activity or who must bear the costs, a.k.a. the taxpayers, do not all belong to the same group. In these conditions, we think PI offers a potentially effective means to reflect the views of minority stakeholders.

Specifically, for the 5-Yr. Road Improvement & Management Program, PI was incorporated from the earliest stages of planning. First, to establish the Program's guiding policies, we compiled and distributed a "Kick Off Report" survey of how the general public viewed its public roads. Next, we compiled a "Voice Report" that noted what policies might best cover the issues raised. In this period, some 130,000 opinions were logged. The resulting 5-Yr. Road Improvement & Management Program has tried to reflect every opinion in its policies.

While PI might be required at every stage of road building from planning to surveys, to construction to management, this report focuses on PI in the planning stage. In terms of planning, many from the public opined they first became aware of road plans at the decision making stage of urban planning and complained that government imposed the roads as done deeds. There were charges that planning consequently fails to reflect opinions on environmental impact and/or calls to review our vehicle-dependent social structures.

As an example, the general routes of expressways are outlined in legislation. What the general public sees is the next step: planning at the 1/5000 level of detail. Consequently, what the public experiences is

the sudden appearance of plans for an expressway next to their homes.

Such factors indicate we may have been remiss in not including the step of giving public explanations in the early stages of planning. Explaining the process to the public is particularly important at the planning stages. Therefore, the Ministry of Construction is currently field testing PI in the planning stages. Please note there are myriad ways to implement PI, with each field office using its own way. Nor would it be easy to use a system uniform to all areas.

Earlier, Mr. Judycki noted the importance of road management. Japan too considers road management to be pivotal; we are trying to enhance road management processes by incorporating IT technology and expanding public involvement.

We are now considering ways by which we can improve government interaction with the general public at all stages of roadway system management. PI is heavily incorporated in the West, but historical and cultural differences make it difficult to identify any system as the best nor can any system be brought to Japan for use as is.

Several future issues are involved in integrating PI into the overall system.

First, we must clearly define the costs and systems needed to integrate PI.

Secondly, we must have a consensus on the part of the public and government on the need for PI, and incentives for integrating PI into the overall operation of the program.

Third, we need systems capable of covering the larger territories that come with major projects, and bring in something similar to the MPO system in the U.S..

Fourth, we need PI specialists. PI includes diverse systems and methodologies that require a rich and extensive experience to fully use. We need experts with specialized know how.

Fifth, we need greater awareness of PI. In other words, we need the general public to more aware of what PI holds for them especially in terms of community building, road systems, and in participation in planning.

And finally, we need to bank data and enhance PI techniques. It is important to place the different PI approaches into a database for reference.

Japan's is referred to as a society of consensus, and Japanese are reportedly awkward with intense debate. However, if intense debate is what is needed to determine how social capital is allocated, civil servants too must develop techniques for forging consensus.

We hope to continue to draw on U.S. examples, and believe strengthening the Japan-U.S. bonds of cooperation is imperative.

2.3 Session

2.3.1 ITS Session

DATE: 9:00 – 12:00, 30 November (Thursday), 2000

SITE: Tsukuba International Congress Center, Rm. 302

(1) Overview of Smartway Program

1) Speaker: Harumi Kikuchi (ITS Policy and Program Division, MOC)

2) Contents of the presentation

ITS activities in Japan are supported by the cooperation of five ministerial bodies and other related organizations. The ITS budget of Ministry of Construction has allocated about 84.6 million dollars for R&D in 2000. Among ITS applications, ETC and VICS services have already been implemented. Smart Cruise system development is now underway. This system is composed of Smart Cars, Smart Gateway and Smartway. At this occasion of Smart Cruise 21, a variety of functions are tested and in 2001, further system development and standards including system architecture will be promoted to achieve the realization of Smartway in 2015. The DSRC 5.8 GHz active format now used for ETC systems will be employed for communications among road operators and regional construction bureaus based on the road communication standards and the system architecture. The services which will be available through AHS range from lane departure avoidance, to collision prevention and to maintenance of safe headway. To evaluate these functions, a tool called SIPA (Smart Infrastructure Performance Analyzer) has been developed. The tool allows functions to be evaluated on two levels: at the micro level and at the macro level. The micro level is the evaluation of drive behavior, route selection and other traffic phenomena, and the macro level is of amount of traffic, length of traffic jams and other traffic phenomena. More details for each item are explained in the presentation.

3) Questions and answers

U.S. side: Having now heard the presentation regarding 5.8GHz DSRC, I would like to ask if 5.8GHz DSRC will be mandatory in the future?

Japan side: At present, we do not think that DSRC will need to be mandatory but we are now examining the use of OBE with

DSRC when the infrastructure is developed and deployed. The Ministry of Posts and Telecommunications regulates radio wave frequencies.

U.S. side: Has DSRC already been standardized in Japan or have any applications been applied in practice, which are using DSRC technology?

Japan side: Road communication is subject to standardization. This allows regional road bureaus and construction offices to communicate with each other by ensuring inter-connectibility.

(2) Commercial Vehicles and the Intelligent Vehicle Initiative

1) Speaker: Steve Barber (FMCSA)

2) Contents of the presentation

The annual number of fatalities in the U.S. reaches around 40,000 people, of which 5000 are due to commercial vehicles accidents. Facing those facts, Federal Motor Carrier Safety Administration is assigned to address the ambitious goal of reducing fatalities by 50% by 2010 through their effort to promote technical development in six areas. The first is overturn prevention technology. This has already been in the field test phase in cooperation with industries. The second is infrastructure-based obstacle warning system using GPS. This will also be in the testing stage in cooperation with industries in 2001. The third is lane departure prevention system using video cameras. The fourth is eyelid closure rate measuring system which uses video cameras or electronic sensors. The fifth is electronically controlled braking system, and the last one is the development of other various sensors including braking sensor, tire condition sensors. To achieve these developments effectively, the cooperation with industries is indispensable.

(3) Scenarios of AHS Evolution

1) Speaker: Masafumi Mori (ITS Division, PWRI)

2) Contents of the presentation

Traffic accidents are a major concern in recent traffic development in Japan. The primary causes for these accidents are a driver's delay in detection, errors in judgement and errors in operation. To alleviate traffic accidents, Ministry of Construction is addressing the AHS project, which

provides supporting functions for drivers, at each of three phases. The system offers assisting services through role sharing between road infrastructure and vehicles. Particularly, information on blind spots assists a driver to make prompt and appropriate operational judgements. In the next phase when a drive fails to act properly, the vehicle will provide warnings and further, the vehicle will be automatically controlled to avoid imminent hazards. With AHS, the target in a long term is to achieve about a 50% reduction in the traffic accident rate. AHS uses road sensors to gather information and a processor relays the appropriate form of information via beacon to a vehicle. The vehicle provides services to its driver at appropriate times based on location information, etc. from lane markers. To implement AHS, a scenario is prepared by MOC and released in the presentation.

3) Questions and answers

Japan side: One university professor reported in his presentation that the estimated cost for AHS per commercial vehicle could amount to around a million yen. In your reasoned opinion, how much would you estimate the expected cost to be per vehicle?

U.S. side: We do not have any document to witness the estimation in detail but in my opinion, I think it will be around 1000 dollars per commercial vehicle.

(4) Transit IVI: Enhancing Bus Safety and Mobility

1) Speaker: Edward Thomas (FTA)

2) Contents of the presentation

Transit rider (bus and rail) started to increase since 1995, and in 1999 increased 6%. This increase creates driver fatigue, affects pedestrian safety and passenger security, all of which need to be addressed. A variety of accidents types were analyzed including lane change and merge, rear end, intersection, parked, pedestrian. Transit agencies must expand the level and quality of service and become more sensitive to safety Transit in the US does not cover cost from the fares. Average operating cost continues to grow while maintenance and insurance costs have stabilized.

The strategic direction is to be visionary in looking for solutions, and meet the mission to create safer, more mobile transit systems. The strategic goal

to reduce the number of injuries and fatalities and accidents and improve mobility.

Based on accident quantity and severity, a list of priority areas were identified including lane change and collision warning, and passenger and pedestrian incidents. Transit IVI will be based on accident trends and overall system needs.

Over the next five years, development of transit IVI will proceed. Early efforts are for collision avoidance, and then moving to field testing of lateral control and pedestrian detection, and ultimately to integrate and deploy the safety enhancing technologies in the fast growing bus rapid transit system (BRT). BRT is intended to increase the level and quality of bus services and introduce a lower cost surface transportation option. The end of the cycle of innovation is mainstreaming of intelligent transit vehicles through the \$7 billion capital programs.

FTA is looking to broaden partnerships to foster innovation through R&D. This will involve integration of onboard vehicle systems and integration of vehicle to infrastructure systems. FTA will provide oversight and technical assistance regarding the safety of the systems and their connection to the national ITS architecture.

3) Questions and answers

Japan side: I have studied the development of BRT. I am wondering if there is positive activity toward such development as BRT in the U.S.?

U.S. side: Currently, about 195 projects exist and most of these use light rails. However the cost is problematic because the federal budget allocation alone is not enough to cover the total costs. In order to overcome this cost problem we are compelled to study the introduction of ITS technologies.

Japan side: ITS activities using light rails have also begun to be active in Japan. Ministry of Construction is not involved in construction of rails but provides infrastructure and terminals, such as for bus stops.

(5) ITS Application For Snow Removal

1) Speaker: Yasushi Nitta (Mechanical Engineering Division, PWRI)

2) Contents of the presentation

Giving consideration to characteristics of snow in Japan, snow removers are two stage types, consisting of an auger for scraping and chute for throwing. The operation of snow removers always involves hazards and requires skill, and efficiency is low. To enhance existing systems of snow removal, two types of automated systems have been developed. An auto-pilot system for rotary snow removers travels automatically along a magnetic guide installed on roads and snow throwing is concentrated on-point which is useful in places where limitations exist on allowed snow deposit sections. A salt spreader automatically controls the amount of anti-icing agents to be spread.

The ITS application that we propose for snow removal is to use information gathered through ITS to realize efficient and timely operations and to use ITS infrastructure to realize automated or semi-automated operations. Further functions and requirements are introduced in the presentation.

(6) Infrastructure Concepts for Intersection Collision Avoidance and IVI Advanced Snow Plow Research and Testing

1) Speaker: Raymond Resendes (FHWA)

2) Contents of the presentation

The goal of the activity is to achieve effective system development using the infrastructure cooperative approach. The system is subject to the intersection collision avoidance area. The system development includes some difficulties because the federal administration, DOT, has no control over the intersection infrastructure. However, close cooperation is critical to promote this infrastructure cooperative system development. This time we decided to use specialty vehicles to evaluate the effectiveness of collision avoidance systems and lane departure prevention systems.

2.3.2 Summarization Session

DATE: 14:30 – 17:30, 1 December (Friday), 2000

SITE: Tsukuba International Congress Center, Rm. 403

ATTENDEES:

US side: Mr. Judycki, Mr. Cooper, Mr. Barber, Mr. Paniati

Japan side: Mr. Fujii, Mr. M. Nakamura, Mr. T. Nakamura,
Mr. Yasui, Mr. Yamada, Mr. Seo, Mr. Mori, and Mr. Kenzaka

AGENDA ITEMS:

1. Outline of Government Reorganization and Restructuring of Research Functions
 - a) From the US side, Mr. Judycki briefed "Organization and Roles in Leveraging Technology & Innovation", outlining the future structure and roles of the Federal Highway Administration (FWHA).
 - b) From the Japanese side, Mr. Fujii talked about "Government Reorganization and the Reform of Research Institutions", outlining the new structures of Japan's ministries and agencies, and of the Public Works Research Institute (PWRI).
2. Introduction and Information Exchange on Future Directions and Prioritization of Research and Development Projects
 - a) From the US side, Mr. Judycki briefed "Developing a National Research and Technology Agenda" in his overview of FWHA R&D programs.
 - b) From the Japanese side, Mr. T. Nakamura outlined "The New 5-Year Program for Road Technology in Japan," the umbrella for Japan's road R&D projects.
3. Review of the 6th – 8th Workshop Themes, Activities, Results

(Japan side:) Mr. Seo delivered a summary of past workshops.

(U.S. side:) There was no disagreement with the Japanese summary which said the 1st through the 5th Workshops covered general themes, in contrast with the 6th through the 8th, which focused more on specific subjects and practical applications. In conjunction with workshops, on-site tours and field trips were of particular value.

The new emphasis on specific subjects was considered fruitful, and should be continued in the 10th – 11th Workshops.

(Japan side:) Keynote Addresses have also proved to be of notable value, and should be also included in the 10th – 11th Workshops.

(U.S. side:) Agreed.

4. Possible Themes and Activities of the 10th – 11th Workshops

(U.S. side:) Road Traffic Planning is a potential theme for the 10th Workshop, which can include an on-site tour.

(Japan side) The theme aligns well with the themes of past Workshops, with the exception of the themes which have their own workshops such as on Bridges. It is the only topic not yet covered among those listed in the Implementing Agreement. However, the subject of Road Traffic Planning may be too broad, so we should be more specific.

(U.S. side:) One candidate site for next year's workshop is Utah's Salt Lake City. In preparation for the 2002 Winter Olympics, Salt Lake City has started rebuilding 10–15 miles of Interstate highways. As the center of the City's Traffic Management programs, we will be able to view the operations of the Traffic Management Center.

The approval of the Salt Lake City Traffic Bureau is needed, but this can be a subject for fruitful exchange on advanced traffic management. Salt Lake City is an excellent example of improving existing highway systems in the U.S.

(Japan side:) Japan is also interested in this subject, so the US suggestion is accepted. We hope to have on-site tours and a forum for exchanges in Salt Lake City. However, specifics points for discussion under the general topic of TDM, should be finalized in talks between each country's point of contact.

(U.S. side:) There are other examples of successful TDM besides Salt Lake City. The site for the next workshop can also be one of these other cities.

(Japan side:) We do not think there is any problem with Salt Lake City. As host site, Salt Lake City is acceptable.

(U.S. side:) We will discuss arrangements of the workshop with the Salt Lake City Traffic Office.

(Japan side:) Are there any suggestions on timing of the next Workshop?

(U.S. side:) The timing should not conflict with the Winter Olympics.

(Japan side:) Japan too, will host the PIARC winter session in Sapporo in January, 2002. To avoid schedule conflict with this event, autumn of 2001 is preferable.

(U.S. side:) We shall try to arrange the Workshop for autumn of 2001.

(Japan side:) Any recommendations for the theme for the 11th Workshop?

(U.S. side:) How about Asset Management?

(Japan side:) Agreed. This topic is also broad, so let us continue discussions to decide more specific parameters.

5. Discussion on Long Term Directions and Framework of U.S.-Japan Cooperation that Accounts for Reorganizations

(Japan side:) We do not need to reach a conclusion at this time, but we want to note how valuable the cooperation to date has been. We suggest continuing these exchanges but we must remember that a new Implementing Agreement is needed for activities for the year 2003 and further.

(U.S. side:) We also think the cooperation has been mutually beneficial. We agree.

6. Conclusions

(Japan side:) Mr.T.Nakamura summarized today's discussions as follows.

- a) Themes for 10th and 11th Workshops should also be focused on specific subjects.
- b) Keynote Addresses on policies and research planning will be continued.
- c) The 10th Workshop theme is Road Traffic Planning; the event is tentatively scheduled for Salt Lake City, Utah. Specifics discussion points such as TDM will be decided in coming discussions.
- d) Tentatively, the Workshop is scheduled for the fall of 2001.
- e) The candidate theme for the 11th Workshop is Asset Management; specific discussion points will be decided in coming discussions.
- f) Both sides agree to further discussions over a new Implementing Agreement to govern activities in 2003 and beyond.

(U.S. side:) Agreed.

2.4 Closing Ceremony

Tomomitsu Fujii, the Director-General of the Public Works Research Institute, noted that the 9th workshop had been fruitful because we could exchange a lot of technical information, particularly ITS technology, between Japan and the United States and we could discuss the past workshops conclusions and future cooperation.

Dennis Judycki, the Director of Research, Development and Technology of FHWA, stated that the 9th US-Japan Road Workshops had been fruitful and expressed his hope to continue such significant meetings and the next US-Japan road workshop would be held in the United States in 2001.

3. List of participants

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Yasuhiko IWASAKI, Director of Okayama National Highway Office

付録 / Appendix
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**1.1 Toward an “Interactive Road Building” with Public Involvement
(Mr. Takaya Fujimoto)**

Toward an "Interactive Road Building" with Public Involvement

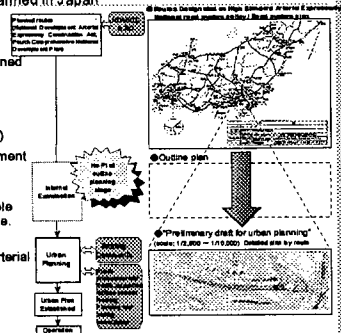
What people say...?

- We had never heard of the road plan until it was discussed at urban planning (detailed planning) stage!
- When and who defined the road plan?
- The plan will destroy the environment.
- To begin with, is the road really necessary? Shouldn't we begin with reexamining our lifestyle wholly depending on cars?

The background of the public opinion

How roads are actually planned in Japan.

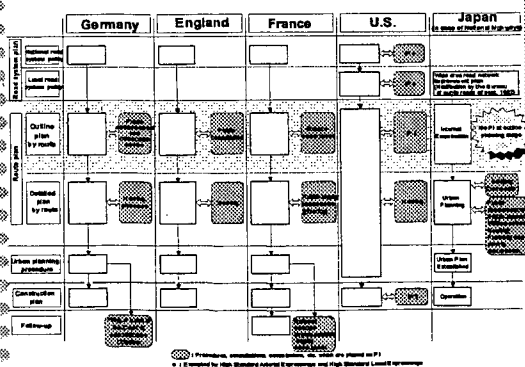
- Designation of routes planned as high standard arterial expressways. (National Development Arterial Expressway Construction Council and Road Council)
- There is no public involvement at outline planning stage.
- Urban planning procedure (Detailed plan) Local people are notified for the first time.
- (In case of high standard arterial expressways)



The background of the public opinion

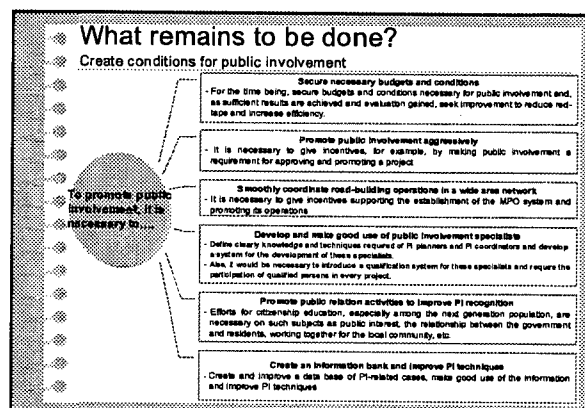
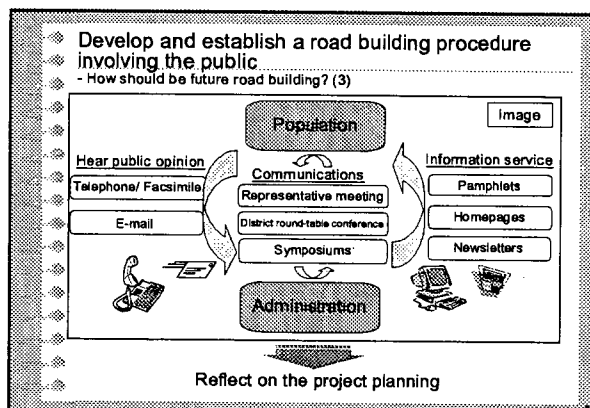
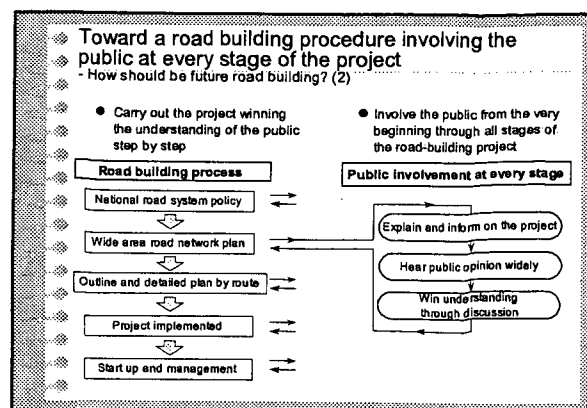
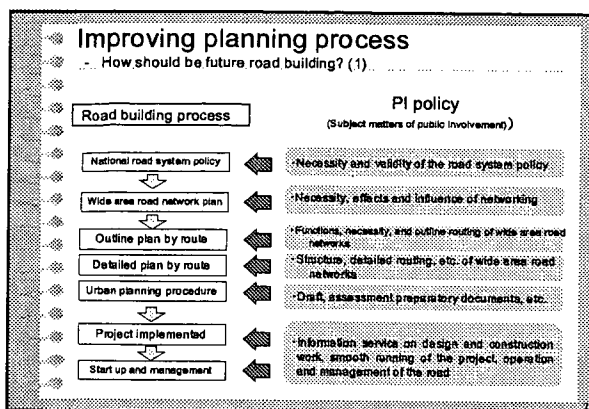
Comparison with European and North American countries

- In Japan, the outline planning is carried out only by administration staff and is rarely disclosed to the public.
- While in European and North American countries, the planning process is institutionalized and the public is involved through all stages of the planning.
- Thus, in Japan, people learn about a road building plan for the first time when it is presented at urban planning stage.



Orientation of road building

- Reexamine and Improve planning process
- Toward road planning system involving the public at every stage of planning.
- Device and establish a system of public involvement for interactive road building suitable to Japanese social situation and climate



2.1 Overview of Smartway Program (Mr.Harumi Kikuchi)

The 9th US-Japan ITS Workshop Overview of Smartway Program

30 November, 2000

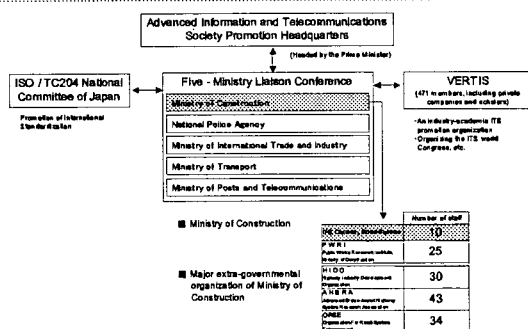
Harumi Kikuchi
ITS Policy and Program Division
Ministry of Construction, Government of Japan

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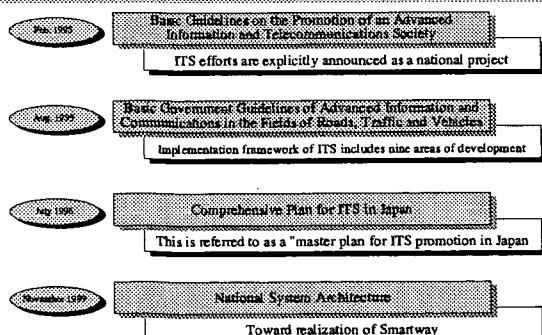
1. Introduction of Smartway
2. S.A. and Standards
3. ITS Deployment in Japan
4. Smartway - A platform for ITS
5. Ways to accelerate regional deployment
6. Evaluation of Smartway
7. Cooperation in the future between US and Japan

1. Introduction of Smartway

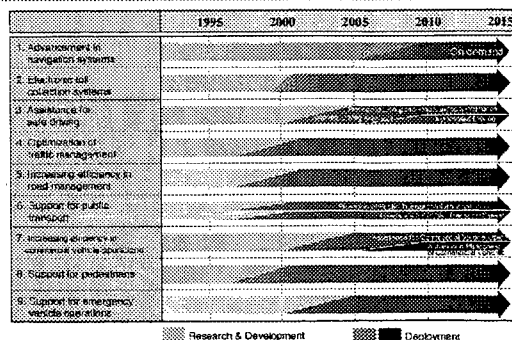
ITS-related organizations in Japan

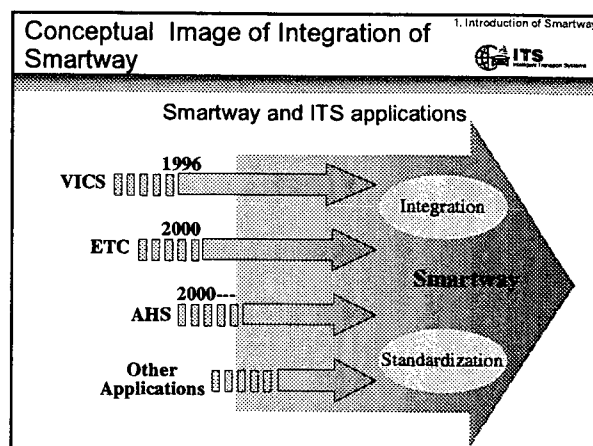
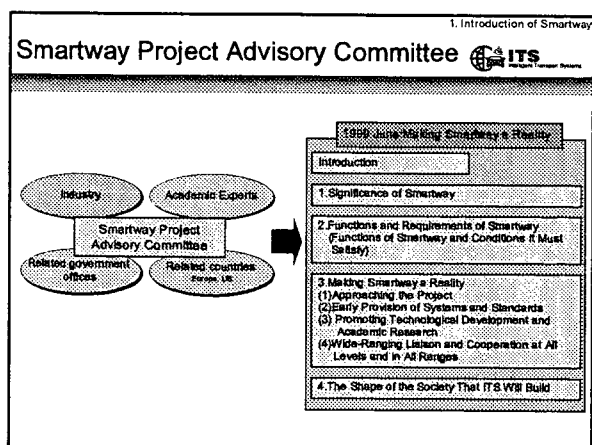
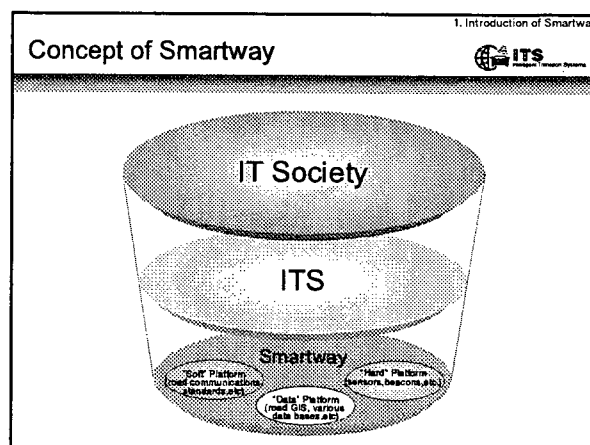
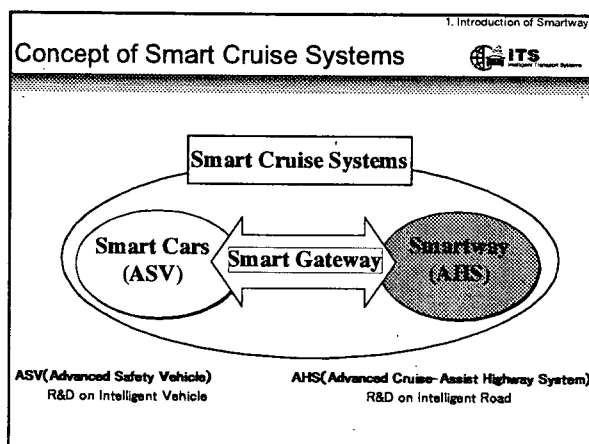
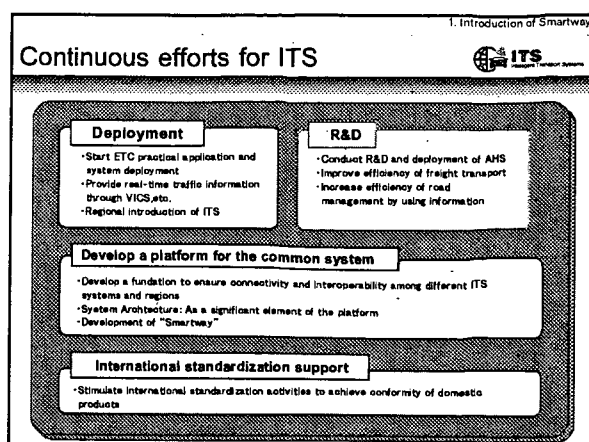
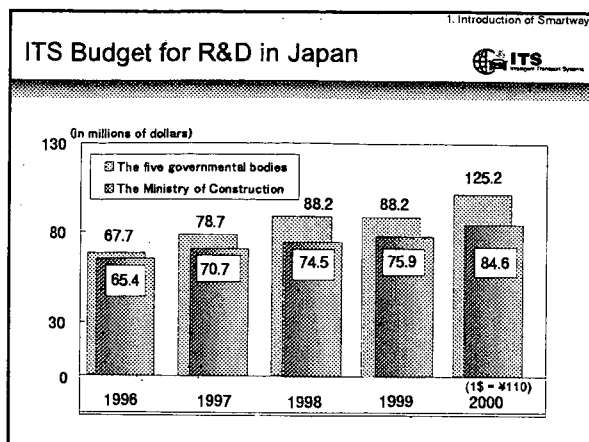


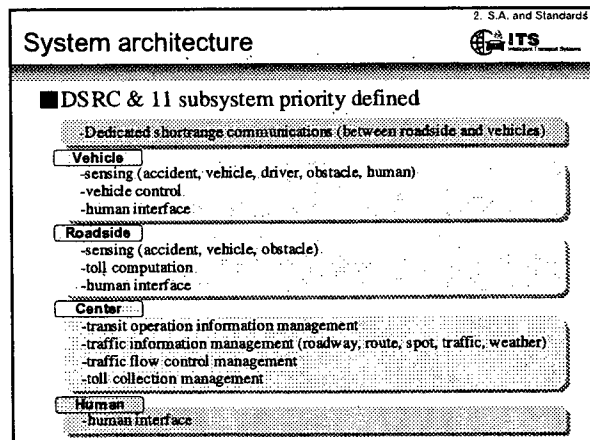
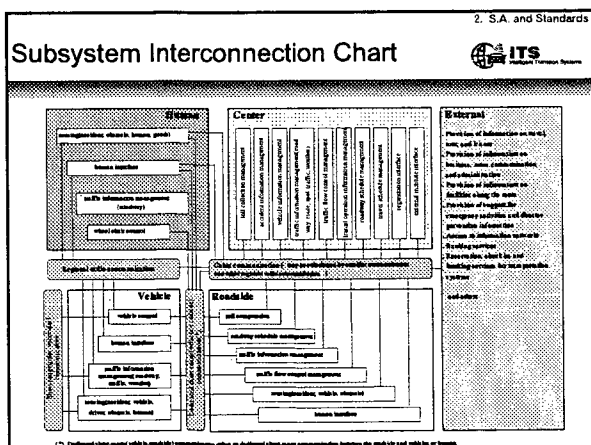
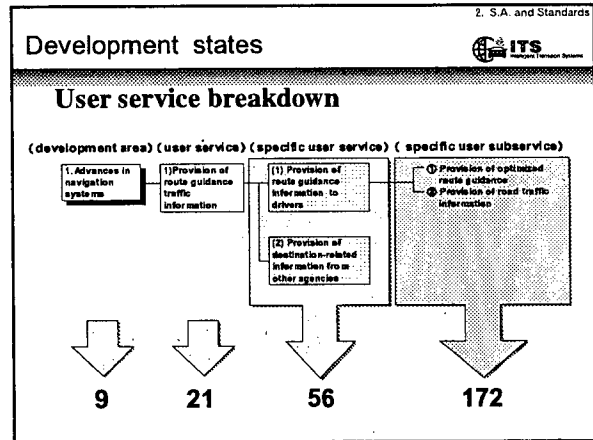
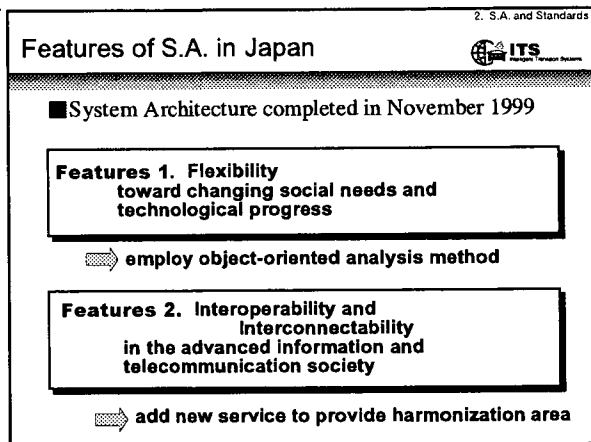
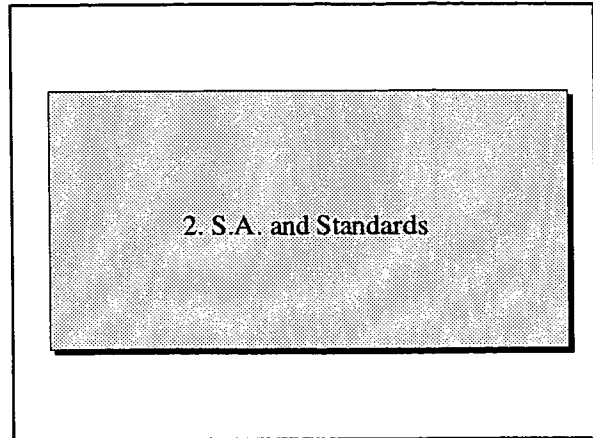
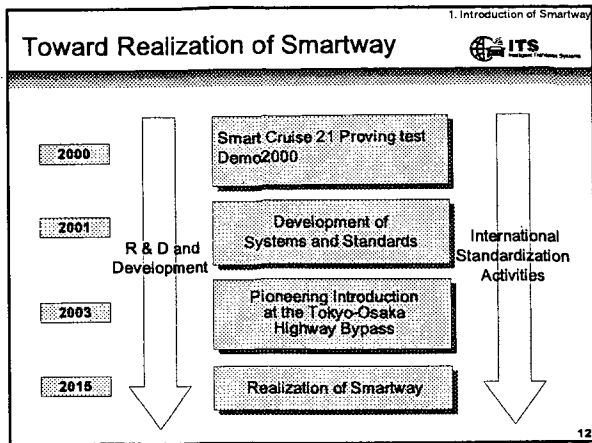
Progress of ITS in Japan



ITS development plan







Road Communication Standards

2. S.A. and Standards
ITS
Intelligent Transport System

Based on Japan's System Architecture, Road Communication Standards were designed as the platform used by various ITS applications.

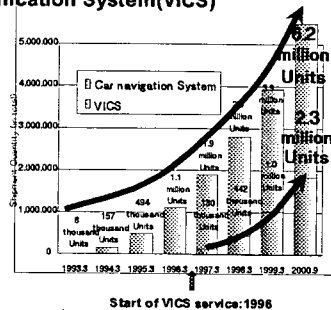
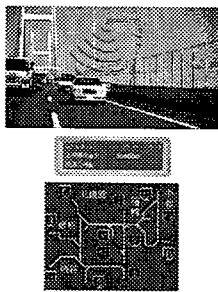
- Data Dictionary(DD): the definition of data
- Message Sets(MS): the rules of sending data
- Protocol (PT): the methods of communication

3. ITS Deployment in Japan

3-1 VICS VICS deployment

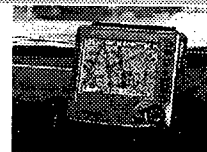
3. ITS Deployment in Japan
3-1 VICS
ITS
Intelligent Transport System

Rapid propagation of Vehicle Information and Communication System(VICS)



Car navigation Systems

3. ITS Deployment in Japan
3-1 VICS
ITS
Intelligent Transport System



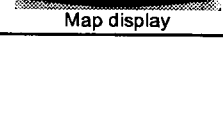
Car navigation System



Information displayed in bird's-eye view



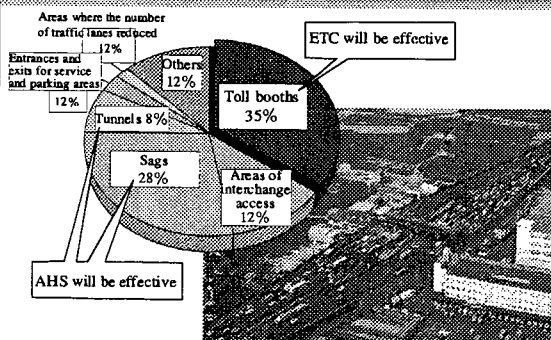
Information displayed in planer View



Map display

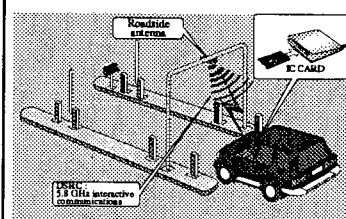
3-2 ETC Expressway congestion

3. ITS Deployment in Japan
3-2 ETC
ITS
Intelligent Transport System



The practical use and deployment of ETC

3. ITS Deployment in Japan
3-2 ETC
ITS
Intelligent Transport System



<ETC deployment>

- 1999
Trial operation began on the Tokyo Bay Aqualine
- April, 2000
Service began, primarily in the Tokyo area
- March, 2003
Service begins at 900 primary locations nationwide

ETC (Electronic Toll Collection System)

3. ITS Deployment in Japan
3-2 ETC

Start of ETC

Schedule

- April 2000: Start of trial operation (beginning with Tokyo city center)
- March 2003: Introduced at 900 toll booths

Features of ETC in Japan

- Uniform nationwide standards (Standard for all toll Authorities)
- Multiple functions and expandability
- 5.8GHz band active format DSRC

3. ITS Deployment in Japan
3-2 ETC

Alleviating traffic congestion on city roads

■ ETC (Introduced at expressway toll booths)

- Establish flexible toll system
- Road pricing/TDM

Road Pricing Scheme

3. ITS Deployment in Japan
3-3 AHS

3-3 AHS History of R&D

(1992 : Incident detection systems)

<CCTV> <Road-end collision warning sign>

(1996 : Implementation of AHS public road test)

3. ITS Deployment in Japan
3-3 AHS

R&D framework

Smart Cruise Systems

AHS (Smartway) <Coordination> ASV (Smart Cars)

*Independent road systems
*Roadway-vehicle Coordination systems

*Independent vehicle systems
*Roadway-vehicle Coordination systems

ASV: Advanced Safety Vehicles

Proving test under way

3. ITS Deployment in Japan
3-3 AHS

The thinking behind Smart Cruise Systems

Driver function

Recognition → Judgment → Operation

Smart Cruise Systems by means of Smartway and SmartCars

Recognition assistance Judgment assistance Operational assistance

3. ITS Deployment in Japan
3-3 AHS

AHS Services

3. ITS Deployment in Japan
3-3 AHS

AHS Basic User Services

Car accidents can be reduced by 50%

7 Basic User Services improve safety in:

1. Collisions with Forward Obstacles
2. Overshooting on Curve
3. Lane Departure
4. Crossing Collisions
5. Right Turn Collisions
6. Collisions with Pedestrians Crossing Streets
7. Surface condition information for Maintaining Headway etc.

3. ITS Deployment in Japan
3-3 AHS

Long-term goals

50% reduction in traffic accident

Accident attributable to driver 75%

Accidents caused by drivers who were provided information

Reduction of such traffic accidents as collisions with forward obstacles, lane change, or crossing collisions

Around 25%

Approx. 10,000 persons

Stakeholder investigation 50%

Mistake in judgment 15%

Mistake in operation 5%

Other 25%

Reckless driving, drinking, etc.

* The long term goals of Smart are to reduce accidents attributable to driver to about 2/3 of the current level, and to reduce traffic accidents by 50%.

3. ITS Deployment in Japan
3-3 AHS

Proving Test of SmartCruise Systems

1. Title SmartCruise21 Proving Test of SmartCruise Systems
2. Time Period October to December, 2000
3. Place Test Track at The Public Works Research Institute in Tsukuba City
4. Object
 - * 7 smart cruise systems aimed at realization after 2003
 - Verification of systems
 - Verification of user acceptance
5. Participants
 - * Cars, buses, trucks, and motorcycles will participate
 - * 30 vehicles, from 30 companies and 3 universities from electronic and other sectors will participate

3. ITS Deployment in Japan
3-3 AHS

SmartCruise21 Demo2000

1. Title SmartCruise 21-Demo2000
2. Date November 20th to December 1st, 2000
3. Place Tsukuba City, JAPAN
 - * Public Works Research Institute of MOC
4. Program
 - * Opening Ceremony
 - * Ride on Test Cars (for experiencing 7 basic user services aboard actual cars)
 - * Panel Sessions (theme: Involvement in AHS and its significance)
 - * Technical Sessions (theme: Introducing AHS and AHS technologies, details of SmartCruise 21 (proving test), introducing AHS-related technologies of various companies, etc.)
 - * Exhibition

More information.....http://www.demo2000.gr.jp/index_e.htm

3. ITS Deployment in Japan
3-3 AHS

AHS-related Technologies Already Commercialized-1

AHS-related systems based on road infrastructures are already realized in major motorways in Japan, such as Meihan Highway and Hanshin Expressway.

<Rear-end collision warning board>

<Effect in the deployed section (1km)>

	No. of accidents involving fatalities
Average before deployment (1992 to 1993)	10.5
Average after deployment (1994 to 1997)	3.0

3. ITS Deployment in Japan
3-3 AHS

AHS-related Technologies Already Commercialized - 2

The system detects vehicles at a halt at curves or in tunnels and gives warning to vehicles down the road with roadside message boards.

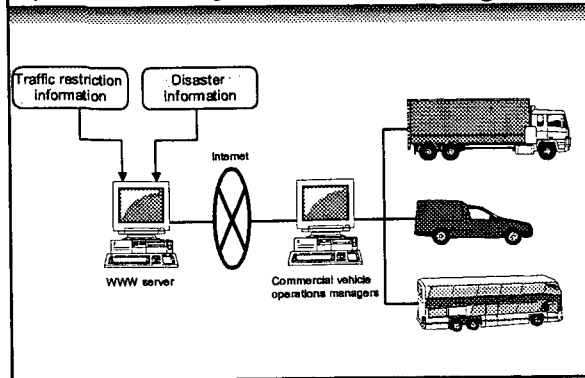
3-4 Commercial Vehicle
Improvement of Efficiency in Commercial Vehicle
Operations Management and Logistics Operations

3. ITS Deployment in Japan
 3-4 Commercial Vehicle

 ITS
 Intelligent Transport System

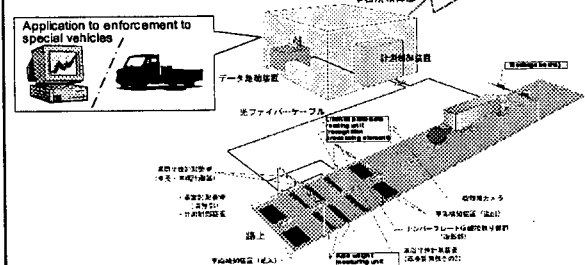
- (1) Support for commercial vehicle operations management
- (2) Improvement of efficiency in the procedures of permit application and associated paperwork for specially permitted commercial vehicles
- (3) Route guidance and securing of routes for specially permitted commercial vehicles
- (4) Monitoring of overload

Support for Commercial Vehicle Operations Management



Monitoring of Overload

Efficient enforcement with regard to detection and banning of overloading will be promoted by precisely measuring weights and sizes of moving vehicles and picking up only those vehicles suspected of overloading.



Utilization of RF-ID Tags

3.1 ITS Deployment in Japan
3.4 Commercial Vehicle

 ITS
Intelligent Transport Systems

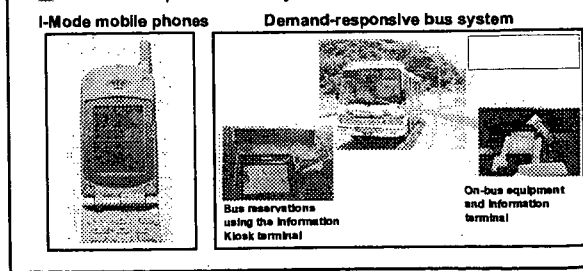
- R & D for effective utilization of information gathered by the ETC system
 - Application to logistics (support for logistics and improvement of transport efficiency)
 - R & D for technologies related to RF-ID tags
 - Application to other efficient logistics services
-  Technical development and proving tests

3-5 Support for Public Transport 3. ITS Deployment in Japan
3.5 Support for Public Transport

- (1) Provision of estimated arrival time of buses
Provision via the Internet or mobile phones
- (2) Demand bus system
- (3) Provision of information on positions of
expressway buses
Provision via the Internet or mobile phones

Example of support for public transport

- Bus arrival time information provided via the Internet (i-Mode mobile phones)
- Demand-responsive bus system



3. ITS Deployment in Japan
3-5 Support for Public Transport

Provision of position information of expressway buses

Mobile phone capable of accessing the internet (such as i-mode)

Provision of estimated arrival time

Location of bus is shown

3. ITS Deployment in Japan
3-6 ITS for Pedestrians

3-6 ITS for Pedestrians

Basic configuration of ITS for Pedestrian

Personal Mobile Terminal

- Route information
- Guidance
- Area information

Communication

Ground Information Terminal (e.g., Pedestrian Information System)

Facility Center

Crosswalk ends

Continue in the current direction

Crosswalk over two lanes begins here

3. ITS Deployment in Japan
3-6 ITS for Pedestrians

Schedule for technical development of Pedestrian ITS

Basic study

Soliciting ideas on system concept and element technologies, etc.

2000 Research and development

2001 Social experiments (10 locations)

2002 Practical application (nation-wide introduction)

3. ITS Deployment in Japan
3-7 Refinement of Data Collection, Investigation, and Evaluation

3-7 Refinement of Data Collection, Investigation, and Evaluation

Probe Car

- Collection of vehicle data, such as positions and speed, allows a clear understanding of travel speed, congested section, and other road traffic information.

GPS satellite

Transmits various information, such as Data Position Speed Speed increase/decrease etc.

Probe car data center

Acquisition of traffic information, such as congestion area and dangerous points

Vehicle equipped with probe car detects the position, speed, and moving direction of its own

Communication network

2000 Experimental introduction at 10 locations in Japan and its evaluation

2002 and on Full-scale introduction

3. ITS Deployment in Japan
3-9 ITS Model Experiment Regions

3-9 ITS Model Experiment Regions

Gifu Prefecture

- Experiment to detect location of vehicles carrying industrial waste by satellite communication
- Experiment on business opportunities in providing information for truck terminals at gas stations and convenient stores, etc.

Okayama Prefecture

- Provide integrated information on the internet
- Build advanced road management system

Kochi Prefecture

- Wide area road information on the Internet
- Experiment on vehicle communication device at each road by satellite

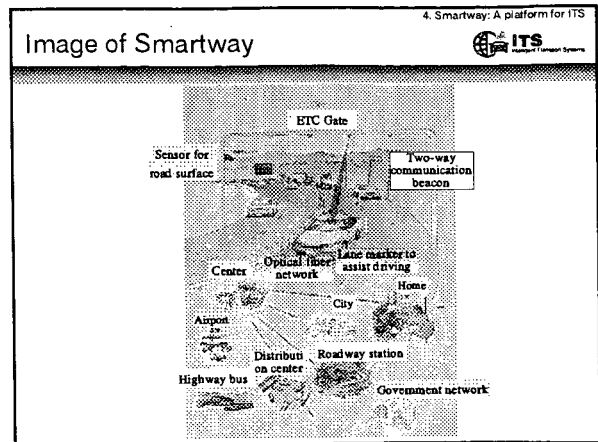
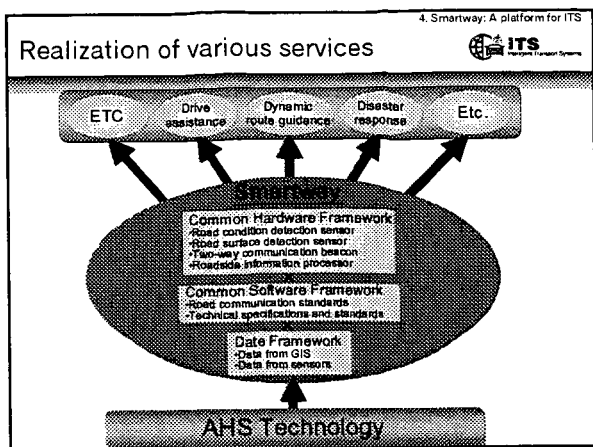
National Police Agency

- Introduce PTPS to Tokyo bus and the Tokyo metropolitan bus lines on Meguro Street, etc.
- Introduce PTPS to Tokyo bus lines on Funaoka Road and Industrial Road

Toyota City

- Experiment on advanced road traffic information systems: Build parking information boards, roadside broadcasting, VICS, etc. TV, Internet and information machine
- Electric Vehicle (EV) sharing experiment

4. Smartway : A platform for ITS



4. Smartway: A platform for ITS

[Reference Data] Results of Research on DSRC System

■ January 2000 Inquiry to the Telecommunications Council (about technical requirements for DSRC, such as radio system, etc.)

■ October 2000 Answer provided

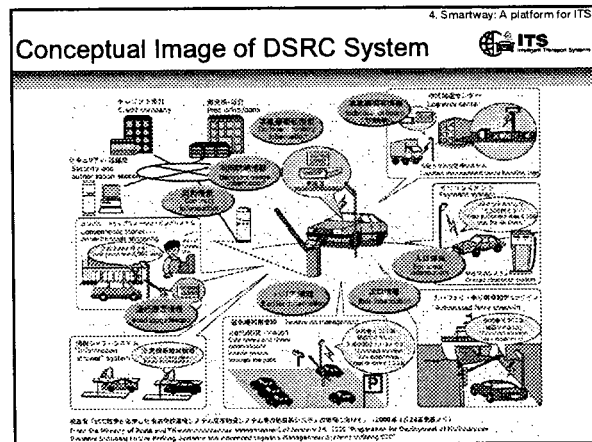
■ Results of Research

[Expected applications]

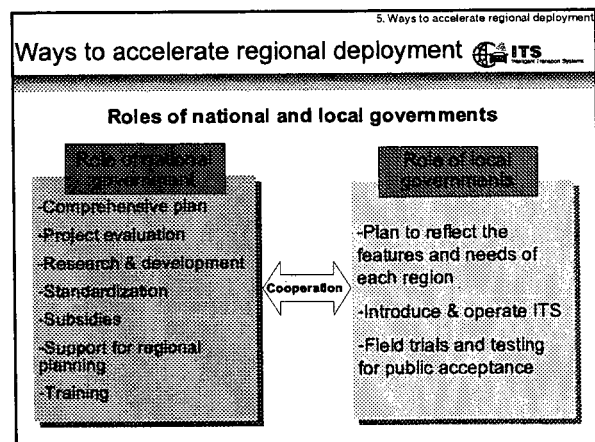
- Systems intended for services related to parking lots, gas stations, and convenience stores
- Systems intended for pedestrian support service or designated area entry charging service
- Systems intended for services, such as provision of information during semi-halt condition, provision of information during high speed acceleration, or operation support

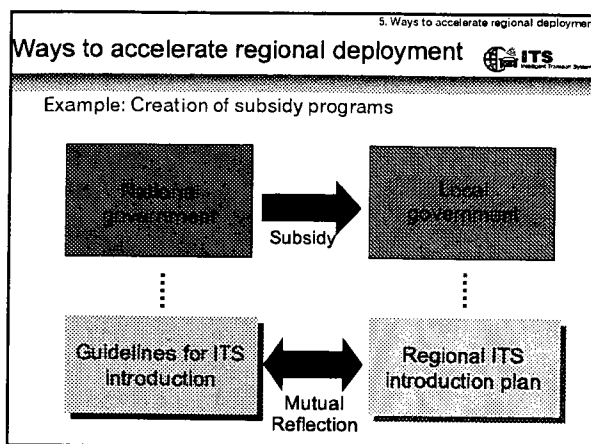
[Technical requirements]

- Radio frequency : 5.8 GHz — Same as ETC
- Modulation methods: ASK modulation method — Same as ETC
- QPSK modulation method — Method different from ETC may be tolerated.



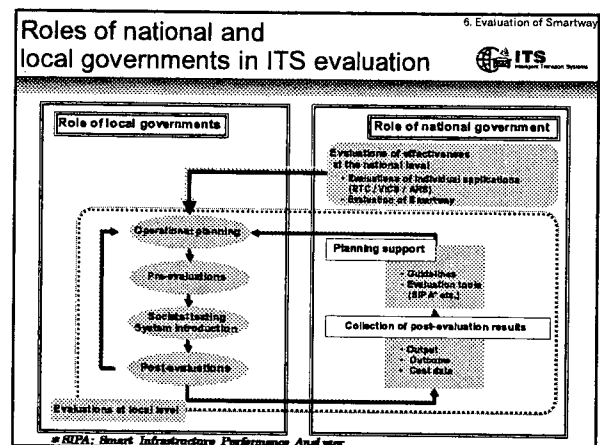
5. Ways to accelerate regional deployment





5. Ways to accelerate regional deployment
- ### Examples of Service to which Subsidies are Considered
- Road Related Information Providing Services
 - Parking and Public Transportation Related Information Providing Services
 - Advanced Cruise Assist Highway Pilot Systems
 - Disaster Response Systems
 - Environment Information Collecting Systems

6. Evaluation of Smartway



6. Evaluation of Smartway
- ### Results of Evaluation at Nation-wide Level
- ETC : Approximately 150 billion yen / year (2015)
 - VICS: Approximately 1 trillion yen / year (2015)
 - AHS : Approximately 550 billion yen / year (1997)
 - Other effects:
 - Congestion at sags almost completely eliminated when 40% of all vehicles are equipped with AHS on-board units
 - CO2 emissions from automobiles reduced by 1.5% (2010)

6. Evaluation of Smartway

Policy of Regional Level Evaluation

- Cost-benefit analysis is implemented to evaluate effectiveness

Applications measured for effectiveness / perspectives used for measurement

	Efficiency	Safety	Environment	Comfort	Management
Information-providing	○		○	○	
ETC	○		○	○	○
AHS	○	○	○	○	○
Road management		○			○
Vehicle management					○

6. Evaluation of Smartway

Evaluation tools

Tools have been developed for evaluation at the local level
For example, SIPA (Smart Infrastructure Performance Analyzer)
SIPA can evaluate changes in the following due to the introduction of AHS, ETC, VICS etc.

- At the micro level: driver behavior, route selection and other traffic phenomena
- At the macro level: amount of traffic, length of traffic jams and other traffic phenomena

➡ Evaluation of the effectiveness of ITS introduction at the local level

6. Evaluation of Smartway

SIPA-based Evaluation

- ETC distribution rate of 30% will eliminate congestion at toll gates.
- AHS distribution rate of 30% will eliminate congestion at sages on expressways

6. Evaluation of Smartway

Completion of Evaluation Tools 1 (ETC)

<Simulation of introducing ETC>

Unregistered FreeCar

Tollbooth WITHOUT ETC

30% of Tollbooth equipped with ETC

6. Evaluation of Smartway

Completion of Evaluation Tools 2 (AHS)

<Simulation of traffic flow control by AHS at sags>

Unregistered FreeCar

0% sags ratio

30% sags ratio

6. Evaluation of Smartway

For more information

Please visit our ITS Web sites (in English)

Japan's MOC ITS Web sites ITS Division:
<http://www.moc.go.jp/road/ITS/>

Highway Industry Development Organization(HIDO):
http://www.hido.or.jp/ITSHP_e/

Advanced Cruise-Assist Highway System Research Association(AHSRA):
<http://www.ahsra.or.jp/>

ITS formation Delivery Service:
<http://www.jice.or.jp/itslist-e/index.html>

6. Evaluation of Smartway

Cooperation between US and Japan

2.2 Commercial Vehicles and the Intelligent Vehicle Initiative

(Mr. Steve Barber)

COMMERCIAL VEHICLES AND THE INTELLIGENT VEHICLE INITIATIVE

Stephen Barber
Associate Administrator for Research,
Technology and Information Management
Federal Motor Carrier Safety Administration
U.S. Department of Transportation
9th U.S.-Japan ITS Workshop, Tsukuba, Japan
November 30, 2000

The Federal Motor Carrier Safety Administration (FMCSA)

- Congress created the FMCSA on January 1, 2000 to focus on commercial vehicle (truck and bus) related injuries and fatalities.
- Currently about 5,000 commercial vehicle related fatalities annually of 40,000 total vehicle fatalities.
- Our goal is a 50% reduction in truck fatalities by 2010.
- Technology along with Education and Enforcement will be the methods to achieve this.

Six High Priority Technology Focus Areas

- Rollover stability
- Infrastructure Assisted Hazard Warning
- Lane Tracking Device
- Drowsy Driver Detection
- Electronically Controlled Braking
- In Vehicle Sensors

ROLLOVER STABILITY ADVISOR/CONTROLLER

- System used to train the driver, as well as controlling engine speed in anticipation of rollover.
- FMCSA partnering with Freightliner truck manufacturing.
- On road testing using one Hazardous Materials trucking company and 6 tractors-baseline collection began 9/00.

INFRASTRUCTURE ASSISTED HAZARD WARNING

- Based on a database of roadway high hazard areas (intersections, congestion areas etc).
- Notify the truck driver of upcoming hazard location via GPS.
- Developed in partnership with Mack Trucks.
- On road testing with one company using 36 tractors scheduled to begin 3/01.

LANE TRACKER

- Roadway departure system detects lane drifts.
- Assistware Lane Tracker is device manufacturer.
- Partnership with Mack Trucks.
- On road testing with one company using 36 tractors scheduled to begin 3/01.

DROWSY DRIVER

- PERCLOS-The percentage measurement of eyelid closure to detect drowsiness.
- In vehicle cameras measure PERCLOS continually during driving time.
- Operational test of PERCLOS camera to begin in FY2002.

ELECTRONICALLY CONTROLLED BRAKING SYSTEMS (ECBS)

- An enabling technology-can be used as a platform for other devices.
- Test & Evaluation via partnership with FMCSA, NHTSA and truck and brake manufacturers.
- Current U.S. standards require back up brake systems.
- Next phase is track testing followed by on-road testing.

SENSOR STUDY

- FMCSA is conducting research on in vehicle sensors and notification devices related to:
 - Brake System Sensors;
 - Tire Condition Sensors;
 - J1939 Network Sensors.

2.3 Scenarios of AHS Evolution (Mr.Masafumi Mori)

The 9th US-Japan ITS Workshop

Scenarios of AHS Evolution

Masafumi MORI

ITS R&D Division, Public Works Research Institute,
Ministry of Construction, Government of Japan

Nov. 30 2000, U.S./JAPAN ITS WS

Today's Presentation

- Background of AHS Development in Japan
- Scenarios of AHS Evolution

Nov. 30 2000, U.S./JAPAN ITS WS

Background of AHS Development in Japan

Nov. 30 2000, U.S./JAPAN ITS WS

Transition of Casualties in Traffic Accidents

Despite a variety of safety measures, the number of traffic accident-related deaths has hovered around the level of 10,000 persons in recent years, and that of traffic accidents is steadily increasing.

Drastic measures from a new perspective are needed for a substantial reduction in the number of casualties and traffic accidents.

Reference: "Traffic Statistics" by Center for Comprehensive Analysis of Traffic Accidents

Nov. 30 2000, U.S./JAPAN ITS WS

Analytic Breakdown of the Causes of Accidents

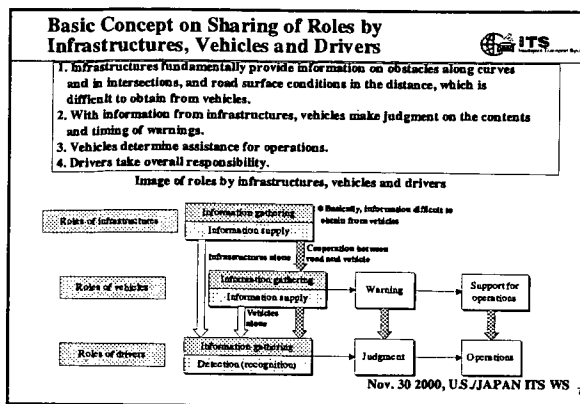
- Preventing a driver from being a primary party involved in the accident
- "Delay in detection", "Misjudgment" and "Mistake in operation" being as objectives (75% of the total)

Fatality Rate by Causes of Accidents

Nov. 30 2000, U.S./JAPAN ITS WS

The Thinking Behind Smart Cruise Systems

Nov. 30 2000, U.S./JAPAN ITS WS

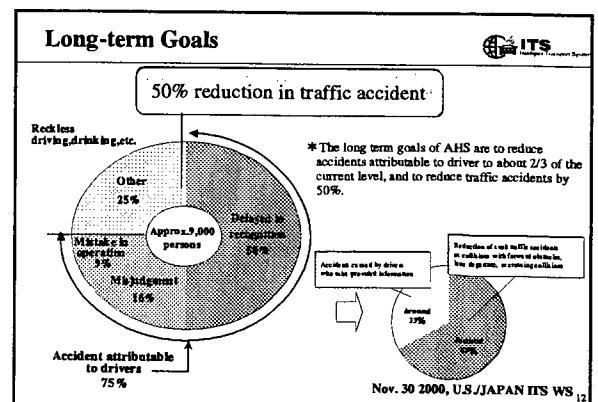
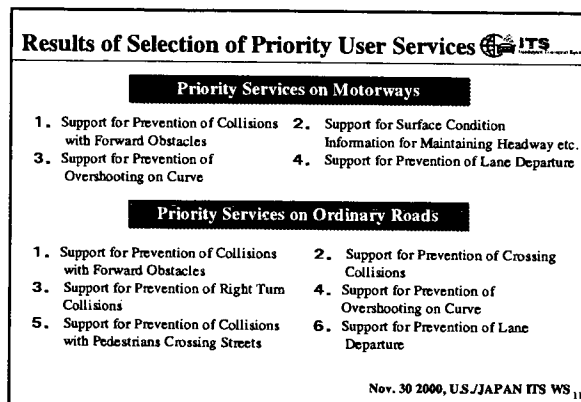
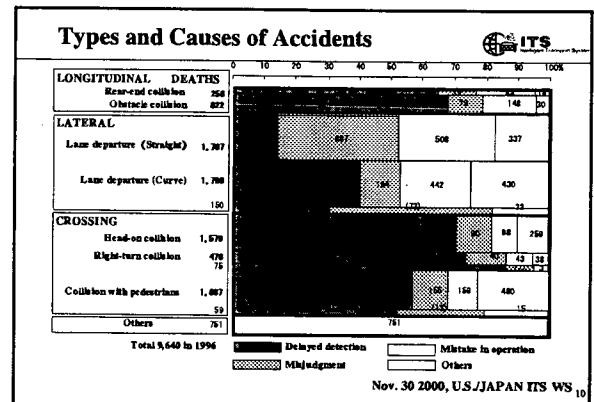
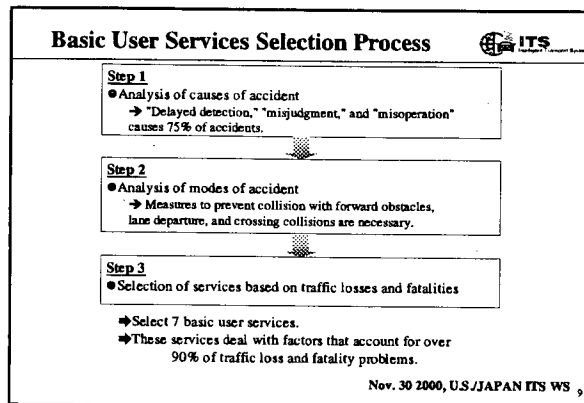


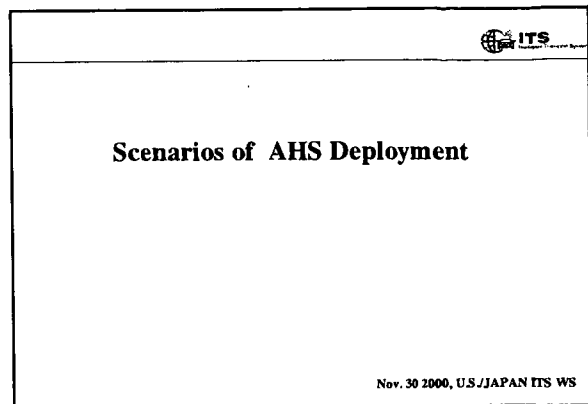
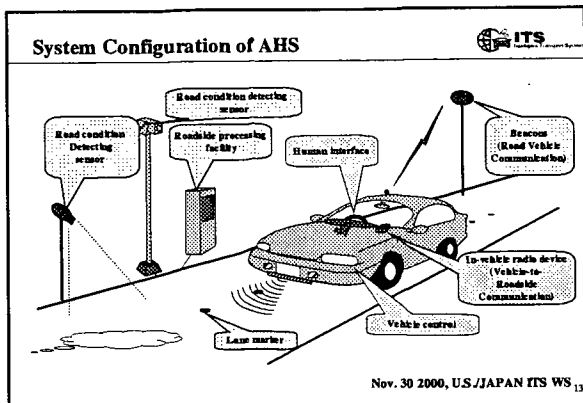
Strong points of the vehicle side systems and infrastructure systems



Category	Item	Vehicle side	Infrastructure
Information Collection	Vehicle vicinity information collection	Strong point	Weak point
	Obtaining remote and dead angle information	Impossible	Possible
	Effects of weather	Susceptible	Not susceptible
	Places obtainable	Everywhere	Only where installed
	Links with other information	Difficult	Few restrictions
Information processing	Quantity of data that can be processed	Small	Large
	Judgments and Processing including own vehicle's behavior	Strong point	Weak point
Information provision	Efficiency and service level	Superior with separate services	Superior with broadcast services

Nov. 30 2000, U.S./JAPAN ITS WS 8





Requirements for AHS Implementation

Document describing the scenario of developing and deploying AHS

- Policy for implementing AHS services during the introduction period of AHS (2003 to 2007)
- Quantitative functions and performance necessary for AHS during the introduction period
- Target of the research to be developed after the introduction

Nov. 30 2000, U.S./JAPAN ITS WS 15

Main Points of The Requirements

- Background of needs for AHS
- Basic policy on formulation of the requirements
- Scenario for evolution
- Realization of AHS services
- Requirements for system establishment

Nov. 30 2000, U.S./JAPAN ITS WS 16

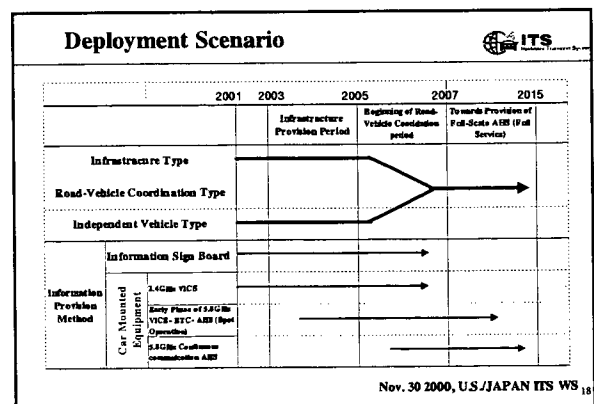
Deployment Scenario

Stage 1 Promotion of wide use (expansion of available areas), Wide publicity to AHS

Stage 2 Launch of full-fledged services
Improvement of service level

Stage 3 Enjoyment of improved services
Challenge of next-generation services

Nov. 30 2000, U.S./JAPAN ITS WS 17



Deployment Scenario: Stage 1

- Services using information sign board
 - Provision of information
- Preliminary services using spot-type DSRC
 - Provision of information (AHS-i)
 - Integration of VICS/ETC and AHS
- Promotion of lane marker development on major expressways
- Lane marker development for dedicated way
 - New transportation systems and freight services
 - Utilization of abolished ways

Nov. 30 2000, U.S./JAPAN ITS WS₁₉

Deployment Scenario: Stage 2

- Full service using two-way continuous DSRC
 - Information and warning (AHS-i)
- Implementation of special-use services
 - Information, warning and control (AHS-c)
 - For road management vehicles and long-distance buses, etc.
- Completion of lane marker development for major expressways

Nov. 30 2000, U.S./JAPAN ITS WS₂₀

Deployment Scenario: Stage 3

- Enjoyment of improved services
 - Information, warning and control (AHS-c)
 - Improvement of service available areas
- Partial launch of next-generation services
 - Feasibility study of automated cruise (AHS-a) on specific routes

Nov. 30 2000, U.S./JAPAN ITS WS₂₁

Realization of Various Services

Nov. 30 2000, U.S./JAPAN ITS WS₂₂

**2.4 Transit IVI – Enhancing Bus Safety and Mobility
(Mr.Edward Thomas)**

Transit IVI: Enhancing Bus Safety and Mobility

Edward L. Thomas
Associate Administrator
Office of Research, Demonstration and Innovation
Federal Transit Administration

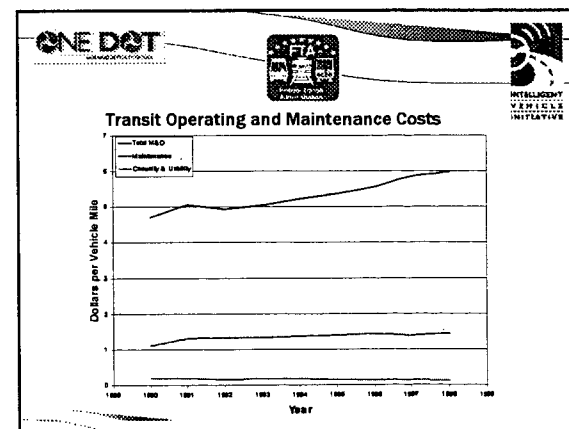
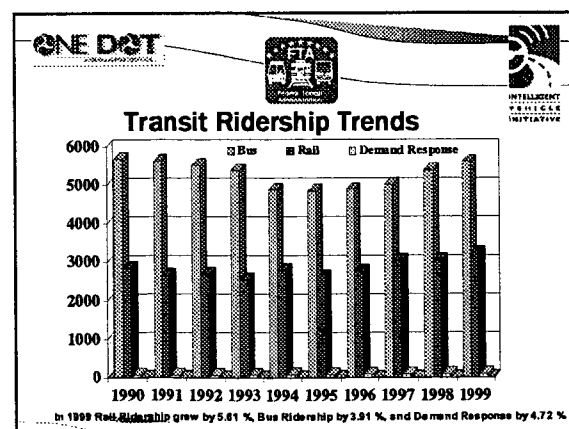
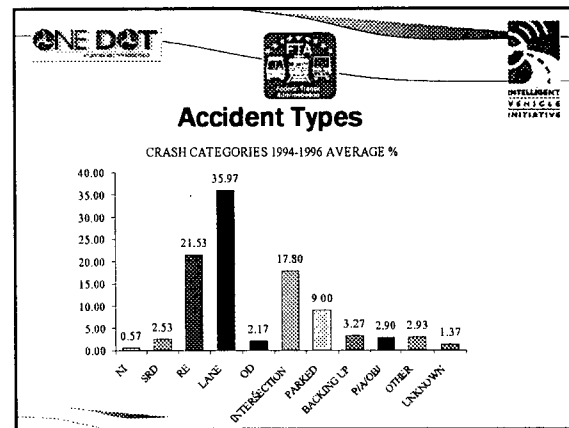
US - Japan Workshop
Tsukuba City, Japan, November 30, 2000

Presentation Outline

- Transit Safety Challenges
- U.S. DOT Strategic Direction
- Transit IVI Priority Areas
- Transit IVI Innovation Continuum and Timeline
- Federal Transit Administration's Role in Technology Deployment

Transit Challenges

- Accident Types
- Increasing Ridership
- Pedestrian Conflicts
- Driver Fatigue
- Security
- Cost of Operations and Maintenance



ONE DOT  

Applying DOT Strategic Plan to IVI

- Vision - Be visionary and vigilant in developing new technology to improve safety of the driver and passengers
- Mission - Serve the people by improving the safety and mobility
- Goals - Reduce the number of transit injuries and fatalities and improve mobility

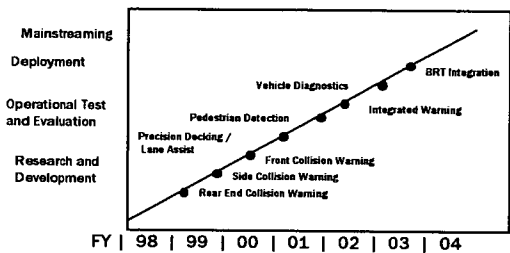
ONE DOT  

Transit IVI Priority Areas

- Lane Change and Merge Collision Warning
- Rear End Collision Warning
- Forward Collision Warning
- Precision Docking
- Pedestrian Safety
- Vehicle Automation and Guidance
- Vehicle Diagnostics

ONE DOT  

Transit IVI Timeline



Phase	Year	Technology
Research and Development	FY 98	Rear End Collision Warning
	FY 99	Side Collision Warning
	FY 00	Precision Docking / Lane Assist
Operational Test and Evaluation	FY 01	Front Collision Warning
	FY 02	Pedestrian Detection
Deployment	FY 03	Integrated Warning
	FY 04	BRT Integration

ONE DOT  

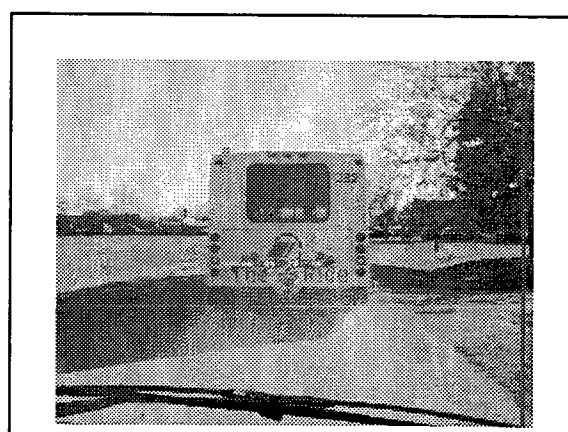
FTA's Role and Industry Partnerships

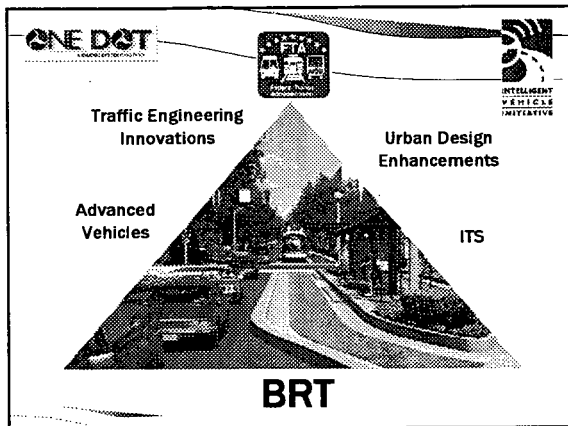
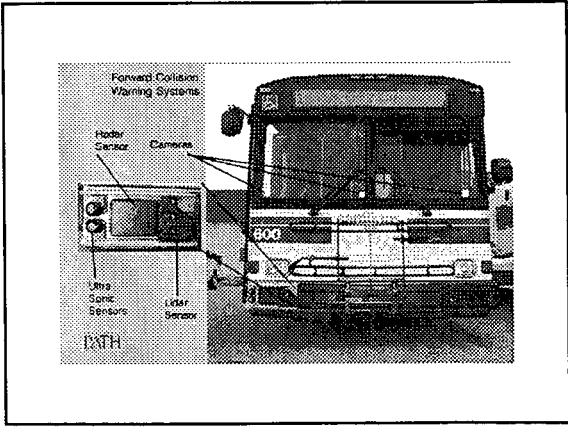
- Foster Innovation Through R&D
- Encouraging Integration and Interoperability
- Mainstreaming Innovation

ONE DOT  

Summary

- Transit Challenges
- Transit IVI R&D
- FTA and Industry Partnerships
- Mainstreaming Innovation





2.5 ITS Application for Snow Removal
(Mr.Yasushi Nitta)

The 9th US-JAPAN ITS Workshop

ITS Application For Snow Removal

30 November, 2000

Yasushi NITTA

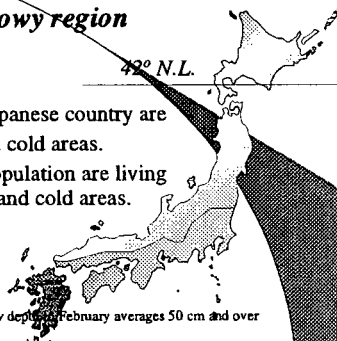
Construction Equipment Division,
Public Works Research Institute,
Japanese Ministry of Construction

Today's topics

1. Snow removal in Japan
2. Issues -mechanical snow removal-
3. Fundamental techniques in Japan
4. ITS applications for snow removal

The specific characteristics of Japanese snowy region

- 1) About 60% of Japanese country are special snowy and cold areas.
- 2) About 20% of population are living in special snowy and cold areas.



Snowy region:

Regions whose monthly max snow depth in February averages 50 cm and over

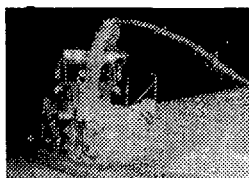
Cold region:

Regions that have an average temperature in January of 0C and under

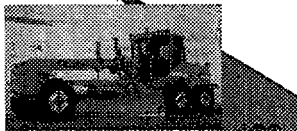
Mechanical snow removal in Japan

- ① Fresh snow removal
- ② Treatment of snow bank
- ③ Compacted snow removal
- ④ Surface treatment of compacted snow
- ⑤ Snow removal by hauling
- ⑥ Spreading anti-icing chemical

Snow removers



Snow truck ①②③④



Snow removing motor grader ⑤⑥



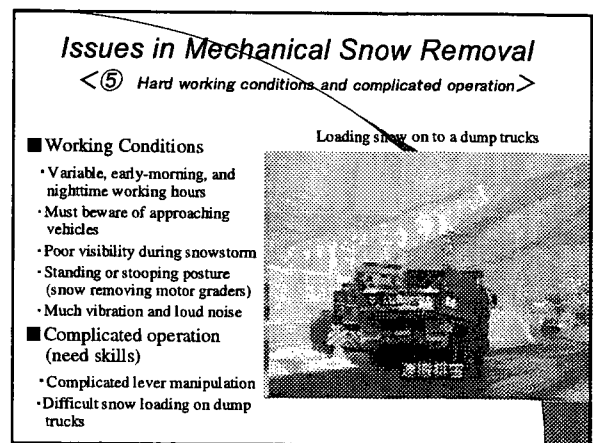
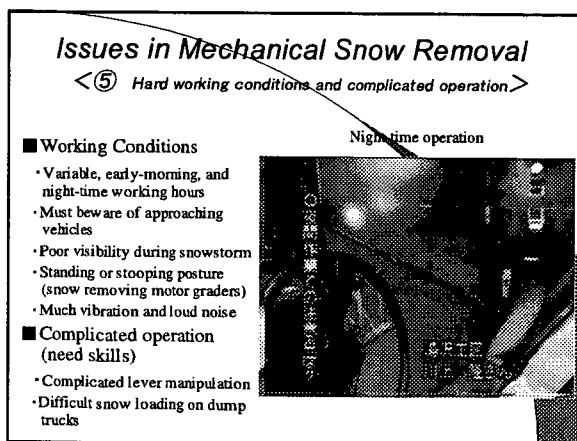
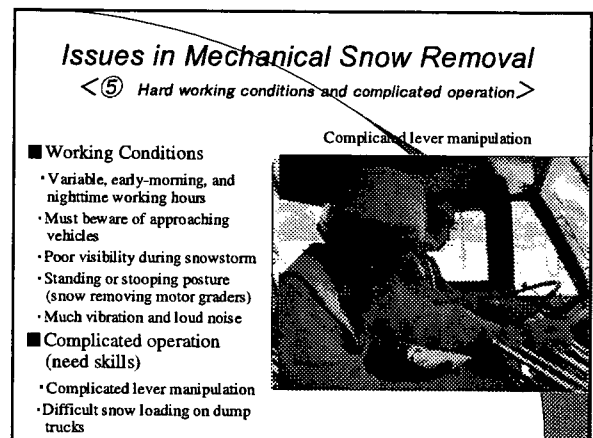
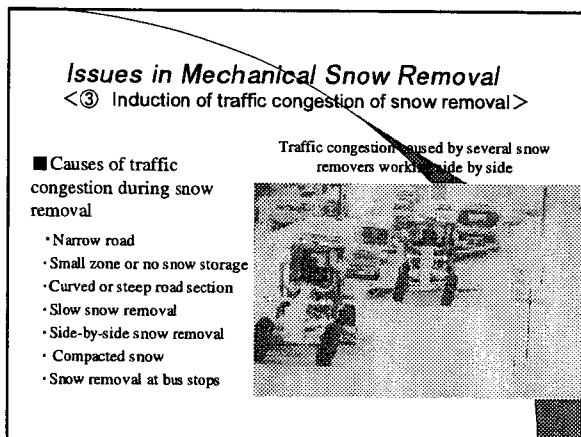
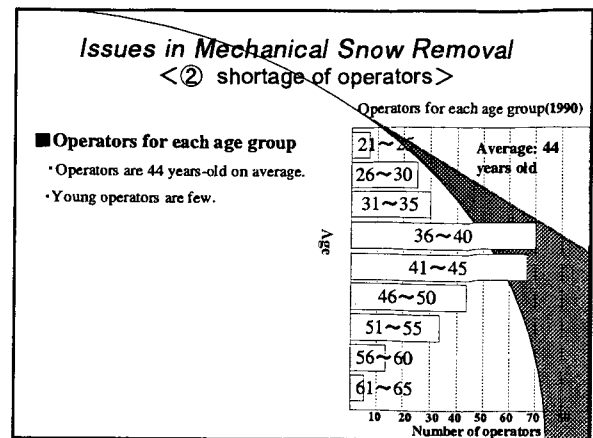
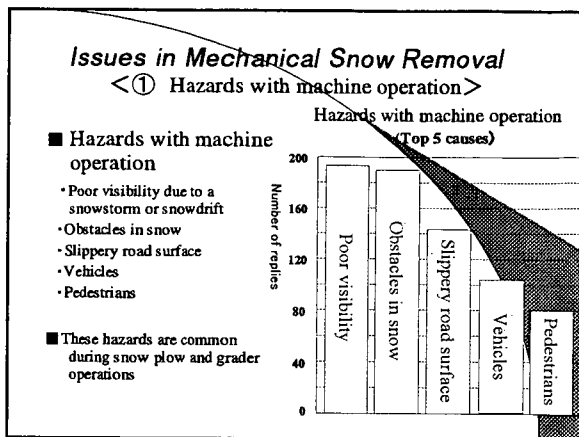
Salt spreader ⑥



Snow dozer ①②③

Issues in Mechanical Snow Removal

- ① Hazards with machine operation
- ② Shortage of operators
- ③ Induction of traffic congestion by snow removal
- ④ On-road obstacles that hinder snow removal
- ⑤ Hard working conditions and complicated operation
- ⑥ Low work efficiency



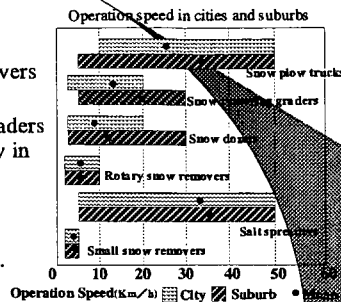
Issues in mechanical snow removal

<⑥ Low work efficiency>

■ Operation speed

- Rotary snow removers are slow.
- snow removing graders and dozers are slow in cities

- All snow removers need two operators.



Automated Snow Removing Machines That Have Been Developed

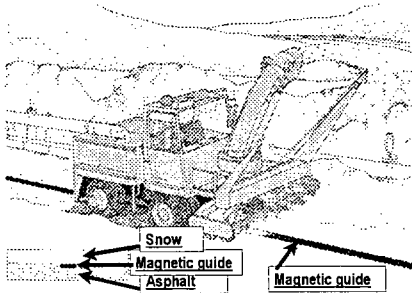
① Rotary snow removers

- Automated throwing of snow (one-point concentration and teaching)
- Autopilot (ferrite markers)

② Spreading of chemicals

- Chemical spreaders that use GPS and road surface sensors to automatically control the amount of chemicals

Autopilot that uses ferrite markers



Automatic snow throwing control

Automatic operating units

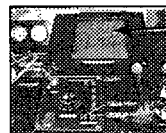
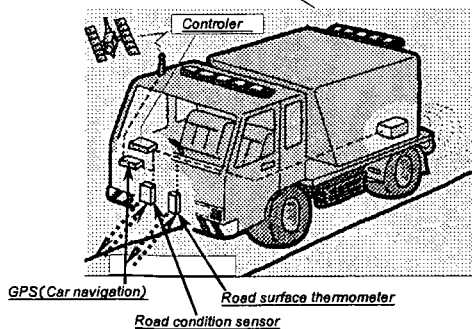


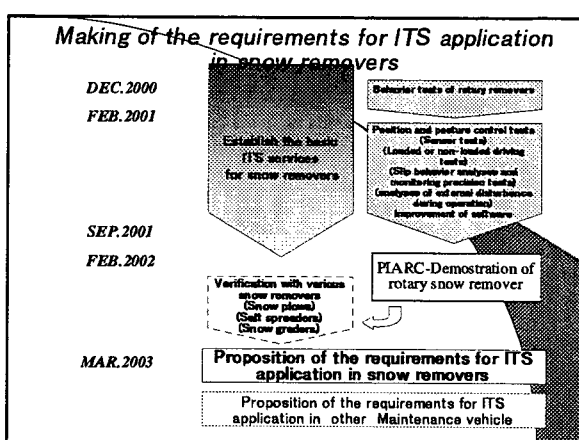
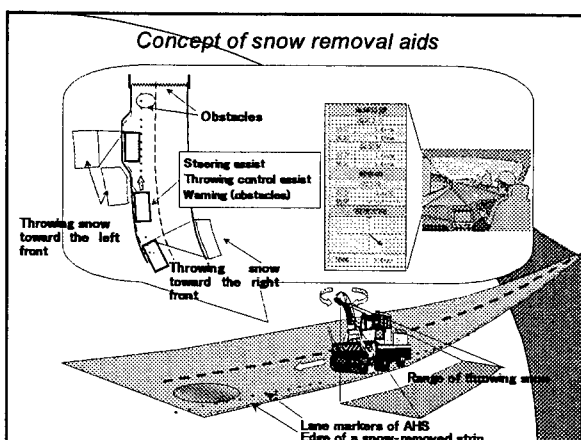
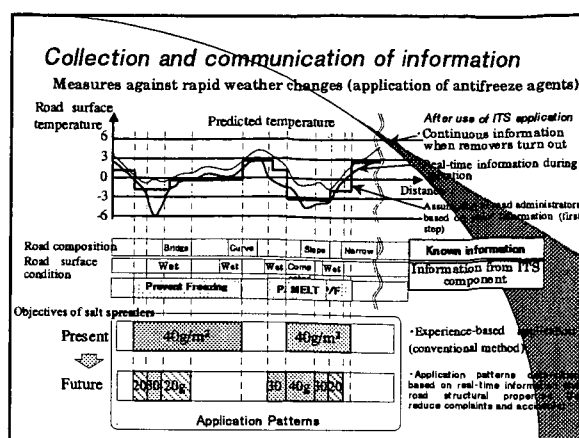
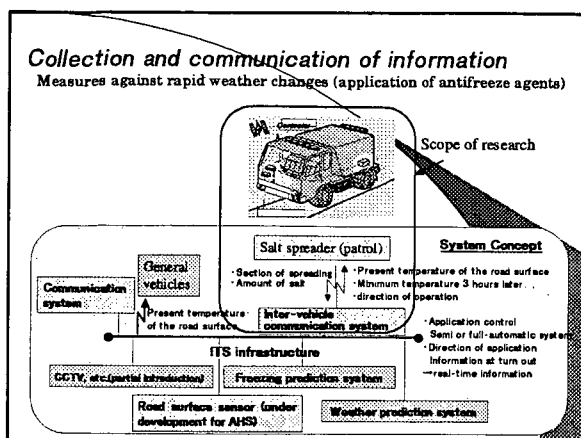
Photo: One-point concentrated

Salt Spreaders That Use Road Surface Sensors To Automatically Control The Amount of Chemicals



ITS application we propose

- ① Collection and communication of information (to support driving)
 - road surface sensors, inter-vehicle communication (ITS-i), etc
- ② Automatic or semi-automatic operation (to support operation)
 - lane markers, beacons (ITS-c), etc.



Thank you for listening...

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**2.6 Infrastructure Concepts for Intersection Collision Avoidance
and IVI Advanced Snow Plow Research and Testing
(Mr.Raymond Resendes)**



Infrastructure Concepts

INTELLIGENT VEHICLE INITIATIVE

Ray Resendes, Program Manager, IVI

United States Department of Transportation

Presentation Outline

- ◆ What is the Intelligent Vehicle Initiative (IVI)?
- ◆ Why is USDOT involved?
- ◆ What is the IVI Process?
- ◆ The Federal Role in Deployment

United States Department of Transportation

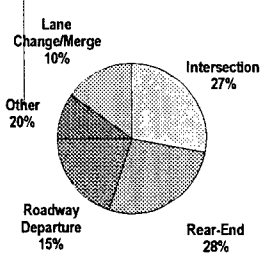
What is the IVI?

GOAL: Reduce motor vehicle crashes & incidents by accelerating the development, introduction, & commercialization of driver assistance products



FHWA **FMCSA** **TSA**

What are the Target Crash Problem Size?

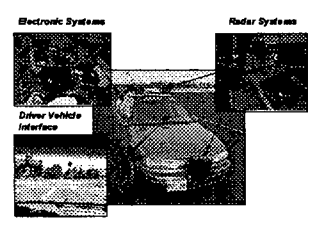


41,000 annual deaths
6 M motor vehicle crashes
5.2 million injuries
Cost \$150 Billion per year

INTELLIGENT VEHICLE INITIATIVE

◆ Intersection Crashes

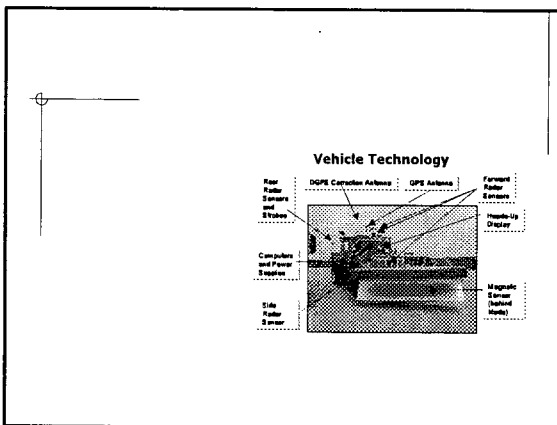
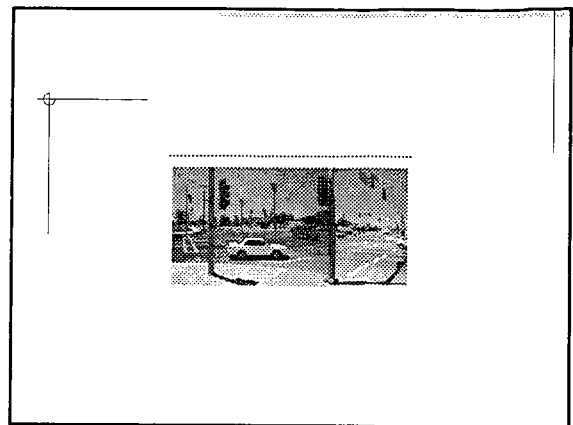
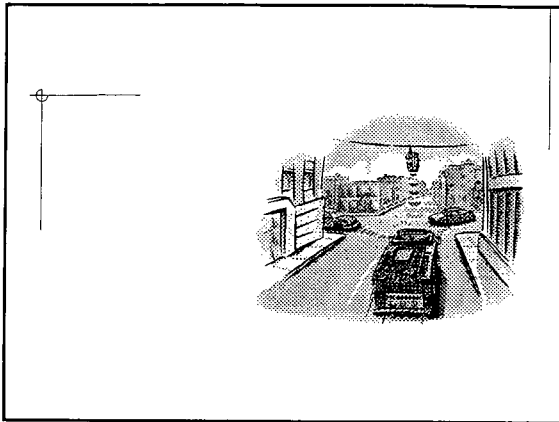
- Vehicle-Based: Autonomous and Cooperative Communication Systems
- Autonomous Infrastructure
- Situation awareness warning system, Left turn across path;
- Imminent crash warning system, Initially perpendicular directions



Electronic Systems

Radar Systems

Driver Vehicle Interface

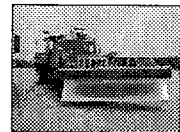


Minnesota DOT

♦ Rear-end and Road Departure

- Altra Technology, Navistar, U. of Minn, 3M
- Start road test November 2001

GPS Antenna
GPS Correction Antenna
Rear Radar Sensors & Strobe
Head-Up Display
Computer and Power Supplies
MagnaLink Sensor (Hidden Mode)
Side Radar Sensor
Forward Radar Sensors



The IVI Process

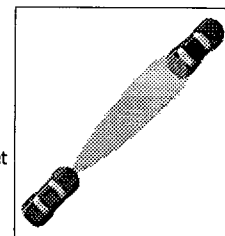
Federal Activities

- Identify Safety Needs, Priorities and Benefits
- Develop Performance Specifications
- Evaluate Effectiveness
- Partnering with Industry to Facilitate/Expedite the Deployment Process



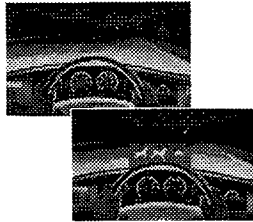
Adaptive Cruise Control

- ♦ Will ACC *impact* safety?
- ♦ Will ACC *enhance* safety?
- ♦ USDOT Activities
 - Field Operational Test
- ♦ Products on or Near Market



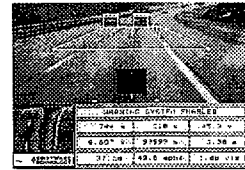
Night Vision

- ◆ Will Night Vision *impact* safety?
- ◆ Will Night Vision *enhance* safety?
- ◆ USDOT Activities
 - Technology Reinvestment Project
 - Human Factors Studies
- ◆ Products on or Near Market



Lane Tracking

- ◆ Will Lane Tracking Systems *impact* safety?
- ◆ Will Lane Tracking Systems *enhance* safety?
- ◆ Can improve safety?
- ◆ USDOT Activities
 - Performance Specifications
 - Field Operational Test
 - Objective Test Methods
- ◆ Products on or Near Market



Conclusions

- The Federal Role is to facilitate the accelerated commercialization of advanced safety systems
- Increased Knowledge base
 - Identify Safety Needs, Priorities and Benefits
 - Develop Performance Specifications
- USDOT is an effective and supportive partner to the vehicle and infrastructure industry to develop an understanding of the problems and solutions related to intelligent vehicle systems



3.1 FHWA Organization and Roles in Leveraging Technology and Innovation

(Mr.Dennis Judycki)

CBU's Roles in R&T

- Coordinate and lead R&T plans in specific areas, primarily through roadmaps
- Perform market analysis
- Lead in Headquarters for technology delivery role
- Customer/partner outreach

Field Offices' Roles in R&T

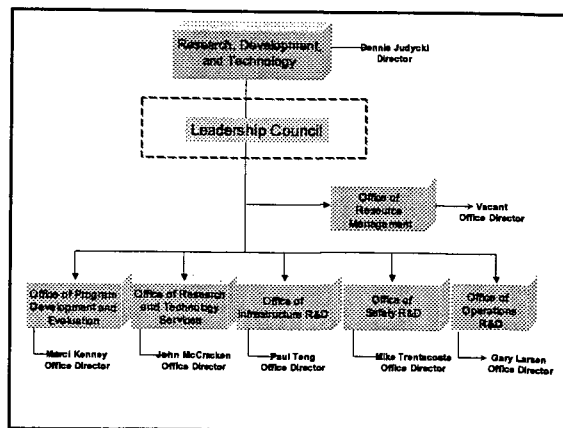
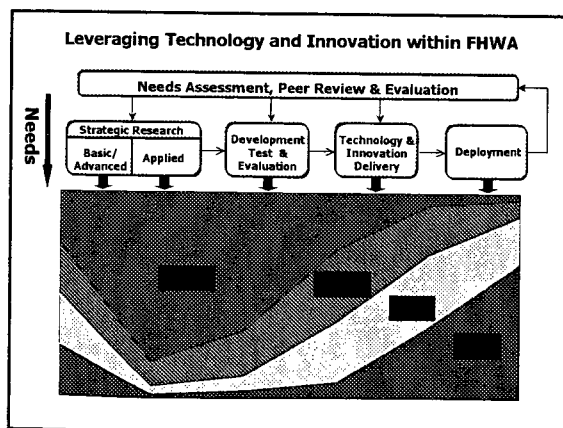
- Serve as primary point of contact with most customers/partners
- Identify and translate customer/partner needs
- Validate needs and provide feedback to CBU's and RD&T
- Participate in agenda-setting and roadmapping processes
- Facilitate outreach and input activities in the field

RD&T's Roles in R&T

- Coordinate development of overall agency R&T agenda
- FHWA's Secretariat to integrate R&T program and budget
- Conduct research and development
- Provide marketing expertise and support
- Coordinate FHWA participation in major national and international R&T efforts

Technology Facilitation Plans

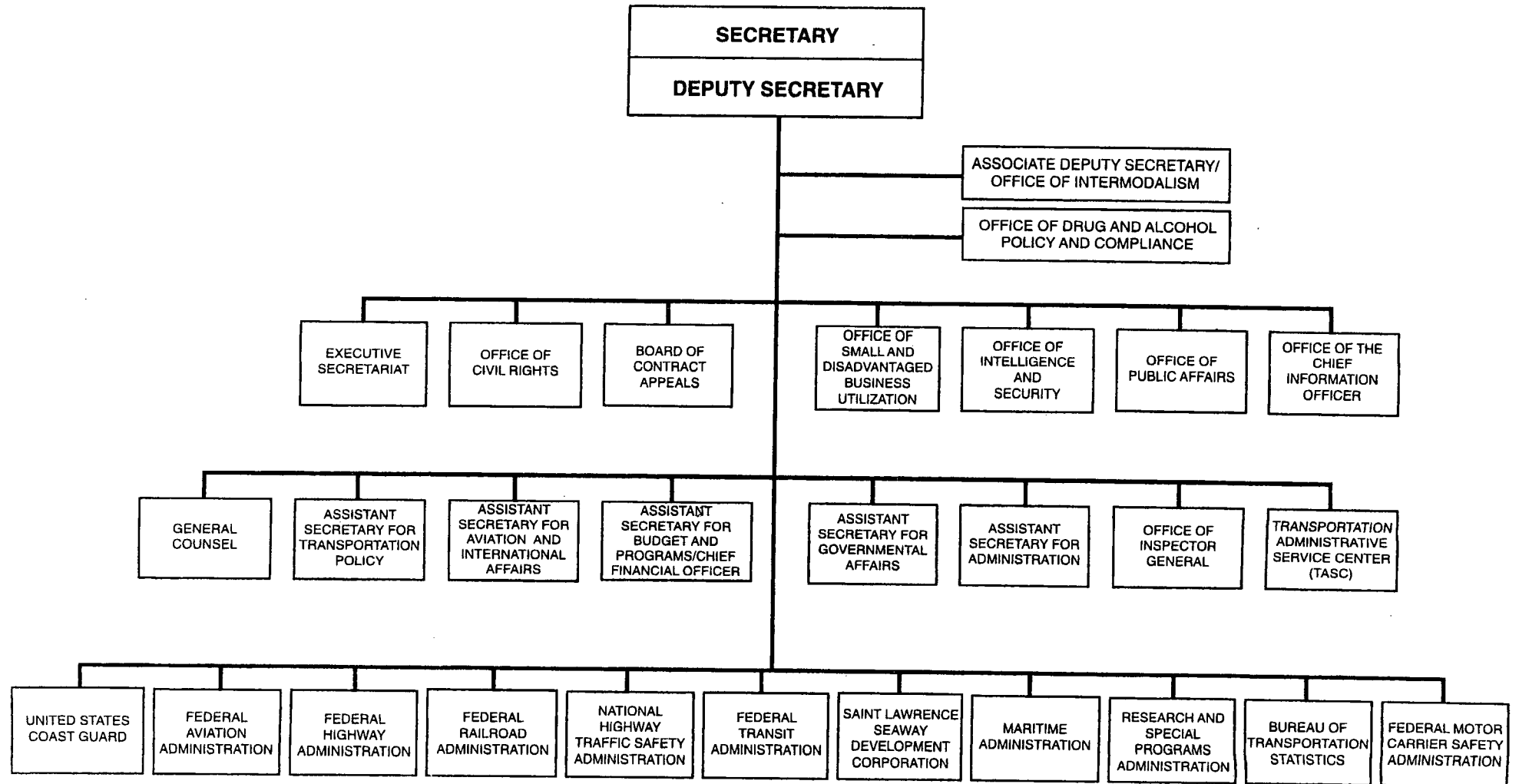
- Product development should be closely aligned with CBU priorities and schedules
- Opportunity for field involvement and notice of delivery schedule



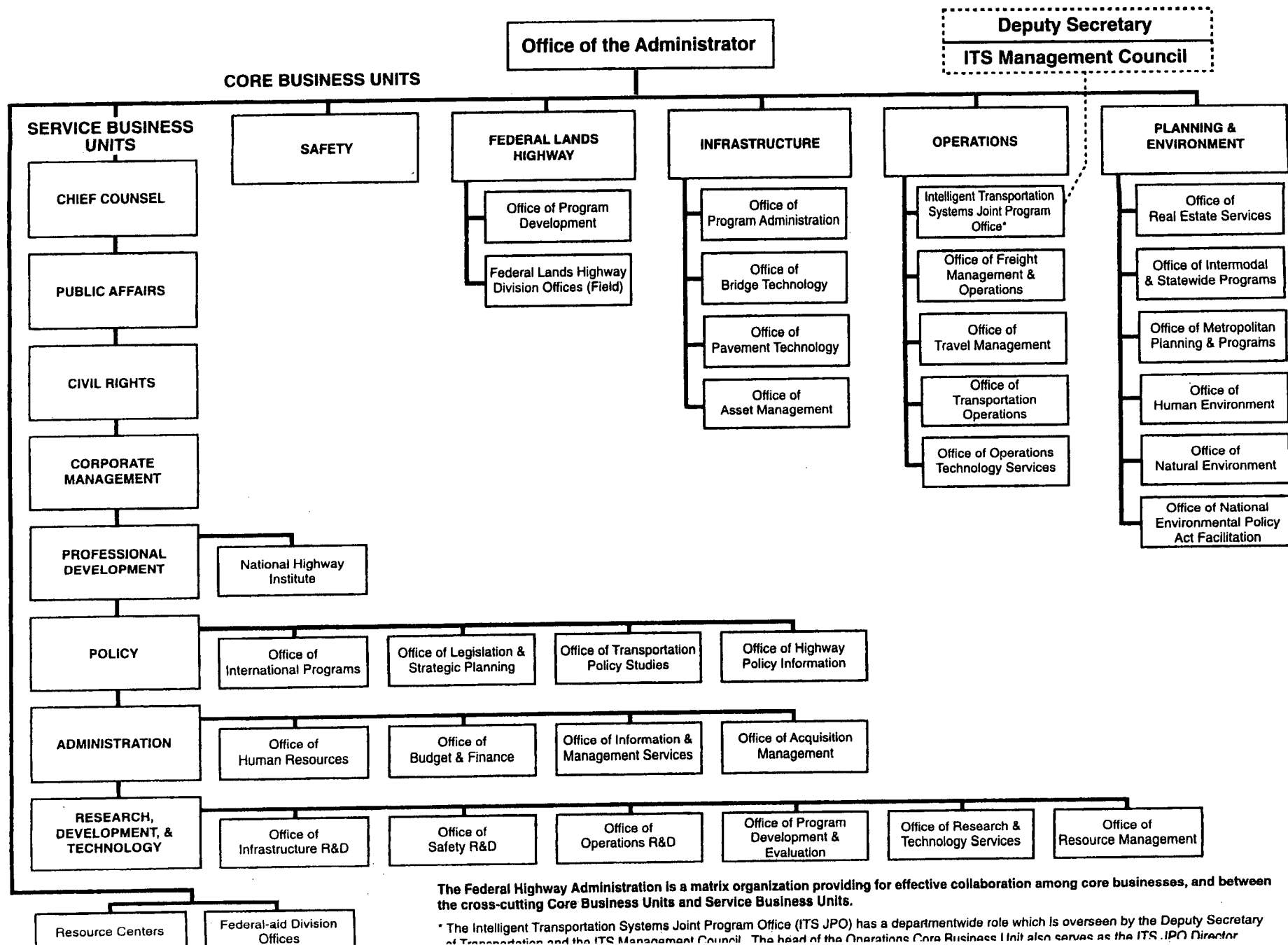
The Future FHWA Organization

- Strategically Driven
- Partnership Operations
- Customer Service Orientation – Added Value
- Tailored Technical Assistance
- Lowest Possible Level of Delegation
- Minimum Structural Layers
- Open Knowledge Flow

U.S. DEPARTMENT OF TRANSPORTATION



FEDERAL HIGHWAY ADMINISTRATION



The Federal Highway Administration is a matrix organization providing for effective collaboration among core businesses, and between the cross-cutting Core Business Units and Service Business Units.

* The Intelligent Transportation Systems Joint Program Office (ITS JPO) has a departmentwide role which is overseen by the Deputy Secretary of Transportation and the ITS Management Council. The head of the Operations Core Business Unit also serves as the ITS JPO Director.

Leveraging Technology and Innovation

Roles and Relationships within a Reorganized FHWA

A key principle of FHWA reorganization, completed during 1999, was to place the Agency's products and services as close to the customer as possible. This includes efforts to leverage technology and innovation, which is one of the Agency's guiding principles as defined in the *FHWA National Strategic Plan*: "... FHWA will be an international leader in researching, developing, and advancing technology to ensure the most efficient, effective, and environmentally sensitive intermodal transportation system. Technology deployment will be a key factor to accomplish strategic objectives in all goal areas."

The purpose of this paper is to outline the key roles and responsibilities of various FHWA organizational components to carry out this guiding principle in support of the Agency's goals and objectives. Alignment of resources and expertise in line with these roles and responsibilities is a continuing process aimed at improving the Agency's ability to provide outstanding service. Active offices include the Core Business Units (CBUs), the Research Development & Technology (RD&T) Service Business Unit (SBU), other SBUs, the Resource Centers (RCs), and our chief delivery and deployment component, the Division Offices (DOs). It takes each one contributing and working in unison and with our external partners to do the job successfully.

Building upon the many strengths of past and present FHWA programs and leveraging the organizational changes to create greater successes in the future requires recognition of both formal and informal roles, responsibilities, and relationships necessary to successfully develop and deliver innovative solutions. This process of working together will use both our traditional communication and coordination methods and new methods that will be initiated as we expand our activities agency-wide in the technology and innovation arena.

Technology and Innovation ... includes advances in processes and services for a wide range of topic areas including policy, planning, environment, design, highway safety, construction, maintenance, system management and operation.

FHWA will Leverage Technology and Innovation... Promote the use of technological advancements and innovations by States and local governments... Technology deployment will be a key factor to accomplish strategic objectives...

-Guiding Principle, FHWA Strategic Plan

The purpose of this paper is to outline key roles and responsibilities ... to carry out this Guiding Principle in support of Agency goals...

At the outset, it should be recognized that "technology and innovation" as used in this paper includes advances in processes and services for a wide range of topic areas including policy, planning, environment, design, highway safety, construction, maintenance, system management and operation. Internal business process changes are not included within this purpose.

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Technology / Innovation Process Features and Characteristics

The major elements of an innovation process are shown here as a series of sequential, linear activities. Real-world experience in advancing innovation clearly does not follow such a discrete set of steps; in fact, many of the steps occur in parallel, “loop-backs” between integrated activities are frequently necessary and beneficial, and products can enter the cycle at different stages. This dynamic nature of innovation is natural and healthy. For clarity, this paper will use this simple sequence of steps as a basis for discussion of the roles and responsibilities of FHWA organizational elements.

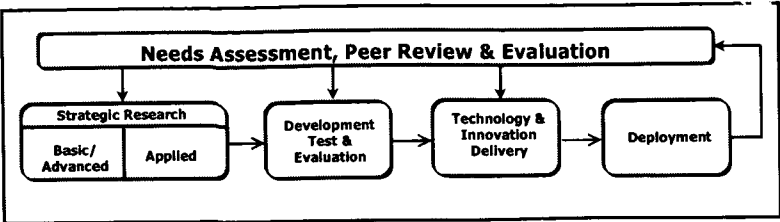
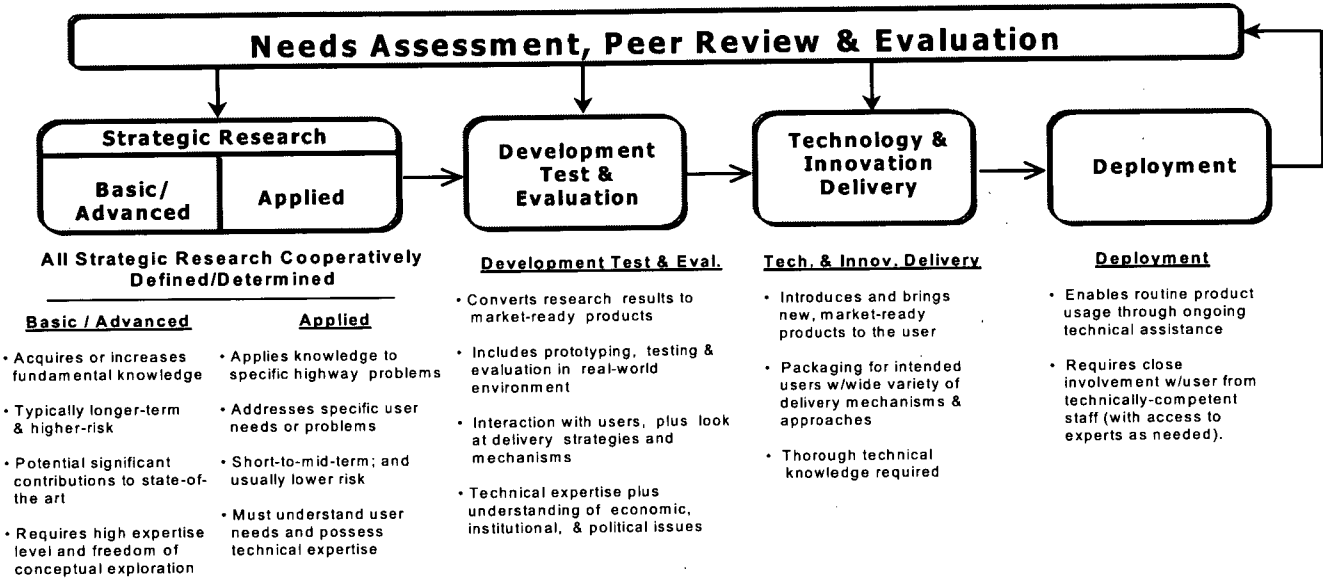


Figure 1, below, includes a set of bullets briefly describing the functions or characteristics of each element of this process. Precise “boundaries” between elements should not be looked at as defining strict roles or limits on activities, as the dynamic nature of the process needed to meet customer needs for advancing innovation requires flexibility and willingness to adapt tasks to unique needs.

Figure 1

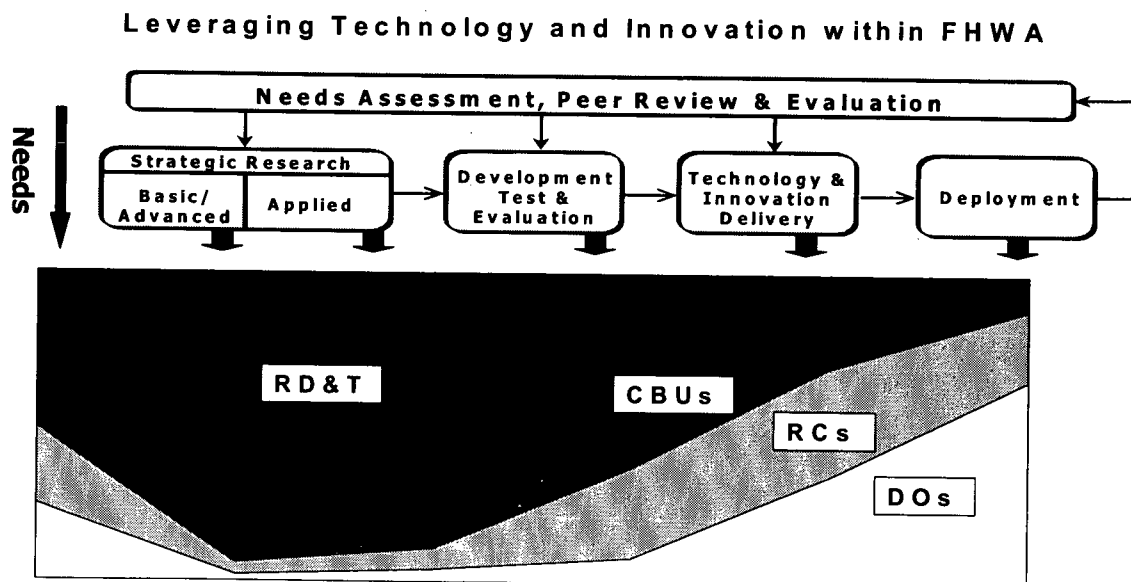


Functions / Characteristics of Technology & Innovation Process

FHWA Organizational Responsibilities in the Process

Figure 2 presents an approach to visualizing the relative degree of responsibility, leadership, participation, and interest which various FHWA organizational elements have within each step of the process. The relative influence of different FHWA offices is shown as varying depths in the area chart. For instance; division offices take a leadership role and are most active in “delivery” and “deployment;” the role of the RD&T SBU is most prevalent in the “strategic research” element, but others (most notably the Environment & Planning CBU) also actively pursue strategic research). Note that while RD&T is the only SBU specifically identified in this figure, other SBUs including Professional Development and Administration actively participate in the process. Professional Development, for instance, is responsible for a wide range of training and education efforts which support technology and innovation delivery, especially through programs of the National Highway Institute (NHI) and the Local Technical Assistance Program (LTAP).

Figure 2



Following is a synopsis of primary roles:

Needs Assessment, Peer Review, and Evaluation - These functions are shown as a continuous set of activities which take place throughout the innovation cycle, with feedback into each phase to drive decision-making. All elements of the Agency should be involved in these efforts; with each bringing their particular perspectives. A coordinated, comprehensive approach to these functions which ties priorities to achievement of

All elements of FHWA should be involved in Needs Assessment, Review, and Evaluation.

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FHWA strategic and performance goals is necessary. As strategic goal owners, CBU leaders (along with the Policy SBU Director) are responsible for defining strategic research priorities and program and project plans within their business area, and developing budget proposals to carry out necessary work. Similarly, all SBUs and RCs participate in planning and development of a program of Agency-wide R&T activities.

This continuing process of needs assessment and program definition relies heavily on external outreach to create a national R&T program which recognizes the priorities and participation of all stakeholders. The National R&T Partnership Initiative brings together Federal, state, local, academia, and private sector participants to collaborate on development of a national R&T agenda.

This effort is strengthening current relationships and broadening the range of contacts which benefit FHWA in defining and executing R&T programs, in addition to expanding opportunities for collaborative work. This effort is being focused by five working groups in the areas of infrastructure renewal, safety, operations & mobility, planning & environment, and policy analysis & system monitoring; and CBUs and Policy SBU are taking a lead role in working with these groups. (Activities in the planning and environment area are being advanced by the Surface Transportation-Environment Cooperative Research Program Advisory Board, a National Academy of Sciences Committee established in accord with Sec. 5107 of TEA-21.)

In addition to responding to customer and partner needs, attention is also given to research which informs the Agency as a corporate customer; e.g., policy-oriented issues where FHWA itself is the user of the information. FHWA also participates with other US DOT modal administrations and external entities (such as DOD and DOE) in development and execution of strategic R&T program efforts.

Strategic Research - The primary organization responsible for conducting research is RD&T. Other elements of FHWA conduct research and many participate in the research phase, this is

Research is primarily the responsibility of the RD&T SBU; with Policy and Planning & Environment having responsibility in their business areas.

especially valuable to assure that projects remain focused on producing "real-world" benefits. It should be noted that the Planning & Environment CBU is responsible for research in their business area; in addition, the Policy SBU is responsible for preparation and execution of policy-related initiatives supported by R&T funds. In some cases,

other CBUs will also conduct contract research in specific areas, such as freight topics. Also, the Intelligent Transportation Systems (ITS) program is managed by the DOT-wide ITS Joint Program Office, with execution of ITS research projects being the responsibility of various offices within several modal administrations.

External outreach is critical to development of a national R&T program. The National R&T Partnership Initiative brings together Federal, State, local, academia, and private sector participants. This strengthens current ties and broadens FHWA's contacts with the

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Development, Test, and Evaluation - As the innovation process moves to production of market-ready products, prototyping and evaluation in real-world conditions is an essential task. This phase involves more interaction with users, along with more focus on delivery strategies and mechanisms. These aspects call for a greater degree of participation and leadership from CBUs and growing involvement of RCs.

Greater leadership and participation from CBUs and growing involvement of RCs is called for during Development, Test, and Evaluation phase

Technology Delivery - Responsibility for packaging and delivery to customers rests with the

Responsibility for delivery to customers rests primarily with the RCs, and with CBUs & Policy SBU within Headquarters. Division Offices provide critical link to State-level needs.

Resource Centers and the CBUs (and Policy SBU) within Headquarters. In serving the needs of multiple Division and State customers, the RCs are well-positioned to be aware of priority needs and opportunities, and to deliver appropriate solutions and assistance. As the direct link to State, local, and other customers; Division Offices have a critical role in linking needs to appropriate products.

The Professional Development SBU, through

the NHI and the LTAP, also contributes critical resources to building the skills necessary for expanded adoption of innovation; and increased use of CBU and RC staff as course instructors will reinforce our ability to provide services.

Deployment - After focused efforts in packaging and delivery of products, technical expertise and assistance is needed as customer support during routine adoption and use. This is a primarily a function of Division office staff; with significant RC involvement and assistance as needed from CBUs, RD&T and other SBUs.

Deployment is primarily a Division Office function; with significant RC involvement and support from CBUs and SBUs as needed.

Communication / Coordination Linkages

Routine, open, and broad interaction among FHWA elements throughout the activities outlined above is essential to success in meeting customer and partner needs. Frequently, the most effective channels for this interaction have developed informally, with motivated staff working to assure success through collaboration. FHWA management should assure that communication linkages are defined and remain robust in support of the process. Examples of relevant efforts to date include initial work to create "Communities of

Advancing "Communities of Practice" and "Technology Facilitation Action Plans" will improve communication

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Practice” which are intended to foster improved knowledge sharing on specific topic areas among all staff, and recent work on “Technology Facilitation Action Plans” by RD&T which define schedules for R&T product development and delivery, including identification of participating staff members throughout various FHWA offices. (This initiative is currently focused on programs in operations, infrastructure, and safety; use for other areas such as environment and planning and policy is not yet determined.)

Agency-wide coordination of the technology / innovation delivery process received particular attention with discussion at the senior leadership retreat in January 2000. The discussion recognized that, while the FHWA restructuring was intended to create a closer connection to potential users of technology and services, it is also true that decentralizing the function does present an increased challenge in terms of setting a strategy and communicating a “corporate message” for FHWA. A decision was made that RD&T should coordinate technology and

RD&T will coordinate Agency-wide innovation / technology transfer, with a CBU / RC working group

innovation delivery for FHWA. In addition, in order to assure close coordination between offices, CBUs and RCs will designate “points-of-contact” for the technology and innovation functions. These contacts will serve on a working group facilitated by RD&T for the purpose of defining an agency technology deployment strategy, identifying

priority initiatives and needs, sharing information regarding good practices, improving communication of the R&T “story”, and defining a framework for the measurement/evaluation of technology deployment by FHWA.

R&T Program Resources

As part of R&T program allocations under the previous organization, the Office of Technology Applications distributed a significant amount of funding authority to FHWA field offices for their direct use for a variety of technology delivery purposes. These funds have been very successfully applied by the field to further adoption of technology and innovation, and the FHWA Management Council has continued this support with allocation of R&T funds to the RCs. These funds have been provided directly to the RCs through an “advance of funds” from the FHWA Office of Budget. In addition to these funds provided directly to field offices, CBUs delivery programs are expected to include elements which provide funds to field offices to support specific program areas.

Field offices continue to receive R&T delivery funds, in addition to program-specific funds from CBUs

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Appendix - Expanded Discussion
FHWA Roles & Responsibilities for Leveraging Technology and Innovation

The following material has been prepared to offer additional information on the types of activities and relationships anticipated within FHWA. This discussion especially focuses on roles and opportunities for Resource Center staff, as this organizational level is a new entity and has a unique position within the Agency's innovation process. A matrix which highlights key features within each element of the technology / innovation process follows this narrative.

This material should not be viewed as formal FHWA policy, and circumstances which exist for particular programs or projects should determine the specific manner in which Agency offices work together and with external partners and customers to assure success.

Needs Identification / Prioritization / Evaluation — Innovative solutions that fulfill partner and customer needs are a primary objective for FHWA. Solutions aimed at meeting the priority needs of customers will require far less "selling" by FHWA because the "pull" from the partners and customers will be strong for the adoption and deployment of the technology. To achieve this, the key is to clearly understand and translate customers current and future needs and then to tailor our delivery systems to always be on the target. As noted in the main body of this paper, external outreach and participation by key stakeholders in this process is critical to success.

RD&T will coordinate development of an overall national R&T agenda and will facilitate Management Council action on FHWA's R&T program and budget. The agenda will be derived, in part, through the use of subject area marketing analysis in the transportation community and interaction through and partnership with national and international organizations such as the Transportation Research Board, Civil Engineering Research Foundation, Organization for Economic Cooperation and Development, the National Cooperative Highway Research Program, and others.

As strategic goal owners, CBU managers will lead and coordinate creation and execution of R&T plans in subject areas which address strategic and performance goals, primarily through the development and use of multi-year program plans, or roadmaps. They will perform market analysis in those subject areas to understand the size and characteristics of the customer-base, what they need, what they are willing to spend, opportunities for shared programs with external partners, and the practical and political constraints on implementation. The multi-year program plans will present for each priority area or initiative the comprehensive set of projects and activities necessary to identify, develop, test, evaluate, and deliver technology products. These program plans should be developed in cooperation with FHWA partners such that a comprehensive coordinated plan that identifies products, milestones, and key responsibilities is maintained.

The prioritization and program planning process that is built upon our strategic objectives and which contribute to FHWA's R&T program plans should involve field technical specialists, not

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from the perspective of entitlement, but rather because of the skills and capabilities of these specialists in the future. Networks of specialists will continue to evolve naturally over time and these professional linkages will be used as sources of counsel and information exchange. Field perspectives related to problems and issues experienced at the delivery end of the transportation program will make their way into the discussions of the biggest opportunities for FHWA in future programs.

The identification and translation of customer and partner needs is also an important role for FHWA's technical specialists in the field, as specialists at the Division level will continue to be the primary point of contact with most of our customers and partners. Through close working relationships of division staff with the technical staff of the Resource Centers, RC specialists will acquire knowledge about the array of needs from among State and local DOT's. In many cases the needs of these State and local partners and customers can be satisfied through existing and improved systems of sharing better practices—a primary responsibility of the Divisions where the Resource Centers and CBUs / SBUs can provide support.

The technical staffs of the Resource Centers will become primary points of contact to ensure an effective feedback loop with the CBU's and RD&T in understanding the perspectives and needs of our primary partners and customers regarding future technology initiatives. It is important to understand that initial discussions about the contents of national R&T agendas will produce input that includes multiple overlaps and conflicts. Sorting through this input requires an understanding about the extent to which problems and needs are either understated or overstated. This validation process can effectively be performed by Resource Center specialists.

Another potential role for the Resource Center staff is as the focal point and facilitator of the outreach and input activities in the field, a necessary part of the agenda setting collaboration. Improved relationships and technical/professional peer-to-peer activities with a wide range of technical experts at Divisions, State and local DOT's, universities, research laboratories, and other partners and customers would provide an open and productive venue for input, evaluation, and validation as our national plans are formulated.

At the product level, the evaluation of new technologies relative to its acceptance, utilization, and effectiveness will continue to best be accomplished by field personnel. The ability to understand perspectives that might be "uniquely" local in nature as a factor in the evaluation process will be housed in the Resource Centers. The process of identifying and selecting partners at State and local DOT's and with other customers is completed when those same partnerships are used to do the evaluation. This process will involve networks of specialists from both RD&T and the CBUs through the feedback mechanisms that are formed and will grow stronger as a result of restructuring.

Scanning — A continuing and increasingly more effective method to advance the "state of best practice" in the transportation industry is to scan for new ideas. Identifying cutting edge technologies and processes through scanning will involve participation by RD&T and CBUs as well as the Office of International Programs. CBUs will also have a role in identifying existing solutions in other highway organizations or industries for needs identified in roadmaps.

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Similarly, since a primary role for the Resource Centers involves the ongoing challenge to create an environment for our partners and customers to continually “raise the bar” in building better transportation facilities, it is reasonable to expect that Resource Center specialists would be integral members of many teams that do scanning.

Attempting to differentiate scans around “cutting edge technologies” or “existing technologies” or based on geography may not be effective. Scans have high potential payoff where participants see the potential of new technology (existing or cutting edge) and are able to apply perspective and mental comparison with current methods, practices, and techniques; thereby, they are able to apply the new concepts to help solve problems. This capability, to make the mental connection between existing problems and the opportunities created in seeing new technologies, can be supplied by field personnel, especially the specialists in the Resource Center.

Advanced / Applied Research — The advanced research program is intended to include studies of those technologies which are on the leading edge of the research spectrum. It will be carried out to the extent possible through various partnerships and cost-sharing arrangements with the public and private sectors. FHWA’s advanced research program is an RD&T responsibility but the most advanced technical specialists among other Headquarter staffs and Resource Centers should participate in the discussions of the program.

For the most part, applied research is to be administered centrally by RD&T, although the lead for planning and environment, right-of-way, and policy remain decentralized in the respective CBU and SBU. The role of field personnel in the applied research function is primarily one of information exchange, including the formation of and delivering of expectations among technical specialists within and outside FHWA. For both advanced and applied research, the Planning and Environment CBU and the Policy SBU have responsibility in their topic areas; other CBUs may also manage efforts in specific or unique topic areas such as freight.

Development — Taking prototypes from the research stage to the market ready stage (concept proven, being made field-deployable) will require cooperation among all major participants in FHWA’s technology program. Field testing and evaluation and the resulting modifications that improve the market readiness of new technology will best be accomplished through shared responsibilities and interests. Interests and involvement in the later stages of the research cycle will for new technology become a natural expansion of the interest and involvement in earlier phases of research and development. Knowledgeable specialists at the Resource Center level will complement CBU and RD&T specialists in making technologies ready for the delivery and deployment stages. Continued evolution and growth of expectations about new technologies will come from continuous involvement at the peer-to-peer level among technical specialists at all levels of the Agency.

For those new technologies which are in the development stage, there will be a continuing need to partner with leading edge States and locals to identify field test and evaluation sites. This will be done in cooperation with technical specialists at the Resource Centers who understand the interest and readiness of field partners and customers. The evaluation plans will be developed by

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Headquarters units and will be implemented with active participation by the Resource Center specialists.

Technology Delivery — FHWA's primary focus for delivering technology as a basic premise of our stewardship role is through sharing and promotion of "better practice" technology to customers such as State DOTs, localities, Metropolitan Planning Organizations, and other Federal agencies. At more robust levels, it also extends to the promotion of leading edge or "best practices" concepts, practices, and technology to those customers capable of dealing with the advanced concepts in the various areas of transportation technology.

The Division offices are a primary point of delivery of better practice activities and for advancing greater acceptance and use by State and local-level customers. The Divisions can also play a significant role in the determination of areas of potential interest and opportunity for advancing States and locals to the highest level of proven performance known as the "state of best practices." Not all States are ready, willing, or able to test and deploy the "state of best practice" as their standard operating procedure. Assessing and influencing their sense of readiness is an emerging role for FHWA field engineering staffs.

Based on identified needs and program plans, the CBUs have a lead role within Headquarters for packaging of technology products for delivery, which should be done in close cooperation with resource centers and divisions. The delivery programs which are created should be an integral part of multi-year program plans, and actively involve key partners including States, localities, and the private sector. Professional Development and RD&T support these delivery programs with their program and staff resources.

The Resource Centers have a primary role in providing technical, training, and program assistance and services to FHWA's State and local partners. In the short term, RC specialists will be requested to provide these partners with consulting and trouble shooting services. Success at this first step will have significant bearing on the acceptance of the RCs in the evolving technology role; all key FHWA offices involved in the R&T program must work in unison to ensure the success of this and subsequent stages. The RCs – aided by Headquarters' staff where needed for specific issues – will provide a staff capability to:

- Assist the Divisions in the needs assessment, problem identification, and evaluation.
- Generate alternative solutions to customer problems and opportunities.
- Share information on the changing "state of best practice," helping to create and foster a sense of the future of a particular technology.
- Assist in the identification of areas of "better technologies" for the States and divisions to evaluate for their unique needs and situations—in short, putting solutions in the hands of those that need it.

Technologies that are past the development stage will need professional marketing and promotion packages readied for the field to deliver. This delivery stage will be a joint field and headquarters activity that has its origins in collaborative discussions about the deployment process. Resource Center and division specialists will continue their partnering with CBU and RD&T specialists, and together they will create professional, informative, and effective

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technology sharing packages, demonstrations, etc. This continued partnership creates a sense of collective ownership by both the field and headquarters and should ensure a smooth and effortless transfer process. The development of "Technology Facilitation Action Plans" by RD&T which define schedules for R&T product development and delivery, including identification of participating staff members throughout various FHWA offices, will support this process.

Professional Development will support the evolution of Resource Center technical experts and others through training on technologies and the techniques of technology transfer and marketing. The RD&T Office of Research and Technology Services also will provide expertise and guidance on technology transfer and marketing efforts. The P.D. Office will also administer and coordinate the Local Technical Assistance Program (LTAP) and will foster education and training through the LTAP Centers. Field offices should actively coordinate and support the LTAP; while in Headquarters, RD&T and the CBUs will work with the Centers to support technology transfer to locals.

The delivery of training through the National Highway Institute (NHI) also directly supports delivery through providing education and professional development tools to greatly expand adoption of state-of-the-art innovations.

Delivery of technology involves more than providing today's solution; it also should incorporate an awareness of what innovations are "over the horizon" which users should be anticipating. In working with customers, the Resource Centers and some talented division office specialists will link expectations about future technologies with existing/future needs. The focus of synthesizing future needs into potential technology initiatives in the R&T program will be a primary feedback role of the Resource Center specialists. This would occur naturally in the future as an integral part of the R&T agenda-setting and multi-year programming process led by the CBUs and facilitated by RD&T. Field technical experts would be expected to become virtual team members of headquarters teams and contribute to that process on an ongoing basis.

Technology Deployment — To enable routine product usage, ongoing technical assistance to support those who make the decision to adopt a product is essential. In fact, the availability of on-going support is frequently a key factor in the purchase / adoption decision. Deployment involves continuous technical assistance, much of which will be of a routine nature. This also requires a close involvement with the user by technically competent individuals who have ready access to technical experts. Division offices staff would have lead responsibility for this customer support element of the R&T program, with support from Resource Center and appropriate CBU staffs.

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DISTRIBUTION OF R&T FUNCTIONS¹

Stage of R&T Process	RD&T; other SBUs where noted	Core Business Units ²	Resource Centers	Division Offices
Need Identification and Prioritization	• Coordinate / lead development of overall national R&T agenda. • Coordinate integrated FHWA R&T program and budget. • Provide marketing expertise support for subject area market analysis. • Coordinate FHWA participation in major national and international R&T efforts - TRB, CERF, OECD, NCHRP, etc.	• Lead/Coordinate development of subject area R&T strategic priorities and detailed program plans (roadmaps) • Market analysis at subject area level to understand size and characteristics of the customer-base, what they need, what they are willing to spend, and the practical and political constraints on R&T implementation, etc.	• Acquire / synthesize the array of needs among State and local customers. • Point of contact to ensure an effective communication / feedback loop among field and CBUs / SBUs. • Facilitate field outreach / input activities as appropriate.	• Maintain primary contact with customers and partners. • Identify and translate customers' and partners' needs.
Scanning	• Scan for cutting edge technology; which is not ready for near term application. • HPI—Support international scans.	• Scan for existing solutions in other highway organizations or other industries, that could meet the needs identified in multi-year program plans.	• Initiate scans for existing solutions among States and localities	• Provide input on connection between exiting problems in States and local jurisdictions and opportunities for the use of new technologies.
Advanced Research	• Conduct research to develop or adapt solutions for highway application which have potential for significant improvement but will not be ready for near term application and/or involve high risk. Requires conceptual thinking and exploration free from the constraints and demands of current problems or solutions	• Give input to advanced research agenda through helping to identify the more fundamental problems and issues to be addresses over the long term. • Planning & Environment CBU and Policy SBU plan and conduct efforts in their topic area; other CBUs may also take lead in specific or unique areas.	• May also give input to advanced research agenda through imparting the field perspective on fundamental problems and issues.	

Stage of R&T Process	RD&T; other SBUs where noted	Core Business Units ²	Resource Centers	Division Offices
Applied Research	• Conduct research and manage contract research to develop and apply knowledge to solve specific highway problems identified in CBU program plans; may be short-term or long-term, but is typically lower-risk. Currently performing this function in areas of infrastructure, operations, and safety; potential expansion to other areas, as requested. • Provide research management, policy, legislative expertise. • Operate research laboratories. • Operate technical functions in support of research: machine and electronics shops, computers.	• Conduct research and manage contract research to develop and apply knowledge to solve specific highway problems identified in CBU roadmaps. • Currently performed by Planning and Environment CBU and Policy SBU; other CBUs may also take lead in specific or unique areas.	• Participate in research contained in R&T program plans as appropriate; based on technical expertise among specialists. • Provide input in the development of technology delivery methods.	• Provide input in the development of technology delivery methods.
Development	• Prototype and beta test research results/products. • Include adequate field test, evaluation, and verification as part of appropriate research projects. • Operate technical functions in support of development: machine and electronics shops, computers.	• Demonstrate beta-tested products for testing and evaluation by prospective users, in cooperation with RCs.	• Cooperate with demonstration through coordination with States, finding demo sites, etc.	• Monitor field testing and evaluation of technologies in States.

Stage of R&T Process	RD&T; other SBUs where noted	Core Business Units ²	Resource Centers	Division Offices
Delivery	• Provide marketing support to CBUs. • Provide more general information dissemination / communication (web site, exhibits, general reports and brochures) • PD—Provide training support to CBUs / field / external customers. • PD—Coordinate LTAP.	• Package for delivery to the RCs and Divisions; aimed toward needs of ultimate customer. Marketing expertise needed to focus on needs of users in specific business area.	• Perform activities required to bring new, market-ready products to the customer: marketing of technologies to users (flyers, exhibits, reports); demonstrations; development of training; delivery of training; technical assistance. • LTAP—Delivery to local governments.	• Serve as primary point of delivery for States and locals for better practices activities. Determine areas of potential interest and opportunity for advancing the delivery of technologies to Sates and locals.
Deployment	• Very limited involvement; only in special cases, when requested	• Limited involvement, as support to RC &/or DO when requested	• Provide technical assistance support to Divisions; and to others such as CBUs as requested.	• Serves as primary lead in the provision of on-going technical assistance. Where needed, seeks technical expertise from RC / CBU.
Evaluation	• Evaluate/measure the overall R&T process, including management and T² processes. • Evaluate/measure the R&D laboratories.	• Evaluate/measure the effectiveness of the technologies used, on a nation-wide basis.	• Gather data on use of new technologies by States and evaluate/measure their effectiveness.	• Interact with State and local contacts relative to the acceptance, utilization, and effectiveness of new technologies. on an on-going basis.

1. Note: At all stages, a significant degree of input and coordination is assumed to be necessary across the units.

2. This column includes Policy where appropriate, although it is not a Core Business Unit.

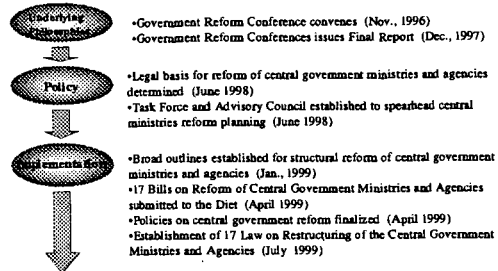
3.2 The Government Reorganization and the Reform of Research Institute (Mr.Tomomitsu Fujii)

The Government Reorganization and the Reform of Research Institute

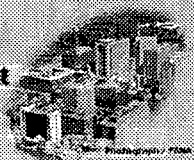
Tomomitsu Fujii
Director-General,
Public Works Research Institute, MOC, JAPAN



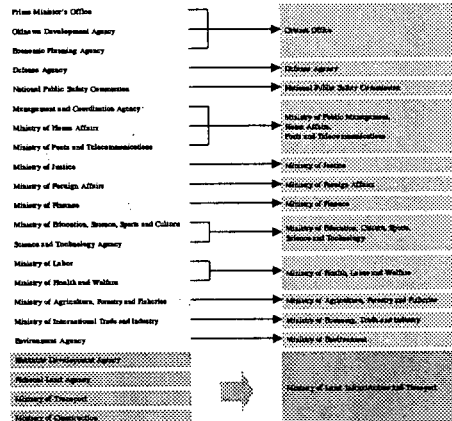
Timeline for Reform



Central Government Reform of Japan

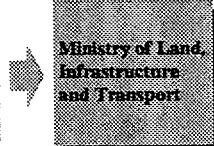


- I. Establishing a System with More Effective Political Leadership**
The Leadership of the Prime Minister and Cabinet will be enhanced along with the creation of the Cabinet Office.
- II. Restructuring of National Administrative Organs**
The reorganization along with a new inter-Ministerial coordination system will bring about more efficient and effective decision-making within the government.
- III. More Transparent Administration**
A unique system of Independent Administrative Institutions will be created by April 1, 2001.
- IV. Drastic Streamlining of the Central Government**
The goal for the government is to reduce the number of national public employees by 27% over the three-year period.



The duties of the new Ministry of Land, Infrastructure and Transport

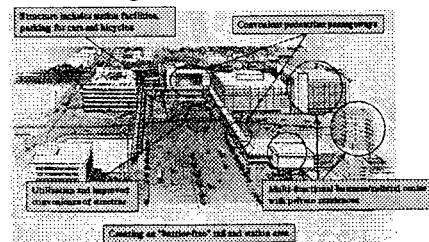
Regional Development Agency
National Land Agency
Ministry of Transport
Ministry of Construction



The Ministry of Land, Infrastructure and Transport serves as a national comprehensive organization for development and maintenance of the national social capital. To this end, it works to coordinate infrastructure, promote transportation policies, provide efficient meteorological services and ensure ocean safety and security.

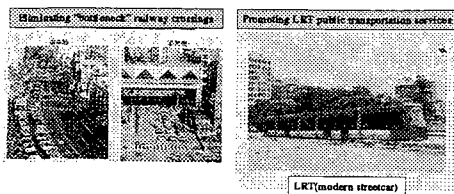
(ref: Article 3 of the Ministry of Land, Infrastructure and Transport Law)

Rapid Improvement for an Appealing, Bustling Station Complex



Transportation and construction management programs must go hand in hand. By building new city hubs that integrate options for work, home and play, we create new faces for our urban faces.

Working to Resolve Urban Traffic Congestion in the Early Stage



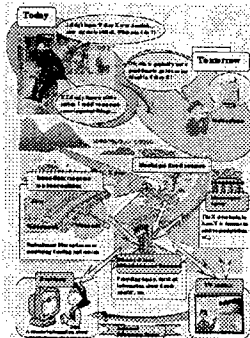
By integrating transportation and construction management planning, we can take pre-emptive action and eliminate long standing urban traffic problems.

Shortening Commutes for Urban Residents



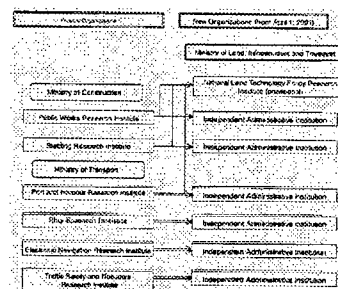
National land management, transportation and construction planning focus together on the common goal of halting the growth in or reducing commuting time.

Providing Timely, Accurate Disaster Information through IT



Meteorological administration and construction planning go hand in hand. Providing timely, accurate information promptly on flood conditions overflow conditions, help prevent damage and loss.

Research Institute under the new Ministry of Land, Infrastructure and Transport



Services conducted by the Public Works Research Institute, Independent Administrative Institution

"Undertakings indispensable from the public view point as to the stability of people's lives, society and the economy" and "the ones which may not necessarily be conducted in the case that they are committed to private bodies, although they are not necessary to be conducted under the initiative of the government"

(Quoted from the Law concerning the General Rules of the Independent Administrative Institutions)

For example :

- Research and Development concerned with advanced technologies with great risk for private sectors
- Research and Development concerned with fundamental and/or general-purpose technologies with small merit against investigation cost for private sectors

Outline of organizations and services based on the FY2001 Budget Requests

Public Works Research Institute, Independent Administrative Institution

Organizational Department	Service concerned with personnel, welfare, financial affairs and accounts, asset management, etc.
Planning and Research Administration Department	Service concerned with planning of research, evaluation of research, development and management of research facilities, etc.
Headquarters for Technology Research Promotion Department	Comprehensive coordination of major research projects, research on advanced technologies, construction engineering, etc.
Materials Department Research Group	Research on civil engineering materials, advanced material development, recycling of civil engineering materials, etc.
Ground Research Group	Research on soil mechanics, geology, etc.
Earthquake Engineering Research Group	Research on ground vibration, earthquake engineering, earthquake disaster prevention of civil engineering structures, etc.
Structure Research Group	Research on aerodynamic stability of bridge structures and other dynamic characteristics, foundation of civil engineering structures, research development of geospace use, etc.
Water Cycle Research Group	-
Hydraulic Engineering Research Group	-

Services conducted
by the National Land Technology Policy Research Institute

In charge of research which should be conducted by the government including services directly concerned with decisions regarding national policy

For example :

- Developmental studies to determine the technical standards on which to base laws and ordinances on rivers, roadways, architectures, etc.
- Conducting the studies, experiments and development research required to compile the standards, guidelines, manuals, etc., needed for projects under the direct control of the Ministry.

Outline of organizations and services based on the FY2001 Budget Requests

National Land Technology Policy Research Institute
(only organizations related with the Ministry of Construction)

Organization	Services
General Affairs Department	Support concerned with personnel, welfare, expenditures and revenue, asset management, etc.
Planning and Research Administration Department	Support concerned with planning of research, evaluation of research, promotion of international research cooperation, development and management of research facilities, etc.
Environment Research Department	Research on technology for better road environment conservation, planning, research in preservation, etc.
Road Research Department	Research on road, road maintenance, bridges, etc.
Urban Research Department	Research on city planning, urban facilities, urban disaster prevention, etc.
Sewerage Research Department	-
River Research Department	-
Building Research Department	-
Housing Research Department	-
Advanced Information System Research Center	Research on promotion of intelligent transport system (ITS), information communication technology in construction projects, etc.
Technological Policy Research Center	Research on manufacturing, automating and systemizing civil engineering technologies, construction economy, management of construction projects, promotion of advanced living system, etc.
Risk Management Technology Research Center	Research on sea area information system, earthquake disaster prevention plan, etc. and through ground motions, disaster such as landslide and subsidence, and prediction system against these disasters, etc.
Disaster Laboratory	Research on earthquake, subsidence, snow damage on road, etc. in the Hokuriku district

3.3 Developing a National Research and Technology Agenda (Mr.Dennis Judycki)

Developing a National Research and Technology Agenda

9th U.S.-Japan Workshop
On
Advanced Technology in Highway Engineering

Tsukuba, Japan
November 28 – December 1, 2000

National R&T Partnership Initiative

Objectives

- Increase National R&T stakeholder collaboration
- Help Develop a National Consensus on Needs
- Determine Theme Areas and Priorities
- Establish a national R&T agenda
- Determine Roles and Responsibilities for FHWA, States, Locals, Academia, and Private Sector
- Improved Communication/Outreach on R&T

National R&T Partnership Initiative

- Forum Meetings
 - December 1998 - 35 Participants
 - July 1999 - 60 Participants
- Working Groups Formed
 - Infrastructure Renewal
 - Safety
 - Planning and Environment
 - Operations and Mobility
 - Policy Analysis and System Monitoring

Characteristics of National Partnership Initiative

- Shared priority-setting/decision-making/governance
- Shared resources
- Build upon existing effective relationships
- Be open to new partners - Federal, State, local, academia, private sector
- Partnership transcends current legislative environment - look long term

Themes - Infrastructure Renewal

- Structures -

1. Enhanced Materials, Structural Systems, and Technologies
2. Efficient Maintenance, Rehabilitation, and Construction
3. Safety Assurance of Highway Structures for Extreme Events
4. Assessment and Management of Bridges and Other Structures
5. Enhanced Specifications for Improved Structural Performance
6. Information and Automation for Structures Design, Construction, and Maintenance

Themes - Infrastructure Renewal - Pavement -

1. Designs and Materials for Longer-Lived, More Cost-Effective Pavements
2. Construction and Maintenance Techniques and Technologies to Reduce Highway User Delay While Maintaining Service and Securing Work Zone Safety
3. Safer, Environmentally Friendly Pavements
4. Education, Communication, and Sub-Training

- Asset Management -

1. Education
2. Implementation
3. Decision-Support Tools
4. Information Management

Themes - Safety

1. Safety Management and Data Systems
2. Driver Competency
3. High Risk Driving
4. Vehicle Safety
5. Highway Infrastructure and Operations
6. Vulnerable Road Users
7. Truck and Bus Safety
8. Post-Crash Management

Themes - Policy Analysis and System Monitoring

- Data-Driven Decision Tools -

1. Linkage Between Investment and Benefits
2. Performance Measures
3. Innovative Financing Mechanisms / Approaches
4. Alternative Revenue / Tax Sources
5. Traditional Highway-User Funding
6. Public-Private Partnerships

- Monitoring Evolving Trends -

1. Sustainable Data Collection
2. More Responsive Analytical Tools
3. Continuing, Coordinated, Comprehensive System Monitoring

Themes - Operations and Mobility

1. Customer, Customer Expectations, and Customer Needs
2. Maximizing Efficiency / Minimizing Congestion
3. Information Needs and Requirements
4. Transportation Safety
5. Environmental Issues
6. Intermodal Interfaces and Efficiencies
7. Research Programs and Process

Themes – Planning and Environment (Preliminary)

1. Environmental Streamlining
2. Wetlands, Water Quality, and Ecosystems
3. Noise
4. Air Quality Improvement
5. Public Health
6. Livable Communities

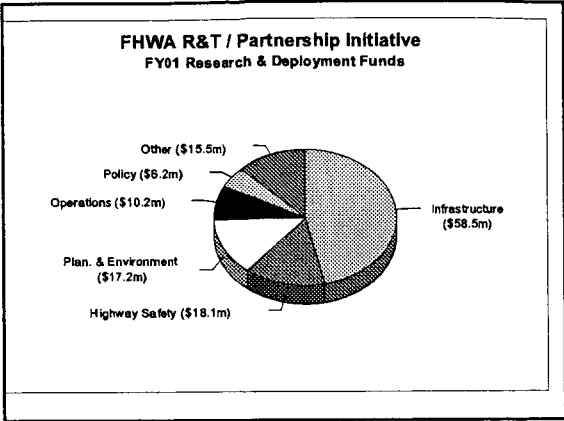
R&T Partnership Initiative Next Steps

- Working Group reports completed by December 31, 2000
- Present findings at 2001 TRB Annual Meeting
- Synthesize reports into National R&T Agenda

http://www4.nationalacademies.org/trb/homepage.nsf/web/r&t_forum

FHWA Participation in the National Partnership Initiative

- Launching the Initiative
- Defining the National Research Agenda
- Conducting a Nested Federal Research Program
- Advocating a Robust National Research Agenda

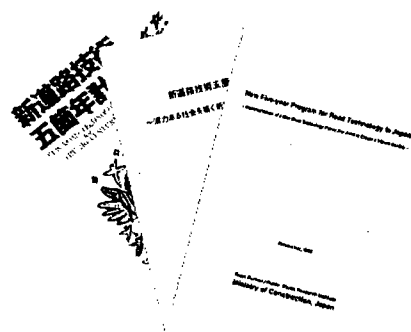


Partnership Conclusions

- Creates national strategic R&T vision
- Optimizes resources
- Effectively promotes the value of the research R&T enterprise
- Establishes effective communication
- Creates partnerships among Federal, state, academia, and industry to develop and successfully implement R&T innovation

3.4 The New 5-year Program for Road Technology in Japan (Mr.Toshiyuki Nakamura)

The New 5-year Program for Road Technology in Japan



December 1, 2000

Toshiyuki NAKAMURA
Director, Road Department,
PWRI, Japan

1

The New 5-year Program for Road Technology in Japan (1998~2002)

Background

- Support the New 5-year Road Improvement and Management Program
 - FY 1998~2002
 - total investment ¥ 78 trillion



2

The New 5-year Program for Road Technology in Japan (1998~2002)

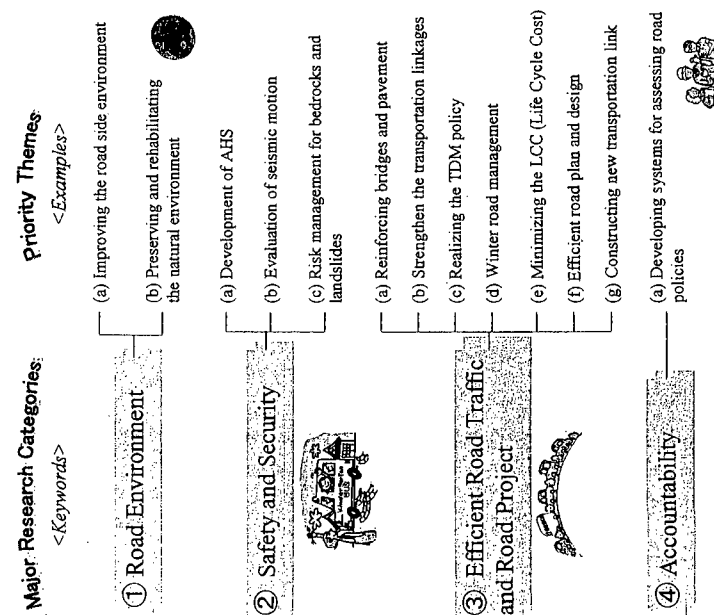
Setting 4 Major Research Categories

- ① Improving the road environment
- ② Improving the safety and security of roads and daily lives
- ③ Improving the efficiency of road traffic and road projects
- ④ Improving accountability



3

4 Major Research Categories and 13 Priority Themes

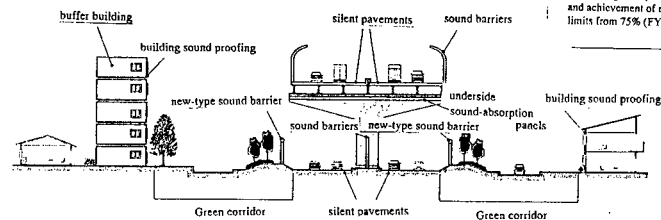


4

① Improving the Road Environment

- (a) Technology for improving the roadside environment
- air pollution, noise and vibration

■ Improvement of Road Structure



GOALS

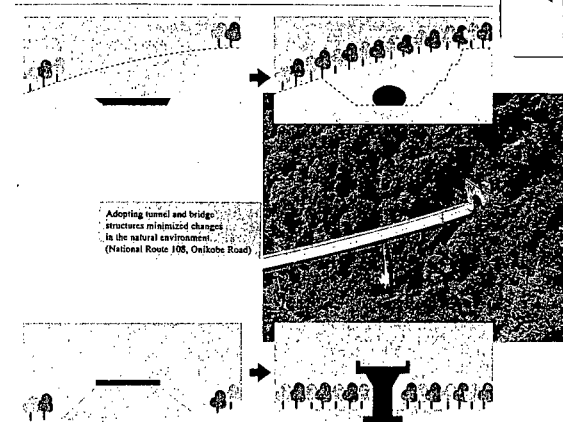
- Improvement of roadside environment by combining technologies from different industrial sectors (development of low-emission vehicles and low-noise tires)
- Greater achievement of nitrogen dioxide reduction goals by more than 46% (FY1997) and achievement of requested nighttime noise limits from 75% (FY1997) to 79% all by FY2002.

5

① Improving the Road Environment

- (b) Technology for preserving and rehabilitating the natural environment

■ Adopting tunnel and bridge structures can minimize the effect on the surrounding natural environment.



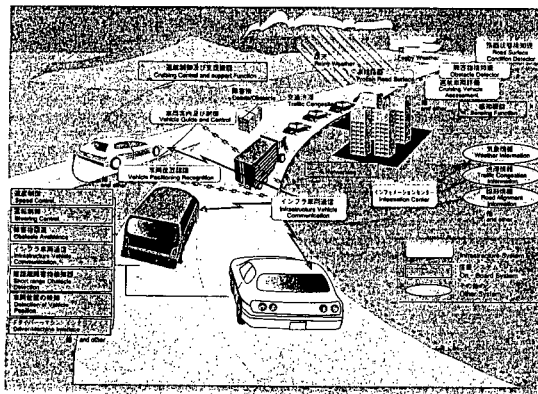
GOALS

- In order to preserve and improve the precious natural environment, various guidance is issued for planning, design, construction, and management technology.

6

② Improving the Safety and Security of Roads and Daily Lives

- (a) Development of AHS (Advanced Cruise-Assist Highway System)



GOALS

- Implementation of practical experiments for realization in 2000
- Complete system by 2002 and implement in accident-prone areas, etc.

7

② Improving the Safety and Security of Roads and Daily Lives

- (b) Evaluation of seismic motion taking into consideration regional characteristics



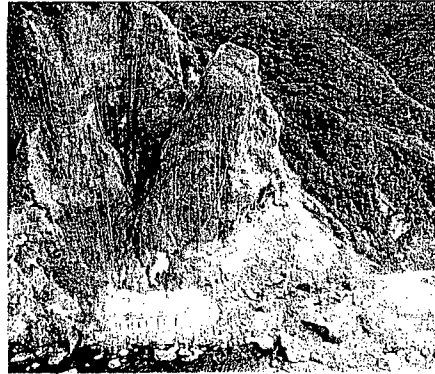
GOALS

- Creation of earthquake resistance design standards taking into consideration the facility's importance and balance with cost, based upon an earthquake risk analysis of the fault line's size and past earthquake occurrences.
- Reduce the cost of earthquake resistance performance by around 10%.

8

② Improving the Safety and Security of Roads and Daily Lives

(c) Risk management technology for bedrock collapse and landslides



GOALS

- Development of integrated risk management technology through risk evaluations and high-quality disaster detection systems.

9

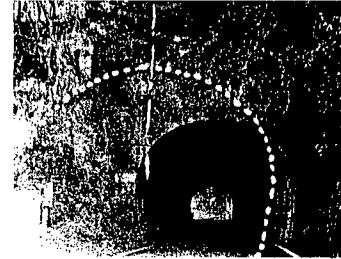
③ Improving the Efficiency of Road Traffic and Road Projects

(a) Technology for reinforcing bridges and pavement and enlarging tunnels

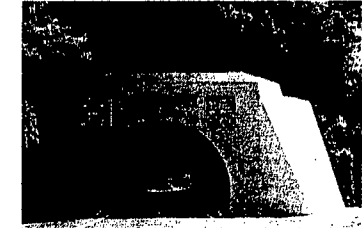
GOALS

- Assess the impact of vehicular characteristics on the road structure and develop efficient reinforcement technology.
- Develop tunnel widening construction methods with short construction periods and at low cost.
- Respond to the increased size of international freight transportation.

(before improvement)



(after improvement)



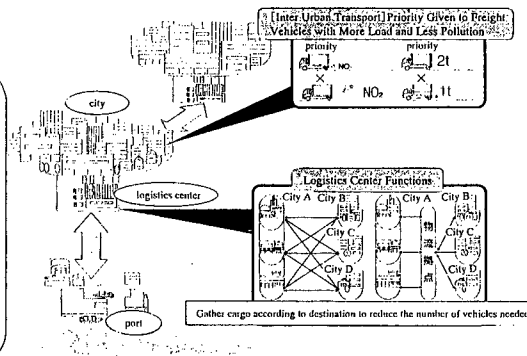
10

③ Improving the Efficiency of Road Traffic and Road Projects

(b) Development of freight transport systems

GOALS

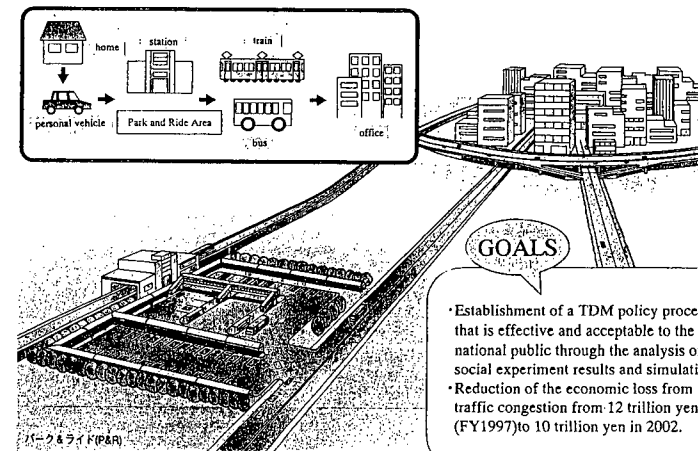
- Improvement of logistic efficiency by making the transfer between inter-urban transport more efficient and improving the efficiency of freight vehicles through the utilization of information technology.
- Development of new logistics for high-speed / high density inter-urban transport.



11

③ Improving the Efficiency of Road Traffic and Road Projects

(c) Technology for realizing the TDM policy



12

③ Improving the Efficiency of Road Traffic and Road Projects

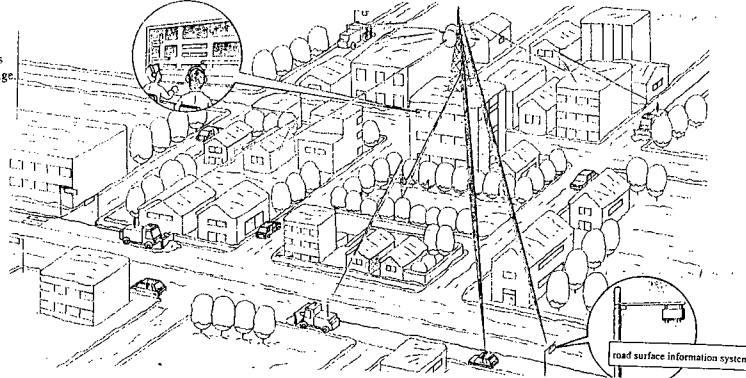
(d) Improvement of winter road management

GOALS

- Development of longer-lasting anti-road ice chemicals with less salt damage.
- Development of snow-melting systems that utilize heat generated from sewerage factories, etc.
- Improve the relief rate for road surface freezing 10% (FY1997) to 45% in FY2002.

The operation of snow removal vehicles is managed by gathering information from patrol cars and road surface condition sensors

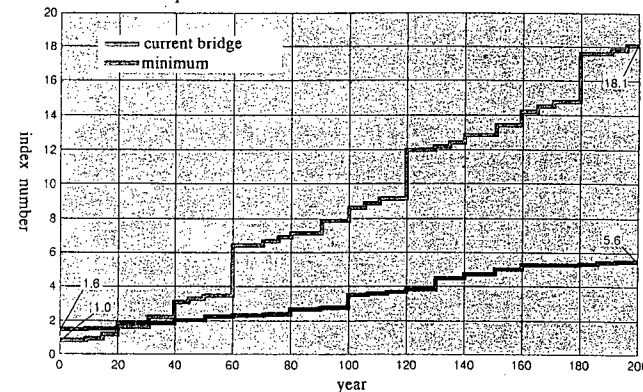
* Relief rate for road surface freezing: The proportion of general national routes and prefectural roads within snowy and cold regions where road surface freezing in the winter season obstructs traffic that is equipped with snow removal facilities.



③ Improving the Efficiency of Road Traffic and Road Projects

(e) Management technology for extending the useful life of pavements and bridges and minimizing the LCC (Life Cycle Cost)

Example of calculation for LCC of bridge



GOALS

- Development of a management system for pavement / bridge based on the Lifecycle Cost (LCC) concept.
- Bridges: Reduce LCC by a quarter, extend life by 4 times.
- Pavement: Retain level of maintenance " " without incurring increased costs from rising demand.

14

③ Improving the Efficiency of Road Traffic and Road Projects

(f) An efficient road planning and design technology that takes regional characteristics into consideration



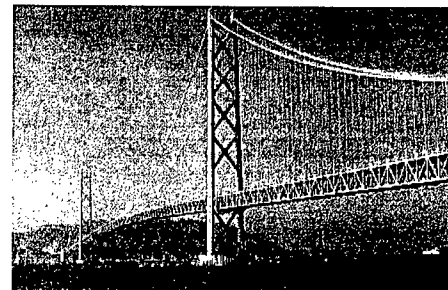
GOALS

- Aiming for more innovative use of road space in response to new traffic demand and the nature of the roadside environment.

15

③ Improving the Efficiency of Road Traffic and Road Projects

(g) Technology for constructing new transportation links that promote regional cooperation and consolidation



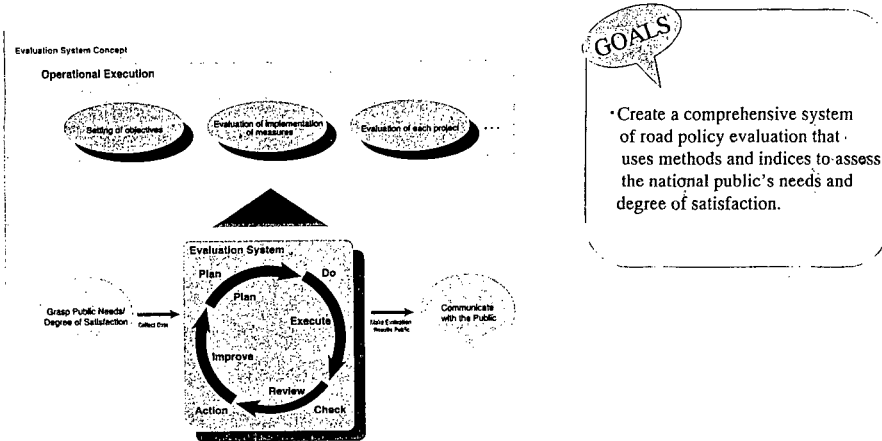
GOALS

- Reduce project costs by 30-50% compared to past design and construction using old technology.
- Development of cost-benefit analysis methods including long-term and wide-area economic ripple effects.

16

④ Improving Accountability

(a) Development of systems for assessing road policies



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Evaluation of Result and Method

- Interim evaluation in 2000

Results of Evaluation

Contents, Budget and Method of promoting

- Follow-up evaluation in 2002

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3.5 Review and Discussion of Past Workshops Conclusions and Actions

Review and Discussion of Past Workshops Conclusions and Actions

1. Background of U.S.-Japan Workshop

1) "Implementing Arrangement between the Ministry of Construction of Japan and the Federal Highway Administration of the Department of Transportation of the United States of America on Highway Science and Technology" was signed by Dr.T.Larson, Federal Highway Administration, and Dr.H.Mitani, Vice-Minister of Construction for Engineering Affairs on May 29, 1992.

2) U.S.-Japan Workshops on the Advanced Technology in Highway Engineering are held mutually every year in Japan or in U.S.A according to this implementing arrangement.

2. From the 1st U.S.-Japan Workshop to the 5th U.S.-Japan Workshop

1) We discussed research activities about following subjects and exchanged information about general road affairs of each country in the first four WS.

- 1- Road Administration (1st WS only),
Transportation Demand Management (after 2nd WS)
- 2- Pavement
- 3- Highway Bridge Design
- 4- Highway Bridge Maintenance
- 5- Tunnel Safety
- 6- Earthquake Engineering and Data Bank
- 7- Intelligent Vehicle and Road
- 8- Road Traffic Safety
- 9- Road Environment

2) We agreed the extension of "Implementing Arrangement" and accomplishments in the past five years were presented in the 5th U.S.-Japan Workshop.

3. Agreement on the Implementing Arrangement between the Federal Highway Administration of the DOT of USA and the Ministry of Construction of Japan on highway science and technology

1) New "Implementing Arrangement between the Ministry of Construction of Japan and the Federal Highway Administration of the Department of Transportation of the United States of America on Highway Science and Technology" was signed by Mr.Rodney E.Slater, Federal Highway Administration, and Mr.K.Hashimoto, Vice-Minister of Construction for Engineering Affairs in January, 1997.

2) We agreed to exchange scientific information and technology related to highway transportation including the following subjects:

- 1- Road Traffic Planning and Environment
- 2- Road Traffic Safety
- 3- Pavement and Road Maintenance
- 4- Bridges and Other Structures
- 5- Earthquake Engineering
- 6- Intelligent Transport Systems

4. The 6th U.S.-Japan Workshop

1) October 1997, in Washington

2) Participants

(U.S.-side)

Mr.Tony Kane, Executive Director of FHWA
and other people (total 20 people)

(Japan-side)

Mr.Seizo Tsuji, Director General of PWRI
and other people (total 6 people)

3) Keynote Speeches

"Highway Administrative Activity" (Mr.Betsold from U.S. and
Mr.Harada from Japan)

"Research Summary Presentations" (Mr.Nemmers, Mr.MacGowan
from U.S. and Mr.Tsuji, Mr.Ohnishi, Mr.Ueda from Japan)

4) Technical Sessions(Environment)

-Noise Barriers

-Tire Pavement Noise Concerns

5) In the 6th U.S.-Japan Workshop, general road affairs were discussed, and then, Seizo Tsuji, the Director-General of the Public Works Research Institute, and Robert Betsold, the Research Director of the Federal Highway Administration, decided to hold workshops for general road affairs every three years and to focus on specific and technical subjects in the other workshops.

In March 1998, Yasutake Inoue, the Director-General of the Public Works Research Institute, and Betsold selected "Pavement" as the topic for the 7th Workshop.

5. The 7th U.S.-Japan Workshop

1) October 1997, in Tsukuba

2) Participants

(U.S.-side)

Mr. Paul Teng, FHWA, Chief of Pavement Division
and other people (total 5 people)

(Japan-side)

Mr. Yasutake Inoue, PWRI, Director-General
and other people (total 80 people)

3) Keynote Speeches

(U.S.-side)

"Transportation Equity Act for the 21st Century (TEA21)"
(Mr. Paul Teng, FHWA, Chief of Pavement Division
and Mr. Allan Abbott, Nebraska Highway Agency)

(Japan-side)

"New Five-Year Road Improvement and Management Program"
(Mr. Kiyoshi Okudaira, MoC, Director of Highway Economic
Research Section of Road Bureau)

4) Technical Sessions (Pavement)

- Accelerated Loading Tests
- Suspension (Interaction between Pavement and Vehicles)
- Strategic Highway Research Program (SHRP)
- Utilization of Non-Road By-Products

6. The 8th U.S.-Japan Workshop

1) November 1998, in Washington

2) Participants

(U.S.-side)

Mr.Kenneth R.Wykle, FHWA, Administrator

and other people (total 20people)

(Japan-side)

Mr.Makoto Nakamura, PWRI, Director of Road Department

and other people (total 5people)

3) Keynote Speeches

(U.S.-side)

「Overview of FHWA Safety Initiatives, specifically addressing primary safety focus areas」 (Mr.Dwight Horne, FHWA, Director of Office of Highway Safety Infrastructure)

(Japan-side)

「New Five-Year Program for Road Technology in Japan」 (Mr.Makoto Nakamura, PWRI, Director of Road Department)

4) Technical Sessions (Traffic Safety)

- Pedestrian Crashes
- TEA21 and Pedestrian Planning
- Disabled and Elderly Pedestrians
- Tool and Programs for Traffic Safety
- Nighttime Crashes

Photographs



Keynote Speech by Mr. Judycki



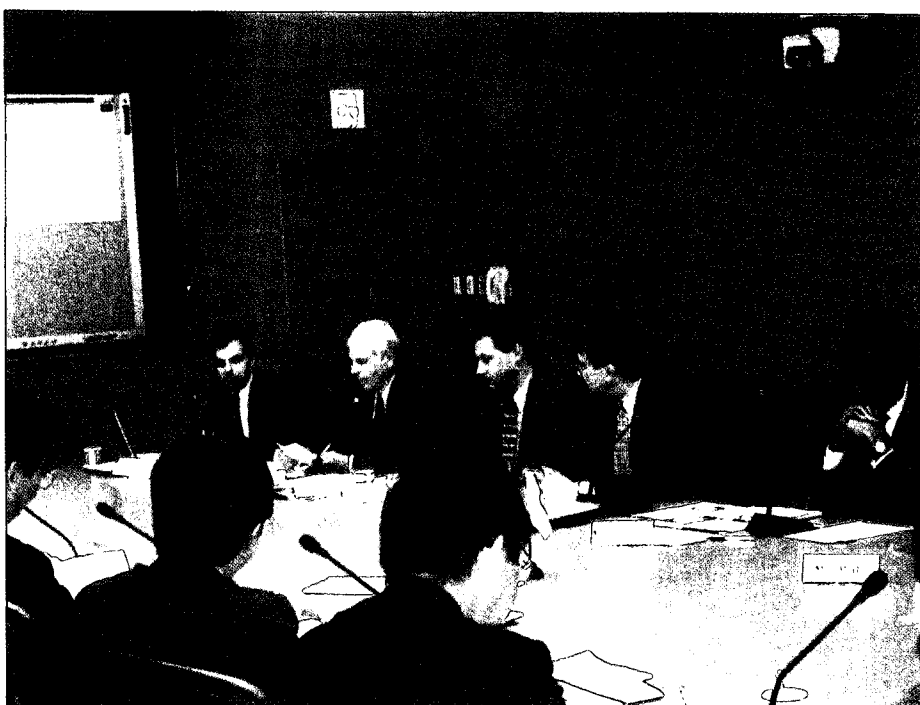
Keynote Speech by Mr. Fujimoto



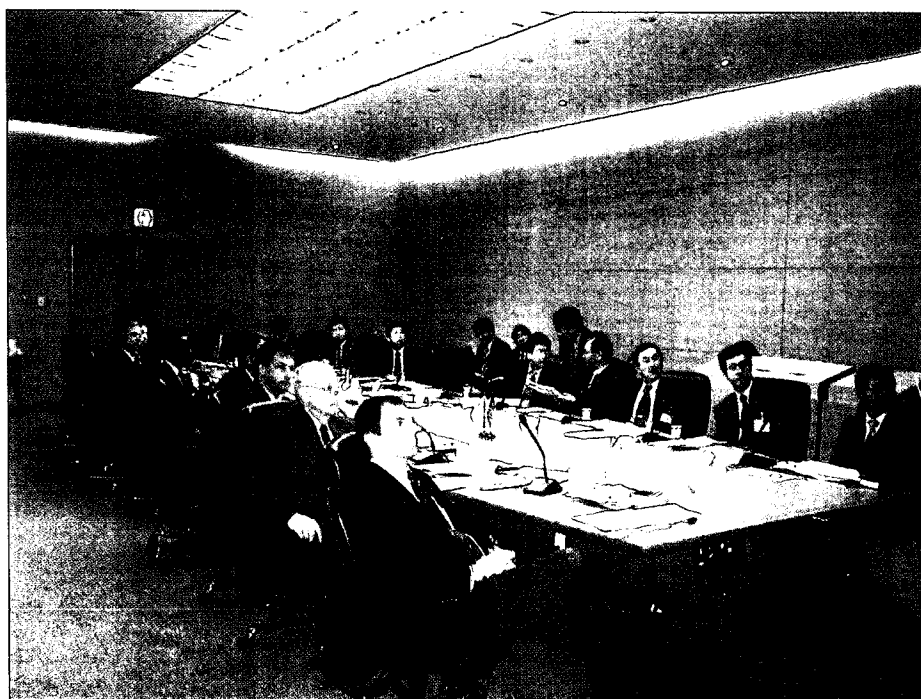
Group Photo



Welcome Dinner at the Nineteen



Workshop (ITS Session)



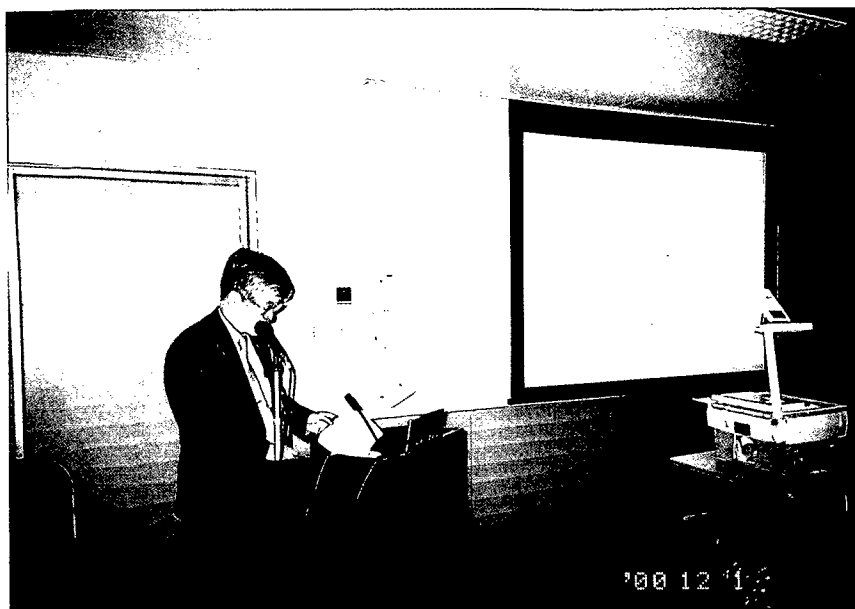
Workshop (ITS Session)



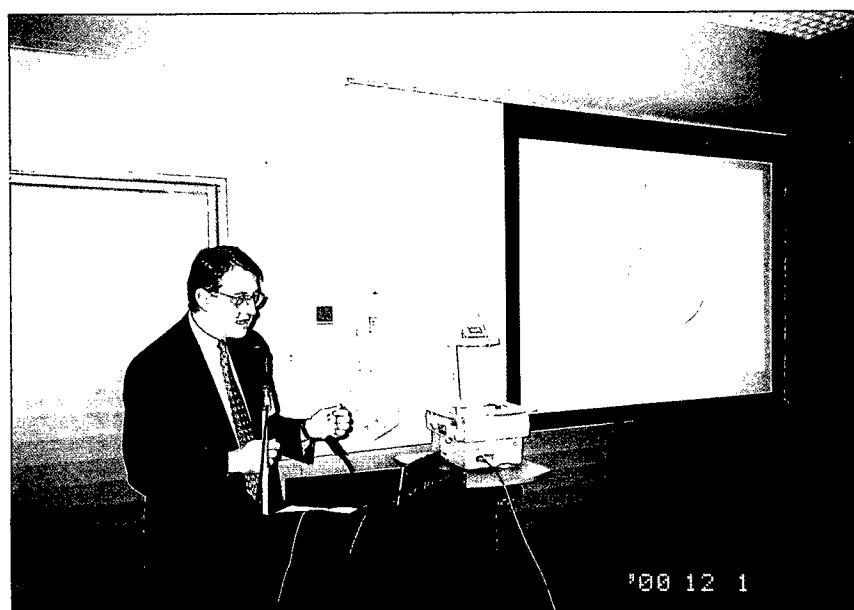
Workshop (Summarization Session)



Workshop (Summarization Session)



Presentation by Mr.Fujii (Summarization Session)



Presentation by Mr.Judycki(Summarization Session)



Mr.M.Nakamura puts a question to Mr.Judyski.



Mr.Paniati explains FHWA's Research Program.



Exchange of memorial presents



Group Photo in front of Daibutsu(Great Buddha) in Kamakura



In the Japanese garden of the Imperial Palace



Japanese style dinner (They are eating Udon-suki.)