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Minnesota Intelligent Transportation Systems

Statewide Intelligent Transportation Systems As-Is Agency Reports for Minnesota



Volume 4 Metropolitan Council Transit Operations and Metro Mobility

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Statewide ITS As-Is Agency Report for Minnesota

Volume 4

Metropolitan Council Transit Operations and Metro Mobility

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- 1.1 Generic Closed Loop Traffic Control Signal System
- 1.2 Mn/DOT Advanced Portable Traffic Management System
- 1.3 Mn/DOT Portable Traffic Management System
- 1.4 Mn/DOT Metro Division Lane Closure Information System
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Volume 4
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1. INTRODUCTION

The purpose of the Polaris Project is to define an Intelligent Transportation Systems (ITS) architecture for the state of Minnesota. An architecture is a framework that defines a complex system, in terms of a set of smaller, more manageable systems which are fully defined in terms of their individual boundaries, functions, physical components, and interfaces. They illustrate how each of the systems interrelate and contribute to the overall ITS objectives and requirements.

A well defined architecture provides many benefits for a complex system. It defines and optimizes the location of system functions. It identifies critical interfaces, and illustrates how associated systems can be integrated to share resources and information. It establishes standards for communications and physical components so that inter-operability can be maintained as the system evolves to incorporate new capabilities and technologies.

The Minnesota Statewide ITS Architecture is a tailored version of the National ITS Architecture. Tailoring incorporates the prioritized wants and needs of the state's transportation users and stakeholders, as well as its existing ITS infrastructure. The functional architecture, physical architecture, system requirements and implementation plan are fully documented in the following project deliverables:

ITS Traveler Wants/ Needs - Information obtained from Minnesota residents in ten end user sessions held across the state. Used to establish and prioritize end-user requirements.

ITS Transportation Wants/ Needs - Information obtained from ITS stakeholder institutions. Used to establish and prioritize ITS service provider requirements.

ITS Wants/ Needs Analysis - Final results and recommendations of the wants and needs research.

Statewide ITS As-Is Agency Reports for Minnesota - Information about existing transportation systems that establish the starting point for the Architecture Implementation Plan.

ITS System Specification - Incorporates the results of the functional and physical architectures into specification format. The specification will clearly identify ITS system level requirements for the identified Minnesota ITS services.

ITS Component Specification - Incorporates the results of the functional to physical allocation in specification format. The specification will clearly identify the Minnesota ITS component systems requirements.

ITS Architecture Implementation Plan - A recommended ITS deployment strategy for future state initiatives.

2. SCOPE

This document, *Statewide ITS As-Is Agency Reports for Minnesota*, consists of a collection of individual system survey reports related to transportation systems. The Polaris Project will use the survey information collected to derive the existing architectural framework. After the existing architectural framework is derived, this information will be used as the baseline for developing the Minnesota Statewide ITS Architecture.

Agencies identified and contributed to this document were:

- Minnesota Department of Transportation Office of Advanced Transportation Systems
- Minnesota Department of Transportation Traffic Management Center
- Minnesota Department of Transportation Metropolitan Division
- Minnesota Department of Transportation Electrical Services Section
- St. Paul Department of Public Works
- Minneapolis Department of Public Works
- Hennepin County Department of Public Works
- Ramsey County Department of Public Works
- Minnesota State Patrol
- Hennepin County Medical Center
- Metropolitan Council Transit Operations
- Metropolitan Airports Commission
- Gopher State One Call
- Minnesota Office of Tourism

2.1 Document Overview

This document presents the methods, assumptions and procedures used to collect the baseline information. The documentation of systems that were inventoried is presented in Section 3.

2.2 Methods, Assumptions, and Procedures

2.2.1 System Identification

Agency and system candidates were based upon several factors prior to survey. Through market research, the highest wants and needs priorities for traveler and transportation related agencies identified the functional areas to be improved (i.e. Travel Conditions). The Polaris Project took the functional wants and needs and associated the wants and needs functions to current Minnesota Agencies. Another factor that contributed to identifying the candidate agencies was the presence of existing Intelligent Transportation Systems infrastructure that has been deployed to support integrating open systems for travelers, inter-agency and intra-agency needs.

One hundred twenty one pre-survey candidate systems identified by the process described previously, are listed in Appendix A. The pre-survey candidate list represents systems that were known by members of the Polaris Architecture working team, Mn/DOT Guidestar, and SRF Consulting Group, Inc. Of the 121 candidate systems, 38 system surveys were performed and

included in this document. The 38 systems were selected as best representatives of the 121 pre-survey candidates and provided a diverse base of information to use for developing the Minnesota Statewide ITS Architecture.

2.2.2 Data Collection Guide

The survey of systems required that a standard data collection approach be applied for the *Statewide ITS As-Is Agency Reports for Minnesota*. A data collection guide was prepared to help this effort.

The data collection guide was developed to provide interviewers with an overview of relevant information that needed to be collected during the survey for each system. The data collection effort focused on the following:

- A block diagram of the system and interfaces to external users and systems.
- All hardware elements that are interconnected to form the bounds of the system.
- All software components used by the hardware elements.
- All system interfaces that connect hardware components together and external systems to the system.
- All personnel using the system.

The Data Collection Guide is presented in Appendix B.

2.2.3 Field Data Collection

The survey collection activities were completed by two teams of interviewers. Prior to an on-site interview, an agency or system contact person was briefed as to the nature of the survey. In some cases, generally where agencies knew little of the Polaris project, a follow-up letter was sent to further outline the desired level of information.

The on-site interview was generally a free format discussion of the specific system elements. The data collection guide was only used to ensure all components were discussed. The interviewers recorded the audio portion of the interview in order to help with the documentation of the system. Where possible, the actual system components were also recorded on videotape, again, to help with the system documentation. In some cases, written documentation from the agency was reviewed to help describe the system.

A report of the surveyed system followed a standard format and consisted of two basic parts: 1) a system block diagram and 2) a data collection template. The block diagram is intended to depict the system components and interfaces while the template thoroughly describes the system configuration. The template is organized to step through the system related personnel, hardware, software and interfaces. All systems documented for the project used this standardized approach. The system documentation was separated by agencies into eight volumes.

The system reports contained in this volume follow in Section 3.

3. AS-IS BASELINE SYSTEM DOCUMENTATION

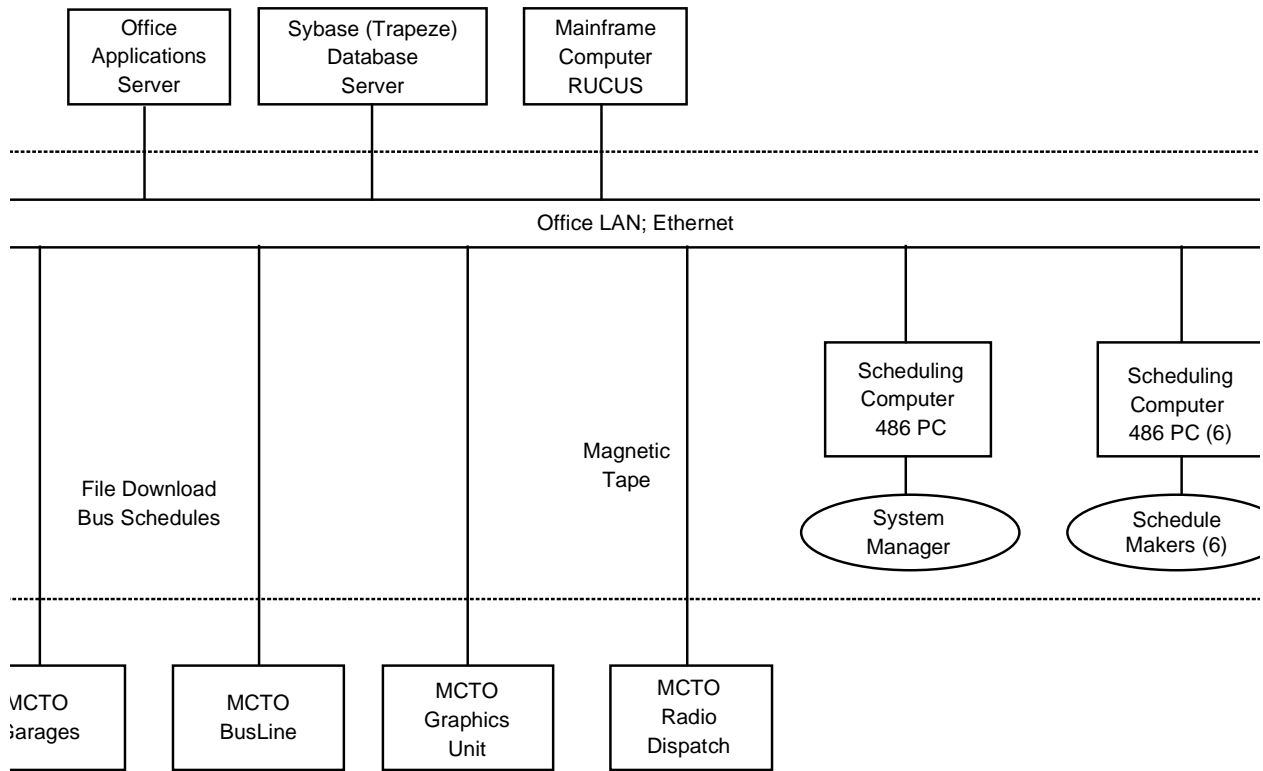
3.4 METROPOLITAN COUNCIL TRANSIT OPERATIONS AND METRO MOBILITY

- 3.4.1 MCTO Trapeze Scheduling/Planning System
- 3.4.2 MCTO Automated Passenger Counting System
- 3.4.3 MCTO Electronic Fare Collection System
- 3.4.4 MCTO TIC BusLine System
- 3.4.5 MCTO TIC Customer Phone Line Service System
- 3.4.6 Metropolitan Council Metro Mobility
Reservation/Scheduling/Dispatch System
- 3.4.7 MCTO Construction Information System

3.4.1 MCTO TRAPEZE SCHEDULING/PLANNING SYSTEM

Polaris As-Is Data Collection
MCTO Trapeze Scheduling/Planning System

Baseline Data Collection
Scheduling/Planning System



AS-IS DATA COLLECTION TEMPLATE

1.0 AGENCY MCTO SCHEDULING AND PLANNING DEPARTMENT@

- Agency Type Transit Provider
- Agency Functions Build transit schedules..
- Agency Location(s) MCTO Heywood Facility, 560 Sixth Avenue N.,
Minneapolis, MN 55411-4398
- Recommended Improvements MCTO needs an accurate GIS system which includes the
roadways/streets their buses run on. The GIS map needs to
accurately show the streets and roadways at a low level
(city streets) with street attributes such as one ways and cul-
de-sacs.
- Contacts Dennis Tollefsbol, Manager of Service Analysis and
Support, 349-7770 349-7675(fax)

2.0 SYSTEM MCTO TRAPEZE SCHEDULING/PLANNING SYSTEM@

- Date of As-Is Data Collection 2/5/96
- Purpose This system is used to build bus and driver transit
schedules.
- Hours of Operation M - F, normal business hours. The Novell network is up
and running 7 days a week but Trapeze is normally not used
on weekends.
- Geographic Coverage 7 county area (Anoka, Hennepin, Ramsey, Dakota, Scott,
Carver, Washington).
- Contacts Dennis Tollefsbol, 349-7770 349-7675 (fax)
- Status Existing.
- Policies Trapeze is used to make schedules for private providers
- Constraints 1) Labor agreements(Transit Union 1005). Drivers are
limited to driving from 6.5 to 9.25 hours. This requires a
mid-route driver change during some routes.
2) Schedule Makers must have some knowledge of the
system to use Trapeze to schedule a route since the number
of routes is high and the large number of variables involved
in the system.
- Recommended Improvements 1) MCTO would like a GIS system.
2) MCTO is thinking about creating a Home Page@ on the
Internet or on an electronic bulletin board that would make
transit schedules available to computer users in the next
year or so.
- Block Diagram See attached

- Typical Operational Scenario

1) Scheduler writes a ATrip@ from point A to point B with 10 - 20 intermediate time points between the origin and destination of the Trip. The Schedule Makers will write thousands of these Trips to cover the transit routes. Once they have these trips written, they put these Trips together in the most economical way for the vehicle to cover the Trips. Once the vehicles have been assigned to cover multiple Trips, then the Scheduler divides the vehicle work among Driver shifts.

2) MCTO makes minor changes to the system every week such as shifting trip times by a few minutes, changing the type of bus on a route, adding/deleting trips. MCTO makes the major system changes 4 times per year. For instance, of the 120 routes that MCTO controls, they will make major changes to 40 of these routes in April. Major changes may include a new route, new destinations within a route, changes in running times of buses along a route, assignment of drivers to a new route, etc.

3) A ARun@ is a list of buses, locations, and times that a driver follows. A Trip is the movement of a vehicle from point A to point B and may be a revenue generating Trip, non-revenue generating Trip, or an interline Trip. An Ainterline@ is a trip from one route to the next. A ABlock@ is the list of locations and times that a bus follows.

4) MCTO does the scheduling for virtually all of the Transit Service Providers. The private providers tell MCTO when they want a particular route to arrive/leave downtown, and MCTO will build the rest of the schedule using this constraint.

- Other

750 buses in the MCTO fleet. Types of buses are: 60', 40', 30' (30' buses are being phased out), Articulated, buses equipped with a handicap lift. Service life of a bus is 12 years. MCTO buses log a total of 30 million miles a year. MCTO has 5 bus garages in the Twin Cities. Schedule covers 120 different bus routes.

2.1 PERSONNEL ASYSTEM MANAGER@

- Personnel Function Manage service analysis and route scheduling
- Quantity One
- Location MCTO Heywood facility
- Workload N/A
- Working hours M - F, 40 hrs/wk.
- Status Existing

2.2 PERSONNEL ASCHEDULE MAKERS@

- Personnel Function Build transit schedules on a daily basis.
- Quantity 6 full time people
- Location MCTO Heywood facility
- Workload N/A
- Working hours 40 hours/week during normal business days.
- Status Existing
- Recommended Improvements No plans for adding people.

2.3 PERSONNEL ASYSTEM SUPPORT PERSONNEL@

- Personnel Function Support MCTO's office networks including Trapeze, BusLine, AS400, Mainframe, Metropolitan Council network, general office LAN, etc.
- Quantity 2 - 3 people
- Location MCTO Heywood facility
- Workload N/A
- Working hours 40 hours/week during normal business days.
- Status Existing
- Recommended Improvements No plans for adding people.
- Other Jim Pelecheck is the supervisor, has intimate knowledge of Applications and interfaces between systems.

3.1 HARDWARE ATRAPEZE SERVER@

- Hardware Type Novell 3.11 network file server
- Functions Stores the scheduling database and the Trapeze SW.
- Location MCTO Computer Room
- Other There are 3 servers in the MCTO network, one of the network servers is mostly dedicated as the Trapeze server.

3.1.2 SOFTWARE ATRAPEZE FX@

- Software Type Current system is DOS based.
- Software Standards Trapeze works out of a BTRIEVE database. MCTO takes the data out of the BTRIEVE database and exports it into a Sybase database. MCTO uses Crystal to create reports from the data in the Sybase database.
- Functions Used to build transit schedules. Trapeze acts like a calculator in computing the time it will take to reach each schedule time point along a route.
- Application Language C++
- Status Existing. Have had Trapeze for 2 years and have upgraded new versions 4 times. Version updates are installed by MCTO
- Policies MCTO gets a 2 year warranty with the Trapeze SW., and can purchase a maintenance agreement after this time.
- Constraints Requires each Scheduler's PC to have 600K of RAM available. The Trapeze SW is resident on the sever but is downloaded to each Scheduler's PC when they use the system. Trapeze SW is a proprietary, commercial product. The 600K of RAM is a problem under DOS, but the next version is supposed to use less memory.
- Issues The Trapeze system is not a black box@ or a database that can produce the correct answer by simply doing a search.....The Schedule Makers must have some knowledge of the system to use Trapeze to schedule a route since the system is so big and the number of routes is high and the large number of variables involved in the system.
- Recommended Improvements MCTO will do an upgrade to the software this spring. They are going through the acceptance testing of this new version now. This new version of Trapeze will be modular, therefore it won't require as much memory on the Scheduler's PCS to run. A Windows version of Trapeze is coming out in the fall of 1996, MCTO will probably move to this in the future. The newer versions of Trapeze will use a Sybase database. MCTO currently has 3 versions of Trapeze (current version, upgrade version, a version they are using to make bus driver contract changes).
- Contact Dennis Tollefsbol

3.2.1 SOFTWARE ASCHEDULING PC SOFTWARE@

- Software Type DOS based, user defined portions of the Trapeze SW.
- Software Standards Trapeze is a proprietary software.
- Issues MCTO Schedule Makers use a memory manager to make enough memory available for loading on the needed Trapeze SW.

4.1 INTERFACE

TRAPEZE SERVER

- Connects to ... Connects scheduling PC-s, MCTO garage PC-s.
- Interface location MCTO Heywood facility
- Interface Type Ethernet - Novel network version 3.12
- Interface Direction Both
- Interface Component Coax cable
- Protocol/Standard IPX
- Information Type/Content Trapeze schedule database - schedule times, route numbers, schedule time points, Trapeze program loading.
- Information Direction Both
- Information Frequency As needed while Schedule Makers work on system.
- Information Standards Trapeze info.

4.2 INTERFACE

TRAPEZE SERVER

- Connects to ... MCTO Garages
- Interface location Garages
- Interface Type Data - Sybase database
- Interface Direction Trapeze system to Garage
- Interface Component Network
- Protocol/Standard N/A
- Information Type/Content The MCTO garages get the Trapeze bus schedule data in a Sybase database format and use this data to create a checkout sheet. The checkout sheet contains the information about when the Driver should leave the garage to start a route, a schematic diagram of the garage with buses so that garage personnel can send a bus of the appropriate type (30', 40' etc) to a route.
- Information Direction Trapeze to Garage
- Information Frequency Weekly

4.3 INTERFACE

- Connects to ...
- Interface location
- Interface Type
- Interface Direction
- Interface Component
- Information Type/Content

- Information Direction
- Information Frequency

TRAPEZE SERVER

MCTO Radio System
MCTO Heywood facility
Data - bus/driver schedules..
Trapeze to radio dispatch
Magnetic tape.

Trapeze provides the following information to the radio system: Run data, shows bus and driver schedules and routes such as when the bus leaves the garage, when it is scheduled to leave each node on the route, type of bus.

Trapeze to radio dispatch.
Once per week.

4.4 INTERFACE

- Connects to ...
- Interface location
- Interface Direction
- Information Type/Content

- Other

TRAPEZE SERVER

Travlink System - this interface has been disabled.
MCTO Computer Room
One way - Trapeze to Travlink

Trapeze provides data to the Travlink project showing where the routes are and the timing of those routes.

Trapeze outputs a database which is converted to Westinghouse format for its CAD/AVL system. Currently, Travlink is no longer being used and this interfaced has been disabled.

4.5 INTERFACE

- Connects to ...
- Interface location
- Interface Type
- Interface Direction
- Interface Component
- Information Type/Content

- Information Direction
- Information Frequency

TRAPEZE SERVER

MCTO shelter signs unit
MCTO Heywood facility
Data - bus schedules
Trapeze to shelter sign unit
Network

Schedule data is exported from the BTRIEVE database to the Sybase database on the network and available to the MCTO personnel who produce pocket shelter signs. They load this into a Macintosh PC and make up the signs.

Trapeze to shelter signs unit
Once per week.

4.6 INTERFACE

- Connects to ...
- Interface location
- Interface Type
- Interface Direction
- Interface Component
- Information Type/Content

- Information Direction
- Information Frequency

TRAPEZE SERVER

BusLine System
MCTO Heywood facility
Data
Trapeze to BusLine
LAN

The BusLine system also gets schedule data from the Crystal reports.
Trapeze to BusLine
Weekly

4.7 INTERFACE

- Connects to ...
- Interface location
- Interface Type
- Interface Direction
- Interface Component
- Information Type/Content

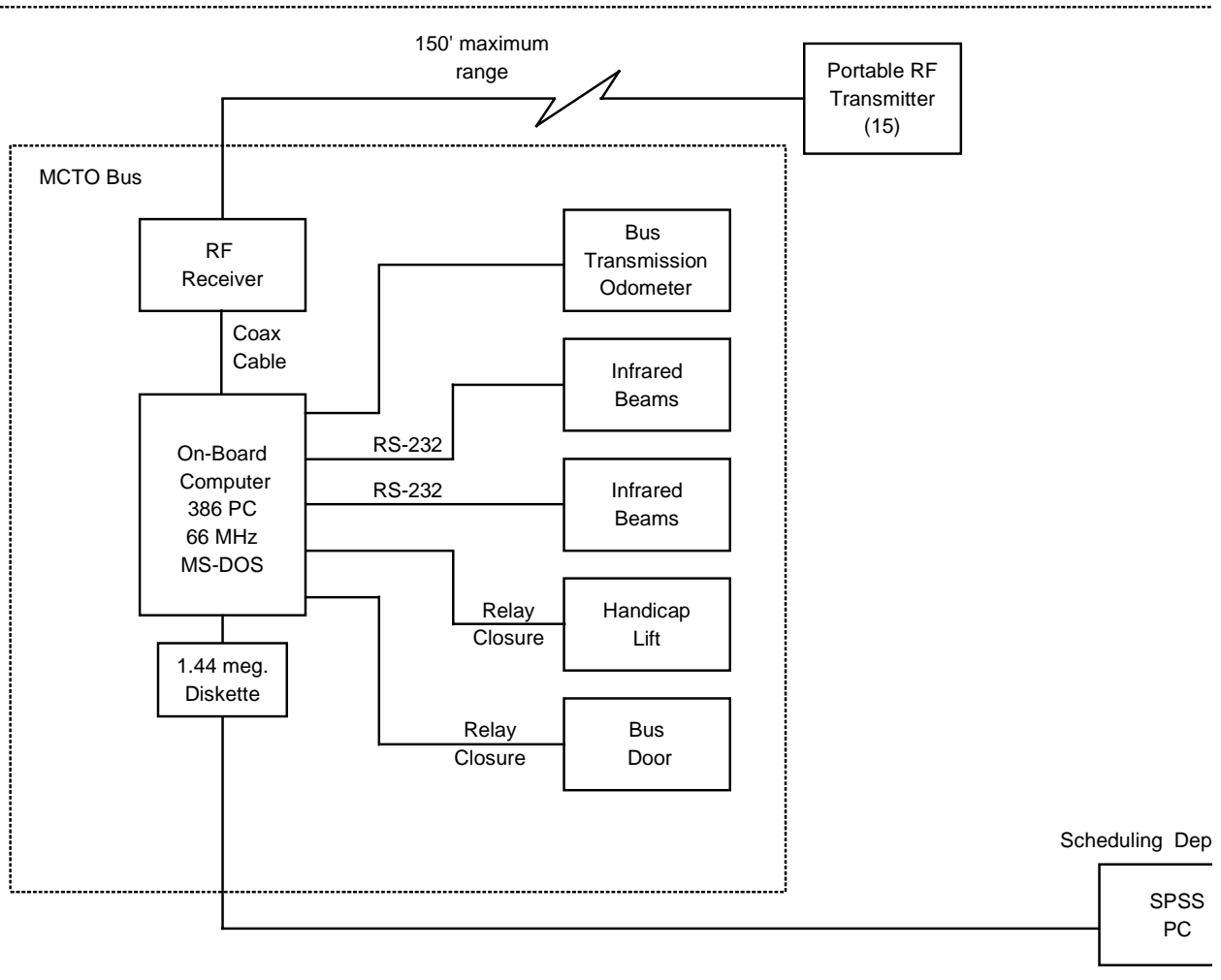
TRAPEZE SERVER

Other MCTO systems
MCTO Heywood facility
Data
Trapeze to other MCTO systems
LAN

The old scheduling system was a mainframe based batch system that used RUCUS. Planning and Scheduling still fills the old RUCUS database with data from the Trapeze database (BTRIEVE) each week so that the Radio, TIC, and Payroll can get the data in the RUCUS format. RUCUS is written in FORTRAN 4. TIC will move from RUCUS to Sybase as soon as MCTO is done acceptance testing. Then the utilization of Sybase database and Crystal as a report generator will grow dramatically. MCTO Finance Dept. uses some of the summary statistics generated using the Crystal report maker. Trapeze Software Inc. writes the Trapeze software.

3.4.2 MCTO AUTOMATIC PASSENGER COUNTING SYSTEM

Baseline Data Collection
1 Passenger Counting System



AS-IS DATA COLLECTION TEMPLATE

1.0 AGENCY MCTO SCHEDULING AND PLANNING DEPARTMENT@

- Agency Type Transit Provider
- Agency Functions Build transit schedules.
- Agency Location(s) MCTO Heywood Facility, 560 Sixth Avenue N.,
Minneapolis, MN 55411-4398
- Recommended Improvements MCTO needs an accurate GIS system which includes the
roadways/streets their buses run on. The GIS map needs to
accurately show the streets and roadways at a low level
(city streets) with street attributes such as one ways and cul-
de-sacs.
- Contacts Dennis Tollefsbol, Manager of Service Analysis and
Support, 349-7770 349-7675(fax)

2.0 SYSTEM MCTO AUTOMATIC PASSENGER COUNTING SYSTEM@

- Date of As-Is Data Collection 2/5/96
- Purpose This system is used to collect bus ridership information on
selected routes. The data is collected for use in planning
bus schedules, vehicle needs, etc.
- Hours of Operation 24 hours/day as needed.
- Geographic Coverage Roadside units are portable, can be installed along any
route in the 7 county Metro area to collect data as needed.
Must assign equipped buses to route being studied.
- Contacts Dennis Tollefsbol, 349-7770 (voice) - 349-7675 (fax)
- Status Existing on 10 buses. Will have 35 buses equipped in near
future. May equip up to 50 buses some day.
- Policies Would not want to have this system on all buses and routes
because the MCTO does not need all of the data that would
be collected. Therefore this is used as needed to study
route ridership/loading patterns.
- Constraints Must physically move the 15 portable transmitters from
poles along one route to the next route when they want to
study a new route if location data is desired. Only have on
10 buses equipped at present time.
- Recommended Improvements Would like to use GPS to replace the pole mounted
transmitters. This would eliminate the need to manually
relocate the portable RF transmitter from one route to the
next.
- Block Diagram See attached

- Typical Operational Scenario

Up to 15 small, portable transmitters are placed on poles along a bus route XX that needs to be studied. The MCTO Scheduling and Planning department notifies the MCTO Garage to put up to 10 buses equipped with the automatic passenger counters on Route XX. As these buses travel along Route XX and the bus gets approximately 150 feet from a portable transmitter, the receiver on the buses receives the Transmitter signal and marks the on-board database.

All bus loading and unloading activity is recorded and stored on a 1.44 megabyte diskette in the on-board PC. As the bus moves out of range of the Transmitter (150') another date/time stamp is made in the database. At the end of the week, the 1.44 megabyte diskette is removed from the on-board PC and used by the Scheduling department.

The Scheduling department takes the bus route XX schedule data and overlays onto the ridership data collected by this system and uses this data to make route/schedule changes, vehicle changes, etc.

The scheduling department uses SPSS PC (DOS based) to produce reports for statistical reporting.

2.1 PERSONNEL ASCHEDULE MAKERS@

- Personnel Function

Build transit schedules. Use data obtained from automatic passenger counters to make minor changes weekly to schedules and assigned vehicles.

- Quantity

6 full time people - these people are using other systems besides this system to do their jobs.

- Location

MCTO Heywood facility

- Workload

N/A

- Working hours

40 hours/week during normal business days.

- Status

Existing

- Recommended Improvements

No plans for adding people.

3.1 HARDWARE AON-BOARD COMPUTER@

- Hardware Type 386 PC - Industrial Ziatactech
- Functions Records and stores passenger loading information on route by time of day and bus stop location.
- Location On board each of 10 equipped MCTO buses.
- Data Name/Contents
 - 1)Time that bus comes within 150 feet of transmitter.
 - 2)Transmitter identification number.
 - 3)Time at stop.
 - 4)Time that bus leaves 150 foot range of Transmitter .
 - 5)Passenger loading information consisting of the number of passengers entering and exiting.
 - 6)Each time the doors open.
 - 7)Bus mileage.
 - 8)Each time the handicap lift is used on equipped buses.
- Data Type Database. Data is stored on a 1.44 megabyte diskette.
- Status Existing on 10 buses. Will add this to 25 more buses in near future. Eventually would like to have 50 buses instrumented with this system.
- Contact Dennis Tollefsbol

3.1.1 SOFTWARE AON-BOARD COMPUTER SOFTWARE@

- Software Type Operating System
- Software Standards MS-DOS
- Functions Executes custom made AOn-Board computer software@

3.1.2 SOFTWARE AON-BOARD COMPUTER SOFTWARE@

- Software Type Application
- Software Standards Custom made software for this application
- Functions Monitors incoming data from infrared beams and records bus travel and loading activity.

3.2 HARDWARE AINFRARED PASSENGER COUNTER SENSORS@

- Hardware Type Infrared sensor
- Functions Senses a disturbance in zone (bus doorway) to count a passenger entering or exiting a bus.
Use of multiple sensors allows discrimination between entering and exiting.
- Location On board one of 10 equipped MCTO buses.
- Data Name/Contents N/A
- Data Type Event
- Status Existing on 10 buses.
- Recommended Improvements Will add to 25 additional buses shortly.
- Contact Dennis Tollefsbol

3.3 HARDWARE APORTABLE TRANSMITTER@

- Hardware Type RF Transmitter, battery powered
- Functions Constantly emit an RF signal. This signal is recognized by Receivers on equipped buses.
- Location Portable. 15 separate units placed on poles along a route that needs to be studied.
- Data Name/Contents N/A
- Data Type N/A
- Status Existing - 15 units.
- Constraints Units must be physically moved from route to route. 150 foot detection range from Transmitter to Receiver.
- Recommended Improvements Would like to replace these portable transmitters with GPS system. This would eliminate the need to move transmitters from one route to another each week.
- Contact Dennis Tollefsbol
- Other Transmitters are powered by battery and solar cells. Transmitters have 9-10 dip switches that can be set to identify each Transmitter on the on-board computer database.

3.4 HARDWARE ARF RECEIVER@

- Hardware Type RF Receiver
- Functions Receives RF signal when bus is within 150 feet of Transmitter.
- Location On 10 buses equipped with automated counting equipment.
- Data Name/Contents N/A
- Data Type N/A
- Status Existing - 10 units.
- Contact Dennis Tollefsbol

4.1 INTERFACE

- Connects to ... INFRARED PASSENGER COUNTER SENSORS
- Interface location On-Board Computer
- Interface Type On 10 equipped MCTO buses
- Interface Direction Data
- Interface Component Both
- Interface Component RS-232 cables
- Protocol/Standard RS-232
- Information Type/Content Sensor disturbance - infrared beam has been broken by a passenger.
- Information Direction Sensor to PC
- Information Frequency Whenever passenger passes through beam.
- Other Each sensor is connected to a port in the on-board computer.
The computer determines if the passenger is loading or unloading by the sequence that the multiple beams are broken.

4.2 INTERFACE

- Connects to ...
- Interface location
- Interface Type
- Interface Direction
- Interface Component

ON-BOARD COMPUTER

Handicap Lift, bus doors
On 10 equipped MCTO buses, located at entrance doors to bus
Hardwire relay closure.
Door/Lift to the computer.
Cable

4.3 INTERFACE

- Connects to ...
- Interface location
- Interface Type
- Interface Direction
- Interface Component
- Information Type/Content
- Information Direction
- Information Frequency
- Information Standards
- Constraints

PORTABLE TRANSMITTER RF INTERFACE

Automatic passenger counter receiver
Roadside to bus. Usually at bus stop.
RF signal.
One way - roadside Transmitter to bus receiver.
N/A
N/A
N/A
Continuous signal emitted
N/A
150 foot range. Limited to spot locations where portable RF transmitters are located.

4.4 INTERFACE

- Connects to ...
- Interface location
- Interface Type
- Interface Direction
- Interface Component

RF RECEIVER

On-Board Computer
On 10 equipped MCTO buses, from bus roof to computer.
RF signal.
One way - antenna to computer.
Coax cable

4.5 INTERFACE

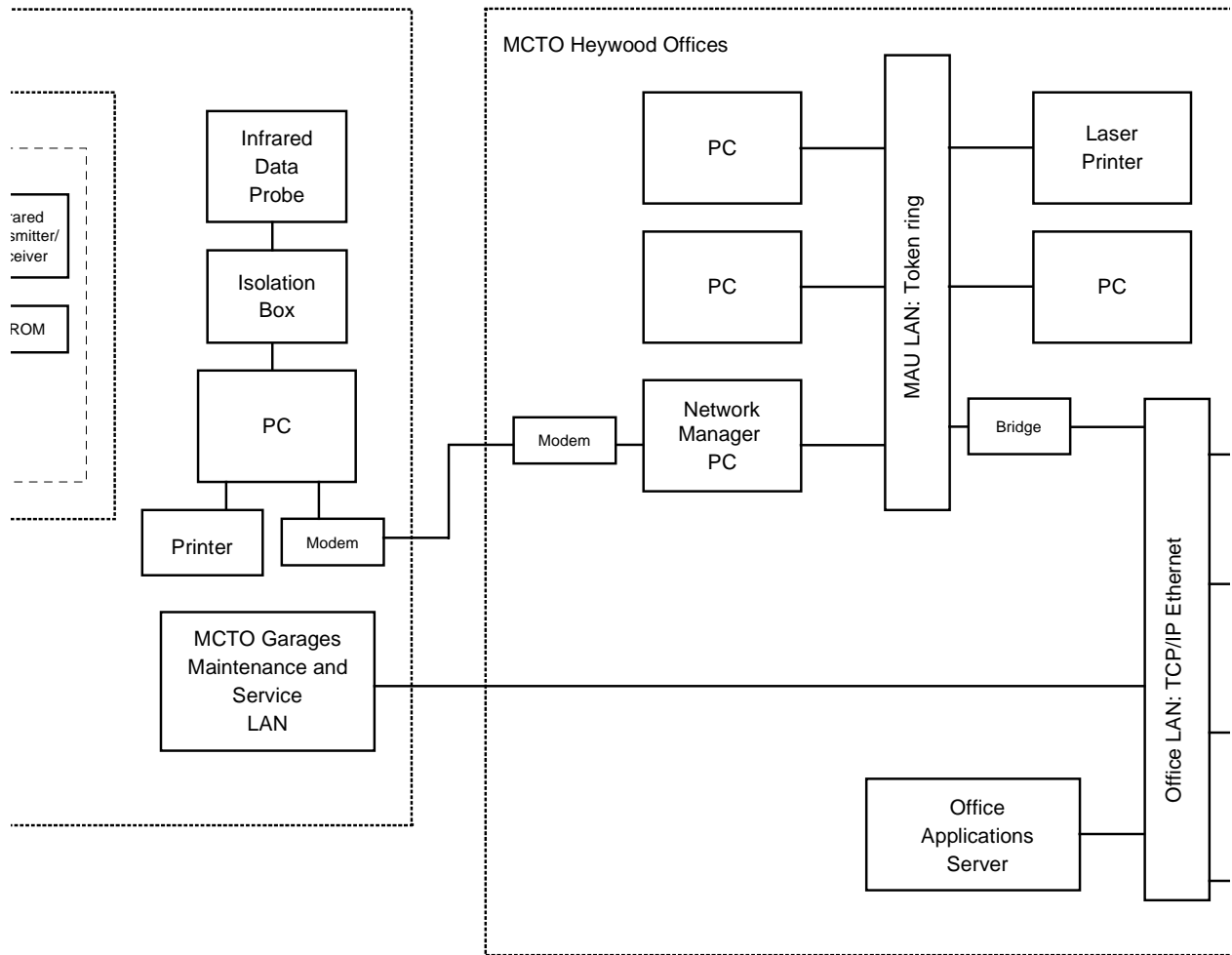
- Connects to ...
- Interface location
- Interface Type
- Interface Direction
- Interface Component
- Information Type/Content

ON-BOARD COMPUTER

Bus odometer
On 10 equipped MCTO buses.
Data
Odometer to On-Board Computer.
Cable
The same electrical signal that goes from the bus transmission to the bus odometer is sent to a communications port on the On-Board Computer.

3.4.3 MCTO ELECTRONIC FARE COLLECTION SYSTEM

Baseline Data Collection
Fare Collection System



1.0 AGENCY AMETROPOLITAN COUNCIL TRANSIT OPERATIONS (MCTO)@

- Agency Type Public Transit Provider
- Agency Functions Plan and operate transit service within the Twin Cities Metro Area.
- Agency Location(s) 560 Sixth Av. North
Minneapolis, MN 55411-4398

2.0 SYSTEM AMCTO ELECTRONIC FARE COLLECTION SYSTEM@

- Date of As-Is Data Collection 2/22/96
- Purpose Collect, review and distribute revenue and ridership data for MCTO.
- Hours of Operation The electronic fare collection system is used on all buses and operates when buses are in operation. Data from the fare collection system is collected from the garage computers by office personnel Monday through Friday.
- Geographic Coverage All MCTO buses
- Contacts Lynn Wallace
Department Supervisor
Metropolitan Council Transit Operations
560 Sixth Avenue North
Minneapolis, MN 55411-4398
(612) 349-7308 (voice)
(612) 349-7675 (fax)
- Status Existing
- Policies The office is the official source for existing ridership data.
- Issues There have been problems with receiving data from the garage facilities, they would like to have a direct connection with each of the garage facilities for data transfer.
- Block Diagram See attached
- Other 1) This documentation includes information collected on the magnetic stripe card reading system that will be in operation by July, 1996. The card reader is an add-on piece of equipment that is attached to the existing electronic fare box. The new card reader system will replace the current rider passes with debit cards. There will be three types of cards : 1) a stored value card in \$10.00, \$15.00 and \$20.00 denominations; 2) a period pass card that will be valid for 31 consecutive days from the date of first use; 3) a transfer card. It was unclear on how the new card reader system would affect the driver interaction with the fare box. The new system will be able to log each transaction and it was not known at the time of the interview what, if any, changes to the overall

data collection, manipulation and reporting system would be made. A new DOS or UNIX based database system will be implemented when the new magnetic stripe card reading system is in operation.

2) There are several other transit providers in the Twin Cities metropolitan area that are operating the same electronic fare collection system including Medicine Lake Lines and North Suburban. There is currently no communication of data between the transit providers.

- Typical Operational Scenario

1) The driver enters the bus at the beginning of a route and logs into fare box using the key pad. The driver enters their driver number, the route number, the run number, the direction of travel and city (either Minneapolis or St. Paul). The fare box uses the preprogrammed fare structure which varies by the time of day.

2) As a passenger boards the bus along the route, they either deposit the correct fare or give the driver a rider pass. The driver keys the appropriate button on a keypad to designate what type of fare, whether there is any extra charge and/or passenger type.

3) The existing fare data collection system logs running totals on an hourly basis.

4) The driver at the end of their shift/route pulls into the garage where a route puller uses an infrared probe to download information to the garage computer. The route puller places the hand-held probe on the transmitter/receiver window on the farebox.

5) The puller also removes the cash vault and replaces it with an empty one.

6) The revenue supervisor runs standard reports on the daily data.

7) The network manager computer dials up each of the five garage computers every week night and uploads files from each garage containing the daily data on revenue collected, passenger, route and driver information.

8) The files are combined by the revenue balancer staff person for each garage and uploaded to the mainframe computer. The revenue balancer processes, edits and maintains data.

9) The office produces reports daily including security, maintenance, daily ridership, revenue and driver report.

10) The revised files are uploaded to mainframe for use by other departments and backup purposes. The revenue balancer only edits incorrect driver login data.

11) The revenue department uses the data collected to

check revenues counted by the financial department and for billing to the suburban transit providers.

12) The information from the electronic fare collection system is also used to provide ridership information on specific routes and/or corridors for other MCTO departments or consultants.

13) Internal departments have access to data on the mainframe computer and produce their own reports.

- 2.1 PERSONNEL ADEPARTMENT SUPERVISOR@
- Personnel Function Oversees the daily operation and personnel of electronic fare collection system as well as other projects not related to the fare collection system.
 - Quantity 1
 - Location MCTO Heywood offices
 - Working hours Normal workday
 - Status Existing
- 2.2 PERSONNEL AREVENUE CLERK@
- Personnel Function Provides billing statements (including the revenue collected credits) and reports to suburban transit providers.
 - Quantity 1
 - Location MCTO Heywood offices
 - Working hours Normal workday
 - Status Existing
- 2.3 PERSONNEL AREVENUE/RIDERSHIP ANALYST@
- Personnel Function Responsible for official revenue and ridership information/reports for distribution to other MCTO departments, consultants and the general public.
 - Quantity 1
 - Location MCTO Heywood offices
 - Working hours Normal workday
 - Status Existing
- 2.4 PERSONNEL AREVENUE BALANCER@
- Personnel Function Responsible for processing data from garage computer, editing erroneous login data (does not edit any of the summary transactional data), and maintaining database. Also responsible for generating daily reports for internal distribution.
 - Quantity 1
 - Location MCTO Heywood offices
 - Working hours Normal workday
 - Status Existing
- 2.5 PERSONNEL ATECHNICAL ASSISTANT@
- Personnel Function Provide support and back up to other staff personnel
 - Quantity 2
 - Location MCTO Heywood offices

- Working hours Normal workday
 - Status Existing
- 2.6 PERSONNEL AINFORMATION SYSTEM PERSONNEL@
- Personnel Function Provide computer support and upload files to mainframe computer system.
 - Quantity 1
 - Location MCTO Heywood offices
 - Working hours Normal workday
 - Status Existing
- 2.7 PERSONNEL AREVENUE SUPERVISOR@
- Personnel Function Oversee garage fare collection computer system operation and personnel.
 - Quantity 1 per garage facility (5 total)
 - Location MCTO garage locations
 - Status Existing
- 2.8 PERSONNEL AROUTE PULLER@
- Personnel Function Remove and replace vault from the bus and operate probe to upload data from the fare box to the garage computer.
 - Quantity 1 per garage facility (5 total)
 - Location MCTO garage locations
 - Status Existing
- 2.9 PERSONNEL AFARE BOX TECHNICIAN@
- Personnel Function Service and maintain fare boxes.
 - Quantity 1 per garage facility (5 total)
 - Location MCTO garage locations
 - Status Existing
- 2.10 PERSONNEL AMOBILE FARE BOX TECHNICIAN@
- Personnel Function Service and maintain fare boxes in field.
 - Quantity 2 per garage facility (10 total)
 - Location MCTO garage locations
 - Status Existing
- 3.1 HARDWARE AFARE BOX@
- Hardware Type Cabinet
 - Functions Houses electronic fare collection system components: keypad, card reader, cash box, vault, infrared transmitter/receiver and EPROM module.
 - Location On each bus

POLARIS As-Is Data Collection
MCTO Electronic Fare Collection System

- Status Existing
- Other GENFARE Incorporated (GFI)
Elk Grove Village, IL

3.2 HARDWARE AKEYPAD@

- Hardware Type Keypad
- Functions Enables driver to login to the electronic farebox system and input passenger type and/or extra fare charge. See attachment for driver log on information and key pad button function.
- Location On each bus
- Data Name/Contents Driver login, extra fare charge
- Data Type Data
- Status Existing
- Other GENFARE Incorporated (GFI)
Elk Grove Village, IL

3.3 HARDWARE ACASH BOX@

- Hardware Type Cash box
- Functions Collects and counts cash fares
- Location On each bus
- Data Name/Contents Cash fare collected
- Data Type Data
- Status Existing
- Other GENFARE Incorporated (GFI)
Elk Grove Village, IL

3.4 HARDWARE AVAULT@

- Hardware Type Vault
- Functions Collects cash fares
- Location On each bus
- Data Name/Contents Vault number
- Data Type Data
- Status Existing
- Other Each vault has its own serial number that fare box logs when inserted.
GENFARE Incorporated (GFI)
Elk Grove Village, IL

3.5 HARDWARE AEPROM MODULE@

- Hardware Type EPROM module
- Functions Has fare structure programmed and stores summary of hourly transactions.
- Location On each bus
- Data Name/Contents Fare structure by time of day, passenger type, payment type and driver information from keypad.
- Data Type Data
- Status Existing
- Constraints Existing system memory limited to 100 records
- Other It was not clear from the interview what changes might be made to the EPROM to enable system to save every transaction with the card reader system.
GENFARE Incorporated (GFI)
Elk Grove Village, IL

3.6 HARDWARE AINFRARED TRANSMITTER / RECEIVER@

- Hardware Type Optical transmitter/receiver
- Functions Transfers information from farebox to the data probe.
- Location On each bus
- Data Name/Contents Passenger type, payment type, payment amount and driver information.
- Data Type Data
- Status Existing
- Other GENFARE Incorporated (GFI)
Elk Grove Village, IL

3.7 HARDWARE AMAGNETIC STRIPE CARD READER@

- Hardware Type Magnetic stripe card reader
- Functions Reads and writes information to card
- Location On each bus
- Data Name/Contents Fare collected/debited
- Data Type Data
- Status New
- Other Three types of cards will be used:
1) Stored value card in \$10.00, \$15.00 and \$20.00 increments.
2) Period pass card which will be valid for a 31 consecutive day period after the first use and is equal to 42 times the ride value.
3) Transfer card
GENFARE Incorporated (GFI)
Elk Grove Village, IL

3.8 HARDWARE AINFRARED TRANSMITTER / RECEIVER PROBE@

- Hardware Type Optical transmitter/receiver
- Functions Transfer information to/from the fare box infrared transmitter/receiver.
- Location 2 per MCTO garage facility (10 total)
- Data Name/Contents Passenger type, payment type, payment amount and driver information.
- Data Type Data
- Status Existing
- Other GENFARE Incorporated (GFI)
Elk Grove Village, IL

3.9 HARDWARE AISOLATION BOX@

- Hardware Type Isolation box
- Functions It was unclear from the interview what the function is of this piece of hardware. It appears that it supplies power to the data probe from a universal power supply.
- Location 1 per MCTO garage facility (5 total)
- Data Name/Contents Not applicable
- Data Type Not applicable
- Status Existing
- Other GENFARE Incorporated (GFI)
Elk Grove Village, IL

3.10 HARDWARE APC@

- Hardware Type Personal computer
- Functions
 - 1) Runs GFI fare collection software
 - 2) Receives call from network manager PC for data upload.
 - 3) Other office functions.
- Location 1 per MCTO garage facility (5 total)
- Data Name/Contents Passenger type, payment type, payment amount, driver information, route number, run number, direction and city.
- Data Type Data
- Status Existing
- Constraints This computer system could not be connected to the garage local area network. It was not known by the contact person being interviewed whether this was a problem with the computer or the GFI software.
- Other NEC 386-66Mhz

3.10.1 SOFTWARE AGFI FARE COLLECTION SOFTWARE@

- Software Type Application
- Software Standards Proprietary - DOS based application
- Functions Polls data from fare box, clears and stores information to the garage computer.
- Status Existing

3.10.2 SOFTWARE ADOS - LATEST VERSION@

- Software Type Operating system
- Software Standards DOS
- Functions
 - 1) Control PC hardware resources
 - 2) Executes software applications
- Status Existing

3.11 HARDWARE APRINTER@

- Hardware Type Printer
- Functions Prints summary reports from the GFI software
- Location 1 per MCTO garage facility (5 total)
- Data Name/Contents Passenger type, payment type, payment amount, driver information, route number, run number, direction and city.
- Data Type Data
- Status Existing
- Other Dot Matrix printer

3.12 HARDWARE AGARAGE MODEM@

- Hardware Type Modem - 2400 BPS
- Functions Enables communication over telephone line to network manager PC in MCTO Heywood office.
- Location 1 per MCTO garage facility (5 total)
- Data Name/Contents 4 ASCII files per garage with passenger type, payment type, payment amount, driver information, route number, run number, direction and city information.
- Data Type Data
- Status Existing

3.13 HARDWARE AMCTO HEYWOOD OFFICE MODEM@

- Hardware Type Modem - 2400 BPS
- Functions Enables communication over telephone line to each of the five garage computers.
- Location MCTO Heywood office
- Data Name/Contents 4 ASCII files per garage with passenger type, payment type, payment amount, driver information, route number, run number, direction and city information.
- Data Type Data
- Status Existing

3.14 HARDWARE ANETWORK MANAGER PC@

- Hardware Type Personal computer
- Functions
 - 1) Runs GFI fare collection software.
 - 2) Makes calls to garage computer for data upload.
 - 3) Network manager.
 - 4) Other office functions.
- Location MCTO Heywood office
- Data Name/Contents Passenger type, payment type, payment amount, driver information, route number, run number, direction and city.
- Data Type Data
- Status Existing
- Other 486 PC

3.14.1 SOFTWARE AGFI FARE COLLECTION SOFTWARE@

- Software Type System management
- Software Standards Proprietary - DOS based application
- Functions
 - 1) Enables communication to garage computers and uploads data.
 - 2) Prints standard and user specified GFI reports
- Status Existing
- Other GENFARE Incorporated (GFI)
Elk Grove Village, IL

3.14.2 SOFTWARE ADOS - LATEST VERSION@

- Software Type Operating system
- Software Standards DOS
- Functions
 - 1) Control PC hardware resources
 - 2) Executes software applications
- Status Existing

3.14.3 SOFTWARE ANETWORK SOFTWARE@

- Software Type Communication protocol
- Functions Network interface
- Status Existing

3.15 HARDWARE ANETWORK PC@

- Hardware Type Personal computer
- Functions
 - 1) Runs GFI fare collection software.
 - 2) Runs other software applications for generating reports.
 - 3) Other office functions.
- Location MCTO Heywood office
- Data Name/Contents Passenger type, payment type, payment amount, driver information, route number, run number, direction and city.
- Data Type Data
- Status Existing
- Other
 - 1) These computers are used to generate reports using a variety of spreadsheet and database software including Quattro and Imagine.
 - 2) Also used to generate billings and reports to suburban transit providers.

3.16 HARDWARE ALASER PRINTER@

- Hardware Type Printer
- Functions Prints reports from GFI and other software applications.
- Location MCTO Heywood office
- Data Name/Contents See attached examples
- Data Type Text/graphics hard copy
- Status Existing

3.17 HARDWARE ABRIDGE@

- Hardware Type Bridge
- Functions Allows communication between network manager PC and the office local area network.
- Location MCTO Heywood office
- Data Name/Contents Passenger type, payment type, payment amount, driver information, route number, run number, direction and city.
- Data Type Data
- Status Existing

3.18 HARDWARE AIBM MAINFRAME@

- Hardware Type Minicomputer or mainframe
- Functions Store electronic fare collection system information
- Location MCTO Heywood office
- Data Name/Contents ASCII file
- Data Type Data
- Status Existing
- Other This piece of hardware and corresponding network is documented as part of System 3.5 - MCTO BusLine system.

4.1 INTERFACE

Interfaces between fare box components are not documented. This is assumed to be one component of hardware for the purposes of an interface.

4.2 INTERFACE

- Connects to ... Farebox infrared transmitter/receiver
- Interface location Infrared data probe
- Interface Type MCTO garage locations
- Interface Direction Data
- Interface Direction Both
- Interface Component Infrared
- Protocol/Standard Proprietary
- Information Type/Content Driver data, route, passenger, fare collection and fare structure information.
- Information Direction Both
- Information Frequency Variable
- Information Standards Proprietary

4.3 INTERFACE

- Connects to ... Infrared data probe
- Interface location Isolation box
- Interface location MCTO garage locations
- Interface Type Data
- Interface Direction Both
- Interface Component Unknown - but possible a coaxial cable
- Protocol/Standard Proprietary
- Information Type/Content Driver data, route, passenger, fare collection and fare structure information.
- Information Direction Both
- Information Frequency Variable
- Information Standards Proprietary

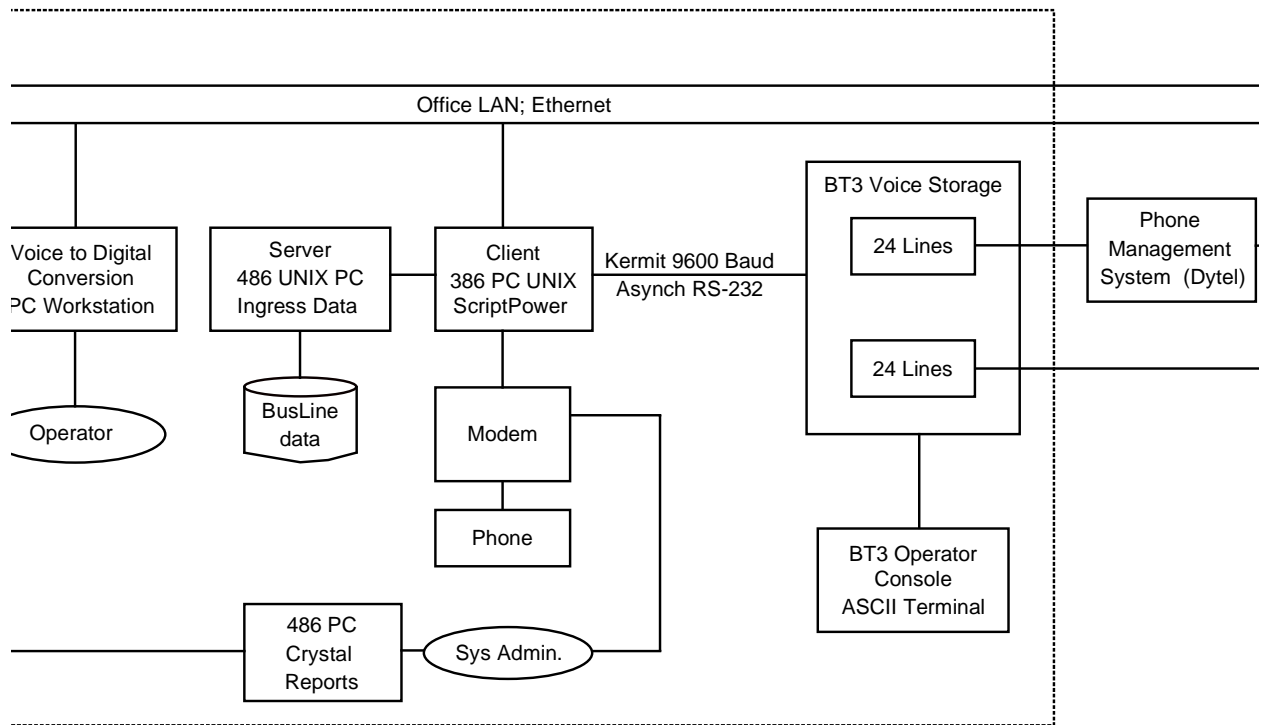
4.4	INTERFACE	Isolation box
- Connects to ...		Garage PC
- Interface location		MCTO garage locations
- Interface Type		Data
- Interface Direction		Both
- Interface Component		Coaxial cable
- Protocol/Standard		Proprietary
- Information Type/Content		Driver data, route, passenger, fare collection and fare structure information.
- Information Direction		Both
- Information Frequency		Variable
- Information Standards		Proprietary
4.5	INTERFACE	Garage PC
- Connects to ...		Printer
- Interface location		MCTO garage locations
- Interface Type		Data
- Interface Direction		Both
- Interface Component		RS-232
- Information Type/Content		Hard copy reports of driver data, route, passenger and fare collection information.
- Information Direction		Output
- Information Frequency		As needed
- Information Standards		Standard GFI reports
4.6	INTERFACE	Garage PC
- Connects to ...		Garage PC modem
- Interface location		MCTO garage locations
- Interface Type		Data
- Interface Direction		Both
- Interface Component		RS-232
- Information Type/Content		Daily summary of driver data, route, passenger and fare collection information
- Information Direction		Output
- Information Frequency		Once per day
- Information Standards		ASCII files

4.7	INTERFACE	Garage PC modem
- Connects to ...		Network manager PC modem
- Interface location		MCTO garage location / MCTO Heywood office
- Interface Type		Data
- Interface Direction		Both
- Interface Component		Service provider
- Protocol/Standard		Public
- Information Type/Content		Daily summary of driver data, route, passenger and fare collection information
- Information Direction		Output
- Information Frequency		Once per day
- Information Standards		ASCII files
4.8	INTERFACE	Network manager PC modem
- Connects to ...		Network manager PC
- Interface location		MCTO Heywood office
- Interface Type		Data
- Interface Direction		Both
- Interface Component		RS-232
- Information Type/Content		Daily summary of driver data, route, passenger and fare collection information
- Information Direction		Input
- Information Frequency		Once per day
- Information Standards		ASCII files
4.9	INTERFACE	Network manager PC
- Connects to ...		MAU LAN
- Interface location		MCTO Heywood office
- Interface Type		Data
- Interface Direction		Both
- Interface Component		Token ring
- Information Type/Content		Driver data, route, passenger and fare collection information
- Information Direction		Both
- Information Frequency		As needed

4.10	INTERFACE	Network PC
- Connects to ...		MAU LAN
- Interface location		MCTO Heywood office
- Interface Type		Data
- Interface Direction		Both
- Interface Component		Token ring
- Information Type/Content		Driver data, route, passenger and fare collection information
- Information Direction		Both
- Information Frequency		As needed
4.11	INTERFACE	MAU LAN
- Connects to ...		Bridge
- Interface location		MCTO Heywood office
- Interface Type		Data
- Interface Direction		Both
- Information Type/Content		Variable
- Information Direction		Both
- Information Frequency		As needed
4.12	INTERFACE	Office LAN
- Connects to ...		MCTO garages maintenance and service LAN
- Interface location		MCTO Heywood office and MCTO garage locations
- Interface Type		Data
- Interface Direction		Both
- Interface Component		It was not stated in the interview how data was sent back to the garage facilities. On other system documentation, data was uploaded to the garage facilities by tape drives
- Information Type/Content		Variable
- Information Direction		Output
- Information Frequency		As needed

3.4.4 MCTO TIC BUSLINE SYSTEM

Baseline Data Collection
Line System



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le

AS-IS DATA COLLECTION TEMPLATE

1.0 AGENCY AMCTO TIC@

- Agency Type Transit provider
- Agency Functions Communicate transit information via Busline system (audio-text) and live operator assisted trip planning system.
- Agency Location(s) Metropolitan Council Transit Operations (MCTO)
Heywood Facility
560 Sixth Avenue N.,
Minneapolis, MN 55411-4398
- Policies Strong commitment to customer satisfaction. Its more important to give out high quality, useful information than to just handle a large quantity of calls. Distribute 7 million bus schedules per year.
- Constraints Financial Shortages
- Contacts Dee Molean, 349-7410, FAX 349-7612
- Other MCTO has 3 transit stores in the Twin Cities Metropolitan Area (TCMA) (downtown Minneapolis., downtown St. Paul, Mall of America) where bus riders can get schedules, bus passes, etc.
MCTO has 19000 bus stops in the TCMA with 1300 bus shelters.

2.0 SYSTEM AMCTO TIC BUSLINE SYSTEM@

- Date of As-Is Data Collection 1/24/96
- Purpose
 - 1) Provide people with audio bus scheduled departure times using the same node points as contained in the bus schedule.
 - 2) Can use to plan a trip for a future day.
 - 3) Also provide info. on public transit providers system.
- Hours of Operation 24 Hours/day, 7 Days/week, except for approximately 2 hour daily at 3:00 AM.
- Geographic Coverage Seven county metropolitan area. (Anoka, Hennepin, Ramsey, Dakota, Scott, Carver, Washington)
- Contacts Dee Molean, 349-7410, FAX 349-7612, Manager and Art Brakob, Technical
- Status Existing, Improve. This same service was purchased from CityLine for a year or so in 1986/1987. Then MCTO decided to put in their own system.
- Policies Handle 2 million calls per year. Refresh the schedule information every Thursday with minor changes. Major schedule changes are made 4 times per year.

- Constraints
The system is "maxed out". On certain days all 48 Incoming lines are used....getting to be a problem. System is down for about 1 hour during the night for updates. Cannot do any trip planning because system only contains departure times of buses, and not arrival times so that if you have to make a transfer, you would not know when your initial leg bus would arrive at the transfer bus stop. Nothing set up for access to system via Internet, modem, etc. System is 5 years old.
System clock loses time and needs to be reset each week.
- Recommended Improvements
They would like to upgrade the hardware and software. MCTO received approval for this upgrade 3/1996.
- Block Diagram
See attached
- Typical Operational Scenario
A user calls into the system. When prompted he/she selects schedules for the same day or another day (if another day, which category of day), the bus route number, whether Minneapolis or St. Paul, which direction, which bus stop. The system lists the times at that stop on that bus in that direction.
- Other
System is used for special event info. like the State Fair, indicating which routes serve the State Fair area.
System has the capability for the user to leave a message- haven't used. System can be used to do customer surveys.
System is used to put bus re-route times when major snowstorms affect routes. This overwrites the normal route times.
95% of calls are for the Next bus departure time@.
Blind community uses the system a lot.
System is capable of tracking how the system is used, i.e. what parts of the system the customers use most often, etc.
Private provider schedules changes are sporadic and are made every couple weeks or so. This info. comes to MCTO from private providers in paper form.

2.1 PERSONNEL ASYSTEM ADMINISTRATOR@

- Personnel Function Maintain the database
- Quantity 1
- Location MCTO Heywood Facility
- Workload Update the system 1/week on Thursday
- Working hours Normal working hours
- Status Existing
- Contact Art Brakob 349-7423

2.2 PERSONNEL ASYSTEM OPERATOR@

- Personnel Function Record voice messages
- Quantity 1
- Location MCTO Heywood Facility
- Workload Update the system 1/week on Thursday
- Working hours Normal working hours
- Status Existing
- Contact Art Brakob

3.1 HARDWARE ABT3@

- Hardware Type Telephone audio-text processor and telephone line selector.
- Functions Process audio-text responses and controls telephone line off-hook, on-hook.
- Location MCTO Heywood Facility
- Data Name/Contents Audio-text responses
- Data Type Digitized voice.
- Status Existing
- Constraints None. There is room for expansion on the existing hardware.
24 phone lines come into BT3 directly from the Busline # (341-4287), and 24 phone lines come in from the phone management system(by Dytel)(373-3333).
- Contact Art Brakob 349-7423
- Other Runs on RSX operating system (from Perception Technologies)
All the voice messages are stored on the BT3, and the server requests the message to be played based on the touch tone phone number pressed by the user.
Schedule data is downloaded to the server from the Trapeze system, through a conversion program on the RUCUS system, every Thursday. The data that gets updated each week includes adding nodes and minor time changes. The voice messages can be updated any time, but they are usually needed at the same time as a major schedule change, which occurs approximately quarterly.

3.1.1 SOFTWARE ARSX@

- Software Type Operating System
- Software Standards Proprietary to Perception Technology.
- Functions Manage operation of the BT3
- Status Existing
- Contact Art Brakob

3.2 HARDWARE ACLIENT WORKSTATION@

- Hardware Type 386 PC Computer (25 MHz)
- Functions The application software for the Busline system is stored & executed on this machine. At the User's touch tone phone prompt, the client decides what function to process next, searches database for bus schedule time and directs BT3 to playback the voice recorded message about the route and departure time to the User.
- Location MCTO Computer Room
- Constraints Client and Server machines are at capacity. Experiencing a lot of problems due to the speed of these two machines.
- Issues No capacity to handle additional machines.
- Recommended Improvements MCTO received approval to upgrade this PC 3/1996.

3.2.1 SOFTWARE AUNIX@

- Software Type Operating System
- Software Standards UNIX
- Functions Executes software applications and controls hardware.

3.2.2 SOFTWARE ASCRIPTPOWER@

- Software Type Application software
- Software Standards Custom written software.
- Functions Manages user requests and information response. Takes the incoming requests from the user (touch tone phone) and determines what information should be given back to the user, searches the database for the correct data, commands the BT3 to play appropriate messages.
- Constraints Scriptpower requires Ingress database. Described as Aclunky@ software.
- Recommended Improvements Will be upgraded to WriteOne software. (From Digital DataVoice Co.- Eagan, MN)
MCTO received approval to upgrade this software 3/1996.
- Other MCTO has a contract with Digital Data Voice for all of Busline equipment support. They also wrote the application software.

3.3 HARDWARE ADATA SERVER@

- Hardware Type 486 PC
- Functions Database for Busline resides on this PC.
- Location MCTO Computer Room
- Data Name/Contents Bus schedule times.
- Data Type Bus schedule times.
- Status Existing
- Constraints Client and Server machines are at capacity. Experiencing a lot of problems due to the speed of these two machines
MCTO received approval to upgrade this PC 3/1996.

3.3.1 SOFTWARE AUNIX@

- Software Type Operating System
- Software Standards UNIX
- Functions Executes S/W applications and controls hardware.

3.3.2 SOFTWARE AINGRESS@

- Software Type Database.
- Functions Stores bus schedule route data and stores address locations of voice messages in the BT3.
- Recommended Improvements MCTO received approval to upgrade this software to Sybase database 3/1996.

3.4 HARDWARE AVOICE STORAGE PC@

- Hardware Type PC - 386 Intel
- Functions Operator records voice messages to PC's hard disk by an analog to digital voice card.
Voice files are transferred to the Client via a file transfer protocol, then downloaded to the BT3.
- Location MCTO building. - not in computer room.
- Data Name/Contents Voice messages.
- Data Type Data
- Status Existing
- Other DOS operating system.
Other office application software like WordPerfect and spreadsheets are used on this PC.

3.4.1 SOFTWARE ADSR@

- Software Type Application software
- Software Standards Custom written software. Proprietary to Perception Technologies.
- Functions Convert human voice to digital.
- Status Existing
- Constraints This software must run on a 386 PC.

3.5 HARDWARE ASWITCHBOARD (DYTEL)@

- Hardware Type Telephone line voice response unit.
- Functions Directs incoming phone calls from users to the Busline System when the user presses the appropriate number on a touch tone phone.
- Location MCTO Heywood facility
- Data Type Telephone calls - audio
- Status Existing
- Constraints Currently 48 separate phone lines come into the MCTO - this capacity is reached during busy periods.

3.6 HARDWARE A486 PC@

- Hardware Type PC
- Functions System Administrator uses this PC to create bus schedule reports using RUCUS.
- Location MCTO building. - not in computer room.
- Data Name/Contents RUCUS reports.
- Data Type Data.
- Status Existing
- Other DOS operating system.

3.6.1 SOFTWARE ARUCUS@

- Software Type Application software
- Software Standards Custom written software. Proprietary to Perception Technologies.
- Functions Schedule reports using the data from the Trapeze system.
- Status Existing

4.1 INTERFACE

- Connects to ... BT3
- Interface location Client workstation
- Interface location MCTO Computer Room.
- Interface Type 9600 Baud A-Synchronous
- Interface Direction Both
- Protocol/Standard RS-232
- Information Type/Content Voice files are downloaded from Client to BT3 via Kermit.
- Information Direction Client to BT3.
- Information Frequency Weekly - as schedule changes are made which require new messages.

4.2 INTERFACE

- Connects to ...
- Interface location
- Interface Type
- Interface Direction
- Interface Component
- Protocol/Standard
- Information Type/Content
- Information Direction
- Information Frequency

OFFICE LAN

Connects office computers, also is LAN for Interface between office computers and Busline computers. MCTO building.
Ethernet - Novell network and TCP/IP - use TCP/IP for Busline.
Both
Coax cable.
Novell, TCP/IP
Various info. contents.
Both
Whenever schedule changes are made.

4.3 INTERFACE

- Connects to
- Interface location
- Interface Type
- Interface Direction
- Interface Component
- Information Type/Content
- Information Frequency
- Other

BT3

Switchboard and to U.S. West
MCTO Heywood facility
Audio
Both
Telephone twisted pair wire
Audio recorded messages containing bus schedule departure time goes to User.
As needed by User call in demand
24 phone lines come into BT3 via the Switchboard, 24 come into the BT3 via the direct Busline number.

4.4 INTERFACE

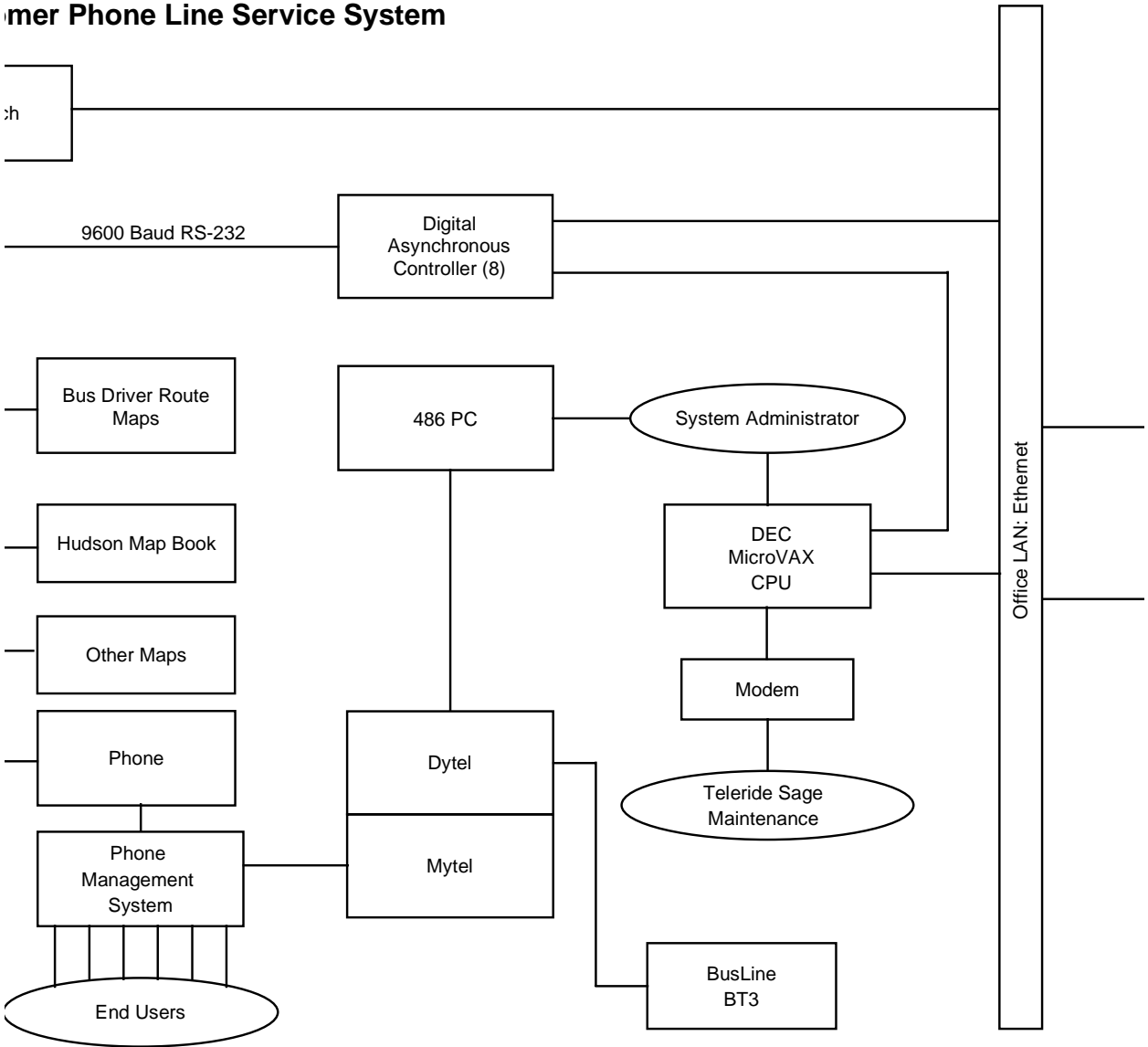
- Connects to ...
- Interface location
- Interface Type
- Interface Direction
- Interface Component
- Protocol/Standard
- Information Type/Content
- Information Direction
- Information Frequency

TRAPEZE SYSTEM

Busline System - Data Server
MCTO Heywood facility
Data
Both
via Novell network
Rucus database format
The Trapeze bus route schedule information is converted into a Rucus database and downloaded to the Busline system.
Trapeze to Busline
Weekly - minor changes. Major changes quarterly.

3.4.5 MCTO TIC CUSTOMER PHONE LINE SERVICE SYSTEM

Baseline Data Collection
Customer Phone Line Service System



AS-IS DATA COLLECTION TEMPLATE

1.0 AGENCY AMCTO TIC@

- Agency Type Transit provider
- Agency Functions Communicate transit information via Busline system (audiotext) and live operator assisted trip planning system.
- Agency Location(s) MCTO Heywood Facility
560 Sixth Avenue N.,
Minneapolis, MN 55411-4398
- Policies Strong commitment to customer satisfaction. Its more important to give out high quality, useful information than to just handle a large quantity of calls. Distribute 7 million bus schedules per year.
- Constraints Financial Shortages
- Contacts Dee Molean, 349-7410, FAX 349-7612
- Other MCTO has 3 transit stores in the TCMA (downtown Mpls., downtown St. Paul, Mall of America) where bus riders can get schedules, bus passes, etc.
MCTO has 19000 bus stops in the TCMA with 1300 bus shelters.

2.0 SYSTEM AMCTO TIC CUSTOMER PHONE LINE SERVICE SYSTEM@

- Date of As-Is Data Collection 1/24/96
- Purpose Provide personalized trip planning assistance via phone to users of the transit system.
- Hours of Operation M - F 6:30 AM - 9:00 PM
Sat. 7:00 - 4:30
Sun. 9:00 - 9:00
- Geographic Coverage 7 County Metro Area (Hennepin, Ramsey, Anoka, Dakota, Washington, Scott, Carver)
- Contacts Dee Molean, Art Brakob.
- Status Existing
- Policies Handle 750,000 calls per year. Quality of service provided is more important than quantity of calls handled.
- Constraints Manual system today, no GIS system available to help plan trips automatically.
Proprietary system made by Teleride, Sage Ltd. Canada.
- Issues Have just recently cut back hours due to funding.
Peak usage time is during the midday.
Teleride does the maintenance of the system - very stable system. System installed in May 1993.
The MCTO radio system is also from Teleride.
- Recommended Improvements Nothing on the Internet due to lack of people to support.
- Block Diagram See attached

- Typical Operational Scenario User calls into the system (373-3333) and selects audiotext option. From initial prompt, options are:
 - 1) Talk with a bus information representative
 - 2) Busline
 - 3) Customer service
 - 4) Mn Rideshare or travel demand management representative

The operator asks the user information about the trip they would like to take via the bus system (i.e. origin/destination)and plans out the trip by giving the user the bus route number and departure/arrival times of each leg of the trip, including information about transferring from one route to the next such as walking direction information from one bus stop to the next.
- Other Metro Mobility uses a trip planning system - the mapping is done by Lawrence Map. Tidewater was mentioned as a good trip planning system.

2.1 PERSONNEL ASYSTEM ADMINISTRATOR@

- Personnel Function Maintain the database
- Location MCTO Heywood Facility
- Working hours Normal working hours
- Status Existing
- Contact Art Brakob

2.2 PERSONNEL ATIC OPERATOR@

- Personnel Function Assist bus system users who call in to plan a complete trip from their origin to destination.
- Quantity 37 full-time + 4 part-time, currently staff from 6 to 21 operators throughout the day.
- Location MCTO Heywood Facility
- Workload Very heavy - wait times to get an operator can be as high as 15- 20 minutes.
- Working hours Normal working hours. Start in the AM with a staff of 6 operators, gradually staff up to 21 operators during midday when system usage is at peak, gradually staff down to 6 operators in evening.
- Status Existing
- Policies Rigorous training of operators
- Constraints Hard to keep competent operators because pay rate is low. Rigorous training of operators prior to letting them operate independently. Currently operating with 21 operators, system capacity is for 27 operators.
- Issues Complete training of operators takes 6 months.
- Recommended Improvements Could use an automated trip planning system to lesson the burden on the operators.
- Contact Dee Molean

3.1 HARDWARE ADEC MICROVAX@

- Hardware Type Central Processing Unit
- Functions Stores bus route and schedule information.
Displays information on ASCII terminals as requested
- Location MCTO Computer Room.
- Data Name/Contents Bus route and schedule information:
 - 1) Bus route numbers
 - 2) Bus route stops
 - 3) Schedule departure times from stops
 - 4) Detour information
- Data Type Data
- Status Existing
- Other VAX, VMS MicroVax 3100
From Sage Ltd., Canada
Microvax II, 16 MB Memory, VMS 5.2, Unlimited users,
Detour information is put into the system by Transportation
Section of MCTO(Dick Loeffler).

3.1.1 SOFTWARE ATELERIDE SOFTWARE@

- Software Type Database display software.
- Software Standards Proprietary
- Functions Converts the bus schedule file from the Trapeze system(BTRIEVE) to a RUCUS database format.
TIC operators use this data to identify the bus route, bus stop locations, departure time and arrival times to plan a trip from the customers origin to destination.
- Constraints Proprietary to Sage, Ltd.

3.2 HARDWARE AASCII TERMINAL@

- Hardware Type PC Terminal
- Functions Allows TIC Operators to view bus route, schedule and detour information.
- Location TIC Operations Room, Heywood facility
- Data Name/Contents Bus route and schedule information:
 - 1) Bus route numbers
 - 2) Bus route stops
 - 3) Schedule departure times from stops
 - 4) Detour information
- Data Type Data
- Status Existing
- Other 21 Operator stations/terminals Wyse Terminals

3.3 HARDWARE APHONE@

- Hardware Type Telephone (headset)
- Functions Provide voice communication between operator and customer.
- Location TIC Operations Room, Heywood facility
- Data Name/Contents Interactive voice communications for desired trip by customer and planned route from operator.
- Data Type Voice
- Status Existing
- Other 21 Operator stations/terminals

3.4 HARDWARE ADIGITAL ASYNCHRONOUS CONTROLLER @

- Hardware Type Multiplexor
- Functions Asynchronous multiplexor ports, provides for data transfer between the DEC Microvax and the operator terminals.
- Location MCTO Computer Room, Heywood facility
- Data Name/Contents Bus route and schedule information:
 - 1) Bus route numbers
 - 2) Bus route stops
 - 3) Schedule departure times from stops
 - 4) Detour information
- Data Type Data
- Status Existing
- Other 8 - DEC server 200/MC machines

3.5 HARDWARE A486 PC @

- Hardware Type Personal Computer
- Functions Monitor and record customer phone call activity.
- Location MCTO Heywood facility
- Data Name/Contents Customer phone call statistics such as:
 - 1) number of calls receive
 - 2) time of calls
 - 3) length of calls
 - 4) the time the customer spent waiting for an operator
 - 5) number of calls taken by each operator
 - 6) time each operator spends per call
- Data Type Data
- Status Existing

3.6 HARDWARE ADYTEL@

- Hardware Type Phone answering machine, call routing.
- Functions
 - 1) Monitors the customer call statistics such as the time
 - 2) Routes call to next available operator or to the Busline system.
- Location MCTO Heywood facility
- Data Type Voice

3.7 HARDWARE AMYTEL@

- Hardware Type Phone answering machine, call routing
- Functions When a call comes in, this plays a standard message to the customer about the options available via the system and routes the call to Dytel for an operator or Busline for audiotext.
- Location TIC Operations Room, Heywood facility
- Data Type Voice

3.8 HARDWARE ABUS DRIVER ROUTE MAPS@

- Hardware Type Map
- Functions Map of the bus route that a driver is to follow showing bus stop locations.
- Location TIC Operations Room, Heywood facility
- Issue: Maps used by operators are at different scales which makes it more difficult to relate geographic information from map to map when planning a customer's route.

3.9 HARDWARE AHUDSON MAP BOOK@

- Hardware Type Map book
- Functions TIC operators use this to locate addresses of customer origins/destinations in relation to bus routes.
- Location TIC Operations Room, Heywood facility

3.10 HARDWARE AOTHER MAPS@

- Hardware Type Maps
- Functions TIC operators use this to locate addresses of customer origins/destinations and landmarks in relation to bus routes.
- Location TIC Operations Room, Heywood facility

3.11 HARDWARE AMODEM@

- Hardware Type Modem
- Functions Allows the personnel from Teleride Sage to call into system to perform remote maintenance activities if needed.
- Location TIC Operations Room, Heywood facility
- Other This system is described as very stable, therefore this is not heavily used.

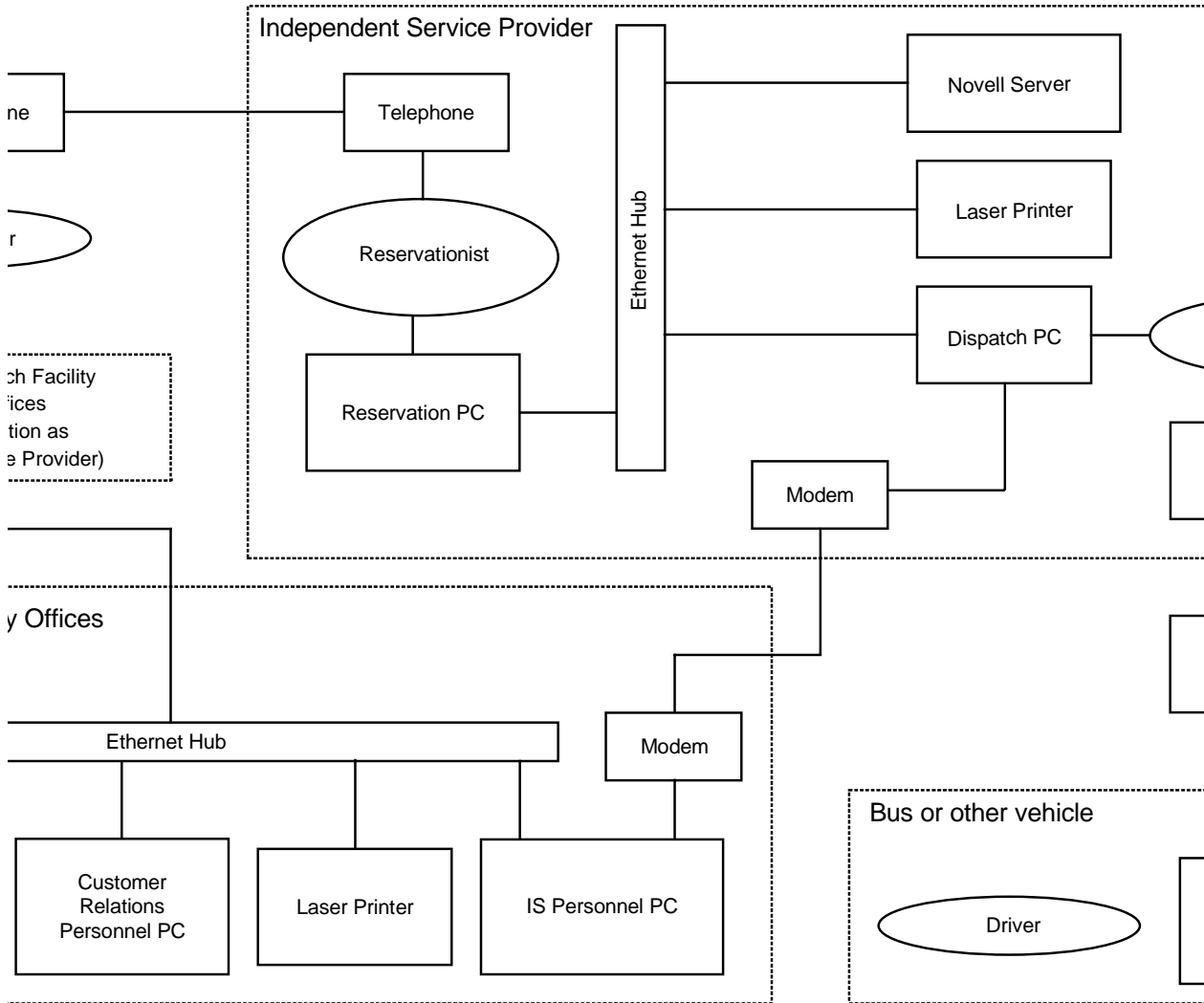
3.12 HARDWARE APHONE MANAGEMENT SYSTEM@

- Functions Routes incoming phone calls to Busline, TIC operators, and MCTO office personnel.
- Location TIC Operations Room, Heywood facility
- Data Type Voice

4.1	INTERFACE	ASCII TERMINAL
- Connects to ...		Digital Asynchronous Controller
- Interface location		MCTO Heywood facility
- Interface Type		Data
- Interface Direction		Both
- Interface Component		RS-232, 9600 baud
- Information Direction		To ASCII Terminal
- Information Frequency		As needed.
- Information Standards		RS-232
4.2	INTERFACE	DYTEL
- Connects to ...		Busline BT3
- Interface location		MCTO Heywood facility
4.3	INTERFACE	DEC MICROVAX
- Connects to ...		Bus Radio Dispatch
- Interface Direction		Both
- Interface Component		LAN - Ethernet
- Information Direction		From DEC to radio dispatch
- Information Frequency		As needed

3.4.6 METROPOLITAN COUNCIL METRO MOBILITY RESERVATION/ SCHEDULING/ DISPATCH SYSTEM

Baseline Data Collection
Metropolitan Council Metro Mobility Reservation/Scheduling/Dispatch System



AS-IS DATA COLLECTION TEMPLATE

1.0 AGENCY AMETROPOLITAN COUNCIL@

- Agency Type Regional planning organization
- Agency Functions Responsible for planning and oversight of metropolitan area services including transit.
- Agency Location(s) 245 East 6th Street, Suite 200
St. Paul, MN 55101

2.0 SYSTEM AMETRO MOBILITY RESERVATION/SCHEDULING/DISPATCH@

- Date of As-Is Data Collection March 13, 1996
- Purpose Metro Mobility provides transit services for people with disabilities in the Minneapolis/ St. Paul area and selected suburbs. This system receives requests from pre-approved customers, creates pick-up and drop-off schedules, and provides near-real-time tracking and communication with transit vehicles. Requests for service may be made from one to 4 days in advance.
- Hours of Operation Reservations are taken from 6:00 a.m. to 5:00 p.m. daily for Mayflower, Metro Ride Interzone and Handicabs; 8 a.m. to 5 p.m. Monday through Friday for county programs.
First daily pick-up can be scheduled no earlier than 5:00 a.m., last daily pick-up can be scheduled no later than 12:30 a.m.
- Geographic Coverage See attached map
- Status Existing
- Recommended Improvements Metro Mobility would like to add Automatic Vehicle Location (AVL) equipment to its vehicles, but no firm plans are in place to do so.
- Block Diagram See attached
- Typical Operational Scenario A person wishing to use Metro Mobility's transit services must first go through a certification process, which is handled by the Metro Mobility Service Center in St. Paul. Eligibility is based on Americans with Disabilities Act (ADA) criteria. Exact criteria were not gathered during the interview. Once certified, a rider is assigned to a service provider based on place of residence. The service providers are:
 - 1) Mayflower
 - 2) Metro Ride
 - 3) HandicabsThe same provider is called to make reservations for all trips. When a trip reservation is made, the operator at the service provider will ask for the following information:

- 1) Name
- 2) Day and date of trip
- 3) Pick-up address (must be an address, not a place name (i.e. A200 Constitution Ave.@ not AState Capitol@).
- 4) Phone number at pick-up address
- 5)\$Pick-up time
- 6)\$Drop-off address (see above)
- 7)\$Time of return trip
- 8)\$Any location specific information that might assist the driver (building entrance, etc.)
- 9) Any information regarding guests or attendants that will also need to use a Metro Mobility vehicle
- 10) Special boarding requirements (for passengers who use scooters)
- 11)\$Steps at pick-up and drop-off (for passengers who use wheelchairs)

This information is entered into PASS, a commercial software package which is designed specifically to schedule and dispatch passenger trips for transit systems.

- Operational Scenario Cont.

PASS generates a list of possible vehicle trips for the new passenger trip based on its Asubscription service@ list. ASubscription service@ is trips that are repeated at the same time at least three times a week on the same day every week. An operator Areservationist@ then either adds the passenger trip to an existing vehicle run or if no run will accommodate the trip, fills out a form called a Amanual ticket@. The passenger is informed that a trip cannot be scheduled at that time, but that Metro Mobility will attempt to fit the request into a run and the passenger will be notified at least three days prior to the date of a requested trip if the trip cannot be accommodated on any vehicle run. The manual ticket is given to a scheduler who reviews pick-up/drop-off manifests and attempts to fit manual ticket trips onto existing vehicle runs. The PASS system automatically generates manifests for drivers and prints them in chronological order of pick-up/drop-off. A driver checks in with the dispatcher before beginning a run via radio system, and also calls in to report status of the run every second or third pick-up/drop-off. The dispatcher keys in time reports and schedule status from drivers to check against scheduled times on the manifest. A report is generated showing deviations from scheduled times at the end of each run. On a daily basis, a person from Metro Mobility Service Center will use a PC remote control package (PC Anywhere) to dial into one of the PCS via a modem at

each of the service providers. Files that have the current day as the creation date, are transferred to a drive at Metro Mobility Service Center in St. Paul. Once the files are at the St. Paul office, a variety of reports are generated from the data using Clarion database reporting software.

Hard copies of the reports are brought to the St. Paul office by the managers of the independent service providers for a monthly meeting.

- Operational Scenario Cont.

In addition to the seven service providers, the Metro Mobility Service Center also has reservation, scheduling, and dispatch facilities.

Each service provider deals only with those trips which begin and end in their respective areas.

Those trips that begin in one service providers geographic area and end in another providers area, called interzonal trips and are serviced by a separate fleet, in effect a interzonal-specific service provider.

2.1 PERSONNEL ARESERVATIONIST@

- Personnel Function Takes calls from passengers and enters reservation information into PASS system
- Quantity Approximately 30 at independent service providers.
- Location At each of the independent service providers.
- Workload Reservationists work full time with this system
- Working hours Reservations are taken from 6:00 a.m. and 5:00 p.m. daily
- Status Existing

2.2 PERSONNEL ADISPATCHER@

- Personnel Function Communicates with driver to receive time checks and send schedule updates.
- Quantity Approximately eight at independent service providers.
- Working hours First daily pick-up can be scheduled no earlier than 5:00 a.m., last daily pick-up can be scheduled no later than 12:30 a.m. Dispatchers must be on duty prior to and after these times.
- Status Existing

2.3 PERSONNEL ADRIVER@

- Personnel Function Operates transit vehicles and reports status of run to dispatchers
- Quantity Approximately 260 at independent service providers.
- Working hours First daily pick-up can be scheduled no earlier than 5:00 a.m., last daily pick-up can be scheduled no later than 12:30 a.m.

2.4 PERSONNEL AINFORMATION SYSTEMS (IS) STAFF@

- Personnel Function Downloads PASS system (i.e. reservation and dispatch) data from independent service providers. Creates reports for Metro Mobility's managerial staff.
- Quantity One
- Location Metro Mobility Service Center, St. Paul

2.5 PERSONNEL ACUSTOMER RELATIONS STAFF@

- Personnel Function Record customer complaints about service and researches driver logs.
- Location Metro Mobility Service Center, St. Paul

3.1 HARDWARE ATELEPHONE@

- Hardware Type Multi-line, multi-extension communications system
- Functions Communications with Metro Mobility customers wishing to make reservations. These can either be direct calls or, in the case of an interzonal trips, calls transferred from another service provider to the interzone system.
- Data Name/Contents Reservation information (see Operational Scenario)
- Data Type Voice
- Status Existing

3.2 HARDWARE ARESERVATION PC@

- Hardware Type Intel-based PC
- Functions Data entry into the PASS system
- Location At each of the service provider offices.
- Data Name/Contents See operational scenario
- Data Type Data
- Status Existing

3.2.1 SOFTWARE ADOS@

- Software Type PC operating system
- Software Standards 16 bit DOS
- Status Existing

3.2.2 SOFTWARE APASS (RESERVATION MODULE)@

- Software Type Transit trip reservation, scheduling, and management software. The reservation module is run on these PC-s
- Functions Accepts information as specified in section 2.0-s operational scenario. Information from the reservation module is sent to the PASS scheduling module. Which runs on the server.
- Status Existing

3.3 HARDWARE ANOVELL SERVER@

- Hardware Type Intel based server
- Functions Serves files to clients on LAN
- Location At each of the service providers
- Data Name/Contents Reservation information for PASS scheduling
Time check information entered by dispatchers.
Time check reporting information for customer relations.
- Data Type Data
- Status Existing
- Issues The LAN is part of the contract specification from Metro Mobility. Each independent service provider must conform to the specification to be awarded a contract.

3.3.1 SOFTWARE ANOVELL NETWORK 3.12@

- Software Type Network operating system.
- Functions Acts as a file server in a client/server network environment.
- Status Existing

3.3.2 SOFTWARE APASS (SCHEDULING MODULE)@

- Software Type Transit trip reservation, scheduling, and management software. The scheduling module is run on the server.
- Functions Receives reservation data from each of the reservation PC-s and uses proprietary algorithms to create schedules for vehicles and generate pick-up/drop-off manifests
- Status Existing

3.4 HARDWARE ALASER PRINTER@

- Hardware Type Hewlett-Packard plain paper laser printer
- Functions nts pick-up/drop-off manifests
nts reports from PASS system.
- Location At each service provider
- Data Type Data

3.5 HARDWARE ADISPATCHER PC@

- Hardware Type Intel based PC
- Functions Displays pick-up/drop-off manifests for each run
Accepts dispatcher input for time checks
- Location At each service provider=s dispatch facility

3.5.1 SOFTWARE ADOS@

- Software Type PC operating system
- Software Standards 16 bit DOS
- Status Existing

3.5.2 SOFTWARE APASS (DISPATCHING MODULE)@

- Software Type Transit trip reservation, scheduling, and management software. The dispatching module is run on these PC=s
- Functions splays manifests for vehicles on runs
cepts input from dispatchers for time checks
nerates predefined reports
- tatus isting
- Other This software is run basically Aoff the shelf@ without custom modifications

3.5.3 SOFTWARE APC ANYWHERE@

- Software Type PC remote control software
- Functions This software allows a user at Metro Mobility Service Center to control a PC at the service provider=s office, in effect Abecoming@ that PC, with all the LAN connections intact. Once a remote user is connected, file transfer is a simple DOS copy operation.
PC Anywhere is used to transfer PASS files that have been changed since the previous day to the Novell server at the Metro Mobility Service Center.
- Status Existing
- Recommended Improvements Metro Mobility is interested in a solution which would allow continuous real-time or near-real-time access to PASS scheduling and dispatch data at the independent service providers. No specific solution has yet been identified, but any real-time connection would probably

make this software obsolete.

3.6 HARDWARE AETHERNET HUB@

- Hardware Type Multi-port hub for Ethernet LAN
- Functions Controls network traffic
- Location At each service provider
- Data Name/Contents See above descriptions
- Data Type Data
- Status Existing

3.7 HARDWARE AMODEM@

- Hardware Type Dial-up serial communications device
- Functions Allows Metro Mobility Service Center to download data from each service provider LAN.
- Location At each service provider
- Data Name/Contents Any files which have changed from the previous day (these are identified by the file date).
- Data Type Data

3.8 HARDWARE ADISPATCH RADIO@

- Hardware Type 800 MHZ radio transmitter/receiver (part of trunked system in section 3.9)
- Functions Communications between the dispatchers and the drivers.
- Quantity Five total, one at each dispatch station plus power supply.
- Location At each service provider
- Data Name/Contents Time checks and any special information/ instructions
- Data Type Voice
- Status Existing

3.9 HARDWARE ATRUNK REPEATER@

- Hardware Type 800 MHZ leased trunked radio repeater system.
- Functions Scans, receives and rebroadcasts radio messages to and from Metro Mobility vehicles.
- Data Name/Contents Voice
- Data Type Voice
- Other Leased system

3.10 HARDWARE AIN-VEHICLE RADIO@

- Hardware Type 800 MHZ radio transmitter/receiver
- Functions Communication to/from dispatchers
- Quantity 150 units
- Location In each Metro Mobility vehicle
- Data Name/Contents Voice
- Data Type Voice
- Status Existing

3.11 HARDWARE AMODEM@

- Hardware Type Dial-up serial communications device
- Functions Data transfer from each of the service providers to the Metro Mobility Service Center.
- Location Metro Mobility Service Center, St. Paul
- Data Name/Contents Any PASS system data files which have changed since the previous day
- Data Type Data
- Status Existing

3.12 HARDWARE AINFORMATION SYSTEMS (IS) PERSONNEL PC@

- Hardware Type Intel based PC
- Functions Download data from service provider computers
in PASS reports
in Clarion programs to generate reports
- Location Metro Mobility Service Center, St. Paul
- Data Type Data
- Status Existing

3.12.1 SOFTWARE ADOS@

- Software Type PC operating system
- Software Standards 16 bit DOS
- Status Existing

3.12.2 SOFTWARE ACLARION@

- Software Type 4th generation language
- Functions Allows IS personnel to create custom programs and reports from the PASS system data
- Status Existing
- Constraints At this time only one person at Metro Mobility is able to write Clarion programs.

3.12.3 SOFTWARE APC ANYWHERE (REMOTE)@

- Software Type PC remote control software
- Functions This software allows a user at the St. Paul office to control a PC at the service provider's office, in effect becoming that PC, with all the LAN connections intact. Once a remote user is connected, file transfer is a simple DOS copy operation. PC Anywhere is used to transfer PASS files that have been changed since the previous day to the Novell server at Metro Mobility Service Center.
- Status Existing
- Recommended Improvements Metro Mobility is interested in a solution which would allow continuous real-time or near-real-time access to PASS scheduling and dispatch data at the independent service providers. No specific solution has yet been identified, but any real-time connection would probably make this software obsolete.

3.13 HARDWARE ALASER PRINTER@

- Hardware Type Hewlett Packard plain paper laser printer
- Functions Prints reports from PASS and Clarion programs
- Location Metro Mobility Service Center, St. Paul
- Data Type Data/text
- Status Existing

3.14 HARDWARE ACUSTOMER RELATIONS PERSONNEL PC@

- Hardware Type Intel based PC
- Functions Allows customer relations personnel access to vehicle logs containing pick-up/drop-off, time, customer, driver, and vehicle information.
- Location Metro Mobility Service Center, St. Paul
- Data Name/Contents See Functions
- Data Type Data
- Recommended Improvements Metro Mobility would like to make real-time information regarding vehicle run status (i.e. time and stop information) available to its customer relations personnel. This would necessitate a continuous link between the Metro Mobility Service Center and each of the service providers. There is no current plan to add this functionality.

3.14.1 SOFTWARE ADOS@

- Software Type PC operating system
- Software Standards 16 bit DOS
- Status Existing

3.14.2 SOFTWARE APASS (UNKNOWN MODULE)@

- Software Type Transit trip reservation, scheduling, and management software. A module which permits users to see the previous day's manifests with time-check information is run on these PC's
- Functions Access to manifests and time-check data for response to customer complaints/ inquiries.
- Status Existing

3.15 HARDWARE ANOVELL SERVER@

- Hardware Type Intel based network file server
- Functions Stores information gathered from service provider systems.
Makes information available to users (information system (IS) and customer relations) for reporting
- Location Metro Mobility Service Center, St. Paul
- Data Name/Contents Files received from service provider systems are in DBASE format. These tables contain pick-up/drop-off manifests, time check information from dispatchers, and revenue/finance information.
- Data Type Data
- Status Existing

3.15.1 SOFTWARE ANOVELL NETWARE 3.12@

- Software Type Network operating system.
- Functions Acts as a file server in a client/server network environment.
- Status Existing

3.15.2 SOFTWARE APASS@

- Software Type Transit trip reservation, scheduling, and management software. The scheduling module is run on these PC's
- Functions Receives reservation data from each of the reservation PC's and uses proprietary algorithms to create schedules for vehicles and generate pick-up/drop-off manifests
- Status Existing

3.16 HARDWARE AETHERNET HUB@

- Hardware Type Multiport Ethernet hub
- Functions Manages network traffic
- Location Metro Mobility Service Center, St. Paul
- Data Name/Contents Ethernet data packets/ see HARDWARE 3.15
- Data Type Data
- Status Existing

4.1 INTERFACE

- Metro Mobility customer
- Connects to ... Reservationist at service provider
- Interface Type Voice
- Interface Direction Both
- Interface Component US West voice grade telephone line
- Information Type/Content See operational scenario
- Information Direction Both
- Information Frequency As needed

4.2 INTERFACE

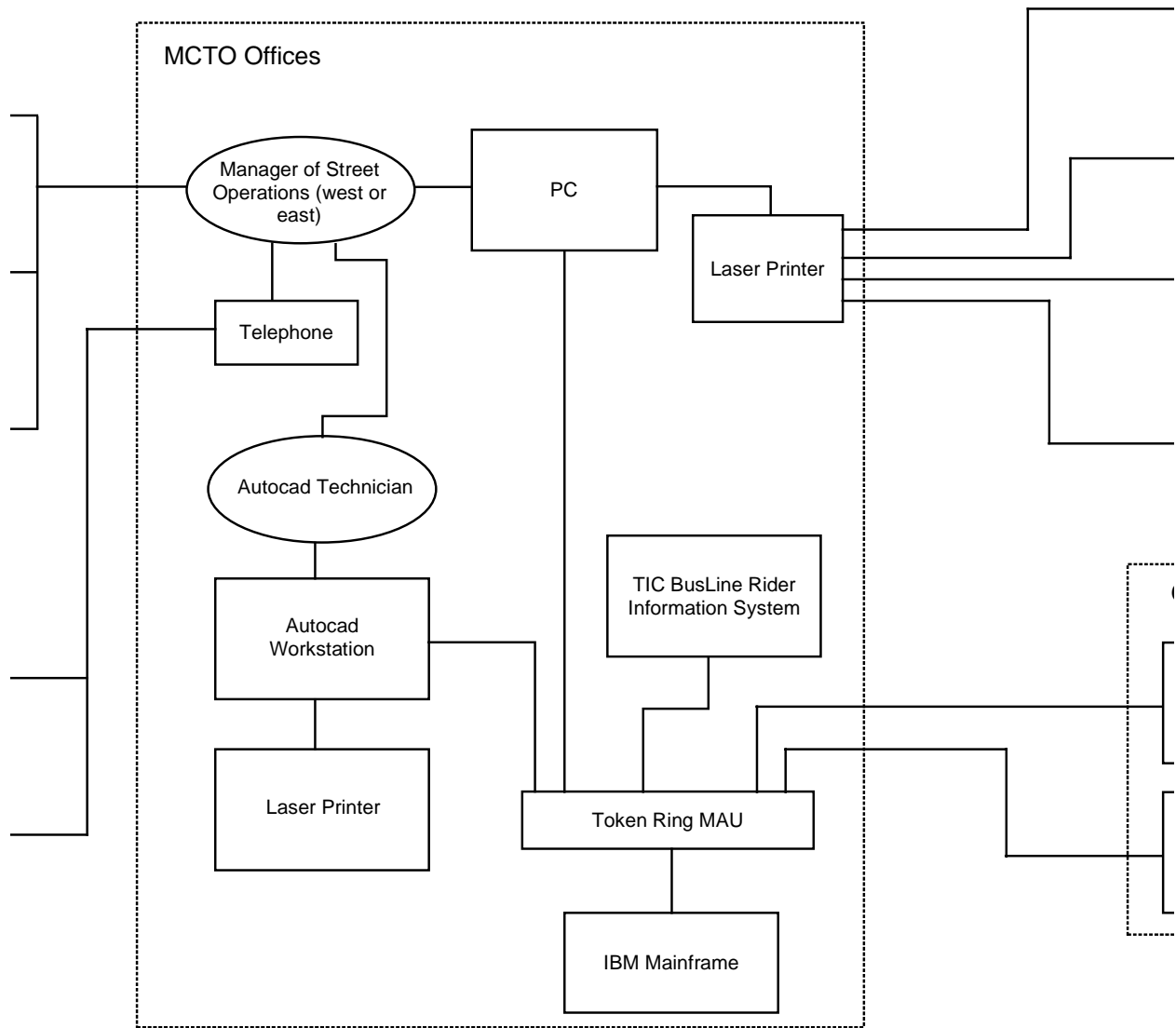
- Ethernet Hub
- Connects to ... reservation PC
Novell Server
Laser Printer
Dispatch PC
- Interface location At each service provider
- Interface Type Data
- Interface Direction Both
- Interface Component 10BaseT Ethernet
- Information Type/Content Reservation PC: Data is entered for reservations and stored on server. Server sends Asubscription@run suggestions to be offered to a customer.
Novell Server: Receives data from the reservation PC to be stored and used in the scheduling algorithms. Also receives time check data from the Dispatch PC. Novell Server sends subscription run information to the Reservation PC and sends pick-up/drop-off manifests to the Dispatch PC.
Laser Printer: PASS predefined reports and pick-up/drop-off manifests to be distributed to drivers.
Dispatch PC: Receives manifest information from the Novell Server and sends time-check information back to the Server
- Information Direction Both
- Information Frequency Continuous

4.3	INTERFACE	Dispatch (or other Novell client PC)
- Connects to ...		Modem
- Interface location		At each service provider
- Interface Type		Data
- Interface Direction		Both
- Interface Component		RS-232 Serial cable
- Information Type/Content		Any PASS (.DBF) system files that have changed from the previous day.
- Information Direction		Output
- Information Frequency		Once Daily
4.4	INTERFACE	Dispatch Radio
- Connects to ...		Trunk Repeater
- Interface Type		Voice
- Interface Direction		Both
- Interface Component		800 MHZ leased trunk radio repeater transmission
- Information Type/Content		Time checks approximately every third pick-up or drop-off. Also any special instructions or other communications.
- Information Direction		Both
- Information Frequency		As needed
4.5	INTERFACE	Trunk Repeater
- Connects to ...		Radio (in vehicle)
- Interface Type		Voice
- Interface Direction		Both
- Interface Component		800 MHZ leased trunk radio repeater transmission
- Information Type/Content		Time checks approximately every third pick-up or drop-off. Also any special instructions or other communications.
- Information Frequency		As needed
4.6	INTERFACE	Modem (at service provider)
- Connects to ...		Modem (at Metro Mobility Service Center, St. Paul)
- Interface Type		Data
- Interface Direction		Both
- Interface Component		US West voice grade telephone line
- Information Type/Content		Any PASS (.DBF) system files that have changed from the previous day.
- Information Direction		Output
- Information Frequency		Once daily

4.7	INTERFACE	Ethernet Hub
- Connects to ...		Novell Server Customer relations PC Laser Printer IS Personnel PC St. Paul office reservation/dispatch facilities
- Interface location		Metro Mobility Service Center, St. Paul
- Interface Type		Data (Ethernet data packets)
- Interface Direction		Both
- Interface Component		10BaseT Ethernet cable
- Information Type/Content		\$ Novell server \$ Receives and stores daily PASS files. updates from the IS personnel computer. \$ Sends run time-check information to customer service PC. \$ Sends manifests for drivers and PASS reports to laser printer. \$ Customer relations PC \$ Receives time check information from the Novell server \$ IS Personnel PC \$ Receives data for custom Clarion reports. \$ Sends daily PASS file updates. \$ Laser Printer \$ Prints daily manifests for drivers. \$ Prints PASS and Clarion reports for management staff
- Information Direction		Both
- Information Frequency		Continuous

3.4.7 MCTO CONSTRUCTION INFORMATION SYSTEM

Baseline Data Collection
Construction Information System



AS-IS DATA COLLECTION TEMPLATE

1.0 AGENCY AMETROPOLITAN COUNCIL TRANSIT OPERATIONS (MCTO)@

- Agency Type Public Transit Provider
- Agency Functions Plan and operate transit service within the Twin Cities Metro Area.
- Agency Location(s) 560 Sixth Av. North
Minneapolis, MN 55411-4398

2.0 SYSTEM AMCTO CONSTRUCTION INFORMATION SYSTEM@

- Date of As-Is Data Collection February 29, 1996
- Purpose
 - 1) Gather information about incidents and construction projects that may impact bus routing.
 - 2) Provide information about alternate routing to drivers and passengers.
- Geographic Coverage All MCTO Routes
- Contacts Dick Loeffler
Manager of Street Operations, West Metro
Metropolitan Council Transit Operations
560 Sixth Avenue North
Minneapolis, MN 55411-4398
(612) 349-7308 (voice)
(612) 349-7675 (fax)
- Block Diagram See attached
- Typical Operational Scenario Information enters this system from a variety of sources but generally comes from a phone contact with an agency performing construction that may affect a bus route, or an emergency service provider (fire or police) in the case of a major fire, demonstration, etc. Construction information is gathered from preconstruction meetings (when MCTO staff is invited) and from direct contact with construction contractors in the form of plan sheets of the construction project. Throughout the course of projects, MCTO staff attend weekly on-site construction progress meetings. Construction information is reported to either the east or west metro Manager of Street Operations, who, in consultation with the 22 member street operations staff, decides on appropriate bus route and service changes. Once a change in routing has been planned, the change is mapped by a technician using Autocad. If the change is not to take effect immediately, the documentation (including the map) is retained in a hard-copy clipboard system until it becomes effective. The information about the change is then entered into a mainframe computer. Once in the mainframe, information about changes is available to bus riders

through the automated TIC (documented as syetm 3.5), as well as dispatchers and other users in the MCTO garages through PC=s attached to a wide area network. Drivers are given hard-copy directions and maps of detours and hard-copy notifications called ARider Alerts@ are posted at bus stops along the route. Notices of planned route changes are also sent to the local media as press releases. Field Supervisors are notified through interoffice mail and city governments are either faxed or mailed a hard copy.

2.1 PERSONNEL AMANAGER OF STREET OPERATIONS@

- | | |
|----------------------|--|
| - Personnel Function | Oversees daily operation of transit vehicles and approves detours/route changes. |
| - Quantity | Two |
| - Location | One at Minneapolis MCTO office, one at St. Paul MCTO office. |
| - Workload | Spend roughly 50 percent of total time on route changes/detours |
| - Working hours | Regular workday (8:00am to 5:00pm) and as needed |
| - Status | Existing |

2.2 PERSONNEL ASTREET OPERATIONS STAFF@

- Personnel Function
 - 1) Attend various preconstruction and project planning meetings
 - 2) Visually inspect affected routes and identify detours/alternate routes
 - 3) Report information to Manager of Street Operations
 - 4) Place ARider Alert@ signs at bus stops
- Quantity
 - 22
- Location
 - MCTO offices
- Working hours
 - Regular working day (8:00 am to 5:00 pm)

2.3 PERSONNEL AAUTOCAD TECHNICIAN@

- Personnel Function
 - Create maps of bus detours/route changes for distribution.
- Quantity
 - 1
- Location
 - MCTO Minneapolis offices
- Working hours
 - Regular working day (8:00am to 5:00pm)
- Status
 - Existing
- Other
 - See attached example

3.1 HARDWARE ATELEPHONE@

- Hardware Type
 - Standard voice telephone
- Functions
 - Communications with emergency service providers and with anyone performing unplanned (i.e. emergency repairs) construction.
- Location
 - MCTO Minneapolis offices
- Data Name/Contents
 - Location (as a street address) and nature of construction or other obstruction that may affect bus routes
- Data Type
 - Voice
- Status
 - Existing

3.2 HARDWARE APC@

- Hardware Type
 - Intel-based personal computer
- Functions
 - The Manager of Street Operation (or one of the staff) enters a description of the planned detour/route change on a PC. It is stored on the IBM mainframe and can be printed on a laser printer for hard-copy distribution.
- Location
 - MCTO Minneapolis offices
- Data Name/Contents
 - Exact description of planned detours using street names. See attached example
- Data Type
 - Data (text)
- Status
 - Existing

3.3 HARDWARE A AUTOCAD WORKSTATION@

- Hardware Type Intel-based PC
- Functions Creates maps of the alternative routes/ detours
- Location MCTO Minneapolis offices
- Data Name/Contents .DXF files which conting a map of the route
- Data Type Data
- Policies Existing

3.4 HARDWARE ALASER PRINTER@

- Hardware Type HP Laser Jet plain paper laser printer
- Functions These printers are used for many MCTO functions. Those directly related to this system are:
 - 1) Descriptions of planned route detours for interoffice distribution
 - 2) Press releases for local media
 - 3) Maps of detours when Manager of Street Operations determines they are appropriate.
- Location MCTO Minneapolis offices
- Quantity Total unknown, but more than two
- Data Name/Contents See attached examples
- Data Type Text/graphics hard copy
- Status Existing

3.5 HARDWARE A IBM MAINFRAME@

- Hardware Type Minicomputer or mainframe
- Functions Stores information (i.e. text descriptions and maps) about current detours. Acts as a file server to PC-s on the MCTO-s Token Ring LAN, thus making this information available to a variety of users
- Location MCTO Minneapolis offices
- Data Name/Contents See attached example
- Data Type Data
- Policies Only current detours are stores on this hardware. Detours which are planned but not yet in effect are stored on a clipboard system until they become effective. This is largely because detours may be revised many times before they are actually used. Keeping planned detours physically separate from the computerized system avoids delivery of inaccurate information to drivers/riders.
- Other Very little information was available about this component. All that is known about the physical hardware is that it is an IBM computer and that it connects to other components through a Token Ring

LAN.

- 3.5.1 SOFTWARE UNKNOWN IBM MAINFRAME OPERATING SYSTEM@
- Software Type Operating system
- 3.6 HARDWARE ATIC BusLine RIDER INFORMATION SYSTEM@
- Hardware Type See system documentation 3.5 ATIC BusLine Information System@
- 3.7 HARDWARE GARAGE FACILITY LAN (GARAGE PC-S, DISPATCHERS)@
- Hardware Type No information was available about the LAN/WAN system used by the garages other than that they are able to assess information
- 3.13.1 SOFTWARE ADOS@
- Software Type Operating system on garage PC-s. No other information available
- Software Standards DOS 16-bit
- 4.1 INTERFACE Manager of Street Operations
- Connects to ...
1) City project staff at meetings
2) Special event planning staff at meetings
3) Contractors
4) On-site construction staff at weekly meetings
5) Street operations staff
- Interface Type Person to person contact
- Interface Direction Both
- Interface Component Voice/notes/other hard-copy documentation (such as maps and plan sheets)
- Information Type/Content Extent and affected areas of construction projects. This information is generally given as street addresses

4.2	INTERFACE	ione (Manager of Street Operations)
- Connects to ...		Emergency service providers Municipal public works divisions County public works divisions Mn/DOT
- Interface Type		Voice
- Interface Direction		Both
- Interface Component		Voice grade telephone line
- Information Type/Content		This interface is generally used for notification of emergency street repairs and usage. This can be fire emergencies, public demonstrations, or as a result of such mechanical problems as a water main break. All of these circumstances require immediate transit detours.
- Information Direction		Both
4.3	INTERFACE	Manager of Street Operations
- Connects to ...		Autocad Technician
- Interface location		MCTO Minneapolis offices
- Interface Type		Person to person contact
- Interface Direction		Both
- Interface Component		Text and voice
- Information Type/Content		1)Location (as street address) of construction activities or events that might disrupt transit service. 2)Estimated start and end dates of detour.
- Information Direction		Both
- Information Frequency		As needed. Mapping is only done when the Manager of Street Operations determines it is necessary.
4.4	INTERFACE	Autocad Workstation
- Connects to ...		Token Ring MAU (hub)
- Interface location		MCTO Minneapolis offices
- Interface Type		Data
- Interface Direction		Both
- Interface Component		Token Ring. Probably using twisted pair cable, but physical configuration was not available during the interview
- Information Type/Content		Autocad maps (.DXF) format to be stored on the mainframe for access by other users on the LAN/WAN
- Information Direction		Both
- Information Frequency		As needed

4.5	INTERFACE	PC-s
- Connects to ...		Token Ring MAU (hub)
- Interface location		MCTO Minneapolis offices
- Interface Type		Data
- Interface Direction		Both
- Interface Component		Token Ring. Probably using twisted pair cable, but physical configuration was not available during the interview
- Information Type/Content		Descriptions of current detours
- Information Direction		Both
- Information Frequency		As needed
4.6	INTERFACE	TIC
- Connects to ...		Token Ring MAU (hub)
- Interface location		MCTO Minneapolis offices
- Interface Type		Data
- Interface Direction		Both
- Interface Component		Token Ring. Probably using twisted pair cable, but physical configuration was not available during the interview
- Information Type/Content		See documentation for system 3.5 ATIC BusLine® system
- Information Direction		Both
- Information Frequency		As needed
4.7	INTERFACE	IBM Mainframe
- Connects to ...		Token Ring MAU (hub)
- Interface location		MCTO Minneapolis offices
- Interface Type		Data
- Interface Direction		Both
- Interface Component		Token Ring. Probably using twisted pair cable, but physical configuration was not available during the interview
- Information Type/Content		This interface carries all types of data concerning detours, including: Maps of detours Text descriptions of detours Any special messages for MCTO staff regarding detours (e-mail)
- Information Direction		Both
- Information Frequency		As needed

4.8 INTERFACE

- Connects to ...
- Interface location
- Interface Type
- Interface Direction
- Information Direction
- Information Frequency
- Other

Garage PC

Token Ring MAU (hub)

MCTO Minneapolis offices

Data

Both

Both

As needed

Details regarding connections to external systems (those not located at the MCTO Minneapolis Office) were not available through the interview. Through information gathered while surveying other MCTO systems, it appears that each of the four external garages have their own LANs, so it is likely that there is some type of bridge in use between these systems and the MCTO Minneapolis office. However, no specific information was available about how these systems communicate with each other, only that information stored on the IBM Mainframe was available at remote locations through PC access.

4.9 INTERFACE

- Connects to ...
- Interface location
- Interface Type
- Interface Direction
- Information Direction
- Information Frequency
- Other

Dispatch PC-s

Token Ring MAU (hub)

MCTO Minneapolis offices

Data

Both

Both

As needed

Details regarding connections to external systems (those not located at the MCTO Minneapolis office) were not available through the interview. Through information gathered while surveying other MCTO systems, it appears that each of the four external garages have their own LANs, so it is likely that there is some type of bridge between these systems and the MCTO Minneapolis office. However, no specific information was available about how these systems communicate with each other, only that information stored on the IBM Mainframe was available at remote locations through PC access. There may be additional information regarding this interface under System 3.1 ATrapeze Scheduling Planning System@

4.10	INTERFACE	TIC BusLine System
- Connects to ...		Passengers
- Interface Type		Voice
- Interface Direction		Both
- Interface Component		Voice grade telephone line
- Information Type/Content		Locations and schedules of alternate bus stops during detours
- Information Direction		Both
- Information Frequency		As needed
- Other		See system documentation 3.5 ATIC BusLine Information System@
4.11	INTERFACE	Laser Printers
- Connects to ...		Press/Media (local newspapers and television/radio stations),City Governments
- Interface Type		Hard-copy text and graphics
- Interface Direction		Output
- Interface Component		USPS Mail Service
- Information Type/Content		Press releases containing the location of detours and alternate bus stops stop times. This information is released as maps and text.
- Information Direction		Output
- Information Frequency		As needed
4.12	INTERFACE	Laser Printer
- Connects to ...		Field Supervisors
- Interface Type		Hardcopy text and graphics
- Interface Direction		Output
- Interface Component		Interoffice mail
- Information Type/Content		See attached examples. Any special information not included in the attached examples may be included as text
- Information Direction		Output
- Information Frequency		As needed

4.13 INTERFACE

- Connects to ...
- Interface Type
- Interface Direction
- Interface Component

- Information Type/Content

- Information Direction
- Information Frequency
- Other

Laser Printer
Rider Alert Cards
Printed cards
Output
Physically carried to bus stops and placed on busses operating on affected routes.
Locations of alternate bus stops during detours (given as street addresses)
Output
As needed
These are the direct communications to passengers regarding route changes/detours. Approximately 18,000 Rider Alert Cards are photocopied and hand placed at bus stops and on busses annually. This is a very labor intensive part of this system.

4.15 INTERFACE

- Connects to ...
- Other

Dispatcher PC=s
Drivers
See additional information regarding this interface under System 3.1 ATrapeze Scheduling Planning System@

APPENDIX A

As-Is Agency Reports Pre-Survey Candidate Systems List

PRE-SURVEY CANDIDATE SYSTEMS

Traffic Signal Control Systems

- City of St. Paul Computran traffic signal control system
- City of St. Paul traffic signal intersection hardware (field equipment)
- City of Minneapolis Fortran traffic signal control system
- Mn/DOT Metro Division/District traffic office closed loop traffic signal system(s)
- County closed loop traffic signal systems (Hennepin, Ramsey, etc.)
- City closed loop traffic signal systems
- Video detection/control of signal system (T.H. 65 & 53rd, Lyndale and Franklin Ave)
- Pre-emption of traffic signals for emergency vehicles (EVP)
- Pre-emption of traffic signal at fire stations
- Pre-emption of traffic signals at railroad crossings (20 locations in Metro area)
- Minneapolis AUSCI operational test

Freeway Management System

- Mn/DOT TMC ramp meter system
- Mn/DOT TMC video surveillance system
- Mn/DOT TMC CMS control system
- KBEM radio broadcast system
- Mn/DOT TMC cable TV information system - (Triple Vision system)
- Mn/DOT Metro Division/District portable changeable message signs
- TMC traffic history database (volume and occupancy data)
- TMC incident log database
- U of M Autoscope incident detection system
- Genesis operational test
- Trilogy operational test
- Mn/DOT workzone traffic management system operational test

Transit Management Systems

- MCTO "Trapeze" scheduling/planning system (creates bus/driver schedules)
- MCTO "radio" system (computer assisted radio system, 7 channels)
- MCTO automatic passenger counters (on some buses)
- MCTO electronic fare collection boxes (on all buses)
- MCTO TIC BusLine system (voice responses system, customer service system)
- MCTO customer service system for route/schedule planning (live telephone operators)
- MCTO transportation section (provides construction information to MCTO)
- MCTO bus stop database (contains the attributes of each bus stop)
- MCTO Police crime/incident tracking system
- MCTO Opticom emitters (EVP on 80 buses)
- MCTO speed light system (ramp meter pre-emption on selected ramps)
- MCTO Route-O-Matic system - vectors around incidents and congestion
- Metropolitan Council Rideshare system (Mn dial-a-ride)
- MCTO funded paratransit systems
- Metropolitan Council Metro Mobility passenger registration system
- Metropolitan Council Metro Mobility passenger reservation system
- U of M transit management
- Southwest Transit
- Minnesota Valley Transit
- Plymouth Metrolink
- School bus dispatch systems

Incident Management Program

- Mn/DOT TMC Highway Helper program (including AVL system)
- Private tow contracts
- U of M police incident management
- St. Paul DIVERT operational test

Electronic Fare Payment Systems

- City of Minneapolis Parking fare collection (smart card)
- City of Minneapolis electronic parking meter maid system

Smart Darts operational test

PRE-SURVEY CANDIDATE SYSTEMS (CONTINUED)

Electronic Toll Collection Systems

- Toll road proposals (5 proposals in MN)
- Congestion Pricing Study
- Mileage based tax study

Multi modal Traveler Information Systems

- Travlink operational test

Administrative Systems

- Mn/DOT Electrical Services maintenance management system
- Mn/DOT Electrical Service gopher state one-call access system
- Mn/DOT TIS
- Mn/DOT automatic traffic recorder system
- Mn/DOT ISTEAM management systems
- Mn/DOT CVO administrative systems
- DPS CVO administrative systems
- City of Minneapolis sign database

Other Information Systems

- Airline flight arrival/departure information - NW
- Airport rental car kiosk - Hertz
- MN Office of Tourism travel information center kiosks
- Mn/DOT TMC road weather information system access
- Mn/DOT Metro Division weather information access
- Mn/DOT Aeronautics weather information system
- Mn/DOT statewide road weather information telephone information
- Mn/DOT Pavement Condition and Weather Reporting System - future
- Internal distribution system Distribution of TMC loop data via the Internet
- RWIS - Mn/DOT future Road/Weather Information System

Emergency Response Systems

- Motorist call box system
- Mobile Data Terminals (MDT) in all State Patrol cars
- Laptop PC's in State Patrol cars to replace MDT's - pilot project in 1996
- Emergency 911 log system at State Patrol
- State Patrol information desk
- State Patrol South St. Paul information desk
- State Patrol access to drivers license information. via 911 center
- Mn/DOT Mayday operational test
- Demand response dispatch systems - numerous standalone systems

Parking Management Systems

- Metropolitan airports commission parking management
- City of Minneapolis parking management systems
- U of M parking management
- St. Paul Advanced Parking Information System operational test

Miscellaneous

- Mn/DOT portable traffic management system
- City of Minneapolis police special event management
- City of St. Paul special event management
- U of M special event management
- Mn/DOT pilot differential GPS broadcast base station
- Mn/DOT maintenance vehicle AVL
- Mn/DOT Metro Division/District maintenance dispatch
- Hennepin County Medical Center emergency vehicle dispatch
- MN Pollution Control Agency air quality monitoring sites
- Met. Council Forecasting models - uses data from Mn/DOT TIS database
- U of M traffic management system proposal

Interagency Systems

- ICTM - Integrated Corridor Traffic Management System operational test (includes Autoscope)
- ARCTIC - operational test in Virginia, MN

PRE-SURVEY CANDIDATE SYSTEMS (CONTINUED)

CVO Systems

- List of systems from MN Guidestar

- CVO call-in number

- State Patrol toll free Information number

Construction Information/Notification Systems

- Gopher State One Call system for utility locations

- Mn/DOT construction information dissemination

- Counties' systems (Hennepin County)

- Counties' systems (Ramsey County)

- City system (Minneapolis)

- City system (St. Paul)

- Utilities' systems

Communications Systems

- Mn/DOT TMC Fiber optic data communications system

- Mn/DOT Microwave Communication System

- Mn/DOT T1 system

- Mn/DOT Wide Area Network

- MNET (STARS)

- Voice radio - State Patrol, Mn/DOT Maintenance, DNR

- 800 MHZ Trunked Radio system (Metro area)

- Internet Communications

- Traffic Signal Interconnect systems

- RBDS - Radio Broadcast Data Systems

- Mn/DOT Video Conferencing

APPENDIX B

As-Is Agency Reports Data Collection Guide

APPENDIX C

As-Is Agency Reports
System Documentation Attachments