Standards Requirements Packages Abstract: Information Service Provider to Traffic Management Subsystem and Information Service Provider to Transit Management Subsystem

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Prepared by the
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US Department of Transportation
Washington, D. C. 20590

For MDI team consideration in developing common ISP-TMS and ISP-TRMS interfaces.

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The diagram which follows shows the ISP, TMS and TRMS subsystems, with the architecture flows between them (not showing TMS to TRMS flows) as defined in the current version of the National Architecture. In the following sections, the sequences of messages (or "transaction sets") used to implement information transfer services will be presented. Also shown is how the architecture flows hierarchically decompose into more primitive logical information flows.

Finally, a subset of the National Architecture Data Dictionary is included with definitions of each of the logical flows named in the previous sections. An alternative way to decompose any specific flow to its logical primitives in the data dictionary is to use the National Architecture browsing web site:

http://www.rockwell.com/itsarch/

Please contact me if you have any problems using the website. Many people, including many of us on the National Architecture team, use the web site regularly and find it far preferable to the paper documentation.

The preparation of this document was motivated based on an exchange of email between myself and Steve Dellenback, South West Research Institute (SWRI) of the San Antonio MDI Team, where the idea was raised of "what does the NA have to say about these interfaces, in a concise way" (or something like that). This is a first cut.

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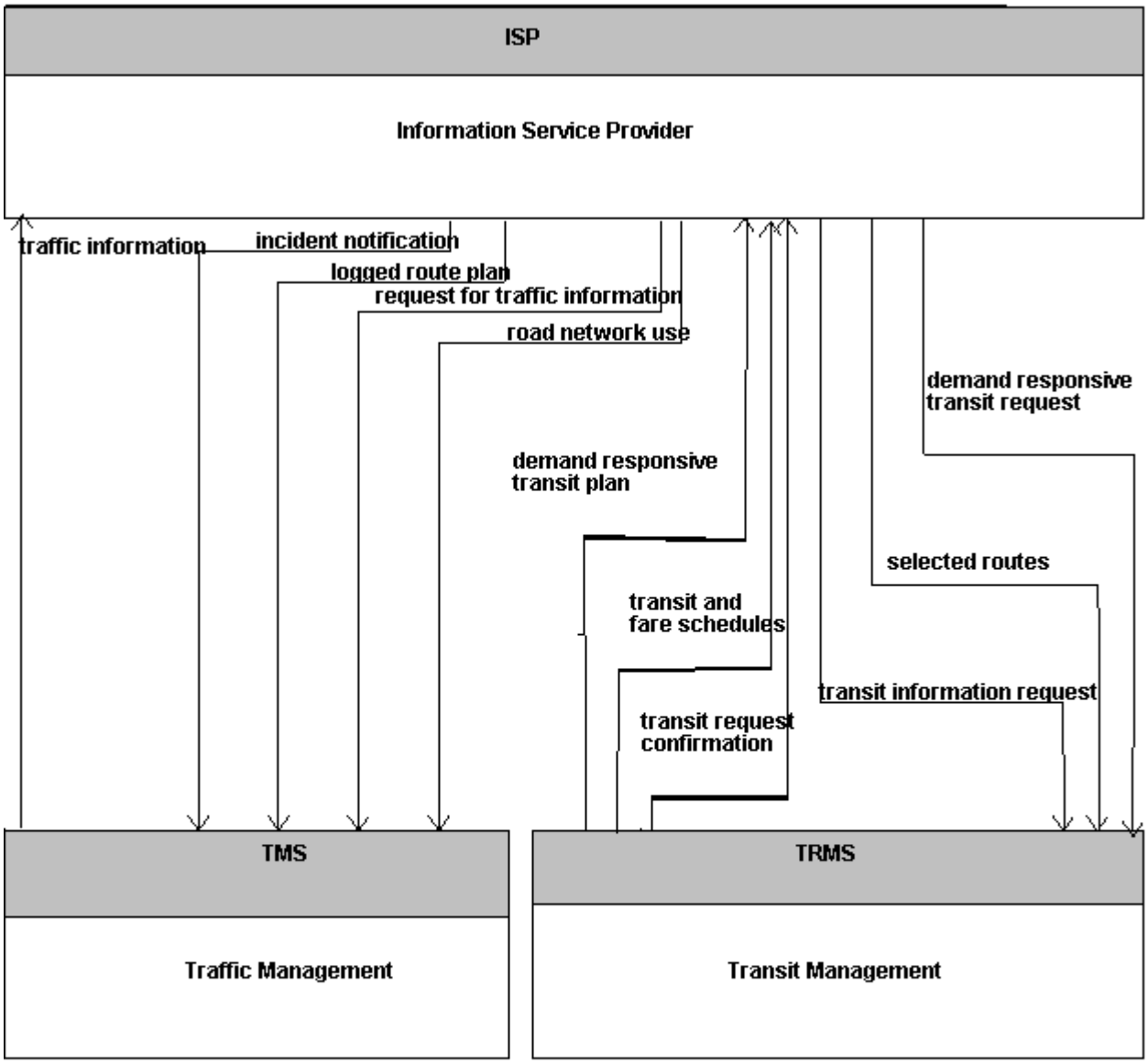

Figure 1 . Information Service Provider to Traffic/Transit Management Subsystem Architecture Flows

2. Transaction Sets for the TMS to ISP and TMS to TRMS Interfaces

In this section we define the transaction sets needed to accomplish the TMS to ISP. A message sequence chart format along the lines of those defined under ISO standardization is used for clarity of presentation. The following subsections discuss the interactions between the TMS and the ISP.

The transaction set figures used in this chapter identify the messages that go between the TMS and the ISP. Where messages follow each other top to bottom, they represent a transaction sequence or protocol. Where messages are separated by a horizontal dotted line, the messages are distinct, and not related in any particular

sequence. Notes to the right of the messages or in some cases groups of messages amplify on details of the message protocols and sometimes a number in a circle identifies a following numbered section in the text which also describes the particular message or message sequence function . Most of the messages shown are physical architecture flows. Occasionally , in order to better explain the functionality the logical architecture dataflows are used. These will be printed in italics to distinguish them from the physical flows.

2.1. Traffic Management Subsystem to Information Service Provider Subsystem

The message transaction sets for this interface are shown in Figure 2 . .

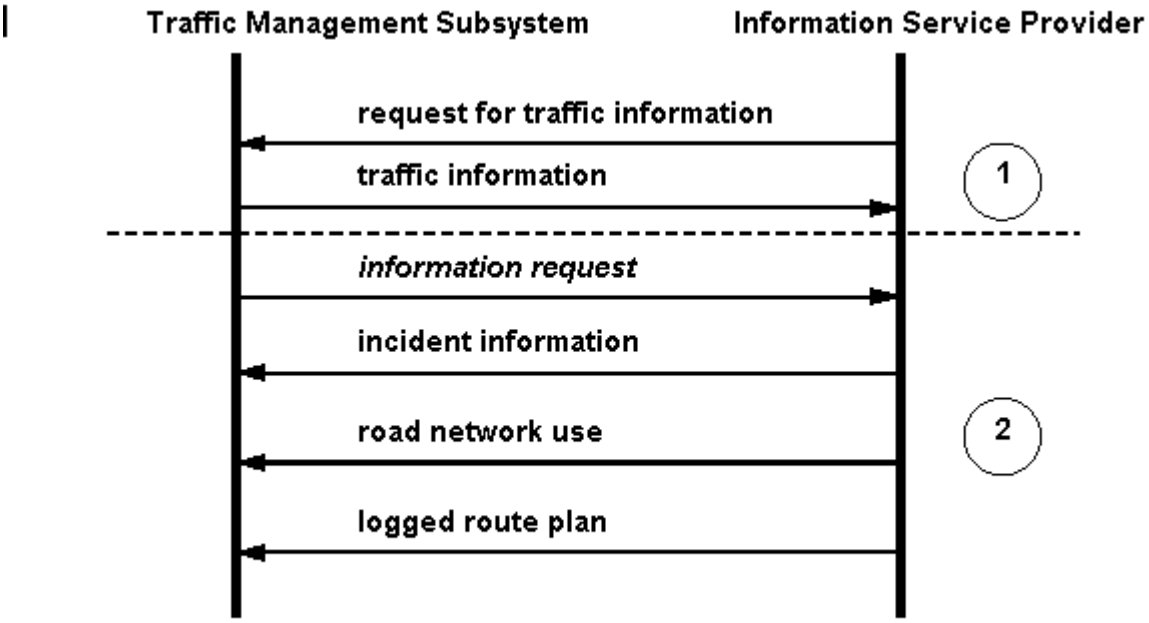

Figure 2 . TMS to ISP Transaction Sets

The architecture describes the following transaction sets for this interface.

1. The ISP makes a request for traffic information and the TMS provides traffic information. This information can include current network state, predicted network state, or specific incident information. It is also possible for the TMS to send traffic information on a periodic basis (or even a continuous basis) to the ISP (not at the response to a specific request).

2. The TMS can request data of the ISP (there is no separate ' information request' physical architecture flow- the logical flows are contained within the physical flow 'traffic information'), or the ISP can send the data periodically to the TMS. The following types of data are sent by the ISP to the TMS:

a) Incident information (obtained from its users, or from the media). The National Architecture has interfaces to the Media through the ISP (See the Standards Package on ISP to Other Centers for complete description of this interface.)

b) Road network use: Information about the road network, and the travelers on the network (not about any specific traveler, but about levels of usage of the various parts of the network). This can include results of independent ISP network surveillance through information gathered by vehicles acting as probes. Also included in this category is information the ISP has as a travel information repository, such as toll, parking, and transit prices.

c) Actual vehicle routes (logged route plan). In recognition of advanced coordinated traffic management

concepts, the National Architecture includes the capability for the ISP to pass individual routes to the TMS for information (in the case of HAZMAT routes) or for priority treatment in the system.

2.2. Transit Management Subsystem to Information Service Provider

For clarity in the message transaction sets for the ISP to Transit Management (TRMS) Subsystem shown in Figure 3 . and continued in Figure 4 . , sometimes the physical flow is further specified as the relevant high level logical architecture flow component for a particular transaction.

1. Demand Responsive Transit (formerly known as ‘‘Paratransit") Information and Reservations.
The ISP acts as an ‘‘agent" for a traveler to iterate on identifying an acceptable demand responsive route, and then assists the traveler in confirming that selected route with the TRMS.

2. ISP requests Transit Prices for the entire transit schedule from TRMS. Used for trip planning and advisories.

3. Enable ‘‘reserved seating" services, e.g. for demand responsive transit, to be purchased from parking or toll facilities.

4. Enable transit users on transit vehicles to make parking and other reservations.

5. Enable ‘‘reserved seating" services, e.g. for demand responsive transit, to be purchased from vehicles.

6. ISP requests Transit Services and timings for the entire transit schedule from TRMS. Used for trip planning and advisories.

7. TRMS provides a custom transit route in response to a specific origin/destination request from the ISP.

8. Sending schedule deviations from the TRMS to the ISP:

• The TRMS notifies the ISP that there is a change in the transit deviations database at the TRMS, indicating a change in schedule for one or more vehicles in the transit network.

• Then the ISP may decide to request (and can do this at any time) the deviation details.

• In response, the TRMS sends the ISP the deviation details.

9. The TRMS notifies the ISP of a transit emergency with details.

10. The TRMS notifies the ISP of a transit incident with details.

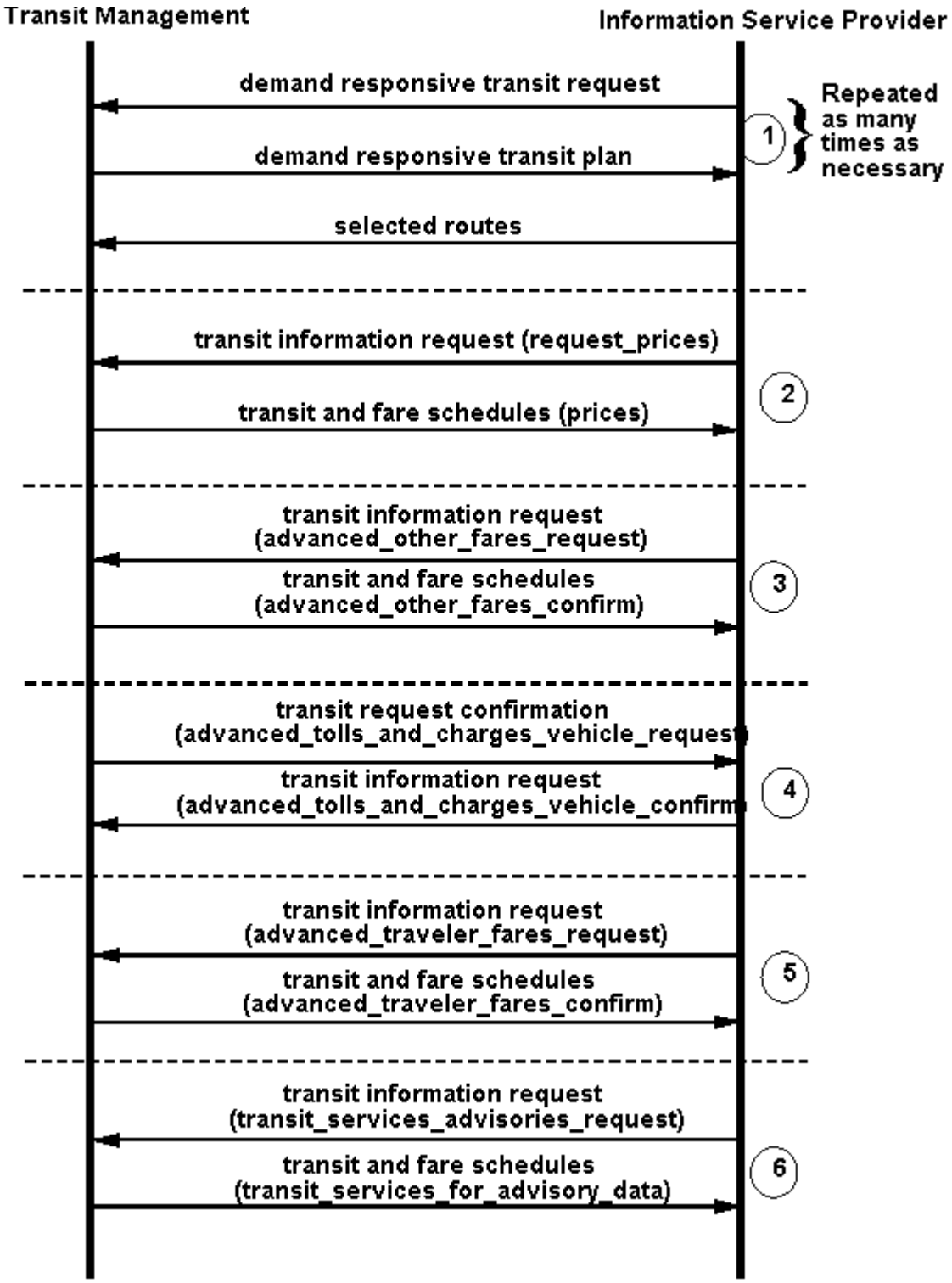

Figure 3 . Transit Management Subsystem and ISP Transaction Sets

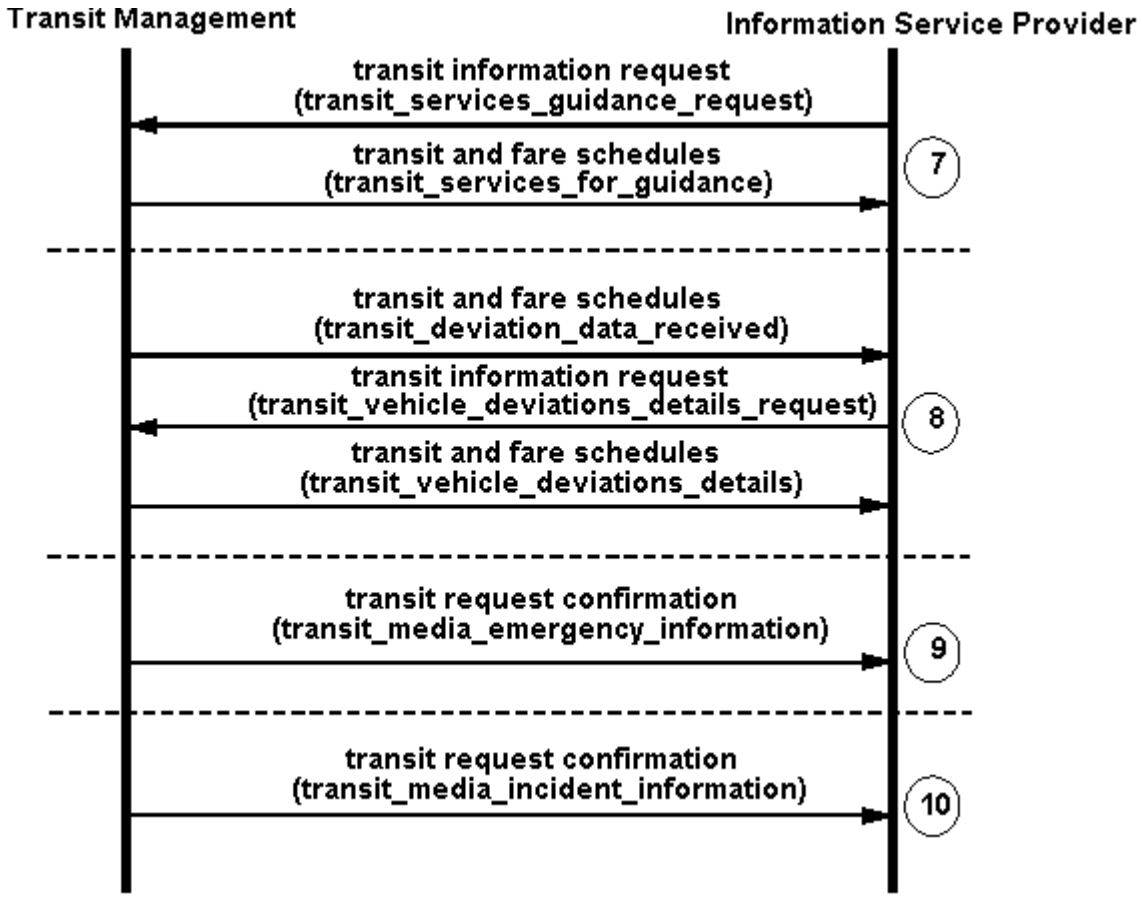

Figure 4 . Transit Management Subsystem and ISP Transaction Sets Continued

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3. Interface Decomposition

This section shows the interface decomposition for the interfaces covered in this package. The format shows the interface followed by the first physical architecture data flow in the interface and its description. Each of the physical architecture flows is then decomposed into its constituent logical architecture data flows, which in turn are decomposed until we reach primitive data elements. (The hierarchy is carried down 5 levels. In some instances this does not extend to the primitive elements. In these cases the remaining decomposition can be found by referring to the data dictionary.) The logical architecture data flows are numbered and indented to indicate which are top level flows (1) and which are constituent data flows (numbered 2 and lower). The description of the top level logical architecture flows is given. The full data dictionary entry for the top level flows and for all the constituent flows is given in Section That section contains the data dictionary entries, listed in alphabetical order, for all of the logical data flows contained in this package. (Hence it represents a focussed subset of the entire National Architecture Data Dictionary).

3.1. Information Service Provider -> Traffic Management

Physical Architecture Flow: incident notification W

Notification by a motorist of an incident on the roadway through emergency network

Logical Architecture Flows:

(1) ***confirm_incident_data_output***

This data flow is used within the Manage Traffic function to confirm output of previously requested incident data by the Media System.

(1) ***media_incident_data_updates***

This data flow is used within the Manage Traffic function. It contains changes to the data about incidents in the current or predicted incidents data stores, which have been input by the Media Operator. It consists of one of the following data items each of which is defined in its own DDE:

(2) ***current_incidents_data***

(3) ***incident_duration***

(4) ***duration***

(3) ***incident_location***

(4) ***location_identity***

(3) ***incident_severity***

(3) ***incident_start_time***

(4) ***time***

(3) ***incident_traffic_impact***

(3) ***incident_type***

(2) ***predicted_incidents_data***

(3) ***list_size***

(3) ***predicted_incident_details***

(4) ***incident_duration***

(5) ***duration***

(4) ***incident_location***

(5) ***location_identity***

(4) ***incident_severity***

(4) ***incident_start_time***

(5) ***time***

(4) ***incident_traffic_impact***

(4) ***incident_type***

Physical Architecture Flow: logged route plan W

Route plan which may be used for demand management or optimal routing

Logical Architecture Flows:

(1) ***logged_hazmat_route***

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Traffic function. It contains details about an route that has been requested by a commercial vehicle that is carrying cargo which could be viewed as being liable to cause a potential incident. Loads falling into this category are those containing hazardous (HAZMAT) material, or those which are outsize, e.g. wide, heavy, or fragile and hence slow moving. The data flow is derived from the route that has been produced for the commercial vehicle and consists the following items each of which is defined in its own DDE:

(2) ***hazmat_load_data***

(2) ***list_size***

(2) ***route_segment_end_point***

(3) ***location_identity***

(2) ***route_segment_estimated_arrival_time***

(2) ***route_segment_estimated_travel_time***

(2) ***route_segment_identity***

(3) ***location_identity***

(3) ***route_segment_type***

(3) ***unit_number***

(2) ***route_segment_start_point***

(3) ***location_identity***

(1) ***low_traffic_route***

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Traffic function. It is a special form of route similar to an emergency vehicle route, but for use by other vehicles when traffic volumes are low, e.g. in the early hours of the morning and is used to trigger a special green wave route for the vehicle. The traffic volume in the road network which will allow this type of route to be used is set in the static data. This flow contains the items shown below each of which is defined in its own DDE:

(2) ***route***

(3) ***route_cost***

(3) ***route_list***

(4) ***route_segment_number***

(3) ***route_segment***

(4) ***route_segment_data***

(5) ***route_segment_description***

(5) ***route_segment_end_point***

(5) ***route_segment_estimated_arrival_time***

(5) ***route_segment_estimated_condition***

(5) ***route_segment_estimated_travel_time***

(5) ***route_segment_predicted_weather***

(5) ***route_segment_report_position_points***

(5) ***route_segment_start_point***

(4) ***route_segment_identity***

(5) ***location_identity***

(5) ***route_segment_type***

(5) ***unit_number***

(4) ***route_segment_mode***

(3) ***route_start_time***

(4) ***date***

(4) ***time***

(3) ***route_statistics***

(2) ***vehicle_identity***

Physical Architecture Flow: request for traffic information W

Request issued to agency which collects traffic data for traffic conditions

Logical Architecture Flows:

(1) ***current_transit_routes_use***

This data flow is used within the Provide Driver and Traveler Services and Manage Traffic functions. It contains data showing the numbers of travelers using all or part of the available transit routes, either for personal guidance or as part of trip requests. The data flow consists of the following data items each of which is defined in its own DDE:

(2) ***list_size***

(2) ***transit_route_current_use***

(2) ***transit_route_number***

(1) ***request_incident_media_data***

This data flow is used within the Manage Traffic function to request incident data for output to the Media Operator, or to the Media System. The request must specify whether the data to be output to the Media Operator

should include current or predicted incident data, or any combination of the two, or data about a particular incident in the case of output to the Media System. The request for output must also include the geographic area(s) to be covered.

(1) ***traffic_data_media_request***

This data flow is used within the Manage Traffic function and contains a request for particular data to be retrieved from the stores of long term and current traffic data. This data will be used by the media as the basis for output that it generates.

Physical Architecture Flow: road network use W

Aggregated OD data from clients for planning purposes. Also information about the road network collected by probe surveillance.

Logical Architecture Flows:

(1) ***current_other_routes_use***

This data flow is used within the Provide Driver and Traveler Services function and contains data about the non-vehicle portion(s) of routes that have been requested by travelers. These route portions will involve the use of modes such as cycling, walking, etc. The data will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments), and consists of the following data items each of which is defined in its own DDE:

(2) ***route_segment_guided_travelers***

(2) ***route_segment_identity***

(3) ***location_identity***

(3) ***route_segment_type***

(3) ***unit_number***

(2) ***route_segment_journey_time***

(2) ***route_segment_total_number***

(1) ***current_road_network_use***

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Traffic function. It contains information about how many vehicles are being guided down each route segment and the average journey time for each route segment provided by guided vehicles. The data will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments), and consists of the following data items each of which is defined in its own DDE:

(2) ***route_segment_identity***

(3) ***location_identity***

(3) ***route_segment_type***

(3) ***unit_number***

(2) ***route_segment_journey_time***

(2) ***route_segment_total_number***

(2) ***route_segment_use_prediction***

(3) ***route_segment_guided_vehicles***

(1) ***current_transit_routes_use***

This data flow is used within the Provide Driver and Traveler Services and Manage Traffic functions. It contains data showing the numbers of travelers using all or part of the available transit routes, either for personal guidance or as part of trip requests. The data flow consists of the following data items each of which is defined in its own DDE:

(2) ***list_size***

(2) ***transit_route_current_use***

(2) ***transit_route_number***

(1) ***parking_lot_charge_details***

This data flow is sent from the Provide Electronic Payment Services function to the Manage Traffic function and contains the prices being charged by each parking lot for each of its spaces, together with the time and date for which they apply.

(2) ***parking_lot_charge_application_time***

(2) ***parking_lot_identity***

(3) ***location_identity***

(3) ***unit_number***

(2) ***parking_lot_price***

(2) ***vehicle_type_for_charges***

(1) ***toll_price_details***

This data flow is sent from the Provide Electronic Payment Services function to the Manage Traffic function and contains the price for each road segment to which a toll applies, with the time and date for when it applies. This data will be used by the Manage Travel Demand facility in its efforts to re-distribute travel demand to the more efficient providers. The data flow consists of the following data items each of which is defined in its own DDE:

(2) ***toll_price***

(2) ***toll_price_application_time***

(2) ***toll_segments***

(3) ***list_size***

(3) ***toll_segment_identity***

(4) ***unit_number***

(2) ***vehicle_type_for_tolls***

(3) ***cv_tag_data***

(4) ***cv_carrier_number***

(4) ***cv_driver_number***

(4) ***cv_vehicle_number***

(3) ***cv_vehicle_characteristics***

(4) ***cv_vehicle_configuration***

(4) ***cv_vehicle_size***

(4) ***cv_vehicle_weight***

(3) ***vehicle_identity***

(3) ***vehicle_type***

(1) ***transit_fare_details***

This data flow is sent from the Provide Electronic Payment Services function to the Manage Traffic function and contains details of the fares being currently charged for transit services. It consists of the following data items each of which is defined in its own DDE:

(2) ***list_size***

(2) ***transit_route_number***

(2) ***transit_route_segment_list***

(3) ***link_identity_list***

(4) ***link_identity***

(5) ***link_type***

(5) ***location_identity***

(5) ***unit_number***

(4) ***list_size***

(3) ***list_size***

(3) ***transit_route_segment_cost***

(3) ***transit_route_segment_number***

(2) ***transit_route_use_time***

(2) ***transit_user_category***

3.2. Traffic Management -> Information Service Provider

Physical Architecture Flow: traffic information W

Congestion, pricing, and incident information

Logical Architecture Flows:

(1) ***current_highway_network_state***

This data flow is sent by the Manage Traffic function to the Provide Driver and Traveler Services function and contains data about traffic conditions on links in the road network served by the function. The data is used by the route selection and guidance processes in determining the best vehicle routes. It consists of the following data items each of which is defined in its own DDE:

(2) ***link_delay***

(2) ***link_identity***

(3) ***link_type***

(3) ***location_identity***

(3) ***unit_number***

(2) ***link_journey_time***

(2) ***list_size***

(1) ***current_road_network_state***

This data flow is sent by the Manage Traffic function to the Provide Driver and Traveler Services function and contains data about traffic conditions on links in the highway network served by the function. The data is used by the route selection and guidance processes in determining the best vehicle routes. It consists of the following data items each of which is defined in its own DDE:

(2) ***link_delay***

(2) ***link_identity***

(3) ***link_type***

(3) ***location_identity***

(3) ***unit_number***

(2) ***link_journey_time***

(2) ***list_size***

(1) ***incident_data_output***

This data flow is used within the Manage Traffic function and contains incident data that is to be output by the Media System. This data will cover a particular current or predicted incident, rather than the output of more general incident information, as the Media System is expected to be something similar to the current Highway Advisory Radio (HAR) systems. The data must also specify the part(s) of the Media System that are to output the data so that it can be directed to the appropriate areas.

(1) ***link_data_for_guidance***

This data flow is sent from the Manage Traffic function to the Provide Driver and Traveler Services function. It contains data for use in determining which other ISP(’s) must be contacted to obtain data about roads and highways in geographic area(s) outside that served by the local function. It consists of the following data items each of which is defined in its own DDE:

(2) ***link_attributes***

(2) ***link_identity***

(3) ***link_type***

(3) ***location_identity***

(3) ***unit_number***

(2) ***link_ISP_identity***

(2) ***list_size***

(1) ***predicted_incidents***

This data flow is used within the Manage Traffic function and contains details of known incidents due to take place in the future. It contains the following data items each of which is defined in its own DDE:

(2) ***incident_description***

(2) ***incident_location***

(3) ***location_identity***

(2) ***incident_severity***

(2) ***incident_traffic_impact***

(2) ***incident_type***

(2) ***list_size***

(1) ***prediction_data***

This data flow is used within the Manage Traffic function and is also sent by that function to the Manage Transit and Provide Driver and Traveler Services function. It contains output from the predictive model process showing predictions of traffic data for route segments on the road and highway network served by the Manage Traffic function. The data flow consists of the following items each of which is defined in its own DDE:

(2) ***list_size***

(2) ***route_segment_identity***

(3) ***location_identity***

(3) ***route_segment_type***

(3) ***unit_number***

(2) ***route_segment_occupancy_predictions***

(2) ***route_segment_queue_delay_predictions***

(2) ***route_segment_volume_delay_predictions***

(1) ***retrieved_incident_media_data***

This data flow is used within the Manage Traffic function and contains incident data for output to the Media Operator. It contains one or more of the following data items each of which is defined in its own DDE:

(2) ***current_incidents_data***

(3) ***incident_duration***

(4) ***duration***

(3) ***incident_location***

(4) ***location_identity***

(3) ***incident_severity***

(3) ***incident_start_time***

(4) ***time***

(3) ***incident_traffic_impact***

(3) ***incident_type***

(2) ***defined_responses_data***

(3) ***incident_info_template***

(3) ***incident_type***

(3) ***planned_incident_response***

(4) ***agency_incident_response_procedures***

(4) ***traffic_control_strategy_alterations***

(4) ***vms_displays***

(3) ***traffic_impact_criteria***

(2) ***predicted_incidents_data***

(3) ***list_size***

(3) ***predicted_incident_details***

(4) ***incident_duration***

(5) ***duration***

(4) ***incident_location***

(5) ***location_identity***

(4) ***incident_severity***

(4) ***incident_start_time***

(5) ***time***

(4) ***incident_traffic_impact***

(4) ***incident_type***

(1) ***traffic_data_for_media***

This data flow is used within the Manage Traffic function. It contains the response to a request for particular data to be retrieved from the stores of current, long term and predictive model data. This data will be used as the basis for traffic information data that is provided to other ITS functions. The data flow consists of the following data items each of which is defined in its own DDE:

(2) ***current_data_for_media***

(3) ***current_incident_data***

(4) ***current_incident_details***

(5) ***incident_description***

(5) ***incident_duration***

(5) ***incident_location***

(5) ***incident_severity***

(5) ***incident_start_time***

(5) ***incident_traffic_impact***

(5) ***incident_type***

(4) ***list_size***

(3) ***current_other_routes_use***

(4) ***route_segment_guided_travelers***

(4) ***route_segment_identity***

(5) ***location_identity***

(5) ***route_segment_type***

(5) ***unit_number***

(4) ***route_segment_journey_time***

(4) ***route_segment_total_number***

(3) ***parking_lot_storage_data***

(4) ***list_size***

(4) ***parking_lot_current_occupancy***

(5) ***parking_lot_calculated_occupancy***

(5) ***parking_lot_identity***

(4) ***parking_lot_identity***

(5) ***location_identity***

(5) ***unit_number***

(4) ***parking_lot_state***

(3) ***traffic_flow_state***

(4) ***current_ramp_state***

(4) ***current_road_network_use***

(5) ***route_segment_identity***

(5) ***route_segment_journey_time***

(5) ***route_segment_total_number***

(5) ***route_segment_use_prediction***

(4) ***current_roadway_network_data***

(5) ***current_highway_network_data***

(5) ***current_road_network_data***

(4) ***hov_lane_data***

(5) ***hov_lane_vehicle_count***

(5) ***hov_lane_violation_count***

(5) ***list_size***

(4) ***link_data_from_tags***

(5) ***link_journey_time***

(5) ***link_queue_time***

(5) ***list_size***

(3) ***wide_area_pollution_data***

(4) ***list_size***

(4) ***pollution_state_area_collection***

(5) ***current_carbon_monoxide_pollution***

(5) ***current_hydrocarbon_pollution***

(5) ***current_nitrous_oxide_pollution***

(5) ***current_ozone_pollution***

(5) ***current_particulate_pollution***

(5) ***current_pollution_location***

(5) ***current_sulfur_dioxide_pollution***

(4) ***pollution_state_roadside_collection***

(5) ***current_carbon_monoxide_pollution***

(5) ***current_hydrocarbon_pollution***

(5) ***current_nitrous_oxide_pollution***

(5) ***current_ozone_pollution***

(5) ***current_particulate_pollution***

(5) ***current_roadside_pollution_location***

(5) ***current_sulfur_dioxide_pollution***

(2) ***long_term_data_for_media***

(3) ***current_incident_data***

(4) ***current_incident_details***

(5) ***incident_description***

(5) ***incident_duration***

(5) ***incident_location***

(5) ***incident_severity***

(5) ***incident_start_time***

(5) ***incident_traffic_impact***

(5) ***incident_type***

(4) ***list_size***

(3) ***current_other_routes_use***

(4) ***route_segment_guided_travelers***

(4) ***route_segment_identity***

(5) ***location_identity***

(5) ***route_segment_type***

(5) ***unit_number***

(4) ***route_segment_journey_time***

(4) ***route_segment_total_number***

(3) ***parking_lot_storage_data***

(4) ***list_size***

(4) ***parking_lot_current_occupancy***

(5) ***parking_lot_calculated_occupancy***

(5) ***parking_lot_identity***

(4) ***parking_lot_identity***

(5) ***location_identity***

(5) ***unit_number***

(4) ***parking_lot_state***

(3) ***traffic_flow_state***

(4) ***current_ramp_state***

(4) ***current_road_network_use***

(5) ***route_segment_identity***

(5) ***route_segment_journey_time***

(5) ***route_segment_total_number***

(5) ***route_segment_use_prediction***

(4) ***current_roadway_network_data***

(5) ***current_highway_network_data***

(5) ***current_road_network_data***

(4) ***hov_lane_data***

(5) ***hov_lane_vehicle_count***

(5) ***hov_lane_violation_count***

(5) ***list_size***

(4) ***link_data_from_tags***

(5) ***link_journey_time***

(5) ***link_queue_time***

(5) ***list_size***

(3) ***wide_area_pollution_data***

(4) ***list_size***

(4) ***pollution_state_area_collection***

(5) ***current_carbon_monoxide_pollution***

(5) ***current_hydrocarbon_pollution***

(5) ***current_nitrous_oxide_pollution***

(5) ***current_ozone_pollution***

(5) ***current_particulate_pollution***

(5) ***current_pollution_location***

(5) ***current_sulfur_dioxide_pollution***

(4) ***pollution_state_roadside_collection***

(5) ***current_carbon_monoxide_pollution***

(5) ***current_hydrocarbon_pollution***

(5) ***current_nitrous_oxide_pollution***

(5) ***current_ozone_pollution***

(5) ***current_particulate_pollution***

(5) ***current_roadside_pollution_location***

(5) ***current_sulfur_dioxide_pollution***

(2) ***predictive_model_data_for_media***

(3) ***predicted_highway_network_data***

(4) ***link_delay***

(4) ***link_journey_time***

(4) ***link_list_for_highways***

(5) ***link_identity***

(5) ***list_size***

(3) ***predicted_hov_lane_data***

(4) ***hov_lane_vehicle_count***

(4) ***hov_lane_violation_count***

(4) ***list_size***

(3) ***predicted_other_routes_use***

(4) ***route_segment_guided_travelers***

(4) ***route_segment_identity***

(5) ***location_identity***

(5) ***route_segment_type***

(5) ***unit_number***

(4) ***route_segment_journey_time***

(4) ***route_segment_total_number***

(3) ***predicted_parking_lot_data***

(4) ***list_size***

(4) ***parking_lot_identity***

(5) ***location_identity***

(5) ***unit_number***

(4) ***parking_lot_occupancy***

(4) ***parking_lot_state***

(3) ***predicted_road_network_data***

(4) ***link_delay***

(4) ***link_journey_time***

(4) ***link_list_for_highways***

(5) ***link_identity***

(5) ***list_size***

(3) ***predicted_road_network_use***

(4) ***route_segment_guided_vehicles***

(4) ***route_segment_identity***

(5) ***location_identity***

(5) ***route_segment_type***

(5) ***unit_number***

(4) ***route_segment_journey_time***

(4) ***route_segment_total_number***

(1) ***traffic_data_media_parameters***

This data flow is used within the Manage Traffic function and contains parameters used to define the actual data elements that are required for each request for output data by the media. This data flow is the result of input of new parameters and/or updates to the current set of parameters by the traffic operations

[Note: the following are types of information request the TMS can send to the ISP, which as the repository of travel information represents a one stop source for the TMS]

(1) ***parking_lot_charge_request***

This data flow is sent from the Manage Traffic function to the Provide Electronic Payment Services function and contains a request for the current prices being charged for parking lot spaces.

(1) ***toll_price_request***

This data flow is sent from the Manage Traffic function to the Provide Electronic Payment Services function and contains a request for the current prices being charged for toll segments on the road and highway network.

(1) ***transit_fare_request***

This data flow is sent from the Manage Traffic function to the Provide Electronic Payment Services function and contains a request for the current prices being charged for transit fares.

3.3. Transit Management -> Information Service Provider

Physical Architecture Flow: demand responsive transit plan W

Plan regarding overall schedules and deployment of demand responsive system

Logical Architecture Flows:

(1) paratransit_personal_schedule

This data flow is sent from the Manage Transit function to the Provide Driver and Traveler Services function. It consists of the following data items each of which is defined in its own DDE:

(2) paratransit_service_cost

(3) cost

(2) paratransit_service_details

(3) paratransit_availability_time

(3) paratransit_destination

(3) paratransit_pickup_location

(4) location_identity

(3) paratransit_pickup_time

(3) paratransit_service_identity

(2) traveler_identity

(1) transit_deviation_data_received

This data flow is used within the Manage Transit function and contains an indication that new data about transit service deviations has been received and is now in the local store of this data. The process(es) receiving this data is(are) expected to take action automatically to output the new data to other functions that are outside the scope of the ITS.

Physical Architecture Flow: transit and fare schedules W

Specific schedules from transit management

Logical Architecture Flows:

(1) transit_fare_data

This data flow is used within the Provide Electronic Payment Services function and contains details of the fares being currently charged for transit services. It consists of the following item which is defined in its own DDE:

(2) list_size

(2) transit_fares

(3) transit_route_number

(3) transit_route_segment_list

(4) link_identity_list

(5) link_identity

(6) link_type

(6) location_identity

(6) unit_number

(5) list_size

(4) list_size

(4) transit_route_segment_cost

(4) transit_route_segment_number

(3) transit_route_use_time

(3) transit_user_category

(1) transit_media_incident_information

This data flow is used within the Manage Transit function and contains information about an incident that has been automatically detected at a transit facility. The data is in its raw form and requires processing before it can be output to the media. It consists of the following data items each of which is defined in its own DDE:

(2) transit_incident_details

(3) incident_duration

(4) duration

(3) incident_location

(4) location_identity

(3) incident_severity

(3) incident_start_time

(4) time

(2) transit_incident_extra_data

(2) transit_incident_location

(3) location_identity

(2) transit_media_incident_interface_parameters

(1) transit_services_for_guidance

This data flow is sent from the Manage Transit function to the Provide Driver and Traveler Services function. It contains a complete set of all the transit routes and the services that run upon them, including timings, etc. that are provided by the transit fleet from which the data was requested, for use in the preparation of data for output as on-line driver and traveler guidance data. The data flow consists of the following data items each of which is defined in its own DDE:

(2) transit_services_for_output

(3) list_size

(3) transit_route_number

(3) transit_route_segment_cost

(3) transit_route_segment_number

(3) transit_stop_scheduled_time

(4) time

(2) traveler_identity

(1) transit_vehicle_deviations_details

This data flow is used within the Manage Transit function. It contains details of the deviations of transit vehicles from their published routes and schedules and is used as a source of data to be sent to processes in other functions. The data flow consists of the following data items each of which is defined in is own DDE:

(2) transit_vehicle_collected_trip_data

(3) transit_vehicle_passenger_loading

(4) list_size

(4) transit_route_number

(4) transit_route_segment_number

(4) transit_vehicle_identity

(4) transit_vehicle_passengers

(3) transit_vehicle_running_times

(4) list_size

(4) transit_route_number

(4) transit_route_segment_number

(4) transit_stop_scheduled_time

(5) time

(2) transit_vehicle_deviation_update

(3) list_size

(3) transit_route_number

(3) transit_route_segment_number

(3) transit_vehicle_identity

(3) transit_vehicle_time

(2) transit_vehicle_eta

(3) transit_route_number

(3) transit_vehicle_identity

(3) transit_vehicle_time

(2) transit_vehicle_location

(3) transit_vehicle_identity

(3) transit_vehicle_location_data

(4) location_identity

(2) transit_vehicle_schedule_deviations

(3) list_size

(3) transit_route_number

(3) transit_route_segment_number

(3) transit_vehicle_achieved_time

(4) time

(3) transit_vehicle_identity

Physical Architecture Flow: transit request confirmation W

Confirmation of a request for transit information or service

Logical Architecture Flows:

(1) advanced_other_fares_confirm

This data flow is used within the Provide Electronic Payment Services function to confirm the advanced payment of a transit fare by a transit user. It consists of the following data items each of which is defined in its own DDE:

(2) confirmation_flag

(2) credit_identity

(2) stored_credit

(2) transit_fare

(2) traveler_identity

(1) advanced_tolls_and_charges_vehicle_request

This data flow is used by the Manage Transit function to transfer requests for advanced payments for toll and parking lot charges from the traveler (as a transit user) fare payment interface in a transit vehicle to the Provide Electronic Payment Services function for subsequent processing. The size of the data flow has been set at less than the sum of the two constituent flows to allow for the fact that they will both not be present for every data transfer. It consists of the following data items each of which is defined in its own DDE:

(2) advanced_charges

(3) credit_identity

(3) parking_lot_identity

(4) location_identity

(4) unit_number

(3) parking_space_details

(4) date

(4) duration

(4) time

(3) stored_credit

(3) traveler_identity

(3) vehicle_identity

(2) advanced_tolls

(3) credit_identity

(3) stored_credit

(3) toll_route_segments

(4) list_size

(4) toll_segment_identity

(5) unit_number

(3) vehicle_identity

(1) advanced_traveler_fares_confirm

This data flow is used within the Provide Electronic Payment Services function to show whether advanced fare payment by a traveler planning a trip has been refused or cleared. The traveler will be using facilities in the Provide Driver and Traveler Services function to generate the trip request. The data flow consists of the following data items each of which is defined in its own DDE:

(2) confirmation_flag

(2) stored_credit

(2) transit_fare

(2) traveler_identity

(1) transit_media_emergency_information

This data flow is used within the Manage Transit function and contains information about an emergency that has been detected on board a transit vehicle following input from a transit user or transit vehicle driver. The data is in its raw form and requires processing before it can be output to the media. It consists of the following data items each of which is defined in its own DDE:

(2) transit_driver_emergency_request

(2) transit_media_emergency_interface_parameters

(2) transit_user_emergency_request

(2) transit_vehicle_location

(3) transit_vehicle_identity

(3) transit_vehicle_location_data

(4) location_identity

(1) transit_services_for_advisory_data

This data flow is sent from the Manage Transit function to the Provide Driver and Traveler Services function. It contains a complete set of all the transit routes and the services that run upon them, including timings, etc. that are provided by the transit fleet from which the data was requested, for use in the preparation of driver and traveler advisory information for output on-board vehicles. It consists of the following data item which is defined in its own DDE:

(2) transit_services

(3) map_transit_data

(3) transit_routes_data

(4) list_size

(4) transit_route_number

(4) transit_route_segment_list

(5) link_identity_list

(6) link_identity

(6) list_size

(5) list_size

(5) transit_route_segment_cost

(5) transit_route_segment_number

(4) transit_route_stop_number

(3) transit_schedule_data

(4) list_size

(4) transit_route_number

(4) transit_route_segment_list

(5) link_identity_list

(6) link_identity

(6) list_size

(5) list_size

(5) transit_route_segment_cost

(5) transit_route_segment_number

(4) transit_route_stop_list

(5) list_size

(5) transit_route_stop_data

(6) list_size

(6) transit_route_schedule_number

(6) transit_stop_scheduled_time

(5) transit_route_stop_number

(1) transit_user_payments_transactions

This data flow is used within the Provide Electronic Payment Services function and contains records of all payment transactions for the provision of other (yellow pages) services to transit users.

3.4. Information Service Provider -> Transit Management

Physical Architecture Flow: demand responsive transit request W

Request for paratransit support

Logical Architecture Flows:

(1) paratransit_trip_request

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Transit function to action a trip request using the paratransit operation. It contains the following data items each of which is defined in its own DDE:

(2) traveler_identity

(2) trip_request

(3) constraints

(4) constraint_on_acceptable_travel_time

(4) constraint_on_ahs_lanes

(4) constraint_on_eta_change

(4) constraint_on_interstate

(4) constraint_on_load_classification

(4) constraint_on_number_of_mode_changes

(4) constraint_on_number_of_transfers

(4) constraint_on_special_needs

(4) constraint_on_urban

(4) constraint_on_vehicle_type

(3) departure_time

(4) time

(3) desired_arrival_time

(4) time

(3) destination

(4) route_point

(3) origin

(3) preferences

(4) modes

(4) preferred_alternate_routes

(4) preferred_ridesharing_options

(4) preferred_route_segments

(4) preferred_routes

(4) preferred_transit_options

(4) preferred_weather_conditions

Physical Architecture Flow: selected routes W

Routes selected by optimization algorithms

Logical Architecture Flows:

(1) paratransit_service_confirmation

This data flow is sent by the Provide Driver and Traveler Services function to the Manage Transit function to confirm that the traveler wants to use the previously identifies paratransit service. It contains the following data items each of which is defined in its own DDE:

(2) paratransit_service_identity

(2) transit_confirmation_flag

(2) traveler_identity

Physical Architecture Flow: transit information request W

Request for transit schedule information

Logical Architecture Flows:

(1) advanced_other_fares_request

This data flow is used within the Provide Electronic Payment Services function to request that a transit fare be paid for in advance by a driver who is paying either a parking lot charge or a toll. It consists of the following data items each of which is defined in its own DDE:

(2) credit_identity

(2) stored_credit

(2) transit_journey_date

(3) date

(3) time

(2) transit_route_destination

(2) transit_route_origin

(2) traveler_identity

(1) advanced_tolls_and_charges_vehicle_confirm

This data flow is used within the Provide Electronic Payment Services function and contains the result of the requested advanced payment transaction from a traveler (as a transit user) in a transit vehicle. It consists of the following data items each of which is defined in its own DDE:

(2) advanced_charges_confirm

(3) confirmation_flag

(3) credit_identity

(3) parking_lot_cost

(4) cost

(3) stored_credit

(2) advanced_tolls_confirm

(3) confirmation_flag

(3) credit_identity

(3) stored_credit

(3) toll_cost

(2) confirmation_flag

(1) advanced_traveler_fares_request

This data flow is used within the Provide Electronic Payment Services function to request that a transit fare be paid for in advance by a traveler who is planning a trip using facilities in the Provide Driver and Traveler Services function. It consists of the following items each of which is defined in its own DDE:

(2) credit_identity

(2) stored_credit

(2) transit_journey_date

(3) date

(3) time

(2) transit_route_destination

(2) transit_route_origin

(2) traveler_identity

(1) transit_services_advisories_request

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Transit function. It is a request for supply of details of the services being currently provided by the transit fleet and will be used in the preparation of on-line driver and traveler advisory data for output to vehicles.

(1) transit_services_guidance_request

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Transit function. It is a request for supply of details of the services being currently provided by the transit fleet and will be used in the preparation of on-line traveler guidance data. The process(es) that are providing the interface through which the traveler is obtaining the on-line guidance will have to provide the origin and destination so that the receiving process in the Manage Transit function can work out for which transit route(s) data will be provided. The data flow consists of the following data items each of which is defined in its own DDE:

(2) destination

(3) route_point

(2) origin

(2) traveler_identity

(1) transit_vehicle_deviations_details_request

This data flow is used within the Manage Transit function. It contains a request for output of the details of the deviations of transit vehicles from their published routes and schedules for use as a source of data to be sent to processes in other functions.

(1) transit_fare_data_request

This data flow is used within the Provide Electronic Payment Services function. It contains a request for the current transit fare price data to be provided from the store that is being used to calculate transit fares.

Undisplayed Graphic

4. Data Dictionary Elements

This section contains the data dictionary abstracts and sizes for all the logical architecture data flows listed in this standards requirements package. This is an abbreviated version of the information available in the Logical Architecture Document, but should be sufficient for understanding the purpose of a given data element. For a deeper understanding, it is necessary to consult the Logical Architecture Document (or the National Architecture Web Browser site: http://www.rockwell.com/itsarch/) to find the specifications of the processes that the data flows connect.

The Additional sizing assumptions provide an estimate of the expected size of the data flow. There are three cases which occur in the data dictionary.

1. The dataflow is a primitive element and a size in bytes is given In the common case where the data flow is composed of other DDEs, the size of the composite dataflow is calculated by adding up the sizes of the constituent DDEs.

2. The dataflow is a composite flow (made up of other flows) and the expected size is simply the sum of the sizes of the other flows. In this case the additional sizing assumption is ‘‘None".

3. The dataflow is a composite flow and the expected size is an expression relating to the component dataflows and some additional parameters. The full list of parameters is given in the Logical Architecture Document Volume 1, Table 1.

The DDE’s are given in alphabetical order.

advanced_charges

text

* This data flow is used within the provide Electronic Payment Services function and is

also sent as part of a data flow from the Manage transit function. It contains data to

enable an advanced parking lot charge to be calculated and billed, and can be input by

either a driver from a vehicle, or a transit user from on-board a transit vehicle or at

the roadside, i.e. a transit stop. The data flow consists of the following data items

each of which is defined in its own DDE: *

credit_identity

+ parking_lot_identity

+ parking_space_details

+ stored_credit

+ traveler_identity

+ vehicle_identity.

SIZING ATTRIBUTES

SIZE=0;

advanced_charges_confirm

text

* This data flow is used within the Provide Electronic Payment Services function to

show that payment for advanced parking lot charges has been confirmed or not. It

consists of the following data items each of which is defined in its own DDE: *

confirmation_flag

+ credit_identity

+ parking_lot_cost

+ stored_credit.

SIZING ATTRIBUTES

SIZE=0;

advanced_other_fares_confirm

text

* This data flow is used within the Provide Electronic Payment Services function to confirm the advanced payment of a transit fare by a transit user. It consists of the following data items each of which is defined in its own DDE: *

confirmation_flag

+ credit_identity

+ stored_credit

+ transit_fare

+ traveler_identity.

SIZING ATTRIBUTES

SIZE=0;

advanced_other_fares_request

text

* This data flow is used within the Provide Electronic Payment Services function to request that a transit fare be paid for in advance by a driver who is paying either a parking lot charge or a toll. It consists of the following data items each of which is defined in its own DDE: *

credit_identity

+ stored_credit

+ transit_route_origin

+ transit_route_destination

+ transit_journey_date

+ traveler_identity.

SIZING ATTRIBUTES

SIZE=0;

advanced_tolls

text

* This data flow is used within the Provide Electronic Payment Services function and contains data to enable an advanced toll to be calculated and billed. It consists of the following data items each of which is defined in its own DDE: *

credit_identity

+ stored_credit

+ toll_route_segments

+ vehicle_identity.

SIZING ATTRIBUTES

SIZE=0;

advanced_tolls_and_charges_vehicle_confirm

text

* This data flow is used within the Provide Electronic Payment Services function and contains the result of the requested advanced payment transaction from a traveler (as a transit user) in a transit vehicle. It consists of the following data items each of which is defined in its own DDE: *

advanced_charges_confirm

+ advanced_tolls_confirm

+ confirmation_flag.

SIZING ATTRIBUTES

SIZE=0;

advanced_tolls_and_charges_vehicle_request

text

* This data flow is used by the Manage Transit function to transfer requests for advanced payments for toll and parking lot charges from the traveler (as a transit user) fare payment interface in a transit vehicle to the Provide Electronic Payment Services function for subsequent processing. The size of the data flow has been set at less than the sum of the two constituent flows to allow for the fact that they will both not be present for every data transfer. It consists of the following data items each of which is defined in its own DDE: *

advanced_charges

+ advanced_tolls.

SIZING ATTRIBUTES

SIZE = 0.6{advanced_charges) + 0.6{advanced_tolls};

advanced_tolls_confirm

text

* This data flow is used within the Provide Electronic Payment Services function to show that payment for an advanced toll has been confirmed or not. It consists of the following data items each of which is defined in its own DDE: *

confirmation_flag

+ credit_identity

+ stored_credit

+ toll_cost.

SIZING ATTRIBUTES

SIZE=0;

advanced_traveler_fares_confirm

text

* This data flow is used within the Provide Electronic Payment Services function to show whether advanced fare payment by a traveler planning a trip has been refused or cleared. The traveler will be using facilities in the Provide Driver and Traveler Services function to generate the trip request. The data flow consists of the following data items each of which is defined in its own DDE: *

confirmation_flag

+ stored_credit

+ transit_fare

+ traveler_identity.

SIZING ATTRIBUTES

SIZE=0;

advanced_traveler_fares_request

text

* This data flow is used within the Provide Electronic Payment Services function to request that a transit fare be paid for in advance by a traveler who is planning a trip using facilities in the Provide Driver and Traveler Services function. It consists of the following items each of which is defined in its own DDE: *

credit_identity

+ stored_credit

+ transit_route_origin

+ transit_route_destination

+ transit_journey_date

+ traveler_identity.

SIZING ATTRIBUTES

SIZE=0;

agency_incident_response_procedures

text

* This data flow is used within the Manage Traffic function and contains the actions required by agencies such as police, fire, ambulance, vehicle recovery, Environmental Protection, etc. to combat an incident. *.

SIZING ATTRIBUTES

SIZE=10240000;

confirm_incident_data_output

text

* This data flow is used within the Manage Traffic function to confirm output of previously requested incident data by the Media System. *.

SIZING ATTRIBUTES

SIZE=1;

confirmation_flag

text

* This data flow is used within various ITS functions. It is a flag which is set to one (1) to indicate the success of a request or transaction, and zero (0) to indicate failure. *.

SIZING ATTRIBUTES

SIZE=1;

constraint_on_acceptable_travel_time

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the maximum total travel time which the traveler or driver will allow for the selected route. This is an integer value of the time in minutes and is sized at two (2)

bytes to enable a route to be selected that takes several days. *.

SIZING ATTRIBUTES

SIZE=2;

constraint_on_ahs_lanes

text

* This data flow is used within the Provide Driver and Traveler Services function and contains a flag which if set to one (1) means that where possible use route segments that are automatic highway system (ahs) lanes. The default is set to false, i.e. do not use ahs lanes. *.

SIZING ATTRIBUTES

SIZE=1;

constraint_on_eta_change

text

* This data flow is used within the Provide Driver and Traveler Services function. It contains the value by which the estimated time of arrival (eta) at the destination must change for a new route to be automatically sent to the vehicle, or used for autonomous guidance with long journey and queue times being obtained from a central source. *.

SIZING ATTRIBUTES

SIZE=2;

constraint_on_interstate

text

* This data flow is used within the Provide Driver and Traveler Services function and contains a flag which if set to one (1) means where possible use interstate freeways except for when access is required to particular places, e.g. origin, destination, way points along a route. The default is set to true. *.

SIZING ATTRIBUTES

SIZE=1;

constraint_on_load_classification

text

* This data flow is used within the Provide Driver and Traveler Services function and contains a three character code that specifies the load type. This is principally aimed at hazardous material (HAZMAT) type loads that may require special routing restrictions. The load type is specified using a three character code, the most hazardous type being used if more than one is being carried on a single vehicle. *.

SIZING ATTRIBUTES

SIZE=3;

constraint_on_number_of_mode_changes

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the maximum number of changes between different modes of transport which the traveler or driver wishes to see used in the planned trip (1 byte) *.

SIZING ATTRIBUTES

SIZE=1;

constraint_on_number_of_transfers

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the maximum number of mode changes that a traveler or driver will allow when a multimodal route is being specified. *.

SIZING ATTRIBUTES

SIZE=1;

constraint_on_special_needs

text

* This data flow is used within the Provide Driver and Traveler Services function and contains a three character code that covers physical and/or mental disabilities which may affect the choice of mode, route, etc., e.g. blind and will be accompanied, blind with a guide dog, deaf, dumb, uses crutches, wheelchair bound, etc. *.

SIZING ATTRIBUTES

SIZE=3;

constraint_on_urban

text

* This data flow is used within the Provide Driver and Traveler Services function and contains a flag which if set to one (1) means avoid all urban roads except for when they are needed for access. The default is set to true. *.

SIZING ATTRIBUTES

SIZE=1;

constraint_on_vehicle_type

text

* This data flow is used within the Provide Driver and Traveler Services function and contains a three character code that specifies that the route must be suitable for a particular type or types of vehicle. If left blank then routes suitable for all types of vehicle will be chosen so that for example, routes prohibiting commercial vehicles will be avoided. When vehicle types are specified, then the route will be suitable for that type and will if possible use segments from which other types are prohibited. The type is specified using a three (3) character code and the data flow has been sized to enable up to six different types to be specified. *.

SIZING ATTRIBUTES

SIZE=18;

constraints

text

* This data flow is used within the Provide Driver and Traveler Services function and is also sent to that function by the Provide Vehicle Monitoring and Control function as part of the data to enable a route involving automatic highway system (ahs) lanes to be selected. It contains the constraints being placed on the choice of route and which will override any preferences that are also specified. Unless a default value is specifically defined, a value giving the least severe requirement will be used. Some parameters will have to be supplied by the traveler or driver (or provided by a process as a default value) before the route selection process can proceed. The data flow consists of the following items each of which is defined in its own DDE: * constraint_on_acceptable_travel_time
+ constraint_on_number_of_mode_changes
+ constraint_on_number_of_transfers
+ constraint_on_eta_change
+ constraint_on_special_needs
+ constraint_on_load_classification
+ constraint_on_ahs_lanes
+ constraint_on_interstate
+ constraint_on_urban
+ constraint_on_vehicle_type.

SIZING ATTRIBUTES

SIZE=0;

cost

text

* This data flow is used by several functions within ITS and contains the cost of a service. This may something provided by a yellow pages service provider, the cost of a display map or navigable map database update, the cost of a transit fare, a

paratransit service etc. The cost is shown in cents (US) and is sized as a two (2) byte number. *.

SIZING ATTRIBUTES

SIZE=2;

credit_identity

text

* This data flow is principally used within the Provide Electronic Payment Services function, although it also appears in the Manage Commercial Vehicles, Manage Transit and Provide Driver and Traveler Services functions. It contains the identity number of a credit card (13 digits) which is to be used to secure preclearance from paying dues, taxes, and other commercial vehicles charges, or by a traveler or driver for payment of current or advanced tolls, fares, parking lot charges, or for yellow pages services. The value is obtained from the relevant credit identity data flow provided from the payment instrument terminator and consists of the credit identity (using the standard 16 character credit card identity field) plus the expiration data (4 characters). *.

SIZING ATTRIBUTES

SIZE=20;

current_carbon_monoxide_pollution

text

* This data flow is used within the Manage Traffic function and contains the average level of carbon monoxide pollution as measured by sensors. These sensors may provide general coverage of the geographic area served by the function, or located at the roadside, or measure data for particular vehicle types. The unit of measurement will be in parts per million (ppm). *.

SIZING ATTRIBUTES

SIZE=2;

current_data_for_media

text

* This data flow is used within the Manage Traffic function. It contains a subset of the current data stored by the function which will be used as the basis for traffic data that is sent to other functions. The data flow consists of the following data items each of which is defined in its own DDE: *

current_incident_data

+ current_other_routes_use

+ parking_lot_storage_data

+ traffic_flow_state

+ vehicle_smart_probe_stored_data

+ wide_area_pollution_data.

SIZING ATTRIBUTES

SIZE=0;

current_highway_network_data

text

* This data flow is used within the Manage Traffic function and contains data about traffic conditions on links in the highway network served by the function. This data is used for determining traffic management strategies and is also sent for storage in both the long term and current data stores. It consists of the following data items each of which is defined in its own DDE: *

link_list_for_highways

+ list_size{link_journey_time

+ link_delay}.

SIZING ATTRIBUTES

SIZE=link_list_for_highways+HIGHWAY_LINKS{link_journey_time+link_delay};

current_highway_network_state

text

* This data flow is sent by the Manage Traffic function to the Provide Driver and Traveler Services function and contains data about traffic conditions on links in the road network served by the function. The data is used by the route selection and guidance processes in determining the best vehicle routes. It consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{link_identity

+ link_journey_time

+ link_delay}.

SIZING ATTRIBUTES

SIZE=list_size+LINKS{link_identity+link_journey_time+link_delay};

current_hydrocarbon_pollution

text

* This data flow is used within the Manage Traffic function and contains the current level of hydrocarbon pollution as measured sensors. These sensors may provide general coverage of the geographic area served by the function, or located at the roadside, or measure data for particular vehicle types. The unit of measurement will be in parts per million (ppm). *.

SIZING ATTRIBUTES

SIZE=2;

current_incident_data

text

* This data flow is used within the Manage Traffic function to transfer data about current incidents from the Incident Management facility to the Provide Traffic Surveillance facility for storage. It contains the following data items each of which is defined in its own DDE: *

list_size

+ list_size{current_incident_details}.

SIZING ATTRIBUTES

SIZE=list_size+MAX_CUR_INCIDENTS{current_incident_details};

current_incident_details

text

* This data flow is used within the Manage Traffic function and contains the details of a current incident. It consists of the following data items each of which is defined in its own DDE: *

incident_description

+ incident_duration

+ incident_location

+ incident_number

+ incident_severity

+ incident_start_time

+ incident_traffic_impact

+ incident_type.

SIZING ATTRIBUTES

SIZE=0;

current_incidents_data

text

* This data flow is used within the Manage Traffic function and contains data about current incidents. It consists if the following items each of which is defined in its own DDE: *

incident_duration

+ incident_location

+ incident_number

+ incident_severity

+ incident_start_time

+ incident_traffic_impact

+ incident_type.

SIZING ATTRIBUTES

SIZE=0;

current_nitrous_oxide_pollution

text

* This data flow is used within the Manage Traffic function and contains the average level of nitrous oxide pollution as measured sensors. These sensors may provide general coverage of the geographic area served by the function, or located at the roadside, or measure data for particular vehicle types. The unit of measurement will be in parts per million (ppm). *.

SIZING ATTRIBUTES

SIZE=2;

current_other_routes_use

text

* This data flow is used within the Provide Driver and Traveler Services function and contains data about the non-vehicle portion(s) of routes that have been requested by travelers. These route portions will involve the use of modes such as cycling, walking, etc. The data will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments),r and consists of the following data items each of which is defined in its own DDE: *

route_segment_total_number

+ route_segment_total_number{route_segment_identity

+ time_period{route_segment_guided_travelers}

+ route_segment_journey_time}.

SIZING ATTRIBUTES

SIZE=route_segment_total_number+OTHER_SEGS{TIME_PERIOD{route_segment_guided_travelers}
+route_segment_journey_time+route_segment_identity};

current_ozone_pollution

text

* This data flow is used within the Manage Traffic function and contains the average level of ozone pollution as measured sensors. These sensors may provide general coverage of the geographic area served by the function, or located at the roadside, or measure data for particular vehicle types. The unit of measurement will be in parts per million (ppm). *.

SIZING ATTRIBUTES

SIZE=2;

current_particulate_pollution

text

* This data flow is used within the Manage Traffic function and contains the average level of pollution from particulates as measured sensors. These sensors may provide general coverage of the geographic area served by the function, or located at the roadside, or measure data for particular vehicle types. The unit of measurement will be in parts per million (ppm). *.

SIZING ATTRIBUTES

SIZE=2;

current_pollution_location

text

* This data flow is used within the Manage Traffic function and gives the location coordinates from which a set of current pollution levels have been obtained. The location may be one at which the pollution for the geographic area served by the

function is measured, or one at which roadside pollution levels are measured, or one at which pollution data for particular vehicle types is measured. These pollution levels will be defined in an associated set of data flows. This data flow consists of the following data item which is defined in its own DDE: *

location_identity.

SIZING ATTRIBUTES

SIZE=0;

current_road_network_data

text

* This data flow is used within the Manage Traffic function and contains data about traffic conditions on links in the road network served by the function. This data is used for determining traffic management strategies and is also sent for storage in both the long term and current data stores. It consists of the following data items each of which is defined in its own DDE: *

link_list_for_roads

+ list_size{link_journey_time

+ link_delay}.

SIZING ATTRIBUTES

SIZE=link_list+ROAD_LINKS{link_journey_time+link_delay};

current_road_network_state

text

* This data flow is sent by the Manage Traffic function to the Provide Driver and Traveler Services function and contains data about traffic conditions on links in the highway network served by the function. The data is used by the route selection and guidance processes in determining the best vehicle routes. It consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{link_identity

+ link_journey_time

+ link_delay}.

SIZING ATTRIBUTES

SIZE=list_size+LINKS{link_identity+link_journey_time+link_delay};

current_road_network_use

text

* This data flow is sent from the Provide Driver and Traveler Services function to the Manage Traffic function. It contains information about how many vehicles are being guided down each route segment and the average journey time for each route segment provided by guided vehicles. The data will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments), and consists of the following data items each of which is defined in its own DDE: *

route_segment_total_number

+ route_segment_total_number{route_segment_identity

+ route_segment_use_prediction

+ route_segment_journey_time}.

SIZING ATTRIBUTES

SIZE=route_segment_total_number+ROADWAY_SEGS{route_segment_use_prediction

+route_segment_journey_time+route_segment_identity};

current_roadside_pollution_location

text

* This data flow is used within the Manage Traffic function and contains the location at which an associated set of current roadside atmospheric pollution values have been obtained from sensors. It consists of the following data item which is defined in its own DDE: *

location_identity.

SIZING ATTRIBUTES

SIZE=0;

current_roadway_network_data

text

* This data flow is used within the Manage Traffic function and contains data about traffic conditions on links in the road (surface street) and highway network served by the function. The data is used for determining traffic management strategy and is also sent for in both the long term and current data stores. It consists of the following data items each of which is defined in its own DDE: *

current_highway_network_data

+ current_road_network_data.

SIZING ATTRIBUTES

SIZE=0;

current_sulfur_dioxide_pollution

text

* This data flow is used within the Manage Traffic function and contains the average level of sulfur dioxide pollution as measured by sensors. These sensors may provide general coverage of the geographic area served by the function, or located at the roadside, or measure data for particular vehicle types. The unit of measurement will be in parts per million (ppm). *.

SIZING ATTRIBUTES

SIZE=2;

current_transit_routes_use

text

* This data flow is used within the Provide Driver and Traveler Services and Manage Traffic functions. It contains data showing the numbers of travelers using all or part

of the available transit routes, either for personal guidance or as part of trip requests. The data flow consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{transit_route_number

+ transit_route_current_use}.

SIZING ATTRIBUTES

SIZE=list_size+NUM_TRANSIT_ROUTES{transit_route_number+transit_route_current_use};

cv_carrier_number

text

* This data flow is used within the Manage Commercial Vehicle function and contains a sixteen character code that is the carrier identification number. *.

SIZING ATTRIBUTES

SIZE=16;

cv_driver_number

text

* This data flow is used within the Manage Commercial Vehicle function and contains a sixteen character (16) alphanumeric code that is the commercial vehicle driver identification number. *.

SIZING ATTRIBUTES

SIZE=16;

cv_tag_data

text

* This data flow is used within the Manage Commercial Vehicles and Provide Electronic Payment Services functions and contains the data read from a commercial vehicle’s on-board tag. It consists of the following data items each of which is defined in its

own DDE: *

cv_carrier_number

+ cv_driver_number

+ cv_vehicle_number.

SIZING ATTRIBUTES

SIZE=0;

cv_vehicle_characteristics

text

* This data flow is used within the Manage Commercial Vehicles and Provide Electronic Payment Services functions and contains the characteristics of a commercial vehicle as determined from data provided by roadside sensors. It consists of the following data items each of which is defined in its own DDE: *

cv_vehicle_weight

+ cv_vehicle_size

+ cv_vehicle_configuration.

SIZING ATTRIBUTES

SIZE=0;

cv_vehicle_configuration

text

* This data flow is used within the Manage Commercial Vehicles and Provide Electronic Payment Services functions and contains a three character code that defines the commercial vehicle configuration. Examples of the character codes that will be used are:

1TV - tractor unit plus articulated trailer (van type),

TCR - tractor unit only,

VTV - vehicle plus trailer, i.e. the motive power unit may carry payload (van type),

2TV - tractor unit plus articulated trailer plus trailer (van type),

1TK - tractor unit plus articulated trailer (tanker type),

VTK - vehicle plus trailer, i.e. the motive power unit may carry payload (tanker type),

2TK - tractor unit plus articulated trailer plus trailer (tanker type).

Other codes will be needed to accommodate different types of commercial vehicles. *.

SIZING ATTRIBUTES

SIZE=3;

cv_vehicle_number

text

* This data flow is used within the Manage Commercial Vehicle function and contains a sixteen character (16) alphanumeric code that is the commercial vehicle identification number. *.

SIZING ATTRIBUTES

SIZE=16;

cv_vehicle_size

text

* This data flow is used within the Manage Commercial Vehicles and Provide Electronic Payment Services functions and contains the commercial vehicle size as measured by roadside sensors. The data will include details such as the length, width and height of the vehicle. It will be stored as a four (4) byte integer comprising two bytes for the length and one byte each for the width and height. All sizes will be measured in inches. *.

SIZING ATTRIBUTES

SIZE=4;

cv_vehicle_weight

text

* This data flow is used within the Manage Commercial Vehicles and Provide Electronic Payment Services functions and contains the commercial vehicle weight as measured by

roadside sensors, such as weigh-in-motion detectors. The data will be stored as a three (1) byte integer to enable commercial vehicle weights of up to 255000 lbs to be accommodated, the weight being shown in thousands of pounds. *.

SIZING ATTRIBUTES

SIZE=1;

date

text

* This data flow is used within many ITS function and contains the calendar date data normally used to indicate currency or effectivity of other data flows. The codification of the data is MMDDYY or equivalent and the size estimate is based on 4 bit month, 5 bit day, 7 bit year code.*.

SIZING ATTRIBUTES:

SIZE = 2;

defined_responses_data

text

* This data store is used within the Manage Traffic function and contains data about defined incident responses. It consists of the following data items each of which is defined in its own DDE: *

incident_type

+ planned_incident_response

+ incident_info_template

+ traffic_impact_criteria.

SIZING ATTRIBUTES

SIZE=0;

departure_time

text

* This data flow is used within the Provide Driver and Traveler Services function and defines the time at which a driver or traveler's planned or requested trip is to start. It consists of the following data item which is defined in its own DDE: *

time.

SIZING ATTRIBUTES

SIZE=0;

desired_arrival_time

text

* This data flow is used within the Provide Driver and Traveler Services function and specifies the target time for arrival at the end of a driver or traveler's planned or requested trip. It consists of the following data item which is defined in its own DDE: *

time.

SIZING ATTRIBUTES

SIZE=0;

destination

text

* This data flow is used within the Provide Driver and Traveler Services function. It defines the destination point for a trip request or a route to be used by a traveler or a vehicle. In some instances it will be used as the origin for the use of a particular mode within a trip, e.g. the part of the route for the trip that is to be provided by walking, or ridesharing, or an intermodal service provider. It consists of the following data item which is defined in its own DDE: *

route_point.

SIZING ATTRIBUTES

SIZE=0;

duration

text

* This data flow is used within many ITS function. It contains the expected duration of a particular activity. Although 17 bits would be required to provide 1 second granularity, a 16 bit data element supports time accurate to within a few seconds and will be sufficient for all ITS applications.*.

SIZING ATTRIBUTES:

SIZE = 2;

hazmat_load_data

text

* This data flow is used within the Manage Commercial Vehicles, Manage Emergency Services, Manage Traffic and Provide Driver and Traveler Services functions. It contains the manifest data plus the chemical characteristics of a hazmat load being carried by a commercial vehicle. This data is used by the emergency services to plan their responses if the vehicle on which the load is traveling is involved in an incident. The data flow is sized at ten (10) bytes to use of the standard safety codes for hazardous materials. *.

SIZING ATTRIBUTES

SIZE=10;

hov_lane_data

text

* This data flow is used within the Manage Traffic function and contains the data obtained from processing the inputs from traffic sensors located on High Occupancy Vehicle (HOV) lanes around the road network. It consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{hov_lane_vehicle_count

+ hov_lane_violation_count}.

SIZING ATTRIBUTES

SIZE=list_size+HOV_LANES{hov_lane_vehicle_count+hov_lane_violation_count};

hov_lane_vehicle_count

text

* This data flow is used within the Manage Traffic function and contains the a count of the number of vehicle legitimately using High Occupancy Vehicle (HOV) lanes in the road and highway network served by the function. The count shows the actual number of vehicles in a lane, which is not the same as the vehicle flow rate, although this can be calculated as an average from successive values of this data flow. The data flow is updated every second and is fixed at one (1) byte for a maximum value of 255. *.

SIZING ATTRIBUTES

SIZE=1;

hov_lane_violation_count

text

* This data flow is used within the Manage Traffic function and contains the a count of the number of vehicle illegally using High Occupancy Vehicle (HOV) lanes in the road and highway network. The count shows the actual number of illegal vehicles in a lane, which is not the same as the illegal vehicle flow rate, although this can be calculated as an average from successive values of this data flow. The data flow is updated every second and is fixed at one (1) byte for a maximum value of 255. *.

SIZING ATTRIBUTES

SIZE=1;

incident_data_output

text

* This data flow is used within the Manage Traffic function and contains incident data that is

to be output by the Media System. This data will cover a particular current or predicted incident, rather than the output of more general incident information, as the Media System is expected to be something similar to the current Highway Advisory Radio (HAR) systems. The data must also specify the part(s) of the Media System that are to output the data so that it can be directed to the appropriate areas. *.

SIZING ATTRIBUTES

SIZE=64;

incident_description

text

* This data flow is used within the Manage Traffic function and contains the description of an incident using a predefined dictionary of three character codes. *.

SIZING ATTRIBUTES

SIZE=3;

incident_duration

text

* This data flow is used within the Manage Traffic function and gives the expected duration of an incident from its start time until the time at which it is expected that it will have no further effect on traffic conditions. The data flow consists of the following data item which is defined in its own DDE: *

duration.

SIZING ATTRIBUTES

SIZE=0;

incident_info_template

text

* This data is used within the Manage Traffic function and contains a templates showing what data will be available for a particular type of incident. *.

SIZING ATTRIBUTES

SIZE=64;

incident_location

text

* This data flow is used within the Manage Traffic function and contains the location at which an incident will take place (for predicted incidents) or is taking place (for current incidents). The location will be defined in terms of map coordinates to enable it to be referenced spatially within the geographic area served by the local TMC. The data flow consists of the following data item which is defined in its own DDE: * location_identity.

SIZING ATTRIBUTES

SIZE=0;

incident_number

text

* This data item is used by processes in the Manage Emergency Services and Manage Traffic functions and identifies each incident that has been or is active. The data flow is seized at two (2) bytes to enable up to 32767 incidents to be accommodated before old data is overwritten. Note that each function will have its own copy of this data so that an incident in one function does not have the same number in the other function, i.e. the numbering of incidents is independent in each function. *.

SIZING ATTRIBUTES

SIZE=2;

incident_severity

text

* This data flow is used within the Manage Traffic and Manage Emergency Services functions and defines the severity of an incident held as a three character code. *.

SIZING ATTRIBUTES

SIZE=3;

incident_start_time

text

* This data flow is used within the Manage Traffic function and shows the time at which an incident will start. The point at which it starts to have an effect on traffic conditions will be later than this time which is used as the trigger for any corrective or mitigating action, e.g. change in traffic control strategy. Thus in the case of incidents that are some form of special event, the start time may not be the actual event start time. An example would be a baseball game, which could create an incident as spectators arrive for the start of the game. The time at which this happens will be different (before) the actual start of the game but after the time at which the gates open. The data flow consists of the following data item which is defined in its own DDE: *

time.

SIZING ATTRIBUTES

SIZE=0;

incident_traffic_impact

text

* This data flow is used within the Manage Traffic function and contains details of the impact that a particular incident will have on traffic flows. *.

SIZING ATTRIBUTES

SIZE=80;

incident_type

text

* This data flow is used within both the Manage Traffic and Manage Emergency Services

functions and defines an incident type using a three character code. This will use a standard set of character codes to uniquely define the type of incident. *.

SIZING ATTRIBUTES

SIZE=3;

link_attributes

text

* This data flow is used within the Provide Driver and Traveler Services function and contains details of the type of road data stored for the link by a TMC or ISP. *.

SIZING ATTRIBUTES

SIZE=16;

link_data_for_guidance

text

* This data flow is sent from the Manage Traffic function to the Provide Driver and Traveler Services function. It contains data for use in detemining which other ISP(’s) must be contacted to obtain data about roads and highways in geographic area(s) outside that served by the local function. It consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{link_attributes

+ link_identity

+ link_ISP_identity}.

SIZING ATTRIBUTES

SIZE=list_size+LINKS{link_attributes+link_identity+link_ISP_identity};

link_data_from_tags

text

* This data flow is used within the Manage Traffic function. It contains the link

journey and queue times calculated by processing the times at which tag data was collected from vehicles on the road (surface street) and highway network served by the function. The data flow consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{link_queue_time

+ link_journey_time}.

SIZING ATTRIBUTES

SIZE=list_size+1{HIGHWAY_LINKS+ROAD_LINKS}{link_queue_time+link_journey_time};

link_delay

text

* This data flow is used within the Manage Traffic function and contains the calculated delay for vehicles driving along a particular link in the road and highway network served by the function. This delay is the additional time it will take above that recorded during free flow conditions to travel from one end of the link to the other and will either be calculated from sensor and/or probe data, or produced by the predictive model process within the function. *.

SIZING ATTRIBUTES

SIZE=2;

link_identity

text

* This data element is used within the Manage Traffic, Provide Driver and Traveler Services and Plan System Deployment functions. It contains the unique identity of each link, data for which is stored by a particular TMC or ISP. A link is a short segment typically less than one mile, e.g. a segment of freeway between off-ramps or a street segment between two intersections. The utilization of this data in a variety of other data flows necessitates fairly comprehensive coverage to include all route segments

along which such services as route guidance are offered. For some link attributes such as link times, a link pair may be required since travel times will differ per link pair (e.g. link time for a vehicle turning left may be different from the link time for a vehicle proceeding through an intersection). The data flow consists of the following data items each of which is defined in its own DDE: *

unit_number

+ link_type

+ location_identity.

SIZING ATTRIBUTES

SIZE=0;

link_identity_list

text

* THis data flow is used within the Manage Transit function. It contains a list of the links in the road and freeway network that are covered by a transit route segment. The data flow has been sized to enable up to four (4) links to be part of a segment in all three scenarios (urban, inter-urban and rural). It consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{link_identity}.

SIZING ATTRIBUTES

SIZE=list_size+4{link_identity};

link_ISP_identity

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the indentity of other ISP’s with which road links outide the local ITS geographic area are associated. *.

SIZING ATTRIBUTES

SIZE=32;

link_journey_time

text

* This data flow is used within the Manage Traffic function and contains the current journey time for vehicles on a particular link. This will have been determined using sensor data that measures traffic on the road and highway network served by the function or produced by the predictive model process. *.

SIZING ATTRIBUTES

SIZE=2;

link_list_for_highways

text

* This data flow is used within the Manage Traffic function and contains a list of links for which data is being provided. These links will comprise all of those on the the highway network served by the function. The data flow consists of the following data items each of which is defined by its own DDE: *

list_size

+ 1{link_identity}list_size.

SIZING ATTRIBUTES

SIZE=list_size+HIGHWAY_LINKS{link_identity};

link_list_for_roads

text

* This data flow is used within the Manage Traffic function and contains a list of links for which data is being provided. These links will comprise all of those on the road (surface street) network served by the function. The data flow consists of the following data items each of which is defined by its own DDE: *

list_size

+ 1{link_identity}list_size.

SIZING ATTRIBUTES

SIZE=list_size+ROAD_LINKS{link_identity};

link_queue_time

text

* This data flow is used within the Manage Traffic function and contains the current queuing time for vehicles on a particular link. This will have been determined using sensor data that measures traffic on the road and highway network served by the function or produced by the predictive model process. *.

SIZING ATTRIBUTES

SIZE=2;

link_type

text

* This data flow is used within the Manage Traffic function and contains an identifier to show the type of link to which associated data applies. The link type varies according to how it fits into the road and highway network. It can be all or part of a surface street, a lane of a surface street, a lane on a highway, or all of a highway, and can have other characteristics such as high occupancy vehicles (hov) use only,etc. *.

SIZING ATTRIBUTES

SIZE=4;

list_size

text

* This data flow is a general parameter used throughout ITS functions to specify the number of data items included in a data flow. For example is can be the number of indicators in a strategy selection message, or the number of data items that have been collected in a particular time period. *.

SIZING ATTRIBUTES

SIZE=1;

location_identity

text

* This data element is used within many of the ITS functions and is an identifier for the position of a subsystem or component such as a variable message sign (vms), parking lot, ramp, etc., or for the start, end and way points along a route segment. The position may then be used to orient the equipment or route segment within a spatial database. The data flow is sized at thirteen (13) bytes to enable it to include the georeferenced point ISP-location reference standard LRMP format, as described in the White Paper on location referencing dated 11/8/95. *.

SIZING ATTRIBUTES

SIZE=13;

logged_hazmat_route

text

* This data flow is sent from the Provide Driver and Traveler Services function to the Manage Traffic function. It contains details about an route that has been requested by a commercial vehicle that is carrying cargo which could be viewed as being liable to cause a potential incident. Loads falling into this category are those containing hazardous (HAZMAT) material, or those which are outsize, e.g. wide, heavy, or fragile and hence slow moving. The data flow is derived from the route that has been produced for the commercial vehicle and consists the following items each of which is defined in its own DDE: *

hazmat_load_data

+ list_size

+ list_size{route_segment_end_point

+ route_segment_estimated_arrival_time

+ route_segment_estimated_travel_time

+ route_segment_identity

+ route_segment_start_point}.

SIZING ATTRIBUTES

SIZE=list_size+NUM_SEGS{route_segment_end_point

+ route_segment_estimated_arrival_time

+ route_segment_estimated_travel_time

+ route_segment_identity

+ route_segment_start_point};

long_term_data_for_media

text

* This data flow is used within the Manage Traffic function. It contains a subset of the long data stored by the function which will be used as the basis for traffic data that is sent to other functions. This subset shows the traffic conditions for the last six hours plus the smoothed or average flow over a weekday, giving a total of 31 entries or sets of data. The data flow consists of the following data items each of which is defined in its own DDE: *

1{current_incident_data

+ current_other_routes_use

+ parking_lot_storage_data

+ traffic_flow_state

+ vehicle_smart_probe_stored_data

+ wide_area_pollution_data}31.

SIZING ATTRIBUTES

SIZE=31{current_incident_data+current_other_routes_use+parking_lot_storage_data

+traffic_flow_state+wide_area_pollution_data};

low_traffic_route

text

* This data flow is sent from the Provide Driver and Traveler Services function to the Manage Traffic functoin. It is a special form of route similar to an emergency vehicle route, but for use by other vehicles when traffic volumes are low, e.g. in the early hours of the morning and is used to trigger a special green wave route for the vehicle. The traffic volume in the road network which will allow this type of route to be used is set in the static data. This flow contains the items shown below each of which is defined in its own DDE: *

route

+ vehicle_identity.

SIZING ATTRIBUTES

SIZE=0;

map_transit_data

text

* This data flow is used by many processes within ITS functions and forms part of the store of digitized map data. It contains data which enables maps of the transit route network to be produced. These will be produced to suit the geometry of the actual display unit on which the data will be shown in either visual or hardcopy format. *.

SIZING ATTRIBUTES

SIZE=614400;

media_incident_data_updates

text

* This data flow is used within the Manage Traffic function. It contains changes to the data about incidents in the current or predicted incidents data stores, which have been input by the Media Operator. It consistis of one of the following data items each of which is defined in its own DDE: *

current_incidents_data

+ predicted_incidents_data.

SIZING ATTRIBUTES

SIZE=0;

modes

text

* This data flow is used within many functions and forms part of the data used for route requests and trip plans. It defines the mode(s) of transport to be used on a requested route or proposed trip. The following different modes are supported using the associated three character code and up to six (6) may be used in any trip request:

CAR - own private car

BUS - part of public transit services

RLY - part of public transit services

AIR - scheduled air service

SHP - sea borne transport other than ferry, see below

FRY - passenger or vehicle ferry

CYL - pedal or motor powered bicycle

WLK - walking

VPL - van pool

CPL - car pool

EBS - express bus service

SPS - specialized_service, e.g. a private bus service from airport to hotel

EMV - emergency vehicle *.

SIZING ATTRIBUTES

SIZE=18;

origin

text

* This data flow is used within the Provide Driver and Traveler Services function. It

defines the origin point for a trip request or a route to be used by a traveler or a vehicle. In some instances it will be used as the origin for the use of a particular mode within a trip, e.g. the part of the route for the trip that is to be provided by walking, or ridesharing, or an intermodal service provider. It consists of the following data item which is defined in its own DDE: *

route_point.

SIZING ATTRIBUTES

SIZE=0;

paratransit_arrival_time

text

* This data flow is used within the Manage Transit function and contains the time at which the requested paratransit service will get the traveler to the requested destination. The location of the destination is provided in a separate data flow. The data flow consists of the following data item which is defined in its own DDE: *

time.

SIZING ATTRIBUTES

SIZE=0;

paratransit_availability_time

text

* This data flow is used within the Manage Transit function and contains time window of availability of the requested paratransit service. If the traveler does not confirm the use of the within this time frame, the details will no longer be valid, and the traveler will have to re-request the service. This is to allow for the fluctuating nature of demand for paratransit services and to enable the best possible service to be provided at any time. *.

SIZING ATTRIBUTES

SIZE=4;

paratransit_destination

text

* This data flow is used within the Manage Transit function and contains destination of the requested paratransit service, which may not be the traveler's final destination, since the remainder of the trip may be completed by other means, e.g. regular public transit. *.

SIZING ATTRIBUTES

SIZE=3;

paratransit_personal_schedule

text

* This data flow is sent from the Manage Transit function to the Provide Driver and Traveler Services function. It consists of the following data items each of which is defined in its own DDE: *

paratransit_service_details

+ paratransit_service_cost

+ traveler_identity.

SIZING ATTRIBUTES

SIZE=0;

paratransit_pickup_location

text

* This data flow is used within the Manage Transit function and contains the location at which the requested paratransit service will pick up the traveler. The time at which the traveler will be picked up is contained in a separate data flow. The data flow consists of the following data item which is defined in its own DDE: *

location_identity.

SIZING ATTRIBUTES

SIZE=0;

paratransit_pickup_time

text

* This data flow is used within the Manage Transit function and contains the time at which the requested paratransit service will pick up the traveler. The location of the pick-up point is provided in a separate data flow. *.

SIZING ATTRIBUTES

SIZE=4;

paratransit_service_confirmation

text

* This data flow is sent by the Provide Driver and Traveler Services function to the Manage Transit function to confirm that the traveler wants to use the previously identifies paratransit service. It contains the following data items each of which is defined in its own DDE: *

paratransit_service_identity

+ transit_confirmation_flag

+ traveler_identity.

SIZING ATTRIBUTES

SIZE=0;

paratransit_service_cost

text

* This data flow is used within the Manage Transit function and contains the cost of the requested paratransit service. It consists of the following data item which is defined in its own DDE: *

cost.

SIZING ATTRIBUTES

SIZE=0;

paratransit_service_details

text

* This data flow is used within the Manage Transit function to provide details of the response to a requested paratransit service. It consists of the following data items each of which is defined in its own DDE: *

paratransit_arrival_time

+ paratransit_availability_time

+ paratransit_destination

+ paratransit_pickup_time

+ paratransit_pickup_location

+ paratransit_service_identity.

SIZING ATTRIBUTES

SIZE=0;

paratransit_service_identity

text

* This data flow is used within the Manage Transit function to provide a unique identity number for a requested paratransit service. It is sized at three (3) bytes to enable this number to be unique over a long time period. *.

SIZING ATTRIBUTES

SIZE=3;

paratransit_trip_request

text

* This data flow is sent from the Provide Driver and Traveler Services function to the Manage Transit function to action a trip request using the paratransit operation. It contains the following data items each of which is defined in its own DDE: *

traveler_identity

+ trip_request.

SIZING ATTRIBUTES

SIZE=0;

parking_lot_calculated_occupancy

text

* This data flow is used within the Manage Traffic function and contains the current occupancy of a parking lot, i.e. the number of vehicles present, calculated from traffic sensors located at its entrance(s) and exit(s). It is sized at two (2) bytes to enable a parking lot with up to 32767 spaces to be served by the Manage Traffic function. *.

SIZING ATTRIBUTES

SIZE=2;

parking_lot_charge_application_time

text

* This data flow is used within the Provide Electronic Payment Services function and contains the time at which a parking lot charge applies for a particular toll segment. The time is held as the number of seconds since a fixed reference point, from which the actual time and date can be easily computed. *.

SIZING ATTRIBUTES

SIZE=2;

parking_lot_charge_details

text

* This data flow is sent from the Provide Electronic Payment Services function to the Manage Traffic function and contains the prices being charged by each parking lot for each of its spaces, together with the time and date for which they apply. *

parking_lot_identity

+ parking_lot_price

+ parking_lot_charge_application_time

+ vehicle_type_for_charges.

SIZING ATTRIBUTES

SIZE=0;

parking_lot_charge_request

text

* This data flow is sent from the Manage Traffic function to the Provide Electronic Payment Services function and contains a request for the current prices being charged for parking lot spaces. *.

SIZING ATTRIBUTES

SIZE=1;

parking_lot_cost

text

* This data flow is used within the Provide Electronic Payment Services function. It defines the cost of particular vehicle using a space in a parking lot for a particular time period. The data flow consists of the following data item which is defined in its own DDE: *

cost.

SIZING ATTRIBUTES

SIZE=0;

parking_lot_current_occupancy

text

* This data flow is used within the Manage Traffic function and contains the parking lot identity and current occupancy. It consists of the following data items each of which is defined in its own DDE: *

parking_lot_identity

+ parking_lot_calculated_occupancy.

SIZING ATTRIBUTES

SIZE=0;

parking_lot_identity

text

* This data flow is used within the Provide Electronic Payment Services and Manage Traffic function. It contains the identity of an individual parking lot so that its charges can be defined and a control strategy applied to its use. The data flow consists of the following data items each of which is defined in its own DDE: *

unit_number

+ location_identity.

SIZING ATTRIBUTES

SIZE=0;

parking_lot_occupancy

text

* This data flow is used within the Manage Traffic function and contains the current occupancy of a parking lot, i.e. the number of vehicles present. *.

SIZING ATTRIBUTES

SIZE=2;

parking_lot_price

text

* This store is used within the Provide Electronic Payment Service function to hold data about the prices to be charged for parking lot spaces(cents). *.

SIZING ATTRIBUTES

SIZE=2;

parking_lot_state

text

* This data flow is used within the Manage Traffic function and contains the current state of a parking lot, e.g. "spaces", "almost full", "full", "closed", etc. It will have been determined from data provided by either the parking lot operator, the parking service provider, or a comparison of the actual occupancy of the parking lot determined from vehicle detectors sited at the lot entrance(s) and exit(s) with threshold values for each status condition. The state is stored as a two character code, which could typically be as follows:

SP - spaces

AF - almost full

F - full

C - closed. *.

SIZING ATTRIBUTES:

SIZE=2;

parking_lot_storage_data

text

* This data flow is used within the Manage Traffic function and contains occupancy and state data for all the parking lots in the geographic area served by the function. It consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{parking_lot_current_occupancy

+ parking_lot_identity

+ parking_lot_state}.

SIZING ATTRIBUTES

SIZE=list_size+PARKING_LOTS{parking_lot_current_occupancy+parking_lot_identity

+parking_lot_state};

parking_space_details

text

* This data flow is used within the Provide Electronic Payment Services function and contains details of the parking lot space requirements for a particular user. It consists of the following data items each of which is defined in its own DDE: *

date

+ duration

+ time.

SIZING ATTRIBUTES

SIZE=0;

planned_incident_response

text

* This data flow is used within Manage Traffic and contains details of what should be done as a response for each type of incident. It contains the following data items each of which is defined in its own DDE: *

agency_incident_response_procedures

+ traffic_control_strategy_alterations

+ vms_displays.

SIZING ATTRIBUTES

SIZE=0;

pollution_state_area_collection

text

* This data flow is used within the Manage Traffic function and contains the current states of the various types of pollution within the atmosphere in the geographic area served by the function. It consists of the following data items each of which is defined in its own DDE: *

current_ozone_pollution

+ current_nitrous_oxide_pollution

+ current_sulfur_dioxide_pollution

+ current_hydrocarbon_pollution

+ current_carbon_monoxide_pollution

+ current_particulate_pollution

+ current_pollution_location.

SIZING ATTRIBUTES

SIZE=0;

pollution_state_roadside_collection

text

* This data flow is used within the Manage Traffic function and contains the digitized values of pollution levels obtained from roadside sensors in the geographic area served by the function. It consists of the following data items each of which is defined in its own DDE: *

current_ozone_pollution

+ current_nitrous_oxide_pollution

+ current_sulfur_dioxide_pollution

+ current_hydrocarbon_pollution

+ current_carbon_monoxide_pollution

+ current_particulate_pollution

+ current_roadside_pollution_location.

SIZING ATTRIBUTES

SIZE=0;

predicted_highway_network_data

text

* This data flow is used within the Manage Traffic function and contains data about

predicted traffic conditions on links in the highway network served by the function.

This data is produced by the predictive model process. It consists of the following

data items each of which is defined in its own DDE: *

link_list_for_highways

+ list_size{link_journey_time

+ link_delay}.

SIZING ATTRIBUTES

SIZE=link_list_for_highways+HIGHWAY_LINKS{link_journey_time+link_delay};

predicted_hov_lane_data

text

* This data flow is used within the Manage Traffic function and contains prediction of

the numbers of both legal and illegal vehicles using High Occupancy Vehicle (HOV) lanes

in the road and highway network served by the function. It consists of the following

data items each of which is defined in its own DDE: *

list_size

+ list_size{hov_lane_vehicle_count

+ hov_lane_violation_count}.

SIZING ATTRIBUTES

SIZE=list_size+HOV_LANES{hov_lane_vehicle_count+hov_lane_violation_count};

predicted_incident_details

text

* This data flow is used within the Manage Traffic function and contains the details of

a predicted incident. It consists of the following data items each of which is defined

in its own DDE: *

incident_duration

+ incident_location

+ incident_number

+ incident_severity

+ incident_start_time

+ incident_type

+ incident_traffic_impact.

SIZING ATTRIBUTES

SIZE=0;

predicted_incidents

text

* This data flow is used within the Manage Traffic function and contains details of known incidents due to take place in the future. It contains the following data items each of which is defined in its own DDE: *

list_size

+ list_size{incident_location

+ incident_type

+ incident_severity

+ incident_description

+ incident_traffic_impact}.

SIZING ATTRIBUTES

SIZE=list_size+NUM_PREDICTED_INCIDENTS{incident_location+incident_type+incident_severity +incident_description+incident_traffic_impact};

predicted_incidents_data

text

* This data flow is used within the Manage Traffic function and contains data about predicted incidents. The data consists if the following items each of which is defined in its own DDE: *

list_size

+ list_size{predicted_incident_details}.

SIZING ATTRIBUTES

SIZE=list_size+MAX_PRED_INCIDENTS{predicted_incident_details};

predicted_other_routes_use

text

* This data flow is used within the Manage Traffic function. It is produced by the predictive model process and contains information about how many travelers it is predicted will be guided down each non-vehicle and non-transit route segment and the average journey time for each route segment. The data will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments), and consists of the following data items each of which is defined in its own DDE: *

route_segment_total_number

+ route_segment_total_number{route_segment_identity

+ time_period{route_segment_guided_travelers}

+ route_segment_journey_time}.

SIZING ATTRIBUTES

SIZE=route_segment_total_number+OTHER_SEGS{TIME_PERIOD{route_segment_guided_travelers}

+route_segment_journey_time+route_segment_identity};

predicted_parking_lot_data

text

* This data flow is used within the Manage Traffic function and contains predicted parking lot states produced by the predictive model process. It will apply to all the parking lots in the geographic area served by the function, and consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{parking_lot_identity

+ parking_lot_state

+ parking_lot_occupancy}.

SIZING ATTRIBUTES

SIZE=list_size+PARKING_LOTS{parking_lot_identity+parking_lot_state+parking_lot_occupancy};

predicted_road_network_data

text

* This data flow is used within the Manage Traffic function and contains data about predicted traffic conditions on links in the road network served by the function. This data is produced by the predictive model process. It consists of the following data items each of which is defined in its own DDE: *

link_list_for_roads

+ list_size{link_journey_time

+ link_delay}.

SIZING ATTRIBUTES

SIZE=link_list_for_highways+ROAD_LINKS{link_journey_time+link_delay};

predicted_road_network_use

text

* This data flow is used within the Manage Traffic function. It is produced by the predictive model process and contains information about how many vehicles it is predicted will be guided down each route segment and the average journey time for each route segment. The data will only apply to those route segments that are related to links in the road and highway network served by the Manage Traffic function. It will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments), and consists of the following data items each of which is defined in its own DDE: *

route_segment_total_number

+ route_segment_total_number{route_segment_identity

+ time_period{route_segment_guided_vehicles}

+ route_segment_journey_time}.

SIZING ATTRIBUTES

SIZE=route_segment_total_number+ROADWAY_SEGS{TIME_PERIOD{route_segment_guided_vehicles}

+route_segment_journey_time+route_segment_identity};

prediction_data

text

* This data flow is used within the Manage Traffic function and is also sent by that function to the Manage Transit and Provide Driver and Traveler Services function. It contains output from the predictive model process showing predictions of traffic data for route segments on the road and highway network served by the Manage Traffic function. The data flow consists of the following items each of which is defined in its own DDE: *

list_size

+ list_size{route_segment_identity

+ route_segment_volume_delay_predictions

+ route_segment_queue_delay_predictions

+ route_segment_occupancy_predictions}.

SIZING ATTRIBUTES

SIZE=list_size+LINKS{route_segment_identity+route_segment_volume_delay_predictions

+route_segment_queue_delay_predictions+route_segment_occupancy_predictions};

predictive_model_data_for_media

text

* This data flow is used within the Manage Traffic function. It contains a subset of the predictive model data stored by the function which will be used as the basis for traffic data that is sent to other functions. The data flow consists of the following data items each of which is defined in its own DDE: *

predicted_highway_network_data

+ predicted_hov_lane_data

+ predicted_other_routes_use

+ predicted_parking_lot_data

+ predicted_road_network_data

+ predicted_road_network_use.

SIZING ATTRIBUTES

SIZE=0;

preferences

text

* This data flow is used within the Provide Driver and Traveler Services function and is also sent to that function by the Provide Vehicle Monitoring and Control function as part of the data needed to request a route involving automatic highway system (ahs) lanes. It contains the preferences being placed on the choice of a route being requested by a driver or traveler and consists of the following data items each of which is defined in its own DDE: *

modes

+ preferred_routes

+ preferred_alternate_routes

+ preferred_route_segments

+ preferred_weather_conditions

+ preferred_ridesharing_options

+ preferred_transit_options.

SIZING ATTRIBUTES

SIZE=0;

preferred_alternate_routes

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the number of alternate routes that are to be provided to the driver or

traveler making the route request. These alternate routes will be in addition to the primary route, which will be the one that most nearly meets the specified preferences and constraints. This data flow is sized at one (1) byte to give 255 as the maximum number of alternate routes. *.

SIZING ATTRIBUTES

SIZE=1;

preferred_ridesharing_options

text

* This data flow is used within the Provide Driver and Traveler Services function and contains *.

SIZING ATTRIBUTES

SIZE=12;

preferred_route_segments

text

* This data flow is used within the Provide Driver and Traveler Services function and contains a list of preferred route segments. This is actually a list of preferred types of route segment, e.g. those containing automatic highway system (ahs) lanes. If no preference is identified, the route selection process will assume that it is free to choose any type of segment, although this will not include those with ahs lanes unless this is specifically identified. This data flow has been sized at twelve (12) bytes to enable a reasonable type selection to be made. *.

SIZING ATTRIBUTES

SIZE=12;

preferred_routes

text

* This data flow is used within the Provide Driver and Traveler Services function and

contains a list of preferred route choices, e.g. a route must go via a particular place or avoid another place. The list will comprise a list of place names and has been sized at 40 bytes to enable a reasonable choice to be made. *.

SIZING ATTRIBUTES

SIZE=40;

preferred_transit_options

text

* This data flow is used within the Provide Driver and Traveler Services function and contains *.

SIZING ATTRIBUTES

SIZE=12;

preferred_weather_conditions

text

* This data flow is used within the Provide Driver and Traveler Services function and contains . *.

SIZING ATTRIBUTES

SIZE=12;

ramp_controls

text

* This data flow is used within the Manage Traffic function and contains the actual control data to be passed to a ramp meter controller. The state will show either a proceed (green) or stop (red) state dependent on what has been determined as the best strategy for traffic entering the highway via the ramp. *.

SIZING ATTRIBUTES

SIZE=2;

ramp_identity

text

* This data flow is used within the Manage Traffic function to indentify individual ramp metering equipment used for the control of traffic entering highways. The data flow consists of the following data items each of which is defined in its own DDE: *

unit_number

+ location_identity

+ indicator_identity.

SIZING ATTRIBUTES

SIZE=0;

ramp_list

text

* This data flow is used within the Manage Traffic function and contains a list of the ramps to which a particular traffic control strategy is to be applied. The ramps are served by ramp metering equipment which has the ability to control vehicle access to the highway. The data flow consists of the following data items each of which is defined by its own DDE: *

list_size

+ 1{ramp_identity}list_size.

SIZING ATTRIBUTES:

SIZE=list_size+RAMPS{ramp_identity};

ramp_signal_state

text

* This data flow is used witin the Manage Traffic function to indicate the required state of the ramp meter contollers at the entrance to the highway ramps controlled by the TMC. The data flow consists of the following data items each of which is defined in its own DDE: *

ramp_list

+ 1{ramp_controls}list_size.

SIZING ATTRIBUTES:

SIZE=ramp_list+RAMPS{ramp_controls};

request_incident_media_data

text

* This data flow is used within the Manage Traffic function to request incident data for output to the Media Operator, or to the Media System. The request must specify whether the data to be output to the Media Operator should include current or predicted incident data, or any combination of the two, or data about a particular incident in the case of output to the Media System. The request for output must also include the geographic area(s) to be covered. *.

SIZING ATTRIBUTES

SIZE=4;

retrieved_incident_media_data

text

* This data flow is used within the Manage Traffic function and contains incident data for output to the Media Operator. It contains one or more of the following data items each of which is defined in its own DDE: *

current_incidents_data

+ defined_responses_data

+ predicted_incidents_data.

SIZING ATTRIBUTES

SIZE=0;

route

text

* This data flow is used within the Provide Driver and Traveler Services function and

contains details of a route. This will have been produced to fit the origin, destination, preferences and constraints requirements provided by a traveler through the trip request data. The route segment(s) will be in sets, one for a primary route (the nearest fit to the traveler's requirements), plus one or more alternates that may give a better modal split, or improved journey time, etc. There may be one or many route segments depending on the length of the route. The data flow consists of the following items each of which is defined in its own DDE: *

route_start_time

+ route_statistics

+ route_cost

+ route_list

+ route_segment_number{route_segment}.

SIZING ATTRIBUTES:

SIZE=route_start_time+route_statistics+route_cost+route_list+NUM_SEGS{route_segment};

route_cost

text

* This data item is used within the Provide Driver and Traveler Services function and contains the cost of using a particular route. This is made up of some or all of such things as tolls, fares, port charges, plus the cost of commercial vehicle credential filing and tax payments. The cost is shown in cents. *.

SIZING ATTRIBUTES

SIZE=3;

route_list

text

* This data flow is used within the Provide Driver and Traveler Services function and contains a list of the number of route segments in each route that is being provided to a traveler. The data flow is sized at four (4) bytes to enable a primary route plus

up to three alternates to be offered. The primary route will be that which most closely fits the traveler's requirements, whilst the others will be alternates that may give such things as improved journey time, shorter distance, lower cost, different modal split, etc. The byte entries will be filled from the lowest with a zero entry denoting that there is no further alternate routes. The data flow therefore consists of the following data item which is defined in its own DDE: *

1{route_segment_number}4.

SIZING ATTRIBUTES

SIZE=4{route_segment_number};

route_point

text

* This data flow is used within the Provide Driver and Traveler Services function. It defines a point that may be on the route that is provided in response to a trip request, or it may be part of the trip specification produced by the traveler as the trip request. In either case it may be the origin, destination, or an intermediate point which the traveler wishes to pass through, or where the trip planning facility has decided that it is necessary to change modes. *.

SIZING ATTRIBUTES

SIZE=16;

route_segment

text

* This data flow is used within the Provide Driver and Traveler Services function and forms the basic building block for a route. It consists of the following items of data each of which is defined in its own DDE: *

route_segment_data

+ route_segment_identity

+ route_segment_mode.

SIZING ATTRIBUTES

SIZE=0;

route_segment_data

text

* This data flow is used within the Provide Driver and Traveler Services function and contains information about a route segment. It consists of the following items of data each of which is defined in its own DDE: *

route_segment_estimated_condition

+ route_segment_predicted_weather

+ route_segment_end_point

+ route_segment_start_point

+ route_segment_description

+ route_segment_estimated_arrival_time

+ route_segment_estimated_travel_time

+ route_segment_report_position_points.

SIZING ATTRIBUTES

SIZE=0;

route_segment_description

text

* This data flow is used within the Provide Driver and Traveler Services function and contains a description of the physical details for the entire route segment. This data is used to provide information from which guidance can be produced in a form which is understandable by the driver, e.g. lane selection, right/left turns, etc. *.

SIZING ATTRIBUTES

SIZE=64;

route_segment_end_point

text

* This data flow is used within the Provide Driver and Traveler Services function and the Manage Traffic function. It contains the location of the end of a route segment and consists of the following data item which is defined in its own DDE: * location_identity.

SIZING ATTRIBUTES

SIZE=0;

route_segment_estimated_arrival_time

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the estimated time at which the route segment end point will be reached. The data flow is sized at five (5) bytes to enable the use of the twenty four hour clock system, plus an indicator for whether the time applies to the current or next day. *.

SIZING ATTRIBUTES

SIZE=5;

route_segment_estimated_condition

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the traffic conditions expected on the route segment at the time at which it will be used. It is sized at three (3) bytes to enable the use of a three character code to define the actual conditions. *.

SIZING ATTRIBUTES

SIZE=3;

route_segment_estimated_travel_time

text

* This data flow is used within the Provide Driver and Traveler Services function and

contains the estimated time it will take a vehicle to travel the route segment taking account of the expected conditions defined in other data. It is sized at two (2) bytes to enable the time to be in excess of 255 seconds (the maximum value for one byte), but with a maximum value of 32767 seconds. *.

SIZING ATTRIBUTES

SIZE=2;

route_segment_guided_travelers

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the number of travelers being guided along a route segment in one minute of real time. This data only applies to non-vehicle route segments and those not provided by transit services. The travelers may not actually be on the segment at the time the data is used, but will have it included in their current personal guidance data. The data flow is sized at two bytes to give a maximum of 32767 travelers per route segment per minute. *.

SIZING ATTRIBUTES

SIZE=2;

route_segment_guided_vehicles

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the number of vehicles being guided along a route segment in one minute of real time. The vehicles may not actually be on the segment at the time the data is used, but will have it included in their current route guidance data. The data flow is sized at two bytes to give a maximum of 32767 vehicles per route segment per minute and will only apply to those route segments that are used by road vehicles other than transit vehicles. *.

SIZING ATTRIBUTES

SIZE=2;

route_segment_identity

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the identity number of a route segment. A link may not be the same physical entity as a surface street or highway link (defined elsewhere), but in some cases they could be the same. The data flow consists of the following data items each of which is defined in its own DDE: *

unit_number

+ route_segment_type

+ location_identity.

SIZING ATTRIBUTES

SIZE=0;

route_segment_journey_time

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the average route segment journey time calculated from data being provided by guided vehicles. These vehicle are acting as probes in the road network by reporting their position to request fresh (updated) guidance at the beginning of each new route segment on their current route. The data is stored in seconds (secs) so that with a size of two bytes the maximum journey time for a route segment is 32767 seconds. *.

SIZING ATTRIBUTES

SIZE=2;

route_segment_mode

text

* This data flow is used within the Provide Driver and Traveler Services function and

contains the mode that has been selected for use within the route segment. The choice of mode is made as part of the trip planning process using one of those listed in the "modes" data flow. Only one mode can be used in any single route segment. This gives a size of three (3) bytes to accommodate the three character code used to define the mode. *.

SIZING ATTRIBUTES

SIZE=3;

route_segment_number

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the number of segments in a route that is being provided in response to a trip request from a traveler. The maximum number of route segments allowed in a route is two hundred and fifty five (255). *.

SIZING ATTRIBUTES

SIZE=1;

route_segment_occupancy_predictions

text

* This data flow is used within the Manage Traffic function and is also sent by that function to the Manage Transit and Provide Driver and Traveler Services function. It contains output from the predictive model process showing predictions of the occupancy for route segments on the road and highway network served by the Manage Traffic function. This occupancy is shown as a percentage (%) value with zero (0) meaning that there are no vehicles present and one hundred (100) meaning that the vehicles are not moving. The data flow is sized at one (1) byte as its value can never be greater than 100, i.e. 100%. *.

SIZING ATTRIBUTES

SIZE=1;

route_segment_predicted_weather

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the weather conditions expected on the road segment at the time at which it will be used. It is sized at three (3) bytes to enable the use of a three character code to define the actual conditions. *.

SIZING ATTRIBUTES

SIZE=3;

route_segment_queue_delay_predictions

text

* This data flow is used within the Manage Traffic function and is also sent by that function to the Manage Transit and Provide Driver and Traveler Services function. It contains output from the predictive model process showing predictions of the delay(s) due to traffic queues for route segments on the road and highway network served by the Manage Traffic function. This delay is the additional time that a vehicle will take to move from the start of a route segment to its end, above that which it would need in totally free flow conditions. The queues may be caused by very high traffic flows such that the traffic cannot all physically fit into certain part(s) of the roads and highways. The data flow is sized at two (2) bytes to take account of the long segments that may be present on highways and in rural areas. *.

SIZING ATTRIBUTES

SIZE=2;

route_segment_report_position_points

text

* This data flow is used within the Provide Driver and Traveler Services function and contains a list of any points other than those at the route segment start and end

where the vehicle’s position is to be reported. It consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{route_segment_way_point}.

SIZING ATTRIBUTES

SIZE=list_size+MAX_SEG_WPS{route_segment_way_point};

route_segment_start_point

text

* This data flow is used within the Provide Driver and Traveler Services function and the Manage Traffic function. It contains the location of the start of a route segment and consists of the following data item which is defined in its own DDE: * location_identity.

SIZING ATTRIBUTES

SIZE=0;

route_segment_total_number

text

* This data flow is used within the Manage Traffic and Provide Driver and Traveler Services function to define the total number of route segments in the road (surface street) and highway network served by the Manage Traffic function. This may be different from that served by the Provide Driver and Traveler Services function, and in this instance is used to define the number of route segments for which probe vehicle data is being provided to the Manage Traffic function, or the total number of route segments used by non-vehicle modes (walking, cycling, etc.) for which journey times are available. The data flow is sized at two bytes to enable the maximum number of route segments to be up to 32767. *.

SIZING ATTRIBUTES

SIZE=2;

route_segment_type

text

* This data flow is used within the Manage Traffic, Provide Driver and Traveler Services and Plan System Deployment functions. It contains the definition of the type of route segment which will depend on the types of use it will support. The data flow is sized as a three (3) character string which is used to defined the supported types in the following way:

ATV - any type of vehicle

OCV - commercial vehicles only

OTR - transit vehicles only

OCT - commercial and transit vehicles

OPC - private cars and vans only

OBC - bicycles only

PNV - all pedestrians, no vehicles

DPO - disabled pedestrians only, no vehicles

RRS - road route segment

HRS - highway route segment. *.

SIZING ATTRIBUTES

SIZE=3;

route_segment_use_prediction

text

* This data flow is used within the Provide Driver and Traveler Services function. It contains data about the number of guided vehicles that will be using a route segment over a set of time periods. Typically these time periods will cover five (5) minutes as so far as traffic management is concerned there is no advantage in providing a greater resolution. The data flow consists of the following data items each of which is defined in its own DDE: *

time_period{route_segment_guided_vehicles}.

SIZING ATTRIBUTES

SIZE=TIME_PERIOD{route_segment_guided_vehicles};

route_segment_volume_delay_predictions

text

* This data flow is used within the Manage Traffic function and is also sent by that function to the Manage Transit and Provide Driver and Traveler Services function. It contains output from the predictive model process showing predictions of the delay(s) due to traffic volume for route segments on the road and highway network served by the Manage Traffic function. This delay is the additional time that a vehicle will take to move from the start of a route segment to its end, above that which it would need in totally free flow conditions. The data flow is sized at two (2) bytes to take account of the long segments that may be present on highways and in rural areas. *.

SIZING ATTRIBUTES

SIZE=2;

route_segment_way_point

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the location of a point part way along a route segment at which a vehicle's position is to be reported. It consists of the following data item which is defined in its own DDE: *

location_identity.

SIZING ATTRIBUTES

SIZE=0;

route_start_time

text

* This data flow is used within the Provide Driver and Traveler Services function. It contains the date and time at which a route will start taken from the time specified in the request for the route. The data flow consists of the following data items each of which is defined in its own DDE: *

date

+ time.

SIZING ATTRIBUTES

SIZE=0;

route_statistics

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the overall predicted statistics associated with a route which may assist the traveler in making a final route selection. The statistics will include such things as itinerary, estimated net travel time, time of arrival, total distance, anticipated delays/congestion, etc. *.

SIZING ATTRIBUTES:

SIZE=25;

stored_credit

text

* This data flow is used within the Provide Electronic Payment Services function and contains the value of the credit currently stored by the payment instrument. This value is stored in cents (US) and has a maximum value of 32767. *.

SIZING ATTRIBUTES

SIZE=2;

time

text

* This data flow is used within many ITS functions. It contains the current time of day and will be associated with other data flows and (possibly) a date. Although 17 bits would be required to provide 1 second granularity, a 16 bit data element supports time accurate to within a few seconds and will be sufficient for all ITS applications. *.

SIZING ATTRIBUTES:

SIZE = 2;

toll_cost

text

* This data flow is used within the Provide Electronic Payment Services function and defines the cost of the toll for a particular vehicle through a toll plaza (cents), thus giving it the ability to use the toll segment governed by the toll plaza. *.

SIZING ATTRIBUTES

SIZE=2;

toll_price

text

* This data flow is used within the Provide Electronic Payment Services function and contains the price (cents) for each road segment to which a toll can be applied. *.

SIZING ATTRIBUTES

SIZE=2;

toll_price_application_time

text

* This data flow is used within the Provide Electronic Payment Services function and contains the time at which a toll price applies for a particular toll segment. The time is held as the number of seconds since a fixed reference point, from which the actual time and date can be easily computed. *.

SIZING ATTRIBUTES

SIZE=2;

toll_price_details

text

* This data flow is sent from the Provide Electronic Payment Services function to the Manage Traffic function and contains the price for each road segment to which a toll applies, with the time and date for when it applies. This data will be used by the Manage Travel Demand facility in its efforts to re-distribute travel demand to the more efficient providers. The data flow consists of the following data items each of which is defined in its own DDE: *

toll_segments

+ toll_price

+ toll_price_application_time

+ vehicle_type_for_tolls.

SIZING ATTRIBUTES

SIZE=0;

toll_price_request

text

* This data flow is sent from the Manage Traffic function to the Provide Electronic Payment Services function and contains a request for the current prices being charged for toll segments on the road and highway network. *.

SIZING ATTRIBUTES

SIZE=1;

toll_route_segments

text

* This data flow is used within the Provide Electronic Payment Services function and contains the identity of toll segments for which toll payment is being provided or

requested. It consists of the following data for a specific route. The size definition below is based on the assumption that toll segments occur in about the same frequency as the percentage of toll road miles to total freeway miles. The data flow consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{toll_segment_identity}.

SIZING ATTRIBUTES

SIZE=list_size+1{ROUTE_SEGS{TOLL_MILES/HIGHWAY_MILES}}{toll_segment_identity};

toll_segment_identity

text

* This data flow is used within the Provide Electronic Payment Services function and the Provide Driver and Traveler Services function. It contains the identity number of a toll segment, which may not be the same physical entity as a route segment or a link as used by traffic management processes. The data flow consists of the following data items each of which is defined in its own DDE: *

unit_number.

SIZING ATTRIBUTES

SIZE=0;

toll_segments

text

* This data flow is used within the Provide Electronic Payment Serivces function and contains the identity of the toll segment for which toll payment is being provided or requested, or for which toll price data is stored. It consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{toll_segment_identity}.

SIZING ATTRIBUTES

SIZE=list_size+TOLL_SEGS{toll_segment_identity};

traffic_control_strategy_alterations

text

* This data flow is used within the Manage Traffic function and contains the traffic control actions necessary to minimise the impact of an incident. *.

SIZING ATTRIBUTES

SIZE=1024;

traffic_data_for_media

text

* This data flow is used within the Manage Traffic function. It contains the response to a request for particular data to be retrieved from the stores of current, long term and predictive model data. This data will be used as the basis for traffic information data that is provided to other ITS functions. The data flow consists of the following data items each of which is defined in its own DDE: *

current_data_for_media

+ long_term_data_for_media

+ predictive_model_data_for_media.

SIZING ATTRIBUTES

SIZE=0;

traffic_data_media_parameters

text

* This data flow is used within the Manage Traffic function and contains parameters used to define the actual data elements that are required for each request for output data by the media. This data flow is the result of input of new parameters and/or updates to the current set of parameters by the traffic operations personnel. *.

SIZING ATTRIBUTES

SIZE=64;

traffic_data_media_request

text

* This data flow is used within the Manage Traffic function and contains a request for particular data to be retieved from the stores of long term and current traffic data. This data will be used by the media as the basis for output that it generates. *.

SIZING ATTRIBUTES

SIZE=2;

traffic_flow_state

text

* This data flow is used within the Manage Traffic function. It contains data showing the current traffic flow conditions on roads (surface streets), freeways and ramps served by the function. It also includes flows in high occupancy vehicle (hov) lanes from the same area. The data is a subset of that in the current and long term data stores and is used as a means of "packaging" the data for distribution to users such as ISP’s. The data flow consists of the following data items each of which is defined in its own DDE: *

ramp_signal_state

+ current_roadway_network_data

+ current_road_network_use

+ hov_lane_data

+ link_data_from_tags.

SIZING ATTRIBUTES

SIZE=0;

traffic_impact_criteria

text

* This data contains the criteria for calculating the impact an incident will have on traffic flows. *.

SIZING ATTRIBUTES

SIZE=256;

transit_confirmation_flag

text

* This data flow is used within the Manage Transit function to indicate that a paratransit service is to be used (set to 1) or not set to (999). *.

SIZING ATTRIBUTES

SIZE=1;

transit_deviation_data_received

text

* This data flow is used within the Manage Transit function and contains an indication that new data about transit service deviations has been received and is now in the local store of this data. The process(es) receiving this data is(are) expected to take action automatically to output the new data to other functions that are outside the scope of the ITS. *.

SIZING ATTRIBUTES

SIZE=1;

transit_driver_emergency_request

text

* This data flow is used within the Manage Transit function and contains a request for action because a transit driver has identified an emergency situation on-board or close to a transit vehicle. Details of the transit vehicle identity and location are provided through accompanying data flows. *.

SIZING ATTRIBUTES

SIZE=2;

transit_fare

text

* This data flow is used within the Manage Transit function and contains the actual cost (cents) for the transit user to travel over a route in the transit network, i.e. the cost of going from a particular origin on a transit route to a particular destination on (possibly another) transit route. *.

SIZING ATTRIBUTES

SIZE=2;

transit_fare_data

text

* This data flow is used within the Provide Electronic Payment Services function and contains details of the fares being currently charged for transit services. It consists of the following item which is defined in its own DDE: *

list_size

+ list_size{transit_fares}.

SIZING ATTRIBUTES

SIZE=list_size+NUM_TRANSIT_ROUTES{transit_fares};

transit_fare_data_request

text

* This data flow is used within the Provide Electronic Payment Services function. It contains a request for the current transit fare price data to be provided from the store that is being used to calculate transit fares. *.

SIZING ATTRIBUTES

SIZE=1;

transit_fare_details

text

* This data flow is sent from the Provide Electronic Payment Services function to the Manage Traffic function and contains details of the fares being currently charged for transit services. It consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{transit_route_number

+ transit_route_segment_list

+ transit_user_category

+ transit_route_use_time}.

SIZING ATTRIBUTES

SIZE=list_size+NUM_TRANSIT_ROUTES{transit_route_number+transit_route_segment_list +transit_user_category+transit_route_use_time};

transit_fare_request

text

* This data flow is sent from the Manage Traffic function to the Provide Electronic Payment Services function and contains a request for the current prices being charged for transit fares. *.

SIZING ATTRIBUTES

SIZE=1;

transit_fares

text

* This data item is used within the Manage Transit function. It contains the current fare for each segment of a transit route in the network. The data flow consists of the following data items each of which is defined in its own DDE: *

transit_route_number

+ transit_route_segment_list

+ transit_user_category

+ transit_route_use_time.

SIZING ATTRIBUTES

SIZE=0;

transit_incident_details

text

* This data flow is sent from the Manage Transit function to the Manage Emergency Services function and contains details of an incident in the transit operations network. It consists of the following data items each of which is defined in its own DDE: *

incident_location

+ incident_start_time

+ incident_duration

+ incident_severity.

SIZING ATTRIBUTES

SIZE=0;

transit_incident_extra_data

text

* This data flow is used within the Manage Transit function and contains details of any additional data relevant to a transit incident which the transit system operator requires to be output. This data is in addition to that specified in the accompanying transit incident required action data flow. *.

SIZING ATTRIBUTES

SIZE=256;

transit_incident_location

text

* This data flow is used within the Manage Transit function and contains the location of an incident that has occurred in the transit operations network. The location will be something other than a transit vehicle and so will be at a fixed point. The data flow consists of the following data item which is defined in its own DDE: * location_identity.

SIZING ATTRIBUTES

SIZE=0;

transit_journey_date

text

* This data flow is used within the Provide Electronic Payment Services and Manage transit functions. It gives the date and time at which a transit journey is to be made by a traveler as a transit user and is used for trip planning purposes only. The data flow consists of the following data items each of which is defined in its own DDE: * date

+ time.

SIZING ATTRIBUTES

SIZE=0;

transit_media_emergency_information

text

* This data flow is used within the Manage Transit function and contains information about an emergency that has been detected on board a transit vehicle following input from a transit user or transit vehicle driver. The data is in its raw form and requires processing before it can be output to the media. It consists of the following data items each of which is defined in its own DDE: * transit_driver_emergency_request

+ transit_media_emergency_interface_parameters

+ transit_user_emergency_request

+ transit_vehicle_location.

SIZING ATTRIBUTES

SIZE=0;

transit_media_emergency_interface_parameters

text

* This data flow is used within the Manage Transit function and contains parameters used to define the content and form of data that is automatically output to the media following an emergency in the transit operations network. It covers incidents to both transit users and vehicles and is principally concerned with emergencies that have taken place on-board transit vehicles. The data in the flow is set up by the transit system operator and enables some control to be exercised of the information being output, e.g. the suppression of some details where such things as acts of terrorism may be involved. *.

SIZING ATTRIBUTES

SIZE=256;

transit_media_incident_information

text

* This data flow is used within the Manage Transit function and contains information about an incident that has been automatically detected at a transit facility. The data is in its raw form and requires processing before it can be output to the media. It consists of the following data items each of which is defined in its own DDE: *

transit_incident_details

+ transit_incident_extra_data

+ transit_incident_location

+ transit_media_incident_interface_parameters.

SIZING ATTRIBUTES

SIZE=0;

transit_media_incident_interface_parameters

text

* This data flow is used within the Manage Transit function and contains parameters used to define the content and form of data that is automatically output to the media following an incident in any part of the transit facilities. It covers incidents to transit users, and may have taken place at a transit stop or in some other transit operating facility. The data in the flow is set up by the transit system operator and enables some control to be exercised of the information being output, e.g. the suppression of some details where such things as acts of terrorism may be involved. *.

SIZING ATTRIBUTES

SIZE=256;

transit_route_current_use

text

* This data flow is used within the Provide Driver and Traveler Services functions. It contains a count of the number of travelers who have selected a particular route as part of their on-line guidance or through trip planning requests. The data flow is sized at two (2) bytes to enable a realistic number of travelers to be accommodated. *.

SIZING ATTRIBUTES

SIZE=2;

transit_route_destination

text

* This data flow is used within the Manage Transit and Provide Electronic Payment Services functions. It contains the destination of a transit route to be used by a traveler (advanced fares) or transit user. The destination will be defined as the name of a transit stop and provided as a string of up to twenty (20) alphanumeric

characters. This should enable each destination to be uniquely identified allowing for the use of a common town or city name. *.

SIZING ATTRIBUTES

SIZE=20;

transit_route_number

text

* This data flow is used within the Manage Transit function and contains the number of a regular transit route. This is stored as a four (4) character string to enable the use of alphanumeric characters so that the route number may be the same as that seen by transit users, e.g. 141A, or N177, etc. *.

SIZING ATTRIBUTES

SIZE=4;

transit_route_origin

text

* This data flow is used within the Manage Transit and Provide Electronic Payment Services functions. It contains the origin of a transit route to be used by a traveler (advanced fares) or transit user.. The origin will be defined as the name of a transit stop and provided as a string of up to twenty (20) alphanumeric characters. This should enable each destination to be uniquely identified allowing for the use of a common town or city name. *.

SIZING ATTRIBUTES

SIZE=20;

transit_route_schedule_number

text

* This data flow is used within the Mange Transit function and contains the number of the transit service that is operating on a particular route. This number may be in the

range 1 to 255 and hence is sized at one (1) byte. *.

SIZING ATTRIBUTES

SIZE=1;

transit_route_segment_cost

text

* This data flow is used within the Manage Transit function and contains the cost (cents) of the

use

of a particular transit route segment. It can only be used in association with the segment

number,

the category of the transit user and the time at which the route is used. *.

SIZING ATTRIBUTES

SIZE=2;

transit_route_segment_list

text

* This data flow is used within the Manage Transit function. It contains a list of the

transit route segments that make up a particular transit route, plus the cost to a

transit user for using each segment and the identity of the road or freeway link(s)

over which the route segment runs. The data flow consists of the following data items

each of which is defined in its own DDE: *

list_size

+ list_size{link_identity_list

+ transit_route_segment_number

+ transit_route_segment_cost}.

SIZING ATTRIBUTES

SIZE=list_size+TRANSIT_SEGS{link_identity_list+transit_route_segment_number

+transit_route_segment_cost};

transit_route_segment_number

text

* This data flow is used within the Manage Transit function. It contains the number of a transit route segment within the transit route on which it lies. The data flow is sized at two (2) bytes to enable the numbering system to accommodate a large number of stops, which may be required for long routes. *.

SIZING ATTRIBUTES

SIZE=2;

transit_route_stop_data

text

* This data flow is used within the Manage Transit function and contains data for each of the transit stops that make up a particular transit route. It consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{transit_route_schedule_number

+ transit_stop_scheduled_time}.

SIZING ATTRIBUTES

SIZE=list_size+NUM_TRANSIT_SERVICES{transit_route_schedule_number

+transit_stop_scheduled_time};

transit_route_stop_list

text

* This data flow is used within the Manage Transit function and is a list of the transit stops that make up a particular transit route and the time at which services on the route will arrive at each stop. It consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{transit_route_stop_number

+ transit_route_stop_data}.

SIZING ATTRIBUTES

SIZE=transit_route_stop_number+list_size

+NUM_TRANSIT_SERVICES{transit_route_schedule_number+transit_stop_scheduled_time};

transit_route_stop_number

text

* This data flow is used within the Manage Transit function and contains the identity number of a transit stop on a transit route. It is sized at one (1) byte to enable a maximum of 255 stops to be specified on one route. The identity of the route number that goes with the stop is carried in an accompanying data flow. *.

SIZING ATTRIBUTES

SIZE=1;

transit_route_use_time

text

* This data flow is used within the Manage Transit function and contains the time at which the associated transit fare will apply, e.g. weekday morning peak, Sunday, public holiday, etc. *.

SIZING ATTRIBUTES

SIZE=2;

transit_routes_data

text

* This data flow is used within the Manage Transit function. It contains details of the routes being provided by the transit operation. The list of route segments contains the identity of each link in the road and freeway network associated with the segment to enable them to be output on top of a display of digitized map data. The data flow consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{transit_route_number

+ transit_route_segment_list

+ transit_route_stop_number}.

SIZING ATTRIBUTES

SIZE=list_size+NUM_TRANSIT_ROUTES{transit_route_number+transit_route_segment_list

+transit_route_stop_number};

transit_schedule_data

text

* This data flow is used within the Manage Transit function and contains the schedule

of services on each transit vehicle route and the cost to the transit user of the use

of each route segment. It consists of the following data items each of which is

defined in its own DDE: *

list_size

+ list_size{transit_route_number

+ transit_route_segment_list

+ transit_route_stop_list

+ transit_schedule_identity}.

SIZING ATTRIBUTES

SIZE=list_size+NUM_TRANSIT_ROUTES{transit_route_number+transit_route_segment_list

+transit_route_stop_list};

transit_schedule_identity

text

* This data flow is used within the Manage Transit function and contains the identity of

a particular set of transit schedules. This identity is sized at sixteen (16) bytes to

enable the identity to include a short description of when (day and/or period) the

schedule is expected to apply. *.

SIZING ATTRIBUTES

SIZE=16;

transit_services

text

* This data flow is sent by the Manage Transit function to other ITS functions. It contains a complete set of all the transit routes and the services that run upon them, including timings, etc. that are currently being provided by the transit fleet. This data is a processed version of the raw data to enable it to be easily understood by the recipients such as drivers and travelers. The data flow consists of the following items of data both of which are defined in their own DDE: *

transit_routes_data

+ transit_schedule_data

+ map_transit_data.

SIZING ATTRIBUTES

SIZE=0;

transit_services_advisories_request

text

* This data flow is sent from the Provide Driver and Traveler Services function to the Manage Transit function. It is a request for supply of details of the services being currently provided by the transit fleet and will be used in the preparation of on-line driver and traveler advisory data for output to vehicles. *.

SIZING ATTRIBUTES

SIZE=32;

transit_services_for_advisory_data

text

* This data flow is sent from the Manage Transit function to the Provide Driver and

Traveler Services function. It contains a complete set of all the transit routes and the services that run upon them, including timings, etc. that are provided by the transit fleet from which the data was requested, for use in the preparation of driver and traveler advisory information for output on-board vehicles. It consists of the following data item which is defined in its own DDE: *

transit_services.

SIZING ATTRIBUTES

SIZE=0;

transit_services_for_guidance

text

* This data flow is sent from the Manage Transit function to the Provide Driver and Traveler Services function. It contains a complete set of all the transit routes and the services that run upon them, including timings, etc. that are provided by the transit fleet from which the data was requested, for use in the preparation of data for output as on-line driver and traveler guidance data. The data flow consists of the following data items each of which is defined in its own DDE: *

1{transit_services_for_output}2

+ traveler_identity.

SIZING ATTRIBUTES

SIZE=2{transit_services_for_output}+traveler_identity;

transit_services_for_output

text

* This data flow is used within the Manage Transit function and contains details of the transit route(s) that fulfil the origin-destination requirements of a particular transit user or traveler’s request. The data flow consists of the following data items each of which is defined in its own DDE: *

transit_route_number

+ list_size

+ list_size{transit_route_segment_number

+ transit_route_segment_cost

+ transit_stop_scheduled_time}.

SIZING ATTRIBUTES

SIZE=transit_route_number+list_size+TRANSIT_SEGS{transit_route_segment_number

+transit_route_segment_cost+transit_stop_scheduled_time};

transit_services_guidance_request

text

* This data flow is sent from the Provide Driver and Traveler Services function to the Manage Transit function. It is a request for supply of details of the services being currently provided by the transit fleet and will be used in the preparation of on-line traveler guidance data. The process(es) that are providing the interface through which the traveler is obtaining the on-line guidance will have to provide the origin and destination so that the receiving process in the Manage Transit function can work out for which transit route(s) data will be provided. The data flow consists of the following data items each of which is defined in its own DDE: *

destination

+ origin

+ traveler_identity.

SIZING ATTRIBUTES

SIZE=0;

transit_stop_scheduled_time

text

* This data flow is used within the Manage Transit function and contains the time at which a transit vehicle is scheduled to reach each stop on a transit route. This will thus be the scheduled time of arrival at the end of a transit route segment. The

identity of the transit route segment to which this data applies is carried in an accompanying data flow. The data flow consists of the following data item which is defined in its own DDE: *

time.

SIZING ATTRIBUTES

SIZE=0;

transit_user_category

text

* This data flow is used within the Manage Transit function and contains the category of transit user to which the associated transit fare applies, e.g. adult, child, senior citizen, disabled, etc. *.

SIZING ATTRIBUTES

SIZE=1;

transit_user_emergency_request

text

* This data flow is used within the Manage Transit function and contains a request for action because a transit user has identified an emergency situation on-board or close to a transit vehicle. Details of the transit vehicle identity and location are provided through accompanying data flows. *.

SIZING ATTRIBUTES

SIZE=2;

transit_user_payments_transactions

text

* This data flow is used within the Provide Electronic Payment Services function and contains records of all payment transactions for the provision of other (yellow pages) services to transit users. *.

SIZING ATTRIBUTES

SIZE=128;

transit_vehicle_achieved_time

text

* This data flow is used within the Manage Transit function and contains the time at which a transit vehicle actually reached the end of a transit route segment. This point is usually a transit stop and the data is thus the arrival time of a transit vehicle at each of the transit stop(s) along the transit route. The identity of the transit route segment to which this data applies is carried in an accompanying data flow. The data flow consists of the following data item which is defined in its own DDE: *

time.

SIZING ATTRIBUTES

SIZE=0;

transit_vehicle_collected_trip_data

text

* This data flow is used by processes within the Manage Transit function and contains data collected from the transit vehicle. The data is produced by sensors analyzing conditions on-board the vehicle during the course of its operation. The data flow consists of the following data items each of which is defined in its own DDE: *

transit_vehicle_passenger_loading

+ transit_vehicle_running_times.

SIZING ATTRIBUTES

SIZE=0;

transit_vehicle_deviation_update

text

* This data flow is used within the Manage Transit function. It contains the estimated time of arrival of several transit vehicles at stop(s) along their route(s) plus the route and service number on which they are operating. It is used for multiple transit vehicle deviations where one or more routes are affected and consists of the following data items each of which is defined in its own DDE: *

list_size

+ 1{transit_vehicle_identity

+ transit_vehicle_time

+ transit_route_number

+ transit_route_segment_number}list_size.

SIZING ATTRIBUTES:

SIZE=TRANSIT_VEH_DEVS{transit_vehicle_identity+transit_vehicle_time+transit_route_number};

transit_vehicle_deviations_details

text

* This data flow is used within the Manage Transit function. It contains details of the deviations of transit vehicles from their published routes and schedules and is used as a source of data to be sent to processes in other functions. The data flow consists of the following data items each of which is defined in is own DDE: *

transit_vehicle_eta

+ transit_vehicle_collected_trip_data

+ transit_vehicle_deviation_update

+ transit_vehicle_location

+ transit_vehicle_schedule_deviations.

SIZING ATTRIBUTES

SIZE=0;

transit_vehicle_deviations_details_request

text

* This data flow is used within the Manage Transit function. It contains a request for output of the details of the deviations of transit vehicles from their published routes and schedules for use as a source of data to be sent to processes in other functions.*.

SIZING ATTRIBUTES

SIZE=1;

transit_vehicle_eta

text

* This data flow is used within the Manage Transit function. It contains the estimated time of arrival of a transit vehicle at the end of a transit route segment, which is usually a stop, plus the route and service number on which it is operating. It is used for individual transit vehicle deviations and contains the following data items each of which is defined in its own DDE: *

transit_vehicle_identity

+ transit_vehicle_time

+ transit_route_number.

SIZING ATTRIBUTES

SIZE=0;

transit_vehicle_identity

text

* This data flow is used within the Manage Transit function and contains the identity of an individual transit vehicle. This data is used by processes within the function to identify the source and/or ownership of other data. *.

SIZING ATTRIBUTES

SIZE=16;

transit_vehicle_location

text

* This data flow is used within the Manage Transit function to provide the exact location of the transit vehicle. It contains the transit vehicle location plus the its identity and consists the following items each of which is defined in its own DDE: *

transit_vehicle_identity

+ transit_vehicle_location_data.

SIZING ATTRIBUTES

SIZE=0;

transit_vehicle_location_data

text

* This data flow is used within the Manage Transit function to provide the exact location of the transit vehicle. It is based on the standard vehicle location data supplemented with additional data that is only relevant to transit vehicles. The data flow consists of the following data item which is defined in its own DDE: *

location_identity.

SIZING ATTRIBUTES

SIZE=0;

transit_vehicle_passenger_loading

text

* This data flow is used by processes within the Manage Transit function and contains the number of passengers (transit users) carried by a transit vehicle on each part of its route, i.e. each transit route segment. The data flow consists of the following data items each of which is defined in its own DDE: *

transit_vehicle_identity

+ transit_route_number

+ list_size

+ list_size{transit_route_segment_number + transit_vehicle_passengers}.

SIZING ATTRIBUTES

SIZE=transit_vehicle_identity+transit_route_number+list_size

+TRANSIT_ROUTE_SEGS{transit_route_segment_number+transit_vehicle_passengers};

transit_vehicle_passengers

text

* This data flow is used within the Manage Transit function and contains a count of the number of passengers (transit users) that were on-board a transit vehicle on a particular transit route segment. This data is measured by counting the numbers of transit users that enter and leave the vehicle at each transit stop, and is determined independently of any transit fare collection process. The size has been set at two bytes to enable the number of passengers on a transit vehicle to reach a maximum of 37267, which may be possible with multi-carriage units of the type employed on some metro and mass-transit systems. *.

SIZING ATTRIBUTES

SIZE=2;

transit_vehicle_running_times

text

* This data flow is used within the Manage transit function. It contains the time at which it is expected that a transit vehicle will reach the end of each transit route segment on its route and is used to determine any schedule deviations. The end of a transit route segment is usually a transit stop and the data is thus the expected arrival time of a transit vehicle at each of the transit stop(s) along the transit route. The data flow consists of the following data items each of which is defined in its own DDE: *

transit_route_number

+ list_size

+ list_size{transit_route_segment_number

+ transit_stop_scheduled_time}.

SIZING ATTRIBUTES

SIZE=transit_route_number+ list_size

+TRANSIT_ROUTE_SEGS{transit_route_segment_number+transit_stop_scheduled_time};

transit_vehicle_schedule_deviations

text

* This data flow is sent from the Manage Transit function to processes in the Provide Driver and Traveler Services function. It contains the deviations of transit vehicles from their published routes and schedules at transit route segments that have already been completed, i.e. at transit stops that have been passed by the vehicle. The data is used to provide information about the current state of the transit service operation to a traveler, and consists of the following data items each of which is defined in its own DDE: *

list_size

+ list_size{transit_vehicle_identity

+ transit_vehicle_achieved_time

+ transit_route_number

+ transit_route_segment_number}.

SIZING ATTRIBUTES

SIZE=list_size+ITS_TRANSIT_VEHS{transit_vehicle_identity+transit_vehicle_achieved_time

+transit_route_number+transit_route_segment_number};

transit_vehicle_time

text

* This data flow is used within the Manage Transit function. It contains the estimated time of arrival of a transit vehicle at the end of the next transit route segment not so far reached during its journey along the transit route. The end of a transit route segment is usually a transit stop and the data is thus the estimated arrival time of a transit vehicle at each of the remaining transit stop(s) along the transit route. The

identity of the transit route segment to which this data applies is carried in an accompanying data flow. The time is stored as a seven (7) character string in the format 'hhmmssd'. The first six characters show the time using the 24-hour clock system, whilst the last character is an indicator to show whether the time applies to the day on which the schedule started, or the next day.. *.

SIZING ATTRIBUTES

SIZE=7;

traveler_identity

text

* This data flow is used within the Provide Driver and Traveler Services function and contains the identity of the traveler who is making a request for information or guidance, so that the results of the request can be sent back to the originating traveler. It may be passed to processes in functions outside the Provide Driver and Traveler Services function for the same purpose. The identity can be up to twenty four (24) alphanumeric characters so that (for example) the traveler's family name and initials can be used. *.

SIZING ATTRIBUTES

SIZE=24;

trip_request

text

* This data flow is used within the Provide Driver and Traveler Services function as a means of specifying the parameters needed for a trip or route to be provided to a driver or traveler. It consists of the following data items each of which is defined in its own DDE: *

origin

+ destination

+ departure_time

+ desired_arrival_time

+ preferences

+ constraints.

SIZING ATTRIBUTES

SIZE=0;

unit_number

text

* This data flow is used within the Manage Traffic function to provide an identification number of a particular piece of equipment, e.g. intersection signal controller, pedestrian signal controller, variable message sign (vms), ramp meter, parking lot, road/highway link, toll segment, traffic sensor, etc. The actual form of the number is defined as a five (5) byte character string, enabling a flexible alphanumeric based numbering system to be used rather than a more rigid entirely numeric based system. *.

SIZING ATTRIBUTES

SIZE=5;

vehicle_identity

text

* This data flow is used within the Manage Commercial Vehicles function and contains the identity of a vehicle (16 characters). *.

SIZING ATTRIBUTES

SIZE=16;

vehicle_smart_probe_data_for_storage

text

* This data flow is used within the Manage Traffic function. It contains the processed vehicle smart probe data collected from a roadside unit, which in turn have received data output by suitably equipped vehicles as they pass by. The data flow consists of

the following data items each of which is defined in its own DDE: *

vehicle_smart_probe_data_source

+ vehicle_smart_probe_data_indication.

SIZING ATTRIBUTES

SIZE=0;

vehicle_smart_probe_data_indication

text

* This data flow is used within the Manage Traffic function. It contains the data from a vehicle mart probe, processed to provide an indication of the type of hazard that the vehicle found on the road or freeway. The indication will be shown as a three (3) byte character code, comprising but not limited to the following:

BDN - bridge down, i.e. broken, or in some way hazardous to traffic;

ESD - earth or mud slide;

FOG - fog, smoke or mist reducing visibility;

ICE - the road surface is icy;

LOR - road covered by a liquid, e.g. oil, which makes it hazardous to traffic;

OOR - obsticle on road, e.g. fallen treee, telegraph pole, etc.;

RSS - road subsidance, i.e part of the road surface has fallen away. *.

SIZING ATTRIBUTES

SIZE=3;

vehicle_smart_probe_data_source

text

* This data flow is used within the Manage Traffic function. It contains the identity and location of the roadside unit that has collected a particular vehicle smart probe data. The data flow consists of the following data items each of which is defined in its own DDE: *

vehicle_smart_probe_data_source_identity

+ vehicle_smart_probe_data_source_location.

SIZING ATTRIBUTES

SIZE=0;

vehicle_smart_probe_data_source_identity

text

* This data flow is used within the Manage Traffic function. It contains the identity of the roadside unit that has collected a particular vehicle smart probe data. The data flow consists of the following data item which is defined in its own DDE: * unit_number.

SIZING ATTRIBUTES

SIZE=0;

vehicle_smart_probe_data_source_location

text

* This data flow is used within the Manage Traffic function. It contains the location of the roadside unit that has collected a particular vehicle smart probe data. The data flow consists of the following data item which is defined in its own DDE: * location_identity.

SIZING ATTRIBUTES

SIZE=0;

vehicle_smart_probe_stored_data

text

* This data flow is used within the Manage Traffic function. It contains the processed vehicle smart probe data collected from roadside units. The data flow consists of the following data items each of which is defined in its own DDE: * list_size

+ list_size{vehicle_smart_probe_data_for_storage}.

SIZING ATTRIBUTES

SIZE=list_size+VEH_PROBE_SITES{vehicle_smart_probe_data_for_storage};

vehicle_type

text

* This data flow is used within the Manage Traffic function and contains an identifier for the type of vehicle for which pollution violations have been detected. The data is stored as up to eight alphanumeric characters. *.

SIZING ATTRIBUTES

SIZE=8;

vehicle_type_for_charges

text

* This data flow is used within the Provide Electronic Payment Services function and contains the vehicle type as determined from processing of the vehicle’s characteristics for the purpose of paying for parking lot charges. *.

SIZING ATTRIBUTES

SIZE=16;

vehicle_type_for_tolls

text

* This data flow is used within the Provide Electronic Payment Services function and contains the vehicle type and identity as determined from processing of the vehicle’s characteristics for the purpose of charging for tolls. It consists of the following data items each of which is defined in its own DDE: *

cv_tag_data

+ cv_vehicle_characteristics

+ vehicle_identity

+ vehicle_type.

SIZING ATTRIBUTES

SIZE=0;

vms_displays

text

* This data flow is used within the Manage Traffic function and contains th actual texts for use in variable message sign (vms) displays that are to be used to provide forwarning of the full range of incidents. *.

SIZING ATTRIBUTES

SIZE=1024000;

wide_area_pollution_data

text

* This data flow is used within the Manage Traffic function as a means of transferring current pollution data from the Manage Emissions facility to the Provide Traffic Surveillance facility. It contains data about the current levels of pollution obtained from the store of pollution data in the area covered by the Traffic Management Center (TMC) and consists of the following data items each of which is defined in its own DDE: *

pollution_state_area_collection

+ list_size

+ list_size{pollution_state_roadside_collection}.

SIZING ATTRIBUTES

SIZE=pollution_state_area_collection+list_size

+POLLUTION_POINTS{pollution_state_roadside_collection};