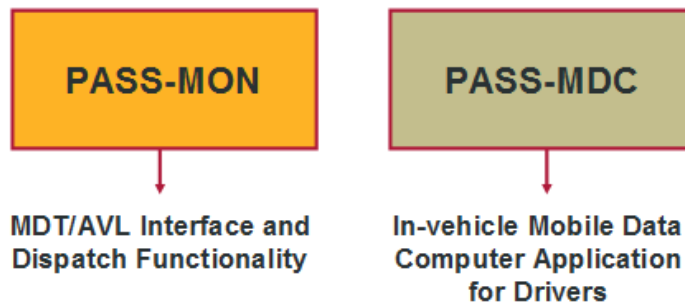


TRAPEZE PASS MOBILE COMPUTING SOLUTION (PASS-MON)

The Trapeze mobile computing solution proposed for this project consists of two main components: enhancements to the existing Trapeze PASS dispatching and addition of AVL monitoring (desktop product), and the mobile unit application which resides on the in-vehicle unit (in-vehicle application).



These two components are discussed below.

Key Benefits of Mobile Computing

- **Enhanced Functionality:** Provide dispatchers with the tools to remain in constant contact with vehicles and to be aware of their exact location at all times.
- **Real-Time Communications:** Coordinate up to the minute information exchange between vehicle operators, dispatchers, and their customers.
- **Lower Costs:** Improve operational efficiencies through persistent access to real-time information about schedules, vehicle location, client information, and other factors.
- **Long-Term Flexibility:** Accommodate change and growth, such as additional in-vehicle units, upgrades, without affecting the mobile application.
- **Extended Integration:** Ensure in-vehicle software is compatible with any changes made in the workstation application.
- **Global Standards:** The in-vehicle units employ the latest technologies available to wireless devices and adhere to global standards in wireless and software development.
- **Increased Safety:** Our solution provides integration with 'covert alarms' and GPS/AVL monitoring designed to improve the ability to respond to emergency situations.

- **Network Expansion:** with a mobile solution, vehicles become another 'node' on the network, enabling sites to monitor vehicle status and improve their preventative maintenance programs.

DISPATCH CENTRE APPLICATION (TRAPEZE MOBILE COMPUTING)

Applications for the desktop enhance the current Trapeze PASS dispatch system by providing tools that enable wireless data communication between drivers and dispatchers. TRAPEZE MOBILE COMPUTING provides two-way data messaging capabilities and GPS data communication to provide 'real-time' vehicle positioning and schedule adherence information. More specifically, the product adds three components to the existing dispatch functionality.

Mobile Data Terminal Server

This application integrates the PASS scheduling and dispatching software with Mobile Computing Units, enabling communication via a public or private data network that employs the TCP/IP communications standard. Integrated with the Trapeze dispatch system, this component enables:

- Trip, AVL and odometer data exchange between Trapeze PASS and the mobile computer
- Configuration of how many trips a driver is able to see based on number of trips or time period
- Configuration of how often AVL data is received
- Notification when a driver has arrived early or late for a pickup
- Additional configuration parameters to control performance
- Logging of data exchanged for troubleshooting

MDT Dispatch Functionality

The following MDT dispatch features and functionality are enabled:

From Dispatch to Mobile Data Computer

- Electronic Manifest
- Automatic Dispatch of Add-ons
- Automatic Dispatch of Cancels/No-shows
- Dispatch of Event Modifications
- Two-Way Text Messaging

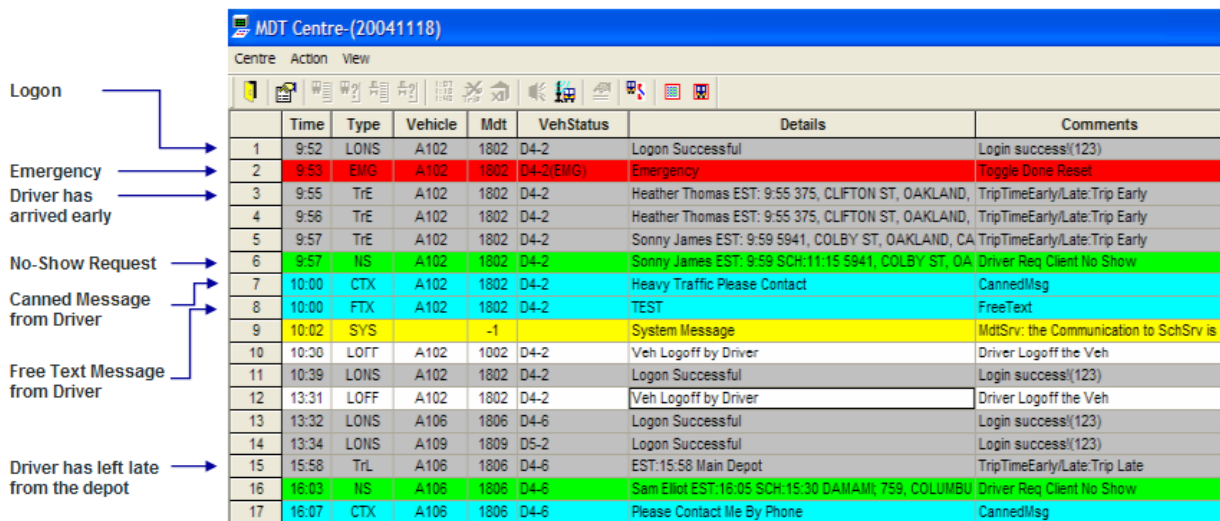
From Mobile Data Computer to Dispatch:

- Arrive/Perform Status and Times
- Driver Cancel or No Show Request
- Fare Collected
- Updated Passenger Information
- Odometer Entries
- Vehicle Location Monitoring (AVL)
- Speed and Direction data
- Overt/Covert Alarm
- Driver log-on/log-off notification

MDT Centre

The MDT Centre facilitates two-way communications between the dispatcher and drivers. More importantly, this includes notification of exceptions such as no-shows and early/late trip arrivals. Among the types of messages received are:

- Vehicle Emergency (Covert or Overt Alarm)
- Schedule Adherence (Trip Early / Trip Late)
- Canned or freeform Text Messages
- Driver Logon /Logoff
- System Messages and Alerts
- No-show and Cancel Requests



	Time	Type	Vehicle	Mdt	VehStatus	Details	Comments
Logon	9:52	LONS	A102	1802	D4-2	Logon Successful	Login success!(123)
Emergency	9:53	EMG	A102	1802	D4-2(EMG)	Emergency	Toggle Done Reset
Driver has arrived early	9:55	TrE	A102	1802	D4-2	Heather Thomas EST: 9:55 375, CLIFTON ST, OAKLAND,	TripTimeEarly/Late:Trip Early
	9:56	TrE	A102	1802	D4-2	Heather Thomas EST: 9:55 375, CLIFTON ST, OAKLAND,	TripTimeEarly/Late:Trip Early
	9:57	TrE	A102	1802	D4-2	Sonny James EST: 9:59 5941, COLBY ST, OAKLAND, CA	TripTimeEarly/Late:Trip Early
No-Show Request	9:57	NS	A102	1802	D4-2	Sonny James EST: 9:59 SCH:11:15 5941, COLBY ST, OA	Driver Req Client No Show
Canned Message from Driver	10:00	CTX	A102	1802	D4-2	Heavy Traffic Please Contact	CannedMsg
Free Text Message from Driver	10:00	FTX	A102	1802	D4-2	TEST	FreeText
	10:02	SYS		-1		System Message	MdtSrv: the Communication to SchSrv is
	10:30	LOFF	A102	1002	D4-2	Veh Logoff by Driver	Driver Logoff the Veh
	10:39	LONS	A102	1802	D4-2	Logon Successful	Login success!(123)
	13:31	LOFF	A102	1802	D4-2	Veh Logoff by Driver	Driver Logoff the Veh
	13:32	LONS	A106	1806	D4-6	Logon Successful	Login success!(123)
	13:34	LONS	A109	1809	D5-2	Logon Successful	Login success!(123)
Driver has left late from the depot	15:58	TrL	A106	1806	D4-6	EST:15:58 Main Depot	TripTimeEarly/Late:Trip Late
	16:03	NS	A108	1806	D4-6	Sam Elliot EST:16:05 SCH:15:30 DAMAM: 759, COLUMBU	Driver Req Client No Show
	16:07	CTX	A106	1806	D4-6	Please Contact Me By Phone	CannedMsg

Message can be color coded by type. An audio alert can also be associated with selected message types for priority exceptions.

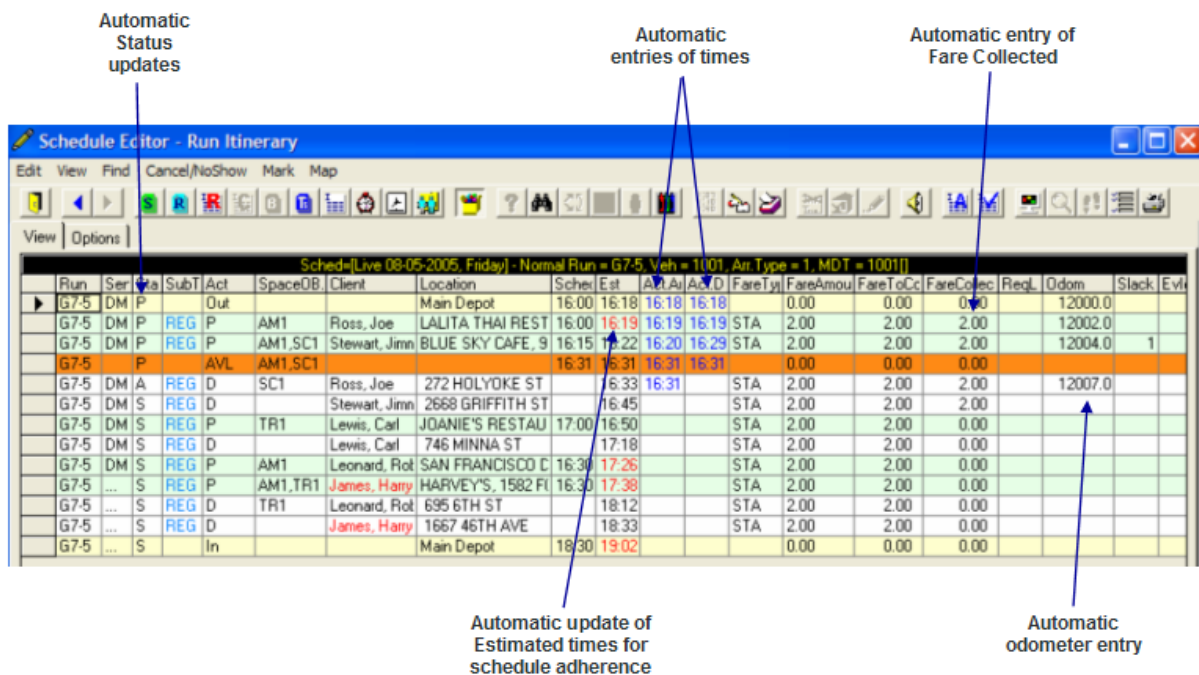
Actions in the MDT Centre

Dispatchers can perform the following actions from the MDT Centre:

- Send a text message
- Manually log vehicles on/off
- Filter messages by Vehicle or Run Group
- View message histories
- Cancel or No Show a trip that a driver has requested a Cancel or No Show for
- View Client Info screen
- Jump to Run Itinerary
- Jump to Client Itinerary

Schedule Editor

MDT Dispatch features in Schedule Editor enables automatic entries of real time performance data including Actual Arrive Time, Actual Depart Time, Odometer, and Fare Collected. The real-time data will provide timely notification of possible Schedule Adherence violations.



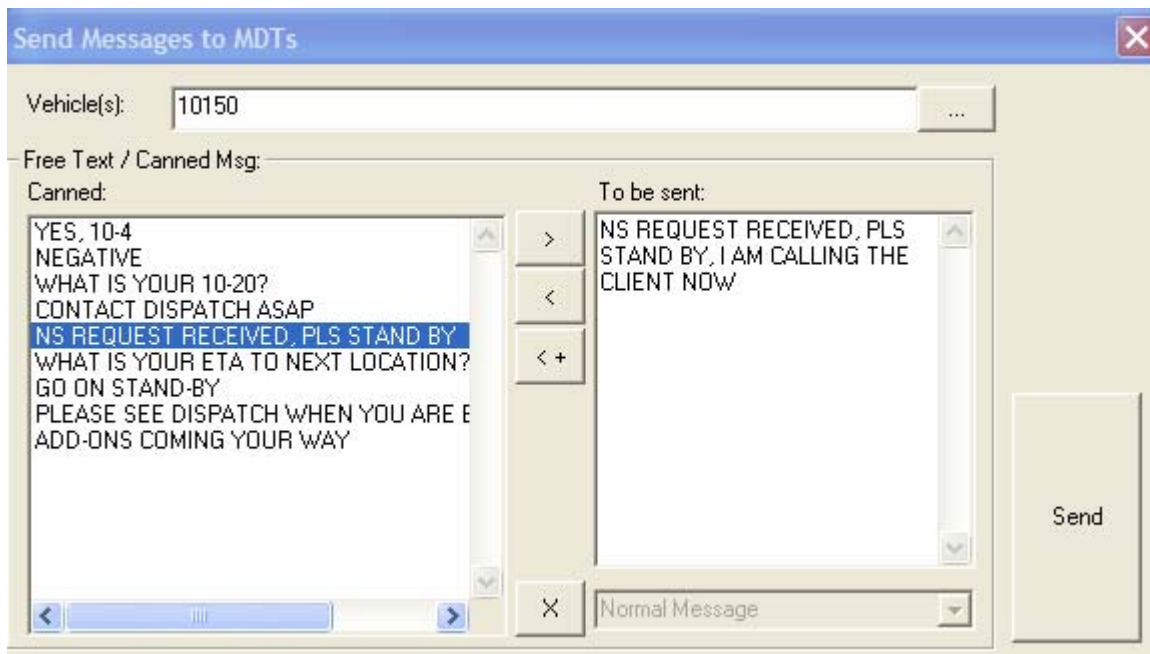
The screenshot shows the 'Schedule Editor - Run Itinerary' application window. The main data is presented in a table with the following columns: Run, Ser, SubT, Act, SpaceDB, Client, Location, Schem, Est, Act.A, Act.D, FareTy, FareAmou, FareToCc, FareCollec, ReqL, Odom, Slack, and Evl. The table contains several rows of data for run G7-5, including stops at Main Depot, LALITA THAI REST, BLUE SKY CAFE, 272 HOLYOKE ST, 2668 GRIFFITH ST, JOANIE'S RESTAU, 746 MINNA ST, SAN FRANCISCO C, HARVEY'S, 1582 FI, 695 6TH ST, and 1667 46TH AVE. Annotations with blue arrows point to specific cells in the table:

- 'Automatic Status updates' points to the 'Act' column.
- 'Automatic entries of times' points to the 'Est' and 'Act.A' columns.
- 'Automatic entry of Fare Collected' points to the 'FareCollec' column.
- 'Automatic update of Estimated times for schedule adherence' points to the 'Est' column.
- 'Automatic odometer entry' points to the 'Odom' column.

Text Messaging Dialogue

The “Send Message” feature can be accessed from the Workstation or the MDT Centre. Messages can be sent to one or multiple vehicles.

Dispatchers can choose from a predefined list of canned messages that can be customize and changed at anytime. Messages can be compose a message from scratch, or combine the canned message with their own.

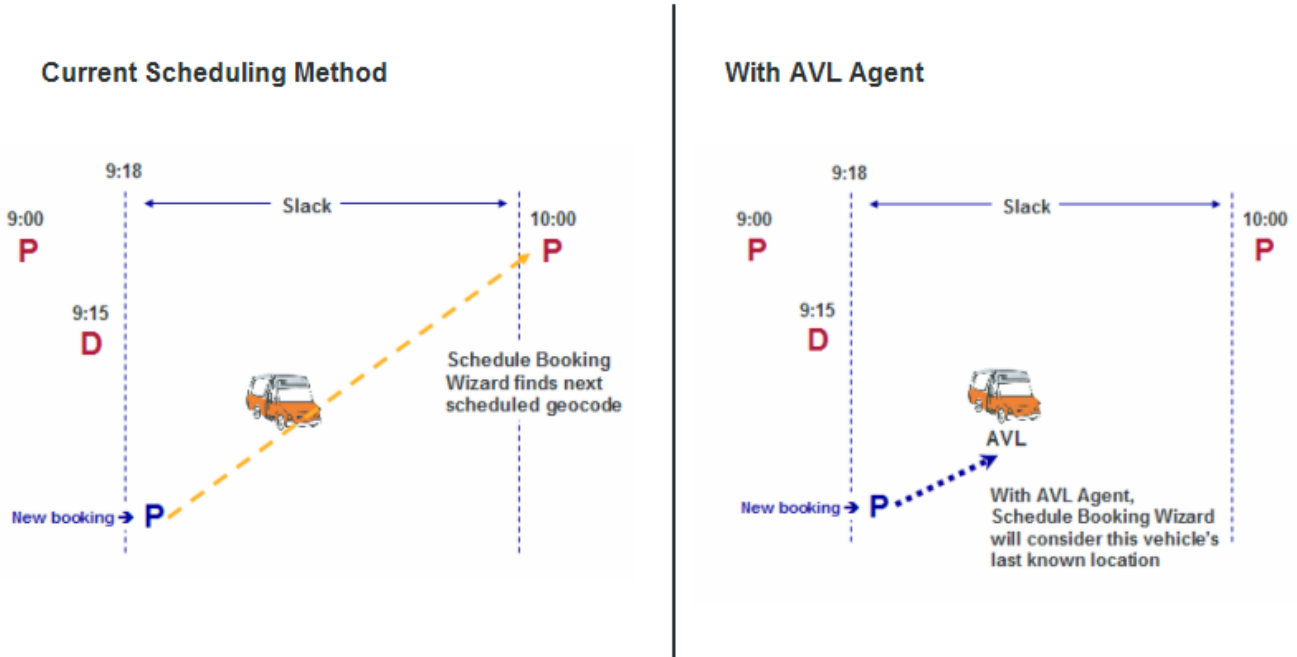


AVL Agent

The AVL Agent improves system scalability by allowing processing of AVL data to be handled separately from other data received from the mobile data computer. In addition, this server component adds a new real-time function to scheduling:

- The Trapeze PASS Schedule Server module will recognize the vehicle's last known location. Currently, the Schedule Server does not consider "in-transit" location reported by AVL information when offering solutions.

Same day solutions would be based upon current vehicle location rather than geocoded events. This also makes it easier to “find” a vehicle in a certain area, especially during vehicle slack times when the exact whereabouts of a vehicle may not be known.



Schedule Booking Wizard screen showing the last known AVL for this vehicle

Client	Day	RE	RT	RL	ST	NT	ET	Location	Run	Viol
Franklin, Aretha	08-08-2005		15:45		14:35	14:35	15:10	ALTA LOMA MIDDLE SCHOOL; 11	D4-6	SL20
							15:34	1490, JENEVEIN AVE, SAN BRUNO	D4-6	

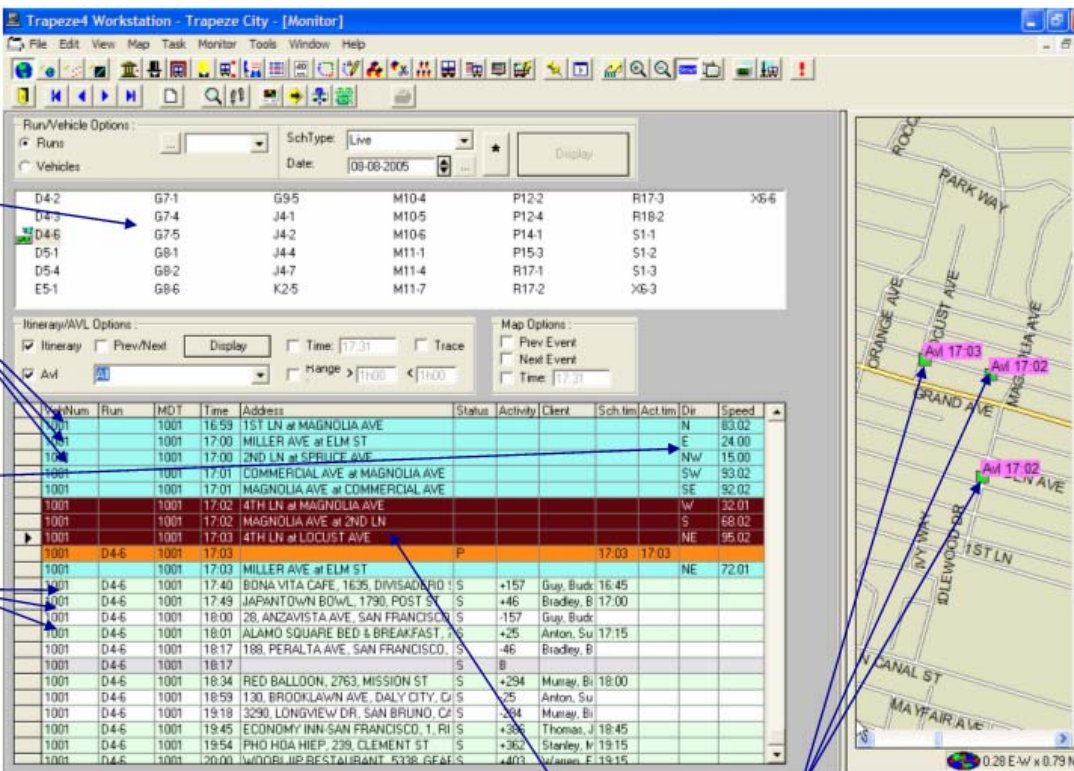
#	Run	Desc	+SE	+ST	+SL	-ET	Trav	T	Fare	Viol	Weight	Provider	Cost
1	D4-6	P	14:20	14:35	14:50	15:15	23	0		SL1	339.46	AC	0.00
2	S1-3	P	14:20	14:35	14:50	14:57	22	0			632.50	XYZ	0.00
3	P14-1	P	14:20	14:35	14:50	14:57	22	0			705.52	AC	0.00
4	S1-3	P	14:20	14:35	14:50	14:44	24	0		0B8	827.13	XYZ	0.00
5	R17-1	P	14:20	14:35	14:50	14:57	22	0			1581.31	CRC	0.00

Run	Act	ST	ET	Location	Viol	SchSt
D4-6	Out	13:30	13:30	Main Depot		P
D4-6	P	13:30	13:34	1122, NDE ST, SAN FRANCISCO, CA		P
D4-6	P	13:20	13:46	1276, UNION ST, SAN FRANCISCO, CA	COV	P
D4-6	D		13:49	RENDEZVOUS CAFE, 1760, POLK ST		P
D4-6	D		14:36	P&P HUNAN RESTAURANT, 61, BAY CT	H015,COV	P
D4-6	AVL	14:38	14:38			P
D4-6	P	14:30	14:43	ALIDO'S RESTAURANT, 3560, CALLAN BLVD		NS
D4-6	P	14:35	14:51	ALTA LOMA MIDDLE SCHOOL, 116, ROMN...	SL1	S
D4-6	D		15:15	1490, JENEVEIN AVE, SAN BRUNO, CA		S
D4-6	P	16:45	16:58	BONA VITA CAFE, 1635, DIVISADERO ST		S
D4-6	P	17:00	17:06	JAPANTOWN BOWL, 1790, POST ST		S
D4-6	D		17:18	28, ANZAVISTA AVE, SAN FRANCISCO, CA		S
D4-6	P	17:15	17:22	ALAMO SQUARE BED & BREAKFAST, 719, SCOTT ...		S
D4-6	D		17:41	188, PERALTA AVE, SAN FRANCISCO, CA		S
D4-6	P	18:00	17:45	RED BALLDON, 2763, MISSION ST		S

Vehicle Location Monitor

The Vehicle Location Monitor supports the integration of the 'real-time' GPS information with the PASS scheduling software, providing up-to-the-minute information about driver runs and vehicle locations. Dispatchers can use the Monitor screen to:

- View the location of any vehicle on the system map in real time.
- View speed and direction associated with AVL data (if data is available from provider).
- Check the status of a vehicle in relation to future trips.
- View the itinerary of a run based on a user defined time span.
- Monitor the schedule adherence of a vehicle/run.
- View multiple vehicle/runs at any one time.
- Review historical AVL data.
- Produce a turn list and send to a MDT.
- Set properties to customize the appearance of the monitor screen and GIS.



The screenshot shows the Trapeze4 Workstation interface. On the left, there are several control panels: 'Run/Vehicle Options' with a 'Runs' tab selected, 'Itinerary/AVL Options' with 'Itinerary' and 'AVL' checked, and 'Map Options'. The main area contains a table of runs and a map on the right.

Runs available for viewing: A list of runs with columns for Run ID, Vehicle ID, and other identifiers. Run D4-6 is highlighted in green.

Run	Vehicle	Other
D4-2	G7-1	G9-5
D4-3	G7-4	J4-1
D4-6	G7-5	J4-2
D5-1	G8-1	J4-4
D5-4	G8-2	J4-7
E5-1	G8-6	K2-5

AVL data: A table showing real-time location and speed data for various runs.

Run Num	Run	MDT	Time	Address	Status	Activity	Clerk	Sch. tm	Act. tm	Dir	Speed
1001		1001	16:59	1ST LN at MAGNOLIA AVE						N	83.02
1001		1001	17:00	MILLER AVE at ELM ST						E	24.00
1001		1001	17:00	2ND LN at SPRUCE AVE						NW	15.00
1001		1001	17:01	COMMERCIAL AVE at MAGNOLIA AVE						SW	93.02
1001		1001	17:01	MAGNOLIA AVE at COMMERCIAL AVE						SE	92.03
1001		1001	17:02	4TH LN at MAGNOLIA AVE						W	32.01
1001		1001	17:02	MAGNOLIA AVE at 2ND LN						S	68.02
1001		1001	17:03	4TH LN at LOCUST AVE						NE	95.02
1001	D4-6	1001	17:03		P			17:03	17:03		
1001		1001	17:03	MILLER AVE at ELM ST							
1001	D4-6	1001	17:40	BONA VITA CAFE, 1635 DIVISADERO	S	+157	Guy, Burk	16:45			
1001	D4-6	1001	17:49	JAPANTOWN BOWL, 1790 POST	S	+46	Bradley, B	17:00			
1001	D4-6	1001	18:00	28 ANZAVISTA AVE, SAN FRANCISCO	S	-157	Guy, Burk				
1001	D4-6	1001	18:01	ALAMO SQUARE BED & BREAKFAST	S	+25	Ankon, Su	17:15			
1001	D4-6	1001	18:17	188 PERALTA AVE, SAN FRANCISCO	S	-46	Bradley, B				
1001	D4-6	1001	18:17		S						
1001	D4-6	1001	18:34	RED BALLOON, 2763 MISSION ST	S	+294	Murray, Bi	18:00			
1001	D4-6	1001	18:59	130 BROOKLAWN AVE, DALY CITY	C	-25	Ankon, Su				
1001	D4-6	1001	19:19	3290 LONGVIEW DR, SAN BRUNO	C	-264	Murray, Bi				
1001	D4-6	1001	19:45	ECONOMY INN SAN FRANCISCO, 1, RI	S	+267	Thomas, J	18:45			
1001	D4-6	1001	19:54	PHO HOA HIEP, 239 CLEMENT ST	S	+362	Stanley, N	19:15			
1001	D4-6	1001	20:00	WINDMILL RESTAURANT, 530R GEA	S	+402	Waters, E	19:15			

Direction and Speed: Annotations on the map and table pointing to specific data points.

Scheduled Events: Annotations on the table pointing to specific rows.

Highlighted events are: A note pointing to the highlighted row in the table.