A1.5 Traffic Control Assistance

1) Service Requirements and Use Cases

(1) 1st Stage

(i) Notification to the road operation vehicles immediately after receiving the information of incident,

(ii) Arrival of the road operation vehicles at the site by 1 hour at the latest from the incident occurrence,

(iii) Decision/implementation of traffic restriction immediately after arrival of the road operation vehicles,

(iv) Incident/restriction information dissemination to the drivers en-route on adjacent section immediately after the decision of restriction, and prevention of the secondary incidents,

(v) Prompt incident/restriction information dissemination to the drivers en-route for reducing vehicles to the concerned section,

(vi) Traffic congestion information dissemination to the drivers en-route on adjacent section immediately after grasping the congestion for prevention of the collision from behind,

(vii) Decision/implementation of the restriction of incoming traffic at the interchange as needed,

(viii) Prompt restriction information dissemination to the drivers en-route,

(ix) Information update every 15 minutes for dissemination.

(2) 2nd Stage

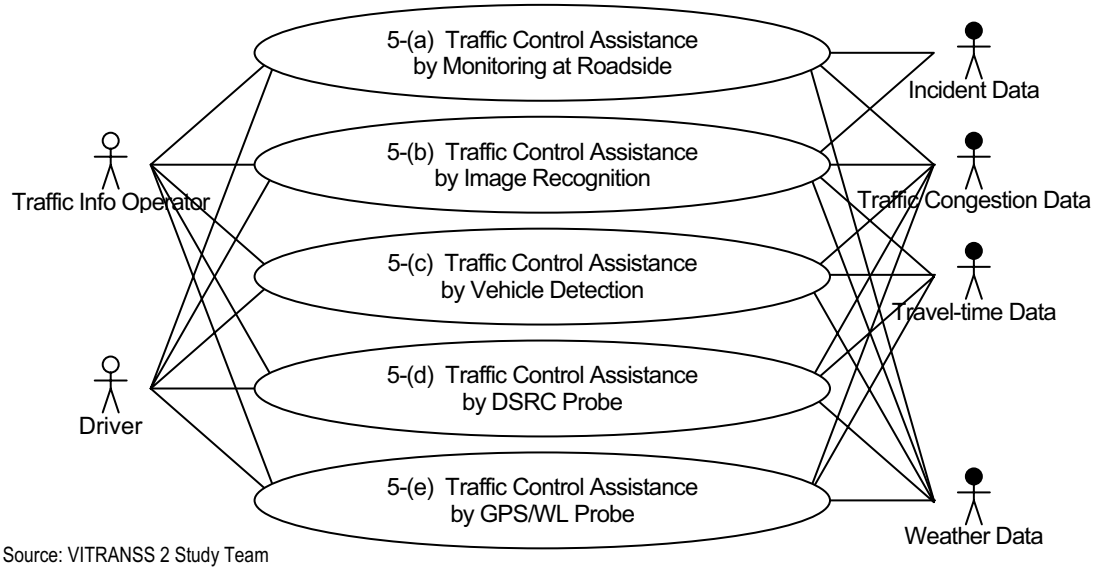
(i) Travel-time/weather information dissemination to the drivers en-route.

(3) 3rd Stage

(i) Congestion forecast information dissemination to the drivers en-route.

The following five alternative use cases are to be considered in the discussion.

Figure A1.5.1 Use Case Diagram of Traffic Control Assistance



Source: VITRANSS 2 Study Team

2) Message Sequence Diagram

The message sequence diagram (MSD) of the use cases above are shown in the following pages.

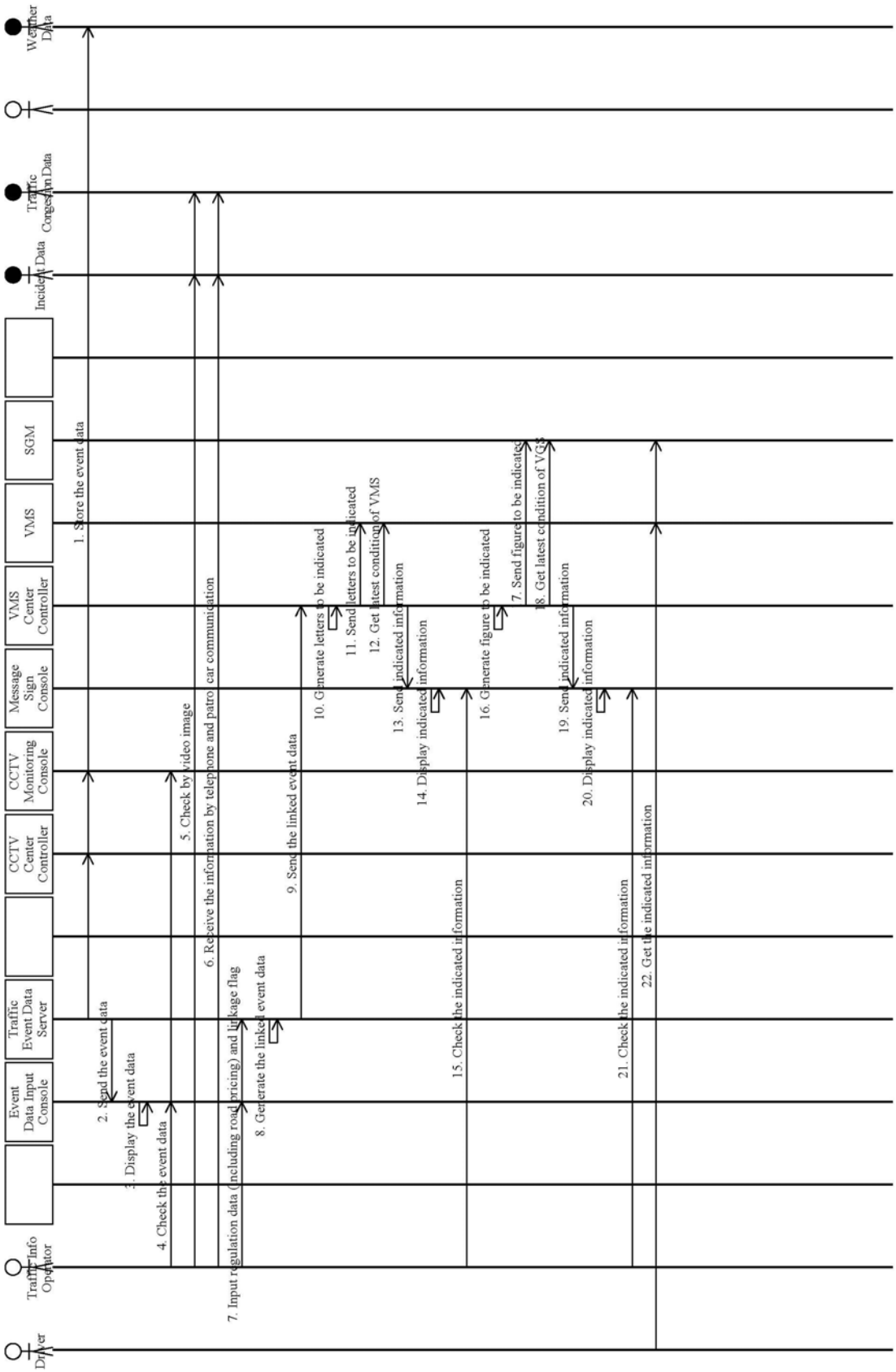


Figure A1.5-(a).MSD Traffic Control Assistance by Monitoring at Roadside

Figure A1.5-(b).MSD Traffic Control Assistance by Image Recognition

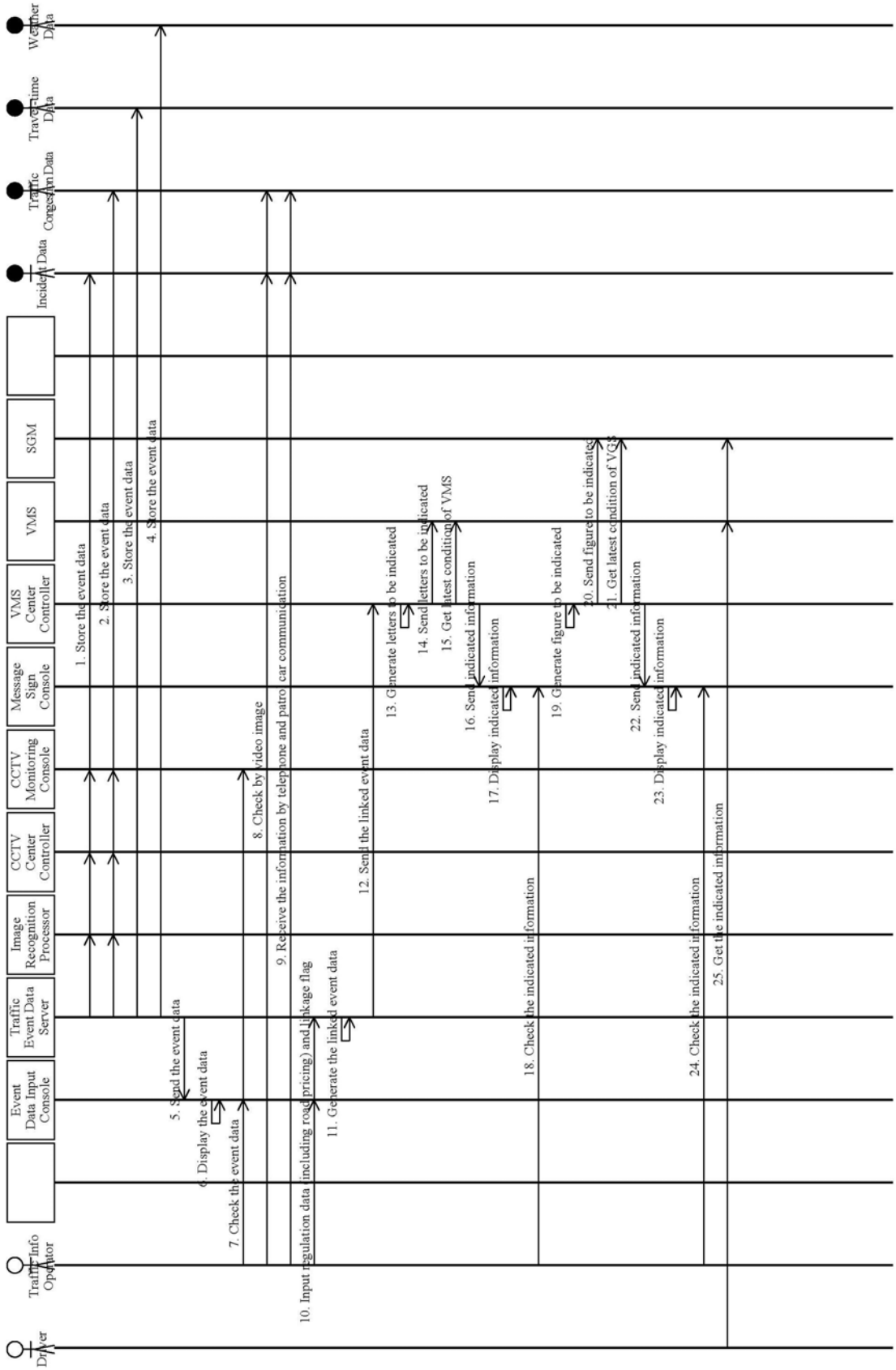


Figure A1.5-(c).MSD Traffic Control Assistance by Vehicle Detection

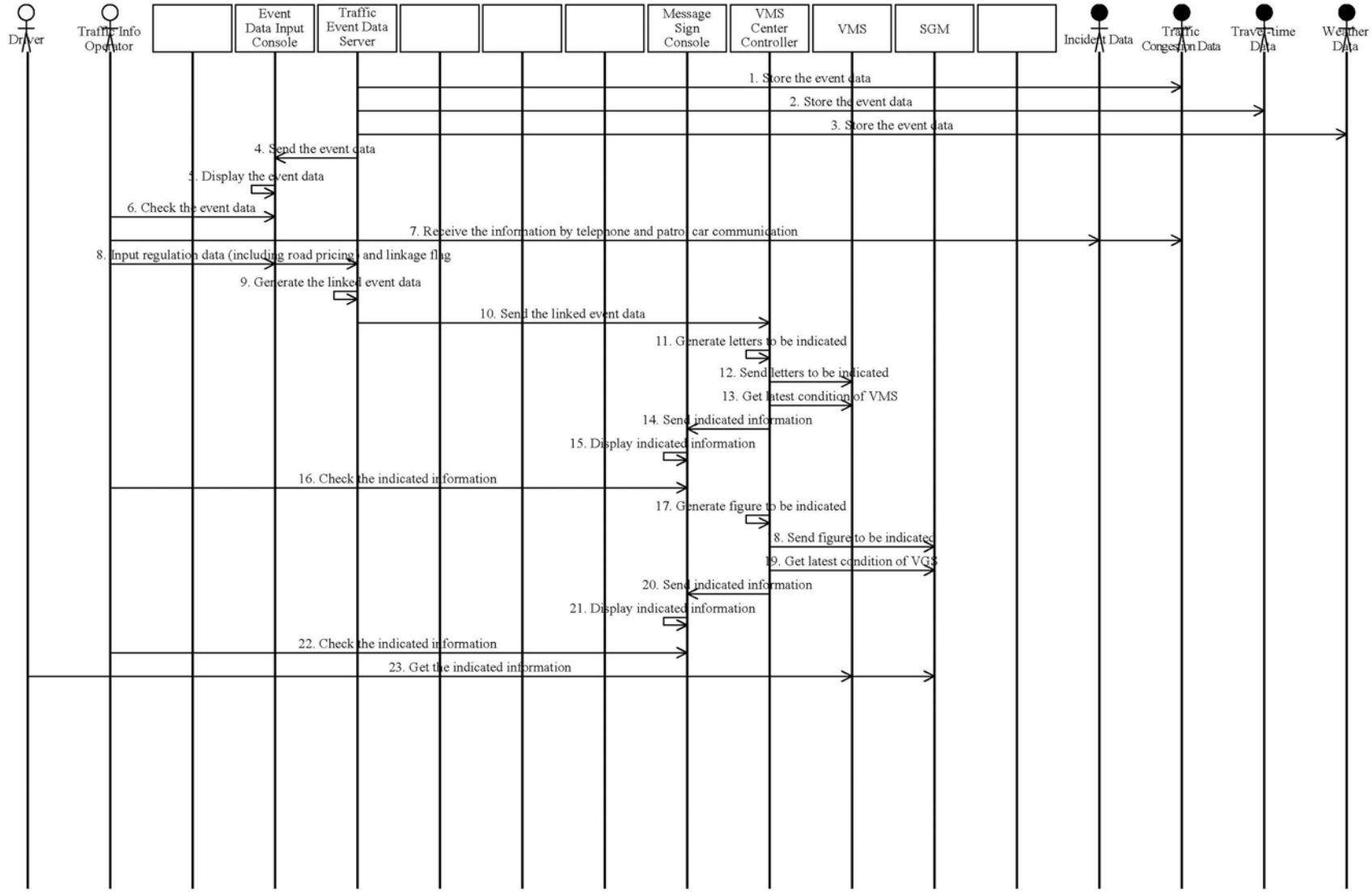


Figure A1.5-(d).MSD Traffic Control Assistance by DSRC Probe

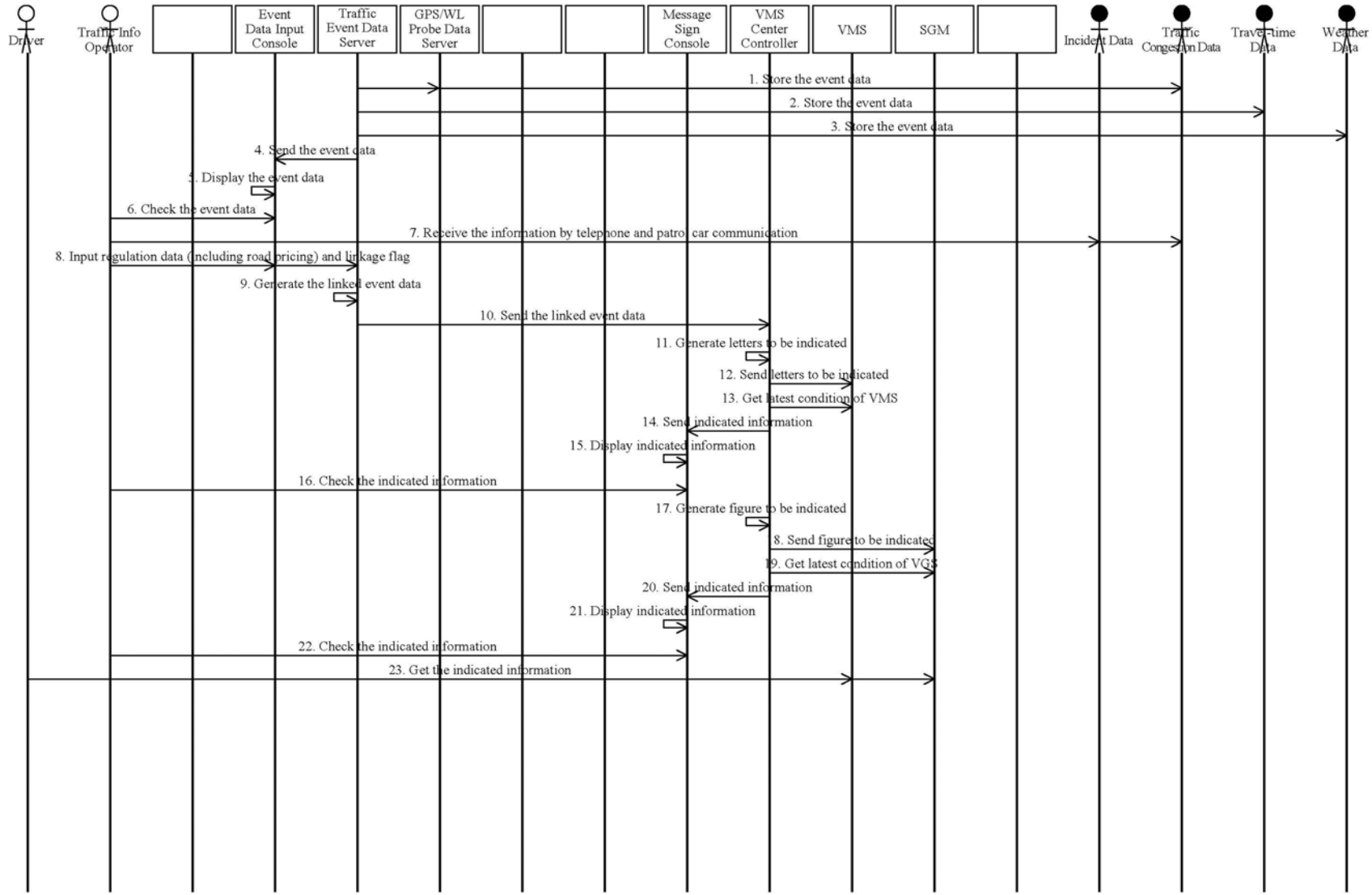
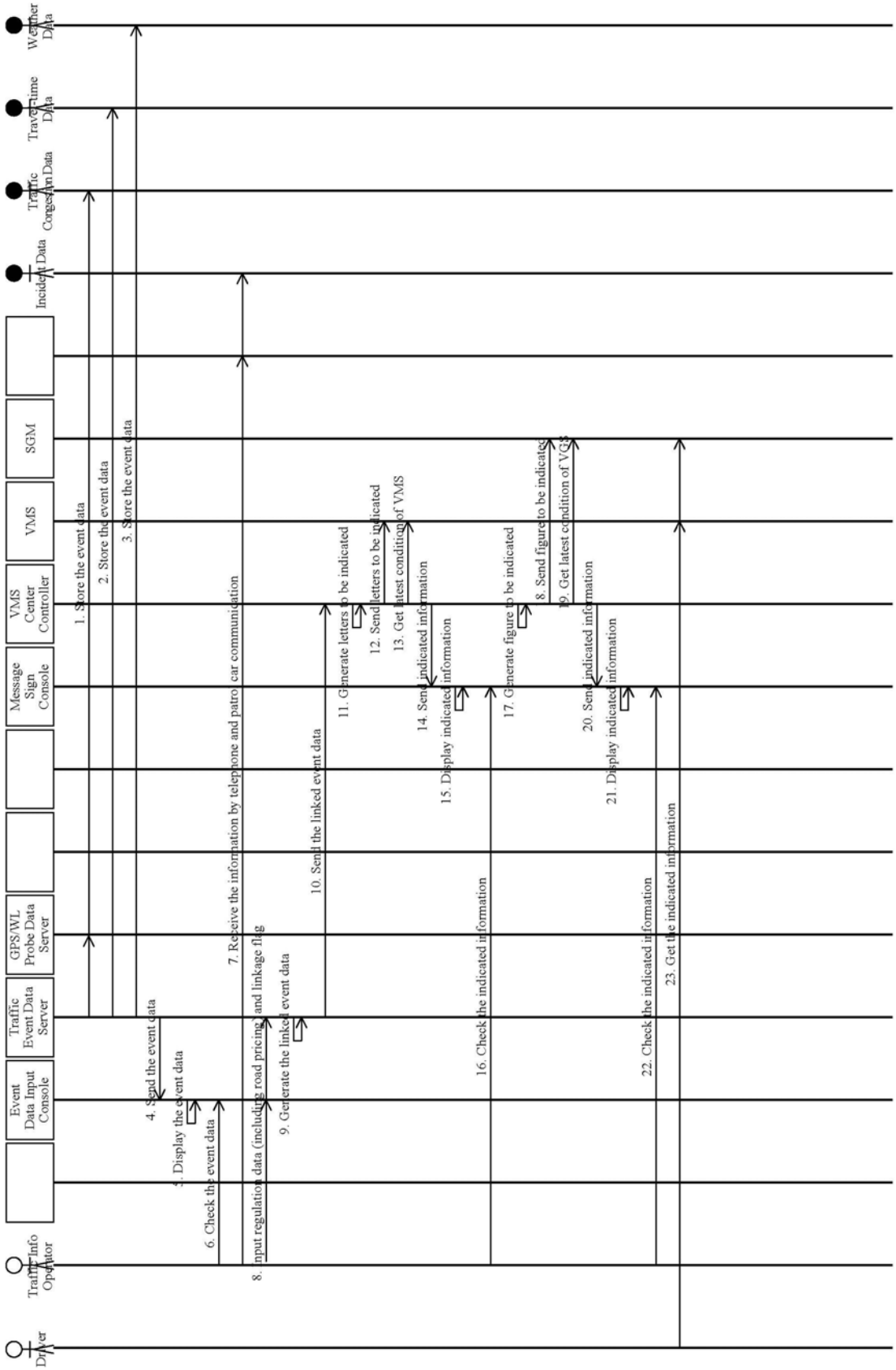


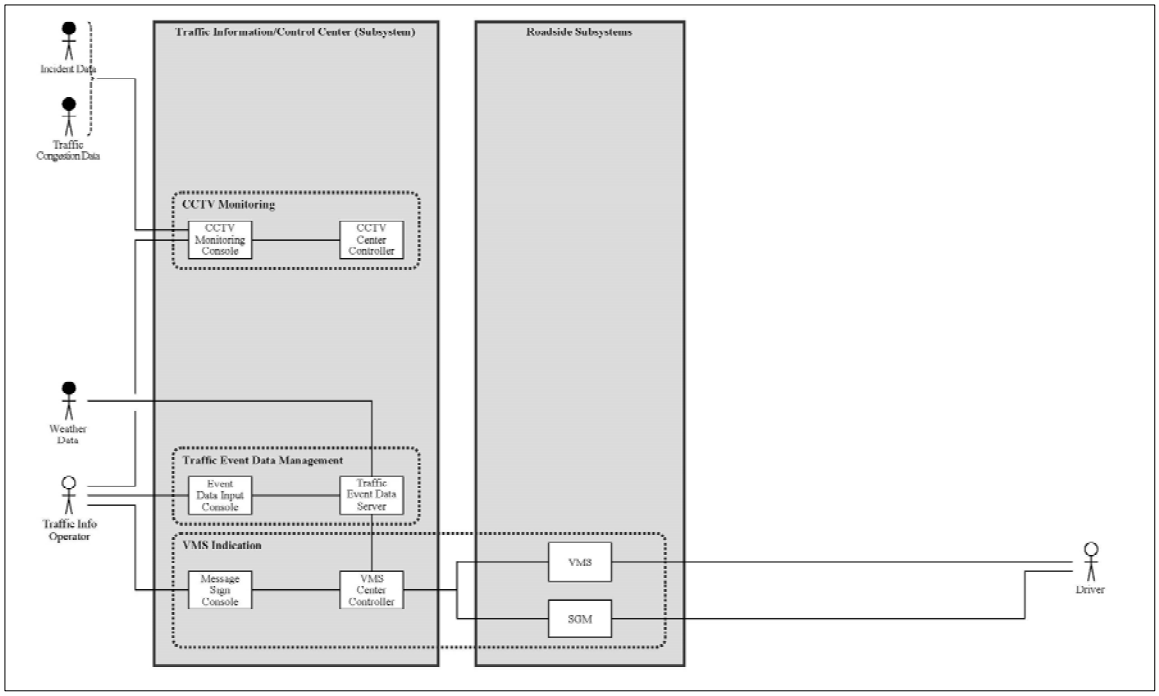
Figure A1.5-(e).MSD Traffic Control Assistance by GPS/WL Probe



3) Collaboration Diagram with Functions/Installation

The collaboration diagrams (CD) are derived respectively from the message sequence diagrams aforementioned.

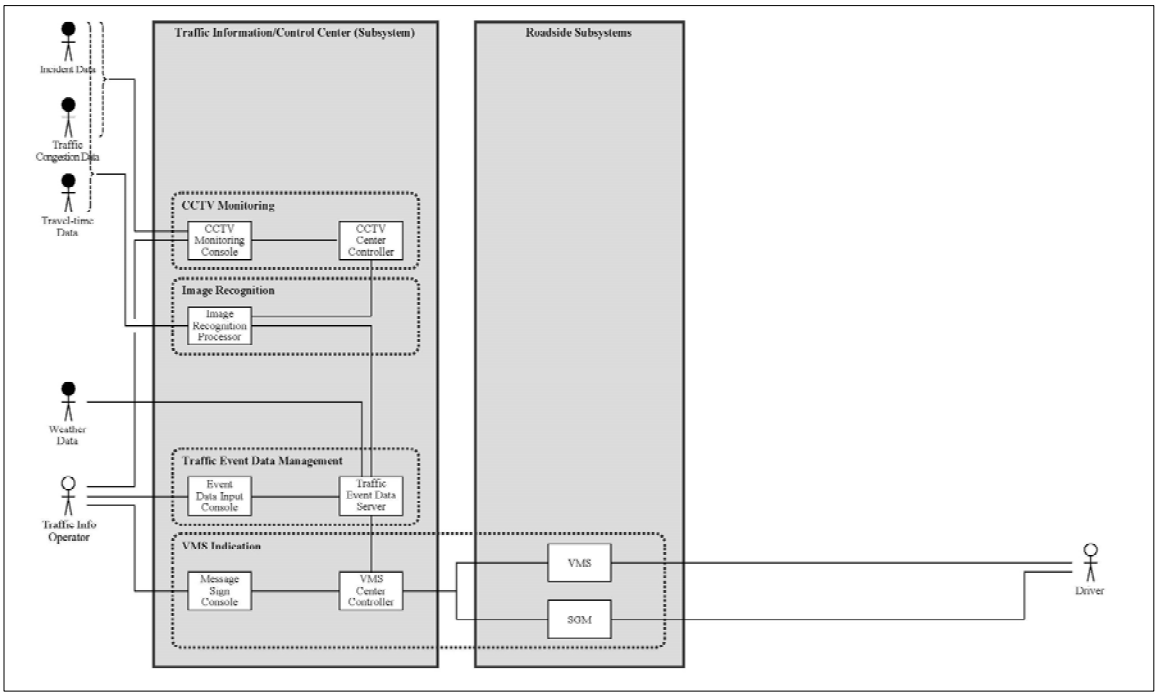
Figure A1.5-(a).CD Traffic Control Assistance by Monitoring at Roadside (Graded as "Useful as a Complement")



Functions & Installation: 5-(a) by Monitoring on Roadside		
Function	Equipment	Installation
CCTV monitoring	Console	Traffic information/control center **
	Computer	Traffic information/control center **
Event data management	Console	Traffic information/control center **
	Computer	Traffic information/control center **
VMS indication (→ See Table 9.3.2)	Console	Traffic information/control center **
	Computer	Traffic information/control center **
	VMS	Roadside (1st ~ : short of exit diverging point, entrance point, tollgate, relevant spot))
	SGM	Roadside (3rd : short of junction)

Note, **: Three main centers shall be constructed in the 1st stage (→ See Section 8.4). Management offices shall be implemented every 50–80 km in the 1st–2nd stages keeping pace with the road construction (→ See Figure 8.3.2).

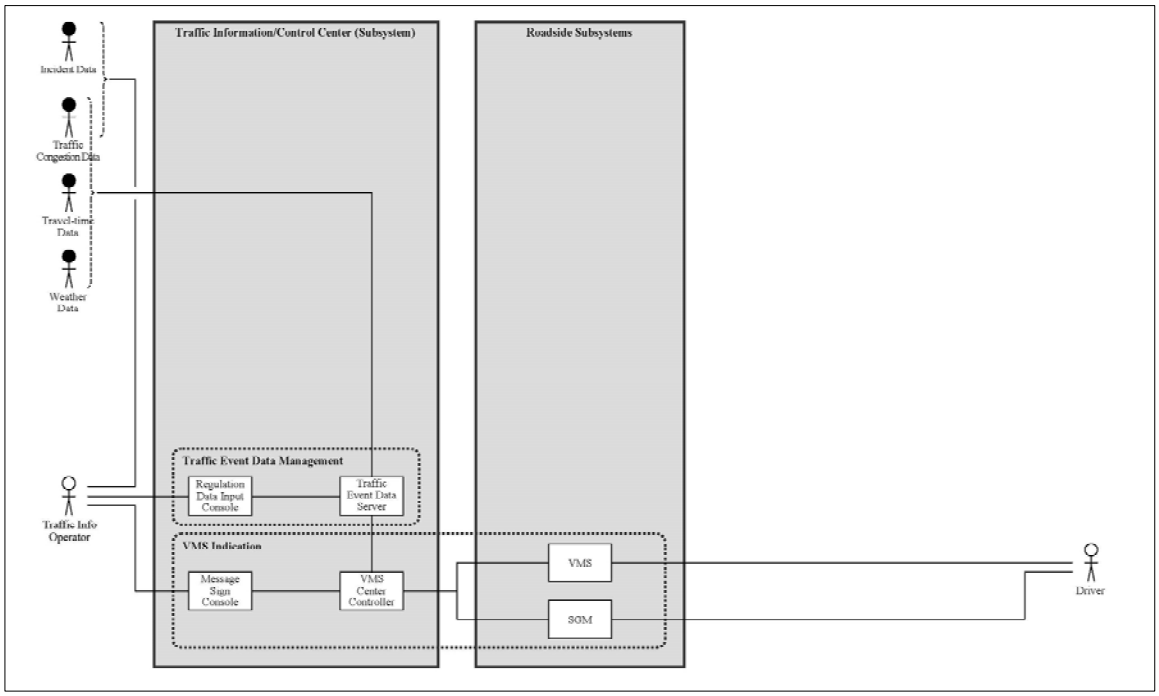
Figure A1.5-(b).CD Traffic Control Assistance by Image Recognition (Graded as "Necessary")



Functions & Installation: 5-(b) by Image Recognition		
Function	Equipment	Installation
CCTV monitoring	Console	Traffic information/control center **
	Computer	Traffic information/control center **
Image recognition	Computer	Traffic information/control center **
Event data management	Console	Traffic information/control center **
	Computer	Traffic information/control center **
VMS indication (→ See Table 9.3.2)	Console	Traffic information/control center **
	Computer	Traffic information/control center **
	VMS	Roadside (1st ~ : short of exit diverging point, entrance point, tollgate, relevant spot))
	SGM	Roadside (3rd : short of junction)

Note, **: Three main centers shall be constructed in the 1st stage (→ See Section 8.4). Management offices shall be implemented every 50–80 km in the 1st–2nd stages keeping pace with the road construction (→ See Figure 8.3.2).

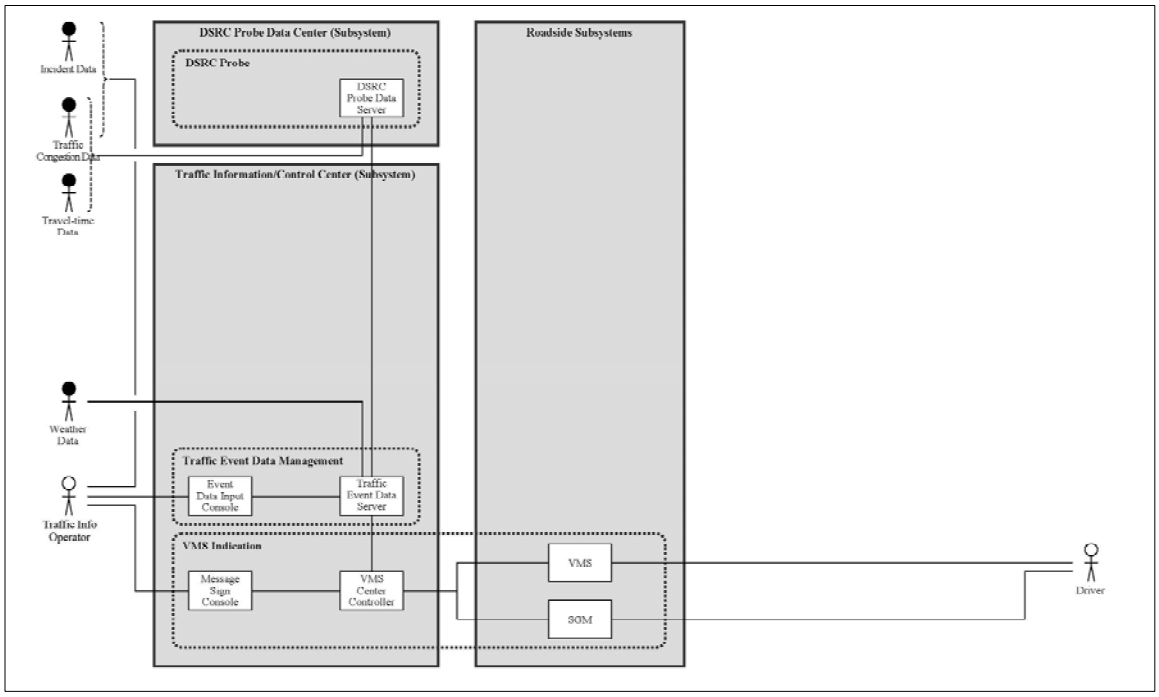
Figure A1.5-(c).CD Traffic Control Assistance by Vehicle Detection (Graded as "Necessary")



Functions & Installation: 5-(c) by Vehicle Detection		
Function	Equipment	Installation
Event data management	Console	Traffic information/control center **
	Computer	Traffic information/control center **
VMS indication (→ See Table 9.3.2)	Console	Traffic information/control center **
	Computer	Traffic information/control center **
	VMS	Roadside (1st ~ : short of exit diverging point, entrance point, tollgate, relevant spot))
	SGM	Roadside (3rd : short of junction)

Note, **: Three main centers shall be constructed in the 1st stage (→ See Section 8.4). Management offices shall be implemented every 50–80 km in the 1st–2nd stages keeping pace with the road construction (→ See Figure 8.3.2).

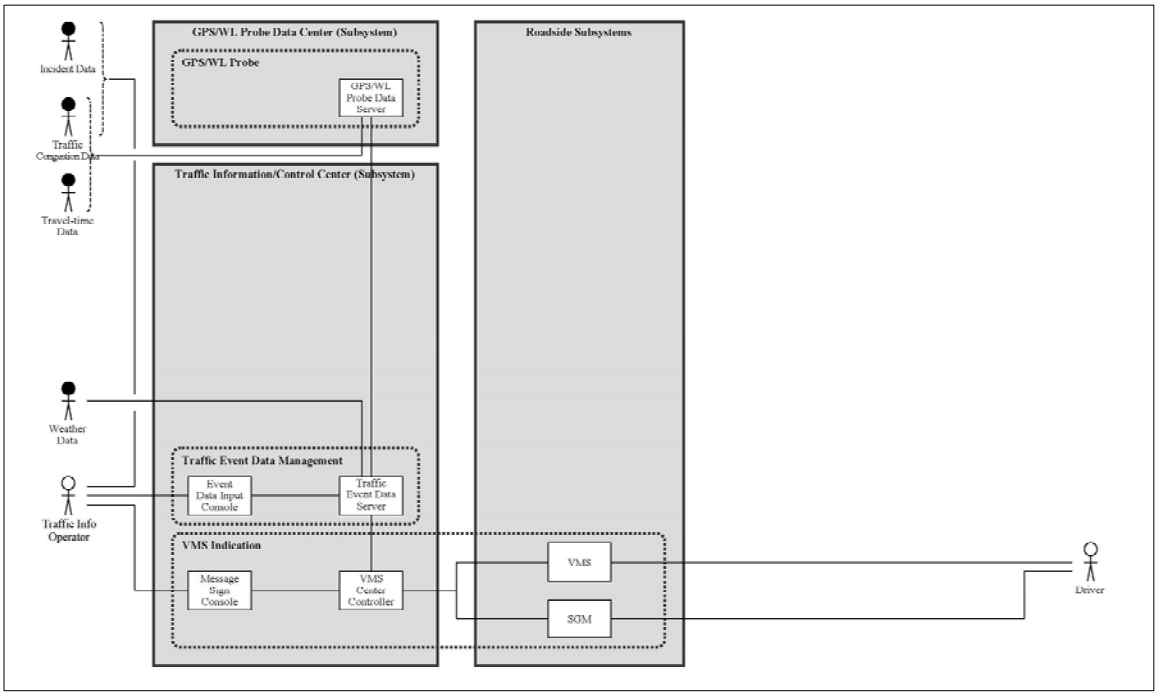
Figure A1.5-(d).CD Traffic Control Assistance by DSRC Probe (Graded as "Necessary")



Functions & Installation: 5-(d) by DSRC Probe		
Function	Equipment	Installation
DSRC probe	Computer	Probe information management center (2nd ~)
	Computer	Toll Management Center (1st ~)
Event data management	Console	Traffic information/control center **
	Computer	Traffic information/control center **
VMS indication (→ See Table 9.3.2)	Console	Traffic information/control center **
	Computer	Traffic information/control center **
	VMS	Roadside (1st ~ : short of exit diverging point, entrance point, tollgate, relevant spot))
	SGM	Roadside (3rd : short of junction)

Note, **: Three main centers shall be constructed in the 1st stage (→ See Section 8.4). Management offices shall be implemented every 50–80 km in the 1st–2nd stages keeping pace with the road construction (→ See Figure 8.3.2).

Figure A1.5-(e).CD Traffic Control Assistance by GPS/WL Probe (Graded as "Useful as a Complement")



Functions & Installation: 5-(e) by GPS/WL Probe		
Function	Equipment	Installation
GPS probe	Computer	Probe information management center (2nd ~)
	Sensor	In-vehicle (2nd ~)
Event data management	Console	Traffic information/control center **
	Computer	Traffic information/control center **
VMS indication (→ See Table 9.3.2)	Console	Traffic information/control center **
	Computer	Traffic information/control center **
	VMS	Roadside (1st ~ : short of exit diverging point, entrance point, tollgate, relevant spot))
	SGM	Roadside (3rd : short of junction)

Note, **: Three main centers shall be constructed in the 1st stage (→ See Section 8.4). Management offices shall be implemented every 50–80 km in the 1st–2nd stages keeping pace with the road construction (→ See Figure 8.3.2).