Heimdall Radar Traffic Detector

SCOOT/MOVA Detector Installation Guide

Document Authorisation			
Role	**Name**	**Function**	**Signed**
Prepared by:	M Tonkin	Project Support Manager	
Reviewed by:	A. Rhodes	Lead Product Engineer	
Reviewed by:	A. White	Product Design Manager	
Authorised by:	C. Whipps	Technical Support Manager	

Document record		
Issue Number	**Date**	**Comment/Revision Details**
1	04/04/08	Initial Release
2	24/12/09	Updated to include ELV
3	14/07/11	Update to Electrical Information
4	23/07/11	Document Updated

This document is electronically held.

Contents

1 General 3
1.1 Part number 3
1.2 Tooling requirements 3
1.3 Performance Details 3
1.4 Electrical Details 3

2 Detector Installation 4
2.1 Electrical Connections 4
2.1.1 9-Pin 'Buccaneer' connector 4
2.1.2 Output Cable (Standard) 5
2.1.3 Output Cable (with SiTOS) 5
2.1.4 Output Cable (with isolated 2nd detector O/P) 5
2.2 DIP Switch Settings 6
2.3 Detector mounting methods 7
2.4 Detector alignment 8
2.5 Detector Alignment – Second Lane Detection (default) 9

1 General

This document refers to the Scoot/ Mova version of the Heimdall series of Detectors which incorporate 'state of the art' radar antenna designs tailored to the specific requirements for each detector type.
All detectors are housed within the same style of enclosure and are of minimal size to reduce the 'eye clutter' associated with older types of equipment.
All detectors can be readily installed onto both new and existing traffic signal control poles.
Detectors come supplied with a standard interface cable together with the HA specified Bulgin Buccaneer connector. Existing sites can easily be upgraded with the Heimdall detector as the detector is compatible with existing above ground units.

1.1 Part number

Part Number	Description
667/1/31900/04x	SCOOT / MOVA Detector

Note: In the above table '**x**' relates to the particular option installed, thus:

0 – Basic Detector
1 – Basic Detector with RS485 Interface (SiTOS)
2 – Basic Detector with Wireless Interface
3 – Basic Detector with 2nd Output
4 – Basic Detector with 2nd Output + Wireless Interface

1.2 Tooling requirements

As well as a standard Installers tool kit, the following are required when installing or maintaining a Heimdall Detector:

1. 2mm Allen key – for side access door and lid.
2. T-8 Torx driver – alternative tool for side access door and lid.
3. 13mm Socket spanner - for angular adjustment and installation of detector.
4. 19mm Ring spanner - for cable gland (DE only).
5. Small flat bladed screwdriver – for DIP switch adjustment.

1.3 Performance Details

Operating Range:	N/A.
Lane Width:	Replicates the function of a normal SCOOT loop.
Vehicle Approach Speed Range:	0Km/Hr (0 MPH) to greater than 112 Km/Hr (70 MPH).
Detection Presence Time:	At least 30 minutes.
Detector Location:	Can be located on either the 'nearside' primary signal pole or the 'off-side' primary signal pole.
Detector Mounting Height Range:	Various Pole heights (above the ground) can be accommodated from 3.3m to 8.0m. Note: Actual SCCOT 'footprint' will be dependant on the mounting height.
Accuracy:	98% Accuracy on vehicle count.

1.4 Electrical Details

The Heimdall detector is capable of being powered from either:

(a) 24V AC ± 20% (48 to 63 Hz), or
(b) 10.8V to 24.8V DC
(c) 24V Full wave rectified ± 20%. From Siemens ELV controller

For information relating to the following:

1. Power consumption requirements of this model.
2. 24V AC & DC power supply options.
3. Permissible detector supply cable lengths.
4. Calculating 24V AC & DC supply cable feeds.
5. Cable length 'look up tables'.

Please refer to the '***Heimdall General Handbook***' (667/HB/31900/000).

2 Detector Installation

2.1 Electrical Connections

Important Notes:

a) **When connecting this detector to a 24V AC source, please ensure that the 24V AC source is derived from an earthed secondary transformer (as used in standard traffic installations).**

b) **Particular attention should be paid to the correct termination of the power supply wires. The RED wire should be used for the 24V AC/DC supply feed and the Black wire for the EARTHED supply return.**

c) **When using a 24V AC supply, only use battery powered interface equipment (e.g. laptop, PDA). Do not connect mains powered/connected equipment to the Heimdall series of detectors, as this will cause the detectors to fail.**

d) **When installing this detector with a Siemens ELV controller or a Siemens ELV controller additional supply, please ensure the RED wire of the interface cable is connected to the POSITIVE (common) connector, the BLACK wire is connected to the NEGATIVE (-24VDC) source and the GREEN (screen) is connected to the POSITIVE (common) connector.**

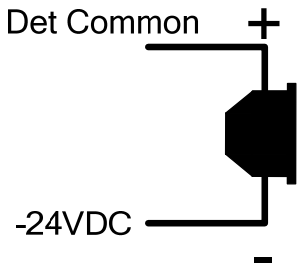


Figure 2-1 Connection of Heimdall detector to Siemens ELV controller

2.1.1 9-Pin 'Buccaneer' connector

All Heimdall detectors are equipped with a captive lead and a standard 9 pin 'Buccaneer' connector (see **Figure 2-2**, below).
The pin out for this connector is as specified in the Highways Agency Specifications: TR2505, TR2506 & TR2507. The Heimdall series of detectors provide additional facilities, to that specified in the HA documents, using the spare connections within the 9 way connector. These are outlined in the sections below.

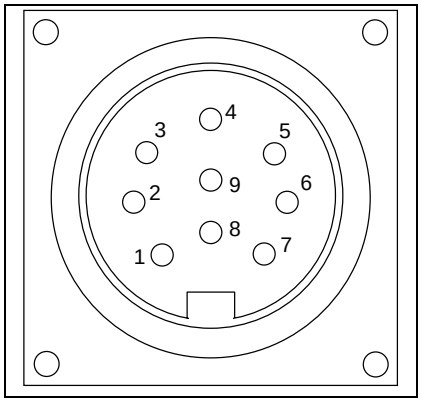


Figure 2-2 Buccaneer Bulkhead Connector (front view)

For the Helios Signal Head the Heimdall bulkhead connector cable is generally fitted to the topmost indent on the red Aspect (either side). The hole should be drilled using the rear drill start point. For other signal head suppliers, please refer to the relevant documentation supplied with their products.
The wires from this connector should be terminated in accordance with the details shown in the sections below.

2.1.2 Output Cable (Standard)

Table 1: Output Cable (Standard) configuration – for variants: 667/1/31900**/xx0 & /xx2**.

Connector Pin No.	Comment	Colour Code
1	Detector Supply (24V AC/DC)	Red
2	Detector Supply Common (0v)	Black
3	Screen	Green
4	Detector O/P #1&2 (Common)	White
5	Detector O/P #1 (Normally Open)*****	Yellow
6	Detector O/P #1 (Normally Closed)*****	Blue
7	Not Used	Violet
8	Not Used	Orange
9	Not Used	Brown

Note: * This signal condition refers to the state when the detector is un-powered (detect state).

2.1.3 Output Cable (with SiTOS)

Table 2: Output Cable (with SiTOS) configuration – for variant: 667/1/31900**/xx1**.

Connector Pin No.	Comment	Colour Code
1	Detector Supply (24V AC/DC)	Red
2	Detector Supply Common (0v)	Black
3	Screen/ RS485 Ground	Green
4	Detector O/P #1&2 (Common)	White
5	Detector O/P #1 (Normally Open)*****	Yellow
6	Detector O/P #1 (Normally Closed)*****	Blue
7	Detector O/P #2 (Normally Open)*****	Violet
8	SiTOS RS485 (Terminal A)	Orange
9	SiTOS RS485 (Terminal B)	Brown

Note: * This signal condition refers to the state when the detector is un-powered (detect state).

2.1.4 Output Cable (with isolated 2nd detector O/P)

Table 3: Output Cable (with isolated 2nd detector O/P) configuration – for variants: 667/1/31900**/xx3 & /xx4**)

Connector Pin No.	Comment	Colour Code
1	Detector Supply (24V AC/DC)	Red
2	Detector Supply Common (0v)	Black
3	Screen	Green
4	Detector O/P #1 (Common)	White
5	Detector O/P #1(Normally Open *)	Yellow
6	Detector O/P #1(Normally Closed *)	Blue
7	Detector O/P #2 (Common)	Violet
8	Detector O/P #2 (Normally Open *)	Orange
9	Detector O/P #2 (Normally Closed *)	Brown

Note: * This signal condition refers to the state when the detector is un-powered (detect state).

2.2 DIP Switch Settings

All Heimdall detectors are equipped with switches that enable the unit to be installed, for the majority of applications, without the need for any special terminal (handset) equipment.
Access to these switches is gained by removal of the side cover. Before removal, note the cover's orientation and ensure it is replaced the same way round.
The switches on the first PCB (Digital Processor) control the basic functions of this detector and are as listed in the following table:

Note: Default settings are with all DIP switches set to '0'/ OFF.

DIP Switch Number							
1	2	3	4	5	6	7	8
SW 1, 2: **Detector Height** **0,0** = < 4.5 m **0,1** = 4.5m to 6.5m **1,0** = > 6.5m **1,1** = As per 0,0		**SW 3, 4:** **Detector LED** **0, 0** = Normal Detector O/P. **0, 1** = Permanently Off. **1, 0** = Detector O/P for 20 mins. after power applied. **1, 1** = Normal Detector OP.		**SW 5:** **Maximum presence time** 0=4 minutes (Default) 1= 30 minutes	**SW 6:** **Detection Method** **0** = Perpendicular (static only) **1** = Angled (static + movement)	**SW 7:** **DFM** **0** = Default monitor time (20hours inactive) **1** = 'fault monitor time' is set by the Engineer's Terminal	**SW 8:** **Remote Configuration** **0** = Disabled **1** = Enabled

Key:

0	OFF
1	ON

Note: The switches provided on the second PCB (Special I/O) control the operation of the Siemens Serial Interface (SiTOS) and detail of these settings can be found in the '***Heimdall General Handbook***' (667/HB/31900/000).

2.3 Detector mounting methods

This detector can be mounted on poles with heights ranging from between 3.3 to 8.0 metres, however the best mounting height for optimum performance would be 4 metres
The initial installation angle will change depending on the installation height. As a guide these are listed as:

4m – 50 degrees from horizontal

6m – 75 degrees from horizontal

8m – 85 degrees from horizontal

(see **Figure 2-5**)

For a second lane:

6m – 50 degrees from horizontal

8m – 75 degrees from horizontal

(see **Figure 2-6**)

1. When mounting on a pole the detector would normally be fitted on a separate bracket to all other street furniture, as shown in **Figure 2-3,** below.

Figure 2-3

2. Alternatively, a side mounting bracket can be fitted on top of the head fixing bracket, thus providing a slot and two holes for attaching the detector to, as shown in **Figure 2-4**, below.

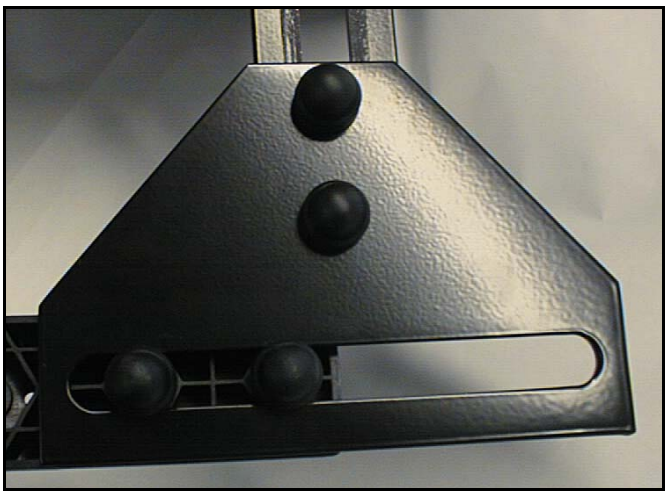


Figure 2-4

2.4 Detector alignment

When aligning the detector always ensure the following:

1. The pole that the detector is to be mounted on is located directly adjacent to the detection zone.
   Note: If there is an existing signal pole directly adjacent to the detection zone then the detector may be mounted to this. If there is not, then the detector will need mounting to a standalone pole.
2. There is sufficient strain relief and no risk of entrapment or pinching of the detector cables when installing or aligning the detector on a pole.
3. The detector should be aligned with the '**aiming point**' shown in the diagram below.

Note: This detector has an in-built fixed processing delay of 1 second. This should be taken into account when defining site installation.

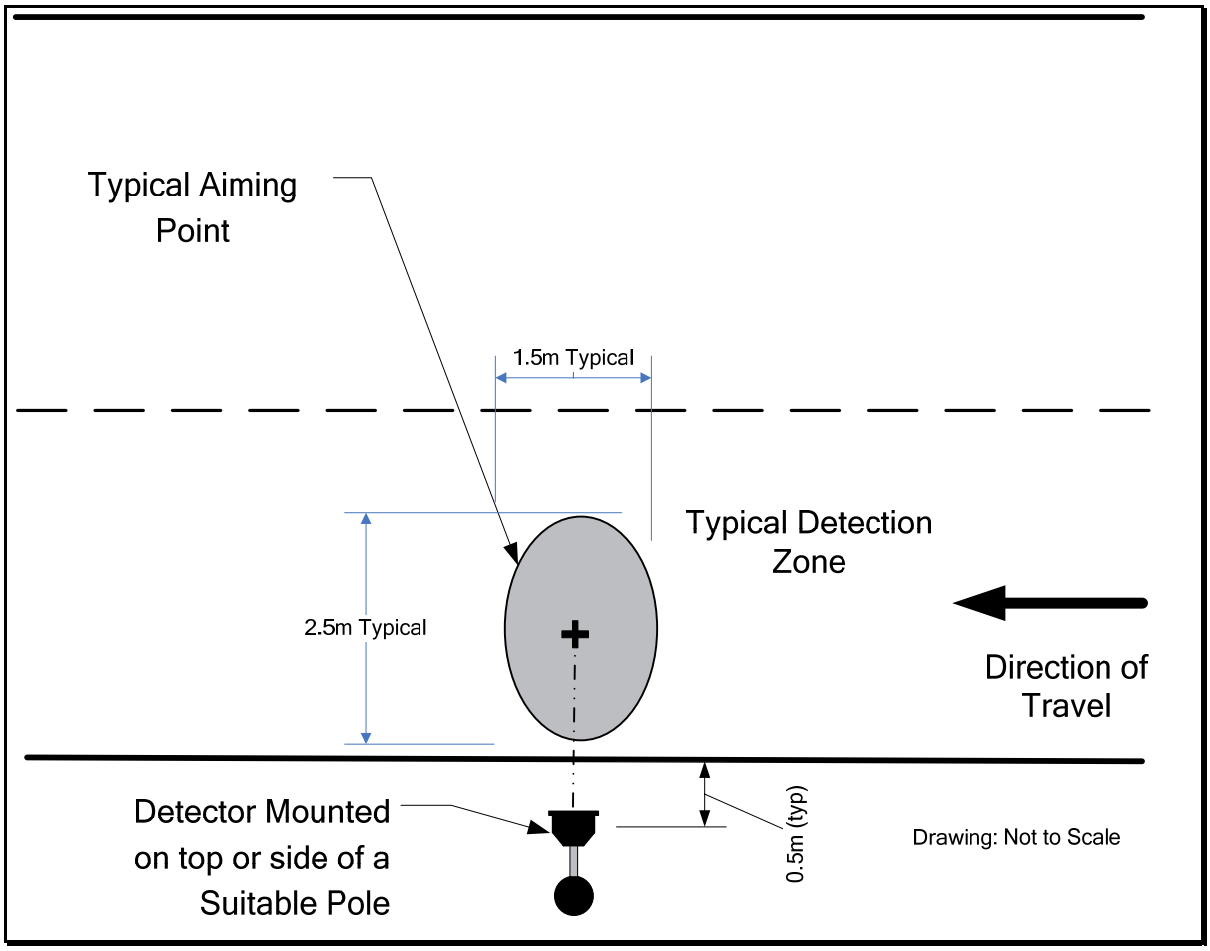


Figure 2-5 First Lane Plan View, 4m Pole

For advanced modes of detection please refer to the Heimdall Detector General Handbook (667/HB/31900/000)

2.5 Detector Alignment – Second Lane Detection (default)

The detector default setup uses a static detection algorithm. The detector is aimed perpendicular to the traffic flow and just below the centre of the carriageway, as shown in **Error! Reference source not found.** below. To use this installation method, ensure DIP switch 6 is set to '0', or using the appropriate terminal command 'DAA' is set to '0'[1]. This is factory default.

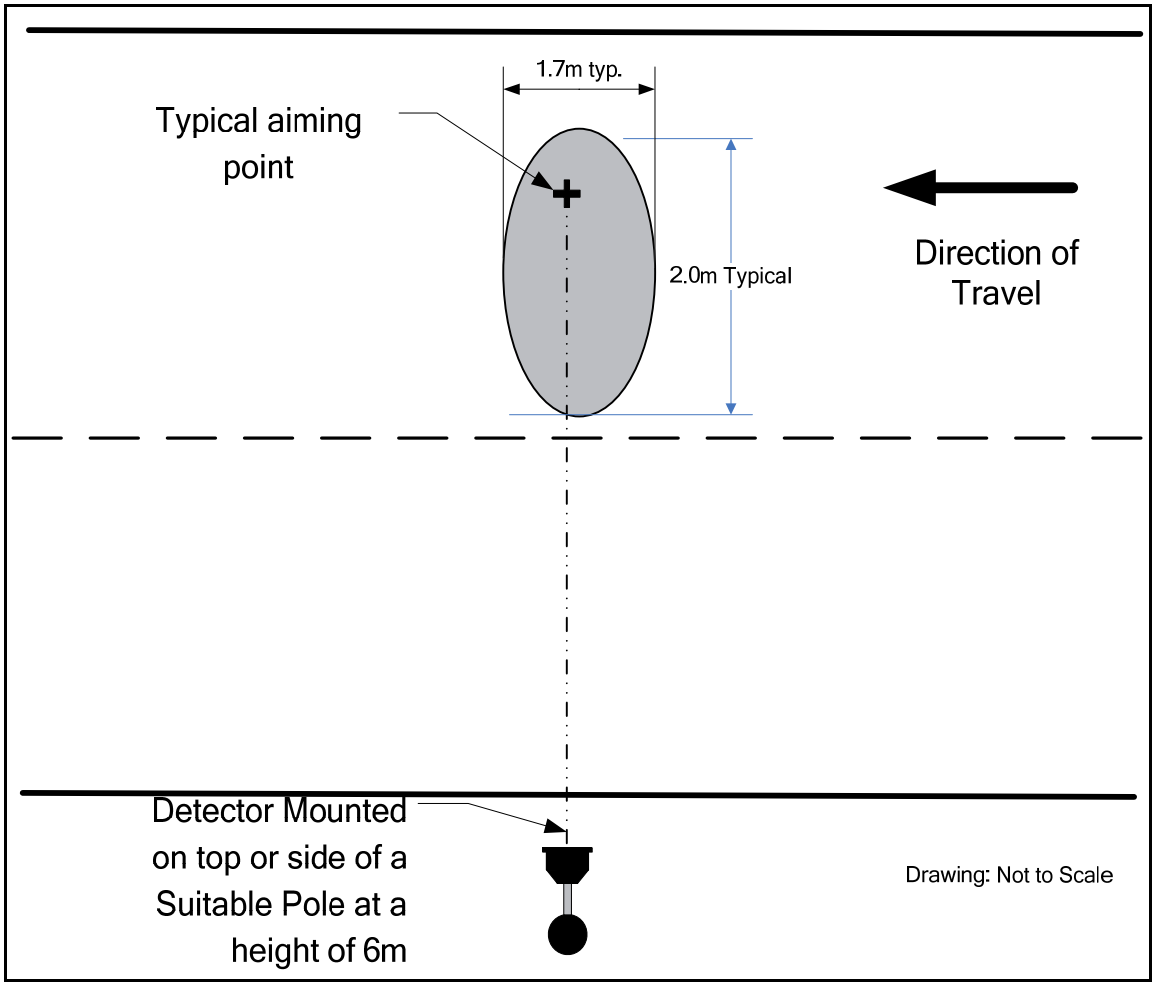


Figure 2-6 Second Lane Plan View (6m installation)

3.0 Installation Quick Reference Guide

Electrical Connections

Important Notes:

a) **When connecting this detector to a 24V AC source, please ensure that the 24V AC source is derived from an earthed secondary transformer (as used in standard traffic installations). Particular attention should be paid to the correct termination of the power supply wires. The RED wire should be used for the 24V AC/DC supply feed and the Black wire for the EARTHED supply return.**

b) **When connecting to a Siemens ELV controller such as the ST900ELV the Red wire should be connected to detector supply common and the black to the detector supply as per section 3.5 of 667/HB/31900/000**

c) **When using a 24V AC supply, only use battery powered interface equipment (e.g. laptop, PDA). Do not connect mains powered/connected equipment to the Heimdall series of detectors, as this will cause the detectors to fail.**

All Heimdall detectors are equipped with a captive lead and a standard 9 pin 'Buccaneer' connector. The pin out for this connector is as specified in the Highways Agency Specifications: TR2505, TR2506 & TR2507. The Heimdall series of detectors provide additional facilities, to that specified in the HA documents, using the spare connections within the 9 way connector.

For the Helios Signal Head the Heimdall bulkhead connector cable is generally fitted to the topmost indent on the red Aspect (either side). The hole should be drilled using the rear drill start point. For other signal head suppliers, please refer to the relevant documentation supplied with their products.
The wires from this connector should be terminated in accordance with the details shown in the table below.

Output Cable (Standard)

Output Cable (Standard) configuration – for variants: 667/1/31900**/xx0 & /xx2**.

Connector Pin No.	Comment	Colour Code
1	Detector Supply (24V AC/DC)	Red
2	Detector Supply Common (0v)	Black
3	Screen	Green
4	Detector O/P #1&2 (Common)	White
5	Detector O/P #1 (Normally Open)*****	Yellow
6	Detector O/P #1 (Normally Closed)*****	Blue
7	Not Used	Violet
8	Not Used	Orange
9	Not Used	Brown

Note: * This signal condition refers to the state when the detector is un-powered (detect state).

For pinout and wiring details of the output cable for either the SiTOS or 2nd output detector options, please refer to **section 3.5** of 667/HB/31900/000

DIP Switch Settings

All Heimdall detectors are equipped with switches that enable the unit to be installed, for the majority of applications, without the need for any special terminal (handset) equipment.
Access to these switches is gained by removal of the side cover. Before removal, note the cover's orientation and ensure it is replaced the same way round.
The switches on the first PCB (Digital Processor) control the basic functions of this detector and are as listed in the following table:

Note: Default settings are with all DIP switches set to '0'/ OFF.

DIP Switch Number (PCB 1) – Digital Processor							
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
SW 1, 2: Detector Height **0,0** = < 4.5 m **0,1** = 4.5m to 6.5m **1,0** = > 6.5m **1,1** = As per 0,0		**SW 3, 4: Detector LED** **0, 0** = Normal Detector O/P **0, 1** = Permanently Off **1, 0** = Detector O/P for 20 mins. after power applied **1, 1** = Normal Detector OP		**SW 5: Maximum Presence Time**. **0** = 4 minutes default. **1** = 30 minutes	**SW 6: Detection Alignment** **0** = Perpendicular (static only) **1** = Angled (static + movement)	**SW 7: DFM** **0** = Default monitor time (20 hours inactive) **1** = 'fault monitor time' is set by the Engineer's Terminal	**SW 8: Remote Configuration** **0** = Disabled **1** = Enabled

Key:

0	OFF
1	ON

Note: The switches provided on PCB 2 (Special Serial Interface card) control the operation of the Siemens Serial Interface (SiTOS), details of the switch settings for this PCB are shown in Section **3.8 of 667/HB/31900/000**

Detector Mounting Methods

1. This detector can be mounted on poles with heights ranging from between 3.3 to 8.0 metres, however the best mounting height for optimum performance would be 4 metres
2. When mounting on a pole the detector would normally be fitted on a separate bracket to all other street furniture, as shown in ***Figure 1***, below.
3. Alternatively, a side mounting bracket can be fitted on top of the head fixing bracket, thus providing a slot and two holes for attaching the detector to, as shown in ***Figure 2***, below.

Figure 1

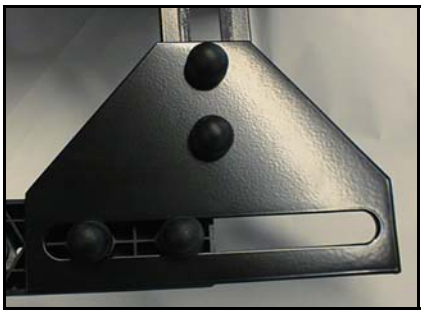


Figure 2

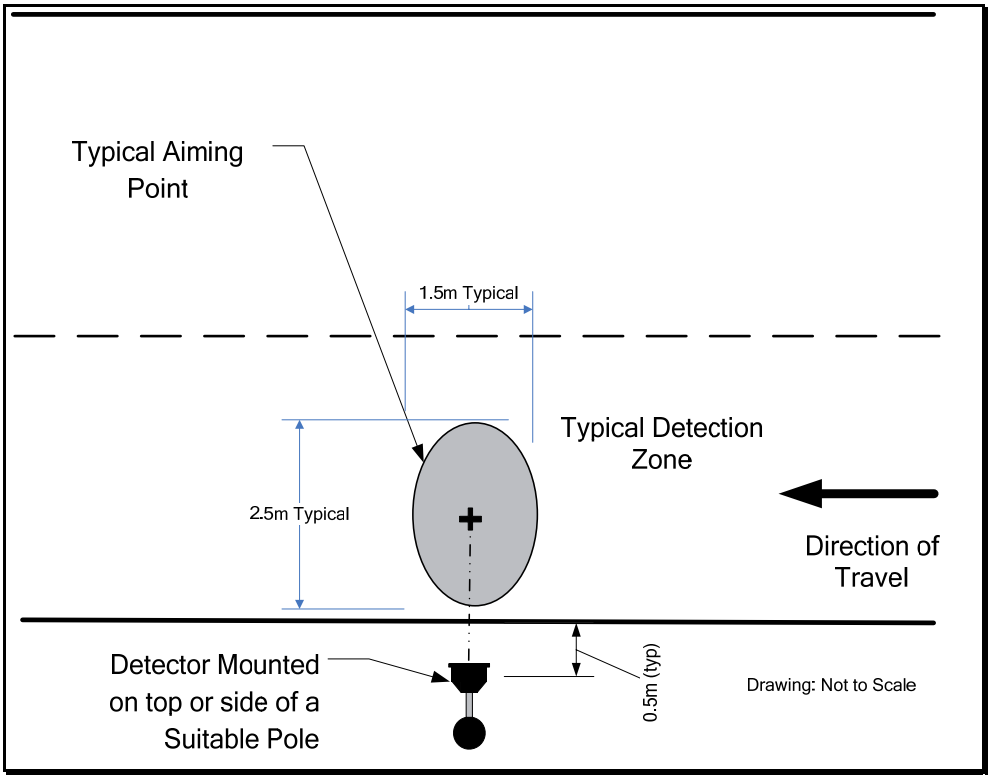
Detector Alignment

When aligning the detector always ensure the following:

1. The pole that the detector is to be mounted on is located directly adjacent to the detection zone.

   Note: If there is an existing signal pole directly adjacent to the detection zone then the detector may be mounted to this. If there is not, then the detector will need mounting to a standalone pole.
2. There is sufficient strain relief and no risk of entrapment or pinching of the detector cables when installing or aligning the detector on a pole.
3. The detector should be aligned with the '**aiming point**' shown in the diagram below.

Note: The detector has an in-built fixed processing delay of 1 second. This should be taken into account when defining site installation.



SCOOT and MOVA Detector Installation – Plan View (4m installation – Static Algorithm)