



# TrafiCam

## Guidelines for sensor selection & positioning

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Two TrafiCam versions are available:

- **Wide angle:**
  - Detection at close range and with a wide camera view
  - Rather vertical camera position
- **Narrow angle:**
  - Detection at a longer distance and with a wide camera view, but zoomed in
  - More horizontal camera position



**WIDE ANGLE**



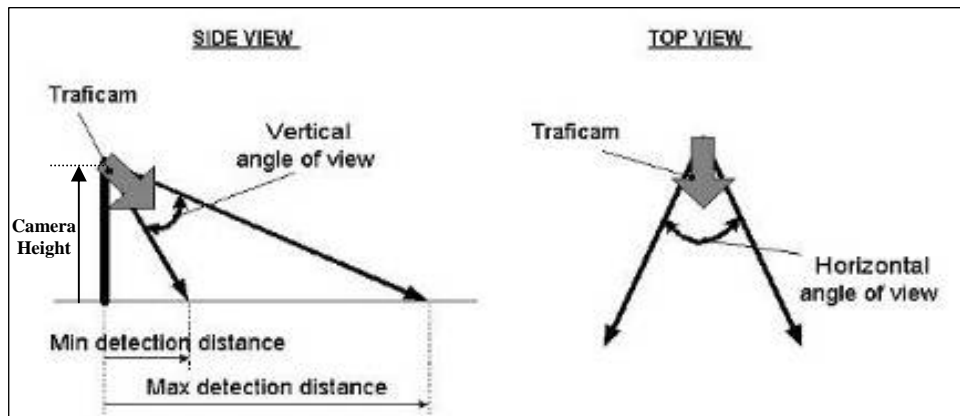
**NARROW ANGLE**

Table 1 gives an overview of the main characteristics per version.

Version	Lens Type	Angle of View			Detection Range
	Focal Distance (fd)	Vertical	Horizontal	Corner to corner	
wide angle	3,0mm	65°	95°	103°	0m → 25m, 0ft → 80ft
narrow angle	8,0mm	22°	32°	39°	15m → 75m 45ft → 250ft

**Table 1:** Specifications “wide angle” and “narrow angle” TrafiCam

The definitions of “vertical angle of view” and “horizontal angle of view” are illustrated in figure 1.



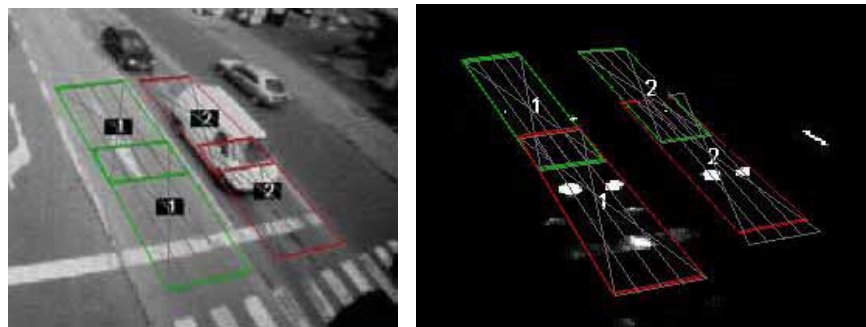
**Figure 1:** Angle of view

Note that the **horizon** may never be visible in the image (see **figure 2**).



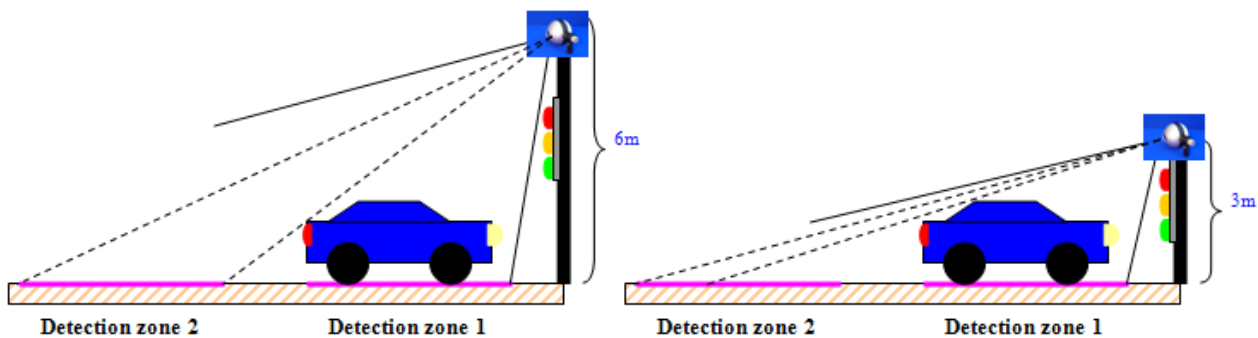
**Figure 2:** Bad and good camera image (illustration with wide angle TrafiCam)

At night, the detection is on the vehicle headlights (see **figure 3**).



**Figure 3:** Detection during daytime and nighttime (same TrafiCam, same configuration)

Another important issue is that optical **occlusion** will be reduced if the positioning of the camera is higher, see **figure 4**. Optical occlusion can cause false detection on the same lane and the adjacent lane – it is a 3 dimensional issue!



**Figure 4:** Optical occlusion of main part detection zone 2 due to low camera position

The paragraphs below show the maximum detection distance with respect to the camera height (“**Where do I want to mount the TrafiCam?**”) and the minimum detection distance (“**Where do I want to place the nearest detection zone?**”) for the wide angle TrafiCam and narrow angle TrafiCam.

Here, it is important to know that the detection algorithm only is effective when the vehicle width is between 5% and 50% of the image width. This determines the maximum and the minimum detection distance.

## A. Wide Angle TrafiCam

Table 2 shows the maximum detection distance with respect to the camera height and the minimum detection distance for the wide angle TrafiCam (focal distance 3,0mm).

$F_d = 3,0\text{mm}$		MIN. DETECTION DISTANCE				$F_d = 3,0\text{mm}$		MIN. DETECTION DISTANCE					
		0m	1m	2m	3m			0ft	3ft	7ft	10ft		
CAMERA HEIGHT	3m	6m	25m	25m	25m	CAMERA HEIGHT	9ft	20ft	80ft	80ft	80ft		
	4m	8m	20m	25m	25m		13ft	26ft	66ft	80ft	80ft		
	5m	10m	20m	25m	25m		16ft	33ft	66ft	80ft	80ft		
	6m	12m	21m	25m	25m		20ft	39ft	69ft	80ft	80ft		
	7m	15m	23m	25m	25m		23ft	49ft	75ft	80ft	80ft		
	8m	17m	24m	25m	25m		26ft	56ft	79ft	80ft	80ft		
	9m	19m	25m	25m	25m		30ft	62ft	80ft	80ft	80ft		
	10m	21m	25m	25m	25m		33ft	69ft	80ft	80ft	80ft		
	11m	23m	25m	25m	25m		36ft	75ft	80ft	80ft	80ft		
	12m	25m	25m	25m	25m		39ft	80ft	80ft	80ft	80ft		
	13m	25m	25m	25m	25m		43ft	80ft	80ft	80ft	80ft		
	14m	25m	25m	25m	25m		46ft	80ft	80ft	80ft	80ft		
	15m	25m	25m	25m	25m		49ft	80ft	80ft	80ft	80ft		
	$F_d = 3,0\text{mm}$		MAX. DETECTION DISTANCE				$F_d = 3,0\text{mm}$		MAX. DETECTION DISTANCE				

Table 2: Distances for wide angle version of TrafiCam (metric + imperial)

The TrafiCam positioned at 6m height and the front edge of the nearest detection zone (1) at 1m ground distance gives a maximum ground detection distance of 21m. The far end detection zone (2) may not be positioned further away, see figure 5.

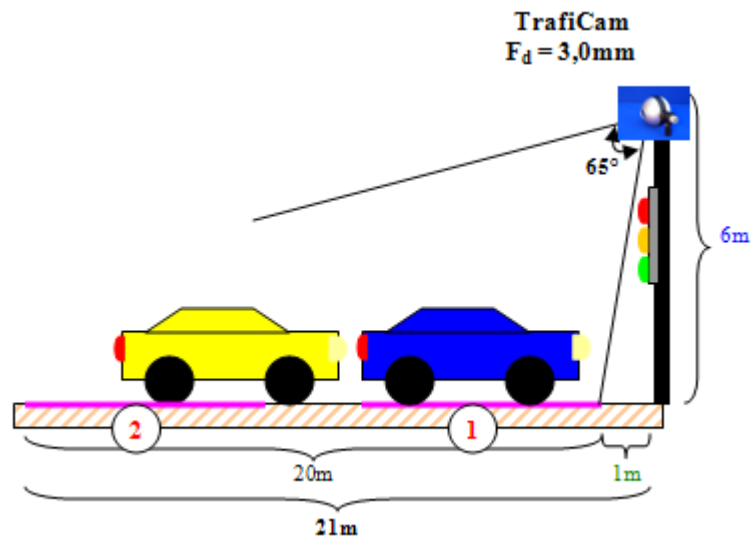


Figure 5: Maximum detection distance in function of camera height + minimum detection distance

## B. Narrow Angle TrafiCam

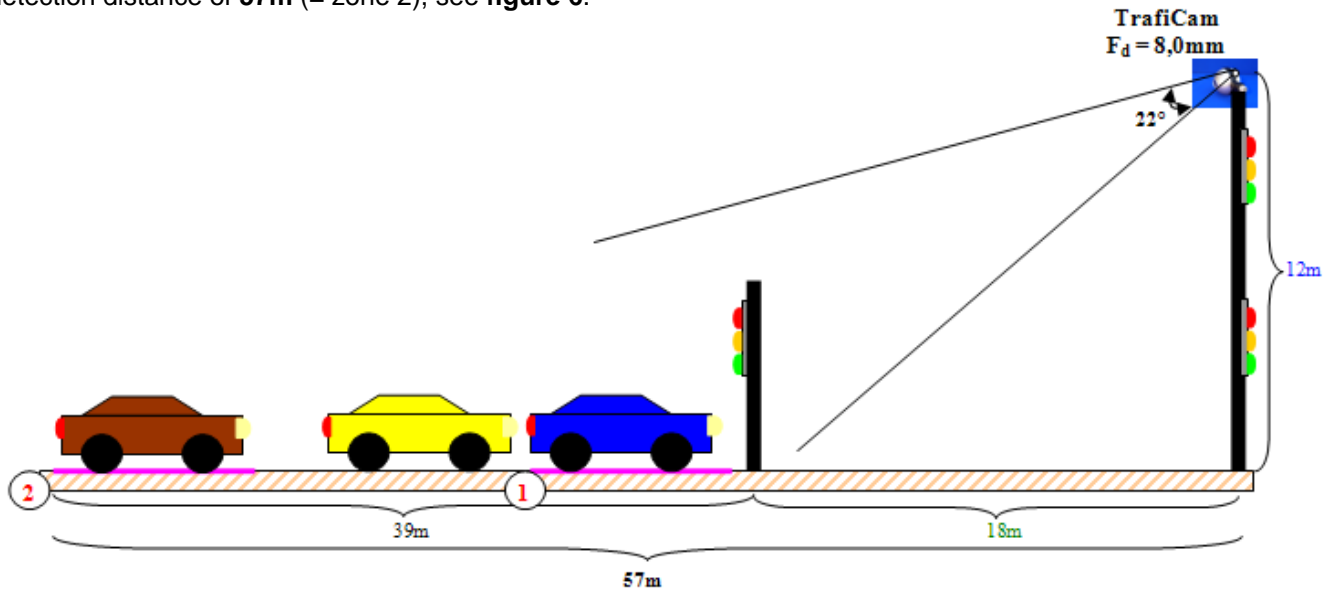
Table 3 shows the maximum detection distance with respect to the camera height and the minimum detection distance for the narrow angle TrafiCam (focal distance 8,0mm).

<b>F<sub>d</sub> = 8,0mm</b>		<b>MINIMUM DETECTION DISTANCE</b>									
		6m	7m	8m	10m	12m	15m	18m	20m	25m	
<b>C A M E R A  H E I G H T</b>	3m	37m	75m	75m	75m	75m	75m	75m	75m	75m	
	4m	19m	29m	50m	75m	75m	75m	75m	75m	75m	
	5m	15m	20m	28m	62m	75m	75m	75m	75m	75m	
	6m	-	17m	22m	38m	75m	75m	75m	75m	75m	
	7m	-	16m	20m	30m	48m	75m	75m	75m	75m	
	8m	-	-	-	26m	38m	75m	75m	75m	75m	
	9m	-	-	-	24m	33m	57m	75m	75m	75m	
	10m	-	-	-	23m	31m	48m	75m	75m	75m	
	11m	-	-	-	-	29m	43m	66m	75m	75m	
	12m	-	-	-	-	28m	40m	57m	75m	75m	
	13m	-	-	-	-	27m	37m	52m	66m	75m	
	14m	-	-	-	-	-	36m	49m	60m	75m	
	15m	-	-	-	-	-	35m	46m	56m	75m	
	<b>F<sub>d</sub> = 8,0mm</b>		<b>MAXIMUM DETECTION DISTANCE</b>								

<b>F<sub>d</sub> = 8,0mm</b>		<b>MINIMUM DETECTION DISTANCE</b>								
		20ft	23ft	26ft	33ft	39ft	49ft	59ft	66ft	82ft
<b>C A M E R A  H E I G H T</b>	10ft	121ft	250ft	250ft	250ft	250ft	250ft	250ft	250ft	250ft
	13ft	62ft	95ft	164ft	250ft	250ft	250ft	250ft	250ft	250ft
	16ft	49ft	65ft	91ft	203ft	250ft	250ft	250ft	250ft	250ft
	20ft	-	55ft	72ft	124ft	250ft	250ft	250ft	250ft	250ft
	23ft	-	52ft	65ft	98ft	157ft	250ft	250ft	250ft	250ft
	26ft	-	-	-	85ft	124ft	250ft	250ft	250ft	250ft
	30ft	-	-	-	78ft	108ft	186ft	250ft	250ft	250ft
	33ft	-	-	-	75ft	101ft	157ft	250ft	250ft	250ft
	36ft	-	-	-	-	95ft	141ft	216ft	250ft	250ft
	39ft	-	-	-	-	91ft	131ft	186ft	250ft	250ft
	43ft	-	-	-	-	88ft	121ft	170ft	216ft	250ft
	46ft	-	-	-	-	-	118ft	160ft	196ft	250ft
	49ft	-	-	-	-	-	114ft	150ft	183ft	250ft
<b>F<sub>d</sub> = 8,0mm</b>		<b>MAXIMUM DETECTION DISTANCE</b>								

Table 3: Distances for narrow angle version of TrafiCam (metric + imperial)

The TrafiCam at **12m** height and the nearest detection zone (= zone 1) at a distance of **18m** gives a maximum detection distance of **57m** (= zone 2), see **figure 6**.



**Figure 6:** Maximum detection distance in function of camera height + minimum detection distance

Note that, in most cases, a proper camera selection gives a **4 lane coverage**.