

# Stéréovision-Fisheye à Large Entraxe aux Carrefours: Auto-Calibration Extrinsèque à l'échelle absolue pour la Trajectographie 3D

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Encadrants

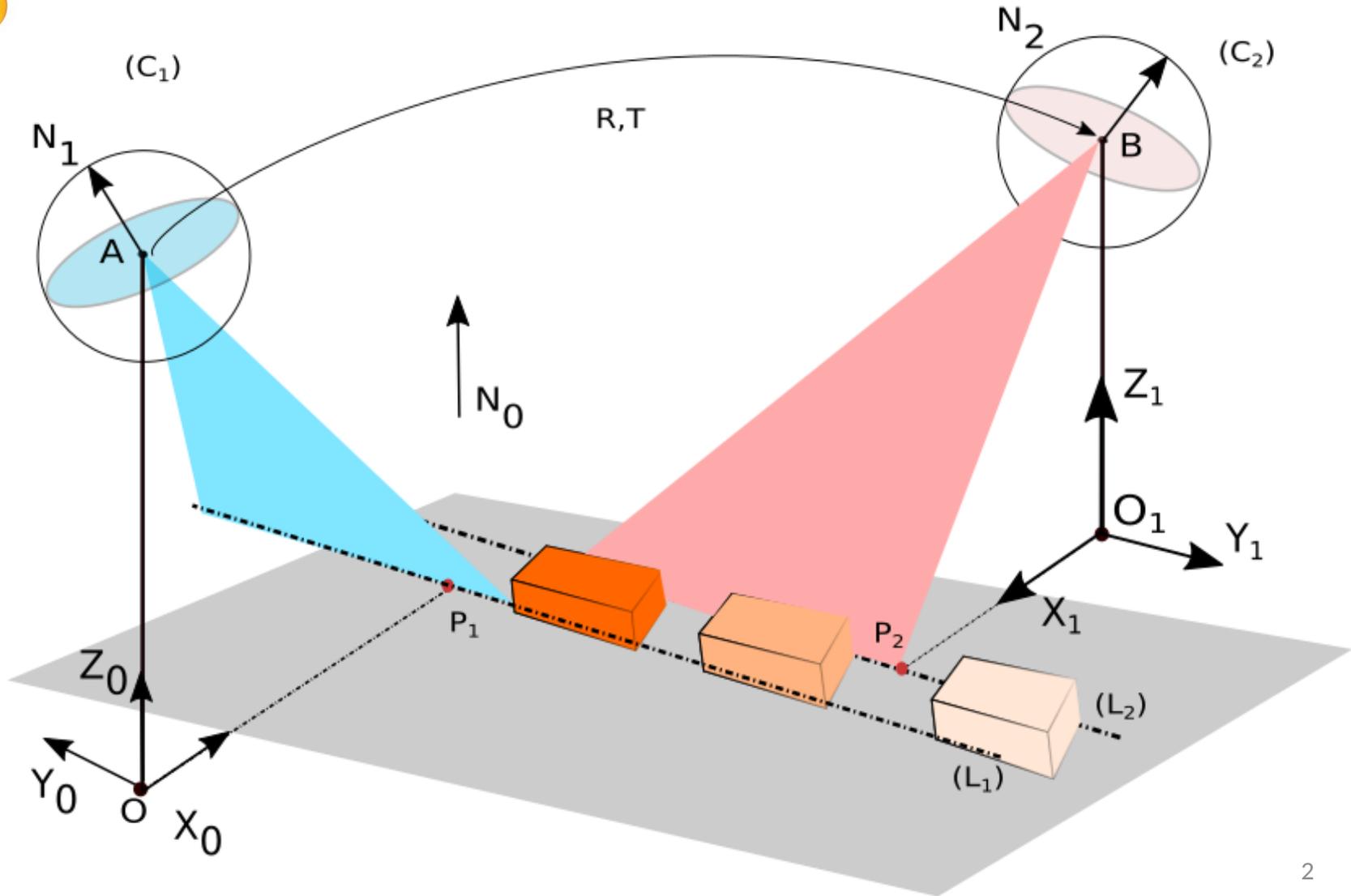
Directeur



# Stéréovision Omnidirectionnelle Large Entraxe

L'étalonnage extrinsèque large entraxe au carrefour: **notre solution**

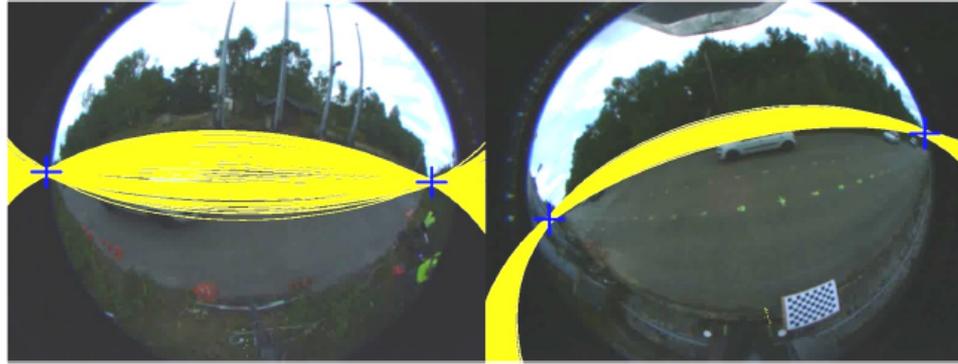
💡😊 Idée: utiliser les véhicules comme objets dynamiques de calibration



# Stéréovision Omnidirectionnelle Large Entraxe

Estimation complète du trièdre orthogonal de points de fuite : (VP1; VP2; VP3)

**VP-RANSAC:**  
*trajectoires*



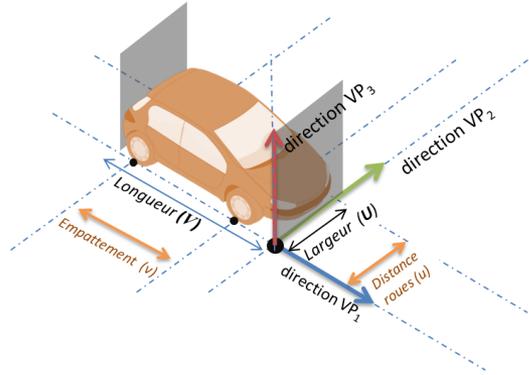
**SIP-VP:**  
*Contours actifs*



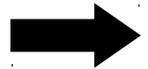
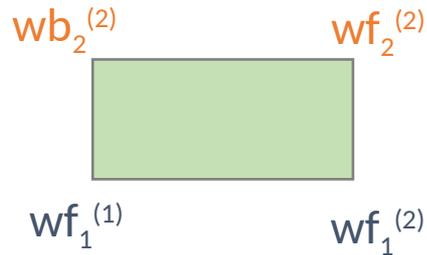
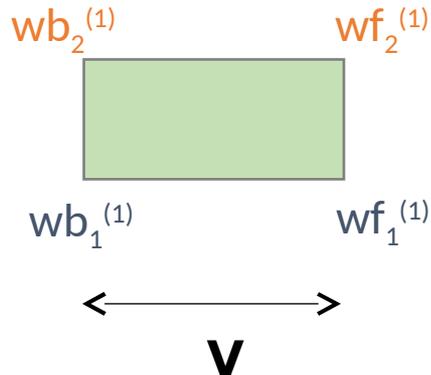
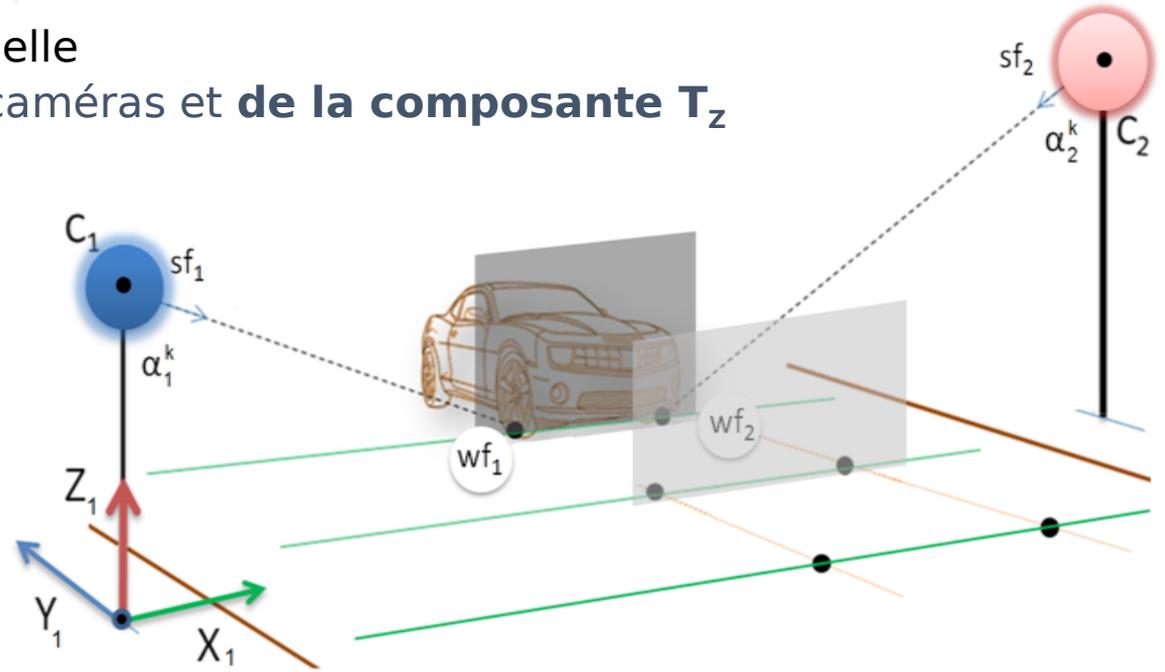
# Stéréovision Omnidirectionnelle Large Entraxe

Calcul de la translation à l'échelle

Estimation de la hauteur des caméras et **de la composante  $T_z$**

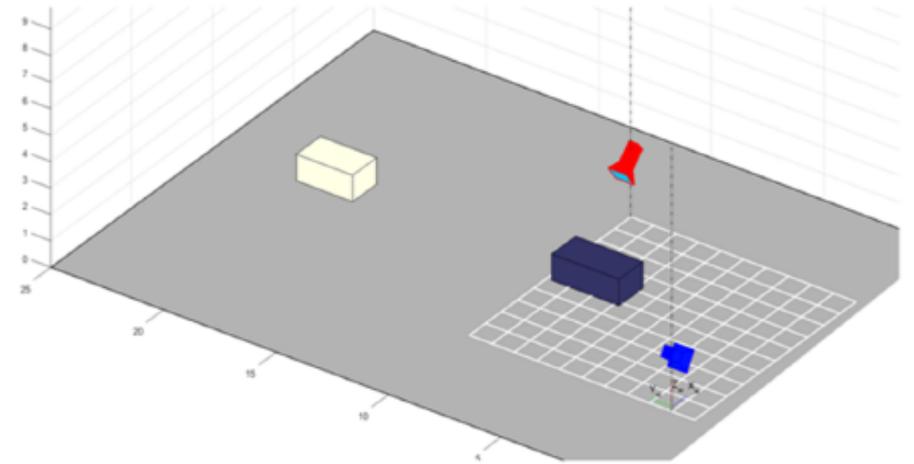
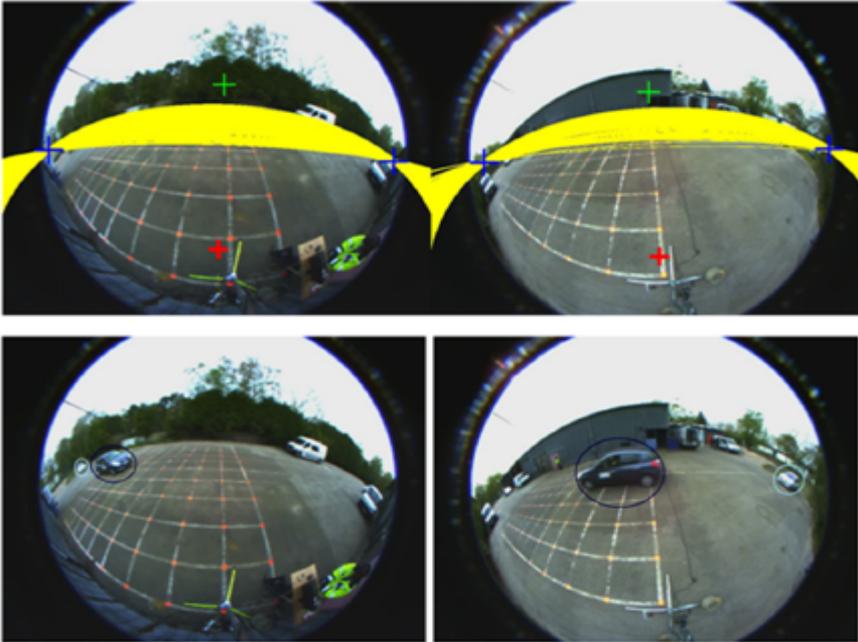


$$|| wf_i^{(k)} - wb_i^{(k)} || = V$$



# Stéréovision Omnidirectionnelle Large Entraxe

Evaluation: calibration extrinsèque (en environnement contrôlé)



# Stéréovision Omnidirectionnelle Large Entraxe

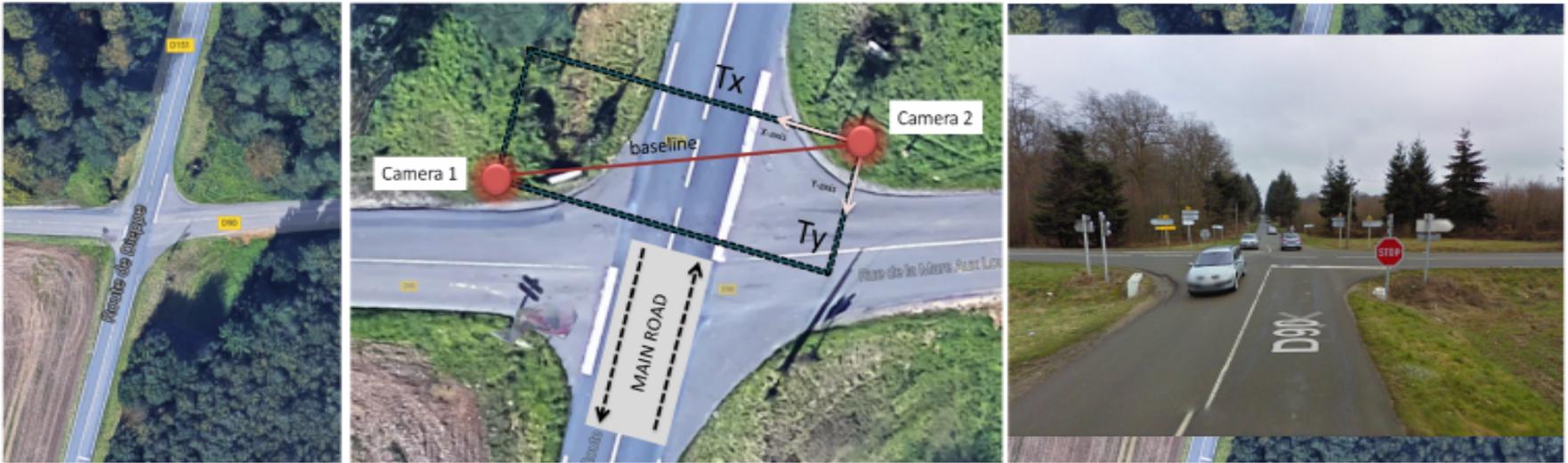
Evaluation: calibration extrinsèque (en environnement contrôlé)

Calibration	Vérité Terrain	Estimation (automatique)	Erreur (auto)	Erreur (semi-auto [49])
<b>R</b>	$\begin{bmatrix} -1 & -0.05 & -0.06 \\ 0.06 & -1 & -0.08 \\ -0.06 & -0.08 & 1 \end{bmatrix}$	$\begin{bmatrix} -1 & -0.09 & -0.07 \\ 0.09 & -1 & -0.03 \\ -0.07 & -0.04 & 1 \end{bmatrix}$	$X_1 - axis :$ $2.3455^\circ$ $Y_1 - axis :$ $0.3344^\circ$ $Z_1 - axis :$ $2.2351^\circ$	$X_1 - axis : 2.8937^\circ$ $Y_1 - axis : 0.0566^\circ$ $Z_1 - axis : 2.9184^\circ$
<b>h<sub>1</sub></b> (m)	$2.4 \pm 0.1$	2.33	0.07	0.07
<b>h<sub>2</sub></b> (m)	$2.3 \pm 0.1$	2.21	0.09	0.12
<b>T<sub>X</sub></b> (m)	$10 \pm 0.1$	10.23	0.23	—
<b>T<sub>Y</sub></b> (m)	$9 \pm 0.1$	9.13	0.13	0.11
<b>T<sub>Z</sub></b> (m)	$0.1 \pm 0.1$	0.12	0.02	0.05

# Stéréovision Omnidirectionnelle Large Entraxe

Evaluation: calibration extrinsèque (sur site réel)

métrique indirecte: erreur de reprojection des dimensions de véhicules



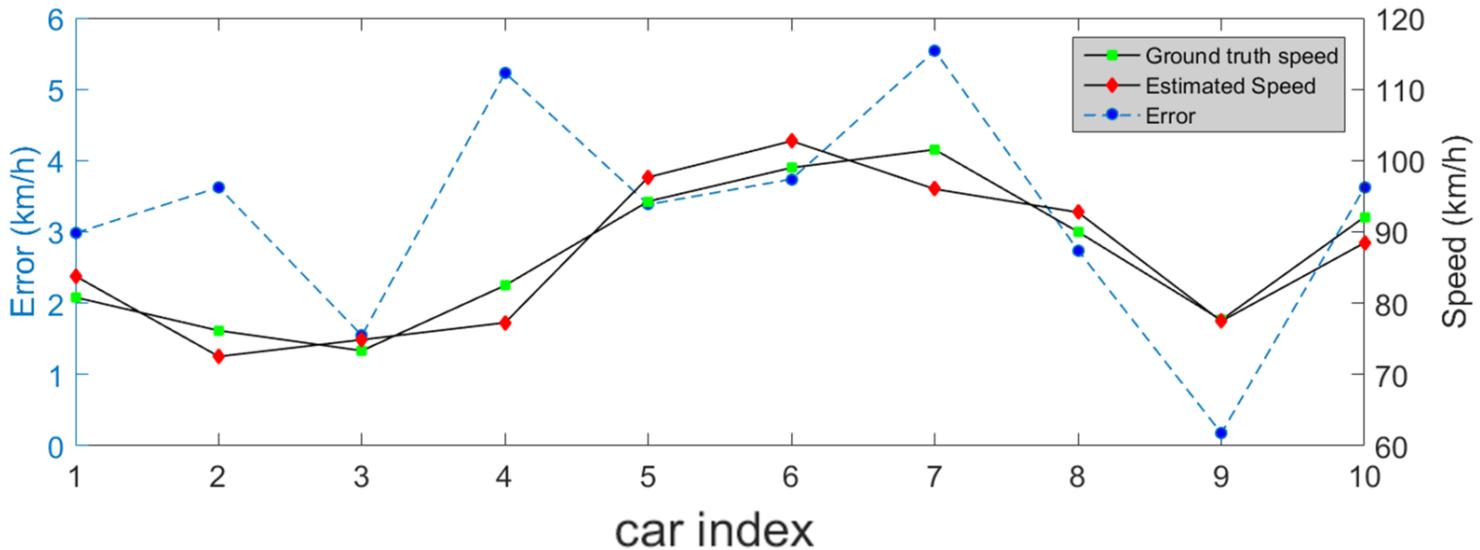
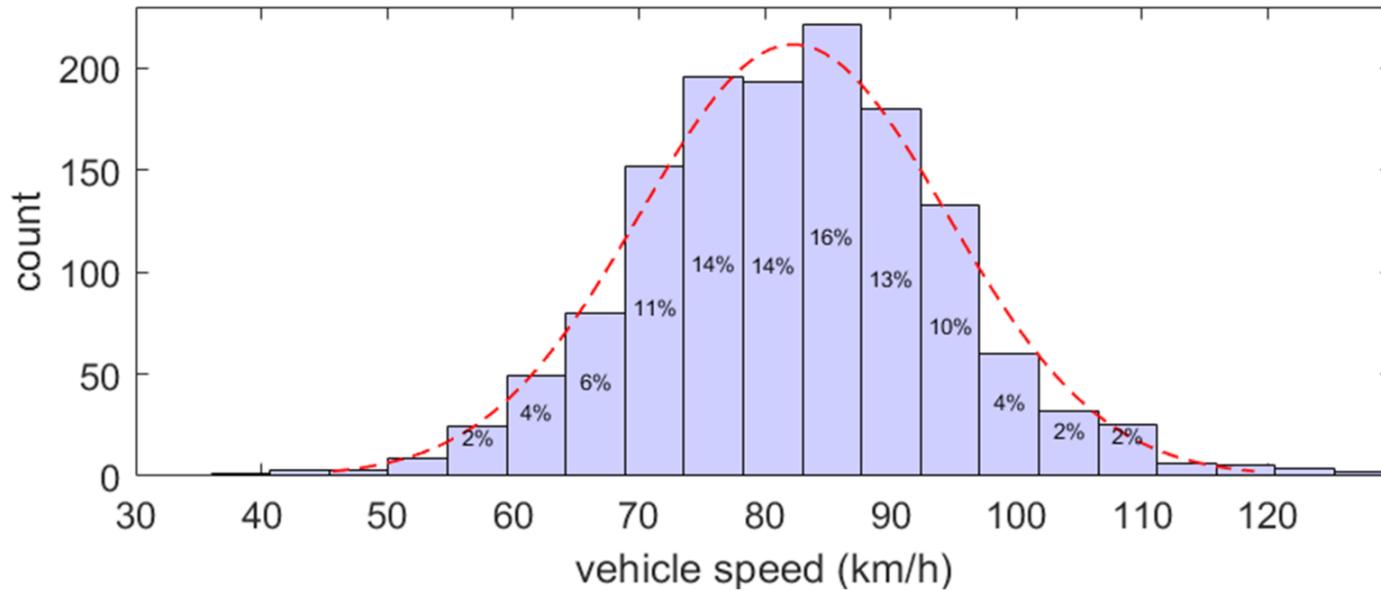
## ROTATION

R1	R2	R
$\begin{bmatrix} 0.475 & -0.199 & -0.857 \\ -0.15 & -0.978 & -0.144 \\ -0.867 & -0.06 & -0.495 \end{bmatrix}$	$\begin{bmatrix} -0.436 & 0.180 & 0.882 \\ 0.117 & 0.983 & 0.143 \\ -0.892 & 0.041 & 0.449 \end{bmatrix}$	$\begin{bmatrix} -0.998 & -0.026 & -0.051 \\ 0.026 & -1 & -0.009 \\ -0.051 & -0.008 & 0.999 \end{bmatrix}$

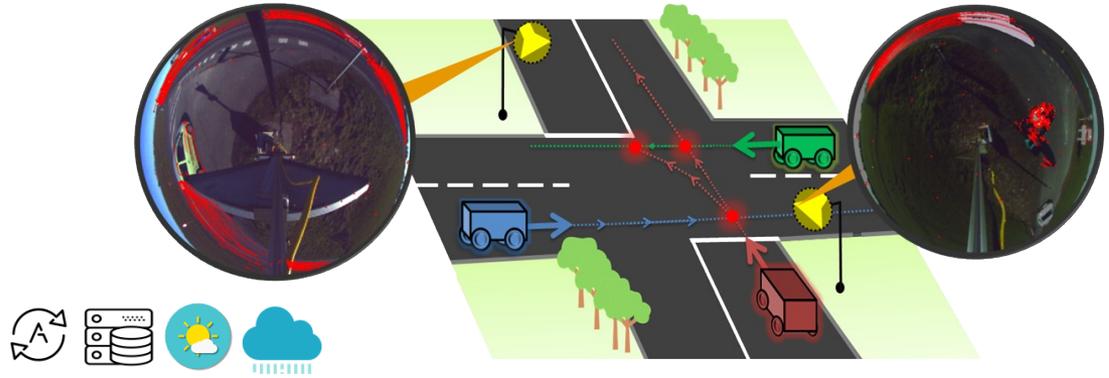
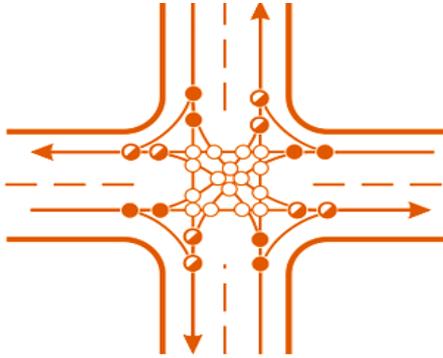
TRANSLATION			HAUTEUR	
TX	TY	TZ	h1	h2
20.468	10.638	0.092	1.890	1.798

# Stéréovision Omnidirectionnelle Large Entraxe

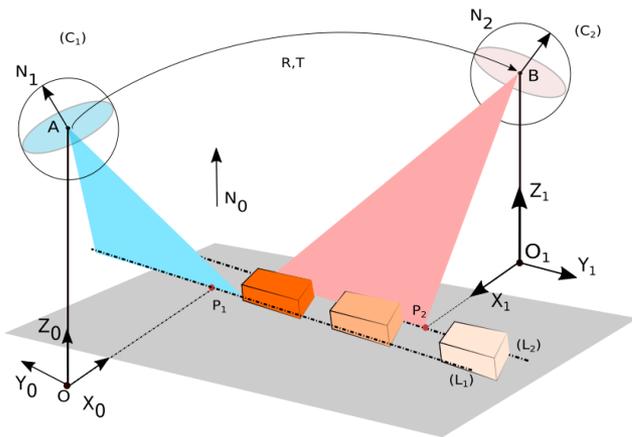
Evaluation: Trajectographie (sur site réel) - estimation de vitesses



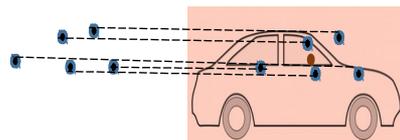
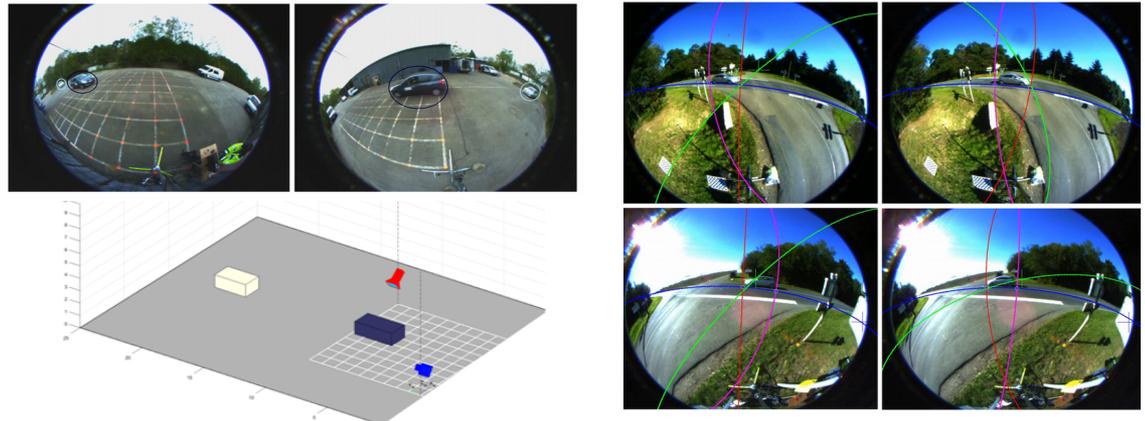
# Conclusion: Bilan et Perspectives



## Auto-Calibration Extrinsèque



## Localisation précise des véhicules



Paramètres Extrinsèque



Apparence et Mouvement

Trajectoire-Vitesse

Danger

