

Regulating the lateral optic flow to navigate in a corridor

Julien Serres, F. Ruffier, N. Franceschini

▶ **To cite this version:**

Julien Serres, F. Ruffier, N. Franceschini. Regulating the lateral optic flow to navigate in a corridor. 5ème Journées Nationales de Recherche en Robotique (JNRR), Oct 2005, Guidel, France. hal-02298950

HAL Id: hal-02298950
https://amu.hal.science/hal-02298950

Submitted on 27 Sep 2019

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

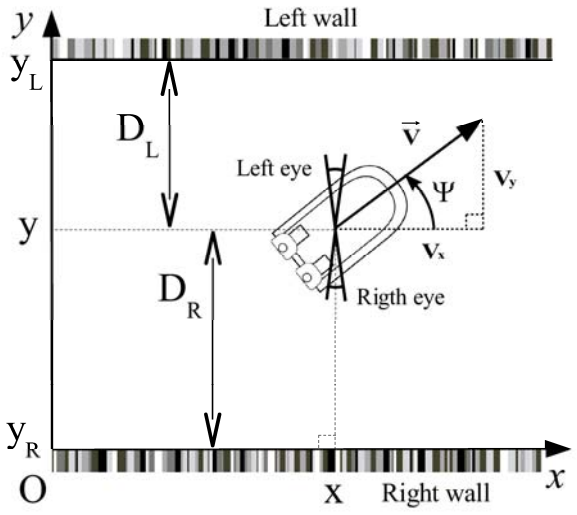
Regulating the lateral optic flow to navigate in a corridor

J. Serres, F. Ruffier, and N. Franceschini

Biorobotics, Movement and Perception Lab., CNRS/Univ. de la Méditerranée,
31, chemin Joseph Aiguier, 13402 Marseille Cedex 20, France

Information Society Technologies
Future and Emerging Technologies

• Lateral optic flow to navigate safely



Ψ : hovercraft yaw angle

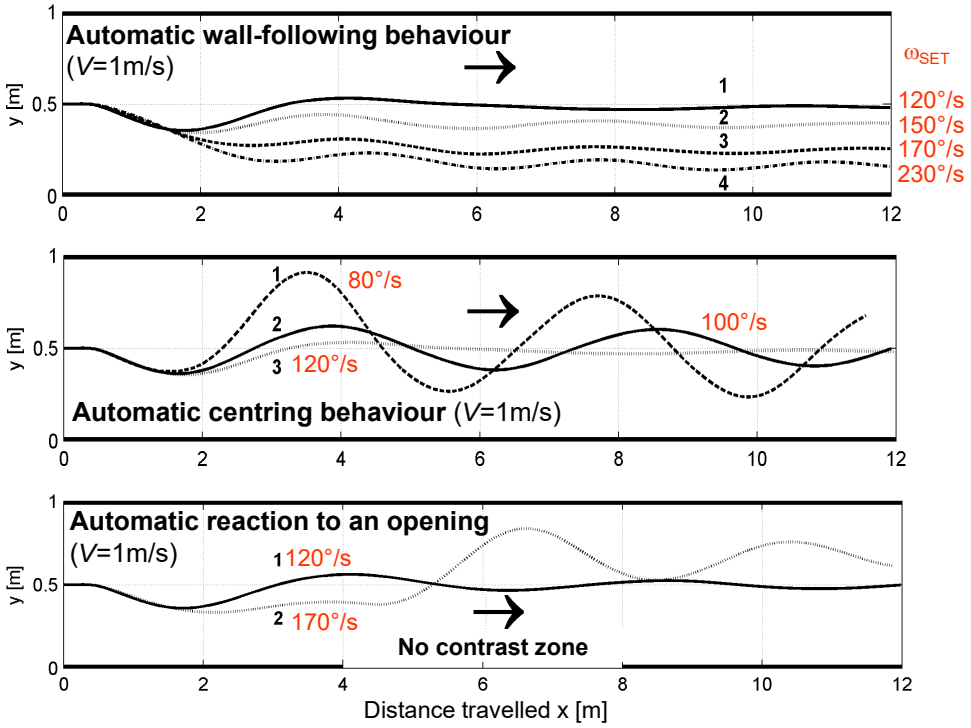
v_x : ground speed along X-axis

D_R : distance from right wall

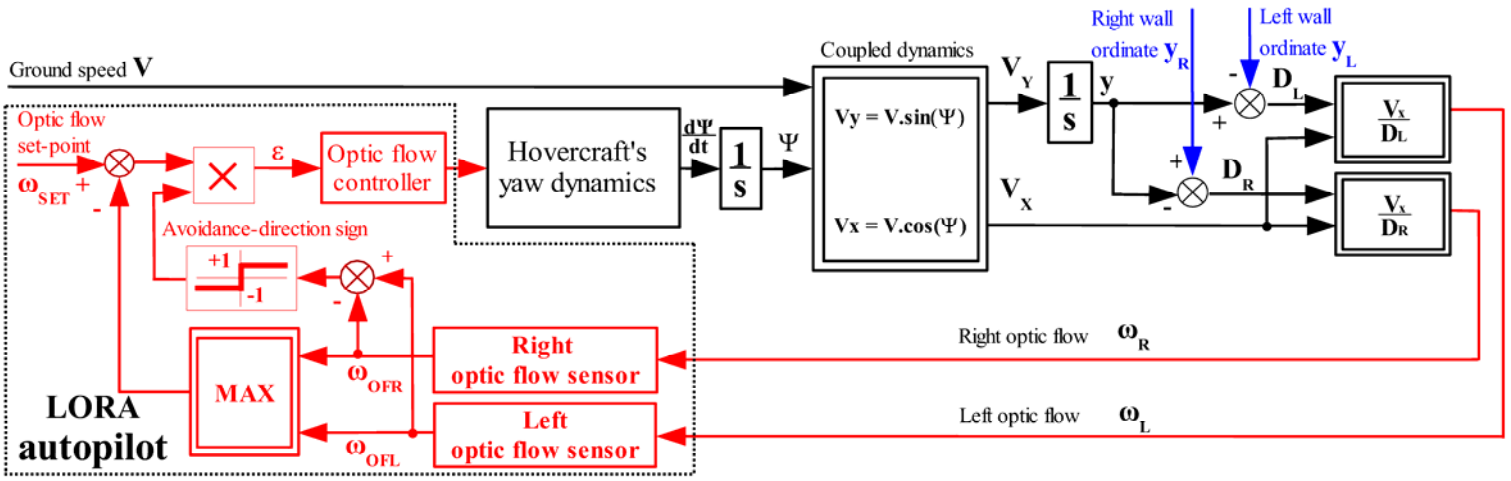
ω_R : right optic flow

$$\omega_R = \frac{v_x}{D_R}$$

• Corridor following



• The "optic flow regulation" loop (LORA = *Lateral Optic flow Regulation Autopilot*)



1. The autopilot keeps constant the ratio v_x / D.
2. It reacts to any optic flow variations by acting on the yaw.
3. Remote control ground speed
4. Active gaze stabilization by inertial information

• Optic flow regulation does not require explicit knowledge of :

1. Ground speed (wheel tachometer not required),
2. Distance (emissive rangefinders not required),
3. Relief data (cartography not required)

⇒ **Well adapted to artificial (and natural) Micro-Air Vehicles**

• Future improvements

- **Visual control of ground speed**
- **Independent control of each vehicle degree of freedom**
- **Implementation on a miniature hovercraft**

[1] Serres J., Ruffier F., Franceschini N., Int. Modeling Mediteraean Multiconference, I3M'2005. Biomimetic visual navigation in a corridor: to centre or not to centre?