A bee in the corridor: regulating the optic flow on one side

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T14-7B

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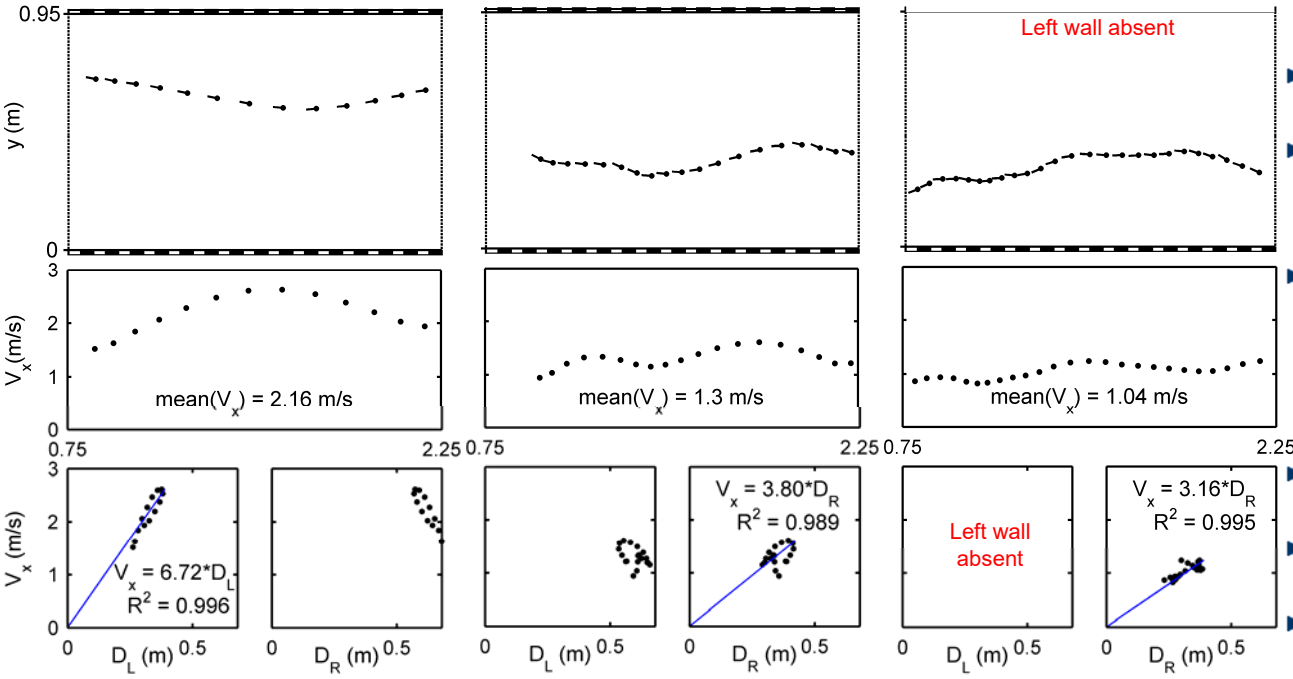
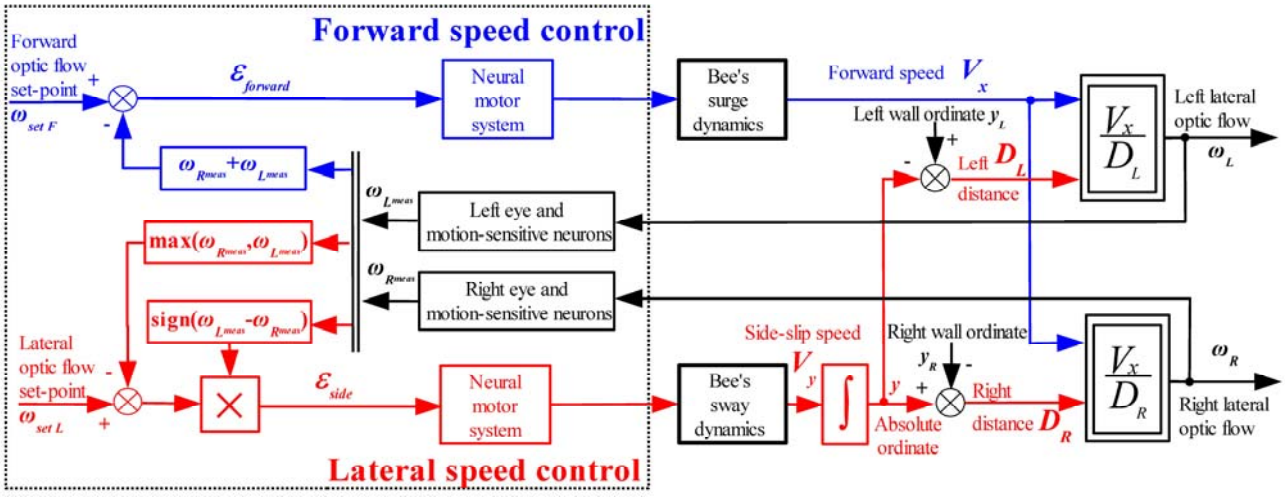
Future and Emerging Technologies

• Frame by frame analysis of the trajectories of individual bees (*Apis Mellifera*)



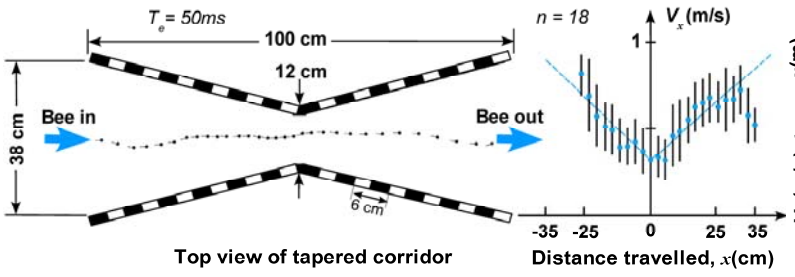
- Sampling period: T_e=50ms
- Camera viewfield: 1.5 m x 0.95 m
- experimental procedure: **T14-8B** (**Serres et al., Göttingen, 2007**)
- Speed and distance are proportional
- Proportionality factor: $\omega_{set\ L}$
- $\omega_{set\ L}$ *is the lateral optic flow 'set-point'*

• The dual optic flow regulator for speed control and collision avoidance



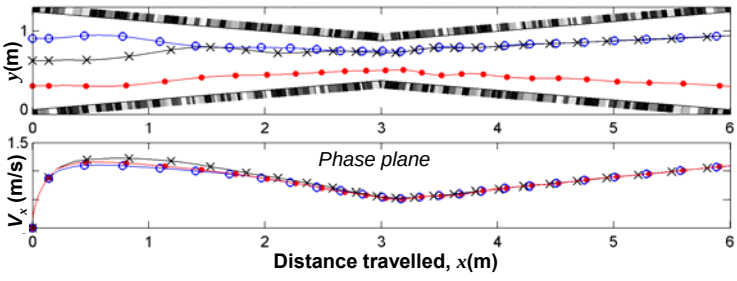
• Actual flight of a bee:

(adapted from Srinivasan, Zhang, Lehrer, Collett, 1996)



• Simulations of a *fully actuated* hovercraft:

(Serres, Ruffier, Franceschini, Proc. IEEE Biorob, 2006)



• Conclusion

- Forward speed and distance to one wall are ***proportional*** to each other, attesting that the lateral optic flow is held constant.
- The bee's behaviour is well accounted for by a ***lateral optic flow regulator*** (**Serres et al., Proc. IEEE/RAS Biorob 2006**)
- The ***dual optic flow regulator*** generates behaviours that are similar to those observed in bees (**Srinivasan et al., 1996**)