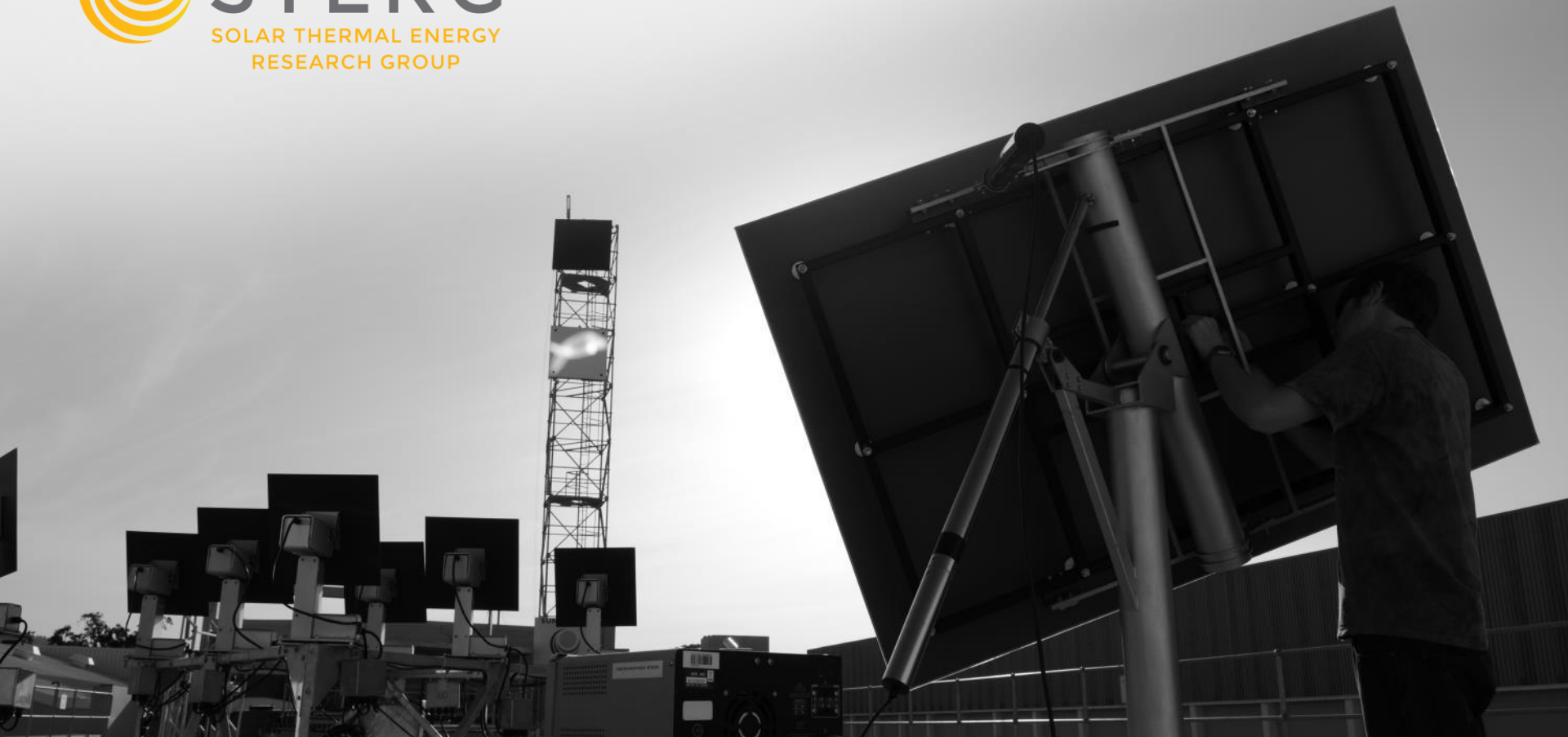




STERG

SOLAR THERMAL ENERGY
RESEARCH GROUP



Vector Histogram Star Obstacle Avoidance for Multicopters.

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Solar Thermal Energy Research Group (STERG),
University of Stellenbosch

Overview



- Why is obstacle avoidance necessary?
- Different obstacle avoidance algorithms
- Why the VFH* was chosen.

Why is obstacle avoidance necessary?



Different obstacle avoidance algorithms

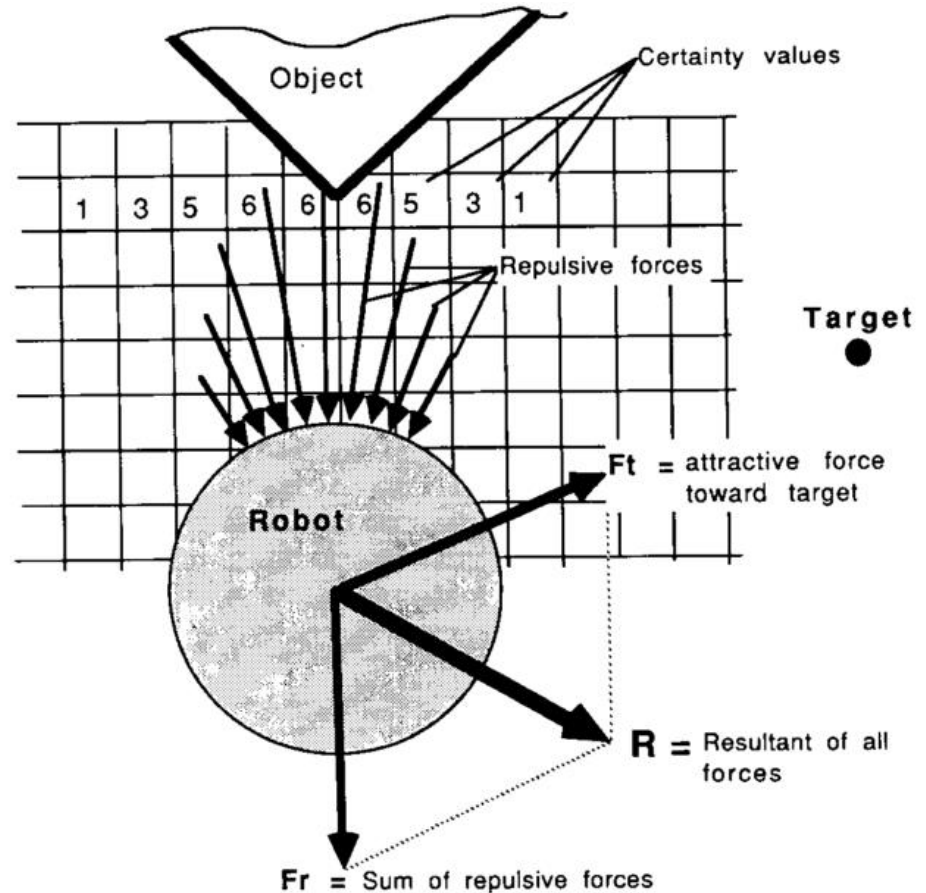


- VFF (Virtual Force Field)
- VFH (Vector Field Histogram)
- VFH+ (Vector Field Histogram Plus)
- VFH* (Vector Field Histogram Star)

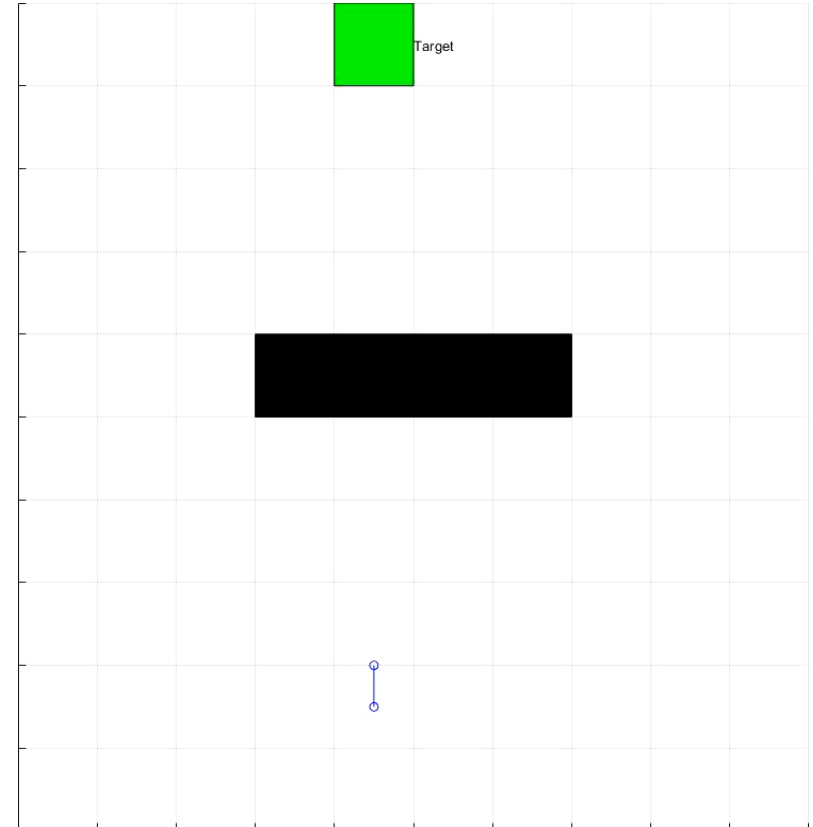
VFF (Virtual Force Field)



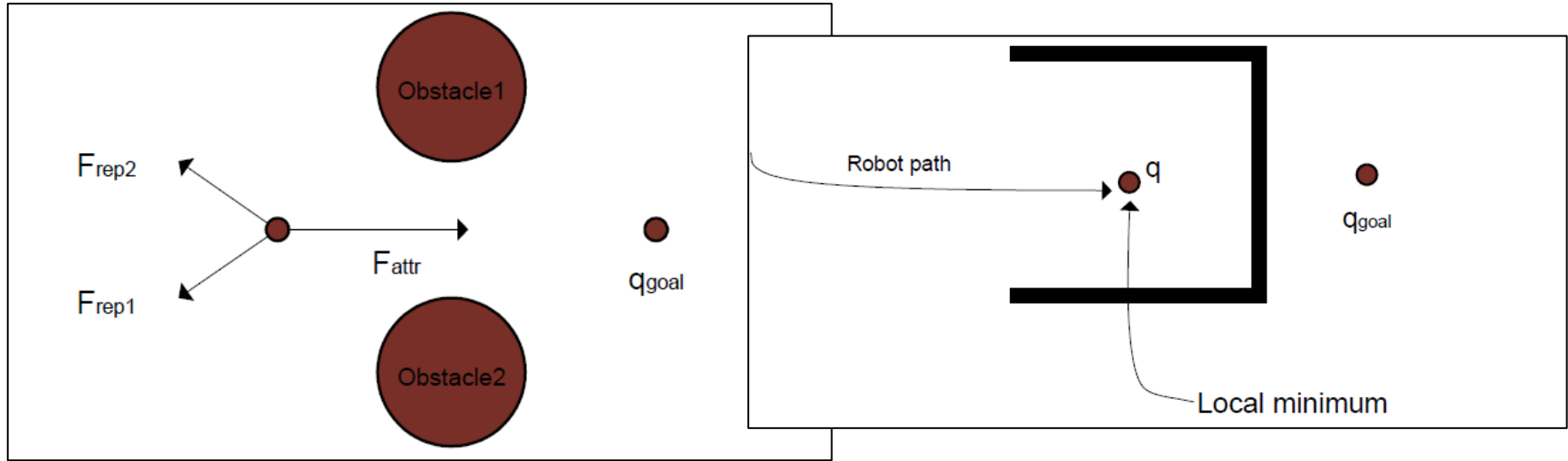
- Attractive force to the target.
- Repulsive forces from obstacles.
- Resultant force leads robot to target.
- Wall Following Method to get out of local minimums.



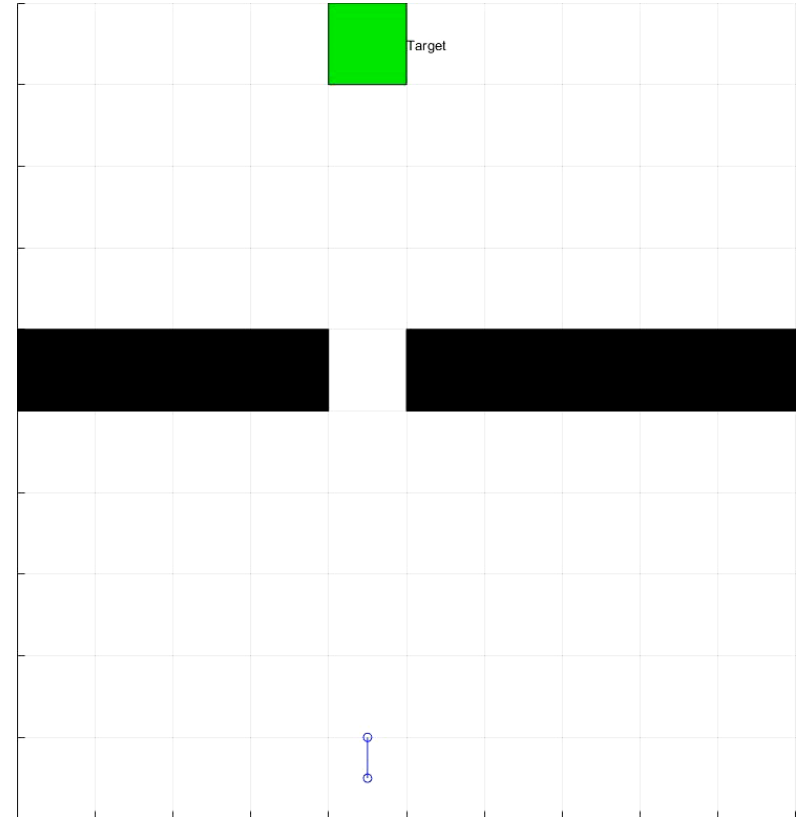
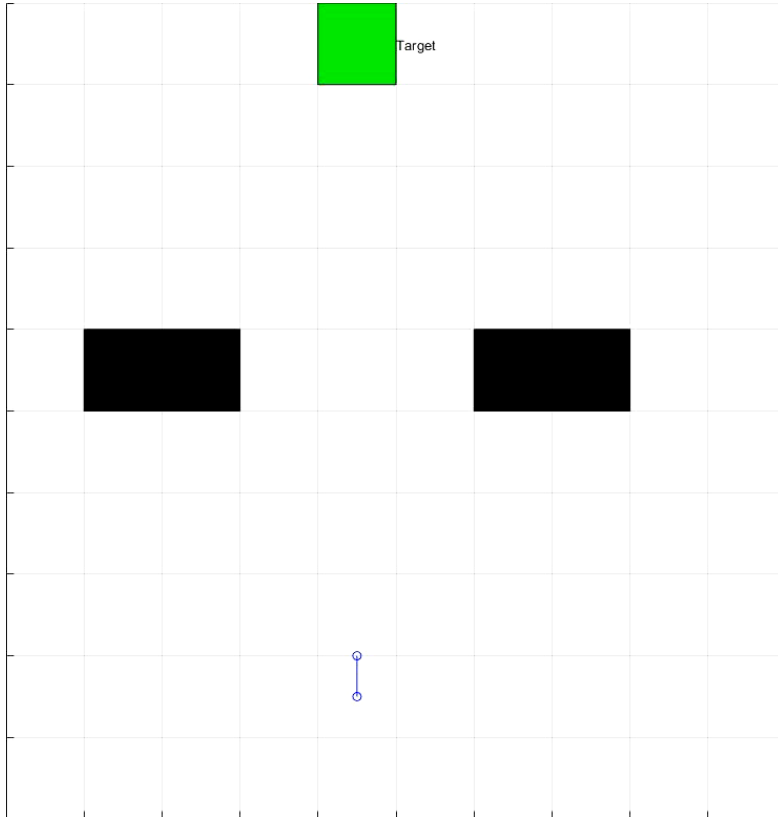
VFF (Virtual Force Field)



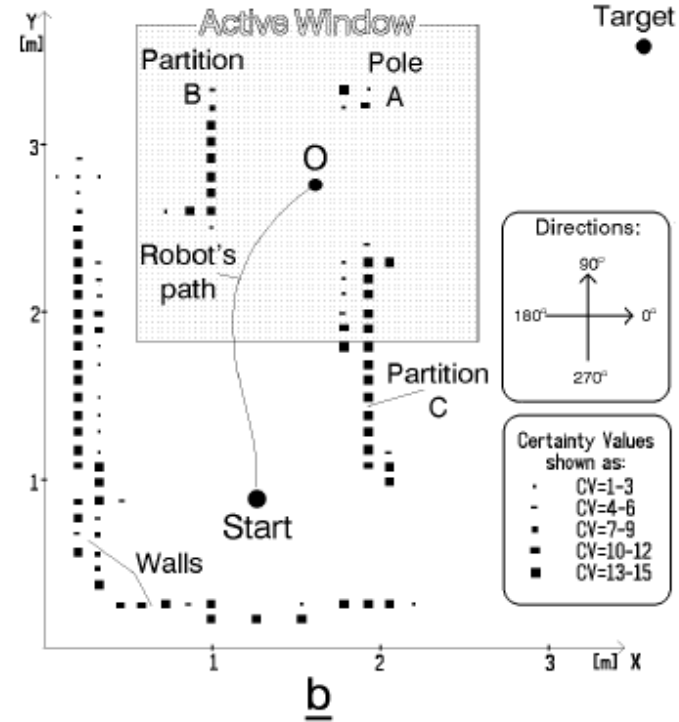
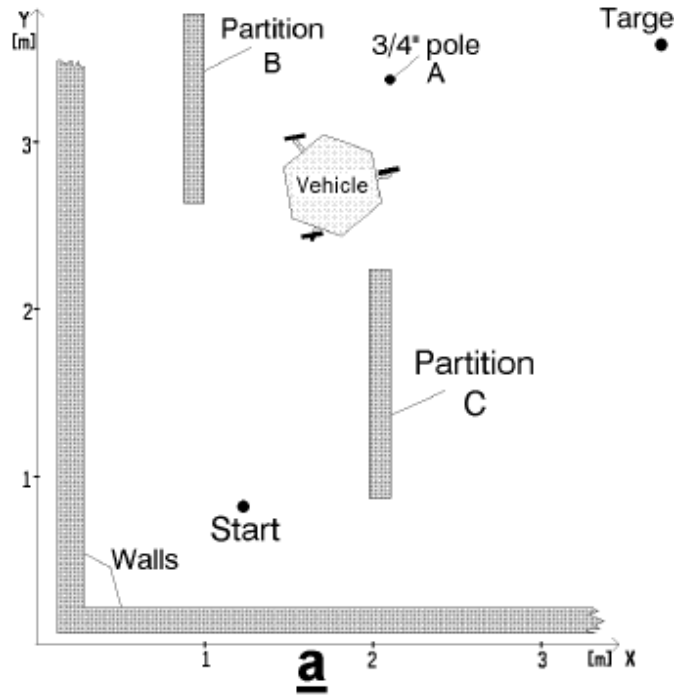
VFF (Virtual Force Field) – Trap Situations



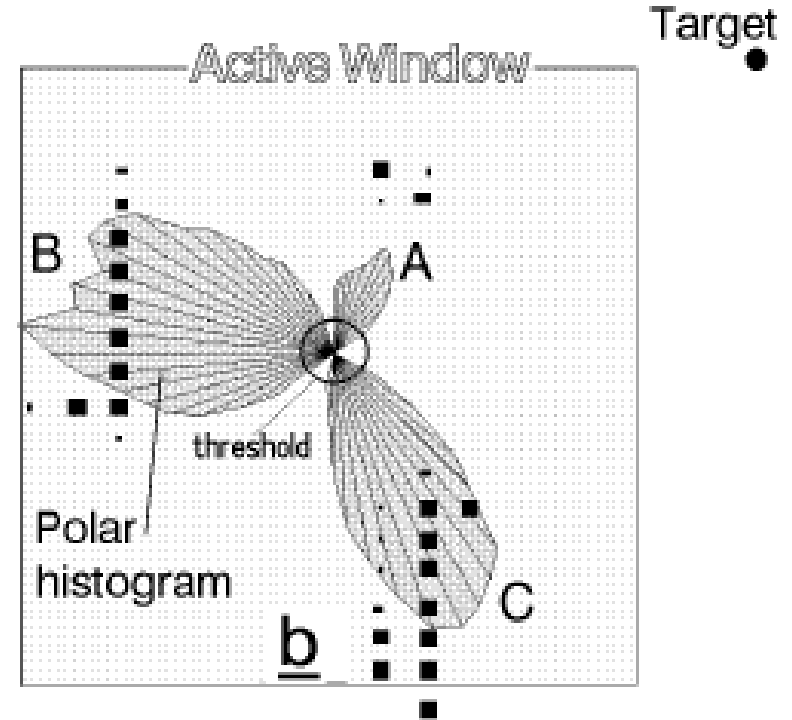
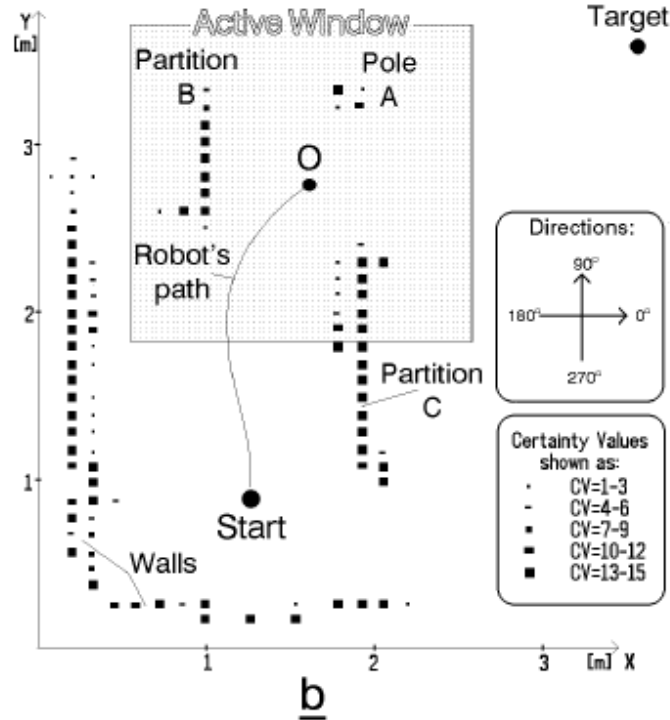
VFF (Virtual Force Field)



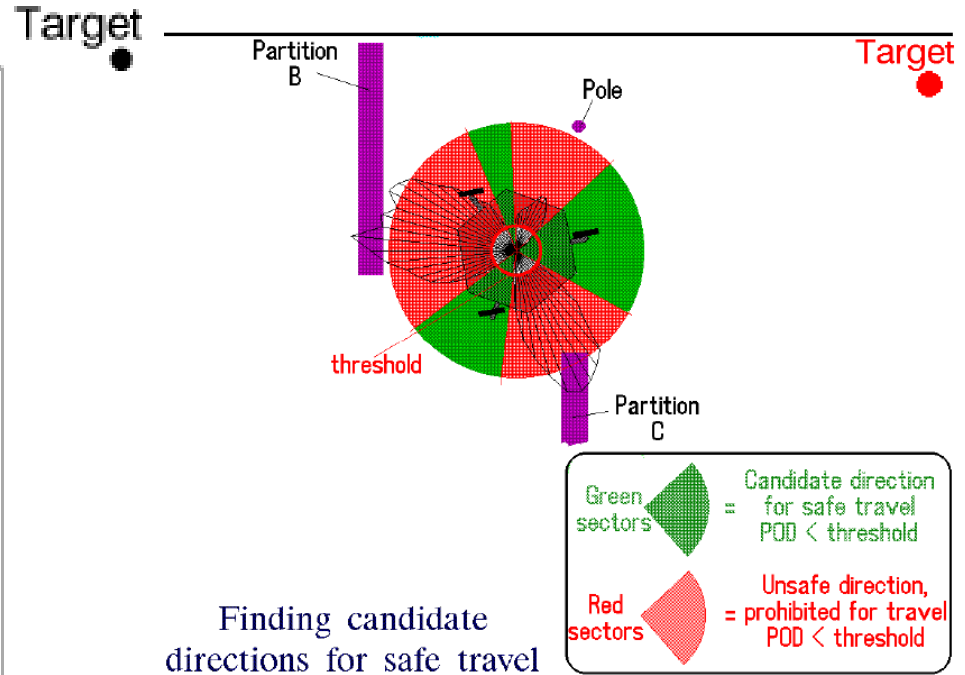
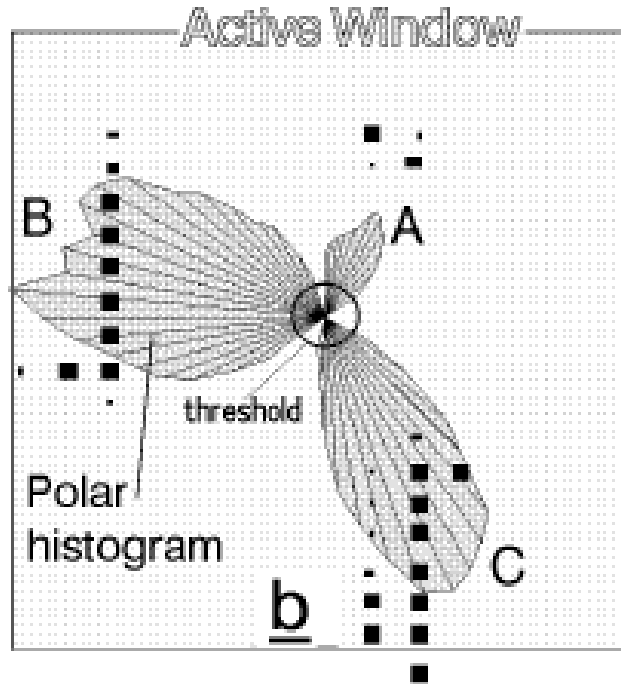
VFH (Vector Field Histogram)



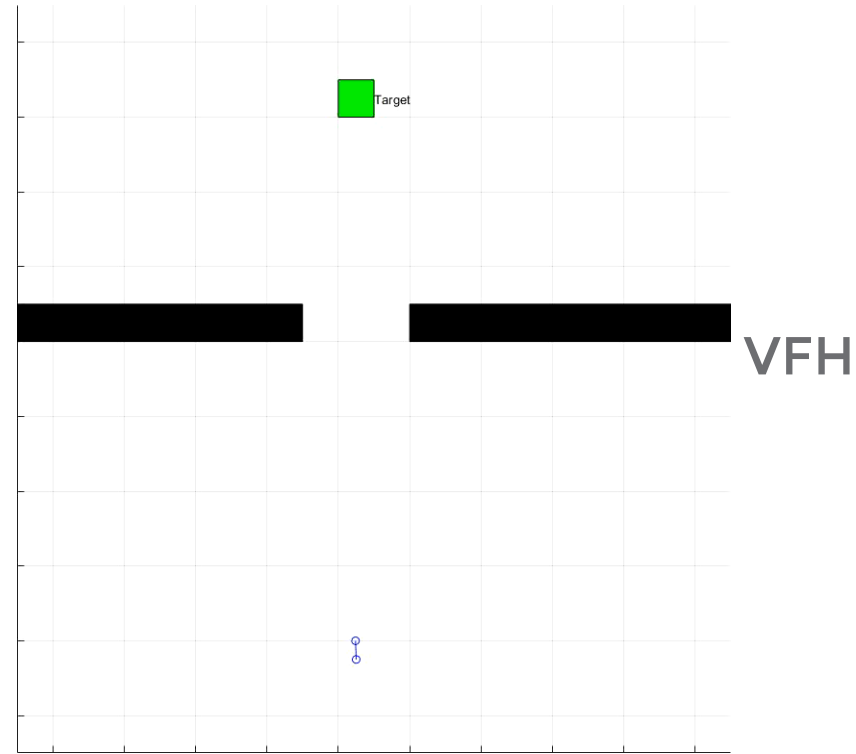
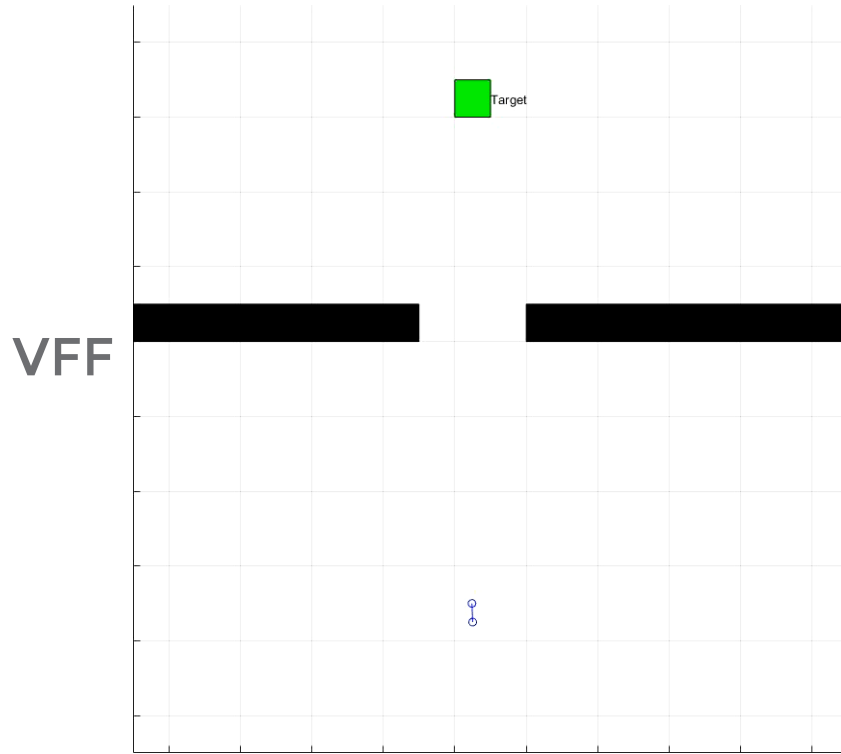
VFH (Vector Field Histogram)



VFH (Vector Field Histogram)



VFH (Vector Field Histogram)



VFH+ (Vector Field Histogram Plus)



- Accounting for robot width.

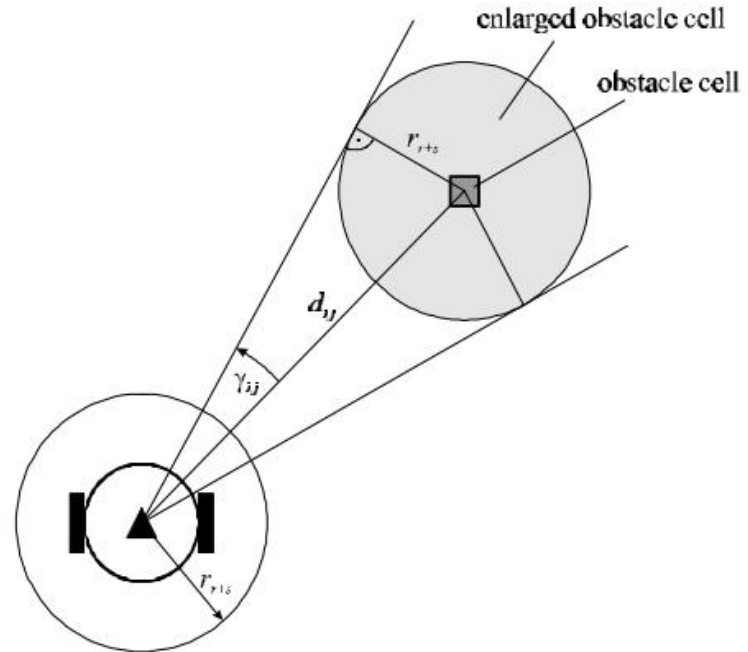


Figure 2: Enlargement angle

VFH+ (Vector Field Histogram Plus)



VFH



Target



VFH+

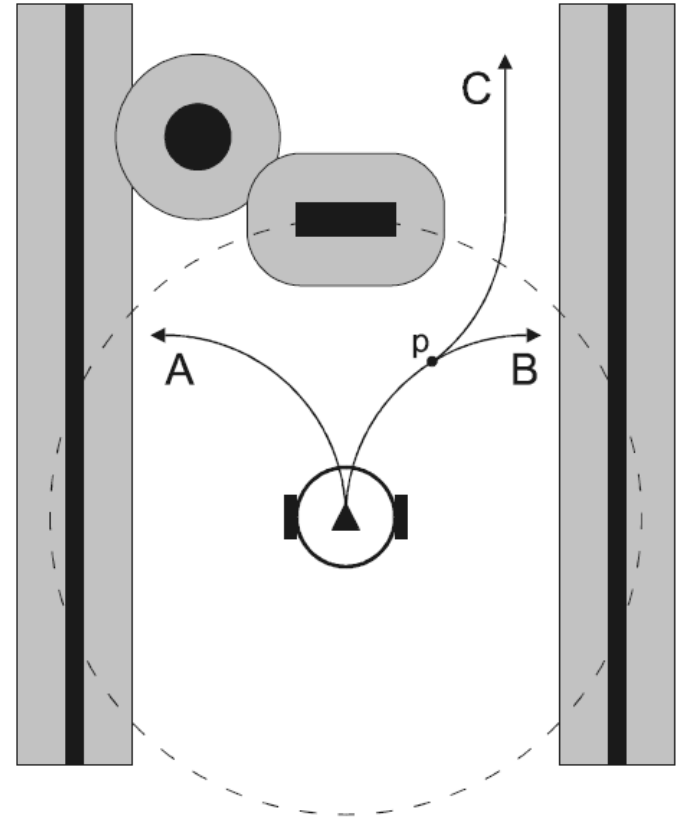


Target

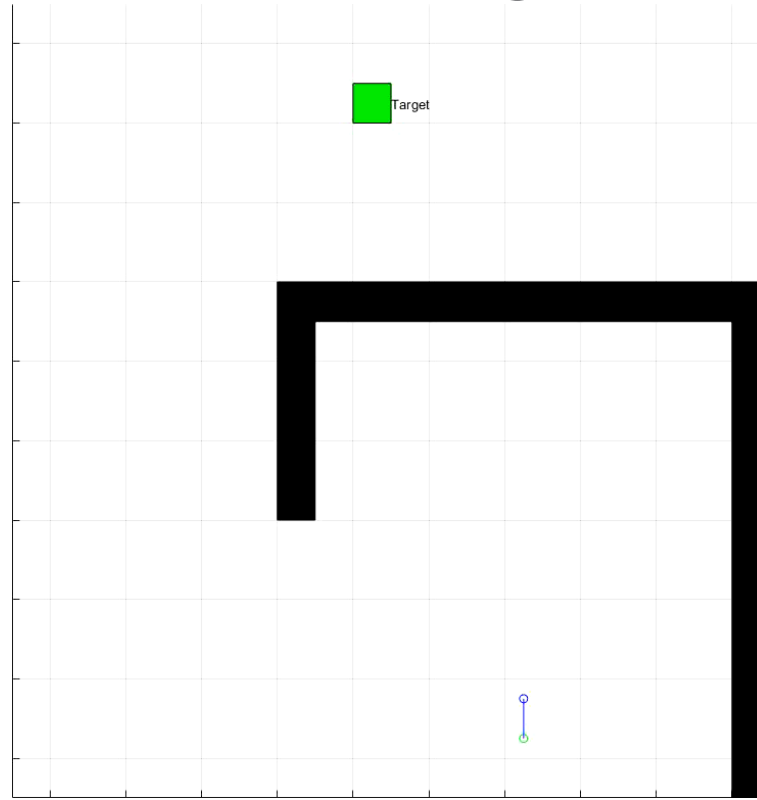


VFH* (Vector Field Histogram Star)

- Look-ahead verification (A* search algorithm)



VFH* (Vector Field Histogram Star)



ACKNOWLEDGEMENTS:

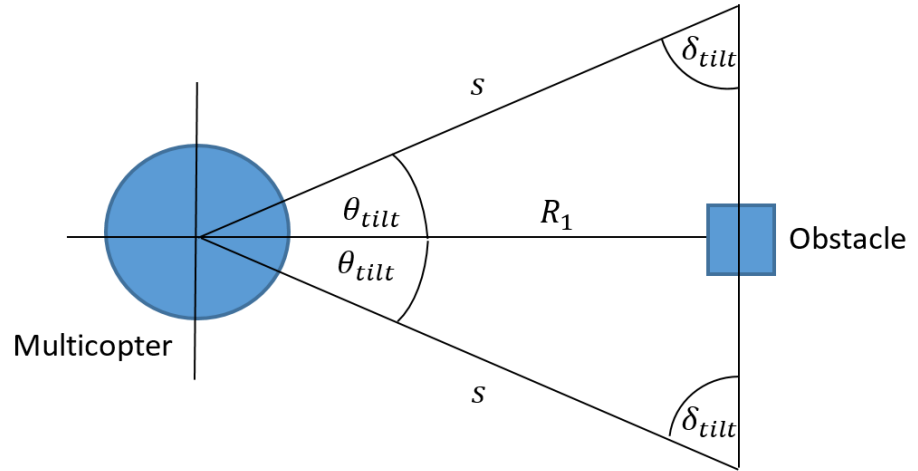
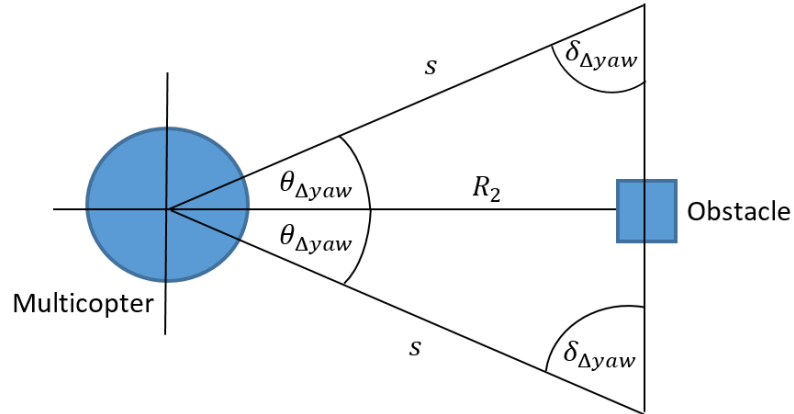
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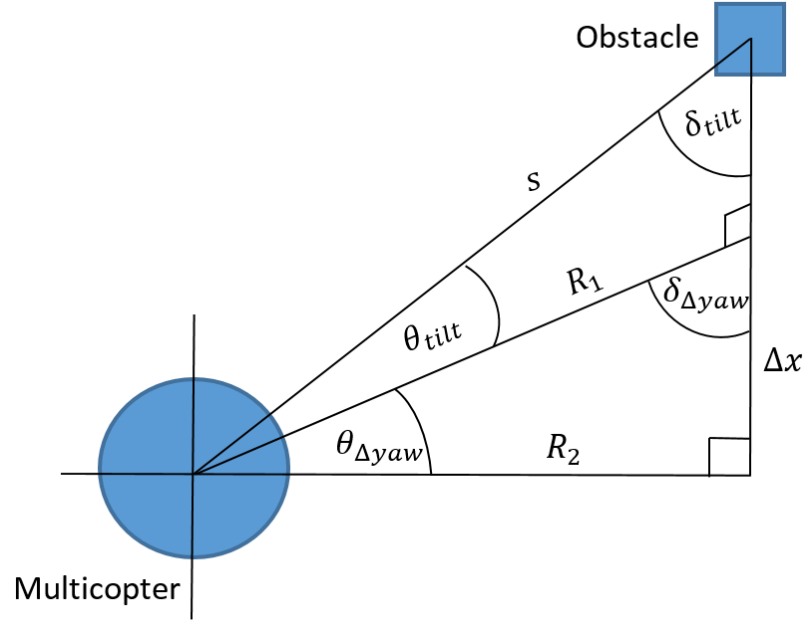
16546660@sun.ac.za

visit us: concentrating.sun.ac.za

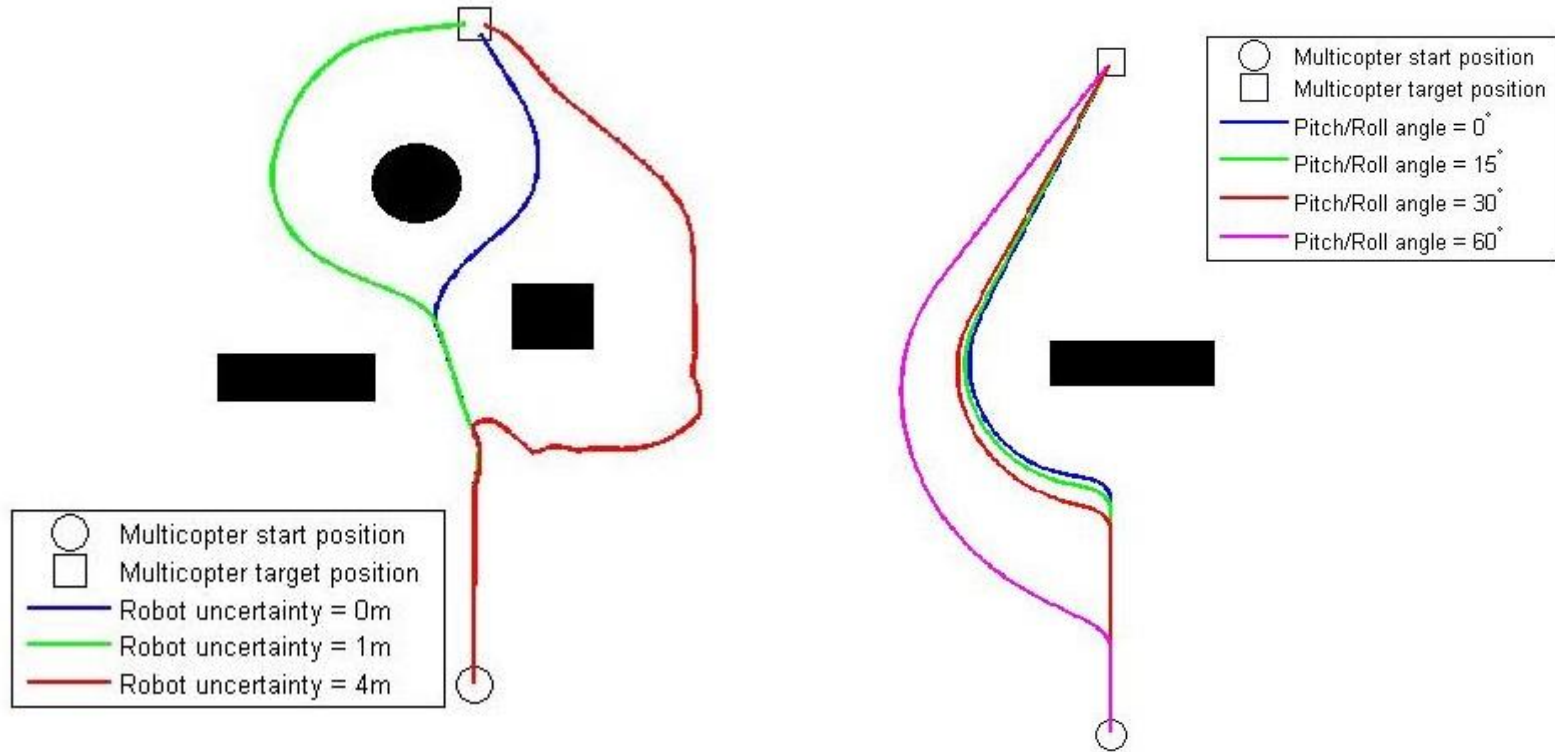
VFH* (Vector Field Histogram Star)



VFH* (Vector Field Histogram Star)



VFH* (Vector Field Histogram Star)



VFH* (Vector Field Histogram Star)

