

Figure S1: Visual grid cells obtained from the conjunction of respectively 10 (a) and 30 (b) random landmarks x azimuths couples with a modulo projection on the azimuth field  $\pi/30$  and threshold=0. (c) and (d) again 10 and 30 landmarks with a threshold of 0.995.

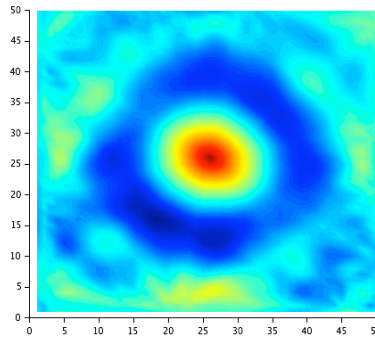


Figure S2: Large visual place cells obtained from the conjunction of 30 random landmarks x azimuths couples with a modulo projection on the azimuth field  $\pi/4$  and threshold=0.

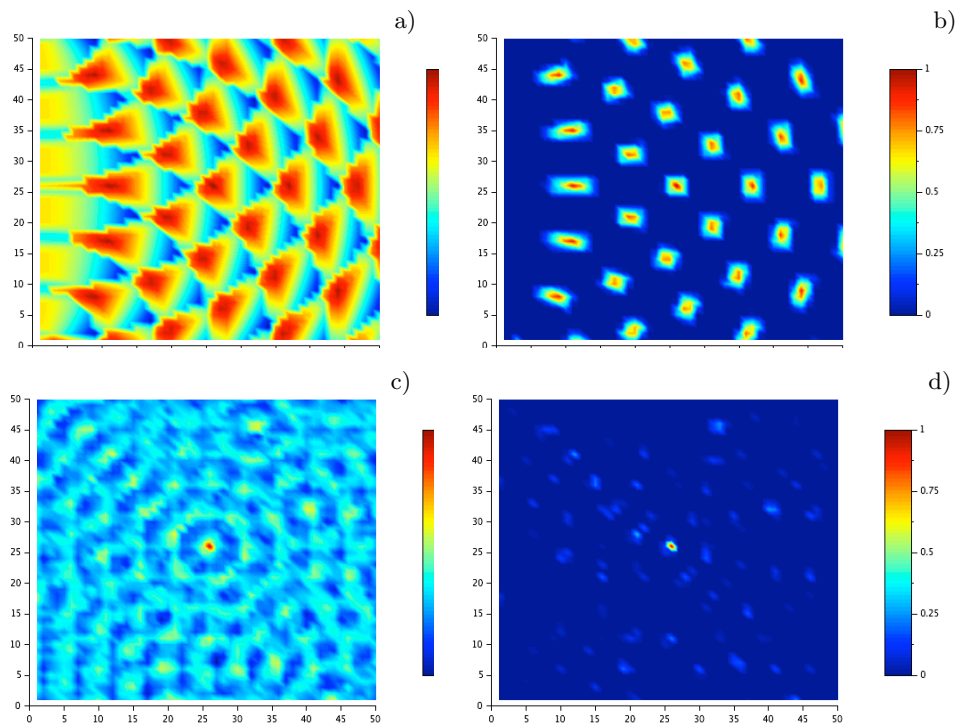


Figure S3: a) and b) Grid cells obtained from the conjunction of 2 landmarks x distance couples with a modulo projection on the distance field  $size/6$  with threshold=0. and 0.95 respectively. c) and d) Grid cells obtained from the conjunction of 30 random landmarks x distance couples with a modulo projection on the distance field  $size/10$  with increasing threshold=0. and 0.98

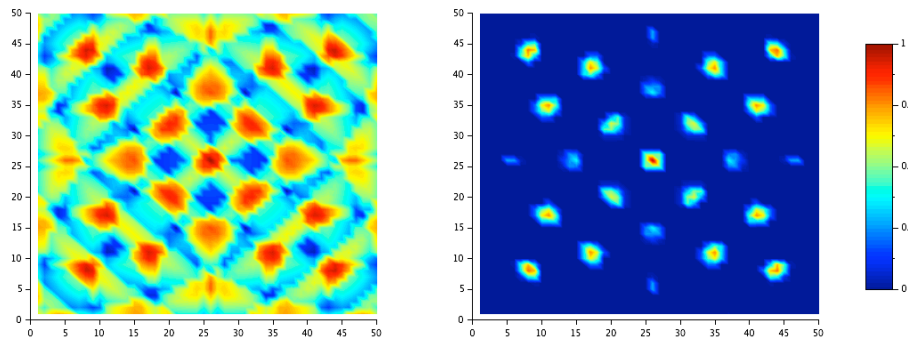


Figure S4: Visual place cells obtained from the conjunction of 4 landmarks x distance couples with a modulo projection on the distance field  $size/6$  with threshold=0. and 0.98