Supplementary Material

TABLE S-I
NOTATIONS

Symbol	Definition
$\hat{\mathbb{O}}_i$	Set of uncovered target points
$\hat{\mathbb{O}}'_i$	Set of additional uncovered target points
$\check{\mathbb{O}}_i$	Set of covered target points
$\bar{\mathbb{O}}_i$	Set of target points occupied by obstacles
N	Upper capacity limit of $\hat{\mathbb{O}}_i$
n	Number of robots
Υ	Set of robots
Φ_i	Position of the ith herd
Ψ_i^k	kth dynamic predator of robot i
r_i	Position of the ith robot
$\check{o}_i$	Start target point
$\hat{o}_i$	Destination target point
$\check{o}_i$	Previous target point
$\bar{o}_i$	Next target point
o'_i	Temporary target point
C_i	Set of candidate target points
o_j	jth candidate target point
o_{j^*}	Candidate target point with maximal reward
$R(o_j)$	Total reward of o_j
$R^H(o_j)$	Herd attraction reward of o_j
$R^D(o_j)$	Dynamic predator avoidance reward of o_j
$R^S(o_j)$	Smoothness reward of o_j
$R^B(o_j)$	Boundary reward of o_j
$W(o_j)$	missing reward of o_j
Ω	Reward function parameters
λ	Weighting factor for missing reward
ω^D	Weighting factor for dynamic predator avoidance reward
ω^S	Weighting factor for smoothness reward
ω^B	Weighting factor for boundary reward
$H(o_j)$	Distance from o_j to Φ_i
$D(o_j, \Psi_i^k)$	Distance from o_j to Ψ_i^k
$S(\hat{o}_i, \Psi_i^k)$	Inverted sigmoid function
κ	Slope
a	Distance from $\hat{o}_i$ to Ψ_i^k
b	Effective range
$\Theta(o_j)$	Deflection angle $\angle \check{o}_i \hat{o}_i o_j$
$B(o_j)$	Number of uncovered and obstacle-free neighbors of o_j
η	Neighborhood radius
$\hat{t}$	Maximum time

TABLE S-II
SIMULATION RESULTS VS. N_r IN BOUNDED ENVIRONMENTS

Scenario	N_r		DH-CPP	DPPCPP	Pac-AUV	BoB
4	2	N_t	378	**370**	412	399
		$\bar{T}_r$	0.16	0.13	**0.02**	0.06
	3	N_t	**254**	**254**	337	287
		$\bar{T}_r$	0.11	0.09	**0.01**	0.08
	4	N_t	190	**186**	\	232
		$\bar{T}_r$	0.09	**0.07**	\	0.09
	5	N_t	153	**150**	321	172
		$\bar{T}_r$	0.1	0.07	**0.01**	0.08
7	2	N_t	**462**	477	\	\
		$\bar{T}_r$	0.17	**0.15**	\	\
	3	N_t	**315**	326	\	\
		$\bar{T}_r$	**0.13**	0.18	\	\
	4	N_t	**235**	247	\	\
		$\bar{T}_r$	0.12	**0.1**	\	\
	5	N_t	**196**	197	\	\
		$\bar{T}_r$	0.13	**0.12**	\	\

TABLE S-III
SIMULATION RESULTS VS. N_r IN UNBOUNDED ENVIRONMENTS

Scenario	N_r		DH-CPP	DPPCPP	Pac-AUV	BoB
11	2	D_a	**10.87**	21.24	18.89	13.13
		N_m	**0**	**0**	3	5
		N_c	593	**600**	569	591
		$\bar{T}_r$	0.15	0.04	0.17	**0.01**
	3	D_a	**10.2**	20.67	16.96	13.76
		N_m	**0**	**0**	7	**0**
		N_c	894	**897**	861	860
		$\bar{T}_r$	0.13	0.08	0.14	**0.02**
	4	D_a	15.13	17.33	**15.09**	17.59
		N_m	**0**	**0**	126	**0**
		N_c	**1189**	1183	1160	1152
		$\bar{T}_r$	0.15	0.1	0.1	**0.02**
	5	D_a	15.64	17.25	**15.01**	18.87
		N_m	**0**	**0**	157	**0**
		N_c	**1473**	1463	1363	1415
		$\bar{T}_r$	0.17	0.12	0.09	**0.02**
14	2	D_a	**10.85**	20.55	\	\
		N_m	**0**	**0**	\	\
		N_c	593	**600**	\	\
		$\bar{T}_r$	0.1	**0.05**	\	\
	3	D_a	**11.58**	18.27	\	\
		N_m	**0**	4	\	\
		N_c	884	**900**	\	\
		$\bar{T}_r$	0.11	**0.08**	\	\
	4	D_a	**13.33**	19.04	\	\
		N_m	**0**	4	\	\
		N_c	1174	**1189**	\	\
		$\bar{T}_r$	0.14	**0.09**	\	\
	5	D_a	**14.37**	16.56	\	\
		N_m	**0**	4	\	\
		N_c	**1463**	1455	\	\
		$\bar{T}_r$	0.16	**0.14**	\	\

TABLE S-IV
SIMULATION RESULTS OF DIFFERENT INITIAL MOVABLE AREA SIZES

Scenario	S_m		DH-CPP	DPPCPP	Pac-AUV	BoB
11	25×25	D_a	9.61	10.41	**9.23**	10.79
		N_m	**0**	**0**	11	3
		N_c	**874**	843	737	868
		$\bar{T}_r$	0.12	0.11	0.06	**0.01**
	40×40	D_a	**10.2**	20.67	16.96	13.76
		N_m	**0**	**0**	7	**0**
		N_c	894	**897**	861	860
		$\bar{T}_r$	0.13	0.08	0.14	**0.02**
	55×55	D_a	**10.2**	27.91	24.81	16.57
		N_m	**0**	**0**	**0**	**0**
		N_c	894	**900**	897	878
		$\bar{T}_r$	0.13	0.07	0.24	**0.01**
14	25×25	D_a	12.19	**10.88**	\	\
		N_m	**0**	4	\	\
		N_c	**884**	844	\	\
		$\bar{T}_r$	0.11	**0.09**	\	\
	40×40	D_a	**11.58**	18.27	\	\
		N_m	**0**	4	\	\
		N_c	884	**900**	\	\
		$\bar{T}_r$	0.11	**0.08**	\	\
	55×55	D_a	**11.58**	29.75	\	\
		N_m	**0**	**0**	\	\
		N_c	884	**900**	\	\
		$\bar{T}_r$	0.11	**0.07**	\	\

TABLE S-V
SIMULATION RESULTS OF DIFFERENT BOUNDARY EXPANSION RATES

Scenario	R_e		DH-CPP	DPPCPP	Pac-AUV	BoB
11	1	D_a	**10.2**	20.67	16.96	13.76
		N_m	**0**	**0**	7	**0**
		N_c	894	**897**	861	860
		$\bar{T}_r$	0.13	0.08	0.14	**0.02**
	2	D_a	**10.2**	22.42	19.73	14.06
		N_m	**0**	**0**	16	**0**
		N_c	894	**900**	884	862
		$\bar{T}_r$	0.13	0.09	0.17	**0.01**
	3	D_a	**10.2**	25.08	21.61	15.8
		N_m	**0**	**0**	**0**	**0**
		N_c	894	**900**	883	885
		$\bar{T}_r$	0.14	0.09	0.21	**0.01**
14	1	D_a	**11.58**	18.27	\	\
		N_m	**0**	4	\	\
		N_c	884	**900**	\	\
		$\bar{T}_r$	0.11	**0.08**	\	\
	2	D_a	**11.58**	22.88	\	\
		N_m	**0**	4	\	\
		N_c	884	**900**	\	\
		$\bar{T}_r$	0.11	**0.08**	\	\
	3	D_a	**11.58**	25.61	\	\
		N_m	**0**	**0**	\	\
		N_c	884	**900**	\	\
		$\bar{T}_r$	0.11	**0.09**	\	\