Table S1. Total flight number per month and per year performed at offshore (Lampedusa) and nearshore (Linosa) areas and total, certain (C) and uncertain (U) number of turtles sighted. For offshore transects, distance from the coast is indicated.

location	year	month	n flights	distance from coast	turtles (C; U)
Offshore (Lampedusa)	2017	7	6	10 km	5 (1; 4)
		9	11	10 km	5 (4; 1)
		10	31	10 km	6 (5; 1)
		tot	**48**		**16 (10; 6)**
	2018	6	15	10 km	5 (5; 0)
		6	18	5 km	14 (10; 4)
		7	14	10 km	6 (4; 2)
		7	13	5 km	13 (9; 4)
		8	5	10 km	0 (0; 0)
		8	11	5 km	7 (7; 0)
		9	4	5 km	0 (0; 0)
		tot	**80**		**45 (35; 10)**
	TOTAL		**34**	**10 km**	**11 (9; 2)**
			46	**5 km**	**34 (26; 8)**
			128	**all**	**61(45;16)**
Nearshore (Linosa)	2020	8	21		56 (14; 42)
		9	8		0 (0; 0)
		10	8		2 (1; 1)
		11	57		22 (11; 11)
		tot	**94**		**80 (26; 54)**
	2021	5	18		18 (8; 10)
		6	27		15 (7; 8)
		7	29		21 (8; 13)
		9	17		5 (0; 5)
		tot	**91**		**59 (23; 36)**
	2022	7	34		10 (6; 4)
		8	45		19 (1; 18)
		9	24		3 (2; 1)
		10	85		22 (6; 16)
		tot	**188**		**54 (15; 39)**
	2023	7	26		8 (3; 5)
		TOTAL	**399**		**201 (67; 134)**

Table S2. Secchi disk visibility test: visibility from 0 to 1 tested at 0,1,2 Beaufort Sea State (BSS) and from 1 to 4 m of depth at offshore areas in Lampedusa.

Depth (m)	BSS	Visibility
1	0	1
1	2	1
1	2	1
2	2	1
2	2	1
3	0	0.5
3	2	1
4	0	0
4	1	0.5

Table S3. Surface density (bootstrapped mean and 95% CI, N rep=10000) measured as turtle km^{-2} relative to Lampedusa (years 2017-2018) and to Linosa (years 2020-2023) and overall total density (Dt; bootstrapped mean and 95% CI; N =1000 bootstrap) relative to Lampedusa, calculated through the formula Dt=Ds/ATP. Ds: mean surface density (of dataset CU, CUc, C and Cc); ATP by Depth2 (depth sensor with surface >= -2 m). Datasets: CU (all C+U sightings); Cc+Uc (CU with DCC); C (only C sightings); Cc (C with DCC).

	Lampedusa	Linosa	Lampedusa
density	surface	surface	total
dataset	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)
CU	0.477 (0.336-0.609)	0.504 (0.383-0.609)	0.882 (0.621-1.126)
Cc+Uc	0.445 (0.320-0.563)	0.396 (0.316-0.417)	0.823 (0.591-1.041)
C	0.352 (0.242-0.453)	0.168 (0.118-0.213)	0.651 (0.477-0.837)
Cc	0.336 (0.234-0.430)	0.158 (0.113-0.201)	0.621 (0.433-0.795)

Table S4. Contingency tables for Pearson Chi-square Test to investigate differences among years in DCC in Linosa counts. Cc+Uc and Cc counts: corrected number of sightings (potential duplicated removed); PD: potential duplicates.

year	Cc+Uc	CU PD	tot	Cc	C PD	tot
2020	59	21	80	26	0	26
2021	47	12	59	21	2	23
2022	47	7	54	14	1	15
2023	5	3	8	2	1	3

Table S5. Mean ATP estimates and % CI for each source and relative sample size (N). "video": camera; "SWS": satellite tag; "Depth0": depth sensor considering surface = 0 m; "Depth2": depth sensor with surface >= -2 m.

Source	Mean (95% CI)	N
video	0.108 (0.072 - 0.133)	21
SWS	0.383 (0.363 - 0.401)	547
Depth0	0.404 (0.321 - 0.484)	19
Depth2	0.541 (0.472 - 0.613)	19

Table S6. Estimates of loggerhead turtle density and/or abundance worldwide, obtained through aerial surveys by aircraft and UAV. Area: M=middle, E=east, NE=north-east, N=north, GoM=Gulf of Mexico, W=west, Med=Mediterranean, C=central, NW=north-west. Oceanic/neritic: OC=oceanic, NE=neritic. Nearshore/offshore: NS=nearshore, OF=offshore. ATP source type: SR=same region of surveys, NO=not same region of surveys. Transect design: LT-DS = line transect distance sampling, LT = line transect, CST = concentric squared transect, STP = saw tooth pattern. Surveyed area: *area in km. References: [a]DiMatteo et al. 2022, [b]winter; summer, [c]Revelles et al. 2007, [d]Cardona et al. 2005, [e]estimated by table 2 on paper, [f]estimated by paper results, [g]Renaud and Carpenter 1994, [h]Nelson 1996, [i]Dellinger & Freitas 2000, [l]oceanic density/abundance min and max, [m]Barco et al. 2018, [n]Peckham et al. 2012, [o]summer 2018 abundance, [p]long-term and summer 2018 abundance, [q]min and max; in t km⁻¹, [r]max from n=154 turtles in a cell (2 x 0.4 km), [s]respective peak.

Study	Habitat use	Area	Location	Oceanic /Neritic	Nearshore /Offshore	N years	Mean surface density (turtle km⁻²)	Mean surface abundance (turtle)	Availability correction	Mean total density (turtle km⁻²)	Mean total abundance (turtle)	ATP source type	ATP value	Perception correction	DCC	Vehicle	Transect design	Altitude (m)	Speed (km h⁻¹)	Surveyed area (km²)	N observers	Depth sea floor (m)	Max dist from shore (km)
present study	foraging	C Med	Tunisian Continental Shelf	NE	OF	2 (2017-2018)	0.336 - 0.477	\	Y	0.621 – 0.882	\	Depth2	0.541	y	y	UAV	CST	74	28	2	2	80	10
present study	foraging	C Med	Linosa Island	NE	NS	4 (2020-2023)	0.158 - 0.504	\	\	\	\	\	\	y	y	UAV	LT	74	28	1	3	100	1
Pierantonio et al. 2023	foraging	C-NW Med	Pelagos Sanctuary, Ionian Sea, Tyrrhenian Sea, Sicily Channel	NE-OC	OF	7 (2009-2016)	0.0026 – 0.665	273-100571	Y	\	634-233866	SWS[a] (NO)	0.43-0.48	n	n	aircraft	LT-DS	229	185	736000	\	\	\
Lauriano et al. 2011	foraging	NW Med	Pelagos Sanctuary	OC	OF	1 (2009)	0.0026; 0.046[b]	237; 4083[b]	Y	\	600; 10000[b]	SWS[c] (NO)	0.40	n	n	aircraft	LT-DS	229	185	88268	2	around 2500	\
Gómez de Segura et al. 2006	foraging	W Med	Ebro Delta - Aguilas	NE-OC	OF	2 (2001-2003)	0.21	6653	Y	0.592	18954	SWS[d] (SR)	0.351	n	n	aircraft	LT-DS	152	166	16700*	2	0-2800	112
Cardona et al. 2005	foraging	W Med	Balearic Archipelago	NE	OF	1 (2002)	0.052[e]	\	\	\	\	SWS[d] (SR)	0.351	n	n	aircraft	STP	152	140-156	477	\	<200	36
Carreras et al. 2004	foraging	W Med	Balearic Archipelago	NE	OF	1 (2002)	0.056[f]	\	n	\	\	\	\	n	n	aircraft	STP	152	140-156	658	2	<200	\
Gómez De Segura et al. 2003	foraging	W Med	Columbretes Islands Marine Reserve	NE-OC	OF	2 (2000-2001)	0.322	1324	y (twice)	0.644		SWS[g-i] (NO)	< 0.5	n	n	aircraft	LT-DS	152	166	4107	2	30-1000	93
Barco et al. 2018	foraging	M Atlantic	Chesapeake Bay	NE	OF	2 (2011-2012)	0.249 - 1.134[l]	3005 -27508[l]	y	0.990- 3.319[l]	14248- 80503[l]	depth sensor[m] (SR)	3 values, for: 0 m; 0-1 m; 0-2 m	y	y (called "duplicate")	aircraft	LT-DS	183	175	1682	4	<200	72
Seminoff et al. 2014	foraging	E Pacific	Baja California Sur	NE	OF	3 (2005-2007)	0.231	15341	y	0.650	43226	depth sensor[n] (SR)	0.355	n	n	aircraft	LT-DS	152	165-175	66471	3	0-92	140
DiMatteo et al. 2022	foraging/ breeding/ nesting	Med	Whole basin	NE-OC	NS-OF	16 (2003-2018)	\	343321[o]	Y	\	1201845; 789244[p]	depth sensor (SR)	0.27-0.48	n	n	aircraft/ boat	LT-DS	\	\	230000*	\	\	\
Dickson et al. 2021	breeding/ nesting	C Med	Laganas Bay, Kyparissiakos Bay, Lakonikos Bay	NE	NS	3 (2016-2019)	273 – 63[q]	\	\	\	\	\	\	y	n	UAV	LT	60	\	319*	\	<7	0.4
Dickson et al. 2022a	breeding	C Med	Southern Peloponnese, Laganas Bay, Southern Kefalonia	NE	NS	5 (2016-2020)	192[r]	\	n	\	\	\	\	y	n	UAV	LT	60	\	620*	2	\	0.4
Dickson et al. 2022b	breeding	C Med	Laganas Bay, Kyparissiakos Bay	NE	NS	3 (2017-2019)	\	250; 459[s]	n	\	\	\	\	y	n	UAV	LT	60	45	16*	2	\	0.8

Schofield et al. 2017	breeding (cleaning station)	C Med	Laganas Bay	NE	NS	2 (2015-2016; 2016 UAV)	\	\	\	\	\	\	\	\	\	UAV/underwater	LT	60	\	8*	\	5	0.4
Davis et al. 2000	\	N GoM	Western and north-central Gulf of Mexico	NE-OC	OF	3 (1996-1998)	0.0003-0.004	141-503	n	\	\	\	\	n	n	aircraft	LT-DS	\	\	12266*	2	100 - 2000	\
Griffin & Griffin 2003	\	E GoM	West Florida continental shelf	NE	OF	3 (1998-000)	0013	181	n	\	\	\	\	n	n	aircraft	LT-DS	\	\	7*	2	10-180	\

Table S7. ATP values of loggerhead sea turtles worldwide, estimated by two different methods: depth sensor or SWS. *SWS data were referred to 0 m as provided by the tag deactivation at the surface (no salt water contact).

| Data type	Area	Age	N turtles	Dive definition	0 m*	0-1 m	0-1.5 m	0-2 m	0-3 m	0-5 m	Study
depth sensor	N pacific	\	9		0.13			0.39			Peckham et al. 2012
depth sensor	Gulf of Mexico	adult female	25	when depth > 1 m for 30 sec		0.09					Iverson et al. 2019
depth sensor	Gulf of Mexico	adult-subadult	59					0.16			Roberts et al. 2022
depth sensor	W Atlantic	adult-subadult	38				0.02-0.43, mean 0.16		0.03-0.53, mean 0.23		Nelson 1996
depth sensor	NW Atlantic	juvenile - adult	27		0.08						Barco et al. 2018
depth sensor	W Atlantic	\	245	when depth > 1.5 m for 20 sec	0.25-0.68; mean 0.50						Hatch et al. 2022
depth sensor	C med	juvenile - subadult	13	when depth > 3 m for 30 sec					0.06-0.57, mean 0.22		Hochscheid et al. 2007
depth sensor	CE med	adult female	20	when depth > 1 m for 1 min						0.558	Patel et al. 2015
depth sensor	Med	adult (male/female) - juvenile - subadult - unknown	55	when depth > 3/4 m					warm-oceanic 0.48; cool-oceanic: 0.43; warm-neritic: 0.43; cool-neritic: 0.27		DiMatteo et al. 2022
SWS	Gulf of Mexico	juvenile - adult	4		0.04-0.20						Renaud & Carpenter 1994
SWS	C med	adult male	10		0.34 foraging; 0.24 breeding; 0.29 migration						Casale et al. 2013
SWS	W med	juvenile	5		0.351						Cardona et al. 2005
SWS	SW med	juvenile	10		0.07-0.59						Revelles et al. 2007
SWS	W med	juvenile	7		neritic areas 0.08; oceanic areas 0.58						Cardona et al. 2009
video	C med	subadult	21		0.108						This study
Depth0 (depth sensor)	C med	subadult	19		0.404						This study
Depth2 (depth sensor)	C med	subadult	19					0.541			This study
Fixes (SWS)	C med	juvenile-adult	11		0.383						This study
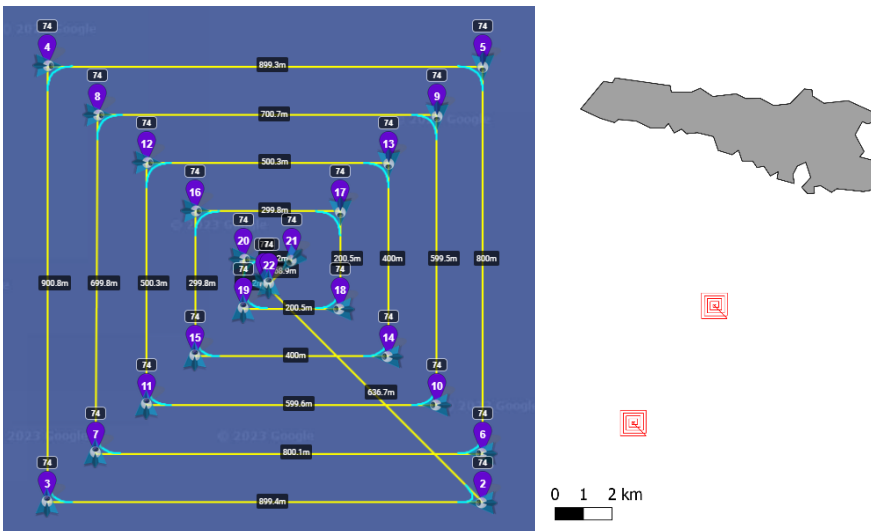
Figure S1. On the left, squared concentric design of transects followed by drone in surveyed areas in Lampedusa. Waypoints (N = 22) indicates heading changepoints; waypoint #1 and #22 coincide with take-off/landing station. On the right, the two surveyed areas offshore Lampedusa (red path).
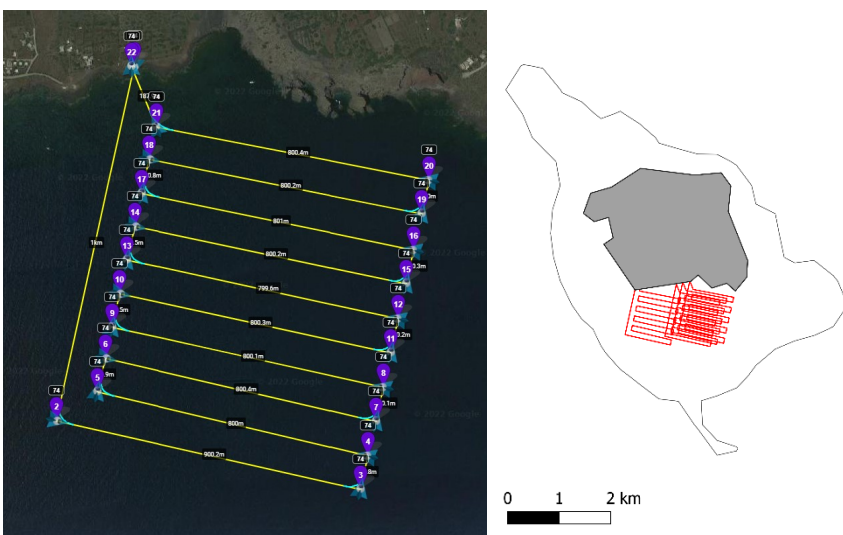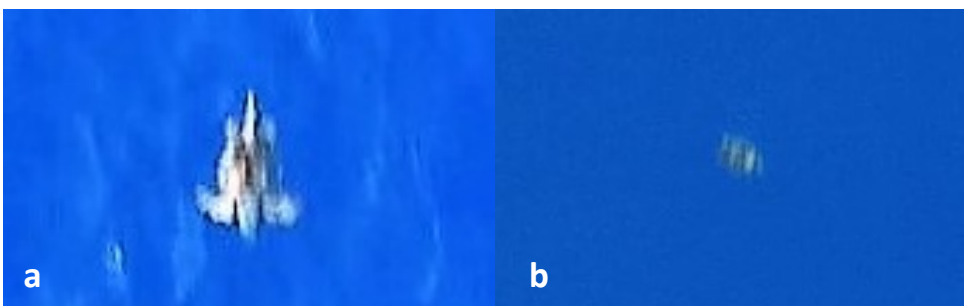

Figure S2. On the left, flight path design of strip line transects followed by drone in surveyed areas in Linosa. Waypoints (N = 22) indicates heading changepoints; waypoint #1 and #22 coincide with take-off/landing station. On the right, the four overlapping surveyed areas nearshore Linosa (red path).

Figure S3. Examples of certain (C; a) and uncertain (U; b) turtle sightings extracted from video frames of Lampedusa surveys (zoomed in).
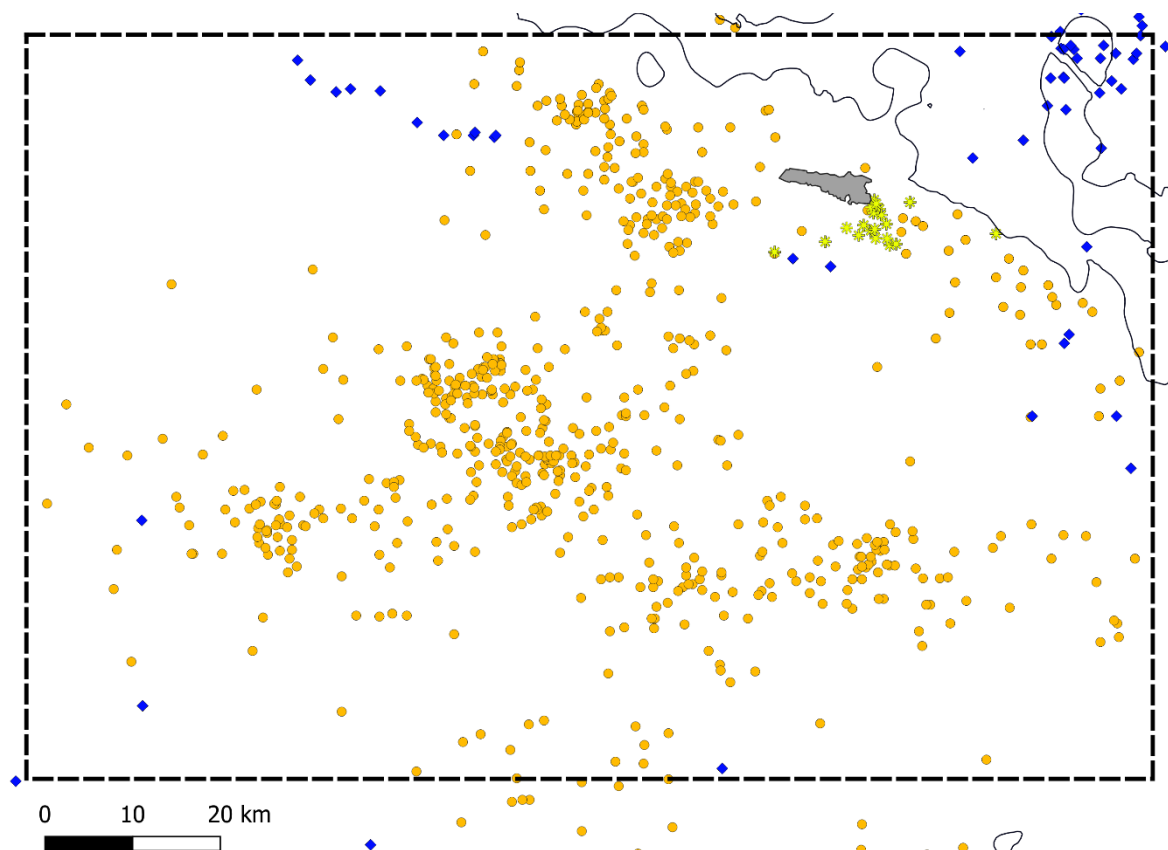
Figure S4. Locations of fixes selected in order to estimate ATP by satellite tags applied on 11 turtles travelling within the Tunisian shelf. Orange round points: individuals by Casale et al. 2013; Blue squared points: individuals by Casale et al. 2012; yellow stars: biologger positions after detachment (see text). Black line: 200 m bathymetry lines; black dotted line: area of fixes selection (vertex coordinates: 35.662983 N 11.574740 E; 35.662983 N 12.977822 E; 34.91049670 N 11.574740 E; 34.91049670 N 12.977822 E).

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