

British Air Racing Today

or,
How we became
British & European
Air Racing Champions
2016



Royal Aero Club 3R's

British Air Racing is run by the Royal Aero Club Records Racing and Rally Association (3R's) and governed by the FAI

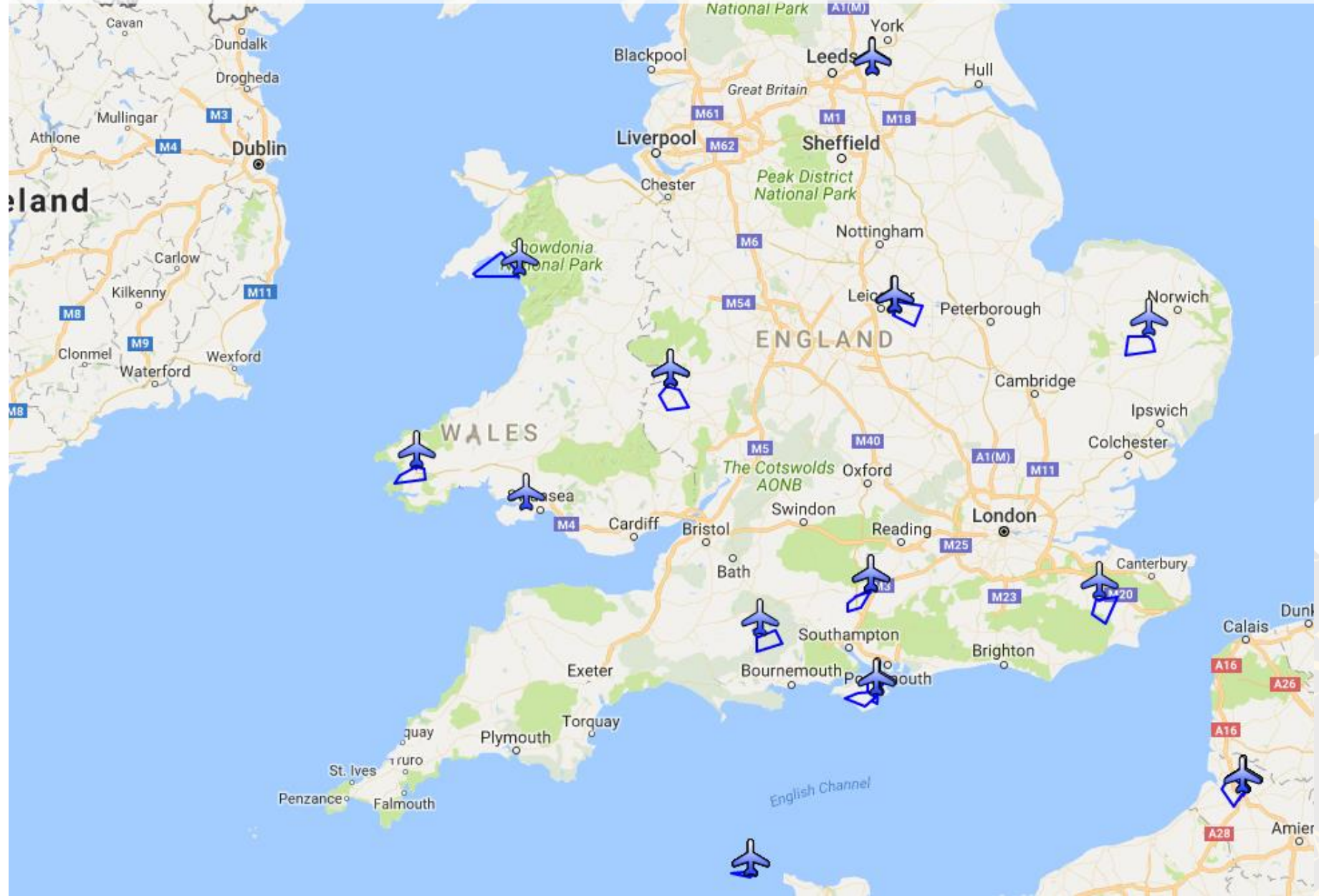
Races are Handicapped – Slower planes start before faster planes. The aim is everyone finished together!

British Air Racing is open to everyone, who has

- 100hrs P1
- Can pass a flight proficiency check – can turn left & navigate
- Flies an aircraft capable of 100mph or higher – **flat out!**
- No helicopters!
- No Jets!
- Maybe Turbines, we are not sure

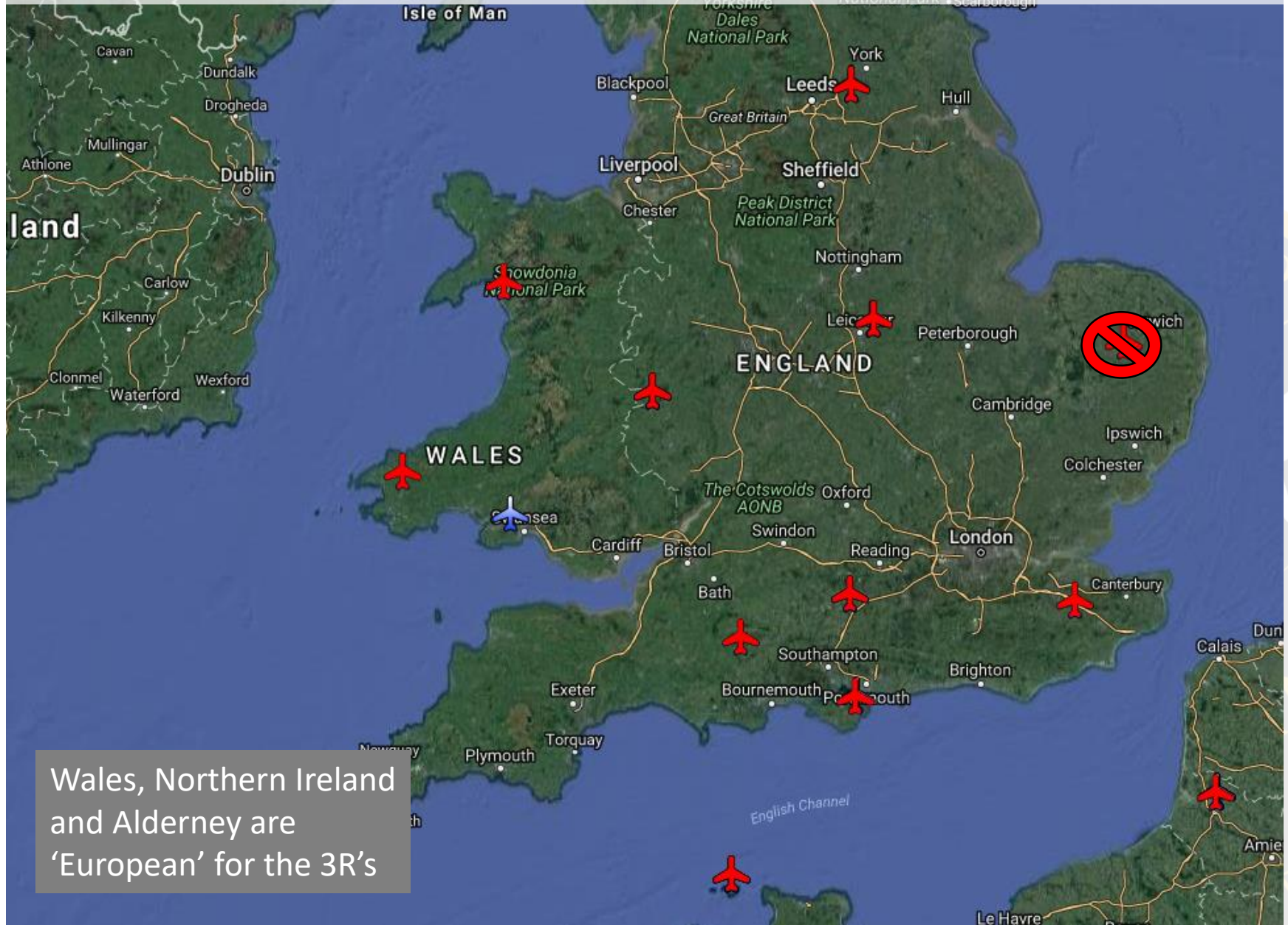
There are up to 8 race weekends

- Some weekends are qualifiers for the Kings Cup!



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- Some weekends are qualifiers for the Kings Cup!



Wales, Northern Ireland
and Alderney are
'European' for the 3R's

Air Races

- Weekends are structured

- Saturday;

- Registration
 - Practice Brief 11:00
 - Handicap Speed Calibration – ‘the Octagon’ – more later! 12:00
 - Practice 12:00
 - Race 1 15:00
 - Results & Protest period 16:30

- *You will find us all at the bar* 16:35

- Sunday

- Race 2 12:00
 - Results & Protest period 13:00
 - Tea & Medals 14:00



Briefing

Key messages for Race

- Course
- Turn points
- Weather
- Radio Frequency
- Emergencies & diverts
- Safety rules
- Landings
- Overtaking



Maps & Practice

Each racer receives a map at registration of the race course, sometimes GPS co-ords are provided.

The practice enables the pilots to find the turn points and plan their race.

The practice period follows the same rules as the race for overtaking and direction of flight – no turning back! Always turn left. Choose your own speed & height...

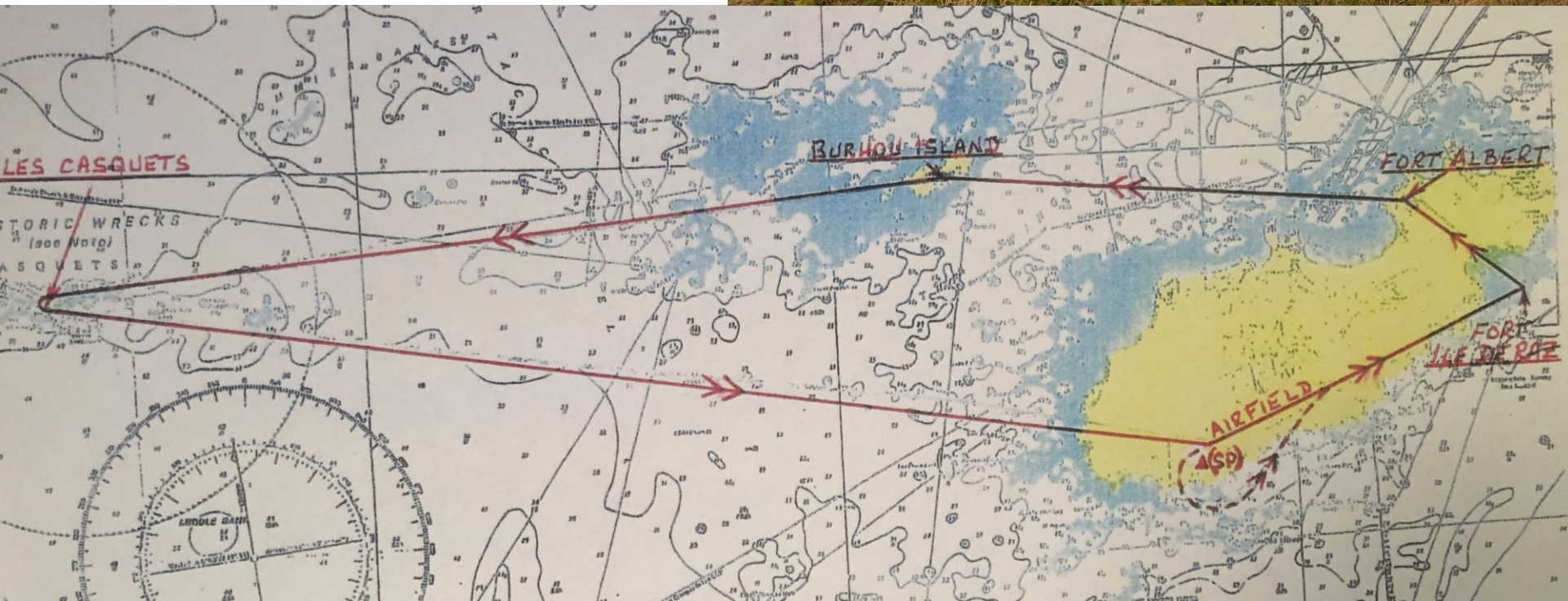


Turnpoints

Finding scatter & turn points is vital
Missing them means penalties or
flying too far!

Scatter is a turn only used at the start

Each turn is marked clearly by a tent

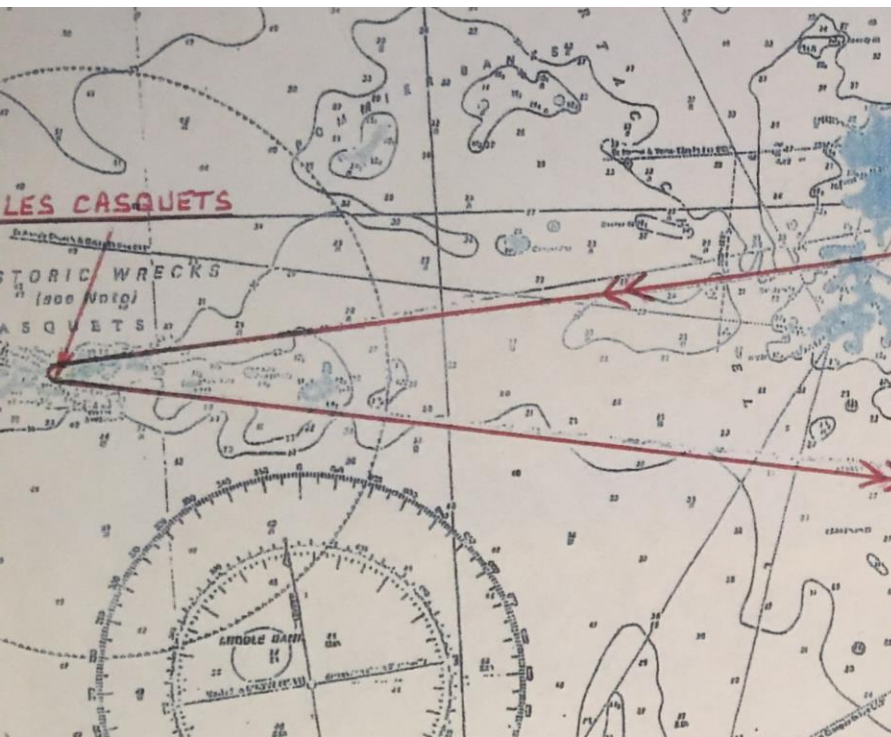


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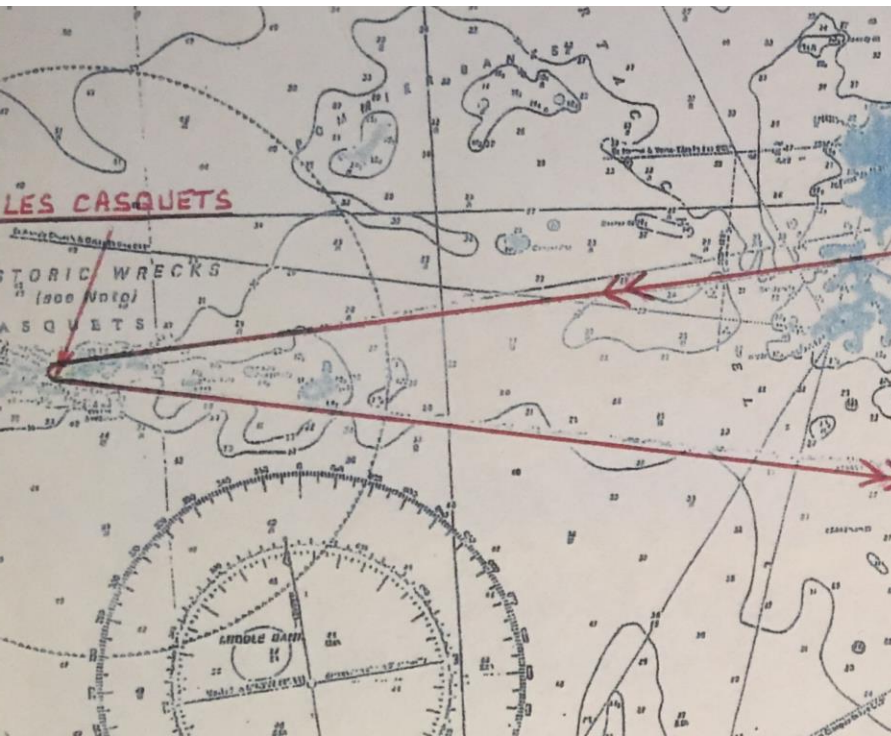
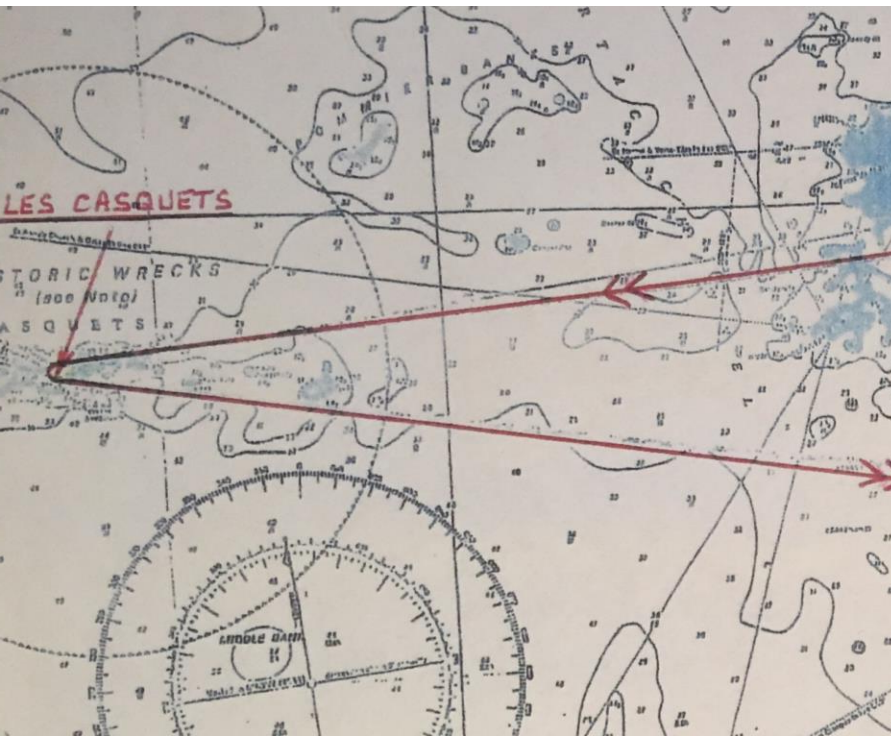


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Handicapping



Race No	Title	Forname	Surname	post-noms	Is Navigator	Default Nav	Default Aircraft	Default Solo	
		Gaynor	Kieswetter		<input checked="" type="checkbox"/>			<input type="checkbox"/>	
2		Michael	Wingenroth		<input type="checkbox"/>		G-TSKY	<input checked="" type="checkbox"/>	
3		Nigel	Reddish		<input type="checkbox"/>			<input type="checkbox"/>	
4		Mark	Hanson		<input type="checkbox"/>		G-RVER	<input checked="" type="checkbox"/>	
5		Peter	Earp		<input type="checkbox"/>		N241WB	<input type="checkbox"/>	
6		Nick	Kieswetter		<input type="checkbox"/>	Gaynor Kieswetter	G-CGYO	<input type="checkbox"/>	
7		Roger	Scholes		<input type="checkbox"/>	Dominic Crossan	G-OTRV	<input type="checkbox"/>	
8		Dan	Pangbourne		<input type="checkbox"/>	David Pangbourne	G-TGER	<input type="checkbox"/>	
11		Andrew	Dent		<input type="checkbox"/>		G-TYGA	<input checked="" type="checkbox"/>	
11		Serge	Weibel		<input checked="" type="checkbox"/>		F-BXJB	<input type="checkbox"/>	
12		Jonathan	Paris		<input type="checkbox"/>			<input type="checkbox"/>	
12		Jonathan	Paris		<input type="checkbox"/>		G-IPUP	<input type="checkbox"/>	
13		Gabriel	Gomila		<input type="checkbox"/>		D-ESPK	<input type="checkbox"/>	
15		John	Kelsall		<input type="checkbox"/>		G-JKEL	<input type="checkbox"/>	
16		James	Dolan		<input type="checkbox"/>			<input type="checkbox"/>	
17		Hamish	Mitchell		<input type="checkbox"/>		G-DRAM	<input type="checkbox"/>	
20		Roderick	Morton		<input type="checkbox"/>		N8004B	<input checked="" type="checkbox"/>	
22		David	Moorman		<input type="checkbox"/>		G-DAVM	<input type="checkbox"/>	
23		Jonathan	Willis		<input type="checkbox"/>		G-TNGO	<input checked="" type="checkbox"/>	
25		Martin	Gerling		<input type="checkbox"/>		G-GOSL	<input checked="" type="checkbox"/>	

Registration	Type	Default Bank	Reference Speed	
G-BOZO	AA5B	60	132.87	
G-BPPZ	Taylorcraft BC12D	60	102.25	
G-BTLP	AA1C	60	116.10	
G-CBZR	PA28-R	60	141.00	
G-CGYO	RV6a	60	165.00	
G-CILK	T67	60	129.00	
G-DAVM	CAP 10B	60	146.00	
G-DRAM	FR172F	60	117.00	
G-EDYO	PA32	60	145.00	
G-GORD	DR401	60	127.00	
G-GOSL	Robin DR400	60	143.00	
G-HACE	RV6A	60	159.00	
G-IIRW	Vans RV8	60	176.85	
G-IPUP	Beagle Pup 150	60	130.79	
G-JABS	Jabiru UL450	60	112.01	
G-JBTR	RV8	60	160.00	
G-JCWM	Bulldog 125	60	125.05	
G-JKEL	Vans RV7	60	171.10	
G-KONG	AA1C	60	111.67	
G-NNRA	SF260W	60	176.52	

Handicap program

Handicap program

Venue :	Aladeney 2016			
Saturday :	24/09/2016	15:00		Auring Trophy
Sunday :	25/09/2016	12:00		Schneider Trophy

☐ **Test Race**

Racers

Course

Laps :

Laps : Refresh Map Export Turn Points Import Turn Points

[illegible][illegible]Lap Distance :

 Course Map Thumbnails

First Lap

Middle Laps

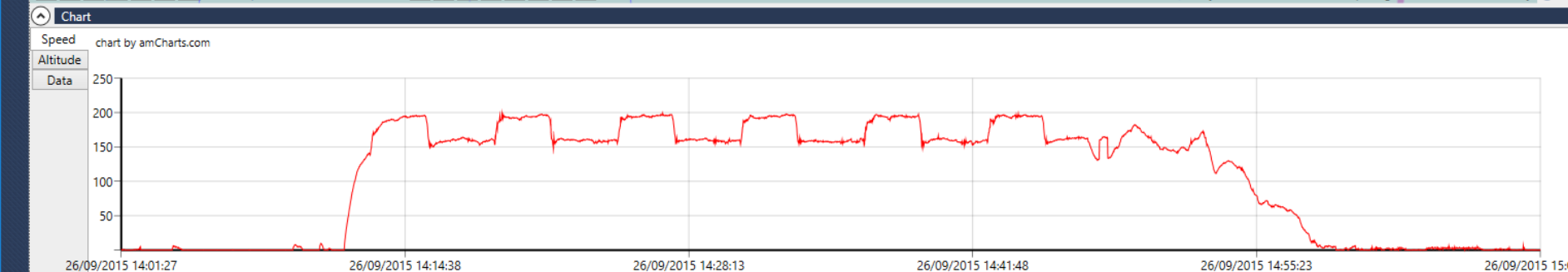
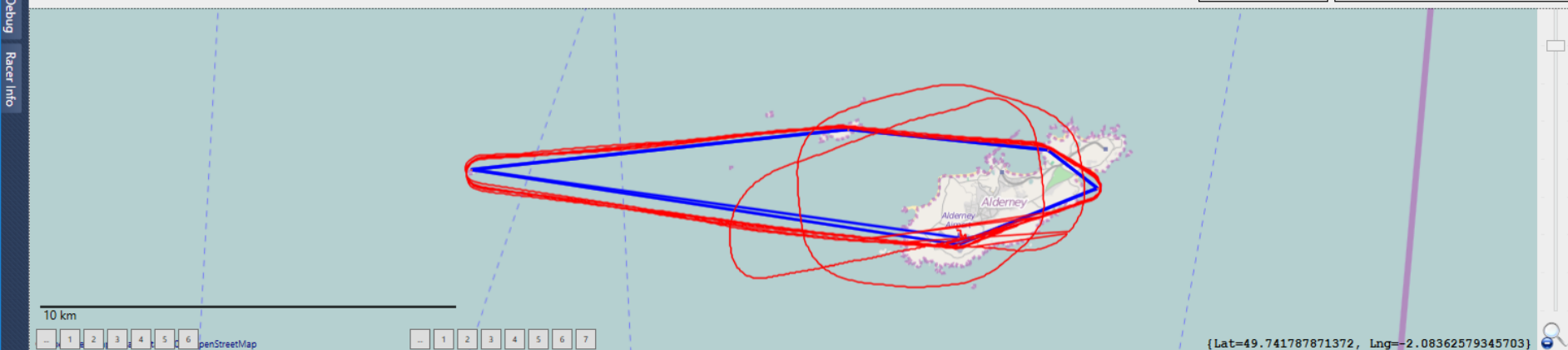
Last Lap

10 km

Show Finish

Alcorns

© OpenStreetMap - Map data © 2016 OpenStreetMap

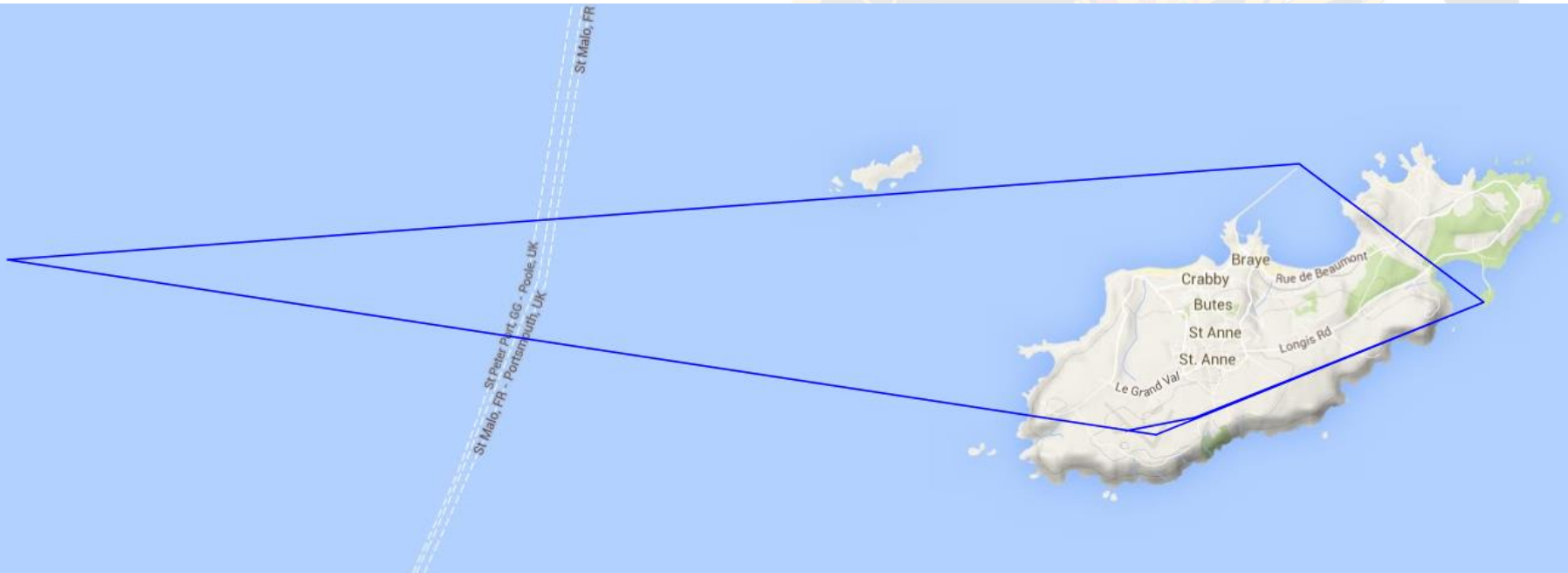


	Min	Max	Average	Avg D/T 3D	CF Speed	CF Wind Dir	CF Wind Speed	Ideal Dist	Measured Dist	Excess Dist	Race Time	
	9.2491	199.1723	171.9246	172.0601	175.9614	081	18.12	102.0366	102.8743	0.8377	0:35:55	Report
												Trim

Lap	Min	Max	Average	Avg D/T 3D	CF Speed	CF Wind Dir	CF Wind Speed	Start	End	Time	Distance	Excess Distance	
1	9.2491	195.9533	159.4051	159.8237	169.2739	030	43.02	641	1030	0:06:29	17.2698	0.1328	
2	147.1045	198.1903	174.2558	174.3437	176.0101	080	17.70	1030	1383	0:05:53	17.0954	0.1135	
3	154.7843	199.1723	174.8488	174.9207	176.6943	078	18.31	1383	1736	0:05:53	17.1519	0.1701	
4	153.7288	197.8081	173.6088	173.6838	175.5178	082	18.42	1736	2091	0:05:55	17.1271	0.1453	
5	148.5393	197.4311	174.0767	174.1592	175.8966	078	18.00	2091	2445	0:05:54	17.1257	0.1438	
6	153.4466	197.9253	175.3522	175.4295	177.0692	074	17.87	2445	2796	0:05:51	17.1044	0.1324	

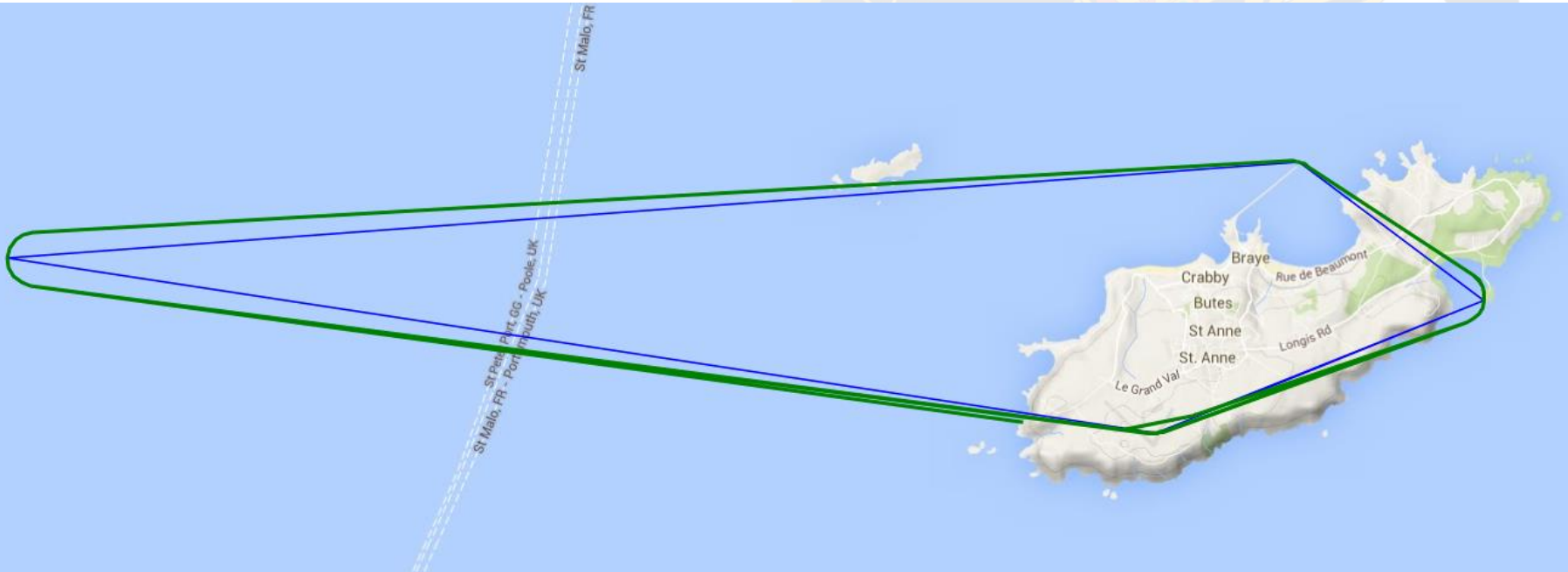
Handicapping - Course

- Handicapper sets out a course
 - 4, 5 or 6 roughly 100 nm in total
- Each racer has a handicap speed
- Handicap program works out how long each racer takes
- Assume 60 degree turn, factoring in wind, temp, pressure
 - Faster aircraft fly farther than slower aircraft



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Calculating Handicaps

- Fly Octagon 30s per side
- “Circle Fit” **ground** speed & direction
 - Returns
 - Absolute **air** speed
 - Wind direction & speed

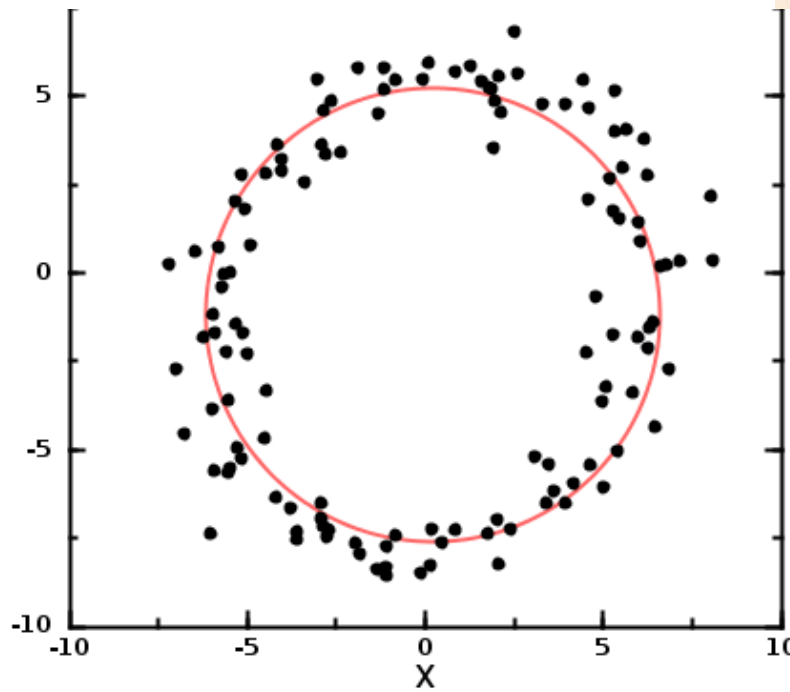


Chart										
Octagon										
	Min	Max	Average	Avg D/T 3D	Max Speed	CF Speed	CF Wind Dir	CF Wind Speed		
	150.5870	200.0437	175.2992	175.2996	179.0278	174.8047	259	20.30		
Sector	Min	Max	Average	Avg D/T 3D	Start	End	Heading	Time	Dist 3D	
0	189.2774	200.0437	195.9720	195.9956	60	91	85	31	1.6877	
1	190.0049	198.0829	193.2201	193.0842	105	134	51	29	1.5554	
2	173.4167	182.5705	176.1427	176.0053	141	176	6	35	1.7112	
3	162.4161	167.9813	165.6069	165.6883	197	227	318	30	1.3807	
4	150.5870	157.9622	154.1149	154.0667	237	275	269	38	1.6263	
5	151.4194	161.7883	158.1835	158.3897	288	324	222	36	1.5839	
6	171.7358	174.6383	173.3077	173.3673	340	370	177	30	1.4447	
7	183.4180	189.1550	185.8456	185.7996	393	424	131	31	1.5999	

Calculating Handicaps



Calculating Handicaps

- Logged scaled back to ISA standard atmosphere
 - Normalises for temperature & pressure
- Each race scale to days temperature & pressure
- Octagon used for first race
- GPS track from race used for next handicap
 - Weighted average of last 7 races

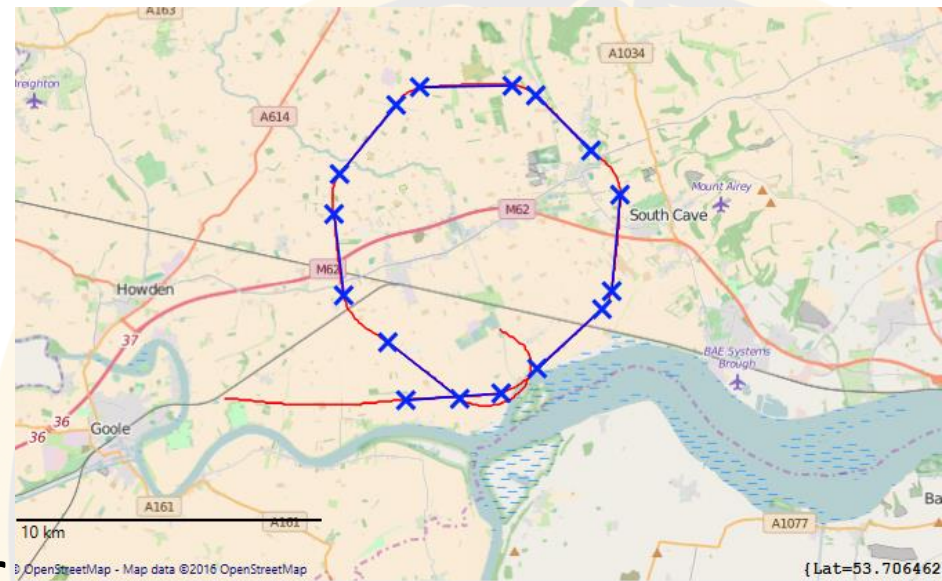


Chart									
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Sector	Min	Max	Average	Avg D/T 3D	Start	End	Heading	Time	Dist 3D
0	189.2774	200.0437	195.9720	195.9956	60	91	85	31	1.6877
1	190.0049	198.0829	193.2201	193.0842	105	134	51	29	1.5554
2	173.4167	182.5705	176.1427	176.0053	141	176	6	35	1.7112
3	162.4161	167.9813	165.6069	165.6883	197	227	318	30	1.3807
4	150.5870	157.9622	154.1149	154.0667	237	275	269	38	1.6263
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6	171.7358	174.6383	173.3077	173.3673	340	370	177	30	1.4447
7	183.4180	189.1550	185.8456	185.7996	393	424	131	31	1.5999

Handicap = Start times

[illegible]

Race - Start

For the race each racer is assigned 2 GPS's to log the race

These are used after the race to analyse the race, check turn points, prepare the next handicap and give the racers a report

The steward will notify the racer to turn their **GPS ON**
No GPS data = Disqualified
It happens often!



Race - Timekeeper



The timekeeper uses the handicap/start times to make sure the pilots start on time

Pilot gets

- 1 minute warning
- flag raised 10 seconds before start
- Flag drops on time

Timekeeper logs start time on a time clock

Race - Timekeeper



Race - Start



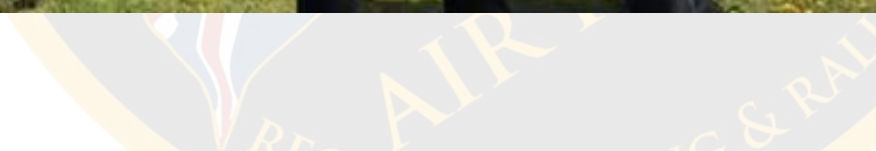
Race - Start



Race - Start



Race – Start Videos



Racing video – Alderney 2012



Turn point marshals



Turn point marshals check who and when racers make a turn and IF they make the turn!

Turn Point marshals



Our view!

Turn Points – occasionally features



Race - Overtaking

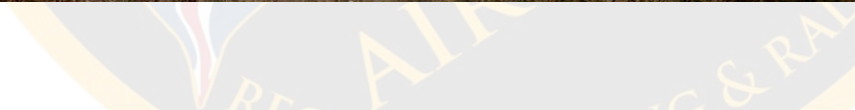








Finish - dive to the line!



Finish - dive to the line!

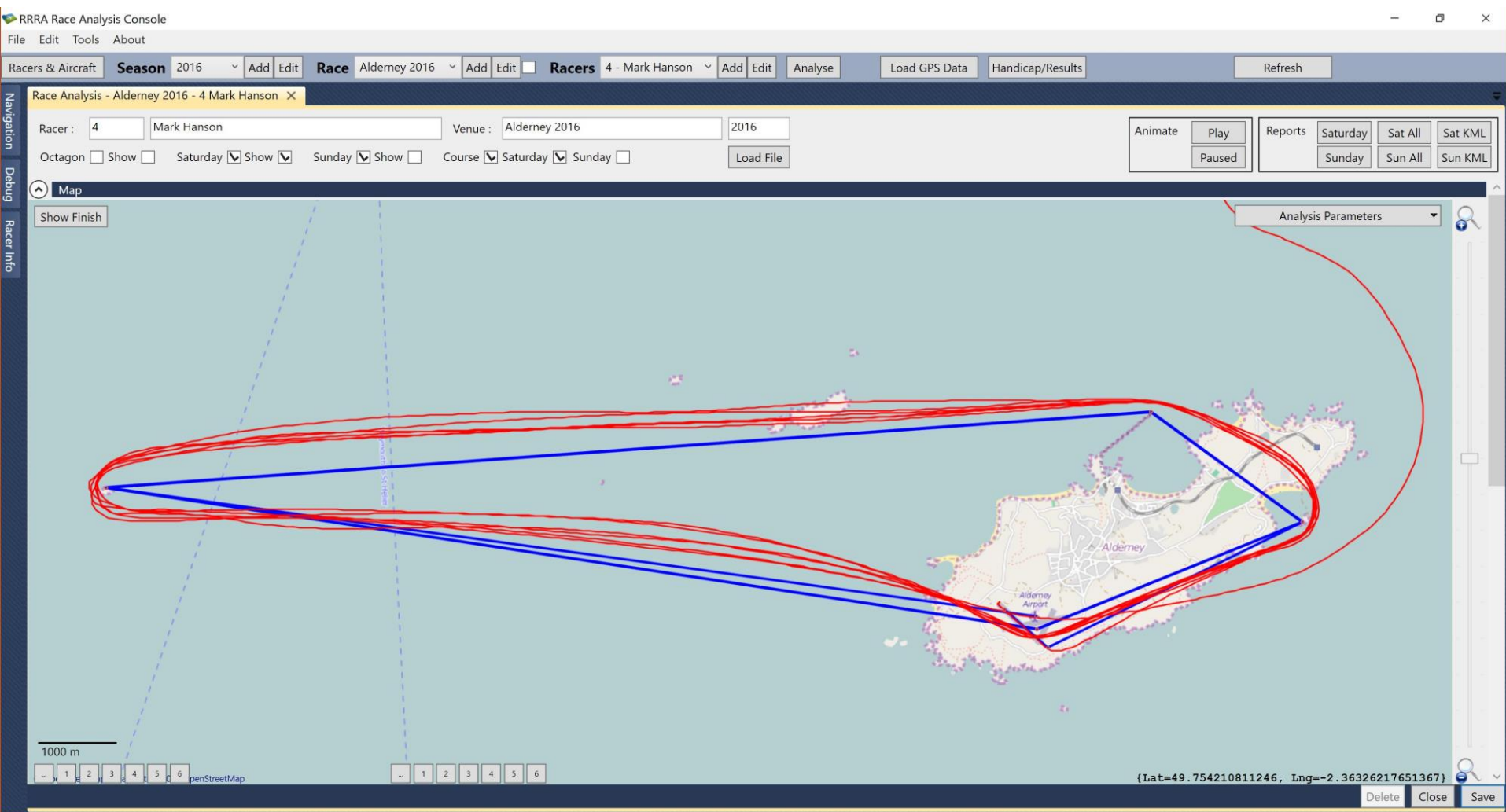


Finish – Timekeeper



Timekeeper logs line crossing on time clock
Someone logs the finish order

Handicapping – Analysis – Bad Track!



Handicapping - Alderney

RRRA Race Analysis Console

File Edit Tools About

Racers & Aircraft Season 2016 Add Edit Race Alderney 2016 Add Edit Racers 4 - Mark Hanson

Navigation
Race
Oct
Sho
Debug
Racer Info

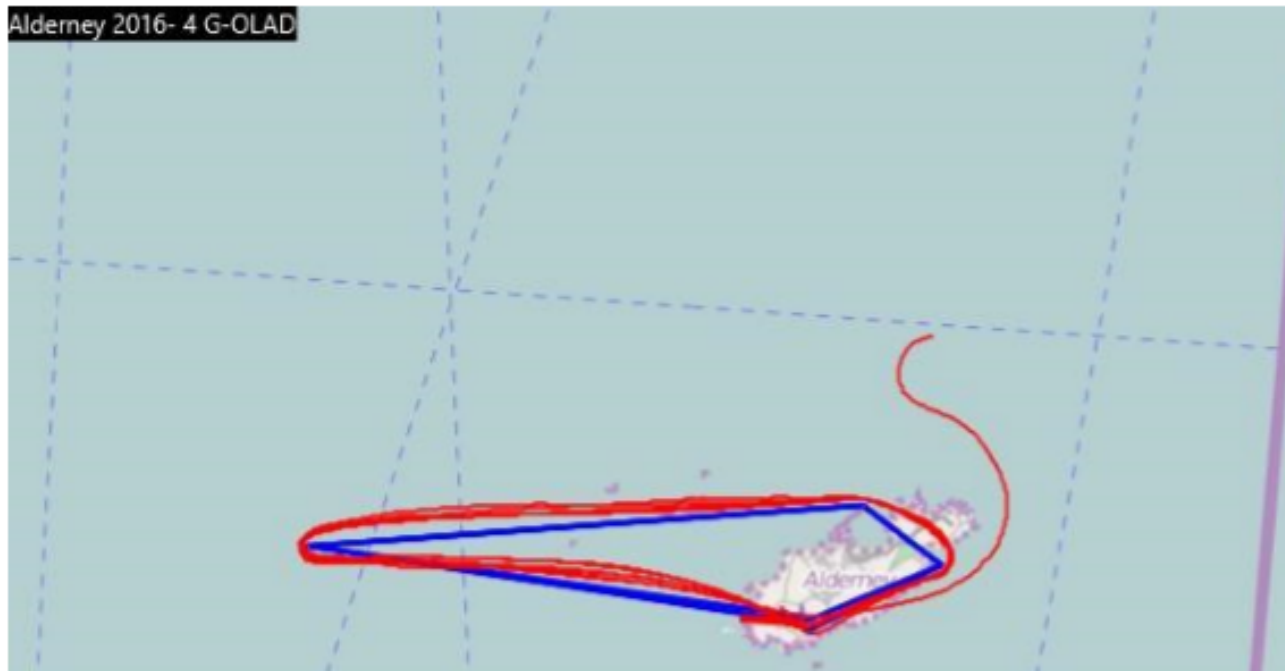
Alderney 2016
4 Mark Hanson

Aurigny Trophy
Position:

24/09/2016

Elapsed Time		Min Speed	Max Speed	Race Speed	Race Dist	Actual Dist	Excess Dist	Handicap Speed	
00:35:31		0.0000	298.0844	181.9047	102.6369	104.6649	2.0280	178.2400	
Lap	Time	Min Speed	Max Speed	Race Speed	Lap Dist	Actual Dist	Excess Dist	Start Time	Finish Time
1	00:06:26	0.0000	269.6278	169.6513	17.4300	17.8227	0.3927	14:16:35	14:52:07
2	00:05:49	148.6903	210.6397	181.7033	17.0444	17.3820	0.3376	Wind Speed 30	Direction 180
3	00:05:50	144.3789	202.1790	181.5542	17.0444	17.4402	0.3958		
4	00:05:49	147.8499	241.1047	183.0292	17.0444	17.4896	0.4452		
5	00:05:49	128.4644	298.0844	181.3835	17.0444	17.2477	0.2033		
6	00:05:48	104.5022	272.9112	182.5906	17.0293	17.2828	0.2535		

Alderney 2016- 4 G-OLAD



Alderney 2016
4 Mark Hanson

Aurigny Trophy
Position:

24/09/2016

Elapsed Time		Min Speed	Max Speed	Race Speed	Race Dist	Actual Dist	Excess Dist
00:35:31		0.0000	298.0844	181.9047	102.6369	104.6649	2.0280
Lap	Time	Min Speed	Max Speed	Race Speed	Lap Dist	Actual Dist	Excess Dist
1	00:06:26	0.0000	269.6278	169.6513	17.4300	17.8227	0.3927
2	00:05:49	148.6903	210.6397	181.7033	17.0444	17.3820	0.3376
3	00:05:50	144.3789	202.1790	181.5542	17.0444	17.4402	0.3958
4	00:05:49	147.8499	241.1047	183.0292	17.0444	17.4896	0.4452
5	00:05:49	128.4644	298.0844	181.3835	17.0444	17.2477	0.2033
6	00:05:48	104.5022	272.9112	182.5906	17.0293	17.2828	0.2535

Handicap Speed
178.2400

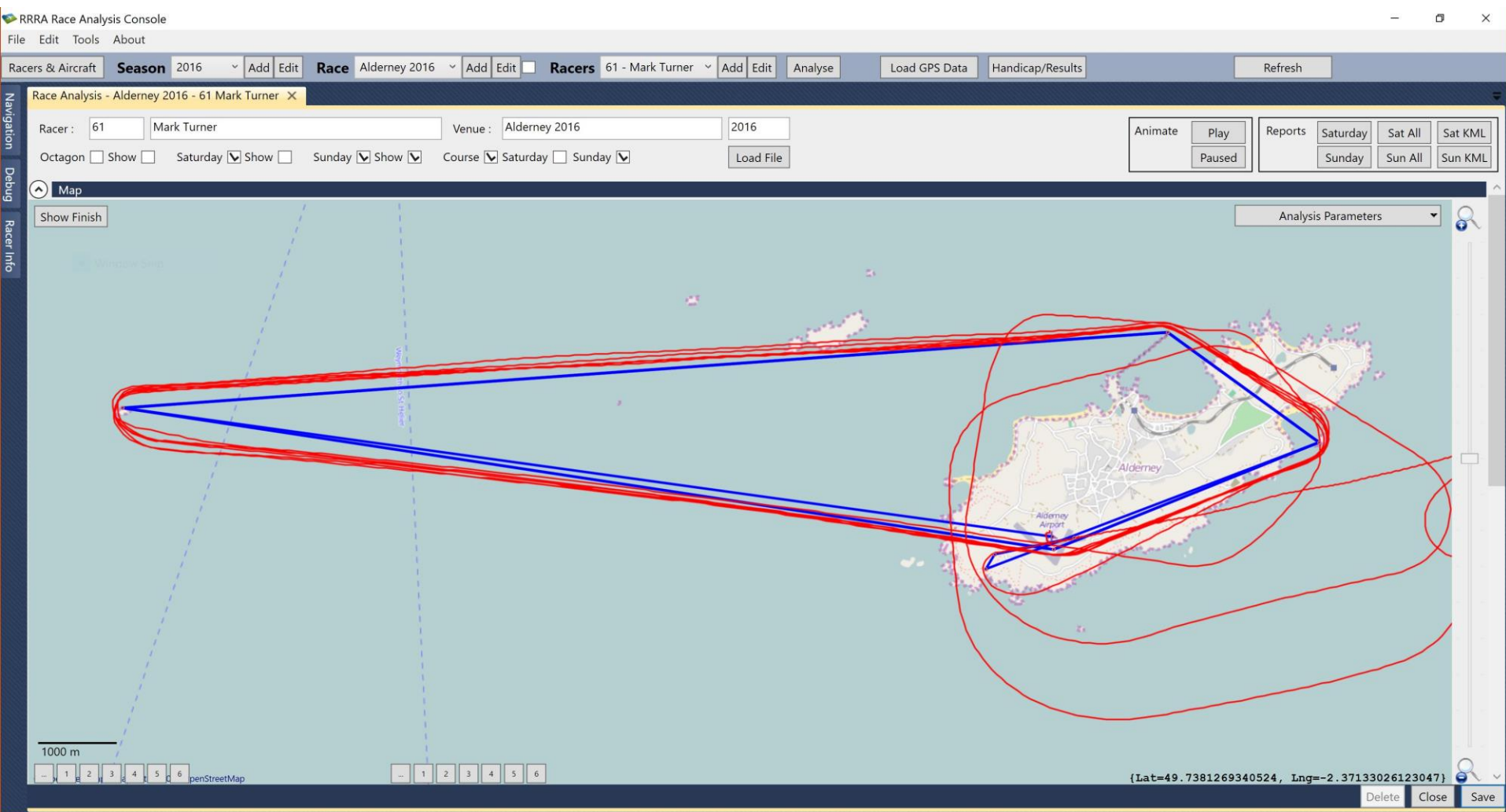
Start Time
14:16:35

Finish Time
14:52:07

Wind Speed
30

Direction
180

Handicapping – Analysis – Good!



Handicapping - Ar

25/09/2016

Alderney 2016
61 Mark Turner

Schneider Trophy
Postion: 3

	Elapsed Time	Min Speed	Max Speed	Race Speed	Race Dist	Actual Dist	Excess Dist	Handicap Speed	
	00:36:40	0.0000	254.9213	175.5169	103.5062	104.0986	0.5925	175.8900	
Lap	Time	Min Speed	Max Speed	Race Speed	Lap Dist	Actual Dist	Excess Dist	Start Time	Finish Time
1	00:07:01	0.0000	246.3288	164.6660	18.3460	18.6055	0.2594	11:17:34	11:54:15

Direction
260

Alderney 2016
61 Mark Turner

Schneider Trophy
Postion: 3

25/09/2016

Elapsed Time	Min Speed	Max Speed	Race Speed	Race Dist	Actual Dist	Excess Dist
00:36:40	0.0000	254.9213	175.5169	103.5062	104.0986	0.5925

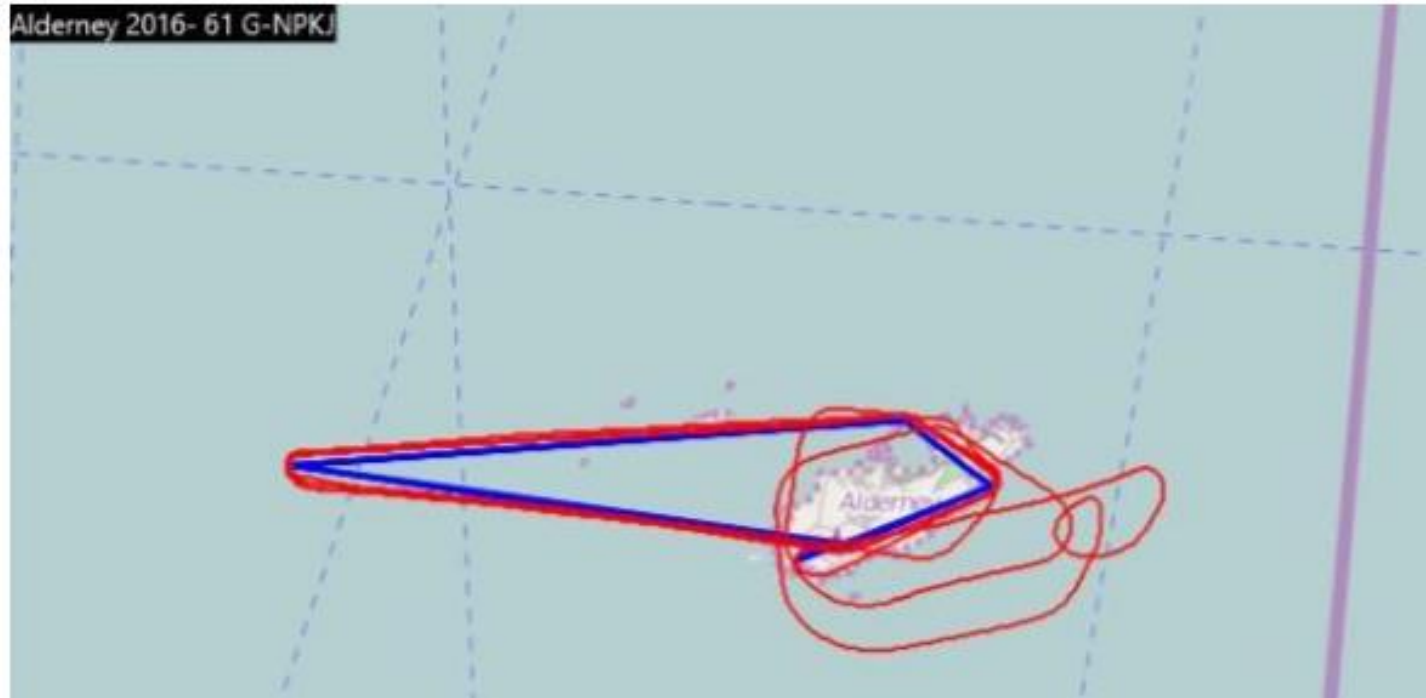
Handicap Speed
175.8900

Lap	Time	Min Speed	Max Speed	Race Speed	Lap Dist	Actual Dist	Excess Dist	Start Time	Finish Time
1	00:07:01	0.0000	246.3288	164.6660	18.3460	18.6055	0.2594	11:17:34	11:54:15
2	00:05:54	82.4883	254.9213	175.4848	17.0351	16.8450	-0.1900		
3	00:05:55	148.8661	220.0658	177.0509	17.0351	17.2228	0.1877		
4	00:05:57	144.7677	215.2637	175.1922	17.0351	17.1191	0.0841		
5	00:05:56	146.2427	205.5923	175.2433	17.0351	17.0818	0.0468		
6	00:05:57	149.8545	203.8850	176.2575	17.0199	17.2244	0.2045		

Wind Speed
25

Direction
260

Alderney 2016- 61 G-NPKJ



Race Results Sheet

Abbeville 2016

Battle of Britain Trophy

10/04/2016

Sunday

Position	Race Number	Registration	Handicap Speed (kts)	Measured Race Speed (kts)	Speed Change (%)	Optimum Distance (NM)	Measured Race Distance (NM)	Excess Distance (NM)	Estimate Race Time (H:M:S)	Measured Actual Race Time (H:M:S)	Excess Race Time (H:M:S)	
1	61	G-NPKJ	175.79	178.96	1.81%	120.358	121.133	0.776	0:41:13	0:41:35	0:00:22	
2	25	G-GOSL	143.00	144.55	1.09%	120.024	120.897	0.874	0:50:36	0:51:11	0:00:35	
3	17	G-DRAM	109.17	110.90	1.58%	119.752	121.077	1.325	1:06:21	1:07:04	0:00:43	
4	8	G-TGER	131.51	132.28	0.59%	119.923	121.368	1.445	0:55:01	0:56:10	0:01:09	
5	66	F-GAXC	132.81	132.92	0.08%	119.934	120.880	0.946	0:54:29	0:55:40	0:01:11	
6	1	G-JBTR	171.65	170.64	-0.59%	120.312	120.893	0.581	0:42:12	0:43:22	0:01:10	
7	82	G-GORD	128.68	129.04	0.28%	119.900	121.157	1.258	0:56:14	0:57:30	0:01:16	
8	2	G-TSKY	116.98	117.47	0.42%	119.808	121.005	1.197	1:01:53	1:03:19	0:01:26	
8	26	G-RVPL	182.10	179.46	-1.45%	120.430	122.132	1.702	0:39:48	0:41:32	0:01:44	
10	31	N230MJ	167.81	166.12	-1.01%	120.270	123.647	3.377	0:43:09	0:45:44	0:02:35	
11	20	N8004B	114.90	110.52	-3.81%	119.793	76.766	3.563	1:03:01	0:43:56	0:00:00	
994	74	G-RRRZ	179.99	183.18	1.77%	120.405	121.941	1.536	0:40:15	0:40:37	0:00:22	
995	23	G-TNGO	165.65	167.95	1.39%	120.247	121.454	1.207	0:43:43	0:44:13	0:00:30	
996	9	G-KDOG	127.00	125.61	-1.10%	119.886	123.235	3.349	0:56:59	1:00:03	0:03:04	
997	28	G-BTLP	118.14	113.35	-4.05%	119.817	122.172	2.355	1:01:17	1:06:34	0:05:17	
998	69	G-GRIN	168.00	0.00	-100.00%	120.272	0.000	0.000	0:00:00	0:00:00	0:00:00	
999	47	G-OTRV	175.00	0.00	-100.00%	120.349	0.000	0.000	0:00:00	0:00:00	0:00:00	

Results are provisional – there are protests!

Prizes!



- There used to be prize money from Sponsorship (Digital)
- Top 3 pilots get a cup, Navigators a plate.
- All races have 'historic' trophies to keep for a year

Air Races Championships

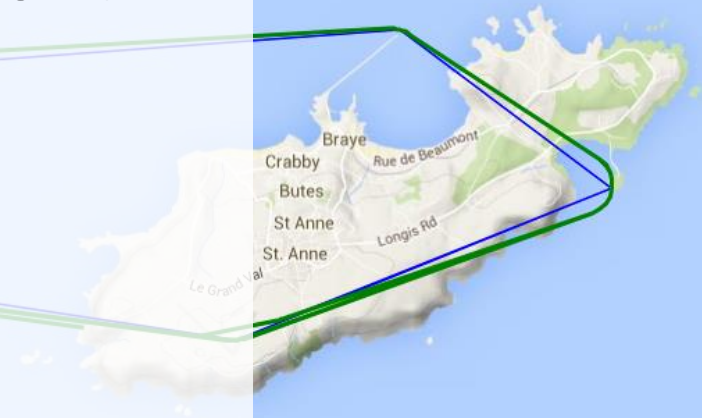
- Points are awarded like F1 – 100, 90, 85, 84,...
- Each year is a championship
 - British Championship – best 8 races
 - European Championship – 3 races outside England
 - Mosley Preston – all races, all points
 - Sonic Trophy – Saturdays only
 - ABC Homebuilt Trophy
 - Navigators Championship
 - Mitel Sword – best military or ex-military
 - Outrum Trophy – best newcomer
 - Twin Championship – for people with really deep pockets
- Kings Cup is real Kings cup – must qualify
- Schneider is replica but full size!



How do we Race

Calculate turn in point and show on GPS

- V1 Tried custom tablet/gps... too slow!
- V2 Tried custom tablet/gps... too slow!
- V3 Convert to Sky Demon
 - Just use for turn in point



Race Navigator

NXT: TP2

Race Setup Other

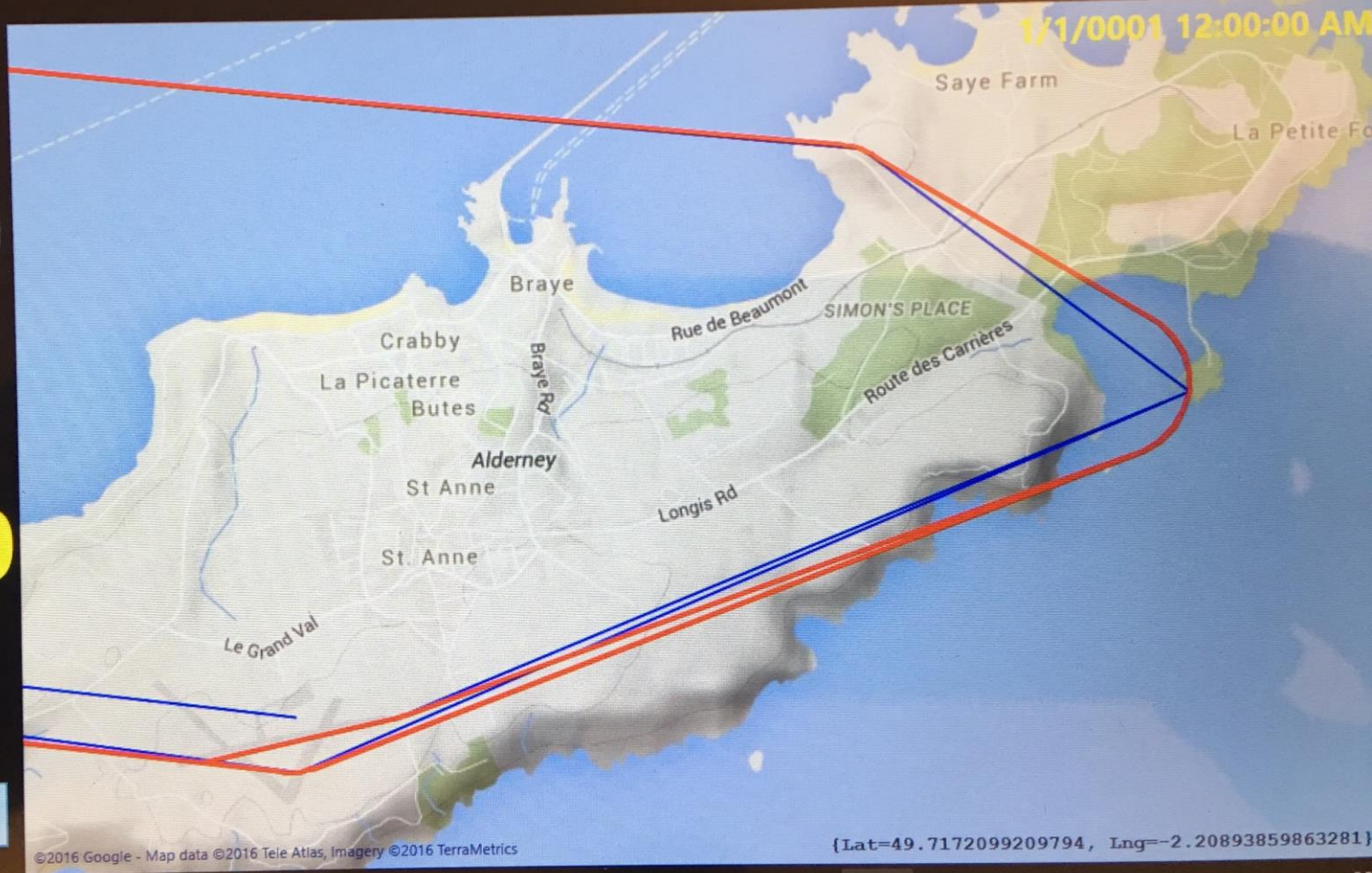
308

308

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Next



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{Lat=49.7172099209794, Lng=-2.20893859863281}



Search the web and Windows

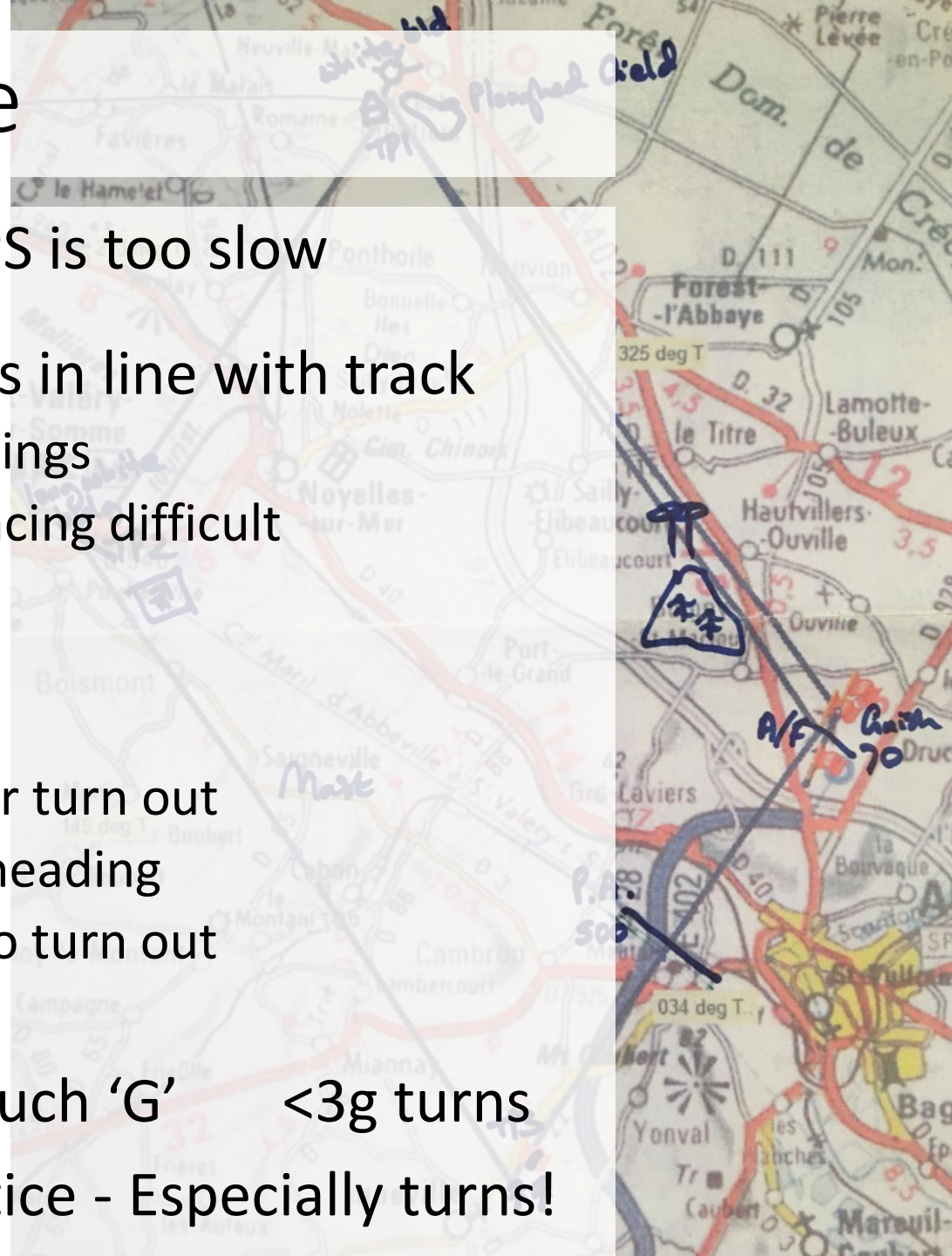


20

13/11

How do we Race

- VISUAL References - GPS is too slow
- Identify ground features in line with track
 - Record features & headings
 - Changing light makes racing difficult
- As approaching turn,
 - evaluate turn in point
 - Look for next feature for turn out
 - Joanne reads out next heading
 - Joanne tells me when to turn out
- Fly smooth - Not too much 'G' <3g turns
- Practice, Practice, Practice - Especially turns!



How do we Race



Race Career

- Started in 2009 Bleriot Race – Abbeville to Dover
- Slow start in 2009, and a year off in 2014 – new engine!
 - stand-in handicapper & steward

Race Weekends



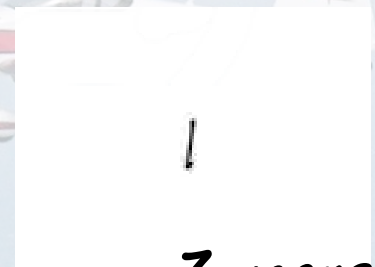
35

Races



58

Race Wins



7 years!

- 16 races this year

-, 1, 8, 4, 2, 4, 4, -, -, 6, 2, 7, 6, 6, 2, 3

- For championship

1, 2, 2, 2, 3, 4, 4, 4, 6, 6, 6, 7, 8, -, -, -

British Championship Jubilee

1 Mark Turner	1049
2 Derryn McMaster	1029
3 Gordon Bellerby	1013
4 Roderick Morton	1009
5 M Gosling	985
6 John Bate	941
7 Mark Hanson	929
8 Michael Wingenroth	891
9 Dominic Crossan	835
10 Bob Ellis	671
11 Hamish Mitchell	643
12 Jonathan Willis	573
13 David Moorman	561
14 Geoffrey Boot	548
15 Simon Tilling	545
16 Erik Andersen	544
17 Matt Summers	474
18 Daniel Pangbourne	470
19 Tim Wassell	377
20 John Kelsall	229
21 Roger Hayes	220
22 Alan Turner	160
23 Fiona Macaskill	148
24 Nigel Reddish	144
25 Alan Paton	142
26 Andrew Dent	85

European Championship

1 Mark Turner	530
2 Roderick Morton	491
3 Hamish Mitchell	489
4 M Gosling	486
5 Derryn McMaster	478
6 Matt Summers	474
7 Daniel Pangbourne	470
8 Michael Wingenroth	463
9 Gordon Bellerby	463
10 John Bate	403
11 Bob Ellis	339
12 Jonathan Willis	337
13 Mark Hanson	324
14 Dominic Crossan	250
15 Erik Andersen	238
16 Geoffrey Boot	235
17 David Moorman	157
18 Tim Wassell	150
19 Nigel Reddish	144
20 Alan Paton	142
21 Roger Hayes	140
22 Simon Tilling	80
23 Alan Turner	80

Mossey Preston

1 Mark Turner	1498
2 Derryn McMaster	1299
3 M Gosling	1282
4 John Bate	1180
5 Mark Hanson	1117
6 Michael Wingenroth	1109
7 Roderick Morton	1105
8 Gordon Bellerby	1101
9 Dominic Crossan	1011
10 Bob Ellis	719
11 Hamish Mitchell	719
12 David Moorman	645
13 Daniel Pangbourne	624
14 Jonathan Willis	621
15 Simon Tilling	621
16 Geoffrey Boot	612
17 Erik Andersen	608
18 Matt Summers	534
19 Tim Wassell	441
20 John Kelsall	277
21 Roger Hayes	268
22 Fiona Macaskill	180
23 Nigel Reddish	176
24 Alan Paton	174
25 Alan Turner	160
26 Andrew Dent	97

Sonic Challenge

1 Mark Turner	647
2 Derryn McMaster	544
3 Gordon Bellerby	539
4 John Bate	537
5 M Gosling	534
6 Mark Hanson	468
7 Michael Wingenroth	458
8 Jonathan Willis	448
9 Dominic Crossan	444
10 Roderick Morton	444
11 Erik Andersen	435
12 Simon Tilling	433
13 Bob Ellis	352
14 Hamish Mitchell	352
15 David Moorman	278
16 Matt Summers	268
17 Daniel Pangbourne	257
18 Geoffrey Boot	254
19 Tim Wassell	182
20 Roger Hayes	181
21 Alan Turner	160
22 Andrew Dent	97
23 John Kelsall	92
24 Fiona Macaskill	89
25 Nigel Reddish	87
26 Alan Paton	86

Navigator

1 Joanne Turner	1498
2 Claire Carter	1299
3 Gervais Henderson	1117
4 David Lee	1101
5 Roger Scholes	648
6 Glynn Farrar	645
7 Ian Scarborough	618
8 Suzie Boot	612
9 Christine Carlin	551
10 Sean Roberson	534
11 David Pangbourne	447
12 Millie Wassell	441
13 Guy Hook	363
14 Jim Turley	268
15 Alan Paton	142

ABC Homebuilt

1 Mark Turner	1283
2 John Bate	941
3 Dominic Crossan	835
4 Bob Ellis	671
5 Jonathan Willis	573
6 Erik Andersen	544
7 Matt Summers	474
8 John Kelsall	229
9 Fiona Macaskill	148
10 Nigel Reddish	144

Twin Engine

1 Geoffrey Boot	171
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Outram

1 Dominic Crossan	835
2 Simon Tilling	545
3 Erik Andersen	544
4 Matt Summers	474
5 Fiona Macaskill	148

Mitel Sword

1 Mark Hanson	929
2 Bob Ellis	671
3 Hamish Mitchell	548
4 Alan Turner	160



The ramble concludes

Racing is great fun
but ***bloody*** expensive?

The race is really your own
navigation and flying skill

It's a good excuse to fly
somewhere with good
friends

Come along, help out



British and European Air Racing Champions 2016
...beaten across the line by Ollie the cat!

