

## **Chapter 16**

### **Route Planning**      MANUAL OF PROCEEDURES

WRFC 2022 Brits, SA

Dated 15/09/2022

#### **WHO:**

The Route Planners are Frank Eckard and Cally Eckard.

The Route Checker is Colin Jordaan (To be confirmed)

The Chief Judge is Ralf Grünwald

#### **WHAT:**

Requirements: 3 practice routes, 4 competition routes and 1 flat land spares.

B 9.3 At least four (4) navigation tests, two of which should be "bad weather" routes, and 3 training routes, must be available. The layout of the training routes must avoid conflicts so that they can be flown simultaneously by the competitors in the training week while others are flying landing practices. If such conflict points cannot be avoided, these "hot spots" must be published on the information board.

Dates	Event	Routes to be completed	
		Training Routes (including spares)	Competition Routes (including spares)
	180412 National Rally Champs-Brits Day 3 Loaded as sample route to website)	1*	
16 <sup>th</sup> June 2022 18 <sup>th</sup> June 2022	South African Nationals	3	
5th to 12th Nov 2022	Unofficial practice WRFC 2022	3*	
14th to 18 <sup>th</sup> Nov 2022	WRFC 2022		4 + 1**

\* all the previous routes will be available from our website as training routes.

\*\* We will prepare 5 and ask the chief judge to choose 4. (Print only 4)

#### **WHERE:**

Flying Areas - We have identified three possible flying areas, which we have named SW Sector, West Sector, and Northern Sector. The SW Sector cannot be used as a "bad weather" route.

Training Routes – will include one route for each of the three sectors that we have identified as suitable flying areas. For safety, our intention is to keep each sector separate, so that during Training Week, there is no possibility of air traffic collisions.

Having studied the weather systems, these three sectors also coincide with weather patterns.

#### **WHEN:**

The required routes will be completed by the Route Planners and sent to the route checker 6 weeks before the start of the competition, (including Google Earth photos). The Route Checker will return the routes 4 weeks before the competition. The routes for the WRFC will be sent to the Chief Judge 4 weeks before the start of the WRFC. The photos will be taken 2 weeks before the competition. All routes will be printed and complete before the start of the WRFC training week.

**HOW:**

Each route, including Training Routes, will be checked by both Route Planners.

The full document pack, including time sheets will be forwarded to the Route Checker. If any changes are made to a route, once the changes are complete, the process starts again. That route (full document pack) will then be checked again, until it is perfect.

A final check will then be made by the Chief Judge.

## **MAPS and Printing**

Number of teams, 36 budget for 40 + officials 10 = 50 sets

### **The Competition Map**

The Competition Map is available on the website at: <https://www.wrfc2022.com/wp-content/uploads/HomePage/Maps/Map%20WRFc2022.A2.pdf>

Each team will be provided with one copy of the map at registration, and may purchase additional copies as required.

A.2.1.7 Each crew will be provided with charts, not necessarily aeronautical, with a scale 1:200 000 or 1:250 000, to cover all tests. (1:200 000 is recommended)

B 6.4 The organizer must provide a sample of the competition map to every participating crew, at least one month before the competition, together with the explanation of all symbols used on the map. This could be available as a download on the competition website.

## **TRAINING ROUTE**

The following training route are offered to allow you to get familiar with the area and the style of documentation that the route planners will use in the competition.

One paper copy of these route will be provided to each team at registration, and may purchase additional copies as required.

B 6.5 The host NAC must prepare 3 training routes of the same level as competition routes with 2 (A3) maps each and free of charge for each crew. A result sheet with coordinates of turn points and photos targets must be included with each route. (A Google Earth file as a download from the competition website would satisfy this requirement.)

## **Printing Requirements**

### **Competition Map**

Map WRFc2022.A2.pdf

Number of teams, 36 budget for 40 + officials 10 = 50 sets + 50 for resale = 100

### **Training Route**

#### **1 Route West**

A3 Route Maps 2 x 40 + 2 x 20 = 120

A4 Document Pack 60 x 16 pages = 960

A4 Envelope = 60

#### **2 Route SW**

A3 Route Maps 2 x 40 + 2 x 20 = 120

A4 Document Pack 60 x 16 pages = 960

A4 Envelope = 60

### 3 Route NE

A3 Route Maps  $2 \times 40 + 2 \times 20 = 120$

A4 Document Pack  $60 \times 16 \text{ pages} = 960$

A4 Envelope = 60

### Competition Routes

#### Day 1

A3 Route Maps  $3 \times 50 \text{ sets} = 150$

A4 Document Pack  $50 \text{ sets} \times 12 \text{ pages} = 600$

#### Day 2

A3 Route Maps  $3 \times 50 \text{ sets} = 150$

A4 Document Pack  $50 \text{ sets} \times 12 \text{ pages} = 600$

#### Day 3

A3 Route Maps  $3 \times 50 \text{ sets} = 150$

A4 Document Pack  $50 \text{ sets} \times 12 \text{ pages} = 600$

#### Day 4

A3 Route Maps  $3 \times 50 \text{ sets} = 150$

A4 Document Pack  $50 \text{ sets} \times 12 \text{ pages} = 600$

## Accuracy

If no exact digital map is available during route planning, the map must be verified using Google Earth or similar program working on the WGS84 coordinate system. Each TP must be checked and if the position on the map is not within 100 m of the position on Google Earth, it may not be used.

## Distances.

Using the points 29:00:00 S, 26:00:00 E and 29:00:00 S, 27:00:00 E, the model on website [http://www.fai.org/distance\\_calculation/](http://www.fai.org/distance_calculation/) give the distance using WGS84 as 52.613 Nm. Using FAI Sphere as 52.512 Nm, using the great circle model, the distance is reported as 52.477 Nm, using the Approximate Ellipsoidal Distance the same distance is reported as 52.463 Nm, Oziexplorer using the Spherical reports the distance as 52.477 Nm or ellipsoid as 52.560 Nm and Aiobserver reports the distance as 52.477 Nm

All distances shall be measured using the Spherical Earth Model. So that Aiobserver and Oziexplorer (Spherical) are the same. Other distances (curves tracks and photos) can be measured using Google Earth.

Latitude	Longitude	Distance nm	Distance KM	Distance Map mm
-33 55 00.0	18 55 00.0			
-34 00 00.0	18 55 00.0	5.000	9.26	46.3
-34 00 00.0	19 00 00.0	4.145	7.67654	38.3827

## Timing Allowances

**Take off to start allowance.** From the runway threshold, past the Take off point (Middle of the runway) to the middle of the downwind position is ~ 3 minutes. (This allows for acceleration, climb to altitude and setting course from either threshold. Then we measure the direct distance from the middle of the runway to the start and calculate the time required at 70 Kts and add this value, add another 2 minutes and round up to the nearest whole minutes. ie Time at 70 Kts + 5 minutes rounded up.

**Last Landing Time Allowance .** This is not a critical allowance, but needs to prevent delays. We measure the direct distance from the FP to the Landing Point and calculate the time required at 70 Kts, add another 5 minutes and round up to the nearest whole minutes.

**Answer Sheet Hand Over Time.** To the Last Landing Time, add 3 minutes for the taxi and 5 minutes for the cross checking. ie 8 Minutes after Last Landing Time.

TO CHECK THE ROUTES

ROUTE NAME.....

CHECKED BY.....

		Check Route Planner	Check Chief Judge
<b>MAP</b>			
1	Are co-ords printed on the map		
2	Title		
3	Scale		
4	Are TP's and reference points all within the limits of the map		
5	Are TP's more than 3NM of edge of map		
6	Print: 6 mm margin, Caption: Title and Scale: Highest Quality		
7	Print a back-up map (all TP's and not to scale, B&W)		
8	Print 3 maps per crew		
<b>TASK SHEETS</b>			
1	Correct variation at top of Task Sheet		
2	Conversion Factor at top of Task Sheet		
3	Are all TP's included		
4	Does the task sheet work out		
5	Are there diagrams where there is a similar point within 0,5NM		
6	SP and FP further than 2NM from each other		
7	Arrival and Departure must not conflict		
8	Max 2 arcs per flight		
9	Plotting of TP from previous TP – only 3 per flight		
10	Are there the correct number of TP's (10–16 legs)		
11	Check total distance of route (max 80-120NM from TOP to LDP)		
12	Check length of each leg (5-15NM)		
<b>TIME SHEETS</b>			
1	Distance and Time to SP		
2	Do curved tracks have straightening way points?		
3	Curved track distances corrected?		
4	Does the time sheet plot correctly?		
<b>TURNPOINT PHOTOS</b>			
1	Are all TP photos included (can be max 2 without – FP and FP-1)		
2	Are the TP photos taken of the correct/incorrect TP		
3	Are the photos clear		
4	Are the circles in the correct position		
5	Check Titles at top of photo sheets		
6	Incorrect photos must be more than 1NM from TP		

EN ROUTE PHOTOS			
1	Are all En route photos included (max 10 in each group)		
2	Is object within 300m of track		
3	No photos in first 5NM after SP (A 3.4.1)		
4	No photos within 1NM of each TP (A 3.4.1)		
5	Photo deviation not more than +/- 45° from the inbound course) and within an angle of 30° to 60° below the horizon. (B 9.7)		
6	Check Titles at top of photo sheets		
ANSWER SHEET			
1	Are all TP's included		
2	Are all En Route and Ground Markers included		
3	Check Correct/Incorrect TP's		
4	Check distances of En route photos from previous TP		
5	Check distances of Ground Markers from previous TP		
TAXI, DEPARTURE & ARRIVAL INSTRUCTIONS			
1	Print a sketch of taxi, departure and arrival instructions		
ENVELOPES			
1	Must contain: 3 maps task sheet time sheet TP photos En Route photos Answer Sheet Taxi, Departure & Arrival Instructions Safety Envelope containing back-up map		
2	To be handed out 2 mins per TP before		
MASTER MAP			
1	Master Map Prepared.		