BRONZE

NAVIGATION MODULE

POINTS

This module is the **NAVIGATION** requirement suitable only for

BRONZE

TASK SUMMARY

The standard minimum distance for the **BRONZE** task is **100 NM***, unless you have a slower aircraft, in which case there is an accommodation for this.

See **task elements** section for details

*Absolute minimum is 58NM.

OBJECTIVE

The aim of the BMAA Navigation tasks is for the pilot to demonstrate planning and execution of a flight to specified times and fuel consumption goals. For newer pilots it also provides the opportunity to progress to the next level after their NPPL.

It is anticipated that the vast majority of pilots will achieve the objective at the first attempt, with the opportunity for self-examination as to how the task was achieved but maybe not completed as they expected, and for those who fall at the hurdle to have valued experience to improve flight planning.

TASK ELEMENTS

The basic task distance is in line with similar aircraft in sister associations, but we have made some **allowances** for categories of aircraft we have which others do not, to cater for a large diversity of aircraft types and performances.

There is a **calculator** to make the task more accessible for aircraft with lower cruise speeds.

In order to avoid task flyers being pressured by things outside their control, we ask for the segment times to be recorded between the exit and entry point to the traffic patterns for the departure and arrival airfields. Should you find yourself in a queue for take-off, you are not penalised, as you only start the stopwatch when you set course for the first waypoint, and same philosophy applies to arriving in the circuit or joining overhead at a busy airport or having to extend a long way downwind to accommodate other traffic. The task form expects you to plan your flight time between these points, not from brakes off to brakes on, nor from take-off to landing.

Fuel is different - the task requirement is to estimate total fuel consumption for the leg, including any time

you may spend in queues, as there is no slack on this - regardless of any delays you must have enough fuel both for this Wings flight and for any other trips you plan.

The task has a requirement for **way points**. The reason for a way point is to focus on the use of the same for avoiding airspace or checking on your navigation at a useful point in the task. The use of visual reference points (VRPs) is a great technique, both for confirmation when using a moving map, or navigating using a paper chart. Providing it meets the task criteria, you should place the way point somewhere that makes the task easier for you, and forms one of the tools in your TEM (Threat and Error Management) for avoiding infringements or getting lost.

The suggestion is to plan and execute the tasks with methods you are familiar with. We advise you to avoid taking on more than one new thing at a time. If that familiar method is a paper map, ruler and stopwatch, so be it. If you use a moving map, then that's fine too. Flying a Wings Navigation Task isn't the time to change your methods of navigation.

OVERVIEW & PHILOSOPHY

The **minimum** distance for the BRONZE task is 100NM, unless you have a slower aircraft, in which case there is an accommodation for this. A slower aircraft for the purpose of this task is an aircraft with a cruise speed of less than 60 knots. This is done to cater for a wide range of aircraft performance and to recognise that the Wings scheme should be open to everyone irrespective of which type of microlight they fly.

The pilot must choose the cruise speed to use during planning and all calculations of time and fuel will be based upon that speed.

NOTES:

1. If your aircraft cruises at 60 knots or faster, the minimum distance for the BRONZE navigation task is 100NM.
   If you fly an aircraft with a lower cruise speed, then you may use a lower minimum distance for the flight.

This figure is the cruise air speed that you choose multiplied by five then the result divided by three to give a distance in nautical miles. The figure is rounded up to the next integer.

Example

Cruise speed (kts)	X 5	/ 3	Distance
50 kts	250	250	83 NM

If the result of this calculation is less than **58 NM**, you must use the figure of **58 NM**.

2. The flight must be completed on one day.

3. The distance given or calculated is a **minimum**. If you want to fly further, you can. The same criteria apply to your flight plan, in that you must schedule the flight and predict the fuel consumption, and be within the same percentage requirements.

4. For each leg of the flight enter one planned Waypoint along the route, no less than **20 NM** from each departure airfield measured in a straight line, and the planned time at that point.

5. Departure time is the time that the aircraft sets course for the next Waypoint or Airfield. It is not the brakes-off or take-off time.

6. Arrival time is the time that the aircraft arrives overhead the Waypoint or Airfield, or the time that the aircraft joins the airfield traffic pattern.

7. Hand a copy of the plan to your BMAA observer or email it in prior to departure. Complete the actual times and fuel use after the flight.

8. Flight times achieved must be within 20% of planned times. Fuel use must be within 20% of planned use.

COMPLETION

Changes have been made to the way the task can be verified.

There is a **Navigation PLOG Form** which must be completed for recognition of the task. **The plan must be submitted BEFORE departure**.

There are now two methods of completion

1. OBSERVER

The first way is to use an **observer**. A BMAA approved observer is a person known to and trusted by the BMAA (a fellow BMAA member, flight instructor or inspector would be ideal). The observer should be a pilot or person familiar with navigation tasks.

- The observer keeps the task form with the planning details on it whilst you fly the task.
- On your return, you complete the form with the figures obtained in flight.
- The observer signs it all off as a true representation and you send the form in.

2. GPS LOG

The second way is to:

- send in a copy or a scan of the planned flight **before you fly** to wings@bmaa.org.
- Complete the flight and the form with the actual figures, then mail it in **with a track log file** from your EFB or GPS unit.
  Accepted formats are:
  .trk (from PilotAware and some EFBs),
  .gpx (from SkyDemon if you mail your log for the flight to yourself) or
  .igc (most gliding apps and some older Garmin devices).

Please send your completed post-flight declarations to wings@bmaa.org or post paper applications to BMAA HQ.

BRONZE example flight

NAVIGATION MODULE

TASK SUMMARY

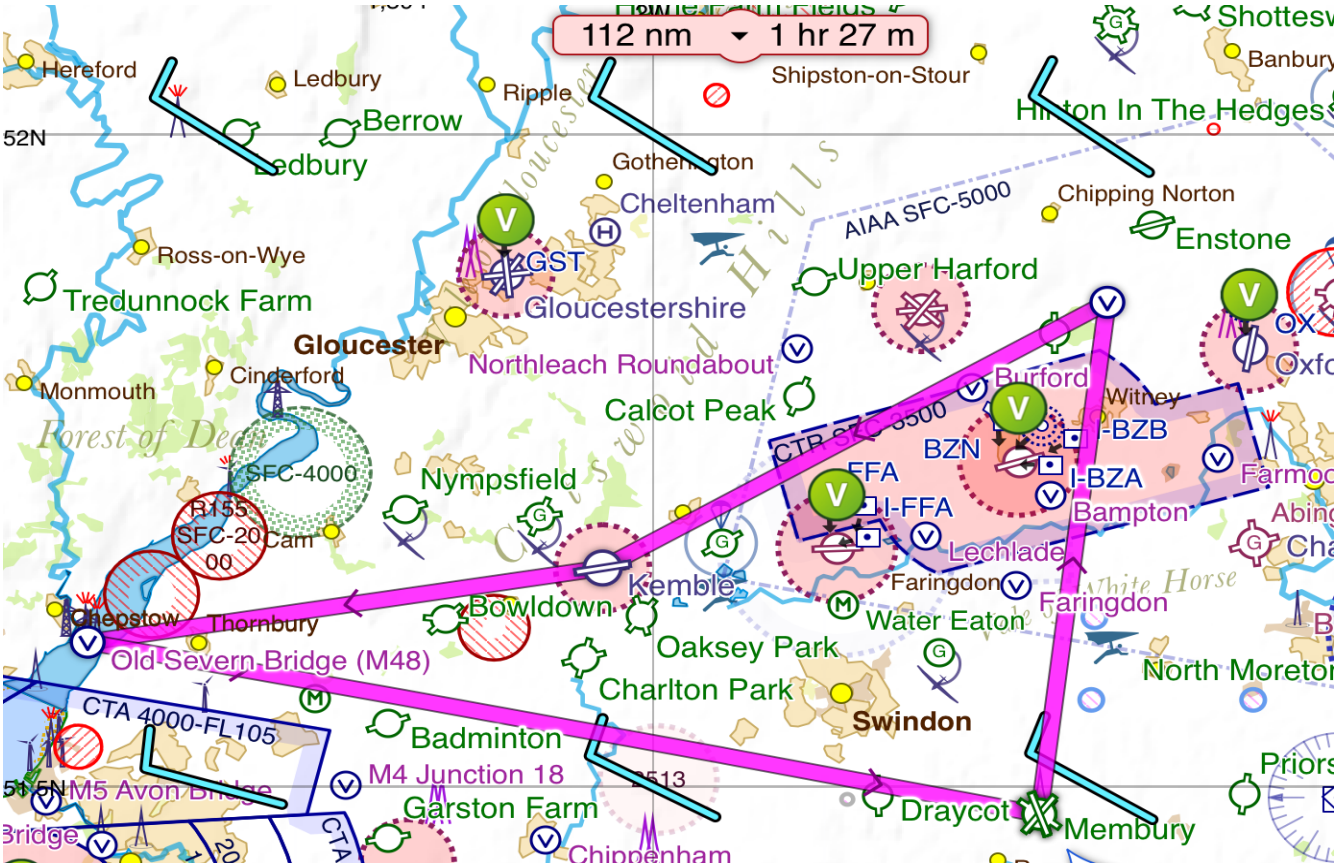
The **standard minimum distance** for the **BRONZE** task is **100NM**, unless you have a slower aircraft, in which case there is an accommodation for this.

The requirement is:

1. Take off from airfield A to waypoint B must be no less than 20NM.
2. Land at airfield B.
3. Take off from airfield B to waypoint C must be no less than 20NM.
4. Land back at airfield A.
5. Total distance must be 100NM or more OR as calculated minimum for your declared cruise speed *(see notes for more detail)*.

EXAMPLE ROUTE

The route below is an example of a route suitable for the BRONZE navigation exercise:



NOTE: this route crosses Brize class D airspace and a clearance would be needed to complete the flight at the 2000ft level indicated on the following PLOG.

EXAMPLE PLOG

Membury - Membury

Aircraft: G-SAMC (C42B)
Pilot: Cameron Spence

Startup		**Brakes Off**		**Fuel Required**	33.5 ltr
Takeoff		**Landing**		**Planned Fuel**	65.0 ltr
Brakes On		**Shutdown**		**Endurance**	4 hr 21 m

	Level	IAS	TrkT	Wind	HdgM	GS	Dist	Time
Elevation 667 ft (24 hPa) SR 05:23 Z, MCT 04:49 Z								
Membury Ⓥ **Charlbury (EGVN)**	**2000**	75	007	000/00	**007**	75	24	19
Charlbury (EGVN) **EGBP Kemble**	**2000**	75	240	000/00	**240**	77	25	19
EGBP Kemble Ⓥ **Old Severn Bridge (M48) (EGGD)**	**2000**	75	261	000/00	**262**	77	22	17
Old Severn Bridge (M48) (EGGD) **Membury**	**2000**	75	101	000/00	**101**	76	41	33
Elevation 667 ft (24 hPa) SS 18:52 Z, ECT 19:27 Z							**112**	**1:27**

EXAMPLE DETAIL

The **standard minimum distance** for the **BRONZE** task is **100NM**, unless you have a slower aircraft, in which case there is an accommodation for this. (See the main Bronze Navigation document for details of how to adjust for slower aircraft)

The requirement is:

1. Take off from airfield A to waypoint B must be no less than 20NM.
   In this case we flew from departure point at **Membury** to a waypoint at **Charlbury** which is a VRP and very easy to identify from the air. This is 24NM from the departure point.
2. Land at airfield B. There is no min, distance from the waypoint to this airfield.
   In this case we landed at **Kemble**.
3. Take off from airfield B to waypoint C must be no less than 20NM in this case we left from **Kemble** to the VRP at the **Severn Bridge**, again very easy to identify. The distance for this leg is 22NM.
4. Land back at airfield A.
   We landed back at **Membury**. There is no min. distance for this leg.
   NOTE: you could go on to a different airfield if the distance requirements were met.
5. Total mileage declared must be 100NM or more OR as calculated minimum for your cruise speed.
   The total distance of 112NM met the requirement for this aircraft with a cruise speed of 75kts which is 100NM.

NOTES: This task was planned using SkyDemon. Others have used stopwatch and chart methods for the same task. The only difference is that GPS logs can be submitted as evidence if used whereas you need to have the flight verified by an observer using chart/stopwatch methods. The observer can be any BMAA member and they don't need to fly with you (although they can if you'd enjoy their company!) In both cases the proposed route, timings and estimated fuel burn must be submitted in advance either by email to the BMAA prior to departure or a copy of your plan left with your observer.

If your aircraft cruises at 60 knots or faster, the minimum distance for the BRONZE navigation task is 100 NM. If you fly an aircraft with a lower cruise speed, then you may use a lower minimum distance for the flight. This figure is the cruise air speed that you choose multiplied by five then the result divided by three to give a distance in nautical miles.

Example

Cruise speed (kts)	X 5	/ 3	Distance
50 kts	250	83.3	83 NM

If the result of this calculation is less than **58 NM**, you must use the figure of **58 NM**

BRONZE Navigation Plan & Log

HOW FAR DO I NEED TO FLY?

The **standard minimum distance** for the **BRONZE** task is **100NM**, unless you have a slower aircraft, in which case there is an accommodation for this. *If your aircraft cruises at 60 knots (70 mph) or slower you may apply the following:*

Cruise speed in knots*	***x 5***	***÷ 3***	***Task distance***
(example) 55 knots	*55 x 5 = 275*	*275 ÷ 3 = 91.67*	*92NM*

**In order to convert from mph to knots divide by 1.15 (65mph ÷ 1.15 = 56.5knots).*

Cruise speed in knots?	**x 5**	**÷ 3**	**Task distance**
			*

**For BRONZE This distance cannot be less than 58NM.*

Now you've worked out how far you have to fly, next is to prepare your plan, see below. At this stage just fill out the green cells, leaving the yellow ones ready for the actual flight and you can ignore the grey cells.

THE FLIGHT PLAN

Please fill out the highlighted sections:

Pilot's name			**BMAA No:**	
Aircraft type				
Aircraft registration	***G-***			
Date of flight				
Start Airfield (name)	Planned depart time		Actual depart time	
Waypoint 1 (name)	Planned arrival time	Planned duration	Actual arrival time	Actual duration

Destination Airfield 1 (name)	Planned arrival time	Planned duration	Actual arrival time	Actual duration
Depart Airfield 1 (name)	Planned depart time		Actual depart time	
Waypoint 2 (name)	Planned arrival time	Planned duration	Actual arrival time	Actual duration
End Airfield (name)	Planned arrival time	Planned duration	Actual arrival time	Actual duration
Flight time planning	Total planned duration	Total actual duration	Percentage difference (%) planned to actual	
Fuel planning	Total fuel use planned	Total fuel use actual	Percentage difference (%) planned to actual	
Total Distance flown in Nautical Miles		Minimum distance from page 1 or 100 NM		*

**For BRONZE This distance cannot be less than 58NM.*

DECLARATION

Once you've completed all the green cells and before you fly you must either; submit the plan to BMAA (wings@bmaa.org) or get an observer to sign the declaration below:

BMAA Approved observer declaration:
I confirm that the applicant has completed the planning for their BMAA BRONZE Wings Award and that I checked the figures prior to take-off.

Observer Name:	**Signed:**	**Dated:**
		*

Once the BMAA or the observer have signed off on the plan, you may perform the flight. We highly recommend using GPS for the actual flight as well as recording your track.

Good luck!

POST FLIGHT

Congratulations on completing the flight, this is now the final stage. You must now go back over the plan and fill in the yellow cells. Please also calculate the percentage difference (%) between your plan and the actual figures flown, the aim being to be within +/-20% for timings and fuel used:

$$\text{To calculate percentage difference (\%)} = \frac{\textbf{(Actual - Planned)}}{\textbf{(Actual)}} \textbf{ x 100}$$

$$\text{Example (\%)} = \frac{\textbf{(60mins – 54mins)}}{\textbf{60mins}} \textbf{ x 100}$$

$$= \frac{\textbf{6}}{\textbf{60}} \textbf{ x 100}$$

$$= \underline{\textbf{10\%}}$$

SUBMISSION & DECLARATION

Once the form is fully complete, please now submit it to BMAA along with the Award Level Application Form and if you have it, pictures of your GPS track or a copy of the file (track file from SkyDemon, PilotAware, Garmin GPS, etc).

I declare that I undertook the flight as described on this form as 'Pilot in Command' (PIC) and that all the data submitted is true and an accurate account. I submit this to the BMAA for consideration of the grant of a BRONZE Wings Award.

Pilot Name:	**Signed:**	**Date:**

OFFICE USE ONLY

BRONZE NAV	
Received date:	
Checked by:	
Outcome?	ACCEPTED / REJECTED