



DEUTSCHER  
AERO CLUB

Power Flying Commission



National Rules and Regulations

2017

Navigation Flying

## Preface

The present National Rules and Regulations (Wettbewerbsordnung - WBO) form the basis for the preparation and organization of German Navigation Flying Championships. Taking national and international rules and regulations (FAI Air Rally Championship Rules and Regulations and Precision Flying Rules and Regulations) into account, these Rules and Regulations were established by the Power Flying Commission of Deutscher Aero-Club e.V. (DAeC) in cooperation with experienced competition pilots.

Necessary changes, if any, shall be presented to the Power Flying Commission for incorporation into the WBO.

Organizers of navigation flying championships or competitions at national or regional level are asked to adhere to the WBO as closely as possible in order to make it easier for the competitors to prepare for national and international championships.



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# Competition Rules

## 1. Introduction

- 1.1. Deutscher Aero Club e.V. - through its Power Flying Section - will normally organize a National Navigation Flying Championship (Deutsche Meisterschaft im Navigationsflug - DMM-Nav) every two years. The organization of these Championships will be delegated to a local flying club (Competition Host) of a DAeC member association (Landesverband).
- 1.2. The Deutsche Meisterschaft im Navigationsflug is a national competition and will be organized and executed in accordance with the relevant version of the National Rules and Regulations - Navigation Flying. Foreign pilots may also participate in the DMM-Nav. Their results do not affect the ranking of the German championships. Unless otherwise specified, foreign pilots/crews are not eligible for a title or to win any special trophies.
- 1.3. The competition shall be run in accordance with these Rules and Regulations and the aviation authority's additional requirements.
- 1.4. Organizers of regional championships and competitions are recommended to follow these Rules and Regulations, with local issues also being taken into account.
- 1.5. The competition will be held only in VMC as defined by applicable European regulations. If the conditions deteriorate during the competition, it is the pilot's sole discretion and responsibility to continue or not.
- 1.6. The competition, or any stage, may be postponed, modified or cancelled due to prevailing weather conditions or any other reason at the discretion of the Competition Director after consultation with the Chief Judge.

## 2. General Rules

- 2.1. The competition is for both, solo pilots and two-person crews. Each competing pilot must hold a valid pilot license and the ratings required. Aircraft eligible for the competition must have a current airworthiness certificate and must be operated according to the manufacturer's specifications. The minimum allowable declared competition airspeed is 60 knots.
- 2.2. The competition will consist of the following three groups of tests:
  - 2.2.1. Flight planning test (independent) as an option
  - 2.2.2. Accurately timed navigation and observation tests
  - 2.2.3. Landing test

- 2.3. There will be three competition flights including one landing test each. The maximum distance for each stage must not exceed 90 NM. A stage is considered to be flown if at least 75% of all competitors have accomplished the task. For a National Championship two stages including two landing tests must be flown.
- 2.4. All three stages, if successfully completed, shall be used for scoring.
- 2.5. The competition language will be German. However, English terms commonly used in aviation may also be used during the briefing or for task-setting.
- 2.6. Official competition time will be GPS time displayed as local time. A master clock showing GPS time must be made available to the competitors to set their timing.
- 2.7. Each crew will fly the same aircraft throughout the competition. In case of a technical malfunction, the Competition Director may authorize a change to another aircraft.
- 2.8. In the event of a technical malfunction (a/c or GNSS-FR), the crew must not leave their aircraft and must not communicate with their team. The crew shall make a radio call to the competition management to explain the situation and shall follow given instructions.
- 2.9. Each crew will be provided with all charts (1 set for each crew member), not necessarily aeronautical, with a scale 1:200 000, that are required for flight planning and execution.
- 2.10. Before each stage, a list showing takeoff sequence and time will be published. A minimum time of two minutes between takeoffs will be used.
- 2.11. By providing a special quarantine area, the Competition Director ensures that no crews who have returned from a flight get in contact with those still having to fly the task. Crews can be kept in quarantine either before or after flying a task.
- 2.12. An electronic measuring system shall be used for the Landing Test. In this case, the aircraft is considered to have landed when the wire of the measuring system has been touched. In addition, all landings must be documented using a suitable camera system. The equipment must allow picture freezing and frame-by-frame advance. The video recording shall be made available to the Chief Judge and the Jury.

### 3. Competition Details

- 3.1. The flight planning test is optional and can be used at the discretion of the competition director. If there will be no flight planning test, chapters 3.1.1. to 3.1.5. and 3.1.7. will not be applicable. The computerized flight plan will be handed over to the crew at the aircraft 30 to 45 minutes before takeoff.
- 3.1.1. The crew must report at the entrance of the flight planning room five (5) minutes before the assigned time to be checked for non permitted equipment.
- 3.1.2. The crew may enter the flight planning room three (3) minutes before the assigned time to arrange the table to be ready in time to receive an envelope containing the competition map, a set of instructions, two sets of photographs, a flight plan form as well as departure and approach charts.
- 3.1.3. The instructions will define all necessary flight procedures and identify the checkpoints (Start Point SP, Checkpoints CPs, Final Point FP). All checkpoints will be displayed and marked with a circle on the competition map. All checkpoints will be numbered. Wind direction and speed between 5 and 30 knots will be given. All crews will use the same wind for flight planning.
- 3.1.4. Leg distances will be given in nautical miles. True tracks must be taken from the map. The flight plan will require the crew to only calculate the true heading in degrees and the time on each leg in minutes and seconds.
- 3.1.5. The crew is required to calculate the flight plan and to submit it to the competition management within 30 minutes after receipt of the instructions. Following the submission of the flight plan, the crew will be given a computerized flight plan for the navigation test.
- 3.1.6. If actual wind conditions change during the competition (more than 45° in direction and/or more than 10 knots in velocity), an updated computer flight plan has to be given out for the next group of competitors.

Computerized flight plans based on each individual crew's declared competition airspeed will be produced by the competition management and used by the competitors.

The computer flight plan shall specify:

- Local times for Takeoff, SP, all CPs and FP in hours : minutes : seconds
- True tracks and true headings in degrees
- Ground speeds in knots
- Leg distances in nautical miles
- Time on leg in minutes and seconds

- 3.1.7. Map preparation will take place in the flight planning room. Crews are required to leave the flight planning room not later than 60 minutes after receiving the flight instructions. From the time when the crew is scheduled to leave the flight planning room, the crew shall be allowed 15 minutes to go to the aircraft, to prepare it for flight and to taxi to the takeoff position.
- 3.1.8. For flight planning calculation navigation computers and other electronic calculators may be used provided that they do not feature any GPS interfaces or integrated mapping software.

## 3.2. Navigation Test

- 3.2.1. There will be three navigation tests. Each test is intended to assess the crew's skills in precise navigation and timing and in maintaining minimum altitudes.
- 3.2.2. Times will be checked on takeoff and on passing overhead CPs. In addition to timing at CPs, enroute time checks are also possible. Latest landing time at the competition airfield after passing the Final Point shall be indicated.
- 3.2.3. There shall be a maximum of 16 timed checkpoints. No navigation test will have more than 8 straight legs. Legs comprising secret enroute time checks shall be indicated during the briefing. No secret enroute time check must take place within one nautical mile of a CP.
- 3.2.4. The aircraft must be established on the correct track of the first leg when passing the Start Point (SP).
- 3.2.5. All CPs including secret enroute time-check points must be well-defined features, both on the ground and on the map.
- 3.2.6. During the navigation tests, the prescribed minimum altitude must be maintained. The flight altitude can be checked at any time.
- 3.2.7. The takeoff time will be measured when passing a defined gate.

- 3.2.8. All CPs and secret enroute time-check points must be passed inside a “gate”.

All gates extend 0.5 NM to the left and right of the relevant CP and 1.0 NM to the left and right of the relevant secret enroute time-check point.

Passing outside a gate will incur penalties for “not observed”. No penalties will be given for laterally deviating from the track prior to or after passing a CP or a secret enroute time-check point.

- 3.2.9. A turn of more than 90° on the leg will incur penalties when the FR shows this deviation for more than 5 seconds in sequence.
- 3.2.10. Passing the SP at a lateral distance of 1 NM or less in opposite direction to the SP - CP1 leg will result in penalties for circling (turn of more than 90°). Time will be checked at the SP when the aircraft is for the first time passing the time gate extending 0.5 NM either side of the SP on outbound track to CP1.
- 3.2.11. A procedure turn will be prescribed when any checkpoint involves a change of track of more than 90 degree. Track changes of more than 120 degrees are not permitted.

When a procedure turn is prescribed, the computerized flight plan given to the crew shall include one minute for the turn, added on a separate line. In this case, minimum time between takeoffs must be three minutes.

Failure to carry out procedure turns will incur penalties.

### 3.3. Observation Test

- 3.3.1. Each test is intended to assess the crew’s ability to perform observation tasks during a complex navigation flight. The test includes:
- identifying enroute photographs
  - identifying checkpoint photographs
  - marking the photographs’ position on the competition map
- 3.3.2. The precise object to be identified will be circled on each photograph.
- 3.3.3. No photograph will be located within one nautical mile of a CP.
- 3.3.4. Photographs wrongly identified or not marked at all will incur penalties.
- 3.3.5. At the end of the flight, at the parking position, the crew is allowed 10 minutes for completing the marking on the map. The 10 minutes will begin after the aircraft wheels have stopped at the parking position.



- 3.3.6. The crew will be debriefed as soon as possible. Communication with other crews prior to the debriefing will result in disqualification.
- 3.3.7. Enroute photographs can be located at a maximum distance of 200 meters left or right of the track and must be taken into the direction of the next CP. The photographs are provided with numbers and are not in sequence. The crews must mark the photographs' exact position on the map and provide them with the relevant numbers.
- 3.3.8. There are two options to handle checkpoints. The decision which option shall be used, must be published in the Invitation and Air Rally Information documents or must be announced at the Opening Briefing at the latest.
- Checkpoint photographs are provided with letters. They are all correct and taken from inbound direction. Competitors must assign them to the relevant CPs and mark the CPs on the map with the relevant letters; or,
  - Checkpoint photographs are in correct sequence and may be taken from any direction. They may be correct or incorrect and the crew must decide and mark them as "correct" or "incorrect" on the map. Incorrect photographs must be at least 1 NM away from the actual checkpoint.

#### 3.4. Landing Test

- 3.4.1. The landing test will be done as a full stop landing into a landing field in accordance with Appendix A 1.
- 3.4.2. Each landing will be made out of a normal approach where the use of power, flaps, spoilers and sideslip is at the discretion of the pilot.
- 3.4.3. Touchdown must be on both wheels with a maximum distance of five (5) meters between main wheel 1 and main wheel 2, except when the Chief Landing Judge has declared "crosswind conditions". If a crosswind condition exists, the aircraft may touch down on the upwind main wheel. In this case, the touchdown point for measurement is the touchdown of the first main wheel.
- 3.4.4. The nose wheel must be off the ground until both main wheels have touched down. Tail-wheel aircraft must be landed in a configuration where the tail is lower than the horizontal attitude.
- 3.4.5. If the main wheels touch down with a distance of more than five (5) meters between main wheel 1 and main wheel 2 or if the aircraft "bounces", the box with the highest penalties will be taken for scoring. In case of crosswind landings according to 3.4.8. the touchdown of the upwind main wheel will be used for scoring.
- 3.4.6. An aircraft is considered bouncing, when after any touchdown the aircraft jumps (all wheels in the air) over one or more landing field boxes. Jumps out of the last box will be assessed using an auxiliary line located 10 meters behind the last box. An aircraft is considered jumping out of the last box when jumping over the auxiliary line.

- 3.4.7. In case of a three point landing with a tail-wheel aircraft, the touchdown of the main wheels will be measured. If the tail wheel touches down first and if the distance between touchdown of the tail wheel and main wheel(s) is less than the distance of main and tail wheel plus 5 meters, the touchdown of main wheels will be used for scoring, otherwise the tail wheel touchdown will be used.
- 3.4.8. "Crosswind conditions" must be declared when the crosswind component is 8 knots or more. Wind direction and speed shall be measured close to the landing field by means of suitable equipment. The Chief Landing Judge will decide when "crosswind conditions" exist. Crews will be advised by radio. If the crosswind component exceeds 15 knots, the landing test of that stage will be cancelled.
- 3.4.9. The maximum tailwind component for scored landings is 5 knots. If the tailwind component exceeds 5 knots, landing direction should be changed or the landing test of that stage will be cancelled.
- 3.4.10. Abnormal landings are defined as follows:
- a) Landing not in accordance with 3.4
  - b) One main wheel off the ground to a height of more than one diameter of the main wheel at the initial touchdown without authorized "crosswind conditions".
  - c) In authorized "crosswind conditions", touchdown on the downwind main wheel with the upwind main wheel off the ground to a height of more than one diameter of the main wheel.
  - d) Any other part of the aircraft than the wheels touching the ground.
  - e) Retraction of flaps and/or change of spoiler setting overhead the marked landing strip before touchdown.
  - f) Touchdown with blocked wheels.
  - g) Any main wheel leaves the ground while nose wheel remains on it.

Penalties for abnormal landings will be given in addition to the other landing penalties.

### 3.5. Flight Data Recording Equipment

- 3.5.1. The use of GNSS Flight Recorders (GNSS-FR) is mandatory for German Rally Flying Championships (DMM-Nav). Organizers of regional competitions should support the use of flight data recording equipment.
- 3.5.2. Technical requirements for GNSS-FR are stipulated in the FAI Sporting Code, Section 2, Annex 4.
- 3.5.3. Each crew has to carry and operate a GAC-approved GNSS-FR during the competition flights.
- 3.5.4. Responsibility for the operation of the flight data recording system in the aircraft rests with crew.
- 3.5.5. No crew is permitted to manipulate the GNSS-FR in any way, otherwise they may be disqualified. Special issues concerning the use of the GNSS-FR have to be covered during the Opening Briefing.

## 4. Table of Penalties

	Penalties	Max.
4.1. Flight Planning and Navigation		
<b>4.1.1 Preparation of Flight Plan</b>		
- Limit + or - 2 degrees in heading	0	
- Additional error per full degree	2	
- Limit + or - 5 seconds in timing	0	
- Additional error per full second	1	
- Maximum total penalties for calculation		200
- Late delivery of flight plan	50	50
- Failure to leave flight planning room in time	100	100
<b>4.1.2 Takeoff time (aircraft passing takeoff time gate)</b>		
- Takeoff time + 60 seconds	0	
- Passing takeoff gate before or after time slot	200	200
<b>4.1.3 Passing each timed point</b>		
- Limit + or - 2 seconds	0	
- Additional error per full second	1	200
- "not observed" (outside gate), each time		200
<b>4.1.4 Procedure turns</b>		
- Failure to carry out prescribed procedure turn, each time	200	200
<b>4.1.5 Flying below prescribed minimum altitude (each time)</b>		
	500	500
<b>4.1.6 Other deviations from track (each time)</b>		
- Circling or other deviations from desired track by more than 90 degrees (each time)	200	200
- Failure to follow prescribed arrival/departure routes and/or procedures	500	
- Late landing at the competition airfield (if latest landing time is indicated)	200	
<b>4.1.7 Late submission of competition map and envelope</b>		
	100	100
4.2. Observation Test		
<b>Enroute photographs:</b>		
- Photo within 5 mm of correct position	0	
- > 5 mm to 10 mm of correct position	10	10
- Not observed	20	20
- Incorrect position	40	40
<b>Checkpoint photographs:</b>		
- Correct identification	0	
- Not observed	40	40
- Incorrect identification	80	80

### 4.3. Landing Test

White line	0 penalties
Area "A"	20 penalties
Area "B"	40 penalties
Area "C"	60 penalties
Area "D"	80 penalties
Area "E"	50 penalties
Area "F"	90 penalties
Landing out of landing box, rolling out of box (left/right)	200 penalties
Applying power after touchdown, within the landing box	100 penalties
Go around without touching ground (without being forced)	200 penalties
Go around after touching ground (without being forced)	200 penalties
No attempt to land at designated landing field	300 penalties
Abnormal landing (3.4.10)	200 penalties
Penalties for abnormal landings will be given in addition to other landing penalties; however, the maximum per landing will be	300 penalties

## 5. Disqualification

- 5.1. Disqualification may result from
- any misconduct or bad behaviour on the ground or in the air,
  - dangerous flying, endangering people, aircraft or structures,
  - general protests against other competitors,
  - failure to comply with the relevant rules and regulations,
  - violating FAI anti-doping rules,
  - manipulation of the flight recording system,
  - any kind of cheating,
  - flying the competition route again.
- 5.2. Disqualification of crews or Landesverband teams may result from
- use of the radio on a frequency not allocated in the instructions,
  - communicating with other than authorized persons,
  - use of forbidden communication or navigation equipment.

If it can be proved that only one crew of a Landesverband team is involved in the violation, only that crew may be disqualified.

- 5.3. A decision to disqualify a crew or a team will be made by the Competition Director in consultation with the Chief Judge.

## **6. Complaints/ Protests**

- 6.1. Competitors are the only persons who have the right of filing a protest.
- 6.2. The Competition Director will, as soon as the preliminary individual result of a stage is available, provide each crew with the result. This can already be done when the crew leaves the debriefing room. A preliminary overall list will be made available after the end of protest time.
- 6.3. Within 30 minutes of the release of the individual results, the crew may check the results and, if not satisfied, to present, without payment, a complaint in writing to the Chief Judge. The complaint must be signed by one member of the crew concerned.
- 6.4. The crew concerned will then be given the opportunity to inspect the relevant marking sheets in the presence of a person authorized by the Competition Director. Any obvious errors will be corrected.
- 6.5. No inspections will be permitted between 10.30 p.m. and 07.30 a.m. local time unless all parties involved agree to.
- 6.6. If after clarification the crew is still dissatisfied with the result, the crew may file a written Protest with the Competition Director. The Protest must be signed by one member of the crew concerned and must be accompanied by the prescribed protest fee.
- 6.7. The Competition Director will refer the Protest to the Chairman of the Jury who will then call a Jury meeting. The crew concerned has the right to address the Jury and to be shown all relevant information regarding the protest.
- 6.8. A protest will not be accepted later than one hour following the rejection of a complaint or later than the end of the protest time specified in the Local Rules.
- 6.9. Air Traffic Control recordings will not be used as evidence within a competition.
- 6.10. Protests against other competitors are forbidden. However, violations of any flight safety rules should be reported to the Competition Director. The Competition Director has to investigate and to report the result to the Chief Judge.
- 6.11. If corrections due to complaints or the Jury's ruling affects another or other crews, the appropriate alterations will be made to the results.
- 6.12. According to the provisions of the FAI Sporting Code, General Section, the Jury's decision is final and binding upon the crew concerned. No further right to appeal.

- 6.13. After the protesting crew has been advised of the Jury's decision, the results of the protest will be posted at a previously notified position.
- 6.14. The fee for filing a protest is 100 euros and will be refunded in case protestor wishes to withdraw the protest prior to the Jury hearing or when the protest is successful. If a protest is rejected the protest fee will be retained by the DAeC Power Flying Commission.

## **7. Final Results**

- 7.1. To determine the order of placing each crew will be awarded penalty points in each of the individual tests. These penalty points will be added together to form the crew's final results.
- 7.2. Winner of the German Navigation Flying Championship will be the competitor/crew with the least number of penalties. To declare a winner, at least two navigation tests must be flown.
- 7.3. In case of a tie, the solo pilot/crew flying the aircraft with the highest declared competition speed will be placed first.
- 7.4. In case of a further tie, the crew with the least punctuality penalties will be placed first.
- 7.5. For the "Deutscher Mannschaftsmeister im Navigationsflug, Landesverbandswertung" team competition, the final results of the two best crews of a DAeC member association (Landesverband) will be added.
- 7.6. "Deutscher Mannschaftsmeister im Navigationsflug" team winners will be the two best "Landesverband" crews with the least total added penalties.

# Appendix A I (Competition Landing Field)

