FEDERATION AERONAUTIQUE INTERNATIONAL

COMMISSION D'AEROSTATION DE LA FAI

FAI BALLOONING COMMISSION

CIA

COMPETITION OPERATIONS HANDBOOK

(FOR HOT AIR BALLOON EVENTS)

Version 2021

Effective April 2021

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INTRODUCTION

This handbook is written to be used in Hot Air Balloon (AX) competitions. The details of this handbook will not fit all kinds of AX competitions or all sizes of events. However, the philosophy of the handbook is to operate a 'Safe and Fair' competition and to deliver knowledge and experience to organisers around the world.

Masculine pronouns refer to both masculine and feminine.

All references to AXMER mean AX Model Event Rules Version 2021.

As stated in AXMER R4.1, in some events, the "Event Director" is also referred to as the "Competition Director." In this handbook the word "Director" is used to refer to the person responsible for competition operations.

UPDATE RECORDS

March 1994	The Scoring Working Group decided to edit the 'Scoring Handbook'.
March 1996	The First draft (version 1.5) was submitted to the CIA plenary
July 1996	The Scoring Working Group decided to change the name of this document to 'Competition Operations Handbook'
February 1997	The draft version 2.0 was submitted to Working Group members.
March 1997	The draft version 2.1 was submitted to the CIA plenary and was authorised as one of the CIA official manuals.
March 2001	Version 1/2001 was submitted to the CIA plenary and was authorised as one of the CIA official manuals.
March 2003	Version 2003 was updated as result of CIA plenary decisions. New are the Penalty Guide and GPS-Logger procedures.
March 2004	Version 2004 was updated as result of CIA plenary decisions. New are the Chapter 12 Weather Information, a standard Weather Information Sheet (Appendix A: Forms) and a list of recommended standard penalty description wordings for Task Score Sheets (). The AXMER have changed this year, be reminded that the Penalty Guide is unchanged and may not apply to changed rules.
March 2005	Version 2005 was updated with mostly editorial changes. Appendix A: Forms 'Report on the Use on GPS loggers' was removed and given to the Tracking WG. It was agreed that policies and procedures would be under the umbrella of the SWG and information and study publications would be published by the Tracking WG.
March 2006	Most importantly the FAI/CIA Plenary decided that the COH becomes a mandatory document. This recognises the validity and importance of this document. Version 2006 has the following minor changes. Folding of a target at the end of the scoring period is no longer a recommended procedure and the PG (Penalty Guide) now advises to no longer apply the 250ft warning zone but to apply penalties for all infractions of blue PZs.
March 2007	The COH was checked in its entirety and some editorial changes were made. Target teams procedures were added and it was decided that the COH is the place where all physical dimensions of competition equipment is covered. The PG provides important guidance for collision penalties.

March 2008 It was decided to reduce the 'precision' for result calculations based on GPS to 1m (was 10m) and to allow for interpolation (new rule AXMERs). The interpolation method is not specified (time based or mathematical). An important table is entered in the PG specifying the good and bad in PZs and OfB areas. A new chapter LOGGER CONTROL is added with two paragraphs and more to come in 2009

March 2009 In the PG guidance is added to penalize competitor for not providing a track (R6.5 GPS failure) even if the track is not needed for scoring but needed for rule infringements checking. Furthermore a remark has been added in the PG that penalties under R10.1 (Collision) also be applied for collisions during Take-Off and Landing.

March 2010 Information on the use of old markers and marker dimension tolerance is added as well as the use of 'pigtail' pins. Furthermore a detailed job description of Target Teams is added. Logger and FRF (Flight Report Form) procedures were also added. The word MSA is changed in MMA in accordance with the AXMERs.

March 2011 Minor updates and editorial changes to the COH were made. Procedure for handling the final results added. 15 min. study time before task briefing added. Penalty proposal of Marc Andre to be studied, downloadable from FAI/CIA web site.

March 2012 Updates to support AXMER 2012 changes for declaration of Fly On goals (R15.5.4) and the elimination of distance infringement penalties. Most significant changes were to the table for FON task on page 43.

April 2012 Numerous updates to bring the COH up to date and in alignment with AXMER 2012, including:

- this page above re: the Director
- 2.1 Type of Logger, references to the NTSC
- 6.2.2, reference to methods and tools to verify results in the CIA Jury Handbook
- 6.6 Guidelines of Scoring Software, added additional detail about how to compute score points, when to use floating point math, how to share points, how to handle ties at the median and how to compute a checksum. Also added a reference to the CIA Jury Handbook's methods and tools for verifying results.
- 13.4.3, advice to MO to not state if weather is OK for flying or if flight is on/off.
- 14.1.4, added suggestion re: "adequate time"
- Penalty Guide re: R10.1.5 and awarding points to competitors suffering a collision.
- Penalty Guide re: R9.21 Clearing Launch Area and MDT R15.13.5 & R15.13.6 which do not exist in AXMER 2012, with corresponding comments in Appendix B: Standardised Text For Task Score Sheets.
- Appendix D: RED PZ ALTERNATE FORMULA, changed title to "Alternate Prohibited Zones and Penalties" and added references to discussion in CIA Forum SWG section for alternate Red PZ penalty method and to 2010 WHABC Event Director's page for discussion of Motorway ("Tunnel") PZs.
- Added Appendix E: CIA LOGGERS, with references to a few CIA Logger related resources.

March 21, 2013 Change AXMER Rules 13.3 Distance Infringements and 13.3.5 to align with changes to AXMERs at 2013 CIA Meeting.

June 3, 2013 May 28: Added Appendix F Role of the Event Director, a document from the Statutes, By-laws and Sporting Code Working Group, as approved by the 2013 CIA Meeting. This document has been added with only one minor changes – "Rules Working Group" was changed to "Statutes, By-laws and Sporting Code Working Group." A minor change to section 1.1.2 (Marker Numbering) was made so that underlining numbers 69 and 96 is

not required as these numbers are unambiguous in any orientation. Also fixed the Table of Contents to correctly display Appendix D to F entries. June 3: After feedback from members of the SWG, a comment was added to Appendix F to indicate that this appendix is the responsibility of the Statutes, By-laws and Sporting Code Working Group. Also corrected the distance penalty calculation description in 13.3.

March 20, 2014 Changes at 2014 CIA Meeting:

1. Chapter 6: Measurement Accuracy and Precision
2. Appendix A: Forms Flight Report Form
3. Appendix E: CIA Loggers Instrument Error Correction
4. Changes due to AXMER changes or requests by AXWG:
    a. Penalty Guide 3.1.3 Vents
    b. Penalty Guide 9.2 Individual Launch Areas
    c. Penalty Guide 13.3.4, 11.2.2 and 11.3.4 Penalties related to landing distance infringements
    d. Chapter 6: Scoring Added 6.10 Calculating “No Result” Distance Infringement Penalties

March 20, 2015 Changes at 2015 CIA Meeting:

1. 6.11 Scoring Traceability
2. 7.8 Inappropriate but unambiguous declarations
3. 9.1.1 Moving Balloons
4. 10.1 Collisions
5. 10.14 Air Law
6. Appendix A Forms GPS Position Report

March 20, 2016 Changes at 2016 CIA Meeting:

Section	Comment
6.9.2 MEASUREMENT ACCURACY AND PRECISION 6.9.2	Guidance of determining if similar measurements within accuracy limits should be declared tied.
8.13 MARKING THE CENTRE OF ROAD INTERSECTIONS	New paragraph.
13. 7 DELIVERY OF PIBALL INFORMATION	New paragraph.
14.2 TASK DATA SHEETS (TDS) 14.2.7	New paragraph about TDSs with multiple flight options are preparing multiple TDSs when a significant change to the TDS is likely.
14.3 TASK SETTING	Update to indicate activity to gather task setting advice will continue through 2016.
14.4 TASK CANCELLATION	New paragraph.
9.3.2 QUICK-RELEASE TIE-OFFS	Added to indicated maximum length of 5 m (as advised by Safety & Education SC).
10.1 MIDAIR COLLISION AND MID-AIR COLLISION	Updated to include Andre/Weber method as used at 2015 European Championship and 2015 World Air Games.
APPENDIX C: SCORING SOFTWARE STANDARDS AND BENCH MARK TESTING	Updated to include guidance for developers of near miss detection software.

March 2018:

- Re-introduce the missing chapter on Collision penalty
- Update Near-Miss table and comments

March 2020:

- Penalty guide 7.5: Added yellow PZ recommendation (as agreed in the 2019 scoring WG meeting)
- Penalty guide 7.5: Added motorway PZ details. This was referred so far with an external link to Mathijs website which is no longer active.
- Penalty guide 10.1: Added recommendation on penalty for collision on the ground
- Penalty guide 13.3: Explanation on when 13.3.6 applies to altitude infringements

March 2021:

- Added new chapter 7.7 on time limits
- Penalty guide 15.1: Updated penalty points for late declarations to match AXMER
- Penalty guide 9.9: Updated penalty points for late launch to match AXMER
- Penalty guide 9.21: Cleaned-up recommendation
- Several cosmetic updates based on feedback from Ilona G.

TABLE OF CONTENTS

CHAPTER 1 MARKER CONTROL

1.1 MARKER MANAGEMENT

1.1.1 Standard Competition Marker
Information refers to the AXMERs (Model Event Rules),

1.1.2 Numbers should be written at the end of the streamer. The numbers shall be written clearly with water-resistant ink and in a way to avoid confusion.

Note: The following numbers shall be written with an underline.

1	2	3	4	5	**6**	7	8	**9**	10
11	12	13	14	15	**16**	17	**18**	**19**	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	**66**	67	**68**	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	**86**	87	88	**89**	90
91	92	93	94	95	96	97	**98**	**99**	100

One and seven should be written as in the graphic.

1.1.3 Markers should be rolled and fastened with a rubber band with the numbers showing.

1.1.4 The Chief Debriefer or Chief Target Team will appoint a marker controller from among the debriefers or target team members.

1.1.5 Spare Markers
It is recommended to prepare spare markers without numbers. The quantity of spare markers should be around 10% - 20% of the number of competitors.

1.2 MARKER ASSIGNMENT

1.2.1 The use of brightly coloured markers is recommended for evening tasks when there is a possibility that searching will take place after sunset, e.g., bright yellow, orange or pink.

1.2.2 When two or more markers are used, make sure the colours contrast and cannot be confused.

1.2.3 To avoid confusion over goals declared on markers in previous tasks, any set of markers should only be used once in a Fly On Task or the old declarations are deleted before being used again. Use light coloured markers for Fly On Tasks as it is easier to read the declared coordinates.

1.3 MARKER DELIVERY

1.3.1 Markers and other competition material (logger, TDS, etc.) should be put on competitors' tables in the Task Briefing Room 15 minutes before briefing time. Markers for competitors not answering the roll call should be picked up as soon as possible by the assigned observer (or officials if observers are not used). These markers should be kept in the Competition Centre.

1.3.2 The competition number of non-entered competitors shall be displayed at the Debriefing/Scoring Room and brought to the attention of the Director, Chief Scorer, Chief Observer, Chief Debriefer or Chief Target Team if observers are not used

1.4 MARKER RETURN

1.4.1 An observer shall return all retrieved markers to his debriefer. For marker return when no observers are used, see Chapter 2 Logger Control.

1.4.2 Debriefers must check the return of markers when debriefing the observer. All lost or unused markers shall be reported to the Chief Debriefer.

1.4.3 Cancellation of a Flight or Task

When a flight or task is cancelled, make sure that a procedure for collecting markers from competitors is established. This procedure should be announced to the observers and competitors during the task briefing. A recommended way is that observers (or Target Team members responsible for marker control) collect the markers from competitors and bring them back to the Competition Centre or Chief Observer.

1.5 MARKER STORAGE

1.5.1 Returned markers must be sorted by colour and number and checked for damage.

1.5.2 If a marker is missing, check the Observer Report Sheet (or pilot's Flight Report Form), where its loss should have been reported. If not reported, inform the Chief Debriefer or Chief Target Team. All missing or lost markers must be reported to the Chief Debriefer or Chief Target Team.

1.5.3 Lost markers must be replaced. The replacement marker should be correctly numbered and marked with an 'R' to indicate that it is a replacement marker.

1.6 MARKERS

1.6.1 This information refers to AXMER R12.6 and may not be changed.

Weighted part	10 cm x 10 cm	70 grams
Streamer	10 cm x 170 cm	approx. 7 grams
Total length and weight	10 cm x 180 cm	approx. 77 grams

Note: Usually markers are made from "rip stop" nylon. They should be cut with a heated cutter to prevent fraying of the edges.

1.6.2 It is recommended to print on the streamer information to the general public in local language(s) in case the marker is found by anyone outside the competition. This information should state that the marker is an important competition device and should not be removed, and if removed and taken, the finder should call a certain telephone number. E.g., "Important competition device in hot air balloon competitions. PLEASE DO NOT REMOVE. If found or inadvertently removed please call ..." A way to achieve this is by having a rubber stamp made with the above text and to stamp each marker with that stamp with water-resistant ink.

1.6.3 Markers may be marked with the name of the event or sponsors etc.

1.6.4 Approximately 40 cm must be reserved at the tail end for goal declarations. Alternatively a piece of flexible plastic may be stitched on the tail end for marker declarations. Declarations can be easily removed from this with alcohol and the marker can be used in subsequent tasks requiring declarations.

1.6.5 In Continental or World Championships, new markers shall be used according to the above mentioned specification.

1.6.6 In other events, used markers may be used provided their dimensions are within 10% of the specifications mentioned above, they are not worn out and they have enough room for declarations if desired in the type of competition.

1.7 LOST MARKERS

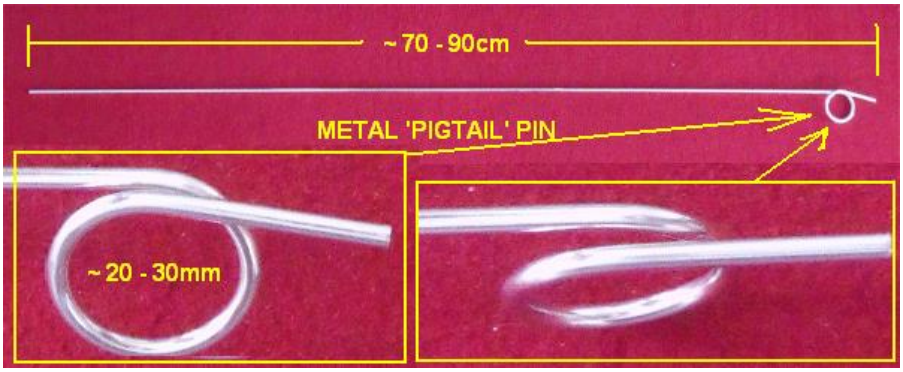
According to AXMER R12.15.3, competitors may be required to pay for markers lost, stolen or not brought back. This rule is intended to deter competitors from dropping markers in 'hopeless' areas and then not bringing them back. Generally the price should be roughly three times the

actual price. The Chief Debriefer or Chief Target Team should keep the money in a safe place and keep a list of who paid what. At the end of the event, the money should be handed over to the organisers when handing back all other competition material.

1.8 MARKER FLAGS (PIG TAILS)

1.8.1 The organizer should prepare several sets of marker spotting pins (‘marker flags’, ‘pig tails or ‘daffodils’)These flags should be used by the target or measuring teams to flag a marker immediately after it has been dropped so that it can be spotted more easily when actually measuring the marker at a later point, and in order to not oversee one in high grass or in the dark. Each target team should ideally have one marker flag per competitor, or a minimum of approximately 20 pins.

1.8.2 The dimensions of a ‘pigtail’ pin should be:



CHAPTER 2 LOGGER CONTROL

2.1 TYPE OF LOGGER

2.1.1 All official loggers shall be of the same make and model and considered as the primary logger. In CAT I events, they shall be of a minimum quality and approved by the Plenary on recommendation of the Scoring Working Group (SWG) and the New Technology Subcommittee (NTSC). See NTSC documents at www.fai.org for more complete information about the approval of loggers.

2.2 MINIMUM QUALITY STANDARDS

2.2.1 In March 2008, it was decided that Garmin eTrex loggers no longer meet the minimum requirements. The Garmin Geko loggers are considered OK. For other models, please consult the SWG and the NTSC.

2.3 LOGGER HANDLING

2.3.1 The logger setup (model, time interval, type of altitude recording, etc.) shall be conveyed to competitors as soon as possible but not later than one month before the event so that competitors can equip themselves with an appropriate back-up logger.

2.3.2 Loggers shall be marked with the competitor's number. Temporary number stickers shall be used if necessary.

2.3.3 Loggers shall be put on the competitors' tables before the task briefing together with the markers, Task Data Sheet (TDS) and Weather Information Sheet (WIS).

2.3.4 The Chief Logger Official shall have some spare loggers (fully charged and ready for use) available at the flag pole for competitors having problems with their loggers.

2.4 LOGGER RETURN (EVENTS WITH OBSERVERS)

2.4.1 Competitors are required to switch off the logger 5-10 minutes after landing. The observer shall ask the competitor to hand the logger over to him. The observer shall at no time operate the logger. E.g., if the logger is still 'ON,' the observer shall ask the competitor to switch it 'OFF.'

2.5 LOGGER RETURN (EVENTS WITHOUT OBSERVERS).

2.5.1 The competitor shall return his logger to the designated official as announced in the General Briefing. The competitor must hand in :

- his logger
- the Flight Report Form (FRF)
- any unused marker(s)

2.5.2 The official shall quickly check the FRF to determine that it is filled in completely and properly. If items are missing, the competitor will be requested to complete his form. He shall leave the debriefing table to do so and join the queue of waiting competitors after completing his form.

2.5.3 The official shall ask the competitor to pay for any marker(s) not accounted for. He shall note these payments in a separate list so that the competitor can get his money back if he returns his marker later. The amount payable is regulated in COH Section 1.7 Lost Markers and AXMER R12.15.3.

2.5.4 If possible, the Chief Logger Official should make available a system by which competitors can be informed if their track is OK. A list of contact information (names and mobile telephone numbers) should be kept to call competitors to turn in any backup logger when their use becomes necessary.

CHAPTER 3 SIGNAL CONTROL

3.1 FLAG POLES

3.1.1 Each CLA should have a (master) flag pole. The location should be chosen so that the flags can be seen from the entire launch area. If necessary, additional (slave) flag poles should be installed. Each flag pole should have two lines to raise flags, so that one flag can be lowered and another raised at the same time. The design should take care that lines do not get tangled or stuck.

3.1.2 A 'quick assemble' flag pole should be supplied for improvised launch areas. This flag pole should be lightweight, detachable and quick to set up, and shall preferably be carried in the Director's car.

3.2 SIGNAL FLAGS

3.2.1 Signal flags shall be provided for each flag pole. Usually 3 sets of flags are sufficient for one event. The flags should have a minimum size of 50 x 50 cm and larger for large launch areas.

3.2.2 Flags shall be provided in the colours as specified in AXMER R9.7 Launch Signals and will have the following meanings:

RED	No take-off permitted. Any previous permission to take-off cancelled.
GREEN	Permission to all balloons to begin hot inflation.
BLUE	Permission to 'blue' wave (odd numbered balloons) to begin hot inflation.
WHITE	Permission to 'white' wave (even numbered balloons) to begin hot inflation.
YELLOW	Five minute warning.
PINK	Supplementary or amended briefing information available.
BLACK	Task cancelled.
VIOLET	Reserve: meaning as declared at task briefing.

3.3 SIGNALS POINT

3.3.1 The signals point is the point where the flag pole is erected. Supplementary briefings will take place there. When competitors' declarations are required, the declaration box will also be located there. When extra wind readings are made, the recommended procedure is to display the readings on a flip chart so that all interested competitors can look at them simultaneously.

3.4 SIGNALLING

3.4.1 Flags shall be raised according to instructions of the Director. The official(s) operating the flags shall record the times of raising and lowering the flags. The signal times should be preferably at full five minutes intervals, e.g., 08:00:00 or 08:05:00 etc.

3.4.2 An audible signal (preferably a horn) shall be given when raising flags.

3.5 DECLARATION BOX

3.5.1 When competitors are required to make declarations, a declaration box shall be made available at the signals point. Declaration procedures for competitors are stipulated in AXMER R12.3 Declarations By Competitors.

3.5.2 The official managing the declaration box shall see that the area in front of the box is free so that competitors do not need to queue or wait. Competitors should only be allowed to approach the box when actually ready to deposit their declaration.

3.5.3 The official should not comment or give advice to the competitors. In order to expedite the procedure, the official should not keep track of the declarations nor note their times. Any second or further declarations shall be deposited in the box without comment.

3.5.4 When the declaration time is reached, the box shall be closed and carefully guarded. Declarations of late competitors shall be taken by hand and immediately the time of receipt shall be noted on the declaration paper by the official with his signature and the remark "LATE

DECLARATION".

3.5.5 The declaration box and late declarations shall be handed over to the Chief Scorer after returning to the Competition Centre.

3.5.6 In large CLAs with more than one signals point, a declaration box shall be made available at each signals point.

3.6 RECALL PROCEDURE

3.6.1 The recall procedure to be used shall be documented in AXMER Section II.10 Recall Procedure, and announced and explained at the General Briefing.

3.6.2 If the Director uses beepers for the recall procedure, it is recommended that '99999999' be sent to all beepers under the control of the Director when the task is cancelled.

3.6.3 A recall procedure must be fool proof! That means it should be tested before the event or during the General Briefing. Modern technology changes quickly and new methods can be used provided that they have been tested and work flawlessly. Specifically, SMS seems to be a good system. The Director should check the coverage, make sure he has a list of all mobile numbers of the competitors, crew and officials, and familiarize himself with the operation or have a responsible person do that for him. The list is also useful to contact competitors for any other reason during the event.

Not all cell phones/SIM cards work in all countries. Therefore it is recommended to inform the competitors (in the event invitation) that they must bring a working cell phone and card. A test should be made at registration and during the General Briefing. As some competitors always show up without a working phone, the organizer should have some spare devices/cards ready for rental. If SMS messages are used the information shall go to the competitor and a designated crew member.

3.7 TELEPHONE MESSAGE BOX

3.7.1 The Director may arrange a separate telephone message box. He may use it for any purpose as announced at the General Briefing or task briefings. During bad weather, especially for morning flights, it may be convenient for competitors to be informed of a cancellation of the task briefing before driving to the Competition Centre. The Director should not cancel any task briefing later than 1 hour before briefing time - the sooner the better. The best way is to reserve one telephone number for this purpose, speak the message, e.g., "*Here is the Event/Competition Director. The morning briefing for Wednesday 6 June is cancelled. The next briefing will be Wednesday afternoon at 16:00.*" and then switch off the mobile phone and test the message with another mobile phone.

CHAPTER 4 LAUNCH CONTROL

4.1 LAUNCH MASTER

4.1.1 Launch masters may be assigned out of the group of competition officials. It is recommended that they are experienced balloon competitors.

4.1.2 Launch masters shall wear vests as specified by the Director.

4.1.3 One launch master should be in charge of between 6 and 8 balloons.

4.1.4 Launch masters must be familiar with the launching rules in the AXMERs (especially R9.15) and instructions in the Safety Handbook.

4.1.5 The launch master, if time permits, should identify himself to the competitors that he is responsible for launching, before the green flag is raised.

4.1.6 The launch master shall report all possible safety violations to the Safety Officer.

4.2 LAUNCH PROCEDURES WHEN LAUNCH MASTERS ARE COMPULSORY (AXMER RULE 9.15)

4.2.1 To have a general overview of all balloons in the air, the launch master should wait outside the perimeter of the balloons until the competitor signals his readiness.

4.2.2 When the competitor signals his readiness for take-off with a white flag according to AXMER R9.15.1, the launch master should acknowledge that by pointing at the competitor with the right hand while the left hand remains pointed to the ground. He may give additional instructions visually with his right hand. E.g., move towards me. When the sky is clear to launch the balloon, he will point both hands to the competitor signalling him that take-off clearance is imminent. When ready, he will move both hands up to clear the competitor for take-off. If necessary, the launch master can cancel any instructions by crossing his arms before his chest. (See also visual signals in AXMER R9.15.3).

4.2.3 In the Minimum Distance (AXMER R15.13) or the Race To An Area (AXMER Rule 15.10) tasks, the launch master will call ‘NOW’ when he sees the bottom of the basket at normal eye level to start the timing process with the observer. If an inflation harness or other similar equipment is in use and under tension, time measurement starts at disconnection.

4.3 LAUNCH PROCEDURES WHEN LAUNCH MASTERS ARE OPTIONAL (AXMER RULE 9.16)

4.3.1 The Director may decide to launch without the use of launch masters.

4.3.2 If this procedure is applied, the Director must clearly specify this in the General Briefing and/or task briefings.

4.3.3 The Director should brief competitors on their responsibilities for take-offs and to make best use of their crew to assist them during launching.

4.3.4 The Director may assign launch masters for those competitors desiring to make use of launch masters during their take-off.

4.4 LAUNCH AREA PROCEDURES

4.4.1 Only one vehicle per competitor is allowed to enter a launch area. (AXMER R9.4 Vehicles)

4.4.2 Watch that all envelopes stay under two meters before the green flag is raised. Fans may not be tested or used after the raising of any colour flag. (AXMER Rule 9.5 Cold Inflation)

4.4.3 After take-off permission is given, competitors must take off within 30 seconds. If a competitor does not take off within 30 seconds, permission to take off may be cancelled. (AXMER R9.15.5)

4.4.4 If a launch master records an infringement, he must report this to the Chief Debriefer or Chief Scorer on a Supplementary Observation Report Form.

CHAPTER 5 DEBRIEFING

5.1 COMMON COORDINATES LIST

5.1.1 Goal coordinates in FON or PDG tasks shall be standardised as common coordinates. This means that the result of each competitor who declared the same intersection shall be calculated from the same coordinates. If you cannot find the goal coordinates in the list of common coordinates, these goal coordinates shall be added to the list. The common coordinates list will be distributed to all debriefers. The common coordinate list is rarely used these days with the use of official goal lists and GPS for measurement.

5.2 OBSERVER'S ESTIMATED RESULT

5.2.1 The observer's estimated result is very important data for debriefing. It enables scoring officials to verify results calculated by the computer with the estimated results. Make sure not to forget to fill in the estimated result in the Observer Report Sheet. It should be measured with a ruler and not by calculation. Numbers rounded to 100 meters should be accepted.

5.3 DETERMINING MARK, RESULT AND COORDINATES

5.3.1 A debriefer shall inspect drawings produced by an observer. When direct measurements are not possible, indirect measurements or mark coordinates shall be taken. Some tasks require both, e.g., Elbow or Land Run in combination with another task. Rectangular measurements to points clearly identifiable on the map should be used to establish results or mark coordinates. Alternatively or additionally, the bearing-distance method may be used. Software or a calculator will help to calculate coordinates from the point on the map with bearing-distance. For GPS measurement procedures, see Chapter 2 Logger Control and Appendix A: Forms.

5.4 OBSERVER INTERVIEW BY THE DEBRIEFER

5.4.1 Interview technique is one of the most important skills needed during debriefing. The time needed to debrief an observer is usually less than 20 minutes. However, the duration will depend on the number of tasks in a flight, how complicated the tasks are and what infringements were caused by a competitor. If a task is simple, e.g., JDG or FIN, it may take only 5 or 10 minutes. PDG or FON tasks mixed with other tasks usually take more time but should be completed within approximately 20 minutes.
It is therefore recommended that a debriefer have previous experience as an observer.

5.4.2 At first, a debriefer will ask an observer to indicate the points concerning take-off, mark(s), declared goal(s) and landing on the map. Thereafter, the debriefer will check those grid coordinates on the map.

5.4.3 Depending on the quality of the map and the instruments used when observing and debriefing, a precision of 50 meters should be possible. When using high quality maps and instruments, a precision of 10 meters is possible and should be aimed for as this is also the precision of 8-digit coordinates. There are several high quality rulers on the market with scales of 1:50 that are very suitable. It is also recommended that debriefers use needles or sharply pointed indicators to establish points on the maps. Such pointers with small magnifying lenses are available in land surveyor utility shops. Pointing with pens should be avoided because they leave spots on the map that may reduce the precision of measurement.

5.4.4 It is the debriefer's duty to determine whether the observer and competitor took the same intersection as the competitor's goal declaration or another (wrong) intersection. Measurement could be taken from the wrong intersection, the wrong centre point, an invalid goal, etc. Reasons can range from simple misunderstandings to deliberate misleading. In case the debriefer cannot resolve the problem, he should consult with the Chief Debriefer.

5.4.5 The time of marker drop and finding the marker shall be checked carefully to assure compliance with the rule on the scoring period (AXMER RR12.17 Scoring Period) or marker search period (AXMER R12.14 Search Period).

5.4.6 An observer shall record infringements of his balloon and other balloons on the Observer Report

Sheet. The debriefer will discuss these findings during debriefing and confirm the circumstances. Infringements concerning other balloons shall be noted on the Supplementary Observation Report Form.

5.4.7 The Director, after consultation with the Chief Scorer or Chief Debriefer, will decide the amount of penalty for an infringement at a later time.

5.5 HANDLING OF THE OBSERVER REPORT SHEET (ORS)

5.5.1 The Observer Report Sheet shall be filed in a folder arranged by competition number, together with the Task Data Sheet, a record of any information provided at a supplementary briefing, Weather Information, Launch Assignment, Measuring Team results list(s) and, if applicable, all submitted Supplementary Observation Report Forms.

5.5.2 It is recommended that debriefers use green coloured pens and the Chief Scorer or other higher scoring officials use red ones. Therefore an observer shall use black or dark blue coloured pens.

5.5.3 After debriefing an observer, the debriefer must clearly write his name on the ORS and sign it. The ORSs will be gathered at the desk of the Chief Debriefer.

5.5.4 The Chief Debriefer will inspect the ORSs. When he finds something wrong in the ORS, he will call the debriefer and request him to check the report again. Sometimes the concerned observer will be called for re-interview. To provide for such a case, the Chief Observer must establish a communication system to recall an observer (room number, phone number, etc.).

5.5.5 After checking the ORSs, the Chief Debriefer will transfer the ORSs to the Chief Scorer.

5.5.6 Debriefers must make themselves available for questions about the ORSs by the scoring officials if an inquiry arises.

5.5.7 One of the duties of the Jury is to inspect the above mentioned process. See the CIA Jury Handbook for additional information about how the Jury may inspect the scoring process. Therefore clear procedures and proper filing of all competition documents are important. The file shall be made available to the Jury upon their request.

5.6 RETURN OF LOGGERS, MARKERS AND FLIGHT REPORT FORM (FRF).

5.6.1 In competitions without observers, the Flight Report Form (FRF) serves as a substitute for the Observers Report Sheet. In this form, the competitor declares his flight details and provides his estimated results. The form is an important document and may serve as an official statement by the competitor in case of complaints by landowners and may be used in protests.

5.6.2 After the flight, the competitor shall return his logger for track download, any unused markers and the signed FRF to a designated official at the earliest possibility. In peak hours, additional officials should assist to avoid competitors waiting.

5.6.3 As described in COH 2.5.2, the official shall check the completeness (not validity) of the FRF and ask the competitor to complete his form in case of missing items.

5.6.4 The official will check off the receipt of any unused markers in his debriefing form. Markers unaccounted for shall be paid for in cash. This money may be returned when the competitor turns in his marker at a later stage.

5.6.5 Loggers shall be received and handed over to the downloading officials at the earliest opportunity.

CHAPTER 6 SCORING

6.1 SCORING SOFTWARE

6.1.1 Scoring software is one of the most important tools used at an event. The organiser can use their own software or software made and used by other organisers.

6.1.2 Details about designing, developing and testing scoring software will be published in Appendix C: Scoring Software Standards and Benchmark Testing. The CIA Jury Handbook includes methods and tools for verifying scoring system results.

6.2 SOFTWARE FUNCTIONS

6.2.1 Basic Functions

1) Result and penalty data input
2) Calculate score points and subtract penalties
3) Print results in ranking order.

6.2.2 Additional functions

1) Checking distance infringements against minimum and maximum limitations

6.3 CHECKING FOR PZ INFRINGEMENTS

6.3.1 Some software is designed to work on a single computer only and some will work with a network. If a network is available, it will save time and work of officials in large events. In networking, one scoring official can input new task results, while other scoring officials are updating older task data or printing other results. Such multi-user applications are more complex than a single-user system so it is important that developers or support personnel are available in case problems arise with the network, hardware or software.

6.4 DATA INPUT

6.4.1 Data input is usually a simple and easy job. An experienced Chief Scorer however might find logical mistakes in the data on the Observer Report Sheet that was overlooked by the debriefer or the Chief Debriefer.

6.4.2 The Chief Scorer, or scoring officials under his direction, shall after input of the data verify the result with the estimated result on the Observer Report Sheet and with any measuring team data.

6.4.3 After input, the data should be checked before the posting of any scores.

6.5 GUIDE LINES OF SCORING SOFTWARE

6.5.1 GENERAL

Points will be calculated using “floating point math” and then rounded up and stored as integers. Scores will be published as integers with three digits, except for 1,000 points.

EXAMPLE:

Step 1 If there are 101 competitors in the event, then P = 101. According to the rules, M = 51 (P / 2 rounded to the next higher number; 50.5 is rounded up to 51), and SM = 505 (rounded points of the median ranking competitor, calculated under Formula Two; 504.950495 is rounded up to 505).

Step 2 When calculating the higher ranked competitors, 505 will be used as SM during computation.

Step 3 If points must be shared (under AXMER Rule 14.6.3) the (integer) points for each competitor shall be totalled and then divided, using “floating point math.” The result of this division shall then be rounded up.

Step 4 Penalty points are integers. After subtracting penalty points, the resulting points shall be sorted and printed.

Step 5 This method might produce more than one competitor achieving 1,000 points, which is acceptable.

6.5.2 CHECKSUM

For each task, a checksum shall be calculated and printed at the bottom of the task score sheet. The checksum of each task shall also be printed at the bottom of the total score sheet. This enables checking that the posted version on the Official Notice Board is in fact the same as the result printed in the total score.

The checksum shall be calculated so that:

- Any change to a single competitor's result or penalties that causes his point score to change will absolutely cause the checksum to be different.
- Any changes to multiple competitor's results or penalties that cause any competitor's point score to change will most likely cause the checksum to be different.

A common method of achieving the above is to sum each competitor's point score multiplied by their competition number. This method should be sufficient for our purposes however it should be noted that multiple or "offsetting changes" may not cause the checksum to be different. The requirements of a checksum are specified here rather than an absolute method of calculating a checksum so that software developers may implement more robust algorithms that achieve or surpass the above requirements.

Checksums may be displayed using, as a minimum, the least significant four digits of the checksum, or in another number base (such as hexadecimal) to reduce the space required to display the checksum.

6.6 TIES AT THE MEDIAN

Competitors with the same result should receive the same score before point penalties are applied. Care should be taken to ensure that competitors below the median with the same result as the median ranked competitor receive the same points (before point penalties are applied).

6.7 BENCH MARK DATA

6.7.1 Bench mark data will be published in an Appendix C: Scoring Software Standards and Benchmark Testing. The CIA Jury Handbook also includes methods and tools for verifying scoring system results.

6.7.2 Organisers shall test their software with these data.

6.8 MEASUREMENT ACCURACY AND PRECISION

6.8.1 The material below is based on work done by Hans Akerstedt. It is part of a larger presentation Hans made at the 2013 CIA Meeting. Changes to the Sporting Code General Section (expected in 2014) will require each Air Sport Commission to update their rules to address measurement accuracy and precision. This will likely mean that several rules in the AXMERs (Chapter 14 Scoring) will have to be modified. The general concepts of measurement accuracy and precision are applicable without specific rule changes so, are presented here as guidance. Scoring practices and software should be updated to utilize these concepts during 2014 for compliance in 2015.

6.8.2 The basic concept is that every measurement should also include an assessment (actual or estimate) of the precision or uncertainty of the measurement. Suggested uncertainties for various measurement method are:

<u>Distances</u>

Measuring method	Precision	Printout example [m]	
Tape / surveying	± 10 centimeters	1,23	
Map coordinate	± 10 meters	1250	
Track point/GPS	± 10 meters	1230	SBAS DISABLED
3D distances	± 30 meters	1230	SBAS DISABLED
Track point/GPS	± 5 meters	1235	SBAS ENABLED
3D distances	± 10 meters	1230	SBAS ENABLED

Angles from map or GPS coordinates

	Precision	Printout example [degrees]	
Shortest leg length 1000m and less			
	± 2 degrees	96	SBAS DISABLED
	± 1 degree	95	SBAS ENABLED
Shortest leg length more than 1000m			
	± 0.5 degrees	96.5	SBAS DISABLED
	± 0.2 degree	95.2	SBAS ENABLED

Land Run areas from map or GPS coordinates

Precision	Printout example [degrees]
± 0.1 sq km	96.5

Note: In reality the probable accuracy of the Land Run calculation depend on many factors such as the actual shape and size of the area and the relative positions of the corner points. ± 0.1 sq km is a good average.

For angles, reference is made to the following table of probable accuracy as a function of angle achieved and length of the legs flown.

Direction change α	95% probability error in angle calculation							
	500 m legs		1000 m legs		2000 m legs		5000 m legs	
	WAAS OFF distance error ± 10 m	WAAS ON distance error ± 5 m	WAAS OFF distance error ± 10 m	WAAS ON distance error ± 5 m	WAAS OFF distance error ± 10 m	WAAS ON distance error ± 5 m	WAAS OFF distance error ± 10 m	WAAS ON distance error ± 5 m
180	**1.6**	**0.8**	**0.8**	**0.4**	**0.4**	**0.20**	**0.16**	**0.08**
135	**1.8**	**0.9**	**0.9**	**0.5**	**0.5**	**0.23**	**0.18**	**0.09**
90	**2.3**	**1.1**	**1.1**	**0.6**	**0.6**	**0.29**	**0.23**	**0.12**
45	**2.7**	**1.3**	**1.3**	**0.7**	**0.7**	**0.33**	**0.27**	**0.13**
0	**2.8**	**1.4**	**1.4**	**0.7**	**0.7**	**0.35**	**0.28**	**0.14**

Results should be determined and reported taking precision and uncertainty into account:

- Every measurement/result should have an associated uncertainty (error) estimate.
- Uncertainties should be propagated according to standard scientific methods (for example, as described in "Introduction to Error Analysis").
- Results with overlapping uncertainties should be declared tied and made equal.
    - Measurements obtained by the same method (electronic distance measuring equipment, tape measure, GPS position, etc.) will have approximately the same uncertainty and need not normally be reviewed for tied measurements.
    - Measurements obtained by different methods will likely have significantly different uncertainties and may be candidates for review. Results with overlapping uncertainties may be made equal (tied) by changing the result with the greater uncertainty to that of the one with the least uncertainty.
    - For example, if a result of 145.15 m was obtained by tape measure (uncertainty in cm) and a result of 142 m (uncertainty of m) was obtained from GPS positions, the 142 m result could be changed to 145.15 m). Note: This appears to cause GPS results to have the precision of a tape measured result!

It might be appropriate to make the modified result a greater result equal to GPS measurement rounded to metres. In any event the objective is to make the modified result the same or slightly worse than the more accurate measurement.

- Results should be reported (displayed) with only the proper number of significant digits:
  - 1234.56 to indicate measurement/result to 2nd decimal place.
  - 1234.5 to indicate measurement/result to 1st decimal.
  - 1234. to indicate measurement/result to one unit.
  - 1230 to indicate measurement/result to tens of units.
  - 1200 to indicate measurement/result to hundreds of units.
  - The decimal separator may be a 'decimal point' ('.') or a 'comma' (',') as used locally.
  - The thousands separator should be a 'space' (' ').
- Task results should indicate precision (significant digits), uncertainties and declared ties.

Notes:

SBAS = Satellite Based Augmentation System

A system of ground stations (20-25) sending correction signals to:

A small number of geostationary satellites these send GPS signals which can be received by ordinary GPS units, allowing much improved accuracy. Designed to be used for aviation navigation, especially for landing. Accuracy is better than ±25 ft (±7.6m)

WAAS, Wide Area Augmentation system, is the SBAS system used in USA

EGNOS, European Geostationary Navigation Overlay System is the European SBAS equivalent.

There are similar systems in Japan and India. They are all compatible and are enabled when a GPS is set to enable WAAS.

6.9 CALCULATION OF "NO RESULT" DISTANCE PENALTIES

R13.3.6 states "A competitor penalized under this rule cannot achieve a score less than Group B as a result of the distance infringement penalty." This implies that the penalty a competitor receives for a distance infringement is determined by the number of points allocated to competitors not achieving a result. For any given task, the number of points allocated to Group B may change as scoring decisions are made. For example, if a competitor was initially scored in Group B but later is scored in Group A, the number of points allocated to Group B will change. The converse may also happen – a competitor initially scored in Group A may later receive a penalty putting him into Group B. Again, the number of points allocated to Group B will change.

In other words, the threshold for applying the above provision may change and therefore any distance infringement penalties must be reviewed each time there is change to Group B.

As a result of this provision, allocation of points must be done recursively until the provision is applied to all competitors with a distance infringement. Every time there is a change to the number of competitors in Group B, the number of points assigned to Group B competitors will change, which changes the minimum number of points that competitors with a distance infringement may receive and therefore competitors (with a distance infringement penalty) who were not previously subject to this provision may become subject to it, causing them to be assigned to Group B and requiring that Group B calculations and checks be done again, which may cause other competitors to be subject to the provision - repeat until all competitors with distance infringements have been handled. If the number of competitors in Group B changes for any reason, distance infringement penalties must be re-processed recursively.

6.10 TRACEABILITY OF RESULTS AND SCORING

Competitors often ask to be shown how their results, including penalties, were determined and the Jury is

responsible for the verification and approval of results (see CIA Jury Members Handbook Appendix F). The following data should be readily available so that it can quickly be seen how results were determined and to ease the verification and approval process:

- Position data (including coordinates, altitude/elevations and/or time as required to determine a task result) for key positions such as take-off, landing, goal, mark and marker positions.
- Measured or calculated performance.
- Indication of how performance was calculated (direct measure, from coordinates, using GPS, etc.)
- Explanation if there is a significant variation between estimated and actual performances.
- All rule infractions, alleged and applied.
- Explanation or indication that all alleged rule infractions were considered.

The above may be noted on an Observer Report Form, a Flight Report Form or a separate document (aka "Debriefer Report") intended to more clearly isolate the essential scoring information. If a separate document is used, care must be taken to ensure that all essential data taken from source documents (Observer Report Form or Flight Report Form) are recorded on the separate document. A separate document could be produced automatically (as part of the scoring software) and made available online to competitors, officials and the Jury.

Key position data may be in the form of explicit coordinates (with altitude/elevation and time as required), position identifiers or numbers (PIDs) from a track file, valid goal list numbers, etc.

CHAPTER 7 PUBLICATION OF SCORES

7.1 STATUS

7.1.1 Task scores sheets will have the following status:

- PROVISIONAL
- OFFICIAL
- FINAL

7.2 PROVISIONAL SCORE

7.2.1 Provisional scores are NOT official and do NOT have any power or consequences for a competitor or officials. They are for information only and for the benefit of competitors and to save time. Provisional scores may not be complete and may not have all penalties included. They should be published without signature of the Director and marked 'PROVISIONAL.'

7.3 OFFICIAL SCORE

7.3.1 Official scores shall be published as soon as possible after all penalties are included and scores are calculated. When the official score is published, the time period concerning claims and protests will start; see AXMER Chapter 5 – Complaints and Protests. The official scores shall have a version number and publication date/time at the bottom. The version number will start with 1. Newer versions will subsequently be marked 2, 3 and so on. All changes in a newer version against the previous version shall be clearly marked. The complaint and protest period starts from the time of the latest published version for the competitors concerned by the change only. For all other competitors, the complaint and protest period starts from the previous applicable publication time.

7.4 FINAL SCORE

7.4.1 A published official score becomes final when all complaint and protest periods concerning the task have expired, unless a protest or a complaint has been filed. The Director may mark a final score as such. A final score can only be changed according to AXMER R14.3.3.

7.5 TOTAL SCORE

7.5.1 The total score will be the sorted addition of all task scores. The total score will not have a version number and time stamp. The Director should publish intermediate total scores as often as possible for information only. A total score cannot be grounds for a complaint or a protest (provided of course that the calculations are performed correctly).

7.5.2 At the end of the event the Director shall sign the final total scores and present them to the Jury.

7.5.3 The Jury will check, approve and sign the final total score next to the Director's signature.

7.5.4 This signed document will then serve as the Official Total Score of the event and be forwarded to FAI as soon as possible by the Director.

7.5.5 During the prize giving ceremony, a copy of this document shall be handed out to all competitors.

7.6 CHECKSUM

7.6.1 A checksum enables competitors and officials to quickly check the status of all task score sheets against the total score. In particular, it enables a check that the total score is indeed the sum of all published task score sheets.

7.6.2 The checksum shall be displayed:

1. for a task on the task score sheet.
2. for each task on the total score sheet.

7.7 TIME LIMITS

The time limit for accepting complaints and protest should be interpreted as follows:

7.7.1 Asking for assistance doesn't stop the clock. Assistance is intended to get information from appointed officials about how a score was achieved. If the score isn't changed before the end of the complaint period, the pilot must submit a complaint within the period.

7.7.2 It is up to the director to define if he accepts requests for assistance via non-personal contact such as telephone, email, or text. Any text or email received from the competitor should be considered a request for assistance unless clearly stated as complaint or protest.

7.7.3 Outside the rest period and especially towards the end of deadlines the pilot must have the possibility to hand-in his complaint or protest within the timeline. This should be done by having an official in the competition centre who has permission to receive the complaint in person or by any other means. In case of use of electronical transmission such as email, the risk of emails not being received or being delayed must be considered. Also, a procedure to confirm the identity of the sender should be in place. Receiving, timestamping, and signing the complaint or protest by an official doesn't mean its acceptance but only means that it was handed in at a specific date and time. It is up to the director to define the acceptance.

7.7.4 It is the duty of the pilot to observe the results and to complain or protest within the timeline.

CHAPTER 8 PREPARATION BEFORE EVENT

8.1 COMMON LAUNCH POINT (CLP)

8.1.1 In accordance with AXMER R9.1.2, the Common Launch Point (CLP) must be marked on the ground physically before the beginning of competition. The coordinates of the CLP must be announced at the General Briefing and may be written on each task sheet if needed. There may be more than one launch area, in which case each area should have its own CLP.

8.1.2 When choosing a CLP, consideration should be made that this point is also suitable as a goal during Fly In (FIN) or Minimum Distance (MDT) tasks.

8.2 ASSESSMENT OF THE COMMON LAUNCH POINT

8.2.1 Determine the position of the CLP, in or near the launch area and mark it with a banner or other suitable material. A road intersection may be used as the CLP.

8.2.2 Determine the coordinates of the CLP on the competition map. Be sure to check the accuracy between the map and field. A launch area may be a huge field and will not have any reference points which directly relate to the map. In this case, survey equipment or GPS may be used to accurately measure the coordinates of the CLP.

8.3 SELECTION FOR GOAL SITE

8.3.1 What type of site is suitable for a goal?

- NO power lines
- NO livestock
- NO crop within 100 meter radius of centre of target
- NO main road - avoid a field which is connected to a main road
- FLAT area for getting accuracy for measuring and for ease of using laser surveying equipment

Of course, these ideal conditions may be changed by local area restrictions or wind factors.

8.4 GETTING PERMISSION

8.4.1 It is important to obtain permission or authorisation from all landowners or tenants to use their land for goals and target sites.

8.5 TARGETS LOCATED CLOSE TO A GOAL

8.5.1 When locating targets close to a goal, it is important for the measuring team to obtain the distance and direction from the intersection of the roads that have been designated the goal.

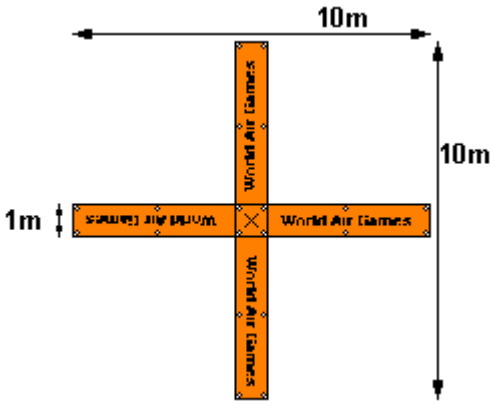
8.6 TARGETS WITHOUT A GOAL

8.6.1 When markers are used in logger only events, they normally will be dropped at targets announced by the Director in the TDS. These targets are not related to a goal as in conventional competitions but should be chosen so that an unobstructed approach by balloons is possible and preferably in open cut grass or freshly harvested fields.

8.6.2 The target should be laid precisely at the coordinates given in the TDS. If not given in the TDS, the target team shall determine the best position for the target and will immediately contact the Director to inform him of the proposed coordinates. Only after approval from the Director shall the target be laid out. When the target team has to choose a target position, they shall do so in such a way that the whole MMA is free of obstacles whenever possible. The target team shall write down the precise GPS coordinates **and** altitude of the target in the header of the Measuring Sheet.

8.7 TARGETS

8.7.1 TARGETS

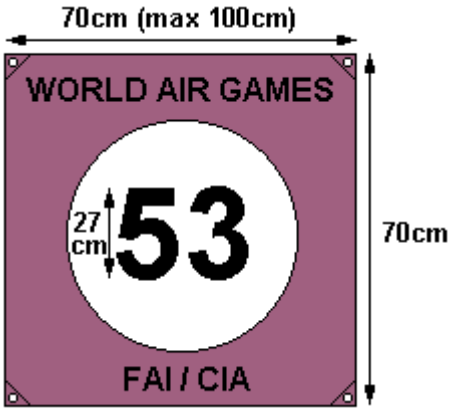


According to AXMER R12.5 targets may be used. The standard dimension of targets is 10 x 10 x 1 metre however targets of other dimensions may be used as approved by the Director. They should be made of non slippery material (rip stop nylon is OK). The legs of the target should be sewn together in the centre to facilitate laying out the target. The colour shall be contrasting to the surface (preferred colours are white or orange). Targets should have rings or straps at the corners to secure them to the surface. The centre shall be marked with a visible "X". The event and/or sponsor names and logos may be displayed.

8.7.2 The required number of targets depends on the size of the event and tasks to be set. It is advisable to prepare not less than 5 targets.

8.8 COMPETITON NUMBERS

8.8.1 BASKET BANNERS



Two basket banners per competitor shall be made available by the organisers. The dimension of basket banners should be horizontally 70 cm (max 100 cm) and vertically 70 cm. They shall be made of durable material and provided with reinforced attachment rings in each corner. The competition number shall be clearly visible in the centre with a minimum character height of 27 cm. The event and/or sponsor names and logos may be displayed.

8.8.2 VEHICLE NUMBERS

Two stickers with competition numbers shall be made available by the organisers to be attached on either side of a retrieve vehicle. The size shall be maximum DIN A3 (US B, “ledger size” or 11 x 17 in) and minimum DIN A5 (US 5 ½ x 8 ½ in). The event and/or sponsor names and logos may be displayed.

TOOLS AND EQUIPMENT FOR MEASURING

8.9 MEASURING TEAM REPORT

8.9.1 The Measuring Team shall have a special report form (Measuring Sheet) to report observations of dropped markers. It must contain the following items.

- Title, date, day, time, task name, and location of goal or target.
- For each competitor, his number and name with columns for distance, time, direction and notes or comments.

8.10 BALLOON PICTURES LIST

8.10.1 It is useful for the measuring team, when identifying balloons at the goal, to have a set of competitor's balloon pictures, since it is often difficult to read the competition numbers on the basket. Pictures are available from the official program of the event. However, competitors sometimes change their balloon just before the beginning of the event therefore the set of pictures should be verified after registration is complete.

8.11 BINOCULARS

8.11.1 Binoculars will help the measuring team to read the competition number of a balloon approaching the target at a high altitude, flying at rapid speed or that is some distance away. They might also be useful for watching for ground contact and collisions.

8.12 SURVEY EQUIPMENT

8.12.1 Survey equipment is very helpful to measure markers that have been dropped more than 30 meters from a target. The time to measure the markers with laser equipment can be reduced considerably if more than one reflective mirror is available. Survey equipment is designed to be used by professionals and must be operated by experienced operators. The competition organisers should have a good working relationship with the local survey companies to get their cooperation.

8.12.2 Handheld radios are helpful tools to assure good communication between the operator of the survey equipment and the helpers walking around with mirrors.

8.12.3 Additional tools and equipment are:

1. an accurate watch, clipboard and Measuring Sheet for each member.
2. a target with 20 spikes (large nails or metal pegs) and a hammer.
3. several marker flags ('pig tails') as described in COH Section 1.8
4. 100 (alternatively 30) meter measuring tape.
5. measuring wheel (if available).
6. circle scale.
7. magnetic compass.
8. display board to display result measured for observers and competitors.
9. mobile telephone or radio to communicate with the Competition Centre, Director, other officials, etc.
10. GPS.

8.13 MARKING THE CENTRE OF ROAD INTERSECTIONS

8.13.1 It is a "best practice" to mark the centre of intersections before the event. This will eliminate any controversy regarding the correct centre and allows organizers (or the Director and his staff) to evaluate the safety of each intersection. Criteria similar to that in COH 8.3 SELECTION FOR GOAL SITE and AXMER Rule II.12 GOALS SELECTED BY A COMPETITOR may be used to determine if an intersection should be marked. The centre might be marked with a metal disk, paint or some other clearly identifiable method. Local road authorities should be consulted before marking an intersection.

CHAPTER 9 OBSERVATIONS AT THE TARGET AREA

9.1 BALLOONS APPROACHING THE TARGET

9.1.1 One of the most important jobs for the measuring team is to watch the balloons as they approach the target. Because a competitor will be concentrating on getting a good line to the target, there is a chance of ground contact or collision with another balloon. Therefore the measuring team should clear the target by 30 - 50 meters.

9.2 RECORDING OF INFRINGEMENTS

9.2.1 The measuring team must note any infringements they observe with the time of occurrence, location and estimated distance from the target. There will probably be one or more competition officials present at the target area, who will be watching the balloon's behaviour also, however the measuring team's records will help in debriefing or scoring.

9.2.2 These observations primarily include ground contact (within or outside 200m of the target – AXMER R11.4 and R11.5), method of releasing a marker (Gravity – AXMER R12.9 or Free – AXMER R12.10), "right of way" infractions (AXMER R10.1.1) and collision between balloons (AXMER R10.1 and R10.8).

9.3 STAYING CLEAR OF GOAL OR TARGET

9.3.1 It is important that the target area be kept clear while the competitors are approaching and dropping their markers. There should be no distractions to impair the competitor's concentration. Competitors also want to see marker drops by other competitors to compare their results. Great care must be taken by officials not to move or disturb markers that have landed at the target.

9.4 BEHAVIOR DURING MARKER DROPS

9.4.1 Because markers that fall a bit further away can be easily lost if everybody is looking at the close marker drops, the measuring team should divide itself over the target area and watch all balloons in their assigned area.

9.4.2 When using marker flags, they shall be placed immediately next to where the marker lands.

CHAPTER 10 MARKER MEASURING PROCEDURES

10.1 RECORD MARKER POSITION

10.1.1 Not only close marker drops, but all marker drops, shall be closely watched by the measuring team. The measuring team shall immediately mark far away drops with marker flags to ensure that none of them is forgotten or lost. One or two of the staff members will record time, direction from target, competition number and estimated distance from the goal or target, when a marker lands or has been seen falling. A simple sketch of the goal/target area will make it easier for the team to recall where markers have landed. Timing will be very important if the task has a scoring period or limitation by sunset. It is critical that any timepiece used by the team is precisely synchronised with GPS time. The SWG does not recommend folding up the target at the end of the scoring period because this procedure has the disadvantage of the target officials concentrating on this job instead of looking out for time critical marker drops, and there is a risk of moving markers dropped on the target before they are measured.

10.1.2 The Director may state which markers he expects the measuring team will measure, e.g., those within 50/100/200 metres or those within the field boundary. However, it is always the responsibility of the competitor to make sure his marker has been measured.

10.1.3 In AXMER events without observers, the target team (TT) shall measure all markers within the MMA (usually 100 metre radius). Markers measured shall be recorded on the MS (Measuring Sheet). Competitors and crews shall not be within the MMA without special permission and reason. Markers dropped just outside the MMA shall be measured to avoid discussion with competitors whether they were in or out and be returned by the TT. Other dropped markers outside the MMA may be collected up to a certain distance deemed reasonable by the TT. Competitors should not assume that markers dropped outside the MMA will be returned by the TT. The Earth is considered flat and horizontal within the MMA and individual marker altitudes need not be recorded, except if needed for other tasks. Further information on the duties of a target team is in Chapter 12 Target Teams.

10.2 MARKER FLAG USAGE

10.2.1 When a marker lands further than 30 meters from the centre of the target, a member of the measuring team must use a marker flag to identify the marker location. The measuring point will be defined in the competition rules, but it is normally the closest part of the weighted bag to the centre of the target – see AXMER R12.11.1 and R12.21.4. When marking dropped markers, it is important for the measuring team to stay clear of other balloons approaching the target and not hinder competitors in any way.

10.3 MARKERS OUTSIDE THE GOAL AREA

10.3.1 When a marker is dropped out of the immediate goal area, behind trees or houses, this should be recorded so that the measuring team can search for it when time permits. In most cases, the observer and/or the competitor will inquire about the marker drop from the person who observed and marked it on his sheet. He can tell them where to look for it. If it was not possible to identify the competition number of the balloon, then the type and colours together with any art work should be noted. This will help in identifying the competitor who dropped the marker.

10.4 MEASURING MARKERS

10.4.1 Measuring markers should not commence before the majority of the balloons have passed over the goal area.

10.4.2 First, markers close to the target will be measured with a measuring tape. Thereafter, the other markers will be measured with the measuring equipment.

10.4.3 When measuring and recording results, careful procedures shall be applied to avoid mistakes in numbers and results.

10.4.4 The following procedure is recommended:

- First, the marker number shall be called by radio by the person carrying the mirror, e.g.,

"Number 53".

- The operator of the survey equipment will then measure the result.
- The operator will radio back "Number 53 is OK, 345.78 meters".
- The person carrying the mirror shall check that the right number is read back and should collect the marker, leaving either a marker flag or a sprayed mark.
- The operator shall write the result in his log.
- An assistant standing close to the surveyor shall also write up the result and will thereafter read back verbally to the operator "Number 53, 345.78meters".
- After all markers are measured, the operator's log shall be cross-checked with the assistant's log and all Measuring Sheets. Any discrepancies should be investigated immediately and resolved before marker flags are collected and the target is removed.
- Thereafter, the operator, Measuring Team Chief or Target Team Leader will phone or bring back the results to the Chief Debriefer or Target Team Chief.

10.5 MARKERS ON THE CENTRE OF A TARGET

10.5.1 If any part of the weighted bag is on the centre point of the target, the competitor's result shall be 0.0 cm.

10.6 FINISH MEASURING

10.6.1 Check that all markers are collected with measured results. There should be the same number of markers as recorded results.

10.7 DISPLAY OF RESULTS TO OBSERVERS AND COMPETITORS

10.7.1 Competitors may want to confirm that their markers have been measured by the measuring team. A procedure should be established to call the measuring team by mobile phone to enquire whether a marker has been measured.

10.8 REPORTING RESULT TO CHIEF DEBRIEFER OR TARGET TEAM CHIEF

10.8.1 Competitors shall check their results by themselves but some competitors will return to the Competition Centre after completion of the tasks without checking, believing the measuring team has taken care of their markers. They will ask about their markers and their results if they dropped markers close to the target. Therefore the measuring team should report their survey results to the Chief Debriefer or Target Team Chief by a mobile phone or radio as soon as possible.

10.9 SCORING INSPECTION

10.9.1 The Chief Measurer will work for the Chief Scorer after the competitor's results have been entered into the scoring system and the results are printed. Compare the printed results with those on the original Measuring Sheet compiled by the measuring team or on the ORS. This will reduce the chance of errors. Quite often, hand written numbers are hard to read and may lead to mistakes in data input into the scoring system.

CHAPTER 11 CONTROLLING THE GOAL AREA

11.1 CROWD CONTROL

11.1.1 Spectators and crews must be kept out of the MMA. Press or photographers should be allowed and be instructed so that they don't interfere with markers.

11.2 TRAFFIC CONTROL

11.2.1 Traffic jams are a problem in the vicinity of the target. This is one of the reasons the goal must be kept away from a main road. Balloon retrieve vehicles as well as spectator's vehicles will combine to contribute to a huge traffic jam.

11.2.2 When possible, and if permission is obtained, a parking area in the target field may be arranged for crews to park, thereby reducing the congestion on the road. Check AXMER R3.10.3 for the minimum distance from a goal/target set by the Director or selected by a competitor.

11.3 LANDOWNER RELATIONS

11.3.1 Good landowner relations are very important for the competition organisers. Courtesy and friendliness are required for their future co-operation.

11.4 MAKING NOTES FOR NEXT TASK SETTING

11.4.1 A good measuring team will make notes and report these after each task. They may make notes on the winds around the target during the task flight. Likewise, information about hazards, livestock and crops in the surrounding fields. This is valuable to the Director in setting future tasks.

11.5 MISCELLANEOUS

11.5.1 The measuring team should be familiar with the competition rules. There are many rules that apply to a goal, a target and the area around these locations. Knowing the rules will assist the measuring staff. However, only the Director and the Chief Scorer have the responsibility of interpreting the rules. If the measuring team needs to interpret the rules, they MUST not apply them until after they confer with either the Director or Chief Scorer.

CHAPTER 12 TARGET TEAM

12.1 TARGET TEAM

12.1.1 A target team (TT) is a group of people manning a target in a hot air balloon competition.

12.1.2 A target team observes the performances of competitors at a target, observes their compliance with the rules (AXMER), measures the results after the balloons have past and records any rule infringements.

12.1.3 A TT consists of a Target Team Leader (TTL) and one to three (or even more) members.

12.1.4 Each TT member shall be familiar with the COH and AXMER, especially with R12.9 Gravity Marker Drop and R11.5 Ground Contact 2.

12.2 CHIEF TARGET TEAMS

12.2.1 The Chief Target Teams (CTT) will take his instructions from the Director or Chief Scorer after the task is set.

12.2.2 He is responsible for briefing and dispatching the target teams and shall monitor their functions. He will rearrange the TTs when necessary.

12.3 TARGET TEAM LEADER

12.3.1 The Target Team Leader (TTL) heads the target team. He will take his instructions from the CTT.

12.3.2 When driving to the target, the TTL normally navigates while a team member drives. The TTL must be in constant reach by mobile phone with the CTT to receive last minute instructions or pass on important information.

12.4 EQUIPMENT OF A TARGET TEAM

12.4.1 The equipment of a TT usually consists of:

- The equipment listed in COH 8.12.3 (Additional tools and equipment).
- Car.
- Target and material to fix the target to the ground (spikes and hammer)
- Measuring tape(s) of a preferred length of 100m.
- Marker flags ('pigtails') to mark dropped markers. The marker flags will be put in the ground next to the marker and the marker tail is lifted through the ring. This provides a means to find markers later, especially if measuring in higher grass or in darkness.
- Flags or small traffic cones to temporarily mark the Marker Measuring Area (MMA). Preferred minimum 8, absolute minimum 4. The flags or cones should be set up as time permits at the perimeter (radius around the target) so that competitors can more easily identify the MMA when approaching the target.
- Spray paint to mark the centre of the target.
- Flashlight or torch.
- A roll of coloured tape (red/white or yellow/black) to mark scoring area(s) if required in the task.
- A simple robust bag or box to put all the above in. An additional bag for the measured/collected markers is useful.

12.5 EQUIPEMENT OF TARGET TEAM LEADER

12.5.1 The TTL must have:

- Mobile phone (usually provided by the organizer).
- Map and, if available, a sketch of the target field.
- A handheld GPS to note the coordinates and altitude of the target, and markers if required by the Director for a specific task.

12.6 EQUIPMENT OF TARGET TEAM MEMBER

12.6.1 A target team member shall have:

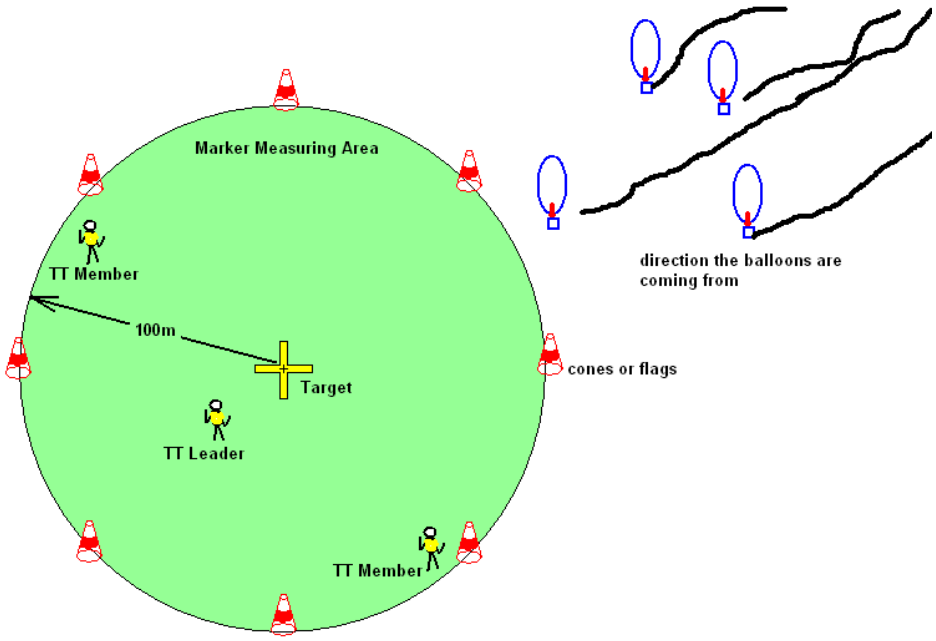
- A clipboard, paper and pencil to note results and infringements. Measuring Sheets will be provided by the Director, Chief Scorer or Chief Measurer.
- A colour printout of all competing balloons to more easily identify them.
- When possible, binoculars to identify the competitors.
- When possible, a digital camera to take pictures of rule infringements.
- When possible, a handheld GPS to note coordinates and altitudes and to check measurements.

12.7 DUTIES OF A TARGET TEAM

12.7.1 All TT members should wear the same colour vests (usually yellow) so that competitors looking from above can see who is who at a target. All other officials should wear vests of a different colour (usually orange).

12.7.2 After arriving at the designated coordinates the TTL must immediately determine the exact coordinates of the centre point of the target. Normally the target centre point is surveyed before and the target should be laid out exactly at the coordinates given. However, if circumstances have changed, e.g., power lines in dangerous vicinity, livestock in field, busy roads etc. the TTL must immediately inform the CTT to determine further actions. In any case, the TTL must call the CTT to inform him that the target is laid out and pass on the coordinates and altitude. This is crucial, as the Director may be waiting for confirmation of the coordinates during the task briefing.

12.7.3 Only after having called the CTT to confirm the target coordinates will the TT start preparing the target and the MMA. The target should be laid out precisely at the confirmed coordinates and fixed to the ground by spikes (alternatively with stones). The target does not need to be aligned with North. After fixing the target, the TT will mark the perimeter (radius) of the MMA with cones or flags. When the balloons arrive, the TTL will stand some distance behind the target (about 20 metre) and a TT member will stand at each side of the target, perpendicular to the direction the balloons are coming from.



12.7.4 One of the team shall make a sketch of the target field and mark markers therein when they are dropped. Furthermore, the TT members shall watch for rule compliance of the dropping method, note collisions and witness ground contact (GC). Other things like improperly attached

loggers, missing basket numbers, retrieve cars too close to the goal or blocking the roads, etc. should be noted, if time permits. In fields where markers may become lost (due to high grass, close to sunset, dropped at the perimeter of the MMA, etc.), markers should be marked with marker flags ('pigtails'). However, watching marker drops and checking rule compliance has priority over 'skewering' markers with marker flags.

12.7.5 Only after the majority of balloons have passed will the TT start measuring according to the procedures documented in COH 10.4. Competitor's markers will only be measured if in the MMA (which usually have a 100 metre radius). Outside the MMA, competitors will be scored by their logger track. Markers outside the MMA need not be measured, however it is advisable that markers just outside the MMA are also measured, and their measurements noted and marked as 'OUT' in order to avoid disputes with competitors afterwards. Competitors should only drop their markers in the MMA, however when dropped within a 'reasonable' distance (as defined by the Director, Chief Scorer or Chief Target Teams), markers should be picked up and returned by the TT.

12.7.6 The most important things to watch for are:

- The dropping method as declared on the TDS, especially when a Gravity Marker Drop (GMD - AXMER R12.9) is required.
- Ground contact. Note whether it was outside the MMA (AXMER R11.4 Ground Contact 1) or inside the MMA (AXMER R11.5 Ground Contact 2) and 'solid' or 'light'.
- Collisions of balloons or reckless flying (AXMER R10.1 and R10.2).
- Scoring period (AXMER R12.17 Scoring Period), especially as towards the end of the scoring period each second counts and careful observations are crucial.

12.7.7 All observations shall be noted with time, competitors/balloons involved and in- or outside the MMA. Digital cameras can be of help, especially if the date/time are recorded in the picture. When using cameras that display the date/time, make sure that they are synchronized with GPS time at the start of the event.

12.7.8 Before leaving the target area:

- The TTL should check that all retrieved markers are in fact measured (except the ones far outside the MMA). Make sure the Measuring Sheet is readable for the Chief Scorer. Use the international method of writing figures (see COH 1.1.2).
- Mark the exact point of the centre of the target on the ground permanently (spray paint).
- Return all equipment (target, pins, flags, cones etc.) and leave the area as clean as (or cleaner than!) you found it.

12.8 OTHER TARGET TEAM DUTIES

12.8.1 Target teams not being used at a target may be asked to observe the competitors when taking off especially during Fly Ins, and to watch them retrieving their balloon after landing.

12.8.2 In this case, TTs should check compliance with the rules for finding take off sites and asking landowners for permission to use their fields etc. See AXMER R9.2 Individual Launch Areas.

12.8.3 TTs carry out this duty as observers. They should not explain or interpret the rules if asked by a competitor. However, to avoid the impression of a 'secret police,' all this should be done in an open and positive way while wearing vests.

12.8.4 Any improper behaviour or rule violation should be noted with time, location and competitor(s) involved.

12.9 WAITING FOR THE BALLOONS

12.9.1 Last but not least, this is supposed to be fun! A TT should take with them some food and drinks. Don't forget warm clothes in the morning. Playing cards or small board games might come in handy when waiting for the balloons.

12.9.2 In case the balloons all miss your target, the TTL should call the CTT and inquire whether they may leave their target and return to the Competition Centre, or go to another target to help the TT there.

CHAPTER 13 WEATHER INFORMATION

13.1 INFORMATION FOR METEOROLOGICAL OFFICERS

13.1.1 The Meteorological Officer (MO) is a very important expert to provide the Director, the Safety Officer (SO), other key officials and competitors with the necessary weather information.

13.1.2 It is important to realise that a hot air balloon competition is a very local and time limited matter. The balloons will normally fly twice a day; first soon after sunrise and then again before sunset. The balloons will fly within a radius of about 50 km from the event locality and a competition flight usually takes not more than 2 hours.

13.1.3 MOs generally think on a bigger scale, it is however important to concentrate on the local weather for the period of the flight. This includes the knowledge of local effects from topographical formations, coast lines, etc.

13.1.4 When presenting the weather (WX) information, the MO should only give a very short reference to the general weather situation and then concentrate on providing the data for the area and time of the flight. For pilots, the most important issue is the wind; more the direction than the speed. The objective in balloon competitions is to make the best use of the different wind directions with altitude to reach a certain target.

13.2 TIME SCHEDULE BEFORE A FLIGHT

13.2.1 All times herein are referenced to the briefing time (BT) of a flight.

13.2.2 The Director usually starts preparing the flight two (2) hours before BT. Around this time, he expects a rough briefing from the MO telling him the expected WX situation and what the wind directions will be. Thereafter, the Director will think about what tasks he will set and prepare the Task Data Sheet (TDS). In the meantime, the MO should refine the forecast, make a wind reading (or have other people do that) and prepare the Weather Information Sheet (WIS).

13.2.3 The WIS should be finished and ready to be copied not later than 20 minutes before BT. Before copying, show the WIS to the Director and give him an update with the latest information.

13.3 WEATHER INFORMATION SHEET

13.3.1 The Weather Information Sheet should have a standard format as shown in Appendix A: Forms. All the information should fit on one DIN A4 (US A, “letter size” or 8 ½ x 11 in) sheet. The information should include:

- A small synoptic chart showing the general weather information. Try to illustrate the location of the event on the chart.
- A short description of the weather situation and outlook. Include the time of the start of convection in the morning and the end of convection in the evening.
- Tables for wind readings and forecasts including altitude, direction, speed and observation or forecast time.
    - The altitudes should be in rounded figures (100, 250, 500 feet and not 127, 1696, 483) and include the reference **AGL** (Above Ground Level) or **MSL** (Mean Sea Level) and **ft** (feet) or **m** (metres).
    - The direction should be in full degrees **To** or **From**, and include the reference **G (**Grid North), **M (**Magnetic North) or **T (**True North).

13.3.2 The speed should be in full figures including the reference **kts** (NM/Hour), **m/s** (metres/second) or **km/h** (kilometres/hour).

- If a change of direction is likely during the expected flight time, include this information.
- A graphical plot of the wind reading.
- The barometric pressure information usually expressed as **QNH** and in **hPa** (hectopascals) or **mm** (millimetres)
- **DO NOT** include the sunrise and sunset information. This information is provided by the Director in the TDS.

13.4 WEATHER BRIEFING

13.4.1 During the task briefings, the Director usually asks the MO to explain the weather situation to the competitors. When providing this information, try to be brief. Do not read the information from the sheet you have handed out - they can read that themselves! When the weather is not good and the flight is postponed or cancelled, you may take some more time to explain why.

13.4.2 When you have the possibility to show weather maps, radar plots showing frontal zones and CBs with a projector ('beamer'), preferably 'live' from the internet, that's fine and appreciated, but again, try to be brief.

13.4.3 A WX briefing should not take longer than 5 minutes as a maximum.

13.4.4 **DO NOT** state that the weather is good or not for safe flights or that competition has or has not been cancelled. The Director and his staff will make those decisions and announcements.

13.5 PROBLEMATIC WEATHER SITUATIONS

13.5.1 Everybody can see when the weather is good or very bad, but the situation in between is where a good MO is most important. Always inform the Director objectively about the situation and he will then decide to fly, cancel or postpone.

13.5.2 Sometimes the Director will order the competitors to the launch field and will call for an extra (supplementary) briefing there. The MO's presence is necessary at these extra briefings to update the Director with the latest developments. Try to make arrangements to have access to your information sources by telephone or otherwise when attending these ad hoc briefings in the launch field. Inform your colleagues in advance to give you the necessary information when you call them. A laptop computer with mobile internet connection is very helpful.

13.6 WEATHER INFORMATION ON THE OFFICIAL NOTICE BOARD

13.6.1 Some competitors like to inform themselves about the weather between flights outside the official task briefings. It is appreciated if you can provide significant weather charts, wind charts and printed forecasts, etc. Contact the Director about where to display this information and mention when and where you will be posting information during your first briefing.

13.7 DELIVERY OF PIBALL INFORMATION

13.7.1 The delivery of pibal data to competitors via SMS or other electronic means is considered a "best practice." Pibal data may be sent prior to or during the launch period and during the flight period. Tests should be conducted before the event to evaluate the reliability of the delivery method (SMS or another electronic method) to determine that all competitors will likely receive all transmitted information (while in the contest area).

CHAPTER 14 TASK BRIEFINGS, TASK DATA SHEET AND TASK SETTING

14.1 TASK BRIEFINGS

14.1.1 The Briefing Room should be prepared well ahead of briefing time. Minimum equipment should be a flip chart, chalk board or a computer with a projector ('beamer') for the Director to make drawings. A copy of the Official Competition Map should be displayed in front so that the Director can describe things with reference to the map. Microphones for the Director and competitors should be available, as necessary depending on the size of the event and briefing room.

14.1.2 Competitors should be permitted to enter the Briefing Room 15 minutes before briefing time. In case observer briefings are held, they should either finish before that time or take place elsewhere.

14.1.3 Markers, logger(s), Weather Information Sheets (WIS), Flight Report Forms (FRFs) or Observer Report Sheets (ORSs) and Task Data Sheets (TDSs) should be in place before competitors are allowed into the Briefing Room (15 minutes before BT). It is important that competitors get sufficient time to study these documents and prepare for their flights, so strict adherence to this time schedule is important.

14.1.4 The following AXMER rule concerning study time was approved at the 2012 CIA Annual General Meeting:

"8.7.2 Where written information is supplied, **adequate** study time should be allowed before briefing proceeds (as specified in the COH)."

This rule previously said that five (5) minutes study time should be allowed. The intent of the change is to allow the Director to tailor the amount of study time for the number and complexity of the tasks set. It is suggested that 5 minutes be allowed for flights with one (1) or two (2) tasks, and that two (2) minutes be added for each additional task. E.g., for a four (4) task flight, 9 minutes (5 plus ((4 – 2) X 2) would be allowed as study time, while for a 6 task flight, 13 minutes (5 plus ((6 - 2) X 2) would be allowed. Of course, the Director may adjust (round up?) these suggested times to more convenient values. If during the planned study time period the Director senses that the competitors have had adequate time, the briefing may proceed with the unanimous consent of the competitors.

14.2 TASK DATA SHEET (TDS)

14.2.1 It is important for competitors that the layout and order of information of the TDS follows a standard format. This guarantees easy and fast recognition of all the information.

14.2.2 The compulsory task data is stipulated in the AXMER. The order of information shall be the same as in the AXMER and items shall be referred to with the same abbreviations as in the AXMER.

14.2.3 The TDS shall begin with the "flight data" and then the "individual task data" for each task shall be given.

14.2.4 Flight data shall always be specific; expressed in words or figures. When a specific individual task data is standard (e.g., the relevant AXMER rule would stipulate "... unless otherwise stated ...") the data box or area should indicate a "-" (dash), no other expressions should be used for this meaning.

14.2.5 An example of a TDS is included in Appendix A: Forms. The TDS shown includes all of the above ideas. A TDS does not have to be exactly the same as this example but the layout should basically follow the layout displayed there.

14.2.6 At task briefings, three (3) copies of the TDS should be distributed (competitor, observer and crew chief).

14.2.7 In situations where the Director believes that a flight/task plan (and the associated TDS) may need to be significantly changed (perhaps due to rapidly changing meteorological conditions), it is a "best practice" to prepare a TDS with various options, or a TDS per option, so that

competitors do not have to make lengthy, detailed notes of changes.

14.3 TASK SETTING

Activity to gather Task Setting advice to be continued through 2016.

14.4 TASK CANCELLATION

AXMER Rule 8.2.2 was modified in 2016 to say “The Director has the authority to cancel a task(s) for safety reasons at any time before the official task scores are published.”

The significant change in the above rule is the addition of the word “official.” This means that Measuring Team measurements and Provisional results may be published before a Director decides to cancel one or more tasks.

The CIA Safety & Education Subcommittee has provided the following advice regarding cancelling a task:

“The unsafe conditions may include weather conditions that reducing human performance, weather warnings as well as zero wind or circulating wind conditions (balloons not able to clear each other).”

15 PENALTY GUIDE

WHAT IS A PENALTY?

The Webster Dictionary defines among other things under 3.b a penalty as:

> *3: b: a disadvantage (as loss of yardage, time, or possession of the ball or an addition to or subtraction from the score) imposed on a team or competitor for violation of the rules of a sport.*

Further guidelines and definitions are given in the Sporting Code Section I and in the AXMER.

WHY A PENALTY GUIDE?

Our sport has matured from the experimental stage to a more mature stage where rules and penalties are less disputed. It is therefore time to write down what the debate over rules and penalty interpretation has produced in order to avoid future discussions and reinvention of the wheel. This guide is therefore a 'guideline' and nothing more or less. The SWG recommends that it be used as such without wanting to prevent discussions and interpretations.

There are two schools of Direction; one that wants all penalties to be fixed or fixed as much as possible, and the other that wants as few as possible fixed penalties in order to be able to vary the penalty. Both views have merit.

With fixed penalties the Director is in a position that seems more objective because he only has to prove the infraction. The disadvantage though is, that he is not in a position to vary a penalty when, e.g., in his view the competitor's fault is minor.

Not specifying fixed penalties puts a great pressure on the judgement of the Director, but he is in a position to weigh the infraction. The disadvantage is that he may be accused of prejudgement and of favouring or disfavouring a competitor, or he may be totally wrong because of lack of experience.

Generally one might say that in the ideal world only a few rules deserve a fixed penalty and the rest will be determined by the good judgement of the Director. This however puts a great burden on him and therefore it has been decided to provide this Penalty Guide as a means to streamline penalties without binding the hands of the Director too much. Especially lesser-experienced Directors will find this guide very useful.

WHAT FACTORS PLAY A ROLE IN A PENALTY

Safety

There is no doubt that safety is a prime factor to be considered and abusing safety is listed as a "Serious Infringement" in the Sporting Code GS 5.2. Whether and how something affects safety or not should be judged objectively and with common sense. Penalizing a competitor 200 points for attaching the quick release to a wrong point on the car in first instance would be unjust although it affects safety.

Competitive advantage

This is sometimes easy to determine and sometimes very difficult. Is it a competitive advantage if a competitor touches a blade of grass close to the goal? Certainly not when you think of the effect it has on his result, but yes, when you compare him with the prudent competitor paying a lot more attention in avoiding this.

Deliberate or unintentional infractions

Generally infractions are made by: not knowing the rules, inattention, inexperience and/or bad luck. Sometimes however they are deliberate, generally as a tactical manoeuvre and less frequently as intentional deception.

Disturbance to third parties

This is generally easy to determine. Disturbance to third parties is of course very important to follow up on, especially for those pilots who want to fly in the area again after the competition. What disturbance is can be

locally very different and the local habits should be considered carefully. Driving in an open short-grass field is generally considered a lot less abusive in Bavaria than in Great Britain or the U.S.

Sportsmanship

It is clear that good sportsmanship is important. After all, we compete to enjoy the sport for ourselves and each other. A competitor forgetting this should be reminded. With prize money, one should watch more carefully that good sportsmanship is not lost.

Competitor's experience

There is not much reason to consider a competitor's experience when applying penalties. After all, he could have (should have!) studied the rules (and this document) carefully.

TYPES OF PENALTIES

Result Penalties

Result penalties are applied to a competitor's before using the scoring formulas. As a result of changes made in 2012 to AXMER R13.3 Distance Infringements, the only specified result penalties relate to the dropping of a marker (AXMER R12.9 Gravity Marker and R12.10 Free Marker Drop) and they should not be used on an interpretation basis.

Penalty Points

When the penalty is fixed, life is simple; just apply the rule (e.g., Late Entry 50 points). If not, it is where your judgement is required. Try to apply the before mentioned general observations and the rule specific guidelines following hereafter.

Group B Score

Apply this 'penalty' when the rule specifies so or when the rule states "… will not achieve a result." Otherwise apply this rule when the competitor has not achieved a valid result.

Competition and Task point penalties (Rule 13.4 Penalties)

The differentiation was introduced to point out that the penalty relates either to the competition in general (safety, disturbance, etc.) or to a specific task (competitive advantage, etc.). In case of a combination of both, first subtract the task points and then the competition points. Should the competitor then end up with a negative score, determine what brought him below zero. In case of competition points, he will receive a negative score while in case of task points, he will score zero.

HOW TO PUBLISH PENALTIES?

The SC S1 requires that:

5.9.4.3 The fixed data used in the scoring formulas, for a given task, e.g., P, M, RM, W and SM, shall be printed and penalties given should be followed by a rule reference and a brief description.

Specifying penalties is very important, firstly the competitor has the right to know but more important, it is the best learning method. New competitors (and experienced as well) learn a lot when seeing what penalties were given and why.

Therefore it is very important that you specify the penalty with the rule number and a brief description. For the rule reference, we recommend to use the following format: e.g., **R12.6** (An R directly followed by the Nr. 12.6, so that it is as short as possible).

The brief description should specify the infraction as precisely and be as short as possible. Here are some tips:

- Don't use references without information value, e.g., 'R13.3 distance penalty' but tell what distance

was abused, and if possible, by how much. E.g., ‘R11.2.2 40m landing close to marker’ or ‘R15.4.2b 350m min. dist. goal to launch point’.

- Try, if possible, to say what was done wrong instead of referencing the word only. E.g., ‘**100 TP R9.17 Take-off without permission’** is better than ‘**100 R9.17 Take-off permission’.**
- Try to be consistent in your wording. Because penalties are entered at different times and sometimes by different people, there is a risk of using different wording for the same offence. Nothing looks worse than a score sheet with several competitors having made the same offence but referenced differently.

Summary of Rule Specific Guidelines

2.2.2 (Nationality)

First instance, a warning, thereafter Group B.

2.11 RESPONSIBILITY (S1 An3 3)

First instance, a warning (unless: safety, competition advantage or sportsmanship), thereafter Group B.

2.12 CONDUCT (S1 An3 4)

First instance, a penalty of not less than 200 points, thereafter disqualification from the Event.

3.1.3 Vents

March 2014: AXMERS were changed to allow the use of vents. “The use of vents which are designed to propel a balloon is prohibited. Turning vents may only be operated in flight for the purpose of orienting the basket. Prolonged or excessive use of the turning vents is prohibited.”

Prolonged or excessive use may include using both (“turn right” and “turn left”) vents at the same time, rotations of greater than 180 degrees and repeated use of the vents in a short period of time.

Without competitive advantage, 250 points, otherwise 500 points.

3.5.2 Any damage to a balloon affecting its airworthiness …

Generally this rule is seldom abused and usually not deliberately. First instance, 50 points (5% GS) if safety is affected, otherwise a warning.

3.7 ALTIMETER

Almost all countries require that balloons fly with an altimeter as part of the Certificate of Airworthiness. When observers fly in the basket, they must be able to read the indication. Penalty in first instance should be a warning, thereafter 250 points seems appropriate.

3.8 COMPETITION NUMBERS

On the first flight this rule is often abused because competitors did not find (or have) the time to fit them to the basket; in this case a warning should be given. After the second flight, a penalty of 50 points seems to be appropriate.

3.10.1 Retrieve Crew shall not be within any MMA…

This is a difficult rule to give a penalty guideline for because the circumstances may vary enormously from a harmless offence to deliberate interference, resulting in anything from a warning to a serious penalty.

3.10.2 All vehicles used to aid the retrieval of a balloon…

Same as 3.8.

3.10.3 Retrieve vehicles shall not be parked within 100m…

When reported by an observer or official, the competitor should get a warning in the first instance. When the crew obviously disturbs the action around a goal or target, 100 or 200 points may be given.

6.6 OBSERVER ON RETRIEVE

The treatment of an observer by the crew (and vice versa!) should be correct and respectful. Problems sometimes originate in misunderstandings and different cultures. Not all competitors have fancy cars but still want to compete. Generally a warning should be given in the first instance. Speaking with the competitor and or his crew explaining the problem might help here.

6.6.2 It is the duty of the competitor and crew…

It is important for the smooth running of an event that the observer is brought back without delay. Penalty should be a warning or 50 points when inexcusable delay occurs. Sometimes the refuelling station is on the way back to the competition centre and a competitor loses a lot of time when bringing back the observer first. In this case, try to organise or allow alternative procedures for bringing back the observer. E.g., by shuttle bus or by retrieve car swap.

6.8 OBSERVER REPORT

Generally this rule does not need to be penalized because it is in the interest of the competitor to sign and check the sheet. However, if correction of the scores becomes necessary because of wrong data that is signed by the competitor, one might consider a warning or penalty of 20 points (2% GS) for not stating the competitor's disagreement at the time of signing the report.

6.13 GPS-LOGGERS FAILURE

A competitor not supplying the required logger track or a substitute track of his own GPS should be penalized 100 points. If it is **obvious** that the official logger's failure was not at the competitor's fault but the competitor did not have a useful substitute, then he should be penalized 50 points only. If the competitor may have abused a PZ or other rule because, e.g., he flew close to a PZ, or very high near a Blue PZ, but the lack of his track failed to provide evidence of a rule violation, then the competitor should be penalized up to 1000 points (in steps of 100), according to the likelihood of a violation.

6.9 GPS LOGGERS

At this moment it is difficult to establish guidelines for penalties because of lack of experience. However it should be quite clear that GPS-Loggers are a substantial part of HAB competitions and not complying, even unintentional, should be penalized as a substantial break of the rules.

7.2 OUT OF BOUNDS

When considering the effects of PZ and OFB on scoring, the following table shall be used as guidance. Penalties for flying within a PZ are not affected by this guidance and will be applied as per the rules for PZ infringement (AXMER R7.5 in general and in greater detail in this document).

	Outside Competition map	Outside Contest Area	In OFB Area	In Red PZ	In Yellow PZ	In Blue PZ
Take Off	invalid R9.2.5	invalid R9.2.5	invalid R7.2	prohibited R7.3.4	prohibited R7.3.5	NA
Landing	OK	OK	OK	prohibited R7.3.4	prohibited R7.3.5	NA
Contest landing	invalid R11.3.1	invalid R11.3.2	invalid R7.2	prohibited R7.3.4	prohibited R7.3.5	NA
Declare goal	invalid R11.2.1	invalid R7.1	invalid R7.2	prohibited SII 12.c.	OK	prohibited SII 12.d.
Achieve Mark	invalid R7.1	invalid R7.1	invalid R7.2	OK	OK	NA
Achieve TP	invalid R7.1	invalid R7.1	invalid R7.2	Scored + penalty	NA	Scored + penalty

7.3 PROHIBITED ZONES (PZs)

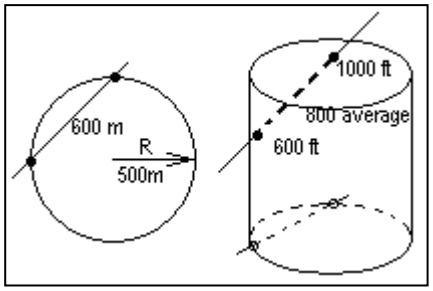
R7.3.4 and R7.3.5 both mention “ground handling.” Ground handling means manoeuvring or dislocating (to force someone or something to move from a place or position) the inflated balloon.

7.5 PZ INFRINGEMENT

With the introduction of GPS loggers in 2002 the penalty changed from ‘500 to 1000’ to ‘up to 1000’. Loggers enable the Director to determine the amount of infringement and what actually happened. The normal penalty is up to 500 points. The amount should be doubled if there is a complaint from the ‘owner’ of the PZ or if officials witnessed actual disturbance of animals.

In 2003 it was accepted to use the following penalty calculation procedure:

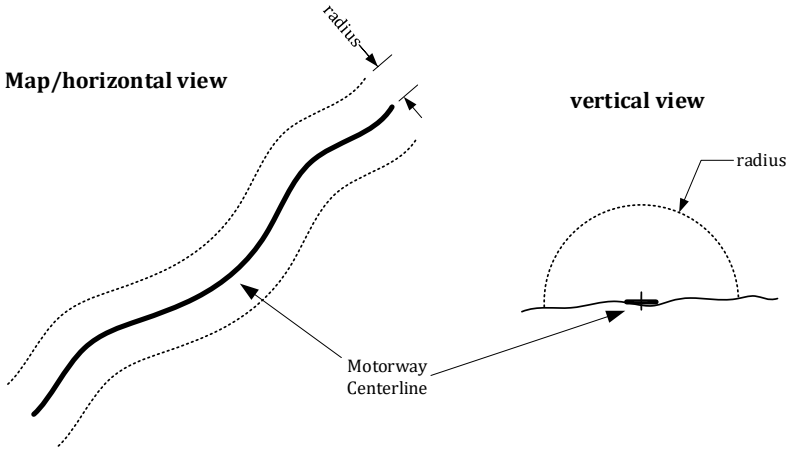
1. Determine the percentage of the horizontal distance travelled through the PZ compared to the maximum. This constitutes half the final percentage.
2. Determine the percentage of the average altitude in the PZ compared to the maximum. This constitutes the other half of the final percentage.
3. The final percentage is the average of the figures from steps 1 and 2 above.
4. Take the final percentage of 500 points and this constitutes the penalty (round to 10).
5. Double this figure if there is a complaint from the ‘owner’ of the PZ or if officials witnessed actual disturbance of animals



Example:

1. 600/1000 x 100 = 60% 'horizontal %'
2. 100- 800/1000 x 100 = 20% 'vertical %'
3. ½ x (60 +20) = 40% 'final%'
4. 40% x 500 = **200 points**
5. in case of complaints = **400 points**

In 2010 the Motorway or Tunnel PZ was introduced. Motorway PZs are a defined by a centerline (along the road) and a radius. In order to keep scoring simple, the height of the motorway is usually defined as constant for the whole length of the PZ.



The penalty is proportional to the nearest distance (track point) to the centerline of the motorway PZ. Maximum penalty is 500 points unless there is some reported incident.
Example: If the radius is 300m and the nearest track point to the center line is 200m (i.e. 100m inside the PZ), the penalty is (300-200)/300*500=167 competition points.

Yellow PZ: Landing should be penalized with 250CP (half of a penalty of a red PZ) and take-off

should result in NR in the first task (because it would probably give a competitive advantage and should be penalized similarly as moving the balloon outside the ILP for take-off).

Altitude infringements of Blue PZs are explained under R10.14 Air Law.

7.6 MAPS

When a competitor flies without the competition map simply because he forgot it in the retrieve car, e.g., then a warning should be given in first instance. Depending on the circumstances a penalty should be considered if important data such as PZs are not drawn on the map.

7.8 MAP COORDINATES

In 2010 it was decided that rather than giving a no result for minor errors in a declaration, an inappropriate but unambiguous declaration would be accepted with a 100 point penalty. This does not apply to rule R12.3.2 (ambiguity between more than one valid goal).

The original case came about because of a task that required each competitor to select (in writing) a goal from a list (of three) specified by the ED using only the coordinates for each goal. A competitor did not faithfully write down (transcribe) the coordinates for the goal he intended to select. The competitor was initially scored as a No Result but the Jury decided that the competitor should receive a result. Even though the coordinates that the competitor wrote down were not exactly the same as any goal in the list, the transcription error was such that it was obvious (unambiguous) which goal the competitor intended to select. At the next CIA Meeting, it was decided that such cases should be penalized under Rule 7.8.

Additional examples of potential "inappropriate but unambiguous" declarations that have occurred include:

- Reversed Easting and Northing.
- Incorrect grid line number (errors in 2 most significant digits of Easting or Northing).
- Imprecise coordinates (errors in 2 least significant digits of Easting or Northing).
- No UTM Zone specified (if specifying the UTM Zone is required).
- Specifying a grid line number when none is required.
- Specifying an altitude when none is required.
- Not specifying an altitude when it is required.
- Specifying an altitude that is obviously wrong, such as being 1/10th of (too few digits) or 10 times (too many digits) the expected range for declared altitudes.

As noted above, this rule (7.8) and R12.3.2 are related and both must be applied consistently throughout an event. R7.8 should be used to determine the actual position of the "inappropriate but unambiguous" declaration while R12.3 should be used to determine if that position is valid and/or ambiguous.

EDs should be careful and clear when describing how declarations should be made particularly when the declaration is not as simple as specifying just an 8 (or the minimum number required for the event) digit coordinate. If a component (such as an Easting, Northing or altitude) of a declaration is explicitly required or explicitly not required, it should be stated how common errors will be handled. Here are a few examples that an ED might use:

- If a declaration does not require altitude but an altitude is specified, the altitude will be ignored without penalty.
- If a declaration requires altitude but an altitude is not specified, an ED specified altitude will be used, perhaps with a penalty under 7.8.
- If a grid line number is not required (because the grid line number was specified by the ED on a TDS) and a grid line number is specified, the grid line number will be ignored

without penalty.

- If a declaration requires a Northing or an Easting (but not both because the ED has specified one on the TDS) and the Northing or Easting is in the wrong position, the Northing or Easting will be used, perhaps with a penalty under 7.8.

8.4.2 Unless otherwise specified, tasks in a multiple task flight shall be flown in the order…

This rule has a long history of interpretations. In the beginning it was accepted as being smart to (ab)use this rule. Then during the Worlds in 1993 and the Europeans in 1994 for the first time competitors were penalized for deliberately abusing this rule under the rule of unsporting behaviour (AXMER 13.1 Serious Infringements, Unsporting Behaviour (GS 5.2 part)). The penalties caused protests and quite some debate. In 1993 the protesters won while in 1994 they lost. The penalty was arguable because it was a change of common practices; nevertheless it was felt that is was time to change our appreciation of rules from making 'smart use of them' to 'simply obey them' and this led to the interpretation of today. Normally the Director sets the tasks in such a way that they can be flown in a logical order. However, sometimes a reversion or abuse of that order can give considerable advantage. 'Wrong' task setting or a weather change can cause this. Sometimes the competitor is left in a position where with the prevailing winds, flying the task in order makes no sense. So in case of an infraction, one should try to analyse whether there was no other option or whether the infraction was deliberate. In the last case nowadays, the interpretation is that this is not in line with the sporting idea and should be handled accordingly. Normally this means a hefty penalty 'up to 1000' if deliberate wrongdoing is a fact. In any case, this wrongdoing should be penalised in such a way that the outcome is not rewarding for the competitor.

Practically, this means that a competitor who wants to give up a certain task to do good in another task should comply strictly by this rule which means dropping his marker in the order specified. However, if a competitor chooses to do this, then this should be allowed and no other interpretation should be placed upon his choice.

Do not forget to look into AXMER R8.4.4 Multiple Tasks which relates a lot to this rule!

8.4.6 Penalties related to the takeoff will normally be applied in the first task…

This rule is rather unambiguous and should be applied as written.

8.4.7 Marker order...

This rule was adopted in 1993 (Dresden), and was intended to end a situation where dropping the wrong marker was penalised very differently. Hans Akerstedt proposed a 'soft' penalty of 25 points and won against the hardliners in the committee. This rule is a good example of a fixed penalty rule that ended a lot of discussion.

8.11 LATE ENTRY

This is another example of a rule allowing a straightforward fixed penalty.

9.1.1 COMMON LAUNCH AREA(S)

The AXMERs were modified at the 2015 CIA Meeting to add the following to R 9.1.1:

"Once his balloon is inflated a competitor may not move his balloon on the CLA except for safety reasons and only after approval from a responsible official."

The above addition does not clearly define what constitutes an infringement of the rule or a penalty if the rule is infringed. R9.2 Individual Launch Areas does specify how far a competitor might move his balloon before he is deemed to be outside his individual launch

area and what the penalty is if the rule is infringed, and it might be logical to use similar methods and penalties when applying R9.1.1. Moving under this rule could be defined the same as R9.2 but given that common launch areas do not generally provide each competitor with a launch space 100 m in radius, exactly the same definition is not practical, although a smaller distance may work. Moving under this rule could be defined as moving out of a competitor's assigned launch space (or into another competitor's assigned space?) **while still attached to a quick-release tie-off or in contact with ground crew**, but given that the orientation and size of launch spaces may vary with the wind direction at the time of launch, and that launch spaces may not be marked and/or assigned, it may be difficult to determine if a competitor has moved out of their space, and for what purpose. And it may desirable to allow some movement to avoid downwind balloons that have not take-off.

So given the above considerations, the definition of "move" under this rule (at this time) is somewhat unclear and quite possibly a subjective evaluation. As guidance, a suggested definition of "move" under this rule is "intentionally maneuvering a balloon **while still attached to a quick-release tie-off or in contact with ground crew** for any purpose other than obvious safety reasons such as avoiding collision with other balloons that have not yet take-off (after a reasonable period of being inflated)". Most likely, movement under this rule would be lateral, 90 ninety degrees to the expected line of flight, purely for the purpose of changing the competitor's flight line, and clearly not to avoid collision.

It is recommended that the penalty for movement under this rule be the same as R9.2, that is "no result in the first task of that flight."

9.2 INDIVIDUAL LAUNCH AREAS

This rule was changed after the 1999 Worlds when a competitor carried his balloon 600 metres from where he inflated it to where he took-off. The rule implies that a competitor must take-off from the spot (launch field) he has chosen for inflation. The launch field is the physical field or the area within 100 metres from where he inflated, whichever is smaller. Should he choose to take-off elsewhere after his inflation, then he must deflate the balloon first and re-inflate on the new spot. Since the rule is rather new, there is no set penalty yet; however we would assume the take-off becomes invalid resulting in a Group B score in the first task of that flight.

March 2014: This rule was changed to define an individual launch area (ILA) as “a circle of 100 meter radius from the position of the basket at the start of hot inflation.” The individual launch point (ILP) was redefined to be “the position of the basket at take-off.” The intent of these changes was to more precisely define ILA and ILP. Competitors wishing to take-off elsewhere after inflation must deflate and re-inflate in the new ILA.

9.2.2 LANDOWNER’S PERMISSION

Check for the local rule due to local conditions under AXMER RII.6 Landowner’s Permission. The penalty depends a little on the circumstances and they vary in some parts of the world. Generally, one should say that a genuine attempt must be made to find the landowner, but if they cannot be found and there is no alternative then the Director should weigh the circumstances and penalize from a warning to the full 250 task points if the competitor clearly disregarded common behaviour.

9.3.2 Quick-release tie-offs must be used for all balloons inflating in a common launch area…

An abuse of this rule is more frequent and generally not deliberate. In the first instance the Director should warn more as an educational tool. However if other balloons were (potentially)

hindered, e.g., in a windy condition, then the competitor should be given a penalty of approximately 100 points.

It is recommended that a quick-release tie-off should not be longer than 5 m.

9.4 VEHICLES

These rules are seldom abused. However when abused the penalty is clear and fixed.

9.5 COLD INFLATION

This rule was introduced to enable all competitors to see the flagpole and hear the audible signals. Abuse should be penalised by a warning in first instance.

9.9 LAUNCH PERIOD, 9.11 ADEQUATE TIME and 9.12 EXTENSION OF TIME

These rules are related. The penalty for late take-off is fixed and not disputed. However sometimes competitors all wait to the last minute before waiving their white flags and start complaining when not given take-off permission immediately. A competitor waiting to the last minute and whose take-off is late because of a hard working launch master, is not "… delayed by the action of an official …" hence he should be at least warned or penalised 50 points / minute.

9.10 OBSTRUCTION

Obstruction is difficult to penalise. Actually (Technically?), a competitor obstructing other competitors with his inflated balloon while not waving a white flag should be requested to deflate by the launch master. Therefore it is difficult to penalise a competitor if the launch master did not order him to deflate. Nevertheless, in this case, at least a warning should be given. Competitors should also not obstruct others when not using launch masters. Generally a competitor should take-off within 5 minutes after his balloon is upright. When he waits longer he should be asked to deflate and should be warned or penalized afterwards under this rule.

9.14 & 9.15 LAUNCH MASTERS

When using launch masters, taking off without permission should be penalised by a warning or 50 points in first instance and when no disruption of the take-off process was caused. During a take-off with many balloons or when causing potential safety problems, this should be penalised between 100 and 250 points. However, if actual problems were observed or safety was actually impaired then the penalty should be from 250 to 500 points. When launch masters are not used, the competitor should ask his crew to assist and the same or even more care should by applied by the competitor in this case. When abusing this care he should be penalized using the same principles as mentioned above.

9.21 CLEARING LAUNCH AREA

A competitor should clear the launch area without undue delay (in 3 minutes or to above 500 feet). The penalty for infringing this rule should be a warning except when deliberate or when competitive advantage was gained, and then the penalty should be 100 points or more, depending on the advantage.

Until 2010 the MER rules contained a fixed 100 points per minute penalty for the MDT task (R15.13.5). This got removed, but it is unclear for what purpose. As a guidance, 100 task points per minute should still be applied for the MDT task.

10.1 BALLOON COLLISION

GPS loggers provide a means to objectively determine what happened when climbing too fast or in case of a balloon collision. The tracks should be examined in case of observed and/or reported collisions. As a reaction to multiple serious collisions during the 2006 WHABC, the RSC at their meeting in 2007 decided to provide strong guidance on how to treat collisions. Any collision other than trivial envelope 'touches' (under AXMER R10.1.4) should be considered

dangerous and penalized. Generally the idea is the more forceful the collision, the higher the penalty. Also, the principle should be that the one that could have avoided the problem best should be more severely penalised, which usually is the higher balloon. However this does not relieve the lower or climbing competitor from responsibility. In general, one can presuppose that a competitor climbing fast in competition acknowledges responsibility for collisions. For example, if a competitor climbing at 10 metres / second hits a balloon flying level then we would suggest 75% of responsibility was with the climbing competitor and 25% was with the level flying one. If however, a fast descending competitor hits a balloon flying level, the descending competitor should be assessed 100% responsibility and likewise, 100% of the penalty given.
Although rather difficult and subjective, when possible the aspects of recklessness and irresponsibility should be addressed. If a competitor is a repeat offender, he should be strongly penalised up to disqualification.
New competitors not used to flying in large events tend to not pay enough attention. This may be addressed at the general briefing and should not be a reason to reduce a penalty. The guidance mentioned above also applies to collisions during take-off and landings.

Taking all of the above into account, the SWG suggests the following penalties for actual collisions. (For near misses, see penalty for 10.2):

Lower Balloon			**Higher Balloon**	
VS m/s	Penalty		VS m/s	Penalty
1	Warning		-1	200
2	100		-2	400
3	300		-3	600
4	500		-4	800
5	700		-5	1,000
6	1,000		-6	1,000

In 2019 the rule was amended to also include collisions on the ground.
If the basket of a competitor hits the envelope of another balloon which is standing on the ground (e.g. at take-off), and the envelope is not damaged, the penalty should normally be 200 competition points. If the envelope is damaged, the penalty should be at least 500 competition points.

10.1.5 Awarding points in case of a collision

The following AXMER rule was approved at the 2012 CIA Annual General Meeting:

"10.1.5 In case the competitor suffering the collision is not able to fly further tasks after the collision, the director may award him points for the lost tasks in that flight. (COH)"

The intent of this rule is to allow a Director to compensate a competitor for points that he might have received if he had been able to complete the flight. This situation has come up a number of times in the past; however it was always determined (by the Directors and Juries at the time) that the rules did not allow a Director to compensate a competitor in such cases.

At that time, there was no guidance for the awarding of compensatory points. Suggestions included:

- awarding SM points
- awarding the competitor his average points for all completed tasks (including tasks in previous flights)
- awarding the competitor his average points for all completed tasks in the current flight
- awarding the competitor a set (but yet to be determined) number of points per task

Directors were encouraged to use this rule with caution and keeping the interests of all competitors and the integrity of the event in mind. They were advised that this is probably a good opportunity to ask the Jury's advice.

Directors using this provision were requested to document the situation and their rationale in their Director's report to FAI/CIA.

In response to the above, Mathijs de Bruijn provided the following:

"Compensation points after a collision taking a balloon out of the air:

During the Worlds2014 in Rio Claro Brazil, two balloons collided and the lower balloon had to make an emergency landing. The balloons were all flying low (approx. 500ft AGL) and probably due to different speed in the air layers they touched. This was not a typical high vertical speed accident. The higher balloon stated that he was not paying enough attention to the outside world and acknowledged he was at fault. My personal impression was that sharp objects on his basket were the most important reason for initially ripping the lower envelope after the contact.

Anyhow the lower balloon had to abandon his flight and it was my duty to see if the provisions of the new Rule 10.15 (compensation points) could or should be applied.
Since the lower balloon did not contribute to the incident and had to abandon his flight, I considered the provisions for applying the rule fulfilled. The next question was how. At the moment the COH suggest:

1. awarding SM points (generally 500)
2. awarding the competitor his average points for all completed tasks (including tasks in previous flights)
3. awarding the competitor his average points for all completed tasks in the current flight
4. awarding the competitor a set (but yet to be determined) number of points per task

In my opinion option 2 seemed to be the best. Luckily we had already a 4 tasks, so using this option would reflect his standing in the competition at that moment. My calculation of the average points in the competition at this time produced a score of close to 500 by coincidence.
I therefore decided to score him in those tasks with 500 points. Obviously the competitor was happy and none of the others complained. Frankly I think nobody even noticed.

Conclusion:
I think the new rule works. I think the best option is to award his average score until the incident. This is of course difficult when this happens very early in the event. Therefore I would say the COH recommendation should be:
To award the (innocent) pilot a score of 500points in the missing tasks when this happens very early in the competition and thereafter he should be awarded an average of his score until the incident.

Details:
The incident happened in Task 5 see: (http://www.debruijn.de/results/2014/pwcb/results.htm)
Technically you cannot score a pilot points because the score is the result of applying the scoring formulas. So I had to penalize him negative points to achieve a score of 500pts."

At the 2015 CIA Meeting, the SWG accepted Mathijs' recommendation. That is, the innocent competitor should be awarded a score of 500 points in the missing tasks when this happens very early in the competition and thereafter he should be awarded an average of his score until the incident.
Directors are request to continue to provide the SWG with their experiences in applying this rule.

10.2 DANGEROUS FLYING & Near Misses

Since 2007, several methods for detecting possible near misses, along with supporting software, have been developed and penalty recommendations have evolved. One method (developed by Marc Andre and Claude Weber), used at the 2015 European Championship and the 2015 World Air Games, is described below. In addition to this method, methods and software have been developed and used at numerous by Mathijs de Bruijn and the Balloon Federation of America (Maury Sullivan and Mike Gilligan).

At the 2016 CIA Meeting, it was decided to publish the Andre/Weber method and penalty summary in this document. The supporting software can be found at www.balloonloggers.org/software/bsa. While the Andre/Weber method is described here, other methods may be used. The penalties detailed in the table below are guidance therefore different penalties may be applied following review of specific cases. Use of any near miss detection method must include the investigation of any potential near miss by experienced officials. In other words, penalties should not be automatically applied without review by a scoring official.

Reviewing near misses can be a very time consuming activity, therefore Event Directors may want to delegate investigation and recommendation of penalties to another (senior) official. An approved Safety Officer should be the ideal candidate to conduct these reviews. Other senior officials such as a Deputy Director, Stewards and Chief Scorers may be good candidates as well. Further, it is recommended that one (or at maximum 2) person(s) performs all investigations and penalty recommendations to ensure consistency of penalties throughout the event.
Developers of software to support the detection of near misses should read the advice from Marc Andre in Annex F.

Limitations

The following limitations should be checked after each flight.

The limits apply to a certain difference in vertical speed at a 3D-distance between balloons.

Limit 1: more than 3m/s at less than 25m
Limit 2: more than 5m/s at less than 50m
Limit 3: more than 8m/s at less than 75m

Limit 4: more than 8m/s vertical ascend speed

Special software written by Marc Andre is available to calculate all infringing cases. A detailed report is put out indicating those incidents. The incidents then should be analyzed by a senior official (e.g. designated scorer, safety officer or steward) and the points should be assigned according to recommendations below.

Limit 4 must be violated for a consecutive 5s or more to be triggered.

Scoring policy

As above, the penalties detailed in the table below are guidance therefore different penalties may be applied following review of specific cases.

lower balloon					upper balloon			
Vertical speed [m/s]	Limit 1 Penalty	Limit 2 Penalty	Limit 3 Penalty		Vertical speed [m/s]	Limit 1 Penalty	Limit 2 Penalty	Limit 3 Penalty
					0 ≤ v < -2			
2 ≤ v < 3	50(WRN)				-2 ≤ v < -3	100		

						(WRN)		
3 ≤ v < 4	100(WRN)	50(WRN)			-3 ≤ v < -4	200	50(WRN)	
4 ≤ v < 5	300	100(WRN)	50(WRN)		-4 ≤ v < -5	400	100(WRN)	
5 ≤ v < 6	500	300	100(WRN)		-5 ≤ v < -6	600	200	100(WRN)
6 ≤ v < 7	700	500	300		-6 ≤ v < -7	800	400	200
7 ≤ v < 8	900	700	500		-7 ≤ v < -8	1000	600	400
8 and more	1000	900	700		-8 and more	1000	800	600

In case multiple limits are infringed, the highest penalty should be applied.

Under several conditions the penalty may be lowered by half or reduced to a warning. After analysing the report, or talking directly to the pilot(s), the following factors may lead to such lowering:

- In case where both pilots were “playing” close to each other within 1 - 2 balloon heights for a while (up and downs). Both were most likely seeing each other clearly and ascents/descents were engaged only after seeing that a collision can be clearly avoided. Longer ascents/descents are more unpredictable, so penalties should be maintained as per table.
- Other unusual or unique cases will be added here as they are encountered.

Limit 4 will be penalized by 250 points per 1 m/s, or part of, exceeding.

10.3 CLEARING GOAL/TARGET AREA

Certainly a competitor should not block the target with his balloon and should reasonably clear the area while observing not to climb too fast and not to abuse any rate of climb limits the Director may have given. Generally a warning should be given unless deliberate action can be assumed.

10.4 DROPPING OBJECTS

This rule is generally not abused. By law, water and loose sand is allowed. Competitors also use pieces of paper, shaving foam, etc. All these materials should be allowed as long as they do not endanger people on the ground or should be banned for other reasons (e.g., toxically, non-ecologically, etc.). If safety is not an issue, a warning should be given.

10.5 BEHAVIOUR

Behaviour of competitors and crews that may discredit the good name of our sport must be avoided. Judging the magnitude of misbehaviour is difficult and depends on subjective and objective points of view. A penalty guide is not provided because of the wide range of possible misbehaviours.

10.6 LIVESTOCK AND CROP

Judging an infraction of this rule can be very difficult. One should weigh all circumstances like: could the competitor see the cattle (maybe he was surprised to see the cattle just behind a row of trees.); what action did he take (sometimes burning to climb does more harm than gently flying low and burn thereafter); sometimes cattle start running away from another balloon and a competitor ends up flying right over them whereas he could assume originally that his flight path was free. Unless clear disregard of the livestock is witnessed, one should warn in the first instance.

10.8 COLLISION

No pilot wants to touch a wire, nor is there any advantage in doing so. Therefore generally he is penalised already by shock or burns to his balloon. We would say a penalty should be from 200

to 500 points. If however, a competitor takes unnecessary risk such as landing in a small field with wires around hoping things will be alright and then touches wires, he may be penalised under AXMER R10.2 Reckless Flying.

10.9 PERSONS ON BOARD

AXMER Rule 10.9.1 says that crew members may perform any duty "…except to act as pilot-in-command." This means virtually anything including operating the burner, dropping markers or even both. Practically this means there is no penalty for this rule.
When a competitor does not fly "solo" when prescribed by AXMER R10.9.3, he should be scored in Group B in all tasks in that flight.

10.10 GROUND CREW

The competitor is responsible for his crew even when in the air. So if his crew does things they shouldn't do according to the rules, there is generally little room for interpretation and the competitor should be penalised. The amount of penalty varies from warning to competition points depending on the type of rule infraction.

10.11 DRIVING

The Director is not the police or a law enforcement officer. So generally he should not penalise for breaking traffic rules, e.g., like wrong parking. However, if a competitor or his crew drives through a red traffic light or races far above the speed limit through a village, the Director should intervene if this is reported to him, generally with a warning in the first instance.

10.13 ASSISTANCE

This rule is more or less superfluous because handling lines or pushing the basket would constitute a ground contact and should be penalised as such under AXMER R11.4 Ground Contact 1 or R11.5 Ground Contact 2. What happens now and then is that a competitor forgets his markers, radio, etc. In that case, sometimes the competitor tries to fly low over a road and the crew throws them to him. As long as there is no physical contact, this should be tolerated.

10.14 AIR LAW

What is said under DRIVING also applies here; that is, the Director is not a law enforcement officer. However infringements that affect safety and/or constitute competitive advantage should be followed up upon. The two major stumbling blocks are not flying VFR and abusing altitude limits (AXMER 7.3.6 Blue PZs).
GPS loggers deliver a means to more objectively determine who flew in the clouds, provided there is a common cloud base, and in any case altitude infringements of Blue PZs.
Generally, the following procedure for determining penalties in conjunction with altitude limits is suggested:

- For every track point, the altitude above limit is determined.
- Penalties should be given based on the time and altitude above the limit.
- For each feet/meter and second, penalty points should be calculated with a penalty factor (penalty per (feet / meter x seconds)).

The total penalty is the sum of all calculated track point penalties and should be rounded to the next full ten points. The following variables should be considered in the calculations:

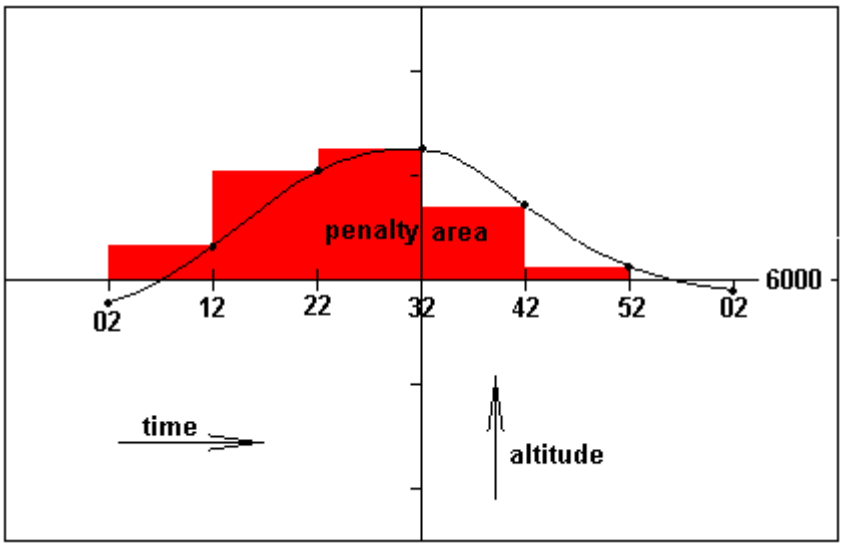
- Time interval of track points.
- Penalty factor.

In March 2006, the SWG agreed that the warning zone will no longer be used and penalties will be applied with a penalty factor of [1 point/1 feet / 1second] / 100.

In the following example the penalty would be **190 points.**

Example: Altitude limit is 6000 (1829m)

Time	Altitude	Infraction	Penalty.	Sum for this infraction
08:13:02	5900 (1798m)	-	-	-
08:13:12	6200 (1889m)	200 (60m)	200x1x10/100=20	20
08:13:22	6550 (1996m)	550 (168m)	550x1x10/100=55	75
08:13:32	6700 (2042m)	700 (213m)	700x1x10/100=70	145
08:13:42	6350 (1935m)	350 (107m)	350x1x10/100=35	180
08:13:52	6100 (1859m)	100 (30m)	100x1x10/100=10	**190**
08:14:02	5950 (1813m)	-	-	-



When a Civil Aviation Authority has given permission to use airspace directly below an airway or near other such busy controlled airspace, the Director should take action to keep the competitors away from Blue PZ such as by announcing stricter penalties, up to disqualification from the event.

At the 2015 CIA Meeting, the AXWG determined that using Blue PZs to control and monitor maximum altitudes when weather conditions do not otherwise permit the full use of the airspace allocated for the event is a good practice, provided that sufficient airspace is available to comply with applicable air law.

11.2 LANDING AT WILL and 11.3 CONTEST LANDING

The penalty should be applied for each metre that the competitor landed within the 200 metre radius from his mark or goal/target under AXMER R13.3.

March 2014: Rule 13.3.4 was modified to include penalties related to landing when a MMA is not set. In that case, the penalty for landing too close to goals/targets or any physical mark of the competitor was set to a maximum of 200 task points (rather than using the “percentage of infringement” method).

For landings at will (see R11.2 LANDING AT WILL), the penalty should be applied as one point for every meter that the competitor landed within the 200 metre radius from the mark.

For contest landings (see R11.3 CONTEST LANDING), the penalty should be applied as one point for every meter for a goal/target set by the director or a goal chosen by the competitor.

It is possible that a contest landing within 200 m of a goal will get a lower penalty than a ground contact at the same spot. If a pilot makes a contest landing under R11.3, ground contact (such as a "bounce" just prior to the contest landing) should not be regarded as a Ground Contact 2. Any penalty for landing within 200 metres should only relate to the final resting place of the basket.

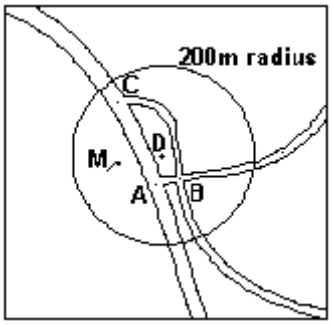
11.4 GROUND CONTACT 1 and 11. 5 GROUND CONTACT 2

Both rules clearly have fixed penalties leaving no room for interpretations. In 2003, a differentiation was introduced between light and solid contact, the definition of which seems clear. In the past, competitors were harshly penalised for arbitrary contacts like blades of grass, marker tail, etc.; hopefully this differentiation will reduce protests.

11.6 PERMISSION TO RETRIEVE

The same as was said before for behaviour, landowner permission, etc. is also applicable here. When no complaint is received by a landowner and no damage is done, then a warning should be given in the first instance.

12.3 IDENTIFICATION



If the declaration is right on the spot there is no ambiguity even if there are other goals within 200 metres. However, let's assume D is the point complying with the competitor's declaration. A, B and C are valid goals and M is the marker drop. Under Rule 12.3.1 the competitor "… may add descriptive detail …" In this case he should have done that otherwise it is not clear which goal he actually meant. In this case of ambiguity, calculate the result to each possible goal and take the least advantageous result.

12.6 MARKER

What happens mostly is that the competitor forgets his marker(s). In this case, he usually throws something else, e.g., glove, or uses a training marker he happens to have on board. In this case, a penalty of 50 points should be given unless he gained a competitive advantage, e.g., dropping high and falling fast. Sometimes the marker tail becomes knotted when thrown; in this case, 50 points should be given. More than 50 points should be given if competitive advantage is gained, e.g., in case of gross neglect or substantial change of the marker.

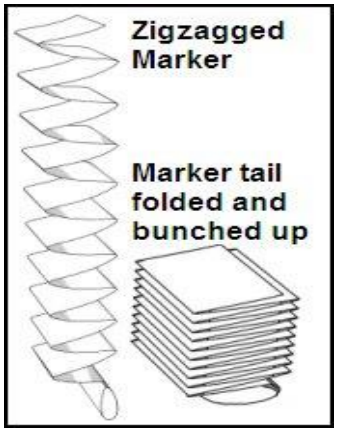
In 2003 after discussion in the SWG, it was concluded that a marker that had previously been swirled and subsequently dropped correctly as a gravity marker drop does not constitute a modified marker.

12.9 GRAVITY MARKER DROP

Fortunately the penalty is fixed for not dropping the marker correctly; simply add 50 metres to the competitor's result. In 2005, the AXWG adopted the gravity marker drop rule used in the USA. The method is clearly described in the rule and needs no further interpretation. However, after some discussion, it was decided that in case a competitor uses the 'old' method of gravity drop, it would be harsh to penalise him with 50 metres and therefore a lighter penalty of 50 points was included. In the past, there have been some lengthy debates up to Plenary level about whether a marker thrown into a limited scoring area when a gravity marker drop was prescribed was valid or unsportsmanlike. By Plenary decision this was considered OK provided the 50 metre result penalty is applied. The last sentence of this rule reflects this Plenary

decision.

12.10 FREE MARKER DROP



It has become practise to accept any method (throwing, swirling, etc.), except with a mechanism of course. It may add to the amusement to see competitors struggling with their markers. However in any case, the marker must be unrolled.

Some competitors fold their markers (zigzag pattern) before dropping. A zigzagged marker is considered unrolled. A zigzagged marker that is almost laid on a target when a competitor makes a low pass over the target is OK, even if the zigzagged tail does not completely free up in this process.

12.13 INTERFERENCE WITH MARKER

Normally interference with a marker constitutes a severe infringement of the rules and should be penalised accordingly. However in a situation for example where a competitor with the observer on board passes over a road junction and the competitor does a good drop on the junction and the crew is able to spray the point while the observer is still in sight, then it would be rather counterproductive to leave the marker on the road ready to be taken by car or by–passers. In such a situation, the observer should give the crew permission to remove the marker without incurring a penalty.

13.3 DISTANCE INFRINGEMENTS

The method of penalizing distance infringements was changed significantly at the 2012 CIA Annual General Meeting. The "2 x infringement" or "2 x arcsin" result penalty (that is then applied to a competitor's achieved outcome) was replaced by a "percentage infringement" method that determines a task point penalty (that is applied to the points a competitor receives for his achieved outcome). This change was made so that one competitor's penalties do not affect the score of other competitors and so that distance infringement penalties are more consistent. This rule was further modified at the 2013 CIA Annual General Meeting to move away from a "stepped" method of determining penalty points to a linear formula. The current rule is:

"13.3.5 For competitors taking off too close to a goal or target, declaring a goal outside the limits specified in the TDS or otherwise abusing the set distance limits of a task, the penalty will be 2 task points per 0.1% infringement. Above 25% infringement the competitor will be scored in group B.

For Elbow, Angle and Land Run Tasks, the percent infringements will be the sum of the percent infringements of each 'leg', unless otherwise defined in the TDS.

A competitor penalized under this rule cannot achieve a score less than Group B as a result of the distance infringement penalty."

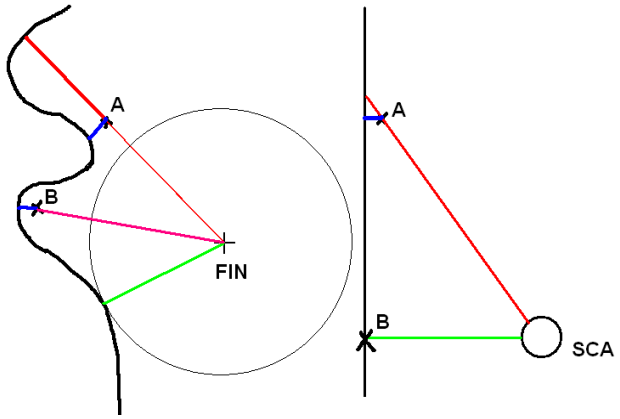
"A competitor penalized under this rule cannot achieve a score less than Group B as a result of the distance infringement penalty." requires that distance infringement penalties be applied before any other penalties. If the score is less than Group B, the competitor's score must be set to that of Group B. Other penalties will then be applied, in the usual manner for task and competition penalties.

Percentage infringement should be calculated by truncating the result of dividing the infringement by the distance limit to a lower integer value. For example, if a competitor infringes a 1,000m limit by 251m, the result of the division would be 0.251, or 25.1%, which should be

truncated to 25%. This method ensures that a competitor will not be scored in Group B because of infringements slightly over the 25% limit (and likely within the accuracy of measurement).

How to apply the above method is obvious for clearly defined “radial” minimum and maximum distances from a goal or scoring area. If other means, e.g., map grid lines or natural boundaries (shown on the Official Competition Map) such as roads or waterways are used, it is not so obvious which distance should be used if an infringement occurs.
In tasks where minimum and maximum distances are not explicitly set, e.g., when permitted take-off areas are defined by map grid lines, features on the Competition Map such as roads, waterways, etc. or as declared by the Director on the TDS, the minimum and maximum distances for the purpose of calculating percentage distance infringements will be the minimum and maximum distances from the limiting conditions to the closest goal or closest point of the closest scoring area. In these cases, the infringement distance is the distance from the take-off position to the closest limiting condition.

In the following diagram, the minimum distance would be the length of the green line and the infringement distance would be the length of the blue line. The percentage infringement would be ‘blue line’ / ‘green line’ X 100%.



When does 13.3.6 apply to altitude infringements?

In which cases does 13.3.6 distance infringement also apply to altitude infringement? Only in cases when the altitude infringement can be determined relative to a differential (not absolute – e.g X must be 500ft higher/lower than Y) altitude. An absolute altitude cannot be used to determine a relative infringement.

Altitude infringements when 13.3.6 does NOT apply:

a) A track point or mark is outside a define scoring air space. One example is a 3D shape task with altitude limits on the scoring volume (e.g. «cake»). A track point or mark outside the scoring air space (12.19) should be considered invalid. If no scoring position inside the scoring air space is achieved, the competitor will achieve no result. (Aligned to rule 12.18.2).
b) PZ infringements. Those are to be handled by rule 7.5 (PZ Infringement).
c) Absolute altitude limit band for declarations. The competitor is restricted to a specific altitude band for the declaration. Example: «any coordinates at min 1000 ft AMSL» or «any goal from the list with altitude; the altitude must be between 1000ft and 3000ft». This is comparable to a horizontal case «any coordinates east of grid line 4200». Any declaration which does not comply with the limit is invalid. If the competitor doesn’t have a

valid declaration (e.g. a previous declaration), he will achieve no result.

d) Declaration with predefine goal altitude. Example: «any coordinate, the goal will be at 1000ft». Often the pilots are asked to declare the altitude in the logger anyway. In case they declare a wrong altitude or miss declaring the altitude, this could be ignored, and the declared altitude can just be assumed to be the predefined altitude (e.g. the 1000ft).

Altitude infringements when 13.3.6 DOES apply:

e) Declaration with relative altitude limits. This is a task where the allowed declared altitude depends on the altitude of the declaration point. Example: «the altitude of the declared goal must be 500ft higher or lower than the declaration point». In this case 13.3.6 can be applied and the reference for the relative calculation is the required altitude difference. If the competitor in the example above declares at 1050ft a goal at 1500ft his infringement is 50ft (500ft - 450ft) or 10%.

SPECIFIC TASK RELATED PENALTIES

15.1 PDG

Many things can go wrong when declaring goals. Generally the rules should be applied strictly, meaning the competitor must make the declaration himself, in writing and clearly readable on the paper specified in the task data (declaration box, Observer Report Sheet, etc.). Any unreadable or wrong declaration should lead to a Group B score, except when declaring late in which case a penalty of 50 points per minute should be applied (See AXMER R12.3.6 and also comments above regarding AMXER R7.8 Map Coordinates). For further guidelines, read also FON task (AXMER R15.5).

15.5 FLY ON

Many things can go wrong in FON tasks and they have led to extensive discussions. Because of this and the long history of debate and interpretations, today the tendency is to very strictly apply the rule as written. Here are several mistakes made by competitors, followed by the penalty the SWG thinks should be applied.

In 2012, the AXMER R12.3.4 Goal Declarations By Competitors and R15.5.4 FON were changed to be less restrictive.

Infraction	Proposed penalty
More goals are declared than allowed.	The competitor will be scored to the least advantageous valid declaration.
Declaration made verbally to the observer (o.b. = on board) who writes down the declaration on the Observer Report Sheet.	The verbal declaration will be considered invalid. If there is a valid declaration, the competitor will receive a result. If there is no valid declaration, the competitor will not receive a result.
Declaration made verbally to the observer (o.b.) who writes down the declaration on the marker as requested by the competitor.	The verbal declaration will be considered invalid. If there is a valid declaration, the competitor will receive a result. If there is no valid declaration, the competitor will not receive a result.
Marker is found with an unreadable declaration, e.g., washed away because non-permanent ink pen was used or very badly (unreadable) written.	The competitor will be scored to a valid declaration on the Observer Report Sheet.

Marker is found with a goal but figures do not match what the competitor believe he wrote / intended. Competitor argues that he can read the right numbers.	Try to find several independent witnesses and ask them what they think is written. If the majority reads the numbers the way the competitor does, give him the benefit of the doubt. Otherwise apply R12.3.3.
Marker is stolen but observer (o.b.) witnessed what goal the competitor wrote on it before dropping.	In this exceptional case, the result should stand because the competitor had applied the rule as witnessed by the observer and the observer saw the drop (apply R12.15.2 assessed result).
Marker is stolen but seen before by another official or observer.	If the official or observer has noted the coordinates, use that declaration and apply R12.15.2 (assessed result). If the declaration was not noted then the competitor will be scored to a valid declaration on the Observer Report Sheet.
Marker is stolen.	The competitor will be scored to a valid declaration on the Observer Report Sheet.
Marker is stolen. Competitor wrote his goal on the marker before take-off and the observer (f.o.g. = follow on ground) noted this declaration on the sheet.	The competitor claims that the observer saw him write the goal on the marker. The competitor may have changed his declaration and because we don't know what was exactly written on the marker when dropped, the competitor will be scored to a valid declaration on the Observer Report Sheet.
More than one goal was allowed. Competitor declares valid and invalid goals.	Measure him to the best valid goal irrespective where he aimed for (he is lucky if the goal he aimed for was valid). Also applies for PDGs

15.6 HARE AND HOUNDS and WATERSHIP DOWN

What often happens is that competitors overtake the hare balloon and drop their markers before the hare has laid out the cross. This is not prohibited by the rules and should therefore be allowed.

15.13 MINIMUM DISTANCE

Together with the FON task, this task causes most of the problems, complaints and protests. Directors tend to set this task in light wind conditions and competitors tend to hang around after take-off in order to avoid drifting away. This tends to produce ground contacts. Also, clearing the launch area is difficult to check although this becomes easier with GPS loggers. For this reason, setting this task is not recommended in light wind conditions.

One problem is that often the balloons fly together in a big group. What happens then is, the bigger balloons are virtually hanging on (leaning on) the smaller balloons, sometimes pushing them down. The normal heating reaction is then not sufficient because they must burn for themselves and others, and ground contact is more likely. In those cases, interviews with observers or witnesses are necessary to collect information.

APPENDIX A: FORMS

GPS Position Report Form

(Electronic version of form is available at https://www.fai.org/cia-documents --> Event Organizers.)

GPS Position Report Form Usage Notes:

When printing a GPS Position Report Form the notes on the first page shall be printed on the form.

Map Datum, Position Format and Time Zone must be edited to indicate the settings used at a specific event.

A Director may decide the minimum number of position readings that must be taken (1, 2 or 3) provided that Observers are instructed that a GPS receiver must be allowed to stabilize before taking readings. "Stabilise" means easting and northing changing (fluctuating) less than 1 or 2 m over 5 to 10 seconds. Notes 3 and 4 may need to be edited accordingly.

Observers must be instructed on how to determine if the GPS receivers used are in differential when the reading is taken.

GPS Position Report Form

Date 日付:

Task タスク #:

Competitor Number 競技者番号: Name:

Observer Number オブザーバー番号: Name:

Map Datum: WGS 84? YES NO

Position Format: UTM? YES NO

TimeZone: CET?

位置の種類（launch，landing，mark，goal etc）											Task タスク#:							EPE m DGPS?
	Easting 東西										Northing 南北							Time 時刻 (i.e. 16 s)
1																		
2	▨	▨	▨	▨	▨						▨	▨						
3	▨	▨	▨	▨	▨						▨	▨						
Average 平均				▨	▨						▨	▨						Marker Colour:

位置の種類（launch，landing，mark，goal etc）											Task タスク#:							EPE m DGPS?
	Easting 東西										Northing 南北							Time 時刻 (i.e. 16 s)
1																		
2	▨	▨	▨	▨	▨						▨	▨						
3	▨	▨	▨	▨	▨						▨	▨						
Average 平均				▨	▨						▨	▨						Marker Colour:

位置の種類（launch，landing，mark，goal etc）											Task タスク#:							EPE m DGPS?
	Easting 東西										Northing 南北							Time 時刻 (i.e. 16 s)
1																		
2	▨	▨	▨	▨	▨						▨	▨						
3	▨	▨	▨	▨	▨						▨	▨						
Average 平均				▨	▨						▨	▨						Marker Colour:

Note 1: Follow the instructions and complete all information, otherwise position report is
指示に従って、必要な全ての内容を記入すること。指定された内容を満たしていない場合、GPSによる位置報告は無効になる。

Note 2: Before reading or storing points, the GPS unit must be stabilized more than 1 minute
位置を読み取ったり、メモリに保存する場合は、GPSを1分以上動作させて安定させてから用いること。

Note 3: Minimum three GPS position readings at each position must be recorded.
GPSによる位置は、最低3回以上を読み取り、記録すること。

Note 4: Minimum time between GPS readings must be 15 seconds.
各GPSの読み取りは、15秒以上あけること。

Note 5: Write full digits (32U 0289117, 5532706) at the first line.
Last five digits at 2nd and 3rd line. Average of last five digits at 4th line.
最初の行には全てのデジットを記録すること。(32U 0289117, 5532706)
2行目ないしは3行目には、最後の5桁を記入すること。
4行目は、1行目から3行目の下5桁の平均値5桁を記入すること。

Note 6: For goals declared by pilots (PDG and FON Tasks), if goals **MUST** be selected **ONLY** fro
valid goal list, **ONLY** record the position of the marker. If goals may be selected b
coordinates, **ALSO** record the position of the goal.
パイロットがゴールを宣言する(PDG,FON)タスクで、ゴールを有効なゴールリストのみから選択しなければならない場合は、GPS計測はマーカーだけでよい。
ゴールをコーディネートで宣言してよい場合は、ゴールの位置もGPSで計測すること。

Note 7: No GPS is used if EPE is more than 10 meters.
EPEの値が10メートルを超える場合、GPSデータの記録をしてはならない。

Note 8: Measurements by GPS will not be accepted when result is less than 200m.
However, you shall record positions of all marks by GPS with this form.
GPSによる計測は、200m以内では行ってはならない。しかしながら、全てのマークのGPSによる位置報告はこの用紙で行うこと。

Note 9: If big difference between readings appears, check GPS and read again.
読取値に大きな差がある場合には、GPSを点検して再度読み取りを行うこと。

FLIGHT REPORT FORM (FRF)

(Electronic version of form is available at https://www.fai.org/cia-documents)

FLIGHT REPORT FORM

COMPETITOR

Name:	**Pilot Nº:**

FLIGHT

Nº:	**Date:**	**AM** **PM**

SCORING INFORMATION

Takeoff

Coord.:	**Time:**
Remarks:	

Landing

Coord.:	**Time:**
Remarks:	

Task

Nº:	**Coord.:**	**Time:**
Remarks:		**Estimated result:**

Task

Nº:	**Coord.:**	**Time:**
Remarks:		**Estimated result:**

Task

Nº:	**Coord.:**	**Time:**
Remarks:		**Estimated result:**

Task

Nº:	**Coord.:**	**Time:**
Remarks:		**Estimated result:**

DOWNLOADER:

Signature:

Time logger back:
Logger readout:
Markers returned:

Need Pilots GPS:	☐ **yes** ☐ **no**
Pilots GPS readout ok:	☐ **yes** ☐ **no**

Officials only

Result:	☐ **MT** ☐ **GPS**
Remarks:	

Result:	☐ **MT** ☐ **GPS**
Remarks:	

Result:	☐ **MT** ☐ **GPS**
Remarks:	

Result:	☐ **MT** ☐ **GPS**
Remarks:	

Task

Nº:	Coord.:	Time:	Result:	❑ MT ❑ GPS
Remarks:		Estimated result:	Remarks:	

Task

Nº:	Coord.:	Time:	Result:	❑ MT ❑ GPS
Remarks:		Estimated result:	Remarks:	

LANDOWNER INFORMATION

Takeoff

Name:	Phone Number:
Address:	
Remarks:	

Landing

Name:	Phone Number:
Address:	
Remarks:	

Additional Information annexed

No	Yes:

Additional Information annexed

No	Yes:

Pilot's signature:	Analyzer's signature

EXAMPLE OF A STANDARDISED TASK DATA SHEET (TDS)

World Air Games
Seville, Spain 22 June - 1 July 2001

FLIGHTDATA

a) Date	10.03.2001	f) Briefing time/place	04:45 / Comp.centre
b) Sunrise / Sunset	05:00 / 21:00	g) Observer	Fly on pilot's invitation
c) PZs in force	All	h) Solo flight	not set
d) Launch area	Pilots choice	i) Search period	4Hrs
e) Launch period	05:45-07:00		

TASK Nr. 1, FLY IN

a) Marker colour	RED	
b) Marker order	-	
c) Marker drop	BY GRAVITY!	
d) Scoring period	-	
e) Scoring area	-	
f) Task data R15.4.2	a. Goal	12345678
	b. Min/Max dist. L. Point to goal(s)	X / Y km
	c. Number of take-offs permitted	1

TASK Nr. 2, HESITATION WALTH

a) Marker colour	LIGHT BLUE	
b) Marker order	-	
c) Marker drop	-	
d) Scoring period	-	
e) Scoring area	radius of 150m around target or goals	
f) Task data R15.3.2	a. Target	12345678
	Goal	12345678
	Goal	12345678

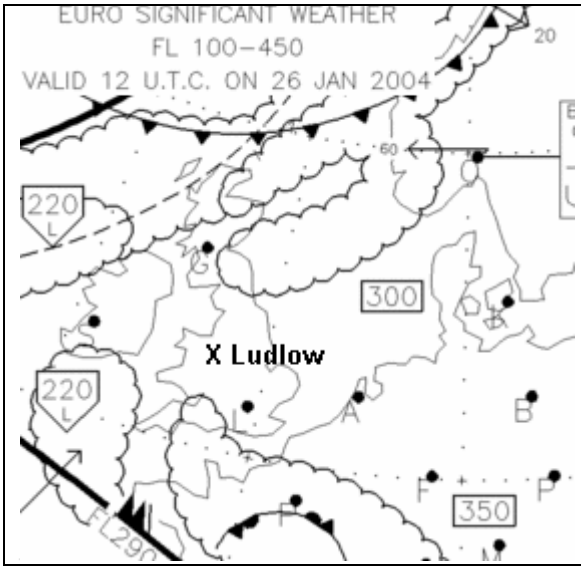
TASK Nr. 3, FLY ON

a) Marker colour	ORANGE	
b) Marker order	-	
c) Marker drop	-	
d) Scoring period	09:45	
e) Scoring area	-	
f) Task data R15.5.2	a. Min/Max dist. previous mark to goal	X / Y km
	b. Number permitted Goals	1

WEATHER INFORMATION SHEET (TYPICAL)

British National Championship

Ludlow, 21-30 Jan 2004



Ludlow is situated in a relatively calm but moisture air mass between a frontal system that has past us and new system that is moving in from the North. We expect to sky to open up in the next hour giving us maybe flyable weather during the morning.

Forecasts for 261020Z

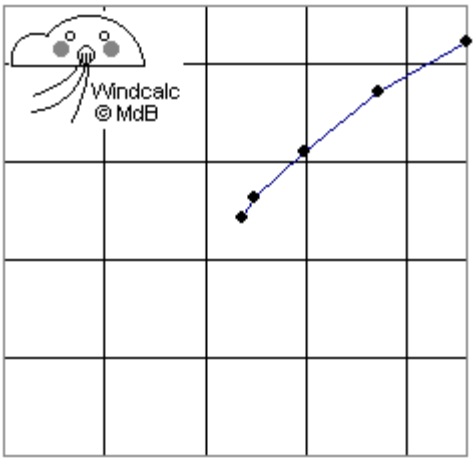
Manchester

03005KT 290V070 5000 HZ FEW013 BKN220 03/01 Q1007 NOSIG=

Birmingham

02007KT 1500 BR SCT004 SCT005 BKN007 01/00 Q1006 RERA=

Local QNH=1007



Next pibal will be available at the flagpole

Forecast winds		
Feet AGL	Magn From	Spd Kts
5000	250	25
4000	250	22
3000	250	20
2000	245	18
1500	240	15
1000	230	12
500	220	9
100	190	2
GND	Var.	1

Pibal 26/01/04 06:00 Ground level= 530ft		
Feet AGL	Magn From	Spd Kts
clouds		
700	240	13
550	231	12
400	226	9
300	214	3
150	203	2
GND	Var.	0

1m/s=200ft/min=2kts 1013hPa=760mmHg=29,92inHg 1ft=0,3048m

APPENDIX B: STANDARDISED TEXT FOR TASK SCORE SHEETS

Rule Nr.	Latest version rule reference	Notes
2.2.2	Nationality of flight crew	
2.11	Competitor responsibility	
2.12	Conduct	
3.1.3	R. vents used	
3.3	Balloon changed	
3.4	Airworthiness	
3.5.1/3.5.2	Envelope damage Envelope replacement	
3.6	Automatic Flight Controls	
3.7	No altimeter Altimeter not readable by OBS	
3.8	No basket number No vehicle number	
3.10.1	Crew within 100m or MMA	
3.10.2	No second vehicle number	
3.10.3	Vehicle within 100m of GL/TGT	
6.6.1	OBS on Retrieve Conveyance of OBS OBS no visual contact	
6.6.2	OBS conveyance OBS return	
6.7	Photography	This is a 'should' rule and therefore should not be penalised.
6.9	Incorrect use LGR	
7.1	T/O / LND / MKR outside CTA	
7.2	T/O / LND / MKR in OFB	
7.5	T/O / Flight / LND in PZ.	Include PZ number or numbers.
7.6	Map markings missing Map not on board	
7.8	Map coordinates	Generally an infringement of this rule should be penalised under R12.3 Identification.
8.4.2	Task ... not flown in order	
8.4.7	Wrong MKR order.	
8.11.1	Late entry	
9.1.1	T/O outside CLA	
9.2.5	ILA outside CTA	
9.2.4	Balloon moved before T/O.	
9.2.2	No LO perm.	
9.3.2	No quick release	
9.4.1	Vehicles-more than one	
9.4.2	Driving speed	
9.4.3	Late vehicles	
9..5	Preparation of balloon	
9.7.1	Fan use/green flg.	
9.9	Late T/O or Early T/O	
9.10	Obstruction	
9.11	Adequate time	
9.12	Extension of time	

9.15	Readiness for T/O	
9.15.3	No T/O permission	
9.20	Aborted T/O	
9.21	LA not cleared in 3min or 500ft	
10.1	Midair collision	
10.2	Dangerous flying	
10.3	Clearing GL/TGT area	
10.4	Dropping objects	
10.5	Behaviour	
10.6	Close to livestock No landowner permission	
10.8	Collision pwr. wires Collision tel. wires	
10.9.2	More than 3 persons	
10.9.3	Not Solo	
10.10	Insufficient grnd. crew	
10.11	Driving	
10.12	Disembarkation	
10.13	Assistance	
10.14	Air law	When air law is infringed and penalised reference to specific law should be made.
11.2.2	LND in 200m of GL/TGT or MKR	
11.3.2	Assistance contest LND.	
11.3.4	Contest LND in 200m of GL/TGT	
11.4	GC 1 light GC 1 solid	
11.5	GC 2 in 200m of GL/TGT	
11.6	No LO perm.	
12.2.1	Invalid goal	
12.3.1	Incorrect goal identification	
12.3.2	Ambiguous goal	
12.3.2	No valid goal	
12.3.3	Invalid goal	
12.3.4	Too many goals	
12.3.5	Late declaration	
12.3.5	No declaration before take-off	
12.6	Modified MKR Unauthorized MKR	
12.7	(Not Used)	
12.9	Invalid GMD	
12.10	MKR not unrolled	
12.12	(Not Used)	
12.13	Interference with MKR	
12.14	SRP exceeded	
12.16.2	Result assessed Result next MKR Result LND position	
12.17.2	Out of SCP	
12.17.3	Out of SCP	
12.17.4	Sunset	
12.18.2	Out of SCA	

13.1	Serious Infringements, unsporting behavior	If possible describe what happened. E.g.: Mislead Officials, Documents falsified
13.2	Unspecified penalties	When penalising rule infringement for which a penalty is not specified, the reference should be made to the infringed rule and **not** to R13.2
13.3	Distance infringements	Competitors should **not** be penalised by reference to R13.3 but reference of the specific rule. Wrong: '50 TP R13.3 Distance infringement' Correct:'50 TP LND close to MKR'
PDG 15.1.2.a 15.1.2.b	 Unreadable declaration No declaration Late declaration Too many goals	
FIN 15.4.4	 More than one scoring attempt	
FON 15.5.2.b 15.5.4.b 15.5.4.b	 Too many goals Unreadable declaration Declaration not on MKR	Many things can go wrong see penalty guide. If the MKR is lost and no goal is declared etc., score him according to R12.15 and use that wording.
CRT 15.9.4	More than one scoring attempt	When a competitor scores outside the SCP or SCA, just score him to Group B without a rule ref.
RTA 15.10.4		When a competitor scores outside the SCP or SCA, just score him to Group B without a rule ref.
MDT		
MDD 15.15.4		When a competitor scores outside the SCP or SCA, just score him to Group B without a rule ref.
XDT 15.16.4		When a competitor scores outside the SCP or SCA, just score him to Group B without a rule ref.

APPENDIX C: SCORING SOFTWARE STANDARDS AND BENCH MARK TESTING

The CIA Jury Handbook includes methods and tools that may be used to verify scoring software.

Marc Andre (developer of the FAI Logger and commercial instruments, with considerable experience working with Flytec, offers the following advice to the developers of software to support near miss detection:

“Care must be taken when calculating the climb/descent rate. Ideally the rate is directly taken from the logger's barometric variometer. In case the rate is calculated with differentiation of GPS altitude some filtering is needed to reduce the quantization noise due to the low resolution of altitude and relatively small sampling interval. [e.g. with 1s interval you would only get 0 m/s, 1 m/s, 2 m/s, etc. Thus a 0.3 m/s climb would give within 3 seconds: 0, 0, 1 m/s. This could easily trigger even though the correct climb rate is much lower.”

APPENDIX D: ALTERNATE PROHIBITED ZONES AND PENALTIES

ALTERNATE RED PZ PENALTY - TO BE DEVELOPED.

The discussion regarding alternate Red PZ penalty formulas mentioned in UPDATE RECORDS is at cia-forums.org in the Scoring Working Group section, topic “New approach for red PZ calculation.”

MOTORWAY (“TUNNEL”) PZs

See Penalty guide on rule 7.5.

APPENDIX E: CIA LOGGERS

Online Logger Training

Mathijs de Bruijn has developed excellent online training for the CIA Logger. It can be found at http://www.debruijn.de/FAIlogger/lgrindex.php.

Fail Over Procedures

The NTSC has developed "risk management and fail-over procedures" for the CIA Logger. Their document can be found at www.balloonloggers.org. Ddiscussions about these procedures can be found at cia-forums.org in the New Technology Subcommittee section, topic "CIA Logger fail-over procedures." This information is offered as an example of how scoring teams (very experienced with using the CIA Flight Logger) handled failures at a number of events.

Electronic Mark Errors

The scoring team for the 2011 European Championship developed a policy for handling "electronic mark errors" that seemed to work well. Their document and some discussion can be found at cia-forums.org in the Scoring Working Group section, topic "Electronic Mark Errors." This information is offered as an example of how one scoring team (very experienced with using the CIA Flight Logger) handled a variety of situations at a CAT 1 event.

Instrument Error Correction

The "Tips & Tricks" section at www.balloonlogers.org describes the recommended method used to correct a CIA Logger for instrument error. This method may also be used to correct other loggers that use barometric pressure to determine altitude.

APPENDIX F: ROLE OF THE EVENT DIRECTOR

Note: This appendix is the product of the Statutes, By-Laws and Sporting Code Working Group. Any comments, questions, suggestions for change, etc. should be directed to a member of that working group. Also note, that the sporting code references have not been updated.

Review of the role of the Event Director

> *On a suggestion from the Jury Board (March 2011) it was agreed that the Statutes, By-laws and Sporting Code Working Group would write an educational review of role of the Event Director and the extent to which he can be expected to be in "overall operational charge" of an event.*

Various documents (Sporting codes, Internal Regulations, UMRs, Competition Operations Handbook etc.) were reviewed to obtain an overall picture of the role and definition of the "Event Director" within competition ballooning.

Having reviewed all the available documents the most important statements from the General Section of the Sporting Code are as follows:

OPERATIONAL OFFICIALS. The NAC hosting a First Category Event shall appoint an Event Director, a Public Relations Officer (PRO), and any other technical personnel or functionaries as per the requirements of the Air Sport concerned. [GS 4.3.4]

The Event Director shall be in overall operational charge of the event. He shall have a Deputy Director and Technical Officials to assist him. The Event Director and Deputy shall be approved by the relevant FAI Air Sport Commission. [GS 4.3.4.1.1]

The Event Director is responsible for good management and the smooth and safe running of the event. He shall make operational decisions in accordance with the rules of the Sporting Code and competition rules. He can penalise or disqualify a competitor for misconduct or infringement of the rules. He shall attend meetings of the Jury and give evidence if requested. [GS 4.3.4.1.2]

He shall publish the officially accepted entry list prior to the start of the event, issue daily results and the article on the event from the event Public Relations Officer, and send the final entry list, full results and details of protests to his NAC and to the FAI within the specified time limits. [GS 4.3.4.1.3]

These GS rules clearly show that the Event Director is responsible for **all** sports related matters, and that he must make sure that the event is organised and run in accordance with the FAI and CIA standards. The Event Director is appointed by the event organiser, (which for FAI purposes is the local NAC and NOT the local organising body). He must be reasonably qualified and has to be approved by the CIA. The Event Director is approved when the event is sanctioned which is 2 years before the event is staged.

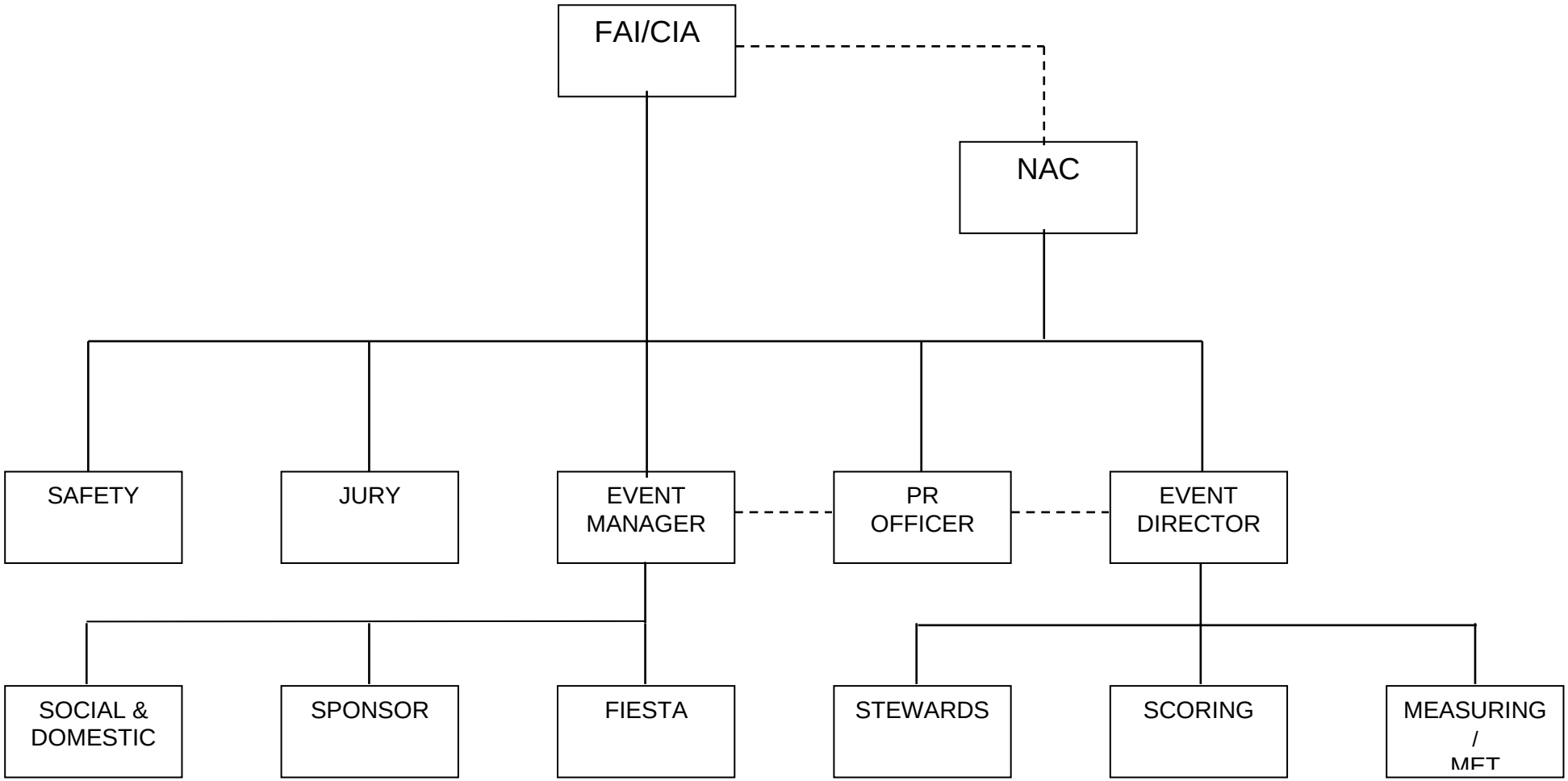
The event organiser may appoint an Event "Manager" or "President" to be responsible for other aspects of the event such as Sponsors, any Fiesta event and social and domestic aspects, but most importantly his role is to make sure that the Event Director has all the means and resources that he requires to organise a successful sporting event in accordance with the FAI and CIA rules.

The Event Director and the Event Manager / President are both under the responsibility of the event organiser. The CIA has the power to withdraw the approval of the CIA approved persons, and the event sanction. However the CIA cannot change personnel appointed or approved exclusively by the NAC/organiser.

The Event Director's "mission" officially starts as soon as he is approved by the CIA. However, the Event Director should be involved in many aspects of the bid preparation and therefore needs to be appointed by the organisers many months before the bid is required to be delivered. It is good practice that the proposed Event Director should also be involved in any test events at the proposed venues, so as to get familiar with the terrain and metrological conditions.

The Event Director's position within the organisation of the event can be seen in the chart below.

ORGANISATION CHART



Event Director Responsibilities

Typical tasks required of the Event Director prior to the bid submission are:

Advise the organiser on:

- Suitability of location / venue.
- Number of competition officials required, dependant on type of event (observer or logger), maximum number competitors.
- Nominating the CIA approved officials. – Deputy Director, 6 Jury members, Stewards and Safety Officer.
- Nominating other senior officials. – Chief Scorer, Chief Observer (if required), Chief Debriefer
- Program / briefings. – How many and where.
- Invitation process. – Closing entry date, how many invitation rounds.
- Equipment requirements. – Targets, Flags, Markers, Measuring tapes / EDM, Photocopiers. Stationary.

Note: The Event Director and Deputy Event Director will be approved at the CIA Plenary meeting sanctioning the event. The Safety Officer, Jury President and Jury Members will be appointed by the CIA at the CIA Plenary meeting prior to the event.

Typical tasks required of the Event Director prior to the event are:

- Rules publication: Submission to CIA for approval 60 days before CIA meeting in the year of the event.
- Distribution of the approved rules to competitors and officials at least 90 days prior to the General Briefing
- Invitation process: NAC invitations, First Round invitations, Second Round invitations
- Deadlines: Ensuring CIA deadlines are met. Closing Entry date (First Round), Final entry date 45 / 60 days before General Briefing. Reserve list updates and application.
- Pilot information: Website open, Map files, Goal list (if required), PZ list, Safety information, Airspace information.
- Registration process: Pre-check in with required documents. Final check in and documentation checks.
- Safety issues: Local hazards. Propane and refuelling instructions in conjunction with the Safety Officer. Emergency plan.
- Competition planning: Goals / targets, Out of Bounds, Competition area
- Location: Competition Centre, Launch fields, refuelling
- Venue:
- Event personnel: All additional personnel not listed in sanction application. Chief Meteorological Officer, Chief Measuring Officer, Chief Logger Handler, Chief Launchmaster etc. (Including all team members).

Typical Event Director tasks during the event are:

- Ensure all equipment is available and functioning
- Ensure re-imbursement of travel expenses is available for all officials and Jury Members.
- Meeting with Jury to confirm check list items.
- Officials meeting. – Introductions and welcome.
- General briefing arrangements.
- Declaring any No-Show entrants to the Jury and confirming action required, publishing Official Entry List.
- Assessing the metrological conditions with the weather chief
- Task setting.
- Task briefings
- Supplementary briefings.
- Launching decisions. – In conjunction with Safety Officer and Metrological chief.
- Liaising with senior officials. - monitor workloads, scoring backlogs, safety issues.
- Liaising with Event Manager – To ensure the organiser, sponsors and public are kept informed of what is happening
- Publishing results. – In conjunction with Chief Scorer so as to understand / confirm penalties.
- Ensuring all FAI/CIA Protocols are adhered to. - Opening/ Closing Ceremony, flags etc.

Note: The Event Director would be expected to be present onsite at least 5 days prior to the General Briefing. All Senior Officials should be present 3 days before the General Briefing. All other staff including the Jury should be present 24 hours before the General Briefing.

Typical Event Director tasks after the event are:

- Ensuring Final Results and Public Relations Officer report is delivered to FAI within 8 days of the Closing Ceremony.

Additional Notes:

- It is recommended that the term “Competition Director” should not be used.
- The same person should not be nominated as Event Director for 2 opposing bids to host a championship.