



*Fédération
Aéronautique
Internationale*

Competition Operations Handbook

For Hot Air Balloon Events

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*Maison du Sport International
Av. de Rhodanie 54
CH-1007 Lausanne
(Switzerland)
Tél. +41 (0)21 345 10 70
Fax +41 (0)21 345 10 77
E-mail: sec@fai.org
Web: www.fai.org*

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. References to GS mean the Sporting Code General Section. SC S1 means the Sporting Code Section 1 (Aerostats).

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.

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1 Information for Organizer

1.1 Definitions

In the FAI view, the event organiser is the NAC of the country concerned. However, the NAC may delegate that authority to the National Balloon Federation, who will then select the organiser of the event. The organiser will nominate an event director (ED). The FAI considers that the ED is the person responsible for everything. However, in some events this only applies to the “Sporting” aspects of the event. 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 ED 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 event director (or competition director) is in OPERATIONAL CHARGE OF THE (competitive) EVENT [GS 5.2.5.1]. He SHALL BE APPROVED BY THE RELEVANT ASC. To be able to deliver this, the ED needs to be a member of the organising committee, so as to have the day-to-day communication and understanding of the issues raised. He should not be involved in the non-competition activities of the event apart from making sure they do not impact on the competition. In past FAI/CIA events there have been many problems between the Organiser and the ED, due to a lack of communication. There must be clear roles and responsibilities through the various phases of the event. The 2 separate areas are the “Competition” (Event Director) and the “Organisation” (Event Manager). See chapter 1.4 People for model Organisation charts. These reflect what the FAI requires in the Sanction document, and what should be shown in any Bid presentation.

The CIA has the power to withdraw the approval of any CIA approved persons, and the event sanction. However, the CIA cannot change personnel appointed or approved exclusively by the NAC/organiser.

1.2 Planning for a Continental/World championship

The four vital parts required before considering a bid are:

- venue (flying area, competition centre, accommodation for all participants)
- people (organising committee, officials, volunteers)
- money (sponsorship, entry fees, public participation, security)
- time (planning, sanction time limits, scheduling for pre-event)

1.3 Venue

1.3.1 Area

The flying area should be at least 40km by 40km with preferably a high ceiling (10,000ft). There should be no large conurbations or industrial areas within the area and minimal power lines and motorways. The land should be ideal for low flying and landing at the time of the event, ideally with large cut fields and few landowner problems. There should be more than one common launch site so that the whole area can be used with the expected wind directions. If airspace is limited by ATC there should be good liaison between the organiser/event director and the airspace controller. The competition area should be tested, preferably by a test event scheduled 12 months before the event and proven satisfactory for a selection of tasks in all directions. A single CLA, either flying out or flying in as part of the task selection has advantages over multiple CLA's which can cause security issues and costs (managing public).

The launch fields should be large enough for the number of balloons planned. Calculate a minimum area of 25m x 25m per balloon. There should be no large obstructions on take-off. There should be an

entrance and exit for competitors separate to the public and these should allow unimpeded access to the road network with the volume of traffic expected on days with the maximum number of public expected.

1.3.2 Weather

The normal weather for the location and dates needs to be suitable for ballooning. Acceptable weather forecasting should be available.

1.3.3 Map

There must be the ability to produce a competition map in paper and electronic form. This needs to show all features expected of a 1:50,000 map with a numbered UTM grid (preferably repeated at intervals across the map) together with the UTM zone, magnetic variation, difference between true and grid north and a legend. It should include all airspace limitations, SAs and preferable symbols to indicate the competition centre, refuelling area and common launch sites.

1.3.4 Competition centre

This should be large enough to accommodate the number of competitors and officials expected. For 100 competitors it should have a:

- Briefing Room to seat 250 people at tables (360 if observers are used) with a stage for the officials, a data projector and screen and PA system.
In Category 1 events the FAI/CIA and FAI flags must be presented in the briefing room.
- Debriefing room/Observer Room (if observers used) to accommodate 25 tables and 105 chairs with network/internet connections. Without observers the room might be a bit smaller.
- Scoring Room to accommodate 4 tables and 6 chairs with network/internet connections
- Jury Room to accommodate 2 tables and 6 chairs with network/internet connections
- Directors Room to accommodate 4 tables and 6 chairs with network/internet connections
- Met room to accommodate 2 tables and 6 chairs with network/internet connections
- Administration / General Affairs / Stewards to accommodate 10 tables and 20 chairs with network/internet connections
- Measuring Team Room to accommodate 10 tables and 60 chairs with network/internet connections and storage for all equipment
- Anti-doping agency testing room and associated facilities e.g. toilet.
- The centre should have enough parking for the number of vehicles allowing for van + trailer so that it is easy to access and leave as well as a separate area and access for official cars.

1.3.5 Briefing room infrastructure

The room should have a means of controlling entry so competitors can be barred until all information is distributed onto the tables or the allotted time has arrived (e.g. 15 minutes before briefing time). There should ideally be one entrance for competitors so that they can be 'electronically registered' if the facility exists. There can be a separate entrance for crew chiefs but their identify should also be checked to ensure that other crew members cannot enter if that is the rule. There should be a means to allow team managers access and seating for them.

The room should be capable of seating the pilot plus chief crew member (and observer if applicable) in front of a desk, all officials and preferably all other crew members. The chief officials should be viewable by the audience at the front (preferable on a raised dais) with the jury to one side. There should be a large screen(s) so that all present can see expected details presented and those presenting should be audible to all, if necessary, using microphones. If microphones are necessary,

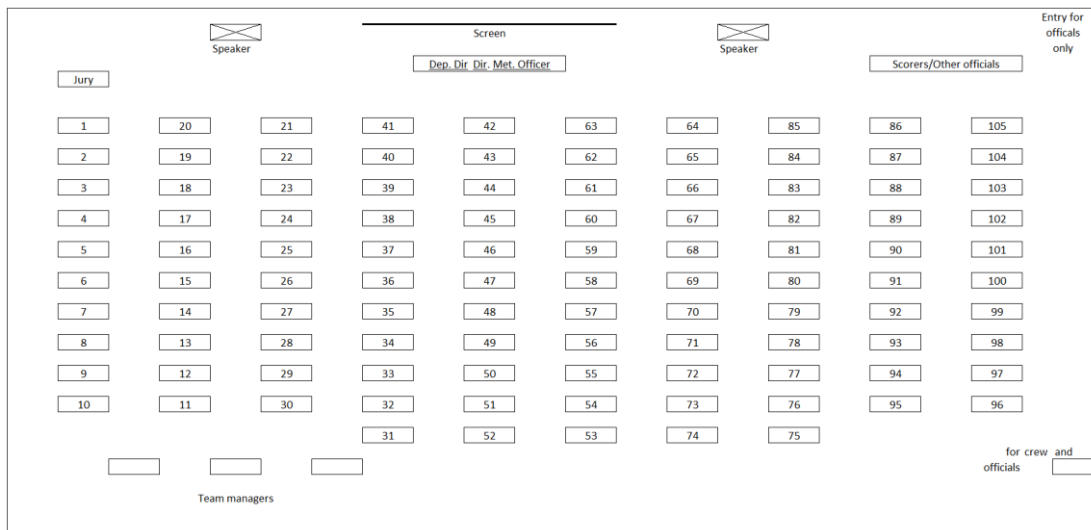
then there should be at least 2 people with remote microphones to deliver to questions or comments from the audience.

Be careful with meeting rooms in tents. Projectors usually don't work in tents due to the limited contrast. Also, the noise level from outside the tent must be considered.

The room should be capable of seating the pilot plus chief crew member (and observer if applicable) in front of a desk, team managers, all officials and preferably all other crew members. The chief officials should be viewable by the audience at the front (preferable on a raised podium) with the jury to one side. There should be a large screen(s) so that all audience can see expected details presented and those presenting should be audible to all, if necessary, using microphones. If microphones are necessary, then there should be at least 2 people with remote microphones to deliver to questions or comments from the audience.

Seating should be arranged in a logical order, but measures should be taken to allow medal winners to be seated with their fellow countrymen if desired and also to take account of any disabilities e.g. hard of hearing.

An example room arrangement is shown below:



1.3.6 **Internet**

Good (fast & stable) internet access is essential for the competition centre. Cable based internet should be provided for scoring purposes.

A free Wi-Fi should be provided for competitors in the briefing room.

Ensure that enough devices can connect to the Wi-Fi. (Assume multiple devices per competitor -> use a large enough DHCP address pool).

Separate the official's and competitor's networks.

1.3.7 **Refuelling facilities**

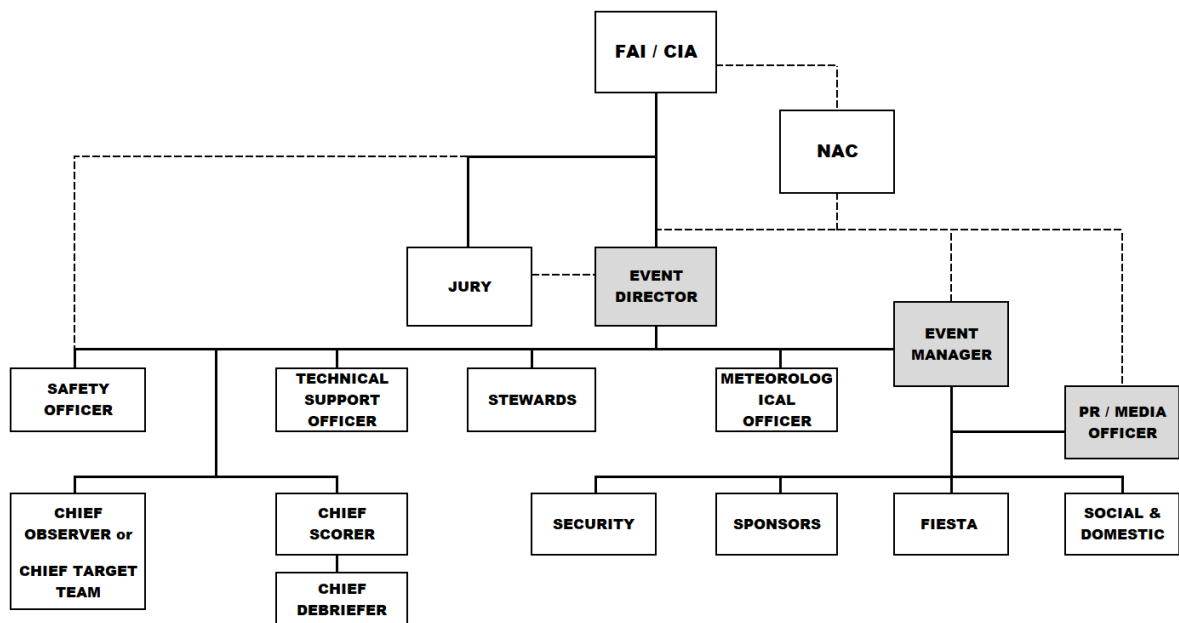
Propane (or propane/butane mix) must be available (allow 100 liters per balloon per flight average). There should be a refuelling area that complies with the country's H&S rules that is within easy distance, easily accessible for vehicles and trailers, arranged so that it is easy to get the tanks to the refuelling point and back, enough refuelling hoses for the number of balloons and at a refuelling pressure that ensures quick filling.

1.3.8 **Accommodation**

There should be enough accommodation for the number of competitors (estimate 2.5 double rooms/team) and officials (up to 80 [160 with observers] for an event with 100 balloons) within easy travelling distance of the competition centre (+/- 20 minutes) and at a reasonable price. The accommodation should have adequate parking. The officials should be in the same hotel and this should have fast internet facilities, a common room for socialising and communication and adequate parking.

1.4 **People**

An example organization chart is shown below. The lines refer to reporting lines and the dotted lines show communication.



1.4.1 **Organising Committee**

Key to this is the Event Manager and his team (the Organising Committee). The team will cover all aspects of the event management and infrastructure. It should be no more than 10 people with a strong Chairman to make decisions.

1.4.2 **Event Organiser or Manager (Event President)**

Nominated by the Organiser

Responsible for the overall control of the organisation teams and staff. He will be the main interface to the Event Director and also to the PR/Media Officer.

1.4.3 **General Affairs**

Responsible for all administration activities.

Budgets, Invitations for staff and volunteers, Invitations for Competitors, Officials and Observers (in conjunction with the ED) Vehicles for Competitors, Officials and Staff.

Shipping / Freight facilities for Competitors balloons and equipment.

Equipment rental for Competitors and organisation.

1.4.4 Social and Domestic

Responsible for Opening and Closing ceremonies, welcome party and any other social events. Also responsible for accommodation for Competitors, Officials and Staff.

1.4.5 Facilities Manager

Responsible for all facilities required during the event.

- Competition Centre – Briefing rooms, photocopiers, stationary etc.
- Launch Field – Briefing facilities, office facilities lighting / generators.
- Parking and access control.
- Propane, Refuelling

1.4.6 Fiesta Director

Responsible for all non-competition balloon activities including any tethering or night glows.

Liaising with the ED to plan the daily flight schedule.

1.4.7 Public Events Manager

Responsible for all events planned for the launch field and surrounding areas.

Liaising with the ED to agree daily timings of launch field activities.

1.4.8 Sponsor Liaison

Responsible for ensuring that all the sponsors are informed of the competition activities.

Liaising with the PR/Media Officer to ensure that the obligations to FAI and Sponsors are met.

1.4.9 PR/Media Officer

Responsible for all media communication and ensuring that the FAI Media rights are complied with as defined in the "Organiser Agreement"

1.4.10 The Competition Officials

The Event Director and Senior Officials should have experience of organising and running FAI Category 1 Championships and/or other international events.

The Event Director must fulfil the minimum requirements of the Officials Subcommittee.

See the detail list of all roles in the competition in chapter 2.1.

1.4.11 Event (Competition) Director

Responsible for all aspects of the competition:

- Checking that all entrants have a valid FAI Sporting Licence*
- Selection of Officials and Observers*
- Completing the Sanction Request documentation*
- Publication of Rules*
- Administering the Invitation process as defined in the Sporting Code*
- Agreeing the Competition area, airspace, goals and launch fields.

- Liaising with the Event Manager and his team to ensure that staff and sponsors are aware of the planned daily flying program.
- Publication of results in a timely manner and ensuring that these are transmitted to Media and Sponsors.

*These tasks may be carried out by the event manager in consultation with the event director. For a detailed list of duties, refer to 2.1.1 Event Director.

1.5 **Equipment**

Refer to 2.2 for a list of equipment needed. It is the responsibility of the organizer in coordination with the competition officials to ensure that the equipment is available.

1.6 **Budgets**

Cost to be considered include:

- **Sanction fee and performance bond**
- **Officials**, travel allowance, accommodation, subsistence.
- **Gas**, to include cost of purging tanks at end if necessary.
- **Facilities** – hire of competition centre, tables, chairs, photocopiers, internet and networks, PA system
- **Equipment**, - paper, markers, targets, flags, etc
- **Loggers** – type, quantity, rent
- **Public safety** – hire of launch field barrier, toilets, signposting. Police and/or security personnel.
- **Vehicles** – Cars are needed for measuring teams, scorers, jury and senior officials.

Event Development Service can indicate budgets from previous events.

1.7 **Timeline**

The mandatory timeline is also described in SC S1. This section copies a lot of this and adds some additional information.

Minus 3 years:

For CIA First Category Event Sanction World or Continental/Regional Championship Intentions to bid must be received by the CIA at least 60 days before the date fixed for the CIA meeting three calendar years before the year scheduled for the Event. They shall be included in the agenda of that meeting. Exceptionally, and only if the CIA has received less than 2 intentions to bid in accordance with the three-year deadline, the CIA may accept intentions to bid up to 60 days before the date fixed for the CIA meeting two calendar years before the year scheduled for the event. Intentions to bid shall not be accepted more than six years before the year of the event. A test event one year before should be considered. Test Events are compulsory for World and Continental Championships unless the Organizer has recent and equivalent CAT1 experience.

The letters of intent, supported by a letter of recommendation from the bidders' NAC, shall be presented to the CIA meeting by the bidding NACs' respective CIA delegates and be recorded in the meeting minutes. The letters of intent must contain the following information:

- The title, dates and place of the event,
- the organiser's name, coordinates and qualifications,
- the maximum total number of competitors the organiser is prepared to accommodate,

- the equal number of competitors to be invited from each eligible NAC,
- the organiser's policy on entry-fees.

For other First Category Sporting Events bids must be received by the CIA at least 60 days before the date fixed for the CIA meeting the year scheduled for the Event, unless these time limits are changed by the CIA under special circumstances

Sanction Application Submission as soon after preferable with Event Director Nomination and Senior Event Official Nominations.

Minus 2 years

FAI Organizers Agreement signed by organizing NAC and Organizer before the Plenary of CIA meeting 2 years before event. Jury Nominations should be on the sanction application by this time. Jury nominations must include the confirmation of the nominated people that they are available.

Bid presentations for world and continental championships shall be included in the Agenda of that Plenary Meeting. This can include information on test event.

Voting on bids take place at Plenary.

When the event has been sanctioned by the Plenary, the EDS chair will request FAI to raise the FAI/CIA Organiser Agreement, and invoices for the Sanction Fee and Performance Bond. The FAI/CIA Organiser Agreement signed by the organising NAC and the Organiser shall be returned to FAI within 28 days of receipt. The Sanction Fee shall be paid within 28 days from the date of the invoice. The Performance Bond shall be paid by the date requested on the invoice.

Minus 1 year

Invitations etc for test event.

Performance Bond must be paid before the invitation date as approved in the Sanction Application. The invitation process will not start unless the Performance Bond has been received by the FAI.

The proposed Rules for the event must be submitted to the CIA Rules Sub-Committee at least 60 days before the CIA Meeting immediately preceding the event.

Creation and maintaining an event website containing current information for competitors, officials, sponsors, media and the public.

1 year to 9 months before event

Invitation to NACs to nominate first round competitors with closing dates

9 months before event

Check entries and payments

Arrange second and third round invitations with closing dates.

6 months before event

Ensure all local plans and organisation are on schedule for event.

Rules and map ready to be distributed

90 days before event

Ensure rules have been distributed

1.8

Event Manager tasks

Tasks required of the Event Manager prior to the bid submission include:

- Preparing Bid Documentation and supporting presentation
- Preparing budgets. - Detailed Costing of Event, Sponsorship.
- Nominating the Organisation Management team members.

- Nominating other Organisation officials. – Fiesta Director, Facilities Manager, Launch field events controller, etc.
- Planning Event Schedule. – Meetings, CIA schedule,
- Agreeing the Invitation process with the ED. – Closing entry dates, how many invitation rounds etc.
- Agreeing the Equipment requirements with the ED. – Targets, Flags, Markers, Basket banners, Measuring tapes, Photocopiers, Stationery, GPS and loggers.
- Planning the Facilities, Competition Centre, Launch Field, Refuelling

Tasks required of the Event Manager prior to the event include:

- Organising accommodation for all Officials, Competitors, Crew, Observers and Volunteers
- Organising Transport and Vehicle Hire for Competitors, Officials and Observers.
- Organising Equipment rental for Competitors and Officials.
- Distribution of the approved rules to competitors and officials at least 90 days prior to the General Briefing
- Distribution of Pilot information
- Registration process. – Pre-check in with required documents. Final check in and documentation checks.
- Location. – Competition Centre, Launch fields, Briefing Facilities, Parking, and Public Access, Signposting
- Launch site facilities – barriers, toilets, signposts, PA.
- Event personnel. – Detailed breakdown of all personnel and their requirements, Organisation, Competition, and Volunteers.
- Fiesta Entries/Special Shapes. – Number, Costs, Vehicles, Transport.
- Meetings with Emergency Services. – Police, Fire, Ambulance
- Risk Management Planning.
- Ensuring all FAI/CIA Protocols are adhered to. - Opening Ceremony, flags, anthems etc.

Event Manager Tasks during the event include:

- Ensure all Facilities are available and functioning.
- Registration of all Competitors, Crew, Officials, Observers and Volunteers
- Ensure re-imburement of travel expenses is available for all Officials and Competitors and Volunteers.
- Meeting with ED to agree daily schedule
- Organisation Officials meeting. – Introductions and welcome.
- General briefing arrangements. – Protocols, VIP's
- Liaising with senior officials. - Monitor workloads, Safety issues, Facility problems
- Liaising with Event Director – To ensure the Organiser, Sponsors and Public are kept informed of what is happening
- Ensuring all FAI/CIA Protocols are adhered to. - Closing Ceremony, flags, anthems etc.
- Liaising with Emergency Services.

- Liaising with PR / Media Officer to ensure maximum exposure for FAI and Sponsors.
- Press accreditation – Distribution lists

Event Manager Tasks after the event include:

- Supplying all Event Media material to FAI (in a timely manner!).
- Press, Television etc.

1.9 Sanction application

Event Development Service (EDS) can provide the latest sanction application.

1.10 Entry process**1.10.1 Initial Invitation to NAC**

The organising NAC must issue initial invitations to participate to all eligible NACs. Copies of all invitations must be sent to the respective National Balloon Federations and CIA delegates, where these exist, for information. Invitations are sent via the respective FAI mailing lists.

The organising NAC shall issue an invitation for an equal number of at least two competitors (based on the approved sanction) to each eligible NAC.

Only the initial invitation must be sent by the organising NAC to eligible NACs, all further documents pertaining to the initial invitation may be addressed directly by the organisers to the nominated participants.

SC S1, chapter 5.6 outlines the entry process.

2 Information for Officials

This chapter describes best practices for the different roles and procedures. It should be considered as a strong guidance when running any Hot Air Balloon championship.

Best effort is done to keep the guide aligned with the AXMER rules. In case of any discrepancy the AXMER prevails.

2.1 Roles

This chapters lists the detailed duties of the officials. An overview of all roles is also listed in 1.4 People.

2.1.1 Event Director (ED)

Nominated by the Organiser and Approved by FAI/CIA. Organizer normally pays full travel cost, accommodation, and food.

Some tasks in the list below overlap with the list of the Event Manager. This is because events are organized differently. In the end the Event Director is in the overall charge of the event relative to the FAI.

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, Jury members, Stewards and Safety Officer.
- Nominating other senior officials. – Chief Scorer, Chief Observer (if required), Chief Debriefeer
- Program / briefings. – How many and where.
- Invitation process. – Closing entry date, how many invitation rounds.
- Equipment requirements. – Targets, Flags, Markers, Measuring tapes, Photocopiers. Stationary.

Note: The Event Director, Deputy Director, Safety Officer, Jury President and Members will be approved at the CIA Plenary meeting 2 years prior to the event or when the event is sanctioned.

Tasks required of the Event Director prior to the event include:

- 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.
- 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, Chief Measuring, Chief Launchmaster etc. (Including all team members).

Event Director tasks during the event include:

- 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 meteorological conditions with the meteorological chief.
- Task setting.
- Task briefings.
- Supplementary briefings.
- Launching decisions. – In conjunction with Safety Officer and Meteorological 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.

Event Director tasks after the event include:

- Ensuring Final Results and Public Relations Officer report is delivered to FAI within 24h of the Closing Ceremony.
- Agree with the Jury President who will send the Jury Report and any Protest Money to FAI. Required within 8 days of the Closing Ceremony.
- Write Directors report and send to Jury Board President, within 30 days of the Closing Ceremony.

2.1.2 Deputy Event Director

Nominated by the Organiser (ED) and approved by FAI/CIA. Organizer normally pays full travel cost, accommodation, and food.

Responsibilities as listed in ED above.

2.1.3 **Jury Members**

These are FAI Officials nominated by the Organiser (ED) and approved by the FAI. The organizer nominates 6 candidates, and the FAI selects 3. Organizer must pay full travel cost, accommodation, and food.

They ensure that the event is run in accordance with the FAI rules and regulations. The Jury President has the power to interrupt the event.

The Jury members must follow the procedures outlined in the CIA Jury Members Handbook.

<https://fai.org/cia-documents> → Officials → Jury → Jury handbook

2.1.4 **Safety Officer**

Nominated by the Organiser (ED) and approved by FAI/CIA. Organizer normally pays full travel cost, accommodation, and food.

Operational procedures for the Safety Officer are contained in the mandatory Safety Officer Handbook.

<https://fai.org/cia-documents> → Officials → Safety Officers → CIA Safety Handbook

Responsible for the safe organisation of the competition.

Liaising with the ED and Chief Meteorologist to decide if conditions are ok for a safe launch. For Fly-In tasks the Safety Officer should be at the launch areas.

Investigation of any accidents / incidents with the local authorities as required.

Investigating and advising the ED on any equipment failures or collisions.

Investigate/review any near-miss reports.

Ensure compliance with any waivers from the aviation authorities

Liaise with security officer concerning site security and safety of public

2.1.5 **Stewards**

Nominated by the Organiser (ED) and approved by FAI/CIA. Usually up to 2. Organizer normally pays full travel cost, accommodation, and food.

Responsible for assisting the ED with complaints and protests, advising on penalties.

Helping other competition officials in any matter, to ensure the smooth running of the event.

2.1.6 **Chief Observer (if observers used)**

Nominated by the Organiser (ED). Organizer normally pays full travel cost, accommodation, and food.

Responsible for the selection of Observers, and their training in the local requirements.

Ensuring that observers are available for the flight by maintaining an observer rota.

2.1.7 **Chief Debriefer (if observers used)**

Nominated by the Organiser (ED). Organizer normally pays full travel cost, accommodation, and food.

Responsible for the debriefing team members. Ensures that the observer report forms are completed to the necessary standard, before being submitted to the scorer.

Providing launch masters from amongst the debriefing team.

2.1.8 **Chief Scorer**

Nominated by the Organiser (ED). Organizer normally pays full travel cost, accommodation, and food.

Responsible for selecting the scoring program to be used.

Generating the results and publishing them on the official noticeboard in a timely manner. Depending on the agreement with the Event Director can publish provisional or official results.

Applying penalties and assisting competitors with any queries on their result.

2.1.9 Technical Support Officer (only in large events)

Nominated by the Organiser (ED). Organizer normally pays full travel cost, accommodation, and food.

Responsible for all the technical aspects of the competition.

Providing an IT network and firewall for the competition officials.

Supporting methods of logger data downloads and storage.

Ensuring that all data is securely stored and made available to persons with the correct authority.

2.1.10 Chief Meteorologist

Nominated by the Organiser (ED). Organizer normally pays full travel cost, accommodation, and food.

Should have in-depth know-how of the local weather and access to local weather observations.

Responsible for obtaining the weather forecast for the event.

Responsible for the piball (wind measuring) team

Responsible for monitoring actual weather conditions and informing the ED and safety officer if the weather is deteriorating towards marginal or unsafe conditions.

Advising the ED on weather matters at task setting.

2.1.11 Chief Target Team

Nominated by the Organiser (ED). Organizer normally pays full travel cost, accommodation, and food.

Responsible for the selection of Target Teams, and their training in the local requirements.

He is responsible for briefing and dispatching the target teams and shall monitor their functions. He will rearrange the TT locations when necessary to best cover busy targets.

2.1.12 Debriefers (if observers are used)

Appointed by the Chief Debriefers & Event Director. Usually, one debriefer for every 7 pilots. Organizer normally pays travel allowance, accommodation, and food.

Responsible for debriefing observers

2.1.13 Observers (if used)

Appointed by Chief Observer & Event Director. Organizer normally pays travel allowance, accommodation, and food.

Usually, the same as the number of pilots plus 2-5 in reserve. The Organizers may also nominate directly not more than 20% of the Observers required, provided they are acceptable to the Chief Observer or CIA Delegate of the individual nominee's home country

2.1.14 Scorers / Analysers

Appointed by Chief Scorer & Event Director. 2-3 Persons for event with observers, approx. one scorer for every 8 pilots for events without observers. Organizer normally pays travel allowance, accommodation, and food.

Support the Chief Scorer to generate scores. In case of an event without observer this team analyses the tracks to generate the scores.

2.1.15 **Target team leader**

Appointed by Chief Target Team & Event Director. Organizer normally pays travel allowance, accommodation, and food.

A Target Team Leader (TTL) heads each target team. He will take his instructions from the Chief Target Team.

The TTL must always be available by mobile phone to receive last minute instructions or pass on important information.

The TTL is ultimately responsible for assuring the accuracy of the measurements of markers at a target, as well as assuring the TT members are properly placed at the target for the best viewing of oncoming balloons and their marker drops.

2.1.16 **Target team member (sometimes called Measuring Teams)**

Appointed by Chief Target Team & Event Director. Organizer normally pays travel allowance, accommodation, and food.

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

A TT consists of a Target Team Leader and one to three (more in large competitions) members. Each TT member should be familiar with the the rules and with chapter 2.6 Procedures for Target Teams of this document.

2.1.17 **Meteorology team**

Appointed by chief meteorologist

Responsible to chief meteorologist for weather matters and producing piball data.

2.2 **Equipment**

2.2.1 **Markers**

Information refers to the AXMERs (Model Event Rules). This information refers to AXMER R12.5 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.

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, 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.

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

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.



In Continental or World Championships, new markers shall be used according to the above-mentioned marker specifications.

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.

Marker Numbering

Numbers should be written at the end of the streamer (tail) off to a side so the number will not be covered by the rubber band. 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	<u>6</u>	7	8	<u>9</u>	10
11	12	13	14	15	<u>16</u>	17	<u>18</u>	<u>19</u>	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
<u>61</u>	62	63	64	65	<u>66</u>	67	<u>68</u>	69	70
71	72	73	74	75	76	77	78	79	80
<u>81</u>	82	83	84	85	<u>86</u>	87	88	<u>89</u>	90
<u>91</u>	92	93	94	95	96	97	<u>98</u>	<u>99</u>	100

One and seven should be written as in the graphic.



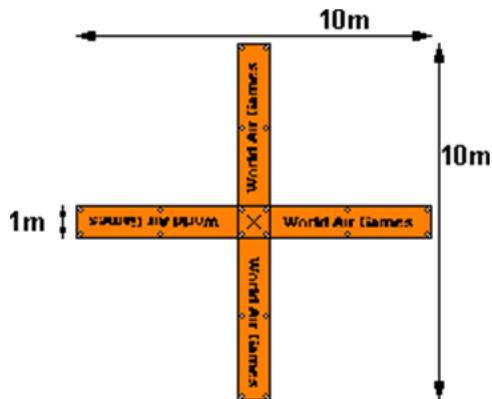
Markers should be rolled and fastened with a rubber band with the numbers showing.

The Chief Target Team (or Chief Debriefing) will appoint a Marker Controller from among the target team members who will be responsible for marker delivery.

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

It is recommended to have at least 7 marker colours available.

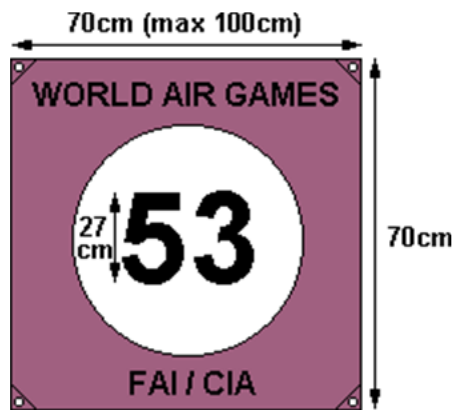
2.2.2 Targets



According to AXMER R12.4 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.

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.

2.2.3 Basket Numbers



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.

2.2.4 Vehicle Numbers

Two stickers with competition numbers shall be made available by the organisers to be attached on either side of a retrieve vehicle and two further for the trailer if used. 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.



2.2.5 Flagpole & Signal Flags

Each CLA should have a (master) flagpole. 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 flagpole 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.

A 'quick assemble' flagpole should be supplied for improvised launch areas. This flagpole should be lightweight, detachable and quick to set up, and shall preferably be carried in the Director's car. There should be some means of illuminating the flag pole if erected before dawn.

A proposed flag-pole design is shown in the picture. The flag pole is fixed by having a car drive onto the base.

Signal flags shall be provided for each flagpole. The flags should have a minimum size of 50 x 50 cm and larger for large launch areas.

The following colours should be available (specified in AXMER R9.7): Red, Green, Blue, White, Yellow, Pink, Black, Violet.

2.2.6 Target Team Equipment

Target teams should be equipped with:

- a motor vehicle
- a competition map and an areal photo of the target if available.
- Measuring sheet and competitors list (see 2.3.4 Competitor List / Balloon Picture List)
- Clipboards and Measuring Sheets, Sketch sheet
- a Mobile phone to communicate with event officials. These can be utilised to capture video evidence of drops and infractions.
- an accurate watch accurate to the GPS time
- a GPS with the settings published in the event rules.
- magnetic compass
- a target with 20 spikes (large nails or metal pegs) or landscape pins and a hammer.
- Several marker flags ('pig tails')
- Landscape marking flags or small traffic cones to temporarily mark the perimeter of the MMA so the competitors can identify the MMA when approaching the target. Preferred minimum eight per target.
- A roll of colourful tape (red/white or yellow/black) to mark the scoring area(s) if required in the task
- 100m (alternatively 50m) measuring tapes – at least two per target.
- Spray chalk to mark the centre of the target
- Safety vests for all members
- Flash light
- Binoculars
- A robust bag or box to contain all of the above-mentioned equipment as well as a bag for all of the collected markers.
- Chairs, coolers, power bars, water, ...

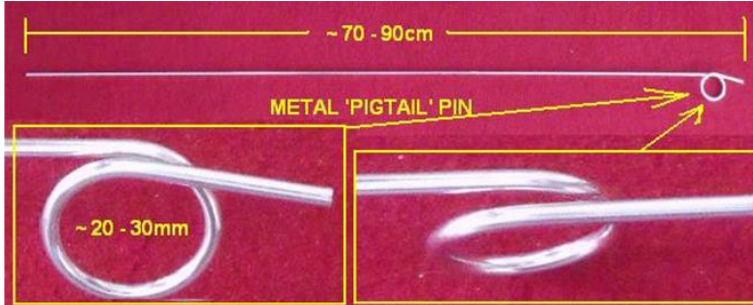
The Event Director coordinates with the Chief Target Team and the organizer to ensure that all equipment is present.

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.

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.

The dimensions of a 'pigtail' pin should be:



2.2.7 Survey equipment

(Only used in large competitions)

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

2.3 Preparations before the events

2.3.1 Common Launch Area (CLA) and Common Launch Point (CLP)

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.

When choosing a CLP, consideration should be made that this point is also suitable as a goal.

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.

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, GPS may be used to accurately measure the coordinates of the CLP.

2.3.2 Selection for target/goal sites

What type of site is suitable for a goal?

- NO power lines
- NO livestock
- NO crop within 100m 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.

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

It is good practice to keep a folder of all selected goals which include goal coordinate, altitude, MMA size, any additional description, landowner information and sketch. The goal coordinate should match the intended target coordinate as closely as possible.

Searching goals should be done a few days before the event when the state of the plants can be accurately assessed.

A goal list should be compiled prior to the General Briefing and handed out to the competitors in paper and as GPX file. An example of a goal list is shown below. Altitudes are often determined from a 3D model instead of from actual GPS measurements. The goal list should be versioned.

Official Goals

Version 1 - August 24, 2019

Goal	Easting	Northing	Elev. (ft)
001	5 9670 9	51 5344 0	555
002	5 9740 6	51 5353 3	556
003	5 9544 6	51 5357 9	560

2.3.3 Prohibited Zones (PZ)

Prohibited zones are created to protect landowners who do not permit balloonist entry on their property for any reason. Yellow PZs disallow any launch or landing and are typically used for landowner privacy purposes and defined on the map as the landowner's specific property lines. Red PZs provide an altitude minimum over sensitive areas for reasons such as livestock or dangers to pilots (towers, smokestacks, etc), and may be enlarged past the landowner's actual property to properly protect the area.

Blue PZs usually relate to airspace restrictions.

For areas new to ballooning competition events, consider reaching out to the surrounding landowners through a newspaper article and provide a means for a landowner to contact the event organizer if they do not want balloonists on their property.

For areas with previous events, local balloonists can provide information regarding surrounding PZs that exist in the area.

The goal is to protect the landowners which ultimately protects future events in the area.

2.3.4 Competitor List / Balloon Picture List

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.

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 number & name, and GPS coordinates of the centre of the displayed target.
- For each competitor, his number and name with columns for distance, time, direction and notes or comments.

The measuring sheet should also contain the balloon registration of each balloon and any description provided.

2.3.5 **Phone list**

All pilots must have been issued with the important phone numbers (preferably printed on the badge)

- Emergency numbers
- Event director & Deputy Event director
- Safety officer
- Event Manager

All officials should have a detailed phone number list of all officials.

The key officials should have a phone number list of all competitors and their crew chiefs.

2.4 **Procedures for Briefings**

2.4.1 **Roll Call**

A roll call at the beginning of each briefing is necessary to identify that all pilots are present. In the General Briefing this is usually done by calling the Number and Pilot name and can also be considered a way to introduce each pilot. For any subsequent briefings usually only the pilot numbers are called.

The Event Director should note which pilots are not present.

Recently, and especially for larger competitions, after the General Briefing the roll call was sometimes replaced with a check-in at the entrance to the briefing hall – either manually or electronically. In this case the roll call could be replaced by just calling out the pilots that were not checked-in when entering the room.

2.4.2 **General briefing procedures**

The General briefing should be conducted between 2 and 18 hours before the first competitive task.

For details on the infrastructure and seating, refer to 1.3.5 Briefing room infrastructure.

The briefing should start with a general introduction and welcome and then the roll call. The roll call should state the competition number and then name of pilot. That competition number is then designated to that pilot and must correspond to the table number (if used) and banner number. It is preferable that this is the same number that may be used at initial registration, but it reduces confusion if no numbering is used for pilots until all applications are received. The numbering should start with 1-3 for the 3 previous medal holders, then 4 and 5 for the women and junior champion, then in NAC order A-Z based on the Olympic country code. Once a number is published it should not be changed anymore.

The general briefing usually covers the following topics:

- Introduction of all key officials
- Check list of all documents or equipment provided on the desk
 - General Briefing Notes
 - Goal List
 - Example weather information sheet
 - Example flight report form (FRF)
 - Any other documents such as refuelling, logger manual, ...
- Rule amendments and updates
- Procedures for launch (with or without launch masters)
- Recall procedures (preferably including a test)

- Debriefing process
- Points of contacts, including those for scoring, complaints, and protests
- Location of the official notice board
- Refuelling arrangements
- Safety officer's brief
- Weather outlook for the competition
- Any further questions
- Confirm place and time of first competition briefing, other events such as welcome ceremony and then closing ceremony

2.4.3 Task Briefings

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.

For details on the infrastructure and seating, refer to 1.3.5 Briefing room infrastructure.

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. Entry 15 minutes before briefing time is to allow adequate time for pilots to study the task data sheet.

Markers, logger(s), Weather Information Sheets (WIS), Flight Report Forms (FRFs) or Observer Report Sheets (ORSs) and 2x Task Data Sheets (TDSs) and associated task diagram sheets 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.

Here should be a logical order for task briefings. If the start of the briefing is to be delayed by several minutes this should be announced just before the start of the stated briefing time.

- Roll call or if pilots have been registered at the door electronically then to call only those that have not been registered.
- General statements such as further delays or possible amendments to the task sheet
- A list of all articles that have been distributed and should be on their desktop
- Explanation of any queries from the previous briefing that have not been answered
- Announcement of shortened briefing times on last day but one
- Urgent social aspects, refuelling changes etc
- Weather
- Task data
- Any questions
- Next briefing

2.4.4 Task Data Sheet (TDS)

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. A recommended TDS layout is shown in B.2 Task Data Sheet (TDS).

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.

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

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.

At task briefings, three (3) copies of the TDS should be distributed (competitor, observer and crew chief). The TDS can also be published on the competition website if active and can be done from 15 minutes before the briefing time. 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.

2.4.5 Weather information

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.

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.

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.

When presenting the weather 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. It is important for the MO to specifically report any predicted marked wind shift during the flight period. This should be further clarified as to when that will occur by giving predictions at hourly or half-hourly intervals during the flight time. The objective in balloon competitions is to make the best use of the different wind directions with altitude to reach a certain target.

The Director usually starts preparing the flight 2-3 hours before briefing time (BT). Around this time, he expects a rough briefing from the MO telling him the expected 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).

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.

2.4.6 Weather Information Sheet (WIS)

The Weather Information Sheet should have a standard format as shown in Appendix B 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).
- 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)**, inches or mm (millimetres). Make sure that the QNH matches the information on the TDS.
- DO NOT include the sunrise and sunset information. This information is provided by the Director in the TDS.

Bold indicates preferred format

2.4.7 Weather Briefing

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.

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.

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

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.

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. The MO does not decide on the cancellation during a briefing.

2.4.8 Marker Delivery & Documents for the briefing

The Event Director will appoint a responsible person to prepare the briefing room.

The following quantity of documents should be prepared:

- Task Data Sheet (TDS) – 2 per competitor
- Weather information sheet – 1 per competitor
- Flight report form (FRF) or Observer Report Sheet (ORS) – 1 per competitor
- Other documents – 1 per competitor.

The Chief Target Team (or Chief Debriefing) will appoint a Marker Controller from among the target team members who will be responsible for marker delivery.

Markers and other competition material (logger, documents) should be put on competitors' tables in the Task Briefing Room before pilots are allowed to access the room. Markers for competitors who were not present at the briefing should be picked up as soon as possible by the assigned official. Those markers should be kept in the Competition Centre.

The competition number of missing competitors per flight shall be displayed at the Debriefing/Scoring Room and brought to the attention of the Director, Chief Scorer, and Chief Measurer. If observers are used the Chief Observer and Chief Debriefing must also be notified.

Some events have started to hand out all markers to the competitors at the General Briefing. Any dropped marker will be returned at the next briefing. In this case it is the responsibility of the pilot to get any lost markers replaced.

Depending on the logger handling details, loggers and/or SD cards may also be distributed at each briefing.

2.4.9 Supplementary briefings

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.

Supplementary briefing will not be hold after the start of the launch period

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).

2.4.10 Recall

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

A recall procedure must be fool proof! That means it should be tested during the General Briefing. Modern technology changes quickly and new methods can be used if they have been tested and work flawlessly. Specifically, SMS/WhatsApp 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 chiefs and officials, and familiarize himself, as well as all of his Chief Officials, with the operation. 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 SIM card. A test should be made at registration.

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. Using the previously announced technology he should forward 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.*"

With modern technology the recall procedure has also been used more often to message the competitors before take-off and in-flight. Care must be taken as the cell coverage might not cover all areas of the competition area (take-off locations). It is recommended to use such recalls only for severe cases and not to conveniently change a task minutes before the launch period.

Some technologies may allow checking if the message has been received and read.

2.5 Procedures for Launch

2.5.1 Launch Field & Signals

The signals point is the point where the flagpole is erected. Supplementary briefings will take place there. There should be some means of illuminating the flags before dawn in place.

The full list of the flag colours and meanings is defined in AXMER R9.7.

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.

An audible signal (preferably an airhorn or car horn) shall be given when raising flags.

When no launch is permitted the *Red* flag should be shown.

During a 5-minute warning the *Yellow* flag should be shown together with the current status. E.g., for the warning before inflation, *Yellow* is shown together with *Red* (as currently no launch is allowed). The 5-minute warning is shown before the start of the inflation and before the end of the launch period (*Yellow + Green*).

Pink (supplementary briefing) should also be shown together with the status (usually *Red*). The pink flag should be lowered immediately the supplementary briefing has finished so there is no confusion over any subsequent supplementary briefings.

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. The reading may also be sent to the pilots with electronic means.

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

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)

2.5.2 **Launch control**

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

Launch masters shall wear vests as specified by the Director.

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

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

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

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

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

Launch procedures when Launch Masters are optional (AXMER R9.16)

- The Director may decide to launch without the use of launch masters.
- If this procedure is applied, the Director must clearly specify this in the General Briefing and/or task briefings.
- The Director should brief competitors on their responsibilities for take-offs and to make best use of their crew to assist them during launching.
- The Director may assign launch masters for those competitors desiring to make use of launch masters during their take-off.
- The Director should still assign several officials to patrol the launch field and observe any infringements

Launch procedures when Launch Masters are compulsory (AXMER R9.15)

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.

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).

In the Minimum Distance (AXMER R15.13) or the Race To An Area (AXMER Rule 15.10) tasks, the launch master shall be assigned another staff member to record times. He will call 'NOW' and the pilot competition number when he sees the bottom of the basket at normal eye level to start the timing process with the staff member who will record the exact time. If an inflation harness or other similar equipment is in use and under tension, time measurement starts at disconnection.

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)

2.6 Procedures for Target Teams

2.6.1 Identification

All TT members should wear the same colour vests (usually yellow) so that competitors looking from above can readily identify target staff. All other officials should wear vests of a different colour (usually orange).

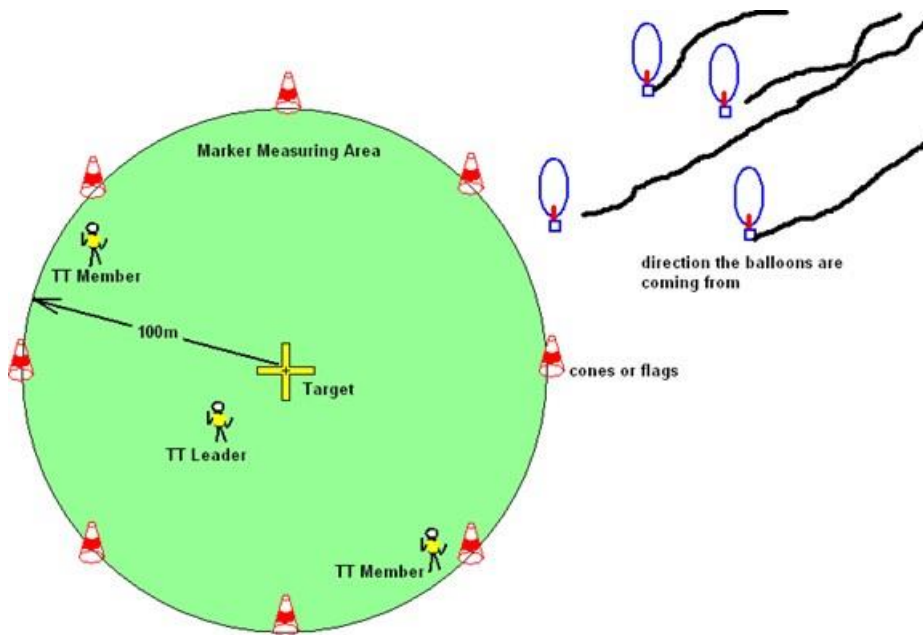
2.6.2 Layout Target

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. If circumstances have changed, e.g., power lines in dangerous vicinity, livestock in field, busy roads etc. the TTL must immediately call 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.

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. The ED at the start of the event may ask that targets be laid out with the wind direction as preferred by most pilots.

It is good practice to send the target coordinate (e.g. a picture of the GPS screen) to the Chief Scorer as soon as the target is laid out. This allows the scoring team to work before the measuring sheet report is back.

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.



2.6.3 Marking the centre of road intersections

(Only used in observer events)

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 like that in 2.3.2 Selection for target/goal sites 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.

2.6.4 Balloons approaching the target

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 and always facing the oncoming balloons

One of the target team members shall make a sketch of the target field and the location of dropped markers.

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.

The most important things to watch for are:

- The dropping method as declared on the TDS, especially when a Gravity Marker Drop (AXMER R12.7) 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 dangerous flying (AXMER R10.1 and R10.2).
- Scoring period (AXMER R12.13 Scoring Period), especially as towards the end of the scoring period each second counts and careful observations are crucial.

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.

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 R12.9.1 and R12.17.4. 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.

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 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 artwork should be noted. This will help in identifying the competitor who dropped the marker.

2.6.5 **Measuring markers**

Only after the majority of balloons have passed will the TT start measuring. Competitor's markers will only be measured if in the MMA (which usually have a 100m 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.

Procedure for marker measurement:

- First, the marker number shall be called by the measuring tape operator e.g. Pilot 53.
- The Measuring Report Recorder will repeat back the pilot number.
- The Measuring Tape Operator will read the measurement (e.g. Pilot 53 – 345.78 meters) as the Measuring Report Recorder also views the tape measurement for accuracy.
- The Recorder will repeat back the Pilot# and the measurement to the Operator as he physically records the measurement on the Measuring Report.
- Both the Operator and Recorder acknowledge the information is correct.
- The Recorder should be instructed by the TT Leader whether or not to pick up markers after they are measured. Some events also paint every marker as well as the competitor number prior to picking up the marker.
- After all markers are measured, a team member will count all markers measured in the MMA and that total will be cross checked with the measuring report for accuracy.
- Any discrepancies should be immediately investigated and resolved before the target is removed.
- The TT Leader will text a cell phone photo of their measuring report to the Chief Scorer and Chief Measurer or Chief Debriefers.

This procedure will be altered per event depending on the number of TT members per target. Duplication is always preferred.

Check that all markers are collected with measured results. There should be the same number of markers as recorded results. Markers observed to be out of bounds should be kept together until after TT has debriefed with the Chief Measurer. The same is true of late markers.

2.6.6 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 2.2.1).

Mark the exact point of the centre of the target on the ground permanently (spray paint).

Collect all equipment (target, pins, flags, cones etc.) and leave the area as clean as (or cleaner than!) you found it.

2.6.7 Marker Return

The Target Team Leaders shall return all retrieved markers to the Competition Centre. An observer when used shall return all retrieved markers to his debriefer. Debriefers must check the return of markers when debriefing the observer.

All lost or unused markers shall be reported to the Chief Target Team and/or Chief Debriefers. The Competition Director shall announce the procedure to be followed by pilots for returning un-thrown markers to the Measuring Team staff.

It is suggested that unused (not thrown) markers be collected from the pilots at the Pilot Debriefing when they turn in their Flight Report Forms.

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 staff, observers and competitors during the task briefing. A recommended way is that Target Team members collect the markers from competitors and bring them back to the Competition Centre.

2.6.8 Marker Storage

Returned markers must be sorted by colour and number and checked for damage. Measuring Team Leaders, after debriefing with the Chief Target Team, will be responsible to assure all recovered markers are rolled and organized. Markers should be organized by pilot number, then left to right in the color order in which they are used on that flight's Task Data Sheet for easy reference if there are any scoring questions.

If a marker is missing, check the pilot's Flight Report Form (or Observer Report Sheet) where its loss should have been reported. If not reported, inform the Chief Target Team (or Chief Debriefers). All missing or lost markers must be reported to the Chief Target Team (or Chief Debriefers). Refer to 2.6.9 Lost Markers.

2.6.9 Lost Markers

According to AXMER, competitors may be required to pay for lost markers. This rule is intended to deter competitors from dropping markers that cannot be easily recovered or from a high altitude. Generally, the price should be roughly three times the actual price. The Chief Target Team (or Chief Debriefers) should keep the money in a safe place with a list of the pilot number, date, task number and marker colour replaced. At the end of the event, the money should be handed over to the organisers when handing back all other competition material.

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.

2.6.10 Other Target Team duties

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.

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.

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.

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

2.7 Procedures during flight

2.7.1 Task Cancellation

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).”

AXMER Rule 8.2.2 states “The Director has the authority to cancel a task(s) for safety reasons and for reasons out of the control of the director, at any time before the official status task scores are published.”

This means that Measuring Team measurements and Provisional results may be published before a Director decides to cancel one or more tasks. However, it is important that the director tries to avoid seeing the provisional results if he considers cancelling the task.

2.8 Procedures for pilot return (track download, flight report form)

2.8.1 Flight Report Form

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.

The official shall check the completeness (not validity) of the FRF and ask the competitor to complete his form in case of missing items.

The official will check off the receipt of any unused markers in his debriefing form. See also 2.6.7 Marker Return for more details.

The FRF can also be done online, see 2.13.1 Balloon Live.

2.8.2 Logger Download

Depending on the type of logger used, the pilot must return the logger for download.

Make sure that a process is in place (i.e. automated assignment with serial number) that the tracks are correctly assigned to the pilots. Manual assignment work (such as naming files) is not a good practice.

Sometimes it is useful to have a quick check of the tracks (quality, completeness) before the pilot is released. This allows downloading the back-up track if needed.

2.9 Procedures for observer debriefing

2.9.1 Observer's estimated result

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. Do not 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.

2.9.2 Observer interview by the Debriefer

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.

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.

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.

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.

The time of marker drop and finding the marker shall be checked carefully to assure compliance with the rule on the scoring period (AXMER R12.13 Scoring Period) or marker search period (AXMER R12.11 Search Period).

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.

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

2.9.3 Handling of the Observer Report Sheet (ORS)

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.

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.

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.

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.).

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

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

One of the duties of the Jury is to inspect the above-mentioned process. See the CIA Jury Members 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.

2.10 Scoring

It is the responsibility of the Chief Scorer to generate accurate results that follow AXMER and the Sporting Code.

Each task is analysed independently. In a first step the performance (e.g. distance) for a competitor is calculated. In a second step the performance is converted into scoring points. In a last step the scoring points are adjusted by any penalties.

Please refer to the Appendix A – Penalty Guide for the mandatory guide on applying penalties.

2.10.1 Scoring Software

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. It is strongly recommended that only well-established and tested tools are used for Category 1 events. The CIA Jury Members Handbook includes methods and tools for verifying scoring system results.

The scoring software has several functions which may be split into separate software packages

- Performance data input (measured/observer results)
- Track analysis (calculate performances from tracks)
- PZ infringement analysis
- Calculation and/or input of penalty data
- Calculation of the scoring points based on AXMER R14.5
- Calculation of the final points considering penalties.
- Calculation of total results based on the sum of all tasks

Checking for PZ infringements

The scoring software must be capable in automatically checking and calculating all PZ infringements (red and blue PZs). This check must be performed for each flight.

Although PZ infringements are competition penalties, the scoring team should assign the penalty to the correct task.

The Chief Scorer must test the software that all defined PZs are correct and that a violation triggers a report.

Checking for Near-Miss events

Checking for near-miss events (See Penalty Guide R10.2 Dangerous Flying & Near Misses) is tricky. The test needs to be robust enough to not trigger too many false events.

A software to perform this test is the Balloon Safety Analyzer by Marc André. The software may be used free of charge. This tool uses the barometric variometer recorded by the logger to determine the vertical speed of each balloon. (<https://balloonlive.org/software/bsa>)

The Safety Officer, the Chief Scorer or any other designated official must review each report.

2.10.2 Scoring Procedures

Scoring is all about process. The process should be run to ensure the following:

- All manual data input is cross-checked

- Once results are checked, no changes should be done without a record
- The Chief Scorer should lead his team so that he can delegate work and that he can keep an overview of the status of all scores and issues.

Visualization of tracks and tasks is often helpful to understand the intent of a pilot.

2.10.3 **Measuring accuracy and precision**

AXMER R14.6 specifies the precision to be used for calculations and publication.

Results shall be established with the highest precision at hand. This means that rounding should only be done before the result is published or used for conversion to score.

The following standards will be used:

Result method	Precision	Printout example [m]
tape / surveying	centimeters	1.23
map coordinate	decameters	1250.00
Track point/GPS	meters	1231.00

Any combination of result methods will revert to the lowest precision method used.

If positions can be determined relative to a common coordinate with a more accurate method, the precision of that method will be used.

Interpolation between track points may be used to establish the scoring position.

Application to scores

In scoring all calculation/data entry should be done with the best accuracy at hand. The rounding should be done prior to the calculation of the scoring points.

Best Practices

- 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.

Background

The basic concept is that every measurement should also include an assessment (actual or estimate) of the precision or uncertainty of the measurement.

The rules mentioned above should be used for all normal scoring purposes. The methods below should be used for assessing scoring situations not covered above.

GPS precision depends on the use of 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 (± 7.6 m)
- 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.

Assumed accuracy based on Hans Akerstedt's work done in 2013:

Distances

Measuring method	Precision	Printout example [m]	
Tape / surveying	± 10 centimetres	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	95.5	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 depends 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

2.10.4 Scoring coordinates

All calculations in a competition (or at least task) must be done with one method. This is to make it simple for the pilots to understand the method and to ensure that their relative score is accurate.

For “normal” competitions, use cartesian coordinates and Pythagoras.

If multiple UTM zones cover the area: Recommend expanding the larger zone across the whole competition area for scoring purpose. If not possible, for distance calculations, the great circle calculation may be used.

Conversion from lat/long to cartesian coordinate should not include rounding or at least have a cm precision.

A coordinate transformation library has been created by Marc André which is in use by BLM, Balloon Live, and WatchMeFly. Please contact Marc if you would like to get access to the library.

2.10.5 Target vs. Goal coordinates

Each target has a goal and a target coordinate. The goal coordinate is the coordinate communicated to the pilot either on the goal list or on the TDS. This coordinate is often given in the 4/4 or 5/4 format.

The target coordinate is the reported (measured) coordinate by the target team where the target was placed. Ideally the goal and target coordinate match, but in reality, there is often a difference of several meters.

For scoring all checks such as distance infringements of a take-off must be calculated against the goal coordinate (as the pilot could not know the target coordinate at this time).

All performance calculation (electronic and physical marker) must be done against the target coordinate.

2.10.6 **Score calculation**

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.

Checksums

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.

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).

Calculation of “No Results” 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.

2.10.7 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 "Debrief 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.

2.10.8 Publication of task scores

Task scores sheets have the following status:

- Provisional
- Official
- Final

Provisional Score

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 will not have penalties included. They should be marked “PROVISIONAL” and published without any signature. Provisional results lists are not associated with any timing constraints related to publication of scores at either “official” or “final” stages and a statement as such could be appended to the sheet. It should also state that publication of provisional scores does not affect the ED’s right to cancel any single task/flight under the appropriate conditions.

Official Score

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 start from the previous applicable publication time.

Final Score

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 by Jury intervention (AXMER R14.3.3).

Publication

A member of the scoring team should be allocated the role of monitoring times to ensure all results adhere the time limits.

The publication of official scores must include the time at which it will be available to all competitors. This time may be pre-dated (e.g. write 14:00 but publish already at 13:34).

2.10.9 Total Score

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).

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

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

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.

During the prize giving ceremony, a copy of this document shall be handed out to all competitors unless it is available for download from the web.

2.10.10 Checksums

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.

The checksum shall be displayed:

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

See 2.10.10 Checksums for more details on the checksum calculation.

2.11 **Assistance, Complaints and Protests**

Each competitor has the right to question his results or penalty and to protest if needed.

1. In a first step the competitor should ask for assistance. He contacts the designated official (often the Chief Scorer or a Steward) and asks to review his result. This step is very informal. If the chief scorer finds an error, he corrects and publishes the result (before they become final) and no additional step is needed.
While the assistance is not formally needed it is strongly recommended to seek for assistance before filing a complaint as it is much more efficient. See 2.11.1 Time Limits for any time implications.
2. If the competitor is not satisfied with the outcome of the assistance, he has the right to complaint. The complaint is handled by the Event Director and a formal answer is given to the competitor. Depending on the decision of the Director, the result is changed.
3. As the last step the Jury gets involved with a formal protest. In this case the Jury reviews the case

The Director must put measures in place that the competitor can exercise his rights for complaints and protests any time outside the rest period. This is often done by naming several senior officials that have the right to receive the complaint or protest. These officials would only confirm the reception of the complaint/protest and not the acceptance. The official must inform the Director as soon as possible.

2.11.1 **Time Limits**

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

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.

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.

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.

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

2.12 **Anti-doping**

All pilots may be subject to In-Competition testing by FAI. A basic information sheet about anti-doping can be obtained from the FAI Anti-Doping Manager.

Doping Control Station

Make provision for a doping control station. This should consist of 2 rooms, one for use as a waiting room and one for the actual testing, a private room with a small table and chairs and access to a clean toilet.

Procedure

<https://fai.org/documents> → Constitution – Statutes, by-laws and anti-doping rules

The FAI is responsible for overseeing all testing conducted by FAI. Tests will only be conducted by qualified Doping Control Officers who have been authorised by the FAI. If a Doping Control Officer comes to the event, he will officially introduce himself and ask for accommodation representing the Doping Control Station to conduct the test. Doping tests are financed and organised by the FAI. At International events, the FAI Anti-Doping Manager shall determine the number of tests to be performed. He shall maximise the diversity of athletes tested, and not necessarily target those linked to final placements. The Doping Control Officer on site is responsible for notifying the pilot(s) for doping control. The Doping Control Officer will explain the procedure to the pilots involved. Chaperones of the same gender will be required for all the competitors to be tested; these individuals need to be identified by the event manager and should be independent of the organisation. The results will take a few weeks, so any positive tests will only come to light after the competition has ended.

TUE (Therapeutic Use Exemption)

It is recommended to inform competitors about the testing process and also about their need to have a valid TUE (Therapeutic Use Exemption) in case they are taking a medication that contains substances on the WADA Prohibited List. This document is required if the competitor is to avoid a sanction in the event of a positive test. For substances prohibited In-Competition only, the competitor should apply for a TUE at least 30 days before the Competition unless it is an emergency or exceptional situation.

Competitors apply for TUEs by filling in the application form obtained from the FAI Anti-Doping Manager with the help of their doctor. The name of the prohibited substance(s) should be mentioned (not the brand name of the medication) and only prohibited substances should be registered on the TUE form. It is their doctor's responsibility to check which medications contain a prohibited substance! <http://www.wada-ama.org/en>. This form should then be sent to FAI Headquarters for the attention of the Anti-Doping Manager.

2.13 Loggers

All official loggers shall be of the same make and model and considered as the primary logger. In Category 1 event they shall be approved by the Plenary on the 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.

2.13.1 Balloon Live

Information about balloon live including the user manual can be found here: www.balloonlive.org

The newest technology in competition, this sensor is owned by hundreds of pilots around the world today. These sensors are performing well and have been tested at multiple major events across the world.

The system consists of

- Balloon Live App (available for Android and iOS)
- Balloon Live Sensor (BLS)
- WatchMeFly

2.13.2 CIA Balloon Competition Loggers

These devices were largely used from 2009 to 2021.

Information about the CIA loggers can be found here: www.balloonloggers.org

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. Discussions 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 Balloon Competition 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 www.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 Balloon Competition Logger) handled a variety of situations at a CAT 1 event.

Instrument Error Correction

The “Tips & Tricks” section at www.balloonloggers.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.

3 Tips for Task Setting

This chapter is intended for Event Directors and task setters. It shall grow with feedback from Event Directors about issues with specific task settings (or great task setting).

3.1 Generic tips

- Morning flights usually have more stable winds, and thus more tasks can be set.

3.2 Specifics to tasks

3.2.1 Elbow (15.11)

- Define the leg length in km (at least 1000m) and not in time. The legs need to be sufficiently long for an accurate measurement which cannot be guaranteed by flight time.
- Only set this task if it is “impossible” to get 180° angle. Otherwise, the spread usually is very bad.

3.2.2 Land Run (15.12)

- Limit the task in time and not in distance. The pilot should have the option to make his legs as long as possible.

3.2.3 Angle (15.19)

- Define the leg length in km (at least 1000m) and not in time. The legs need to be sufficiently long for an accurate measurement which cannot be guaranteed by flight time.
- Set this task if it is difficult (impossible) to fly in the opposite direction of the set direction.

3.2.4 Gordon Bennett Memorial (15.8)

- Don't set an area that results in many competitors ending up in a confined area unless you can direct measure from the target.
- If using loggers do not use physical areas on the map (e.g. roads).

3.2.5 Maximum Distance (15.17)

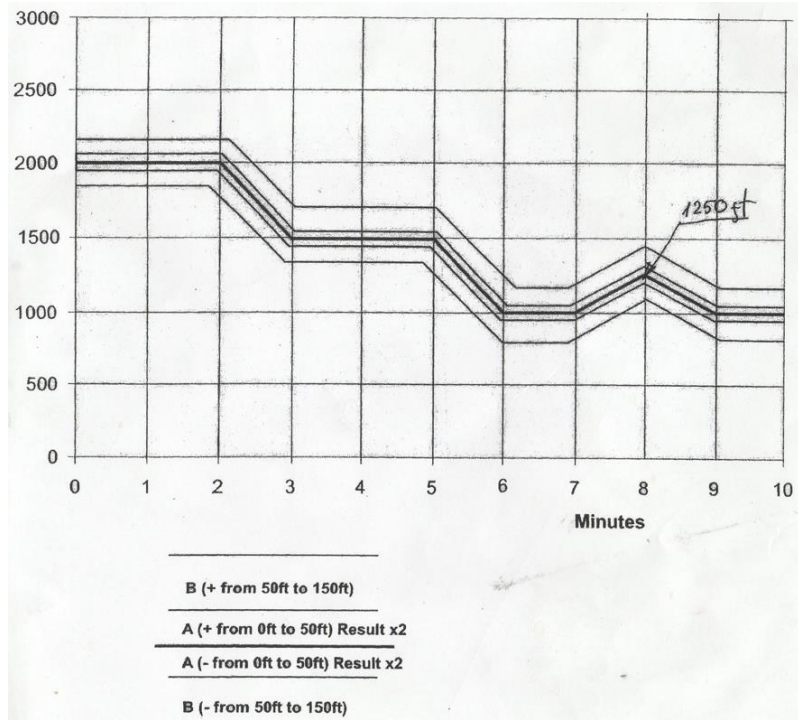
- Don't set an area that results in many competitors ending up in a congested area.

3.2.6 Minimum Distance (15.13)

- Do not set in light winds, preferably set in conjunction with something like a JDG and to be flown in order. Works quite well if you can fly a box

3.2.7 Altitude Profile Task (15.21)

- In this task a sketch is provided to show in what airspace a pilot needs to fly to score. As an example see the sketch below where it shows at what altitude a pilot must fly level or ascent/descent at a certain rate. When the pilot is close enough to the perfect altitude (i.e. in zone A) his time will be doubled. While flying in zone B each second counts only one time. Flying outside zone B means no seconds are added.
- Longest time or distance wins the task.



- As there is a bigger change of a pilot looking more than normal at his instruments it is good practice to set this tasks towards the end of a flight when the balloons are more spread.

A. Penalty Guide

What is a penalty?

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

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 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 so as 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 must prove the infraction. The disadvantage though is, that he is not able 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 able 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 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 6.1.2.2 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**
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 penalty

- **Result Penalties**
Result penalties should only be used if there is no other way to reference the infringement to a score. The reason is that they might influence all scores (as they might influence the median). The only specified result penalties relate to the dropping of a marker (AXMER R12.7 Gravity Marker Drop and R12.8 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.
- **Competition and Task point penalties (Rule 13.4 Penalty Points)**
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 for a specific task, 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. Task penalty points are often written as TP and competition penalty points as CP.
- **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.

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 using 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.

The following chapters will outline guidance to specific rules. They are numbered with the AXMER rule number.

R11.18 Details for use of GPS Loggers

See Penalty Guide R6. GPS Loggers.

R2.2.2 Nationality

First instance, a warning, thereafter Group B.

R2.11 Responsibility (S1 An3 3)

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

R2.12 Conduct (S1 An3 4)

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

R3.1.3 Vents

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 TP, otherwise 500 TP.

R3.5.2 Any damage to a balloon affecting its airworthiness ...

Generally, this rule is seldom abused and usually not deliberately. In the first instance, if safety is not affected, issue a warning.

R3.8 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 CP seems to be appropriate.

R3.10.1 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.

R3.10.2 All vehicles used to aid the retrieval of a balloon shall be marked...

Same as 3.8

R3.10.3 Retrieve vehicles shall not be parked within any MMA or within 100m...

This is somewhat like 3.10.1. Often cars are allowed somewhat closer to the MMA if they can be parked in a good way and don't obstruct balloons, other cars, or officials.

When the crew obviously disturbs the action around a goal or target, 100 or 200 TP may be given.

R6.1 GPS Loggers

Competitor not ensuring the logger has sufficient battery for the tasks	Warning in first instance, then 100CP
Not switching on the logger in time for a fix at take off	Warning in first instance, then 100CP
Wrong positioning in basket so that reception is compromised	Warning in first instance, then 100CP
Entry of PDG co-ordinates in wrong slot	Warning in first instance, then 100CP
Mis-key of co-ordinates	See Penalty guide R7.8
Declaring invalid goal after valid goal	Score to valid goal if not resolved by Mis-key of co-ordinates (above)
Altitude not declared or not valid	See Penalty guide R7.8
Dropping wrong electronic marker	If it can be seen to be an obvious mistake (e.g. in logger mark 2 when close to logger goal 1 and then a second mark is made in logger mark 2 when near logger goal 2) then the pilot should be given the benefit of doubt and a warning in first instance, then 100CP
Not switching off logger after landing	Warning in first instance, then 100CP
Use of competitor's back-up logger	If the back up logger does not have features for logger declaration or for logger marks then best independent evidence should be used. This can include declaration or logger drop by phone (Whats App to crew/officials, text, notes) as long as an accurate time is recorded. See also Penalty guide R6.4

R6.4 GPS Logger Failure

A competitor not supplying the required logger track, or a substitute track of his own GPS should be penalized 100 CP. 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 CP 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 CP (in steps of 100), according to the likelihood of a violation.

R7.2 Out of Bounds (OFB)

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	N/A

Landing	OK	OK	OK	prohibited R7.3.4	prohibited R7.3.5	N/A
Contest landing	invalid R11.3.1	invalid R11.3.2	invalid R7.2	prohibited R7.3.4	prohibited R7.3.5	N/A
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	OK
Achieve TP	invalid R7.1	invalid R7.1	invalid R7.2	Scored + penalty	OK (N/A)	Scored + penalty

R7.3 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.

The rule specifies up to 1000CP. This should be applied as up to 1000CP per flight and PZ. If multiple tasks are affected the points can be split proportionally to the infringement, but because it is competition penalty points, this split is not necessary. If the competitor is flying exceptionally long in the PZ covering multiple tasks and achieving a competitive advantage, a penalty as unsportsmanlike behaviour should be considered as well.

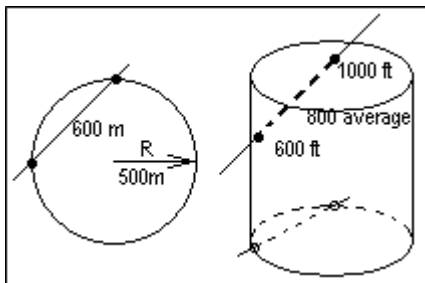
R7.5 PZ Infringement (Red)

Loggers enable the Director to determine the amount of infringement and what happened. The normal penalty is up to 500 CP. The amount should be doubled if there is a complaint from the ‘owner’ of the PZ or if officials witnessed actual disturbance of animals.

Landing in a Red PZ should be penalized with at least 250 CP (more if the calculation below results in a higher penalty). 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).

Calculation procedure for cylinder PZ:

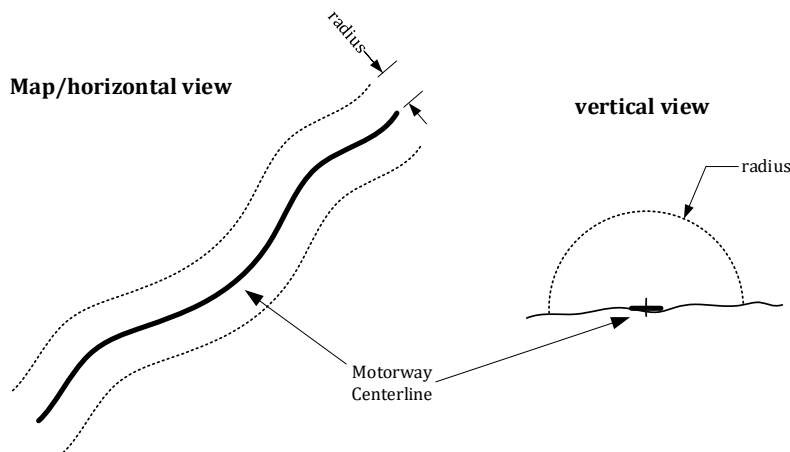
1. Determine the percentage of the horizontal distance travelled through the PZ compared to the maximum. This constitutes half the final percentage.
2. Determine the percentage of the average altitude in the PZ compared to the maximum. This constitutes the other half of the final percentage.
3. The final 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. $600/1000 \times 100 = 60\%$ 'horizontal %'
2. $100 - 800/1000 \times 100 = 20\%$ 'vertical %'
3. $\frac{1}{2} \times (60 + 20) = 40\%$ 'final%'
4. $40\% \times 500 = 200$ CP
5. in case of complaints = 400 CP

In some events a “Motorway PZ” is used. Motorway PZs are defined by a centreline (along the road) and a radius. 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 centreline 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 centre line is 200m (i.e. 100m inside the PZ), the penalty is $(300-200)/300*500=167$ competition points.

R7.5 PZ Infringement (Yellow)

Landing should be penalized with 250 CP (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).

R7.5 PZ Infringement (Blue)

GPS loggers deliver a means to determine more objectively who flew in the clouds, provided there is a common cloud base, and in any case altitude infringements of Blue PZs.

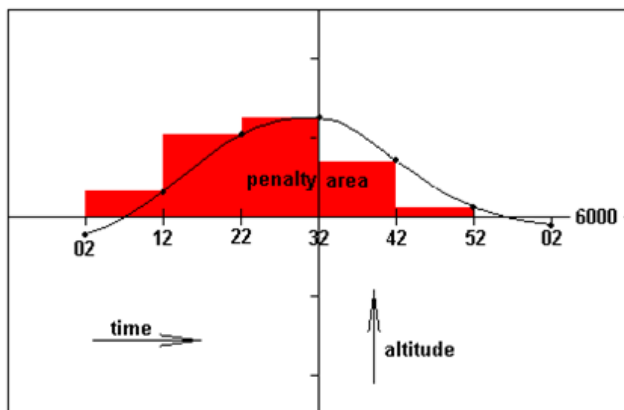
The following procedure for determining penalties in conjunction with altitude limits is suggested:

- 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)).

Penalties will be applied with a penalty factor of [1 point / 1 feet / 1second] / 100. The penalty is capped at 1000 CP per flight.

In the following example the penalty would be 190 CP.

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)	$200 \times 1 \times 10 / 100 = 20$	20
08:13:22	6550 (1996m)	550 (168m)	$550 \times 1 \times 10 / 100 = 55$	75
08:13:32	6700 (2042m)	700 (213m)	$700 \times 1 \times 10 / 100 = 70$	145
08:13:42	6350 (1935m)	350 (107m)	$350 \times 1 \times 10 / 100 = 35$	180
08:13:52	6100 (1859m)	100 (30m)	$100 \times 1 \times 10 / 100 = 10$	190
08:14:02	5950 (1813m)	-	-	-

R7.6 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.

It is generally accepted that a digital competition map is sufficient.

R7.8 Map Coordinates

An inappropriate but unambiguous declaration should be accepted and be penalized with 100 TP. This does not apply to rule R12.3.2 (ambiguity between more than one valid goal).

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) while the flight track doesn't allow both options.
- Imprecise coordinates (errors in 2 least significant digits of Easting or Northing) for any goal selectable from a list or intersections.
- 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.

A combination of multiple of those mistakes – in general – would not be considered "inappropriate but unambiguous".

As noted above, this rule (R7.8) 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 R7.8.

- 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 R7.8.

R8.4.2 Unless otherwise specified, tasks in a multiple task flight shall be flown in the order...

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!

R8.4.6 Penalties related to the takeoff will normally be applied in the first task...

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

R8.4.7 Marker order...

This rule is a good example of a fixed penalty rule that ended a lot of discussion.

Usually, the pilots gets this penalty twice as he has 2 wrong marker colours.

Note, the same penalty is often also applied for using the wrong electronic mark without competitive advantage.

R8.12 Late Entry

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

R9.1.1 Common Launch Area(s)

The rule 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 be 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 manoeuvring 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 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."

R9.2 Individual Launch Areas

The rule implies that a competitor must take-off from the spot (launch field) he has chosen for inflation.

The boundary of the launch area is a circle of 100m radius from the position of the basket at the start of hot inflation. A balloon inflated in an individual launch area shall not be moved and take off outside of it unless it is deflated, moved to another launch area and re-inflated.

The penalty is a no result in the first task of that flight.

R9.2.2 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.

R9.3.2 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 CP.

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

Attaching the quick release to a trailer is not considered safe. Attachment to the wheel of the car (solid structure) is generally considered safe (even though it might damage the car).

R9.4 Vehicles

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

R9.5 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.

R9.9 Launch period

R9.11 Adequate time

R9.12 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 TP / minute.

R9.10 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.

R9.14 Launch masters (and 9.15)

When using launch masters, taking off without permission should be penalised by a warning or 50 CP 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 CP. However, if actual problems were observed or safety was actually impaired then the penalty should be from 250 to 500 CP. When launch masters are not used, the competitor should ask his crew to assist and the same or even more care should be applied by the competitor in this case. When abusing this care he should be penalized using the same principles as mentioned above.

R9.16 Procedures when Launch Masters are optional

Any collisions caused by the pilot should be handled as in R10.1 Balloon Collision.

R9.21 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 TP or more, depending on the advantage.

As a guidance, 100 task points per minute or part minute late should still be applied for the MDT task.

R10.1 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. 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 fly 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 R10.2):

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	600	-4	800
5	900	-5	1,000
6	1,000	-6	1,000

As it is often not very easy to determine the precise moment of the collision, the maximum vertical speed of the last 10-20 seconds before the collision should be considered.

This rule also covers 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.

R10.1.3 and R10.2.1 Doubling penalties in repeated offence

Doubling the penalty for every repeated offence means that for example the 3rd instance, the factor is 4x the penalty for that 3rd offence. With the factor applied, the total penalty can result with more than 1000 point per task.

The repeated offences have to occur on subsequent flights (and if the penalty was published at least provisionally before the task briefing of that flight).

A penalty on 10.1 doesn't trigger a repeated offense for 10.2 and vice-versa.

Example:

Instance	Penalty of the offence	Factor	Applied penalty
1 st	200 CP	1x	200 CP
2 nd	50 CP	2x	100 CP
3 rd	300 CP	4x	1'200 CP
4 th	200 CP	8x	1'600 CP

R10.1.5 Awarding points in case of a collision

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

As a recommendation, 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 requested to continue to provide the SWG with their experiences in applying this rule.

Note: This rule for awarding points only applies to one specific case which is the aborted flight after a mid-air collision. The same rule may not be applied to any other case.

R10.2 Dangerous Flying & Near Misses

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) is outlined in 2.10.1 Scoring Software of the COH. 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).

Care must be taken when calculating the climb/descent rate. Ideally the rate is directly taken from a 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. Also, GPS altitude is usually not accurate in higher vertical speeds.

It was decided to use 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.

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. The default limits are shown below. The limits can be modified in II.11 of the rules.

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 analysed 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.

Thus except for Limit 4 the limits are set as relative speeds between balloons. The limits trigger what is considered a dangerous situation. The actual penalty is then applied only based on the behaviour of each balloon alone. It is possible that a dangerous situation triggers no penalty as both balloons alone are flying within the limits of the table below.

Penalty policy

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

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
$0 \leq v < 2$				$0 \leq v < -2$			
$2 \leq v < 3$	50/WRN			$-2 \leq v < -3$	100/WRN		
$3 \leq v < 4$	100/WRN	50/WRN		$-3 \leq v < -4$	200	50/WRN	
$4 \leq v < 5$	300	100/WRN	50/WRN	$-4 \leq v < -5$	400	100/WRN	
$5 \leq v < 6$	500	300	100/WRN	$-5 \leq v < -6$	600	200	100/WRN
$6 \leq v < 7$	700	500	300	$-6 \leq v < -7$	800	400	200
$7 \leq v < 8$	900	700	500	$-7 \leq v < -8$	1000	600	400
8 and more	1000	900	700	-8 and more	1000	800	600

Under several conditions the penalty may be lowered to the next lower penalty (i.e. one line up in the same column of the table) or reduced to a warning where indicated in the table. 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 (50-150ft) 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.
- If one balloon initiates his decent 1-2 balloon heights (50-150ft) above another balloon at a safe distance of at least 50m. It is understood that modern balloons could - for a short time - get a high vertical speed, but the momentum would not push the balloons too close within the short time.
- Other unusual or unique cases will be added here as they are encountered.

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

If the incident is above 1000ft AGL then the penalty may be raised to the next higher penalty.

It is the pilot's responsibility to fly within the limits of the aircraft. The penalty guide does not consider the limit of every individual balloon manufacturer.

R10.3 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.

R10.4 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 if 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.

R10.5 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.

R10.6 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.

R10.8 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 CP. 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 Dangerous Flying.

R10.9 Persons on Board

AXMER Rule 10.9.1 says that crew members may perform any duty "...except to act as pilot-in-command." This rule means that crew members may perform virtually anything including operating the burner, dropping markers or even both.

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.

R10.10 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.

R10.11 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.

R10.13 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.

R10.14 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).

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.

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.

For the penalty calculation on Blue PZ see 7.5 PZ Infringement (Blue).

R11.2 Landing at will

R11.3 Contest Landing

AXMER rules R13.3.3 – R13.3.5 explain the penalty for those rules.

R13.3.3 states the landing within MMA or within 200m of goals/targets (when no MMA is set) or any physical marker is penalized up to 200 task points. This should be calculated as one point for every meter of violation.

It is possible that a contest landing within 200m 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.

Note that this rule only applies to physical marker. There is no penalty for landing close to electronic marks.

R11.4 Ground Contact 1

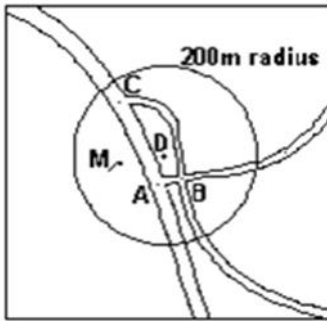
R11.5 Ground Contact 2

Both rules clearly have fixed penalties leaving no room for interpretations.

A ground contact is considered solid if it results in a change of momentum of the basket or envelope. It is also considered solid if a light contact is prolonged. As an example, if the pilot touches a field of tall plants for a longer time (e.g. > 10s).

R11.6 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.

R12.3 Declaration by Competitors (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 meant. In this case of ambiguity, calculate the result to each possible goal and take the least advantageous result.

R12.5 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, if accidental, no penalty 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.

A marker that had previously been swirled and subsequently dropped correctly as a gravity marker does not constitute a modified marker.

R12.7 Gravity Marker Drop (GMD)

Fortunately, the penalty is fixed for not dropping the marker correctly; simply add 50 metres to the competitor's result.

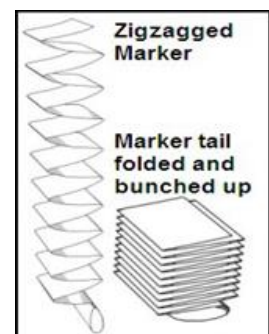
The method for Gravity Marker Drop is clearly described in the rule and needs no further interpretation. However, after some discussion, it was decided that in case a competitor uses the 'old' method of gravity drop (e.g. hand outside basket, but no horizontal movement), it would be harsh to penalise him with 50 metres and therefore a lighter penalty of 50 points was included.

A marker thrown into a limited scoring area when a gravity marker drop was prescribed should be considered ok provided the 50 metre result penalty is applied.

R12.8 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.



R12.10 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.

R13.3 Distance Infringements

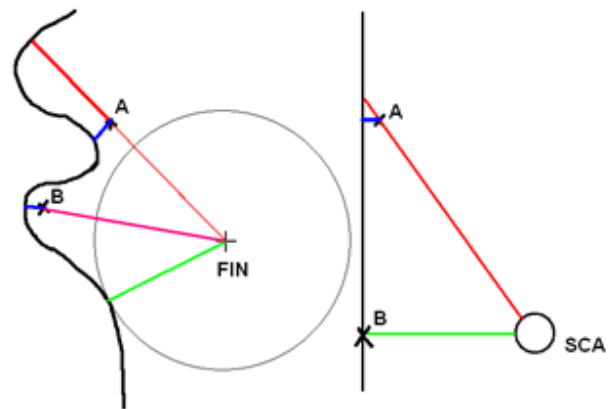
Percentage infringement should be calculated by truncating the result of dividing the infringement by the distance limit to a lower integer value. For example, if a competitor infringes a 1,000m limit by 251m, the result of the division would be 0.251, or 25.1%, which should be truncated to 25%. This 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).

“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.

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.

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%.

R15.1 Pilot Declared Goal (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 R12.3.5 and also comments above regarding AXMER R7.8 Map Coordinates). For further guidelines, read also FON task (AXMER R15.5).

R15.5 Fly On (FON)

Here are several mistakes made by competitors, followed by the penalty the SWG thinks should be applied.

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/R12.16.2 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 R12.12.2 (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

R15.6 Hare and Hounds (HNH)

R15.7 Watership Down (WSD)

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.

R15.13 Minimum Distance (MDT)

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.

Respectful Flying score (RFS)

When a pilot is penalized for an incident, he will usually receive a penalty upon a decision by the event director. The penalty is applied to his score. This is a well-defined and well-working scheme and does not need any change. The existing penalty types “task point penalty” and “competition points penalty” will also remain.

The event rules will clearly determine which penalties (by rule or upon director’s decision) will be marked as “counted for respectful flying score”. The attributed task or competition points will then automatically be flagged as such and later used to calculate the “Respectful Flying Score”.

A pilot’s “Respectful Flying Score” (RFS) will be 100% if he has received no penalties in the past 24 months. The score will decrease with each penalty and will be calculated according to the following formula:

$$\text{RFS} = 1 - (\text{Total of all RFS-penalties of the past 24 months}) / 1500 \text{ in } \%$$

RFS cannot be below 0%

Example: A pilot has the following RFS-flagged penalties applied to his scores in multiple events in the past 24 months :

Event A – task 3: 200 points under rule 10.1

Event A – task 12: 150 points under rule 10.2

Event B – task 2: 250 points under rule 10.2

Event C – task 5: 200 points under rule 10.2

The total of all RFS-flagged penalties is 800 points. The “Respectful Flying Score” for this pilot will be “ $1 - 800 / 1500 = 0.467 = 46.7\%$ ”.

The “Respectful Flying Score” will be calculated and tracked in WatchMeFly. Results of all CAT1 and CAT2 will be considered for calculating the RFS. Any other championships may also be considered if requested by the organiser prior to the event and scored in WatchMeFly.

Any pilot with a score below 0% will be shown as 0%.

The “Respectful Flying Score” will give the pilot restriction or a status (color). If the “Respectful Flying Score” is:

from 50% to 100%: no limitation on participating in any event, pilot flagged as GREEN

from 1% to 50%: participation in any event is still permitted, pilot flagged as YELLOW

at 0%: the participation in any CAT1 or CAT2 events is not permitted anymore. pilot flagged as RED (at the moment of the General Briefing of the relevant event)

When deciding on a participation in an event, the “Respectful Flying Score” is calculated for the moment of the General Briefing of the relevant event.

Example: The above-mentioned pilot with a score of 30% will therefore be allowed to fly in an event D. Upon any additional pilot penalty bringing his RFS to 0%, the pilot will be grounded and will not be allowed to fly any further tasks in that event or any other event, until his score is above 0% again.

Penalties given before 1st April 2024 will not be considered.

Calculation and publication: WatchMeFly will keep track of every pilot’s score.

The pilot will see his own Respectful Flying Score with all relevant penalties listed in his personal dashboard on WatchMeFly.net.

The Respectful Flying Score status will not be shown to other users or public.

A RED or YELLOW warning will be shown to organisers when adding the pilot to the list. At any time, an organiser will be able to check the status of all pilots in the pilot list of an event. He will then be shown the pilots with YELLOW or RED status only.

At each publication of official scores of a task, WatchMeFly will calculate the RFS for each pilot given a new RFS-relevant penalty. If a pilot changes to RED status, a notification will be shown.

Effect on non-FAI Ballooning events

Not all events are sanctioned by the FAI Ballooning commission as CAT1 or CAT2. Many national championships and other notable events usually base their rules on the AXMER. Any reference or application of the new restricting scheme in the AXMER will therefore likely find its way into these events too. Penalty points from those events will only count in the “Respectful Flying Score” if the event is a national championship and the organiser requests prior to the event to have the points considered if such penalties were to occur.

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A2. Guidelines for competitors with observers

R6.6 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. Generally, a warning should be given in the first instance. Speaking with the competitor and or his crew explaining the problem might help here.

R6.6.2 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 CP 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.

R6.8 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.

B. Forms

This section lists some forms that are frequently used. The director is free to make his own forms.

B.1 Flight Report Form

The screenshot shows the 'FLIGHT REPORT FORM' with sections for Competitor information, Flight details, Scoring Information (multiple tasks), and Downloader information. It includes fields for Name, Pilot IFC, IFC, Date, AM/PM, and various checkboxes for equipment like GPS and photo recorders.

This screenshot shows the 'LANDOWNER INFORMATION' section of the form, including fields for Name, Phone Number, Address, and Remarks. It also features a section for 'Additional information annexed' with 'No' and 'Yes' options, and signature lines for the Pilot and Analyst.

Electronic versions of the form can be downloaded here:

<https://www.fai.org/cia-documents> (→ Competition Operations → CIA - COH Flight Report Forms 2015)

B.2 Task Data Sheet (TDS)

The screenshot displays a 'Task data sheet' for a task titled 'Judge Declared Goal (Rule 15.3)'. It includes launch area, launch period, and scoring area details. A diagram shows a circular target area with a central point and surrounding zones. The form also lists scoring methods and equipment requirements.

Claude Weber has created a great Excel template for the TDS.

The template contains a lot of drop-down fields for pre-defined texts.

Also, the template contains a tab with lots of example tasks.

Electronic versions of the form can be downloaded here:

<https://www.fai.org/cia-documents> (→ Competition Operations → Model Task Data Sheet)

B.3 Weather Information Sheet

Will be added later

B.4 GPS Form

GPS Position Report Form

Date 日付		Task タスク名	
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	Time Zone SEYT YES NO	

位置の種類 (launch, landing, mark, goal etc)	Task タスク名	EPE	m DGPS?	Yes	No
	Easting 東西	Northing 南北	True 真緯	(i.e. 16 to 25 to 20 u)	
1					
2					
3					
Average 平均					Marker Color

位置の種類 (launch, landing, mark, goal etc)	Task タスク名	EPE	m DGPS?	Yes	No
	Easting 東西	Northing 南北	True 真緯	(i.e. 16 to 25 to 20 u)	
1					
2					
3					
Average 平均					Marker Color

位置の種類 (launch, landing, mark, goal etc)	Task タスク名	EPE	m DGPS?	Yes	No
	Easting 東西	Northing 南北	True 真緯	(i.e. 16 to 25 to 20 u)	
1					
2					
3					
Average 平均					Marker Color

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

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、連続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.
 GPSの読み取りは、15秒以上あけること。

Note 5: Write full digits (000 0000117, 0002700) 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数字を記録すること。(000 0000117, 0002700)
 2行目ないし3行目には、最後の5桁を記入すること。
 4行目は、17桁から7桁目までの平均値を記入すること。

Note 6: For goals declared by pilots (GPS and FOM tasks), if goals MUST be selected ONLY from a valid goal list. ONLY record the position of the marker. If goals may be selected by coordinates, ALSO record the position of the spot.
 パイロットがゴールを宣言する(GPS/FOM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位置マークにだけ記入。
 ゴールをコーディネイトで宣言してよい場合は、ゴールの位置もGPSで記録すること。

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は、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 position of all marks by GPS with this form.
 GPSによる数値は、200m未満では行なってはならない。しかしながら、全てのマークのGPSによる位置情報は、この用紙で行うこと。

Note 9: If big difference between readings appears, check GPS and read again.
 読数値に大きな差がある場合は、GPSを確認して再度読み取りを行うこと。

Mostly used for observer events.

Electronic versions of the form can be downloaded here:

<https://www.fai.org/cia-documents> (→ Competition Operations → CIA -COH GPS Position Report Form (2015))

C. Release Notes

Version 2022, March 17, 2022

Initial release of the new COH with contributions from Lynn Sullivan, David Bareford, Les Purfield, Erwin Pellegrom, Bengt Stener, Marc André

Version 2023, March 17, 2023

- Updates to 1.6 (Budget)
- Updated the links to fai.org across the document.
- Updates to Penalty guide
 - R6.4 (GPS logger failure)
 - R7.8 (Coordinates)
 - R10.1 (Collision)
 - R10.2 (Dangerous flying)
 - R10.9 (Persons on board)
 - Added R10.1.3 & R10.2.1

Version 2024, March 15, 2024

- Update to references to changed rulenumbers in GS, SC s1 and AXMER
- Rules for events with observers moved to A2
- Added new task 15.21 *Altitude Profile Task* to chapter 3
- Implemented the Respectful Flying score