



PARA BIATHLON OPERATIONS MANUAL

PARA NORDIC

OCTOBER 2022



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1 Introduction

This operations manual is the official reference manual detailing Para Biathlon (PBT) operational procedures. The manual is designed to be used by organizing committees, officials, and Para Biathlon International Referees (IRs) and jury members.

This manual includes operational guidelines and procedures for competition range & equipment setup, rifle checks, competition control, range safety, scoring and results production.

These procedures and guidelines are based on the Para Nordic International Competition Rules (ICR). In the event of any discrepancy between the content of this document and the ICR, the ICR are the official reference and always apply.

2 Background

Para Biathlon was introduced in Innsbruck in 1988 for athletes with a physical impairment. In 1992, athletes with vision impairment also became eligible to compete.

Para Biathlon events include sprint, middle distance, (sprint) pursuit, individual and team sprint competitions and take place on a the sprint, 2.0km, and 2.5km course skied three to five times in the free technique for a total race distance of between 7.5 km - 12.5 km. Between the skiing stages athletes stop in the shooting range and must hit five targets located at 10m during each shooting stage. For each missed target either a 1-minute time penalty (individual competition) or a requirement to ski a penalty loop immediately after leaving the shooting range applies. The winner is determined by the athlete who completes the competition with the fastest overall time. The most important success factor lies in the capability of combining the skills skiing speed and shooting accuracy during the competition.

The Para Biathlon range is divided into two parts with air rifle targets installed in one half and the electronic targets in the other half. The number of targets installed depend on the level of competition. Athletes with a physical impairment (LW) shoot pellets at mechanical targets using an air rifle. Athletes with vision impairment (VI) shoot at an electronic target using an electronic rifle with an infrared camera and aim by listening to acoustic signals through a headset. Signal intensity indicates when the athlete is on target. LW and VI competitions are run consecutively therefore in normal circumstances only half the range is operational during competition.

Para biathletes do not carry their rifles during the skiing stage but receive them in the biathlon range. Athletes with a physical impairment use personal rifles that are brought to the shooting mat by coaches when the athlete arrives at the range. Athletes with vision impairment use standardized rifles that remain at the shooting mat and are the same for all athletes. Athletes shoot in the prone position however some sit skiers may shoot in a sitting position if they are unable to shoot prone due to their impairment.

Para Biathlon is managed jointly by the International Ski and Snowboard Federation (FIS) and the International Biathlon Union (IBU) through a joint Steering Committee. Para Biathlon competitions are organised according to the ICR. The rules for Para Biathlon are based on the principles of the IBU.

3 Operational Procedures and Guidelines

These operational procedures detail operational setup and equipment checks and relative roles and responsibilities of organizing committees and Para Biathlon International Technical Officials (PBT IRs)

3.1 General role and responsibilities of the Organizing Committee

- Provide a biathlon range, penalty loop, related operational equipment consistent with the ICR (art. 12332) and Para Biathlon Range and Equipment Certification Manual (BRECM).
- Appoint a chief of range and related staffing (range crew, marshals, scorers)
- The chief of range is responsible for all range matters including layout and configurations, specifications, targets and their operation, penalty loop, coaches' enclosure, signage and numbering, lane markings, wind flags, rifle racks, grooming, scoring, control procedures, telecommunications, and safety. The chief of range is also the primary contact for the PBT IR.
- Deliver Para Biathlon competitions according to the rules and format specifications.

3.2 General role and responsibilities of PBT IRs

- **Before the event:**
 - Liaise with the FIS Para Nordic Race Director (RD), Chief of Range (organizing committee) before the competition to provide technical support and advice regarding FIS specifications to ensure that the OC is fully aware of the Para Biathlon requirements and able to prepare the venue in advance of the competition.
 - Initial contact should be coordinated through the RD and occur at least in association with site inspection. In situations where new OC's with limited capacity are involved, participation of the PBT IR in the site inspection should be considered and discussed in advance with the OC.
 - At a minimum the PBT IR should organise at least one skype / web call with the Chief of Range to discuss the biathlon requirements (manuals and checklists), range setup and OC range plans and organising structure.
- **On arrival at the venue:**
 - Meet with the OC/Chief of Range, RD and TD to review set up and their plans and schedule.
 - Inspect the biathlon range, penalty loop, and equipment set up and calibration for conformance with the specifications described in the BRECM, adherence to local safety rules and assist the Chief of Range / OC with final setup and calibration and report status to the TD & jury.
 - Check in and liaise with team coaches for any input or feedback regarding range operations.
 - Support the chief of range with training of range marshals and scoring and penalty loop marshals.



- Serve on the jury at World Cup events. Support the ATD Biathlon at World Championships and Paralympic Winter Games.
- **Before training or competition:**
 - Develop and implement daily lane assignments and range operation schedule in consultation with the TD and Chief of Range. Liaise with team coaches for input.
 - Oversee daily range preparation and provide update and sign off to the jury.
 - Oversee the rifle check process (delivered by OC).
 - Oversee and monitor range operations during training and zeroing and support the Chief of Range in their duties.
 - Determine and check placement and operation of range video cameras.
 - Participate in Team Captain's meeting.
 - Participate in Jury meetings, if called.
- **During competition:**
 - Oversee and monitor range and penalty loop operations in support to the TD and Chief of Range.
 - Monitor, verify and record competition activities (and times) and any incidents including:
 - range safety
 - range transit / obstruction/zone of silence (including B1 speakers)
 - lane filling (correct order) and any obstruction (skis within lane, etc)
 - rifle transfer to/from mat
 - neutralization (when required)
 - time adjustments (where required)
 - verify missed shots / lost pellets / misfires / cross firing / proper aiming
 - proper use of rifle supports (balance point and deflection)
 - respond to any target/B system malfunction and close lanes as required
 - check and ensure scoring and consolidation process running smoothly
 - Immediately report any issues or incidents to TD/Jury.
 - Request video evidence as required.
- **After competition:**
 - Verify penalty loop and scoring consolidations and report to TD (all clear or any issues).
 - Participate in post-race jury meetings.
 - Oversee preparation/transition prior to next competition or training round (clean and paint targets, assemble clean paper targets, ensure B system equipment is protected, etc.)
 - Inspect/review equipment calibration. Problem-solve and make equipment repairs, as necessary.
 - After the final biathlon competition, oversee the disassembly, drying and packing of FIS or rented Biathlon Equipment (where applicable).

3.3 Procedures for Range & Equipment Setup, Operation & Maintenance

Specifications for Para Biathlon range layout, construction and equipment specifications can be found in the BRECM. It is assumed that these specifications have already been discussed during the site inspection and implemented by the time the PBT IR has arrived. The following describe operational procedures applicable to training and before, during and after competition. Implementation and delivery of these procedures is a shared responsibility between the Chief of Range and the Biathlon TD / IR.

3.3.1 Shooting platform preparation and maintenance

Art. 12332.1

- Platform to be compact, flat and level in both directions
- Must be maintained throughout the event to ensure safe usage by competitors, teams, officials and volunteers
- Local knowledge and experience of conditions and platform maintenance is critical
- Depending on local conditions, ensure appropriate tools are available
 - Rakes, shovels, tools for ice cutting, levelling screeds (device)
 - Brooms, air blowers, snow blower
 - Grooming machine - make sure to identify timelines and coordinate with course and stadium grooming schedules
- Review and discuss OC plan to ensure adequate understanding, experience and preparation

3.3.2 LW Target and B Target System Set Up and Calibration

Specifications are found in art. 12332.1.14, 12332.1.16, 12332.1.17, and in Annex 1 and Annex 2 of the FIS BRECM.

Calibration is normally checked by the PBT IR. OC staff should be trained by the IR and may assist with calibration checks.

3.3.3 Target levelling and stabilization requirements

As described and illustrated in Annex 1. BRECM

- Targets must be positioned on a solid platform of either a table or bench design.
- All targets must be in the same line and same distance from the firing line.
- Level the targets with a magnetic spirit level (don't use an electronic level).
- Level in vertical plane (back and forth (most critical)) of front of the target and horizontal plane (left/right) at the top of the target face. Recommended: level the horizontal plane of LW targets without the cover plate. The plate may not sit flush on the target.

3.3.4 LW Air Target Painting and Maintenance

Annex 1. Para Biathlon BOM

- Fresh paint each day.
- Lead cleaning each day.
- Touch up painting between races.

3.3.5 Blind Shooting Target, Headphone and Rifle Settings

Art. 12332.1.17

- As required for Automated Scoring and Manual Scoring
 - Manual scoring – Display software setting of “Training Mode”.
 - Automatic scoring – Software setting by Kurvinen team.
- Check trigger weights prior to first use. Respond to athlete request to check and adjust, if needed.
- Reference *Operating Instructions for EKO-Aims Firing Mechanisms* below:



OPERATING INSTRUCTIONS FOR EKO-AIMS FIRING MECHANISM

The firing mechanism is affected with rather small adjustments. Large and unskillful adjustments cause eventual firing mechanism malfunctions and might turn it inoperable. Do not apply unnecessary force when adjusting. This firing mechanism is a fine-mechanical instrument.

The firing mechanism itself is adjusted in the following way:

1. ADJUSTING THE FIRING PULL WEIGHT

To increase the firing pull weight, turn screw 3 anticlockwise. To decrease the firing pull weight, the screw 3 is turned clockwise.

2. ADJUSTING THE TRIGGER FIRST - STAGE AND RETURN TRAVEL LENGTH

To adjust the length of the trigger first-stage travel (slack) screws 2 and 5 are to be operated. The adjusting can be done with the other or with both screws. If the trigger first-stage travel should be shorter, the adjusting screw is turned clockwise (tighter) and when the trigger first-stage should be longer, the adjusting screw is turned anticlockwise (looser). The trigger return movement is adjusted with the same screws. The travel is increased by loosening the screws and made shorter by tightening the screws.

3. INCREASING THE FIRST - STAGE PULL WEIGHT

Increasing the first-stage pull weight (slack weight) is done by adjusting the screw 4. The pulling weight is increased by turning the screw 4 clockwise and decreased by turning the screw anticlockwise.

4. ADJUSTING THE BACKLASH TRAVEL

The trigger backlash travel is adjusted with screw 1. When the backlash should be shorter, the screw is turned clockwise. And vice versa. The screw 5 also has influence on the backlash length. The screw 5 and 1 should be in right relation with each other. In case the screw 5 is excessively tightened, the screw 1 has no adjusting effect.

5. FIRING WITHOUT A FIRST - STAGE TRAVEL (no slack) OR SO-CALLED "HUNTER'S TRIGGER"

The firing mechanism can be adjusted to have no slack by removing the adjusting screw 4 and then spring under it. The screw 4 is then installed back to its threads and turned so deep that the slack is felt no more. The screws 4 and 2 should be in relation to each other.

6. FIRING WITH A FIRST - STAGE TRAVEL OR SO-CALLED "COMPETITION TRIGGER"

The adjusting is started from a long and light first-stage pull, which is achieved by opening the first-stage pull weight adjusting screw 4 and first-stage travel length screw 2 or 5. Then the trigger slack is adjusted as desired with screws 2 and 5. Finally the first-stage pull weight is adjusted with screw 4 and the firing pull weight (the second-stage pull weight) with the screw 3.

The first-stage pull weight (slack weight) can be adjusted from 2-20 N. The smallest first-stage pull weight can be about 0,5 N. These forces depend on the springs used. By changing the springs the forces also can be affected. The values shown above are based on factory-installed springs.



3.3.6 Testing Acoustic levels – headphones

As described in Annex 2. BRECM

- Sound meter to be placed between the ear cups and cups to be firmly pressed together.
- Test both sets of headphones for each lane.
- Minimum 85db (95 db maximum) when rifle pointed at the 21mm hit area.
- Test that both sets of headphones are operating properly each day prior to training and zeroing/testing. Respond to athlete request to check and adjust, if needed.

3.3.7 Athlete Identification and Target resets

As illustrated in Annex 1. BRECM

- Use athlete worn transponder chip for target reset and identification.
- Test each lane each day that it resets properly.
- Test each day that all target lights are working properly for each lane.
- A least 1 target must be hit (lit green) on each lane during daily testing.
- After successful testing of each lane target leave all 5 targets lit red (miss) to signify successful testing.
- A spare reset chip is to be carried by PBT IR, Chief of Range and Assistant Chief of Range for use during training and competition in case of lost or malfunctioning transponder.

3.3.8 Adverse Weather – Equipment Precautions

Use local experience and expertise.

- Use covers on all targets and rifles when not in use (e.g. overnight, daytime when range not in use).
- Wrap all electrical connections in plastic wrap.
- Place B-Rifles inside a warm room overnight to dry and stay warm. (Headphones are typically kept outdoors but may also need to be brought indoors in very wet weather conditions.)
- Leave power on for all electronic targets. Ensure all target lights are lit.
- If heavy rain is expected, consider the potential for flooding and remove equipment at risk of inundation.

3.3.9 Packing Equipment at the end of a Competition

- Un-packed equipment must be placed in a Hot room to dry out for minimum 24hrs before packing for shipment or storage. Other than safety and following the rules, packing the equipment following the competition is the most important responsibility of the BT IR and OC and the BT IRs departure time should be planned accordingly. If the equipment fails at the next event there can be no competition.
- If less than 24 hours is available for drying store equipment in a hot room, then add many fans and directly blow hot air into and across the equipment.

- As a last resort and only if there is no time before departure to adequately dry the equipment and it has to be packed partially wet (at a minimum it must be wiped down to remove excess water/snow/ice, etc.), then inform the receiving destination (storage or next venue) that the equipment must be unpacked on arrival and properly dried before further storage or installation. The RD, with PBT IR input, is responsible to follow-up with the receiving destination to ensure this critical action is taken. The FIS office is also to be informed of these circumstances.

3.3.10 Air Supply & Yokes

(See Annex 1. Para Biathlon Operations Manual (BOM))

- Best option - SCUBA tanks with Yokes.
- Next best option – Fire Fighting SCUBA tanks.
 - Care must be taken that the insert of the rifle adapter will seal and not leak air.
- Best option for refills – Onsite compressor.
 - Next best options –
 - Local SCUBA shop
 - Local Fire Department
 - Compressors should have air driers to remove moisture which can freeze and affect performance.
- Store air tanks in warm room overnight.
- On the range, air tanks should be positioned (see annex drawing) so that they are:
 - Convenient to the team staff;
 - Do not interfere with the functioning of nearby team staff, volunteers, guides, and ITOs.
- Install both styles of rifle air cannister adaptors on 2 tanks. Have a wrench available to switch out adaptors in the event a new tank is needed. Only FULL tanks should be used for official training and competitions.
- Place tanks on an insulated surface (eg, spare shooting mat). Ensure the tanks are stable and not easily “tipped over.”
- **Do not use**
 - Large tanks which are difficult to move (and recharge)
 - Any tanks pressurized beyond or greater than 200bars (2900 psi)
 - Any tanks that do not have the possibility to connect the filling yokes or adapters.

3.4 Rifle Check (Inspection)

The rifle check operations can be a quick process if adequate people and training is provided. Failure to provide a quick process leads to extreme dissatisfaction by the teams and can negatively impact the operations of an event.

The key to successful “Rife Check Inspection” is adequate training and enough personal with the proper tools.



Complete rifle checks ideally should be conducted indoors at pre-determined times. Rifle checks at the range, if possible, should be limited to random checks prior to and/or immediately after official training and competitions.

The Rifle Check Table at the range should be positioned in such a way as to:

- Not interfere with the functioning of team staff, volunteers, guides, and Technical Officials.
- Be situated at the team staff entrance to the range.

3.4.1 Equipment Requirements

Annex 1. Para Biathlon BOM

- 2 Tables
- V-Board for balance point
- 10cm measuring tool (provided by FIS)
- Barrel length tool (provided by FIS)
- Trigger weight (do not use electronic type)
- Stickers for completed rifle check and balance point
- Start list and pencils
- Clip boards
- Tent cover for snow days
- Data results from full rifle check and/or equipment inventory (provided by FIS)

3.4.2 Inspection Protocol

Art. 12332.3.2, 12332.3.2.1, 12332.3.4, 12332.6.2.1

- Calibre .177, 4.5mm
- Barrel length (not to exceed 850mm)
 - With FIS tool provided
- Height of stock (minimum 70mm)
- Width of stock (maximum 70mm)
- Maximum weight (5.5kg)
- Balance point (when required)
- Trigger weight
 - With IBU/FIS sanctioned fixed weight
 - Do not use electronic measuring device
- Trigger Guard
- Rifle cylinder to be less than 10 years old (date on cylinder)
 - Date of manufacture should be stamped on the side of the cylinder (note different jurisdictions may have different ways of marking cylinders – if no stamp is present, consult with coaches to try and determine status of cylinder and / or alternate marking systems).
 - Cylinder with no date stamp is normally considered more than 10 years old.



- Inspect the cylinder for any obvious defects (damage, cracking, deterioration) – cylinders that appear sound and in good condition will normally be accepted in absence of a date stamp and if no alternatives are available.
- Rifle Power
 - With FIS tool & procedure provided
- Optics
- Overall inspection confirming to inventory submission
- Best practice –
 - WC & WSC
 - All rifles before 1st race day
 - Rifle check to be open on 1st race day
 - A random selection of rifles for each race day
 - Recorded on race start list after passing rifle check
 - PWG
 - All rifles
 - Each and every race day
 - Recorded on race start list after passing rifle check

3.4.3 Rifle Marking

Art. 12332.3.4

- Each rifle marked with race sticker after rifle check completed
- New sticker or mark on existing sticker for additional rifle checks
- Record on start list random rifle checks.

3.4.4 Checking against Equipment Inventory Information

Art. 12332.3.4

- By FIS officials, done in advance,
- IRs, TD & RD have access to the inventory and shall be familiar with it and how to access information.
- A booklet may be printed (paper or pdf on a tablet) from the inventory to provide quick reference access to inventory data.
- Checking involves:
 - a comparison of rifle submitted for equipment check corresponds to the rifle information and photos previously submitted and approved by FIS.
 - Any further modifications made after approval by FIS must be observed and checked with compliance to the rules.
 - Such rule infraction can and will result in prohibition of competition usage of that rifle until compliance with the rules.

3.5 LW Lane Allocation for Zeroing and Competition

3.5.1 Considerations

Para Biathlon IR or Chief of Range will allocate lanes by considering the number of lanes available, number of teams, number of athletes per team.

- Consider other factors that could adversely affect good usage of lanes and functioning by teams.

3.5.2 Procedures

- Athletes are to use team zeroing lanes for competition shooting or the closest available lanes when the team zeroing lanes are full.
- Scenario: If team zeroed on lanes 7 and 8 and when the athlete came in for their shooting and lanes 7 and 8 are being used then the athlete should be directed to the next reasonably close lane that is open.
 - Do not send the athlete to open lane 12 which is to ski in the wrong direction.
 - The athlete should not be sent to open lane 1 as this could result in issues for the coaching staff such as running down to lane 1 with a rifle in hand.
 - Instead in this situation an alibi time should be recorded and given to the athlete until a reasonably close lane is open for that team.

3.6 Zeroing / Testing

3.6.1 Time frames

- Art. 12332.4.3
- Check timetable for consistency.
- Discuss contingencies with TD, OC, TCM if time / weather constraints require variance from rule.
- It may be acceptable to split testing time for VI men and women depending upon factors such as number of competitors. Discuss with coaches at TCM.

3.6.2 Paper Changes

- During Training – When Required
- Competition
 - 20 min after start of zeroing.
 - And if required, again when requested.
- Close the range for paper change.
 - Get ready for a paper change by having 2 teams of 1 or 2 people each on either end of the air rifle part of the range.
 - Give warning to the teams and when ready close the range.
 - Close the range with the Chief of Range or Assistant using a whistle. PBT IR may need to do this in their absence.
- Best to have 2 paper change teams starting from left and right at the same time for expediency



- Each of the 2 teams removes and replaces the paper targets moving towards the middle.
 - If one team is faster, then they can assist the other team.
 - Do not start the teams in the middle and move outward as if one team is slower than the other, they can be too far away to give timely assistance.
 - Advise teams to use caution if target reset cords are used.

3.7 Range Safety

3.7.1 Applicable range safety rules

Art. 12332.1, 12332.8, Annex 1. Para Biathlon BCM, Local Safety Rules

- FIS safety rules are the minimum safety standards.
- Local safety rules may exceed the minimum FIS safety standard and will take precedence.
- Review local safety rules with OC before 1st day of range being open for training and review and communicate to teams.

3.7.2 Enforcement

- Enforcement of range safety is a joint responsibility of the Chief of Range *and* the Biathlon IR.
- IR to recognise that the Chief of Range is the leader who holds responsibility and prerogative on the range, however.
- The Chief of Range and/or Biathlon IR are obligated to intervene as required in any violations of range safety rules to ensure range safety. All instances of range safety must be immediately reported to the TD.
- The IR must follow up with Chief of Range at earliest opportunity to review any safety violation incidents.

3.8 Competition Control

Competition control is accomplished through monitoring and reporting of rule violations or potential rule violations, incidents or issues by the range staff, biathlon IR and any other jury members present in the range during training or competition. To assist with competition control, a series of range video camera positions are also used to record range activities during competition.

3.8.1 Range Camera Positions

Annex 1. Para Biathlon BOM

The purpose of the cameras is to record the range activity so that if there is a question on a rule infraction the Jury has video record to assist in any ruling.

- Adherence to specifications (number of cameras, height, position) in the annex is required otherwise the video will not provide enough required detail to the Jury.



- Power
 - Power cable to each position
 - Next best option – Spare batteries
 - Review OC plans and approval by PBT IR
- Video Data
 - Best option – wired to Jury room
 - Next best option – remove and replace memory storage cards then take them to the Jury room.
 - All video collected to FIS external hard drive for Jury/PBT Working Group use
 - File names are to be City/Date/Race

3.8.2 Competition Rules & Procedures:

ICR Section 12332, BRECM, Range Operations Manual

Note that the ICR and related manuals are comprehensive with respect to Para Biathlon. Although IBU rules provide the foundation for the ICR, IBU rules are superseded by the ICR and therefore IBU rules or rule interpretations do not implicitly or explicitly apply. Rules interpretation questions should be referred to the Para Biathlon Coordinator, Para Biathlon IR and/or the Chair of the Para Biathlon Working Group.

3.8.2.1 Enforcement

- The role of the range officials, under the leadership of the Chief of Range and with the support of the PBT IR is to:
 - Organise the range and implement the competition according to the rules. “It is their event!”
 - Observe the competition and intervene as required under the rules to ensure smooth running of the competition.
 - Observe the competition and record any rule violations, potential rule violations, incidents, or activities that may be outside the rules and report these to the Jury.
- The role of the PBT IR is to act as a jury member or support the ATD biathlon during training, zeroing and competition and to oversee the running of the competition, bring any incidents to the attention of the jury, and verify the scoring and penalty loops on completion.
- Enforcement of FIS event and competitions rules and sanctioning when required is the responsibility of the Jury.

3.8.2.2 General Procedures

The following general guidelines and procedures apply to the implementation of various rules and for dealing with various types of incidents and circumstances:

- Target Malfunction (paddle bounce)
 - To be reported to Officials and reviewed by any means available.
- Target Malfunction (paddle does not go down) or suspected target malfunction

- Gather as much information as quickly as you can to make a decision and if required immediately close the lane.
 - If not sure if it was actually a malfunction?
 - Make judgement to close or not (better to close if unsure than to keep it open)
 - Keep lane closed till opportunity to inspect the target and to make further decisions.
- Rifle Malfunction
 - Art. 12332.9
- Missed shots / split shots / shots taken / cross target shooting
 - Art. 12332.9
- Rifle Supports
 - Art. 12332.6
 - Annex 1. BOM
- Lane Dividers
 - Art. 12332.7
 - Annex 1. BOM
- Filling Lanes (B athletes)
 - Art. 12332.5.2
- Neutralization
 - Annex 1. BOM
- Lane Allocation
 - Art. 12332.5.2 (B-Athlete), see above LW lane Allocation - Procedures
- Penalty Loop Control
 - Art. 12332.2, Annex 1, Para Biathlon BOM
 - Review and approval by PBT IR.
- Closing a lane
 - Art. 12332.9 close the lane by folding of the mat or placement of orange cone on the mat.



3.8.3 Reporting and Jury Process

Art. 12303

- Review OC planned jury report procedures of how to get this information to the Jury room for its review.
 - Review procedures and equipment for viewing.
 - Test the procedures and equipment for viewing.
- Review well before 1st competition day.

3.8.4 Sanctions

Art. 223, 224, 12337



- All sanctions are delivered by the Jury according to the decision chart and sanctioning procedures (including automatic sanctions for violation of rules with set sanctions such as safety rules).

3.9 Scoring and Results Production

3.9.1 Personnel Requirements

(See Annex 1. BRECM)

Review OC plans and approval by PBT IR

Review well before 1st competition day

- Single biggest error is to have not enough volunteers
- Too many volunteers are not a problem as jobs can be split up into smaller roles (remember to keep all volunteers busy).
- Another issue is an experienced venue and group of volunteers with overconfidence such as arriving moments before or overconfidence in IBU Biathlon and not enough attention paid to Para Biathlon differences.
 - This can be a sensitive issue with experienced crews as they will say “we know how to do this”.
 - Approach this type of issue with understanding but implement some method of review.
- Keep in mind that the number of scorers needed may vary depending upon the timing and camera systems in place¹.

3.9.2 Scoring Lines 1,2,3

Annex 1. Para Biathlon BOM

- Review OC plans and approval by PBT IR
- Review well before 1st competition day

3.9.3 Acceptable Recording Methods and Systems

(Paperwork)

The important thing is to ensure the LOC has an effective tool in place. It's great if they have something already that they are familiar with. Failing that, Annex 1 provides templates they may use.

¹ Example: In Lillehammer 2019 WC, the timing and camera systems were linked in such a way that 3rd Line scorers would have been redundant and, therefore, were deemed unnecessary. 1st Line scorers had hand-held devices that allowed the timing team to view and compare shooting results side-by-side. 2nd Line scorers used paper/pencil as per usual.



Annex 1. Para Biathlon BOM

- Review OC plans and approval by PBT IR.
- Review well before 1st competition day.

3.9.4 Reconciliation

(Paperwork, Results)

Annex 1. Para Biathlon BOM

- Review and approval by PBT IR.
- Review well before 1st competition day.

3.9.5 Reporting Results

Annex 1. Para Biathlon BOM

- Review OC plans and approval by PBT IR.
- Review method of recordation of shooting results and penalty loop data.
- Review method of shooting results:
 - 1 line
 - 2 line
 - 3rd line
 - Moving the shooting results to the consolidation board:
 - Transposing the shooting results to the consolidation board.
 - Cross checking the shooting results between lines 1, 2 and 3.
- The Shooting Results Board should be positioned in such a way as to be:
 - Visible to team staff;
 - Not interfere with the functioning of team staff, volunteer “runners”, and Technical Officials
 - In some situations, the Results Board may be positioned in the corral immediately behind the area of the rifle stands.
- Review method of collecting Penalty Loop data:
 - By each position, positions 1, 2 and 3.
 - Consolidation of the penalty loop data.
 - Moving the penalty loop data to the consolidation board:
 - Transposing the penalty loop data to the consolidation board.
- Cross checking the shooting results and the penalty loop data.
- Transmission of consolidation board results to stats office.
- Procedure to re-check any results if stats office or Jury requires such re-check.
- Review well before 1st competition day.

3.9.6 Training of OC Range Crew and Officials

The Biathlon IR together with the Chief of Range must plan a range crew briefing / training session prior to competition.

- Each range and penalty loop position and individual crew member knowledge, experience and positioning will be reviewed in conjunction with the Chief of Range.
- Decisions for any required additional training is the responsibility of the PBT IR so that the PBT IR is satisfied that the person(s) can carry out the assigned task to FIS requirements and standards.
- This review will be carried out with adequate time prior to the start of any competition.
- An additional review of personnel at each station will be done again prior to the start of each day of racing and each individual race.
- An overall run thru of how the shooting data is transmitted from each recording position to the consolidation board.
- An overall run thru of how the penalty loop data is consolidated and transmitted to the consolidation board and cross checked.
- An overall run thru of how the consolidation board final data is transmitted to the results room.

3.10 IR & Range Toolkit

A number of tools are necessary for successful preparation and operation of the range. A core set of tools and supplies should travel with the FIS range but in cases where another set of range equipment is going to be used, the IR may need to specify the set of necessary tools and supplies. Additionally, an IR is always prepared and carries a basic set of tools with them necessary to perform the job:

3.10.1 IR Toolkit

Miscellaneous tools and accessories Biathlon IR should bring to events:

- A. Headlamp (with extra batteries)
- B. Paint pens (to re-paint targets; 2 black and 2 white)
- C. Tape measure (metric)
- D. Notepads and pen/pencil
- E. Whistle
- F. Stopwatch
- G. Multi-tool
- H. Training aids (for scorekeepers)



3.10.2 Range Toolkit

Miscellaneous tools to be included in traveling biathlon range kit AND/OR brought by Biathlon IR:

- I. Template to measure 10 cm span of approved rifle balance point; grease pencils to mark
- J. Air rifle cannister adaptors (2 different kinds; one not shown), plus spare O-ring(s)
- K. Paint pens (to re-paint targets; 2 black and 2 white)
- L. Tape measure (metric)
- M. Soft bristle brushes to clean VI target electronics
- N. Sticker assortment and marking pens for rifle check
- O. Small Spirit level (to check targets)
- P. Tool to scrape off lead from LW targets
- Q. Small flat-head screwdriver to adjust VI headphone Db levels
- R. Small adjustable wrench (a large wrench should be available to tighten VI monitors)
- S. Assorted hex allen wrenches (metric)

Not shown: hand-held laser level; 70 mm rifle stock check tool; metric caliper; electrical and duct tape; and other hand tools which should be readily available from the venue operations crew; device to check headphone decibel levels; device to check rifle "power"

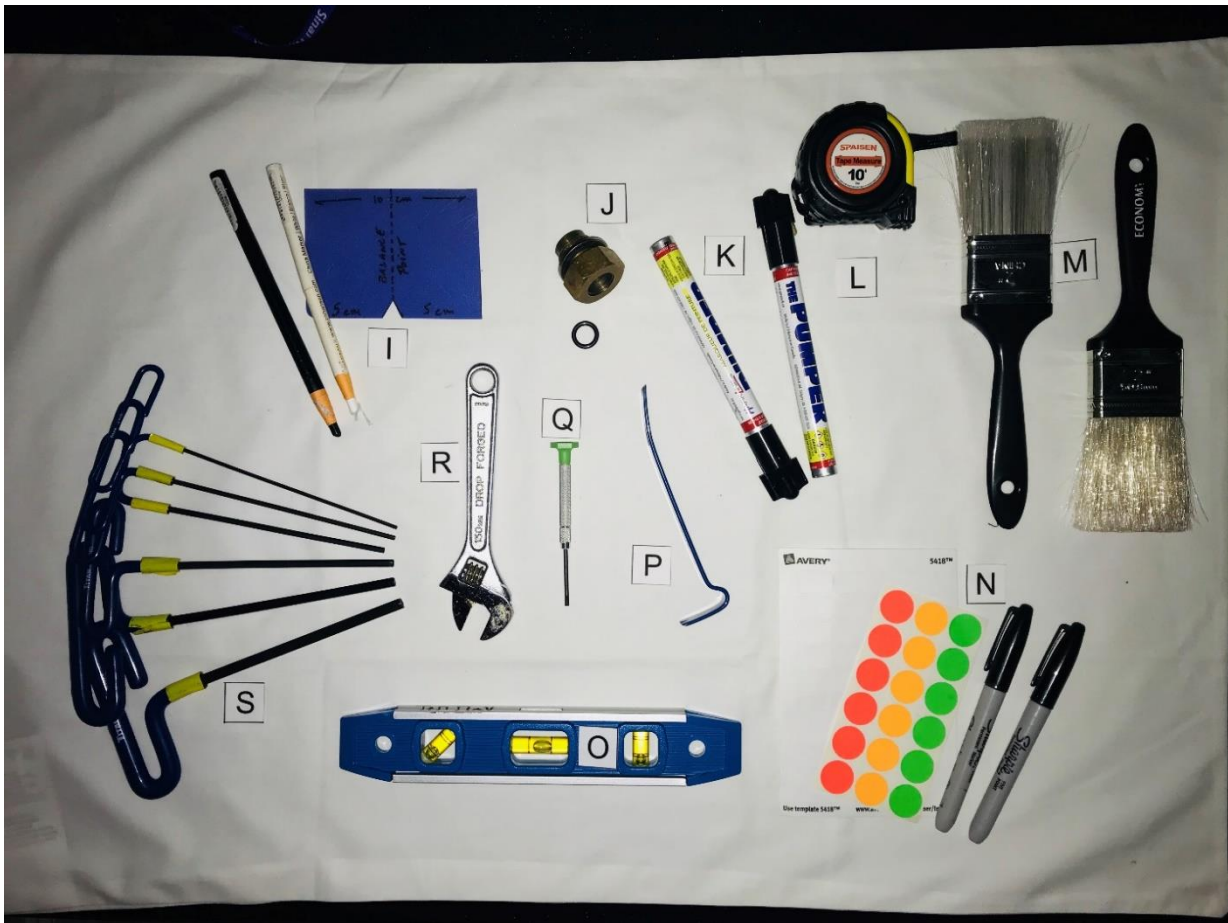
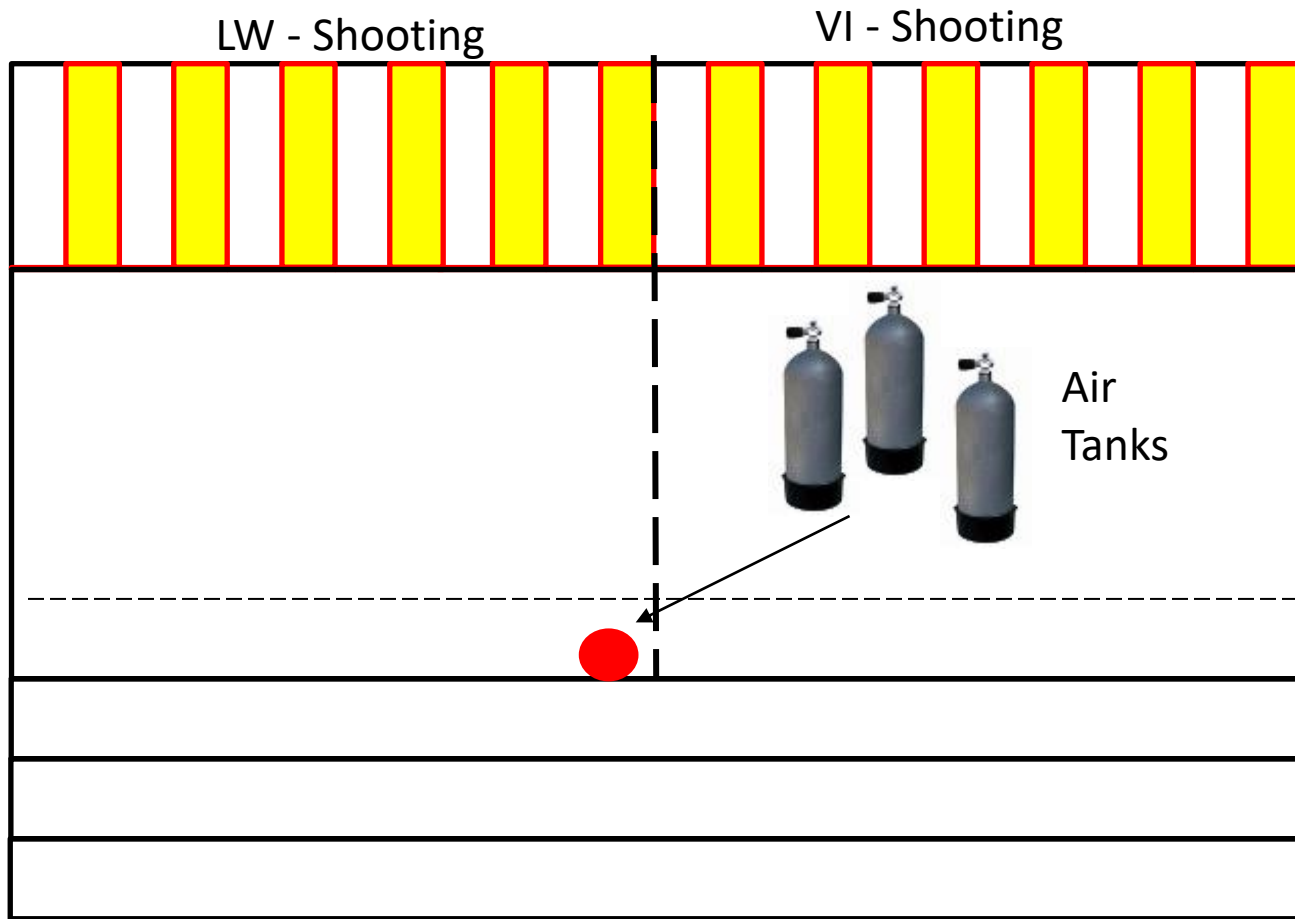


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Air Equipment

Air Rifle Air Tanks Position



Air Tanks Requirements

2 Scuba Tank
Yokes Required

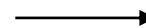


Adaptors – one of each
type



- 3 Air Tanks on the range each day.
- Pressure at 200 bars

Additional set of
tanks available for
rotation and
refilling.

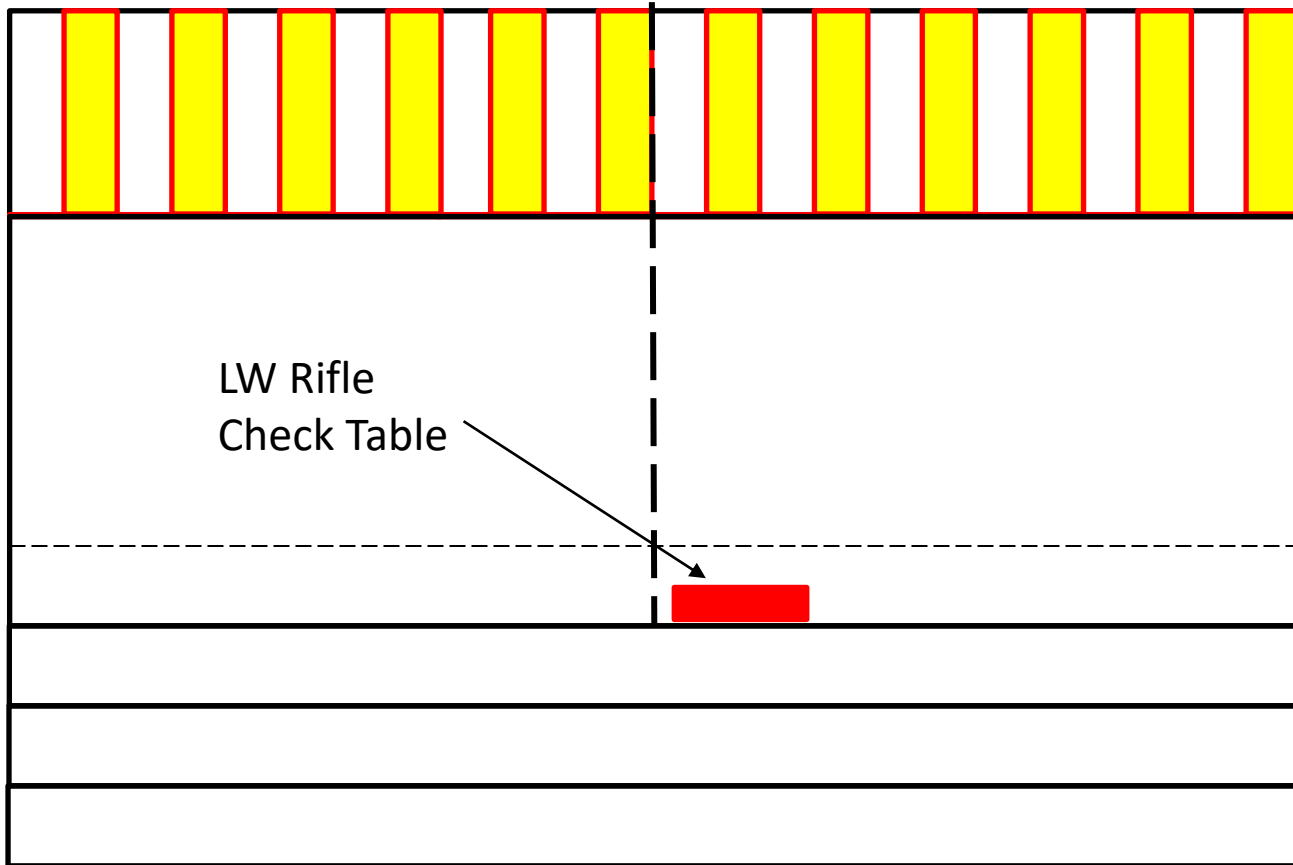


Rifle Check

Rifle Check Location Art. 12332.3.4

LW - Shooting

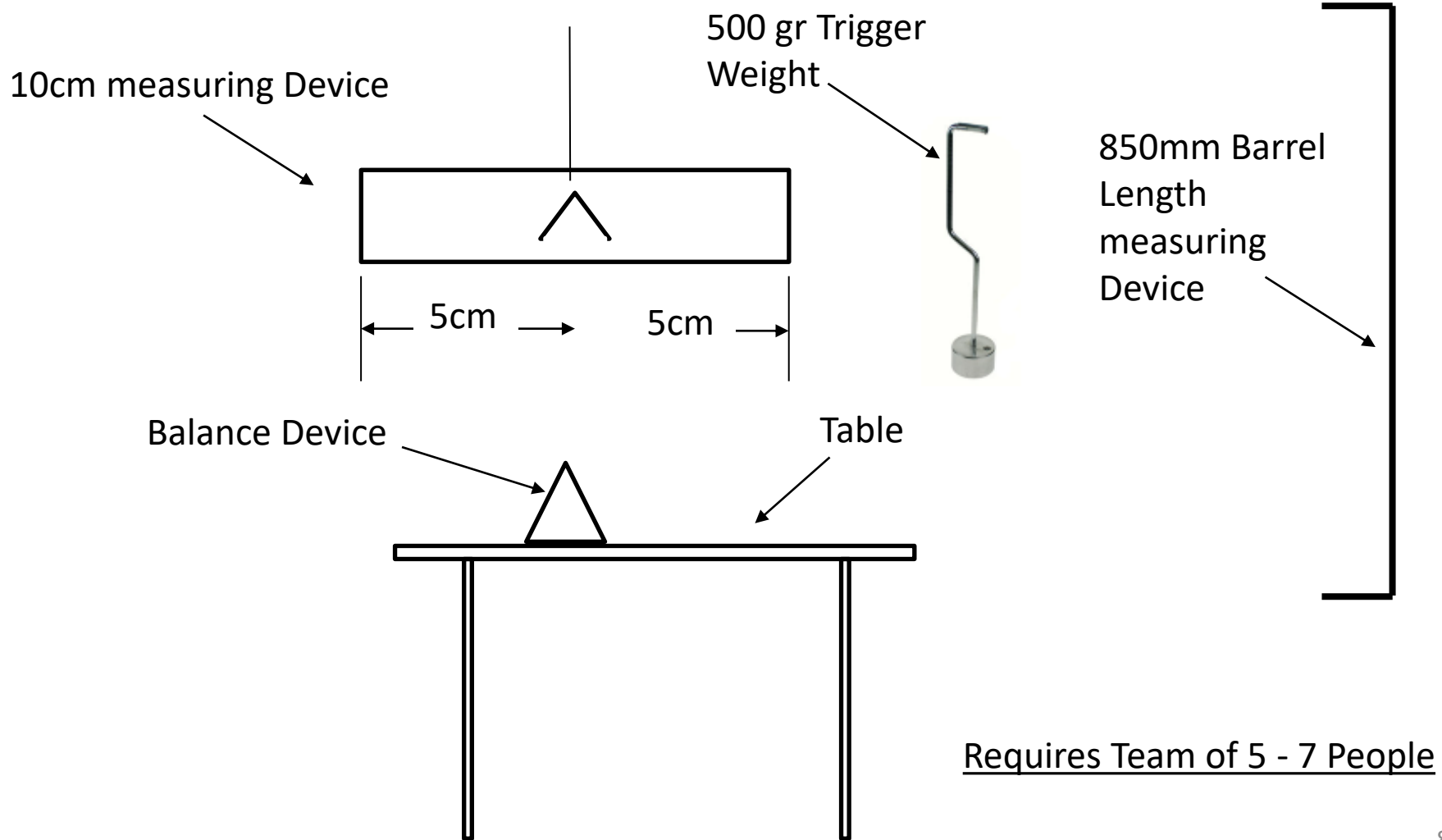
VI - Shooting



LW Rifle
Check Table

Equipment required for Rifle Check

Art. 12332.3.2.1,
12332.3.4, 12332.6.2.1



Scoring Teams

24 Lanes with 12 LW and 12 B - Shooting Lanes, Requirements

12 LW Shooting Lanes

24	23	22	21	20	19	18	17	16	15	14	13		
Scorer		Scorer		Scorer		Scorer		Scorer		Scorer		1st Line	6
Scorer			Scorer			Scorer			Scorer			2nd Line	4
Scorer				Scorer				Scorer				3rd Line	<u>3</u>
												Total Scoring People	13

VI Lanes 1-12: same Team as for the 12 LW Shooting Lanes

26 Lanes with 14 LW and 12 B - Shooting Lanes, Requirements

14 LW Shooting Lanes

26	25	24	23	22	21	20	19	18	17	16	15	14	13		
Scorer		Scorer		Scorer		Scorer		Scorer		Scorer		Scorer		1st Line	7
Scorer		Scorer			Scorer			Scorer			Scorer		2nd Line	5	
Scorer		Scorer			Scorer				Scorer			3rd Line	4		
													Total Scoring People	16	

VI Lanes 1-12: requires 13 of the 16 person team

30 Lanes with 18 LW and 12 B - Shooting Lanes, Requirements

18 LW Shooting Lanes																	
30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13
Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer
Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer
Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer	Scorer
1st Line		9															
2nd Line		6															
3rd Line		5															
Total Scoring People																20	

VI Lanes 1-12: requires 13 of the 20 person team

Paper Work

Neutralization Record

Neutral Zone

Date _____

LW

Bib
Number Time In Time Out

Bib
Number Time In Time Out



Time from
Clock

1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

1st Line Manual Scoring

Bib #	Lane #	In	Time	Date
<input type="text"/>	<input type="text"/>	Out	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>		<input type="text"/>	
○ ● ○ ● ○		= 2 Misses		
○ ⊗ ○ ⊗ ○				
○ ○ ○ ○ ○			Misses	Initials
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Single Piece of Paper for 1 Shooting Only.
1 Scoring Person for each 2 lanes.
Only need to record 1 time of day during shooting not time in and time out

2nd Line Manual Scoring

Name _____	Bib #	Lane #	In	Time	Out	Date
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	Misses	<input type="text"/>	Note: _____		
	Bib #	Lane #	In	Time	Out	Date
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	Misses	<input type="text"/>	Note: _____		
	Bib #	Lane #	In	Time	Out	Date
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	Misses	<input type="text"/>	Note: _____		

Single Piece of Paper for 3 Shooting Only.
1 Scoring Person for each 3 lanes.
Only need to record 1 time of day during
shooting not time in and time out

3rd Line Manual Scoring

Name	Bib #	Lane #	In	Time	Out	Date	
	<input style="width: 80px; height: 40px;" type="text"/>	<input style="width: 80px; height: 40px;" type="text"/>	<input style="width: 60px; height: 40px;" type="text"/>		<input style="width: 60px; height: 40px;" type="text"/>	<input style="width: 80px; height: 40px;" type="text"/>	
	○	○	○	○	○	Misses	
						<input style="width: 60px; height: 30px;" type="text"/>	Note: _____
	Bib #	Lane #	In	Time	Out	Date	
	<input style="width: 80px; height: 40px;" type="text"/>	<input style="width: 80px; height: 40px;" type="text"/>	<input style="width: 60px; height: 40px;" type="text"/>		<input style="width: 60px; height: 40px;" type="text"/>	<input style="width: 80px; height: 40px;" type="text"/>	
	○	○	○	○	○	Misses	
						<input style="width: 60px; height: 30px;" type="text"/>	Note: _____
	Bib #	Lane #	In	Time	Out	Date	
	<input style="width: 80px; height: 40px;" type="text"/>	<input style="width: 80px; height: 40px;" type="text"/>	<input style="width: 60px; height: 40px;" type="text"/>		<input style="width: 60px; height: 40px;" type="text"/>	<input style="width: 80px; height: 40px;" type="text"/>	
	○	○	○	○	○	Misses	
						<input style="width: 60px; height: 30px;" type="text"/>	Note: _____
	Bib #	Lane #	In	Time	Out	Date	
	<input style="width: 80px; height: 40px;" type="text"/>	<input style="width: 80px; height: 40px;" type="text"/>	<input style="width: 60px; height: 40px;" type="text"/>		<input style="width: 60px; height: 40px;" type="text"/>	<input style="width: 80px; height: 40px;" type="text"/>	
	○	○	○	○	○	Misses	
						<input style="width: 60px; height: 30px;" type="text"/>	Note: _____

Single Piece of Paper for 4 Shooting Only.
 1 Scoring Person for each 4 lanes.
 Only need to record 1 time of day during shooting not time in and time out

Requirements with 1st Line Electronic Scoring

The diagram illustrates the layout of shooting score sheets. It shows two identical groups of three sheets each. Each sheet contains the following fields:

- Bib #
- Lane #
- In Time
- Out
- Date
- Five circles for recording misses
- Misses
- Note:

Arrows indicate that the requirements described below apply to the 2nd and 3rd sheets of the right-hand group.

Only Requires Manual 2nd and 3rd Line Scoring
when using 1st Line Electronic Scoring.
Only need to record 1 time of day during
shooting not time in and time out

Penalty Loop Checking Paper & Watch with Time of Day

Penalty Loops

Date _____

Event _____

Name of Official _____



Bib
Number Time

Bib
Number Time


Bib
Number Time

1			11			21		
2			12			22		
3			13			23		
4			14			24		
5			15			25		
6			16			26		
7			17			27		
8			18			28		
9			19			29		
10			20			30		

Penalty Loop Consolidation Paper

Penalty Loop Stats


Date: _____





1 line per check from each recording position

Name of Official: _____

Event: _____

Team 1 

Team 2 

Team 3 

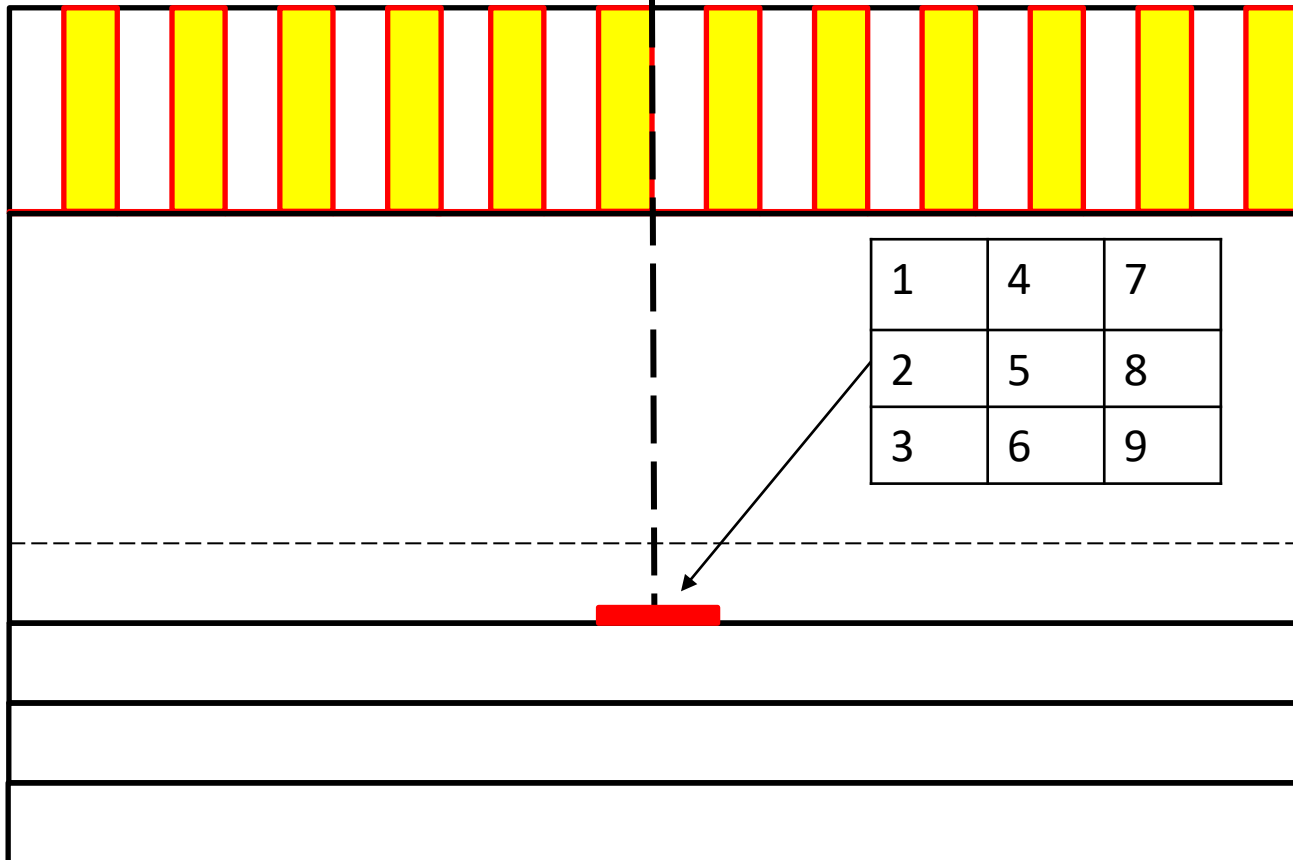
	<u>Loop</u>					<u>Loop</u>											
Bib #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Bib #	Total
1																1	
2																2	
3																3	
4																4	
5																5	
6																6	
7																7	
8																8	
9																9	
10																10	
11																11	
12																12	
13																13	
14																14	

Results

Shooting Results Board

LW - Shooting

VI - Shooting



Requires Team of 4 – 6 People

Shooting Results Board

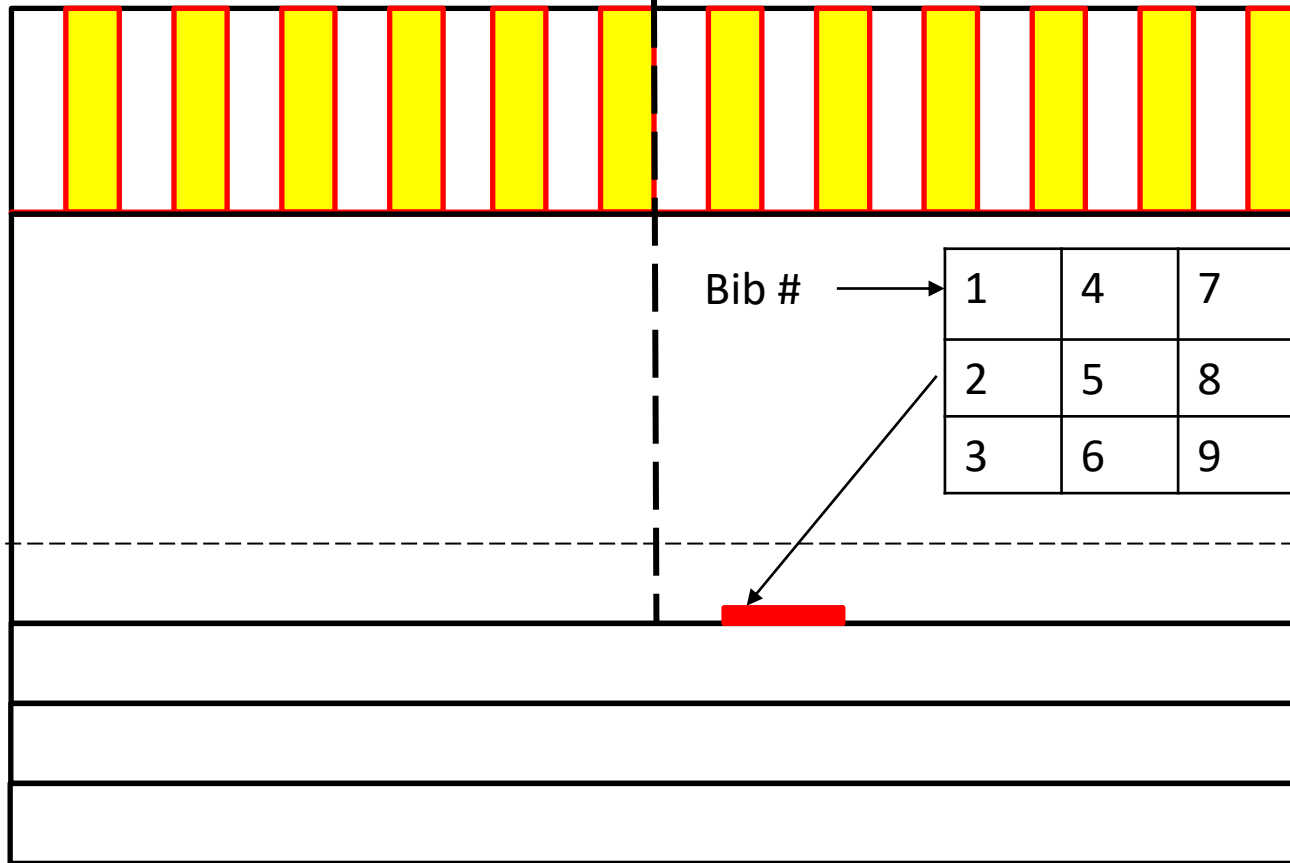
Date: **Race:**

Bib #	S1	S2	Total
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Bib #	S1	S2	Total
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Board with Space and Layout Large enough to write and easily view by coaches and officials.

WC & WSC Shooting Results to Results Office



Radio Results to Race Office

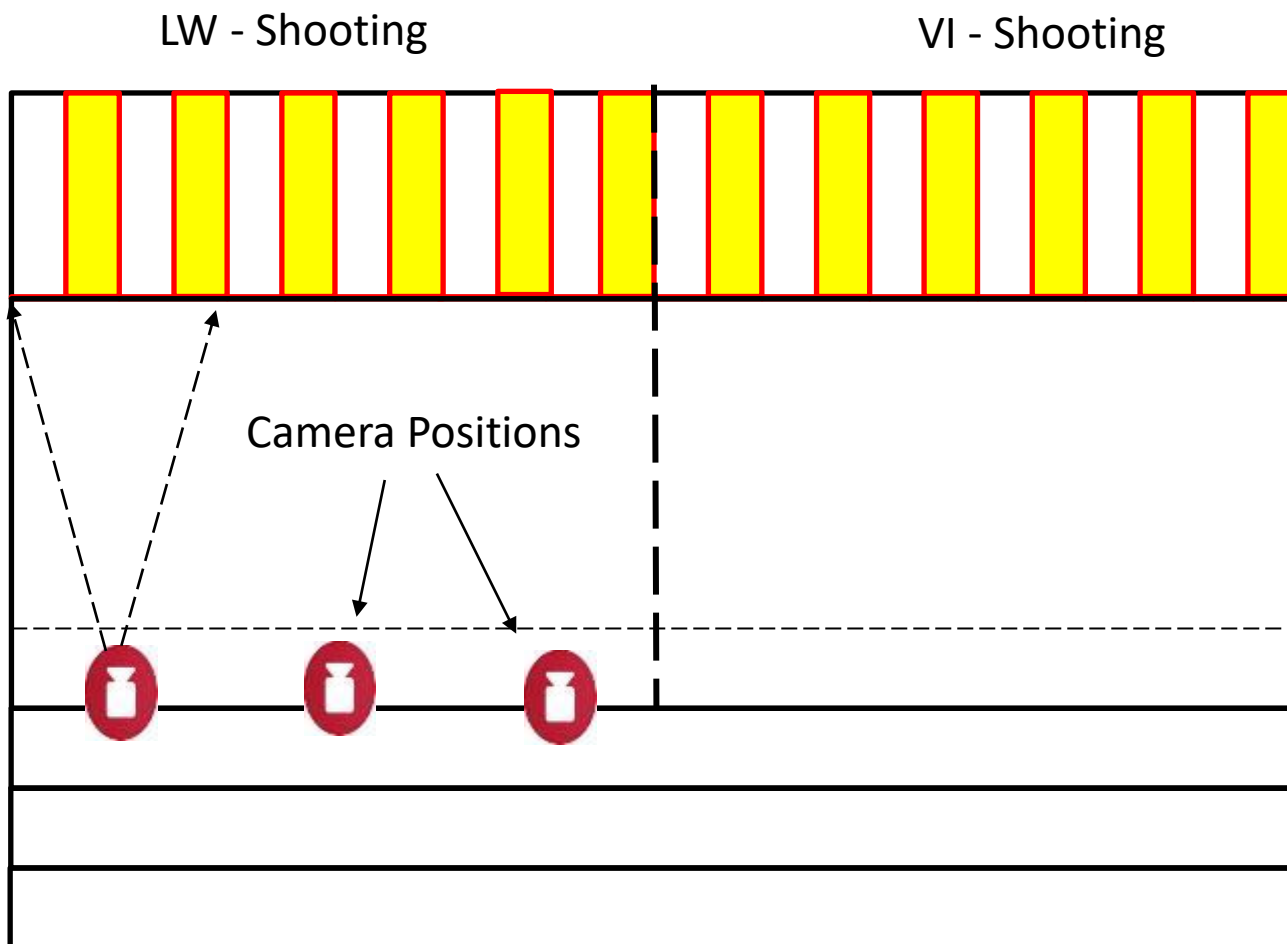


Results PC



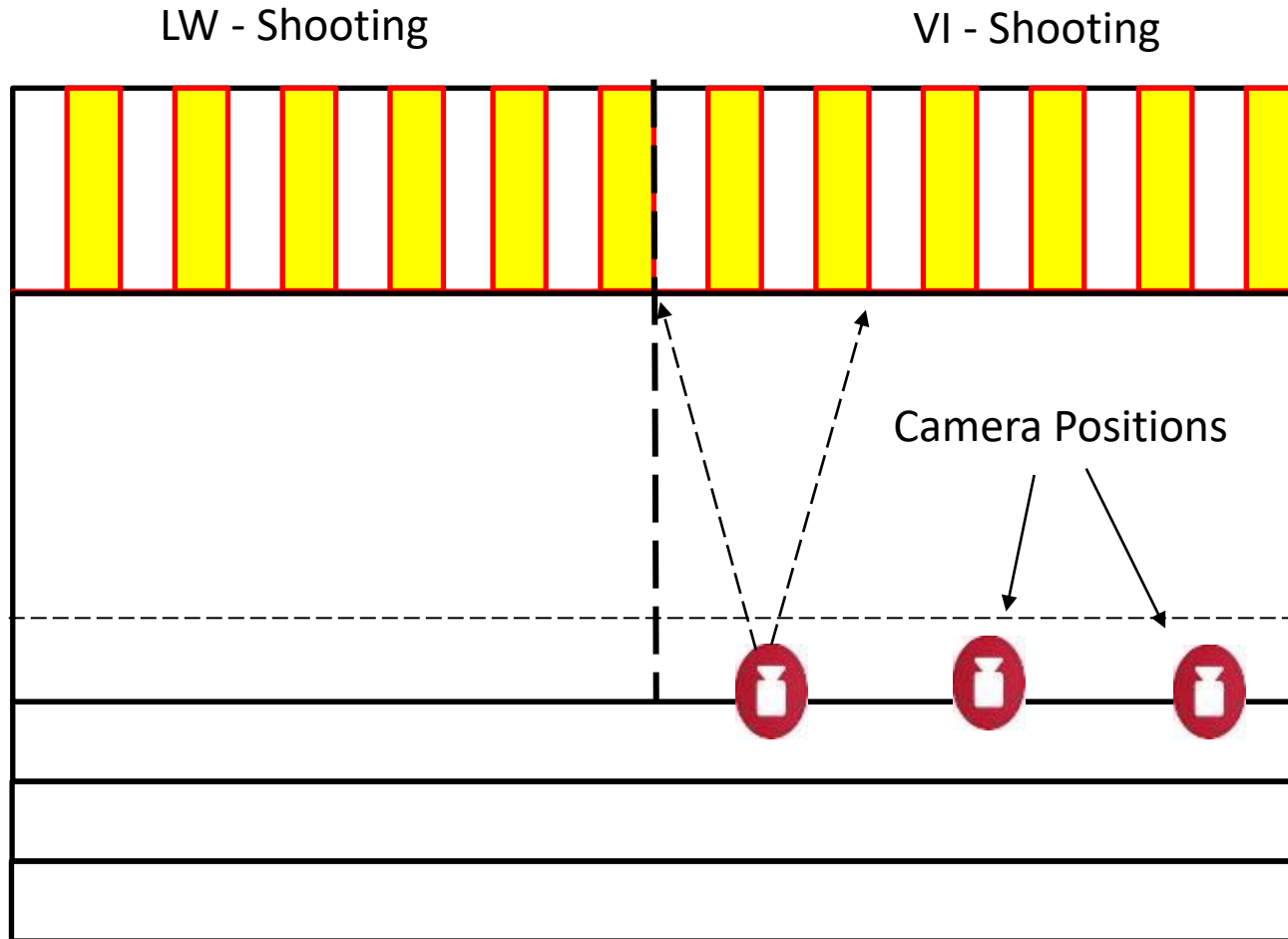
Cameras

LW Class Video Camera Positions Art. 12332.1.21



1 camera per Maximum 4 shooting lanes
Active Range Side - Requires Team of 2 – 3 People

VI Class Video Camera Positions Art. 12332.1.21

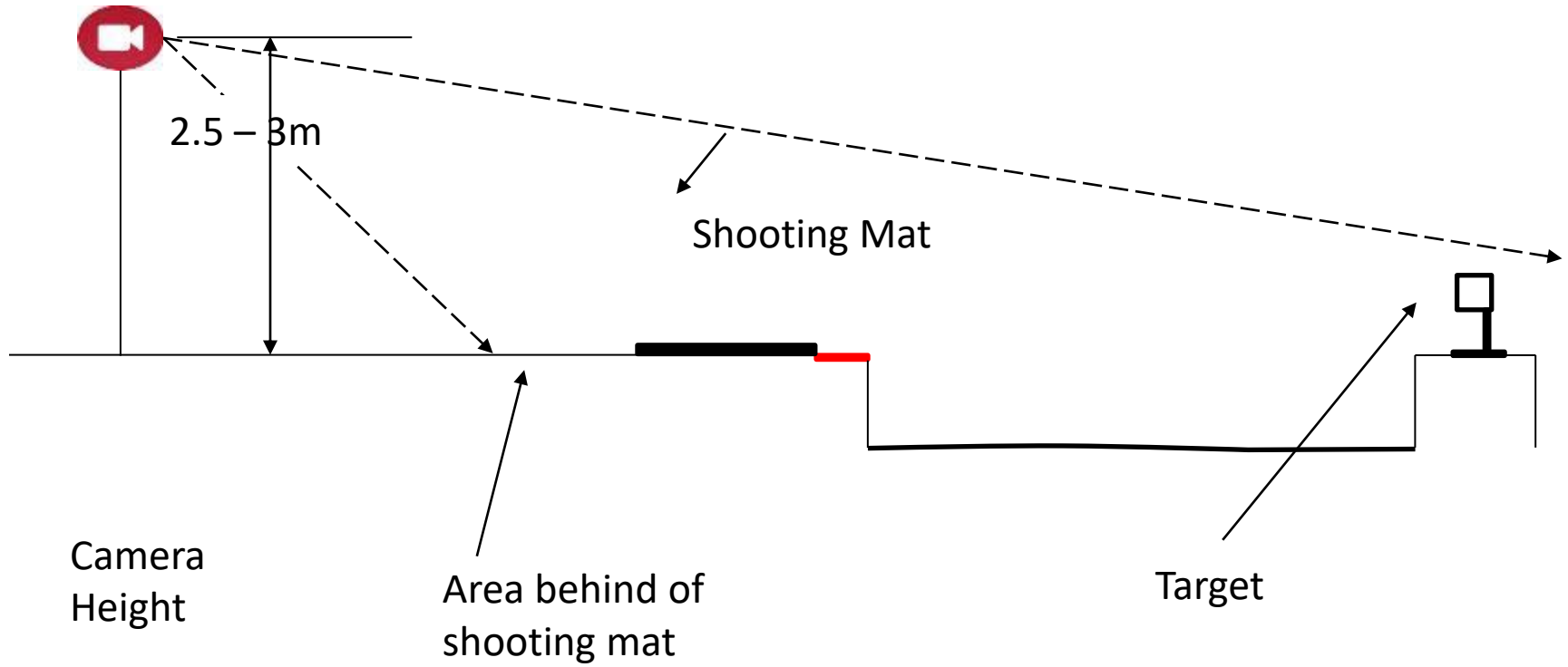


1 camera per Maximum 4 shooting lanes

Active Range Side - Requires Team of 2 – 3 People

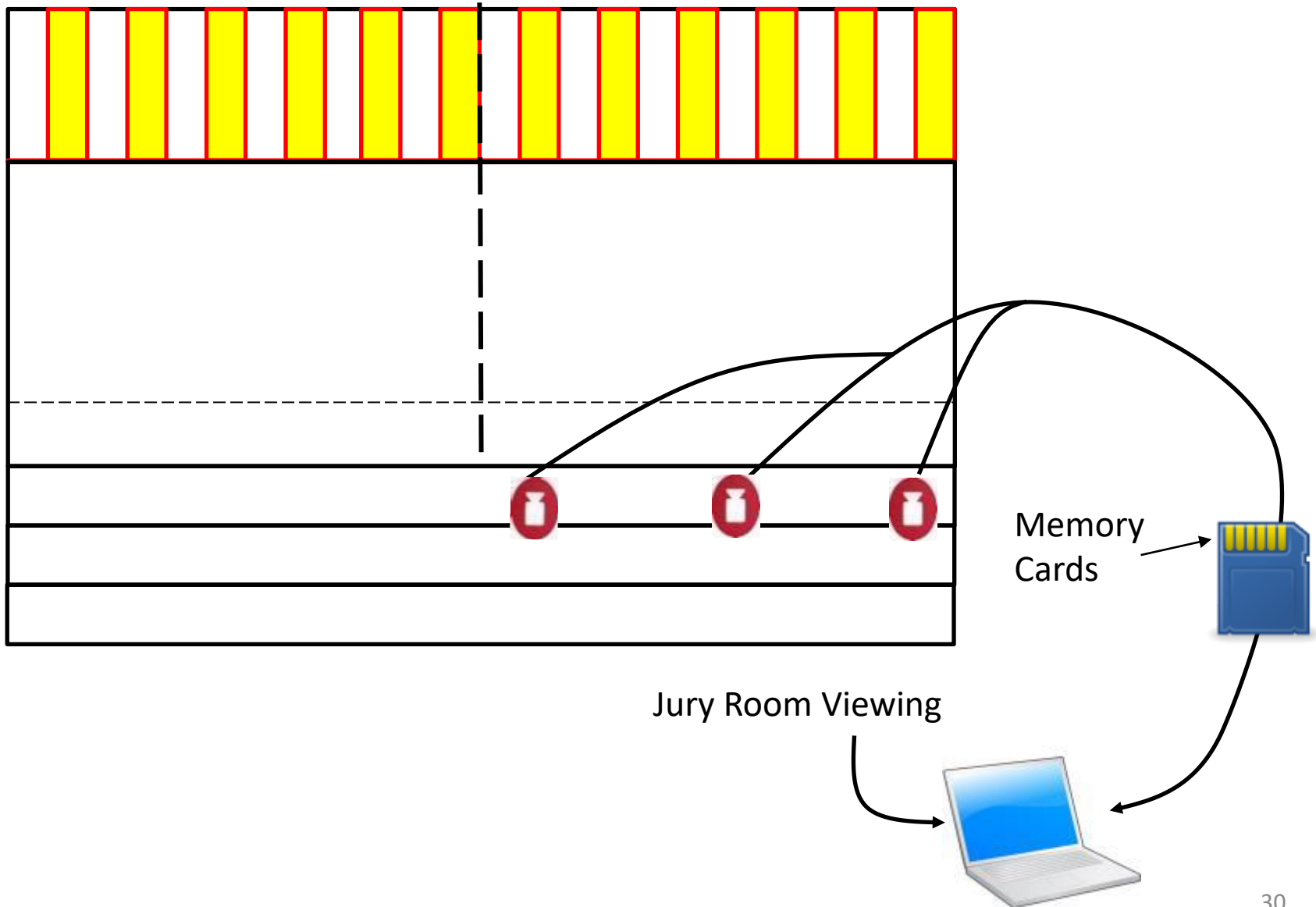
Cameras may be moved from LW side to VI side.

Camera Height and Recording Area

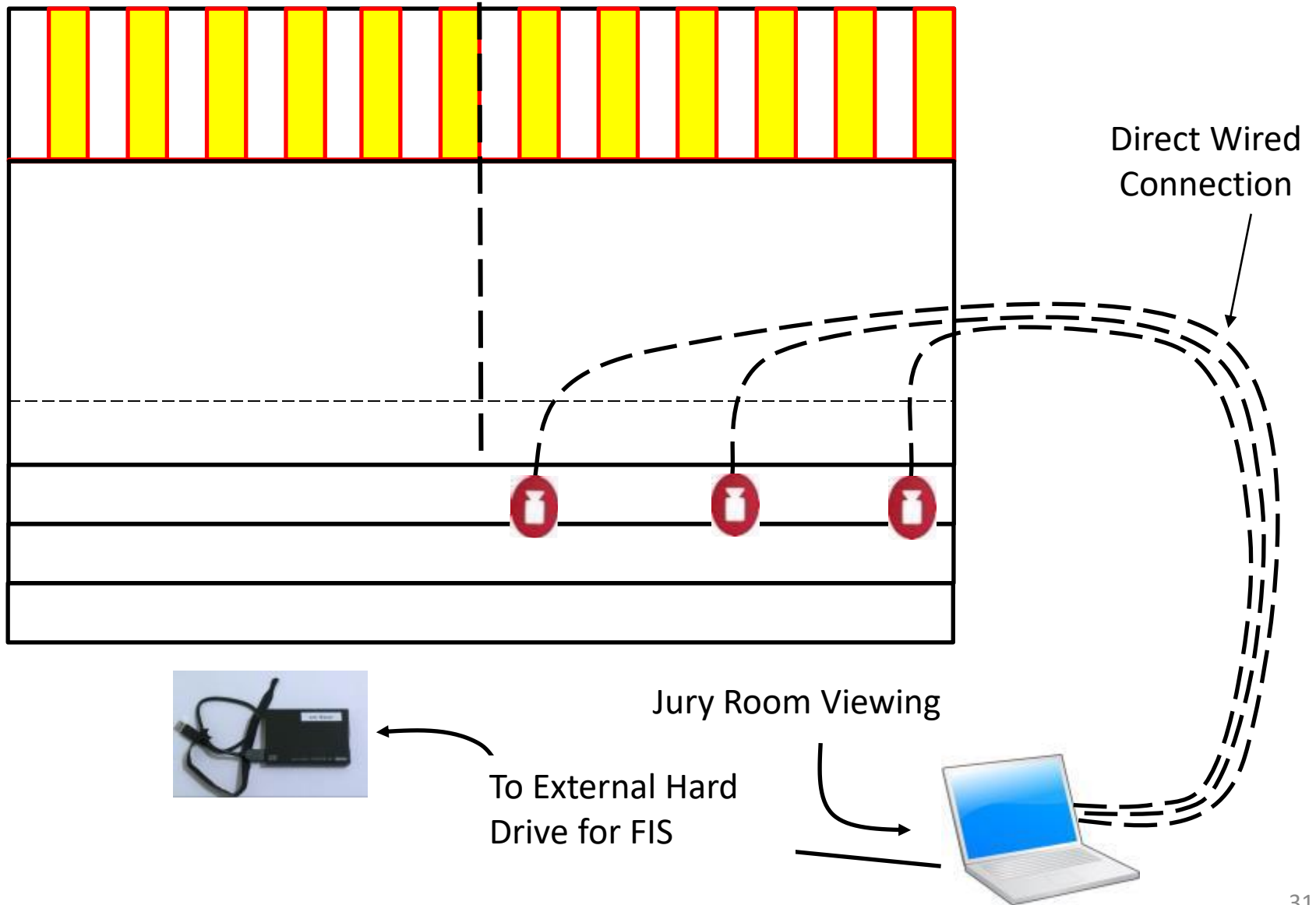


Jury Requirements

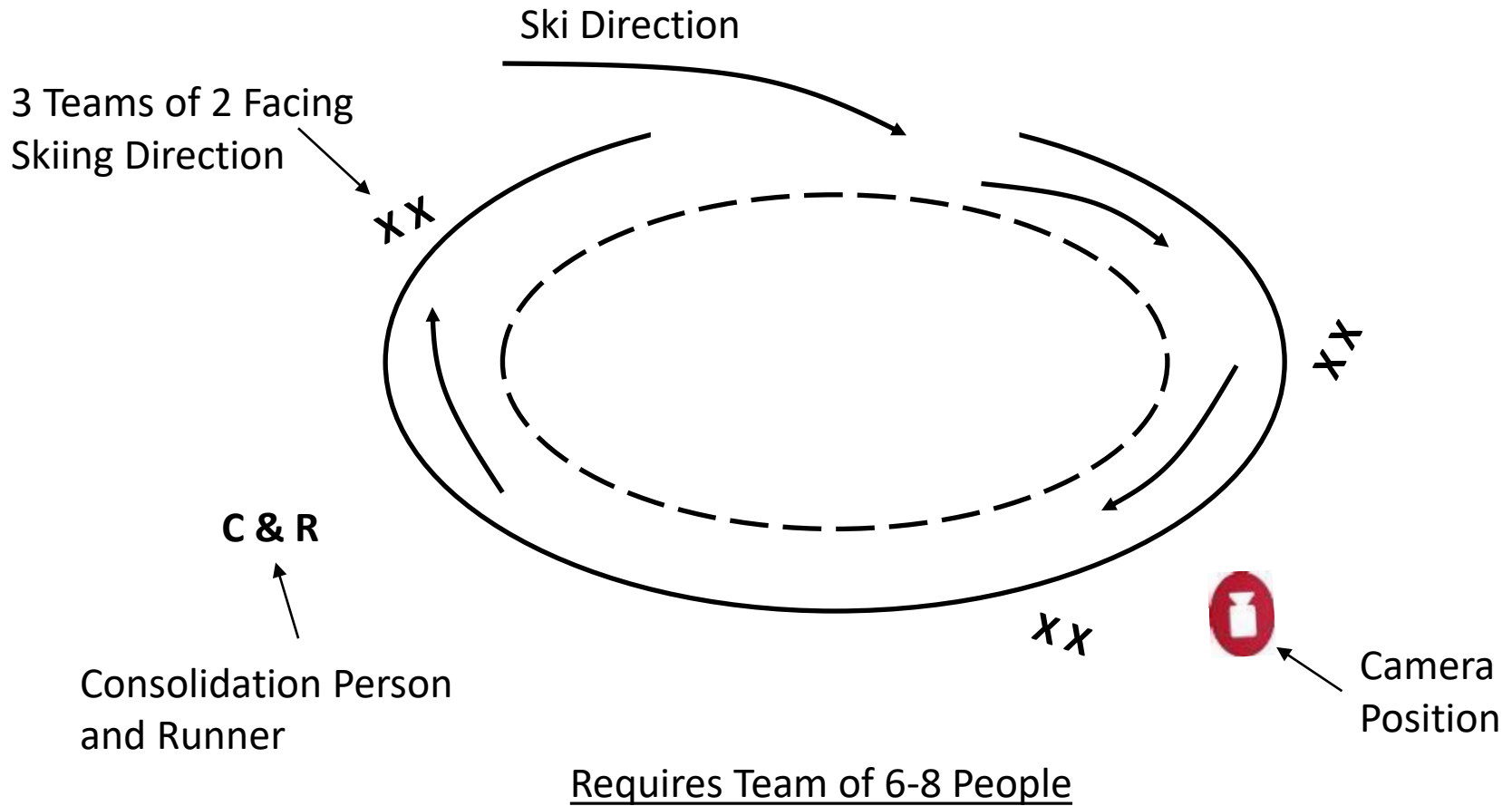
WC & WSC Memory Cards to Jury Room



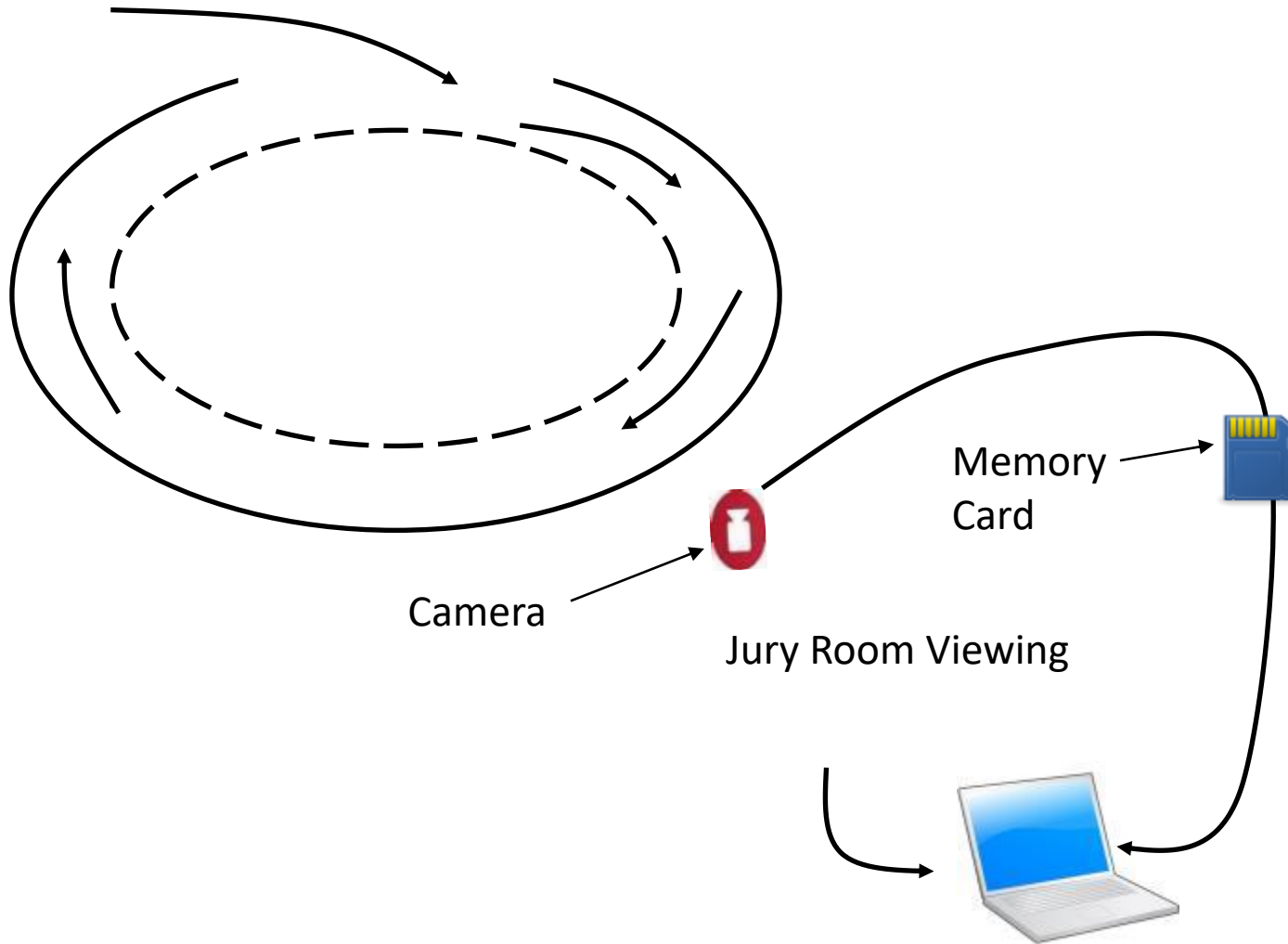
PWG Wired for Jury Room Recording and Viewing

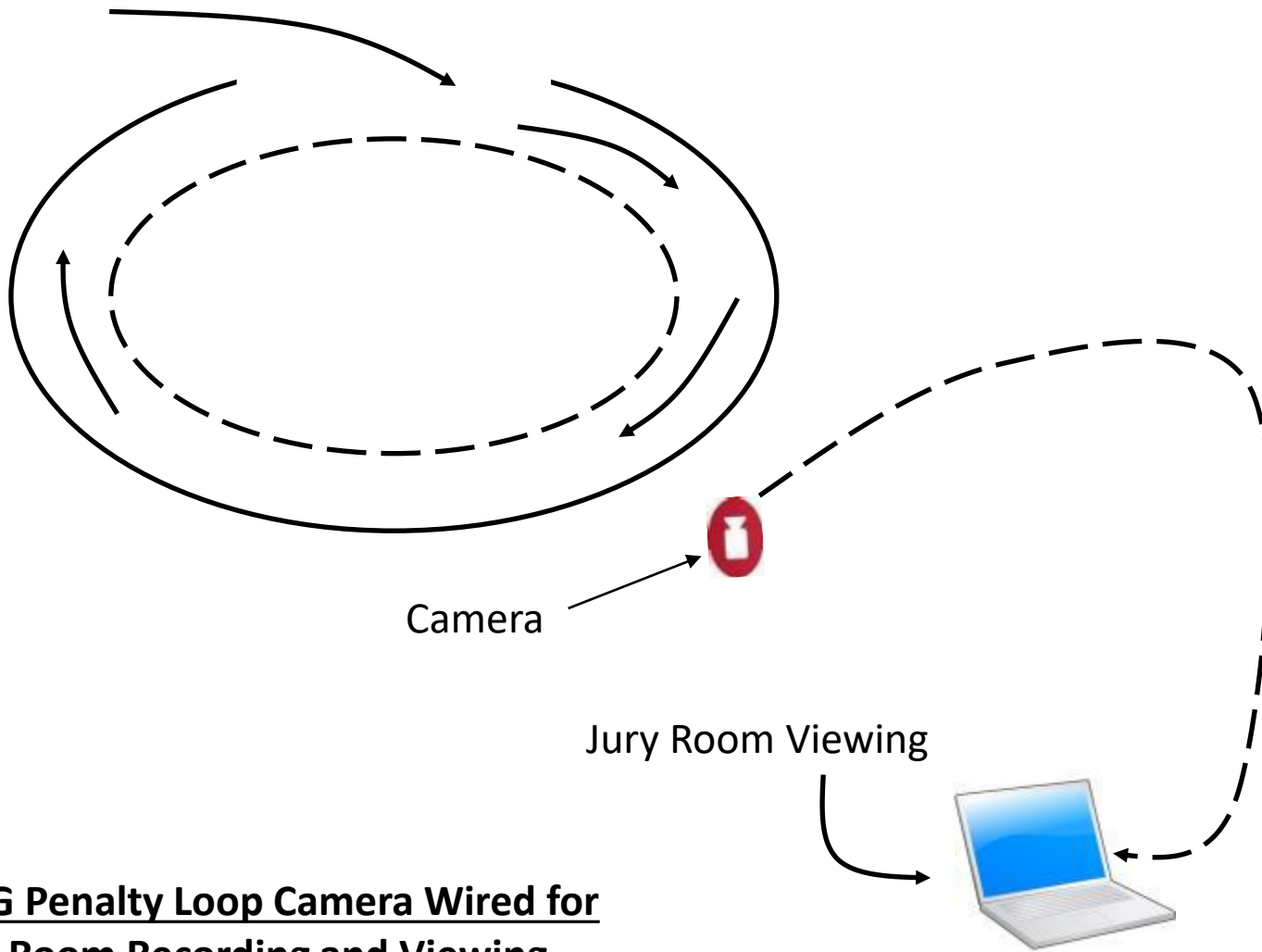


Penalty Loop Checking Teams



WC & WSC Penalty Loop Camera
Memory Card to Jury Room

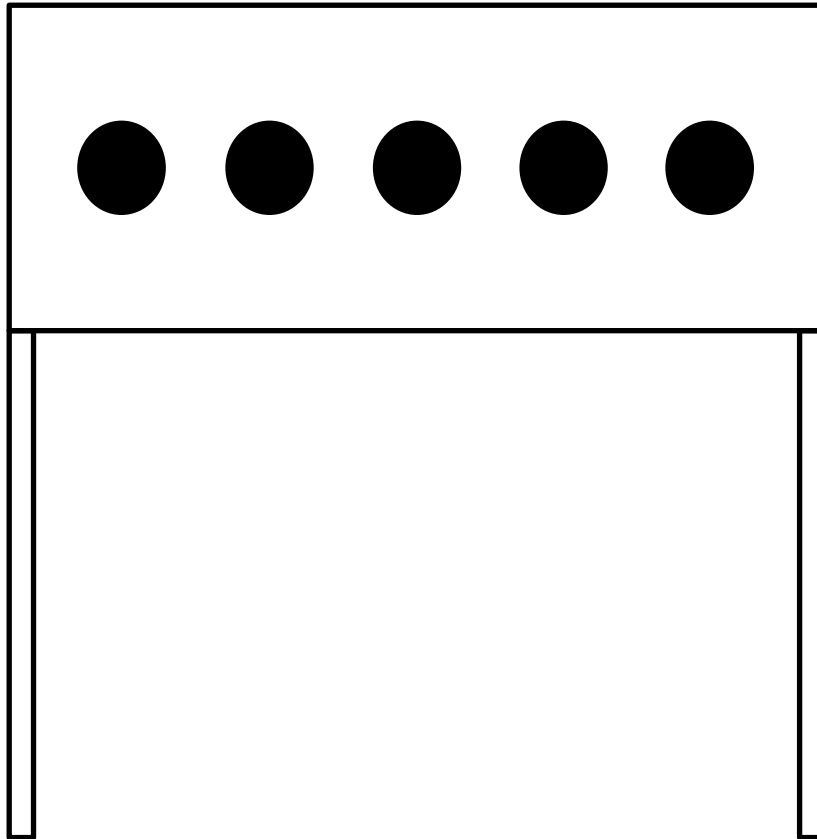




PWG Penalty Loop Camera Wired for Jury Room Recording and Viewing

Target Maintenance

Target Painting



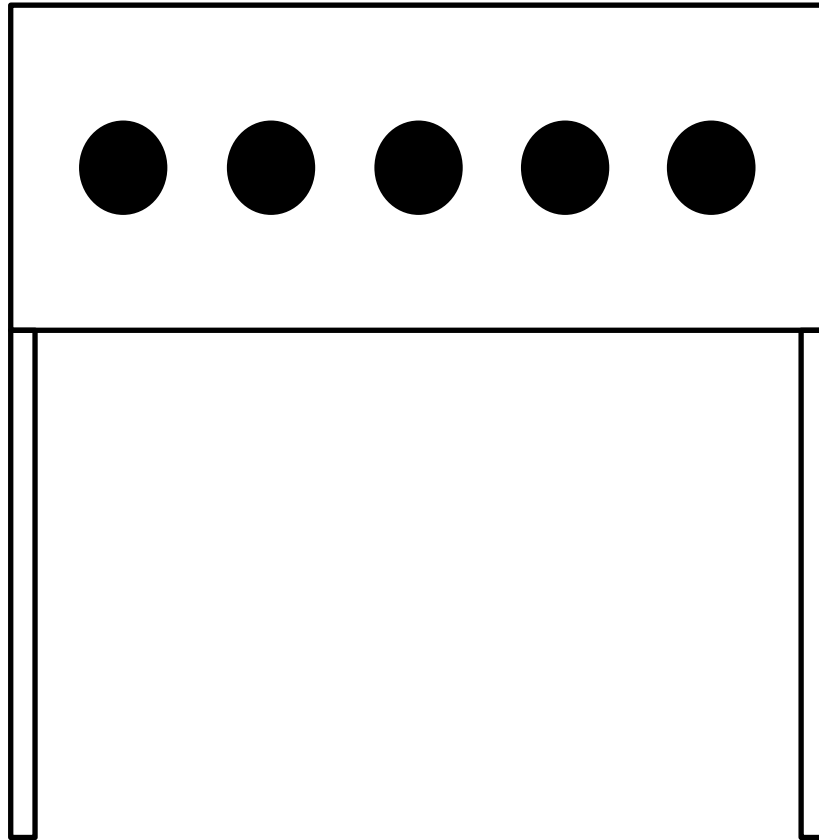
Requires Team of 2 - 4 People



Paint Pens –
Minimum
2 – Black
2 – White
Lead Scraper



Target Painting & Maintenance



Painting and Maintenance to be done -

- Black and White each and every Training or Competition day.
- Black after each race on Competition days.
- Lead removal each day.

Personnel Required

Range Operations People Required

(Several of these jobs may done by the same people such as Rifle check people can do other jobs after rifle check is completed.)

Maximum People Required

Position	24 Lanes	26 Lanes	30 Lanes
Chief of Range	1	1	1
Assistant Chief of Range	1	1	1
Rifle Check	7	7	7
Mat Sweeping	2	2	2
Neutralization Team	2	2	2
Camera Team	3	3	3
1st Line Scoring	6	7	9
2nd Line Scoring	4	5	6
3rd Line Scoring	3	4	5
Scoring Runners	2	2	2
Shooting Results Board	4	4	4
Target (Paper Change and Paint)	4	4	4
Penalty Loop Checking	6	6	6
Penalty Loop Consolidation	2	2	2
B - Shooting Team	2	2	2
Total	49	52	56

Minimum People Required

24

Position

Lanes

Chief of Range	1
Assistant Chief of Range	1
Rifle Check/Paper Change/Paint Team	3
Mat Sweeping	1
Neutralization Team	1
Camera Team	1
1st Line Scoring	6
2nd Line Scoring	4
3rd Line Scoring	3
Scoring Runners and Results Team	3
Penalty Loop Checking	4
Penalty Loop Consolidation	1

Total

29