

VAR IAAP – Technology

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1. Minimum requirements

The Implementation Assistance and Approval Programme (IAAP) was approved during the 132nd Annual General Meeting on 3 March 2018. The five step process is mandatory and must be completed by every competition planning to use VAR (as it is regulated by the Laws of the Game). The following is outlining the minimum requirements a VAR technology installation must fulfil to be used in a live competitive match.

For non-competitive matches technology tests and the assessment and approval by FIFA are not mandatory. FIFA, however, strongly recommends applying the same standards and level of testing for non-competitive matches as required for competitive matches.

1.1. Video Operation Room (VOR)

1.1.1. Location and camera feeds

- The VOR can be located near/in the stadium (for example in a vehicle, container or room), or at a centralised replay facility
- The System Technology Provider (STP) must have independent access to isolated camera feeds and the TV programme feed
 - For the use of VAR in any competition the following four basic cameras must be available:
 - A central wide angle camera
 - A central tight angle camera
 - Two 16 meter/18 yard or similar cameras that can be used to assess offside situations
 - If super-slow motion cameras are used, the video match officials must have access to all super-slow motion cameras (all three phases for triple speed cameras)
 - For camera plans with up to eight cameras (including the cameras mentioned above) all cameras must be available to the video match officials
 - For camera plans with more than eight cameras, it is at the competition organiser's discretion to decide how many cameras (in addition to the 8) are made available to the video match officials. However, the basic four cameras and all super-slow motion cameras must always be available to the video match officials. FIFA strongly recommends to make all pitch facing cameras available to the video match officials.
 - The camera feeds must be synchronised and provided live to the video match officials

1.1.2. Equipment

The VAR watches the main camera on the upper monitor and checks or reviews incidents on the lower monitor (capable of showing up to four cameras at the same time). The AVAR watches the main camera and keeps the VAR informed about live play if an incident is being checked or reviewed. The monitors should not be smaller than 24 inch and must have the same aspect ratio as the source signal (for example 16:9).

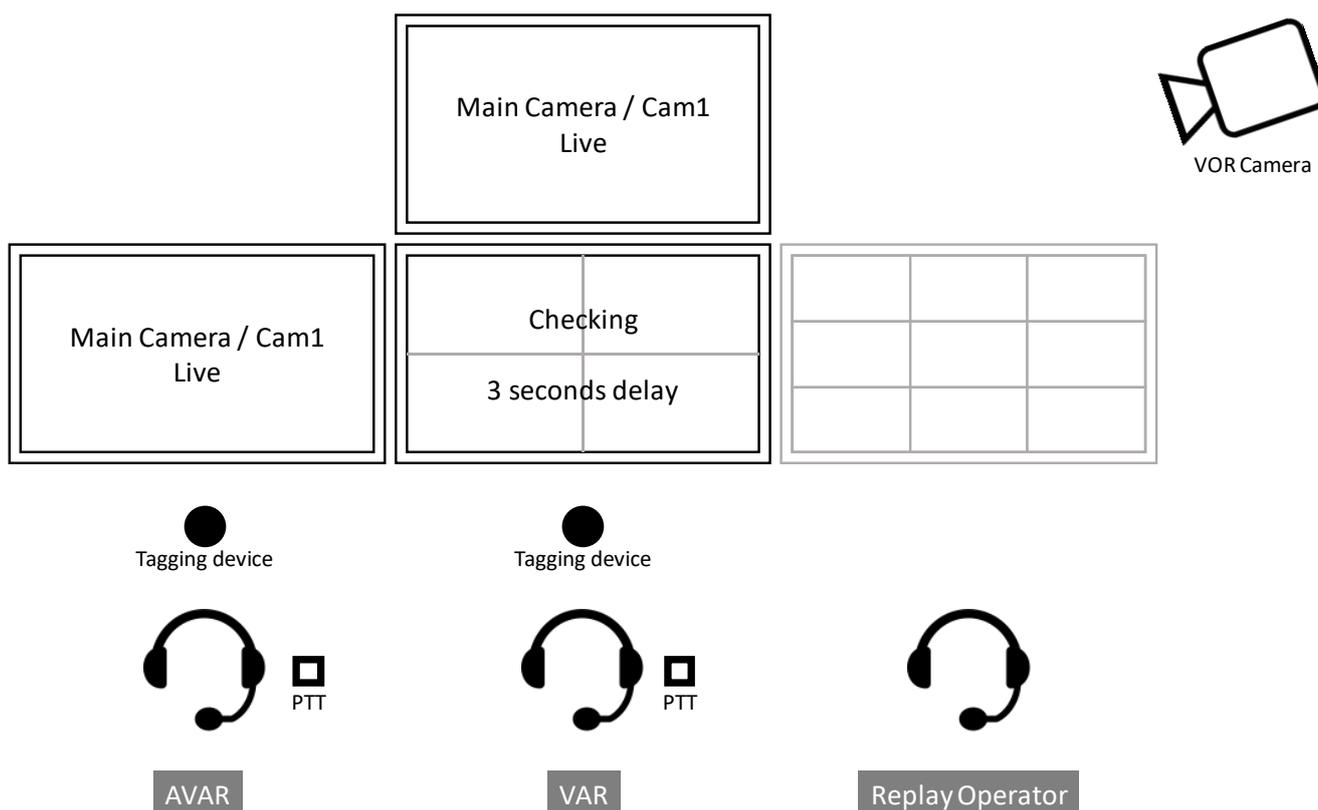


Figure 1: VOR setup

VAR Position

- Monitor showing the main camera (e.g. Camera 1) live
- Monitor for checking incidents. Must be capable of showing multiple camera angles at the same time (provided by the replay operator). Feeds should have a delay of minimum three seconds. Touch is optional.
- Tagging device to mark potential checks and reviews on the timeline (Information for the replay operator)
- Headset and push-to-talk (PTT) button for communication with the on-field match officials

AVAR Position

- Monitor showing the main camera (e.g. Camera 1) live

- Tagging device to mark potential checks and reviews on the timeline (Information for the Replay Operator)
- Headset and push-to-talk (PTT) button for communication with the on-field match officials

Replay Operator Position

- System technology provider specific setup
- RO must be capable to see and access incidents tagged by the VAR and AVAR
- RO must be capable to replay different camera angles (simultaneously and synchronised) for the VAR, play them in different speeds (e.g. 50% or frame by frame), stop the footage at any moment in time and zoom in and out, when required.
- Headset for communication with VAR and AVAR. No communication allowed with on-field match officials.
- The main RO can monitor a maximum of 12 camera angles. As of camera angle 13, a second RO is mandatory. There is no limit on how many cameras the second RO can monitor.

VOR Camera

- Camera inside the VOR filming the video match officials during the match
 - Camera shot from behind or from the side. All video match officials and the main replay operator must be in shot.

1.1.3. Recording and provision of feeds to match broadcaster

- The feeds of the VOR camera, and VAR checking monitor and the TV Programme (including sound) must be recorded
 - Feeds can be recorded by the system technology provider, the broadcaster or the competition organiser himself
 - Recording of all isolated camera feeds is recommended for training purposes (VAR simulator)
- Live transmission of the VOR camera and the VAR checking monitor feed to the match broadcaster is recommended for communication purposes

1.1.4. Virtual offside lines

- The provision of offside lines is not a minimum requirement
- Video match officials are not allowed to use virtual offside line provided by the match broadcaster

- If virtual offside lines are used the VAR and/or RO must create those lines independently and have control over where the lines are placed. FIFA strongly recommends that these lines be independently tested prior to any live use in match.

1.2. Referee Review Area (RRA)

- Cabled outdoor monitor at the side of the field of play for On-Field Reviews (OFR)
- Exact (passive) reproduction of the VAR checking monitor’s content
- Feed should only be visible on the RRA monitor when the referee goes to OFR
- The referee cannot control the images shown on the monitor. Only the VAR/RO can control the images. The referee must communicate with the VAR if he wants to see something else than presented by the VAR/RO.

1.3. Referee communication system

- All video match officials and the replay operators must be able to listen to the on-field match officials during the full match
- The VAR and the AVAR must be able to speak to the on-field match official using a push-to-talk device
- The replay operator(s) are not allowed and should not be able to speak to the on-field match officials
- All communication (on-field, video match officials and the main replay operator) must be recorded
 - Communication can be recorded by the referee communication provider, the system technology provider, the broadcaster or the competition organiser himself

		LISTENING						
		Stadium				VOR		
		Referee	Assistant referee 1	Assistant referee 2	4th official	VAR	AVAR	RO
SPEAKING	Stadium	Referee	Open-mic	Open-mic	Open-mic	Open-mic	Open-mic	Open-mic
		Assistant referee 1	Open-mic	Open-mic	Open-mic	Open-mic	Open-mic	Open-mic
		Assistant referee 2	Open-mic	Open-mic	Open-mic	Open-mic	Open-mic	Open-mic
		4th official	Open-mic	Open-mic	Open-mic	Open-mic	Open-mic	Open-mic
	VOR	VAR	Push-to-talk	Push-to-talk	Push-to-talk	Push-to-talk	Open-mic	Open-mic
		AVAR	Push-to-talk	Push-to-talk	Push-to-talk	Push-to-talk	Open-mic	Open-mic
		RO	No comms	No comms	No comms	No comms	Open-mic	Open-mic

Figure 2: Communication matrix

2. Technology tests and approval

Before a VAR system can be used in a live competitive match, the competition organiser must successfully perform technology tests in all competition stadiums where it will be used. FIFA (or a third party appointed by FIFA) must attend at least one of those tests to assess and approve the VAR technology installation before it can be used live. This final assessment and approval should take place at least 14 days before the first use of VAR technology in any live competitive match. The remaining stadiums can be tested closer to the first match in the respective stadium (at the very latest six hours before kick-off).

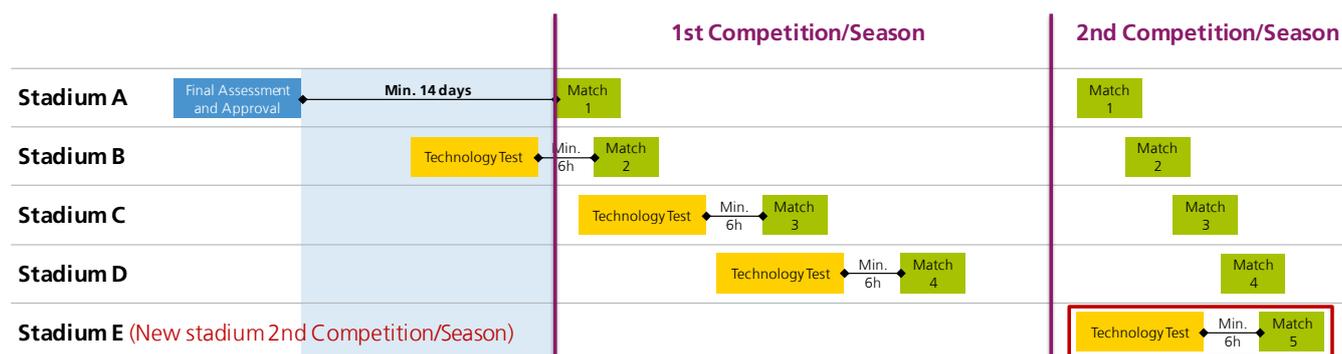


Figure 3: Example of testing schedule for five stadiums

All technology tests (including the test for the final assessment and approval) must be recorded (VAR checking monitor, VOR camera and referee communication) and made available to FIFA upon request.

It is possible to fulfil IAAP referee education requirements and IAAP technology testing requirements during the same event if non-competitive live training (3A, 3B, 3C) takes place in competition stadiums.

	Step	Details	Referee	VAR	AVAR	Replay operator
Theoretical training	1	Principles and practicalities, 4 categories, clear and obviously wrong, communication, etc	continuous	continuous	continuous	continuous
	Offline training					
	2A	Familiarisation	-	1x1 hour	1x1 hour	1x1 hour
	2B	Application of protocol (level1)	-	3x 25 clips (simple situations)	3x 25 clips (simple situations)	3x 25 clips (simple situations)
	2C	Application of protocol (level2)	-	3x 25 clips (complex situations)	3x 25 clips (complex situations)	3x 25 clips (complex situations)
	2D	Live match (Without contact to on-field referee)	-	1x match	1x match	1x match
	2E	Live match (with surrogate referee)	-	1x match	1x match	1x match
Non-competitive live training	3A	Simulated situations	4x session of various incidents	4x session of various incidents	4x session of various incidents	4x session of various incidents
	3B	Short 'staged' matches	2x short match	2x short match	2x short match	2x short match
	3C	Youth, lower leagues or friendly matches	2x full match	2x full match	2x full match	2x full match

Figure 4: IAAP referee education requirements

2.1. Technology tests

The competition organiser is required to carry out technology tests in all competition stadiums (except if the final assessment and approval took place in the stadium) before using a VAR system for the first time in a stadium. The competition organiser has to inform FIFA when and how the tests will be carried out at least two weeks before the test date. FIFA will not be present for those tests, except for the final assessment and approval.

The purpose of the technology tests is to ensure that the different elements of the VAR technology are implemented successfully at each of the competition stadiums. Every stadium where VAR technology will be used must be tested, irrespective of whether another competition organiser has already used VAR technology in the same stadium. Each competition organiser is responsible for its own VAR installations. If, however, a stadium is used for the second time by the same competition organiser, a second test is only required if the system technology provider has changed.

	Technology Test
FIFA involvement	Informed
Where	All competition stadiums
When	Six hours before the first use of VAR in the respective stadium
What	VOR, RRA, Ref Comms, Broadcast and backups
Duration	30 min
Number of players	5
Number of on-field match officials	4
Number of video match officials	2
Number of replay operators	1
Number of cameras	4-8

Figure 5: Minimum requirements for technology tests

Where: all competition stadiums where VAR technology will be used

Every stadium being used for the first time by a competition organiser needs to be tested (except if, the final assessment and approval takes place in the stadium).

Matches where VAR technology is used offline (no communication between on-field and video match officials) can also qualify as technology test if the referee communication system is tested separately (offline), for example, before the match, after the match, or with a surrogate referee communicating with the video match officials during the match.

When: six hours before kick-off at the latest

The test has to be carried out, at the very latest, six hours before kick-off of the first live match at each stadium. It is highly recommended to conduct the test earlier than that in case the technology fails and improvements have to be made.

Areas to be tested: VOR, RRA, Ref Comms, Broadcast and backups

During the test, the VOR and the referee review area must be fully operational and the broadcaster must deliver a minimum number of camera feeds (please refer to the “Number of cameras” section) live to the VOR. In addition, the referee communication system must be working, and communication between the VOR and the field of play must be possible. For the purpose of testing the referee communication system the referees should walk over the whole pitch at least once while testing the communication system. The RRA must be used at least twice during the test. It is recommended to test all backup systems (video and audio) and contingency plans during the test. If applicable, it is also recommended to test how information on reviews (and serious checks) is provided to the broadcaster and/or the giant screen operator in the stadium.

Duration: 30 minutes

For a duration of at least 30 minutes players and referees have to be on the field of play to stage VAR incidents or play a match.

Number of players: 5

A minimum of five players must participate in the test – one goalkeeper, two defenders and two attackers. The level/quality of players is at the discretion of the competition organiser; it is, however, recommended to use players who can stage VAR incidents realistically.

Number of on-field match officials: 4

A full team of match officials, consisting of one referee, two assistant referees and one fourth official, must be present. The level of match officials is at the discretion of the competition organiser. It is possible for staff members of the competition organiser to act as match officials to better assess the quality of the VAR system and especially the referee communication system.

Number of video match officials: 2

A minimum of one VAR and one AVAR have to participate in the test. The level of video match officials is at the discretion of the competition organiser. It is possible for staff members of the competition organiser with VAR experience to act as VARs to better assess the quality of the VAR system, and especially the referee communication system. It is recommended to use the same number of video match officials as in the competition in which VAR technology will be used.

Number of replay operators: 1

At least one replay operator must be present for the stadium test and operate the system as he would during a live match. It is recommended to use the same number of replay operators as in the competition in which VAR technology will be used.

Number of cameras: 4 - 8

The minimum camera setup for the use of VAR technology consists of four cameras: Main Wide, Main Tight and two cameras that can be used to assess offside situation (for example 16m, box camera or GLT camera). Those four cameras must always be available for every stadium test. For camera plans with up to eight cameras, all cameras must be available for the stadium test. For bigger camera plans, a minimum of

eight cameras must be available. If super-slow motion or ultra-slow motion cameras are used, they must also be available for the test. It is recommended to use all cameras that will be used for live matches.

2.2. Final assessment and approval

The aim is to assess the capability of the competition organiser to implement the VAR technology. After the successful assessment and approval no further inspection from FIFA are required. FIFA, however, has the right to perform spot checks to assure the quality of the VAR setup remains high.

After the assessment, FIFA will provide a report and make recommendation for improvements, if necessary. If all requirements are fulfilled, FIFA will approve the use of VAR technology. If minimum requirements are not fulfilled, the competition organiser is expected to make improvements and inform FIFA about the steps taken before the first live match. Based on the information provided FIFA will then decide if another assessment and approval visit is required or approval can be given without a second assessment.

In order to assess and approve the VAR setup, FIFA must see both sides of the installation, the video operation room (VOR) and the field of play. If the VOR is at the stadium (local solution) both parts can be assessed and approved as part of one technology test. Where a centralized solution (replay centre) is used, it might be necessary to attend two technology tests in order to assess the VOR as well as the stadium side.

If more than one system technology provider is used in the same competition, one stadium per system technology provider must be assessed. If different solutions (local and centralised) are used in the same competition one stadium per solution must be assessed.

The final assessment and approval is only required before the first use of VAR technology in any competition. When the same competition organiser uses VAR for the second time, for example, in another competition or the second season of the same competition, the final assessment and approval is not required anymore.

	Final Assessment and Approval
FIFA involvement	Present: Assessment and approval
Where	1-2 competition stadiums
When	14 days before the first use of VAR in any live competitive match
What	VOR, RRA, Ref Comms, Broadcast and backups
Duration	30 min
Number of players	5
Number of on-field match officials	Same as in live competitive match
Number of video match officials	Same as in live competitive match
Number of replay operators	Same as in live competitive match
Number of cameras	Same as in live competitive match

Figure 6: Minimum requirements for the final assessment and approval