

**Commentary**

Introducing Drone Technology to Soccer Coaching

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Abstract: Soccer is one of the most complex and dynamic games (within match situations) where 22 players move for the ball. A ball might have an impact on these 22 players because the game is enclosed by ‘own possession’, ‘out of possession’, and ‘transitions’. So the modern scientific coach needs to think about the impact of a ball on 22 players instead of 1 player. Consequently, the defensive and attacking team shape is very difficult to understand, as the game is very intelligible. A coach can’t reach all the specific places of soccer movement at a time. The Drone camera (flying tactful eye) is capable of filming aerially on the transverse plane and can reach all specific locations as requested by the coach. The coach can also make videos for all his practice sessions and review them later. The researcher did not find any previous studies that demonstrated the importance of Drone video for the analysis of attacking and defensive team shape in practice sessions and an unofficial match context. The Drone video affects the study of soccer strategies that research has explored.

Keywords: Soccer, Drone, Coaching, Team Shape

1. Introduction

Soccer is one of the most popular games in today’s world. Research says millions of viewers are now actively watching the soccer game [1]. In the soccer game, there is a difference of view between the spectator and coaches. Notably, the spectators are watching the ball, what’s going on around the ball, but the coaches need to focus away from the ball. The trend in modern systematic football has emerged and is observed in international matches. In this decade, soccer is transformed into a dynamic and multidimensional game. Soccer movement patterns are so diverse [2], intelligible and intermittent [3] that It’s hard for coaches and players to understand why their teams have been lost when the team has played so well [4]. Intelligent coaching staff analyzes team formation and style of play extensively in this regard. Now the need for team shape work is growing. Due to the progressive intelligibility of the soccer game, all five key moments are very important-own ball possession; ball possession opponent; negative transition (from ball possession to opponent ball possession); positive transition (from opponent ball possession to own ball possession); set-plays [5]. All these

significant moments are bounded by a group or team activity that arises from interactions between three or more players trying to collaborate and work together to achieve common goals [6]. Drone footage can help coaches to analyze this complex and multidimensional phenomenon.

2. Aim of the Study

The specific aim of this scholarly commentary study was to explore the impact of Drone technology on soccer coaching.

3. Methodology

3.1. Acquisition of Evidence

In this systematic commentary study, a thorough online and offline search procedure (books) was applied for the acquisition of evidence. Electronic databases: PubMed, Google Scholar, and Google Advance Search were carefully searched for a critical analysis of the literature.

3.2. Inclusion and Exclusion Criteria

Studies related to the objective of this paper were included in this study, whereas studies that were not directly aligned with the concept of analysis were excluded from the process. Criteria for inclusion were included in the areas of Drone technology, soccer team-shape, soccer coaching, attacking and defensive soccer principles, soccer tactics, and strategies.

4. Drone as an Airship

A Drone is just a flying robot, in simple terms. This aircraft is usually controlled from a specialized remote control and can track all things in the air with the help of intelligent software. It has so many working sensors on board, such as speed and distance sensors (sonar-pulse distance sensing; light-pulse distance sensing; magnetic-field change sensing), infrared and thermal sensors, image sensors, chemical sensors, GPS, etc. [7, 8]. Inside the Drone, a highly designed special multi-propeller system makes this device significantly independent and also helps to reduce breakdowns. One of the key features of a Drone is that if any motor inside this system stops working; it will continue to fly as it receives support from the group-operated propellers. Drones with a large number of motors inside can gain more control over their elevation and can, therefore, carry more loads during the flight [8]. Drones consist of a power source, such as a battery or a rotor, a propeller and a frame, to achieve flight. The Drone frame is typically made of lightweight, composite materials to reduce weight and increase flight maneuverability. The operator uses a remote control to launch, navigate and land remotely. Controllers use radio waves to communicate with Drones via Wi-Fi [9].

5. Advantages of Drone Technology in Sports

Most athletes (runners, rugby players, skiers, climbers, etc.) use Drones to record their training and see if they can make any adjustments. A small change in the athlete's personal best time will knock seconds or split of a second. Many American Football teams use aerial imagery to research and develop players' techniques and movements [10]. Involve intricate strategies in many sports and games, and step-by-step team moves are often the difference between winning and losing games. As the audience of the sports industry has grown along with popularity, the demand for research has increased. It's now beyond sports and games, and indeed a billion-dollar business. As a result, sports scientists are starting to use Drone technology. Even the slightest advantage could have enormous consequences [11]. Nowadays, the broadcasting of a sporting event has become more authentic and realistic. The main advantage of using Drones or unmanned aircraft in important international sports is that they can get closer to international athletes [12].

6. The Drone and Soccer-Specific Team Shapes

Drones (also referred to as unmanned aerial vehicles) was initially used for military operations and then used for everything from wildlife and atmospheric exploration to disaster relief. Drones are now tracking rivers to accurately predict floods and locate unauthorized logging areas. For the invention of Drone, sports photography is simpler [13].

Drone with an integrated camera (see figure 1) enable high-quality shots and photos to be taken from altitude.



Figure 1. Drone with Camera [14].

Drone can record a clearly viewed practice session (see figure 2) and analyze it after the end of the session.



Figure 2. Drone image [15].

The key benefit of using Drones is that they can easily reach anywhere in the pitch, which is very difficult for coaches to reach. It's likely that for soccer coaches, every position and shape of the team is very hard to see from the technical area. Soccer coaches and managers have only a side-view of each action in the technical area, which is very narrow and prone to misinterpretation of tactics [16]. The player's position (own and opponent's) and movement of the player's on the pitch are very dynamic [17]. As a result, numerous space creations occurred on the field. The coach needs to systematically analyze these spaces. In the attacking team, players need to stretch and create space to receive the ball and then compact certain spaces immediately after losing the ball to make it harder for the opposition to play. So the position of soccer players is changing repeatedly. Therefore, one of the greatest tools is to discuss the practical session with the players and to

evaluate the positioning review [17]. According to soccer match analyst-[18], “The drone is useful for all types of drills, collective or individual. With the angle of the aerial view, it’s easier to work the moments of the game, since fundamental principles as space, distance and, the relation between players are more and better identifiable than with the normal broadcast or side tactical camera angles”. Besides, it is noted that some coaches do not like to see the practice session from the ‘Dugout’; they go up into the stand during occasions. In modern soccer, the tactics is a key component of successful elite soccer success [19]. Positional data is needed to understand the tactical performance of players [20]. The Drone can keep an eye on the pitch as well as the ball to track the positional data. Above all, the distribution of players on the pitch during the attack and defense is a key performance metric when evaluating the spatial strategy [6]. In the same way, team dispersion can be evaluated by measuring the length and width of the teams while the ratio of length to width inform us of the team’s shape [21]. So, the bird’s eye view angle provided by Drones is giving a wide-angle that can range from end zone to end zone. Powderly (2016) found that an overhead Drone camera caught a bird’s eye view of the soccer game. He further elaborates, Drone footages might have explained the actual positioning to central midfield. Roberto Martinez, the former Everton’s mentor wants all his tactical sessions filmed utilized drone technology [22]. So it might have been obvious that modern coaches are now willing to use Drone technology to evaluate their coaching sessions.

7. Findings

7.1. Drone Footage as a Team Shape Determinant (Researcher View Point)

The soccer coach organizes training sessions in search of a decisive performance. His motto is to create a good team shape, including attacking and defensive, as the successful team is well organized both defensively and offensively. Drone footage helps coaches focus on the concepts of attacking and defensive principles so that players can maintain a good team shape.

7.2. Space Analysis

The coach may also note the interchange of playing positions that may have an impact on the overall strategy. With the help of a Drone video, he worked extensively on several important ‘runs’ that could affect the shape of the team. These are - diagonal runs, overlapping runs, dummy runs, blind-side runs, the third man runs, all of which create a lot of space and camouflage the opponent on the pitch. On the other hand, FC Barcelona data scientists found that ‘Lionel Messi’ creates more space by standing still or jogging than any other player does by running [23]. So, creating space is not always a function of running. Presumably elite soccer player is the ‘space creator’. The Drone footage can describe all the spaces and also analyze the strength of the dominant zone as outlined in the coaches’ strategy.

7.3. Combination of Attacking and Defensive Plan

Counter-attack, cross from the flank, use of ‘half-space’ and clever assists in ‘zone 14’ all the combination of the attacking plan could have been discussed in depth by a post-match Drone video. On the other side, the attackers, when they don’t have the ball, immediately transform their role as defenders and vice versa. Defenders need to mark the ball as well as the space as necessary. The defensive strategy could have been strengthened by studying the Drone images and/or videos.

8. Conclusion

There can be no doubt that soccer Drone coaching techniques are being quickly adopted by modern innovative and forward-thinking coaches along with other soccer coaching techniques. For all counts, and with proven findings, it is no wonder that the Drone’s image and footage could have been analyzed to evaluate the attacking and defensive team shape of the soccer match. As a consequence, Drone in soccer coaching is the flying astute eye of a modern soccer coach watching the best of the game (unofficial matches) or practice sessions.

Drone Handler

The team’s performance analyst/computer analyst may be the person responsible for the Drone operation and assist the coach.

Limitation

Short flight times may be limited to recording, as the time of the match and practice session is more than 60 minutes

Conflict of Interest

The author declare no conflict of interest

References

- [1] Richard S. Women’s World Cup Final Was Most-Watched Soccer Game in United States History - The New York Times 2015. <https://www.nytimes.com/2015/07/07/sports/soccer/womens-world-cup-final-was-most-watched-soccer-game-in-united-states-history.html> (accessed January 22, 2020).
- [2] Islam MS. Relationship of abdominal muscle endurance with selected anthropometric measurements in soccer players. *Int J Physiol Nutr Phys Educ* 2018; 3: 1088–90.
- [3] Islam MS, De A. Functional Hamstring to Quadriceps Strength Ratio (H:Q) and Hamstrings Injury of Soccer Players: A Qualitative Analysis. *Orthop Sports Med Open Access J* 2018; 2: 126–32.
- [4] Mal B. Coaching Football Professional. New Delhi, India: Friends Publications; 2004.
- [5] Calcio P di. Positive Transition in modern football. *Fabfootballbrain* 2016. <https://fabfootballbrain.wordpress.com/2016/02/18/positive-transition-in-modern-football/> (accessed February 17, 2020).

- [6] Castellano J, Pastor DÁ, Blanco-Villaseñor Á. Analyzing the space for interaction in soccer. *Rev Psicol Deporte* 2013; 22: 437–46.
- [7] Joshi N. 4 sensors that are being used in drones |IOT| Drones Technology | 2016. <https://www.allerin.com/blog/4-sensors-that-are-being-used-in-drones-technology> (accessed February 1, 2020).
- [8] Brown L. What is a Drone and How Does it Work 2019. <https://filmora.wondershare.com/drones/what-is-drone-how-does-it-work.html> (accessed February 1, 2020).
- [9] What is a Drone? - Definition from WhatIs.com. *IoT Agenda* 2019. <https://internetofthingsagenda.techtarget.com/definition/drone> (accessed February 1, 2020).
- [10] Corrigan F. How To Aerial Film People And Best Drone Footage Of People. *DroneZon* 2018. <https://www.dronezon.com/aerial-photo-and-video/aerial-filming/aerial-film-people-and-best-drone-footage-of-people/> (accessed February 1, 2020).
- [11] Murison M. What Happens When Drones Get Involved in Professional Sports? - DRONELIFE 2017. <https://dronelife.com/2017/02/08/drones-sports/> (accessed February 1, 2020).
- [12] Jha AR. Theory, design and applications of unmanned aerial vehicles. Boca Raton: FL: CRC Press/Taylor & Francis Group; 2016.
- [13] Cho R. How drones are advancing scientific research 2017. <https://phys.org/news/2017-06-drones-advancing-scientific.html> (accessed January 20, 2020).
- [14] Lavars N. Intercepting radio signals can reveal if a drone is spying on you 2018. <https://newatlas.com/radio-signals-spying-drone/52968/> (accessed January 22, 2020).
- [15] Smith P. Are drones football's new tactics tool? We lift the lid on Charlton's training ground innovation | Football News | Sky Sports 2018. <https://www.skysports.com/football/news/11684/11196657/are-drones-footballs-new-tactics-tool-we-lift-the-lid-on-charltons-training-ground-innovation> (accessed January 22, 2020).
- [16] Arena Q. Are Drones the Future of Sport Training? *Quadcopter Arena* 2018. <https://quadcopterarena.com/are-drones-the-future-of-sport-training/> (accessed January 21, 2020).
- [17] Powderly D. Drones In Football. *Medium* 2016. https://medium.com/@David_Powderly/drones-in-football-65e275681eba (accessed January 21, 2020).
- [18] Viegas L. Drone changing soccer analysis. *Soccer HUB* 2019. <https://hub-soccer.com/2019/07/03/drone-changing-soccer-analysis/> (accessed January 21, 2020).
- [19] Rein R, Memmert D. Big data and tactical analysis in elite soccer: future challenges and opportunities for sports science. *Springer Plus* 2016; 5. <https://doi.org/10.1186/s40064-016-3108-2>.
- [20] Ric A, Torrents C, Gonçalves B, Torres-Ronda L, Sampaio J, Hristovski R. Dynamics of tactical behaviour in association football when manipulating players' space of interaction. *PLOS ONE* 2017; 12: e0180773. <https://doi.org/10.1371/journal.pone.0180773>.
- [21] Folgado H, Lemmink KAPM, Frencken W, Sampaio J. Length, width and centroid distance as measures of teams tactical performance in youth football. *Eur J Sport Sci* 2014; 14: S487–92. <https://doi.org/10.1080/17461391.2012.730060>.
- [22] Kirkbride P. Everton FC use drone technology to film training sessions - *Liverpool Echo* 2015. <https://www.liverpoolecho.co.uk/sport/football/football-news/everton-fc-use-drone-technology-10013696> (accessed January 21, 2020).
- [23] Burn-Murdoch J. How data analysis helps football clubs make better signings. *Financ Times* 2018. <https://www.ft.com/content/84aa8b5e-c1a9-11e8-84cd-9e601db069b8>.