Investigating Current AFL Player Tracking System and Data Collection

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Investigating Current AFL Player Tracking System Security Risks

The purpose of this report is to delve into the current player tracking system in the AFL which predominantly uses a combination of human analysis and GPSs in player jumpers to record player data. This report also aims to assess how the introduction of an AI-based player tracking system could alter the way player tracking is managed in the AFL, and how best to prepare for this change. Many members of project Orion are currently working on means of player tracking software and training it on various sports including tennis, soccer, rugby and basketball. Given the trajectory of AI and the increased demand for sporting statistics, it is likely only a matter of time before this becomes another part of AFL player tracking.

There have been numerous occasions where players in both men's and women's leagues have flagged security concerns regarding the retention of player data. This report will look at how these concerns can be addressed in a way that is effective for the game and provide secure and ethical opportunities for players while meeting the need of the league.

Current AFL Player Tracking

The AFL primarily uses Melbourne based sports data tracking and analysis company Champion Data in player tracking (Champion Data, n.d.). Champion Data uses an array of player tracking methodologies for AFL tracking including a human approach that involves teams recording stats by calling the play while another team member records the data on a computer, access to player GPS data through player wearable technology company Catapult, and ball/player tracking software similar to that being experimented with within Project Orion. Champion Data also compiles collected data and generates player scores to rank the overall output of players based on an array of statistics. Champion Data analysist Daniel Hoyne notes that this is calculated based on three key factors "How you win the ball, where on the ground you win the ball, and then how you actually use the ball" (Cotton, 2022).

GPS Player Tracking

Since 2015 the AFL has utilized sports data company Catapult for player wearable technologies (Catapult, 2022). Catapult offers a GPS product called Vector Pro which includes a player GPS, kept in a special pocket on the back of a player jumper, as well as the option of heart rate monitors, worn on sports vests or straps. The GPS is primarily used to track distances and speeds covered by player while the heart rate monitor can work as a safety precaution for detecting unusual heart activity as well as an indicator for player fitness levels.

Catapult is trusted by the likes of Greenbay Packers, Manchester United, and Kansas City Chiefs with their player data (Catapult, n.d.). Aside from wearables, Catapult also offers a range of monitoring solutions to aid sports analysis. Secure retention of all player data is essential in ensuring these tracking systems are safe to use and do not allow unfair competitive advantage or inappropriate access to player or team data.

In 2023, Catapult was investigated over a potential security breach involving alleged unauthorized access to footage from a college football game. Catapult conducted an internal investigation, while local authorities and the NCAA also investigated these allegations however there was no evidence to suggest a security breach (Battifarano, 2023).

Catapult offers a multifaceted service that has numerous areas that require reliable security. This includes the application used for data analytics used by teams called OpenField, providing teams with access to footage and statistics relevant to their sports in a clear and convenient manner. This is where the security issue arose about unauthorized access to footage in 2023. Catapult uses cloud-based service provider Amazon for the OpenField application. Amazon Web Services (AWS) are known for being a trustworthy provider from a cybersecurity standpoint, complying with many security standards including FISMA, DIACAP, PSCI DSS, and all relevant ISO standards (Amazon Web Services, n.d.) however it is important to note that when using cloud-based service providers data security is also the responsibility of the user. This is referred to as a shared responsibility model, where the customer must also abide by the correct practices to ensure data security.

Software Based Player Tracking

Champion Data are the main entity responsible for player tracking in the AFL and have been since 1999. Champion Data's deal with the AFL uses real time data analysis to provide team staff, commentators, and spectators with live statistics and player analysis. These statistics are gathered through a process in which callers will announce the statistics (e.g., the player and the type of statistic such as disposal, tackle, hit out). This information is then entered by another Champion Data worker into their software to be used for analysis and commentary. Senior Analyst Daniel Hoyne notes that this is an intense process and there is extraordinarily little time for errors or adjustments (Hoyne, 2023). Sports and data analysts must then package this data into digestible and relevant statistics for the broadcasting team to give viewers a sign of how key player matchups are tracking and other important

match insights. In the days following, Champion Data will present further insights to clients and producers to be presented throughout the week. While Champion Data does an excellent job of capturing statistics and offering match insight, the gameday approach could be made easier in time with the implementation of AI assistance.

As the AFL's primary statistic tracking company, Champion Data keeps a large amount of sensitive data on a variety of individuals including users of Champion Data related services, coaches, officials, employees, and players. Their privacy policy outlines the wide array of personal information they can retain on any of these entities, ranging from name, IP address, and cookies to in the case of sportspeople; health data including medical reports, biometric data, and images of the individual (Champion Data, 2024). While it is noted that Champion Data comply with the Privacy Act 1988 subject to relevant exemptions, it is important to note that they do have access to and retain very private and sensitive information from a variety of users.

Another live player tracking software adopted by the AFL is that of the Telstra Tracker, a feature of the AFL app that allows users to view live tracking of player movements, recording speeds and distances covered by players in games. This is achieved by accessing data from player GPSs and sensors set up at matchday venues (Barbaschow, 2020). Lead architect of the Telstra Tracker, Ralph Stone discusses the security concerns relating to the data being collected and stored in this application in an AWS summit where he notes the use of CloudHSM, a highly powerful hardware security module produced by AWS to ensure the safety of the information, stating up to six HSMs can be used in a game (AWS, nd).

Though there are no reports of leaks or security breaches relating to Champion Data and the Telstra Tracker, the amount of data they can access, and hold is immense and numerous AFL players from both men's and women's leagues have noted their displeasure regarding the level of privacy they must surrender to participate in their jobs.

Privacy, Data Security and Ethical Concerns

As the desire for match and player insight from spectators and analysts has grown, the data required by player tracking entities has greatly expanded. A variety of extremely sensitive information regarding players is collected by clubs and the AFL and is then able to be accessed by third parties such as Champion Data to provide detailed analysis of matches and player outputs. This issue has been raised numerous times by players. Some information kept on players includes very private aspects such as health records, drug tests, and biometrics. In 2024 the AFL Player Association made a request to adjust their data protection rules in the wake of a data breach relating to a Port Adelaide player's sensitive information (Snape, 2024). This breach led to Chief Executive of the AFLPA Paul Marsh outlining the impact leaks regarding performance data can have significant impacts on the players.

A report conducted by the Australian Academy of Science delved into what specific information was being collected on players and noted that player tracking does not stop when the players take their guernseys off, it comes home with them. Some of the data being collected on players range from heart rate, biometrics including weight, size and fat percentage, sleep schedules and depth, to menstrual cycles of players in the AFLW (Powles & et.al, 2022). This level of monitoring would not be allowed in almost any other industry and demonstrates the amount of very sensitive information players are trusting with organizations they may not know much about.

Misinterpretation of data

The balance between client needs and the concerns of players is difficult to meet in this scenario as these requirements are often used as performance indicators within clubs, however it is important to note they do not encapsulate an entire story. Statistics about player performance may take a range of factors into account however this does not encapsulate the individual's internal contributing factors to

their performance. This issue was raised by the AFLPA when broadcasters first presented GPS related statistics ahead of the 2017 season (Cherny, 2017). One suggestion from the AFLPA was to use deidentified information in order to decrease competitive advantage, however these suggestions have not been recognized. Despite these concerns, broadcasters still promote GPS related statistics.

The ease of access to this information and the concern of many players about the privacy they are required to surrender suggests it may be a case of over-monitoring. While it is understandable that clubs may have access to most if not all this sensitive information, the requirement to have it shared with broadcasters and media channels seems to provide little benefit when compared to the toll it may take on players. Clubs would have the insight and facilities to discuss and handle external factors the players may be facing (mental health issues, issues pertaining to private health concerns, issues at home etc.), and can judge the players' performance with these factors in mind. Media and broadcasters, however, do not have or require this kind of knowledge and can deem players to be playing poorly without context of these factors. News outlet The Conversation heard these concerns from many AFLW players, noting that player tracking often neglects the possibility of external factors and all consumers are left to conclude is that players are not competing well enough regardless of their circumstances (Paul Bowell, 2024).

Information security

As is the case with any data retention per the Privacy Act 1988, organizations are required to prioritize the protection and appropriate use of client data. This is particularly important for the kind of information being retained by AFL player tracking entities including clubs, the league, champion data, and Telstra. This seems to have been a top priority for Telstra in their development of the Telstra Tracker, as discussed earlier with their approach ensuring secure data streaming with the use of CloudHSM. Champion Data does not provide very much information regarding information security aside from what is outlined in their privacy policy, where they outline that all data is stored in secure

databases, with security controls including physical security measures and firewalls (Champion Data, 2024). Given the sensitivity of the data these entities are collecting and storing, players are forced to place a large degree of trust in their ability to safeguard this information. Breaches could lead to unfair competitive advantage within the game, but more importantly could have drastic impacts on the players. It is imperative that any means of player tracking in the AFL is done not only in compliance with the Privacy Act 1988, but with attention to best practices for data protection and transparency with players regarding the storage and use of their confidential information.

Threat Mitigation and Recommendation

The capture and retention of player information is a large area of concern as it presents issues regarding the security of this information as well as the well-being of the players. To balance the needs of the players and those with access to this information it would be useful to deidentify data where possible, and broadcasters not promoting statistics which reflect poorly on players. It is also important to assess the use of third parties and their access to this information. Transparency and communication with players about this would be a major step in ensuring player satisfaction. The satisfaction of the players should be at the forefront of this discussion as it is predominantly their information being captured and shared. To build on this further and create a strong and lasting relationship between statistical organizations and the playing group, developing a Data and Ethics Committee could provide a voice for players and means of dealing with data-based issues as the AFL continues to build on its current player tracking systems.

Deidentifying data

Having heard player grievances about the fact that they are heavily analyzed on a broad scale given the wide range of statistics and information the public has access to, there could be an argument made to deidentify some data. Though this would not be plausible with all data and statistics, things

such as running efforts and clangers do not provide any positive insight for the public, particularly without the understanding of external factors affecting the player. Rather than having these kinds of statistics readily available for anyone to access, these could be deidentified and presented as team statistics, potentially with the ability to outline exceptional efforts such as a top 5 player speed within a match. This would present some further work to be put in place to ensure this data is kept deidentified and inaccessible to the public but still available to clubs, therefore harboring the need for strong encryption and access-control to ensure other teams cannot develop an unfair strategic advantage.

Encryption

Regardless of the deidentification of player data, encryption is an important part of player tracking as it prevents unauthorized access or tampering with information. However, the implementation of deidentified data would further push the necessity of strong encryption for the likes of Champion Data who would still be the primary statistic takers in the AFL. Ensuring oppositions teams, the media and the public do not have access to data that is to be deidentified would be crucial and a lapse in this area could easily result in a security breach. In this scenario, Champion Data should identify means of secure encryption and could potentially work with Telstra Tracker and adopt the use of CloudHSM. Alternatively, they could use tools such as AWS' Key Management Services KMS, a cheaper alternative to key management and encryption that is more user-friendly service with greater scalability, meeting FIPS 140-2 standards denoting strong cryptography (Bisht, 2024). This would be in keeping with the AFL's current use of Amazon services in player tracking.

Third-party review

To ensure the compliance of third parties in their correct and Australian Standard abiding use and storage of data, regular security audits should take place within these organizations. This would also provide an opportunity to reflect on what data is being shared to these entities and if we can reduce this

to increase data security. Champion Data outline in their privacy policy that personal information may be shared with recipients from China and the USA which may not align with the Privacy Act 1988, yet Champion Data take reasonable steps to ensure compliance with the Privacy Act when using cloud services (Champion Data, 2024). Catapult on the other hand appear more forward about their approaches to security and restricting access to external parties, with a designated Information Security Policy outlining the use of firewalls, careful handling of documentation and access control measures to protect private information (Catapult, nd). The clarity regarding the use of third parties and data security from Catapult is something Champion Data could take into consideration and refine their security policies to promote data security for all players and users.

Establish a Data and Ethics Committee

Given the existing issues presented by players and the trajectory of the way statistics are being taken and analyzed, the creation of a Data and Ethics committee in the AFL could help ensure the protection of players while not sacrificing the growing capabilities of player tracking. With the emergence of AI and its capabilities to analyze game footage and movement, it is likely to soon become a part of AFL player tracking, and given there are currently no laws regulating the use of AI in Australia (White & Case, 2024) establishing a body that would have voice regarding data and ethical concerns would be a step forward for the AFL. This body could be developed in conjunction with the AFLPA, giving the players direct dialogue regarding their beliefs and concerns in this area. It could also provide new leadership roles and future employment for players with interest in these areas, such as Tom Barrass who has a deep investment in ethics and is studying Philosophy (Black, 2025), as well as the current president of the AFLPA Darcy Moore who has outlined the importance of player confidentiality in the AFL's plan to revamp its illicit drug policy (Clark, 2025) and has previously held a leadership position as

the club Captain of the Collingwood Football Club at a time where a report into racism within the club was leaked in 2021 (Yokayi Footy, 2021).

A designated Data and Ethics committee would be a useful step in providing greater player input into how their data is obtained, stored and accessed. It could also be consulted on other ethics related issues that the AFLPA faces such as the change in illicit drugs policy and any other ethically complex issues pertaining to the playing group.

Conclusion

As the AFL continue to broaden and develop their means of player tracking for performance and match insight, the use of sensitive data being collected continues to grow. While there are significant benefits in this for coaches, broadcasters and spectators it does raise concerns regarding privacy, ethics, and data security. While they are the most integral part of the sport, players are more than the data being collected on them. They are individuals who must, like anyone else in their workplace or at home, have their very sensitive data including biometric and personal information protected.

Incidents such as the data breach that included personal information of Port Adelaide players in 2023 highlight the risk of handling this information as well as the need to not only technically secure this data, but to do so with transparency and the informed consent of the players. The AFL should adopt a more proactive approach to data security, balancing the wants of the public with the needs of the players. Safeguards such as deidentifying data, strong and reliable encryption models, and implementing a Data and Ethics committee would be beneficial steps in the move to prioritize player trust and wellbeing, while continuing to provide useful insight and statistics into the AFL and player contributions.

References

Amazon Web Services, n.d. *Security and Compliance.* [Online]

Available at: https://docs.aws.amazon.com/whitepapers/latest/aws-overview/security-and-compliance.html

[Accessed 1 April 2025].

AWS, nd. *How AFL secures real-time player tracking with encryption.* [Online]

Available at: https://awscloudsecvirtualevent.com/ondemandtracks/secure_real-time_tracking_afl/

[Accessed 10 May 2025].

Barbaschow, A., 2020. *Telstra's AFL Player Tracker was a lesson in more than just getting stats to fans.* [Online]

Available at: https://www.zdnet.com/article/telstras-afl-player-tracker-was-a-lesson-in-more-than-just-getting-stats-to-fans/

[Accessed 10 May 2025].

Battifarano, A., 2023. *NCAA investigating alleged security breach of video on Catapult app in twist before CFP.* [Online]

Available at: https://nypost.com/2023/12/29/sports/ncaa-investigating-alleged-unauthorized-access-to-video-on-catapult-app/

[Accessed 1 April 2025].

Bisht, R., 2024. *AWS CloudHSM vs. AWS KMS.* [Online]

Available at: https://www.infosectrain.com/blog/aws-cloudhsm-vs-aws-kms/#:~:text=When%20deciding%20between%20AWS%20CloudHSM,for%20general%20key%2

0management%20tasks.

[Accessed 15 May 2025].

Black, S., 2025. *Which player is doing FOUR degrees? Meet the AFL's brainy bunch.* [Online]

Available at: https://www.afl.com.au/news/1287096/the-brainy-bunch-anthropology-astrophysics-and-a-four-degree-ruck#:~:text=Bailey%20Banfield%20(Fremantle),(Richmond%2C%20also%20studying%20business)

[Accessed 20 May 2025].

Catapult, 2022. *Catapult x Champion Data delivers athlete tracking services to the AFL.* [Online]

Available at: https://www.catapult.com/blog/afl-athlete-tracking#:~:text=About%20Champion%20Data,the%20story%20behind%20the%20game.

[Accessed 1 April 2025].

Catapult, n.d. *Home.* [Online]

Available at: https://www.catapult.com/

[Accessed 1 April 2025].

Catapult, nd. *Privacy Policy.* [Online]

Available at: https://www.catapult.com/privacy-policy#:~:text=(a)%20We%20may%20use%20your,the%20services%20that%20we%20offer.

[Accessed 20 May 2025].

Champion Data, 2024. *Privacy Policy.* [Online]

Available at: https://www.championdata.com/privacy-policy-au/

[Accessed 1 May 2025].

Champion Data, n.d. [Online]

Available at: https://www.championdata.com/sport/

[Accessed 1 April 2025].

Cherny, D., 2017. *AFLPA raises concerns about plan for broadcasters to show AFL player GPS data.* [Online]

Available at: https://www.theage.com.au/sport/afl/aflpa-raises-concerns-about-plan-for-broadcasters-to-show-afl-player-gps-data-20170209-gu9jtr.html

[Accessed 2 May 2025].

Clark, J., 2025. *Footy's new era: 'Deep-thinking' Darcy's the right man for the job* [Interview] (30 March 2025).

Cotton, B., 2022. *Champion Data explains contentious rating system, reveals best AFL player 'by some margin'.* [Online]

Available at: https://www.foxsports.com.au/afl/afl-2022-champion-data-rating-system-explained-daniel-hoyne-elite-players-best-player-nic-naitanui-shock-selections/news-story/b23df1897ba519c6fa7d891694eb7b07

[Accessed 1 April 2025].

Hoyne, D., 2023. *How Champion Data Deliver Analytics All Over the World* [Interview] (8 October 2023).

Paul Bowell, E. P. E. S. P. S., 2024. *GPS tracking is everywhere in pro sports but many AFLW players are uncomfortable with it.* [Online]

Available at: http://theconversation.com/gps-tracking-is-everywhere-in-pro-sports-but-many-aflw-players-are-uncomfortable-with-it-237475#:~:text=What%20our%20research%20revealed,professional%20athletes%20are%20not%20considered.

[Accessed 2 May 2025].

Powles, J. & et.al, 2022. *Getting Ahead of the Game: Athlete Data in Professional Sport,* Canberra: Australian Academy of Science.

Snape, J., 2024. *AFL players call for data protection overhaul as concerns include drug test results.* [Online]
Available at: https://www.theguardian.com/sport/article/2024/may/14/afl-players-data-protection-leak-breach-drug-test-results
[Accessed 2 May 2025].

White & Case, 2024. *AI Watch: Global regulatory tracker - Australia.* [Online]
Available at: https://www.whitecase.com/insight-our-thinking/ai-watch-global-regulatory-tracker-australia
[Accessed 20 May 2025].

Yokayi Footy, 2021. *Darcy Moore on a report that was 'extremely difficult to digest'.* [Online]
Available at: https://www.afl.com.au/video/608100/yokayi-footy-darcy-moore-on-a-report-that-was-extremely-difficult-to-digest?videoId=608100&modal=true&type=video&publishFrom=1620154801001
[Accessed 20 May 2025].