WHITEPAPER

The foundations for a new era of intelligent sports



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Matt Fleckenstein **Chief Product Officer**



Executive summary: Welcome to a new era of intelligent sports

The sports industry is at a critical juncture where machines have surpassed human capability to track and crucially understand an event. This is about to unlock previously unimagined possibilities in terms of content and capabilities across all levels of world sport.

Through AI, computers can process huge amounts of data and then apply their learned intelligence to perform key functions. In sport, Al is being applied to process incredible amounts of tracking, play-by-play and performance data, transforming everything from live streams and broadcasts to training and analysis.

This is what we call the Era of Intelligent Sports: Where data lives and breathes as actionable insights. Where Al-powered automation drives efficiencies. Where decision making is smarter and faster. Where fans are more immersed in the games they love.

For rights-holders, media companies, brands invested in sport, and fans themselves, the shift is potentially seismic.

Systems of intelligence

To realise and maximise these enormous opportunities, sports need to change the way they think about technology.

Today, almost every league deploys a disparate set of technologies spanning data capture, tracking, video, performance analysis, officiating and much more besides. While they might operate perfectly well in isolation, these systems don't talk to each other and result in fragmented data sets, in turn preventing Al from understanding, learning and adding value.

The optimal future therefore is a single in-venue system of intelligence that can be leveraged in many ways. A single system that automates the collection of vast data sets and uses the power of machine learning to transform how sports are run and experienced.

Immersive experiences

But what about the fans? Eye-catching applications of Al and tracking data are giving enterprises the tools to provide new experiences for people to live and breathe sport like never before, from the stadium to the screen to the metaverse.

Storytelling built on visualisations that convert data into meaningful information, heighten engagement and elevate the fan experience.

It is notable that demand for immersive experiences is growing, with more than half of European sports fans keen to watch sport via virtual reality in 2023, for example.¹

However, this is just the beginning of a new phase in sports entertainment, and this report explores how the new era of Al and tracking data is supercharging the fan experience of the future.

We're living in a world where intelligence wins. And at Genius Sports we're building the system of intelligence to help sports get there faster.



02— Key growth pillars

The influence of AI is growing in sport, filtering down from teams attempting to gain an edge over the opposition to fans who are relishing the chance to delve into performance tactics like never before.²

A lot of Al's growing value in the world of sport is its ability to take huge quantities of data and make them both meaningful and insightful. This is particularly true for tracking data with the most advanced Al-powered systems now capturing up to 10,000 data points on a player's body in near real-time.

"Tracking data has been around for years, but we have always focused on turning the data into a valuable resource that enables consumers to enjoy more personalised and interactive experiences," said Michael D'Auria, Chief Commercial Officer at tracking data solutions provider Second Spectrum, which was acquired by Genius Sports in 2021. "It began with us helping teams to win more games, and now the technology is also being used to transform the way fans interact with sports."

Through AI, a Premier League player's 1v1 dribbles, which are captured through tracking technology, can be automatically paired with the relevant video and clipped for a team's analysts and coaches to review. Or for NBA broadcasts, shot probabilities can be displayed in real-time above a player's head before they have released the ball. Without Al's ability to combine live data and video, the former would have very limited value.

"Our computer vision system translates a live game into millions of datapoints in less than a second," D'Auria said. "In isolation, that is just a heap of numbers. However, we have a machine learning layer that translates the data into the 'eventing' language of sport, and it is much more nuanced than a human. Then the task is to create a solution that is valuable for the end user."

There are four key factors behind this accelerating drive to apply Al and data-tracking solutions in a fan-facing setting:

- Individuals are increasingly interested in statistics and datadriven insights as part of their broader fan experience;
- In the intensifying battle for attention, fan-facing platforms know they need to differentiate their offering and build narratives around the action;
- The fragmentation of sports consumption is providing an ideal launchpad for data visualisations and tailored experiences;
- Technological advancements have resulted in the development of more sophisticated tools derived from tracking data, including performance analysis and officiating tools.





2.1 Increasing fan appetite

Fan interest in insights derived from tracking data is rising as part of a broader growth in appetite for statistics.

This has been partly driven by the increase of statistics-savvy fantasy sports players and bettors since the early 2010s. Taking the US as an example, the total number of fantasy players nearly doubled between 2012 and 2017.3

Then, in the following year, the US Supreme Court overturned a federal ban on sports betting, opening the floodgates to widespread regulatory developments across the country and sharp growth.⁴

In fact, the US regulated sports betting market grew by 50% year-on-year in 2022 and is forecast to more than double in size between 2022 and 2027.5

As a result, sports followers in general are accustomed to statistics as part of the fan experience and hungrier for deeper, more granular statistics – especially among younger generations. For instance, in the US, 46% of Gen Z and 43% of millennial sports fans want real-time statistics to be available through their streaming platform of choice. More than a third of Gen X fans feel the same.

Furthermore, fans are using data not only to enhance their understanding of the action, but also to construct their own stories around the event.7

2.2 Building narratives

Many fans want to immerse themselves in the action through statistics, and not only during live games.

For example, as many as one in four fans will consume in-depth analysis of a team's performance during the off-season, with the majority of sports followers craving a year-round experience underpinned by engaging storylines.8

Tracking data, when converted into consumable storylines through Al, can therefore prolong and enhance the fan experience long after the final buzzer or whistle has sounded.

As a result, rights-holders such as teams and leagues, which have increasingly recognised the engagement potential of statistical insights to create new narratives in their content, have ramped up integration of data-tracking solutions.

2.3 Fragmented consumption

The opportunity to provide a new kind of experience has accelerated due to the digital transformation and fragmentation of sports consumption, including the evolution of traditional broadcasters into multimedia companies.

Specifically, the growth of over-the-top (OTT) consumption in sport is opening the door for content owners including teams themselves to explore new ways to differentiate their coverage.

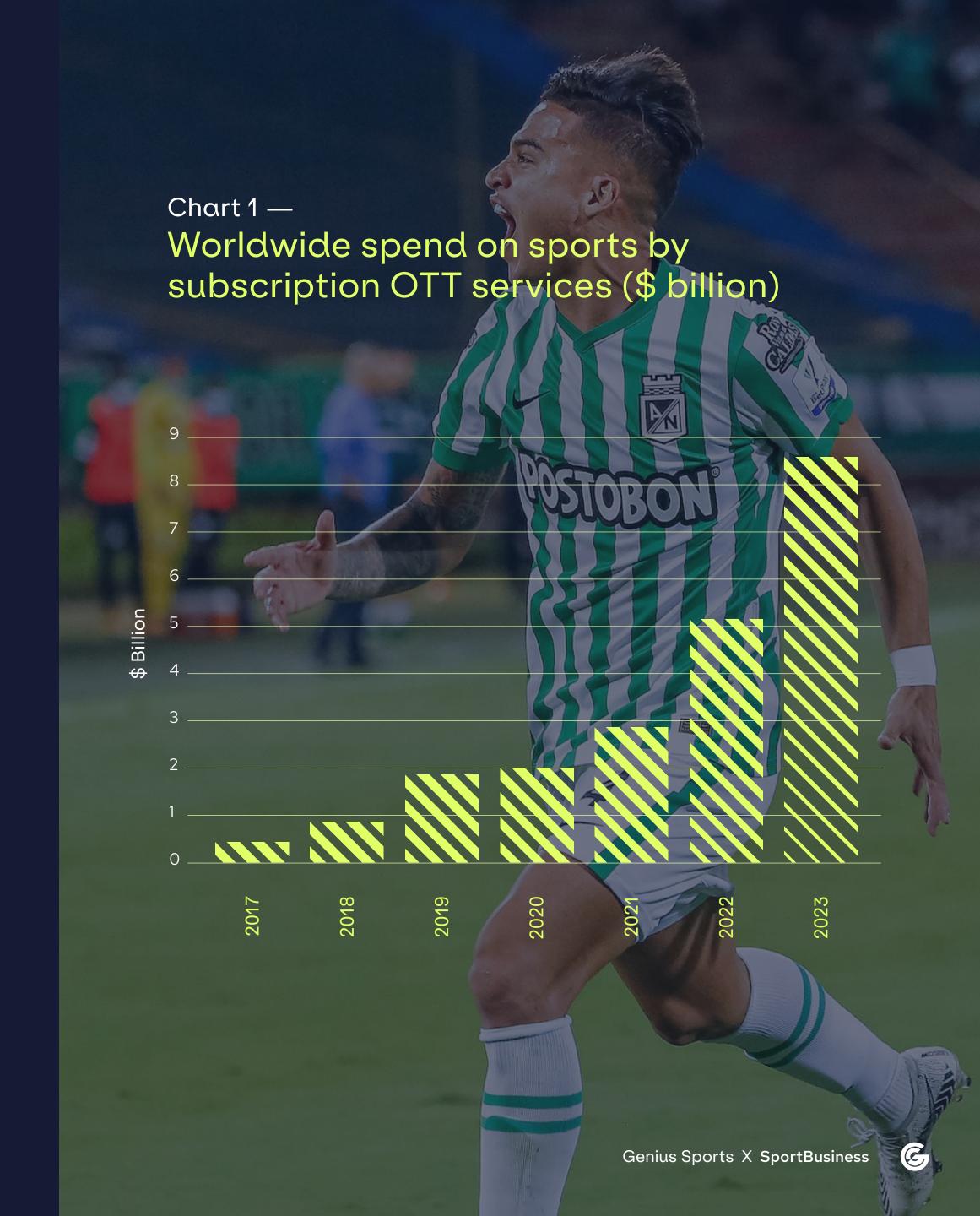
With many linear broadcasters pivoting increasingly to digital, and more digital-first providers sprouting up, the share of expenditure on sports rights by streaming platforms reached 21% of global sports rights investment in 2023, up from 13% in 2022.9

As shown by Chart 1, the total spend on sports rights by subscription OTT services worldwide reached \$8.5 billion in 2023 - nearly treble the figure just two years earlier - with spending in North America having more than doubled from 2022 to 2023.

While there are variations in spending levels across Europe's big five markets of France, Germany, Italy, Spain and the UK, the proportion of total spend on sports rights from subscription OTT services increased on average from 12% in 2021 to 20% in 2022.¹⁰

In recent years, there has also been an acceleration in sports rights expenditure by general entertainment OTT services. Indeed, general entertainment service providers represented six of the top 10 subscription OTT services by global spend on sports rights last year.

As a more varied array of content owners emerges, so too does the ability to test and innovate new viewing experiences – either by enhancing a standard broadcast or by creating entirely new ones for specific audiences.





2.4 Tech advancements

In recent years, significant technological developments have refined the quality of tracking data, whether via chips that are fitted into a player's kit – such as those added to the shoulder pads of NFL players, 11 or more widely through computer vision. 12

Today, Genius Sports' computer vision technology automatically captures 10,000 surface mesh data points per-player, over 200x per second, compared to fewer than 50 in skeletal tracking systems.

These developments have been partly driven by the demands of professional teams seeking to gain a competitive advantage. Computer vision has been applied in conjunction with tracking data to predict when athletes' bodies may become overstretched and prone to injury.¹³

Indeed, the integration of computer vision as a foundational layer for tracking data has had a profound impact on the variety of innovative applications available in a fan-facing environment.



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03— Data-tracking tools and applications

The optimised process for delivering insights based on tracking data broadly comprises three technological stages:

- 1. Computer vision-based data collection
- 2. Machine learning-based understanding of the data
- 3. The application of visual semantics to convert the data into actionable or engaging insights.

The third stage of the process - the application of semantics frames the data in a way that is valuable broadly for the three following purposes:

- Providing detailed performance analytics that can be used to support a club's coaching decisions about player training, recuperation, acquisition and retention;
- Creating compelling content that drives engagement for fanfacing entities, such as rights-holders, broadcasters, brands, and betting and fantasy sports operators;
- The most accurate real-time representation of sport available unlocks automated and semi-automated officiating tools, speeding up crucial decisions to just a few seconds;

This section focuses on existing data-tracking applications that provide different experiences for fans.

3.1 Rights-holders

Purely numerical insights derived from tracking data have become part of the everyday language of a sports fan over the past decade, with phrases like expected goals (xG) in football, expected possession value (EPV) in basketball and expected points added (EPA) in American football having entered the vocabulary.¹⁴

The AI that underpins these insights has introduced a new dimension to the fan experience, and various rights-holders have embraced data-tracking solutions to build on this interest.

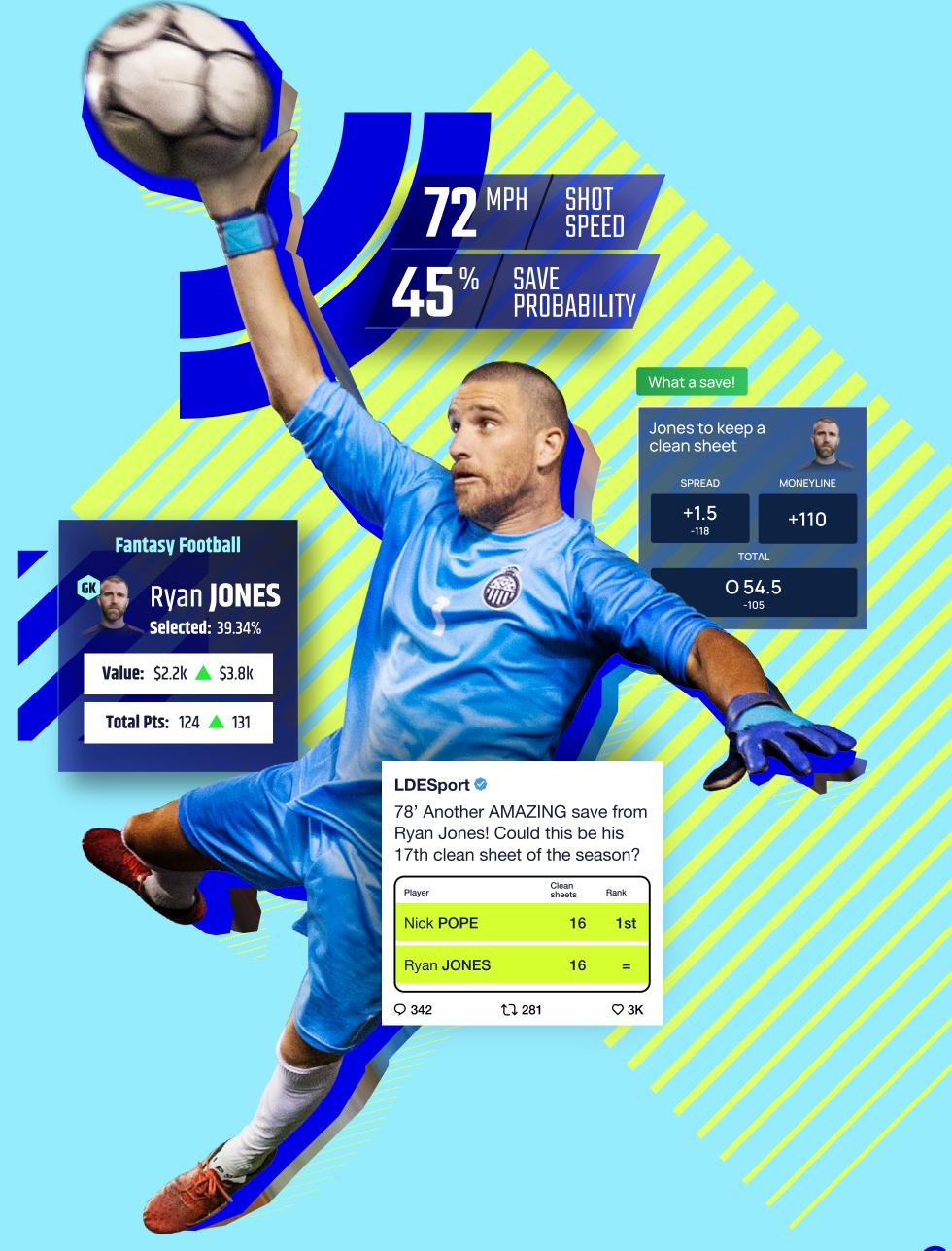
The English Premier League, through Football DataCo, has led the way in adoption of Genius Sports' data-driven solutions. "Technology continues to drive how data is collected, analysed and presented," said Football DataCo General Manager Adrian Ford.

Rights-holders have found that the addition of visual elements to numerical insights - and other statistics - has elevated engagement to unprecedented levels.

This has been vividly illustrated by innovations like ClipperVision, which was launched as a direct-to-consumer streaming service by the NBA's Los Angeles Clippers in 2022 on the back of the development of the Clippers CourtVision Beta in 2018. Genius Sports' partnership with the Clippers has helped to shine a spotlight on augmentations and overlay options, including real-time animations, graphics and special effects integrated with real-time shot probabilities and other game statistics.

These innovative overlays tap into a branch of augmented or mixed reality – something that is being used increasingly across different sectors to engage customers in playful, creative and enjoyable experiences.¹⁵

Indeed, immersive technologies such as augmented reality are increasingly seen as an important tool for sports organisations seeking to boost the fan experience.¹⁶







Going a step further by floating the shot probability figure above the heads of moving players really enhances the live experience

Michael D'Auria Second Spectrum Chief Commercial Officer

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3.2 Content owners

Like their rights-holder partners, broadcasters and streaming giants have increasingly adopted data-tracking based conversational insights – such as xG and EPA, for instance, in their coverage of football and American football in recent years – reflecting the growing interest among viewers in discussing such statistics.

However, it is the underlying AI and computer vision which makes tracking data part of a broadcast experience that is more informative, immersive and entertaining. Combining live data – whether live stats or tracking – with live video in real-time is incredibly complex but due to breakthroughs in AI, broadcasters can now tap into a new wave of alternate broadcasts that lean heavily into everything from statistics to animations or brand activations.

At the apex of this trend has been the Sports Emmy-winning Prime Vision with Next Gen Stats by Prime Video which is breaking new ground in Al-powered broadcasts. Using the NFL's Next Gen Stats Feed combined with Genius Sports' unique augmentation capabilities, Prime Vision integrates everything from ball-carrier speed, to yards after catch, closing speed and time to throw directly into the live Thursday Night Football experience.

For the 2023 NFL season, Prime Vision broke new ground through machine learning algorithms that informed fans what was about to happen on the upcoming play. Prime Targets showed viewers which receivers were open to pass to while Defensive Alerts highlighted who was about to rush the quarterback before the snap. As Prime Vision grows in popularity, expect more of its data-driven features to be adopted in the main Thursday Night Football stream which is already attracting a significantly younger audience than linear broadcasts.

Premier League Productions, meanwhile, have launched the Premier League Data Zone, a data-driven viewing mode for broadcasters of the world's largest football league to utilise and engage stats-mad fans. Integrating everything from a pitch map to player speeds, shot velocities and even official updates from Fantasy Premier League all interwoven into the live viewing experience.

These insights contribute towards storylines, which are vital for engaging new and existing fans in sports coverage for longer.

Therefore, there is a clear financial incentive for media companies to push boundaries and explore the latest augmentation solutions.

"Some data snippets on their own can tell you something really interesting about a game or player," Second Spectrum Chief Commercial Officer Michael D'Auria said. "Shot probability in basketball, which was one of our early creations at Second Spectrum, is a good example of this. However, going a step further by, for example, floating the shot probability figure above the heads of moving players can really enhance the live experience."

Through AI, data-tracking insights and analytics have the power to 'demystify' the complexities of the live action and enable a more immersive experience.¹⁷

Above all, converting raw data into visualisations that enable easier interpretation and understanding helps to fulfil fan expectations of greater access to performance-based statistics.¹⁸

3.3 Brands

For commercial affiliates of a rights-holder, augmented or mixed reality sports coverage, made possible by tracking data and computer vision, are creating new advertising inventory.

Earlier this year EPL team Brentford became the first rights-holder to harness this technology, with its stadium sponsor Gtech integrated into in-game replays augmented with tracking data visualisations such as shot power. Away from the venue these sponsor activations provide fertile ground for highlights and clips on social media, as well as real-time broadcasts.

Other initiatives have included Marvel-themed NBA coverage on ESPN featuring fictional narratives surrounding some of the comic brand's superheroes.19

Similarly, NFL coverage on children's channel Nickelodeon – complete with virtual slime, blimps and animated character Spongebob Squarepants' face between the goalposts – has been crafted to engage younger audiences.²⁰

"Live sport is a compelling space for sponsors because of the narratives and the passion," Josh Linforth, Genius Sports' Chief Revenue Officer said. "Brands often want to tell really authentic stories that are connected to something happening in the game. So, for example, an insurance provider's logo could pop up on a 'spinometer' showing the speed of every shot that is saved, rather than the game cutting away for a sporadic ad break. Through this technology, valuable advertising inventory can be created."

3.4 Sports betting and fantasy operators

By training AI to understand what the tracking data is telling it, this technology will inform in-play pricing, power new innovative betting market-types and reduce market suspensions virtually to zero in the years to come.

Relations between the betting and professional sports and media sectors have strengthened considerably since a federal ban on sports betting was overturned in the US in 2018.

Indeed, by the four-year anniversary of the Supreme Court's decision, more than 300 partnerships with gaming companies had been struck by teams, leagues and media companies in the US.²¹ This shift has facilitated opportunities for the end user to delve deeper into engaging performance analytics across more platforms than ever before.²²

In sports betting and fantasy sports, the demand for granular insights is growing, with 42% of bettors, for example, stating that the activity "makes games more exciting".²³

Accessing performance analytics, including data-tracking insights, can inform a customer ahead of placing a wager or making a fantasy team selection. After all, nearly two-thirds of regular sports bettors carry out their own research ahead of placing a bet.²⁴

Through the augmentation of these statistics and live odds during alternative broadcasts, the in-play betting experience will be taken to a new level. BetVision, launched by Genius Sports in 2023 with FanDuel, Fanatics Caesars and BetRivers, was the first product of its kind, combining low latency live streams on the NFL with integrated odds, official stats, live augmented viewing modes and more.

Interest in data-driven insights that underpin performance analytics also opens up an opportunity to create additional betting markets. On the back of the growth of in-play and micro betting during games, bookmakers are exploring an ever-broader range of wagering options including markets based on player shot distances, total running distances travelled and more.

Furthermore, Al's ability to understand what's happening and what's about to happen will be invaluable for sportsbook trading teams who currently grapple with when to suspend better markets, or in other words when they stop bets being placed on any given event. In future, the combination of AI and tracking data will guarantee the fastest and most accurate market suspension and cash out availability to create a far better experience to bettors.



Josh Linforth Genius Sports' Chief Revenue Officer





04— What's next?

As outlined in Section 3, there are numerous examples of how tracking data can be converted into valuable insights, which in turn fuel compelling options for sports fans seeking to personalise their experiences.

However, this is just the tip of the iceberg due to the depth of data available and future potential for machine-learning capabilities through an increasingly refined Al pipeline.²⁵

Crucially, the technology already exists to deliver a range of solutions that are primed for mainstream consumption once they become democratised and available for more organisations and individuals.

The following foundational pillars will be key to unlocking the future potential of data-tracking tools:

- A collaborative approach to ensure value;
- Transitioning from 'one-to-many' to 'one-to-one' experiences;
- Leveraging deeper data through Al-driven innovations.

4.1 Collaborate to innovate

Innovative data-tracking solutions are only financially sustainable if they are combined with AI to provide real value to the rightsholders, broadcasters, brands or betting and fantasy gaming operators that invest in them.

An 'early feedback loop', which has underpinned the growth of successful tools for rights-holders in this space, will continue to be essential for solutions that will be deployed by fan-facing entities.

Fundamentally, such an approach requires close collaboration from the outset of the product development process between product developers and potential and existing partners to ensure the latter's needs will be fulfilled.

"We take the lead from the people who own content on the right way to roll out technological support," Second Spectrum Chief Commercial Officer Mike D'Auria said. "In the early days of Second Spectrum, we spent a lot of time in NBA practice facilities and locker rooms, talking to coaching staff, to understand how we could create something valuable in their eyes. Then we iterated until ultimately creating something that is indispensable for them."

This early feedback model has since been replicated with media platforms to create tools that enhance the viewing experience, with the collaborative work with professional teams having produced useful case studies that demonstrate the value of the solutions.

"Teams are pretty nimble and are always looking for a competitive edge to unlock potential and find value," said Mike Slade, Chief Evangelist at Genius Sports, explaining why such rights-holders started adopting data-tracking technologies several years before most fan-facing entities. "As we have built up our capabilities and proof points with teams, we have been able to apply the same approach with bigger organisations such as leagues, governing bodies and media companies."





4.2 Transitioning to one-to-one experiences

In a fan-facing context, data-tracking tools, when underpinned by machine learning, not only have the potential to enhance the end user's experience; they also create opportunities to personalise experiences by providing multiple relevant content options.

Personalisation is becoming increasingly important for consumers, and not just in sport. The percentage of consumers who claimed that a brand would lose their loyalty if they failed to offer a tailored experience rocketed from 45% to 62% between 2021 and 2022.²⁶

As a starting point, fans want as many options at their fingertips as possible when accessing data-based sports insights. Even before the Covid-19 pandemic accelerated digital transformation,²⁷ a quarter of sports viewers wanted control over access to on-screen statistics.^{28 29}

Sports consumption habits are shifting from a so-called "one-toall" to "one-to-one" approach, optimising personalisation. This is driven by the interactive element of personalisation, which has become more prominent in sport through long-term increases in social media activity³⁰ and across day-to-day life – as illustrated by the growth of generative AI platforms like ChatGPT.³¹³²

D'Auria said: "The only way you can meet this challenge is with Al. We've been on a mission to build a machine that can understand complex and unscripted sporting action at least as well as a coach can in real-time, and tracking data is the foundation of this. If you understand the nuances of the action and pair that with an understanding of who the consumer is, transformational personalised experiences can be unlocked."

Indeed, the vision of a 'ChatGPT of sports' underpinned by tracking data would provide valuable insights from every perspective of an event. That could be particularly important if the live coverage only shows a fraction of the sporting action taking place – such as in motorsports, where the camera can only focus on a minority of the cars or motorbikes at any one time.³³

Essentially, through this transition to true personalisation, there will be more opportunity for fans to unify multiple sports experiences into one – from data-based graphics to fantasy sports figures to live odds.

"We're starting to move away from the one-to-many model towards a one-to-one model where people get exactly what they want. We might not be there yet, but we are inching closer to that reality," said D'Auria. "One person might want to watch the action with lots of statistics that are relevant for fantasy sports or odds that are relevant for betting, while someone else might just want a simple, clean sports presentation. This is a particularly powerful proposition for younger audiences who have grown up in a digitised world and expect the ability to curate and personalise their own experiences."



4.3 Leveraging deeper data through Al

As outlined by Genius Sports Co-Founder and CEO Mark Locke, deeper levels of data will "affect every aspect of the sports ecosystem... [including] how media tell stories, how teams build their day-to-day workflows, and how bookmakers build new models and new markets... [and] there are elements that brand sponsors can attach themselves to."

The increasing number of datapoints per event, in combination with scaling up data-gathering speed and capacity, will allow coaches and fan-facing enterprises to delve deeper into biomechanical movements and the associated insights.³⁴

Mesh tracking

More datapoints will also drive the development of new innovations. In 2022, Genius Sports expanded its partnership with Football DataCo to capture sub-second tracking data – through 10,000 datapoints mapping out each player's body – across the Premier League through computer vision and AI technology.

The two parties are working together to develop new tracking data opportunities to power richer fan experiences which could include dynamic, interactive metaverse applications that allow fans to put themselves directly into the action.

There is evidence to suggest that sports enthusiasts would have a serious appetite for this new viewing experience. Nearly two-thirds of Gen Z and millennial fans would pay to watch a sporting event in real-time from an athlete's point of view.³⁵

"Initially, we might see broadcasters present these perspectives as part of their highlights coverage by showing what it was like to be the goalscorer or goalkeeper, for example, before the technology is adopted by fans on a widespread basis," Slade said.

Building on this, in 2023, Genius Sports became an NBA League Pass Augmentation Provider, with the two parties working together to develop 'Dragon' – a next-generation platform that will track so-called 'mesh' data with the aim of synthesising millions of on-court datapoints.

Genius Sports will also create automated, enhanced graphics based on optical on-court basketball data for alternate telecasts available on NBA League Pass that will feature optional advanced team and player statistical insights integrated directly into live streams.

This technology, like the CourtVision solution that initially enabled fans of the Los Angeles Clippers to select different augmented feeds of live games, offers options that are particularly important in a sector in which there is fierce competition for the attention of younger viewers.

New inventory and models

Deeper datasets will also provide opportunities for brands, with tailored advertising inventory carved into the fan experience through augmented reality. "Over time, these augmented promotions will become more personalised for each fan," D'Auria said.

Sports betting will also serve as an increasingly important tool for viewers who are in a so-called buying mode.

According to Locke, there is growing potential to upsell new bet types and cross-sell other items that are not related to betting, such as tickets or merchandise, whether that is through graphical representations or more classic audiovisual techniques within coverage, or both.



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05— Conclusion: Datasets that deliver

Through the transformative power of AI, tracking data has elevated performance analytics in sport to unprecedented heights, creating indispensable tools for professional teams that are seeking a competitive edge.

However, from xG to EPA and beyond, data-tracking metrics that were once used exclusively by proactive coaches have become part of an average sports fan's authentic matchday vocabulary in recent years.

In a fan-facing setting, the opportunities associated with datatracking technology are immense, and the conditions for significant growth amidst an Al revolution appear to be perfect.

Sports enthusiasts are craving statistical insights and personalisation. Tailored experiences will allow them to select from numerous options instantly on their live stream, for example, and accelerate the shift from 'one-to-many' offerings to more engaging 'one-toone' experiences.

As Genius Sports' Chief Product Officer Matt Fleckenstein said: "We're riding this technological wave, and we're going to see the pace of change really accelerate as sports become more digitised. If you look at the kind of influence and power of Al in next generation technology, it's really reshaping almost every industry. Data has been at the centre of sports for so long, but it's really just now on that cusp of being revolutionary."

Onus to innovate

There are clear incentives for consumer-facing enterprises, whether they are brands leveraging creative new advertising inventory, sportsbooks upselling new bet types or teams cross-selling into tickets and merchandise. The onus therefore is on fan-facing entities to create compelling, personalised experiences so the end user does not turn elsewhere in the 'attention economy' and can access everything they need to enjoy a holistic sports fan experience through a single platform.

Of course, challenges on such a roadmap of innovation are inevitable. Navigating evolving consumer trends and ironing out the complexities of new sports labour and commercial agreements that cover swathes of athlete data are just two of the tasks that will likely require refinement over time.

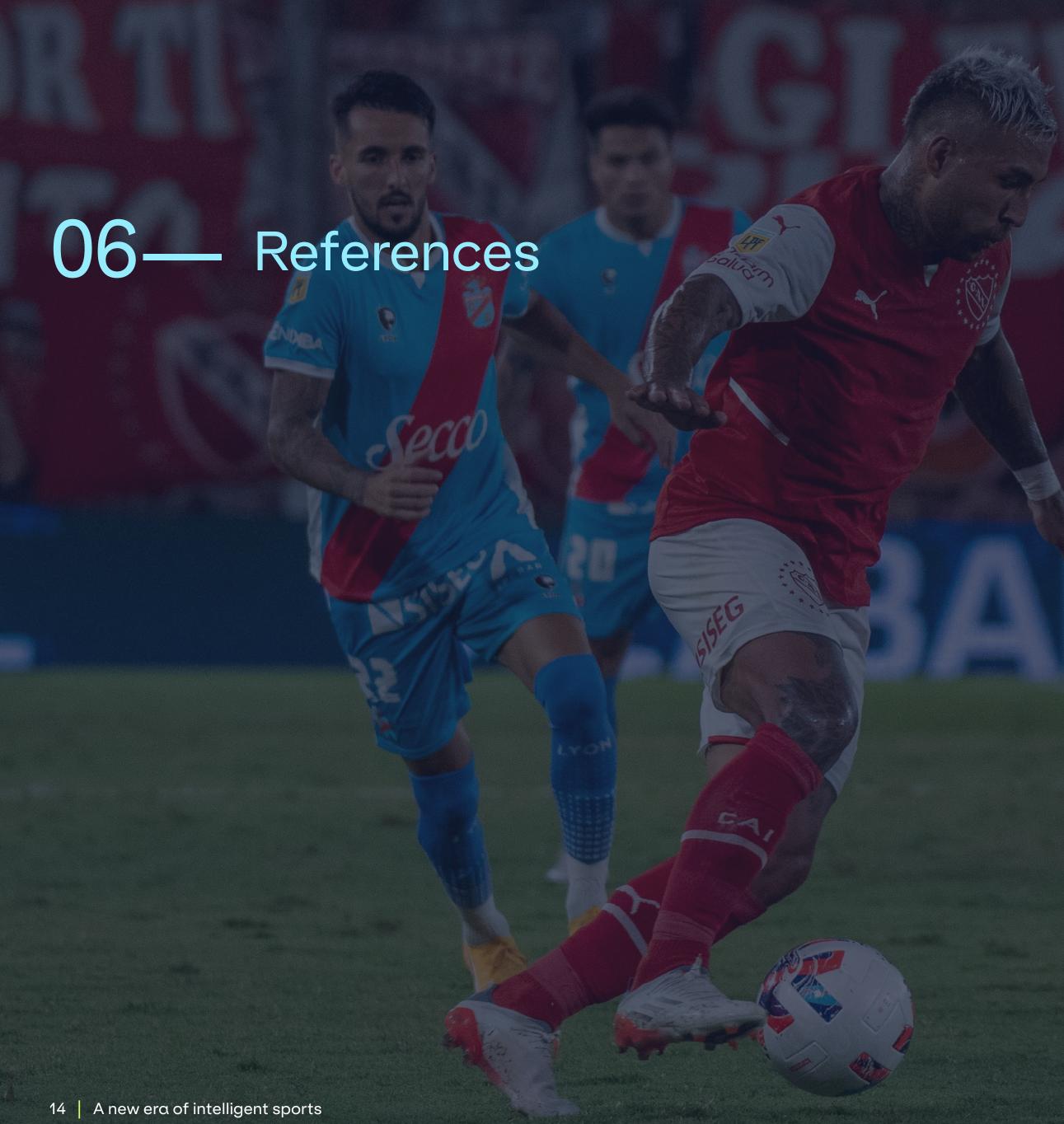
The collection of deeper datasets through 'mesh' data-tracking tools are opening up exciting opportunities for proactive businesses to bring fans even closer to the action, whether those experiences lie in the metaverse or another reality.

More datapoints, underpinned by computer vision and machine learning, will continue to optimise data-tracking solutions and provide a foundational layer to build groundbreaking products.

However, it is equally important that the fan-facing enterprises themselves play a role in the product development process. After all, close collaborations can ensure the ultimate data-tracking creations are not only innovative, but also of unmissable value.







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Genius Sports is the official data, technology and broadcast partner that powers the global ecosystem connecting sports, betting and media. Our technology is used in over 150 countries worldwide, creating highly immersive products that enrich fan experiences for the entire sports industry.

From delivering the future of alternate broadcasts to automated officiating tools, optical tracking technology and bespoke gamification solutions, we connect the entire sports ecosystem from the rights holder all the way through to the fan.

We are the trusted partner to over 400 sports organisations globally, including the Premier League, FIFA, NFL, FIBA, NCAA and many more.

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SportBusiness works with sports organisations around the world to provide the intelligence they need to unlock value and grow their businesses.

Our portfolio consists of SportBusiness Media, the most trusted independent source of media rights values and deals globally, SportBusiness Sponsorship, a leading source of global sponsorship deal data and activation studies, and SportBusiness, our daily news, insights, and analysis service for globally minded professionals in the industry.

SportBusiness is at the heart of the business of sport, giving our clients the competitive advantage to compete globally.

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