THE EXPERT PANEL

PETER BENTLEY
HEAD OF RESEARCH AND INNOVATION, ENGLISH INSTITUTE OF SPORT

ANTONIO ZEA
FORMER DIRECTOR FOR GLOBAL FOOTBALL INNOVATION, ADIDAS

TOM CLAES
MANAGING DIRECTOR, PANENKA76

PAUL EDWARDS
PRODUCT DIRECTOR, SEVEN LEAGUE

THIMON DE JONG
FUTURIST

GARY WALRATH
CHIEF EXECUTIVE OFFICER, STATS

OLD GAMES, NEW TRICKS

As the Internet of Things expands, the sports industry finds new ways to improve the immersive experience of sport and increase the performance of both elite and recreational athletes. **Elisha Chauhan** spoke to leading experts in technology, both inside and outside of sport, to find out what major technological innovations could shape the industry in the next decade.

SPORT PLAYS A central role in pushing the boundaries of what can be done with technology.

Formula One teams, for example, promote technological innovation in the automotive sector by investing millions of dollars to shave a tenth of a second off lap times, while elite athletes are used as guinea pigs by apparel manufacturers for new, wearable technology products that are later rolled out to the masses.

Widespread access to the internet – both Wi-Fi and mobile – has created a huge number of opportunities to embrace technology in a short period of time. It's worth remembering that the launch of the very first iPhone was only in 2007, and Apple has sold more than half a billion of its mobile devices across the world since then. Add in its range of iPads, and the various other rival smartphones and tablets available on the market, and you can start to understand the sheer number of consumer electronics devices that have come onto the market in less than a decade. For many sports fans, these devices are pivotal in how they consume sport.

Technology has also been embraced during that period of time on the field of play, with the introduction of ball-tracking technology in

cricket, tennis, American football and eventually – albeit somewhat reluctantly – football, most notably at last year's FIFA World Cup in Brazil where goal-line technology was introduced for the first time.

But if we look 10 years ahead, can we predict what technological breakthroughs will change the face of sport – how it is both consumed and played at an elite and recreational level – and open up new revenue streams for stakeholders across the board?

From rights-holders and broadcasters to apparel and electronics manufacturers – our expert panel said the opportunities opening up through technological advances and innovative thinking are numerous.

The natural starting place to answer how future technology will impact sport is on the field of play. Our group of experts all agreed there would be two major innovations in this area, the first in the sports apparel and equipment space, and secondly, in the increased use of wearable technology.

Peter Bentley, head of research and innovation at the English Institute of Sport and the man who helped spearhead technological efforts to improve the performance of Team GB at the London 2012 Olympic and Paralympic Games, believes that material science – the discovery and design of new materials – is one of the most important focuses when it comes to the future of sport and technology.

"Most changes in primary technology – which is the equipment directly used in sport – are driven by material science, such as the move from wood to steel to carbon fibre when manufacturing golf clubs, or leather to synthetics for running shoes," Bentley told *SportBusiness International*.

"It is very likely that continuing improvements for primary technology will come in the form of material science. Whether that's

> **"Most changes in primary technology are driven by material science**

in the form of new materials that are yet to be developed, or whether it's in manufacturing technology, remains to be seen. We hear, for example, a lot about 3D printing, and the ability to customise equipment – like running shoes – to suit individual athletes."

We have seen sports teams and coaches embrace the tracking of player performance via 'smart' apparel that monitors and ultimately creates data that can help improve technique and fitness. Smart apparel also gives consumers the opportunity to gain an insight into professional sport – whether that's by comparing themselves to professional athletes, or viewing a deeper data analysis of performance alongside live sports broadcasts.

"We will continue with physiological monitoring within apparel, and will definitely be expanding the ability of what the apparel can monitor. We will also look at the apparel itself – how it is put together and the materials used," says Antonio Zea, former director for global football innovation at sports apparel giant adidas. Zea oversaw the creation of the adidas miCoach Smart Ball, a football with an integrated sensor that provides near-instant feedback on the speed, spin, trajectory and strike-point of every kick made on it.

Performance monitoring has been epitomised with the introduction of 'wearables', which have been extremely popular in non-elite sport in the form of a watch or a chest strap that then relays data, such as how many miles cycled, to platforms – for the most part – available on smartphone apps.

COMMERCIAL OPPORTUNITY: **ADVERTISING**

Experts believe that sports properties can find significant income opportunities when virtual and augmented reality technology is developed to the extent that they can localise – and even personalise – advertising and sponsorship during live events.

This, in effect, will take virtual perimeter board advertising to a whole new level, offering more opportunities than current technology that modifies pitchside billboards, by territory, through the broadcast feed.

"Over the next couple of years we're going to see an increase of digital or virtual advertising that can be monetised through the number of streams," says Edwards. "It will be a game-changer once that technology is used in major sports events, as the companies can start making proper money that can then be used to improve the consumer experience to make advertising more personalised."

"In the future, each shirt sponsor will be personalised for a region or even individuals so that you don't have one insurance company, for example, in every broadcast around the world. What if the brand is not available in your country? That sponsor is just going to waste," adds de Jong.

"Even if in-stadia spectators can only see one shirt sponsor, digital technology – that has already started to develop in this area with perimeter advertising – could show you British Airways as a shirt sponsor because you recently searched for holidays on the internet.

"Taking this even further, if spectators are all wearing Google Glass, or even a contact lens equivalent, they too can see personalised sponsors in stadia. And if sports people wear white or plain shirts, it would be even easier for the digital team to produce personalised augmented reality."

> ***A second generation of wearables will develop system design and workflow***

"There is going to be a huge drive in electronics, specifically a second generation of wearables that will significantly develop system design and workflow. We are reaching the point where the device itself is becoming ubiquitous, and to some extent, a commodity item," says Bentley.

"The majority of what is available now for wearables is only descriptive data, so in the next 10 years we will probably see more predictive metrics that enable us to provide intervention in training, for example, to reduce the chance of injuries."

Futurist Thimon de Jong says that wearable technology will close the gap between sport and gaming.

"Right now wearable technology is very data based, and that's only attractive to the pro-amateurs, but in the future these devices will become more fun by using all of the tricks of the trade that gaming uses," he told *SportBusiness International*. "If you look at computer games, there is at least one game for each age group that is completely addictive. So there's no reason why wearables won't adopt an *Angry Birds* sports equivalent."

Smart Glasses

A major innovation that has high hopes for the future – although has arguably had a slower impact on the sports industry than first expected – is Google Glass, which essentially allows users to wear a second screen in the form of a smart pair of glasses. Google said in January that it is ending sales of Google Glass in its present form, and at a cost of $1,500, but will continue to work on a variation of smart glasses that can be sold as a consumer product.

"Taking cycling as an example, in 10 years' time we're going to be able to watch races from the cyclists' perspective using technology like Google Glass. We're also going to know what their heart rate is and be able to consume similarly immersive content through wearables," says Tom Claes, managing director of sports app developer Panenka76.

However, Zea believes Google Glass is just the start of wearable innovation, with technology becoming increasingly affordable in the future. Data, he says, will also become integrated into the wearable device rather than consumers having to look at their smartphone, which can be inconvenient to access during play or training.

The data produced by wearables can be sold to broadcasters, online statistic platforms like ESPN's Cricinfo website and even betting companies who can improve or create odds based on whether a football player is likely to score based on his fitness and performance.

"I wouldn't say the sky's the limit, but there are definitely commercial

MAJOR EVENTS

Experts are split as to whether major sports events will continue pushing the boundaries of technology. At last year's World Cup, for example, FIFA and technical partner Sony produced three live 4K matches and around 9,000 fans watched games in 8K at four public-viewing sites in Japan. An OmniCam system also gave fans a 360-degree view of the final.

The 2014 Commonwealth Games in Glasgow were also used by UK public-service broadcaster the BBC as a launch pad for broadcast innovations, including 4K, producing and distributing the event entirely over IP networks, and its Augmented Video Player.

"Major sports events are always the driver of new technology. Next year's Olympics is likely to be broadcast predominately in 4K," says Paul Edwards, product director at digital sports consultancy Seven League. "A lot of manufacturers see these events as milestones, so once the Olympics are broadcast in 4K – and the 2020 Tokyo Olympics adopts 8K – other smaller properties will follow suit.

"There are certain sports in the Olympics where broadcast needs to be improved, such as on the athletics track where it isn't really clear who is ahead in the race around the curved section. Soon there will be either graphics or new cameras to address this."

Bentley argues, however, that major sports events are slow in the uptake of innovation and doesn't think that events like the Olympics will be much different in even 20 years' time, mainly because they are events based on tradition.

"I have dedicated 25 years to the Olympics, and by their very nature and the IOC (International Olympic Committee)'s nature, they are immensely conservative. And rightly so, because that's undoubtedly part of the Games' appeal and success," he says. "Media rights are also distributed a long time before the actual Games take place. So when I went to the 1996 Atlanta Olympics, the media contracts made no mention of the internet simply because it did not exist when the rights were awarded."

"There's going to be data that athletes won't want others to see

revenues to be made from statistics, such as selling the data," says Zea. "However, problems come with rights issues – who owns athlete data, who can use it and who can see it? This will also become a focal point in the future when drawing up contracts between athletes and organising bodies."

Gary Walrath, CEO of STATS, the sports data company that created the motion-tracking technology SportVU used by UEFA and the National Basketball Association, predicts that wearables will be utilised by all professional sports leagues and athletes. However, he says that rights-holders should think twice before making performance data public.

"Wearables will become as routine as the protective gear that's worn in all sports, and north American sports consumers in particular are already accustomed to seeing player statistics appear on TV broadcasts. This will only increase," he told *SportBusiness International*.

"However, there will need to be a collaborative approach between sports properties and technology providers because some of this data is sensitive. What will cause issues is if data lets you know a particular player has become slower at a certain point in the season, meaning their fitness is not up to scratch, and therefore their price or brand will be negatively impacted."

Zea agrees: "There is going to be data that athletes just won't want others to see – heart rate is one of them, especially when it comes to injury. Showing this information can be detrimental to a sportsperson's career. Companies need to be sensitive to the repercussions of this technology."

Personalised Content

Second-screen apps will play a central role in future technological innovation, as fans continue to crave an increasingly immersive experience when watching sport. The experts believe that this will come in the form of more personalised content.

This could materialise as apps that automatically push video content – for example, of the user's favourite team – according to preferences or similar content that has been previously consumed.

"Second screen success depends on what information will be available to the user, because right now it's a bit of a gimmick. If it takes a long time to set up your preferences then it will only be for the hardcore fans," says de Jong. "It won't really matter whether the second screen is a wearable, a tablet or

integrated into your TV screen, it's the content that's important.

"It's becoming increasingly difficult for brands to gain recognition on social media because consumers are so overloaded with messages that they just end up filtering most of the information out. The only way to avoid this is by producing personalised content – essentially less but more relevant content."

"Video content will no doubt be important for a brand to get its message out to its consumers on increasingly cluttered social media platforms – if this develops into 3D video content, that would be even more attractive," adds Claes. "Another challenge sports brands face in the future is being forced to give something back to their consumers in return for them following and engaging with the brand on social media."

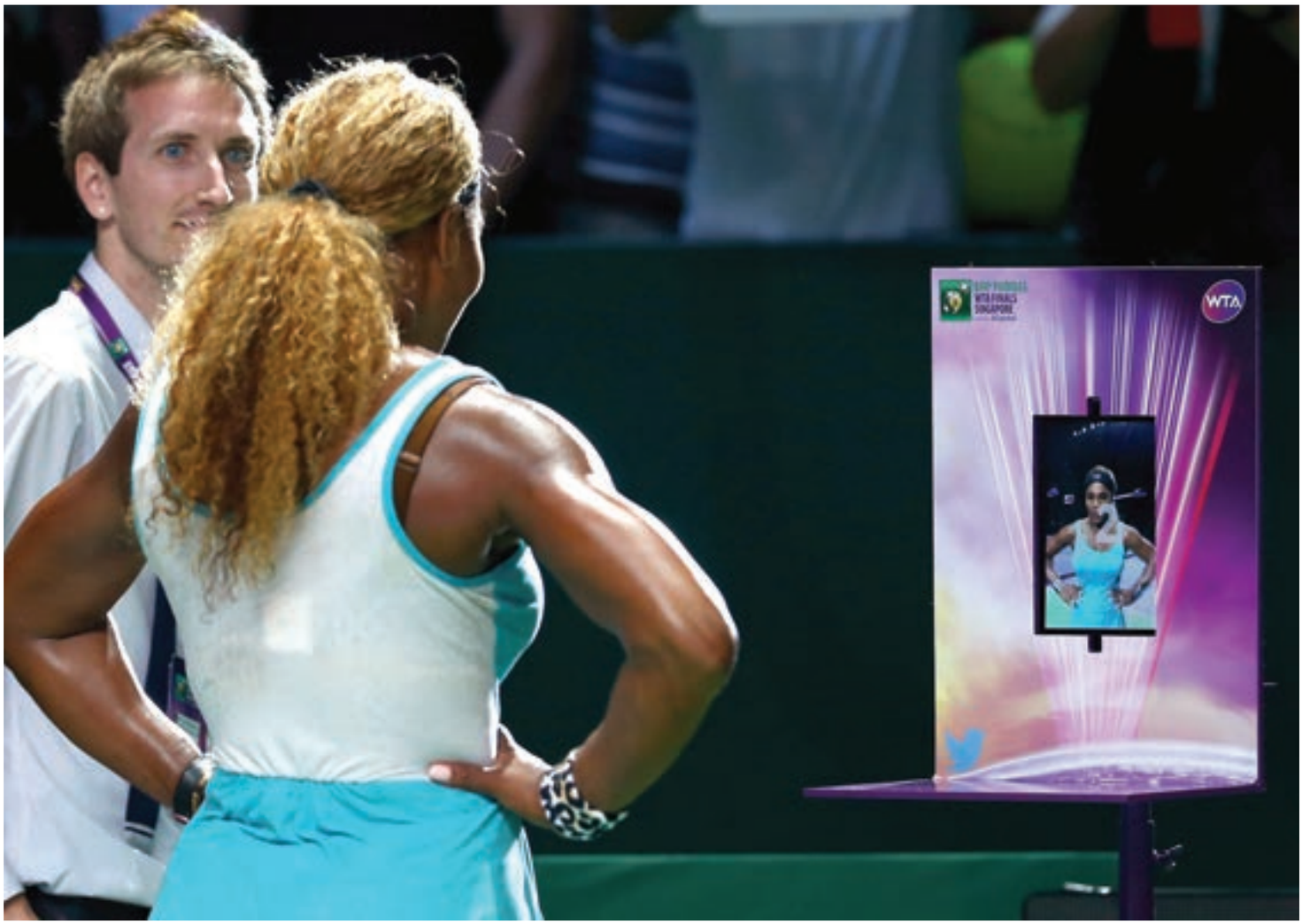
Our experts say that broadcasters, meanwhile, will continue their investment in increasingly higher definition content, with 4K and 8K still currently in an embryonic stage for the mass market.

"The really clever stuff will come when broadcasters integrate their various media services at a functional level. For example, the ability to pan a TV camera angle around the field of play by moving a handheld tablet that's connected to Wi-Fi," says Bentley.

Claes notes, though, that broadcasters and TV manufacturers are caught in a catch-22 situation that will only worsen with time: as industries invest more in higher definition, 3D or even virtual content, the more the market is frustrated with having to continuously invest in new TVs or software. If there is no demand then the technology is stunted, which is a likely reason for consumers' slow uptake of 4K and 8K-ready products.

Beyond improving picture quality, the experts believe that in the future there will be an increase in gamification – applying game-design thinking to non-game applications to make them more fun and engaging – within sports broadcasting. This includes audiences being able to view sport from the athlete's perspective via rendered images when the use of a mounted camera or pair of smart glasses is not possible; so when a penalty is being taken in football, for example, they would have a rendered image of the goalkeeper's perspective.

> ***"Video content will be important on increasingly cluttered social media***



TOP FIVE TECH

Elisha Chauhan outlines five technological innovations that our experts believe are set to break into sporting circles in the not-too-distant future.

SENSOR TECHNOLOGY

Antonio Zea: Sensor technology is growing fast. Adidas launched a smart football that measures different aspects of a kick, and can be used as a teaching mechanism for how to play better. Companies will look to develop every piece of sports equipment to see whether it can measure and help a player when using it. This will come hand in hand with the technology used to relay data, because you can't just run around with a smartphone in your hand to read the information. Furthermore, this technology will be connected with other users so that an element of competition is there to make the data more attractive.

AUGMENTED REALITY

Gary Walrath: Just as five years ago when cinemas started providing 3D glasses to watch a film, I don't see why in the future sports stadia wouldn't sell a disposable type of Google Glass to spectators for $1.99 just so that you can rewind a play you missed or change your view of the field. This could be commercially attractive on many levels, and will also help to keep stadia full as more and more people prefer watching sports from home.

Antonio Zea: Augmented reality is harder to develop than we first realised, not so much in terms of the technology itself, but how we can seamlessly integrate it within sport. Some sports will be much easier than others, but when you try to meld the physical and digital worlds together you come across basic problems like it being too forced and unnecessary. Where it can work best is in training facilities that are specifically designed to bring the two together.

VIRTUAL REALITY

Tom Claes: If you take into consideration Facebook paid $2 billion to acquire virtual reality headset Oculus Rift [in June 2014], it's not because it's a gimmick. I remember 20 years ago we dreamed of having headsets to watch movies and for gaming. It is going to be the next step in watching TV in general, and in sport it will enable us to be on the pitch virtually.

Paul Edwards: Oculus Rift will enable consumers to watch a replay from an on-pitch perspective and be part of the action. A particularly interesting innovation in football would be watching a penalty being taken from the perspective of a goalkeeper.

Thomas de Jong: Oculus Rift takes the immersive experience currently created by curved TVs and 3D broadcasting to the next level. Virtual reality, in general, will also merge sport with gaming, which is a natural progression for the younger generation because that's how they've grown up.

ENERGY HARVESTING

Antonio Zea: Energy harvesting will come into play at some point in the future. It has already been developed in the form of Formula One's ERS (energy recovery system) that converts heat energy from braking to electrical energy to boost the power of the car. Energy harvesting, for example, could see the sports action power heating or cool garments.

SUPER SOCIAL PLATFORM

Thimon de Jong: One breakthrough technology that people are waiting for is a single communication platform. We currently choose from a dozen applications to send a message – e-mail, SMS, Facebook, Vine, Twitter, Instagram, Snapchat...all these may be consolidated by a new player in the market, or by the next generation of Google or Facebook ■

The Internet of Things will vastly improve the in-stadia experience

A main source of income for rights-holders is through the sale of broadcast rights, and experts believe this area will drive investment. Technology too, they say, can increase the value of broadcast rights – if approached in an innovative way.

"A huge commercial revenue stream in the future will come from broadcast rights contracts that will be awarded separately for each digital device, from a laptop to tablet to smartphone and even technologies like Google Glass," adds Claes.

Revenue streams can also come from selling premium content produced by new technology either to broadcasters or straight to fans, such as the broadcast of live matches as seen through an athlete's perspective or even augmented reality layered on top of a standard broadcast feed, similar to that of the BBC's Augmented Video Player, which layers data on top of live coverage.

"One thing I still don't understand is why YouTube's sports content is predominantly made by fans, such as a best goals compilation video," says de Jong. "Sports properties are missing out on a huge revenue stream by not producing this content, which is clearly already proven popular just by looking at the millions of views it gets.

"The case is the same with Vines, which are illegally produced by fans, whereas rights-holders can sell this content to these platforms or create revenue from advertisements next to the content."

"Rugby clubs already have a revenue stream through spectators buying and tuning into radios that can pick up on what the referee is saying, and in the future that will probably extend to technologies similar to that of Google Glass," adds Bentley.

Internet of Things

The Internet of Things is the idea that all future technology will have an integrated connection to the internet and will be able to push data to any other internet-enabled device.

Take the adidas miCoach Smart Ball or French sports equipment manufacturer Babolat's 'connected racquet' as an example of the Internet of Things currently in action in the sporting space. Launched last May and tested by top tennis players like Rafael Nadal and Li Na, inside the handle of the Babolat racquets are sensors and a chip that collects data such as the power of a shot, the level of spin and number of strokes, which can then be accessed by a smartphone or tablet. This technology could be replicated with almost any sport and any electrical device – the question is whether the industry wants to move in that direction.

"Whether the Internet of Things translates into sport may depend on whether the sport is technology-based," says Claes. "For example, football is not technology-heavy, so technology should remain off-the-pitch and with the spectators. But in cycling, technology can be used in the form of every rider having an [location-detecting software] iBeacon so that riders can be notified when their opponents are attacking. The same goes for Formula One."

Sports apparel and equipment companies already produce and market smart, wearable products for the mass market, and this will only continue as the Internet of Things gets bigger.

"There's a huge thrust in the commercial marketplace in the development of sports equipment, which is largely cosmetic and is driven by manufacturers' need to develop something new every year to generate commercial demand," says Bentley.

Inside the stadium is where the greatest opportunities are opened with the Internet of Things, says Edwards.

"The Internet of Things will vastly improve the in-stadia experience. That could be e-ticketing, being able to order food and drinks ahead of time, communicating and marketing to those in premium seating, or even just crowd control by knowing where everyone is via their phone signal," he adds.

However, there are those who doubt the potential of the Internet of Things in sport by questioning the need for more data in a world where consumers are already overloaded with information. The raw data, therefore, has to be packaged in a specific way.

"Statistics are boring and data is not sexy, especially for amateur players – that's why it is important to create a competition or league on social media based on the data," says Zea.

"People don't have the energy or the time to process much of the information the Internet of Things is producing, especially after the gimmick wears off," adds de Jong. "After that, two things can happen: it will be marginalised to professional athletes who are trying to improve performance, or – and what I hope will happen – the sports industry will find out what extra value and engagement all of these data sets can create for the masses." ■