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Contents

Transcript, with his permission, of a presentation given by Peter Husemeyer to the Cambridge Society for the Application of Research on June 1st 2020.

1. Introduction

I would like to tell you a personal story about what it was like to leave academia and start a sports technology company with two of my best friends. This talk will not be a founder's success story, because we are not yet successful! In terms of the start-up lifecycle we're probably somewhere between the start-up and growth phases.

The Sportable team.

We've built an exciting company based in Old Street made up of 23 full-time engineers, data scientists, sports scientists, a radar engineer, embedded, Front End and Back End software developers, and a sales and commercial team.

We've built what I think is a great product and we are working with some of the world's best rugby teams including Saracens, Leicester, Bath, England, England 7s and many others on the horizon. We've done live broadcasts in the Championship Cup, at RugbyX, and with BT Sport, ITV4, Sky Sports and BBC.

But, it's all still in play. We don't know if we'll be successful or not, especially given the current circumstances. Things can absolutely go wrong for us. So I thought this would be an interesting story that one does not often hear, the story of a business that is not yet a success, and not yet a failure. I have learned five key things.

Firstly, you are capable of much more than you think. When you think you can't do any more, you can and, in fact, you do. Just wait until you have kids! My second is due in 4 weeks!

Secondly, remember that mistakes will often teach you more about yourself and business than success will. A few survivable mistakes are good for you and are good for business.

And finally, you'll find that life is the grey area between catch phrases and aphorisms. For example, we're taught to "Never give up!", but an equally wise saying says the opposite, it says "Don't flog a dead horse!". You can't adhere to both at the same time, so which one is it? Well, in business uncertainty is the rule and not the exception, and so you must learn to embrace it.

The story I'd like to tell you tonight is my own experience, and I hope that after hearing it you will all be a bit more prepared as you set out to mark your mark. To start the story I'm first going to give you the pitch! I'm going to give you the problem statement followed by our solution. But then I'm going to remove the veneer and I'm going to tell you what it was like setting up this business. The actual blood, sweat and tears. The agony, the ecstasy, the dead-ends and the mistakes that have defined our journey so far.

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2. Rugby

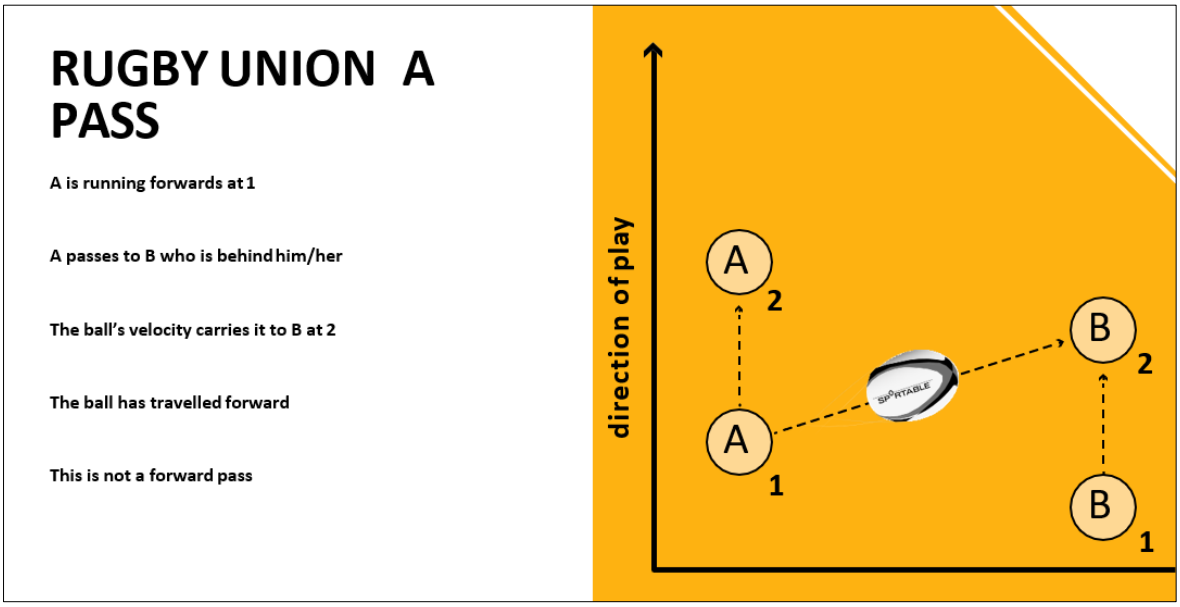
But before we start, I know that some of you will not be familiar with the game of rugby, so I've put together a very quick primer.

A rugby team is made up of 15 players. Eight of them are forwards, seven are backline players. The forwards are generally bigger and stronger than the backline players who are generally faster and more agile. The forwards are responsible for executing most of the setplays that consist of scrums, rucks and mauls - which are organised fights for the ball - and lineouts.

A lineout is like a throw-in, except that teams choose a player to lift and catch the ball. The opposing team may try to guess to which player the ball is going to be thrown and lift one of their own players to compete. The person who throws the ball at the lineout must throw very accurately, they must throw at a known speed, and to a known height so that their teammates can catch it and keep possession.

The scrum is a dark art in rugby. Extreme physical strength is required and the players that bind in the front row are often the highest paid on the team. A scrum is an ordered formation of players, used to restart play, in which the forwards of a team form up with arms interlocked and heads down, and push forward against a similar group from the opposing side. The ball is thrown into the scrum and the players try to gain possession of it by hooking it backwards towards their own side.

In rugby you are only allowed to pass backwards. And if you pass forwards it is a penalty to the opposite team and possession is lost.



A ball can travel forward without it being a forward pass.

This sounds simple, except that it's not that simple. The "forward pass" rule allows for relative motion, after all if a player is sprinting down the wing, and passes to a team member who is behind them, the ball can and does often travel forward because of its own forward motion. This sounds like a fair rule, except that it makes

officiating this rule almost impossible due to errors of parallax and complex relative motion between the passer, receiver and referee.

So now that you're all experts in Rugby, let's turn to the problem statement. I don't think any of you will be surprised to hear that a successful team has skillful players. I would go a step further and say that the success of a team ultimately comes down to the skill of their players, as individuals and as a cohesive unit. Skill is therefore an essential ingredient for the success of a team as a business.

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3. The Importance of Skill

When it comes to leagues, which for the purposes of tonight are commercial bodies made up of professional teams, having talented players is important. But the most successful leagues don't necessarily have the best players, for example in Football / Soccer, the Premier League arguably lags behind Bundesliga and La Liga in terms of having the world's best players, however the Premier League is unquestionably the world's most successful Football league.

Rather, a league's success depends on its ability to celebrate skill and to communicate it effectively with its fans and would-be fans. So in simple terms, nurturing and growing skill, and communicating and celebrating it are essential for the commercial success of teams and leagues. So if skill is so important, what is it?

In rugby, like most contact sports, skill is associated with how adept a player is at:

1. Running into space
2. Passing
3. Kicking
4. Tackling
5. Set plays
6. Decision making

And furthermore, a skilful player must be able to execute these tasks accurately and repeatably in all conditions. There are other factors that could be included in the list, but by and large this is not controversial. By doing these things well, and by doing them well regularly, a team maximises its chances of winning.

So the big question is, how do teams measure how accurately and repeatably players can pass, for example? To know this, you would need to know what they're passing towards, and where the pass landed with respect to the target. The pass error would need to be recorded over time. The average error is then an indicator for the player's accuracy. A smaller average error indicates a better passer.

The standard deviation of the player's error is the indicator of how repeatable they are, or in simpler words, how reliable they are as a teammate. This could also be called their BMT factor or Big Match Temperament factor. The same is true of kicking. You'd need to know where the player is kicking towards and what their error is and how it evolves over time.

When it comes to tackling, a team should know what a player's mean body position is during a tackle, which shoulder is preferred, what the peak forces are and the total impulse transferred during a tackle.

When it comes to lineouts teams should know what the accuracy of the throws is, the standard deviation of the thrower's error, the height a player can jump to and in what time they can reach their peak height.

So, how are these things measured? The answer today is that they basically aren't being measured. In Elite Rugby clubs, kicking hang-time is measured with a stopwatch and is often not recorded on paper or electronically. Passing is assessed by eye or by aiming at a car tyre or just by passing to another player. Kicks for poles are assessed as binary outcomes: through the poles or not, and again these results in practice are often not recorded at all. This is true not just in rugby, but also in AFL, Rugby League and to a great extent in American Football.

In fact, one of England's best Rugby players once said to me, "I honestly don't know if I've gotten better at kicking, or worse, over the last seven years.". And this is the crux of the problem.

In rugby and other contact sports, the ability of players to execute tasks accurately and repeatably is largely not measured. And when it is measured is usually done so ineffectively. This failure to quantify leads to players not reaching their potential, and lost ROI for clubs. Failure to quantify leads to lost revenues for leagues since player skill is not effectively communicated with existing or would-be fans.

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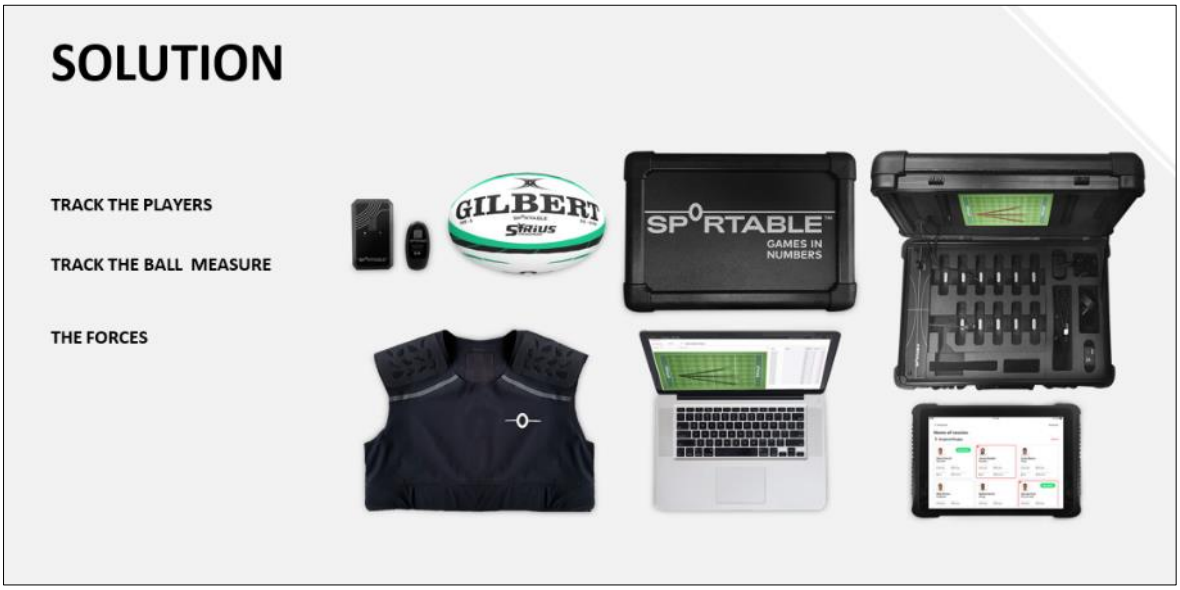
4. Measuring Skill

The solution is to measure skill. To measure passing accuracy, kicking accuracy, tackle technique, running into space and performance in set plays. To do this you must track the players in 3D, track the ball in 3D and measure tackle and scrum forces. And to make it relevant for the broadcaster and viewers, this must be done in real-time. So this is what Sportable has done. We've built all the hardware that you need to track every player and the ball in 3D, and every impact and hit within 100ms of it happening. The technology works indoors and outdoors in all weather conditions.

We've built the entire tech-stack, from end to end, with the sole purpose of measuring skill and celebrating it, in real-time. So how does our system measure skill?



We get a lot of data from our hardware, and it is all streamed in real-time to a pitch-side server which converts the data, into useful information. For example, twenty times every second we get the ball's 3D position, velocity, acceleration, spin, we get it's orientation as a quaternion, we get it's compass reading, the barometric pressure and temperature. Similarly, for every player on the field we get the same data by we also get force and real-time heart-rate.

By combining all this data from the ball, the players and the impact wearable we are able to classify match events in real-time. For example we can determine:

1. Who has possession

2. We can filter out each pass and include information like who made the pass, who received the pass, the distance it travelled, its spin, wobble, speed and accuracy.

3. We can filter out each kick and automatically determine who made the kick, who received it, where it started, where it landed, how high it went, its hang-time, the spin, and what kind of kick it was. For example we can subclassify kicks into:

Clearance Kick (including how many bounces into touch)
Penalty
Conversion
Drop goal
Restart
Box kick
Chip and chase

4. In a similar vein, we can automatically filter out every set move and record its salient details

- We use player and ball position and force data to detect scrums, when they started, when they finished, the location on the pitch, the rotation angle and the outcome.

- We detect lineout location, jumper height, throw accuracy, throw height and outcome

- Ruck speed, ruck location, players dedicated, outcome

5. We can do the same with Phases of play

6. And produce match statistics in a totally automated fashion.

7. In fact, we can even score the game just by looking at the ball position and nothing else!

And as an added benefit, we're able to automate certain officiation decisions which are highly error prone, for example the forward pass, which we discussed earlier. Fans are tired of watching video replay after video replay, trying to determine if a ball travelled forward relative to a moving passer. Fortunately this is something we have automated. We're also automating where the ball was kicked out, when a player is not back 10, when a player is in front of the kicker and did the ball go through poles.

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We call our system HAL0 and we hope that

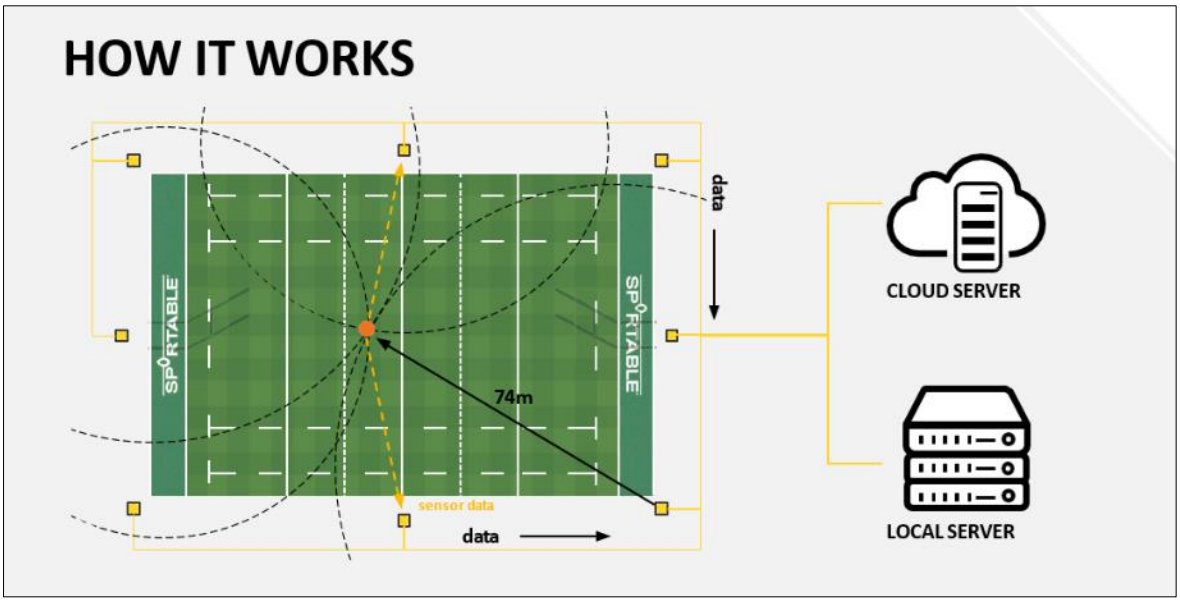
- It's going to make players better

- Team more competitive

- Games faster

- Contact sports more enjoyable for everyone

So how does it work? We put a number of reference devices around the pitch which we call Anchors. The number of anchors can vary from 6 devices for training, to 16 devices for game day. These devices are part of a Time Division Multiple Access network (TDMA) which regulates very carefully when they can and can't transmit messages. This carefully synchronised network sends messages to the player and ball devices and the player and ball devices respond with messages containing data from their sensors.



The network records either the time it took for those messages to travel from the anchors to the player and ball devices and back (which is called time of flight or ToF), or it records the time difference between a reference anchor receiving the messages and the rest of the anchors receiving the messages (which is called Time Difference of Arrival or TDoA).

All of this data which is made up of sensor readings and timestamps is sent by the anchors to a local server near the pitch, either wirelessly or through an ethernet network. The server performs time critical calculations, such as calculating position, orientation and event detection and streams them up to a cloud server.

We send data to clients in two ways. For situations which are latency critical, they receive data directly from the local server. For less latency critical applications, clients can query the data via a cloudserver API or Websocket.

So that's the pitch and I hope it sounds exciting to you because I think it is. And I hope it was clear to you, because hindsight should be absolutely clear! I can promise you that the process of starting this company was anything but clear to me or my co-founders! So let me take you back to the beginning where this starts in 2013, the first year of my PhD.

Our Eureka moment came when I was working in Idaho one summer during my PhD. I had been lucky enough to get a job for NASA, working on nuclear reactors, specifically nuclear reactors for deep space missions. So it'll come as no surprise that my teammates and I were obsessed with numbers. We were watching Ice-Hockey one day at Buffalo Wild-Wings when we saw a collision on the ice that got all of us talking:

- What was the peak force in that collision?
- How long was the contact time?
- What was the change in momentum?

- Would I walk away from that?
- Why isn't this on TV?

That was in June 2013.

In September of 2013 I pitched the idea to my best mate Dugald Macdonald who was studying at Oxford at the time and who was also playing for the Blues rugby team. Dugald loved the idea and phoned me the next day and said "we're starting a business!" The idea at this stage was a simple three step plan:

1. Build some kind of smart shirt, that uses sensors or something, to measure forces which are then transmitted somehow (maybe Wi-Fi or something) to a computer, or server, or maybe a Raspberry Pi.

2. Put the data on TV

3. Profit!

So we had an idea. Now all we needed to do was incorporate the company and think of a catchy name. Eight months later in May 2014 we incorporated "Impact Telemetry Systems Limited". It seriously took us 8 months to come up with the name. I'm happy to tell you, that we changed the name five months later to Sportable, the name we still operate under!

Dugald and I got to work, it was time to build a proof of concept. But the problem was that we didn't understand electronics, at all. We needed help! I called my friend Dan Davson who I'd studied with during my undergraduate. Dan liked the idea and agreed to come onboard as the third co-founder and resident electronics expert!

Through consultation with Dan, the idea crystalised into actual sensors, which were measured with analogue circuitry and digitised with an ADC. The values were read from the ADC at 60 Hz and were transmitted to a Raspberry Pi over Wi-Fi using an NRF 24L01+ module and open source code gleaned from the internet.

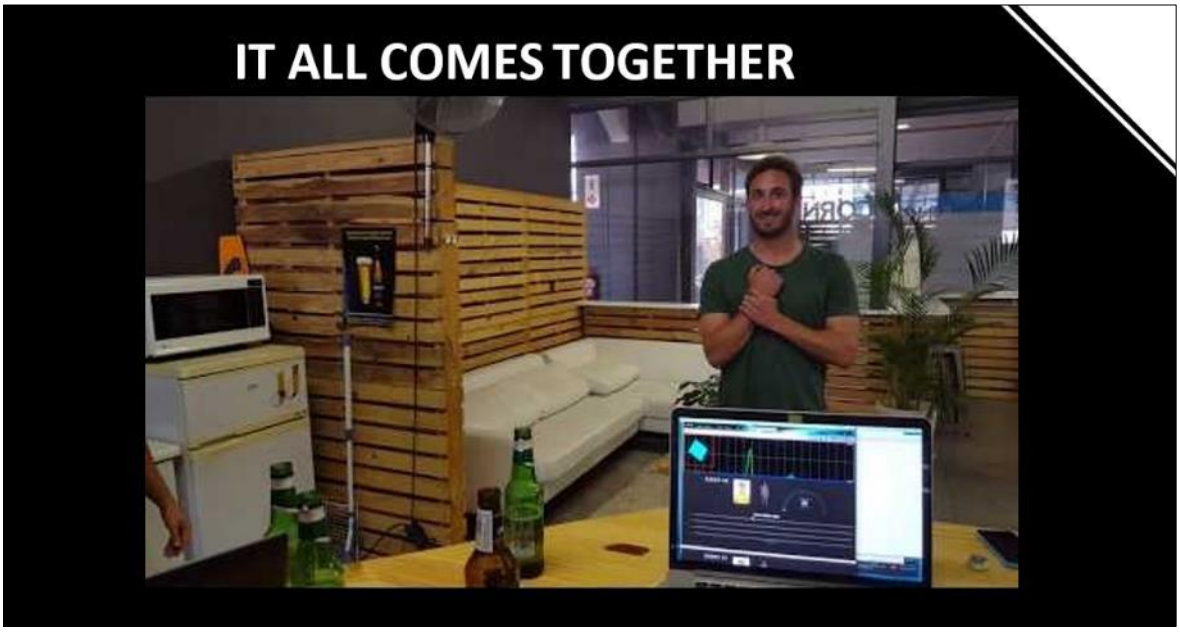
We sourced cables, connectors and components. We got our first custom circuit boards made and assembled. Another friend 3D printed us some enclosures which

we spray painted black and then used Sugru to emboss the logo. We built our sensor assembly and encased the sensors in protective EVA foam, and bound the edges with nylon ribbon. We got a special shirt custom made to hold the sensor assembly while on the player's body. We even made a display box, which ended up looking like a pizza box.

I can't tell you how embarrassing it was taking that pizza box to pitches only to see the disappointed faces of potential investors when they realised that they weren't actually getting pizza for lunch.

When we weren't designing pizza boxes, we were doing useful things like interacting with other friends of ours who had a software development business. We hired them to develop a Web-app which we could use to display the data.

We developed the proof of concept in our spare time. I was doing this during my PhD, Dugald was doing this while he was working in Zimbabwe on a mine and Dan was working in his evenings after work. After 16 months we had all the components ready: the shoulder sensors, the player monitoring device, the Raspberry Pi receiver and the Web-App to display the data in real-time.



The day that we integrated the proof of concept system in September 2015 was an incredible high and feeling of accomplishment!

We were all convinced that as soon as an investor saw our pizza box we would be rich. The reality of course was very different. We pitched our idea to potential investors over the course of about three months. We received many, many very polite and encouraging rejections. After easily our 50th pitch we met our first investor and mentor Aidan Cooney, the founder of Opta - Europe's largest sports data company.

When we met Aidan in December 2015, he and his group pointed out things to us that are perfectly obvious now. Firstly he told us that players were already wearing GPS devices between their shoulder blades, they weren't now going to wear a second device there. He also pointed out that there's no way that Wi-Fi could be

used to offload data from a player in a crowded stadium, something we hadn't really thought about.

But despite this he thought we were on to something. Nobody was measuring tackle or scrum forces in rugby, or forces in contact sports in general. This was an existing pain point and so it could work as a business. Aidan said to Dugald and me that he and his cohort would invest in Sportable. But only if we could add player tracking. And furthermore the player tracking must work indoors, and it must work in real-time.

I looked at Aidan with full confidence and said we can do that. I was confident we could do it, because to be honest at that time I believed I could do anything given enough time and resources. I still do think that, but I've been tempered slightly by experience.

This is a good place to stop and to consider what we did well and didn't do well. We had identified a market problem. But we had mischaracterized it. In our minds fans wanted to know how big a big hit is and broadcasters would pay for that. But in reality teams were more interested in maximising player performance and safety.

We had incorporated a business. But we focused too much energy on the minutiae. We had spent hours and hours debating which sewing technique would best bind the edge of the force pad and which foam we should use. These are important decisions for a prototype or an MVP, but not for a Proof of Concept. We'd spent days on a company logo and getting business cards made. We made a display case that looked like it housed a Pepperoni Pizza. These too are important things, but not for a young hardware start-up at the Proof of Concept stage.

We had put together a business model. But we didn't understand the buying behaviour of teams or leagues.

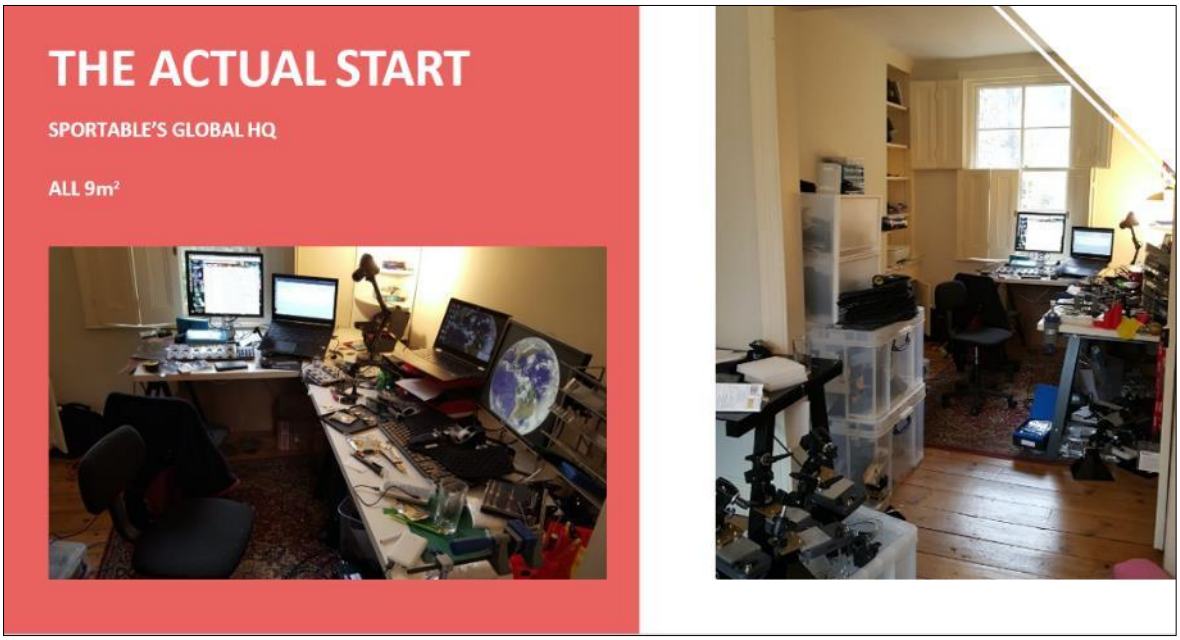
We had built a working proof of concept. But we didn't know the difference between PoC and Prototype and Minimum Viable Product. And we'd spent too much time on the PoC.

We had applied for a patent. And then lost £3000 when the examiner came back saying there was nothing inventive about our idea. That was when I learned how expensive lawyers are.

And while I hope that those of you out there who are considering starting your own business can learn from our mistakes, it's important to remember that mistakes are impossible to avoid totally. And in fact a few survivable mistakes are actually very good for your own personal development and for that of your business. Remember Pope's words: to err is human, to forgive divine. So make mistakes and forgive yourself and keep going!

Through Aidan and his group, we raised £150,000 of seed funding under the SEIS scheme. We were ecstatic to have the vote of confidence, and the seed money which was a huge milestone in our lives, but it slowly dawned on Dan, Dugald and I that the finish line we thought we had just reached, was in fact just the starting line of another bigger event. A much longer and tougher road was in front of us.

I had just finished my PhD and so moved to London to live with Dugald and another friend who was also in the process of starting a business. We converted a room in the house into an office and we got to work full time.



In 2016 we teamed up with an industrial tracking company. This was the first commercial relationship we had ever entered into and so we were absolutely naive! It was an important relationship for us. Their technology would enable us to track players indoors and outside, and hence make good on our promise to Aidan.

Over the course of a single year in 2016 the entire system, all the hardware and software, was redesigned from the ground up with these new partners. We made new PCBs, new injection moulded enclosures in a special RF grade thermoplastic, we got custom force sensors designed and manufactured, we wrote a lot of signal processing and filtering algorithms. In June we approached Gilbert and began building a proof of concept ball to demonstrate the tracking to them. So there was a lot going on in 2016.

I even got a Cherry-Picker License which I used to install our electronics at the top of the lighting posts around rugby fields. I've clocked hundreds of hours in a cherry picker basket 17m above the ground, doing work that is much more dangerous than my shareholders were comfortable with.

One of the things that Dugald and I believe very firmly in is the power of deadlines. There's nothing like a big event or important deadline to catalyze action.

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5. Twickenham

Dugald was looking for a suitably big event that we could use to launch the system. It occurred to him that if we could track all the players in the annual Varsity Match between Cambridge and Oxford, then we would have demonstrated live tracking and live player data at Twickenham one of the world's most recognisable and biggest rugby stadiums.

And so we teamed up with The Varsity match and World Rugby to deliver the first live player tracking data in rugby. But please bear in mind that we had only tracked around club rugby fields to this point. Never in a massive stadium. Furthermore, to track in this bigger stadium required small changes to the firmware that had been developed by these tracking partners of ours. They assured us that it would be simple. What followed was the most stressful thing I have ever gone through.

We trusted that our partner would make the necessary changes to the firmware in time for us to track all the players at the Varsity Match and we began the process of planning for the big day.

Due to time constraints, Twickenham could only give us 6 days to set up the system before the game. And so when those six days started, we were in Twickenham stadium at 8AM. We began by installing the anchors, which go around the pitch and receive signals from the players.

But the going was slow. The stadium is huge and access in a large facility is a real problem. For those of you who know the show the Crystal Maze, it's like that but much bigger, and cold and dark and not fun.

If you don’t have a card, you’re not getting in. If you’ve got a card, but limited access, you’re probably not getting in. If one door blocks you, the next door could be 500m away. Or you might need to come down from floor six to floor one and

then jump into another elevator and go to floor 5 and try another door that's probably also locked.

Now do this with massive boxes of cables, antennas and surveying equipment, and you'll understand frustration and growing panic. To top it all off it was freezing and our hands were getting raw from carrying things. And we were still waiting for our partners to send the code they had promised us weeks ago.

After three days we finally got all the devices installed and calibrated. We switched on the tracking system and found that we could track one player, but only when we held the player device above our heads. When we put it in position, between the shoulder blades, the tracking became totally unusable. Still no word from our partners, and they're unreachable by phone.

The pressure was getting to us. Dugald had invited every major decision maker in the Premiership and at the RFU to come watch our tracking live on game day. They would be looking at little dots representing the players, moving around in real-time on a big screen during the game which they could compare to the players' actual positions.

The Varsity Match was also counting on us, the statistics from the game were going to be used for fan engagement on the big screen, and they had found a data sponsor for the event. We now had three days to get everything in working order before 18,000 fans poured into Twickenham to watch the game.

With two days left, our tracking partners sent us a new firmware binary. This is essentially code that makes the anchors run and offload data. To install this firmware on the anchors we have to take each anchor down, one at a time, remove the screws that hold it together and attach a programmer to its JTAG interface and then run a script on a laptop to "reflash" the device with the new firmware.

We followed this procedure for all sixteen anchors around the field and then ran down to our pitch-side HQ where our freezing laptops were kept. We turned the system on and it just crashed. It was even worse than before.

With one day to go our partners sent us another firmware binary. We ran around the stadium and reflashed all the anchors with the new firmware. We started the system up and the tracking worked well at the edge of the field, but not at all in the middle of the field. Dan, Dugald and I were in shock. All of us had different opinions on what the right thing to do was.

And this takes us back to the question: should I never give up? Or not flog a dead horse? It was not a simple decision and Dan, Dugald and I had never had to grapple with a decision of such magnitude under such duress!

But after a lot of shouting and cursing and thinking and debating, Dan and I realised at 11PM, with 12 hours to go, that the behaviour of the system could be explained by long range measurements being excluded from the position calculations. So we decided to risk it all, and try fix the problem one last time, rather than pull out.

I called our tracking partner and explained the situation to him. I told him that everything we had worked towards for three years came down to his actions over the next 12 hours. He told me he was on his way to his in-laws and was on a highway in Germany. I told him to stop his car at a hotel, and please fix the problem he'd promised would have been fixed weeks ago.

Dugald, Dan and I woke up at 5AM on game day. I cannot tell you the dread and the sadness that we all felt. But we put on brave faces and tried to encourage each other as we started the long journey to Twickenham.

We got to the stadium at 6:30 AM and went up to the suite. We started to clean up the suite, set up the big screen TV and get everything ready for the representatives of Premiership Rugby, the RFU and potential investors. The whole process felt pointless.

At 6:45AM, 4 hours and 15 minutes before kick-off, I got an email with a new firmware binary. Dan and I sprang into action. We raced around the stadium reflashing the 16 anchors. By 07:30 AM we had reflashed everything and were back in the suite and turned the system on. It was stable.

I ran down to the field with a tracking tag. Dan reported back to me that the position looked good. I ran across the field. Dan reported back that position at the centre of the field looked good. So I ran up to the suite and taped 15 tracking tags to a cardboard box to test a full team's worth of tracking, I ran down to the field and ran in big loops. Dan reported back over the walkie-talkie that it all looked perfect! I could hear Dan and Dugald shouting with excitement in the suite.

Our first live game went off perfectly. Well, except for the fact that 11 players forgot to wear their tracking devices. We tracked 19 players, in real-time at Twickenham. We used the data to calculate how far the players had run, their top speeds and the calories they had burned. We put this data into a graphical template which was then shown on the big screen in the stadium.

Dan, Dugald and I were all completely broken after the game ended. It was without doubt the hardest, most stressful, most mentally jarring thing I've done in my whole life. But we'd pulled it off, and everyone was happy. Because of that game, we were able to raise another round of investment. So we hired a software developer, a hardware engineer, a software architect, and a data scientist. We got an office in Exmouth Market in London and we continued to build the system, this time we focused on the ball and the algorithms that support it.

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6. Starting Over

I wish I could tell you that we told our tracking partners to take a hike after that. But we weren't sure how to extricate our business from them. Our technology stack relied on them hugely and we were in some ways their captives.

Thankfully, external events took the decision out of our hands. In late 2017 the tracking partners fell out and their business folded. And the hardware we relied on was gone. We therefore launched project Nighthawk. The aim of the project was to rebuild our entire system from the ground up, for the third time in four years.

I cannot stress to you what a big project this was. We needed to develop three PCBs, one for the ball, one for the player and one for the anchor. The technology stack alone is huge, the system synchronisation is critical and you're developing a system that is running on computationally low power devices like a Cortex M4. So you've essentially got to write your own RTOS (which is a real-time operating system) for your devices. In conjunction you have rewrite the TDMA scheme which is basically your own single cell mobile phone network.

It took us nearly two years, but we did it. And more importantly, we did it better. We built a system that we can set up in literally seconds. Calibration is automatic, events are handled smoothly, data synchronises into the cloud seamlessly even with an intermittent internet connection.

It was exhausting and we never intended to build everything ourselves, three times! But events outside of our control forced our hand and that's how after four years we owned the tracking stack from top to bottom. All the hardware, software, embedded software, algorithms and intellectual property and 12 patents to boot.

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7. Breaking into the Market

For the last year we've been using our system with professional teams and doing live events as we try to break into all the major tournaments. And I'm happy to tell you that we're much better at live events now. But to be honest, something always goes wrong, no matter how much you plan. So you must plan, for things to go wrong!

In May 2019 we teamed up with a major broadcaster to track our smart ball in the Championship Cup final. This is the league directly below the Premiership. During the final, the plan was that we would track the ball live and capture all the kicks for poles. The kicks for the poles would then be shown as Augmented Reality graphics next to the kicker as he is lining up his next kick, like the image.

We prepared for months before for the event, and did three full days of successful testing before the game. Then on game day, with two hours to go before the start of the match, the camera system that makes the augmented reality possible broke!

This would have given me a mild heart attack a few years ago, but I'm more used to it now. One of the broadcasting team jumped in their car and drove off to get the spare at their HQ, at Heathrow airport! He was obviously not back by the time the game had started. But then, about 15 minutes in, he came back with the spare and fitted it to the camera and it worked! The AR graphics worked well, and the commentary team were happy about it, they gave me and Dugald a double thumbs up like we were a couple of Top Gun rookies!

Our big break came when Rugby X invited us to provide live match stats and automated officiation at their first event which show-cased the world's best Rugby 7's players. This was the first time in the world that officiation has been automated in rugby. Our kick height detector was designed to skip the referee and go straight to the stadium multimedia system, and the TV graphic didn't even go through the director, it went straight to live on air!

The event was indoors at the O2 in London, and was broadcast to 2 million people live on ITV-4. The event went off very smoothly, there were no surprises, because we had planned for everything to go wrong, twice!

Our smart ball was used to measure the scorer's speed, team territory, where the ball was kicked out and also to officiate the indoor game's new rule - no kicks above 10m in height. The event was highly successful and as a result we were picked up by The Economist, Forbes and got pretty much a full page spread in The Times.

This was followed by us being invited onto Rugby Tonight, one of the most popular rugby talk shows, to demonstrate our tracking and tackle measurement technology live on air! We even did a demonstration of automatic forward pass detection live on air.

One of our shareholders, after hearing about the live on air demonstrations said to us:

“You either geniuses, or idiots”. But that night we were lucky and everything worked out just as we had prepared. After Rugby Tonight we were invited to do our first Premiership game, between Leicester and Bristol which would have been on the 30th of May. And even though that has been delayed, we are still very happy that we’ve almost achieved our dream from all those year ago.

Pete Husemeyer and Dugald Macdonald appearing on Rugby Tonight.

The three step plan turned out to be a little longer and harder than we had anticipated. But I wouldn’t change any of it. I have learned more in the last 7 years than I possibly describe. And I know the same is true for Dugald and Dan. I won’t speak for them, but I think the biggest lessons I have learned are about myself, and about human nature. About how to be diplomatic, how to resolve issues within our team, how to motivate and lead people during exhausting, nerve wracking times.

Not to sound too cheesy, but the making of the world’s first Smart Ball was in many ways my own making, as an aspiring entrepreneur as a human being, and for the last two years as a father. It’s been an amazing journey of discovery and of learning. And I wish all of you the very best on your own journeys.

Just please remember on your way, that you are capable of much more than you know.
