Formula One: Launch of the Mercedes-AMG F1 W12 E Performance

# Q&A with Hywel Thomas

**Hywel Thomas is the Managing Director of Mercedes AMG High Performance Powertrains.**

**Question: Hywel, our 2021 car will come with a new Power Unit, the Mercedes-AMG F1 M12 E Performance. What can you tell us about the new PU?**

**Hywel Thomas:** We are going into the eighth season of pretty stable regulations, so we have a good understanding of the current hybrid engines. Our new product is a characteristic Mercedes-AMG Power Unit, but we’ve worked hard to take the next development step. Stable regulations mean that it’s getting increasingly challenging to unlock additional performance, so you need a focused approach. We identified three main areas to work on: first, we’ve continued the development of the technology in the Power Unit. That’s a continuous process, and we feel like we’ve been able to take a step forward on that front again this year. The second area is reliability. We discovered some design issues last year, so we’ve been looking at those and introduced some changes to address them. And we’ve also got some completely new innovations that will be in the racing PU for the first time. That was particularly challenging because last season finished late, so the winter period has been shorter than normal and has given us less time to prepare, which put extra strain on the business.

**Question: With most of the engine regulations being carried over from last year, what are the main differences between the 2020 Power Unit and this year’s M12?**

**Hywel Thomas:** We’ve continued our quest for better thermal efficiency in the Internal Combustion Engine. Most of the developments can be found in the core of the Power Unit, with a desire for maximum output from the combustion process. Hand in hand with that, we’ve introduced changes to the turbocharger to minimise the impact on the heat rejection. Those are probably the most striking when it comes to crank power and the performance of the Power Unit. We’ve also completed some work on improving the reliability of the PU. In 2020, we used an aluminium structure which wasn’t as reliable as intended, so we’ve introduced a new alloy for the engine block. We’ve also made some adjustments to the Energy Recovery System, to make it more resilient. We’ve got a big challenge in 2021 with 23 races on the calendar, we will need to ensure that the reliability of the Power Unit is spot on. We’ve worked hard on that area and hopefully it’s paid off.

**Question: We also experienced some issues with the MGU-K towards the end of last year. What steps have we taken to address those?**

**Hywel Thomas:** We introduced a complete redesign in 2020, a very different MGU-K to what we had run previously. It helped us make a solid step forwards in performance, but it was a design that turned out to be difficult to manufacture and assemble consistently. We had lots of examples where the MGU-K ran a full cycle and did exactly what we wanted it to do, but we also had some cases of midlife failures. For 2021, we’ve gone back, looked at that design and built an understanding of where the failures have come from. We have changed it for this year, to allow for a more consistent manufacturing route which should help to improve the reliability of the MGU-K.

**Question: McLaren joins Aston Martin and Williams as a Mercedes Power Unit customer this year. What does that mean for the team at Brixworth?**

**Hywel Thomas:** Firstly, one of the noticeable impacts of us working with McLaren again will be being reunited with an old friend. Some people in this team have already worked with them in the past, so people are excited to be doing so again. Secondly, a third customer team does put more pressure on the organisation. We need to take more engines to winter testing, we need to take more engines to the first race, but we don’t want to freeze our designs any earlier because of that. So that puts some additional strain on the internal and external supply chains and the build and test team, to be able to develop the design for as long as possible. I’m confident they will rise to that challenge and the occasion. What we gain is another group of chassis designers looking at the PU, looking at how it works, how it’s integrated into the car, how it’s working with the rest of the package. And by doing so, they start asking us a different set of questions. For example, how can we integrate the PU into their respective chassis and improve the integration? We can add all those comments and ideas into the melting pot of this season and all the subsequent seasons.

**Question: Next year will bring the biggest rule change in F1 history. To what extent does this already have an impact on the organisation in Brixworth?**

**Hywel Thomas:** The 2022 rule changes are a challenge for everyone in F1. The change on the Power Unit side is not quite as revolutionary as it is on the chassis side, but we will still need to adapt the PU significantly. Starting in 2022, F1 engines will be powered using E10 fuels – so fuels that contain 10 percent sustainably produced ethanol. These are very similar to the kind of fuels you can find at your normal fuel station. This might not sound like a radical change, but it changes the combustion process significantly, so there’s a lot of development work to be done. In addition to that, we need to make sure we meet additional energy measurements put in place by the FIA. This will see us make some changes around the control electronics. Obviously, the biggest changes in 2022 are on the chassis side, which are enormous. The cars are going to be completely different to what we see now. That also impacts all of us in Brixworth because putting the PU into a completely new chassis means there will be some changes where the PU is mounted. As the chassis engineers become more knowledgeable on what they need for the car to go quickly, and how they need to position all the systems within the chassis, the impact on the PU will become clearer as well. We had already started work on that, as the regulations were originally going to be implemented this year, but now the real challenges begin. We are full steam ahead to optimise the PU for those significant new regulations. It will be a challenging year, balancing the requirements of the demanding 2021 season with the requirements of understanding and exploiting the changes for 2022, and making the best from the opportunities we have. Our ability to find ‘the winners’, the ideas that have the potential to give us an advantage, and back them with the correct amount of resource to develop and deploy them, is going to be key this year.

**Question: 2020 saw the introduction of certain restrictions on Power Unit development. How did they impact the work for the new season?**

**Hywel Thomas:** As part of the COVID response early in 2020, the F1 Power Unit manufacturers agreed a set of rules and restriction to secure the long-term stability of the sport. Some of these regulations had already been worked on for a while, but the situation accelerated their introduction. We agreed to a reduction in dyno hours and that has an impact on our operation. It’s similar to how wind tunnel usage has seen restrictions for a number of years, but we had to implement the restrictions with immediate effect for the dyno. Now, we need to decide earlier what projects to focus on, because we can’t afford to use precious dyno hours on ideas that end up not making it to the car. In addition, we also reduced the permitted number of performance upgrades to one per manufacturer per year. So, the performance gains you normally saw spread out across the year will now have to be packaged together strategically. That also has a sizeable impact on us, as we need to make sure to introduce that performance upgrade at the right time and with the right improvements to extract the maximum gain for the season.

**Question: Last year, we announced our new sustainability strategy. How does that impact the operations in Brixworth?**

**Hywel Thomas:** The whole automotive industry has a big responsibility and a part to play in sustainability, and it’s been great to see that we as a team have set ourselves very ambitious targets. At the same time, F1 and the FIA are making sure that we are headed in the same direction collectively as a sport, for example in our move to sustainable fuels. On the other hand, we are minimising the impact of our facilities and factories on the environment and it’s a journey we began several years ago with measures like the installation of solar panels. Last year, we took big strides on that front and now have a net-zero carbon footprint for our technology centre in Brixworth. And we will continue to invest and push for sustainability in motorsport.

**Question: Sustainable fuels are an important step in F1’s road map to sustainability. Why are sustainable fuels interesting from a PU-side in general?**

**Hywel Thomas:** The hybrid regulations put in place in 2014 have driven the PU towards increased thermal efficiency, reducing the amount of fuel we use. With the introduction of sustainable fuels, we want to change the production method of that fuel. We want to move from fossil fuel to fuels made from a variety of sources, such as waste from food production. That reduces the environmental impact over the lifecycle of the fuel. The E10 fuel that we will be racing in 2022 is a first step in that direction. The 100 per cent sustainable fuel that the FIA have announced recently is another big step, and we are very excited to play our part together with our partners at PETRONAS. We’ve been working on the E10 fuel with PETRONAS for a little while now to ensure the engine and the fuel work in perfect harmony to give us the best performance. Also, in the build up to the introduction of a 100 percent sustainable fuel, PETRONAS are playing a big part. We may not know yet when exactly this will be introduced, but all PU manufacturers, fuel manufacturers and the FIA are working together to make sure the sport is heading in the right direction. For ground-breaking technologies like this, it’s not only important to have them introduced in the right way and at the right time, but also that when it is introduced, it will prove a great product. The introduction of this fuel will hopefully show how innovative all the parties involved are.

**Question: What role does the development of fuel and lubricants play in the design, development and running of an F1 Power Unit?**

**Hywel Thomas:** They play an immensely important role as the development of the functional fluids must go hand in hand with the Power Unit development. We work very closely with engineers from PETRONAS; they understand the directions they are hoping to go with the fuel and lubricants for the engines. They have interesting innovations, but for those innovations to be effective in the engine, it sometimes requires a different approach in design and build. We need to make sure we optimise the findings on the fuel side, to make sure we can always exploit those gains. And it works in both directions, too. There might be areas of the PU we are hoping to improve, but we can’t always do that without the help of the fluid technology. And that’s why the relationship between HPP and PETRONAS is so close, so we have a mutual understanding of the direction we’re heading. Between us we can optimise the developments to ensure we get the best performance to the circuit.

**Question: The new year brings an even closer alignment between our F1 Team and our performance road car division AMG. The two parties have already worked on projects like the Project One. What can you tell us about the increased collaboration and the way forward?**

**Hywel Thomas:** Our collaborations with AMG and Mercedes have shown that both sides have been developing very similar kind of technologies over the last few years and are continuing to do so. Even though the boundary conditions and the applications are quite different, we’re clearly moving towards the same kind of technologies and principles. In F1, we are very experienced in developing novel and innovative technologies in a short space of time, and in a very challenging environment. What’s been interesting working with AMG and Mercedes is that they are very interested in the technologies themselves, and our approach to developing them. We don’t pretend to be experts in how these technologies can be utilised in the world of road car development and production, but despite those differences, we are invited to take part in projects – albeit in different ways. From doing peer reviews on development that is going on, to co-developing concepts with our colleagues in Germany. One great example of that is our participation in the EQXX technology programme, where we work alongside our engineering colleagues to take the next step in the reach, efficiency and charging of electric vehicles. It’s an exciting project and one of many examples of how we are contributing to development in the automotive sector.

**Question: The team in Brixworth has been developing both the Formula One and Formula E Power Units for just over two years now. How do these two projects complement each other?**

**Hywel Thomas:** When we first took on the Formula E project, it stretched us as a business. We had to adapt to the new demands. From the supply chains to our build teams, many areas of the business had to develop with the new demands. But now, a couple of years in, we are already seeing the benefits of being involved in both Formula One and Formula E. Although the Power Units are very different and the requirements of the electrical elements differ in both series, there are still several similarities between the two. So, having those two racing projects in the business together with the road car project means we constantly have opportunities to stretch our team in different directions and solve ever-evolving problems. We are always driving the knowledge of the systems to the next level here in Brixworth and we can feed that knowledge from one project to the next, for the benefit of all the projects.

**Question: How do the learnings in F1 from the Power Unit development feed into areas outside of the sport?**

**Hywel Thomas:** Currently we are very much concentrating on Formula One and Formula E, and the projects with AMG and Mercedes around the Project One and EQXX. That means we are developing the technologies in our racing programme and introducing them in road car projects where appropriate. There’s an increased interest from different industries in those technologies, particularly around inverters and electric machines, as the world strives to be more efficient and sustainable in its outlook. That opens more opportunities for developments from the motorsport industry to cross over to other industries, and put the skills learned in this environment to good use in other industries, which is an exciting prospect.