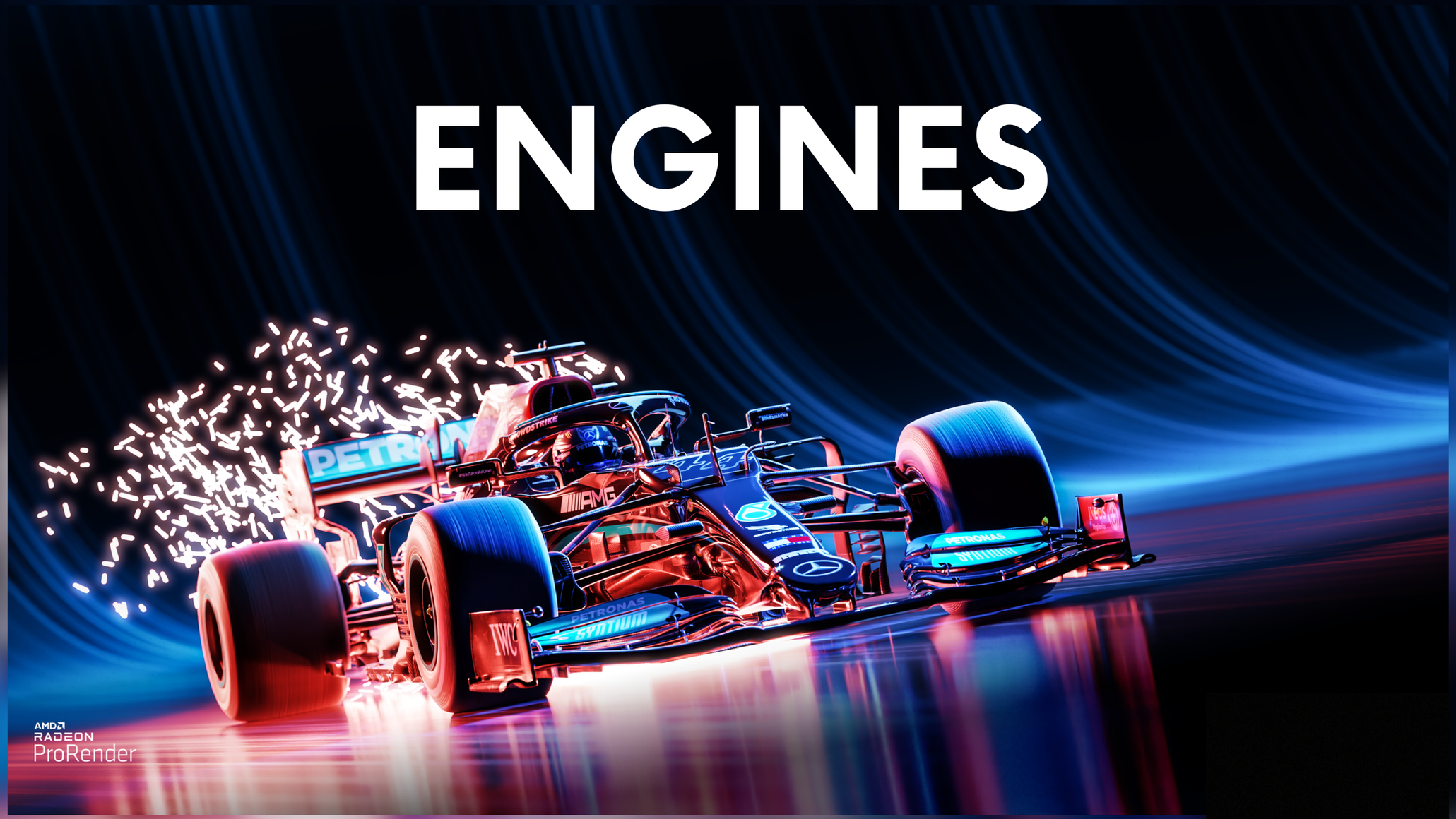
ENGINES & AERODYNAMICS

Presented by:
MD ARHAM
IRENE MARY JAMES
SAGAR G
VINEET
NIDHIN M

ENGINES



INTRODUCTION FOR ENGINES

The current F1 engines are 1.6-liter, turbocharged V6 hybrid engines. They are capable of producing over 1,000 horsepower. The engines are very complex and require a lot of maintenance.

The importance of the engine in Formula 1 is evident in the fact that the team that wins the Constructor's Championship is usually the team with the best engine. The engine is also a major factor in determining which drivers are successful in Formula 1.

IMPORTANCE OF AN ENGINE

1

POWER

The engine provides the power that the car needs to accelerate, brake, and corner. The more powerful the engine, the faster the car will be.

2

AERODYNAMICS

The airflow over the engine can help to create downforce. Downforce is a force that pushes the car down onto the track, which helps to keep the car stable at high speeds.

3

EFFICIENCY

The engine needs to be efficient in order to conserve fuel. This is important because Formula 1 races are long, and the cars need to be able to complete the race without running out of fuel.

4

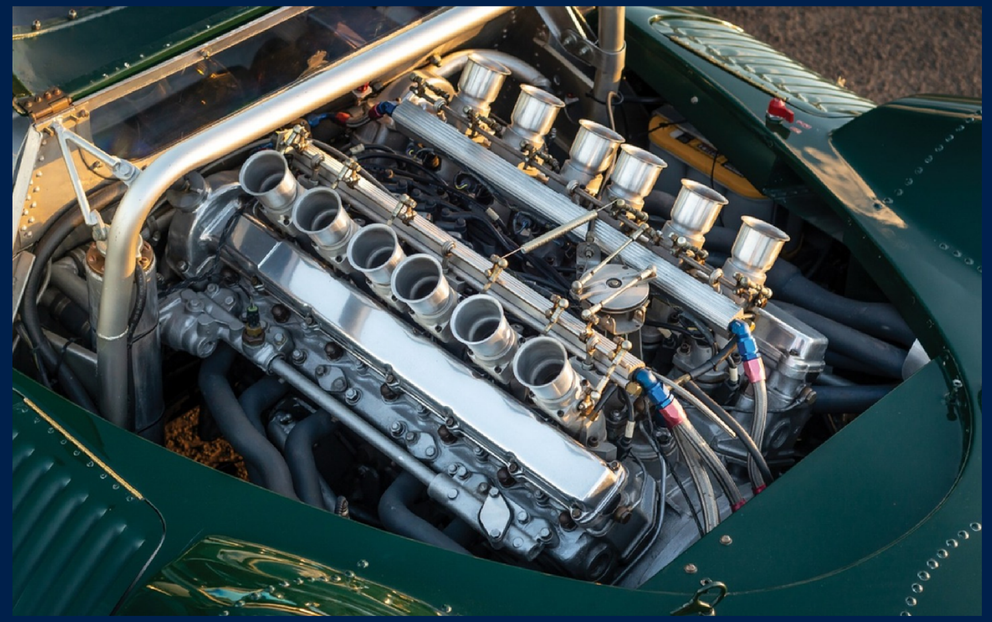
TECHNOLOGY

The engine is a complex piece of technology, and it is constantly being developed. This means that the teams with the best engines are always at the forefront of technology.

The engine is a vital part of a Formula 1 car, and it is one of the most important factors in determining the success of a team or driver.

EVOLUTION OF ENGINES

- **1950s**: The first F1 cars were powered by 2.5-liter, naturally-aspirated V12 engines. These engines were relatively simple, with open cockpits and drum brakes.
- The **1960s** saw the introduction of new technologies, such as wings and disc brakes. Engines also became more powerful, with some cars reaching speeds of over 200 mph.
- **1970s**: The 1970s was a golden age of F1 racing, with some of the most iconic cars ever built. These cars were powered by powerful V12 and V10 engines, and they were capable of reaching speeds of over 220 mph.
- **1980s**: The 1980s saw the introduction of ground effect, which allowed cars to generate more downforce. This made the cars faster and more stable, but it also made them more difficult to drive.
- The **1990s** saw the introduction of active suspension and traction control, which made the cars even faster and more stable. However, these technologies were later banned in an effort to make the racing more exciting.
- **2000s**: The 2000s saw the introduction of new safety features, such as the halo and the carbon fiber monocoque. Engines also became more efficient, with some cars now using hybrid power units.
- **2010s**: The 2010s have seen a continuation of the trend towards more efficient and environmentally friendly cars. The latest generation of F1 cars are powered by 1.6-liter, turbocharged V6 engines, and they are capable of producing over 1,000 horsepower.



CURRENT F1 ENGINE PRODUCERS

- **Mercedes-AMG**: Mercedes-AMG is the most successful engine supplier in Formula 1 history, having won the Constructors' Championship 10 times in the past 11 years. They supply engines to Mercedes-AMG Petronas Formula One Team, Aston Martin Cognizant Formula One Team, and Williams Racing.
- **Ferrari**: Ferrari is the second most successful engine supplier in Formula 1 history, having won the Constructors' Championship 6 times. They supply engines to Scuderia Ferrari Mission Winnow and Alfa Romeo Racing ORLEN.
- **Honda**: Honda is a relatively new engine supplier in Formula 1, having returned to the sport in 2015. They supply engines to Red Bull Racing and Scuderia Alpha Tauri.
- **Renault**: Renault is a long-time engine supplier in Formula 1, having supplied engines to teams such as Williams, Benetton, and Lotus. They supply engines to Alpine.

CONCLUSION

As you can see, the evolution of F1 engines has been driven by a desire to make the cars faster, more efficient, and more environmentally friendly. The latest generation of F1 cars are powered by 1.6-liter, turbocharged V6 engines, and they are capable of producing over 1,000 horsepower. These engines are much more efficient than the older naturally-aspirated engines, and they produce less emissions.

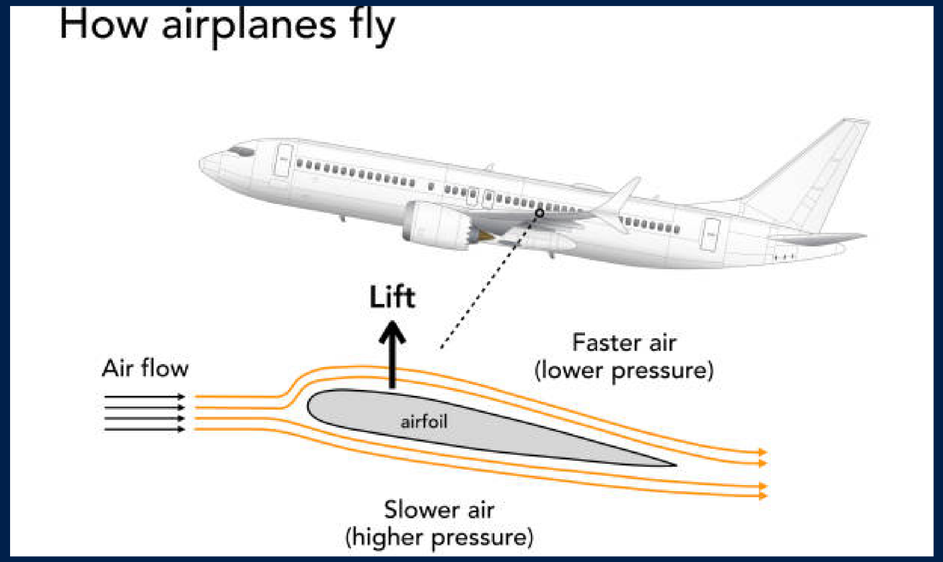
It will be interesting to see how F1 engines evolve in the years to come. With the increasing focus on sustainability, it is likely that we will see more hybrid and electric power units in the future.

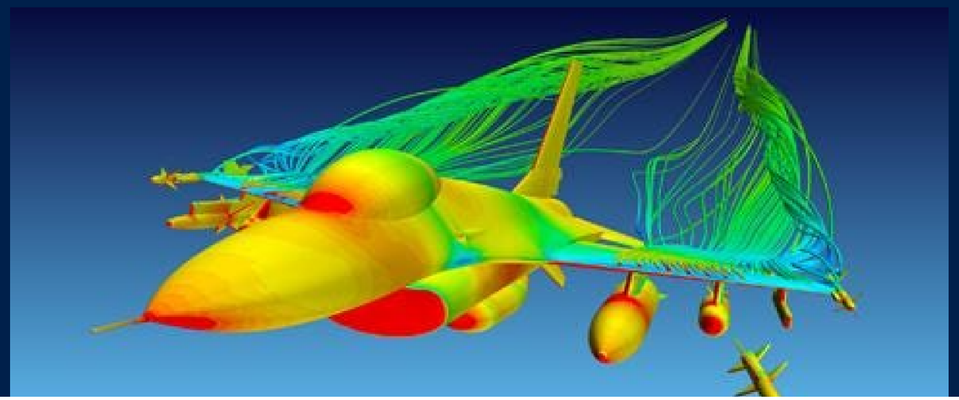
AERODYNAMICS

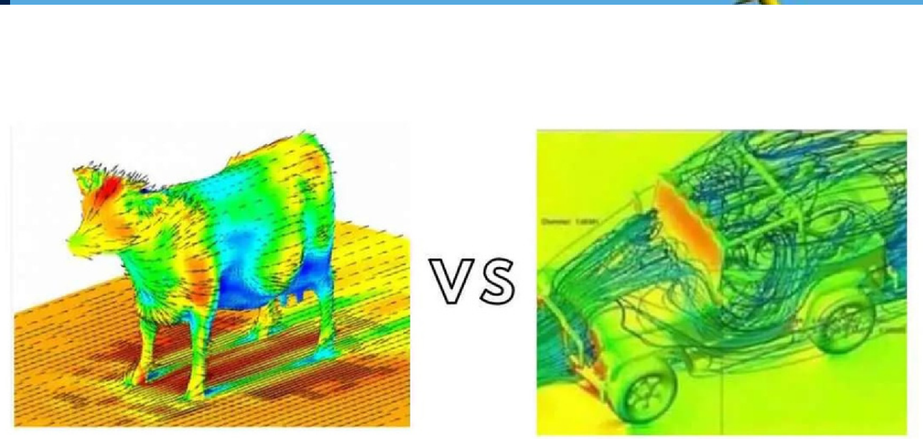
INTRODUCTION

- **Downforce**: Downforce is a force that pushes the car down onto the track, which helps to keep the car stable at high speeds. This is especially important in corners, where the car is subjected to high lateral forces.
- **Drag**: Drag is a force that opposes the motion of the car. It is caused by the air resistance as the car moves through the air. Drag slows the car down, so it is important to minimize drag in order to go faster.
- **Aerodynamic Efficiency**: Aerodynamic efficiency is a measure of how well the car's aerodynamics work together to produce downforce and minimize drag. The more aerodynamically efficient the car, the faster it will be.

The teams spend a lot of time and money developing their cars' aerodynamics. They use wind tunnels and computer simulations to test different designs. The goal is to find a design that produces the most downforce and minimizes drag



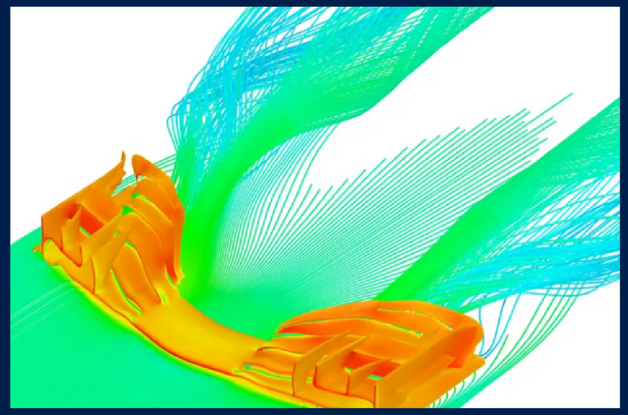


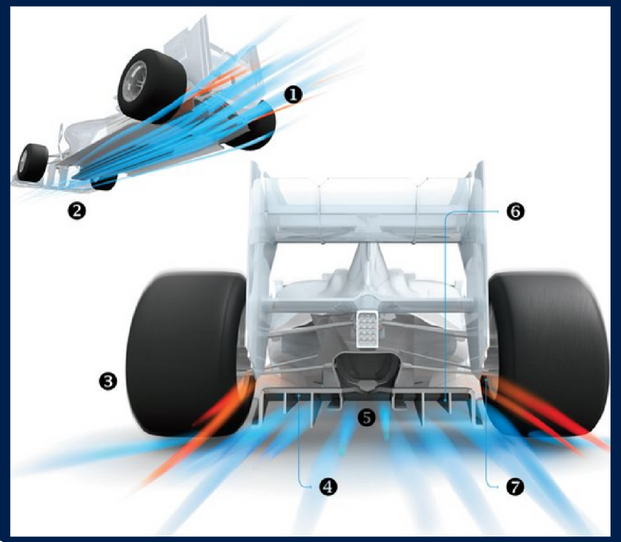


FEATURES

- **Wings**: Wings are the most important aerodynamic feature on a Formula 1 car. They create downforce by generating lift, but in the opposite direction.
- **Splitters**: Splitters are flat surfaces that are mounted under the front of the car. They help to redirect the airflow under the car and increase the downforce.
- **Diffusers**: Diffusers are flat surfaces that are mounted under the rear of the car. They help to slow down the airflow under the car and increase the downforce.
- **Canards**: Canards are small, wing-like structures that are mounted on the front corners of the car. They help to redirect the airflow around the car and increase the downforce.

The importance of aerodynamics in Formula 1 is evident in the fact that the team that wins the Constructors' Championship is usually the team with the best aerodynamics. The aerodynamics of the car can make a big difference in terms of lap time, so it is a critical area of development for the teams.



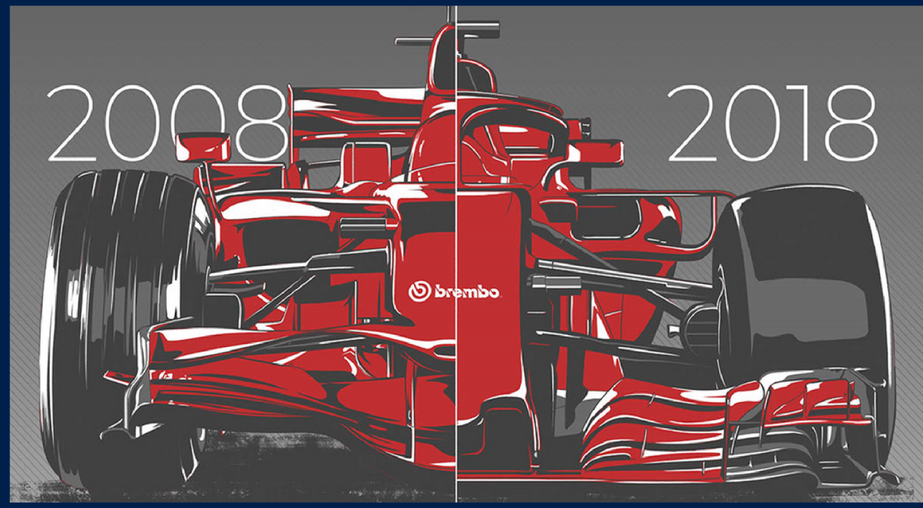


EVOLUTION

- **1968**: Ground effect is a technique that uses the airflow under the car to create downforce. This allows the car to travel faster and corner more effectively.
- **1977**: The fan car uses a fan to suck air out from under the car, which creates even more downforce than ground effect. However, the fan car was banned after just one race due to safety concerns.
- **1981**: The 917/81 has a very low profile, which helps to reduce drag and improve top speed.
- **1988**: The MP4/4 is widely considered to be one of the most successful Formula 1 cars of all time. It won 15 of 16 races in the 1988 season, and it is credited with ushering in a new era of aerodynamic dominance for McLaren.
- **2008**: Double diffusers are a type of aerodynamic device that can create a lot of downforce. The BGP 001 won 8 races in the 2009 season, and it helped Brawn GP to win the Constructors' Championship.
- **2017**: The FIA introduces a new set of aerodynamic regulations. These regulations are designed to reduce the amount of downforce that the cars can generate. This is done in an effort to make the cars more challenging to drive and to reduce the risk of accidents.

  The evolution of aerodynamics in Formula 1 has been driven by a desire to make the cars faster and more competitive. As technology has advanced, teams have been able to develop more sophisticated aerodynamic devices. This has led to a significant increase in downforce, which has made the cars faster and more stable at high speeds.

  However, the increasing reliance on aerodynamics has also led to some concerns about safety. As the cars have become more dependent on downforce, they have become more difficult to drive at the limit. This has led to an increase in the number of accidents, and it has raised questions about the future of aerodynamics in Formula 1.



CONCLUSION

Only time will tell how the evolution of aerodynamics in Formula 1 will play out in the years to come. However, there is no doubt that aerodynamics will continue to play a major role in the sport.

THANK YOU