



Enterprise Portfolio

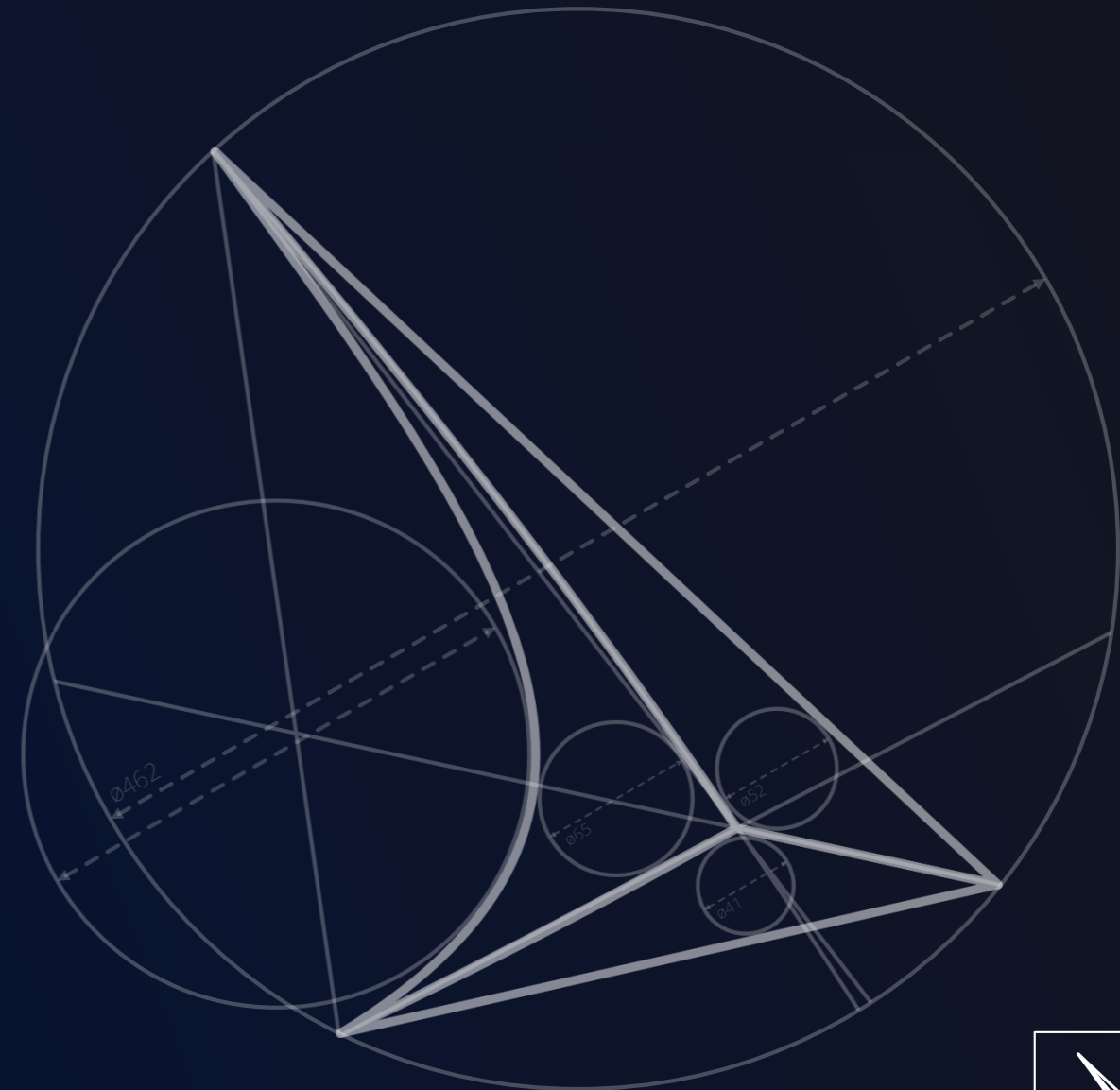
Silverstone, UK

09th July - 15th July

Designer	Adrian Lübeck	Created	August 2016	Version	1.3.2
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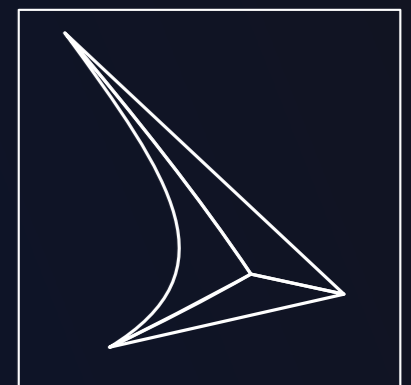


REFERENCE

The Secondary Icon was an adaptation of the inconveniently colored Primary Icon. The theme of speed is still evident in every line. The shape is in homage to the iconic 'Mach cone', a shape native to the aerospace industry, observable at speeds higher than 'mach 1', or 343,2 m/s [20 °C].

The steep front end guides your eye from left to right. In context with the italic 'Sonic Boom' lettering it creates a cohesive racecar look.

Initially the compartmentalized inside aided against the harsh clashing of colours. When viewed without colours it gives the visual impression as if to slightly protrude from the plain.



Sonic Boom

We are Team Sonic Boom, five boys from the "Graf-Rasso-Gymnasium" Fürstfeldbruck and one from the "Gymnasium Grootmoor" in Hamburg. This season, we are participating for the fourth time in the competition. We are the 2020 Bavarian and German national champions. Our goal is to become 2022 World Champions, an achievement we are working for and dreaming of ever since the very beginning of our journey.



THE JOURNEY

In 2017 our Team formed as part of an elective subject and we laid the foundation of our team identity as it is today. Right from the start we were unified in the belief that this wouldn't be just an opportunity for a low effort grade in school, but that our ambition would be to become World Champion.

Our first season was mediocre in its result, but in terms of experience gained it went phenomenally. From then on we fully embraced the motto of the competition - try out and learn.

The newly acquired knowledge led us to score the title of runner up in the development class in 2018. Now we were more confident than ever before to be able to move to the senior class and have our shot at the German national championship.

Finishing first at the Bavarian championship in 2019 against a variety of very strong teams we advanced to the national finals, where we were strong in every category but a small mistake cost us the title.

We decided not to consider this misfortune as a failure, or worse the end of our dream, but as a huge opportunity to learn from and be even stronger the next year.

For the next season our efforts intensified, everything was planned to the smallest detail, but then the pandemic struck. Many things had to be redone, because the competition was held virtually. These challenges were again a big opportunity to be creative and innovative in a way never seen before. This is also the time our team motto "See Beyond" originates from, meaning we would see every challenge as the possibility to learn and improve beyond what we were capable of.

Given this mindset and all the newly acquired skills we were confident to compete for the top position at the German National Finals 2020. With many very competitive teams we gave our best and succeeded - becoming German National Champion 2020 thus qualifying for the World Finals.



Jakob Rauh
R&D Engineer

Jokingly named the intern. Takes on even the most uncomfortable tasks. Maniac for data in Excel.



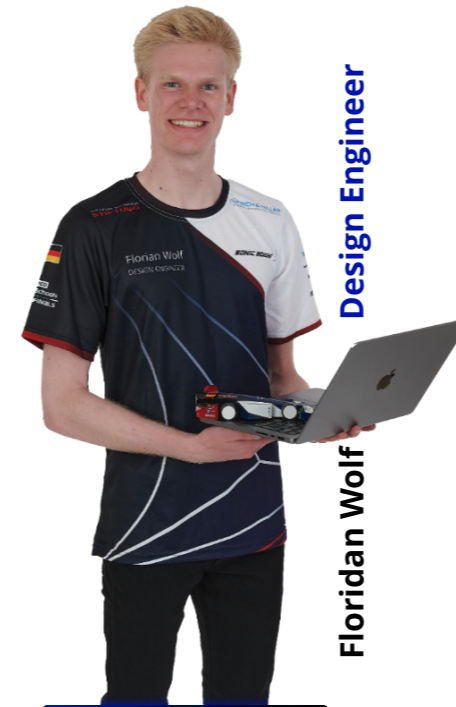
Lukas Kottenhahn
Graphic Designer

A clever and fierce debater. Responsible for stunning graphics and consistent team identity.



Anas Izaaryene
Team Manager

Mr. Motivator. Time doesn't seem to be scarce. Is there a problem? Any time is the best time to solve it!



Florian Wolf
Design Engineer

A disciplined guy, always there to give his best to build the fastest car possible.



Jannis Gordziel
Design Engineer

Out-of-the-box-thinker. Willing to travel through the entire country frequently to solve the small challenges.



Adrian Lübeck
Marketing Manager

Content is nothing without proper marketing. Never hesitant facing innovative approaches.

Team Name

Breaking the sound barrier was one of the biggest engineering challenges in the 20th century. Our name 'Sonic Boom' is not only a homage to the enormous speed needed to break the sound barrier, it's also an analogy to the engineering challenge itself. Breaking barriers is what we want to achieve as a team in every single aspect of the competition. That's why we chose 'Sonic Boom' as our team name.



Team logo

The most noticeable and exposed part of a team is its team logo. Therefore it bears great responsibility to represent a team and its values. The warped, sharply edged font, paired with the pointy triangle, resembling a front wing is specifically chosen to illustrate the ambition for maximum velocity. Incorporated in the triangle is the depiction of pure speed - the mach cone. As the exact opposite to the sharp edges it shows how the many different aspects of the competition form an harmonic shape.

Secondary Logo

For the use on colourful or dark backgrounds our primary logo is of no use. It would be hardly noticeable or even merge with it. Also for scenarios where colour is not an option such as the engraved logo on our giveaway ballpoint pens, consisting of only outlines, it is not suitable to have a colourful logo. To have an option for these situations we designed a streamlined, monochrome version of our team logo.



Team colours

Colours are a marketer's most powerful tool. They can, if used correctly, completely change the impression and resulting decision of an observer, even if the content remains unchanged. They actively convey a message, in our case, they underline what we stand for - speed and innovation. The high contrast of our two primary colours, red and blue, are tightly bound to the aspect of speed, depicting the energy needed to achieve such speed and the cool flow of air rushing around the bodywork.

Brandguide

Having a consistently applied team design with many people working on the same project is very important for the recognition value of a brand. To ensure that everything involved, from the car paint to the social media appearance is uniform, a fine set of rules is needed. For this purpose we compiled a document, that would contain every important design information such as the correct use of our team logo, our team colour codes and fonts. Every team member has a physical copy to refer to in case of doubt.

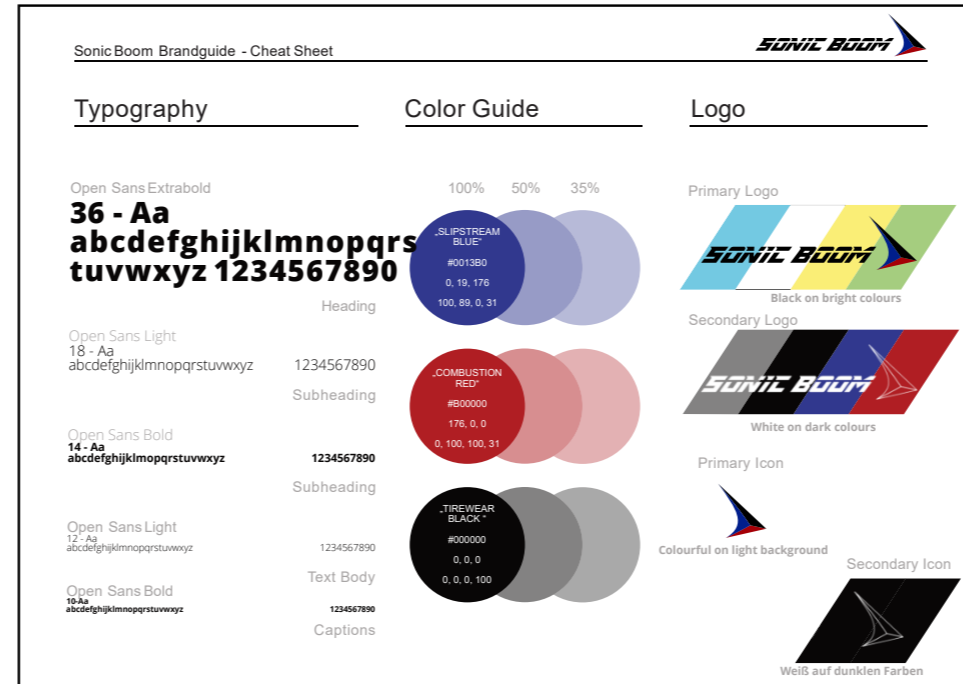


Fig.1: Brandguide cheat sheet

Fonts

In order to make a text appealing and easy to read we chose "Open Sans" as our primary font. Its unadorned look gives the reader the impression of a scientific and well researched text. For better consistency across all project elements we created a digital text style that could be exported and shared between team members. With one click everything from font to letter positioning is exactly the same as in the documents of a different team member.

Pit display

Our pit display is designed to resemble the key features of our team logo. It combines sharp edges, with diagonal lines in our team colours. It is therefore immediately identifiable as our pit display and serves the purpose to attract attention for us and our sponsors. Refer to page 7, pit display.



Fig.2: Pit display

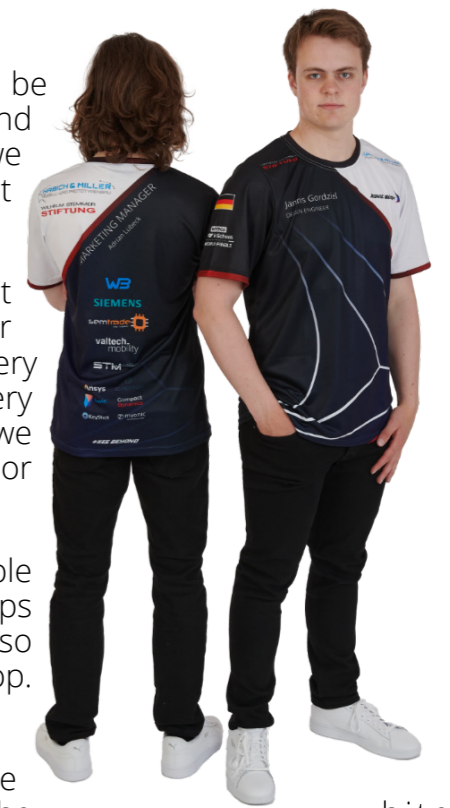
Teamwear

On competition day it is crucial to be easily identifiable as a team. To stand out from the plain coloured crowd we opted for applying our pungent design philosophy full surface.

Prominently on display are our most important sponsors as well as our team name. Highly visible from every angle is the name and function of every team member. This ensures that we can be approached easily by a judge or an interested guest.

For everyday use we designed simple but fashionable hoodies and caps worn at more casual occasions but also by fans, purchased in our web shop. Refer to page 11, Apparel brand.

To finish up the professional look we wear black pants with white shoes. The shoes correspond with the white shoulder to give it the impression of a sophisticated look.



white
Fig.3:
Adrian and Jannis;
by Ruth Forrester

Team slogan

Everything we do is driven by the ambition to be better than last time and to ultimately be the best. To express the desire to go beyond previous boundaries, we developed the slogan "SEE BEYOND". It is prominently placed on the lower back of all team clothing and on our pit display, reminding everyone that limits are often just self imposed and are meant to be broken.

Car paint

Kept in our team colours the SB22 is the perfect combination of elegant tones and rapid lines. The transition from blue to black mimics the flow of air. First the air is laminar flowing, but towards the rear of the car it gets progressively more turbulent. Red coloured parts are located in the vicinity of the stored energy, the cartridge. White surfaces promote a clean and professional design as with our pit display and team clothing. The white areas give space to our most prominent sponsors.



Fig.4: SB22

MARKETING STRATEGY

Strategy is the blueprint of decisions that will be taken in an organisation. To develop this blueprint and execute it meticulously is a task the whole team is involved in.

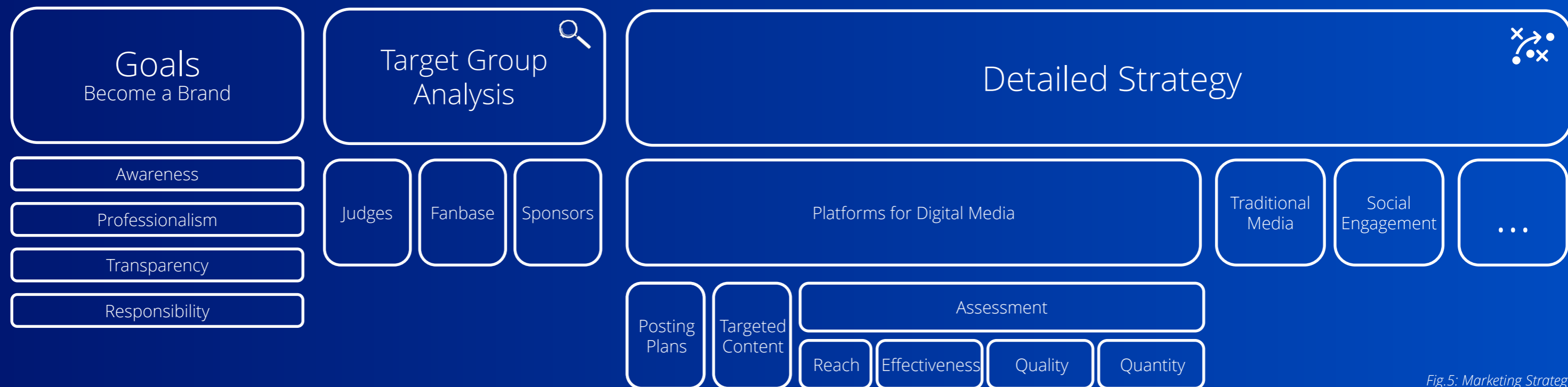


Fig.5: Marketing Strategy

Goals

The clear outlining of our goals at an early stage ensures that there was always the goal of becoming a brand. But what does this actually mean for us as an F1 in Schools team? A brand is something immeasurable. It is what makes our team. And it certainly is the most valuable asset in our team. Without our brand there are no sponsors, no marketing and consequently no car. Sonic Boom has to create a feeling, stay memorable and set the roots for future young students.

To reach this overarching goal we created four sub-goals in the beginning of our strategy planning.

Awareness

Our marketing has to create public awareness for our team. The awareness should not be limited to one target group. That's why we should use a range of platforms and materials for our brand.

Professionalism

All our marketing materials have to leave a professional impression. Quality management is crucial for our marketing. Every post, booklet or other material has to be scrutinized into the finest detail.

Transparency

We are aware that during a competition most information has to be kept confidential until certain deadlines are reached. However it is still important to have a certain level of transparency towards the people supporting you. Sponsors and other important stakeholders should be perfectly informed about our team at any time.

Responsibility

As the first team from our school, and just the second team from Bavaria, that qualified for a world finals event, we are conscious of the social, economical and environmental responsibility. Our marketing should have the goal of fulfilling these expectations (Read more on page 10).

Target group analysis

After establishing our marketing goals, it was important to carry out a detailed target group analysis. We had to ensure that we meet the interests of each group and target them correctly via the right platforms. With our target group analysis we identified three main groups. Our fanbase, sponsors (both potential and existing) as well as the judges of the competition. See on the right side an example for how we analysed one of these target groups.

Target group analysis

15th July 2021

Judges

What is the target group expecting from us as a team?

Judges rate us based on our performance in the different judging criteria. They expect professional and transparent work from our team.

How can we meet these expectations?

We have to study the judging criteria and build our marketing around the expectations mentioned in the criteria. We have to find innovative ways to stand out.

Are there any expectations which go against our team philosophy or the scope of the competition?

No.

Which platforms can we use to gain the attention of the target group?

As most of the judges are industry professionals, LinkedIn might be an important platform. But classic media appearances as well as other social media platforms like Instagram are important, as well.

Fig.6: Extract from our Target Group Analysis

Strategy development

After specifying the goals for our marketing and carrying out a detailed target group analysis we started developing our marketing strategy. Part of our considerations were platforms for social media, marketing in traditional media, as well as social engagement. We also worked out how to communicate our marketing plan within our team.

Digital media

We analysed the different digital media platforms which we could access with respect to reach, effectiveness and need for quality, as well as quantity of content. Different platforms require a different approach in terms of content and audience engagement. We thoroughly discussed this during our strategy planning.

Digital media analysis

17th July 2021

LinkedIn

How many people can we reach through this platform?

Reach is limited as many of our younger fanbase don't use LinkedIn. We approximate a potential reach of 50+ people.

How effective is the reach using this platform?

LinkedIn is a platform for industry professionals. We can directly arrange contacts between our team and potential sponsors on this platform. Therefore the effectiveness is relatively high.

Which quality is expected on this platform?

As this is a platform with industry professionals, we should strive for the highest quality possible.

How often do we need to post in order to have success?

Quantity is not as important as quality in this case. A detailed analysis needs to be run in order to find the best posting frequency.

What is the target group?

The target group are industry professionals.

Is targeted content sensible? If yes, how?

- Exclusive content is not necessarily needed, but we should filter our content from other social media platforms and only post what suits an industrial environment.
- Contact to potential sponsors can be carried out over direct messages.

Fig.7: Digital Media analysis for LinkedIn

Posting plans

A key point of our efficient marketing were posting plans. While we didn't follow a restrictive schedule for our postings, a lot of thought went into when and what to post on which platform. We assessed the required quality for a post, as well as the resulting time investment and our tolerance in time and effort to find the best posting plan for each platform. Refer to page 6, Digital media for optimum frequency analysis.

Scope justifications

Every marketing activity had to be justified with respect to our scope. This helped us avoid scope creep and thus stay environmentally as well as economically sustainable.

Scope justification

17th July 2021

F1 in Schools kick-off event Switzerland

Which of the main goals of our marketing are being fulfilled by this activity?

All four main goals are being fulfilled [...].

For which criteria of the scorecard do we expect points for this activity?

Social sustainability, marketing materials, audience engagement

What is our target group?

Young students interested in STEM

How are we planning on marketing this activity?

Invite audience via social media, create a Vlog-style video, post on all platforms after the event

Fig.8: Scope justification for F1 in Schools Kick-off in Switzerland

Status reports

Marketing activities often involve the whole team. It is important to keep all team members in the loop about upcoming activities and our relevant marketing materials to avoid asymmetric information. We shared regular status reports to communicate this within our team. A scheduled team meeting every Sunday was essential to relay important information team wide.

Traditional media

From the beginning, it was clear to us that appearances in traditional media were crucial if we wanted to raise awareness for our team on a regional level. This was actually part of our stakeholder management. We implemented a communication plan when to contact which media outlet.

Who to contact	What to communicate	Method	When
BR Fernsehen (Bavarian Television)	Our qualification for the world finals, our performance at the world finals	Phone and E-Mail	After the national finals, after the world finals
Süddeutsche Zeitung (South Germany newspaper)	STEM evenings at our school, sponsor evenings, performance at national and world finals	Phone and E-Mail	Whenever a local event is planned
Münchner Merkur (Munich Newspaper)	STEM evenings at our school, sponsor evenings, performance at national and world finals	Phone and E-Mail	Whenever a local event is planned

Fig.9: Communication plan for traditional media

Social engagement

A huge part of our marketing was our social engagement. It was a way for us to fulfil our social responsibility. Ways of social engagement were our STEM evenings, the guidance for starting teams at our school and our participation at the official kick-off event of F1 in Schools Switzerland. We were honoured for our engagement by our hometown, the City of Fürstfeldbruck.



Fig.10: Our team on the stage of the townhall, by Reger Günther



Website

Podcast

Newsletter

OPTIMUM FREQUENCY ANALYSIS

There are two input factors we consider when observing our digital media work. Quality and frequency of content. Both factors are variable and directly influence each other. We presupposed an imperfect substitution factor. Every marginal increase in quality becomes harder to achieve and is tied to a greater sacrifice in frequency, the same is true for a marginal increase in frequency.

Fig.11: Ratio quality/frequency in theory

To find an optimal frequency we first need to establish the graph with empirical data. By carrying out primary market research on our Instagram channel we were able to assemble a data set of 50 posts, each one with three traits: Quality, Time invested and Likes.

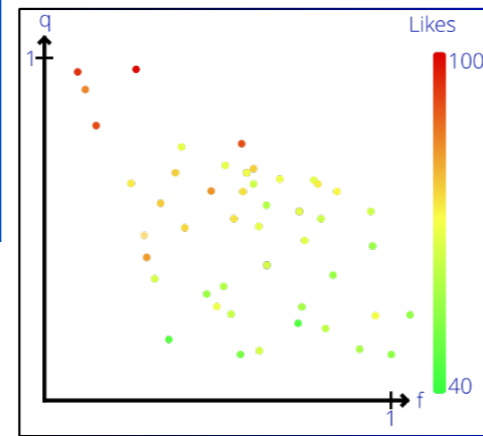


Fig.12: Empirical ratio quality/frequency

We chose Instagram in lieu of our whole social media landscape to standardise the data format, since our Instagram account has the most, and most easily traceable impressions. Figure 12 depicts a stylised graphic of the resulting scatter plot with quality and frequency as relative values between 0 and 1. This graph in itself gives evidence to two statements. It is almost impossible to create high quality

impossible to create high quality

posts along with high frequency and we never invested a lot of time in low quality posts. The addition of likes helped to identify any clear outliers and remove them, e.g. a post made on a busy competition day. They also revealed an inverse relation between frequency and likes, we explained this phenomenon with the Instagram algorithm pushing posts after a longer period of absence.

Just relying on this chart, you could think posts in the upper left corner will be the most promising, but the number of likes does not necessarily correlate with utility. A post is not always in line with our marketing strategy, even if it receives a lot of likes. When we reintroduce the concept of general utility from Fig.11, we notice again that roughly logarithmic lines do form. Points surrounding one line always have a comparable utility. They achieve the same goal and are equally useful.

To find an optimising point we introduce a lower bounds frequency. Approaching the world finals event you want to increase frequency steadily. This trend is indicated by the pink lines. Whenever we adjust our frequency, a pink line is added, to symbolise the new optimal quality for the desired frequency.

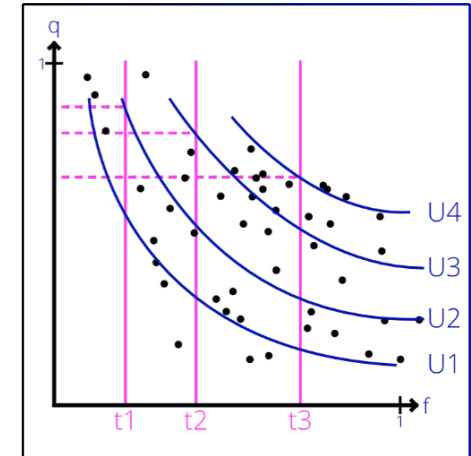


Fig.13: Scatter plot with utility lines

Instagram / Facebook

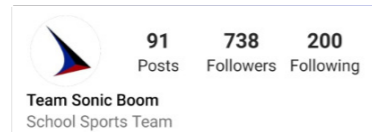


Fig.14: Instagram header

To conserve resources we decided to share one plan for Instagram and Facebook, since both platforms serve a similar purpose but only slightly differ in target audience. Both platforms offer a wide range of tools to identify your audience, and engage with highly specific target groups. As our most successful platform we used Instagram very often to get in contact with the largest of our target audience.

Twitter



Fig.15: Twitter header

Twitter is a very fast moving space to share news and ideas. While the range of usability is very broad if used correctly, the platform is not very popular in Germany. Since a big part of our fan base is located in Germany, we put less effort into regular high quality content here and rather focus on international topics in the F1 and F1 in schools space.

LinkedIn

With LinkedIn we had to take a different approach to traditional social media, since the target audience is drastically different. We found the greatest benefit being not in marketing but B2B contacts. Many industry professionals use LinkedIn personally to promote their professional image. This makes it a great tool to build a personal connection while staying connected to our brand.

Refer to page 5, Fig.7 for our detailed media analysis of LinkedIn

YouTube

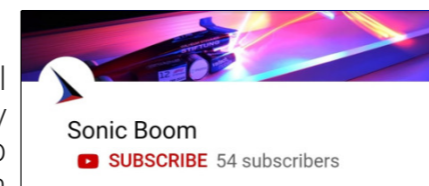


Fig.16: YouTube header

For big projects such as a car reveal or event Vlog, YouTube is the only marketable alternative. We found to have a limited reach on the platform itself, so most of our interactions were redirects from other platforms like Instagram or Facebook. YouTube also served as a platform for our podcast.

Tiktok

Tiktok is a trend that emerged during this season. The rather laid back approach to content can be hard to comply with a professional corporate identity, so we decided on a compromise. Our uploads on Tiktok are more sporadic, mostly short video highlights of events, as well as artistic renditions of ideas and competition elements.

Podcast

Refer to page 10, Sustainability for more information about our Podcast.

Website



Fig.17: Website header

Having a website is a pivotal element to marketing in the 21st century. Everything we couldn't do on social media we transferred to the website. This included a blog, a podcast overview, general information about the team and our car, a prominent showcase of our sponsors, a collection of high quality wallpapers to download and, of course, our shop. If uncertain, we always attach a link to our website. From there you can find out all about us and get in contact quickly.

Newsletter

To relay new information to our stakeholders we published a newsletter. To differentiate between public and confidential information we split the newsletter into two levels, a "Member Newsletter" and a "Sponsor Newsletter". Refer to Page 6 Management Portfolio for Stakeholder Communication.

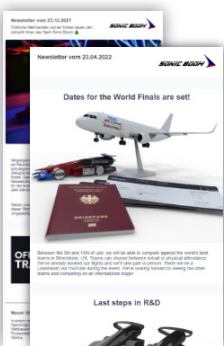


Fig.18: Screenshots of two newsletters

PIT DISPLAY DESIGN PROCESS

In order to come up with the best pit display ever seen we developed a sophisticated design process. It was important to always be aware of the requirements, constraints, as well as our own goals for the exhibition display.

We structured our design process into three phases. In the first phase we discussed the constraints we had for the final pit display. After that we defined the goals for our final pit display. With these requirements set we went into the concept phase after which we would have developed our final pit display.

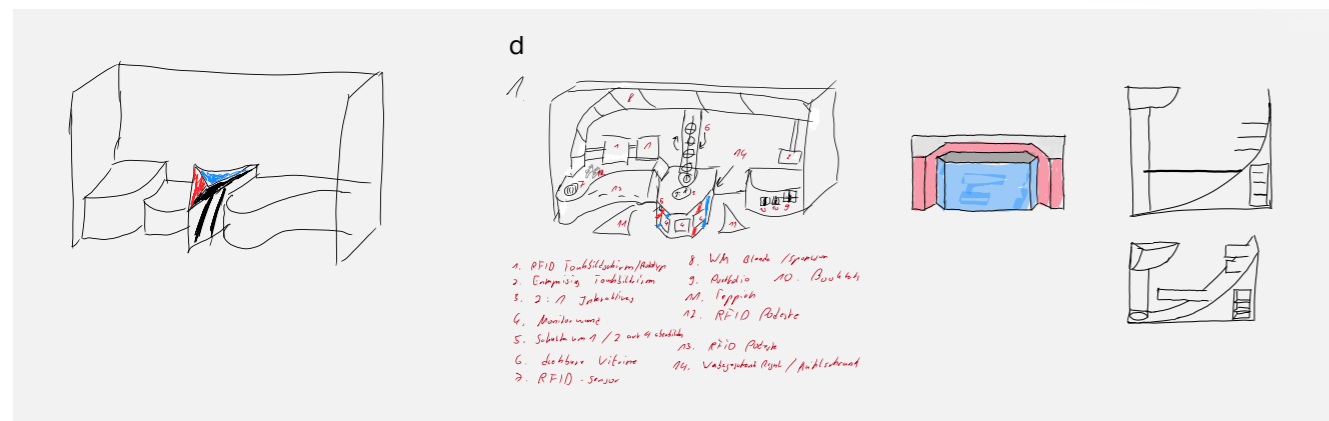


Fig.19: Sketches of pit display concepts which failed our assessment

Merchandise

The choice of eco-friendly marketing material is a challenging task. We decided to offer merchandise which is long-lasting or would be used anyway on competition day. To ensure a closed cycle we integrated a trash compartment for the drinks we offer. That way we could recycle the empty cans after the competition.

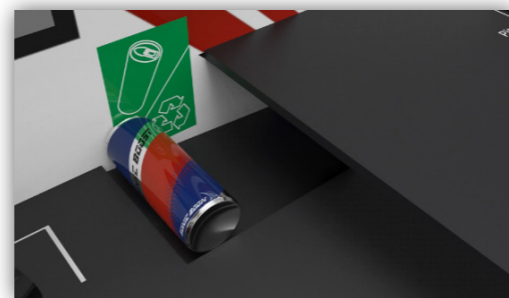


Fig.22: Trash compartment at pit display

FINAL PIT DISPLAY



Fig.20: Pit display

Experience our Pit Display Online!

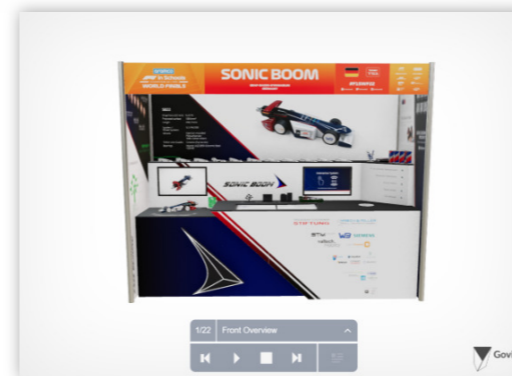
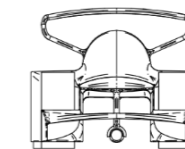


Fig.21: Govie

We partnered with 3DIT to make our pit display perceptible from everywhere. Visit teamsonicboom.de/3D to experience our booth (works best on PC/ Laptop).



Interactive RFID System
Our interactive RFID system enables our visitors to interact with the exhibits on the pit display. By putting any exhibit on the scanner visitors can instantly get all relevant information.



Interactive Model of the SB22
We partnered with Valtech Mobility to create an exhibit revolutionary to the competition. Visitors can interact with our up-sized version of the car by rotating or shaking the model. Visitors will get information on the different views of the car.



Icon
A key element of our branding at the pit display is our logo. It is integrated in the centre of our booth and ensures great visibility.

Packaging and Materials

Throughout the whole design process we were aware of the sizing constraints for the shipping of our pit display. We managed to fit the whole pit display into six boxes none of them exceeding a size of 158 cm (width + height + depth) and not weighing more than 30 kgs. The boards for the booth are made from recyclable cardboard. Our pit display framework is built from aluminum. The framework will be reused after the competition to create a pit display shell that teams can use at STEM events at our school.

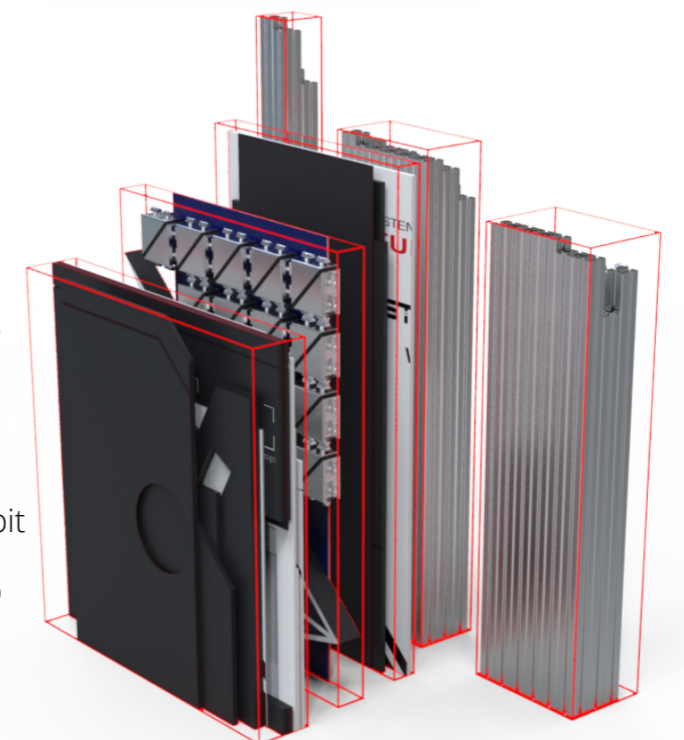


Fig.23: Transport

STRATEGY

To compete at the level we do, we strongly depend on each of our sponsors. Our highest priority is to always deliver the highest level of effort when working with the people who made this journey possible, regardless the size of their contribution. With many of our sponsors we were able to draw on their industry leading knowledge in engineering, as well as in management and enterprise. This was not only helpful on our F1 in schools journey but also a valuable learning experience for all of our future careers.

Target group analysis

As in every part of PR, you need to know and understand your target audience, your customers and your fans to succeed, likewise with our sponsor acquisition strategy. We found a brute force approach, as many teams apply, where you spam as many companies as possible with your marketing material, to be too unrefined and time intensive for our needs. From this understanding we started a target group analysis as we did for our social media (refer to page 3). We cross-referenced all of our past and present sponsors and the ones of some other teams to find a trend. This trend can be divided into three groupings. Smaller, regional businesses, bearing corporate social responsibility, international companies, looking to expand into new markets and shared-interest stakeholders, small to medium sized companies ambitious to share their technology.

Hierarchy

In favour of simplicity we decided to limit complexity in our sponsor hierarchy. A sponsor doesn't want to read through pages of different tiers that ultimately don't make sense. With our five-way split into Platinum, Gold, Silver, Bronze and Partner we achieved an intuitive ranking which makes sense at a first glance. Additionally to the five baseline tiers listed below we are always open to negotiate and come up with a custom package, tailored to the sponsors of this are smaller, local sponsors that profit less from advertising and more from their image as sponsors.

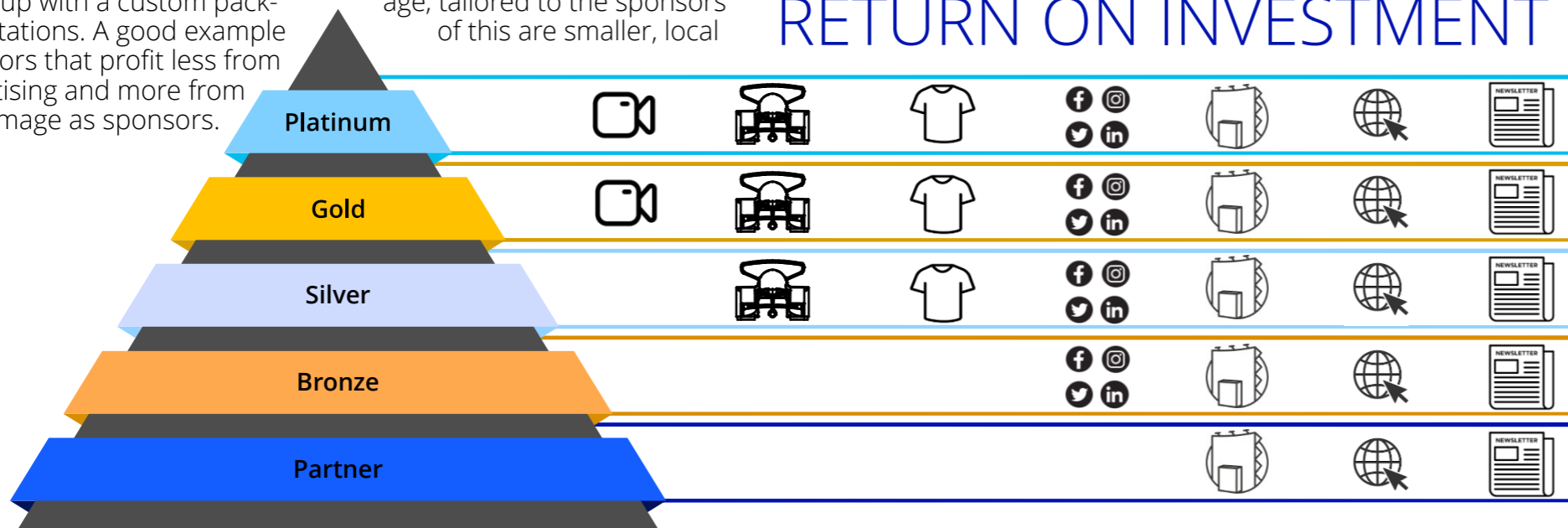


Fig.24: Sponsorship Pyramid

Even small gestures can go a long way. We always made sure to show our heartfelt appreciation to the ones supporting us, be it through one of our racecars, a calendar with team pictures or a handwritten letter.



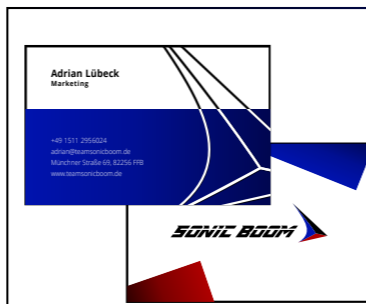
Acquisition initiatives

With a bulletproof strategy in mind, we started the active acquisition process. Being based near Munich we often found the opportunity to visit technology fairs like the Electronica, Productronica and IAA. There, many companies welcomed us with open arms, discussing with us our car design and our motivations as future engineers. Whenever not possible in person, we preferred personal contact via phone to email campaigns to leave a personal impression.



Fig.25: Anas with Nico Rosberg at the IAA, Nico Rosberg YouTube

Our calling cards often came in handy when meeting a potential sponsor unannounced, like when visiting the IAA in Munich or at our honouring at our town hall. We made sure to create six unique prints so every team member could initiate a personal relation from the start.



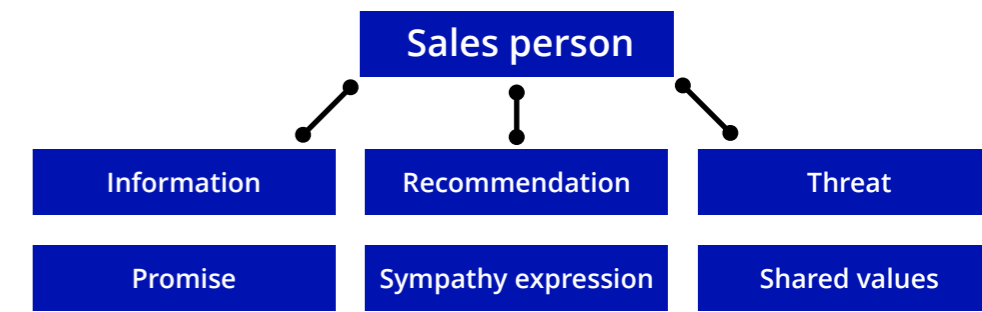
RETURN ON INVESTMENT

Socio-Economic Responsibility

For the longest time most large businesses were run with one goal: profit. In recent years this mindset is shifting among executives who now recognise that they also bear a social responsibility towards humanity and their planet. A good indicator of this is the emergence of so called low-profit limited liability companies and social purpose corporations. There are three types of Corporate-Social-Responsibilities to differentiate between: environmental, ethical and philanthropic. The last one is especially interesting to us, because it opens up a window of opportunity. A company driven by philanthropic responsibility will want to dedicate a portion of its earnings to make the world a better place. This can be through global charities, as well as their local communities. We, as a prominent group in our local community, experience this at first hand. Our acquisition strategy was designed with this in mind. We approached companies in our neighbourhood with a different booklet and a more personal sales pitch.

Sales

When we talk to a potential sponsor we become sales people pitching our product. Sales is a very well researched field in business and we intended to profit from the industry standard. In preparation of this season we took a closer look at a 2006 paper from McFarland, Challagalla, Shervani: 'Influence Tactics for Effective Adaptive Selling'. The authors declare all customers to fall into one of three communication styles. A sales person's job is to match the customer's style with one or more of six distinct styles of their own.



	Information	Recommendation	Threat	Promise	Sympathy expression	Shared values
Task-oriented	+	+	-			
Self-oriented		+		+	+	
Interaction-oriented					+	+

Fig.26: Sales matrix

Due to the very successful outcome of this technique we decided to implement it in our live judgments during the world finals event. The principle of us as a sales person and product equally applies to a board of judges.

COOPERATIONS

A particularly important group we identified early on in our target group analysis are shared-interest stakeholders (refer to page 8). These small to medium sized companies, not particularly bound by location, are drawn towards the competition and us as a team because of their cutting edge technology that they are eager to share with upcoming engineers and tech enthusiasts. They play an integral part in making us as a team stand out with unique ideas and technology. Our most important cooperations can be allotted to our pit display and our car.

Ansysis

We were especially excited to work together with Ansys. As the market leader in CFD, they provide many F1 Teams with their software. Working on that level was a thrill from start to finish. (Refer to Engineering Portfolio page 10 & 11). Together we worked on a case study as well as a video in which we market the Ansys products. The material will be published close to the world finals event.



Fig.27: Scenes from our video for Ansys, by Adrian Lübeck and Jannis Gordziel

CADFEM

CADFEM our local Ansys-partner supported us by giving feedback on our CFD-Simulations. With their help we were able to reduce the simulation time significantly while at the same time even improving the simulation accuracy. We carried out regular meetings with our responsible contact partner. CADFEM also gave us the chance to participate in their introductory courses on Ansys.



ReikaTex

ReikaTex helped us to build our apparel brand. We got valuable insights into material selection and printing of our clothing (Refer to page 11).



WB

The Werner Breitschädel GmbH has played an integral role in the Production of our car. Together with the engineers at WB we came up with an innovative production process for our wheels. The hybrid-material is processed through injection moulding. To achieve perfect concentricity we use CNC-turning as a second step. This allowed us to manufacture wheels efficiently at any time in the engineering schedule.



Through this cooperation we acquired valuable knowledge on the injection moulding process. We were involved in the simulations for the injection process and received crucial tips to optimise our car for stability and to avoid deformations.

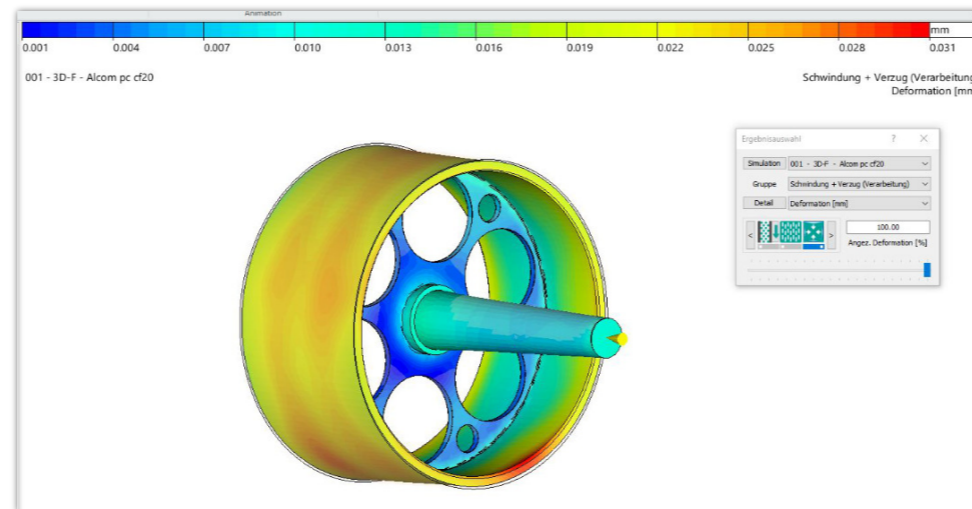


Fig.28: Simulation of injection moulding process

3DIT

Our newest pit display innovation for the world finals was 3DIT's Govie system. With their guidance we mastered this innovative software concept and implemented it in a way never seen before at the competition. With this year's world finals being a hybrid event we knew not everyone would be able to experience our pit display first hand. With Govie all you need is a phone or tablet to get a deeper insight to our pit display, similar to CAD but at the tip of your fingers.



Fig.29: Screenshots from our interactive 3D-presentation

Priapan Media

With this seasons world finals, the need for high quality video production has grown immensely. For our presentation and pit display video, as well as the shorter team introduction, we worked together with Priapan. With their expertise we were able to bring the quality of our content to a new level. The learning experience did not only include video production but also colour theory in light, camera settings and editing software.



Fig.30: Scenes from our presentation video, by Anas Izaaryene and Priapan Media

Science Media

Together with our partner we were able to carry out a sophisticated analysis of our car's track behaviour. Science Media supported us with the shooting of Highspeed footage with more than 2500fps.



Fig.31: Scenes from our presentation video, by Anas Izaaryene and Priapan Media

Valtech

Valtech mobility has been with us since the German championship, they helped us create an award winning pit display. With their expertise and craftsmanship we designed and built our Interactive Model, first based on the Shark II, and now the SB22. Working together has brought the greatest learning opportunities for us so far. To bring the Model to a satisfactory level of quality, we needed to learn about 3D Software, on one hand Blender, for graphics and on the other hand Unreal Engine as our game engine.



Social

A big part of our work consists of getting a future generation of F1 in Schools engineers excited about the competition and to create a healthy and competitive sense of community between teams and fans. An important part of this was our STEM marketing initiative. As the “big guys” at our school, we were given the opportunity to organise regular STEM evenings for our younger students. Here we were able to show off our newest cars on the racetrack to many awestruck students as well as teachers. During this last season this has led us to guiding many younger teams through their first year of competition.

In April 2022 we got the very special chance to attend Switzerland's grand introduction to F1 in schools at the Motorworld in Zurich,



Fig.32: Adrian at Zurich Motorworld

there we met many excited young students mesmerised by the cars shooting along the track as well as adults who marvelled at our old portfolios and booklets. To simulate the real competition, we helped organise a small scale racetrack with paper cars to build yourself.

Podcast

With our Podcast we were able to venture into a market not usually employed by teams. With 200+ regular viewers/listeners we have gathered a substantial following over the last year. The Titel “Unter die Sekunde” is German for “below one second” (of race time), the highest achievement a team can strive for. For branding we decided to go with a subsidiary approach, the design is closely tied to the Sonic Boom CI.



The Episodes range from a beginner friendly introduction to the competition, to exciting interviews with real F1 engineers and judges. On several occasions we collaborated with ‘Off The Track’, a group of F1 in schools alumni who started their own podcast and later blog, to talk about the competition. You can listen to all the episodes everywhere that commonly carries podcasts like Spotify, google podcasts, YouTube and many more.



Fig.33: Spotify Barcode

Environmental

Whenever we work with physical materials we bring back this mantra. It encapsulates how we approach all our resources. The right order is vital. Very often the misconception arises that Sustainability is just about Recycling, that could not be further from the truth. By Reducing & Reusing we ‘cut out the middleman’.

**REDUCE
REUSE
RECYCLE**

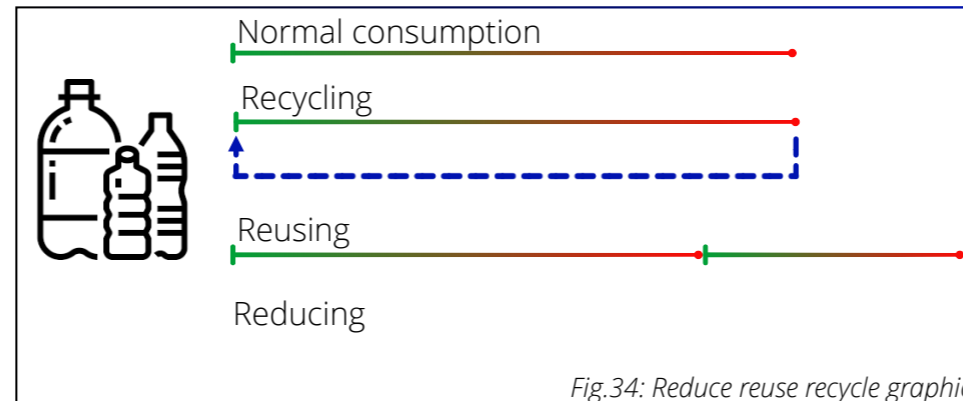


Fig.34: Reduce reuse recycle graphic

Evidently, no waste is always preferable even to recycling. But how did we apply this insight? The first step was primary analysis. To stay aligned with our available resources, we cannot reuse/reduce everything blindly. since this usually come with a sacrifice in quality as well as monetary resources. A pit display, planned to be built from solid wood, simply will not work when built from recycled cardboard. With a satisfactory plan worked out we got to implementation.

Implementation

Modular Testing System

In the first stage of our engineering we worked with modular prototypes.

This helped us to reduce the number of chassis needed in our development concept. These modular systems were used to test different wheel systems, tether line guides and other standard components. The chassis where designed without rear spoilers, in order to avoid the risk of breakages. This also helped us to reduce the number of replacement parts needed for the respective testday.

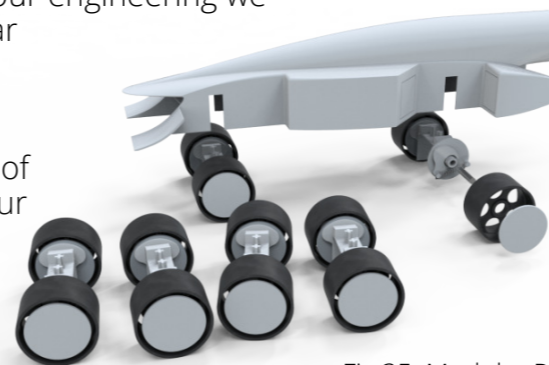


Fig.35: Modular Prototype

Economical

There are 3 economical resources we have to manage during the competition: Capital, Labour, and Financial. Refer to Management Portfolio page 4 for resource management. Our goal is to optimise the financial part, since it is connected to the highest risk, without money we can not compete or ‘sustain’ a team. This was done with an industry standard accounting system to track incoming and outgoing cash-flows and maintain a healthy overview. Our forecasts were always done pessimistically, to cushion any unforeseen deviations. These may occur when a Sponsor drops out on short notice or when an indeterminate expenditure comes out larger than expected. Having a solid forecast is also the basis for any future Sponsor work, as the better informed party you always have one up on the potential sponsor you negotiate with. Direct measures to save money include parts of our pit display design process, skipping the gimmicky marketing handouts or remodelling an old injection mould to precisely mass produce our new wheels. Ultimately any economical optimisation will directly benefit environmental sustainability. After finalising our accounts in the aftermath of the world finals we intend to overturn all equity into CO2 compensation.

Travel

With F1 in schools being an international competition there is no way around travelling a lot. Although whenever possible we try to schedule our meeting virtually, that is not always an option, be it for fairs, photoshoots or planning a pit display. Whenever truly necessary we had the great privilege to travel via electric car, which for us was a reasonable compromise. On longer journeys we often resorted to the German rail system, although not always optimal, since we often travel with much luggage. Of course travelling to the UK is controversial decision, but as a team we unanimously agreed that the once-in-a-lifetime experience outweighs the impact of the relatively short flight. When flying was the last resort we made sure to compensate for our CO2 output.

Standard Car parts

Throughout our development process we tried to reuse as many standard parts as possible. Wheels, axles and wheel hubs could easily be used for multiple testdays. We made sure, where possible, that standard parts were compatible with most of the prototypes. This is a great example for the concept of “Reuse” in our engineering process.

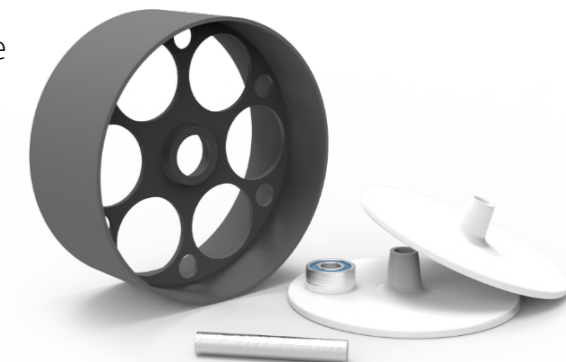


Fig.36 Wheel covers, axle, wheel and bearings

Case Study

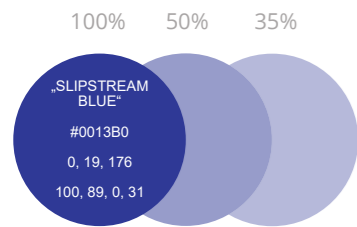
More than 10% of all man-made carbon emissions can be attributed to our lavish consumption of clothing. The life cycle of over 85% of all textiles we produce so resource intensively is shorter than one year - We believe that should be different. Due to the nature of the competition many teams including us are forced to resort to single-use apparel, to display the newest sponsors, the most recent team colours, and of course to stand out. With our apparel brand we are trying to tackle these issues. Along this case study we can observe how we established a small scale enterprise on the basis of the theories listed in this portfolio.

Design

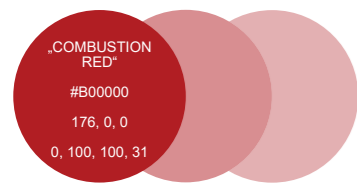
Design makes a team become a brand. Without coherent and recognisable design, customer retention is at risk. This is especially true for distributed goods. Trust in brand stability is a scarce value that we are proud to possess. With our hoodies we opted for a clean design clearly dictated by our corporate identity, while with the front we decided to be slightly more playful while staying true to our basic values.



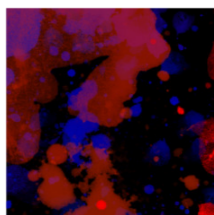
Iconic Sonic Boom Logo prominently on the back



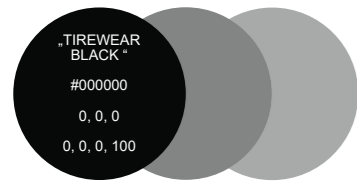
Our hashtag takes a secondary role, placed more subtly like usual



The flashy Sonic Boom colour combination of blue, red and black can't be missing from any of our marketing materials



We try to be loose with the specific application of our design not to stand in the way of creativity. That is why we often go with different design elements while staying within our brand. This colourful paint splash design has an especially playful look and fits perfectly with the more playful idea of the hoodie.



Shop

With our online shop we combined all the knowledge we gathered from building and maintaining an online presence through social media and our website. But with real products we wanted to move a step further and learned about 'search engine optimisation' or SEO. To optimise traffic there are a few variables we can adjust: Ranking, OnPage-/OffPage-optimisation, Keywords and Backlinking.



Fig.37: Anas and Jakob; by Ruth Forrester

Sustainability



From 80% organic cotton and 20% recycled polyester



Made to be long lasting



Produced fairly under 'WRAP' - standards



All Profits are reinvested into CO2 compensation

Sustainability was the most important factor to us. After all, it's why we started this venture. So we didn't shy away from setting up a faultless supply chain and always insist on highest quality.

Strategy

In the big picture of our marketing the apparel brand has played a pivotal role to stand out against our competitors. No team before us has taken this big step into a wildly new direction. With more emphasis than ever on sustainability, our ethically and environmentally flawless concept also sets us apart from other teams.

For our efforts to pay off we needed to make sure we reached a certain number of sales. To stimulate engagement and boost sales we analysed four key performance indicators or 'KPIs'.

Traffic, how many visitors are actively browsing on our store? Furthermore, where did they come from and what other platform has redirected the most visitors to us? Conversion rate, how many of the visitors actually end up buying something? This indicator is especially important to evaluate pricing. Visitor Satisfaction Index, are visitors happy? A slow, disorganised store can put visitors off from becoming customers.

With enough market and target audience awareness we were able to work out a specific marketing plan. After facilitating conversion with an initial pre-sale we regularly made fans aware of our apparel through social media.

Sponsorship

We knew we couldn't go into this on our own. That is why early in the planning stage we tried to get professionals on board - our biggest partner is ReikaTex. ReikaTex is a local, family-owned business specialising in textile print. With their help we were able to optimise the design for the open market, find a reliable supplier who satisfied our very high demands for sustainability and quality and even involved us in the printing process. Later they were by our side for industry standard quality control.

We've been able to learn a lot about clothing, printing, as well as supply chain management from them.

We depend on our sponsors, no matter their role. Thus we have to make sure to always provide an appropriate Return on Investment (ROI). In case of our partners there are two ways to achieve this. During all processes we try to carry as much workload as possible ourselves. For example by helping out during the printing stage we were able to drastically reduce the time investment on the sponsors side. Furthermore we designed a specific marketing strategy to promote the sponsorship on a regional level. Although cool, a Logo on a pit display somewhere in Great Britain has a negligible advertising value. So we focused on local media to advertise our sponsors, most prominently with the concept of Socio-Economic responsibility: "This company helps students achieve their goals and be successful. I will think about them the next time I need their product".



Fig.38: Adrian with Sponsor Reikatex

