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Project Team

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Live Remote Coaching in Sports - Exploring Sailing as a Use Case
• App Design • Sailing • Fan Engagement
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The main objection of the project is to utilize 5G in providing an application that combines real-time statistics with social media to further enhance and connect the sailing community. The application aims to innovate the current way data statistics are organized and displayed in sports. Freedom to customize camera angles and statistics allows fans and teams to tailor the information displayed on their screen. Additionally, teams would not need a coach boat to gather video and data from the race boat. Introducing 5G seeks to improve performance as coaches can make real time adjustments with the live video footage. The project started with understanding the needs of stakeholders such a race teams, event organizers, 5G operators, and fans. The next step was constructing a framework that includes all the capabilities and features of a

functioning application. Currently, the focus is organizing a team of developers to program a testable prototype.
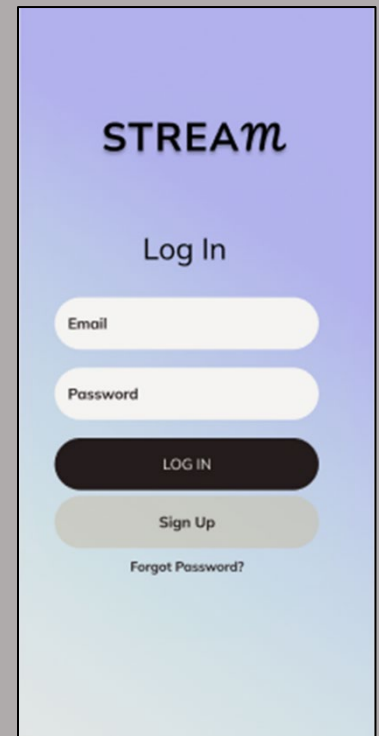

Fig. 1: Stream is app driven to allow ommunication of live streams with sailing.

PROJECT OVERVIEW

Sailing is a tech reliant sport which uses large sums of sensor data to help boats navigate. Due to this, the more fortunate teams have more resources than less fortunate teams, creating a competitive gap in the sport. One example are coach boats. The coach boat travels with the race boat to receive video footage and sensor data for debrief sessions after training/races. Despite of this, coach boats are costly to maintain and have a negative impact on the environment. Having this application would level the playing field for teams without a coach boat. It also allows teams to make real time adjustments instead of waiting until after performance. Another area of improvement is within judgments of crossing line starts and finishes. Finding a reliable way to accurately measure the boat location throughout the course would benefit the integrity of the game.

In terms of fan engagement, it is difficult to broadcast/stream the sport effectively due to its unique terrain. It is also hard to connect different global regions by covering their races. With faster upload/download speeds provided by 5G, it is possible to transform streaming by adding new dimensions to streaming such as live statistics, mic'ed up audio, etc.

Fig. 2: Image of a coach boat trailing behind a race boat.

PROJECT METHOD AND RESULTS

After gaining feedback from 5G technology companies, and sail race teams, we brainstormed what features should be incorporated. The model is to have sensor data overlaid with live footage. With presets feature, creators can choose what data measurements and camera angles they want on their display. A notes section allows coaches to create folders to upload sensor data, footage, video mark ups, and any text they wrote. Coaches can then send this marked data and footage back to the team. Furthermore, a GPS Mapping feature allows coaches to track how far the boat is from the start/finish line and mark bots.

RESEC

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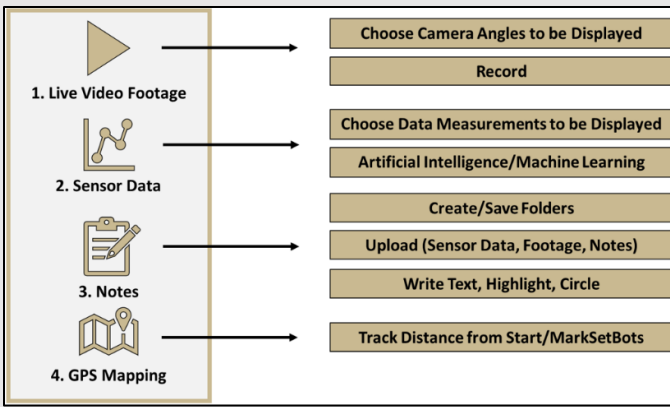jmansson@purdue.edu

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Fig. 3: Lists the technical capabilties of the application

The next step was to layout our ideas in a visual framework. Figma is an app design tool used to create the storyboard of the application. Once a user signs up, it will ask if you are a fan, athlete, coach, or organization. Next it will ask the user to select their favorite races, teams/organizations, and athletes. This is to develop a media feed that supports the users best interests. Next, the app will ask the user to search for any devices for pairing. Furthermore, if the user wants to create a stream, they first need to create a preset. Presets are customized layouts on how one wants their data to be communicated. Based off the devices paired, the user can select their desired sensor measurements. Once selected, the user can choose how they what the data to be visualized on the stream. On the user's profile, they can add statistics, streams, photos, and rosters, and in the form of rows.
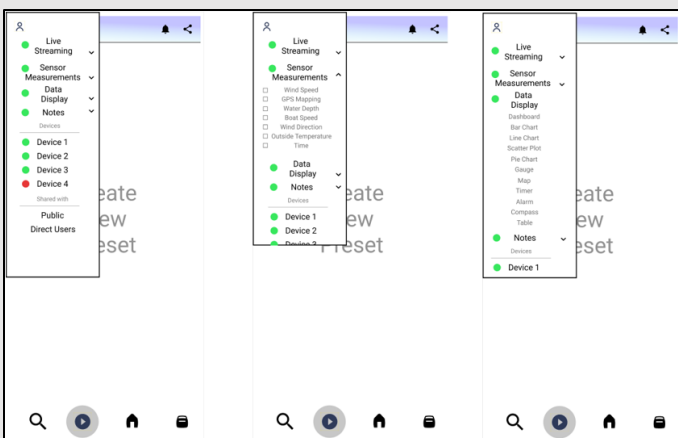

Figure 4: Presets setting dashboard

Once the framework was drafted, meetings were set up with people of different perspectives. Some feedback from a sail team coach was to sync devices from different companies, add an audio feature to the notes section, and include dead rise as a sensor measurement. Some feedback from a developer was to start simple with stream production and add the social media after. A team of 2-3 developers would be suitable for a 6–9-month time window.
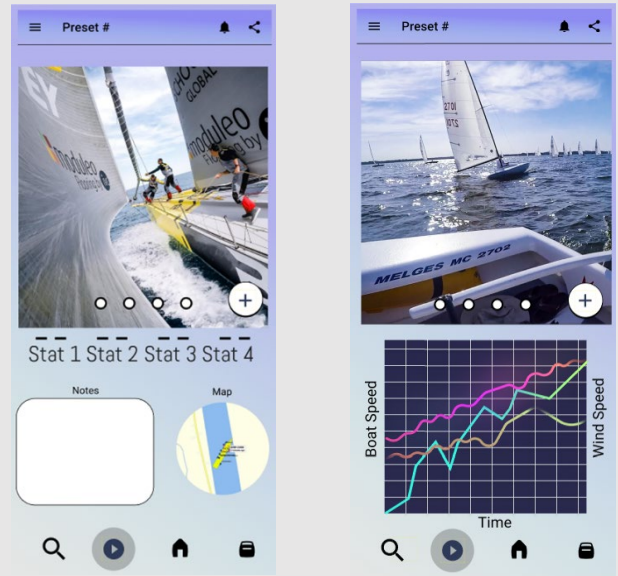

Fig. 5: Examples of possible presets

CONCLUSIONS AND FUTURE WORK
- Goal is to combine 5G technology to provide coaches an application that overlays statistics with live video footage.
- Major features:
  - Presets: Allow creators to customize the data and visualization within streams
  - Social Media: Connects fans with sailing events and shared content
        Future work
- Form relations with developers
- Research optimal environment for the frontend and backend
- Organize a long-term plan for goal setting and execution of the development phase

ABOUT RESEC

The Ray Ewry Sports Engineering Center (RESEC) was launched as a joint collaboration between Purdue College of Engineering and Purdue Intercollegiate Athletics, highlighting Purdue's reputation as the Cradle of Quarterbacks and Astronauts.

Sports have the power to unite, to teach, to challenge, and to initiate change, and those are our goals for RESEC. We are driven by our passion for sport and a deep understanding of the influence it has in shaping society. As technology continues to advance, there is enormous room for opportunity to rethink how athletes train, coaches coach, fans engage, and event organizers plan events. We collaborate closely with partners in athletics, industry, academia, and more to create the solutions that will help bring sports into the future, specifically in the three key research areas highlighted below.
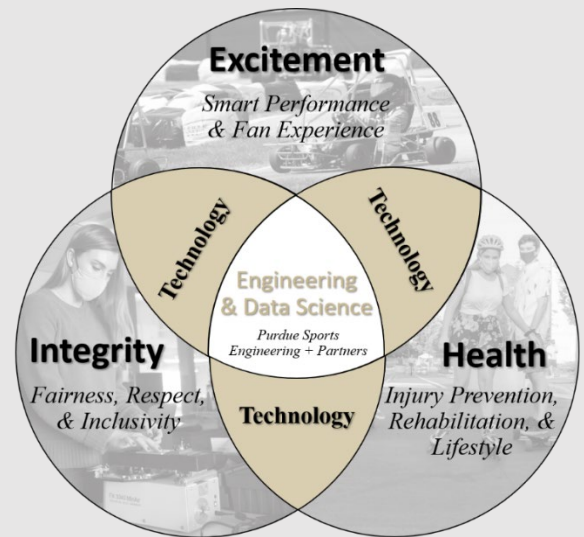
Smart Performance & Fan Experience

Injury Reduction & Rehabilitation

Sports Integrity, Fairness, & Societal Integration

Excitement — *Smart Performance & Fan Experience*

Integrity — *Fairness, Respect, & Inclusivity*

Health — *Injury Prevention, Rehabilitation, & Lifestyle*

Technology

Engineering & Data Science — *Purdue Sports Engineering + Partners*

WHAT IS SPORTS ENGINEERING?

Sports engineering is a global, fast-paced, and multidisciplinary industry that brings people from different backgrounds, cultures, and experiences together. It is an industry that is heavily influenced by advances in other sectors as well as societal pressures and shifts, making working as a sports engineer very exciting. However, it also means being keenly aware of how these innovations and discoveries can be integrated and applied, especially as digitalization expands and what people – the athletes, fans, coaches, governing bodies – expect from sport evolves.

Engineering and data science are at the center of excitement, health and safety, and the integrity of sport, and by bringing a data-driven, human-centered approach to this industry, we can address the growing need and desire to increase participation and engagement of athletes and fans.

WHO IS RAY EWRY?

A Boilermaker track and field athlete, Ewry (1873-1937) won eight gold medals in three Olympic Games from 1900 to 1908. But his story is relatively unknown: at the age of five he became an orphan, and at seven he contracted polio and was confined to a wheelchair. Doctors had little hope he would be able to walk. Later nicknamed "The Human Frog," Ewry won gold in the standing long and high jumps and standing triple jump. By the end of the 1908 Games, Ewry had set a medal count record that lasted more than 100 years.