Introduction:

After defining what the interpreted needs of the user are, it is important to outline the specific design criterias associated with each need. Within those design criteria, we categorize them depending on its effect (or not) on the solution's function and use numerical values based on the requirements desired for the potential solutions. User and technical benchmarking is defined as well to make sure we are aware of the design approaches done by the competition.

Prioritized Design Criteria:

#	Need	Design Criteria
1	Editable birthday messages and team set ups	-Impactful beginning display of team colours and logos represented with stats before games to entertain audience -Personalized messages+favourite colours for fans
2	Simple and Intuitive Panels	- Clear design and layout - Reliable software and quick response
4	Sponsor Satisfaction	- Display ads in a simple manner. -At least one sponsor message displayed at all times (on digital bands around arena, sponsor bugs, short ads interspersed in between game play, etc)

Target Specifications:

Functional Requirements:

#	Design Specifications	Relation (>,< or =)	Value	Units	Verification Method
1	Easily Editable	=	Yes	N/A	Test
2	Reliable quick software	=	Yes	N/A	Test
3	Usability	=	Yes	N/A	Test

Non Functional Requirements:

#	Design Specifications	Relation (>,< or =)	Value	Units	Verification Method
1	High resolution display	>	1,920 x 1,080	Pixel	Test
2	Appealing	=	Yes	N/A	Test
3	Easy to learn	=	Yes	N/A	Test

Constraints:

#	Design Specifications	Relation (>,< or =)	Value	Units	Verification Method
1	Cost	=	Low	N/A	Estimate, Final Check against previous show costs
2	Performance	<	80	GPU/CPU usage %	Test

Technical Benchmarking:

Company	Ross	SMT OPTICS	Venera Technologies	Newtek	BoxCast
Number of panels[@]	1	1	1	Unspecified	Unspecified
Personalization of Graphics[#]	Yes	Unspecified	Unspecified	Unspecified	Unspecified
Real Time Rendering of Graphics[$]	Yes	Unspecified	Unspecified	Unspecified	Unspecified
Reliance on hardware to function[%]	Yes	Unspecified	Unspecified	Yes	Unspecified
Inclusion of statistics in sponsor	No	Yes	Unspecified	Unspecified	Unspecified

messages^					
Real Time Analysis of Player Statistics&	Unspecified	Yes	Unspecified	Unspecified	Unspecified
Real Time system Metrics*	Unspecified	Unspecified	Unspecified	Unspecified	Yes

Why Each Technical Characteristic is Advantageous:

@ - Simplifies panel and makes system intuitive to use

- This characteristic of being able to control everything at once and display the same graphics everywhere not only makes the system easier to use for the operators, but the fan experience is also improved since there is no time where a fan may be missing some of the graphics being shown

- Makes the experience more personal to the fans

$ - Enables design team to spend less time editing and perfecting clips since rendering can be done on the spot (also increases the versatility of the system since in the event of a last-minute change, there is no problem editing the graphics)

% - Cheaper to keep old hardware (increases versatility of the system)

^ - Increases sponsor satisfaction

& - Makes system more convenient and efficient to use, while also bettering fan experience

* - Enables proactive troubleshooting for a smoother show and a better fan experience.

User Benchmarking:

Ross Video

RossVideo powers video productions for billions of global viewers daily. Their services include news, weather and sports broadcasts, engaging content for sports stadium screens, entertainment shows and concerts. Thus, the users of RossVideo are not only the operators of the control room who use the DashBoard interface provided by the company, but also the fans and the audience that experience the finished product.

One user success story from the RossVideo website is at the Nashville Predators' Bridgestone Arena who reached out to Ross for improvements to their game-production system by adding dynamic content. In other words, they were looking to satisfy the fan experience (the primary user). In addition, the Predators are looking to improve "the efficiency of their existing workflow between the Display Control and Production Control Room systems." Indeed, most of the operators' time was spent on rendering graphics rather than using real-time rendered solutions. Thus, they also wish to alleviate the operator's job in the control production room. The Predators have used various products from Ross, such as *Acuity, Xpression, Tria+, Carbonite Mosaic* and *Rocket Surgery.*

The Predators' operator team rapidly became comfortable with the updated workflow of the control room. In fact, the team's work for rendering graphics has been drastically reduced due to a "unified system between production control and LED." In turn, they were able to take any scenario and create an entire production function in a cohesive and uniform way while also making many things happen at the same time during the end-game show. Furthermore, the atmosphere at Bridgestone Arena is unlike any other; there is a sense of community, where each fan feels as if they are a part of the game, as if they contribute to what is happening on the ice. Nashville fans are loud, excited and energetic, and the Predators took that into consideration by implementing so many creative ways to make the atmosphere louder and overall an unforgettable experience for the fans.

SMT OPTICS

SMT (SportsMEDIA Technology) have found another way to revolutionize the fan experience during hockey games. They are the premier technology provider for world-renowned events, such as the NHL, the NBA and the Olympics. Their goal is to "understand how to harness and apply technology to create the next generation of unique tools and visual presentations to enhance analysis, storytelling, and the overall viewer experience." Thus, in this case, the users of their product include the operator of the control system, the fans and the broadcasters.

Their most recent success story includes the new puck-and-player tracking system for the NHL which will be installed in all 31 arenas for the 2020-21 season. During games, the central tracking system will send out "radio pings to the puck and player devices, which will reply by emitting pulses of infrared light. The infrared cameras can sense and triangulate those signals, locating the players and puck in three-dimensional space and transmitting that data nearly in real-time." In other words, the puck and player tracking system aims to foster fan engagement by augmenting broadcasters' like NBC storytelling capabilities (since the software will be sending them the data already packaged and integrated for broadcast) and help team analysts unlock new insights. Thus, it will drastically enhance the experience of everyone in the NHL community, including the players and the coach. For the fans, they plan on integrating free-to-play games and betting applications, so that even fans outside the arena can engage in the game.

Therefore, SMT has aimed to solve the broadcasters' needs (the ability to exploit the data visually within their broadcast) and in turn allow the broadcasters to tell some really great stories. By telling great stories, it gives the fans the ability to get some great insight into what's actually going on in the game and essentially showcase how exciting the game is on a much deeper and interesting level.

Reflect + Updated needs:
Given that the targeted needs were only made after the client meeting with the Ross Video staff, there were no changes to the updated needs of the client from the time of meeting them to now.

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