General Technological Overview

The main components of the setup are as follows:

The Twitch-Chat-Scraper Script: If a Chatter types a command into the chat window this script receives it via the Twitch-API and parses it into Keyboard-Commands.

The main Unity Application: (Has two purposes) Receives those Keyboard-Commands and executes them. Accordingly, it adds votes to the ballot, switches cameras and relays commands to the Gravitrax Connect Client Script via other specific keyboard command.  
Aside from that it arranges and displays all camera feeds - with visualizations for all of the voting processes and interaction options.

The Gravitrax Connect Client Script:  
Receives the Keyboard-Commands output by the Unity Application and transfers those via Bluetooth to the “Gravitrax Power Connect Brick”.

Gravitrax Power Connect Brick:  
This in Turn relays this information to the respective Gravitrax Power Elements (e.g. Switches, Starters or Levers) as a Signal on their “red”, “green” or “blue” channel.

Cameras:  
A mix of mirrorless DSLMs and Webcams capture the Marble track in its entirety with emphasis on important hotspots, such as controllable Switches. Their video feed gets ingested into the PC running the Unity Scene Manager Application in real time through either USB or HDMI links.

OBS: Captures the entire Unity graphical Frame and streams it to Twitch for everyone to see.

1. Abstract
2. Introduction
   1. State of the Art
   2. Motivation
   3. Goal
3. Finding Ideas and creative processes [taking a step back here]
   1. Extraneous Circumstances and initial request
   2. Creative Process Paradigm: 4D-Phases
      1. Discover: (Get Ideas via looking at Creative Tools/Processes & Models<such as Player Types>)
   3. Game Idea A: Melody Playground
   4. Game Idea B: Logistics Puzzler
      1. Player Types: Found via Identifying Achievers as not targeted audience (sandbox-y, therefore free, but non-linear)
   5. Streaming Idea: Interactive Livestream
      1. (Basic Concept)
      2. Inspiration and History of interactive live Video Feeds
      3. Multicam
      4. Moderation?
         1. A complexity I excluded, for focusing on all options for integrating technology – so you can sample them all…
      5. Streamers
         1. Interacting with a built track
         2. Building a track with feedback
4. Implementation (/Transfer?)
5. OR Technical Implementation
   1. Physical Set
   2. Core Software Framework (Unity + 2 PyScripts)
   3. Unity
      1. Video Input
      2. Camera Array (Video-Mixer?)
      3. More interactivity: Sfx
   4. Light-Up Switches
   5. Ausblick: Virtual Particle Systems in 3D Space
   6. Ausblick2: Clickmaps
   7. Ausblick (more vague): Build of an Independent webapp
6. AND Evaluation
   1. Ausblick hier?
7. *Abstract*
   1. *Tags and Buzzwords! (unity3d, 3dPrint, CAD-Software)*
   2. *Ergebnisse (coole latenz…*
8. Introduction
   1. Motivation *(kurz halten)*
      1. *WICHTIGSTER:Streams immer cooler, interaktive noch cooler! -> immer mehr Firmen (z.B. Product launches)*
      2. *(Digitale testversionen easy) Physische produkte testen und ausprobieren*
      3. *Digitalspielzeuge habens schwer, ich hole die leute ab wo sie eh schon sind (kein produktkauf nötig, soziales zusammenspielen)*
   2. Goals and /Abgrenzung/ (ausgearbeitet)
   3. Structure *(Inhaltsverzeichnis in prosa)*
9. Conception: Finding Ideas and creative processes *[taking a step back here]*
   1. {Extraneous Circumstances and }initial request
   2. Creative Process Paradigm: 4D-Phases
      1. *Discover: (Get Ideas via looking at Creative Tools/Processes & Models<such as Player Types>)*
   3. Game Idea A: Melody Playground
   4. Game Idea B: Logistics Puzzler
      1. *Player Types: Found via Identifying Achievers as not targeted audience (sandbox-y, therefore free, but non-linear)*
   5. Streaming Idea: Interactive Livestream
      1. *(Basic Concept)*
      2. UI and 3 Wireframes
      3. Inspiration and History of interactive live Video Feeds
      4. Multicam
      5. Moderation?
         1. *A complexity I excluded, for focusing on all options for integrating technology – so you can sample them all…*
      6. Streamers
         1. Interacting with a built track
         2. Building a track with feedback
      7. //Gibt keinen Programmablauf, nonlinear, come in and have fun…oder eben Phasen
      8. *ANforderungsanalyse? (Ziele optimierung visual quality vs latency/performance) (vielleicht später)*
10. State of the Art
    1. Grundlagen? (Technische basics, api, twitch how does it communicate)
    2. Conflicts: Telegames (I have: no fail condition, lower laterncy, social chaos is feature)
    3. Potential (Motivation an konkreten beispielen) (konkrete beispiele vlt hier und mein Wunsch/pipe dream oben in konzeption)
11. Hardware Implementation
    1. Camera Setup
    2. Lighting and Set
    3. Marble Tracks
    4. *Expansion*: Configuring a custom Daughterboard for a tightly integrated Set
12. OR Technical Implementation
    1. Physical Set
    2. Core Software Framework (Unity + 2 PyScripts)
    3. Unity
       1. Video Input
       2. Camera Array (Video-Mixer?)
       3. More interactivity: Sfx
    4. Light-Up Switches
13. Evaluation
14. Fazit & Ausblick
    1. *Ausblick*: Virtual Particle Systems in 3D Space
    2. *Ausblick2*: Clickmaps
    3. *Ausblick3*: Development of an independent Webapp

3.0/3.1

Before arriving at a streaming concept there were other prototypes defined and pitched to Ravensburger. The following chapter outlines the creative process leading up to the final pitch.  
To that end I took a look at different creative tools and processes, with the goal of finding ideas that could build upon the concepts and mechanics that are at work in Gravitrax and give more value to an already working system.

To gain an understanding for the toy and brainstorm for expansion possibilities I used a model popular in Ludology to identify the main motivators for interacting with Gravitrax. This model does not only explain what type of players engage with Gravitrax but could show, which extensions can Gravitrax benefit from. Even though it is originally derived from video games, it can give some insight into boardgames and toys as well.