GNG1103

**Design Project User and Product Manual**

**Echoes of the Flame**

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**List of Acronyms and Glossary**

**Table 1. Acronyms**

|  |  |
| --- | --- |
| **Acronym** | **Definition** |
| VR | Virtual Reality |
| NPC | Non-Playable Character |
| BOM | Bill of Materials |
| SSD | Solid State Drive |
| GUI | Graphical User Interface |
| FPS | Frames Per Second |
| Oculus | A popular VR headset brand by Meta |
| Unity | A game development platform used to create interactive 3D content |

**Table 2. Glossary**

|  |  |  |
| --- | --- | --- |
| **Term** | **Acronym** | **Definition** |
| Simulation | Sim | A virtual experience designed to mimic real-world scenarios for educational or entertainment purposes. |
| Wildfire | - | A large uncontrolled fire that spreads quickly in rural areas or forests, often caused by climate change. |

**1.0 Introduction**

Welcome to the Echoes of The Flame simulation, where users will explore the dynamics of climate change, understanding the underlying effects of wildfires. This interactive experience will allow users to immerse themselves in a virtual reality environment, where they will foster empathy and understand how to mitigate their impact. Whether you are a student, researcher, or emergency responder, this tool offers valuable insights into wildfire behavior and response strategies.

By immersing yourself in this virtual environment, you will gain a deeper understanding of the challenges of wildfire control and the importance of proactive measures. Get ready to strategize, experiment, and develop skills that could help make a real-world difference!

The user manual is structured to help users understand the simulation while forming the skills to immerse themselves. The purpose of the user manual is to help the users explore a different reality, to expand their skill sets, and introduce a new concept of learning. The simulation is for all ages, allowing all individuals to gather a different perspective on climate change. This User and Product Manual (UPM) provides the information necessary for all types of users to effectively use the simulation *Echoes of the Flame* and for prototype documentation.

**2.0 System Requirements**

**CPU/Processor:**

* Minimum: Intel i5-4590 / AMD Ryzen 5 1500X
* Recommended: Intel i7-9700K / AMD Ryzen 7 3700X or better

**GPU (Graphics Card):**

* Minimum: NVIDIA GTX 1060 / AMD Radeon RX 480
* Recommended: NVIDIA RTX 3060 / AMD RX 6700 XT or better

**RAM:**

* Minimum: 8 GB (recommended to have 16 GB or more)

**Storage:**

* Minimum: 50 GB free space (SSD highly recommended for faster load times)

**USB Ports:**

* 1-2 USB 3.0 ports for headset and sensors
* Windows 10 or later (some headsets support Linux/macOS, but Windows has the best compatibility)

**Display Output:**

HDMI 1.4, DisplayPort 1.2 or newer (depends on the headset)

**2.1 Overview**

### **Problem & Importance**

Wildfires are increasing in frequency and severity due to climate change, yet many people underestimate their impact. Communities, policymakers, and individuals need a deeper understanding of the destruction wildfires cause—both environmentally and socially. *Echoes of The Flame* addresses this by immersing users in a realistic VR experience, allowing them to witness the consequences firsthand. By fostering empathy and awareness, this simulation can drive more informed decisions about climate action and disaster preparedness.

### **Fundamental User Needs**

* **Education & Awareness**: Users need an engaging way to understand how climate change fuels wildfires and how communities are affected.
* **Empathy & Connection**: Rather than just reading statistics, users benefit from an emotional experience that makes the crisis feel personal.
* **Interactivity & Engagement**: Passive learning isn't enough—users should interact with the environment to grasp cause-and-effect relationships.
* **Actionable Insights**: Users need to leave the experience with practical knowledge on fire prevention, policy implications, and sustainability efforts.

### **What Sets *Echoes of The Flame* Apart?**

* **Deep Emotional Engagement**: Unlike static documentaries or articles, VR immerses users in a living, breathing environment where they *feel* devastation.
* **Realistic Fire Dynamics**: The simulation models how fires spread based on real-world physics, making the experience scientifically grounded.
* **Choice-Driven Experience**: Users can interact with the environment, make decisions, and see the consequences, enhancing retention and impact.
* **Adaptive Narratives**: Unlike one-size-fits-all educational tools, this simulation adjusts based on user actions, creating a personalized experience.

### **Key Features & Functions**

* **Fully Immersive VR Environment**: Users explore a virtual forest and nearby town as wildfire spreads.
* **Interactive Scenarios**: Players experience multiple perspectives, from a firefighter to a displaced resident.
* **Scientific Accuracy**: Fire behavior is simulated based on climate data, wind patterns, and fuel sources.
* **Educational Modules**: Integrated learning points explain wildfire prevention and climate change links.
* **Emotional Storytelling**: NPCs (non-playable characters) with personal stories make the experience more impactful.

### **System Architecture & User Access**

* **Platform**: VR-based simulation, compatible with major VR headsets.
* **User Interaction**: Motion controllers allow users to explore, pick up objects, and make choices.
* **Accessibility**: The system offers guided narration for those unfamiliar with VR, ensuring ease of use.
* **Construction**: Built with a high-fidelity game engine, featuring realistic fire physics and dynamic environments.
* **Special Conditions**: Requires a VR headset with moderate hardware capabilities; best experienced in a quiet space to enhance immersion.

**3.0 Installation**

Installing the system to launch *Echoes of The Flame* requires the installation of the game.

1. Download *Echoes of The Flame* from the official website “IntuitiveDesignVR.ca”.
2. Run the installer and follow the on-screen instructions.
3. Launch the application from the desktop shortcut or start menu.

**4.0 Getting Started**

Once installation is complete, follow these steps to begin using the VR simulation:

1. **Launch the Application:**  
    Double-click the desktop icon or open the application from your installed programs list.
2. **Connect Your VR Headset:**  
    Ensure your VR headset is properly connected and detected by your system. Check for firmware updates if prompted.
3. **Calibrate Your Space:**  
    Follow the on-screen instructions to define your play area. Make sure the space is clear of obstacles for safety.
4. **Log In Into Profile:**  
    You'll be prompted to either log in a user profile. Make sure your Oculus Meta account is logged in you VR Oculus app.
5. **Start the Simulation:**  
    From the main menu, select “Start Experience” to launch the forest ranger scenario and begin your immersive journey.

**5.0 Features**

This VR experience offers several key features designed to provide users with an immersive and educational journey into the effects of climate change:

* **Immersive First-Person Role:** Users step into the shoes of a forest ranger, directly engaging with the environment and wildlife to experience the emotional impact of climate change.
* **Interactive Storytelling:** A focused narrative centers on rescuing a distressed deer, allowing users to experience a powerful and emotionally resonant storyline without overwhelming complexity.
* **Educational Insights:** Through visual cues and environmental changes, users learn about climate-related issues such as habitat destruction, rising temperatures, and human impact on ecosystems.
* **Optimized for Meta Quest 3:** The experience is built to run smoothly on the Meta Quest 3, offering high-quality graphics and responsive controls tailored to standalone VR play.

Below is a picture of the simulation:

A path through a forest


**Below is a list of costs:**

|  |  |  |
| --- | --- | --- |
| **Item** | **Description** | **Estimated Cost (CAD)** |
| Meta Quest 3 Headset | Provided by school | $0 |
| Unity Software | Licensed by the university | $0 |
| 3D Assets (Deer, Plants, Props) | Sourced from Unity Asset Store (partially free) | $15 |
| Sound Effects | Free downloads and self-recorded | $0 |
| Graphics Tools | Free version | $0 |
| Custom Assets/Textures | Purchased as needed for visual enhancement | $25 |

**6.0 Product List**

|  |  |  |
| --- | --- | --- |
| ***Product*** | ***Price*** | ***Link*** |
| Nature Renderer 6・Free | Free | https://assetstore.unity.com/packages/tools/terrain/nature-renderer-6-free-285961 |
| Small Survival Pack | Free | https://assetstore.unity.com/packages/3d/props/small-survival-pack-20565 |
| Cigarette Smoke VFX | $5 | https://assetstore.unity.com/packages/vfx/particles/cigarette-smoke-vfx-270030 |
| The Bonfire | $15 | https://assetstore.unity.com/packages/3d/props/exterior/the-bonfire-302307 |
| Fallen Tree Barrier | Free | https://assetstore.unity.com/packages/3d/fallen-tree-barrier-free-49089 |
| Cigarette Lighter PBR | Free | https://assetstore.unity.com/packages/3d/props/cigarette-lighter-pbr-106937 |
| Pickup Model | Free | https://assetstore.unity.com/packages/3d/vehicles/land/pickup-model-135387 |
| Fuel Tank 10L | Free | https://assetstore.unity.com/packages/3d/props/fuel-tank-10l-230694 |
| Free Fire VFX | Free | https://assetstore.unity.com/packages/vfx/particles/fire-explosions/free-fire-vfx-266227 |
| FREE Stylized PBR Textures Pack | Free | https://assetstore.unity.com/packages/2d/textures-materials/free-stylized-pbr-textures-pack-111778 |
| Animals FREE - Animated Low Poly 3D Models | Free | https://assetstore.unity.com/packages/3d/characters/animals/animals-free-animated-low-poly-3d-models-260727 |

**7.0 Controls**

The simulation uses standard VR controller input to provide a smooth and user-friendly experience. Controls are designed to be intuitive and require minimal instruction so that users can focus on the content and message of the simulation.

#### **7.1 Movement**

Teleportation

* + Left Joystick – Aim the teleport arc and release to move.

Snap Turn

* + Right Joystick (left/right) – Rotate view in 30° increments.

#### **7.2 Interactions**

Trigger Dialogue / Objects

* + Right Trigger Button – Activate objects, dialogues, or continue the simulation.

Progress Through Scenes

* + Prompts will appear at specific points. Press the A button to continue or interact.

#### **7.3 Menu Navigation**

Pause / Settings Menu

* + Menu Button (≡) – Opens the in-simulation menu.

Navigate Options

* + Use joystick to move through menu items.
  + Use A Button to select options (e.g., captions on/off, return to main menu).

#### **7.4 Accessibility Options**

Captions

* + Can be turned ON or OFF in the pause menu.
  + Go Back / Skip Scene Available options in menu to return to previous scene or skip forward if unlocked.

**7.5 Exit Simulation**

* Hold the Menu Button (≡) for 3 seconds to return to the main menu or exit.

**8.0 Tips for Effective Use**

List of tips for effective use of VR

* Ensure your **PC meets or exceeds** the recommended system requirements for smooth performance.
* Set up your **tracking sensors or base stations** correctly to cover your play area.
* Avoid direct **sunlight or reflective surfaces** that may interfere with tracking.
* Adjust the **headset fit** to reduce pressure on your face and ensure a clear view.
* **Clear obstacles** from your VR space to avoid tripping or bumping into things.
* Use smooth turning to avoid any motion sicknesses

**9.0 Troubleshooting**

If you encounter issues while using the simulation, try the following solutions:

* **Simulation Won’t Launch:**
  + Ensure your system meets the minimum requirements (see Section 2.0).
  + Restart your computer and try again.
  + Reinstall the application if the problem persists.
* **VR Headset Not Detected:**
  + Check cable connections and USB ports.
  + Restart your headset and computer.
  + Make sure headset drivers and firmware are up to date.
* **Tracking Issues or Glitches:**
  + Recalibrate your play area through the application settings.
  + Ensure good lighting and remove reflective surfaces from your space.
* **Audio Not Working:**
  + Confirm your VR audio output is correctly set in system sound settings.
  + Test audio with another app to verify headset functionality.
* **Simulation Lag or Freezing:**
  + Close background programs to free up system resources.
  + Lower graphic settings in the VR app if available.

If issues continue, refer to Section 9.0 for support contact details.

**10.0 Contact and Support**

For technical support or feedback, please visit **IntuitiveDesignVR.ca/support** or reach out to us directly at [**support@IntuitiveDesignVR.ca**](mailto:support@IntuitiveDesignVR.ca).

Thank you for engaging with *Echoes of The Flame*. Your participation not only enhances the simulation but also helps advance real-world wildfire management strategies. We value your insights in shaping a safer, more sustainable future.

**11.0 Future Development Considerations**

### **11.1 Expanding User Interactivity**

* Implementing branching narratives where user decisions affect the progression of the story and consequences of climate events.
* Adding hands-on tasks such as fire prevention measures, habitat restoration, and emergency response actions to make the simulation more engaging.
* Integrating a decision-tracking system, where users receive a summary of their choices and how they align with real-world climate mitigation strategies.

### **11.2 Enhancing Realism and Scientific Accuracy**

* Improving wildfire propagation mechanics based on actual climate models and fire behavior studies.
* Implementing real-time climate analytics that allow users to see up-to-date wildfire risks in different regions.
* Expanding ecosystem damage visualization, showing the gradual recovery process post-wildfire, based on ecological research.

### **11.3 Accessibility and Multi-Platform Support**

* Ensuring the simulation can be experienced on both VR and non-VR devices, increasing accessibility.
* Adding alternative control schemes for users with physical disabilities, including voice-controlled navigation and simplified UI interactions.
* Optimizing the simulation for low-performance devices to ensure broader availability, particularly for educational institutions and public awareness campaigns.

### **11.4 Multiplayer and Collaborative Features**

* Introducing collaborative multiplayer modes, allowing multiple users to experience the simulation together and work through environmental challenges as a team.
* Enabling shared learning experiences, where educators or facilitators can guide users through the simulation while providing live discussions.

### **11.5 AI-Powered Dynamic Events**

* Integrating AI-driven environmental changes, where climate conditions adapt dynamically based on user behavior.
* Implementing adaptive storytelling, where users receive different climate scenarios based on their prior interactions and learning preferences.
* By implementing these enhancements, future iterations of the simulation will increase its realism, accessibility, and overall educational effectiveness. These improvements will not only increase engagement for general users but also make the simulation a valuable resource for climate educators, policymakers, and activists.

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Link to codes used: <https://github.com/raphaelpinto05/Echoes-of-the-flame-codes.git>