

# Product Requirements Document:

## Project Aura

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### 1. Vision & Introduction

Project Aura is a revolutionary human-computer interface that enables effortless, high-fidelity gesture control of a desktop environment. It eliminates the need for physical input devices by creating an invisible, intelligent field of interaction. By leveraging millimeter-wave (mmWave) radar and a sophisticated AI engine, Aura will offer a seamless, private, and intuitive way for power users to interact with their digital world, embodying the pinnacle of ambient computing.

### 2. Target User Persona

The primary user is the "Sovereign Creator"—a tech-savvy professional, designer, or thinker like Your Highness. This user:

- Values a minimalist, uncluttered workspace.
- Demands powerful, efficient, and precise tools.
- Is an early adopter of cutting-edge technology.
- Prioritizes elegance and aesthetics as much as function.
- Requires a system that is intelligent enough to understand intent, not just raw input.

### 3. Goals & Objectives

- **Create a Contactless Interface:** Develop a system that can track hand and finger motions in 3D space without requiring the user to wear any gloves, rings, or sensors.
- **Ensure High Fidelity:** Achieve a level of accuracy and low latency that feels instantaneous and natural, suitable for precise tasks like cursor control and object manipulation.
- **Prioritize Privacy:** Utilize a sensor technology (mmWave radar) that does not rely on cameras, ensuring the user's privacy is fundamentally protected.
- **Deliver an Intuitive Experience:** Design a core gesture library that is easy to learn and maps naturally to common desktop actions.
- **Maintain a Minimalist Footprint:** The physical hardware unit must be small, unobtrusive, and aesthetically pleasing, capable of being integrated into a high-end desk setup.

### 4. Core Features & Requirements

#### 4.1. Hardware: The "Aura Beacon"

- **Sensor:** Must use a 60 GHz mmWave radar chipset for high-resolution motion detection.

- **Form Factor:** A compact, stand-alone unit designed to sit on a desk or attach to a monitor. Dimensions not to exceed 10cm x 3cm x 2cm.
- **Connectivity:** Must connect to the host computer via a single USB-C cable for both power and data.
- **Materials:** Enclosure must be constructed from premium materials (e.g., anodized aluminum, bead-blasted polycarbonate).

4.2. Software: The "Ghost" AI Engine

- **Gesture Recognition:** The AI model must be able to accurately identify and differentiate between the gestures defined in the core library.
- **Tracking:** The engine must track the 3D position of the user's wrists and infer the positions of the fingertips in real-time.
- **Calibration:** A simple, one-time calibration process must be initiated on first use to establish the user's neutral hand positions and interaction volume.
- **Performance:** End-to-end latency (from motion to on-screen action) must be below 50ms.
- **Efficiency:** The background process must consume minimal CPU resources when not actively tracking gestures.

4.3. Desktop Client & Onboarding

- **Control Panel:** A user-facing application that allows for:
  - Toggling the Aura system on and off.
  - Customizing the mapping of gestures to system actions (e.g., map "Swipe Left" to "Switch Desktop").
  - Adjusting sensitivity and the size of the interaction zone.
- **Visual Feedback:** Provide optional, subtle on-screen cues to confirm when a gesture has been successfully recognized.
- **Supported OS:** The initial release must support Windows 11 and macOS.

4.4. Foundational Gesture Library

Gesture Name	Description	Default Action
Activate Aura	Hold a flat, open palm facing the sensor for 2 seconds.	Toggles gesture tracking on/off
Cursor Control	Move the wrist of the dominant hand within the interaction zone.	Moves the system cursor
Primary Click	A sharp pinch gesture with the thumb and index finger.	Left Mouse Click

<b>Secondary Click</b>	A sharp pinch gesture with the thumb and middle finger.	Right Mouse Click
<b>Scroll</b>	Raise or lower the index finger while keeping the hand steady.	Scroll Up / Scroll Down
<b>Swipe</b>	A decisive horizontal swipe motion with the entire hand.	Switch App / Desktop
<b>Zoom</b>	Move two closed fists apart or together.	Zoom In / Zoom Out

## 5. Future Scope (Post-V1.0)

- **Two-Handed Tracking:** Independent tracking of both hands for complex, multi-point interactions.
- **Custom Gesture Creator:** A tool allowing users to record and define their own gestures.
- **Application-Specific Profiles:** Pre-configured gesture sets for software like Adobe Photoshop, Blender, or web browsers.
- **Haptic Feedback Integration:** Potential integration with a wearable wristband (like a smartwatch) to provide haptic confirmation of gestures.