Integration of Tracing in any one of the made projects

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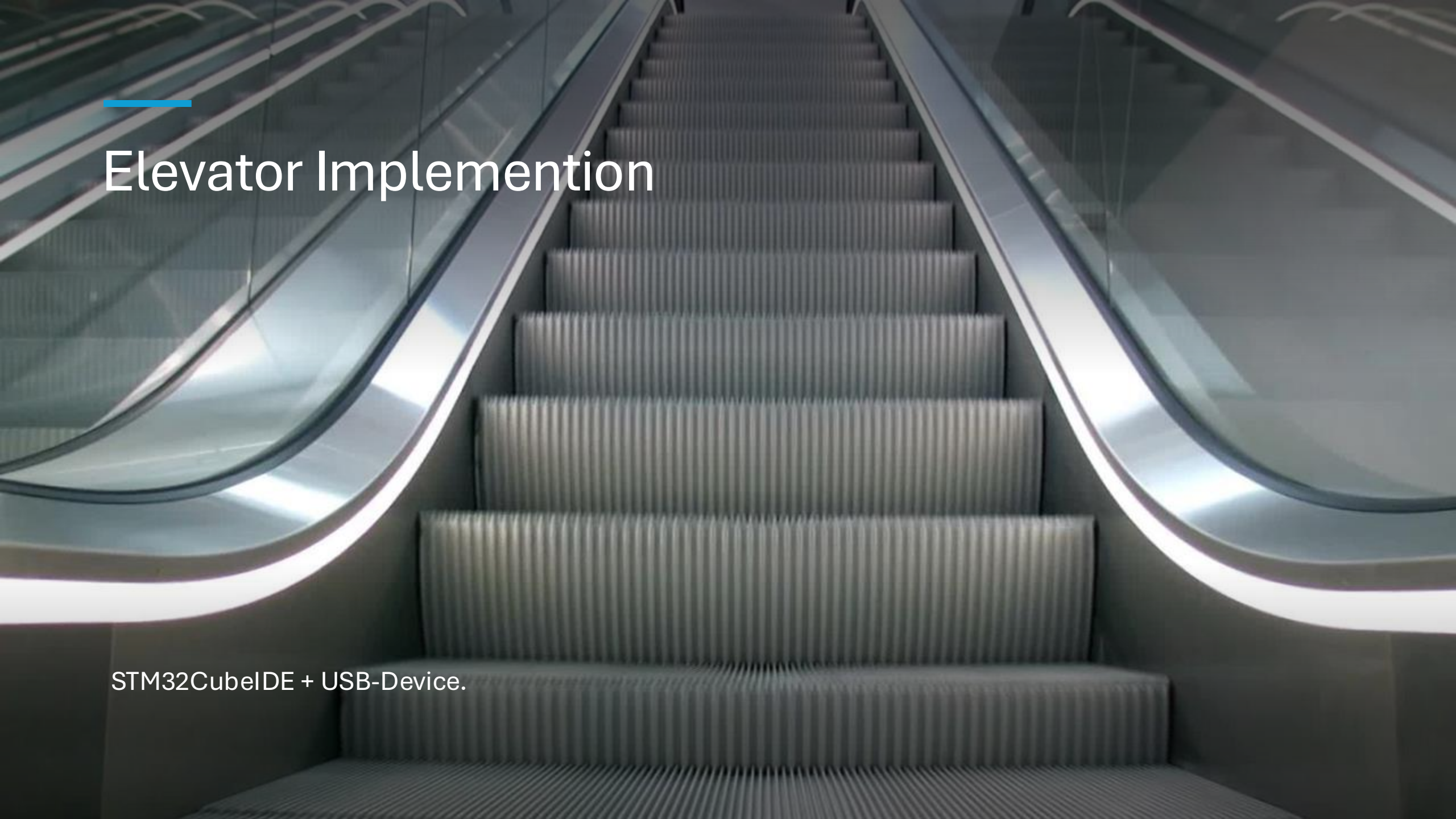
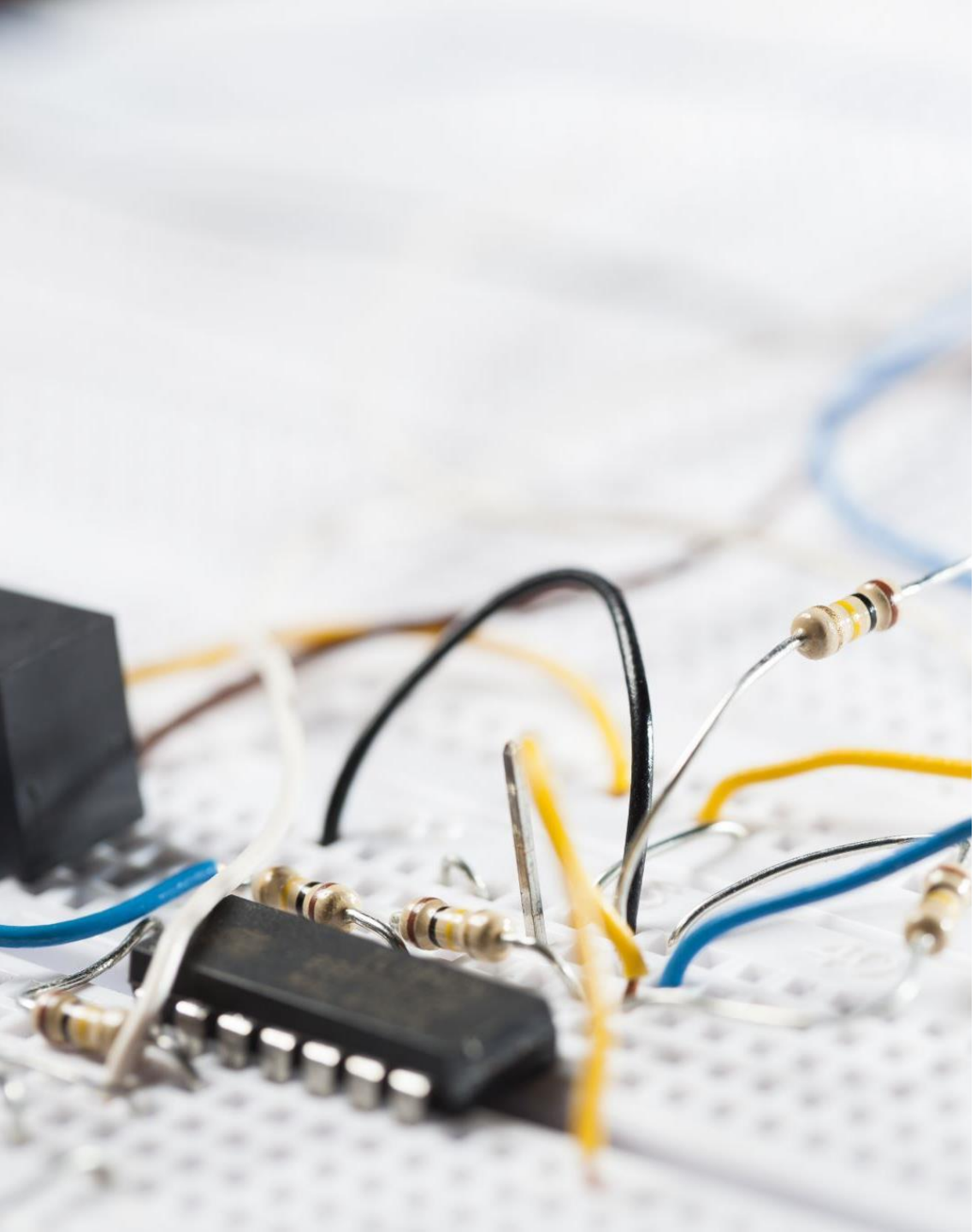
Part 2 of meeting four



Elevator Implemention

STM32CubeIDE + USB-Device.



1) Initial Approach (PlatformIO + ST-LINK VCP)

- Connected STM32F4DISC1 via ST-LINK USB (Type-A to Mini-B)
- Tried USART2 (PA2/PA3) for serial via ST-LINK VCP
- Found ST-LINK VCP pins (U2 12 & 13) **not connected to STM32 USART**
- Possible alternatives:
  - External USB-Serial dongle
  - Flying wires to VCP pins
- **Both were inconvenient**

2) USB CDC Attempt (Still in PlatformIO)

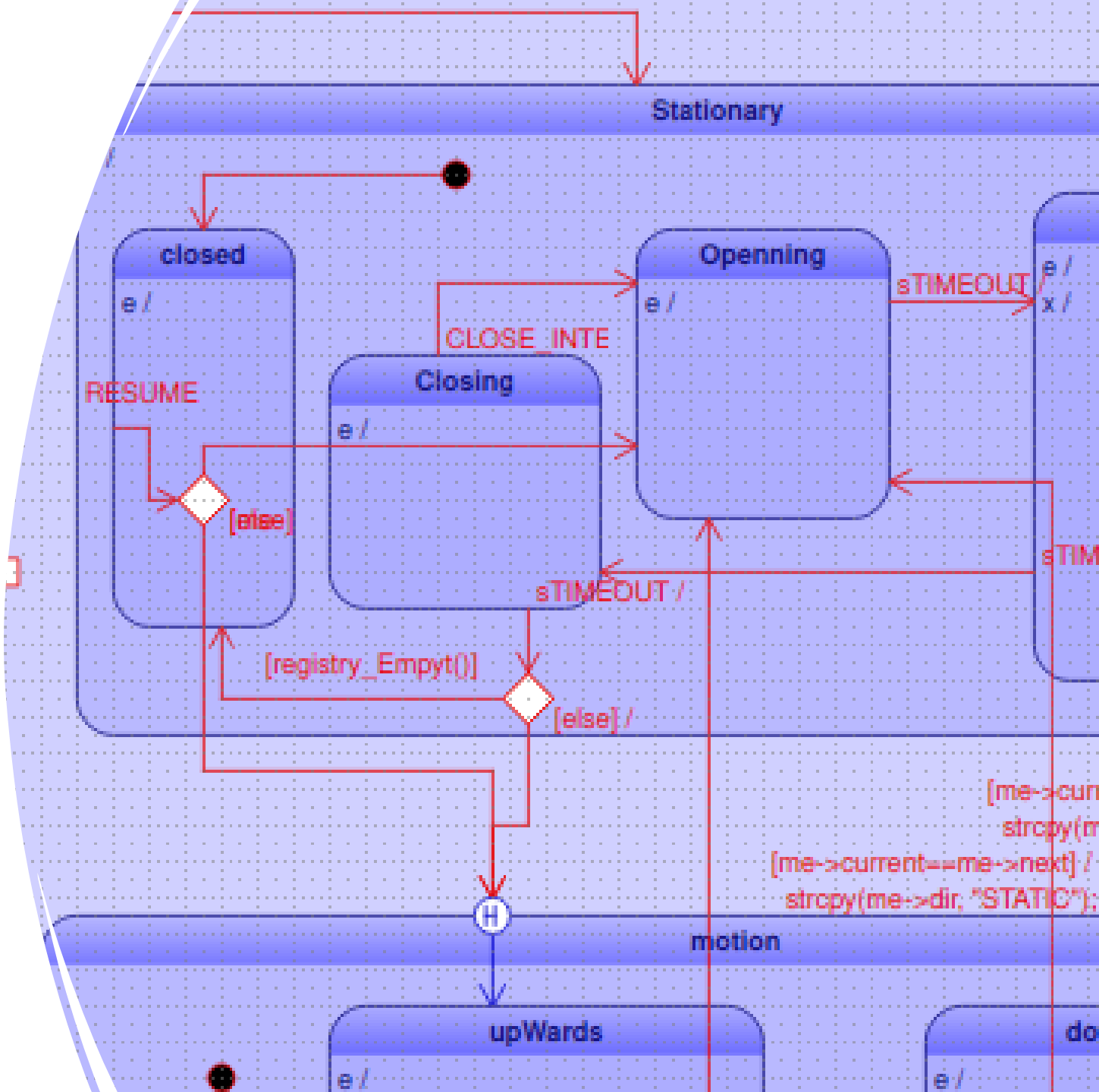
- Discovered STM32F407 board has a native **USB OTG FS (Micro-AB)**
- Used a USB Micro-AB cable
- Manually copied **USB CDC source files** (`usb_device`, `usbd_cdc_if.c`, etc.) from STM32CubeIDE project into PlatformIO project
- Included them in `platformio.ini`, headers, and sources
- **But no COM port appeared** on PC

3) Migration to STM32CubeIDE = Success

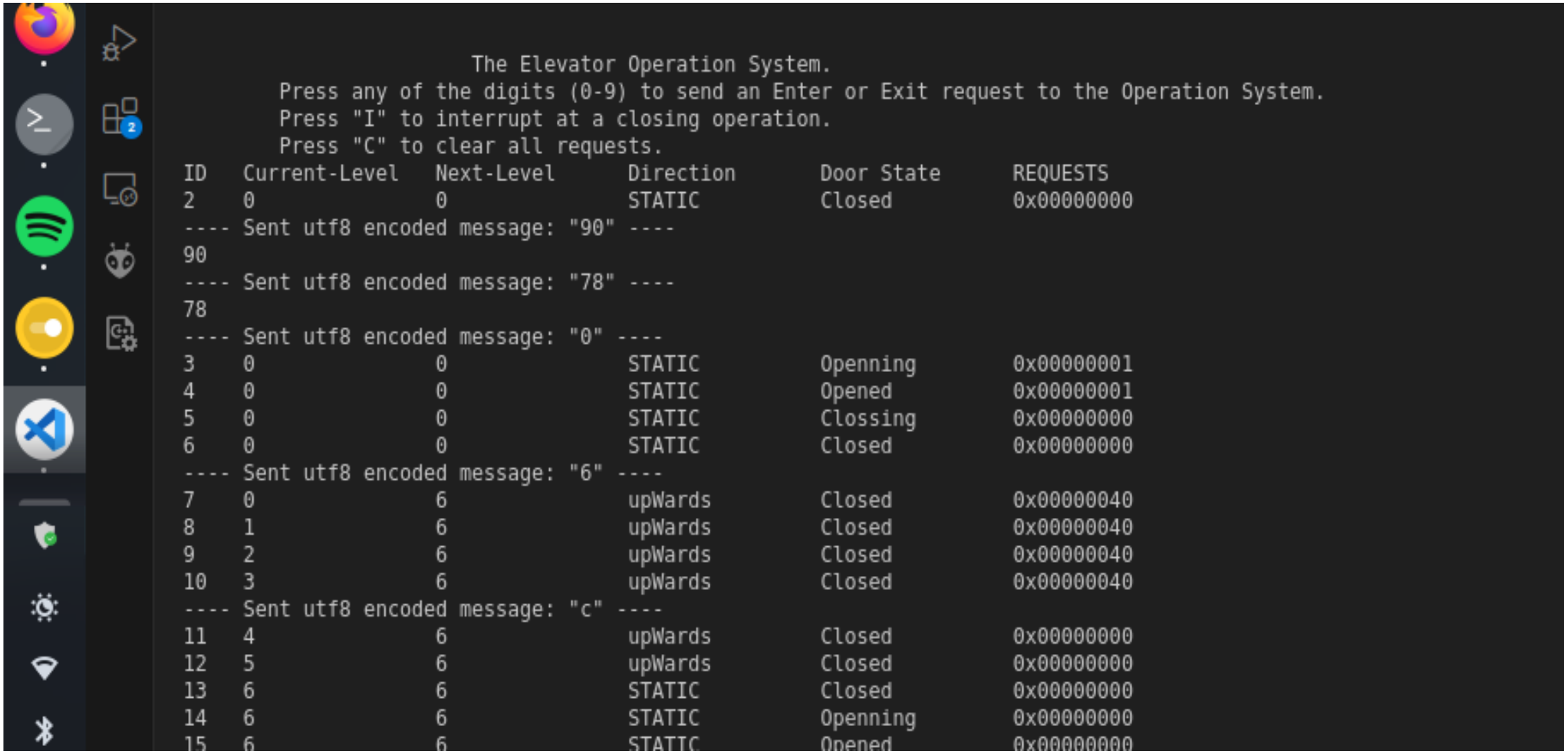
- Recreated project in **STM32CubeIDE**
- Configured USB Device stack as **CDC (Virtual COM Port)**
- Auto-generated correct descriptors and initialization
- Compiled and flashed – **USB port now detected on PC!**
- ✅ Serial communication now works via USB CDC

Changes

- _write() function definition
- +sprintf()
- uint8_t.map(uint_16)



Illustration



Libre Solar BMS C1

Typedef struct{

struct batteryManagementSystem,

struct compactVersion,

} BMS;

Overview & Capabilities

- **Battery Support**: Manages 3–16 Li-ion cells (e.g., $LiFePO_4$, NMC)
- **Current Handling**: Continuous current up to 100A (with appropriate MOSFETs and heat sink)
- **Microcontroller**: ESP32-C3 with Wi-Fi, Bluetooth LE, and CAN (TWAI)
- **BMS IC**: Texas Instruments BQ76952
- **Balancing**: Passive balancing up to 100 mA
- **Protection**: Overvoltage, undervoltage, overcurrent, short circuit, and temperature protections
-

Communication & Firmware

- **Interfaces**:
  - CAN bus
  - USB (CDC-ACM)
  - UART
  - I2C
  - Bluetooth LE
  - Wi-Fi
- **Protocol**: ThingSet for data exchange and configuration
- **Firmware**:
  - Based on Zephyr RTOS
  - Supports SOC estimation via coulomb counting
  - Configurable for different battery chemistries and layouts

Installation & Operation

- **Connections**:
  - Power: M5 screw terminals
  - Signal: Molex Micro-Fit or Würth WR-MPC3 connectors
- **Mounting**: Designed for attachment to a heat sink for thermal management
- **Startup**:
  - Firmware flashing via USB or CAN
  - LED indicators for status monitoring
- **Configuration**:
  - Set battery parameters (e.g., cell count, capacity, chemistry)
  - Adjust protection thresholds