Your goals:

- Record the night sky at **60 fps**
- Detect **satellites, meteors, and anomalies**
- Stay **under $150** total if possible
- Use hardware that works with your existing code (OpenCV-compatible)

🛒 COMPLETE "TO BUY" LIST (with explanations)

🎥 1. Main Computer — Raspberry Pi 4 (4 GB)

- **Purpose:** Runs your detection code, processes frames, and can stream video.
- **Why:** The 4 GB version handles 60 fps camera input + OpenCV smoothly.
- **Price:** ≈ $60–70
- **Example:** Raspberry Pi 4 Model B (4 GB)

✅ You don't need another PC. This one device will record, analyze, and stream.

📸 2. Camera — Raspberry Pi Camera Module 3 Wide NoIR

- **Purpose:** Captures low-light video (night sky).
- **Why:** "NoIR" version removes the infrared filter, so it sees more light at night; "Wide" lens gives a big sky field.
- **Specs:** 12 MP Sony IMX708 sensor, up to 100 fps (at lower resolutions), manual exposure.
- **Price:** ≈ $35–40

- **Example:** Camera Module 3 Wide NoIR

🔋 3. Power Supply — Official Raspberry Pi 4 Power Adapter (5 V 3 A, USB-C)

- **Purpose:** Stable power, avoids reboots under high CPU load.
- **Price:** ≈ $10

💾 4. MicroSD Card — 64 GB (Class 10 / A1)

- **Purpose:** Stores the OS, code, and captured frames.
- **Recommendation:** SanDisk Ultra 64 GB A1 microSDXC
- **Price:** ≈ $10

🧭 5. Tripod or Mount

- **Purpose:** Aim the camera at the sky and keep it stable.
- **Recommendation:** Small table tripod or camera clamp.
- **Price:** ≈ $10

🛡️ 6. Protective Case or Weatherproof Enclosure (Optional)

- **Purpose:** Keeps electronics safe outdoors.
- **Options:**
    - Acrylic dome case for Pi + Camera (DIY)

    - IP65 plastic box with a clear window
- **Price:** ≈ $10–15

🧩 7. HDMI Cable + Monitor (optional)

- **Purpose:** For first-time setup; afterward you can SSH remotely.
- **Price:** $0 – $10 (you might already have one)

⚙️ 8. (Optional Add-ons for Advanced Features)

Item	Purpose	Est. Price
USB GPS dongle	Tag detections with coordinates/time	~$15
External SSD (or large USB stick)	Extra video storage	~$20
IR-pass filter (1 ¼″)	Improve contrast under city lights	~$8

💰 Estimated Total Cost

Item	Cost (USD)
Raspberry Pi 4 (4 GB)	$65
Camera Module 3 Wide NoIR	$40
Power Supply	$10
microSD Card	$10
Tripod / Mount	$10
Optional enclosure	$10
TOTAL	**≈ $135–145 USD ✅**

🧠 Quick Summary of What You'll Get

Feature	Result
Frame rate	60 fps @ 720p
Night sensitivity	Excellent (NoIR + manual exposure)
Field of view	~102° diagonal (wide lens)
Processing	Runs OpenCV/YOLO locally on the Pi
Expandability	Can stream RTSP or send detection data to cloud

1. Raspberry Pi 4 (4GB)

- **Purpose:** Acts as the main computer for running the camera, video analysis, and streaming.
- **Option 1:** Raspberry Pi 4 Model B (4GB) – €78.05 at Mouser Spain
- **Option 2:** Raspberry Pi 4 Model B (4GB) – €47.30 at Mouser Spain

2. Raspberry Pi Camera Module 3 NoIR Wide

- **Purpose:** Captures high-quality night-time footage with a wide field of view.
- **Option 1:** Raspberry Pi Camera Module 3 NoIR Wide – €46.75 at RaspberryPi.dk
- **Option 2:** Arducam 12MP IMX708 Autofocus Wide Angle Camera Module 3 NoIR – €16.50 at DigiKey Spain

3. Power Supply (5V 3A USB-C)

- **Purpose:** Provides stable power to the Raspberry Pi 4.
- **Option 1:** Raspberry Pi Official USB-C Power Supply – €12.83 at PcComponentes
- **Option 2:** 5V 3A USB Type C Adapter for Raspberry Pi 4 Model B – €4.55 at BEEP

4. microSD Card (64GB, Class 10/A1)

- **Purpose:** Stores the operating system, code, and captured data.
- **Option 1:** SanDisk Ultra UHS MicroSDXC Memory Card – €13.95 at Fnac
- **Option 2:** Samsung EVO Select 64GB microSD Card – €10.69 at Amazon.es

5. Tripod or Mount

- **Purpose:** Stabilizes the camera for clear, shake-free footage.
- **Option 1:** Manfrotto Element MII Aluminium Tripod – €109.00 at Amazon.es
- **Option 2:** 192cm Trípode Cámara Compacto con Cabeza Esférica – €31.34 at K&F Concept

6. Protective Case for Camera

- **Purpose:** Protects the camera module from dust and physical damage.
- **Option 1:** sb Components Raspberry Pi Camera Case – €5.35 at Amazon.es
- **Option 2:** Arducam Camera Enclosure Case – €5.35 at Amazon.es