**🎤 Presenter 1 – Introduction & Background**

**"Hello everyone, and thank you for being here today!**  
We’re excited to present our research on **Free Space Optical (FSO) Networks** and **Visible Light Communication (VLC)** — two cutting-edge wireless technologies that are reshaping the way we communicate in high-speed, secure, and interference-free environments.

Let’s start with **what FSO and VLC are**:

* **FSO Communication** uses laser beams to transmit data wirelessly through the air or vacuum — much like fiber optics, but without the cable.
* **VLC**, on the other hand, uses **visible light** emitted by LEDs to send data wirelessly, often while providing illumination at the same time.

These technologies fall under **Optical Wireless Communication** and are becoming increasingly important, especially as we face congestion in traditional radio frequency bands.

A bit of history:

* Optical communication has been around since **ancient times** — think smoke signals and signal mirrors.
* FSO was first developed for military and space communication.
* VLC started gaining attention with the growth of LED lighting, and in 2011, the concept of **Li-Fi** — or light-based Wi-Fi — was introduced by Professor Harald Haas.

Now, I’ll hand over to [Presenter 2] to talk about the system architecture, technologies, and practical applications."\*\*

**🎤 Presenter 2 – Architecture, Technologies, Applications**

**"Thank you [Presenter 1]!**  
Now let’s dive into how these systems actually work.

**🔧 System Architecture:**

For **FSO**:

* A **laser source** transmits the signal through open space.
* The beam must travel in a **direct line-of-sight** to a receiver equipped with a **photodetector**.
* It works over **long distances**, often used in satellite communication or connecting two buildings.

For **VLC**:

* We use **LED lights** as transmitters.
* A **photodiode or camera sensor** receives the data.
* VLC works best in **indoor, short-range settings**, like smart homes or hospitals.

**📶 Communication Technologies:**

Let’s compare the two briefly:

* **FSO** supports speeds up to **100 Gbps**, over distances of several kilometers.
* **VLC** offers high-speed data too, but mainly in small areas — ideal for environments where RF signals are restricted.

Now, where can we use these?

**🧩 Applications:**

* FSO is great for **satellite links**, **military communication**, and **urban backhauls**.
* VLC shines in **hospitals**, **aircraft cabins**, and **smart lighting** systems.
* It’s also a promising option for **Internet of Things (IoT)** setups where radio interference must be avoided.

Next, [Presenter 3] will walk us through the challenges and future opportunities of these technologies."\*\*

**🎤 Presenter 3 – Concerns, Challenges & Future Scope**

**"Thanks, [Presenter 2]!**  
Now let’s talk about the **real-world concerns** and what the **future** holds for FSO and VLC.

**⚠️ Concerns and Challenges:**

Both technologies come with some limitations:

* **FSO** is highly **weather-sensitive**. Fog, rain, or dust can reduce signal strength significantly.
* It also requires **precise alignment** — any shift in position can break the connection.
* **VLC**, while safer and suitable for indoors, can be affected by **ambient light** like sunlight or fluorescent lamps.
* It also has a **limited range** and needs a clear line-of-sight or strong reflections to work efficiently.

**🔮 Future Scope:**

Despite these challenges, the future is bright!

* **Li-Fi networks** are being developed to offer **ultra-fast indoor wireless communication**.
* FSO is becoming key in **satellite-to-earth** communication and even **interplanetary data links**.
* We also see **hybrid systems** emerging that can switch between VLC, FSO, and traditional RF based on conditions.
* New **AI-powered alignment systems** and **miniaturized components** will improve performance and expand usage.

**📌 To conclude:**

FSO and VLC are opening up exciting new frontiers in wireless communication.  
They offer **high data rates, low interference, and strong security**, making them ideal for the next generation of networks — from space to smart homes.

**Thank you for your attention!**  
We’d be happy to answer any questions you may have."\*\*