

# LAPRO: Solar-Powered Laser Projection

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**Abstract**— The present work has been designed to create a cost-effective device using existing devices like wicked lasers and solar panels to give advertising and marketing a new form. A monocrystalline/ polycrystalline solar panel battery would be mounted on top of a wicked laser such that the device becomes easy to install and handle. The solar panel on the top would be charged during the daytime with solar energy and would utilize this energy at night to project videos. The solar-powered laser projector is cost-effective as it requires less manpower, less space, and less energy to function as compared with traditional marketing.

**Keywords:** Wicked Laser, Solar Panel, Cost-Effective, Less Manpower, Less Space, Less Energy, Advertising, Marketing

## I. INTRODUCTION

This invention “Solar Powered Laser Projector for Advertising and Marketing” is related to methods of advertising. This comes under the combined field of marketing and technology. This projector will use a monocrystalline or polycrystalline solar panel as a source of energy which will be utilized by the wicked projector to project the desired image/video through a laser beam without using conventional sources of energy. This might prove to be the most efficient way of marketing through the ultimate use of solar energy.

### A. Overview

A solar-powered laser projector is a device that uses laser technology to project images and videos onto surfaces and is powered by solar energy. This type of projector is designed for outdoor advertising and is becoming increasingly popular due to its eco-friendly and cost-effective nature.

The projector itself is composed of a laser source, a set of optical components to focus the laser beams, and a control system to direct the beams onto the desired surface. The solar panels that power the device are typically mounted on the same structure as the projector and are used to convert sunlight into electricity that can be stored in a battery for use at night or on cloudy days.

### B. Problem and motivation

According to the survey, one of the major issues with current marketing methods is that they are not always environmentally friendly and can be expensive to maintain. Traditional outdoor advertising methods, such as billboards and neon signs, require a constant supply of electricity and can be costly to install and maintain. They also consume a lot of energy, which contributes to carbon emissions and environmental degradation.

### C. Proposed plan of work

#### 1) Project review:

Conduct a thorough literature review to gain an understanding of the current state of the art in solar-powered laser projectors for modern advertisement. This will involve researching academic papers, technical reports, industry publications, and online resources. The literature review

should include an analysis of the technical and practical aspects of the technology, including the design and implementation of solar-powered laser projectors, current trends and innovations, and challenges and solutions.

#### 2) Planning and design:

Based on the information gathered from the literature review, plan and design a solar-powered laser projector prototype for modern advertisement. This will include selecting the appropriate solar panels, battery, laser source, optical components, and control system for the projector, as well as designing the software that will be used to control the projector.

#### 3) Implementation:

Build and test the solar-powered laser projector prototype. This will include assembling the hardware components, installing, and configuring the software, and testing the projector to ensure that it meets the design specifications.

#### 4) Evaluation:

Evaluate the performance of the solar-powered laser projector prototype by testing it under different lighting conditions and measuring its performance in terms of brightness, contrast, and resolution. This will include collecting data on the projector's power consumption, battery life, and overall efficiency.

#### 5) Analysis:

Analyse the data collected during the evaluation to determine the overall performance of the solar-powered laser projector prototype. This will include comparing the results

### D. Objectives

- 1) To provide an environmentally friendly and sustainable alternative to traditional forms of outdoor advertising, such as billboards and neon signs.
- 2) To increase the reach and visibility of advertisements by allowing businesses to advertise in locations that are otherwise inaccessible, such as on top of buildings or in remote areas.
- 3) To provide a high-quality and bright projection that can be displayed on large surfaces, even from far distances, allowing businesses to get noticed by more people and increase the chances of attracting customers.
- 4) To reduce the costs associated with traditional forms of outdoor advertising by eliminating the need for a traditional power source, such as an electrical outlet, and by requiring minimal maintenance.
- 5) To allow businesses to create engaging and immersive advertising experiences for customers through interactive and dynamic content.
- 6) To allow businesses to easily manage and update their advertisements on the fly, through the integration of digital signage technology.
- 7) To provide a cost-effective solution for outdoor advertising by reducing the overall cost of the equipment and operation, and increasing the lifetime return on investment.

- 8) To gather data on audience engagement, interaction, and feedback, that could be used for improving future projection and marketing campaigns.

## II. LITERATURE REVIEW

### A. Overview

Some key areas to focus on in the literature review include:

- Solar panel technology: How solar panels are used to generate electricity for the projector, and the different types of solar panels available.
- Laser technology: The types of laser sources used in solar-powered laser projectors, and their characteristics, including brightness, color, and power consumption.
- Optics: The optical components used in solar-powered laser projectors, including lenses and mirrors, and how they are used to focus and direct the laser beams.
- Control systems: The microprocessors and control software used to govern the movement of the laser beams and synchronize the video playback.
- Applications: The ways in which solar-powered laser projectors are being used for modern advertisement, and examples of businesses currently using the technology.
- Challenges and solutions: The challenges associated with solar-powered laser project

### B. Existing System and its drawbacks

One of the main problems with existing marketing methods is that they are not always environmentally friendly and can be costly to maintain. Traditional forms of outdoor advertising, such as billboards and neon signs, require a constant supply of electricity and can be expensive to install and maintain. Additionally, they also consume a lot of energy, contributing to carbon emissions and environmental degradation.

Another problem with traditional forms of advertising is that they are often limited in terms of location and visibility. Billboards and signs are typically only viewable from one direction and are limited to specific locations, such as along roads or in highly populated areas. This can make it difficult for businesses to reach potential customers in remote or hard-to-reach areas.

Solar-powered laser projectors present a solution to these problems by being an eco-friendly, sustainable alternative to traditional advertising methods. Since they are powered by solar energy, they do not rely on traditional power sources and thus do not contribute to carbon emissions. Additionally, since the projector can be mounted on buildings or other structures, it can be placed in a wide variety of locations, making it possible to reach customers in remote or hard-to-reach areas.

Moreover, Solar-powered laser projectors also offer a high-quality and bright projection, which can be displayed on large surfaces, even from far distances. This allows businesses to get noticed by more people and increases the chances of attracting customers.

## III. WORKING AND MODULES

A solar-powered laser projector for modern advertisement typically consists of several functional modules that work

together to create the final image or video projection. The primary modules include:

### A. Solar panel module:

This module is responsible for converting sunlight into electricity. The solar panel module includes the solar panels, a charge controller, and a battery management system. The charge controller regulates the charging of the battery, ensuring that it does not become overcharged or damaged. The battery management system monitors the battery's state of charge and automatically turns off the projector when the battery's charge drops too low.

### B. Laser source module:

This module is responsible for generating the laser beams that are used to create the final image or video projection. The laser source module includes the laser diode, a cooling system, and a driver circuit. The cooling system is used to dissipate the heat generated by the laser diode, while the driver circuit controls the laser diode's current and voltage to ensure stable operation.

### C. Optics module:

This module is responsible for focusing and directing the laser beams onto the desired surface. The optics module includes lenses, mirrors, and other optical elements. The lenses and mirrors are precisely aligned to ensure that the laser beams are directed onto the desired surface with the highest possible accuracy and brightness.

### D. Control module:

This module is responsible for controlling the movement of the laser beams and synchronizing the video playback with the movement of the laser beams. The control module includes a microprocessor, a control software, and a user interface. The control software is designed to work seamlessly with the other modules, allowing the user to easily control the projector. The user interface provides an easy-to-use interface for adjusting the projector's settings, such as focus and brightness.

### E. Video playback module:

This module is responsible for playing back the video or image that is to be projected. This module can be integrated with other digital signage software to manage the content.

## IV. RESULT AND DISCUSSIONS

### A. Setup for Development

A solar-powered laser projector for modern advertisement typically consists of a number of hardware and software components that work together to create the final image or video projection. The hardware components include the solar panels, battery, laser source, optical components, and control system. The software components include the control software, video playback software and the software that governs the solar panels to charge the battery, and control the laser and optics system.

The solar panels are the primary power source for the projector. They convert sunlight into electricity, which is then stored in a battery. This stored energy is used to power

the projector when sunlight is not available, such as during the night or on cloudy days.

The laser source is the heart of the projector, it generates the light beams that are used to create the final image or video projection. This is typically a solid-state laser diode, and it's usually based on diode-pumped solid-state (DPSS) technology.

The optical components include the lenses and mirrors that are used to focus and direct the laser beams onto the desired surface. These are precisely made and adjusted optical components to focus the laser on a certain surface and create a clear image.

The control system is responsible for directing the laser beams onto the desired surface and syncing the video playback with the movement of the laser beams. This system is composed of electronic components and microprocessors which govern the movement of the laser and optics. The control system also communicates with the solar panels and battery management system to ensure that the projector has enough power to operate.

The software components include the control software, which is used to control the movement of the laser beams and the video playback, this software is designed to work seamlessly with the hardware components, allowing the user to easily control the projector. The video playback software is used to play back the video or image that is to be projected, this software can be integrated with other digital signage software, making it easy to manage the content.

## V. SUMMARY AND CONCLUSION

### A. Summary

- The present work has been designed to create a cost-effective device using existing devices like wicker lasers and solar panels to give advertising and marketing a new form.
- A solar panel used in the laser projector uses a battery and requires 4 to 6 hours to charge.
- The solar panel would charge during the daytime and that energy would be utilized at night for projecting advertisements.
- Hence, many companies/brands might use this method to cost-effectively advertise their service/product.
- In summary, a solar-powered laser projector for modern advertisement is a complex system that is composed of a number of hardware and software components that work together to create the final image or video projection. The solar panels and battery provide the power, while the laser source, optical components, and control system are responsible for generating and directing the laser beams. The software components, such as the control software and video playback software, are used to control and synchronize the operation of the hardware components.

### B. Conclusion

In conclusion, solar-powered laser projectors for modern advertisement present a sustainable and effective solution to the environmental and visibility problems associated with traditional forms of outdoor advertising. The technology is relatively new and is still evolving, but it has the potential to revolutionize the way businesses advertise in outdoor

settings. By using solar energy to power the projector, businesses can reach customers in new and environmentally-friendly ways while also reducing costs associated with traditional forms of outdoor advertising.

### C. Future Scope

The future of solar-powered laser projectors for modern advertisement looks promising, as the technology continues to evolve and improve. In the future, it is likely that solar-powered laser projectors will become even more efficient and cost-effective, making them an increasingly viable option for businesses looking to advertise in outdoor settings.

One area in which solar-powered laser projectors may see significant advancement is in the development of more efficient solar panels. This will increase the amount of electricity that can be generated from sunlight and will make it possible to run the projector for longer periods of time. Additionally, as the technology of laser diodes and projection optics becomes more efficient, the lifetime of the projectors will be much longer, decreasing the cost and increasing the lifetime return on investment.

Another area of potential growth for solar-powered laser projectors is the development of new and innovative ways to use the technology for advertising. For example, the development of interactive and dynamic content for the projector could be used to create engaging and immersive advertising experiences for customers. This can create an interactive and dynamic way for businesses to engage with customers and promote their products or services in an interactive and dynamic way.

In addition, as technology and digital billboards are becoming more popular and widespread, we could see solar-powered laser projectors being integrated with digital billboards and other forms of digital signage. This will allow for a more flexible and dynamic form of advertising, as businesses will be able to easily update and change their advertisements on the fly.

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