**SUMMARY -** HOLOGRAPHIC OPTICAL ELEMENTS WITH LED-BASED OPTICS

The topic of the article I’m going to give a review of is «Holographic optical elements with led-based optics». The article under discussion may be divided into five logically connected parts which are Creating holographic images with the help of LED, HOE Imaging and RGB LED Light, HOE in Automobiles and HOE for Heads up Displays and Wearables.

The first paragraph explains that Holographic Optical Elements (HOEs) are holographic images embedded onto a photopolymer film that come to life when a light source is projected onto them. The author also mentions the fact that although the technology has existed for decades, advances in LED technology continue to bring new opportunities for manufacturers and government agencies.

Next, the author talks about the possibility of creating unique displays using HOEs, as well as creating images on glass or acrylic. The author also draws our attention to the fact that despite the limitless possibilities of HOEs, the most practical applications are displays on helmets and smart glasses and projections on car windshields.

The following paragraph talks about the improvement of the holographic capability in terms of brightness, transparency and responsiveness to color selectivity, so that the driver does not need to take his or her eyes off the road. The author also mentions other applications of HOEs. For example, the appearance of the car can be improved with the help of HOE film embedded in the liner or floor lights and mud lights.

In the end, the author notes the good work of HOE on displays for pilots and motorcyclists, as well as on wearable technologies such as smart glasses. Such technologies allow you to project an image onto the micro display through the visor and view images at a virtual distance.

in his article The author gives an overview of HOEs technology, its advantages and ways of using it. I think this article will be very interesting to people working in this field, as well as ordinary users of wearable technologies and cars.

Advances in LED technology continue to bring new opportunities in digital displays. Existing optical technologies are also benefiting from the LED boom, specifically Holographic Optical Elements or HOEs. Holographic Optical Elements are holographic images embedded onto a thin, clear photopolymer film that can be applied to glass or plastic surfaces. When a light source, such as LED, is projected onto the surface, the invisible recorded holographic images come to life.

Because holographic images are captured on thin flexible films, engineers can create unique displays that would otherwise be impractical with conventional optics. For example, HOEs can redirect images from a light source that is hidden from view. HOEs can also create a transparent image on a surface such as glass or acrylic. While the possibilities are practically endless, the most practical applications of HOE technology being developed are head-up displays (HUDs) on helmets and smart glasses, as well as holographic light projection on car windshields and for interior and exterior lighting.

HOE presents multiple opportunities for the highly competitive, high-end automotive industry. Scientists have been working on HOE technology for over a decade and have refined the holographic capabilities for brightness, transparency, and responsiveness to color selectivity (i.e., red, green or blue). Because color selectivity is now possible, RGB LEDs can be divided by color and placed on the same thin, clear HOE film. Red could display distance to the vehicle ahead, green an approaching car, and blue the current vehicle speed. The driver does not need to focus on the image to view it or ever take his or her eyes off the road.

Other uses for HOE in automobiles include hiding a light source, such as interior dome lights, or center high mount stop light (CHMSL) on the rear windshield of modern cars. Dome lights typically protrude out of the vehicle ceiling. HOE film can be embedded in the liner and the light source can be concealed from view. Transparent in the off state, light from the dome would appear to come from the liner. HOE can also be a key factor in branding. Floor lights or mud lights, for example, on high end cars can project light as well as the auto manufacturer’s logo.

HOE also performs well on heads up displays for pilots and motorcyclists as well as wearable technology such as smart glasses. For helmets, HOE possibilities include head-mounted displays for off-axis image projection of a high-resolution micro display through a thin plastic visor. For smart glasses, HOE eliminates prism-based optics that allows the images to be viewed at a virtual distance without added weight to the user.