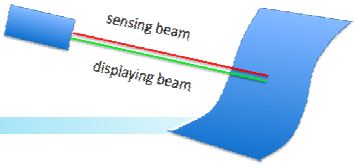
The Laser Sensing Display

A. Cassinelli, A. Zerroug, Y. Watanabe and M. Ishikawa / University of Tokyo



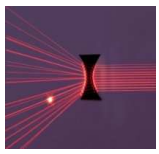
What? A modified laser projector capable of displaying over all kind of non-prepared surfaces**, while simultaneously using the beam (at the same or different wavelength/polarization) as a LIDAR probe gathering information about that surface's position, orientation and shape, texture and spectral reflectance**. This information can then be used to modify the scanning trajectory in real time and augment surfaces with graphics while compensating contrast and geometry distortion (on raster or vector graphics) without the need of any initial projector/camera calibration step.

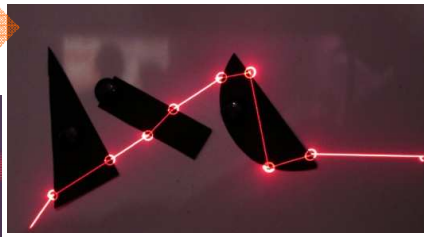
Applications? Input/output interfaces, dermatology, non-destructive control, authentication, and in general all sort of AR applications using any available surface for projection (tables, desktops, wall and floor, but also human skin, printed material and paintings, market products on a shelf, etc).

Entertainment

"Vector-mode" used in "scoreLight" musical instrument and "Sticky Light" media-art installation to interactively augment gestures and drawings.

Simulation of refraction by re-routing the laser scan in real time.

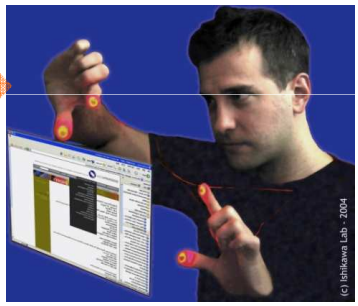




Large scale AR: interactive games on a ski-slope (in collaboration with Lapland and Berlin University).

Human-Computer interface and ubiquitous displays

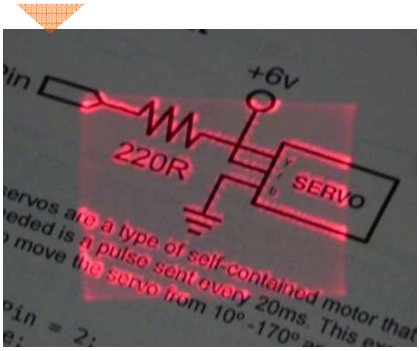
The system can be used as a marker-less tracking device for human-computer interaction (capable of both gestural input and graphical output), as demonstrated with the "smart laser scanner".

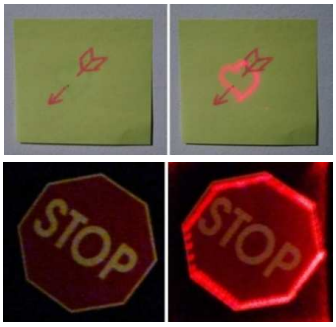


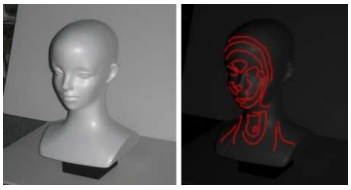
Per "pixel" depth sensing enables automatic size adjustment of alphanumeric data.

Augmented Reality with 'intelligent' lighting

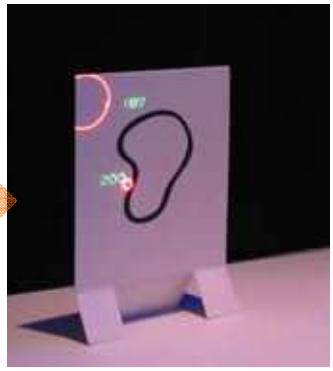
Synthesis of artificial reflectance for contrast enhancement, vein visualization, and 'artificial fluorescence'. An intriguing possibility is the use of one of the collinear laser beams not for just for sensing or diagnosis, but for *treatment or printing (on bistable materials).*

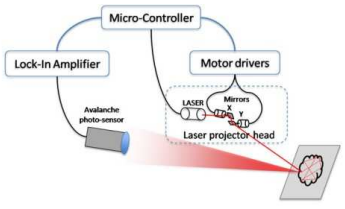


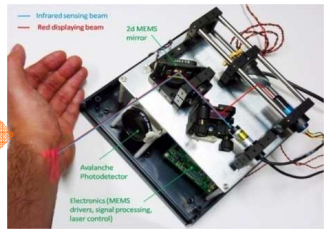




Spatial augmented-reality surveying by displaying depth and angles over physical objects and drawings.







Prototypes? We developed two prototypes, one using galvano mirrors, and another using resonant MEMS micromirrors. Research is underway for designing a miniature `sensing-projector' that could be embedded on mobile phones or attached to everyday objects including clothing.

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