ABSTRACTS OF PAPERS FROM OTHER JOURNALS

Transmission of Broadcast Vision and Sound Signals on Digital Circuits, B. Salkeld, *The Radio and Electronic Engineer,* 173, April 1984.

This paper reviews the developments that have taken place in digital transmission of vision and sound signals. Transmission impairments are related to the requirements for broadcast quality signals. Further developments needed to achieve satisfactory economics are considered.

Latest Developments in Liquid Crystal Television Displays, Shinji Morozumi, Kouichi Oguchi, and Hiroyuki Ohshima, *Optical Engineering,* 241, May/June 1984.

This paper discusses developments in liquid crystal (LC) television displays, mainly for pocket-sized TV sets. There are two types of LC television displays: a simple multiplexing type and an active matrix type. The former is an easier way to fabricate large, low-cost LC panels than is the latter. However, it has serious drawbacks. The contrast gets lower as the duty ratio gets higher. Therefore, the TV image of this type inevitably has low contrast and resolution.

The active matrix type, which consists of active elements in each pixel, has several advantages. The metal oxide semiconductor transistors and the amorphous or polycrystalline Si thin-film transistors (TFTs) have possibilities in this application. A full-color LC display, which can be realized by the combination of color filters and poly Si TFT arrays on a transparent substrate, is proven to have excellent color image, close to that of conventional CRTs.

Charge-Coupled Device Television Camera for NASA's Galileo Mission to Jupiter, Kenneth P. Klaasen, Maurice C. Clary, and James R. Janesick, *Optical Engineering,* 334, May/June 1984.

The slow-scan television camera being built for NASA's Galileo Jupiter spacecraft consists of a 1500mm focal-length telescope coupled to a camera head housing a newly developed 800×800 element charge-coupled device (CCD) detector based on "virtual-phase" charge transfer technology. This detector results in a broadband sensitivity over 100 times that of a comparable vidicon-tube camera while also yielding improved resolution, linearity, geometric fidelity, and spectral range.

In the near-Jovian radiation belts, interaction of high-energy particles with the silicon CCD result in the production of unwanted charge, and special techniques have been implemented (e.g., tantalum and quartz shielding, rapid image readout, and 2×2 picture-element on-chip averaging) to ensure adequate signal-to-noise performance for images acquired as close to Jupiter as five planetary radii. The images returned from Galileo will provide high-resolution (approximately 1 km) mapping coverage of most of the surface of the four large Galilean satellites of Jupiter with coverage of selected targets at resolutions as good as about 20 m.

The broad spectral range of the instrument (0.4 to 1.1 μm) and the use of special methane-absorption-band filters in the near-infrared will allow study of Jovian atmospheric structure and dynamics. Excellent off-axis light rejection and high sensitivity of the instrument will permit study of low-light-level phenomena such as lightning and aurorae on Jupiter and the Jovian ring.

Some Design Aspects of Long-Haul Digital Submarine Optical Fibre Systems, D. R. Borley, S. D. Walker, R. B. P. Carpenter, and J. A. Kitchen, *The Radio and Electronic Engineer,* 163, April 1984.

This paper addresses specific design aspects of long-haul digital submarine systems utilizing optical fiber bearer pairs. These aspects include reliability; error performance specification and design philosophy; receiver design, noise, and intersymbol interference considerations; jitter accumulation and control; and telemetry, supervision, and fault location. No such systems have yet been deployed other than for field trial, but development is well advanced.

Performance of Videotex-to-Speech Convertor, O. R. Omotayo, *IEE Proceedings-A, 131:*328, July 1984.

Videotex is an electronic information service that allows sighted subscribers to access vast amounts of textual information in data bases via the telephone line. Pages of information, called via a keypad or keyboard, are normally viewed on the screen of a domestic television set. A microprocessor-based system that automatically converts Videotex pages to synthetic speech in real time has been developed; this enables blind people to access Videotex pages. This paper reports on the performance of the system when used by both blind and sighted users to access the British Telecom Videotex service (Prestel).

Constructing an Imaging Operator to Enhance Resolution, Hua Lee and Glen Wade, *Journal of the Acoustical Society of America, 75:*499, February 1984.

Constructing a real-time high-resolution imaging operator has become one of the most important objectives in image reconstruction. It is especially advantageous to holographic, tomographic, and synthetic aperture radar systems with limited detection apertures. This paper introduces a method of constructing such an operator by using the step size generated from the steepest descent algorithm to improve the resolution of backward-projected images. With this operator we can overcome resolution limitations due to small-sized apertures, and it is not necessary to go through tedious computations as with iterative algorithms.

ESPI — The Ultimate Holographic Tool for Vibration Analysis? Ole J. Lokberg, *Journal of the Acoustical Society of America, 75:*1783, June 1984.

Holographic interferometry opened new worlds of research by making possible accurate, global mapping of small dynamic surface displacements in a two-step process. A technique, called electronic speckle pattern interferometry (ESPI), has been developed in various forms to provide similar results instantly. ESPI's principal capabilities and some practical applications in industry, biomedicine, and acoustical research are described in an overview in the hope of encouraging its use by researchers who were deterred by the relatively cumbersome process of holography. In various forms, ESPI is shown to be capable of measuring the phase and amplitude of dynamic displacements between 0.01 nm and 10 μm over an area of up to 1 m^2.

Restoration of Nonlinearly Distorted Magnetic Recordings, D. Preis and H. Polchlopek, *Journal of the Audio Engineering Society, 32:*26, January/February 1984.

An efficient method to restore nonlinearly distorted magnetic recordings is presented. Given the distorted recording and the actual recording device or a model of the record-reproduce process, the original input signal can be computed iteratively. Results from several computer simulations using a variety of nonlinear and linear distortions with different test signals are included. The algorithm converged with fewer than 40 iterations in all simulated restorations.

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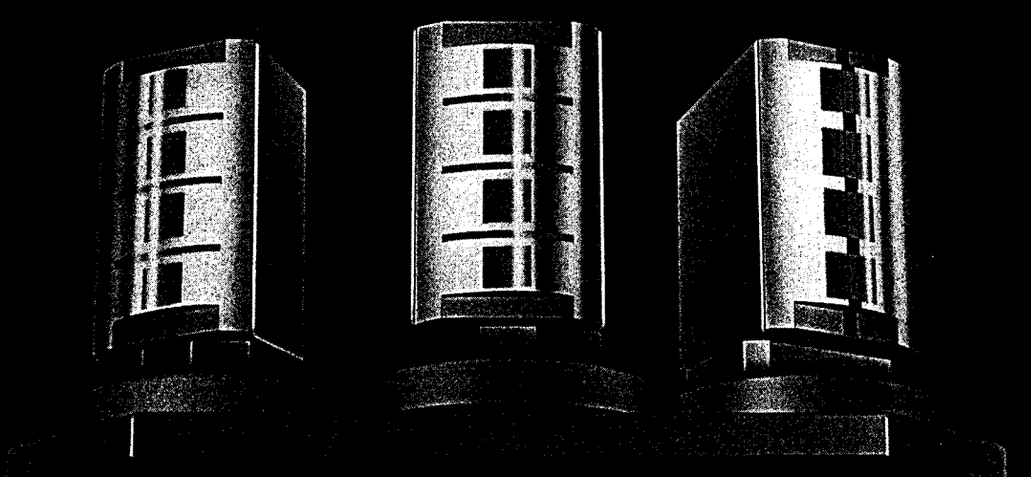

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Resource Inventory Through Instructionally-Based Digital Processing System, Ray Lougeay and Donald Ash, *Imaging Technology, 10:*85, April 1984.

The use of an instructionally-based interactive digital image processing system is discussed for resource inventory applications to assist public agencies. The availability of both photographic and digital remotely sensed data at a local college, plus user-friendly image processing software developed for the mainframe computer has attracted interest from regional, county, and state resource managers. A sample applications project is reviewed, including degrees of success and limitations that develop when the computer disk storage capacity and time-sharing capacity must be dedicated, as first priority, to instructional purposes.

Small Format Aerial Photography From Microlight Platforms, R. W. Graham and R. Read, *Journal of Photographic Science, 32:*100, May/June 1984.

Conventional survey aircraft, with their sophisticated camera and navigation systems, are mainly designed to cover the photogrammetric requirements of line mapping. But for less exacting cover, such as urban or rural surveys, map intensification, crop inspection, estate management, forest inventories, and multispectral photography, there are urgent reasons for seeking more economic methods of gaining the primary data. The authors have initiated trials with commercially available microlight aircraft employing small format (35 and 70mm) cameras to investigate the various flying skills, materials, and strategies that will lead to the optimum economic system for developing countries.

Extending the Content and Expanding the Usefulness of the Simple Gaussian Lens Equations, L. T. Sachtleben, *RCA Review, 45:*109, March 1984.

The Gaussian expressions for the optical separation of the two lenses of a non-afocal primitive relay optical system are developed in general forms that are suited to any one of the four conjugate distances being assigned an infinite value. These are extended to the case where the members of one of the conjugate pairs are both infinite, and the system afocal. The afocal system is analyzed to obtain relationships that simplify Gaussian design of an afocal telescope when all four conjugate distances are finite. Examples are worked through to illustrate applications.

The relaying action of any non-afocal optical system (for two discrete object distances) is studied in its most general terms, with the four conjugate distances, the focal length, and the two magnifications being represented as literal parameters with fixed signs. Eight optically possible sign groupings of the parameters are identified when conjugate distances are Newtonian. They are used to identify the 18 optically possible sign groupings when the conjugate distances are Gaussian. The two sorts of groupings are tabulated for easy reference and to simplify their intercomparison. Analyses that relate the Newtonian and Gaussian groupings are performed in terms of inequalities. Examples of possible applications are reviewed. Useful applications of the theory of two separated lenses to the problems of a single thick lens are developed.

On the Problem of Optimizing Holographic Information Devices (in Russian), S. P. Vorob'jev, *Tekhnika Kino i Televidenya,* 52, April 1984.

The relationship between the holographic image resolution and the spatial spectrum size of the document recorded on the hologram is considered. A calculation method of the optimum hologram size according to stripe sizes in the documents is given.