

In 1972, the high point in photo-instrumentation achievement was the Apollo 17 flight on which the crew produced outstanding photographs throughout the entire mission. In fact, the best pictures for color rendition and fine detail made on any Apollo Mission were made by Ron Evans, Gene Cernan and Jack Schmitt during their moon trip. In addition to extensive photographic briefing and great determination to produce the best possible pictures for the Apollo 17 flight, the improvement was due in part to the quality of film supplied to the astronauts.

A new film called Kodak Aerial Color Film was chosen for this mission because of its significantly less grain and better color reproduction. This film showed a marked improvement over previous moon photographs taken on a faster film similar to Ektachrome EF, which afforded sufficient exposure latitude to cope with the earlier uncertain lunar conditions. Therefore, lunar scientists were able to make the best observations and measurements to date from the Apollo 17 photographs.

The Ground-Commanded Television Assembly for Apollo 15 and 16 was described at the Society's 1972 Fall Conference.¹⁰⁹

During the Society's 111th Technical Conference in April 1972 an Educational Workshop in Photo-Instrumentation Techniques was held to enable students to acquire a working experience with high-speed photographic applications in science and industry. Several experts lectured on photo-instrumentation techniques and student response was excellent.

The 10th International Congress on High Speed Photography, held 25-30 Sept. in Nice, France, was an outstanding success and attendance was excellent. Approximately 100 papers were presented. The *Proceedings* of this 10th Congress were scheduled for publication early this year as noted in the full report, with abstracts, contributed to the *Journal* by Elmer and Endelman.¹¹⁰

New Equipment

A new 16mm high-speed rotating prism camera called Photec was announced by Shotec, Inc. It has a 12-cm (400-ft) capacity. Performance features include 100 to 10,000 pictures/s with an electronic speed control to obtain a flat speed curve; interchangeable disc shutters; and a magnetic clutch drive to improve start-stop operation. The rotating prism and sprocket are on the same axis. The system is rated at T/3.1 and requires long focal length objective lenses.²⁶

Visual Instrumentation Corp. announced the first small format high-speed

pulse camera, Cine 8 Model SP1, a super-8 high-speed pulse camera with top framing rates up to 250 frames/s.¹¹¹

The compact, battery-operated camera uses standard Kodak super-8 cartridges or the MFX 30-m (100-ft) cartridges and has an intermittent pin-registered movement that insures sharp clear pictures at any selected frame rate from 10 to 250 frames/s. An optical reflex through-the-lens viewfinder was announced and is currently available along with many accessories.

Video Logic Corp. announced the Instar System (Instant and Analytical Replay)¹¹² which records stop-action and slow-motion pictures for periods up to an hour. The system records on 25.4-mm (1-in) videotape at a rate of 120 pictures/s and motion is frozen by means of a strobe light synchronized with each field to produce an effective exposure of 10 μ s. This short exposure, coupled with the Instar's logic circuitry, designed to eliminate noise bars, picture tearing and distortion, serves to produce crystal-clear pictures in real time, slow motion, or stop motion. The effective shutter system of 10 μ s is comparable to a high-speed camera operating at 40,000 pictures/s and in many instances the Instar system is quite effective in producing satisfactory data when a quick analysis is required. In practice, the Instar system is to a mechanical engineer as an oscilloscope is to an electronic engineer.

The Mark 3 Gyro Camera,²² a newly developed system of stabilized cinematography, was announced by Frank Gudaitis Enterprises. The camera, a 16mm instrumentation type, has a 120-m (400-ft) film capacity and an intermittent pin-registered movement. It is gyroscopically stabilized for pitch and roll. A hydraulic suspension system has been developed to absorb shock loads in excess of 50 G. The camera is mounted within a welded steel tube frame.

Three 35mm instrumentation cameras, called Robot Motor-Recorders, Models 36BE, 24BE and 18BE, were announced by Karl Heitz Inc.²⁸ The cameras have integrated electric motors, 24-V dc or 12-V dc. Each camera can accommodate any one of a number of quick-change lenses from 360° extreme wide-angle up to 1000mm extreme telephoto. In addition, a built-in second lens with a mirror and shutter on the camera top superimposes an 8- by 8-mm image into the corner of the picture which (according to the model of camera used) is 24 by 36 mm, 24 by 24 mm or 18 by 24 mm. A Robot instrument panel with clock, counter, data plate and rheostat-controlled illumination permits automatic recording of time, picture number and any other desired information into each

frame. Electromagnetic remote releases, time control units and interchangeable 3-, 30-, 60- or 150-m (30-, 100-, 200- or 500-ft) magazines provide up to 12,000 uninterrupted exposures without rewinding.

A new Locam camera was announced by Redlake Corp., Photo Instrument Div.³⁰ It is an intermittent, pin-registered, high-speed camera with a sampling rate of 8 to 500 pictures/s. It has the same features as the earlier Locam including lifetime lubrication and modular construction of camera movement, motor and speed control. New features of the second generation Locam include a variable shutter, self-retracting internal reflex optics and light-emitting diode timing lights. The shutter opening can be varied from 0 to 160° by a simple adjustment through an access in the front panel. A VIEW knob on the front panel actuates the boresight prism assembly in the camera so that focusing and viewing through the lens can be accomplished without opening the film compartment. Dual light-emitting diodes are included as timing lights in all Locam cameras. The new Locam can be used in a rugged high-gravity environment by adding a ruggedized lens mount to the front plate and using a Redlake ruggedized lens.

The new Photo-Sonics 35mm-4M instrumentation/documentation camera was announced by Instrumentation Marketing Corp.¹¹³ The camera can accommodate 60-, 120- and 300-m (200-, 400- and 1000-ft) daylight loading magazines that can be interchanged in a few seconds. The quick-change magazine feature minimizes the loss of event documentation at the time of the film runout and magazines can be loaded without disturbing the optical system. The camera with the 300-m (1000-ft) magazine mounted measures 305 by 356 by 178 mm (12 by 14 by 7 in). Camera speeds ranging from 16 to 180 frames/s are available by means of a selector switch. The camera has a film runout switch, intermittent with four pulldown pins and two register pins, 28-V dc. The camera can be tripod-, top- or side-mounted. A 155-V ac version is available. The lens mount is bayonet interrupted thread. The electronics are modular solid state. The shutter is a variable rotary disc with openings of 9° to 144°.

The Vanguard Model XR-35 projector,¹¹⁴ designed specifically for medical research, development engineering, test engineering and other disciplines that require a simple, rugged projector, was announced by Vanguard Instrument Corp. The projector can operate at 30 frames/s, a slow-scan speed of 6 frames/s and a single-frame advance control for frame-by-frame analysis. The projector

is reported to be flickerless and the direction of film travel can be instantaneously reversed. Model XR-35 is basically a wall projector to project the image on a conventional viewing screen. It can be converted to a film viewer by attaching the Model XR-11 rear-projection hood.

The Photo-Sonics 16mm-1P data recording pulse camera was announced by Instrumentation Marketing Corp.³² The camera operates in pulse mode up to 10 pulses/s and in cine at 15 to 100 frames/s. Applications include time-lapse in traffic engineering, biomedical, microscopic, environmental and other studies. The basic unit consists of the camera body and a data box. A Julian calendar and data slate allow identifica-

tion of each frame, by day of year, down to the second, automatically, plus manual handwritten data. Optional equipment includes 60-, 120- and 300-m (200-, 400- and 1200-ft) daylight-load magazines, Apex automatic exposure control and a selection of Schneider lenses.

A synchronous phase lock 16mm camera, a modification of the Photo-Sonics 16mm-1P intermittent pin-registered camera has been announced by Instrumentation Marketing Corp.³² Daylight-loading magazines holding 60-, 120- or 300-m (200-, 400- or 1200-ft) films can be interchanged in a few seconds. The shutter is synchronized to an external signal and can also be phased. Operation

is from $7\frac{1}{2}$ to 120 frames/s. Applications include industrial and medical cine x-ray photography and recording of video CRT displays.

The Photo-Sonics 16mm-1VN miniature high-speed camera has been announced by Instrumentation Marketing Corp.³² Speeds are from 16 to 200 frames/s and pulse to 15 pulses/s. Features include intermittent pin-registration, daylight load 20-, 30- and 60-m (65-, 100- and 200-ft) magazines that can be interchanged in seconds. The film transport has two register and two pulldown pins. The operating voltage is 28-V dc, 1.6 A at 200 frames/s. The heater requires 28-V dc. The shutter is 120°. Interchangeable fixed shutters 9° to 72° are optional.

EDUCATION

Although the word "revolution" as applied to educational technology was disposed of in last year's Progress Committee Report in favor of "evolution,"¹¹⁵ the word still crops up — for example, the Carnegie Commission on Higher Education's 1972 Report is entitled "The Fourth Revolution: Instructional Technology in Higher Education."¹¹⁶

Sterling M. McMurrin, Dean of the Graduate School of the University of Utah and a former U.S. Commissioner of Education, commented "It is difficult to carry on a successful revolution when most of those who are in the middle of it don't know a revolt is on. . . . They either don't know or won't admit that in the world of learning things are changing and that there are real possibilities for improving the quality and rate of learning through new methods of teaching. . . ."

It still seems that "evolution" is the better word to describe what is happening in the world of education. Revolution or evolution, the important thing is: what use is being made of the available equipments and devices? Also, how does the use of teaching machines and audio-visual aids affect the student learning process and how do they help to bring about the stated educational goals?

An article in the Winter 1972 issue of *AV Communication Review*, "The Effects of a Filmstrip/Tape Program on Teachers' Attitudes Toward Behaviorally Stated Objectives," by Earl P. Smith, asks ". . . will a filmstrip/tape change teachers' attitudes and if so will the change be related to personality types and/or subject matter taught?" It seems fairly obvious that the relationship of teacher-student-machine has not yet been thoroughly explored.

There is also another area where verbal accuracy is desirable. As pointed out in "The SMPTE and Education" in the September 1972 issue of the *Journal*,¹¹⁷

the terms "training" and "education" are not necessarily interchangeable. The rapid changes in technology within the industry are reflected in the number of training programs offered to enable workers on all levels and specialists in many disciplines to learn how to use the new machines and the new techniques and how to adjust to new approaches. One can hardly pick up a professional journal without finding references to new uses of the changing technology. Both industry and education are making increased use of cassettes, using both tape and film, for specific learning situations; also, the number of closed-circuit TV installations seems to be increasing. Many individuals predict that CATV will become a significant force in this direction in the near future.

Industry has come to accept the fact that individual instruction at the point of need is probably the most cost effective. The academic community has been somewhat slower to accept this premise, probably due to tradition and to the fact that the investments must be amortized over a much longer period of time. There is no question, however, that we can no longer afford the luxury of small classes in situations where mediated individual or large group presentations can do the same job as well or better.

The many training programs offered by industrial organizations as well as by many colleges and universities are necessary and desirable. Many training programs, some under the name of "workshops" are offered as part of a broad educational program.

The education of a student, for example in filmmaking, may cover a vast field. As pointed out in "The SMPTE and Education," "It is more accurate to think of education as more general (than training), i.e., learning from the past and relating it to the present and future.

The increasing development of teaching machines and audio-visual equipments used for the classroom is a healthy trend, in spite of some dubious results and setbacks. It is the writer's opinion, that the increasing number of young people seeking training (and education) for careers in motion-pictures and television and related sciences, arts and technologies also is a healthy trend.

As an outgrowth of earlier studies such as the McMurrin Report,¹¹⁸ efforts are being increased for more governmental assistance for instructional technology. On 11 September 1972, Representative Hansen of Idaho introduced H.R. 16572 in Congress to establish a Council on Educational Technology.¹¹⁹ It is hoped that efforts such as this will provide assistance as well as incentive toward increasing the pace of evolution.

As has been noted in another context, in addition to the Society's responsibilities in the field of education related to the training of individuals, we have a major responsibility to assist in the development of standards for the equipment and systems used in education and training programs.

The writer was recently appointed U.S. Technical Advisor to the U.S. National Committee of the International Electrotechnical Commission for IEC/SC60C. This committee is concerned with the creation, promotion and adaptation of international standards for educational equipment and systems involving the recording, copying and reproduction of audio and visual information in the educational field. An advisory committee through the U.S. Technical Advisor and the U.S. National Committee has the responsibility of insuring that requirements of both education and industry in the United States are considered in related international standardization activity. As the Society's Vice-President for Educational Affairs,