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Computer Program for Video Data Processing System (VDPS)

TV pictures are continuously being taken from unmanned spacecraft of bodies in space. These pictures can vary in resolution up to 1200×1200 intensity points per picture. The pictures are transmitted by telemetry and when received on earth are put on analog tapes. The analog tapes consist primarily of intensity readings. In taking raw video data from spacecraft photographic mission telemetry, the analog tape recordings are played back on a special peripheral device which generates a film copy. The film may be flying-spot scanned to generate a digitized magnetic tape copy or a direct analog tape-to-digital tape conversion. The digital tape can be manipulated to:

- (a) print out characteristics of the intensity points;
- (b) clean up noise and telemetry drop-out that occurred during telemetry transmission;
- (c) enhance contrast;
- (d) modify the picture for special purposes, remove fiducials, compensate photometric distortions;
- (e) calculate, and print contour lines on the picture.

The digital output from the computer is then converted into a new photographic film.

The subroutines listed below are the most useful part of the program and perform the following functions:

- (1) *TYPE* facilitates quick input-output of data via the typewriter.
- (2) *MAGTP* provides a general purpose I/O routine to handle operations with magnetic tapes.
- (3) *PRNT* is used to print lines on the line printer.
- (4) *CARD* is used to read cards from the card reader.
- (5) *PACK* is designed to pack, unpack, and change to another form 24-bit words.

- (6) *RUN* loads a catalogued program from the disk and transfers control to it.
- (7) *FREQ* will inspect intensity samples (3 or 4 per word) and increment a counter assigned to each sample.
- (8) *IOMAST* initiates input-output determined by specification of one of the device types.
- (9) *CITPT* is used to save the exact contents of core on the disk for future use.
- (10) *CDUMP* is designed to copy into 1200-word buffers of the second bank of core, successive specified areas of the first band of core.
- (11) *REST* reloads core and restarts a program which had previously been interrupted and written out by checkpoint (CKPT).
- (12) *TRAP* When an interrupt occurs, the trap cell branches to this interrupt routine (TRAP).
- (13) *CSCH* will test if the channel used in the I/O routine called is active.
- (14) *SAVE* is designed to copy binary data from 1200-word buffers in core into disks, and to enter the name of the program in the program directory table.
- (15) *GET* searches tapes and disks for desired picture and provides a pointer to the proper location on disk or positions the proper tape at the desired record.
- (16) *PUT* provides a means of placing the proper labels on a tape file before a picture is added and updates the tape directory.
- (17) *LOOK* searches the picture table(s) or program table for a requested name. If desired entry is found, the location of the entry is returned to the caller. If there is no match, *LOOK* returns control to the caller.

(continued overleaf)

- (18) *PATCH* reads in the assignment statements, stores them in their corresponding cells and types a message if the control message *GO* is encountered before all variables are read in.
- (19) *CSUP* is the central Video Data Operating System control card reader, interpreter, and subsystem loader.
- (20) *DISK* is an I/O routine.
- (21) *ALLOC* is used to find available space (sequential) on disk.
- (22) *ENDPUT* is used to finish processing of a tape after desired pictures have been placed on it.
- (23) *PURGE*—When space allocated on disks for a program or picture is no longer needed, *PURGE* is used to make these tracks available again.
- (24) *LINE* will assist the programmer in reading and writing records on disk or tape.
- (25) *LABEL* initializes a scratch tape which is used for pictures, providing it with names, labels, etc.

(26) *FIX* supplies a simple way to modify core locations from the console to reduce the probability of needing to reassemble a program to remove an error found while debugging.

Notes:

1. The program is written in Symbol language for the SDS 930 and IBM 7094 computers.
2. Inquiries concerning this program may be directed to:

COSMIC
Computer Center
University of Georgia
Athens, Georgia 30601
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Patent status:

No patent action is contemplated by NASA.

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