

8 September 1966

DEVELOPMENT OBJECTIVE

MAGNETIC TAPE TO PHOTO REPRODUCER

1. INTRODUCTION. This document presents requirements for the design, assembly, installation and operation of equipment to produce high quality photographs from various types of video tapes.
2. CONCEPT. Several techniques are used to convert television imagery to photographic prints. These techniques vary widely in cost and quality and many of the systems are not compatible. Video tape widths which vary from $\frac{1}{4}$ inch to 2 inches and scan lines which range from 405 to 819 are two of the main problem areas. A system of integrated commercial components must be devised to accept tapes from the most common U. S. and European systems, display their contents at normal speeds or in stop motion at the highest possible quality consistent with the recording medium, and produce instant, high-quality, still photographs of selected scenes.
3. ADMINISTRATION.
 - 3.1. Evaluation of proposals will be based on cost, quality of imagery, indications of commitment to fulfill these objectives, and the experience and ability evidenced by inclusion of relevant specifics.
 - 3.2. Proposals should contain an indication of thorough comprehension of the areas of prime concern, suggested solutions to problem areas, and a schedule of major steps in the development process.
4. REQUIREMENTS.
 - 4.1. General Configuration.
 - 4.1.1. Playback. The basic component for this system will be a standard, commercial, transverse scan, video tape recorder. This equipment must utilize switching and/or plug-in modules to accept tape with the following standards; 525 scan line/50 field, 625/50, 405/50, and 819 scan line/50 field. The system must be compatible with "Intervision" as well as U. S. "high band" and "low band" broadcast systems. It also must have the quality of a color system, but does not need to have a full color capability. However, it must be designed to accept available commercial equipment for modification so that color capability can be achieved with minimum effort and expense.

4.1.2. Stop-Motion. A disk-type video recorder will be operated on line with the basic video recorder to provide it with a capability for temporary storage and selected stop motion or single frame display. Provisions must be made to accept signals from either helical scan or transverse scan recorders for a better quality stop motion capability. The system must be able to advance the recorded display frame-by-frame and to select and hold a particular frame to recorded imagery. A small monitor affixed to the disk recorder will display the imagery being stepped or held. Off-the-shelf equipment may be modified to suit this requirement.

4.1.3. Display. A Kinescope-type, flat-faced cathode ray tube (CRT) will be used to present imagery to be photographed. This CRT will be large enough to present a 3x4-inch display for reproduction. The display-recorder circuitry must include contrast, brightness, etc., controls.

4.1.4. Photography. A 4x5-inch, high-speed, frame camera will be used to photograph the quality CRT image. This camera will be set and rigidly attached in such a manner that full scale photographs (1:1) of the flat CRT can be produced. A fine focus control will be included so that the sharpest possible image can be obtained on the ground glass. A between the lens shutter with a "Time" setting and an adjustable exposure range from 1 second to 1/50th of a second will be adequate. There will be no need for an automatic exposure device, an exposure meter attachment will be sufficient. The camera will have a back that will accept cut film and "film packs" for use in producing optimum photographic records. The back will have provisions to accept a rapid, self-processing adapter for use in producing urgently needed photos without the need of a photographic laboratory.

4.1.5. Integration. All components must be interfaced for optimum performance. Equipment must be positioned and arranged for optimum man/machine operation and maintenance. Controls must be adequately marked and easily available, but must be positioned so as not to interfere with the operator.

4.2. Additional Equipment Considerations.

4.2.1. Proposals should provide for and discuss capabilities and limitations of the following types of electronic image manipulation devices and techniques.

- (a) "Spot Wobble" circuitry and controls for decreasing scan line patterns of CRT's.
- (b) "Vertical Aperture Equalizing" for apparent increase in vertical resolution of imagery.
- (c) "Gamma" or "Black Stretch" controls.
- (d) "Exponential" or "White Stretch" controls.
- (e) Edge enhancement or outlining techniques.
- (f) Electronic magnification controls.
- (g) Other circuitry or techniques to help produce and improved photographic still copy of video taped material.

4.2.2. Considerations must be given for reducing Radio Frequency Emissions in accordance with Federal Std. #222. This specification is to be limited to information carrying emissions.

5. PHYSICAL AND OPERATIONAL CONSIDERATIONS.

5.1. This equipment will be operated in a clean office type environment. Special considerations must be given to reduce heat output and noise emanating from the system.

5.2. The following facilities will be available as requested:

5.2.1. Electricity: 110V, 1 phase and 208V, 3 phase, 4 wire.

5.2.2. Chilled water and tap water.

5.2.3. Compressed air at 80 psi.

5.2.4. Vacuum

6. DETAILED REQUIREMENTS.

6.1. The maximum size of any single component is not to exceed 32" wide x 65" long x 71" high, and will not exceed 1600 pounds weight.

6.2. Environmental conditions within the room will be held to temperatures of 72 degrees F. \pm 5 degrees F. and humidities of 55% \pm 15% - 5%.

6.3. Provisions must be made for maximum personnel protection from safety hazards that may be generated by the equipment.

6.4. The contractor is to assume responsibility for all facility hook-up from the point where the facilities may enter the room.

6.5. If any component of this system is vibration sensitive so as to adversely affect performance, adequate vibration isolation must be incorporated in the design.

7. MAINTENANCE AND TRAINING.

7.1. A listing and price quotation of recommended spare parts and test equipment will be provided as deliverable items under the contract.

7.2. Written instructions for recommended testing procedures must be included, as well as wiring diagrams and schematics.

7.3. It is highly desirable that initial utilization and operational evaluation of this system not be hampered by less than optimum operation of the equipment itself. However, the equipment embodies several concepts whose technical details are not familiar to most user personnel. Therefore, proposals must include a separate price quotation for provision by the contractor for a technician to help assure the proper and effective operation of the equipment during its introductory phase. This technician must have been acquainted with the development and assembly of the system and must be proficient in the operation and repair of the system components. During the crucial period of initial operation, he must keep the equipment constantly tuned to optimum performance and perform minor modifications, on the spot, as necessary. The technician provided should be available for one year. During that time, he will be expected to train customer maintenance personnel to assume his duties.

7.4. Proposals must include installation specifications, including estimates of necessary supporting services and equipment, such as floor space, atmospheric environment and power.

7.5. The contractor must provide monthly progress report, including currently updated schedules for delivery and installation in accordance with specification No. DB-1001 (attached).

Specification No. DB-1001
Issue Date: 31 August 1966

CONTRACTUAL DOCUMENTATION TO BE SUPPLIED BY CONTRACTORS

1. SCOPE

1.1 This Specification covers the contractual documentation to be supplied by contractors in the performance of Research and Development contracts.

2. REQUIREMENTS

2.1 General - In order to maintain proper control the progress and funding of Research and Development contracts, it is necessary that certain orderly reporting be accomplished by the Contractor on a regularly scheduled basis.

2.1.1 All documentation submitted by the Contractor shall bear the control number assigned by the Contracting Officer's Technical Representative. This control number shall appear on all correspondence, reports, etc., submitted by the contractor under the contract.

2.2 Types of Reports - The following types of reports shall be submitted by the contractor. Specific reports shall include, but not necessarily be limited to, the designated information.

2.2.1 Monthly - A monthly report shall be prepared as of the last working day of each calendar month. The first monthly report shall be prepared as of the last working day of the first full calendar month subsequent to the date of contract. Monthly reports shall be mailed so as to reach the consignee(s), stated in the contract, not later than the first business day after the fifteenth of the month following the reporting period. Each Monthly report shall provide the following, with negative reporting if applicable.

2.2.1.1 A statement of the activity on the project during the month and the percentage of work completed as of the reporting date.

Specification No. DB-1001

- 2.2.1.2 A statement of the planned activity for the next month.
- 2.2.1.3 A statement of pending, unresolved technical problems.
- 2.2.1.4 A statement of pending, unresolved contractual problems.
- 2.2.1.5 A statement for the record, of agreements or understandings reached orally during the reporting period on technical matters not requiring the approval of the Contracting Officer.
- 2.2.1.6 A statement of any proposed change, agreement or understanding which requires the approval of the Contracting Officer. The contractor is cautioned not to proceed in a situation requiring the prior approval of the Contracting Officer until such approval has been obtained. In situations requiring correspondence with the Contracting Officer, a complimentary copy shall be forwarded, simultaneously, directly to the Contracting Officer's Technical Representative.
- 2.2.1.7 A statement of unanswered, unresolved matters, unanswered correspondence, etc., and whether delinquency is attributed to the contractor or to the Government.
- 2.2.1.8 Status of funds. The format shown in Enclosure 1 shall be used to report the status of funds. All applicable items shall be reported. If no expenditures or obligations have been incurred for a specific item, the word "None" shall be entered in the space assigned for the dollar amount.
- 2.2.2 Final Report - The final report shall be submitted to the Contracting Officer's Technical Representative on or before the thirtieth day following completion of the work under the contract. This report shall cover the entire design and/or development work accomplished during the period of performance and shall contain a section covering the work performed under each of the tasks set forth in the Work Statements. The report shall state concisely but completely the major problems encountered, the apparent cause of the problems, the problem solutions and an evaluation of the solutions based on actual application of the solutions.

Specification No. DB-1001

2.2.3 Installation Engineering Data - Whenever hardware is a deliverable item under a contract the contractor shall provide the Installation Engineering Data requested on Enclosure 2. The Contracting Officer's Technical Representative shall provide the blank forms to the Contractor. Preliminary data shall be submitted to the Contracting Officer's Technical Representative at six months and again at three months prior to the delivery date of the equipment. Final data shall be submitted by the contractor not less than thirty days prior to the delivery of the equipment.

2.2.3.1 The outline drawing, submitted with the Installation Engineering Data form shall show:

- (a) the orientation of the equipment within the work area for normal equipment useage.
- (b) the exact location of all external connections.
- (c) the clearance required around the equipment for access to all removeable panels, doors, etc.
- (d) the location of mounting points and type of mounting required.

2.3. Delivery of Reports - All monthly reports and the final report shall be forwarded by the contractor to the Consignee(s) specified in the contract. The contractor shall forward each report in the number of copies specified in the contract.

2.3.1 The Installation Engineering Data form plus the outline drawing shall be forwarded to the Contracting Officer's Technical Representative.

Specification No. DB-1001

Statement of Funds as of 30 September 19XX (See Note 1)

EXPENDITURES

1. Labor:			
a. Total paid as of 31 August 19XX		XX,XXX	
b. Paid during September 19XX		<u>X,XXX</u>	
c. Sub-total			XX,XXX
2. Material:			
a. Total paid as of 31 August 19XX		X,XXX	
b. Paid during September 19XX		<u>XXX</u>	
c. Sub-total			X,XXX
3. Services (sub-contracts, etc.):			
a. Total paid as of 31 August 19XX		X,XXX	
b. Paid during September 19XX		<u>XXX</u>	
c. Sub-total			<u>X,XXX</u>
4. Total expenditures as of 30 September 19XX			XX,XXX

OBLIGATIONS AND ESTIMATES

5. Obligations:			
a. Sub-contract W/ABC Co., amount not yet paid		X,XXX	
b. Sub-contract W/DEF Co., amount not yet paid		XXX	
c. Material ordered but not yet paid for		<u>XXX</u>	
Sub-total			X,XXX
6. Estimates of Future Expenditures:			
a. Estimate of labor required		X,XXX	
b. Estimate of material required		XXX	
c. Proposed sub-contracts		<u>XXX</u>	
Sub-total			<u>X,XXX</u>
Total (See Note 2)			XX,XXX

Specification No. DB-1001

NOTES:

1. All amounts shown above must include overhead, G&A, handling charges, fees, etc.

INSTALLATION ENGINEERING DATA

Date form completed _____

(See Remarks at end of form)

Tentative Valid until _____

Final data

I. INSTRUMENT

- A. Name of instrument: _____
- B. Manufacturer: _____
- C. Contract number: _____
- D. Delivery date: Tentative: _____ Final: _____

II. PHYSICAL FEATURES

- A. Sub-assemblies:
 - 1. Number of sub-assemblies: _____
 - 2. Largest sub-assembly: Weight _____ lbs; _____" H x _____" W x _____" D
 - 3. Heaviest sub-assembly: Weight _____ lbs; _____" H x _____" W x _____" D
- B. Assembled instrument:
 - 1. Number of major components: _____
 - 2. Largest component: Weight _____ lbs; _____" H x _____" W x _____" D
 - 3. Heaviest component: Weight _____ lbs; _____" H x _____" W x _____" D
 - 4. Total floor space required after assembly, including maintenance access space. _____ Ft. _____ In. High x _____ Ft. _____ In. Wide x _____ Ft. _____ In. Deep.
 - 5. Total weight of assembled instrument: _____ lbs.
- C. Type of base of mount: Flat _____; 3-point suspension _____; 4-point suspension _____
- D. Does the instrument have built-in mobility? Yes _____ No _____
- E. Is the instrument particularly sensitive to vibration? Yes _____ No _____
Will the instrument generate vibration? Yes _____ No _____
- F. Are any special or unusual tools or fixtures necessary or advisable for the installation of the maintenance of this instrument? Yes _____ No _____.
If "Yes," please describe: _____

III. UTILITIES

- A. Electrical:

	<u>AC</u>		<u>DC</u>
1. Voltage	_____ Volts / _____ Volts	_____ Volts / _____	
2. Current	_____ Amps/phase	_____ Amps	
3. Frequency	_____ cps		
4. Nr. of phases	_____ Ph		
5. Nr. of wires	_____		
6. Power required	_____ Watts	_____ Watts	
7. Power factor	_____ (Leading) (Lagging)		
8. Type of outlet:	Two prong _____; three prong _____; Twist lock _____; Perm. _____		
9. Type of ground:	Building conduit _____; Direct earth ground _____.		
10. Should the instrument be shielded, either from external electromagnetic signals or to prevent interference with other equipment? Yes _____ No _____			
If "Yes," to what extent? _____			

B. Air conditioning:

- Desired environment: Room air temperature of ___ °F / ___ °F and relative humidity of ___ % / ___ %.
- Input Air: Is a direct connection necessary? Yes ___ No ___; Adviseable? Yes ___ No ___; If "Yes," what is the connector type and size? _____ Recommended input air temperature ___ °F / ___ °F. Relative humidity ___ % / ___ %. If input air must be filtered, what is the maximum particle size in microns? ___ What particle count? _____ / cu. ft.
- Output Air: Is a direct connection to the return air duct necessary? Yes ___ No ___. Adviseable? Yes ___ No ___. Connector type and size? _____. Output air temperature ___ °F / ___ °F. Relative humidity ___ % / ___ %. Output heat ___ BTU/Hr. Flow of ___ CFM. Is output air toxic? Yes ___ No ___; Noxious? Yes ___ No ___.

C. Plumbing:

- Is water required? Yes ___ No ___; Pressure ___ PSIG, flow ___ GPM.
- Type of water required:
Tap ___ °F / ___ °F Deionized ___ °F / ___ °F
Tempered ___ °F / ___ °F Filtered ___ °F / ___ °F
If filtered, give maximum permissible particle size in microns and the maximum permissible count. ___ microns ___ particles/cu. ft.
- Pipe required:
Galvanized ___ Copper ___ Size ___
Stainless Steel ___ Plastic ___ Type of connector ___
- Floor drain:
Diameter of drain ___ Galvanized drain? ___
Plastic drain? ___ Glass drain? ___
- Are any chemical solutions used in the device? Yes ___ No ___. If "Yes," state the nature of the solution(s), permissible temperature range, flow rate in appropriate units and the filtration necessary for each solution _____.
- Size of pipes and connectors _____.

D. Compressed air:

Is compressed air required? Yes ___ No ___. Water free? ___ Oil Free? ___
Type and size of connector? _____. Pressure ___ PSIG. Flow in CFM
Maximum ___, minimum ___, average _____.

E. Vacuum:

Is vacuum required? Yes ___ No ___. Pressure ___ PSIA or (inches of water) (millimeters of mercure). Displacement in CFM, maximum _____, minimum _____, average _____. Type and Size of connectors _____.

F. Peripheral Devices:

Will the instrument be connected to any peripheral devices such as a computer or data input or data output device? Yes ___ No ___. If "Yes," give, in detail, the nature of the connection to the peripheral device such as coaxial cable, multiple wire connector, etc.

IV. REMARKS

- Use additional sheets if more space is required for environmental conditions or utilities not mentioned above.
- Submit three typed copies of the completed form to the Technical Representative.

- C. Attach three copies of a dimensioned outline drawing of each major component and of the completed assembly. Include the estimated weight of each major component and of the completed assembly. Indicate, on the outline drawing of the completed assembly, the space required for access to the instrument for maintenance.

- D. If a question does not apply to the instrument, insert "N/A" (Not Applicable) in the appropriate blank space.

Information provided by:

(Signature)

(Position or job title)