

EXECUTIVE SUMMARY

SAI Technology Company (SAIT), A Division of Science Applications, Inc. (SAI), considers the C³I/VISTA Display System completely feasible. SAIT development of the ERADCOM concept of a lightweight display head tethered to a remote controller and power supply offers the U.S. Army the following key benefits:

- A technical approach which is consistent with the technical guidelines of the solicitation and which is based upon the combined experience of SAIT and six leading companies in the flat display and related technology fields: the GTE Products Corporation - Sylvania Lighting Center, Texas Instruments, Inc., Elographics Inc., Hycom Incorporated, Rockwell International Corporation, and Tektronix Inc.
- A project management plan that offers an in-depth examination of all available equipment and techniques for manufacturing and driving thin film electroluminescent panels. This extensive study will give particular review to those companies that have participated in TFEL panel development under ERADCOM sponsorship. This study phase will occur in the initial 3 months of the contract and will provide ERADCOM and SAIT with a detailed determination of the best combination of available equipment and techniques to accomplish C³I/VISTA Display System objectives. Also, because TFEL is an emerging technology, SAIT will be able to incorporate the very latest advances in design,

hardware and software into the project during the 3-month study phase, consistent with meeting ERADCOM's development schedule and with ERADCOM approval.

- A travel and technical meeting schedule whereby SAIT maintains close coordination with ERADCOM/ETDL/MDD throughout the program to incorporate technical contributions resulting from current ERADCOM AC-TFEL development programs, and to follow modified technical directions which may result from ERADCOM assessment of new technical results and expanding U.S. Army requirements.
- A technical approach in which design and technology decisions will be made by a proven team of experienced personnel who are cognizant of the important factors involved in developing Mil-Spec display equipment and in accomplishing technology insertion, i.e., an approach which will ensure the readiness of the equipment for use in a battlefield environment.

TECHNICAL APPROACH

SAIT's approach to developing the C³I/VISTA Display System to meet the ERADCOM technical guidelines is based on the concept of combining SAIT's extensive experience in developing Mil-Spec flat panel display systems with the capabilities and resources of selected U.S. companies that are leaders in electroluminescent panel technology. In late 1981, as part of a continuing, advanced display IR&D program at SAIT, a task was established to identify and evaluate the companies and/or laboratories working in the areas of flat display and high

voltage line driver technology, efficient power supply techniques, touch panel and keyboard technology, and low volume/low power semiconductor and packaging technology. From this study, SAIT has selected specific high technology companies with which it will work to carry out the development program. The criteria used in selecting these companies include their position in state-of-the-art technology development, their familiarity with U.S. Army requirements, the level of internal investment and resource allocation, and their willingness to work with SAIT on the ERADCOM program.

Three of the companies, Hycom, GTE and Texas Instruments, are the leaders in developing large area AC-TFEL display elements and compatible high voltage LSI drive circuit technology. These companies are currently working under U.S. Army ERADCOM sponsorship on programs which have technical guidelines compatible with this project. SAIT has involved these companies in its advanced terminal development program and has developed a strong working relationship with each company. The working relationship with Hycom and GTE has included a number of joint AC-TFEL technology assessment projects and technology transfer activity in the area of flat panel and drive circuit packaging. The working relationship with Texas Instruments' High Voltage LSI Technology Group extends over the past five years and includes extensive assessment of the Mil-Spec characteristics of the BDFET technology by the Components Engineering Section of SAIT. SAIT uses TI BDFET line driver technology in several of its current flat panel products.

SAIT has established an on-going working relationship with Elographics Inc. of Oak Ridge, TN, considered to be the current industry leader in developing high resolution, transparent touch input surfaces for display systems. Hycom

Inc., and GTE are considered to be the leaders in the development and application of AC-TFEL display technology and hardware.

Each of these companies has identified personnel who are assigned to the associated technology areas and each group is quite familiar with C³I/VISTA program requirements. Combining all these companies' resources and technologies with SAIT's experience in Mil-Spec microprocessor-based graphic display systems provides the U.S. Army with an excellent development team for the C³I/VISTA Display System. Further, SAIT has considered and will continue to consider Rockwell's panel and driver technology during this development program.

In conjunction with the development of outside technology resources, SAIT, together with its parent, SAI, has identified an internal program team with a proven base of experience in developing Mil-Spec graphic display system hardware and software for U.S. Army and other DoD programs. Two key U.S. Army sponsored programs which provide an important base of experience for the C³I/VISTA Display System activity are the Sergeant York high performance radar display and the color-graphic, topo-map display system developed for the National Training Center at Ft. Irwin. Both systems involve graphic hardware and software techniques similar to those called out in the ERADCOM technical guidelines. In addition SAIT personnel and consultants have a working knowledge of emerging international graphic standards and are familiar with DoD directed software developments such as the Ada and C programming languages.

The software development team assigned to the C³I/VISTA Display System program has been selected on the basis of past experience as well as knowledge of current and future trends and techniques in computer graphics as they relate to sensor and C³I display systems. The system specialists selected are experts in

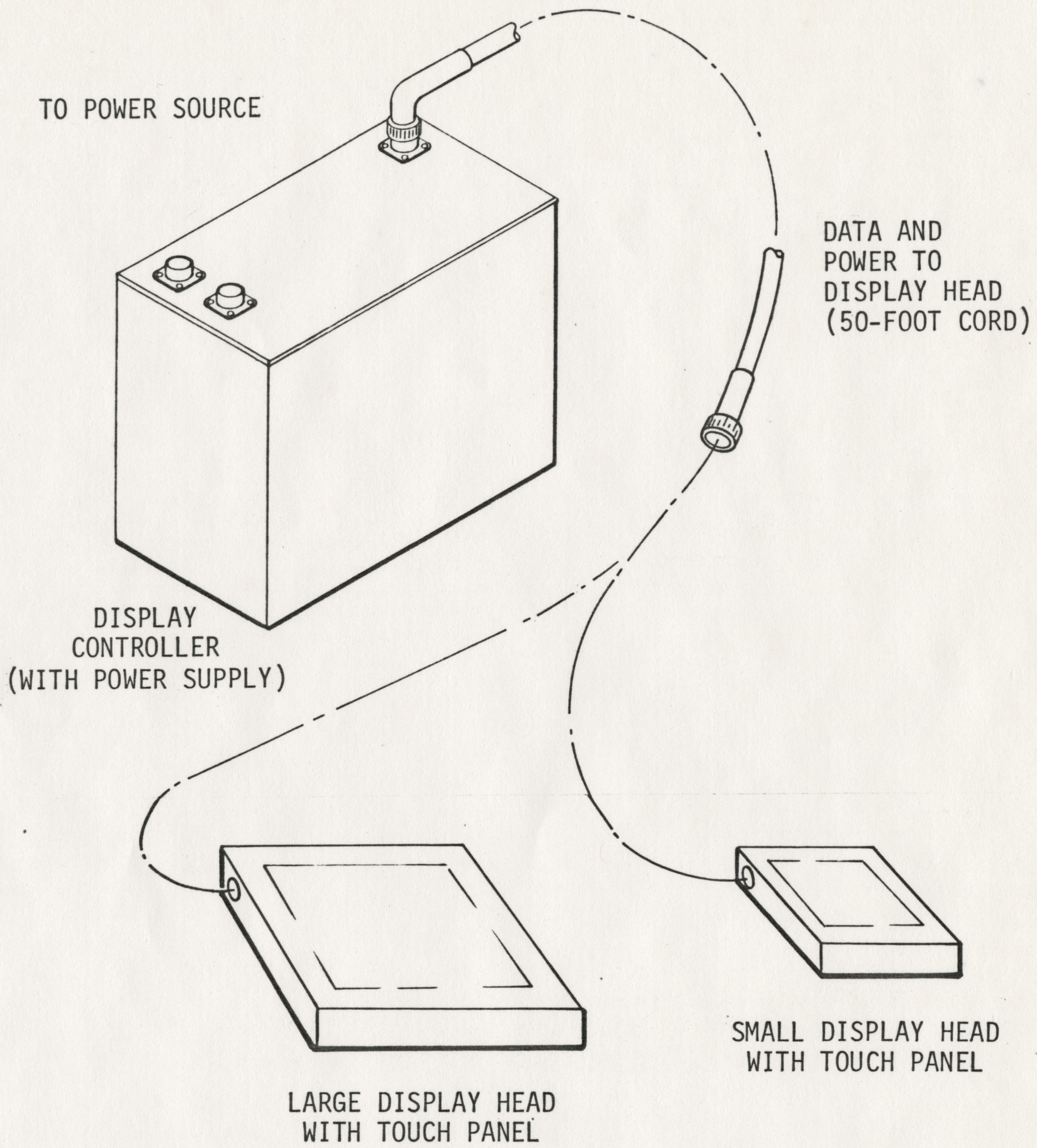
the integration of advanced technology hardware and software. Examples of recent technology integration and design projects handled by this team are the display systems developed for the Harpoon Missile System, the E-4B Computerized Antenna Pointing System (CAPS) and the Ground Launched Cruise Missile System.

C³I/VISTA DISPLAY SYSTEM CONFIGURATION

The first figure illustrates SAIT's interactive flat panel display system configuration. It includes a controller with a 50-foot cable (tether) carrying data and power. The accompanying chart depicts physical characteristics of the design.

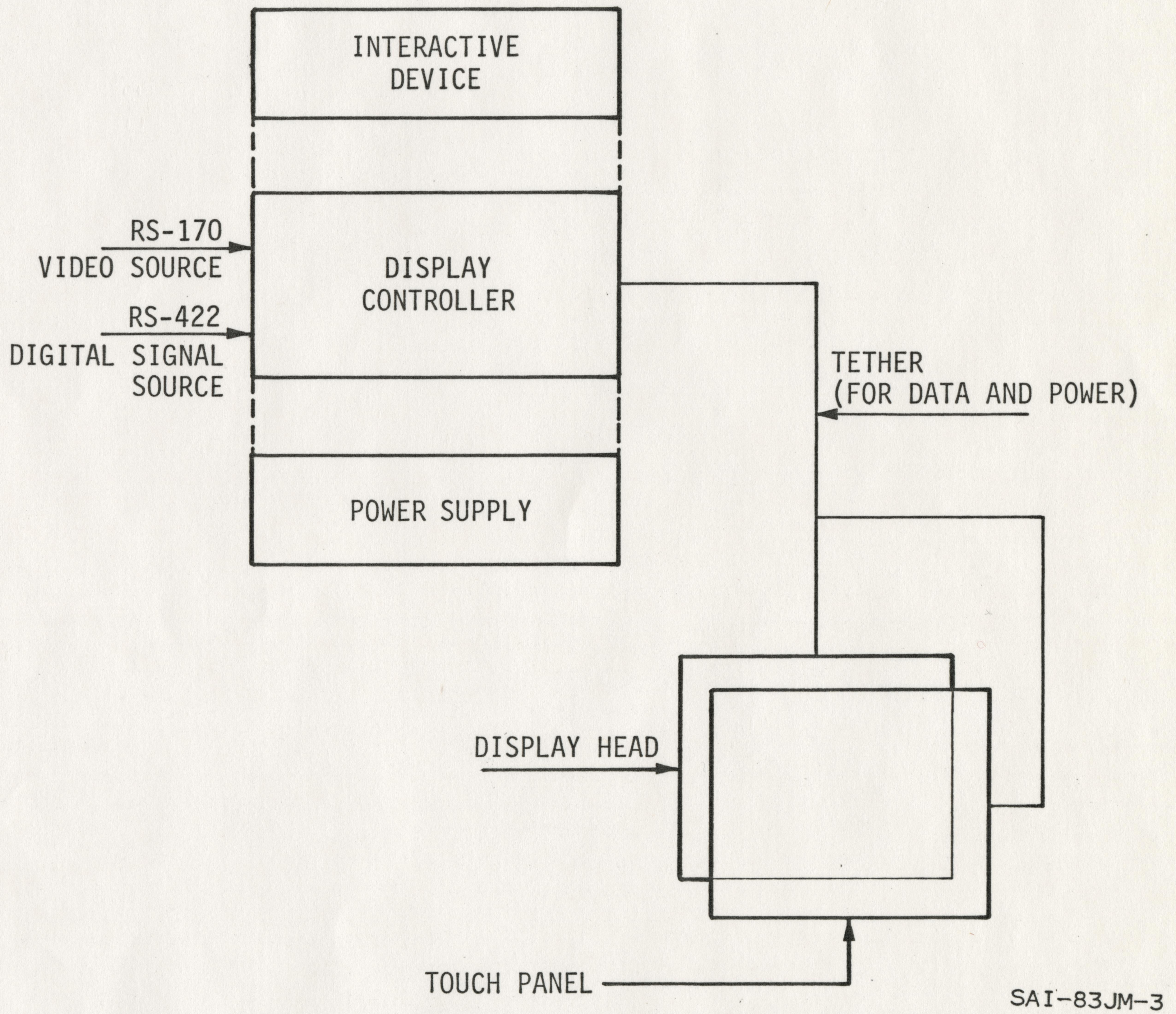
The block diagram illustrates the relationships among the major display system elements to be developed in accordance with ERADCOM technical requirements.

The detailed approach to be taken in developing each of the components pictured is presented in Part I, the Technical Proposal. Part I also presents a more detailed description of the technology resources, consultants, and SAIT/SAI personnel and facilities that will be used in the C³I/VISTA Display System program.



MODULE	SIZE (DESIGN GOAL)	WEIGHT (DESIGN GOAL)
CONTROLLER	15 x 12 x 8 in.	20 lb
LARGE DISPLAY HEAD	15 x 12.5 x 1.5 in.	7 lb
SMALL DISPLAY HEAD	8 x 6.5 x 1.5 in.	5 lb

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C³I/VISTA Display System Block Diagram

CRITICAL PROBLEM AREAS

SAIT personnel have identified two critical problem areas of the proposed development program:

- High voltage line driver/AC-TFEL panel interface technology, with gray scale ability.
- Large EL panels.

SAIT believes that both areas are currently being solved and that in the area of EL drivers, at least one solution is completely acceptable.

All other design aspects of the program are considered to be tasks similar to those already under consideration as part of SAIT's advanced display project. Problems associated with the development of these elements are not considered to be critical in nature.

EXISTING ASSETS AND SUPPORTING RESEARCH

A key factor in SAIT's approach to developing the C³I/VISTA Display System is the maximum utilization of existing assets and resources developed by U.S. industry under U.S. Army sponsorship. Through this approach, program funds can be concentrated on solving the primary technology problems identified by ERADCOM in the technical guidelines, i.e. an approach which avoids re-invention of technology assets and resources already developed under DoD and industry sponsorship. Consistent with this philosophy, SAIT will use its advanced display laboratory, developed with internal funds, to support system and device level integration tasks. This facility currently includes many of the primary resources required in the

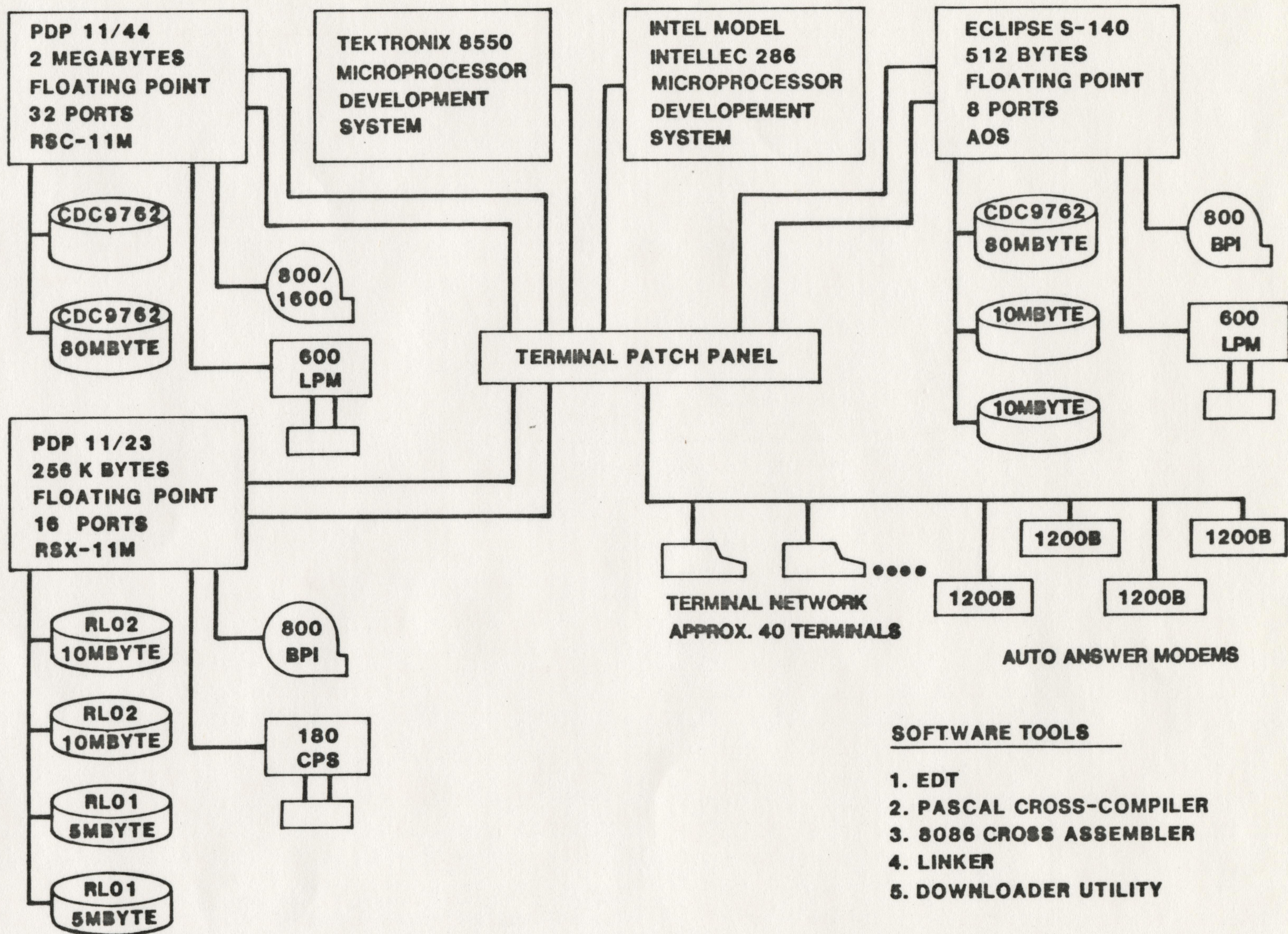
program. For example, a DEC PDP-11/44 computer system fully compatible with the ERADCOM system is available for use as the system host. Display controller development similar to that which is required in the C³I/VISTA Display System program is already underway at SAIT to support the next generation U.S. Army display system project. A Sharp/Hycom AC-TFEL display module (320 x 240) is available in the laboratory for interim testing of these controller designs. This work can be of immediate use in realizing the objectives of the program and will accelerate the demonstration of viewable results via the interim systems required in the specification. The figure following is a block diagram of the SAIT Software Development Facility.

INDEPENDENT RESEARCH AND DEVELOPMENT

SAIT is committed to improving current U.S. Army display products and responding to an expanding set of U.S. Army display requirements. To meet this commitment SAIT supports a continuing advanced display IR&D program whose goal is to identify and use new technology where it will lead to significant improvements in processing capability, display performance, size, weight, power efficiency, reliability, survivability and cost. The ERADCOM goals described in the solicitation are closely related to the SAIT IR&D effort.

EXPERIENCE AND TECHNOLOGY INSERTION

SAIT has over eight years of experience in developing and producing U.S. Army qualified Mil-Spec display equipment. In 1974, under U.S. Army sponsorship, SAIT designed and produced the first Mil-Spec, page-size flat panel display terminal, the AN/UYQ-10. This terminal, now a member of the AN/UYQ-19 computer family, is in the U.S. Army inventory and is used in a variety of ground mobile and airborne platforms. A second generation



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SAIT Software Development Facility

derivative of the AN/UYQ-10 serves as the primary radar display in the U.S. Army's Sergeant York Gun System (DIVAD). The design, production and logistic support experience gained in the development of these and similar military display products (Harpoon, TACAMO, GLCM and E-4B CAPS) gives SAIT a unique level of experience on which to base the development of the next generation flat-panel Mil-Spec display systems. The U.S. Army can use this base of experience to achieve a lower cost and to reduce performance and schedule risk.

In addition to its extensive Mil-Spec display development and production experience, SAIT, together with SAI, understands and in many cases is involved as a contractor in the development of future U.S. Army system concepts such as Advanced Field Artillery Tactical Data System (AFATDS), Short Range Air Defense Command and Control (SHORAD C²), Military Computer Family (MCF), and the High Technology Test Bed (HTTB). In the context of these development activities, SAIT's Advanced Product Concepts Group has been studying U.S. Army display requirements for these systems as well as others needed to support the Air/Land Battle 2000 Concept. This study was initiated to define and develop a display concept that will emulate the AN/UYQ-10 but will use advanced semiconductor, display and packaging technology to provide significant improvements in processing power, size, weight, display performance, power dissipation, reliability, survivability and cost. This SAIT IR&D investment can enhance the ERADCOM C³I/VISTA Display System program and can provide the U.S. Army with an excellent approach to accelerate development of fieldable, next generation display systems.