RMIS View/Print Document Cover Sheet

This document was retrieved from the Documentation and Records Management (DRM) ISEARCH System. It is intended for Information only and may not be the most recent or updated version. Contact a Document Service Center (see Hanford Info for locations) if you need additional retrieval information.

Accession #: D196093657

Document #: SD-WM-ES-390

Title/Desc:

PAMS PHOTO IMAGE RETRIEVAL PROTOTYPE ALTERNATIVES
ANALYSIS

Pages: 24

MAY 02 1996
82.21

21

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT

615703

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Media Systems Application/Media Management Systems/BCSR	4. Related EDT No.:
5. Proj./Prog./Dept./Div.: Engineering/Interim Stabilization Project/Tank Farm Transition Projects	6. Cog. Engr.:	7. Purchase Order No.: N/A
8. Originator Remarks:	9. Equip./Component No.: N/A	10. System/Bldg./Facility: VIDON
		12. Major Assm. Dwg. No.: N/A
11. Receiver Remarks:	13. Permit/Permit Application No.: N/A	14. Required Response Date:

15. DATA TRANSMITTED								
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-ES-390		0	PAMS Photo Image Retrieval Prototype Alternatives Analysis	Q	1	1	

16. KEY											
Approval Designator (F)			Reason for Transmittal (G)				Disposition (H) & (I)				
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)			1. Approval	4. Review			1. Approved	4. Reviewed no/comment			
			2. Release	5. Post-Review			2. Approved w/comment	5. Reviewed w/comment			
			3. Information	6. Dist. (Receipt Acknow. Required)			3. Disapproved w/comment	6. Receipt acknowledged			
17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G)	(H)	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
1	1	Cog. Mgr. Darwin K. Griswold		5/1/96							
1	1	QA: Kelly C. McBride		4/26/96							
1	1	Author: Max L. Conner		4/26/96							
18. Signature of EDT Originator			19. Authorized Representative Date for Receiving Organization			20. Cognizant Manager Date			21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments		

PAMS PHOTO IMAGE RETRIEVAL PROTOTYPE Alternatives Analysis

Max L. Conner

Westinghouse Hanford Company/Boeing Computer Services Richland
Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 615703
Org Code: 67100
B&R Code: YN0100000

UC: 2030
Change Code: MP500
Total Pages: 22 KN

Key Words: Alternatives, Analysis

Abstract: The purpose of the PAMS PHOTO IMAGE RETRIEVAL PROTOTYPE project is to provide a means of capturing low resolution digital images from Photography's negative files and making the images accessible to HAN users to help in locating and identifying specific photographs. The PAMS PHOTO IMAGE RETRIEVAL PROTOTYPE REQUIREMENTS DOCUMENT identifies the requirements for the project.

The intent of this alternatives analysis is to examine the software and hardware alternatives available to meet the requirements for this project, and identify a cost-effective solution.

Trademarks: AREV is a trademark of Revelation Technologies.
ComputerEYES is a trademark of Digital Vision.
DOS is a trademark of Microsoft Corporation.
ImageManager is a trademark of Electronic Imagery, Inc.
M&M Pro is a trademark of Omnicomp.
Marvel is a trademark of Matrox.
Microsoft Video for Windows is a trademark of Microsoft Corporation.
Oculus is a trademark of Coreco.
Powersoft is a trademark of PowerBuilder.
Promotion is a trademark of IEV.
SNAPplus is a trademark of Cardinal.
SQL Server is a trademark of Microsoft Corporation.
Targa+ is a trademark of Truevision.
VideoSpigot is a trademark of Creative Labs.
VideoSurge is a trademark of Aitec.
Windows is a trademark of Microsoft Corporation.

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

Printed in the United States of America. To obtain copies of this document, contact: WHC/BCS Document Control Services, P.O. Box 1970, Mailstop H6-08, Richland WA 99352, Phone (509) 372-2420; Fax (509) 376-4989.

Release Approval

Date

V. L. Burkland 4/30/96

Release Stamp

Approved for Public Release

PAMS PHOTO IMAGE RETRIEVAL PROTOTYPE

ALTERNATIVES ANALYSIS

PREPARED BY:

MAX L. CONNER
IRM, HIMACS SYSTEMS DEVELOPMENT

TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 PURPOSE	1
1.2 SCOPE	1
1.3 OVERVIEW	1
1.4 DEFINITIONS	1
2.0 SYSTEM DESCRIPTION	2
2.1 SYSTEM FUNCTIONS	2
2.2 USER CHARACTERISTICS	2
2.3 CONSTRAINTS, ASSUMPTIONS AND DEPENDENCIES	2
3.0 ALTERNATIVES DESCRIPTIONS	4
3.1 CAPTURE BOARDS	4
3.2 CAPTURE STATION SOFTWARE	4
3.3 RETRIEVAL STATION SOFTWARE	8
4.0 RECOMMENDATIONS	9
4.1 IMAGE CAPTURE BOARD RECOMMENDATION	9
4.2 CAPTURE STATION SOFTWARE RECOMMENDATION	10
4.3 RETRIEVE STATION SOFTWARE RECOMMENDATION	11
5.0 IMPLEMENTATION DESCRIPTION	12
5.1 SCHEDULE AND COST CONSTRAINTS	12
5.2 RESOURCE REQUIREMENTS AND IMPACTS	12
6.0 REFERENCES	13
APPENDIX A Capture Board Features	14
Appendix B Capture Board Comparison	18

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of the PAMS PHOTO IMAGE RETRIEVAL PROTOTYPE project is to provide a means of capturing low resolution digital images from Photography's negative files and making the images accessible to HAN users to help in locating and identifying specific photographs. The PAMS PHOTO IMAGE RETRIEVAL PROTOTYPE REQUIREMENTS DOCUMENT identifies the requirements for the project.

The intent of this alternatives analysis is to examine the software and hardware alternatives available to meet the requirements for this project, and identify a cost-effective solution.

1.2 SCOPE

For this analysis, the alternatives are grouped into three primary categories as follows:

- Capture boards.
- Capture station software.
- Retrieval station software.

This document discusses the alternatives, and recommends a preferred alternative for each category. The advantages and disadvantages of each alternative are listed and the reasons for selecting a preferred alternative are stated.

1.3 OVERVIEW

Photography and Audiovisual Services uses a system called the Photography and Audiovisual Management System (PAMS) to perform order entry and billing services. The PAMS system utilizes Revelation Technologies database management software, AREV. Work is currently in progress to link the PAMS AREV system to a Microsoft SQL Server database engine to provide photograph indexing and query capabilities. The link between AREV and SQL Server will use a technique called "bonding."

This photograph imaging subsystem will interface to the PAMS system and handle the image capture and retrieval portions of the project.

1.4 DEFINITIONS

Technical terms related to the image capture boards are defined in the PAMS PHOTO IMAGE RETRIEVAL PROTOTYPE REQUIREMENTS document and will not be restated here.

HAN	Hanford Area Network
PAMS	Photo Audiovisual Management System.
SQL	Structured query language.

2.0 SYSTEM DESCRIPTION

2.1 SYSTEM FUNCTIONS

Primary functions for this project are as follows:

- Capture still images from photo sources.
- Integrate with the PAMS photo negative database.
- Provide site wide retrieval of the photo images.

2.2 USER CHARACTERISTICS

Users of this system will consist of Photography and Audiovisual Services and selected HAN users (approximately 24 users). Photography and Audiovisual Services will have a single station for image capture and storage. HAN users will access the database with standard HAN workstations for image retrieval.

2.3 CONSTRAINTS, ASSUMPTIONS AND DEPENDENCIES

This project must meet the requirements stated in the PAMS PHOTO IMAGE RETRIEVAL PROTOTYPE REQUIREMENTS document.

2.3.1 Image capture device.

An IBM compatible workstation will be used to capture still frame images from a variety of sources, such as photo negatives and prints. Some basic manipulations, such as simple rotations, will be performed on the images during the capture. The images will then be stored in a file integrated with the PAMS database, which uses the Microsoft SQL Server database engine.

Previous studies for this project have led the users to the conclusion that a color video camera is the most desirable input device for this application. A camera (JVC Model KYR15UL) already owned by Photography has been set aside for use by this project. Features of this camera include:

- Output signals for composite video, S-video and RGB (through included TARGA® compatible D-sub 9 pin connector).
- Picture resolution of 688 x 485 pixels.
- 10:1 zoom lens, with a focal length range of 7mm-70mm and macro focusing to 1.38".
- Motorized zoom and iris.
- Negative/positive reversal switch to convert color negatives into positive images.

The video camera will be attached to a video capture board within the computer. A video capture board accepts a video signal as its input and produces a digital signal that can be displayed on a computer screen. The boards, sometimes called frame grabbers, are controlled by software that provides the ability to freeze the picture at any point and store that picture as a digital image on a

hard disk in any of several standard formats. Some boards provide the ability to capture a series of images and store them as a video clip.

2.3.2 Interaction with PAMS SQL database.

This project is considered a portion of the overall PAMS project and will utilize the database defined for PAMS image information. Microsoft's SQL Server is the database engine to be used by this project.

The user expects that the image capture process will integrate with the image description entry provided by PAMS.

2.3.3 Server Hardware and Software.

Database server hardware and software for this application has already been procured and will be installed as a part of the PAMS project. The usual database management functions such as database administration and backup are also a part of the PAMS project.

3.0 ALTERNATIVES DESCRIPTIONS

3.1 CAPTURE BOARDS.

Because the major options for input devices have already been selected, this portion of the alternatives analysis focuses on evaluating compatible image capture boards. Many consumer and professional oriented products are available for the IBM compatible workstation that can capture single frames in the resolution required. Nine boards were identified which have the potential to meet the base requirements for this project.

Appendix A "Capture Board Features" is a table of product features applicable to this project. Information shown in the table was obtained from vendor supplied literature, technical journal product reviews and, for some products, contacts with the vendor. Section 4.0 discusses the criteria that was used to select a preferred capture board.

3.2 CAPTURE STATION SOFTWARE.

The image capture software that is provided with a capture board typically consists of a utility to control the board and a utility to capture images. Depending upon the board, these utilities operate under DOS or DOS/Windows and may be "Terminate and Stay Resident" (TSR) or command executable. Generally, functions such as input source selection, contrast, brightness and chroma keying are handled by the control utility while the capture utility provides functionality such as frame freeze, image scaling and output file selection. Although the utilities can capture an image and store it in a file, further image manipulations and database access functions are usually not handled by the provided software. In particular, the integration with the PAMS data entry function would not be directly supported.

Also, the capture board provided software does not tend to support a volume operation. Usually, the software is designed to capture a single image or clip and save it to a file. The assumption is that editing programs will be used to perform further manipulations. The requirements for this project state that approximately 10,000 images will be captured per year. To perform the repetitive image capture in an efficient manner will require a tight integration of the capture, manipulation and database access portions of the capture process.

Two alternatives to provide the functionality required at the capture station were evaluated. Essentially, these are to use off-the-shelf procured software versus development of custom code in-house.

3.2.1 Alternative: Procure off-the-shelf image management software.

Off-the-shelf image management applications typically include most of the following image related functions:

- Database creation and management.
- Capture (scanning and frame grabber).
- Manipulation.
- Compression.
- Use and conversion of multiple file formats.

- Storage of database images and text information.
- Image record identification and search capability.
- Image retrieval.

Most often the products have a predefined database engine and record structure. The database engine may even be proprietary to the product.

Where practical, using a commercial software product is preferable to in-house development for many reasons. Potential advantages include the following:

- Shorter project development time and considerably less expensive.
- Probable future enhancements to the software by vendor.

For this project beneficial enhancements would include support for evolving operating environments (Windows NT and OS for example) and functionality for Multimedia support.

- Usually, commercial products have been thoroughly tested by the vendor and by previous users and can be considered more reliable (debugged) than in-house developed software. However, if bugs are discovered, it may not be possible to get them fixed.
- Generally more robust than a custom developed application. Some non-mandatory requirements may already be satisfied by a commercial application. In a custom development environment many desirable features are not implemented because of the additional development expense and project delays.

Potential disadvantages of using commercial software include the following:

- Commercial application software packages rarely meet all of the user requirements fully. User business requirements may have to be modified to match the capabilities of available software.
- Potential licensing problems exist for procured software. Two areas of concern would be adding more image capture stations and, if the same package is used for retrieval, authorizing more retrieval customers.
- Limited flexibility to customize look and feel. The user interface to commercial software has already been established.
- Future direction of Hanford computing environment may not be supported by the vendor.
- More difficult procurement.
- Potential problem of software not performing as expected (or specified). Formalized acceptance testing may not be practical (particularly for shrink wrapped products) because it may be more expensive to specify and conduct than the price of the software warrants.

During the search for appropriate software, it became evident that some requirements would be difficult to fulfill with off-the-shelf image management software. Most difficult is the requirement to

interact with the PAMS environment and to use the PAMS SQL server record format and database engine. Almost all of the reviewed image management software products have predefined record storage schema and database engine. Those products that do have the flexibility to support our database cannot truly be considered off-the-shelf. Instead, they provide a base package and a developer's toolkit for customization.

Only one product was found that has the potential to meet the requirements for this project - ImageManager by Electronic Imagery, Inc. To fully meet our requirements, this product would require extensive customization using their ImageManager Developer's Toolkit.

3.2.2 Alternative: Supplement the capture board software with in-house developed custom code.

The custom code would supplement the functionality provided with the software board utilities. This custom code would become the integrator to tie the functions of image capture, image editing, database storage and PAMS entry together.

Although this alternative is described as in-house developed programming, much of the coding would be accomplished by using procured toolkits and utilities. Some capture board vendors provide an optional developer's toolkit containing low level routines that provide access to the functions of the boards. Other programming tools are available to perform image manipulation and database access.

Potential advantages of in-house development include the following:

- Support for the SQL Server environment and our unique data structures.
- Interaction with PAMS. Future changes in PAMS can be more easily accommodated.
- Procurement problems minimized.
- Minimal licensing problems.

Disadvantages include the following:

- Longer development cycle and development costs.
- Future enhancements will be funded entirely by customer.
- Much more customer involvement and resources are required during the design and testing phases.
- Local on going support will be required.
- Limited information available as to the functionality of developer's toolkits. Most of the board vendors were unwilling to provide more than a simple listing of the names of the routines contained in their toolkits.

Related to the alternative of in-house development is the specification of a development environment. A major consideration is the base development language. Listed below are the language alternatives considered for this project and the reasons for using (plus) or not using (minus) each.

■ Microsoft Visual Basic

- + Easy to develop in this environment.
- + Custom controls available for image manipulations and formats.
- + Supports SQL Server.
- + Windows support built in.
- Potentially slower response times than optimum solution.
- Not object oriented.

■ C/C++

- + Fast response times.
- Image manipulation libraries would need to be procured.
- Windows support must be programmed.
- Long development cycle.

■ Microsoft Visual C++

- + Custom controls available for image manipulations and formats (uses Visual Basic custom controls).
- + Windows support built in.
- + Supports SQL Server.
- Lack of knowledge in this development environment. Training would be required. The product would need to be procured.

■ Powersoft PowerBuilder

- + Object oriented.
- + Windows support built in.
- + Supports SQL Server.
- + Product knowledge and development experience available.
- Unable to support image manipulations.
- Supports only bit-mapped (BMP) and device independent bit-mapped (DIB) image formats.

■ AREV

- + SQL Server supported with 'bond' product (could have licensing problems).
- + Product knowledge and experience are available.
- + Base programming environment for PAMS.
- Cannot integrate with capture boards.
- Cannot implement image manipulations.
- Requires run time licensing (bump disks).
- Does not run as a Windows application.

3.3 RETRIEVAL STATION SOFTWARE.

Software to perform the retrieval of images at HAN workstations is simpler in functionality than the capture station software. To satisfy the minimum requirements, the retrieval software only needs to be able to allow HAN users to query the PAMS SQL database and display the results (text and images) to the user. Desirable features would allow the user to select and store images (or pointers to images) on their workstation for future reference.

No true off-the-shelf software packages were found that would effectively interface with the PAMS SQL database and provide the required query capabilities. Therefore, the retrieval software will need to be developed. It makes sense that the development tools and methods used for the image capture station should be applied to the retrieval station software wherever possible.

4.0 RECOMMENDATIONS

4.1 IMAGE CAPTURE BOARD RECOMMENDATION

The recommended capture board for this project is the Truevision Targa+ board with 1MB memory.

Six criteria were used to select a capture board. Appendix A is a table which lists the features of each board and Appendix B is a table which summarizes the ability of each candidate board to meet each of the evaluation criteria. Only the Targa board meets the important criteria. Below is a listing of these criteria in order of importance.

1. Provide Windows Dynamic Link Libraries (DLL's). Because some custom programming may be required for the capture station, the product selected must provide (DLL's) to interface to the board. Those DLL's that provide high level routines are considered more desirable. Two of the products, Creative Labs' VideoSpigot and Digital Vision's ComputerEYES completely lack this feature and would require that the capture process rely entirely upon the vendor provided software.

2. Provide image capture utility software. For the most part, the image capture software provided with the boards consists of simple utilities that capture the image and send it to a file. Some boards use third party software, such as Microsoft Video for Windows, to accomplish the capture.

A general problem with all of the vendors' specifications is that very little information was provided to describe the capabilities and restrictions of their image capture software. Not enough information was provided to allow an assessment of the ease of using the software. Also, none of the software provided with the boards seems to provide all of the image manipulations.

See the Capture Station Software category for more detailed discussion of this feature.

3. Products should take full advantage of the video camera's capabilities and features. Specifically, a capture resolution nearing 640x480, support for true 24-bit color and an RGB input are viewed as important. Only Cardinal's SNAPplus, CORECO's OCULUS and Truevision's Targa+ have all these features.

4. The capture board should not impose configuration restrictions on the computer.

All of the boards reviewed will work on the standard ISA bus.

Some capture boards reserve a 1MB frame buffer in the first 16MB of extended memory, to give the CPU fast memory access. System memory must be decreased to 15MB or less to make room for the buffer. Although some computers can remap memory to avoid the problem, most cannot and this memory restriction should be avoided. The Omnicomp M&M PRO board has such a restriction. Other boards in the list may have this restriction although not explicitly identified in their specifications.

Some boards restrict the use of available VGA adapters. The Cardinal SNAPplus will only function with its built in VGA adapter that limits VGA displays to 16-bit color at 640x480 resolution.

5. Support for files in multiple standard formats. The ability to save image files in more than one format directly from the supplied capture software will provide more flexibility in constructing interfaces or custom code.

6. General support. Products that have general industry support are desirable. The Truevision Targa boards were among first image capture boards available for PC's and continue to be the most generally supported boards.

4.2 CAPTURE STATION SOFTWARE RECOMMENDATION

The recommended method of providing capture station software is to develop in-house using the Microsoft Visual Basic language with procured Image Management custom controls and the Truevision Targa+ developer's toolkit.

Microsoft's Visual Basic (version 3.0) was selected as the development language of choice for this project for a number of reasons: it has built in support for Microsoft SQL server; it supports communication between applications (DDE and OLE); there is a wealth of third party extensions, including image manipulation controls; and ISS has experience with the product. The PNL project TWINS is a similar image management project and was written in Visual Basic. AREV and PowerBuilder were not selected because of their limited ability to handle image data. The "C" language variants were not chosen because of the lengthy development times associated with this language.

A suitable image management Visual Basic custom control, Image/Knife by Media Associates, is available to provide the simple image manipulations and file format conversions.

An off-the-shelf solution is not recommended for this project. As stated previously in the discussion of capture station software alternatives, only one package was located which would meet the requirements and even that package would need significant custom coding. Essentially, if we used the package, we would be procuring an image management developer's toolkit which supports frame grabber boards (the Targa+ board is one of the boards supported) and has routines to access our SQL database. While this particular image manager product is a viable option, it is better suited to applications that have a need to do significant image analysis and editing rather than simply capturing an image. It does not offer any benefit over simply purchasing a developer toolkit from the capture board manufacturer and integrating their routines into custom code.

4.3 RETRIEVE STATION SOFTWARE RECOMMENDATION

The recommended solution for image retrieval software at HAN workstations is to develop in-house using the Microsoft Visual Basic language with the same image management custom controls used by the capture station software.

Although the image capture and image retrieval functions can be isolated and developed independently, using the same tools and techniques for both functions will have the obvious advantages of project cohesion and shortened learning periods.

An added advantage to using Visual Basic and custom controls at the client workstations is the elimination of licensing problems. Almost all third party Visual Basic custom controls (including Image/Knife) provide for royalty free distribution of applications.

5.0 IMPLEMENTATION DESCRIPTION

Implementation of this project will be performed as a small job development as described in Section SP-3.4 of WHC-CM-3-10 Software Practices. The project development will be integrated with other PAMS enhancements.

Development and implementation schedules will be prepared during the system design.

5.1 SCHEDULE AND COST CONSTRAINTS

No schedule or cost constraints have been identified at this time.

5.2 RESOURCE REQUIREMENTS AND IMPACTS

Hardware:

- Database Server	PAMS provided
(with server software)	
- Capture workstation	\$2.5K
- Video Camera	Photo provided
- Capture boards (2)	\$4K (\$2K each)

The second capture board is recommended for a development workstation. This board would also serve as a backup. It is assumed that a video camera would be made available as needed for the development workstation.

Procured Software:

- SQL Server	PAMS provided
- Visual Basic Upgrade	\$200
- VB Custom Control	\$300
- Targa Developer's Toolkit	\$200

Shown below are estimates for system development. These estimates are preliminary and will be refined during the design portion of this project. The estimates are for ISS labor only and do not include required involvement of Photograph/Audiovisual Services personnel or other services that may be required, such as equipment installation.

- General design	140 hours
- Image capture software	200 hours
- Image retrieval software	
Base requirement	160 hours
Local album storage	120 hours
- Installation, training, etc.	120 hours
	----
	720 hours
	\$43.2K at \$60/hour

6.0 REFERENCES

PAMS PHOTO IMAGE RETRIEVAL PROTOTYPE REQUIREMENTS DOCUMENT

WHC-CM-3-10 Software Practices

APPENDIX A Capture Board Features

Company	Aitec	Cardinal	CORECO	CreativeLabs	DigitalVision	IEV	Matrox	Omnicom	Truevision
Product	Videosurge	SNAPplus	OCULUS	VideoSpigot	CompEYES	Promotion	Marvel	M&M Pro	Targa+
Options/model	S-video option	(note: on GSA)	2MB; color decoder		RT	AV expander (not priced)	MM/LIC+enable		16/32
Price	\$1095	\$1295	\$1895	\$399	\$599	\$995 (+)	\$1095	\$995	\$1995
						(note: on-site)			
Capture Resolutions									
320x240		yes ¹		yes			yes ¹		
640x480	scaleable to	yes		yes ¹			yes	yes	no
512x512	yes		yes		yes	yes			yes
Other	1024x768		to 1024x1024	240x180				1024x512	1024x512 ²
Color Depth Support									
8-bit		yes ¹	yes	yes ¹	yes		no ¹		yes
16-bit		yes ¹	yes	yes ¹		yes	no ¹		yes
24-bit	yes	yes	yes	yes	yes		yes	yes	yes
Input Signals Support									
NTSC Composite	yes	yes	yes	yes	yes	yes	yes	yes	yes
S-Video	yes	yes	yes	S-VHS(mini)	yes	yes(mini)	yes	yes	yes
RGB	no	yes	yes	no	no	yes	no	no	yes

Company	Aitec	Cardinal	CORECO	CreativeLabs	DigitalVision	IEV	Matrox	Omnicom	Truevision
Product	Videosurge	SNAPplus	OCULUS	VideoSpigot	CompEYES	Promotion	Marvel	M&M Pro	Targa+
Other			RS-170/330, CCIR						
Outputs Supported	video	yes	yes	none ¹				option	
Audio input/output	yes					yes	yes	option	
Requires VGA feature connector	yes		yes	no ¹	no ¹	yes	yes	no ¹	
Includes VGA adapter		yes ¹		no ¹	no ¹		option	option	
Prohibits other VGA		yes		no ¹	no ¹		no ¹	no ¹	
Memory restrictions		no		no ¹		no		<14MB..	no ³
File Formats Support									
BMP	yes	yes				yes	yes	yes ¹	yes
PCX	yes	yes			yes	yes	no	yes ¹	
TIFF	yes	yes			yes		no	yes ¹	
TGA (Targa)	yes	yes			yes		yes		yes
Software Compression	no	no			JPEG		JPEG	JPEG(verify)	no
Drivers	MCI, AVI	MCI, AVI		MCI, AVI		MCI, AVI	MCI, AVI		

Company	Aitec	Cardinal	CORECO	CreativeLabs	DigitalVision	IEV	Matrox	Omnicomp	Truevision
Product	Videosurge	SNAPplus	OCULUS	VideoSpigot	CompEYES	Promotion	Marvel	M&M Pro	Targa +
Software									
Product									
Price	included	on GSA	\$500		Developer Kit		MCI develop & Windows developer lib	C libraries	Targa + developer kit
C-Library	yes				\$100	included	\$595	Included	\$150 ¹
Windows DLL	yes	yes(verify)	yes(verify)		yes	yes	yes	yes	yes ¹
Hardware/Software									
Brightness	yes	yes	yes				yes		yes
Saturation	yes	yes	yes				yes		yes
Contrast	yes	yes	yes				yes		yes
Hue	yes	yes					yes		yes
Gain		yes							
VGA overlay			yes					w/IPEG board	yes, blend
VGA Chroma keying	yes	yes	yes			yes		yes	
Video Chroma keying	yes								yes
Zoom		yes	yes					yes	yes
Scale down (shrink)		yes	yes	yes		yes		yes	yes

Company	Aitec	Cardinal	CORECO	CreativeLabs	DigitalVision	IEV	Matrox	Omnicom	Truevision
Product	Videosurge	SNAPplus	OCULUS	VideoSpigot	CompEYES	Promotion	Marvel	M&M Pro	Targa +
Pan (fit in window)	yes	yes	yes			yes			yes
Scroll			yes						
Crop		yes							
Freeze & capture	yes	yes					yes		
Size	yes	yes		yes					yes
Position		yes		yes					
Windows manipulate	yes	yes		yes					
Color to greyscale		yes ¹							yes
Save image to disk	yes						yes	yes	
Load disk image	yes						yes		
Negative to positive		yes ¹							
JPEG hardware compression			optional					optional	no
Price			\$1295					\$1775	
Daughter or slot			slot					Daughter	

1. Based upon comments in product reviews and not vendor supplied information.
2. Targa+. 1024x512x24-bit resolution requires upgrade to TARGA+64 (approx. \$500 additional).
3. Targa+. Memory is restricted to 16MB when using under Video for Windows.
4. Targa+. No license for DLL's is required, i.e., can distribute with runtime. Sample programs are mostly in "C" language.
5. SNAPplus. The included VGA adapter can display only 16-bit color at 640x40 resolution, however, the video is displayed at 24-bit color.

Appendix B Capture Board Comparison

Company	Aitec	Cardinal	Coreco	Creative Labs	Digital Vision	IEV	Matrox	Omni-comp	True-vision
Product	Video surge	SNAP plus	Oculus	Video Spigot	Comp EYES	Pro-motion	Marvel	M&M Pro	Targa +
1. Available development tools.	yes	yes	yes	no	no	yes	yes	yes	yes
2. Provide image capture utilities.	yes	yes	yes	Video for Windows	DOS only	limited	limited	yes	yes
3. Full advantage of video camera's capabilities and features	no	yes	yes	no	no	no	no	no	yes
4. Configuration restrictions on computer	none	built in VGA	none	none	none	none	none	RAM <16M B	none
5. Support for files in multiple standard formats	yes	yes		no	yes	few	few	yes	few
6. General industry support	drivers	drivers	no	drivers	no	drivers	drivers	no	yes

Approvals

Dennis Brunson Date 9/10/93
 D.E. Brunson
 Photography & Audiovisual Services, Mgr.

_____ Date _____
 A.C. Eads
 Photography & Audiovisual Services

_____ Date _____
 E.R. Carroll
 Information & Scientific Systems

_____ Date _____
 M.L. Conner
 Information & Scientific Systems