ABSTRACT
The University of Hawaii Libraries received a federal grant to acquire scanning and digitized image storage equipment. The Libraries will be utilizing prototype CARLterm retrieval software jointly developed by the Boulder Public Library and the Colorado Alliance of Research Libraries to preserve an important archival visual resource for Pacific researchers. The software links bibliographic records describing images with the digitized images themselves. Prior to digitization these photographs were not available for general research. A review of the progress of the project and a display of the images will be presented.

EXCERPTS FROM SUMMARY OF PRESENTATION
Origin of Trust Territory of the Pacific Index
The Trust Territory Archives is a microfilm record of the files of the U.S. Administration of Micronesia. In the early 1980’s the University of Hawaii Libraries participated in a program to preserve the records of the Trust Territory Government. Over 2,000 reels of microfilm were deposited in the Pacific Collection of the University of Hawaii Libraries. The index to the Trust Territory records was received on magnetic tape and loaded into an automated online catalog system.

Visual materials in the Trust Territory collection
The photograph collection of the Trust Territory Archives was also donated to the University of Hawaii and consists of an estimated 30-40,000 photographs and/or negatives and 2,000 slides. Records describing the photographs are included in the TTPI database, but collections of photos are indexed under general headings and by folders which may contain large numbers of images.

Boulder pilot project
In August of 1990, the University Libraries became aware of a pilot project underway at Boulder Public Library to make digitized images of visual materials accessible on PAC workstations. The Archivist and other staff at Boulder Public Library were working with CARL Systems programmers to develop software interfaces between digitized images stored on an optical disk system and cataloging text (bibliographic records) stored on the Tandem mainframe computer.

Since the UH Libraries has a number of archival photographic collections, and there are visual materials collections of great historical interest in a number of public and private institutions in the state of Hawaii, interest in a similar project was strong.

UH Libraries federal grant application
In order to obtain the equipment and personnel that would be needed to undertake such a project, an HEA Title II-C federal grant, under the category "Strengthening Library Resources" was filed by the University Libraries in June 1991. A revised budget requesting approximately $44,000 for personnel, $11,000 for student assistants, $53,000 for microcomputer, scanning, networking and optical storage equipment, and $15,000 for photographic equipment was submitted and approved.

Image Linking
Descriptions of each photographic image is entered as text in the bibliographic record. The "filename" of the image (or last image if more than one is described in the bibliographic record) is entered in a separate tag.

The CARLterm Image Display software reads the "filename" from the tag and seeks the image based on the information encoded in the filename. The PAC program also "reads" the tag, and displays a prompt on the option line at the bottom of individual bibliographic record displays which says "Image File Available". The user then presses Alt-F2 and the CARLterm Image Display software will display the image to the screen of the workstation monitor. The VGA display (640x480) and the 32-levels of gray at which the image is stored, results in a full-screen image which retains the detail of the original photograph and in some cases produces an image more easily studied than the original document.

The public microcomputer workstation, running CARLterm Image Display software is the link between the file server, which mediates multiple access to the optical disk storage system and the Tandem mainframe computer, which houses the bibliographic database and indexes.
HISTORY OF TTPI ARCHIVES AT UNIVERSITY OF HAWAII LIBRARIES

Origin of Trust Territory of the Pacific Index
The Trust Territory Archives is a microfilm record of the files of the U.S. Administration of Micronesia. After WWII, the islands of Micronesia became a U.N. strategic trusteeship, administered by the United States. This trusteeship came to an end in 1988. In the early 1980's the University of Hawaii Libraries participated in a program to preserve the records of the Trust Territory Government. Over 2,000 reels of microfilm were deposited in the Pacific Collection of the University of Hawaii Libraries. The index to the Trust Territory records were received on magnetic tape and reorganized into MARC format for loading into an automated online catalog system.

TTPI on the ALOHA system
The index to the archives, called "TTPI!", was originally loaded as a separate database subsystem on the University Libraries former automated system, ALOHA. It was searchable via the same OPAC software, but switching between the main database and the TTPI database required logging out and logging back into a separate set of files.

Transfer to UHCARL
In 1989, when the library switched to the CARL automated system, the TTPI database was converted and loaded on the new Tandem computer. The CARL software has built-in support for easily switching between different PAC databases. TTPI became easily accessible from the same PAC menu as the main online catalog database.

Visual materials in the Trust Territory collection
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OVERVIEW OF PROJECT PROPOSAL

Boulder pilot project
In August of 1990, the University Libraries became aware of a pilot project underway at Boulder Public Library to make digitized images of visual materials accessible on PAC workstations. The Archivist and other staff at Boulder Public Library were working with CARL Systems programmers to develop software interfaces between digitized images stored on an optical disk system and MARC cataloging text stored on the Tandem mainframe computer.

Since the UH Libraries has a number of archival photographic collections, and there are visual materials collections of great historical interest in a number of public and private institutions in state of Hawaii, interest in a similar project was strong.
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INITIAL PROJECT IMPLEMENTATION

Funding and Hiring

Funding was released in October 1991. Research and request for quotes for equipment began at that time. The position of Project Manager was advertised and interviews held in November. Requests for purchase of the initial scanning equipment were submitted to the Library and University campus purchasing offices. The Project Manager started work in mid-January 1992.

Scanning workstation

The microcomputer, scanner and software for the scanning workstation arrived and were setup in mid-January. The microcomputer is a 386/33 with 8 MB of RAM, a standard VGA color monitor and a 200 MB hard drive. The scanner is a flatbed Umax brand (similar to Microtek300G). The scanning software is Picture Publisher Plus, running under Windows. The printer is an Acer IIIG laser printer, capable of producing printouts with better resolution and gray-scale than the standard laserjet type printer.

Experimentation and demonstrations

Although the procedures used at Boulder were available as "starter" documentation. A great deal of experimentation with scanning and cataloging procedures characterized the first 5 months of the project. Understanding how the CARLterm Image Display software worked in conjunction with the UHCARL PAC program and exploring the implications of cataloging practice with regard to record display and retrieval required time-consuming study and debugging.

In addition to getting the project underway, setting up processing procedures, learning the scanning and CARL Maintenance software, the Project Manager and the Library Systems Office staff were also called upon to demonstrate the embryonic system at a number of locations. The most prestigious occasion was at the March 5, 1992 reception honoring the former University Photographer, Mr. Masao Miyamoto, for over 40 years of service. The Miyamoto Photo Collection has been added to the University Libraries Archive collection and is a resource highly suitable for a future digitization project.
CURRENT STATUS

Inventory
The entire collection of images is being inventoried and re-housed in mylar sleeves and acid-free folders and boxes. Every image to be digitized will have both a negative and positive. Whenever an image is found to only have a negative, a positive contact print is made by the Library Photographer and vice versa. 872 file folders, or a total of 21,736 images have been inventoried to date. Roughly 17% of those images (approximately 3,700) will be scanned.

Images
When photographic contact prints are made there is little to no enhancement done, as this would compromise the archival value of the material. To date 573 negatives, 187 black & white prints and 190 contact sheets have been produced for this project. There are nearly 4,400 35mm color slides that are part of this project and will be inventoried and sorted for digitizing when the slide scanner has been acquired. Nearly 1,900 images have been digitized, all but 68 of them black and white.

Bibliographic records
Approx. 875 bibliographic records have been updated or enhanced and nearly 570 records have been linked to digitized images. There are an average of 10 images linked per record. The number of digitized images per record ranges from 1 to 53. New MARC records will be created to accommodate records with more than approximately 15 digitized images because there is a CARL software limit on the maximum number of words which can be indexed per bibliographic record.- which is 409.

Equipment
Three display workstations, and printers have arrived but have not yet been installed in public reference areas. A File Server and Novell Netware 3.11 are on order. A request for purchase of a Micro Design International, Laserbank Library WORM Jukebox system has been submitted to the University campus purchasing office for approval.

Student Assistant Staffing
The Library Photographer is assisted by one student worker, who worked 20 hours per week during the summer and works 10 hours per week during the academic year. Two student workers started working for the Project Manager in May 1992. They worked half- and full-time during the summer learning inventory, scanning and cataloging. Three more workers were added at the start of the Fall semester, approximately 60 hours per week of student assistant hours are currently devoted to the project.
EXPLANATION OF IMAGE LINKING PROCESS

MARC tags in bibliographic record

Descriptions of each photographic image is entered as text in one or more 530 tags, subfield 3. The words in this tag are indexed as keywords for PAC retrieval. The "filename" of the image (or last image if more than one is described in the bibliographic record) is entered in a separate 530 tag, in subfield d. The presence of this particular tag triggers the display of a special option line on terminals using the CARLterm Image Display software.

CARLterm and PAC

The CARLterm Image Display software reads the "filename" from the 530 tag and seeks the image based on the information encoded in the filename. When the user presses Alt-F2 the CARLterm Image Display software will display the image to the screen of the workstation monitor. The VGA display (640x480) and the 32-levels of gray at which the image is stored, results in a full-screen image which retains the detail of the original photograph and in some cases produces an image more easily studied than the original document.

Link between file server, workstation and UHCARL

The public microcomputer workstation, running CARLterm Image Display software is the link between the file server, which mediates multiple access to the optical disk storage system and the Tandem mainframe computer, which houses the bibliographic database and indexes.
EXAMPLE OF A SUMMARY DISPLAY OF RECORDS:

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Institution</th>
<th>Date</th>
<th>Reel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STORYBOARD - VOL. I, NUMBER 2. THE PALAU/PACIFIC</td>
<td>UHM</td>
<td>1985</td>
<td>MFILM V10001 Reel 3846F</td>
</tr>
<tr>
<td>2</td>
<td>Department of Public HANDICRAFT SHOP; WOOD CARVER; BAR WITH STORYBOARD</td>
<td>UHM IMAGED</td>
<td>1967</td>
<td>MFILM V10001 Reel 2213F</td>
</tr>
<tr>
<td>3</td>
<td>PHOTO OF A PALAUAN STORYBOARD PAINTING IN EXHIBI</td>
<td>UHM</td>
<td>1967</td>
<td>MFILM V10001 Reel 3381F</td>
</tr>
<tr>
<td>4</td>
<td>PHOTOS OF MICRONESIAN PRODUCTS CENTER, TTHQ/EXTE</td>
<td>UHM</td>
<td>1960</td>
<td>MFILM V10001 Reel 3383F</td>
</tr>
<tr>
<td>5</td>
<td>ART AND ARTIFACTS FROM TT ENTITIES PROPOSED FOR</td>
<td>UHM</td>
<td></td>
<td>MFILM V10001 Reel 3385F</td>
</tr>
<tr>
<td>6</td>
<td>Department of Public PAINTINGS, STORYBOARDS, ART WORK, CONTEST WINNER</td>
<td>UHM IMAGED</td>
<td></td>
<td>MFILM V10001 Reel 2212F</td>
</tr>
<tr>
<td>7</td>
<td>Department of Public PORTRAITS OF MOST PEOPLE, LEADERS, GLORIA GIBBON</td>
<td>UHM IMAGED</td>
<td></td>
<td>MFILM V10001 Reel 1769F</td>
</tr>
</tbody>
</table>

ENTER <LINE NUMBER(S)> TO DISPLAY FULL RECORDS (Number + B for Brief) <P>REVIOUS FOR PREVIOUS PAGE OR <Q>UIT FOR NEW SEARCH
AUTHOR(s): Department of Public Affairs Publication Division
TITLE(s): HANDICRAFT SHOP; WOOD CARVER; BAR WITH STORYBOARD-ABAI DECORATION. (PHOTOS) 1967

9 B/W PHOTOGRAPHS AND 9 COPY NEGATIVES. (7 IMAGED).
Photo 1 - Palauan wood carvers at work. (N-2213.01).
Photo 2 - Palauan artist carvers with adze. (N-2213.02).
Photo 3 - Bar with Palauan bai decoration. (N-2213.03).
Photo 4 - Storyboard "Gift Shop" sign. (N-2213.04).
Photo 5 - Palauan children at wood carver's. (N-2213.05).
Photo 6 - Handicraft shop in Palau, 1966? (N-2213.06).
Photo 7 - Jewelry entries, Palau Fair, 1978. (N-2213.07).

OTHER ENTRIES: Palau Information and Public Relations Films and Photographs
Palau Political and Social Development Social Arts, Crafts, Customs, Cultures

LIBRARY: UHM IMAGED CALL #: MFILM V10001 Reel 2213 Frame NA

---2 of 7-------------------------Trust Terr. Archives-------
<REPEAT this display, <Q>uit,
<X> for Express, <H> for History, ? for HELP>
^aDepartment of Public Affairs^bPublication Division^n
^aHANDICRAFT SHOP; WOOD CARVER; BAR WITH STORYBOARD-ABAI DECORATION. (PHOTOS)^n1967^n
^c1967^n
^a9 B/W PHOTOGRAPHS AND 9 COPY NEGATIVES. (7 IMAGED).^n
^a^3Photo 1 - Palauan wood carvers at work. (N-2213.01).^n
^3Photo 2 - Palauan artist carvers with adze. (N-2213.02).^n
^3Photo 3 - Bar with Palauan bai decoration. (N-2213.03).^n
^3Photo 4 - Storyboard "Gift Shop" sign. (N-2213.04).^n
^3Photo 5 - Palauan children at wood carver's. (N-2213.05).^n
^3Photo 6 - Handicraft shop in Palau, 1966? (N-2213.06).^n
^3Photo 7 - Jewelry entries, Palau Fair, 1978. (N-2213.07).^n
^a^dImage File: AACD00002213.07.^n
^aPalau^xInformation and Public Relations^xFilms and Photographs^n
^aPalau^xPolitical and Social Development^xSocial^xArts, Crafts^n
^aUOH^n

LIBRARY: UHM IMAGED CALL #: MFILM V10001 Reel 2213 Frame NA

----1---------------------------------------------Trust Terr. Archives-------
<R>peat this display, <Q>uit,
<X> for Express, <H> for History, ? for HELP >
PERIODICAL AND DOCUMENT INDEXES

40. Uncover -- Journal Articles in All Fields
41. ERIC -- Educational Journal Articles and Documents
42. U.S. Federal Gov't Publications and Colorado State Documents
43. Choice -- Book Reviews
44. Hawaiian/Pacific 'UnCover' Journal Articles
45. Trust Territory of the Pacific Database
46. Hawaii Sheet Music Index

Enter the NUMBER of your choice, and press the <RETURN> key >>
Trust Territory Photo Digitizing Project  
Equipment Specification & Price List  
DRAFT

Scanning Equipment: $6,250.00

Umax UC630 600 dpi gray scale/color scanner  
with Picture Publisher Plus scanning software $1,600.00

Microcomputer - 386/33 CPU, 8 MB RAM, 200 MB Hard disk  
2 floppy drives, w/Seiko CM1440 color monitor,  
mouse with Windows 3.0 $2,650.00

Acer laser printer¹, model "3G", 600 dpi & HP compatible $2,000.00

NOTE: Scanner & workstation must be bought from CARL in order  
to ensure compatibility with software development

Optical Storage/File Server $26,800.00

File Server - 386/33 CPU, 8 MB RAM, 80 MB Hard disk  
1 floppy drive, w mono chrome monitor, Ethernet Interface card $1,800.00

Novell Netware 386 Network Software & cabling $5,000.00

Network backup hardware & software $5,000.00

Micro Design International LaserBank Library 5-10²  
Rewritable Optical storage system (6.5 Gigabytes)  
with Netware 386 and SCSI Express interface $15,000.00

Image File Transfer Software License $5,000.00

CARL proprietary retrieval & display software $5,000.00

Public Access Graphics workstation

Microcomputer - 386/33 CPU, 8 MB RAM, 1 floppy drive,  
w/Super VGA color monitor w/512kb minimum display memory  
and using Tseng Labs 4000 chips; Ethernet Interface card & cabling $2,000.00

Acer laser printer³, model "3G", 600 dpi & HP compatible $2,000.00

¹ Will not be available on the retail market for at least 3 months.
² Contact "Chris" at the COMPUTER TEAM (536-6771) for information on  
cost and specifications for assembling a magnetic storage system of up  
to 4 gigabytes
³ Will not be available on the retail market for at least 3 months.
OVERVIEW OF DIGITIZING PROJECT
Equipment & Connections

- Tandem UHCARL
  - Bib Records for Images with 530 link info
- Starmaster
  - System connect via COM port
  - CARLterm Image Retrieval/Display Software
- Novell Netware 3.11 PC File Server
  - 530 link info processed here after transfer from workstation
- Ethernet
  - connected to Ethernet interface card in PC
  - Jukebox
  - WORM Laserbank System
  - Images stored here retrieved via 530 link info and passed back thru file server to workstation
  - Images transferred via Backpack Tape backup system
- Images scanned & saved here
- Acer IIIG laser printer
  - Public Display Microcomputers
- Digitization Workstation
  - Scanner
Original equipment and software purchased through CARL for TTPI Photo Digitizing Project

Room 4

PC with Image Scanner
Picture Publisher Plus scanning software
CARLterm Image Display software
Windows 3.0

Room 4

3 CARLterm Image Display Workstations

Current temporary locations:
1 - Ann Rabinko
1 - Karen Peacock
1 - Computer Room

NOTE: CARL does not have any experience supporting an optical jukebox for digitized image storage. Boulder Public stores all their images on their file server hard drive.

Equipment and software purchased from other vendors for optical storage/file server system

Computer Room

File Server
Novell Netware 3.11
Network Operating System

Computer Room

SCSI Express Interface and software

Optical Jukebox Laserbank system
(Magneto-Optical WORM storage)
University of Hawaii - Trust Territory of the Pacific
Photo Digitization Project

Tandem
UHCARL
Bib Records for Images

Starmaster
Telecomm Switch

Tandem

x.25

Novell Netware 3.11
PC 386 File Server

System Printer

Acer IIIG Laser Printer

Juke box

SCSI Express
WORM
Laserbank System

Plan to copy files from tape to WORM drives

Backpack portable tape backup system

Public Display Microcomputers

CARLterm
Image Retrieval/Display Software

Async

PC 386 Digitization Workstation

Acer IIIG Laser printer

Umax Scanner

One more photo scanner and one slide scanner to be added

3 public workstations planned
1-2 in Special Collections
1 in General Reference Area
Additional equipment and software purchased from other vendors with surplus funds at end of Fed. Fiscal Year.

**Room 4**

Additional PC and Image Scanner
Picture Publisher Plus
Windows 3.1 (bundled with PC)

**Room 4**

Additional PC with color slide scanner
Slide scanning software
Windows 3.1 (bundled with PC)

**temp. location = Room 4**

Additional PC for use by Karen Peacock to prepare finding aids, etc.
Windows 3.1
Wordperfect for Windows
Pagemaker

**temp. location = Room 4**

2 additional Acer IIIG printers
1 for 3rd public workstation
1 for PC used by Karen Peacock

**NOTE:** The 3 additional PC's have Super VGA monitors which turn out to be "too good" for use with the CARLterm software for purposes of displaying digitized images.

**NOTE:** the slide scanner & software was "a gamble". The original project did not specify slide scanning nor does CARL have any experience supporting slide scanning or any other software than the original version of Picture Publisher Plus for image scanning.

**X**
The new PC was swapped for the older "digitized image demo workstation" in Systems and the 2nd Image Scanner setup is now capable of displaying images in CARLterm.