Installation of Vicki and image capture on the Pt. Lobos

Mike McCann 16 September 1997

Background

The Vicki program (Video Information Capture with Knowledge Inferring) has been installed on the Pt. Lobos. Vicki has been used for over a year in MBARI's Video Lab to annotate video taken by our ROVs. Its purpose is to build a database of quantitative observations and to help index our video archive. It was designed to be an easy-to-learn system to create consistent annotations among various video interpreters.

Currently, the Video Lab has a 2-year backlog of ROV expeditions to annotate. A requirement therefore exists to annotate video in real-time as it is being recorded during the ROV dive. We also have a requirement to mark "events" where we will permanently log observations such as vehicle positions, environmental information, and camera parameters. A real-time video annotation system can satisfy this need.

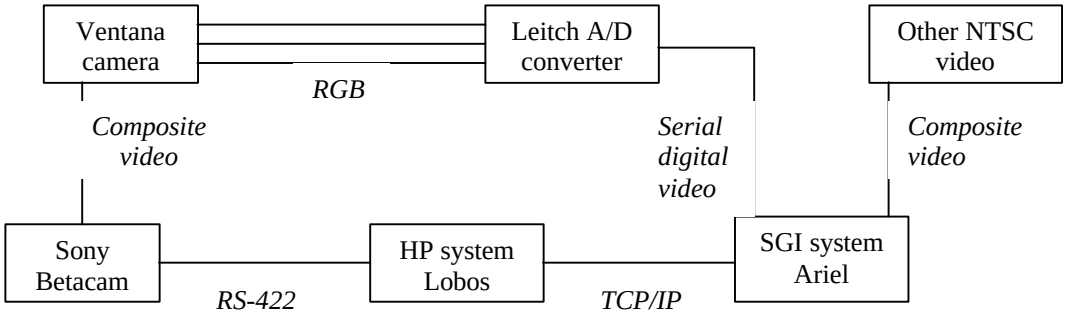
With the installation of the Silicon Graphics Inc. (SGI) workstation ariel in October 1996 we have had the capability of capturing high-quality digital images from Ventana's camera. Until August 1997 we have used the SGI's CosmoCapture tool to capture images and save to disk. While this has been a reliable and easy-to-use tool it does suffer from some inadequacies, namely

1. There is no confirmation that images are actually being saved to disk
2. No ancillary information is saved with the images
3. Naming of files is error-prone
4. Image files are not organized in much of any fashion making their administration difficult
5. Difficult to capture other video sources, such as from the sonar or sit cam

A goal of the Video Information Management System (VIMS) project has been to install Vicki (part of VIMS) onto the Pt. Lobos (and the Western Flyer) so that the above problems can be addressed. This document describes the technical details of the installation so that an operator can understand the system and diagnose problems that might occur.

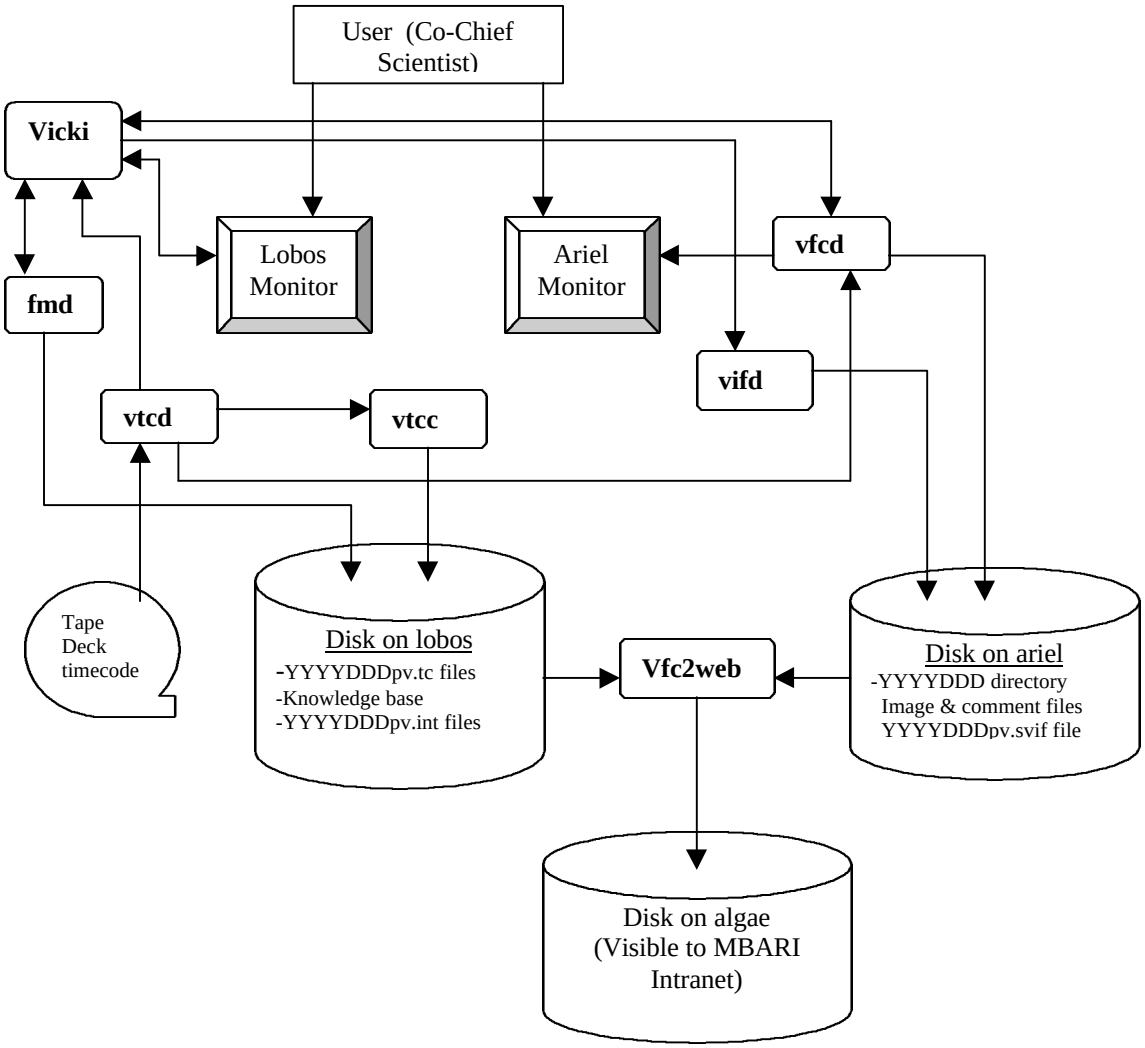
Hardware system component diagram

Below is a diagram of some of the hardware components (boxes) connections between them



Software system component diagram

Below is a diagram of the programs, clients, servers, and file storage systems that make up the Vicki and image frame capture system. The modules in bold text are described after the diagram.



Vicki

The **Vicki** module is centerpiece for this system. It is the primary program with which the user interacts. It is a Smalltalk program that is started from the *start* script in the vicki account on lobos. It communicates via sockets to other services available on hosts lobos and ariel.

Vtcd

The video time code daemon (**vtcd**) is a network service that delivers longitudinal time code from the portable betacam tape deck that is connected to a serial port on lobos. It delivers time code to **Vicki** and to **vtcc** (the video time code client) which is used for logging UTC time and tape time code to files on the lobos file system. **Vtcd** runs on lobos and is registered as service *vicki.vtc 9000/UDP*. Vtcd is started as a

stand-alone daemon upon the bootup of host lobos by the /etc/rc script. The betacam tape deck must be turned on while lobos is booting for **vtcd** to function properly.

Fmd

The file manager daemon (**fmd**) is used by **vicki** to manage a "file database" for the knowledge-base and interpretations created and edited by **vicki**. It also handles user authentication when annotations are edited. It runs on host lobos and is registered as service *vicki.fm 9003/TCP*. **Fmd** is started for each new connection on lobos by inetd(1), file /etc/inetd.conf is specially configured for this operation.

Vtcc

The video time code client (**vtcc**) is started by user vicki's *start* script on lobos. It is used to provide backup logging of real UTC time and betacam tape time code. The network time protocol daemon (xntpd) is run on lobos for accurate timing on the system.

Vfcd

The video frame capture daemon (**vfcd**) runs on host ariel and serves to capture still digital video images from either the serial digital input (Snap Main) or the composite input (Snap Aux). It is started upon bootup of ariel by the /etc/init.d/vicki script. It receives messages from **vicki** on service *vicki.vfc 9006/TCP*. After an image is captured it is written to disk. A copy of the original is converted to a JPEG preview with overlain text; this image is displayed on ariel's monitor as confirmation that the image had been saved. The environment variable VKSNAPHOST, set by vicki's *start* script, specifies the host where **vfcd** runs. Only the last 4 frame captures are shown on the screen; old ones are killed to preserve system resources.

Vifd

The vicki interchange format daemon (**vifd**) is a simple logging service that runs on host ariel. It is started upon bootup of ariel by the /etc/init.d/vicki script. It receives ANNOTATION blocks from **vicki** on service *vicki.vif 9007/TCP*. **Vifd** will eventually be replaced by a direct connection to the VIMS database so that real-time database updates can be made. The environment variable VKVIFHOST, set by vicki's *start* script, specifies the host where **vifd** runs.

Vfc2web

After each day's operations the video frame capture to (2) web script is run on host ariel. **Vfc2web** takes all the files created by the user with vicki, compresses them, constructs image mapped web pages for the images, and transfers them all to a shore-side system that is visible on the *Where was the Pt. Lobos?* Intranet web pages. **Vfc2web** is a perl script that is currently run by cron(1) at 4pm each day from NIS account mccann, the program lives in /u/mccann/Media/vfc2web. Network time protocol is run on ariel for accurate timing.

What can go wrong?

Having an understanding of all the connections that the **vicki** system makes (and needs) is helpful for diagnosing and fixing problems as they occur. For instance, if the **vtcd** service is not available on lobos then time code is not received by **vtcc** or by **vicki**. Vicki's VCR window will show "88:88:88:88" if it can't get a timecode from **vtcd**. If this happens then user vicki on lobos can restart **vtcd** on lobos with the Unix command `'bin/vtcd /dev/tty00'`.

If one cannot log into server lobos to start a new annotation then there is a problem with vicki.fm. (Our experience so far shows that this is rarely a problem.) If a *Snap Main* button fails to grab an image then there may be a problem communicating with host ariel's vicki.vfc service. There could be a network problem or something wrong with the ariel system. The specific error messages received would have to be analyzed to locate the problem. The modular design of the system aids in the upgrade and maintenance of it, but adds to the complexity and the need for understanding how it all works.