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Remote Observing With Java

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Abstract. We demonstrate the next generation of monitor and control software for Caltech's Millimeter Array at the Owens Valley Radio Observatory. The software is based on a client/server architecture and provides remote access for controlling, monitoring and troubleshooting the array. The client is written in Java and thus provides a Web based interface that is supported on many machine architectures and operating systems. The server software is developed in C++ and runs on a UNIX host machine. Data from the microcomputers embedded in the array are transported to the UNIX host shared memory area where they are then available to the server programs. Security algorithms are implemented to authenticate remote access for control of the array. The design of the software makes it portable to other observatories with little modification.

1. Introduction

This computer demonstration consists of remote observing with the Caltech Millimeter Array located at Owens Valley in California to show the feasibility and features of this software package. The demo with realtime status of the array is available on the web[1]. Many of the details of the implementation have been presented in the paper submitted in ADASS VII (Scott & Finch 1998) and this is complementary to that paper. However, in the last year there have been various additions to the program that are further discussed.

Any remote access request to control the array has to be authenticated at the server end. The authentication is made against the UNIX username/password pair in the OVRO server, thereby requiring the user to have a UNIX account on the server beforehand. To avoid password sniffing over the net, the username/password pair is encrypted. Only the monitoring of the array (browsing) is allowed for the non-authenticated users. The modular nature of the authentication function makes it easier to implement other restriction/permission rules based upon machine address or domain name if desired.

[1] `http:/www.ovro.caltech.edu/cma`

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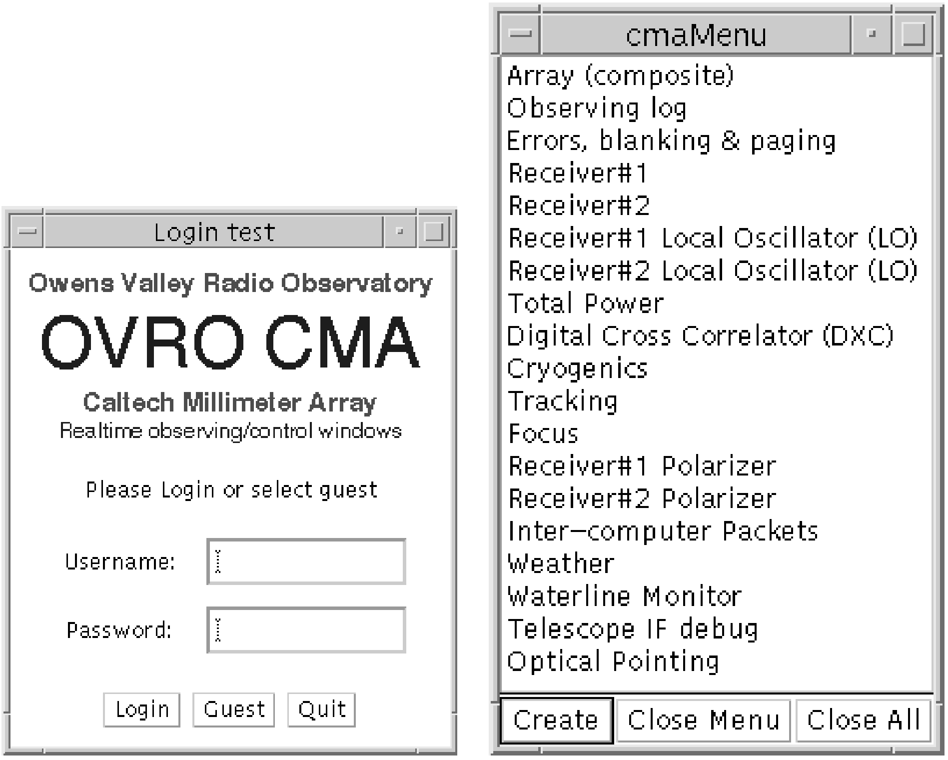

Figure 1. The Login window required for remote authentication (*left*). Unauthorized users may click on the Guest button and provide courtesy user name for only monitoring mode. Menu window (*right*).

The flexibility of the basic realtime window has been increased by adding a pulldown menu that allows other windows to be launched separately or overlay the existing window. Space has been conserved by eliminating the buttons controlling plotting and printing and migrating the functionality to pulldown menus.

The package has proved to be very portable if realtime data is available in shared memory. The observatory specific features have been segregated to allow for easy customization.

Figures 1 through 3 show some sample windows running on a UNIX based machine.

References

Scott, S. & Finch, R. 1998, in ASP Conf. Ser., Vol. 145, Astronomical Data Analysis Software and Systems VII, ed. R. Albrecht, R. N. Hook, & H. A. Bushouse (San Francisco: ASP), 49

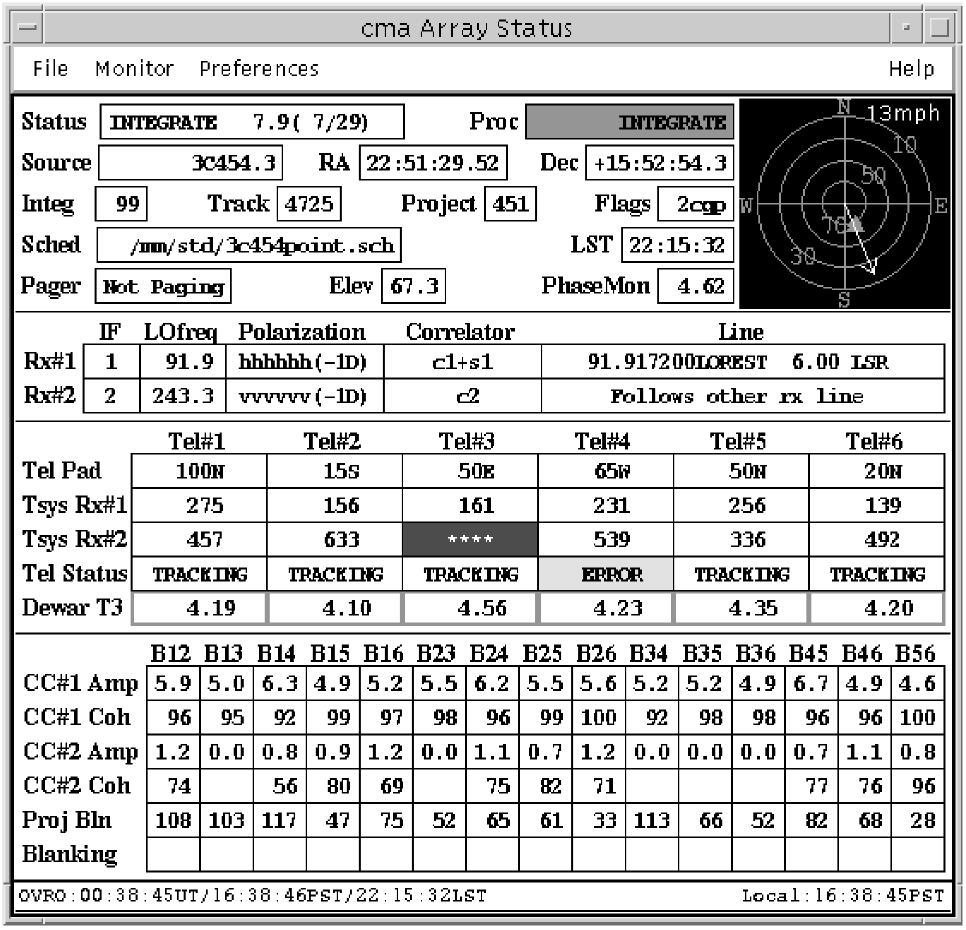

Figure 2. Array Status window.

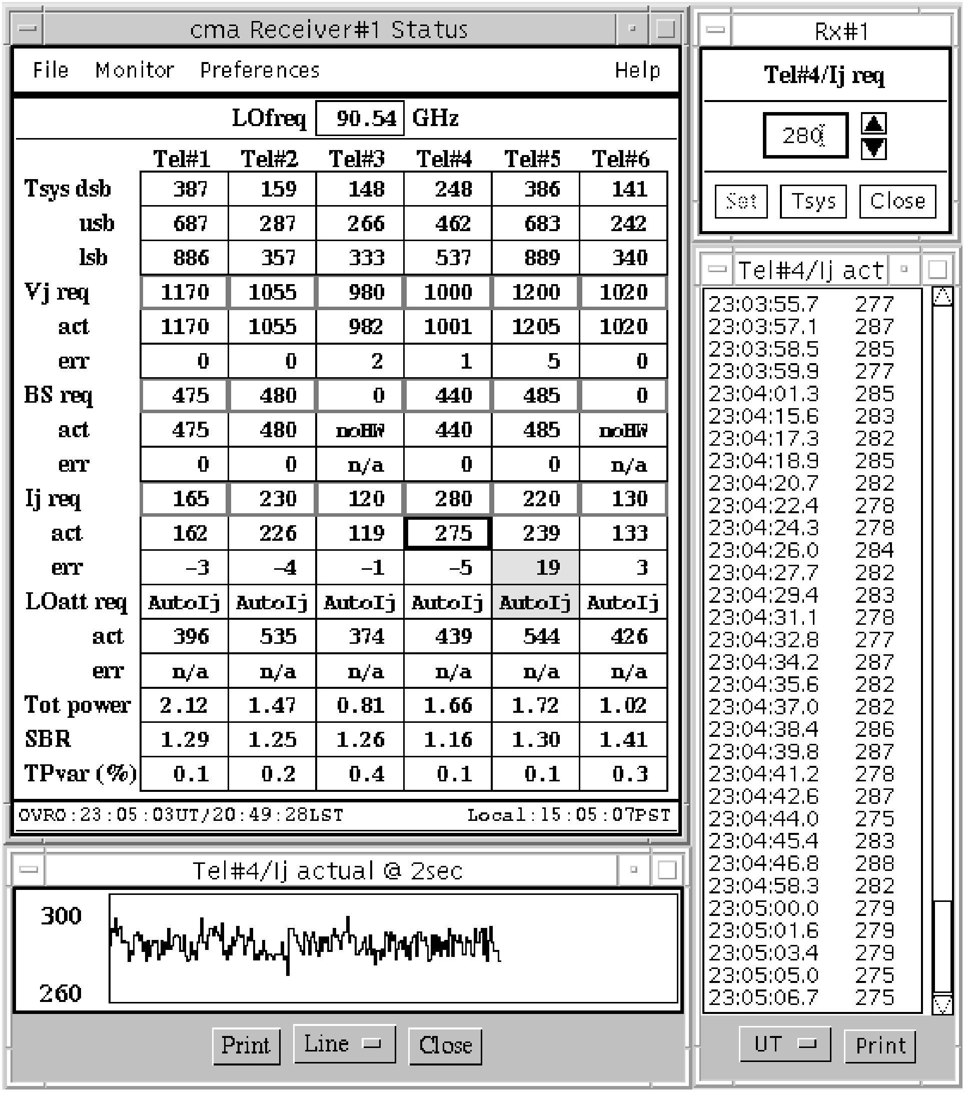

Figure 3. Clockwise from upper left — receiver window, control widget for changing the values, list of the cell values, and the plot of the values.