Valiant Workstation Resurrection

By Keith Myhre – Written January 2022

In 2004 Lockheed Martin Tactical Systems – Eagan, MN developed a ruggedized display workstation to demonstrate key COTS (Commercial Off-The-Shelf) technologies. It was given the named "Valiant Workstation", with multiple configurations to meet customers' operating needs.

We posted the Valiant development story by Robert Monson as story the#290, March 2022, http://vipclubmn.org/Articles/Intrepid-ValiantWorkstation-History.pdf.

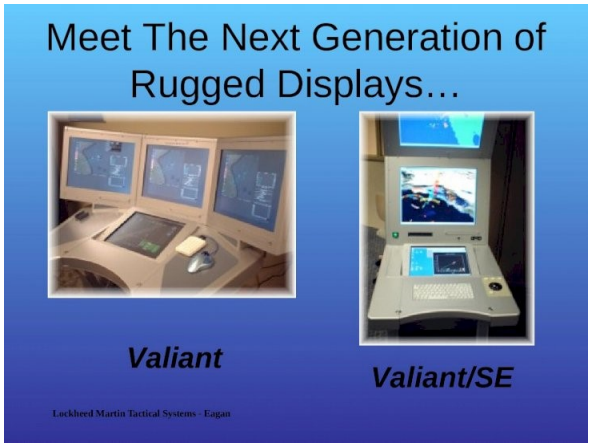


Figure 1. LMCO presentation slide #1.

Lockheed Martin donated both a Valiant and a Valiant/SE Workstation to the Lawshe Museum in South St. Paul. Shown below left is Chad Roberts, Executive Director of the Lawshe Museum at the time, maneuvering a pallet jack with the Valiant Workstation upon its arrival on December 11, 2012.

The photo above right taken February 16, 2021, shows both Valiant Workstations on display in the Lawshe Memorial Museum great hall; next to the beige CP-2044 computer used onboard Japanese Navy P-3C anti-submarine warfare (ASW) aircraft.

RESURRECTION DIALOGUE

In early 2021, Keith decided to see if he could get one of the Valiant Workstations operational so it could be demonstrated to Lawshe Memorial Museum visitors. That effort began July 6, 2021, with help from other VIP Club volunteers at the museum. (Continued on page 4)

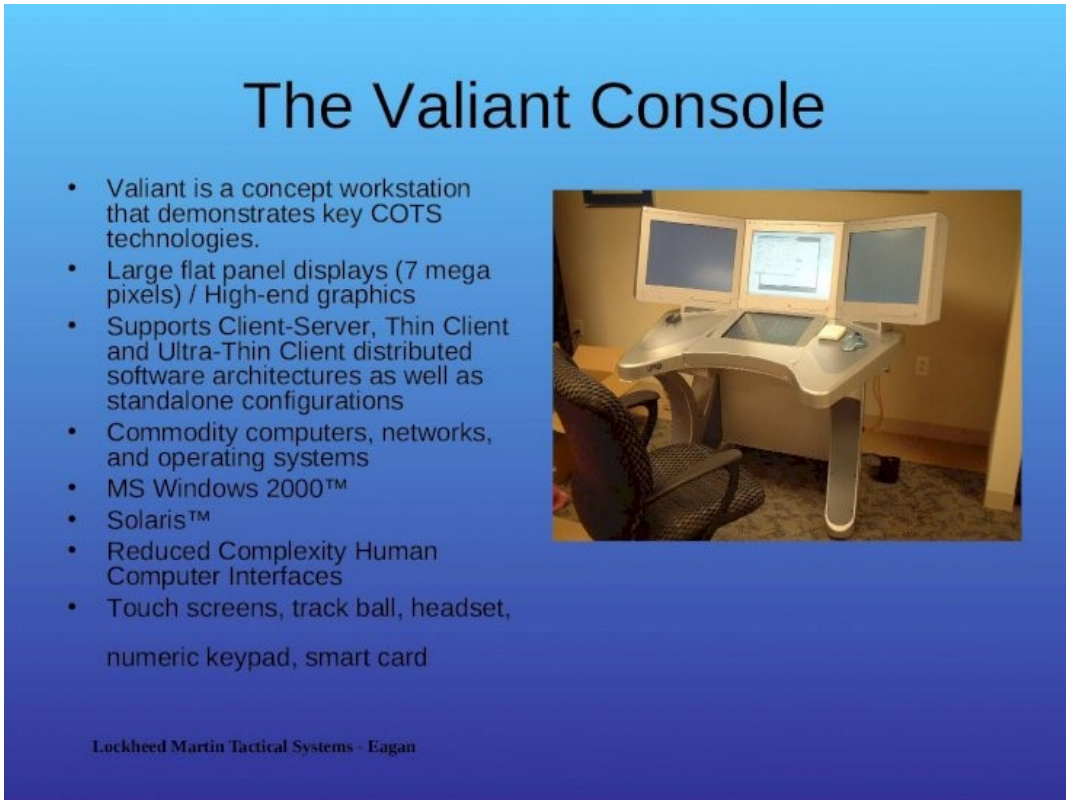
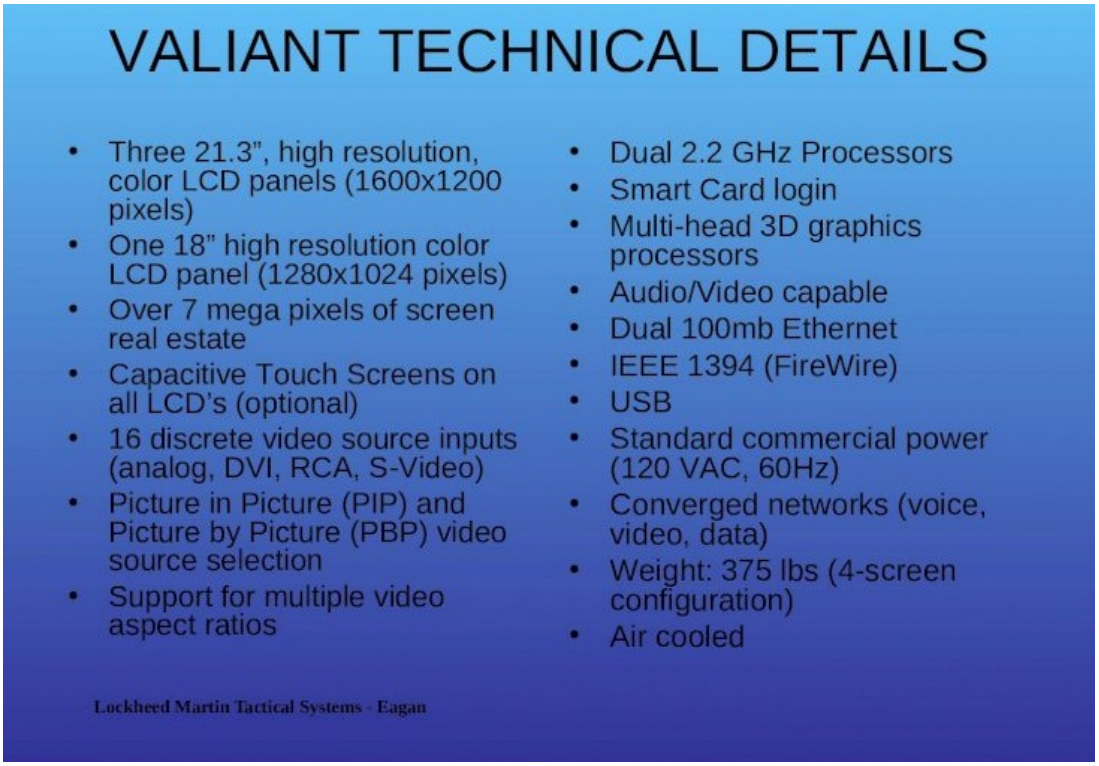


Figure 2. Lockheed Martin slides #2 & #3.



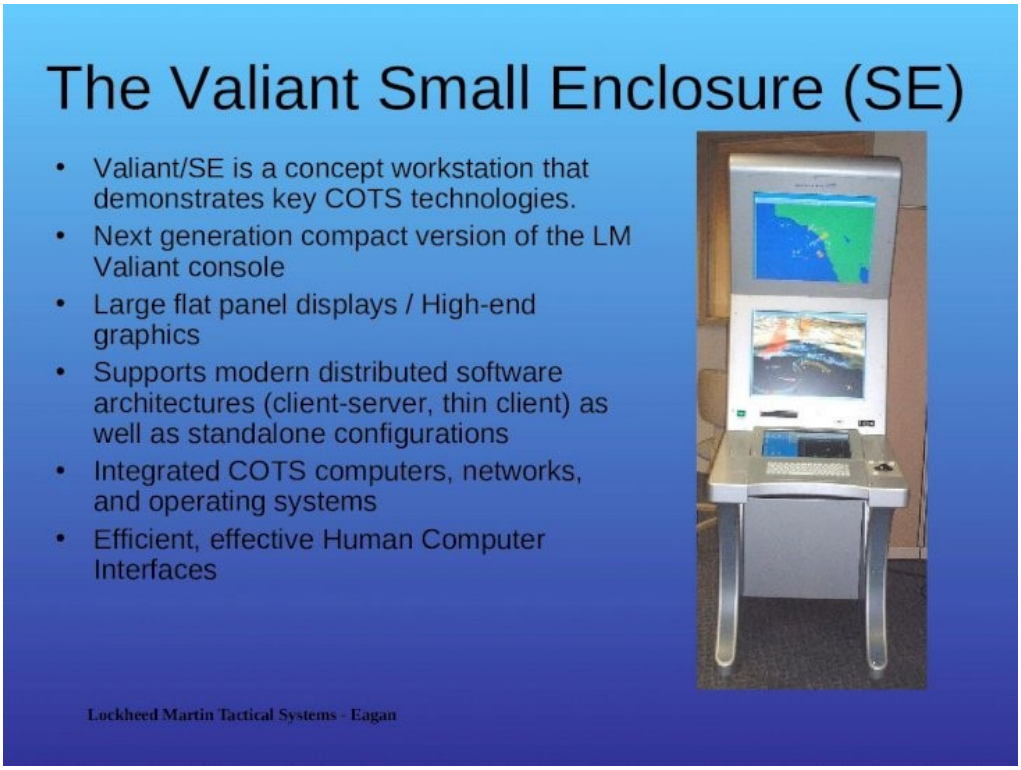
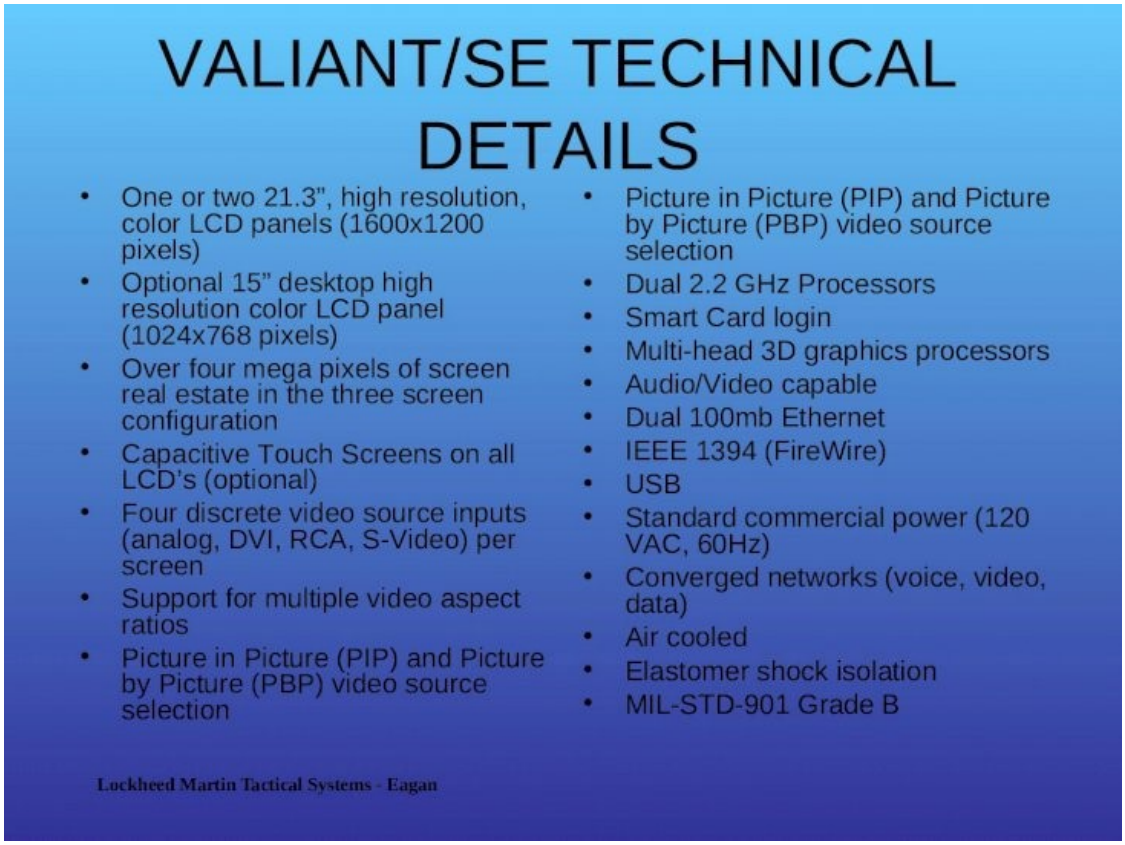


Figure 3. Lockheed Martin slides #4 & 5.



{Resurrection continued} We assumed that the computing power was provided by a VME (Virtual Machine Environment) RISC (Reduced Instruction Set Computer) processor, like the Navy Standard AN/UYQ-70 display family. However, when Les Nelson and I removed the workstation's back panel, we unexpectedly found the "Wizard of Oz". A Dell Precision 530 personal computer was "behind the curtain" running things.

4. Looking behind the display unit.

5. The Dell computer embedded beneath the workstation.

So, we weren't surprised when we removed the back panel on the dual vertical screen Valiant Workstation SE and found a Compaq Evo 6000 behind its "Wizard of Oz curtain".

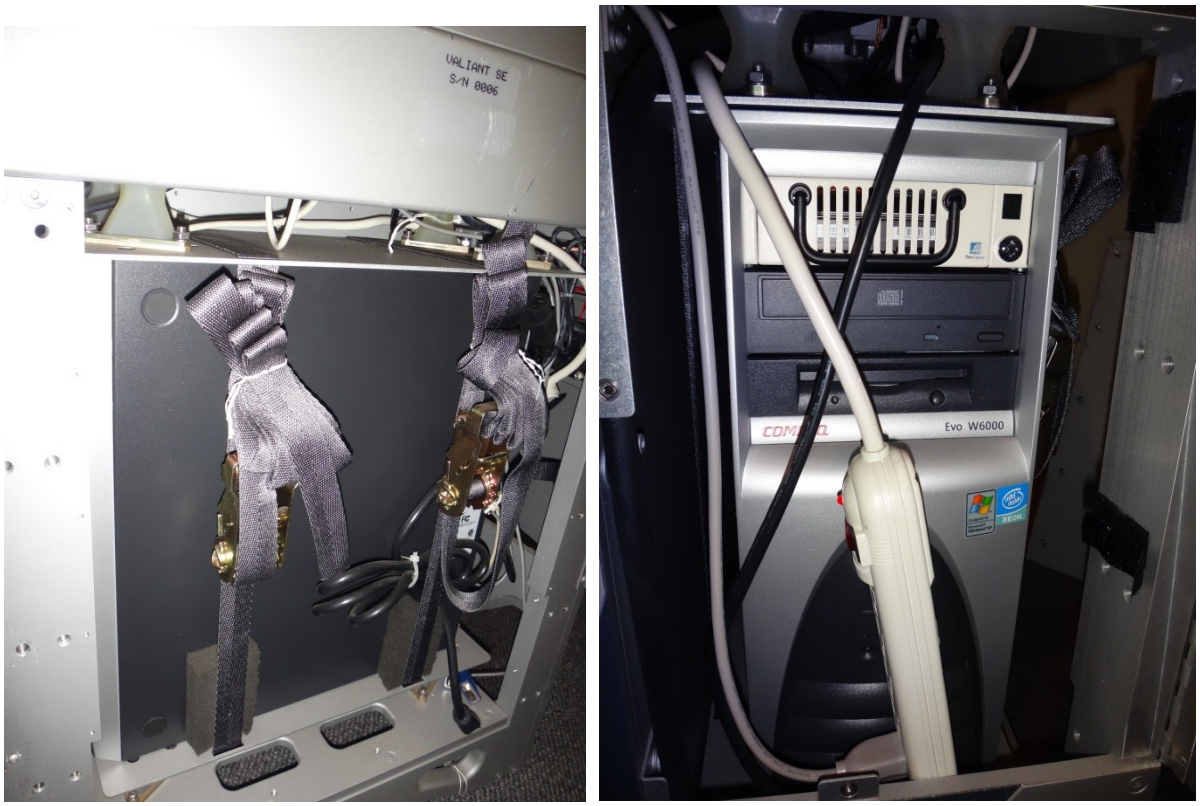


Figure 6. Beneath the EV workstation.

Time to plug in the workstation and power it up. Whoops! The power connector is a round, 3-pin connector. Perhaps 220 volts? There were three 110-volt power strips inside the workstation, so we ignored the primary power input connector and plugged the power strips into a 110-volt power strip.

Figure 7. Les Nelson examining the power connections.

I pressed the power button on the Dell Precision 530 computer. The BIOS booted up, but the operating system wouldn't load, even after multiple tries. The date and time always defaulted to midnight January 1, 2000. Not a surprise for a circa 2002 computer. Time to quit and try again in a fortnight.

Two weeks later I replaced the CMOS lithium battery but still was unable to boot up (not unexpected). I determined that the IDE hard drive was electrically dead. Another two weeks before trying again. {Volunteers work at the museum alternate Tuesday mornings.}

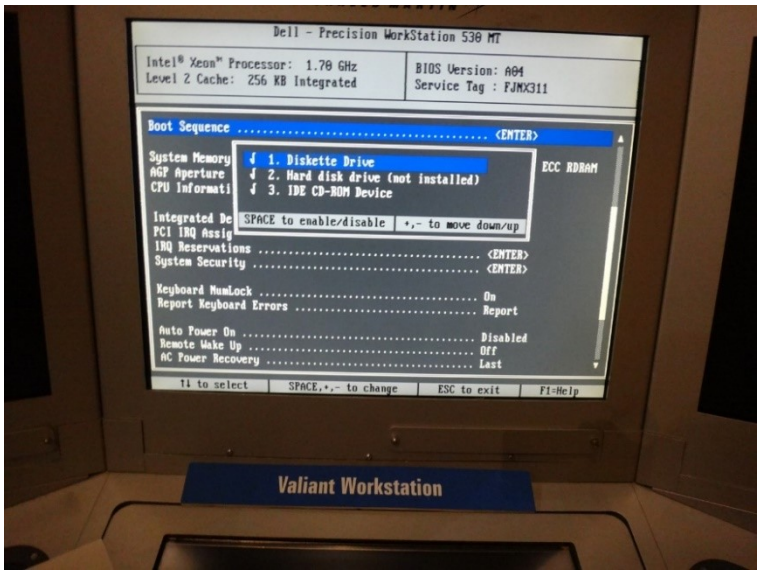


Figure 8. Start-up BIOS screen image on the center display screen.

I had a spare, new IDE drive at home that I brought to the museum and installed. The computer recognized the drive, but without an operating system I couldn't do anything more.

I purchased Window XP Pro on eBay, downloaded it to my home PC, and burned it to a DVD. Hmmmh – Windows wouldn't fully install, no matter how many times I tried. I figured that the 40X DVD that I burned couldn't be read by the archaic PC's drive without errors/hanging. So, I burned an 8X DVD and brought that to the Museum two weeks later. The Bios could read, load and execute the disc install .exe file. Then we went through the hassle of having to call Microsoft to get the XP Pro validation code - no internet access, of course, from the Valiant Workstation).

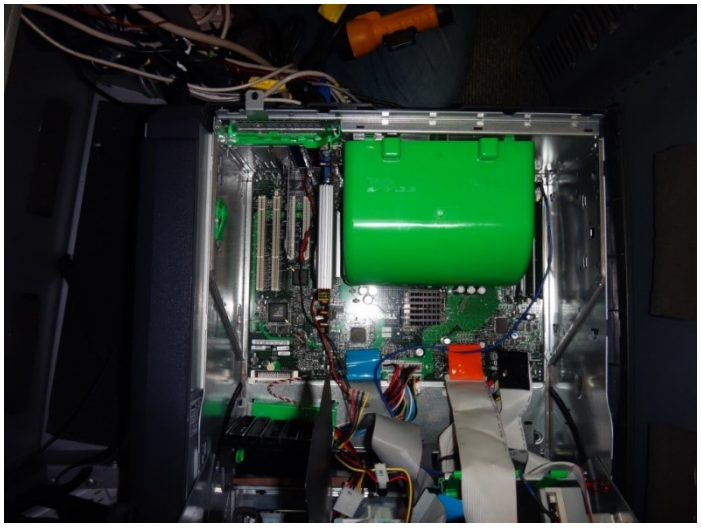


Figure 97. The 'guts' of the Dell computer.

Once Windows XP Pro was installed, I could only get two of the four (Liquid Crystal Displays) LCDs to work. After a lot of trial & error, Les and I determined that one of the two video graphics cards was bad. Each graphics card drives two LCDs. I tried to scavenge a video card from one of the five Dell tower PCs that came from Lockheed Martin but weren't being used. None of video cards physically fit. They were either too new (newer PCI Express interface vs. older PCI interface needed by the Dell Precision 530), were the wrong physical size, or had different type connectors.

I managed to find and purchase a PCI video graphics card on eBay: "PCI Graphics Card ATI Rage XL 8MB VGA Video Module Adapter for Desktop". However, it didn't work with the Windows XP Pro default Microsoft driver. So, it took me another two weeks to search online for an ATI driver package and download it to a flash drive.

Figure 8. Spare parts cache in back room of museum.

Now it's October 5, 2021. I installed that ATI software and was able to get the three vertical displays operational. Earlier, Les and I took apart the back panels on the vertical displays and the bezel on the horizontal LCD. We removed that LCD screen and determined that although the Windows XP Pro device manager recognized the display screen, the screen didn't illuminate. There must be a broken wire or pixel driver circuitry that has failed.

We checked the spare LCDs that were donated to the Lawshe Museum, but none of them were a fit. So, we gave up on getting the horizontal LCD screen operational.

Les and I had one last issue to resolve: Finding a mating connector for the Valiant console's primary power connector.

The power connector is a round, 3-pin, 30-amp connector. Les purchased two different 220-volt mating connectors, but neither fit. It appeared that the shape/keying of the pins were non-standard (i.e., not the same as for a range/stove/dryer). We finally determined that the input power is 110 volts, not 220 volts. With that realization, Les was able to purchase the proper connector.

Once installed, we were able to power up the Valiant Workstation using the rocker switch on the bullnose, as designed, and built. That switch is also wired to the Dell Precision 530 computer's motherboard power connector, so the Valiant Workstation now powers up and automatically loads the Windows XP Pro operating system without any operator intervention, as intended.

Figure 9. Les is installing the correct 110-volt, 30-amp connector.

I also installed Microsoft Office 2000 on the Dell Precision 530 computer, primarily to have Power Point available for slide show presentations.

Figure 10. An operational Valiant Workstation showing photos from the museum archives.

As a side note, after the Valiant Workstation was buttoned-up and operational, I was rummaging through a large box containing cables, spare cards and other miscellaneous items and came across a backup IDE disk drive containing the Windows 2000 operating system and the workstation software. I decided not to swap it for the Windows XP Pro disk drive, since the console was working following four plus months of satisfying effort. {Volunteers are at the museum Tuesday mornings.}

EPILOGUE

Keith and Les are to be commended for their initiative to make this Valiant workstation functional. When the museum re-opens to the public next fall, this workstation will become a highlight for visitors. At that time, we will be looking for new volunteers to investigate the resurrection of the Valliant SE workstation. Perhaps a few months of volunteerism for some other tech-savvy retirees. Thanks also to Keith for taking the pictures to document the volunteerism efforts.

We invite you to review our website, http://vipclubmn.org/Exhibits.html for more about the museum.

More defense-industry computer artifacts than any other museum in the world! LABenson