



radiology departments spend a lot of time and money on image acquisition systems but often take decisions in haste when it comes to image display systems!

A cheap price, a flashy colour monitor, or a one-size-fits-all approach can be distractions in the decision-making process.

High-quality images are of no useful purpose if they are not seen on high-quality and appropriate medical displays.

Here are directions on what to avoid when purchasing your next medical display for your department.



SIN #2. CHOOSING A DISPLAY SOLELY ON PRICE.
 Don't be fooled by low-priced displays that are "suitable" for diagnostic review. Ask for the total cost - purchase price, conformance costs, calibration costs, replacement costs and maintenance costs. You might be surprised how cost effective those "expensive" medical imaging displays really are!

SIN #3. USING A ONE-SIZE FITS ALL APPROACH TO DISPLAY SELECTION.

With a PACS facility, you need medical images throughout your facility. Every reading environment, each viewing application and clinical specialty needs a potentially different display solution. Create categories of use and select displays that are right for each category. You will save money by selecting displays right for each task.

SIN #4. CHOOSING A DISPLAY WITHOUT A LUMINANCE GUARANTEE.

Diagnostic displays must be capable of producing consistent images from one day to the next and from one month to the next. Many medical imaging display manufacturers ensure displays produce consistent images through sophisticated quality checks. In addition, ensure your supplier provides a backlight brightness guarantee that extends at least 12 months from the date of purchase.

SIN #5. NOT UNDERSTANDING THE IMPORTANCE OF THE BARTEN MODEL FOR CONTRAST SENSITIVITY.

The model is not a gimmick created to sell more

WHEN YOU ARE IN THE MARKET TO CHOOSE DISPLAYS FOR MEDICAL IMAGING WORKSTATIONS, PEOPLE WILL TELL YOU HOW MUCH TO PAY AND WHERE TO DEPLOY THEM but every bit of advice is based on someone else's experience or something they read in a magazine or website.

Instead of telling you what you should select, here is a list of things to watch for and avoid. So here are the

THE SEVEN DEADLY SINS

OF MEDICAL IMAGING DISPLAY SELECTION



SIN #1. CHOOSING A DISPLAY THAT REQUIRES FREQUENT MANUAL INTERVENTIONS TO RESTORE DICOM COMPLIANCE.

If the display system cannot maintain DICOM consistency, and your vendor says you need a handheld photometer or third party conformance and calibration software designed to "help you", it is **not** a diagnostic display but a consumer grade display that is not meant for diagnostic display!

displays. The Barten Model plays a large part in the design and engineering of a medical imaging display. By using perceptual linearization, the display can reveal more diagnostic information in areas where the anatomy has inherently low subject contrast.

SIN #6. NOT UNDERSTANDING THE TRADEOFFS OF COLOUR DISPLAYS VERSUS GRAYSCALE DISPLAYS.

Colour displays serve many useful purposes. As more diagnostic information includes a colour component, colour displays will be required in more situations. However, colour displays generally do not achieve the same brightness and contrast that is possible with grayscale displays. Grayscale displays have the filter removed that is used to create the red, green and blue subpixels. Without the filter, more light is available for contrast and brightness. If your imaging requirements do not require colour, select a product that produces the highest quality grayscale images – a grayscale display!! If you do require a combination of colour and grayscale images, select a colour display that is capable of producing DICOM-compliant grayscale images consistently throughout the life of the display.

SIN #7. IGNORING THE AAPM TG18'S FREE ADVICE.

The AAPM TG18 provides a default guideline for medical imaging display performance, QC and QA. Any QA software that has implemented the AAPM TG18 guidelines is a very good starting point for managing display quality.



Straight talk About Data migration

COURTESY: MICHAEL CANNAVO, PACS SECRETS FROM AUNTMINNIE.COM

“Nearly one out of every four PACS sold today is a replacement for an existing PACS. Just as people entering second marriages have baggage they bring along with them so, too, do replacement PACS.”

That “baggage” is the studies that reside in the existing archive. These prior studies need to be transferred to the new archive, so they can be accessed by the radiologists for comparison. Unfortunately, this is often much easier said than done.

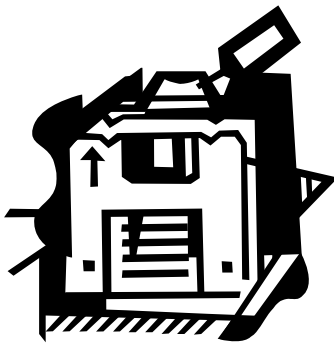
Many issues relating to data migration need to be considered, such as

1/ THE WAY THE DATA IS STORED.

In an ideal situation, image data are stored uncompressed in a DICOM Part 10 file format that includes both image and header information. Unfortunately, ideal situations are typically few and far between, especially dealing with data five years old or older.

2/ CREATION OF A SEARCHABLE DATABASE.

It's unnecessary to have a detailed understanding about DICOM, but it is important to understand that not every vendor captures and stores DICOM header information in the same manner or provides the exact same information either. This is why sharing DICOM-conformance statements is so crucial and knowing what each vendor addresses.



3/ MOST DATA MIGRATION IS

NOTORIOUSLY SLOW, and if you factor in the time it takes for data cleaning and/or data reconciliation, that number can be easily halved. You also need to factor in the time available to do the migration.

Migration impacts retrievals from the archive and the network as well, so these also play a role in data migration time.

Because of the time it takes to do a data migration, you typically want to do this in descending order (most recent to oldest studies first). That way if the migration takes longer to complete you have the most current studies available.

Understanding Archiving



COURTESY: PACS SECRETS FROM AUNTMINNIE.COM

Archiving today follows one of three models:

DIRECT-ATTACHED STORAGE (DAS), NETWORK ATTACHED STORAGE (NAS) and STORAGE AREA NETWORK (SAN).

DAS are storage repositories directly attached to servers or workstations, and are also known as **spinning disks or hard drives**. These are typically clustered (devices linked together) and require at least two devices: a server and a storage bay.

NAS are file-based devices that "own" the data on it, and are typically connected to a Windows-based computer. NAS devices are specialized servers dedicated to storage.

SAN is better suited for large amounts of data such as database files and images. A SAN is a block-based device in which the host also owns the data. You can access a SAN via two protocols: iSCSI (TCP/IP) and/or Fibre Channel (FC).

File-based applications that do not need high speed data transfer may need only NAS topologies. NAS is able to leverage the existing IP network, thereby avoiding one of the major SAN investments, Fibre Channel.

Today, many mid- to large-size PACS implementations use both NAS and SAN solutions in what is known as **UNIFIED STORAGE**.

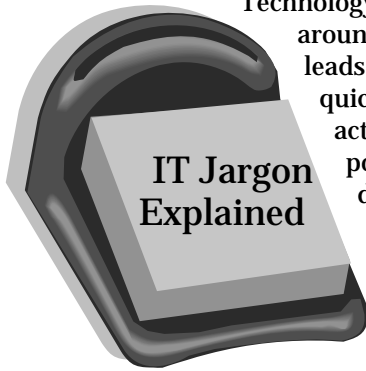
Unified storage is a system that makes it possible to run

Unified storage reduces hardware requirements. Instead of separate storage platforms, such as NAS for file-based storage and RAID for block-based storage, it combines both modes in a single device.

and manage files and applications from a single device. Unified storage systems can also be simpler to manage than separate products.

However, the actual management overhead depends on the full complement of features and functionality provided in the platform. Furthermore, unified storage often limits the level of control in file-

based versus block-based I/O, so mission-critical applications should continue to be deployed on block-based storage systems like SAN.



Technology is an insidious thing: It's around us at all times, and either leads us in new directions, or quickly reacts to our courses of action. Security issues that potentially affect us every day are -

- IDENTITY THEFT
- ACCESS
- VIRUSES
- SPYWARE
- SPAM

Here are some commonly-used Information Security words and jargon explained ...

Phishing Identity thieves strive constantly to come up with new ways to trick us into releasing important private information. They may pose as a legitimate company and then trick you into revealing your current username and password.

They use *trick email*, supposedly from a bank or credit card company, containing a web link that would redirect you to a bogus web site that encourages you to enter your login information.

They could also use the *corporate email trick* where the identity thieves pretend to issue email from **within** your own organization asking for personal information. Always verify from the requester first before disclosing the information.

Sometimes crooks "hijack" a bonafide web address of a reputable company and redirect the unsuspecting person to a fake website that looks very similar to the correct one.

Spyware

These nasty creatures hide in the boot sector area of a hard drive and load even before the operating system or anti-virus software does. The spyware mask their presence and monitor your activities virtually without your knowledge. The disguised spyware cannot be detected by conventional antivirus or spyware software.



Firewall

Firewalls block unwanted access and are now mandatory in the modern interconnected world. If your computer or network has any outside connection, **you must have a firewall.**

A lodged spyware could track what you do with your computer and adapt this to gradually allow remote control of your computer and get access to your private data. Firewall is much more than safe computing, it is an essential part of protecting yourself from wrongful access.

Penny wise and pound foolish?



COURTESY: MICHAEL CANNAVO,
AUNTMINNIE.COM

What makes a person penny-wise and pound-foolish in PACS? People usually make these kinds of mistakes by looking at the minutiae instead of the big picture.

More than 85% of all PACS decisions are based on price and relationship, but price is – or should be – an incredibly small part of the decision-making equation.

An area many people often overlook is **warranty terms.**

Warranties can be worth as much as 20% of the total quoted price. With warranties running the gamut from no warranty at all to one year, this can save as much as \$40,000 on a \$200,000 sale.

When is a deal not really a deal? Sometimes you can be fooled into thinking a deal is a better deal than it really is. Plate life in computed radiography systems (CR) is but one example.

Most CR vendors rate their plate life by the number of exposures and give you a one-year or sometimes a two-year warranty but damage to the plate and the cassette is much more likely than a "burn-out". In the vast majority of cases, damage to the plate and cassettes isn't covered by warranty.

Make sure you get the **right plate combinations** tailored to the type of procedures you do, not just volume alone. You can always shoot an extremity on a 14 x 17-inch plate if needed, so always go with the larger size.

Unfortunately, price is often looked at as the deal maker or deal breaker instead of doing a more thorough look at the total cost of ownership.

Penny wise . . . CONTINUED



Realistically, if a vendor is diligently working to solve a problem, no facility is going to run a stopwatch on the vendor.

Contrary to what every vendor promotes and every facility looks for, uptime guarantees mean virtually nothing; **response time** is the key.

No one wants a relationship that is based on threats, yet expectations need to be set forth and guidelines established if the implementation is to be a success.

Unnecessary Technology.

The last area we'll address is use of technology to solve problems in which solutions may already exist but not be implemented. Voice

recognition is one area that comes to mind here.

Of course voice recognition supporters will talk about time-savings in reporting with nonstandard reporting as well, but the bottleneck really isn't the dictation-to-transcription segment but from completed transcription to report approval.

Facilities, by avoiding penny-wise and pound-foolish decisions, can allow PACS to meet its full potential while saving both time and money in the process.

The real bottleneck isn't the dictation-to-transcription segment but from completed transcription to report approval.



iRAD Technical Services
We know how to make your technology work

PREVIEW OF THE NEXT ISSUE OF IRAD NEWSLETTER:



PACS Networking

“

One of the many benefits Radiologists anticipate when moving from film to digital is the ability to view any image, anywhere, anytime. The vision often includes reading from multiple clinics, providing online access to referring physicians and even catching up on work from the cottage.

Unfortunately, when planning the conversion, much of the attention is focused on digital modalities and viewing stations and insufficient attention

is paid to the network that

”

will transport this information ● ● ●

If you would like to read about certain topics related to PACS and RIS in future issues of our IRAD newsletter, please let us know.

With contributions from:
IRAD'S COMMUNICATION CELL
RICHARDSON ELECTRONICS
AUNTMINNIE.COM

iRAD Technical Services Inc.
1235 Trafalgar Road
Suite 306
Oakville, ON
L6H 3P1
Tel: 905.844.3897
Email: cbennell@mico-on.ca