Now in its second generation, RSTAR brings high quality Picture Archiving and Communications Systems (PACS) to today's medical complex.
The RSTAR Image Management System

The RSTAR image management system is a high performance electronic multi-modality image and workflow management system that enables the fast and efficient distribution of multimedia diagnostic information — radiographic images, text reports, voice notes, and graphics — throughout the medical complex.

Conceived and created in a clinical environment, RSTAR was initially developed by the Massachusetts General Hospital’s Department of Radiology PACS Group. Established in 1985, this research and development group enjoyed the resources and guidance available from MGH’s clinical and academic environment, and employed many highly qualified engineers, scientists, and technicians to develop the RSTAR technology within the Radiology Department.

Massachusetts General Hospital has licensed this technology to RSTAR, Inc.—the company built around the engineers and scientists who developed it. The technology will be available for commercial use through RSTAR, Inc., where the focus is on developing products that solve operational problems in the radiology department and throughout the hospital.

Sophisticated Solutions for Radiology

RSTAR uses leading hardware, sophisticated computer software, and advanced networking technology to meet the needs of the most demanding image management applications from simple CT and MRI mini-PACS to hospital-wide PACS. Specifically, RSTAR is designed to:

- Acquire full fidelity images from:
  - Plain Film Laser Digitizers
  - Computed Radiography Systems
  - CT via DICOM-3 and other interfaces
  - MRI via DICOM-3 and other interfaces
  - Ultrasound via Video Capture
  - Nuclear Medicine via various networks
  - And, of course, other sources i.e., older imaging modalities via custom interfaces

- Perform softcopy display on:
  - High resolution (2K) Diagnostic Workstations™
  - Medium resolution (1K) Image Review Workstations
  - High resolution (2K) Touch Panel™ View Stations
  - Medium resolution (1K) Touch Panel™ View Stations

- Archive images using the latest optical storage technology.

- Interface to the leading high resolution laser film printer with up to a 12-bit image gray scale

- Distribute multimedia clinical data over a 100 megabits/second local area network and over high speed wide area networks from 19.2K to 45 megabits/second
The RSTAR Radiology Solution

### Superior Quality Images
Today, radiology departments and professional groups are being pressed into providing comprehensive services throughout the radiology department, the medical complex, and the world at an ever increasing pace. An image management system that provides superior image quality, speed of display, and ease of use is now necessary to meet the demand. RSTAR is that system. Although softcopy viewing is not yet widely established, the RSTAR system represents a significant step in the migration to softcopy as the principal medium for diagnostics.

### High Speed Image Transport
Because radiologists' time is valuable, the RSTAR system is designed to provide ultra-fast access and transport time. In most cases, transport from the image server nodes to the workstations takes less than 2 seconds for a chest radiograph.

RSTAR understands the need to send radiographic data over wide geographic areas and has integrated a wide array of telecommunications options into the system, from 19.2K, 56K and T1 to 45 megabits per second public switched DS3 lines using an RSTAR developed DS3 modem. Whatever your communications needs, RSTAR will work with you to employ the appropriate technology and services.

### Multi-Modality
RSTAR will provide a variety of interfaces to the major radiologic modalities, such as CT, MRI, and plain film allowing multi-modality viewing on the same monitor (both 1K and 2K displays). RSTAR is standards-based and, in particular, interfaces to any modality or vendor who adheres to the DICOM-3 (ACR-NEMA III) standard.

- Direct digital interfaces to many Computed Radiography Units
- Specialized interface hardware and software to various acquisition devices
- Video acquisition systems to capture analog images

### Information Systems
To support a seamless PACS integration, it is necessary to interface to various Radiology Information Systems (RIS). Therefore, the RSTAR system supports the industry standard hospital information systems interface: HL7 versions 1 and 2.

### Intuitive User Interface
Workstation operation conforms to the Apple Computer Inc. Macintosh® human interface guidelines, which means that the system is intuitive for radiologists, clinicians, and other users. The system supports a wide array of image manipulation, processing, and measurement tools that operate on all classes of images.

- Touch Panel™ View Stations
- Folder paradigms to create the patient's "Master Folder"
- Integrated digitized voice record and playback
- Integrated graphic and text annotation for physician reporting

### High Performance Components
The necessary requirement of any PACS system is that it be able to manage a high volume of image traffic and activity, and at the same time provide real-time performance to the radiologists. The RSTAR system best meets these requirements. RSTAR develops and manufactures the technologies that provide the performance you need. These include

- An efficient 100 megabits per second optical LAN
- Dedicated workstation 2K display and graphics controllers

### Modular and Expandable System
RSTAR products are designed to work in both stand-alone and networked applications. Their modular capabilities allow growth from "mini-PACS" to full PACS systems without having to discard modules as your system grows. The Software Interface Bus, a super-set of the client-server model developed by RSTAR, allows acquisition, processing, archiving, and communication nodes to be added to your system with ease and at a pace that matches your PACS needs. The Software Interface Bus also provides image and demographic accessibility to researchers and scientists alike.
RSTAR makes high quality systems for viewing and interpretation throughout the department, hospital, and at remote locations.

**Diagnostic Workstation™**

The RSTAR Diagnostic Workstation was designed with the goal of primary interpretation at the workstation using superior high resolution, high frame rate, and high brightness displays. The Diagnostic Workstation can support up to eight monitors to accommodate the screen real estate needed for demanding applications. Reports are created at the workstation with simple-to-use study selection tools, image manipulation and processing tools, and voice reporting.

The system offers a variety of search criteria for accessing studies in the database, and it supports the concept of "user configured queues" that hold unread studies with one button access to the next study. As an indication of RSTAR's attention to detail, the system also supports the user creation of teaching files and electronic mail.

**Clinical Review Station**

The Clinical Review Station provides cost efficient viewing of patients' diagnostic images and reports for clinicians and referring physicians. This medium resolution (1K) display station allows for viewing of all modalities. The Clinical Review Station supports one or two displays and, as with all RSTAR workstations, networks via a 100 megabits per second optical LAN or, for remote applications, via telecommunication lines with performance from 19.2K to 45 megabits per second.

**Touch Panel™ View Station**

Diagnostic images and reports should always be available to meet the very specific and time critical needs of the Intensive Care Unit and other critical care areas (CCU, ER, and OR). Recognizing the need for a compact, easy-to-use View Station, RSTAR has created a streamlined user interface that requires no keyboard or mouse, but is patterned after the simple Automatic Teller Machines we all are accustomed to using. By pressing just two buttons along the side of the monitor, you can select the desired image for display: 1) Choose the Patient, and 2) Choose the Study. Touch Panel™ View Stations are available in a variety of configurations from 1K to 2K displays, using one or two monitors.

**Image Acquisition Station**

The RSTAR Image Acquisition Station is used for capturing images from various devices, and transferring those images to the Image Server for archiving, and subsequent review or interpretation at various workstations. Patient study demographics as well as clinical history and hypothesis may also be entered at the Acquisition Station. The station can be configured to connect to one of a number of acquisition devices ranging from Laser Image Digitizers and Computed Radiography Units to Video Capture Units.

**Image Printing Station**

The need for hard copy films will exist for years to come. RSTAR has created a Networked Laser Film Printer Interface that allows the RSTAR system to connect to the leading industry standard laser film printers. This means that any workstation can print any image on any networked printer, and it allows for the set up of automatic print protocols for images entering the Image Servers.

**Image Server**

RSTAR believes that each workstation should have immediate access to every image in the system, and that the pre-routing of images at the workstation does not meet this goal in any practical configuration. To achieve this high level of performance, our Image Servers are composed of image caches made from magnetic disk farms tightly-coupled to high speed optical LANS. Understanding the need for performance at an affordable price, we have developed a line of Image Servers that offer varying capabilities in terms of archiving capacity and processing power.

**Demographic Entry Station**

When no Radiology Information System is present, or when a patient brings images taken off-site, this Entry Station allows for complete Patient Demographic information to be entered into the system.
The RSTAR Customer Services

RSTAR offers a variety of services to hospitals, HMOs, imaging centers and physician groups worldwide.

Teleradiology Support
RSTAR provides complete Teleradiology support services including on-line access, storage, and transmission of medical images via high speed communication lines (19.2K, switched 56K, ISDN, and T1) using standard LAN and WAN technologies.

System Integration and Management
Our expert staff will provide interfaces and other unique solutions to connect systems in multi-vendor environments. Whether the need is on-site or at remote locations, we are experienced in consulting with institutions to help them develop and integrate their own PACS solution.

Network Design and Management
Our experienced network and systems managers provide full services to customers worldwide. We can help you design a network system appropriate for your needs, as well as manage the system.

Specialized Applications: Custom Tools for Clinical Analysis
The unique clinical background of the RSTAR developers allows our staff to provide custom image measuring, processing, and manipulation tools useful in a wide range of clinical studies. The RSTAR system can be customized to assist you in various research/clinical projects.

Customer Training and Support
We provide on-site training to diverse user groups, customized to their specific needs. Training includes hands-on user instruction for administrators and clinicians on how to efficiently operate the RSTAR system. We also provide Radiology Information System consulting for efficient PACS integration and implementation, as well as ongoing consultative support.

RSTAR's team of engineers, technicians, system designers, and specialists is dedicated to the successful implementation of your special projects.