ARIA Oncology Information System

The ARIA® oncology information system (OIS) is a comprehensive software solution for managing radiation, medical and surgical oncology departments.

**Complete information management** ..... page 4
ARIA brings the entire patient chart to the point of care. This system streamlines your department processes, eliminates the time and cost associated with film and paper management, and enables your staff to make more informed decisions for your patients.

**Reporting tools** ........................................ page 12
ARIA’s preconfigured embedded reports provide you with valuable up-to-date information with just a few keystrokes. Use these reports for common queries, or design new reports that are customized to address the specific needs of your department.

**Image management** ................................. page 13
With ARIA, you are able to view clinical images, such as CT, PET, MR, MV, kV, and cone-beam CT (CBCT). Automatic image match algorithms and manual image verification tools simplify the remote image analysis.

**Connectivity** ........................................ page 16
Interfaces to hospital information systems enable the automatic population of data from previously disparate silos of information, minimizing time spent away from the patient to track down information. Information and images are easily imported and exported via DICOM and HL7.

**Data protection** .................................... page 19
Safeguard your clinical information with HARRP (High Availability and Rapid Recovery Protection) — a continuous data protection, disaster recovery, and fault tolerance solution.

**System information** ................................. page 20
With ARIA, you have the flexibility to adapt the system to suit the needs of your clinic. Users can personalize the specific information they wish to view, and departments can configure system-wide settings that affect all users.
Workflow Management

ARIA uses a “push” workflow methodology to facilitate easy access to patient information and streamline the completion of activities and tasks. Users can create custom rules that will enable the system to drive workflow throughout the radiation oncology department.

1.0 Task Management

Tasks can be generated for users when new patients are entered into the system, e.g., when new documents are stored, new images are saved from treatment, or new lab results are entered.

1.1 Additional functionality:
- Automatic reminders when activities are due
- Electronic hand-off of activities and tasks upon completion
- Escalation functionality when tasks are missed or past due
- Checklists aid as reminders to staff prior to completing tasks

1.2 Home Screen
- Customizable launch pad with user-centric overview of day’s activities
- Personalized view of task list, personal schedule, and provider patient list
- Convenient, one-click access to workspaces for completion of activities
- Toolbar access to associated notes and checklists

1.3 Assistant
- Quick-search patient selection
- Switch user and logoff functionality
- Configurable, rights-based workspace access

1.4 Patient overview and summary
- Interactive, graphical view of patient care path
- Consolidated summary of all patient notes
- At-a-glance view of patient information, including:
  - Name, ID, and face photo
  - Diagnosis
  - Status of last image taken
  - Transportation requirements
  - Lab results entered
  - Treatment summary

Information Management

1.0 Patient Manager

Patient Manager provides the core functionality for the ARIA electronic medical record (EMR). It includes patient registration, charting, treatment plan management, charge capture, and scheduling capabilities. Additionally, it provides a collection of reports and system administration management.

1.1 Usability
- On-line Help
- Tabbed interface
- Hyperlinks to data entry screens for data edits
- Taskbar buttons
- Access to full patient radiation oncology medical record
- Define externally launchable applications and execute those applications while passing patient and user context information
- Summary displays registration data, patient photograph, treatment status, appointments, patient notes/alerts, and diagnosis information
- Patient Explorer with filtering tools for patient selection
- Embedded reports
- Portable PC support
- Generation of patient and barcode labels for use with patient check-in
- Patient journal for short entries regarding a patient’s condition or care
- User switching
- Retention of patient context across ARIA
- Patient directives with associated icon, allowing navigation to more details
- Infectious disease data fields with associated icon, allowing navigation to more details
- Persistent individual user-preference settings

1.2 Registration
- Primary oncologist and referring MD lookup functionality
• Patient name, ID, address, demographic, and contact information capture
• Inpatient/outpatient tracking
• Assignment of oncologist and referring physicians
• Listing of patient insurance plans and policies

1.3 Care path management
• Customizable care path templates
• Tracking of all patient-related appointments and tasks for quality assurance
• Dynamic updates as new appointments and tasks are created

1.4 Diagnosis management
• Diagnosis codes reportable to public registries
• Tracking of patient complaints, historical problems, and clinical diagnoses using ICD 9/10 codes
• Automated summary staging based on AJCC/UICC, FIGO, MSTS, Durie Salmon, and RAI guidelines
• Diagnosis tracking
• Detailed pathology and prognostic information for cancer diagnoses
• Tumor markers (e.g., CEA, PSA) summary from lab results with relevant cancer shown

1.5 Disease response
• Disease response is documented for solid tumors via lesion size (in 2 or 3 dimensions)
• Solid tumor response (e.g., CR, PR, NED, SD, and PD)
• Lesion tracking, including multi-focal lesion definition
• Extensive pathology and surgical information (e.g., margins, Oncotype Dx, invasive tumor details)

2.0 Clinical Assessment
Clinical Assessment allows you to evaluate and monitor your patients’ health during their entire treatment process. Be assured you have all the information you need to treat your patients effectively with an in-depth view of their health information. Clinical Assessment provides:

2.1.1 Patient health information
2.1.1.1 Patient history summary workspace
• Medical, surgical, gynecologic, family, and social history information
• Point and click selection of patient health factors
• Ability to enter note for each problem

2.1.1.2 Medications workspace
• Tracking of immunization records and inoculations
• Support for e-prescribing
• Tracking of current medications and drug orders
• Editable medication lookup table based on comprehensive drug database
• Ability to create medication “favorites list” for easy drug selection
• Drug selection from Medi-Span® commercial drug database (optional purchase, only available in the United States)
  - Drug-drug, drug-allergy, drug-diagnosis contra-indication screening

2.1.1.3 Allergy workspace allows for documentation of patient allergies and responses

2.1.1.4 Education/counseling workspace includes information such as:
• Supplemental information, including website addresses and electronic files
• Documentation on department orientation
• Knowledge of disease
• Patient education and teaching
• Nutritional needs
• Documentation of the amount of time spent with the patient

2.1.1.5 Ability to ‘error out’ patient history medication, allergy and education/counseling information and display errors for documentation auditing

2.1.2 Evaluation information

2.1.2.1 Review of Systems (ROS) and Physical Exam (PE) workspaces
• Ability to amend/copy previously approved assessments
• Ability to group ROS/PE body systems into user-defined disease sites
• Point and click selection of ROS and PE status
• Progress notes are dynamically built based on user point-and-click selections to properly document ROS and PE status
• Visual indicators for identifiable assessment results

2.1.2.2 Toxicities workspace
• Ability to amend/copy previously approved assessments
• Tracking of all patient toxicities, date of occurrence, and adverse event using NCI and RTOG grading tools
• Ability to graph toxicity grades

2.1.2.3 Performance status workspace
allows for tracking of a patient’s performance status with date of each assessment using either Karnofsky, Lansky, ECOG, or GOG performance scales

2.1.2.4 Vitals signs workspace
• Body mass index (BMI) calculation
• Includes tracking of the following information:
  - Height (in/cm)
  - Weight (lb/kg)
  - Pulse/heart rate (/min)
  - Systolic blood pressure
  - Diastolic blood pressure
  - Temperature (C/F)
  - User-defined parameters
• Ability to graph vital signs results for analysis
• High/low results alerts

2.1.2.5 Chief complaint/HPI (history of present illness) workspace
• Ability to amend/copy previously approved assessments
• Supports voice recognition software
• Free text description
• Pre-defined comments
• Database tags for inclusion in Dynamic Documents

2.1.2.6 Impression/plan workspace
• Ability to amend/copy previously approved assessments
• Supports voice recognition software
• Free text description
• Pre-defined comments
• Database tags for inclusion in Dynamic Documents

2.1.2.7 Quality measure compliance tracking

2.1.2.8 Clinical notifications to track clinical decisions

2.1.3 Lab orders and results
• Support for partial approvals and preliminary results
• Electronically submit and track lab tests, imaging studies, and diagnostic studies
• Enter lab results with corresponding units
• Ability to create component “favorites lists” for easy data selection
• Ability to graph lab test results for analysis
• High/low results alerts
2.1.4 Ability to approve assessments (ROS, PE, toxicities, performance status, and vital signs) and lab results via electronic signature

2.1.5 User-defined data collection forms
- Define and document assessments, such as JCAHO, quality of life, eligibility assessment, and patient satisfaction
- Ability to create questionnaires, link them to patient appointments, and incorporate the responses into patient documents
- Ability to score questionnaires for assessments, such as symptom screening

2.1.6 Communications
- Patient consent for public registry data submission
- Patient consent for patient portal communications
- Patient information requests: Visit summary, patient health summary, patient care summary
- Continuity of care document generation
- Communication log for audit trail
- Patient reminders

3.0 Varian Treatment (workstation hardware included)
Varian Treatment verify and record software provides treatment delivery functionality for non-Varian linear accelerators. Varian Treatment supports:

<table>
<thead>
<tr>
<th>Summary of Supported Linacs and Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Linac Vendor</strong></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Elekta</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Vericord S2/S3</td>
</tr>
<tr>
<td>GE¹</td>
</tr>
<tr>
<td>Siemens</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Siemens</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Siemens</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

¹Varian Treatment for GE Saturne is not available for sale in Canada. ²MLCi (Standard 80-leaf MLC) MLC ³Elekta RTD Version 5.0 at minimum is required for IMRT treatment delivery. ⁴Saturne M800-MS (GE MLC) series linacs are not supported. ⁵58-leaf MLC
3.1 Elekta, GE, and Siemens: See Summary of Supported Linacs and Features table below:

- Elekta iViewGT™ R3.4 or higher support

3.2 National language support

- French, German, Spanish, and Italian

4.0 Radiation Therapy Management

Radiation Therapy Management provides summary-to-details navigation for complete treatment plan and image management. A treatment course can be planned and approved in advance so that treatments can be readily delivered. Functionality includes:

- Electronic treatment intent/prescription capabilities for advanced treatment course planning
- Support for multi-energy, multi-modal prescriptions
- Organs-at-risk and coverage constraints
- Linkage of multiple plans to a single prescription
- Support for prescription revision and visualization
- Visual timeline of image acquisition, prescriptions, plans, and their revisions
- At-a-glance view of overrides and exceptions
- 3D graphical display of treatment setup with fields
- Integrated MLC field shaping and play back
- Plan templates for standardized treatments
- Plan and image scheduling
- Plan approval/filtering
- Reference image selection and preparation
- Reference point dose management
- Field-shape layers and beam accessories defined
- Treatment history and treatment summary, including overrides, port films/ images, dose corrections, and four slot custom coding for accelerators supporting this option
- Treatment plan modification tracking for auditing
- Plan verification, including support for delivering patient plan for quality assurance

5.0 Patient Check-in

Patient Check-in lets patients check themselves into the department waiting room when they arrive for treatment. Patient Check-in supports:

- Bar-coding technologies
- Touch-screen technologies

6.0 Time Planner

Time Planner is a comprehensive resource and activity manager for all resources configured within ARIA.

6.1 Usability

- User-defined checklists can be attached to tasks/appointments
- Tabbed interface (allowing for multiple schedule views)
- Customizable independent workspace settings per user
- Customizable display time granularity
- Drag-and-drop appointment scheduling
- Color coding for appointment (status and types) and task status
- Customizable parameter display per user
- On-screen filtering capability
- Printing from any view (all displayed data)
- Quick link to patient chart information
- Display of fractions treated and remaining on completed treatment appointments
- Automatic association of specific tasks with activities
- Display of Patient Directive and Infection Control icons
- Embedded Reports

6.2 Multiple views

- Standard calendar views: Day, work week, week, and month
- Customizable calendar views per user
- Agenda views for single and multiple resources (unlimited)
- Calendar layout or row-based layout
- Customizable time display granularity per view

6.3 Full featured schedule

- Schedule management across multiple users, departments, and hospitals
- Repeating appointments (daily, weekly, monthly or yearly)
- Find “next available appointment” function
- Waitlist of patients or appointments
6.4 Tasks management
- List of assigned tasks with priority and color coding
- Task notes
- Online status updates: Manually completed, cancelled, cancelled – no show, open
- Autocapture of charges/cost upon task completion

6.5 Wait list management
- List of waitlisted patients or appointments
- Drag-and-drop scheduling onto resources
- Care path management
- One-click scheduling of entire care path of activities
- Tracking of all patient-related appointments and tasks
- Dynamic updates as new appointments and tasks are created

6.6 Message Exchange
- Ability to send free-text electronic messages within the application to other staff
- Ability to reply to messages to sender or “reply all” to list of recipients

7.0 Message Ticker
Message Ticker is an electronic public address system for ARIA. It is used to send department announcements and alerts to staff workstations.

7.1 Usability
- Customizable background and font color, message speed, direction and expiration date
- Users with rights can create and edit new messages and channels
- Messages are created and organized in “Channels”
- Users select which channels to subscribe to
- Ticker can be hidden if preferred

8.0 Outlook® Sync
Outlook Sync synchronizes staff agendas in Time Planner and Microsoft® Outlook calendar. Appointments and Tasks are shared and updated and can be viewed on personal digital assistants (PDAs).

8.1 Usability
- Microsoft® Outlook look and feel
- Synchronization start and end date range
- Synchronize appointments and/or tasks
- Auto-synchronize on a user-defined schedule
- Privacy settings
- Bi-directional appointment schedule synchronization

9.0 Activity Capture
Activity Capture allows the user to capture comprehensive data for services rendered and activities executed within ARIA. It captures and exports completed procedure codes along with their associated costs and attributes, to the hospital financial system.

9.1 Usability
- Tabbed interface with customized views
- Support of industry-standard billing, diagnosis and user-defined codes
- Up to 50 user-definable attributes captured for each completed activity
- Customizable parameter displays
- Multiple CPT code modifiers
• Message Ticker
• Embedded reports

9.2 Activity management

• Link charges to patient billing accounts
• Management of insurance, government, and private payor information
• Support for procedure codes, relative value units, workload, custom codes, and attributes
• Forecast functionality for treatment costs and expected revenue
• Capture of charges/costs for completed services or clinical activities and tasks
• Auto-capture of charges/costs for treatment delivery and simulation
• Activity codes review, approval and editing at time of completion or audit
• Credits for previously exported activities
• Automated audit and review tools
• Activity export to hospital billing system (requires HL7 Activity Export or ASCII Activity Export)
• Mark activities as non-exportable
• Split billing support

10.0 Dynamic Documents

Dynamic Documents allows the user to save patient encounter information in ARIA. The user can type, dictate, import and save Microsoft® Word™ documents to create a complete radiation oncology electronic medical record (EMR). Dynamic Documents includes:

10.1 Usability

• Unlimited user-definable document template support, and ability to define “favorites” list
• Two levels of document approvals (i.e., residents and attending physicians)
• Full-featured Microsoft Word editor
• Document importing, scanning, and support for other file types such as bmp, gif, jpg, png, and PDF
  • Auto-population of select patient-related information from the Varian Systems database
• Use of hyperlinks to auto-populate and navigate to selected functional areas of the EMR and the current document
• Voice recognition support (Microsoft-compatible voice recognition software purchased separately)
• Fax and E-mail support (Microsoft-compatible fax and E-mail enabling software purchased separately)
• e-Fax support (using XMediusFAX™ optional purchase)
• Open and print multiple documents and EMR simultaneously
• Group document types for easy navigation
• Document amendment functionality. System retains prior version.
• Electronic signature for IEM in-bound interface documents
• Support for Topaz Systems signature pad

11.0 Chart QA

Chart QA allows clinical staff to review patient charts as required to validate treatment delivery accuracy, to identify if plan edits were made or if treatment adjustments are required. Regular chart audits facilitate ACR and AMA compliance and automate charge capture.
11.1 Usability

- Manual entry and storage of In Vivo measurements from third-party measuring devices (Sun Nuclear, Sicel Technologies, PTW, IBA, and Landauer)
- Patient Explorer with filtering tools for patient selection
- Filter the worklist to include only QA eligible patients
- Multiple patient worklist
- Tabbed interface for chart summary, treatment history and document creation (documents tab requires Dynamic Documents)
- Summary displays registration data, treatment status, appointments and patient notes/alerts
- Column chooser
- Quick link buttons open related applications or execute common commands
- Single-click approval
- Color-coding of plan changes and overrides
- Audit history
- Embedded reports (filtered, sorted and saved to file type)
- Portable PC support
- Column sorting and filtering
- Online help
- Pending/completed audit status
- Auto-capture of charges at audit completion (requires Activity Capture)
- Graphing capabilities for trend analysis
- Generation of patient and accessory verification system labels
- Journal tab for short, free-text entries about a patient’s progress or condition
- Questionnaire tab for user-defined data collection forms
- Ability to view SSD values entered at 4D Console

12.0 Consolidated Notes

The Consolidated Notes workspace provides a single view of notes generated throughout the system, including:

- Treatment notes from the 4D Console
- Patient alerts
- Journal entries
- Appointment notes
- Task notes
- Chart QA history notes
- Dose corrections
- Manual treatment notes
- Any free text comment entered for a patient

13.0 Data Segmentation

Data Segmentation functionality provides procedure code sets, user and groups preferences, security features and charge/cost detail for organizations with more than one physical department or location.

13.1 Usability

Set up in Data Administration, each department can have separate:

- Preferences (hours, holidays, …)
- Activities and activity attributes
- Assigned associated tasks to procedure codes
- Lists and user defined labels
- User rights to view patient data
- Procedure Codes and modifiers
- Procedure code attributes (RVU – relative value units, cost, technical, professional, global components)
- Payor and plan preferences
- Billing services
- Resources (staff, rooms and equipment)
13.2 Additional Tools

- “Copy from Master” feature that allows existing settings to be applied to other department
- Acceptance of changes from the Master list of activities and codes
- Assignment of patients and staff to multiple departments

14.0 Long-Term Archive

Long-Term Archive can be used to archive patient data from the ARIA OIS to a computer file system, PACS, or to removable offline media such as DVD and CDs. Archived data includes demographics, schedules, charges, DICOM-based information and documents.

14.1 Usability

- On-line Help
- Task bar buttons

14.2 Archiving feature and capabilities:

- Archiving of patient data into industry standard file formats of DICOM and XML
- Archive tracker for keeping track of who is archived and where
- Archive Log to track all archive and restore activities
- Batch mode for archive and restore of multiple patients
- Semi-automatic completion of treatment courses for cases in which the patient being archived still has uncompleted courses
- Archived data restoration independent of the OIS database version
- Archiving of critical treatment planning data
- Patient demographics held in database
- User rights controlled to ensure only authorized personnel archive critical clinical data
- Local workstation or global configurations
- Ability to configure media labeling and archive locations
- Customizable error handling
- Flexible filters for patient selection

Reports

1.0 Report Manager

Report Manager is an operational reporting tool powered by Microsoft Report Definition Language. Report Manager templates can be customized to create detailed, revealing reports. Interactive interface allows users to create reports without any database knowledge. Report Manager includes:

1.1 82 embedded report templates
1.2 Ability to mark reports “Active” or “Inactive”
1.3 Ability to select and group fields
1.4 Customization of retrieval arguments
1.5 Customization of display settings and font selections for each section in the reports
1.6 Customization of column headers in each report
1.7 Publishing of customized report to host workspace
1.8 Tools to support HIPAA compliance
1.9 Assurance that customized report templates will continue to work after future ARIA upgrades

2.0 Reports Author

Reports Author is a database query and report builder powered by InfoMaker for generating informative, decision-making reports. Reports may be created from scratch or the reports included with ARIA may be modified to meet specific customer needs. Reports Author includes:

2.1 Direct connection to the Varian Systems database
2.2 Point and click construction of reports
2.3 Customizable filtering and formatting of report data
2.4 On-line report previewing
2.5 Report and query libraries for storage and easy access
2.6 Generation of executable files able to run on workstations that do not have InfoMaker installed
2.7 Exporting of reports to other software programs
2.8 Predefined reports in the following categories:
  - Quality assurance
  - Schedules (i.e., patient, resource)
  - Statistics
  - Charge/cost summaries
3.0 Deluxe Reports

Deluxe Reports is a comprehensive set of reports offering the user significantly greater breadth and depth of reporting to augment the basic reports package available in ARIA. Deluxe Reports includes:

3.1 65 user-defined reports (for a total of 147 reports available in ARIA)

3.2 A report scheduling mechanism by which 20 reports can be scheduled to run independent of user interaction

3.3 Customization capability for individual reports (Reports Author application required)

3.4 Library files to organize reports for storage and easy access

3.5 Deluxe Reports consists of reports in the following categories:
   - Administrative
   - Activity capture (reviews, audits, summaries)
   - Resource and patient schedules
   - Image and film verification
   - Quality assurance
   - Physics
   - Clinical profiles

Image Management

1.0 Offline Review

Offline Review provides remote review and manipulation of acquired MV, kV, and cone-beam CT (CBCT) images. Users can compare acquired images with reference images, identify necessary couch corrections and communicate changes back to therapist to be carried out at treatment.

1.1 Image management tools
   - Multi-patient select
   - Worklist driven patient image review
   - Manual, automatic, sync, and smart window/level
   - Image invert
   - Image zoom/pan/rotate/flip
   - Annotation
   - Image remark capture
   - Image alignment and scaling
   - Image enhancement filters for sharpness/contrast/brightness
   - Tabbed interface for MV and kV image viewing and manipulation
   - Easy navigation using course and session timeline
   - Support for CBCT images (requires OBI 1.4)
   - Support for simulation images (match not supported)
   - Support for MR and PET reference images
   - MV, kV, and CBCT cine support

Review images anywhere in your department using the sophisticated imaging toolset.
• Support for 3D/3D match (requires imaging system capable of storing 3D registration information)
• Support for matches using implanted markers (marker match)
• 3D rendering display with structure overlay (optional feature)
• Comparison of CBCTs acquired at two different sessions
• Non-Action Level (NAL) protocol for offline corrections
• Display of patient photo and basic demographic information
• Warning if results of image match are outside of predefined limits
• Support for predefined patient alerts
• Proton gantry pitch support (match not supported)
• MV CBCT support for third-party machines
• Gated single frame images (match supported TrueBeam™ system only)
• BrainLAB setup image support (match not supported)

1.2 Analysis tools
• Distance, angle and area measurements
• Grid overlay
• Digital graticule for acquisition, treatment and OBI matched displays
• Acquired and planned field edge displays
• Contours, overlays and structure sets display
• Area and line profile
• Correlated pointer between reference and acquired images
• Area histogram
• Automatic image blend of acquired image and reference image
• Display of acquired, treated and delta couch positions

• Manual, automatic, and correlated points anatomy match wizard
- Online review parameters reusable offline
  (User can also define and save new match parameters, which are then available for online match on OBI.)
- Anatomy match results displays couch corrections dynamically for translations and rotations
- Match results automatically captured in change request and communicated back to treatment
• Split and moving window with color blending for anatomy matching
• Graphical statistics and trends analysis for MV, kV, and CBCT images
  - Statistics and trends exportable to file
  - Calculations based on mean, medium, minimum, maximum
  - Trends based on single or all fields, or matches from former plans
• Field edge plot and movie
• Match movie
• Match verification using image difference

1.3 Customization choices
• Per user patient select tool
• Worklist image filters
• Workspace
  - Image layout, 2, 3, or 4 (depending on image type)
  - Contours and structure sets display
  - Image annotation display
  - Digital Graticule display
  - Color blending choices and fade out
  - Percent of image blending
  - Couch correction change request calculation algorithm
• Match tolerance limits
• NAL protocol configuration
• Printing options
2.0 Image Browser

Image Browser provides easy access to clinical images (MV, kV, CT, CBCT, MR, and PET). Clinicians can review and compare images acquired during the course of treatment and monitor changes over time.

2.1 Image management tools

- Manual and automatic window/level
- Image invert
- Image zoom/pan/rotate/flip
- Annotation
- Image remark capture
- Image alignment and scaling
- Region of interest
- Image enhancement filters for sharpness/contrast/brightness
- Image status changes display on images

2.2 Analysis tools

- Distance, angle, and area measurements
- Grid overlay
- Easy navigation
- Support for CT, CBCT, MR, and PET
- Support of RT images (DRR, secondary captured images)
- Support for simulation images
- Display of registered images
- Side-by-side comparison of images
  - Synchronized navigation for registered 3D images
- RT objects display
- Contours, overlays, and structure sets display
- Area and line profile
- Area histogram
- Image blend of registered image sets
- Display of patient alerts
2.3 Customization choices
- Customizable patient select tool
- Predefined anatomical windows (lung, bone, brain) for 3D image display
- Workspace
  - Image layout, single/multiple image view
  - Contours and structure sets display
  - Image annotation display
  - Color blending choices and fade out
  - Percent of image blending
  - Print layout
2.4 Miscellaneous:
- Compatible with DICOM RT Import
- Print layout
- Context switching between ARIA workspaces

Connectivity

1.0 DICOM
DICOM is an interface application that supports the transfer of images and plan data using the industry-standard protocol DICOM. For more details on DICOM support, refer to the Varian DICOM conformance statement at www.varian.com/ARIA.

1.1 Wizard-driven user interface for import/export
1.2 Filters
- DICOM media file import/export
- DICOM patient file import/export (single patient import/export as DICOM media files)
1.3 Services supported
- Query/retrieve (SCU/SCP)
- Storage (SCU/SCP)
- Print (SCU)
1.4 DICOM 3 image support: CT, MR, PET, US

---

### Service Object Pair (SOP) Classes Supported
(Service Class User (SCU)/Service Class Provider (SCP))

<table>
<thead>
<tr>
<th>SOP Class</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transfer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computed Radiography Image Storage</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CT Image Storage</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>MR Image Storage</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ultrasound Image Storage</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Secondary Capture Image Storage</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>X-Ray Angiographic Image Storage</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Spatial Registration Storage</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Positron Emission Tomography Image Storage</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>RT Image Storage</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>RT Dose Storage</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>RT Structure Set Storage</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>RT Beams Treatment Record Storage</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>RT Plan Storage</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>RT Treatment Summary Record Storage</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>RT ION Plan Storage</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>RT Ion Beams Treatment Record Storage</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Motion Management Protocol (Private)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Motion Management Waveform (Private)</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Query/Retrieve

<table>
<thead>
<tr>
<th>Operation</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Root Query/Retrieve Information Model – FIND</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Study Root Query/Retrieve Information Model – MOVE</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Print Management

<table>
<thead>
<tr>
<th>Service</th>
<th>SCU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Grayscale Print Management</td>
<td>✓</td>
</tr>
<tr>
<td>Meta SOP Class</td>
<td></td>
</tr>
</tbody>
</table>
1.5 RT objects supported:

- RT image
- RT plan (including dynamic MLC and prescription MU)
- RT structure set
- RT dose
- RT treatment record
- RT treatment summary record
- Deformable registration import

Treatment summary record is only supported by Treatment Daemon and only as a (storage) SCU.

1.6 Non-DICOM image file import/export formats

- BMP (Windows Bitmap)
- CART (Computer Aided Radiotherapy)
- TIFF (Tag Image File Format)
- Vision file (Vision internal file format)
- Raw pixel data

2.0 DICOM Print

DICOM Print service provides the ability to print images as shown in view to include overlays, structures, and MLC. Images print to (networked) DICOM-compatible printers.

3.0 TDS Interface

The Treatment Delivery System (TDS) interface is a proprietary protocol based on DICOM Unified Worklist. It enables treatment delivery systems to:

- Query and update appointments scheduled in ARIA Time Planner.
- Send procedure codes performed by treatment delivery systems to ARIA Activity Capture
- Send treatment records to ARIA for dose tracking in Radiation Therapy Management

<table>
<thead>
<tr>
<th>TDS</th>
<th>Scheduling</th>
<th>Procedure Codes</th>
<th>Dose Tracking</th>
</tr>
</thead>
<tbody>
<tr>
<td>TomoTherapy (HiArt)</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Accuray Cyberknife™</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

4.0 Information Exchange Manager (IEM)

IEM supports communication between ARIA and third-party patient health systems. IEM is designed using the HL7 standards as its baseline, allowing for open system functionality that provides effective communication between patient health systems. Using IEM, both outbound and inbound interfaces can be implemented. Demographic, financial, schedule, provider, lab results, and other data can be shared.

4.1 Interface message formats

- 4.1.1 HL7 2.3
- 4.1.2 Custom interfaces to convert data into HL7 format for importing and from HL7 format to a file format acceptable to the hospital system for exporting

4.2 Demographics (ADT) interface

- 4.2.1 The IEM inbound demographics interface is designed to provide a means for keeping the OIS data up to date with patient information provided by outside systems. In response to HL7 messages received through the interface, the IEM interface will add and/or update patient information.
- 4.2.2 The Demographics (ADT) interface provides inbound (to ARIA) and outbound (from ARIA) processing of patient demographic data
- 4.2.3 The Demographics (ADT) interface eliminates the need for duplicate patient registration in ARIA and the hospital’s registration/ADT system.

More detailed specifications are available in the IEM Demographics (ADT) Interface Guide. Contact your local sales representative to receive a copy of the IEM Demographics (ADT) Interface Guide.

4.3 Provider interface

- 4.3.1 The provider interface, sometimes called the master file upload, imports referring physician information into the OIS using HL7 MFN messages.
4.3.2 The provider interface provides:
- Provider information updates in ARIA
More detailed specifications are available in the Provider Interface Guide. Contact your local sales representative to receive a copy of the Provider Interface Guide.

4.4 Billing (financial) interface

4.4.1 The IEM billing interface exports clinical activity data to a billing system to be processed for payment. The transaction messages can be sent on a scheduled or manually initiated basis.

4.4.2 The billing interface provides:
- CPT (Current Procedural Terminology) support as the default (other procedure code sets may be implemented)
- Multiple billing systems to be defined, which allows for split charge exports to different systems
- Controls to ensure all this interaction according to strict rules so that charges are always submitted correctly.
- Batch message delivery, grouped on a variety of criteria
- Supports professional, technical and global charges
More detailed specifications are available in the IEM Financial (DFT) Interface Guide. Contact your local sales representative to receive a copy of the IEM Financial (DFT) Interface Guide.

4.5 Lab results interface

4.5.1 The IEM lab results interface imports laboratory test results that are completed and released from the defined laboratory systems. HL7 messages are generated containing patient identifier and the lab results information to ensure the proper information is imported into ARIA.

4.5.2 The lab results interface provides:
- Outbound requisitions for lab orders and imaging studies from ARIA
- Lab results data import into ARIA
- Configuration capability to either ignore the results or report them as an error when a patient does not exist within the Varian Systems databases
- Message logs if/when an import problem is encountered to facilitate troubleshooting
- Log files for administrator review
More detailed specifications are available in the Lab Results Interface Guide. Contact your local sales representative to receive a copy of the IEM Lab Results Interface Guide.

4.6 Query/response interface

4.6.1 The query/response interface allows one system to request patient updates from another.

4.6.2 The query interface provides:
- Outbound (send query) from ARIA
- Inbound (receive query and send response)
More detailed specifications are available in the Query/Response Interface Guide. Contact your local sales representative to receive a copy of the Query/Response Interface Guide.

4.7 Document interface

4.7.1 IEM supports inbound and outbound processing of transcriptions for ARIA using HL7's MDM message formats.

4.7.2 The transcription interface provides:
- Importing of transcribed health care professional's documentation (progress notes) into ARIA
- View of the transcriptions information in ARIA
- Exporting of transcribed health care professional documentation (progress notes) from ARIA to another system
4.8 Custom interfaces

4.8.1 Custom interfaces can be created when IEM and the hospital system cannot communicate using HL7 either because the hospital system does not support HL7 and cannot be enhanced to do so, or the information being exchanged is not supported in HL7. In some cases, it is possible to extend the HL7 formats to accommodate unsupported data thereby allowing a modified version of a standard interface to be used.

4.9 Interface connectivity

4.9.1 IEM can communicate with hospital systems through a TCP/IP sockets-based interface engine or by exchanging files on a shared network directory.

4.10 Scheduling Interface

IEM supports inbound and outbound patient scheduling information using the HL7 SIU message format. Users can share scheduling information between ARIA and other patient scheduling systems.

The scheduling interface provides

• Notification of new appointment booking;

• Notification of appointment rescheduling, modification, cancellation or deletion

• Notification that patient did not show up for scheduled appointment

• Results/image report into ARIA - Image reports are sent to ARIA, the patient is located, and the report is updated to the Varian system database.

• Results/pathology report into ARIA - Pathology reports are sent to ARIA, the patient is located, and the report is updated to the Varian system database.

4.11 Daily Treatment History Outbound

IEM supports outbound daily treatment history (session) for ARIA (radiation oncology) using HL7 ORU message format.

At the completion of each treatment session, IEM exports a summary of treatment parameters from ARIA to an HL7 compliant information system.

4.12 Treatment Course History Outbound

IEM supports outbound Treatment Course summary for ARIA radiation oncology using HL7 ORU message format.

At completion of a treatment course, IEM exports radiation treatment summary information from ARIA to an HL7 compliant information system.

4.13 Health information exchange

Processes an outbound continuity of care document (CCD) via a MDM Message type from ARIA. The CCD specification is an XML-based markup standard intended to specify the encoding, structure, and semantics of a patient summary clinical document for exchange.

4.14 Immunization registry

Processes an outbound immunization record (HL7 VXU) from ARIA to an immunization registry.

4.15 Public health information

Processes outbound reportable diagnoses data (HL7) from ARIA to a registered public health agency.

High Availability Solution

1.0 HARRP (High Availability and Rapid Recovery Protection) (optional)

HARRP, powered by Double-Take Software, is a continuous data protection, rapid disaster recovery and fault tolerance solution for ARIA.

1.1 Continuous and transparent byte-level data replication and mirroring of the database and image servers

1.2 Replicate over any distance to any location, based on standard network protocols: LAN, WAN, or VPN

1.3 Configurable replication frequency and speed

1.4 Rapid semi-automatic server failover to the disaster recovery server

1.5 Minimal loss of data in case of a database server failure during replication (≤1 hour worth of data)
1.6 Minimal impact on server CPU utilization (<10%) and network traffic (<5%)
1.7 Remote backups and snapshots using the replicated data
1.8 Easy to maintain with minimal IT intervention
1.9 Server, storage, and network independent
1.10 Hardware (sold separately) and detailed IT requirements: www.varian.com/hardwarespecs
1.11 Additional domain controllers may be required depending on existing domain infrastructure.

System Information

1.0 Minimum Hardware Recommendations
Up-to-date hardware recommendations can be found at www.varian.com/ARIA.

2.0 Networking
The ARIA network white paper can be found at www.varian.com/ARIA.
  • Architecture: Client/server
  • Communication protocols: TCP/IP
  • LAN/WAN compatible

3.0 System Administration
3.1 System setup
  3.1.1 Hospitals and departments
    • Hospital logo customization (using hospital logo bitmap)
    • Resource groups
    • Department availability (including holidays)
3.1.2 Preferences
• Automated activity posting
• Procedure code mapping for acquired images
• Activity post confirmation
• Auto check-in
• Chart printing
• Therapist sign-off
• Patient identifier information in Patient Manager

3.1.3 User-defined patient labels (for additional patient data types)

3.1.4 User-defined activity attributes

3.1.5 User rights and user group management

3.1.6 Charge information
• Procedure codes (i.e., CPT)
• Code modifiers
• Payor (plan types, references)
• Billing services
• Export (type, external billing code)
• RVU (export, multiplier)

3.2 Directories and libraries
• Payor lists
• Diagnosis categories
• Diagnosis, histology, and morphology codes (ICD-9/ICD-10/ICD-0)
• User-updateable diagnosis and drug lists

3.3 Staff and resource management

3.4 Clinical assessment
3.4.1 Diagnosis information (method, codes)
3.4.2 Allergies lists
3.4.3 Drugs information (formulary, categories)
3.4.4 Education/counseling (type)
3.4.5 Medical/surgical/social history information

3.5 Activities and codes
3.5.1 Adding/editing of activities
• Default parameters
• Color coding
3.5.2 Assignment of procedure codes to activities
3.5.3 CPT/HCPCS coding supported
3.5.4 AJCC/TNM staging codes supported

3.6 Care path template management

3.7 Treatment delivery
• Wizard-driven machine configurator
• Lock editing for approved course or plan
• Treatment parameter edit/acquisition
• Treatment approvals
• Session log-ins
• Dose units
• Port film (accumulate dose, subtract MUs)

3.8 Registration management
• Registration system with demographic data set recommended by JCAHO (i.e., marital, religion, race, age, gender, etc.)
• HL7 interface interacts with multi-HIS to import ADT transactions into ARIA

3.4.6 Document management
• Template management
• Document types
3.4.7 Review of systems/physical exam (components)
3.4.8 Test/vitals (components, groups)
3.4.9 Lab orders and requisitions
3.4.10 Toxicities (type)
3.4.11 Questionnaires for patient assessment data (user definable forms)
3.4.12 Import/export document templates and questionnaires
3.9 Tolerance tables
- User-definable
- Default set delivered with system

3.10 Patient master list
3.10.1 Configurable patient master list with multiple views
3.10.2 User-defined organization of patients into groups by:
- Physician
- Completed
- In/out patient status
- Status filters
- Simulation approved, unapproved, new, or reviewed
- Portal images approved, unapproved, new, or reviewed
- Volume images (approved, unapproved)
- Approved plan setup

3.11 Security Features
- Application lock-out settings
- Enforced password length and expiration rate
- Audit log

3.12 Citrix® Application Virtualization Support*
- Citrix Presentation Server® 4.5 Advanced (32-bit) (ARIA only)
- Citrix XenApp™ 5.0 Advanced (64-bit) (ARIA and Eclipse)
* Qualification for Citrix is dependent upon ARIA software version. For detailed information, visit http://www.varian.com/hardwarespecs

4.0 HIPAA (Health Insurance Portability and Accountability Act) Compliance
ARIA includes capabilities and features that will help oncology healthcare providers achieve HIPAA compliance. Varian Medical Systems is a HIPAA Business Associate.

Specifications subject to change without notice.