WellArchitect 1.2

ev_wds, ev_wdslite

WellArchitect™, developed in conjunction with Baker Hughes INTEQ, is an advanced well planning and survey management system for integrated planning and drilling of directional wellpaths with earth models. Trajectory calculation, reporting, plotting and 3D visualization are all included in this package. WellArchitect is designed to handle a range of applications from single wellpath survey calculation through to multi-wellsite, multi-well planning, collision risk-analysis and data management. The software is devised to seamlessly accommodate the needs of sidetracking, multi-lateral wellpaths, and re-entry drilling. The software is Windows PC based and is used at both the office and wellsite.

WellArchitect Functionality

The WellExplorer

The WellExplorer interface is used to easily move through different operators, areas of location, fields, facilities, slots, wells, and actual and planned wellpaths.

- SQL-based data model
- Tree structure makes for easy navigation, easy data access
- Logical hierarchy setup with access to all fields, facilities, slots, wells, and wellpaths via either the owner/ operator or area of location
- Each level can be setup individually or in an "all-in-one" setup (with fewer parameters to be set—these and others can be edited later at any given level)
- At the facility level, can view all slots, wells, wellbores, and targets for quick navigation to the location desired
- Easy selection of offset wellpaths for any reference wellpath (actual or planned) based on rules (e.g., always use all actual wellpaths with the status "drilling" or "drilled" for a particular field) or on specific wellpath selections
- Multiple lists of offset wellpaths can be saved for any wellpath
- Ability to read, edit, or create output of data can be restricted based on user permissions to promote data security
- Data can be exported and imported, allowing data to be shared with different user groups and/or locations (e.g., the office and the rig site)
- Standard and custom anti-collision rules can be specified and loaded on an operator or field basis
- Horizontal and vertical reference datums are managed for all field, facilities, slots, rigs, and wellpaths, and when displaying or comparing data with different datums (e.g., on plots or in clearance calculations)
- Schematics are available to QA that the appropriate horizontal and vertical references have been specified
- Horizontal and vertical references can be changed on the fly for planning, viewing and entering surveys, reports, plotting, and clearance calculations
- Over 20 spheroids, 17 projection systems, and 14 measurements of units combine to form over 1000 mapping systems to cover the world; easy navigation and filtering allows for fast mapping system selection
- Optional application of grid scale-factor to ensure proper location calculation
- Numerous default settings applied at the Operator and/or Field level that can be overridden at lower levels on an individual basis or at the time of creating output (reports and plots)
- Slots can be entered and then translated and rotated as a group
- Managed hole and casing sizes at the wellbore level for actuals (so all actual wellpaths use the same information) and the wellpath level for plans (so any number of scenarios can be tested)
- Calculation of declination can be calculated using the British Geologic Survey Global Geomagnetic Model (BGGM; which requires a non-DGI license to be purchased by the client)

or NOAA International Geomagnetic Reference Field (IGRF; no extra licensing required)

- EarthVision wellpath (*.path*) files can be imported with a slot, well, wellbore, wellpath, and survey log automatically generated for each wellpath ID
- Industry logos are available (and can easily be added) for placement on reports and plots with spots for both contractor (specified in the database) and operator logos (specified at the Operator logo)

Well Path Designer

The Well Path Designer, accessed from WellArchitect's Well Explorer, creates planned wellpaths stand-alone or in the context of offset wellpaths, targets, 2D surfaces, 3D grids, and/or 3D geologic models.

- Trajectory planning uses a spreadsheet-like application to build complex wellpaths from simple building blocks; as the path is entered, it is displayed in 3D against other wellpaths, the targets, and/or 2D and 3D geologic models, if desired
- Numerous sections and profiles are available: tangent, 2D arc (build/drop), 3D arc, 2D and 3D J-curves, 2D and 3D S-curves, 2D and 3D extended S-curve, 3D double arc (with matching or non-matching DLS values on the arcs), and a 3D flat-turn
- Plans can be created via a series of arcs and tangents or as a series of profiles
- Automatic checking for solutions across multiple lines ensures that the user is not required to select a specific complex profile shape (i.e., complex profiles solve whether entered as such or entered as a series of arcs and tangents)
- Any portion of a path that is solvable will solve and be displayed as a segment even if portions above and/or below that segment are not solvable
- Planning from a target or known location back to surface is available
- Color-coded cell entry facilitates wellpath calculation and records user-entered data
- Fields available for input include: MD, course length, inclination (as degrees, degrees-minutes, or degrees-minutes-seconds), azimuth (as degrees, degrees-minutes, degrees-minutes-seconds, or a quadrant), TVD, north/east (in local, grid, or geographic coordinates; displayed as decimal degrees or degrees-minutes-seconds), build/turn, polar coordinates, tool face angle, DLS; as information is entered, any field that can be calculated is, giving users immediate feedback
- Basic mode allows users with no well planning experience to create wellpaths easily by limiting to the most common variants which spreadsheet cells are open for entry (i.e., the ways in which a profile can be solved is limited); solutions can be found quickly and easily
- Advanced mode allows all possible solutions for specific sections and profiles to be used for users with well planning experience; while hundreds of solutions are available in advanced mode, tens of different solutions are available for the various profiles in basic mode
- DLS entry can be constrained to a user-entered maximum
- When possible suggestions are offered if the values entered create an unsolvable plan
- Paths are created using the same vertical and horizontal references as specified for the operator or field, but can be overridden on the fly in the spreadsheet display
- Selecting a section in the spreadsheet highlights the section in the 3D display for easy identification and evaluation of the design
- Distance along a user-specified vertical or curtain section can also be displayed
- Hole and casing information can be specified on a per-plan basis; "parent" information (from plans or actuals) is automatically inherited for any sidetracks or extensions
- Tables show the hole and casing information used when the path is set as the reference wellpath (e.g., the first encountered open holes) or the offset wellpath (e.g., the fully cased diameters)
- Shoe symbols are displayed in the 3D Viewer display along the wellpath, when shoe information is available
- A graphic display shows the varying hole and casing information entered
- Survey programs (i.e., a listing of tool types, tool positional-uncertainty models, and their planned depths for usage) are also specified on a per-plan basis; again "parent" information (from plans or actuals) is automatically inherited for any sidetracks or extensions to ensure the appropriate positional uncertainty calculation is applied throughout the length of the planned wellpath
- Specified tool positional-uncertainty models can be overridden, allowing users to simulate how a wellpath might be surveyed during drilling multiple times, and, for example, resurveyed after completion
- Displays show how the survey programmes are used for calculating position uncertainty based on whether the plan is used as the reference wellpath (the survey programme is

"during drilling") or as an offset wellpath (the survey programme is "completed" or "as drilled")

- Planned wellpaths can be tied to actual wellpaths, other planned wellpaths, or to an arbitrary point
- Multiple paths can be associated with a planned wellbore allowing any number of potential trajectory designs to be stored and accessed during the planning process
- One planned wellpath has a "definitive" status, allowing the user to specify which wellpath is most current and to be used by default
- Existing plans can be saved to a new name to retain the original plan and revise the path or its associated data while keeping a revision history
- Target management is integrated with the Well Path Designer allowing the user to pick and selectively intersect or associate targets with a wellpath
- A traveling cylinder diagram, relative to map north or highside, can be displayed while creating a wellpath to give immediate feedback as to whether the planned path is coming too close to any other existing or planned paths
- Clicking on a wellpath in the traveling cylinder diagram highlights that wellpath in the 3D Viewer display
- Comments can be added on a per path basis and/or for specific MDs or TVDs

Actual Well Path and Survey Calculators

- Survey logs, a group of survey measurements, can be imported as text or comma-separated variable files, hand-entered, or cut and pasted from the clipboard
- Survey logs can be bulk edited, adding a set shift to the MD, inclination, and/or azimuth fields
- The operator/field vertical references are used by default but can be overridden on the fly when importing or entering survey measurements
- A tool positional uncertainty model must be assigned to a log ensuring that positional uncertainty information can be calculated always (an "unknown" tool type, which has a large amount of positional uncertainty assigned, is available)
- Any number of survey logs can be stored for an actual wellbore
- Wellpaths, or survey trajectories, are created from the survey logs quickly and easily
- Individual survey stations or ranges of survey stations may be included or excluded from a wellpath
- Survey logs are shared between wellbores on the same slot
- Survey logs can be created in a separate interface or created, added, edited, or removed from the Wellpath Editor
- Any number of wellpaths can be created for a wellbore, allowing new information to be used, old paths to be saved for revision history, and alternate path compositions to be compared
- An actual wellbore may "fulfill" a planned wellbore: any targets associated with the plan are then linked to the actual well paths on the wellbore; such an association facilitates creating a project-ahead path
- Each wellbore has one definitive wellpath used by default (e.g., to sidetrack from), regardless of the number of available wellpaths
- As a wellpath is created, it is displayed in 3D to ensure that values being entered create a correct looking path (if an erroneous value is entered, it is typical easily seen in the 3D path); in addition, the path can be displayed against the plan on which the path is being drilled (the "fulfilled" plan), the 3D geologic model, and any targets associated with the fulfilled plan
- A projection from the last survey station to the bit location can be entered, using one of several methods (e.g., trend or build/turn values); that location is used (as an interpolated station) in all wellpath and clearance reports
- Once a wellpath is created, new survey measurements can be added and existing survey measurements can be deleted or edited within the wellpath; any changes made are automatically updated to the appropriate survey log
- When editing the data within a wellpath, if the log affected is used by other wellpaths, then the user is alerted; any changes made affect the other wellpath(s) if the edits are within those wellpaths' ranges.
- When adding stations to the end of a wellpath, an auto-append mode automatically generates a new line
- In addition, when adding stations to the end of a wellpath, an auto-increment mode enables the automatic calculation of the next MD value to be entered based on the course length of the previous section
- Actual wellpaths can be tied to slot, another actual wellpath, or user-entered coordinates
- Paths are created using the same vertical and horizontal references as specified for the operator or field, but can be overridden on the fly in the spreadsheet display

- Coordinates can be displayed as local, grid, or geographic values, and can be displayed as decimal degrees or degrees-minutes-seconds
- Various formats are available for entry/display: for inclination, as degrees, degrees-minutes, or degrees-minutes-seconds; for azimuth, as degrees, degrees-minutes, degrees-minutes-seconds, or a quadrant
- Spreadsheet display for a wellpath includes cells for MD, course length, inclination, azimuth, TVD, north/east, build/turn, polar coordinates, tool face angle, DLS, and vertical section
- The vertical section could be that of the fulfilled planned path or specific for the actual wellpath; a curtain section is also allowed
- Comments can be set for a survey log, at specific survey measurement depths, for a wellpath, and/or for specific wellpath depths
- Hole and casing information is set at the wellbore level allowing the user to enter data once; it is applied to all wellpath compositions on the wellbore
- Hole and casing information for a parent wellpath/bore are automatically inherited
- A "projection," i.e., a planned path that extends from the end of the actual wellpath to return to the planned path, can be easily created from the Actual Wellpath Editor; while all of the planning profiles and sections (e.g., 3D arcs and double curves) are available, additional special "return to plan" capabilities are available
- "Return to plan" capabilities include using a user-specified profile and either a point on the plan (specified as TVD or MD) or a user-specified DLS to create new path from the actual to the original plan

Targets

- Target shapes are created with a 3D view displayed to ensure correct placement of all target coordinates; in addition, a geologic model may be displayed to ensure proper placement of the target(s) in association with a reservoir
- Six shapes are available for targets: point, circle, ellipse, square, rectangle, and polygons
- Target "hot spot" locations are specified in grid, geographic, or local coordinates
- TVD of the target can be specified relative to any of the available vertical references
- Polygonal shapes are specified in grid, polar, or target-local coordinates, with any number of coordinate pairs
- Target shapes (other than points) can be rotated by a user-specified azimuth
- Targets can be on tilted planes: two-dimensional shapes can be projected perpendicularly onto a tilted plane or the plane can be vertically cookie-cut by the target shape
- Two-dimensional target shapes can be turned into a 3D shape by projecting (either vertically or perpendicular to the plane) a thickness above and/or below the target plane
- The target shape can be offset from the target "hot spot" using Cartesian or Polar coordinates, either referenced to Grid North or the target-shape's minor axis
- Targets can be associated with one or more planned wellpaths
- Color-coordination and reporting indicates whether a target is "hit" at the hot spot by a specific design point on a plan, associated with a specific design point on a plan but not "hit" at the hot spot, or simply associated with a plan
- Targets associated with points along a plan can be "eroded" by the positional uncertainty of the path's location at the target point to form a "driller's target"; this driller's target represents the target volume reduced to compensate for the uncertainty of the path location; warnings are giving if a target becomes completely eroded due to the amount of uncertainty being greater than the size of the target
- Both 2D and 3D targets can be eroded by the wellpath's positional uncertainty
- Both the geologic and driller's targets can be included in plan view and cross sectional plots, as well as in the 3D Viewer display

Anti-collision Rules (ACR)

- Generic (system-supplied) and user-entered anti-collision rules (ACRs) are available for clearance calculations
- ACRs may be associated with a specific operator and/or a field
- Rules can be specified once and then applied consistently for all calculations
- A primary rule exists for a field, but may be overridden with a different rule or not used at all when calculating clearances for any wellpath in the field
- Once an ACR is entered in the database, it cannot be modified, to prevent ACRs from being altered while being used by other fields
- The ACR interface supports three rule-types

  - C-type: Center-to-center separation distance
  - E-type: Positional uncertainty ellipsoid separation distance
  - R-type: Ratio of center-to-center distance and positional uncertainty ellipsoid
- Details of each rule can be viewed in the ACR interface; these include:
  - The plane of calculation
  - Inclusion of hole and casing sizes
  - Application of cone of safety for the reference and/or the offset wellpaths
  - The positional uncertainty confidence level
  - Surface uncertainty
  - Ratio type
- Ellipse separations are calculated using the pedal curve method ensuring a conservative approach to collision avoidance
- The default clearance calculation applies the selected plane and method for measurement against the set threshold
- Hole and casing information may be applied explicitly within an ACR for both the reference and offset wellpaths
- Reports inform the user of the minimum separation required between wellpath centers in order to fulfill the ACR threshold and highlights any occurrence where this threshold is breached
- Results from ACR calculations can be displayed in 3D space by color-coding each offset wellpath based on the calculation results
- ACR shapes (also known as MASD—Minimum Allowable Separation Distance—shapes) can be included on maps, cross-sections and traveling cylinder plots
- During both planning and drilling, the user can interactively visualize the relationship between wellpaths in 3D space as well as on a traveling cylinder plane, optimizing wellbore placement to minimize collision risk

Tool Positional-Uncertainty Models

- Wellpath positional uncertainty uses the ISCWSA mathematical model set out in SPE67616 and SPE90408 to cover magnetic and gyro tools
- Standard performance models are provided for all measurement tools
- Standard performance models are also provided for generic tool types
- Alternate performance models are also available for many tools to cover their range of drilling applications and any appropriate data corrections
- Cone models and Wolff and deWardt performance models are also available
- Details of the terms applied can be viewed for all non-proprietary models
- New positional uncertainty models, custom positional uncertainty models, and custom cone models can be added (by users with the appropriate permissions)
- New models start out based on an existing model allowing for easy updates
- New models must have unique names to avoid confusion with existing positional-uncertainty models distributed with WellArchitect
- "No uncertainty" (for plans only), "unknown tool," and "blind drilling" models are also available; the latter two include large values of positional uncertainty, with "blind drilling" producing the largest uncertainty

Positional Uncertainty

Calculating and knowing positional uncertainty is critical to successful well planning and wellbore positioning. WellArchitect allows positional uncertainty to be incorporated easily in every step of well planning and wellbore positioning, including in 2D plots, 3D visualization during planned wellpath design and actual wellpath calculation, and wellpath and clearance reports.

- Horizontal and vertical surface uncertainties at the Facility and Slot level can be included in positional uncertainty calculations
- Positional uncertainty calculations can be set to start at slot, mud line/ground level, or any user-specified depth
- Ellipsoids of uncertainty can also be included in plan and cross sectional plots
- Positional uncertainty calculations can be included in wellpath reports
- The percent confidence that the ellipsoids represent is user-settable at the Operator and/or Field level (as defined by the number of standard deviations to display); it can also be overridden when creating reports or plots
- For plans:
  - Survey programs, defining a hypothetical plan for surveying the wellpath during and after drilling, can be defined for each plan
  - Survey programs include a listing of tool types, tool positional-uncertainty models, and their planned depths for usage
  - Survey programs can be copied from version to version of a plan

and subsequently modified individually
  - For sidetracks, survey programs are inherited from parents
  - Survey programs can include "resurveying" (e.g., resurveying an existing actual parent wellpath when drilling a sidetrack) using the override function
  - Once a survey program is in place, the depth ranges for which each tool positional uncertainty model is used is calculated and displayed for the wellpath, both when it is used as a reference wellpath and as an offset wellpath
  - When creating a wellpath, the ellipsoids of uncertainty, generated based on the survey program, can be displayed along the 3D view of the wellpath
- For actuals, each survey log must be given a tool positional-uncertainty model; the default is "unknown tool" which has large positional uncertainty associated with it

Reports

- Three general categories of reports can be generated: wellpath reports, clearance reports, and data management and transfer reports
- Every WellArchitect-designed report has been created such that all information needed to duplicate the report is included, thereby decreasing the chance of possible confusion later or misrepresentation of data that can occur when input information is missing
- Over 20 types of reports can be generated
- Additional user-designed XSLT style-sheets can be created or modified from existing style-sheets to create custom reports
- Wellpath reports, for plans and/or actuals, include full wellpaths, summary reports, approval reports, and straight MD-INC-AZI (measured depth – inclination – azimuth) reports
- Clearance reports, for plans and/or actuals, include full clearance reports and summary reports
- Data management reports include bottom-hole reports, field, facility, facility paths, and slot path reports, and declination and convergence reports
- Transfer reports include NPD (Norwegian Petroleum Directorate) reports, OpenWorks Directional Transfer reports, WITSML well and wellpath reports, and straight MD-INC-AZI (measured depth—inclination—azimuth) reports
- Clearance reports, for plans and/or actuals, include full clearance reports and summary reports
- Reports can be automatically viewed in an Internet Explorer browser in HTML, in Microsoft Excel (via a comma-separated variable file), or in a default text viewer (e.g., NotePad); HTML files can be cut and pasted into Microsoft Word, while retaining appropriate formatting, or saved to a PDF format (from the browser, with the appropriate drivers installed)
- All reports are referenced to the user-specified default datums, but, if desired, the datums can be changed on the fly at the time of report creation
- Any report comparison between reference and offsets paths manages hole and casing size, surface positional uncertainty, and positional uncertainty start-depths appropriately
- Reports can be created for all stations included in a wellpath, only for interpolated stations, or for a combination of real and interpolated stations, and can be optionally restricted by depth
- Appropriate depth-related default columns are included for all reports:
  - Dog-leg severity
  - Vertical/curtain section lengths
  - Build and turn rates
  - Toolface
  - Course length
  - Positional uncertainty (with the number of standard deviations settable at runtime)
  - TVD from field reference
  - Projection grid and/or geographic coordinates (local coordinates are always displayed)
  - Polar coordinates
  - Closure
  - Depth-related wellpath comments
  - Depth-related survey log comments
  - Depth-related well path design comments
- Block comments can also be included in reports:
  - User-specified runtime comments
  - General wellpath comments
  - General survey log comments
  - Depth-related wellpath comments can be posted in a single block
  - Depth-related survey log comments can be posted in a single block
  - Depth-related well path design comments can be posted in a single block
- Formats for inclination and azimuth are set to operator-specific defaults, but can be modified at the time of report calculation
- Reports can be created to fit specific paper sizes (A4, Letter, Legal, or Screen-size) and formats (portrait or landscape)

- Clearance reports can be created for a single reference wellpath and any number of offset wellpaths from the same or different operator, field, facility, or slot
- Clearance reports allow several options:
  - Plane of calculation: Closest approach, traveling cylinder, or horizontal plane
  - Clearance orientation: Horizontal bearing or angle from highside (not available for horizontal plane calculations)
  - A center-to-center (C-C) clearance distance reporting cutoff can be specified; C-C distances greater than the cutoff are not reported, if a cutoff is specified
  - If an anti-collision rule is available for a given operator and/or field, the default rule can be optionally applied at report time
  - If additional rules are available, any one of those rules can be selected for application
  - The name and description of all available rules are displayed for clarity
- Color is used in reports to identify stations that fail an ACR calculation
- Stations in a report are color-coded to match the target information, with green indicating that the station is at the target hotspot, and yellow indicating that although the station is associated with a target, it is not at the target hotspot (colors match those displayed in the well plan spreadsheet)
- Settings are saved from session to session as appropriate (e.g., the default paper size)
- Report header colors can be customized on a site basis

Plots

- Several types of two-dimensional plots can be created: cross sections, wellpath maps, traveling cylinder diagrams, T-Plots (e.g., MD or TVD versus inclination), or graphic images (e.g., of a report or a 3D view of the data)
- One or more of each type can be included in a single plot, allowing informative montages to be created
- Plots of any size (page-sized, wall-sized) can be made with metric or English settings, in portrait or landscape mode, with many default sizes and any custom size available
- A plot-layout preview helps assure that all plot elements will fit in the specified paper size
- Defaults for each element type (e.g., a cross section or map) are based on the specified paper size, decreasing the need for later plot editing
- For each element type:
  - Ranges and scales can be specified; the resulting plot range is displayed both graphically (in the Plot Layout section) and numerically
  - Depth/data-related labels, station markers, comments (from the wellpath, the design, and/or survey logs, as appropriate), targets, and casing and liner symbols can be optionally plotted
  - Offsets, along with their station markers, wellpath, log, and design comments, casing and liner symbols, and their associated targets can also be optionally plotted
  - Depth interpolations can be specified independently from any other view
  - Wellpath labels can be plotted perpendicular to a wellpath or horizontally (cross sections and maps only)
  - Colored scaled "graph paper" can be placed behind elements (cross sections, maps, and T-plots only)
  - Depth ranges can be limited
  - Labeling can be over the entire range, for a specific range, and/or specific points
- Geologic information, including horizons, faults, properties, and contour lines, can be plotted on cross sections and planar maps
- Both geologic (non-eroded) and driller's (eroded) targets can be included in plan view and cross sectional plots
- Each plot automatically includes standard legend information; the full-range of directional drilling information that can be included is:
  - Location information
  - Well profile data
  - Wellpath composition
  - Well data
  - Target data
  - North arrow and declination information
  - Casings/hole sections
  - Approval box
  - Tie-on position
  - Bottom-hole location
- Block comments can also be included on plots:
  - User-specified runtime comments
  - General wellpath comments
  - General survey log comments
  - Depth-related wellpath comments can be posted in a single block
  - Depth-related survey log comments can be posted in a single block
  - Depth-related well path design comments can be posted in a single block

- Cross sections can have the same or different scales on the horizontal and vertical axes
- For wellpath maps
  - Optional annotation or DXF™ files can be posted (DXF files must be created in AutoCAD® and only certain types of information can be posted)
  - Locations can be posted in local or grid coordinates
- Positional uncertainty and ACR shapes can be included on maps, cross-sections and traveling cylinder plots

3D Visualization

Information contained here describes functionality in the 3D Viewer as it relates to WellArchitect. For additional information on the 3D Viewer, please refer to the 3D Viewer Technical Specifications document.

- Wellpaths may be displayed in 3D in combination with offset wellpaths, targets, positional uncertainty ellipsoids, an earth model, 2D surfaces, and 3D grids
- Planned wellpaths are displayed in 3D as the wellpath is created to ensure proper and optimal placement with the reservoir
- In the drilling phase, three-dimensional viewing provides co-visualization of the actual wellpath with the earth model, targets, positional uncertainty, and offsets to ensure the original objectives are met
- Ellipsoids of uncertainty can be displayed along a 3D display of any given wellpath with the appropriate positional uncertainty information
- Wellpaths can be queried for information
- Coordinate information from the 3D Viewer can be relayed back to other programs for easier wellpath creation
- Targets are created with the 3D visualization system
- Geologic (non-eroded) and driller's (eroded) targets can be displayed simultaneously with the wellpath
- Intersections of a wellpath with the faults and horizons of a 3D geologic model can be displayed and queried to ensure such boundaries are hit at appropriate angles or avoided altogether, and to provide invaluable information on wellbore stability
- 3D geologic models can be "sliced" along the vertical projection of a wellpath so that the geological relations along the wellpath can be analyzed; this display gives a cross sectional view of the stratigraphic or property model along the wellpath
- 3D views can also be interactively sliced, shaded, colored, queried, made transparent and annotated to achieve an understanding of their spatial arrangement
- A "chair" view allows the user to cut out portions of the models enhancing the viewer's spatial understanding
- Borehole shoe locations can be posted along the wellpath in 3D

DYNAMIC GRAPHICS, INC.®

Headquarters

Dynamic Graphics, Inc.
1015 Atlantic Avenue
Alameda, CA 94501-1154
1-510-522-0700
1-510-522-5670 fax
info@dgi.com
www.dgi.com

Offices and Representatives

Bakersfield 1.661.204.3016
Houston 1.713.952.2611
London 44.118.977.4755
Aberdeen 44.1339.889219
Paris 33.1.47.49.82.00
S.E. Asia 1.510.522.0700
South America 1.510.522.0700
Tokyo 813.5214.8647