

## Generic Database (GDB) Technology Formats

### GENERIC DATABASE TECHNOLOGY

PCI Geomatics software uses Generic Database (GDB) technology to directly read and write to raster, vector, and other information from an extensive list of supported file formats. This offers the advantage of quick and direct access to data and eliminates the need to replace files, as conversion is no longer necessary.

### SUPPORTED FORMATS

GDB technology supports the following file formats:

- **Advanced Along Track Scanning Radiometer (AATSR)** (Read/Write)
  - Only ATS\_AST\_BP product supported
- **ADRG** (Read only)
  - DIGEST-data format
  - Imagery and georeferencing access
- **Arc Digitized Raster Image (ADRI)** (Read/Write)
  - A flat-raster format that is supported both for linking and for updating the raster data itself
  - Other auxiliary data supported with ADRI datasets is the header file itself, which is imported as a text segment
- **ArcGIS Server – Image Extension** (Read only)
  - Provides efficient data management
  - Accessed through Remote Data wizard in Geomatica or a connection string
  - Requires installation of ArcGIS Image Server or the ClientCore.msi on the local machine
- **Arc/Info Coverage** (Read only)
  - Point Coverage: points and attributes (lab.adf, pat.adf or cover.pat in info)
  - Arc Coverage: arcs and attributes (arc.adf, aat.adf or cover.aat in info)
  - Polygon Coverage: polygon boundary arcs, and a point coverage containing the polygon centroids and any associated polygon attributes
  - Coverage projection (prj.adf)
- **Arc/Info Generate (AGE)** (Read/Write)
  - Single vector segment and single numeric attribute imported
  - the output file will contain either points or lines, but not both and georeferencing system is lost for export
- **Arc/Info Binary GRID** (Read only)
  - Internal format of Arc/Info Grid
  - An associated value attribute table (VAT) is also read
- **Arc/Info ASCII GRID (GRD)** (Read/Write)
  - 16-bit signed or 32-bit floating-point raster layer for import and export
  - Projection (.prj) import but no export
- **Arc/Info Import/Export (E00 Data Interchange)** (Read/Write)
  - Various layers can be imported with attributes (at most one of each type): ARC (arcs), PAL (polygons), NAT (node attributes), LAB (labels), CNT (centroids), TX6 (text), or GRD (raster or grid)
  - Uncompressed file export to E00 file type
- **Arc/Info raster (BIL)** (Read/Write)
  - Import and export support BIL image file, and a HDR file or BLW ESRI World file which contain georeferencing and structural information
  - If the CLR file is present for an 8-bit image, then the values are read into a pseudo-color table (PCT) segment for the image
  - If a PCT segment is selected for export, then a CLR file is created
- **Arc/Info Shapefile** (Read/Write)
  - Import/Export - vector and attribute (SHP, SHX, and DBF)
  - Shapefiles are supplied in thirteen types:
    - POINTM, ARCM, POLYGONM, and MULTIPOINTM shapes contain an additional measurement value at each vertex which is ignored

# Technical Specifications

- POINTZ, ARCZ, POLYGONZ, and MULTIPOINTZ are three 3-D shapes
- POINT, ARC, POLYGON and MULTIPOINT are 2-D shapes
- MULTIPATCH is a special complex type for representing TINs.
- Multi-part shapes for polygon and arc layer types are maintained
- **Arc/Info Stack** (Read only)
  - Arc/Info stacks of grids can be read
- **Arc/Info TIN (NET)** (Read only)
  - For import, triangular tin elements read as whole polygons (4 vertices each) from .net file
- **Aries Image Format (DIPIX)** (Read/Write)
  - Image files with .i suffix
  - Integer files (16/32-bit)
  - Existing Aries files may be written to
- **Advanced Synthetic Aperture Radar (ASAR)** (Read only)
  - Most common forms of ASAR files are supported
  - Image Mode (IM), Alternating Polarization Mode (AP) and Global Monitoring Mode (GM) are fully supported, but Wide Swath Mode (WS) only supports the ASA\_WS\_BP product
  - Some products have images that are flipped
- **ALOS Raw** (Read only)
  - Data is distributed by Japan Aerospace Exploration Agency Earth Observation Research Center from the PALSAR sensor of the Advanced Land Observation Satellite
  - Either the binary IMG file, containing image data, or the ASCII HDR file, containing metadata, can be selected to load the data
- **Atlantis MFF Image** (Read only)
  - Complex images containing real and imaginary components from Atlantis SAR Processor
  - Contains header (e.g. AGC.HDR) and image files (e.g. ABC.X00)
  - No georeferencing or auxiliary data are supported
- **AutoCAD (DXF)** (Read/Write)
  - DXF support up to Version 2004
  - For read operations:
    - The supported vector entities are: 3DFACEs, ATTDEFs, ATTRIBs, LINES, MLINEs, POINTs, POLYLINEs, SOLIDs, TRACEs, RAYs, XLINES
    - ARCs, CIRCLEs and ELLIPSEs are approximated with line segments
    - TEXTs and MTEXTs are supported
    - The non-vector entities, INSERT and BLOCK, are supported
    - In version 14, the definition of new Entity type (CLASSES SECTION) is supported
  - For write operations:
    - The supported entities are: LINE, POLYLINE, TEXT and POINT
    - Any ARC, CIRCLE, or ELLIPSE entity will be approximated with line segments
- **POLYLINEs 2-D with a START POINT, END POINT, and RADIUS are not supported**
- **Advanced Very High Resolution Radiometer Format (AVHRR)** (Read only)
  - Image data (optical and thermal)
  - Supported AVHRR formats include:
    - Level 1b 8-bit/10-bit/16-bit HRPT/LAC
    - Level 1b 8-bit/10-bit/16-bit GAC
    - Dartcom 16-bit HRPT
    - Satlantic 16-bit HRPT
    - Quorum Qtrack 16-bit HRPT
    - 16-bit HRPT Minor Frame
    - Dundee 16-bit HRPT
    - AVHRR CEOS (Raw AVHRR CCT Image Format)
  - Level1b channel selection is supported (Level1b data may contain less than 5 bands)
- **BMP - Windows/OS2** (Read/Write)
  - Windows and OS/2 BMP files are supported for reading 1, 4, 8, or 24 bits-per-pixel raster images
  - BMP files can be exported only in Windows, and this does not include 4 bits-per-pixel images
- **Compressed ARC Digitized Raster Graphics (CADRG)** (See RPF)

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- a military data format for storing digital map and chart images
- **Canadian Digital Elevation Data (CDED)** (Read Only)
  - Consists of an ordered array of ground elevations at regularly spaced intervals based on the National Topographic System at scale of 1:250,000
- **Canadian Council on Geomatics Interchange Format (CCOGIF)** (Read only)
  - This format was produced as a standard file-exchange format for digital spatial data
  - CCOGIF 2.3 Vector format supported
  - Transverse Mercator projection information has been tested
- **Committee on Earth Observation Satellites (CEOS)** (Read only)
  - A multi-file/section format used by the remote sensing community for SAR imagery data
  - Because CEOS can contain complex data, this data is represented in GDB as two separate channels
  - Projection and orbital information from the CEOS ancillary data is contained in the header portions of the CEOS files
- **Computer Graphic Metafile (CGM)** (Read only)
  - Supported as a symbol-assignment file for importing and viewing
  - GeoGateway can open a CGM file as a general file format
  - Georeferencing information is not supported
- **Controlled Image Base (CIB)** (See RPF)
  - orthophotographs made from rectified grayscale aerial images used to support military management systems
- **Digital Aeronautical Flight Information File (DAFIF)** (Read only)
  - Edition 5 supported for FULLALL (full database)
- The airport, runway, heliport and navaid data are supported as point layers with some available attributes
- **Data Access Objects (DAO)** (Read/Write)
  - Support for Microsoft Jet database engine files including MS Access, MS Excel, and Corel Paradox files
  - Databases that are accessible through ODBC may also be accessible using DAO (see ODBC)
- **USGS Digital Elevation Model (DEM)** (Read only)
  - Both USGS 7.5-minute and 1-degree ASCII DEM files are supported
  - Supported DEM projection codes are METER, UTM, GEOGRAPHIC and ALBERS
  - The PACE task DEMWRIT may be used to write USGS DEM files; however, export support is not supported
- **DIEPS raster (EPH)** (Read/Write)
  - Native raster format is supported for reading, linking, updating, and exporting
  - The EPH header file should be selected in order to import DIEPS files
  - Only 8-bit DIEPS files are supported at this time
  - Only raster data is supported for export; no vector data or other auxiliary data can be written to EPH files
- **USGS Digital Line Graph (DLG)** (Read/Write)
  - Files written out are equivalent to DLG level-2 files
  - The full topology of a DLG file is not retained, and only the first attribute of a line is kept
  - The DLGREAD and DLGWRT programs may also be used to import and export DLG-format vector data
- **USGS Digital Orthophoto Quadrangle (DOQ)** (Read only)
  - Digital orthophotos with embedded DEM information are not supported

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- Two formats of the DOQ format are supported:
  - The traditional unlabelled header format, in use before 1997
  - The new keyworded header distributed in the summer of 1997
- Existing DOQ files can be written to, but new files cannot be created
- The PACE program LINK may also be used to access DOQ image data
- **Digital Terrain Elevation Data (DTED)** (Read/Write)
  - The National Geospatial-Intelligence Agency (NGA) DTED level-1 and level-2 formats are supported for importing, updating and exporting
  - Supports the CD-ROM DTED format (DT1 or DT2 extension files)
  - Exporting DTED files is supported, but only one channel can be exported to the DTD file
- **EOSAT CD-ROM** (Read only)
  - A tape format that has been extended as a CD-ROM distribution format
  - Support has been added as distributed by EOSAT, RADARSAT, and the Indian Remote Sensing Centre
  - Revisions A, B, and C of EOSAT Fast Format supported
  - Georeferencing and GCP information
  - The USGS is now distributing LANDSAT products in NDF (NLAPS Data Format), which is also supported
- **Earth Resources Laboratory Applications Software (ELAS - ZSoft Raster Format)** (Read only)
  - Analyzes and processes digital imagery data, such as those collected by multispectral scanners or digitized from maps
  - Supports image variants, which have 8 bits per pixel
- **ENVI raster files (HDR)** (Read/Write)
  - Supports importing, updating, and exporting.
  - Datasets consist of two files: HDR (header file), and the image file with the same basename, but no fixed extension
- Import and export support includes limited support for projections (Lat/Long, State Plane, and UTM) and datums/ellipsoids (WGS \*, NAD27, and NAD83)
- Complex projections are imported and exported as generic METERS.
- Only raster types 1, 2, 3, and 4 (8-bit unsigned, 16-bit signed, 16-bit unsigned and 32-bit floating) are supported.
- Unsupported raster data types include 32-bit integer, 64-bit floating, and complex rasters
- Class name and color map information are not supported
- ENVI files are exported as an NVI file type
- Georeferencing information will be written to the HDR file.
- **European Space Agency Environment Satellite (Envisat)** (Read/Write)
  - GDB supports AATSR, ASAR and MERIS imagery
- **Erdas Imagine (IMG)** (Read/Write)
  - Image layers can be 8-bit, 16-bit unsigned, 16-bit signed, or 32-bit real (any 1-bit image layer is promoted to 8-bit)
  - Georeferencing information is supported for import and export, although some datums may be lost and a few Erdas projections are not supported
  - Export of Erdas Imagine files is supported with an IMG type
  - Compressed Erdas Imagine files are read-only
- **Erdas GIS and LAN** (Read/Write)
  - Erdas version 7.4 GIS and LAN image files are supported (some files earlier than version 7.4 are also supported)
  - Both 8-bit, and 16-bit unsigned Erdas files are supported; however, 4-bit files are not supported
  - Exporting Erdas GIS and LAN files is supported with an ERD file type

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- May contain any number of image channels of either 8-bit or 16-bit unsigned data types
- Georeferencing information is written to the Erdas file if it is Lat/Long or UTM
- **ER Mapper Rasters (ERS)** (Read/Write)
  - Consists of two files: a header file with an ERS extension and a data file of the same basename with no extension
  - Many datums and projections are supported
  - Supports ER Mapper Rasters for live linking, importing, and exporting
- **ER Mapper Compressed Rasters (ECW)** (Read/Write)
  - As above for ERS
  - ER Mapper's Compression and Decompression Software Development Kits (v.2.46) were used; therefore, it is only available on 32-bit Windows operating systems
  - ER Mapper compressed files use wavelet compression, thus some information is lost, but very high compression ratios are achieved
  - Note that in order to compress an image of greater than 500 MB, you require additional software from ER Mapper
- **Excel (XLS)** (see DAO)
- **Generic ASCII Vector (GAV)** (Read/Write)
  - A generic ASCII vector format that allows you to define and use an ASCII vector database
- **GeoExpress** (see MrSID Compressed Raster)
- **Geography Markup Language (GML)** (Read only)
  - The Geography Markup Language is an XML encoding of geographic information
  - GML Versions 2.1.2 and 3.0 are supported
- **Geosoft GRID File - Binary (GRD or GGF)** (Read/Write)
  - Supports Version 2.0 Geosoft GRID binary raster format (exported with a GGF type that can hold only one channel)
  - Georeferencing is read and written
- **Geosoft GRID File - ASCII (GXF)** (Read/Write)
  - Supports Version 2.0 uncompressed ASCII image file format (exported with a GXF type that can hold only one channel)
  - Georeferencing is read and written
- **Graphics Interchange Format (GIF)** (Read/Write)
  - Most common formats of GIF are supported for reading, including GIF87A and GIF89A files
  - Exporting is supported with a GIF type that can have only one channel and a PCT
  - Georeferencing, and metadata will be saved in an associated AUX file, but this will only be used by other PCI applications
  - GIF format does not have any options at this time. It is not possible to produce interlaced or progressively displayed GIF files
- **GRASS Raster/Vector (GRS)** (Read/Write)
  - A public-domain raster/vector GIS produced by the U.S. government
  - Supports dig (vector) and cell (raster) files for read and write operations
  - When GRASS vectors are loaded, both Line and Area arcs are read as polylines. The dig\_att file is also read and processed
  - Georeferencing bounds are imported for vector layers, but the correct georeferencing system is only selected for UTM; all others are mapped to METER
  - Exporting GRASS files is supported with a GRS type
  - Only uncompressed 8-bit and 16-bit raster layers can be exported, and each raster layer can contain only one channel of imagery
- **GTOPO30** (Read only)

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- A global digital elevation model (DEM) with a horizontal grid spacing of 30 arc seconds (approximately 1 kilometer)
- Consists of three files: DEM (image), HDR (header), and PRJ (projection)
- **Hierarchical Data Format (NCSA HDF5);** (Read/Write)
  - Supports HDF5 format files:
  - Projection is always PIXEL
- **HDF-EOS files** (Read only)
  - A specialized organization of Hierarchical Data Format (HDF) files produced by some NASA EOSDIS programs; in particular, it is being used by the ASTER program
  - Supports HDF-EOS Swath and Grid datasets
  - Must choose single swath to handle
  - Georeferencing is supported
- **Helava** (see Socet set annotation)
- **HIDISK (HI-VIEW image format)** (Read only)
  - Version 111 is supported
  - Supports 8-bit unsigned, 16-bit signed, 16-bit unsigned, and 32-bit real data (32-bit signed integer data is not supported)
- **Hyperspectral Image Data format (VQ)** (Read only)
  - Version 2 is supported
- **Image display handler** (Read only)
  - On UNIX systems it is possible to access the display as if it were a file; possible filenames referring to the display are VD00, VDO, VD1, VD2 or VD3
  - Can access the image planes of the display as channels, graphic planes as bitmaps, and vector layers as vector segments. Can also access LUTs and PCTs.
- **IDRISI Raster** (Read/Write)
  - Supports IDRISI 2.x raster images
  - Consists of at least two files: IMG (image) and DOC (header)
  - Supports 8-bit (byte), 16-bit (integer) and 32-bit real (real) images, but does not support IDRISI 24-bit (RGB) rasters
- Supports all IDRISI file types, such as ASCII, binary, and packed binary, for reading; binary is supported for writing
- Reads georeferencing information contained in the DOC file (can also access the REF file from the IDRISI software path if present)
- **IDRISI Vector** (Read/Write)
  - Consists of VEC (vector) and DVC (documentation) files
  - Vector files may contain only one feature type (point, line, polygon or text) per file and must have an associated document file for use
  - Vector files can be ASCII or binary, but only support ASCII format
- **ILWIS Raster** (Read only)
  - Supports ILWIS 2.x Raster images (ILWIS 1.x raster images are not supported)
  - Consists of an MPR (header) file and several MP# (image) files
  - Supports 8-bit (byte), 16-bit (int), and 32-bit (long) images
  - ILWIS projections are read from a CSY file if present. Note that some projections are not supported and will be treated as generic METERS
  - There is no support for exporting ILWIS data or writing data other than the image itself to an existing ILWIS dataset
- **ILWIS Vector** (Read only)
  - Supports ILWIS 2.x table and vector files
  - Consists of following file types:
    - TBT, TB# (tables)
    - MPP, PN#, TBT, TB#, DOM, DM# (pointmap - points)
    - MPS, CD#, SG#, SC#, DOM, DM# (segmentmap - lines)
    - MPA, PL#, PC#, TP# (polygonmap - area)
    - GDB does not support any ILWIS symbolic representations
  - ILWIS projections are read from a CSY file if present. Note that some projections are not supported and will be treated as generic METERS

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- symbolic representations are not supported
- **I<sup>2</sup>S and PRI<sup>2</sup>SM** (see VISTA Image)
- **Intergraph Raster Files** (Read/Write)
  - Supports some variants of the Intergraph Raster format
  - Raster formats including RGB (read only), COT, CFL (read only)
  - Sub-formats supported:
    - grayscale, continuous tone (type 2)
    - compressed RGB (type 27)
    - uncompressed RGB (type 28)
    - cot tiled format
  - Can update the imagery on an existing COT file, if it is not of type 27
  - The PACE LINK program can be used to access Intergraph Raster data in type-2 and type-28 files
- **ISDAS spectral libraries** (Read only)
  - ASCII tables read using the GAV format
- **Joint Photographic Experts Group (JPEG)** (Read/Write)
  - Supports single-scan JPEG files that contain 8-bit grayscale or 24-bit color images
  - YCC (read/write) and RGB color space (read only) files supported
  - Supports exporting JPEG JFIF files
  - Projection read from ESRI World file (JGW) or MapInfo TAB file (TAB), if present
- **JPEG 2000 (JP2)** (Read/Write)
  - Supports fast overview extraction, 8-bit and 16-bit data types
  - Offers sub-region extraction
  - Supports embedding metadata within the container file
  - The GeoJP2™ format is an extension of the JP2 format, where georeferencing and coordinate system information is included within the JP2 file
- **Keyhole Markup Language (Google Earth KML)** (Write Only)
  - Writes raster and vector images to KML format
  - Supports direct loading of KML into Google Earth 4.0 or greater.
- Export current screen to KML
- Supports SuperOverviews
- Output data to Google WGS 84 projection
- **KOMPSAT-2** (Read Only)
  - KOMPSAT-2 data from the Korean Multipurpose Satellite contains panchromatic 1m resolution image data (TIFF), multispectral 4m resolution image data (GeoTIFF), as well as thumbnail image (JPEG) and ancillary text files
  - Need the path to the root directory of all the data specified, not just the TIFF or GeoTIFF so that the whole dataset will be recognized
- **LAS Image Format** (Read only)
  - Supports access for IMG (image) and DDR (header and geocoding information) files
  - Some georeferencing information supported
- **ASPRS LIDAR Data Exchange Format Standard (LASF)** (Read/Write)
  - GDB supports the American Society for Photogrammetry and Remote Sensing (ASPRS) Light Detection And Ranging (LIDAR) LAS extension files
  - Each LIDAR return number is treated as a separate vector layer
  - Supports vector layer attributes including, intensity, return number, number of returns, scan direction flag, edge of flight line, classification, scan angle rank, file marker, user bit field and GPS time
  - Georeferencing is supported
- **Laser-Scan (LSC)** (Read/Write)
  - Supports reading, updating and creating the following Laser-Scan file types (updating of compressed files is not supported):
    - Type 2: Grayscale (uncompressed, LINKable)
    - Type 3: PseudoColoured Image (compressed)
    - Type 4: RGB (24-bit uncompressed, linkable)
    - Type 5: Bitmap (uncompressed)

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- Type 7: Pseudo-colored image (uncompressed, linkable)
- There is no support for georeferencing, nor any auxiliary data other than PCTs
- Supports exporting (with an LSC extension; exports only 8-bit image channels and bitmap images)
- **LaserScan Text (IFF)** (Read/Write)
  - The following attributes will automatically be created for each layer when reading an IFF file:
    - REPCode: Feature Code
    - GroupId: Feature Serial Number (FSN)
    - Angle: RO (orientation for texts and symbols)
    - Height: AC 3
    - TextString: TX for text features
    - ChildList: Used to group features linked by invisible lines
  - Supports exporting files with an IFF extension
- **LGSOWG/CEOS CD-ROM** (read only)
  - Magnetic tape format that can be used as a CD-ROM distribution format
  - Image data read for numerous sensors including Spot, ESA, RADARSAT and CCRS
- **Gould LIPS (LIP)** (Read/Write)
  - Supports 8-bit monochromatic and 24-bit color
  - No georeferencing, or other auxiliary data can be exported
- **MapInfo Data Interchange Format (MIF, MID)** (Read/Write)

Graphical objects are imported with all attributes

  - ARCs and ELLIPSEs are emulated with line segments
  - Projections are remapped to best match
  - Best results if an RST is available
- **Map Info Table (TAB)** (Read/Write)
  - Graphical objects imported with attributes include:
    - TABFCPoint
    - TABFCFontPoint
    - TABFCCustomPoint
    - TABFCText, TABFCPolyline
  - TABFCArc
  - TABFCRectangle
  - TABFCEllipse
  - TABFCRegion
- Datasets typically consists of at least five files that have the same file name, but a different file extension (DAT, ID, IND, MAP, or TAB). Choose the TAB file to open the set.
- **Medium Resolution Imaging Spectrometer (MERIS)** (Read only)
  - Only MER\_RR\_\_BP product supported
- **Microstation Design Files (DGN)** (Read/Write)
  - Supports pre – v 8 only
  - Both raster and vector data can be read from DGN files
  - Supports Compressed Binary, Binary, and Byte Raster Imagery formats
  - Georeferencing system for raster imagery and vectors is PIXEL
  - Supports the following vector entities:
    - LINEs (3), LINESTRINGs (4), SHAPEs (6), ELLIPSE (15), ARC (16), TEXT (17), TEXT (37), and CURVEs (11)
  - Supports limited write access for DGN
  - Creates only TEXT, LINE and LINESTRING elements
- **LizardTech Multiresolution Seamless Image Database (MrSID) Compressed Raster (SID)** (Read only)
  - Supports live linking and importing
  - Supports up to v 3.0.26
  - Only available on Windows operating systems
  - MrSID files can be stand-alone (SID) or have an associated SDW or TAB file which specifies georeferencing
- **MS Access** (see DAO)
- **NDF (National Landsat Archive Production System – NLAPS – data format)** (Read only)
  - Distribution format used by the USGS (Eros Data Center – EDC) for LANDSAT data

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- Supersedes the EOSAT Fast Format from the EDC
- NDF format is a CD-ROM raster-image format supported for reading, but not for creating
- NDF datasets consist of a number of files and are opened by selecting the HD (header) file
- **National Imagery Transmission Format (NITF)** (Read/Write)
  - Supports Version 1.1, 2.0, or 2.1 imagery
  - Processes uncompressed 8-bit unsigned, 16-bit signed, and 32-bit real data
  - RPF format NITF files are only type fully tested.
  - LUT is imported with the image channel
  - Georeferencing can be in LONG/LAT, UTM, or PIXEL when data is read for the associated Image Coordinate System
- **Caris Interchange format (NTX)** (Read only)
  - Supports the following vector entities:
    - CurvedLines (1), Point-to-Point Lines (3), DashedLines(4), TextWithPosition (6), Names (7), Symbols (8), and SpotHeights (11)
- **Open database connectivity (ODBC)** (Read only)
  - Standard interface used to connect to a variety of data sources like Microsoft Access, Oracle, etc
- **Open Geospatial Datastore Interface (OGDI)** (Read only)
  - Supports the following formats:
    - VMAP, VRF, CIB, CADRG, ADRG, and DCW.
- **ORACLE** (Read/Write)
  - Supports Oracle 10g R1 and R2 tables and views for read-write access
  - GDB supports the following Oracle data types:
    - INTEGER
    - NUMBER
    - CHAR
    - VARCHAR2
    - DATE
    - Oracle Spatial (sdo\_geometry)
    - GeoRaster (sdo\_georaster)
- **OTHG Vector file (OTG)** (Read only)
  - Conforms to the Canadian Department of National Defence ITG MTF standard format
- **PAMAP** (Read/Write)
  - Supports importing and exporting but not live linking
  - PAMAP database consists of four files which can be accessed
    - HDR - georeferencing information, PCT and LUTs
    - RFL - raster image data
    - VFL – vector data
    - DFL – attribute data
- **Corel Paradox** (see DAO)
- **PCIDSK (PIX)** (Read/Write)
  - PCI native database, fully supported
  - Only file format which allows adding segments and one of few which allows data description extraction and saving
  - Supports files sizes of greater than 2 GB (image, vector, georeferencing, segment information)
- **PCX - ZSoft Raster Format** (Read/Write)
  - A raster file format used with PC Paint Brush from ZSoft and also used in other Windows applications
  - Supports image variants, which have 1, 2, 4, 8, or 24 bits per pixel
- **Geosoft Plot Meta File (PLT/ATT)** (Read/Write)
  - Directly imports lines, polylines, and polygons
  - Emulates circles and arcs with line segments
  - Projection is set to METERS
- **Portable Network Graphics (PNG)** (Read only)
  - Gray scale and color images supported
  - Palette images expanded to 3-channel RGB
  - Interlaced files not supported
  - Alpha channels, transparency values, gamma and chromaticity ignored

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- **PPM/PGM/PBM (Read/Write)**
  - Simple raster formats used by the popular pbmplus file interchange utilities
  - Supports the following Raw files:
    - PPM: 24-bit RGB format
    - PGM: 8-bit Grayscale format
    - PBM: all Bitmap formats
  - Does not support ASCII-formatted PPM, PGM, and PBM files
  - Export of PPM supported
- **RADARSAT-2 (Read only)**
  - Supports simulated RADARSAT-2 slant range single-look complex (SLC) Fine Mode, Standard Mode and Wide Mode products
- **Raster Product Format (RPF) (Read only)**
  - RPF datasets consist of NITF tiles
  - Supports CADRG and CIB subsets by selecting the a.toc file
  - Projection is defined to use WGS 84 datum
- **Raw Binary Image Format (RAW) (Read/Write)**
  - User-described raw files can be imported and exported by use of a POX descriptive file in the same directory as the raw data
  - Pixel/Line/Band interleaving
  - 8-bit, 16-bit, 32-bit real data
- **Representation Style Table (Works ASCII RST) (Read/Write)**
  - RST is used to attach representation to vector layers in some Works applications, consisting of a list of representation style codes with associated graphical primitives and parameters
  - Only one RST can be stored in each file and it is always in segment 1
- **Spatial Data Transfer Standard (SDTS DEM and TVP) (Read only)**
  - SDTS is a standard to facilitate transfer of Digital Elevation Model (DEM) and Topological Vector Profile (TVP) data between dissimilar computer systems
  - DEM is either a single 16-bit signed integer band or a single 32-bit real valued band
  - TVP has four layer types: Point, Line, Polygon and Attribute
  - The data are typically stored in a master directory and a data directory in DDF files. Best results are gained by selecting the CATD.DDF file.
- **SeaWIFS CEOS (Read only)**
  - Datasets are in a modified CEOS format consisting of 8 or 9 16-bit unsigned image bands, normally consisting of 5 files (ANNOTATION, IMAGE, LEADER, NULL\_VDF and VDF)
  - Open the dataset by selecting the IMAGE file.
  - Only Level 1B and 2A datasets are supported
- **SeaWIFS HDF (Read only)**
  - Only level 1A HDF datasets are supported
- **Siemens SICAD (SQD) (Read only)**
  - Supports the following SQD vector types:
    - Point (PG), line (LI), polyline (LY), arc (BO), circle (KR). Symbols (SY), free text (TX), and variable text (TA)
    - Georeferencing information is lost and units are assumed to be METER
- **Socet Set Annotation (Read only)**
  - This format is used for vector and annotation information intended to be overlaid on an image
  - Vector data of five different types (Line, Polygon, Icon, Text and Grid) are represented as distinct layers
  - Dataset is represented in METERS since true projection is not recovered
- **Socet Set DTM (Read only)**
  - This format is used for elevation data
  - Datasets consist of four files: DTH (header), DTE (elevation data), DTF and DTP (both ignored)
  - Select either DTH or DTE to access the data
  - Dataset is represented in METERS since true projection is not recovered
- **SPANS Raster (RNH) (Read/Write)**
  - 8-bit, 16-bit, and 32-bit real raster data are supported

# Technical Specifications

- RGB color table files are supported
- Projection and georeferencing information supported for most projections and ellipsoids
- **SPANS quadtree (MAP)** (Read only)
  - Used to store raster data as a matrix of variable sized cells, thus reducing total storage needs
  - 8-bit unsigned and 16-bit unsigned are supported
- **SPANS attribute table format (TBA)** (Read/Write)
  - TBA files are associated with VEC/VEH files and need not be directly read or written since they are automatically accessed with these file types
- **SPANS Vector Binary (TOP/VTX/TBB)** (Read/Write)
  - Vector Binary files (TOP and VTX) are supported for reading only
  - Binary Point and table files (TBB) are supported for reading and writing
  - Attributes of vector layers are also supported
  - Layers are separated in GDB (e.g. an arc layer will be shown as a node layer plus an arc layer)
- **SPANS Vector Archive (VEC/VEH)** (Read/Write)
  - Datasets consist of two files: VEC (vector data) and VEH (header file). There may also be a TBA file (attributes).
  - All data sections are supported for read, but only one layer can be specified for export
- **Spectral Library (SPL)** (Read only)
  - Format used for USGS Spectroscopy Lab
- **SPOTView GIS-GEOSPOT** (Read/Write)
  - Supports 1.5 and 4.0 formats
  - Supports EIViz (16-bit elevation product) datasets
  - Datasets contain BIL (image) and HDR (header) files. Select the BIL file to access the data
  - If a CLR file is present, then a PCT segment is created
- Reads georeferencing for some projections
- **Sun Raster (SUN)** (Read/Write)
  - Format used by several Sun utilities and many popular scanners
  - Supports pseudo-color, grayscale, and RGB files
  - No georeference data available
- **Targa Raster File (TGA)** (Read/Write)
  - Supports uncompressed 16-, 24-, and 32-bit true-color, and black-and-white formats
  - Does not support color-mapped images and run-length encoded images
  - No georeference data exported
- **TerraSAR-X** (Read only)
  - Data distributed by German Aerospace Center and the German industry (ASTRIUM) from the TerraSAR-X platform
  - Supported products are:
    - Geocoded Ellipsoid Corrected (GEC)
    - Enhanced Ellipsoid Corrected (EEC)
    - Multi Look Ground Range Detected (MGD)
    - Single Look Slant Range Complex (SSC)
- **TIFF GeoTIFF** (Read/Write)
  - Supports the following common forms of TIFF/GeoTIFF files: TIFF B (Bitmap), TIFF R (RGB), TIFF P (Palette), and TIFF G (Grayscale)
  - Supports 1-, 8- and 16-bit files
  - Compression formats supported include: none, LZW, JPEG, JPEG YCbCr and PackBits
  - Supports Georeferencing with GeoTIFF format, ESRI style world file, or MapInfo style TAB files
  - Supports compressed TIFF files for reading only
- **UK National Transfer Format (NTF)** (Read only)
  - Supports importing most NTF 2.0 files provided by the UK Ordnance Survey of 1994 and thereafter (earlier formats may not work)
  - The number of attributes extracted is limited

# Technical Specifications

- All georeferenced information for NTF files is in the UK's National Grid projection which will be represented by an appropriate Transverse Mercator projection
- **Contours Vector file (NTF)** (Read only)
  - Supports importing and viewing of Land-Form PANORAMA Contour Data (NTF v2.0, level 1)
  - Two vector layers are used to display point and line data with associated attributes
- **Land-Line NTF file (NTF)** (Read only)
  - Supports importing and viewing of National Transfer Format (NTF), and Drawing Exchange File format (DXF)
  - Three vector segments are used to display point, line, and text data, each with associated attributes
- **Ordnance Survey: BaseData.GB (NTF)** (Read only)
  - Supports BASEDATA.GB (NTF v2.0, level 3)
  - Is a geometrically structured "link and node" database where features are represented as points and lines
- **Ordnance Survey: Boundary Line (NTF)** (Read only)
  - Supports Boundary-Line (NTF v2.0, level 3)
  - Is a structured vector dataset in which each polygon contains a seed with attributes; links that represent boundaries carry explicit pointers to the seed
- **Ordnance Survey: Meridian (NTF)** (Read only)
  - Supports Meridian (NTF v2.0, level 3)
  - A link and node structure is used to display the point and line data
- **Ordnance Survey: AddressPoint (NTF)** (Read only)
  - Supports importing and viewing of ADDRESS-POINT v2.0
  - Provides a National Grid coordinate and a unique reference for each postal address in Great Britain
- **OSCAR Vector file (NTF)** (Read only)
  - Supports OSCAR (NTF v2.0, level 3)
  - Used for realistic representation of road networks but with minimal storage
  - Two vector layers are used to display point and line data with associated attributes
- **Strategi Vector file (NTF)** (Read only)
  - Supports Strategi Data (NTF v2.0, level 3)
  - Four vector layers are used to display point, line, node and text data with associated attributes
- **UNIDSK-VMS** (Read only)
  - Format used primarily by Canada Centre for Remote Sensing (CCRS), related to original PCI UNIDKS format
  - Supports reading and updating, but not creation of new files
  - Does not extract georeferencing or auxiliary information
  - Supports 8-bit BIL, 16-bit BIL, 8-bit BSQ, and 16-bit BSQ
- **Urban Vector Map (UVMAP)** (see VRF)
- **VICAR** (Read only)
  - Used for AVIRIS data (Airborne Visible/Infrared Imaging Spectrometer)
- **Vision\* GINA (GIA)** (Read only)
  - Interchange vector format of Vision\* GIS software
  - Versions 2.6 and 2.7 supported
- **VISTA Image** (Read only)
  - The International Imaging Systems (aka I<sup>2</sup>S) PRISM software also uses the same format
  - Supports 8-bit unsigned, 16-bit unsigned, and 32-bit real image data types
- **Vector Intermin Terrain Data (VITD)** (see VRF)
- **Vector Smart Map format (VMAP)** (see VRF)
- **Vector Relational Format (VRF) or Vector Product Format (VPF)** (Read only)
  - Part of the DIGEST standard

# Technical Specifications

- Supports VMap Level 0 (VMAPO), Level 1 (VMAP1), and Level 2 (VMAP2), and VITD and UVMAP as subsets of VRF
- VRF format is supported using OGDII
- **Vitec** (Read/Write)
  - Full support on all platforms (implemented using Socoet Set)
- **WorldMap** (Read only)
  - Format originating in the former Soviet Union, distributed by JEBCO
  - Assumes that all files are single band
  - Files include RH (header) and BSQ or RSF.W (raw imagery)
  - Supports reading and updating imagery
  - Does not support georeferencing or other auxiliary information
- **WorldView** (Read only)
  - Data can be read in TIFF and NITF format in Geomatica, or the CDQB program can be used for orthorectification
- **xBase (DBF)** (Read/Write)
  - A database (attribute table) format supported by many PC applications, and is a standardized form of the DBase IV file format
  - Supports importing and exporting, and is treated as a single-vector layer.
- **X Window Bitmap (XBM)** (Read/Write)
  - 1-bit deep bitmap format often used to store icon images in X Windows
  - Supports reading both X10 and X11 XBM formats
  - Supports writing of the X11 XBM format only
  - No georeferencing or auxiliary information
- **X Window Dump (XWD)** (Read/Write)
  - UNIX screen-dump format
  - Supports pseudo-color, grayscale, and RGB X Window dump files
  - Contains 1 or 3 image channels

## For more information, contact

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