

Federal GIS Conference 2014

February 10–11, 2014 | Washington DC



ArcGIS for Aviation

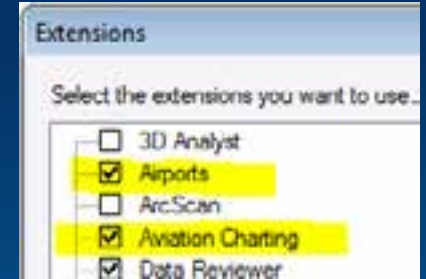
David Wickliffe

What is ArcGIS for Aviation?

- **Part of a complete system for managing data, products, workflows, and quality**
- **ArcGIS for Desktop extension**
 - Specialized Aviation data models, data management and cartography tools**
- **Integrates with ArcGIS for Server and with other Desktop extensions**
 - **ArcGIS Data Interoperability**
 - **ArcGIS Workflow Manager**
 - **ArcGIS Spatial Analyst**
 - **ArcGIS 3D Analyst**

ArcGIS for Aviation

Two Extensions



- **ArcGIS for Aviation: Charting**

Efficiently create, maintain and publish aeronautical products

∅ **Focus:** aeronautical charts

∅ **Audience:** aviation agencies, air navigation service providers,
airlines, and commercial aviation businesses

- **ArcGIS for Aviation: Airports**

Manage, review and analyze airport operations infrastructure data

∅ **Focus:** airport facilities

∅ **Audience :** airport authorities, contractors

ArcGIS for Aviation

Solution History

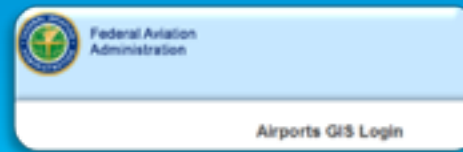
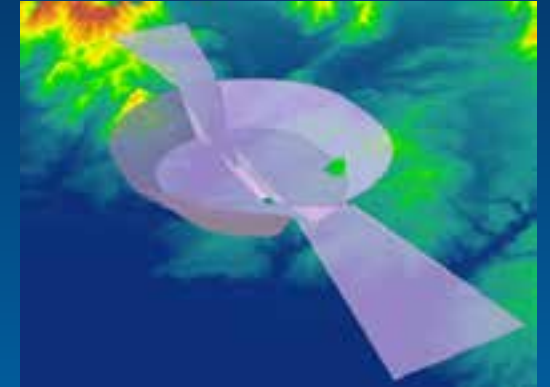
- **2002 NGA came to Esri with concept of database-driven Aeronautical charts**
- **2005 (v9.1) PLTS Aeronautical Solution – 1st release**
 - NGA-centric , some EUROCONTROL chart functions
- **2006 (v9.2) AIS data model introduced**
- **2010 (v10.0) Renamed Esri Aeronautical Solution**
Airports GIS Package @ Resource Center on ArcGIS.com
- **2013 (10.2) ArcGIS for Aviation = 2 extensions**
 - ArcGIS for Aviation: Charting
 - ArcGIS for Aviation: Airports

ArcGIS for Aviation: Airports



ArcGIS for Aviation: Airports

- Improves data quality and supports regulatory compliance
- Ready to Use Airport Geodatabase
- Automated Airport Data Quality Tools
- Template-based Editing Environment
- Preconfigured Templates
- Obstruction Identification Surface Tools



Supports regulatory compliance

ArcGIS for Aviation: Airports

- **FAA Airports GIS Program**

- Collect comprehensive airport spatial data rather than paper airport plans or non-standardized CAD from Airport authorities
- FAA AC 150-5300 18B specification

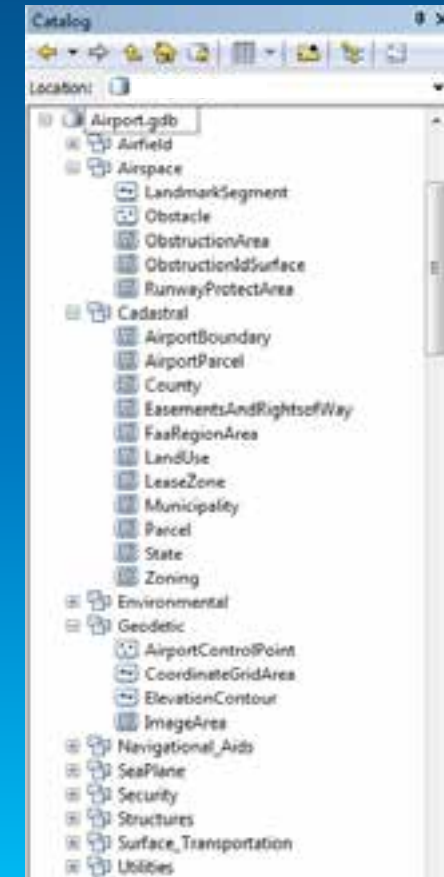
- **Data model based on FAA Airports GIS, 18B spec**

- Feature Datasets
- Domains
- Metadata

- **Automated Export for Submission to FAA Airports GIS**



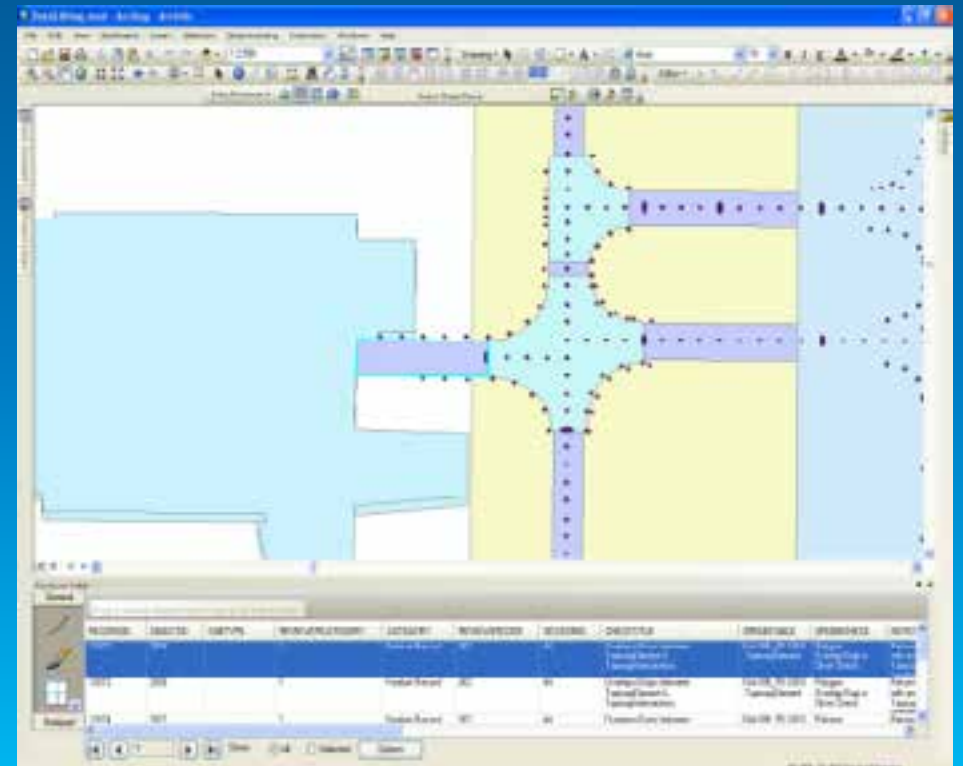
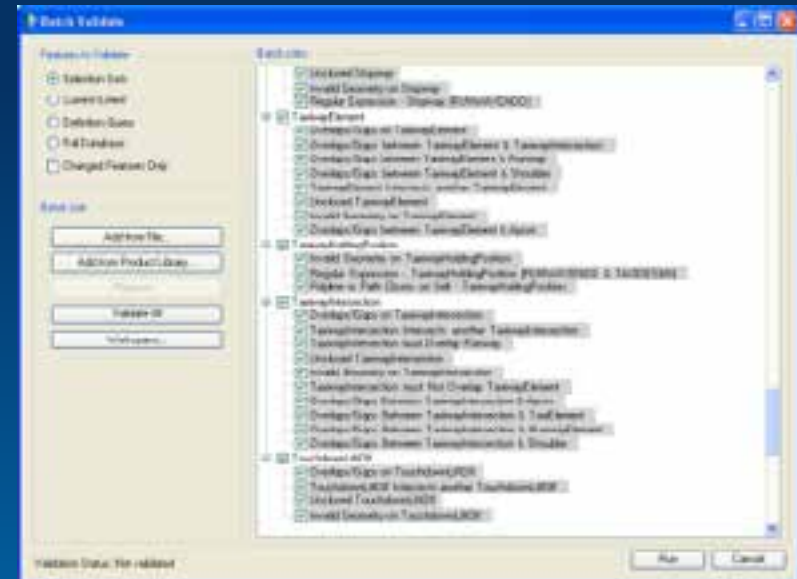
| Feature Group | Geospatial | | | |
|-----------------------------|------------------------|---|-------------|-------------|
| Feature Class Name | AirportControlPoint | | | |
| Feature Type | Point | | | |
| CADD Standard Requirements | | | | |
| Layer Level | Description | | | |
| C: TOPO-RNVE- | Feature: control point | | | |
| Asset/Doc Standard | Color | LineStyle | Line Weight | Symbol |
| MicroStation Standard | 0 | Continuous | | Use Default |
| Information Assurance Level | Restricted | | | |
| Equivalent Standards | AIXM | AirportControlPoint | | |
| | FGDC | SurveyControlPointExtension (Extension) | | |
| | ISO15925 | Control point | | |



Automated Airport Data Quality Tools

ArcGIS for Aviation: Airports

- ArcGIS Data Reviewer
- 450+ Automated 18B schema data checks
 - Reviewer batch jobs (.rbj files)
- Report Quality Information
- Document QC Review Process
 - Data Accountability

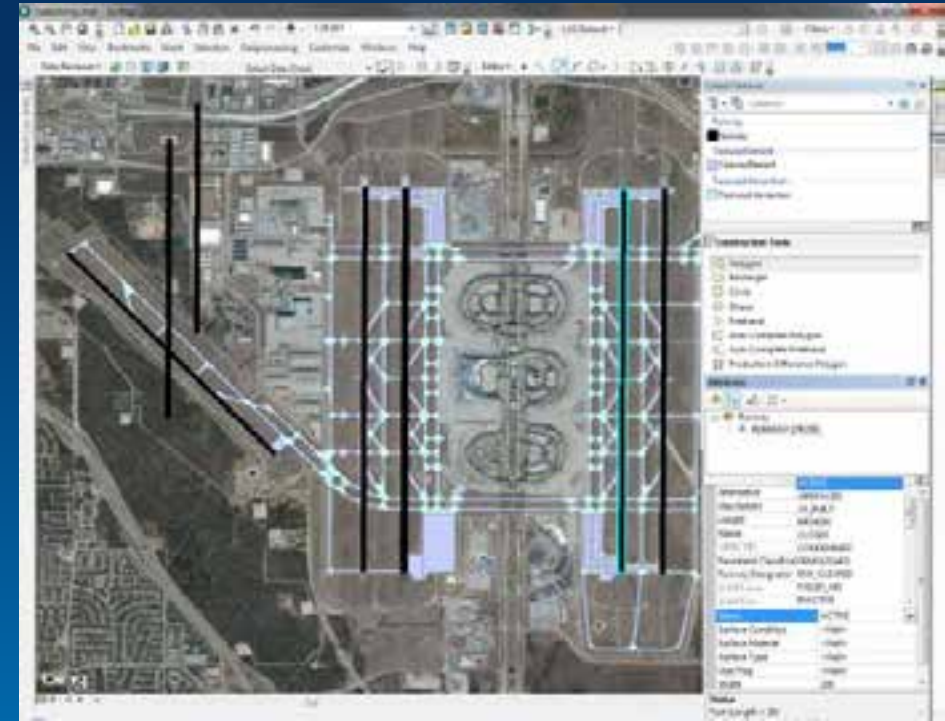
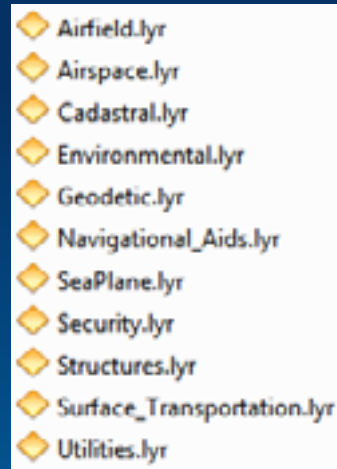


Submit quality data for faster acceptance and less rework!

Preconfigured Templates

ArcGIS for Aviation: Airports

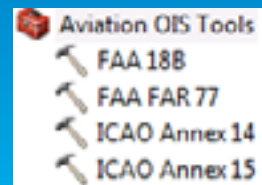
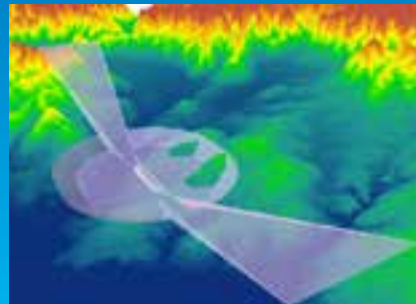
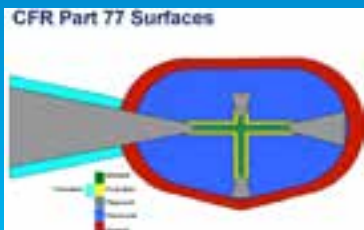
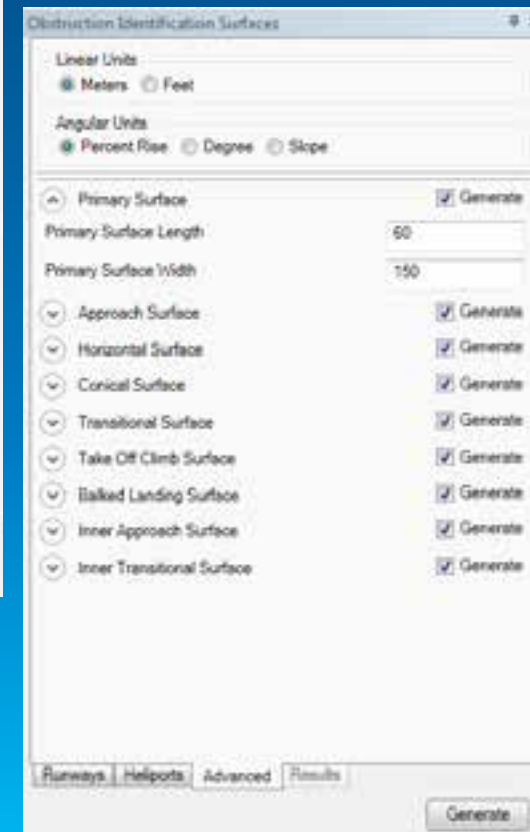
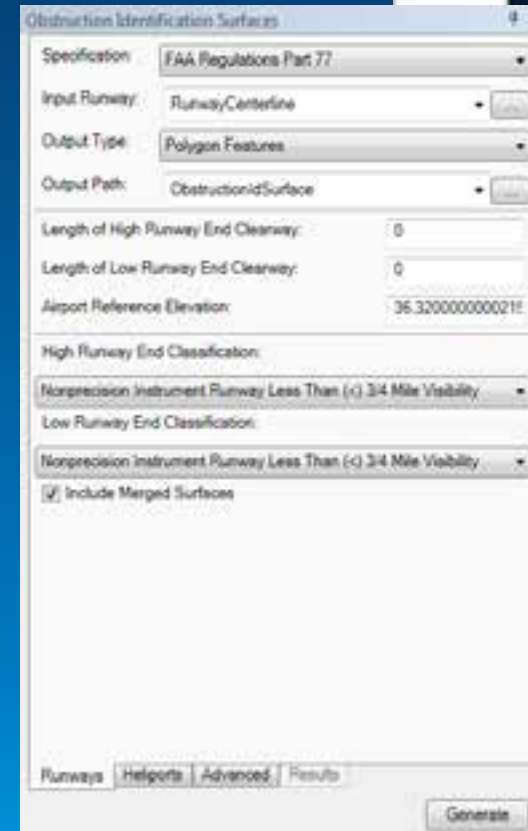
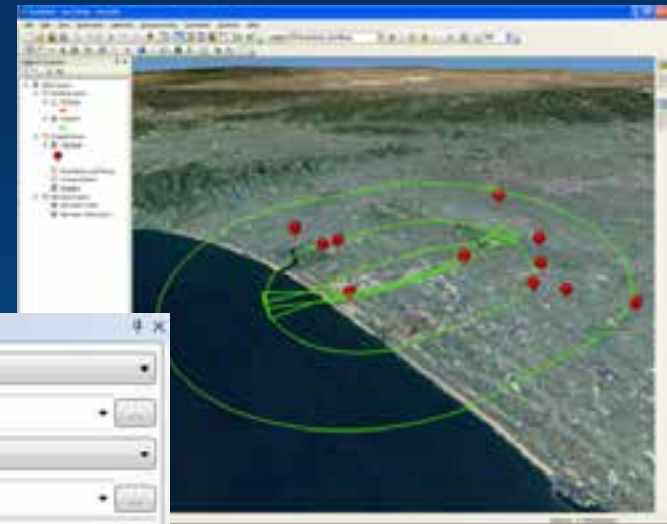
- Preconfigured Group Layer Files
- Feature Template editing interface
 - Preset attribution and geometry tools
 - Drop Down Domain Selection
 - Reduces Data Entry Errors
- Sample Airport Layout Plan map documents
 - Airport Land
 - Airport Overview
 - Runway Environment
 - Data Editing
- Customize to support Planning and Operations Activities



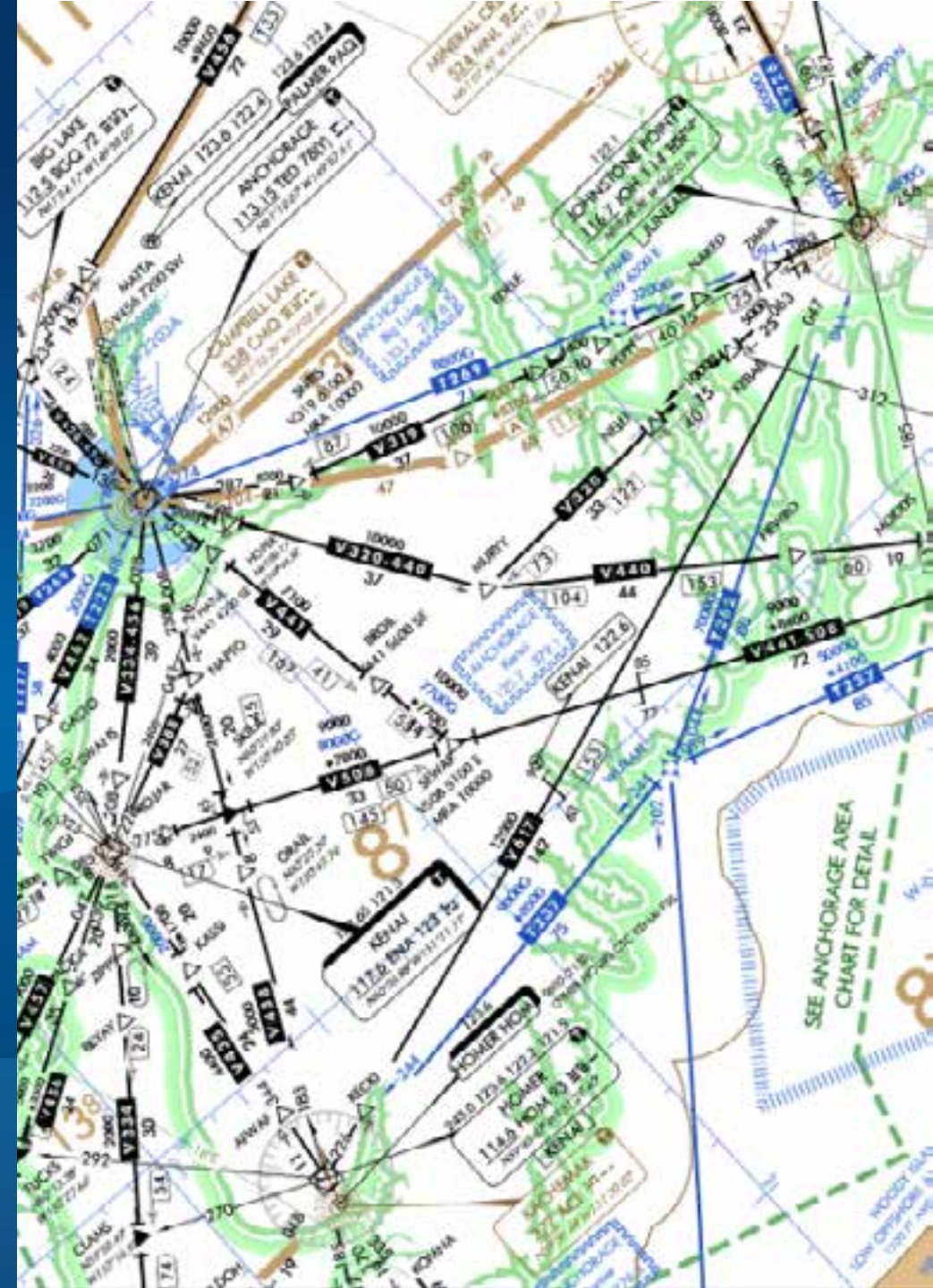
Obstruction Identification Surfaces Tools

ArcGIS for Aviation: Airports

- Automated and efficient generation
- Parameter-based feature construction
- Domestic and International Specifications
 - FAR Part 77
 - AC 150/5300-18B
 - ICAO Annex 14 &15
- Use on the Desktop or Deploy as a GP Service



ArcGIS for Aviation: Charting



ArcGIS for Aviation: Charting

- True GIS-based platform to manage aeronautical data

- One of the Mapping and Charting Solutions

(Along with Production Mapping, Defense, Maritime)

Includes:

- Esri Production Mapping
- ArcGIS Data Reviewer for Desktop
- Task Assistant Manager



ArcGIS for Aviation: Charting

- **Data-driven aeronautical charting solution - streamlines chart production**
- **Configurable to support industry and organization-specific requirements**
- **Improves data quality and supports regulatory compliance**

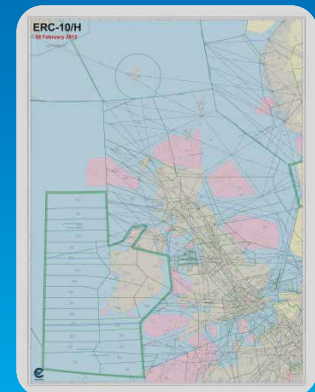
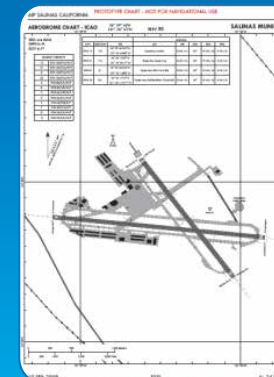
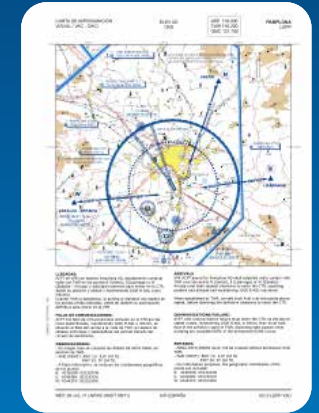
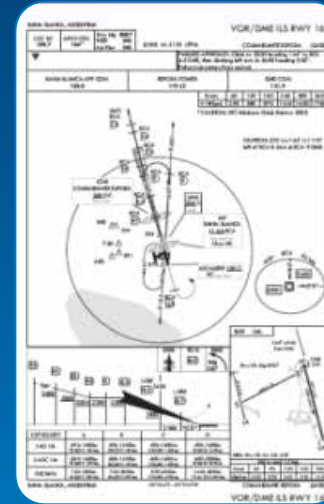


ArcGIS for Aviation: Charting

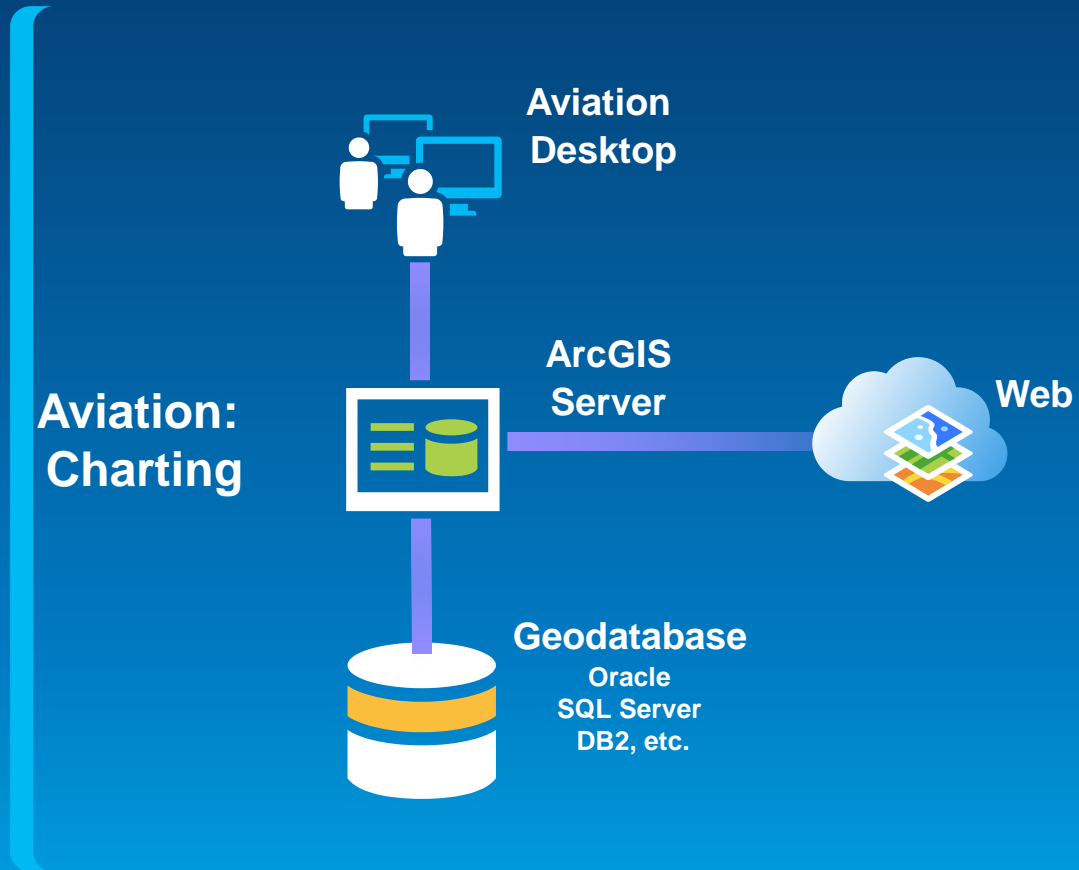


- Create all types of Aeronautical Charts

- Enroute
- Sectional
- Terminal Procedure Charts
- Airport Diagrams
- Various other products



Enterprise Solution Components



Key Features of ArcGIS for Aviation: Charting

Centralized Data

- Features
- Metadata
- Rules
- History
- Replication
- Services
- Products

Specialized Tools

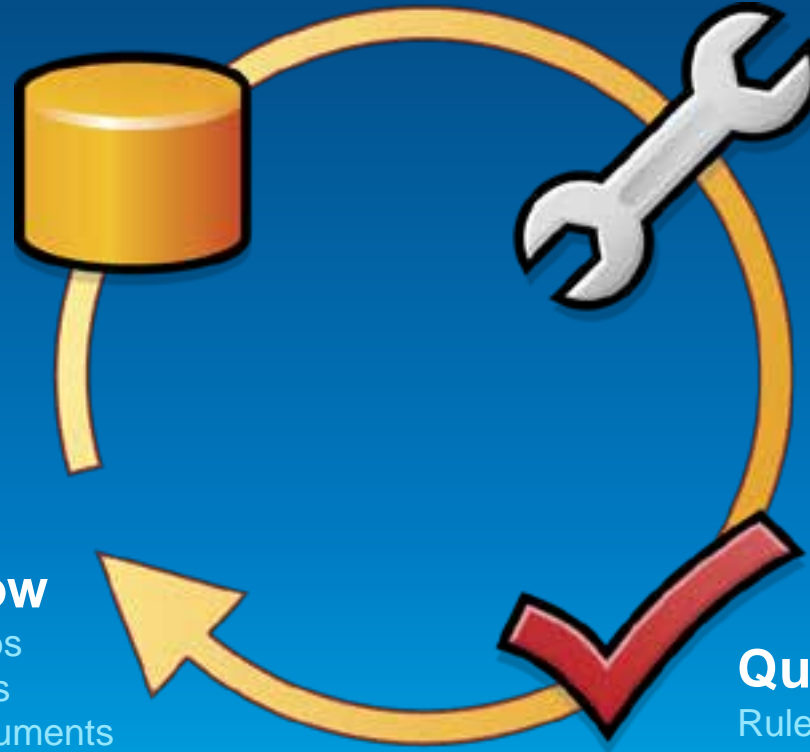
- Manage Products
- Create and Edit Data
- Custom Callouts
- Detailed Cartography
- Variety of Chart Elements

Workflow

- Manage jobs
- Assign Jobs
- Attach Documents
- Receive Assignments
- Keep Tasks Organized

Quality Control

- Rule-Based Editing
- History
- Validation
- Multi-User Environment



Data-Driven Production

Centralized Data

- Data lives in a central location = **Production Database**
- Not 'living' in separate products
- Not having to be edited in many separate products
- Data is updated once and applied to all chart products via rules.



Aeronautical Information System (AIS)

Centralized Data

- **Data model based on Aeronautical Information Exchange Model (AIXM)**
 - World standard for management and distribution of digital Aeronautical Information System data.
- **Enables aeronautical information management, charting, and data exchange**
- **AIS is required to support the charting tools in ArcGIS for Aviation: Charting**

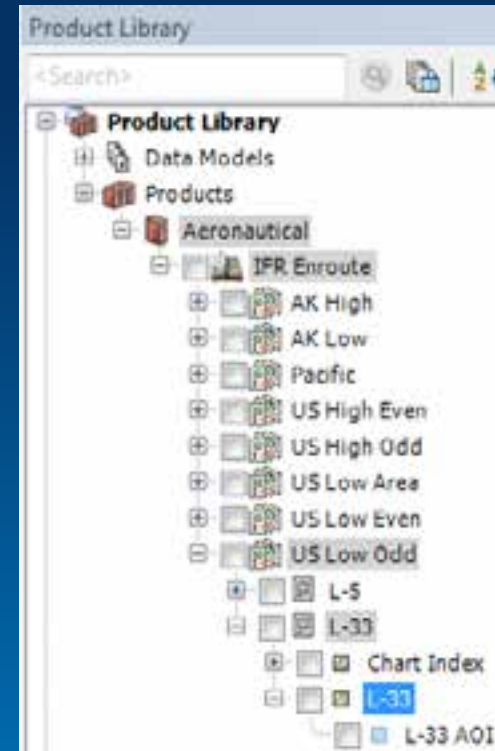


Production
Database

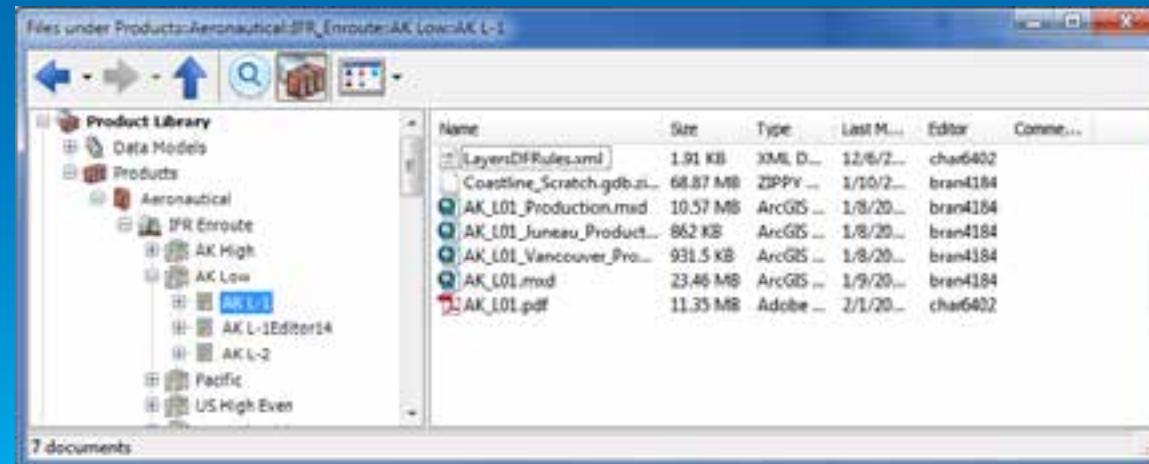
Product Library

Centralized Data

- Separate from AIS Production Database
- Store and manage chart products
 - Browse by tree structure
 - Version controlled
 - chart mxds, additional files of any type



- Ancillary Info
 - Spatial references
 - Visual Specifications
 - Masking rules



ArcGIS for Aviation

Tour the Product Library

David Wickliffe

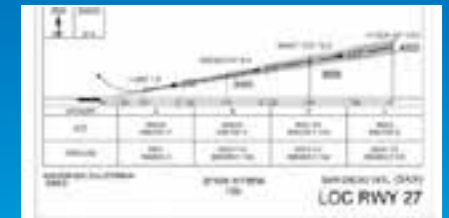
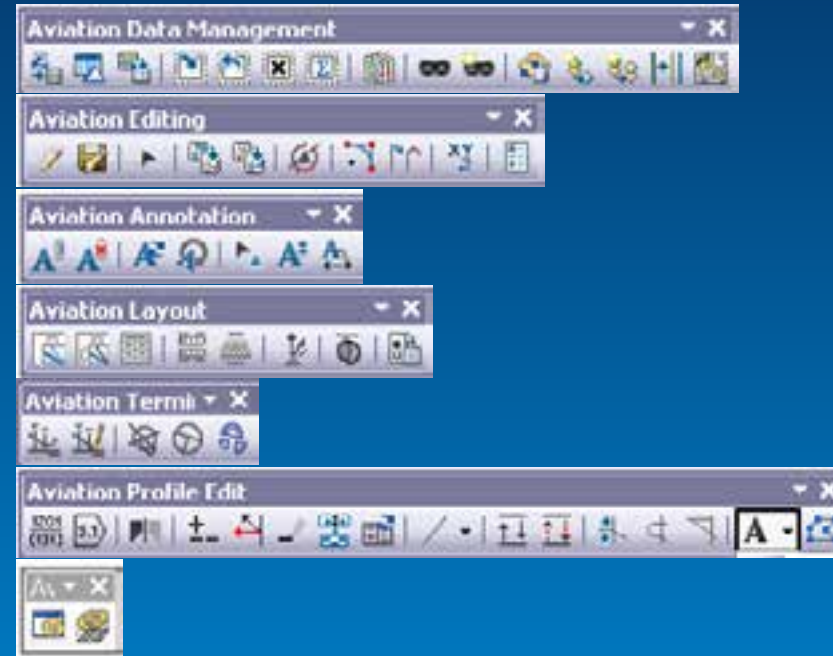


Data Management and Editing Tools

Specialized Aeronautical Tools

- Data Management
- Editing
- Annotation
- Layout
- Terminal Procedures
- Obstruction Identification Surfaces and Analysis

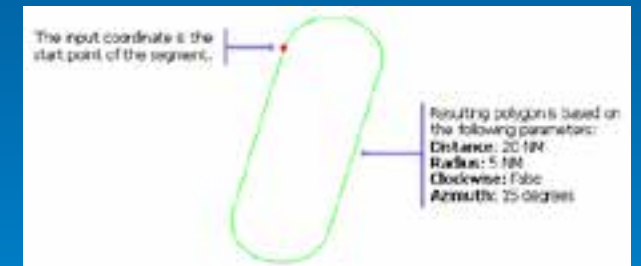
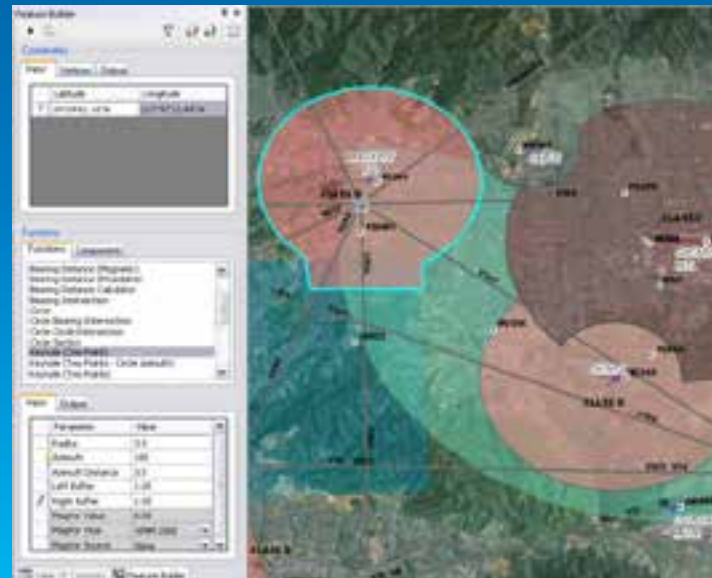
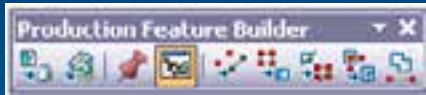
...and many more Production Mapping and core ArcGIS tools



Feature Builder

Specialized Aeronautical Tools

- Create, derive and edit complex geodesic features
- Geodetic, Cartesian and Compsys spatial functions
 - Several for creating Airspace and aeronautical procedure legs



Creating a holding pattern procedure leg

Aeronautical Map Surrounds

Specialized Aeronautical Tools

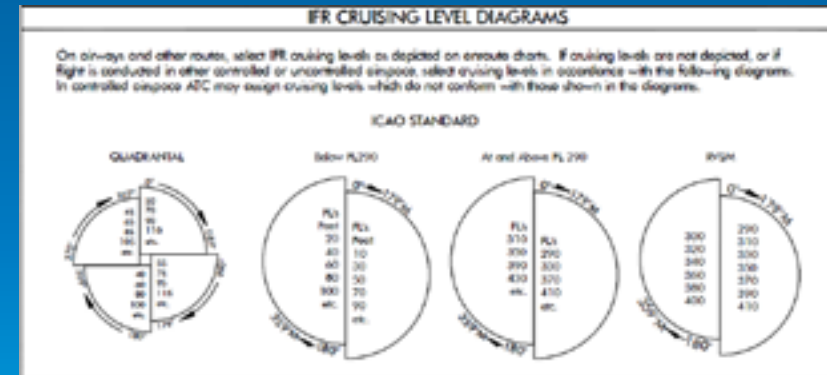
- Chart leads (anno outside the data frame)



- Aviation North Arrow



- Cruising Altitude Diagram



- Aviation Scale Bar



Database Driven Map Surrounds

Specialized Aeronautical Tools



- **Graphic Table Elements (GTE)**

Highly customizable to show a variety of map surrounds
pull data from the production database

- tables
- titles
- legends



| MILITARY TRAINING ROUTES | | | | | |
|--------------------------|----------------------|--------|------------------|--------|------------------|
| NUMBER | ALTITUDE RANGE | NUMBER | ALTITUDE RANGE | NUMBER | ALTITUDE RANGE |
| IR-344 | 200 AGL TO 17000 | IR-921 | 100 AGL TO 14700 | VR-935 | 100 AGL TO 9500 |
| IR-348 | 500 AGL TO 13000 | IR-922 | 100 AGL TO 16200 | VR-936 | 100 AGL TO 9500 |
| IR-654 | SURFACE TO 17000 | IR-923 | 100 AGL TO 16200 | VR-937 | 100 AGL TO 14700 |
| IR-901 | 100 AGL TO 7200 | IR-939 | 100 AGL TO 10600 | VR-938 | 100 AGL TO 14700 |
| IR-909 | 100 AGL TO 10600 | IR-952 | 100 AGL TO 17000 | VR-940 | 100 AGL TO 16200 |
| IR-911 | 100 AGL TO 7200 | IR-953 | 100 AGL TO 17000 | VR-941 | 100 AGL TO 16200 |
| IR-917 | 100 AGL TO 10600 AGL | VR-331 | 200 AGL TO 6000 | VR-954 | 100 AGL TO 9500 |
| IR-918 | 100 AGL TO 10600 | VR-931 | 100 AGL TO 7200 | VR-955 | 100 AGL TO 9500 |
| IR-919 | 100 AGL TO 14700 | VR-932 | 100 AGL TO 7200 | | |

Warning: Refer to current foreign charts and flight information publications for information within foreign airspace.

L-34 PANELS EFGHJ 1"=7 NM **L-33** PANELS ABCD 1"=7 NM

UNITED STATES GOVERNMENT
FLIGHT INFORMATION PUBLICATION
IFR ENROUTE LOW ALTITUDE - U.S.
For use up to but not including 18,000' MSL

EFFECTIVE 0901Z 9 FEB 2012
TO 0901Z 5 APR 2012

Consult NOTAMS for latest information
Published by the
U.S. Department of Transportation
Federal Aviation Administration
Aeronautical Products
<http://www.faa.gov>

CORRECTIONS, COMMENTS, AND/OR PROCUREMENT

FOR CHATting ERRORS, OR RECOMMENDATIONS REGARDING FORMAT AND CONTENT CONTACT:

FAA, Aeronautical Products
5500 C-4, Ste. # 4445
1305 East West Highway
Silver Spring, MD 20910-3281
Telephone 1-800-626-3677
Email: P-AMC-Aeroproducts@faa.gov

FOR PROCUREMENT CONTACT:

FAA, Aeronautical Products Logistics Group
10051 Good Luck Road
Clarks Dale, MD 20769-8700
Online at <http://www.faa.gov>
Telephone 1-800-626-8972
Fax 301-426-6829
acproc@faa.gov

Database Driven Map Surrounds

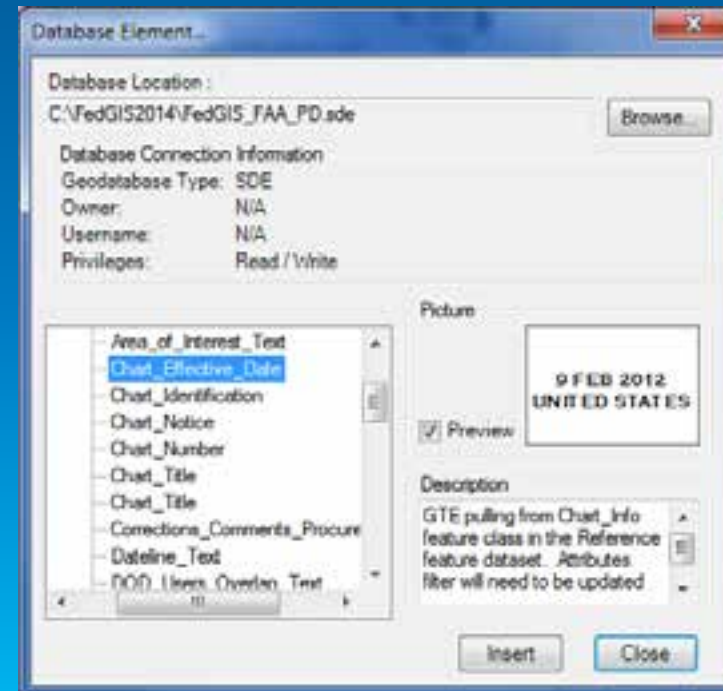
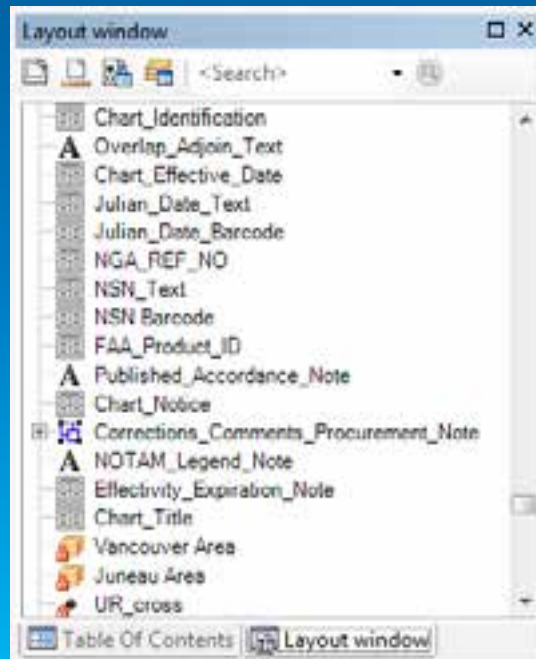
Specialized Aeronautical Tools

- **Database Elements**

Chart surrounds can be saved to Database Elements database

Can be inserted into other chart products as needed

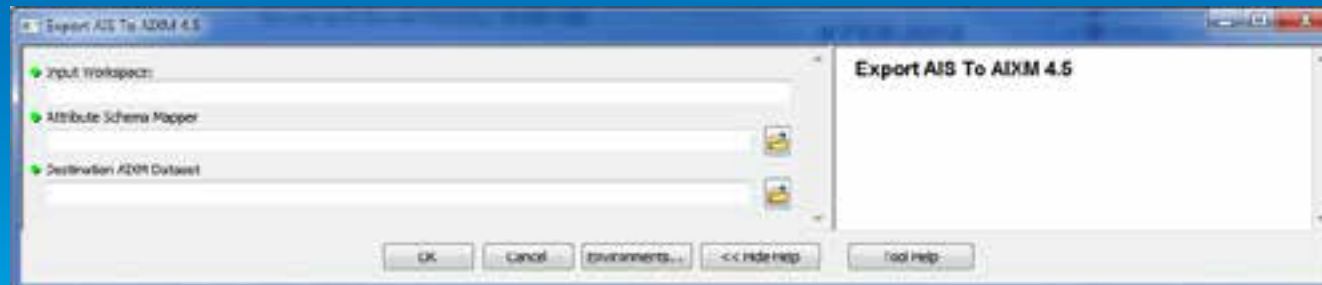
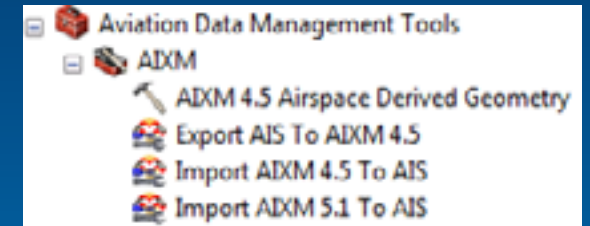
Used 'as is' or as template



AIXM Toolset

Specialized Aeronautical Tools

- Import AIXM 4.5 and 5.1 data to AIS
- Export AIXM 4.5 xml messages from AIS
- Customize/extend with ArcGIS Data Interoperability



Aeronautical Information Exchange Model (AIXM)

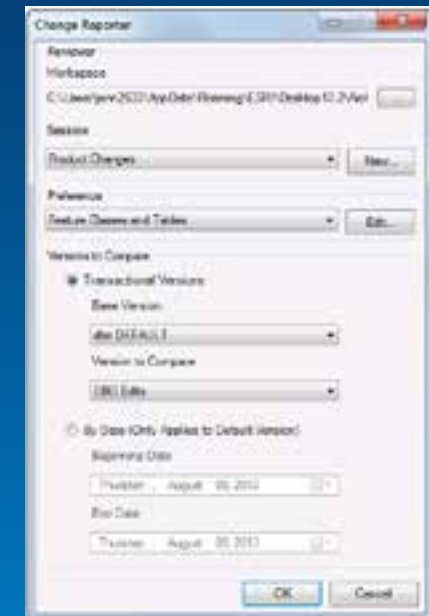
Reviewing Quality and Reporting Changes

Quality Control



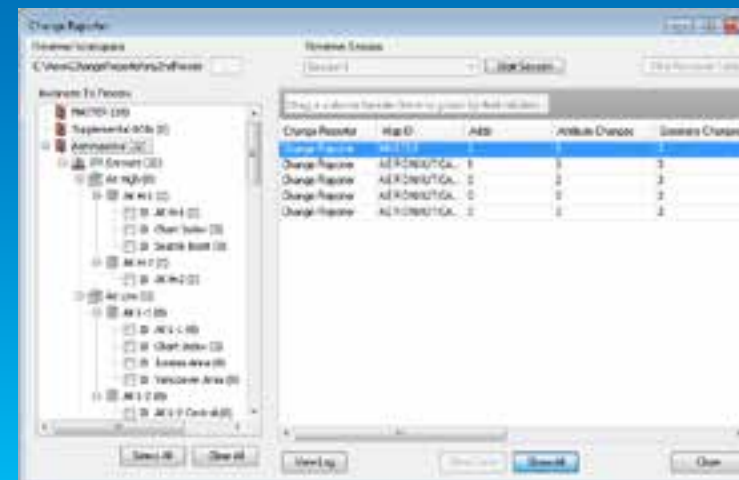
- **Change Reporter Tool**

- Traceability
- Reports adds, mods and deletes to feature classes, tables, and data-driven chart elements
 - Single feature class or entire Geodatabase
 - Between specified dates or versions
 - Can track changes per charting cycle
- Changes are committed to the Data Reviewer table for verification



ArcGIS Data Reviewer

- Review, Correct and Verify

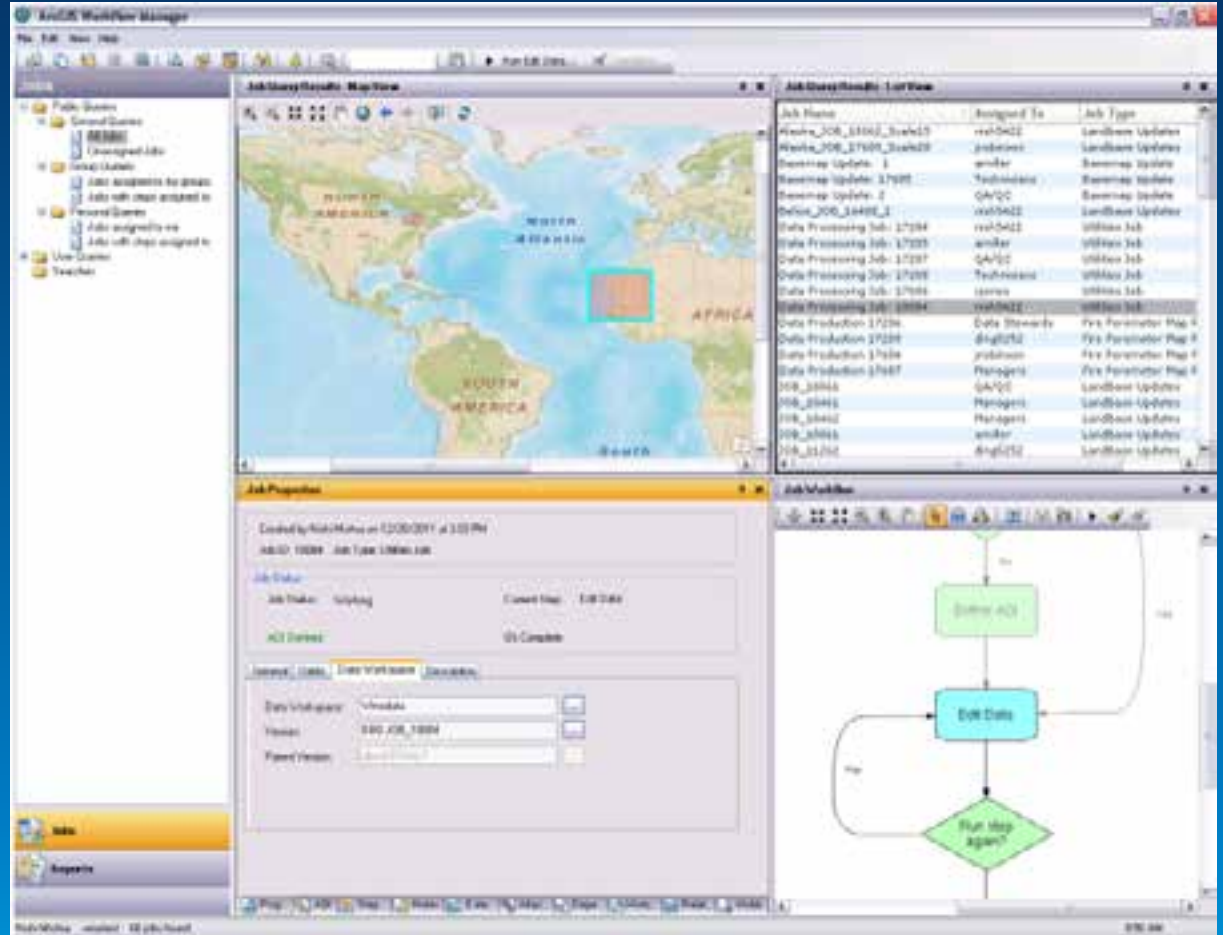


Workflow-based Operations

Workflow Support

ArcGIS Workflow Manager

- Manage GIS and Non-GIS Tasks
 - Construct logical workflow 'jobs'
 - Assign jobs to resources
 - Track job status
- Stores a job history
 - Use for chart maintenance log

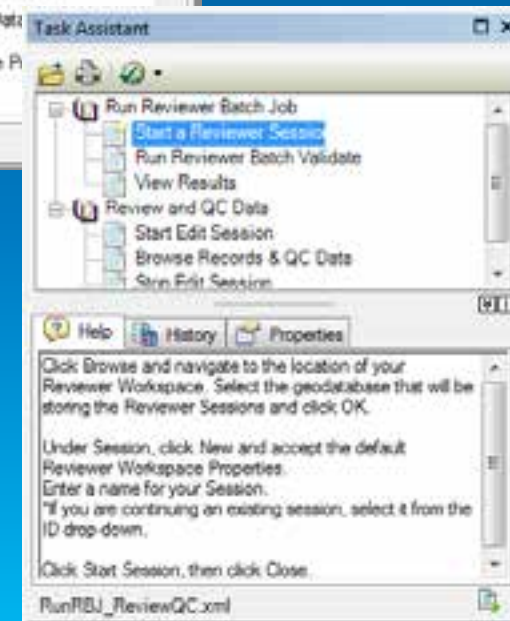
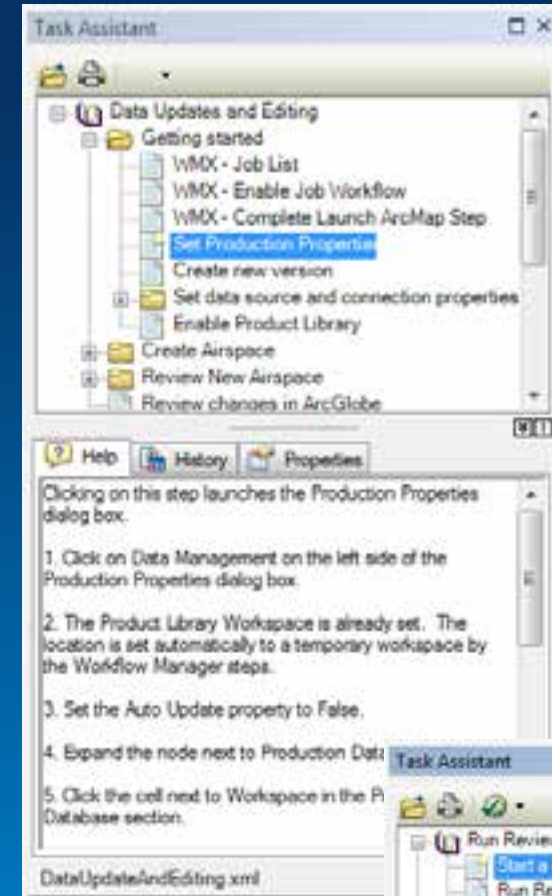


Standardize Your Best Practices – Structured, Repeatable and Efficient

Workflow-based Operations

Workflow Support

- **Task Assistant Manager**
 - Workflows within ArcMap
 - Chains procedures and tools together guides users through defined processes
 - Execute ArcMap commands or geoprocessing tools
 - Embedded Help window
 - Excellent for training
 - Supports standardization and best practices



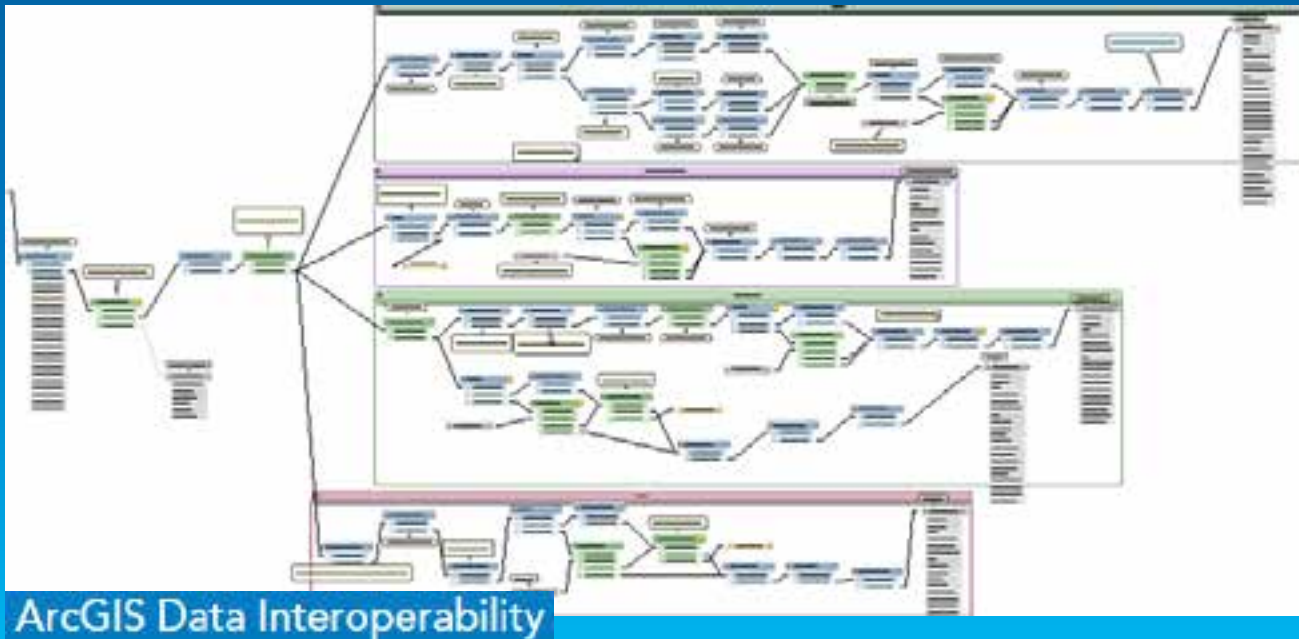
Solution Key Concepts

Leveraged to support database driven charting

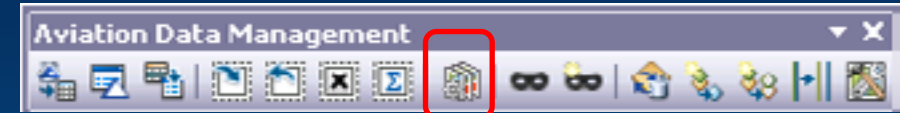
- **Spatial ETL – ArcGIS Data Interoperability**
- **Cartographic Features**
- **Visual Specifications**
- **Feature-Linked Annotation**

Spatial ETL – ArcGIS Data Interoperability

- Extract, Transform, Load (ETL)
- Used to make Custom Spatial ETLs for automated data updates
- Required for AIXM Import/Export tools

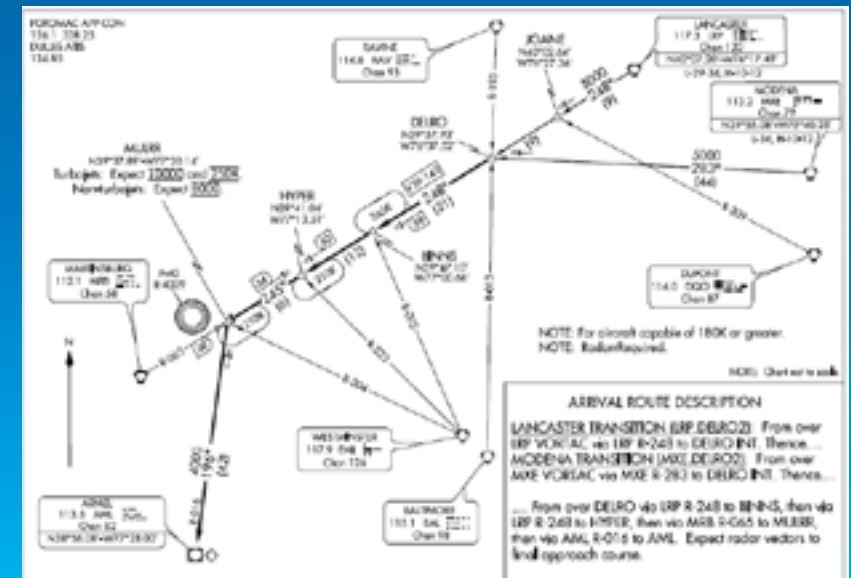


Cartographic Features



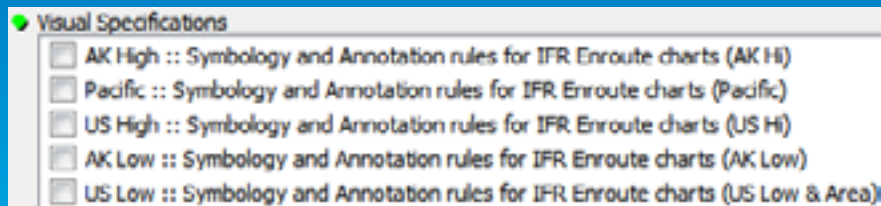
Carto Commander

- Cartographic Features = Geometric copies of master aeronautical features
- Attributes control symbology, annotation and visibility on chart-by-chart basis
- Cartographic features can be modified while maintaining the integrity of the master features
 - can be moved to support cartography
 - Deconflict coincident features
 - Include Not-to-scale features



Visual Specifications

- Automated approach to define chart symbology and label expressions
- Specification Rules can be maintained in Product Library
- Rules are composed of relational queries and VB expressions
- Output are Calculated Fields and/or Calculated Representations
- Support complex logic
 - Calculated Fields can be used as Annotation source – or as inputs to other Rules
 - Processing Order is important

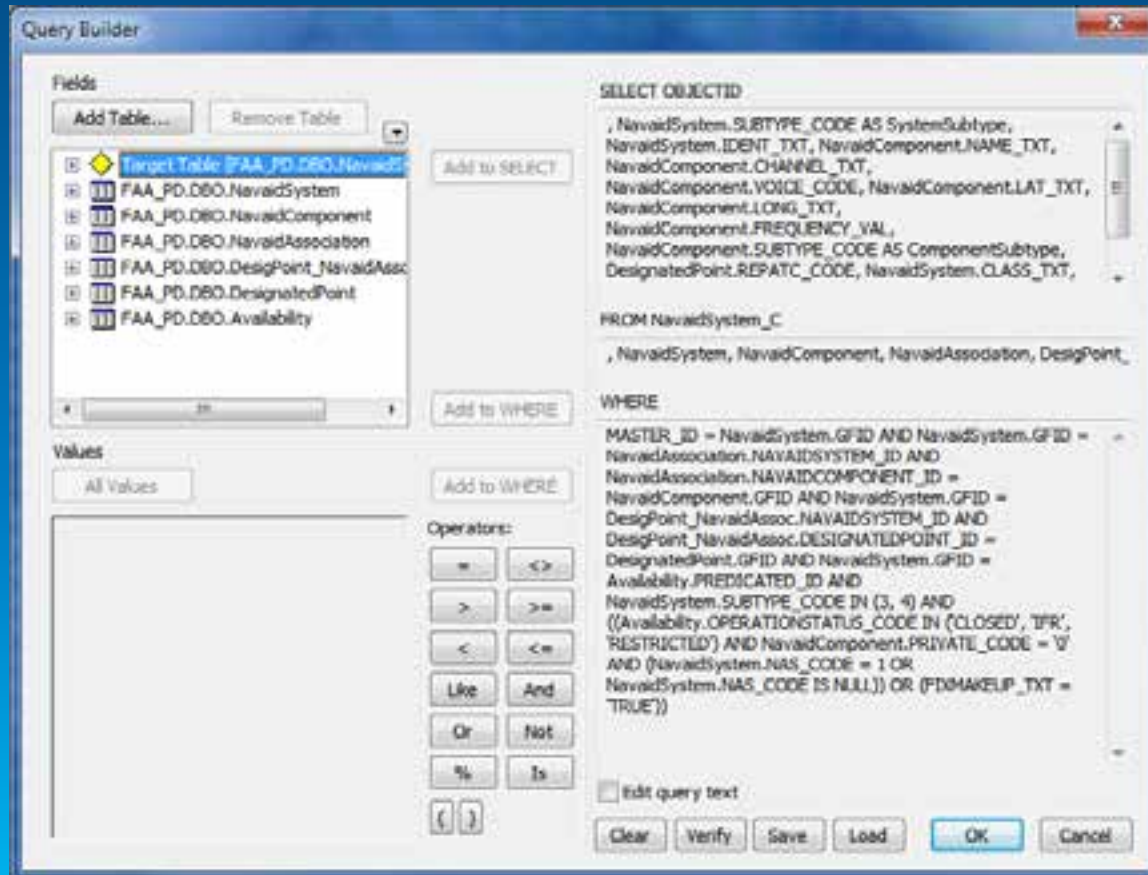


| Rule Type | Specification | Description | Processing Order | Rule Description | Dataset | Layer | Rep-Field Name | File Code | SQL Statement | Expression | Preview | Explicit Use |
|----------------|---------------|------------------|------------------|--|----------------|----------------|----------------|-----------|---------------|----------------|------------------------|--------------|
| Representation | AK High | Symbology and An | 178 | AK High ATISRoute - Symbology | ATISRoute_C | ATISRoute_C | ATISRoute_C | | SELECT <Targ | [VBScript]Func | Route Water/Ov | |
| Field | AK High | Symbology and An | 223 | AK High RadialBearing - Back Course L | RadialBearing_ | RadialBearing_ | BACKCOURSE | | SELECT <Targ | [VBScript]Func | | |
| Field | AK High | Symbology and An | 171 | AK High ATISRoute - End T | ATISRoute_C | ATISRoute_C | ENDT_TXT | | SELECT <Targ | [VBScript]Func | | |
| Field | AK High | Symbology and An | 7 | AK High Airports - ASDS / RWDS | ADHP_C | ADHP_C | ASDSASDLS_ | | SELECT <Targ | [VBScript]Func | TRITE | |
| Representation | AK High | Symbology and An | 11 | AK High Airports - Airports Civil/Military | ADHP_C | ADHP_C | ADHP_C | | SELECT <Targ | [VBScript]Func | Airports Civil/Mil | Marker/Ar |
| Field | AK High | Symbology and An | 55 | AK High Design/ MRA - Flag Symbol Te | DesignatedPnt | DesignatedPnt | FLAGSYMBOL | | SELECT <Targ | [VBScript]Func | FAA NULL Part | |
| Representation | AK High | Symbology and An | 148 | AK High NavSys - North Arrow Medium | NavaidSystem | NavaidSystem | NavSys_C_Fin | | SELECT <Targ | [VBScript]Func | North Arrow - Bl | Marker/Ar |
| Field | AK High | Symbology and An | 130 | AK High NavSys - Symbol Text - North / | NavaidSystem | NavaidSystem | ARROWSYMB | | SELECT <Targ | [VBScript]Func | FAA North Arrow - Gray | |
| Field | AK High | Symbology and An | 104 | AK High NavSys - Symbol Text - TACAN | NavaidSystem | NavaidSystem | SYMBOL_TXT | | SELECT <Targ | [VBScript]Func | FAA TACAN CW State | |

Creating Visual Specifications

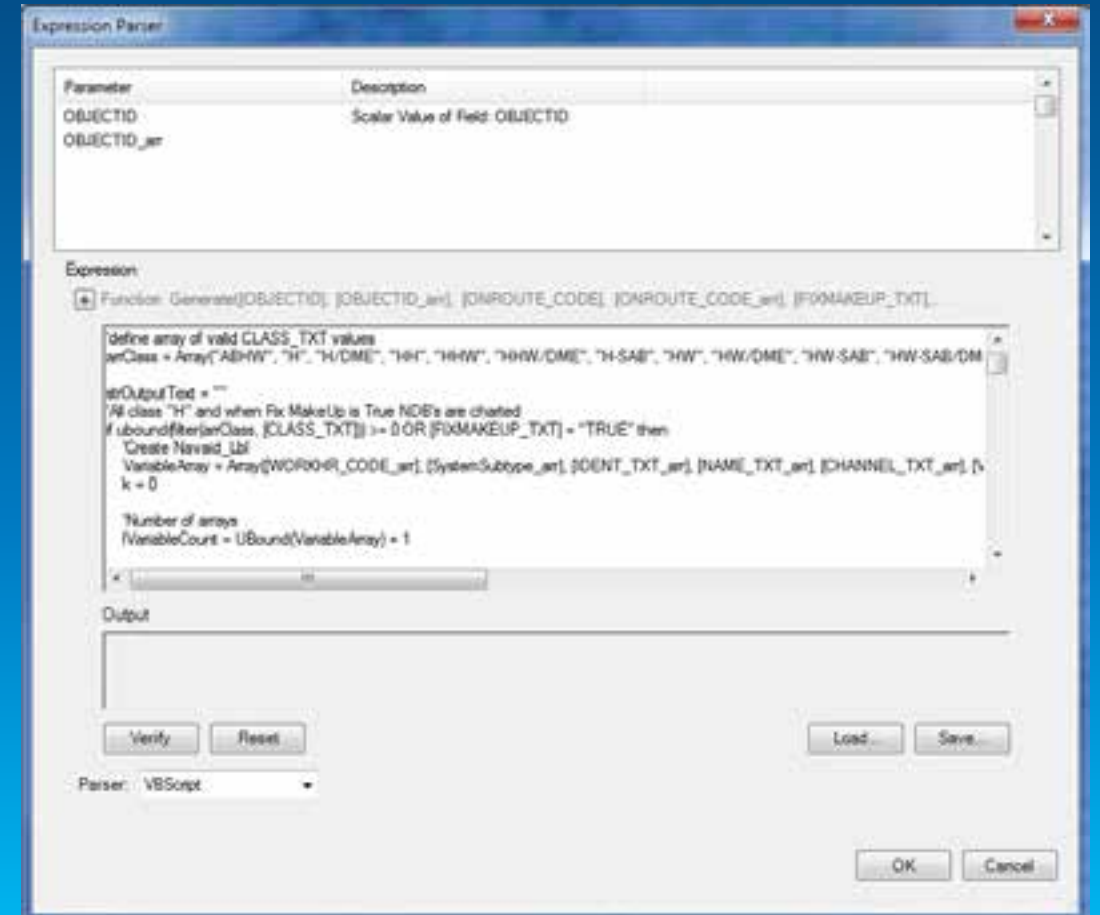
SQL Statement

Pulls attributes from related tables



Expression (VB)

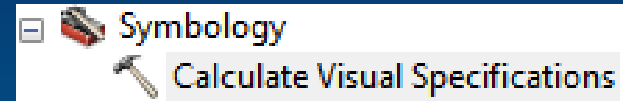
Outputs result as Calculated field or Rep value



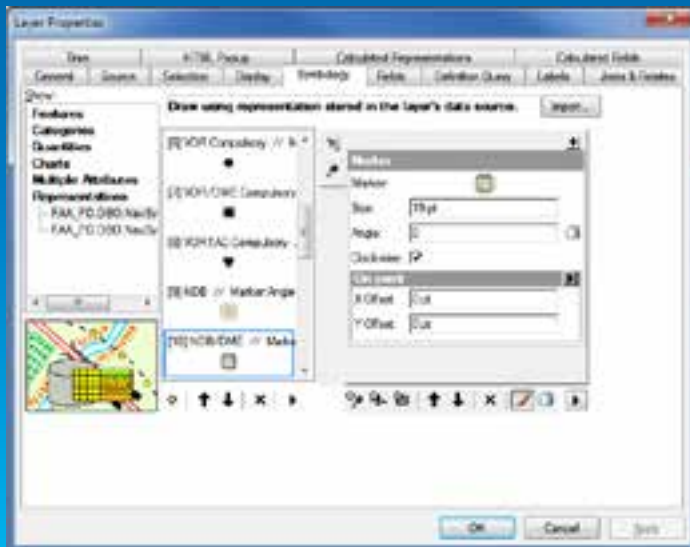
Visual Specifications

- Calculate Visual Specifications GP tool

- applies representation symbology and calculates label fields for multiple layers.



| NAVSYS_C_ID | SERVICEFREQ | NAVAIDSYSTEM_LBL | FSSFREQ_TXT | FSSUNITD_TXT | FSS_TXT | FSSATNAVAID_TXT | NAVSYS_C_RDSE_ID | SYMBOL_TXT | FIXMAKEUP_TXT | ARROWSYMBOL_TXT |
|-------------------------------------|--------------|------------------------------|-------------|---------------|-----------|-----------------|--|-------------|---------------|-------------------------------|
| NDB/DME // Marker/Angle:CAROANGLE_V | [[A,130.40]] | H24<>H24[[4<>4]]AKW<>AKW[[KL | 122.25 | [F4B30B05-C9E | KETCHIKAN | FSSRCO]] | North Arrow - Brown Small // Marker/Angl | FAA:NDB/DME | TRUE | FAA:North Arrow - Brown Small |



Feature-Linked Annotation



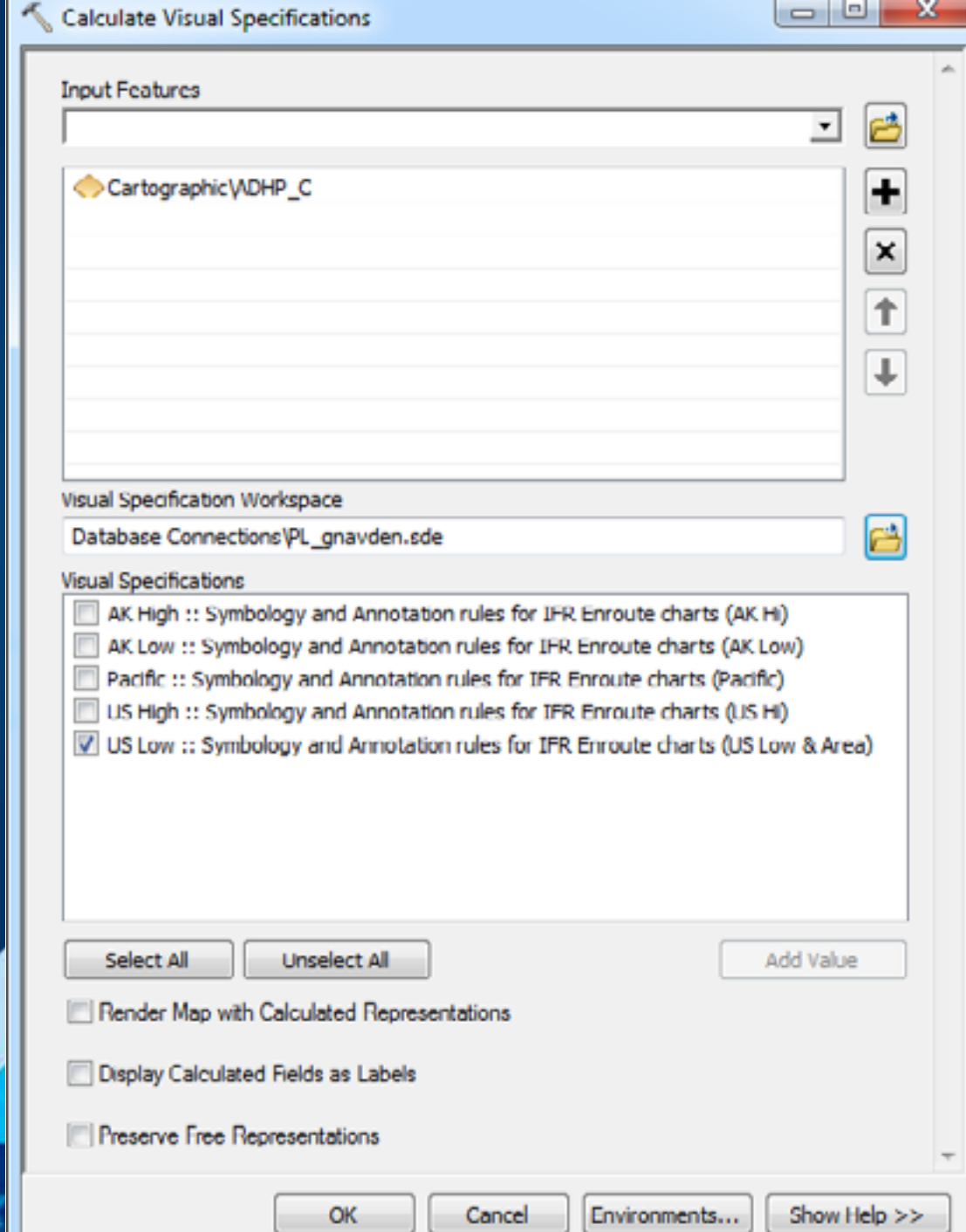
Aviation Create Feature Linked Annotation

- Creates chart specific annotation for cartographic features
- Extends annotation creation behavior:
 - Appends new annotation features to existing feature classes.
 - Creates annotation for specific products based on input product library instances.
 - Supports Visual Specifications (VST) expressions assigned to fields.
 - Creates advanced annotation such as advanced callouts and Vertical Morse Code



Basic Charting Workflow

David Wickliffe



FAA Enroute Automation

Data-Driven Charting

FAA AeroNav Products and Esri



Esri Professional Services

...Starting from textual and tabular aeronautical data to press ready exports that meet spec

FAA Enroute Automation

Data-Driven Charting

- Data Loading
- Charting Logic and Symbology
- Chart Product Specs
- Initializing Prototype charts
- Press Ready Output

+ Tool Development

...Starting from textual and tabular aeronautical data to press ready exports that meet spec

Data Loading

FAA Enroute Automation

- Data mapping FAA & NGA Source to AIS Destination

| Entity | Source | Source Population | Relationship | NASR Subscriber File | NASR Record Type | NASR Subscriber File Field | NASR Layout | Notes | Dest Table Name | Dest Data Type | Dest Attribute |
|---------------------------------|-----------|---|---|----------------------|------------------|--|---|---|-----------------|----------------|----------------|
| Type: ATIS | | ATIS over F NASR AIRPORTTypeFrequencyUse & at TowerTypeATIS or Q.ATIS | ATIS over F NASR AIRPORTTypeFrequencyUse & at TowerTypeATIS or Q.ATIS | TWR TXT | TWR | SECTIONIZATION OF FREQUENCIES BASED ON MASTER AIRPORT OR AIRWAY BOUNDARIES. ORIENTATION BASED ON AIRWAY USAGE (1) SECTIONIZATION OF FREQUENCIES BASED ON MASTER AIRPORT OR AIRWAY BOUNDARIES. ORIENTATION BASED ON AIRWAY USAGE (2) SECTIONIZATION OF FREQUENCIES BASED ON MASTER AIRPORT OR TERMINAL COMMUNICATIONS FACILITY CENTER | L AN 000 6003 L AN 000 6047 L AN 000 6091 L AN 000 6035 L AN 000 6049 L AN 000 6093 | | Service | point | Type_Code |
| Associated Airport ID | | NASR AIRPORTTypeFrequencyUse Name Canada - Manual | NASR AIRPORTTypeFrequencyUse Name Canada - Manual | TWR TXT | TWR | | | Coordinates will be the same as associated airport | AIRP | point | Ident_No |
| ATIS Frequency (s) | | NASR AIRPORTTypeFrequencyUse WFOZ Canada - Manual | AIRPORTTypeFrequencyUse WFOZ Canada - Manual | TWR TXT | TWR | FREQUENCY(1) FOR MASTER AIRPORT USE ONLY AND CODED USES (1) (NOT TRUNCATED) | Frequency--- L AN 000 6009 L AN 000 6053 L AN 000 6097 L AN 000 6141 L AN 000 6185 L AN 000 6229 L AN 000 6273 L AN 000 6317 L AN 000 6361 | Can be null | Frequency | table | Frequency_Val |
| ATIS Frequency(1) Oper Hours | Fulltime | NASR if Airport Type = Fulltime AIRPORTTypeOperHours Canada - Manual | NASR if Airport Type = Fulltime AIRPORTTypeOperHours Canada - Manual | TWR TXT | TWR | HOURS OF OPERATION OF THE AUTOMATIC TERMINAL INFORMATION SYSTEM (ATIS) LOCATED AT THE FACILITY (IF ANY) (1) (LOCAL TIME) | L AN 000 6009 | | Service | point | Ident_Code |
| | Part-time | NASR if Airport Type = Hours of Oper Dutiable SR if Airport Type = Control Tower Hours NOT 24 | NASR if Airport Type = Hours of Oper Dutiable SR if Airport Type = Control Tower Hours NOT 24 | TWR TXT | TWR | HOURS OF OPERATION OF THE AUTOMATIC TERMINAL INFORMATION SYSTEM (ATIS) LOCATED AT THE FACILITY (IF ANY) (1) (LOCAL TIME) | L AN 000 6009 | | Service | point | Ident_Code |
| ATIS Frequency (s) Distribution | | Canada - Manual NASR AIRPORTTypeFrequencyUse & at TowerTypeDistribution is only the portion of the full code that is shown Canada - Manual | Canada - Manual NASR AIRPORTTypeFrequencyUse & at TowerTypeDistribution is only the portion of the full code that is shown Canada - Manual | TWR TXT | TWR | FREQUENCY(1) FOR MASTER AIRPORT USE ONLY AND CODED USES (1) (NOT TRUNCATED) | Frequency--- L AN 000 6009 L AN 000 6053 L AN 000 6097 L AN 000 6141 L AN 000 6185 L AN 000 6229 L AN 000 6273 L AN 000 6317 | This is a null field and if the data is null, it will have a null value | Frequency | table | Remarks_Val |
| AISCT Hours | | NASR AIRPORTType Control Tower Hours Canada - Manual | NASR AIRPORTType Control Tower Hours Canada - Manual | TWR TXT | TWR | NUMBER OF HOURS OF DAILY OPERATION | L AN 000 6029 | | Service | point | Ident_Code |
| Remarks | | NASR AIRPORTType Remarks. Referenced remarks for Canada - Manual | NASR AIRPORTType Remarks. Referenced remarks for Canada - Manual | TWR TXT | TWR | TOWER REMARK TEXT | L AN 000 6034 | | Service | point | Ident_Val |

Data Loading

FAA Enroute Automation

```

NoteTab Light - C:\FAA_EnrouteAuto\FAA_ETLmaint\NASR\56DySubscription_April_05_2012_May_31_2012\APT.txt
File Edit Search View Modify Document Favorites Tools Help
APT.txt COM.txt NAV.txt FIX.txt ATS.txt

RMK90950.*A A40-08/26 FIXED INTST AVBL ONLY ON REQ.
RMK90950.*A E100 NORTH CAICOS INFO SVC.
APT90960.*A AIRPORT MBPV04/05/2012 NONE TURKS AND
ATT90960.*A 1ALL/ALL/1100-0100Z++ UTC-5(-4DT). OTR HRS ON REQ
RWY90960.*A 10/28 9209 148ASPH NONE 59 /F/B/X/THIGH 10 093
RMK90960.*A A110-1 BIRD AND ANIMAL HAZ.
RMK90960.*A A110-2 FIREFIGHT EQUIP: THREE FOAM TENDERS, EACH 7,585 GALS
RMK90960.*A A18 FOREIGN CIV GOVT. LNDG FEES AND DIPLOMATIC CLNC MAY B
RMK90960.*A A43-10 PAPI ON LEFT.
RMK90960.*A A43-28 PAPI ON LEFT.
RMK90960.*A A76 PRIOR ARMG ONLY.
RMK90960.*A A81-BCN AS RQR
RMK90960.*A A86 LCL AIS BRP ON ARPT ALL MONTHS, ALL DAYS, 1100-0100Z+
APT90970.*A AIRPORT MBSC04/05/2012 NONE TURKS AND
ATT90970.*A 1ALL/ALL/DAWN TO DUSK; OTR HRS ON REQ.
RWY90970.*A 11/29 6007 98ASPH 21 /F/A/X/THIGH 11 098
RMK90970.*A A110-1 WILDLIFE HAZ.
RMK90970.*A A110-2 FIREFIGHT EQUIP: THREE FOAM TENDERS; EACH 3,025 GALS
RMK90970.*A A18 FOREIGN CIV GOVT. LNDG FEES AND DIPLOMATIC CLNC MAY B
RMK90970.*A A43-11 PAPI ON LEFT.
RMK90970.*A A43-29 PAPI ON LEFT.
RMK90970.*A A86 SOUTH CAICOS LCL INFO 1-649-946-3228.
RMK90970.*A E100 SOUTH CAICOS APRT FLT INFO SVC (AFIS).
  
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137739:4 Ins Read only [210,602,931 bytes, 137,740 lines, Last Saved: 3/8/2012 4:27:12 PM, Format: Dos/Windows]

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NoteTab Light - C:\FAA_EnrouteAuto\FAA_ETLmaint\NASR\56DySubscription_April_05_2012_
File Edit Search View Modify Document Favorites Tools Help
apt_rf.txt Com_rf.txt nav_rf.txt fx_rf.txt ats_rf.txt

-----
GEOGRAPHIC DATA
-----
L AN 0015 00524 A19 AIRPORT REFERENCE POINT LATITUDE (FORMATTED)
L AN 0012 00539 A19S AIRPORT REFERENCE POINT LATITUDE (SECONDS)
L AN 0015 00551 A20 AIRPORT REFERENCE POINT LONGITUDE (FORMATTED)
L AN 0012 00566 A20S AIRPORT REFERENCE POINT LONGITUDE (SECONDS)
L AN 0001 00578 A19A AIRPORT REFERENCE POINT DETERMINATION METHOD
E - ESTIMATED
S - SURVEYED
R AN 0007 00579 A21 AIRPORT ELEVATION (NEAREST TENTH OF A FOOT MSL)
ELEVATION IS MEASURED AT THE HIGHEST POINT
ON THE CENTERLINE OF THE USABLE LANDING
SURFACE
(EX. 1200.5; -10.0 FOR 10 FEET BELOW SEA LEVEL)
L AN 0001 00586 A21 AIRPORT ELEVATION DETERMINATION METHOD
E - ESTIMATED
S - SURVEYED
L AN 0003 00587 E28 MAGNETIC VARIATION AND DIRECTION
MAGNETIC VARIATION TO NEAREST DEGREE
(EX. 03W)
L AN 0004 00590 E28 MAGNETIC VARIATION EPOCH YEAR
(EX. 1985)
R AN 0004 00594 E147 TRAFFIC PATTERN ALTITUDE (WHOLE FEET AGL)
(EX. 1000)
L AN 0030 00598 A7 AERONAUTICAL SECTIONAL CHART ON WHICH FACILITY
APPEARS. (EX. WASHINGTON)
L AN 0002 00628 A3 DISTANCE FROM CENTRAL BUSINESS DISTRICT OF
THE ASSOCIATED CITY TO THE AIRPORT
(NEAREST NAUTICAL MILE - EX. 08)

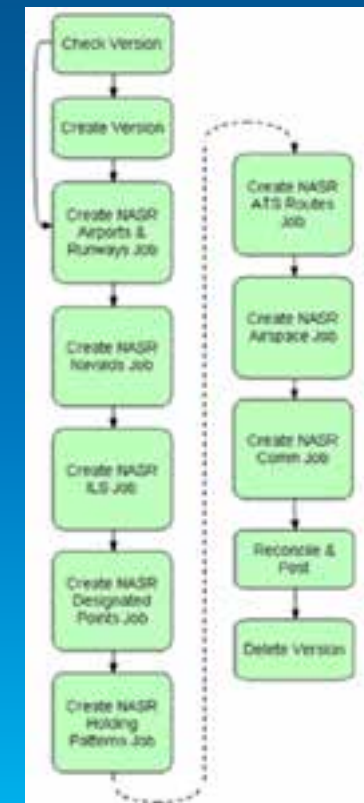
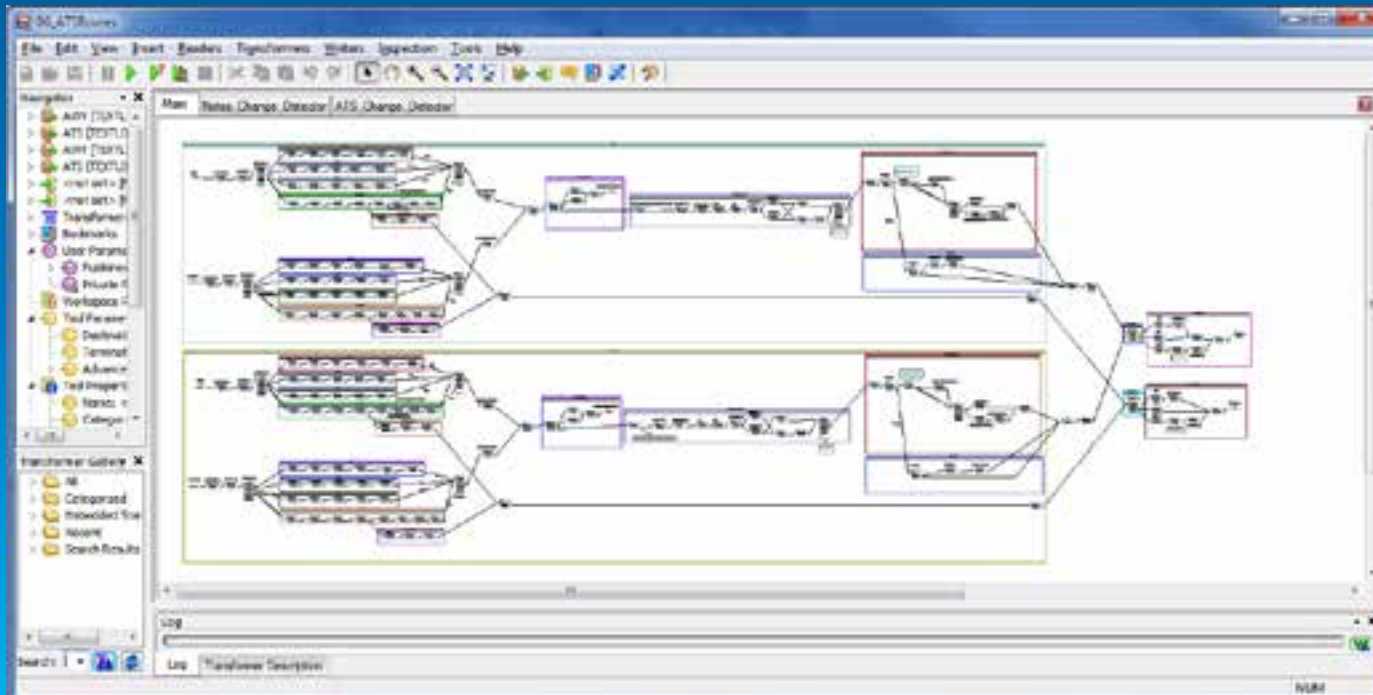
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Data Loading

FAA Enroute Automation

- Custom Spatial ETLs developed
- Workflow Manager

| Preprocessor | Loader Updater |
|----------------------------------|--------------------------------|
| 01_AirportsRunways_Transactions | 01_Airports 01b_Runways |
| 02_Navaids_Transactions | 02_Navaids |
| 03_ILS_Transactions | 03_ILS |
| 04_DesignatedPoints_Transactions | 04_DesignatedPoints |
| 05_HoldingPatterns_Transactions | 05_HoldingPatterns |
| 06_ATSRoutes_Transactions | 06_ATSRoutes 06_ATSRoutesNotes |
| 07_Airspace_Transactions | 07_Airspace |
| 08_Services_Transactions | 08_Services |



Charting Logic and Symbology Specs

FAA Enroute Automation

- FAA provided Specs for Symbology and anno
- Charting Logic Flowcharts

13 March 2011

Figure 1.118 Subroute Route Color/Line

3.7.8.5 Route Data

3.7.8.5.1 General

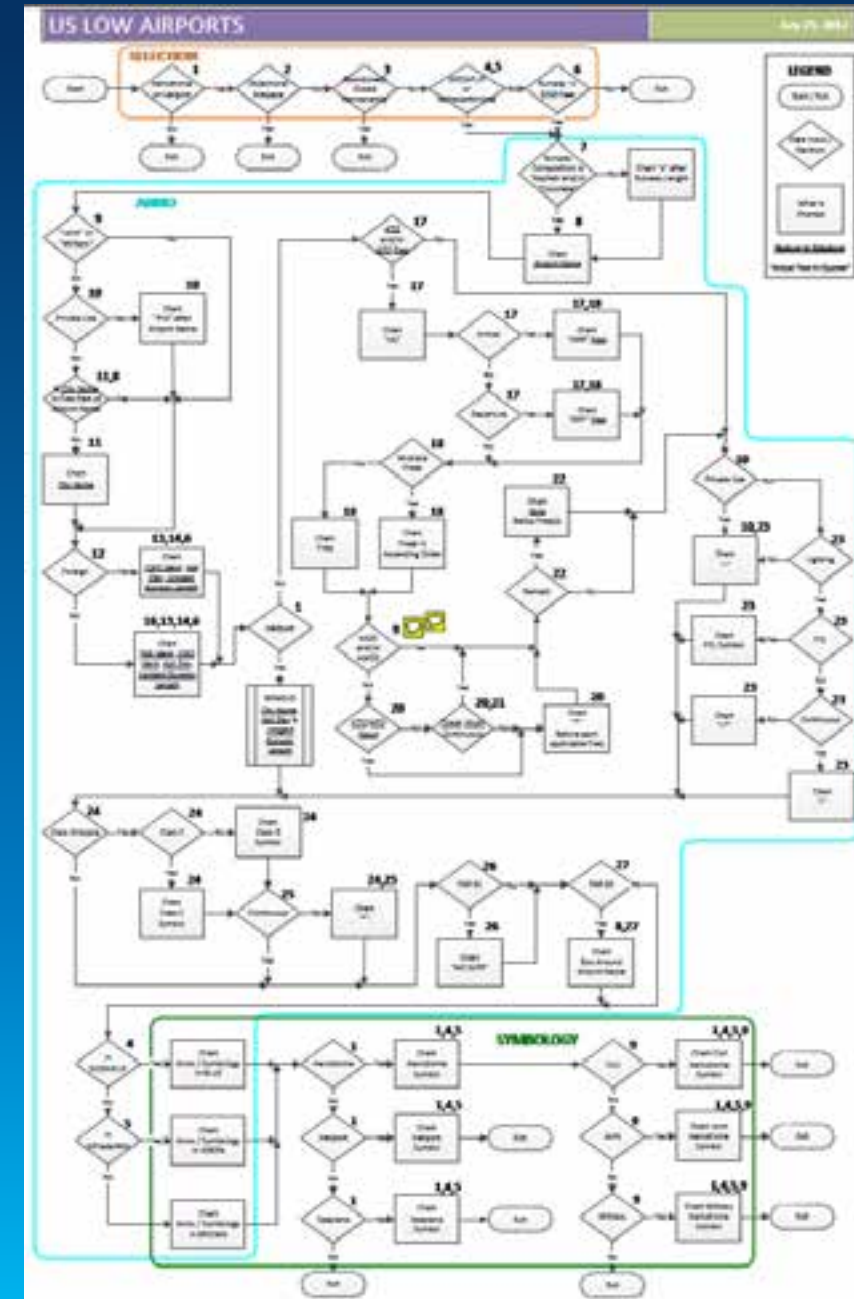
For RNAV "Q" Route, Gulf of Mexico "Q" route, Alaska VOR/DME RNAV, Track, ATIS, Oceanic, Atlantic, and Pacific route data shall be shown parallel to the route criterion. The color of route data will be predicated on the type of route, (i.e., ATIS, Track, "Q") and route make-up (i.e., IFR/VFR, LPMS, RNAV).

3.7.8.5.2 Identification

Routes shall be identified by the appropriate letter(s) to indicate the type of route, and the appropriate number, to indicate the specific route.

For RNAV route identifications (except Gulf of Mexico "Q" routes) shall be shown in negative type.

| AIRWAY/ROUTE DATA | | | | | |
|-------------------------------|------|--|--------------------------------------|--------------------------------------|--------------------------------------|
| MEA, MCA & MSA | CAPE | 20" Future Medium (displayed in 20" increments) As appropriate for airway/route type | MEA | MSA | MSL |
| Color | | | 1000 | 1000 | 1000-1000 |
| T Symbol/Line/Weight & Color | CAPE | 20" Future Medium/Black | VFR/IFR | LPMS | RNAV |
| MCA Day/Note | | | 0'0" Back | 0'10" Brown | 0'10" Blue |
| MCAs & MSA | CAPE | 20" Future Medium | VFR/IFR | LPMS | RNAV |
| Symbol & Color | | | As appropriate for airway/route type | As appropriate for airway/route type | As appropriate for airway/route type |
| MEAs & MSA | CAPE | 20" Future Medium | MEA | MSA | MSL |
| Color | | | 1000 | 1000 | 1000-1000 |
| MILEAGE DISTANCES | CAPE | 20" Future Medium (displayed in 20" increments) As appropriate for airway/route type | MEAs | MSAs | MSLs |
| Color | | | 1000 | 1000 | 1000-1000 |
| Box Line/Weight & Color | CAPE | 20" Future Medium | 0'0" Back | 0'10" Brown | 0'10" Blue |
| TD Note | | | As appropriate for airway/route type | As appropriate for airway/route type | As appropriate for airway/route type |
| Changeover Point (COP) | CAPE | 20" Future Medium May be reduced to 20" increments | VFR/IFR | LPMS | RNAV |
| Symbol & Color | | | Black | Brown | Blue |
| Text | CAPE | 20" Future Medium May be reduced to 20" increments | As appropriate for airway/route type | As appropriate for airway/route type | As appropriate for airway/route type |
| Color | | | Black | Brown | Blue |
| Direction of Flight Indicator | CAPE | 20" Future Medium May be reduced to 20" increments | VFR/IFR | LPMS | RNAV |
| Color | | | As appropriate for airway/route type | As appropriate for airway/route type | As appropriate for airway/route type |



Charting Logic and Symbology Specs

FAA Enroute Automation

- Logic and Chart Specs worked into
 - VST Specifications
 - Representation Rules

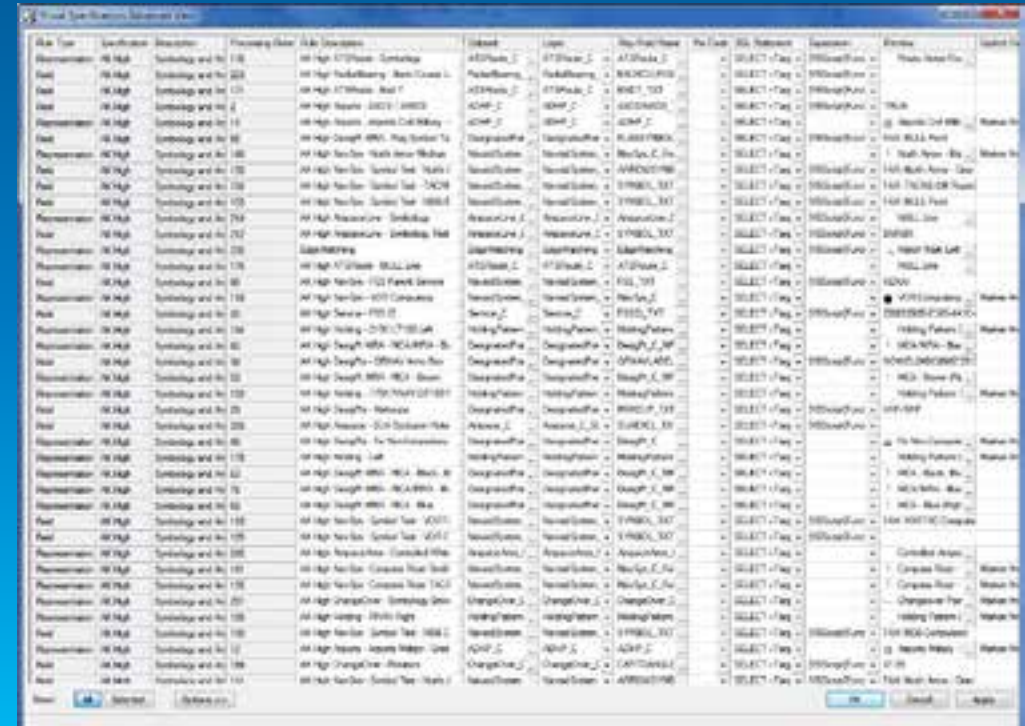
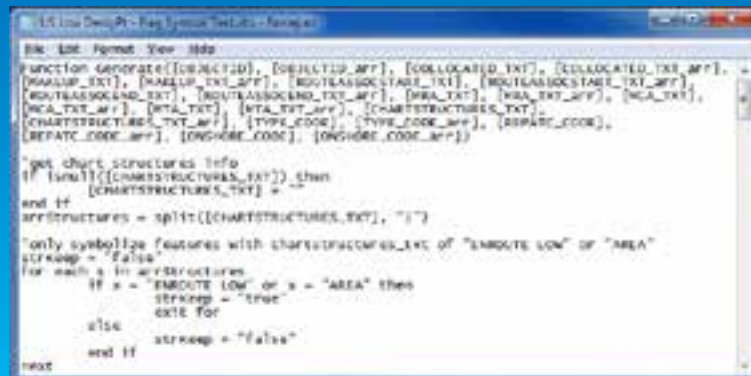
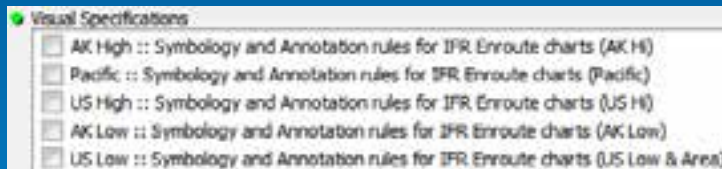
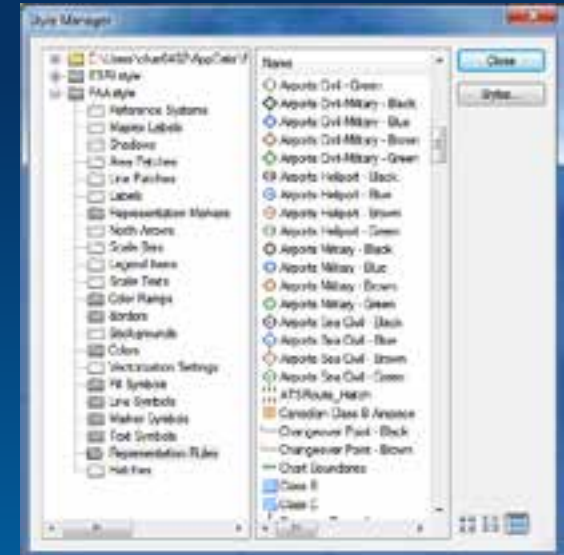
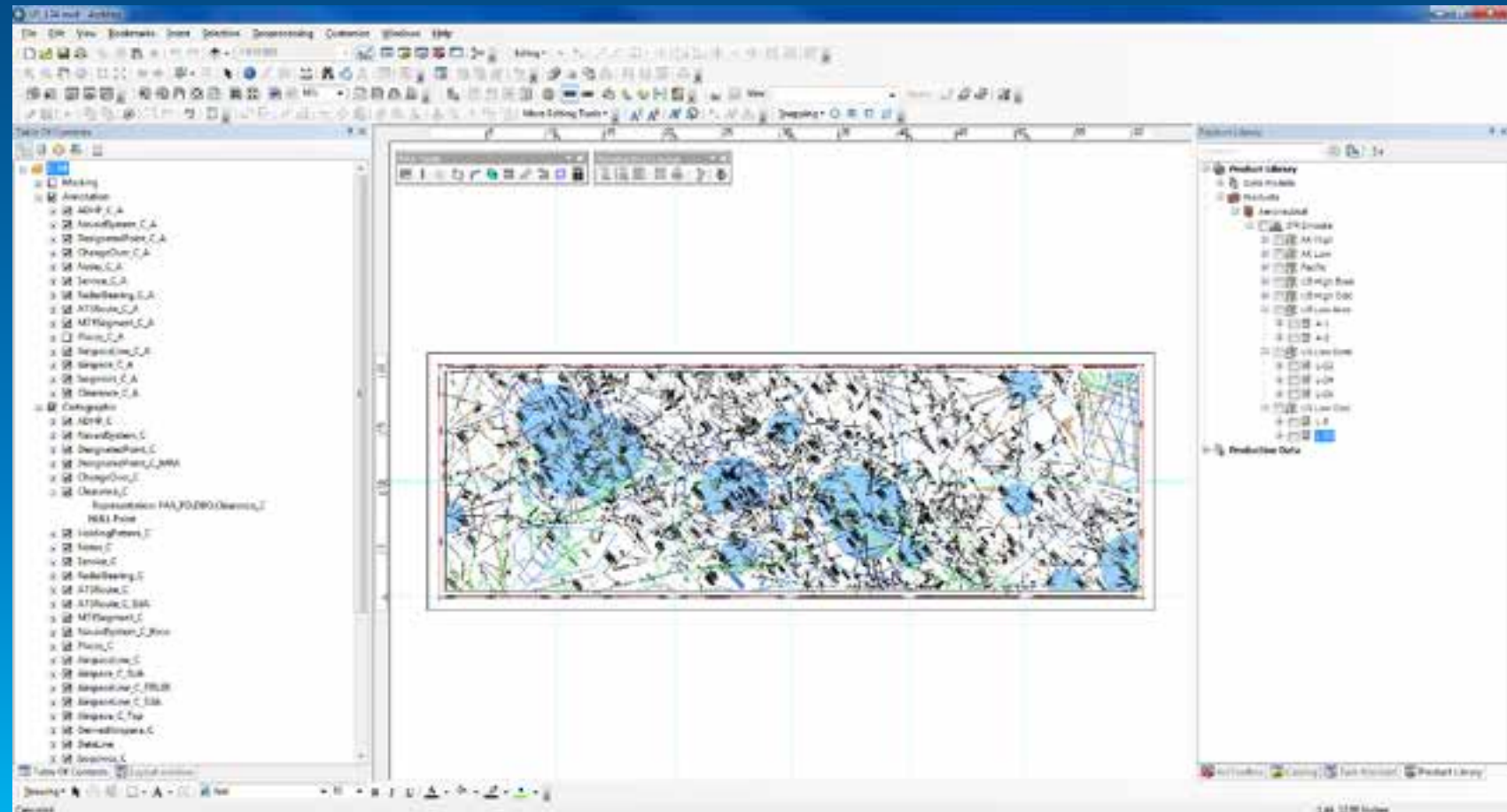


Chart Product Specs

FAA Enroute Automation

- Worked into a Product Library



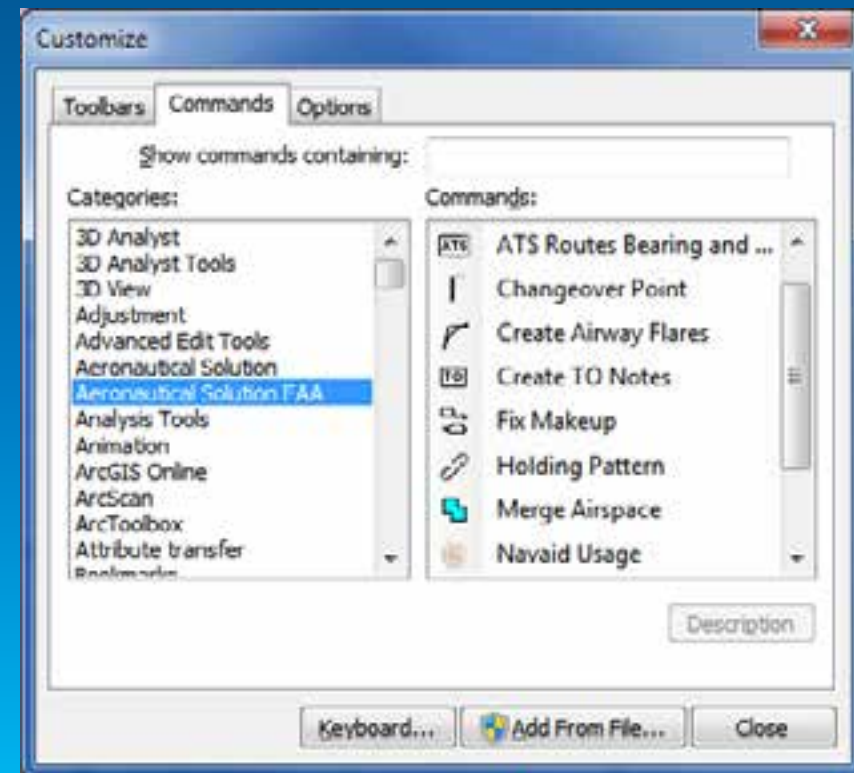
New Tool Development

FAA Enroute Automation

- Throughout Charting Phase
- Better automate FAA charting requirements
- Enhance existing tools



- Esri Staff used for chart initialization



Press Ready Output

FAA Enroute Automation

- Production PDF enables Press Ready PDF export from ArcGIS for Desktop.
 - screen to Spot color mapping
 - %Tint and Overprint control
- FAA provided screen to spot color names for use with their commercial printer

The screenshot shows a software interface with two main columns: 'Input Values' and 'Production PDF Output Values'. The table contains various color names and their corresponding values, with some cells highlighted in yellow.

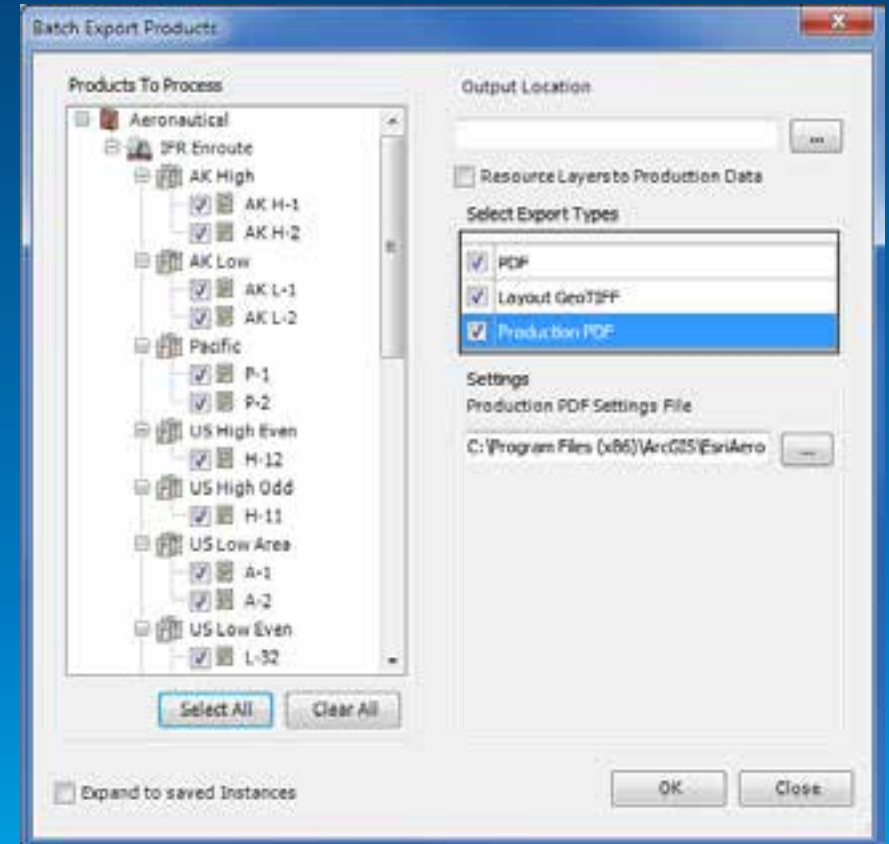
The screenshot shows a 'Color Mapping Rules' dialog box. It displays a table with columns: 'Input', 'Input Value', 'Output', 'Output Value', '%Tint', and 'Overprint'. The table lists various color names and their corresponding values, with some cells highlighted in blue. Below the table are buttons for 'Load Map Colors', 'Show Preview', 'Preview Settings', and 'Separation Settings'.

| Input | Input Value | Output | Output Value | %Tint | Overprint |
|-----------------|-------------|---------|---------------|-------|--------------------------|
| RGB 0 0 0 | | Black | 0 0 0 100 | 100 | <input type="checkbox"/> |
| RGB 255 255 255 | | White | 0 0 0 100 | 0 | <input type="checkbox"/> |
| RGB 215 215 215 | | Black | 0 0 0 100 | 18 | <input type="checkbox"/> |
| RGB 185 185 185 | | Black | 0 0 0 100 | 25 | <input type="checkbox"/> |
| RGB 155 155 155 | | Black | 0 0 0 100 | 45 | <input type="checkbox"/> |
| RGB 125 125 125 | | Black | 0 0 0 100 | 65 | <input type="checkbox"/> |
| RGB 95 95 95 | | Black | 0 0 0 100 | 85 | <input type="checkbox"/> |
| RGB 65 65 65 | | Black | 0 0 0 100 | 100 | <input type="checkbox"/> |
| RGB 35 35 35 | | Black | 0 0 0 100 | 100 | <input type="checkbox"/> |
| RGB 0 0 0 | | Black | 0 0 0 100 | 100 | <input type="checkbox"/> |
| RGB 255 0 0 | | Red | 255 0 0 100 | 100 | <input type="checkbox"/> |
| RGB 0 255 0 | | Green | 0 255 0 100 | 100 | <input type="checkbox"/> |
| RGB 0 0 255 | | Blue | 0 0 255 100 | 100 | <input type="checkbox"/> |
| RGB 255 255 0 | | Yellow | 255 255 0 100 | 100 | <input type="checkbox"/> |
| RGB 255 0 255 | | Magenta | 255 0 255 100 | 100 | <input type="checkbox"/> |
| RGB 0 255 255 | | Cyan | 0 255 255 100 | 100 | <input type="checkbox"/> |
| RGB 255 255 255 | | White | 0 0 0 100 | 0 | <input type="checkbox"/> |

Press Ready Output

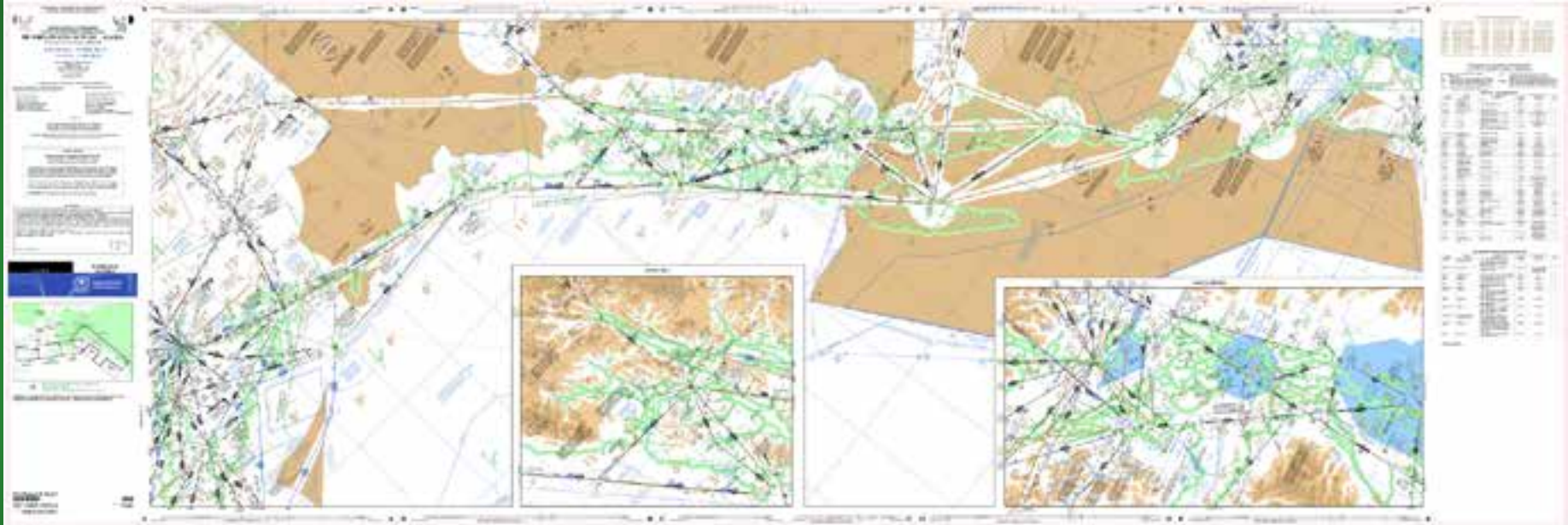
FAA Enroute Automation

- FAA requires export to multiple formats
- Batch Export Products was developed
- Can export all or selected Products from the Product Library tree
- Simultaneously Export:
 - PDF
 - Layout GeoTIFF
 - Production PDF for commercial printing



FAA Enroute Charting

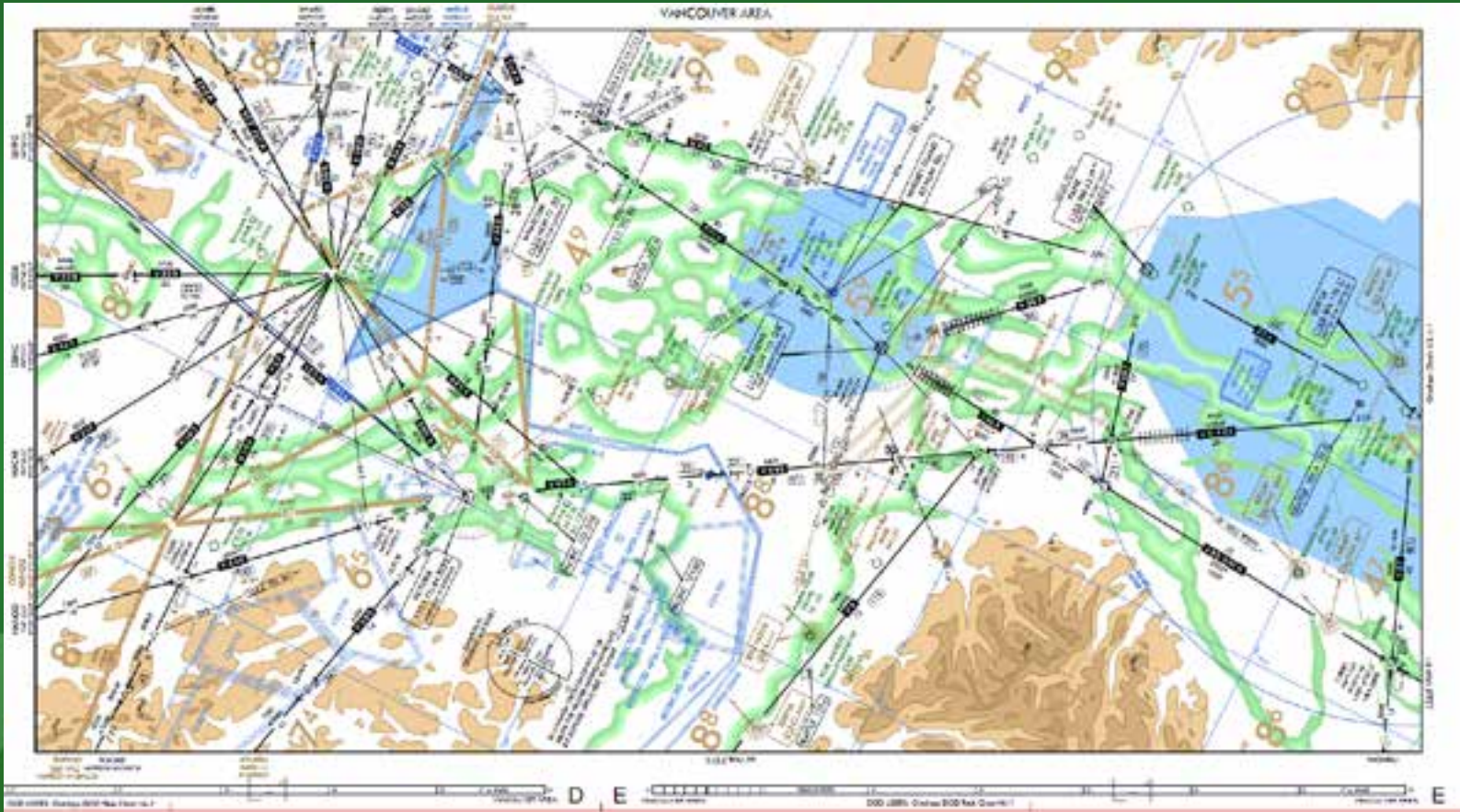
Enroute Low Alaska Chart



Location: Alaska L-1 Juneau and Vancouver Areas

FAA Enroute Charting

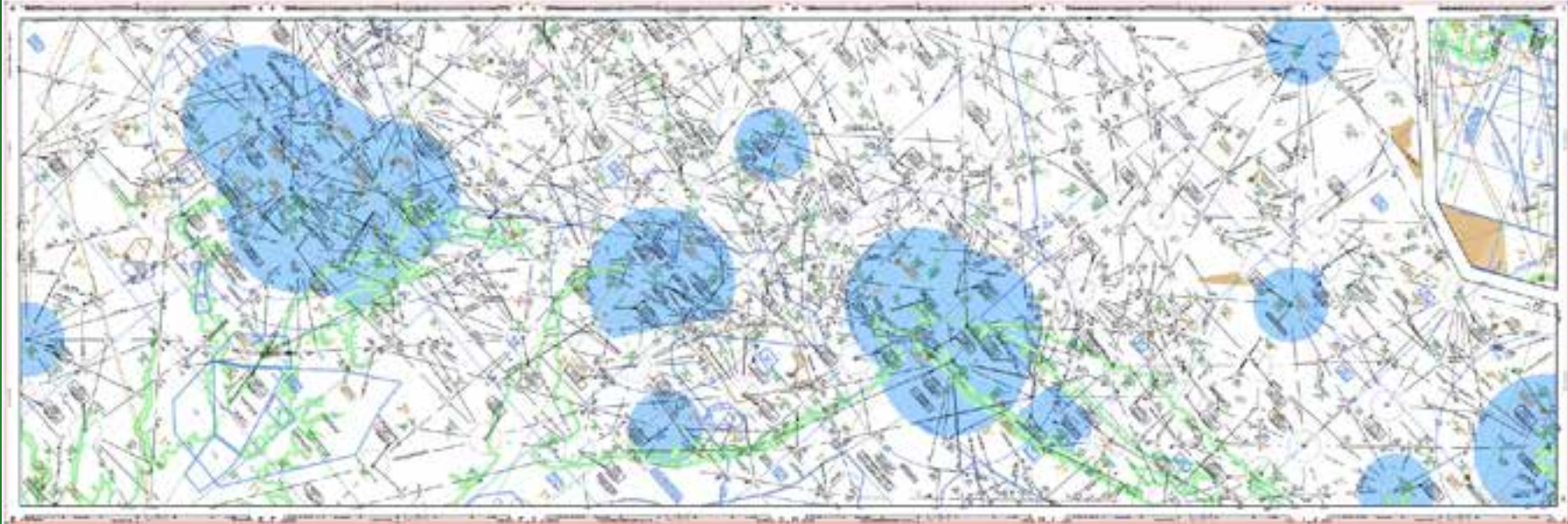
Enroute Low Alaska Chart



Location: Alaska L-1 Vancouver Area

FAA Enroute Charting

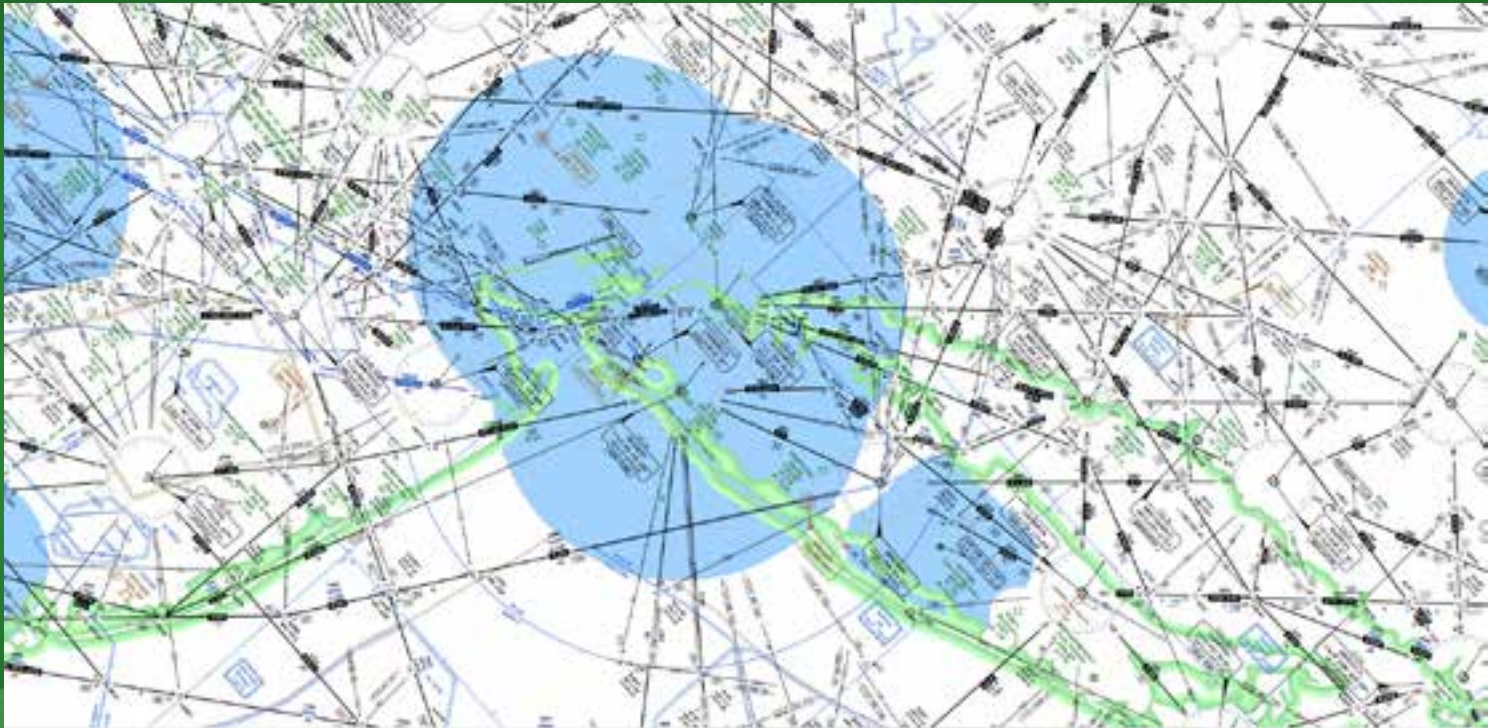
Enroute Low US Chart



Location: US L-34 Mid-Atlantic Coast

FAA Enroute Charting

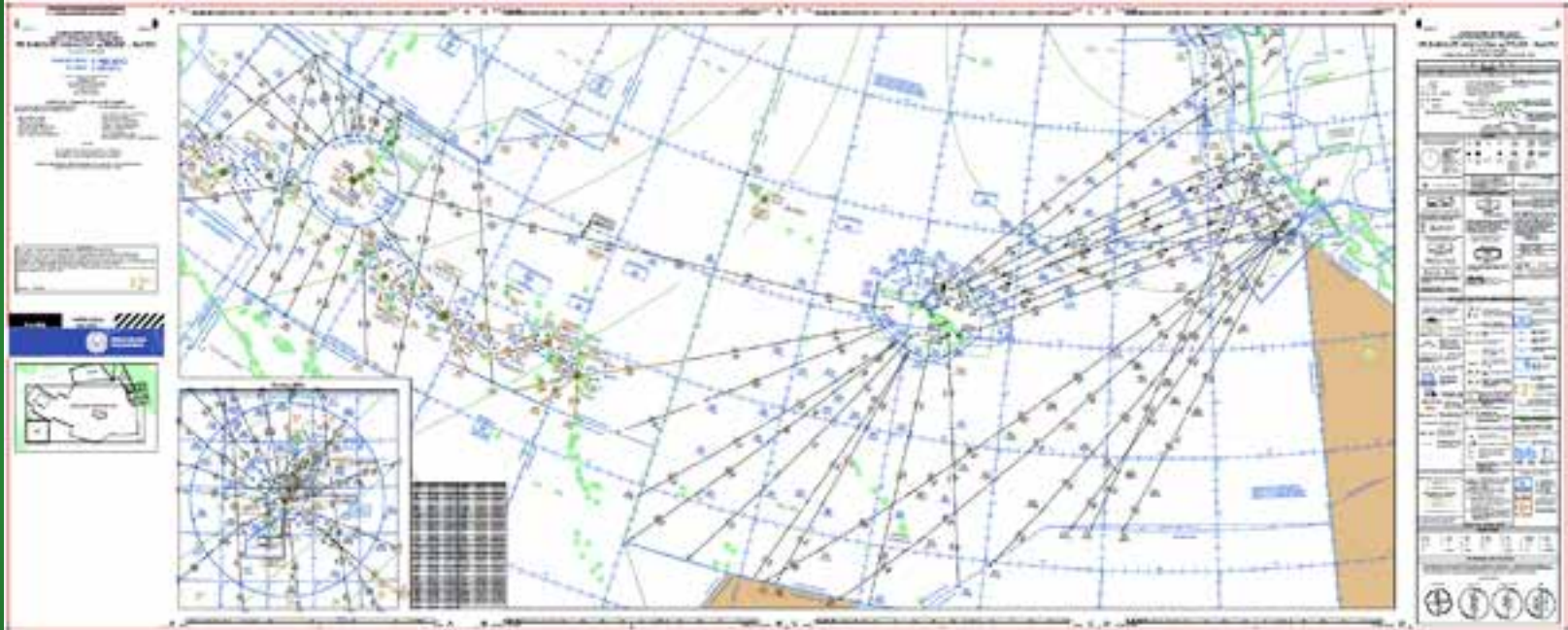
Enroute Low US Chart



Location: US L-34 New York Area

FAA Enroute Charting

Enroute High/Low Pacific Chart



Location: Pacific

Further Info

Visit the ArcGIS for Aviation
Resource Center

The screenshot shows the ArcGIS Resources website for the Aviation community. The page features a navigation bar with links for Home, Communities, Help, Blog, Forums, and Videos, along with a search bar. The main heading is "ArcGIS for Aviation" under the "Communities" section. A central graphic illustrates a workflow cycle with four components: Centralized Data, Specialized Tools, Quality Control, and Workflow Management. To the right, a "Quick Links" section provides resources for getting started, instructor-led training, and support. At the bottom, a "Gallery" of five featured items is displayed, including an Esri Aeronautical Solution package, a tool for dropping all representations, a data reviewer, a tool for making isogonic lines, and a tool for vertical obstructions.

ArcGIS Resources

ArcGIS Online Sign In English

Home Communities Help Blog Forums Videos Search Aeronautical Solution

ArcGIS for Aviation

Communities

What is ArcGIS for Aviation?

ArcGIS for Aviation is part of the ArcGIS system designed to solve problems and gain efficiencies for civil, military, and commercial aeronautical agencies, airports, consultants, and related businesses.

[Read more...](#)

Centralized Data **Specialized Tools** **Quality Control** **Workflow Management**

Quick Links

Getting Started

- What's new in ArcGIS for Aviation at 10.2?
- What is ArcGIS for Aviation?
- Quick tour of ArcGIS for Aviation

Instructor-led Training

- Introduction to ArcGIS for Aviation: Charting
- Configuring ArcGIS for Aviation: Charting

Support

- Help: 10.2 | 10.1 | 10 | 9.3.1/9.3
- System Requirements: Charting | Airports
- Support | Forum | Ideas
- Request Evaluation: Charting | Airports
- Contact the ArcGIS for Aviation Team

Gallery [More Gallery posts](#)

- Esri Aeronautical Solution - Airports GIS Package
- Drop All Representations (ArcGIS 10.1)
- Managing Data Reviewer (ArcGIS 10)
- Make Isogonic Lines (ArcGIS 10.1)
- USDOT FAA Vertical Obstructions

<http://resources.arcgis.com/en/communities/aeronautical-solution/>

Thank You!

Next: Demo by William Reynolds



Understanding our world.