(U) Aeronautical Content Exploitation System (ACES) 2.0 – User Guide

(U) Change History

(U) This table is UNCLASSIFIED

Date	Description of action	Author/Editor
January 2024	Initiated draft	Shivonni Heard
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(U) Table of Contents

(U) Foreword

(U) Purpose

(U) This technical guide outlines functionality of the Aeronautical Content Exploitation System (ACES) 2.0 web portal. ACES is a web application designed to provide Department of Defense (DoD) customers with immediate access to a wide variety of National Geospatial-Intelligence Agency (NGA) aeronautical and topographic products and reports, and links to international flight publications and procedures. The ACES (Aeronautical Content Exploitation System) 2.0 application provides access to a large array of aeronautical resources. It encapsulates several external applications to provide a single point of access, such as Airfield Foundation Data, FLIP publications, CADRG mapping content, vertical obstructions, and more. This document provides a brief overview of the application and its features. The goal is to document the intended functionality of the application and ease the process of onboarding new users. In Chapter 1, the document discusses accessibility topics. Chapter 2 describes the user interface, and Chapter 3 details ACES products, mission planning, and external links.

(U) Use of this Manual

(U) The table of contents indicates chapter, paragraph title, and page numbers to facilitate the location of ACES topics.

(U) Abbreviations and Acronyms

(U) All abbreviations and acronyms used in this document are contained in Appendix A.

(U) Are you brand new to DoD Aeronautical Products?

(U) Please review Appendix B for high-level descriptions of the various products available for download.

(U) For additional details on each product please refer to Chapter 3.

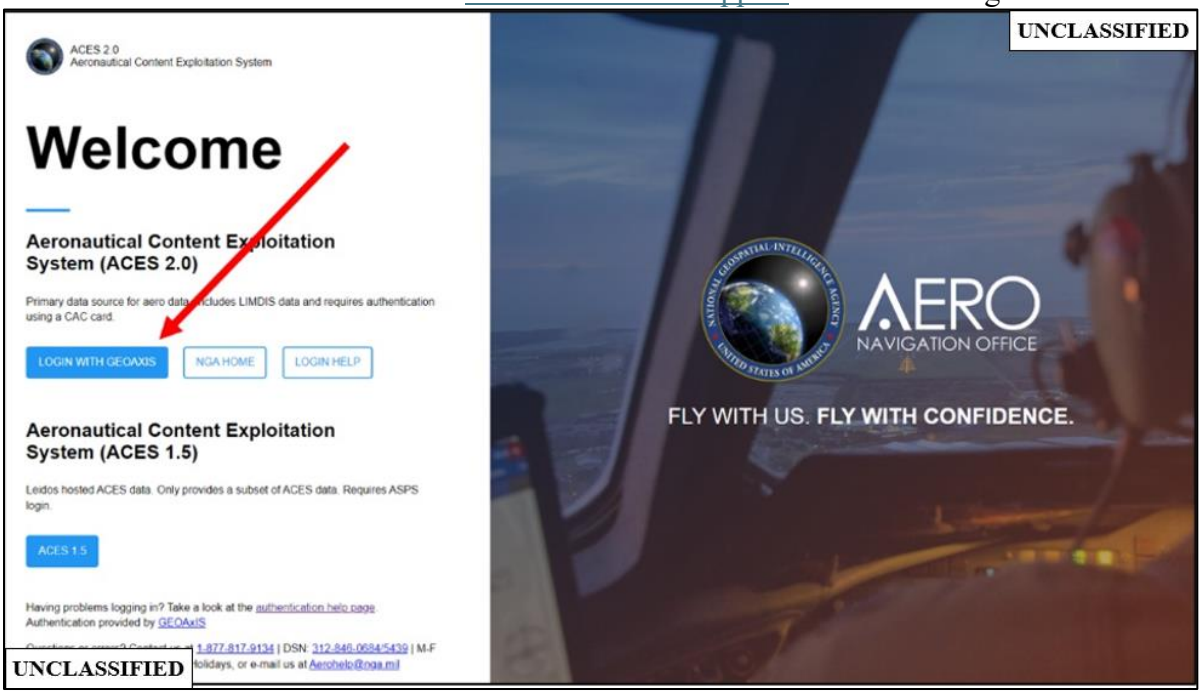
(U) Chapter 1: Admission Considerations

(U) 1.1Accessing ACES

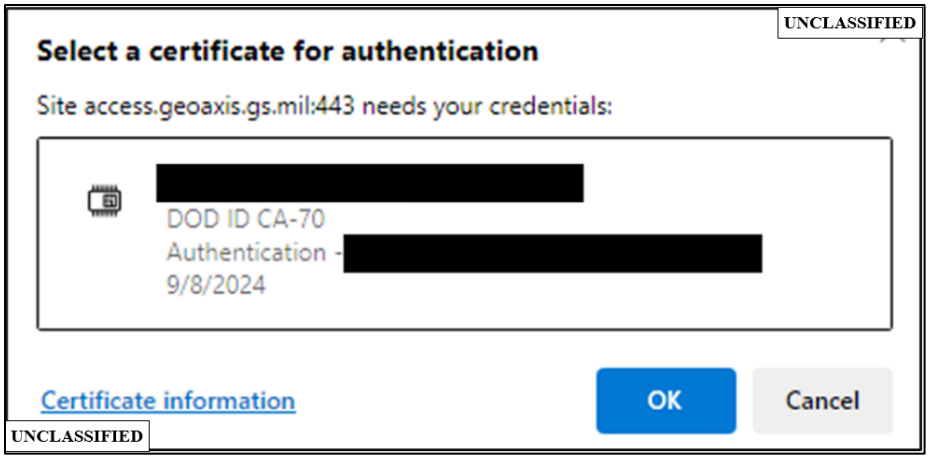
(U) 1.1.1 Unclassified Domain accessibility

(U) To access the ACES portal on the Unclassified / Non-classified Internet Protocol Router Network (NIPRNet), users must possess a Common Access Card (CAC) with a valid Public Key Infrastructure (PKI) certificate or an authorized GEOAXIS login credential. First-time users can navigate to the website at https://aeronautical.nga.mil/login. Once the page loads, click on, *LOGIN WITH GEOAXIS* (Figure 1.1), then select the non-email PKI certificate (Figure 1.1a) and enter your Personal Identification Number (PIN) (Figure 1.1b) when prompted.

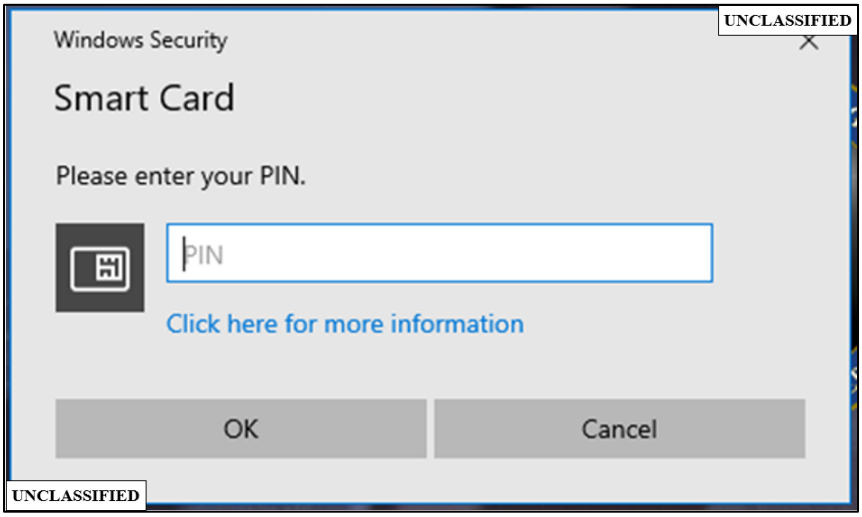
- ACES access is validated through NGA's GEOAxIS service. For GEOAxis accessibility issues, contact their help desk at +1-508-622-5549, Secure 576-1717, or email GEOAxISOpsSupport@nga.mil.
- For concerns with the website loading, contact the ACES Help Desk. Their contact information is listed in the ACES Customer Support section of this guide.



***(U) Figure 1.1** Registration Link*



***(U) Figure 1.1a** Non-Email PKI Certificate*



***(U) Figure 1.1b** Enter PIN*

(U) 1.1.2 Classified domain accessibility

(U) ACES is also located on the following classified US government domains:

- SIPRNet: https://aces2.apps.kubic.nga.smil.mil/login
  - Requires SIPRNet access
  - Includes Unclassified, FOUO, LIMDIS, and content classified up to SECRET
- Joint Worldwide Intelligence Communications System (JWICS): https://aeronautical.nga.ic.gov/login
  - Requires JWICS access
  - Includes Unclassified, FOUO, LIMDIS, and content classified up to TOP SECRET

(U) **NOTE**: Content and appearance may vary between domains

(U) 1.1.3 Supported Web Browsers

(U) ACES supports the following web browsers:

- Microsoft Edge

- Google Chrome
- Mozilla Firefox
- Apple Safari

(U) 1.1.4 Security Considerations

(U) The information disseminated by ACES is designated exclusively for use by personnel from approved Department of Defense (DoD) and partner organizations. It is imperative to adhere strictly to DoD and federal government cybersecurity regulations pertaining to the connection of external storage devices to DoD Information Technology equipment and networks.

(U) 1.1.5 ACES Customer Support

- Normal working hours: Aeronautical Help Desk; M-F 0800-1600 CST (excluding federal holidays)
- After hours: NGA Operations Center; 24/7
  - Toll Free: 1-877-817-9134
  - Commercial: 1-314-676-5439
  - DSN: 312-846-0684/5439
  - VoIP Secure: 577-7102
  - Email: AeroHelp@nga.mil
- 1.1.5 Customer Feedback
  - NGA would like feedback regarding your experience with ACES. Please send all comments and suggestions to AeroHelp@nga.mil.

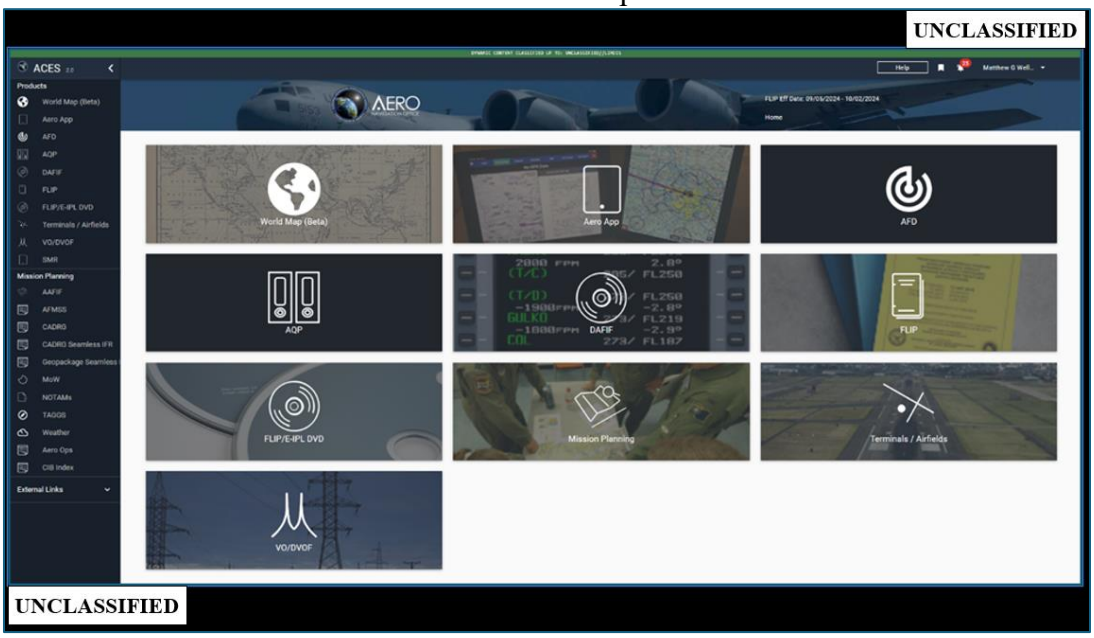
(U) Chapter 2: ACES Features and Functions

(U) 2.1 User Interface

(U) This chapter describes common elements found throughout the user interface.

(U) 2.1.1 Home Page

(U) Figure 2.1.1 illustrates the main page of the website following user authentication. It presents the primary layout of the application, where each tile on the interface serves as a hyperlink to specific modules related to either Products or Mission Planning services. Chapter 3 provides a more detailed overview of these individual products and services.



***(U) Figure 2.1.1** Front Page*

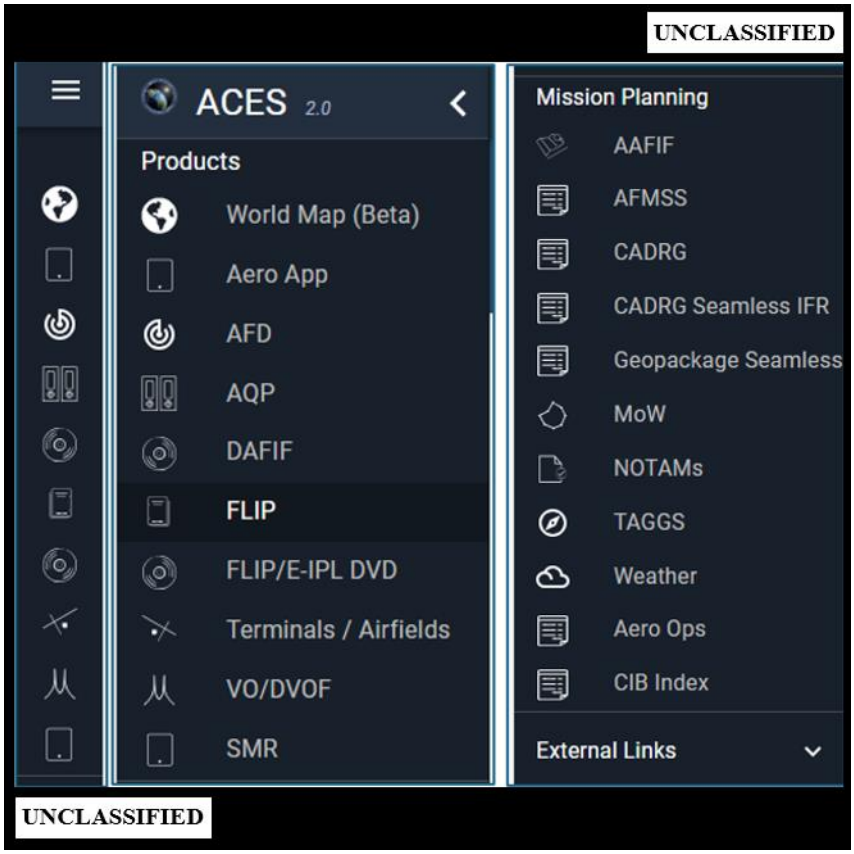
(U) 2.1.2 Cycle Indicator

(U) ACES adheres to the Aeronautical Information Regulation and Control (AIRAC) cycle, a standardized 28-day schedule for publishing aeronautical data. The AIRAC cycle is designed to ensure that changes to aeronautical information are implemented simultaneously across all nations, promoting coordination and consistency for safe aviation operations. Within the ACES platform, users can identify the current AIRAC cycle by looking at the cycle indicator located in the top-right corner of the site (as shown in Figure 2.1.2). This indicator provides the current AIRAC cycle information along with the effective date of the Flight Information Publications (FLIP). Additionally, cyclically produced products and services will have their corresponding date periods displayed in the toggle cycles menu. Section 2.1.8, *Toggle Cycles*, provides further details on cyclic date listings.

(U) ***Figure 2.1.2*** *Site Header*

(U) 2.1.3 Sidebar Navigation

(U) The navigation of ACES products and mission planning services is facilitated through two primary mechanisms. The foremost navigation method is the left-hand sidebar, as illustrated in Figure 2.1.3. This sidebar remains consistently accessible throughout the site. Users have the option to minimize the sidebar by selecting the left-pointing chevron located at the top of the sidebar, thereby concealing it from view and allocating additional screen space to the main content. When the sidebar is hidden, it can be reactivated by clicking the hamburger icon (depicted as three horizontal lines in (Figure 2.1.3) situated in the navigation bar's top left corner.

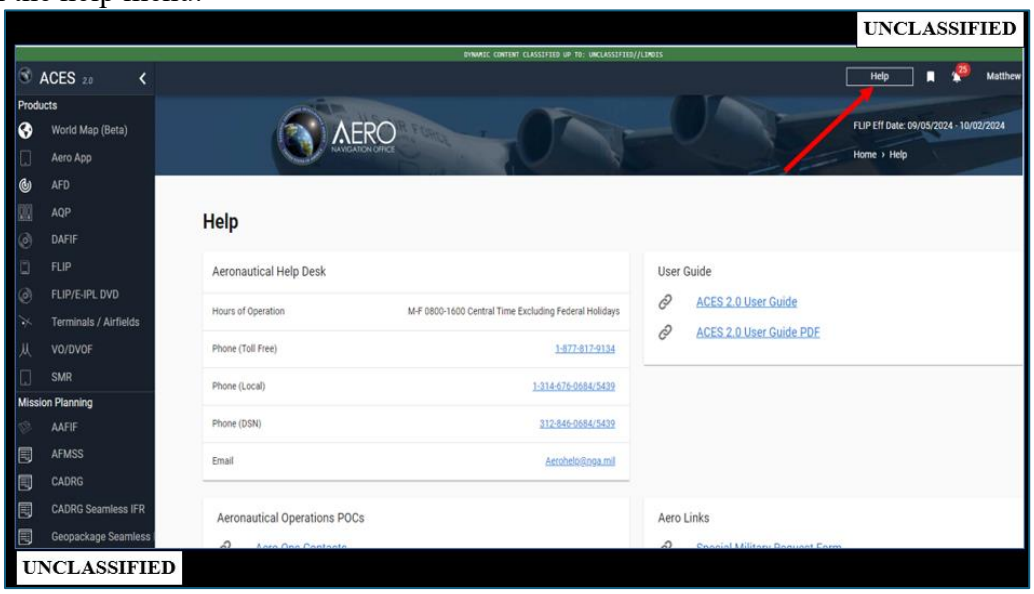


(U) ***Figure 2.1.3*** *Sidebar Navigation Views; the sidebar menus in this Figure have been split and arranged horizontally to minimize scrolling length*

(U) 2.1.4 Help Icon

(U) To access support resources, please select the *Help* icon located in the upper right corner of the screen (see Figure 2.1.4). The Help page offers contact information for the Aeronautical Help Desk, as well as designated products and mission planning points of contact

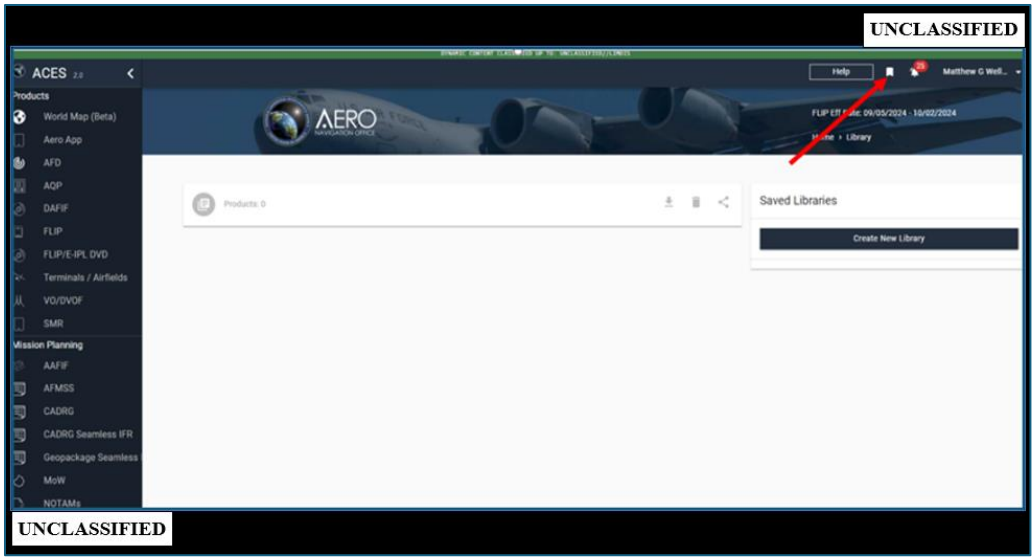
within Aero. Additionally, the page presents utility links for troubleshooting the application, and a short glossary of acronyms for frequently used terms. Users can also find access to this User Guide in the help menu.



***(U) Figure 2.1.4** Help Icon*

(U) 2.1.5 Library Icon

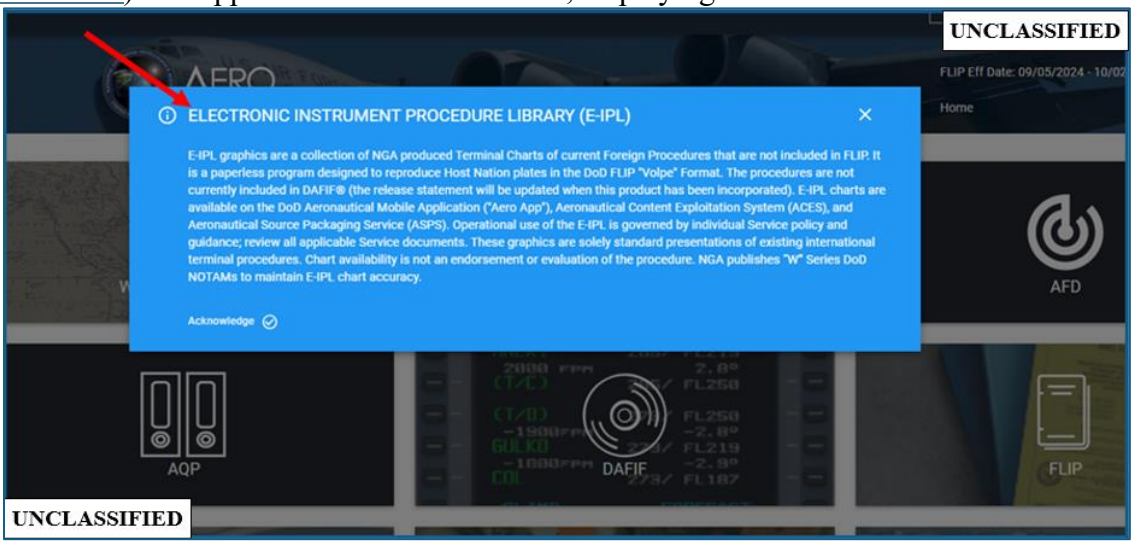
(U) The ACES library icon provides users with access to their designated *Library* collection page. This Library functions as a repository for the storage of frequently accessed or recurring aero data selections, facilitating efficient retrieval for future application. When a user's active library contains items, a red badge will appear above the library icon, indicating the number of available products (see Figure 2.1.5). Detailed guidance on the functionality of the ACES library is provided in Section 2.2, *Creating and Managing Libraries*.



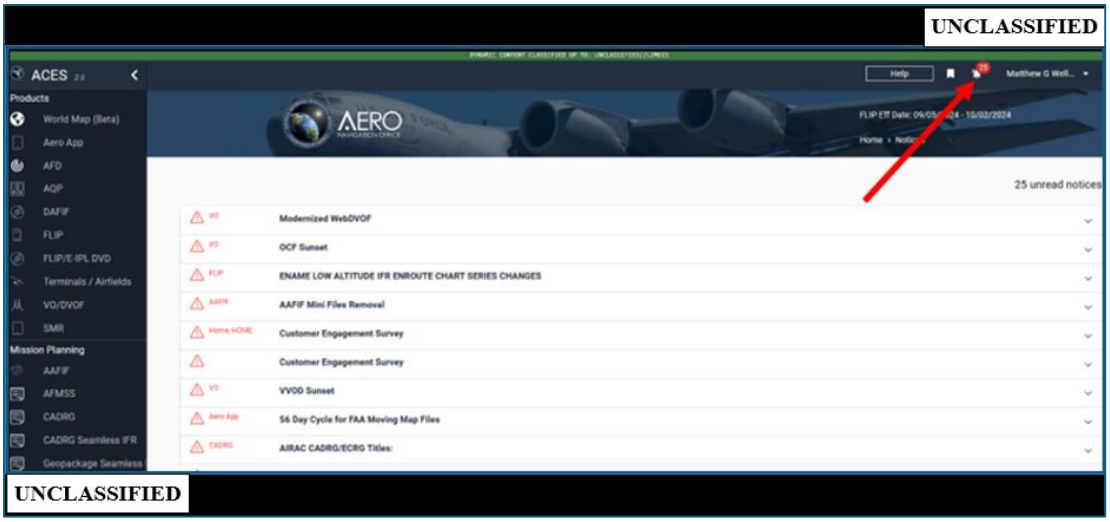
***(U) Figure 2.1.5** Library Icon*

(U) 2.1.6 Notices

(U) Critical notices are displayed upon opening an ACES product or mission planning module (refer to Figure 2.1.6). Once a user has dismissed these notices, they will not reappear. However, users can access a complete list of active notices, irrespective of their urgency or dismissal status, at any time by clicking the notices icon (Figure 2.1.6a). In instances where there are unread notices, which indicate that the user has not yet viewed a posted notice, a red badge (Figure 2.1.6a) will appear above the notice icon, displaying the total count of unread notices.



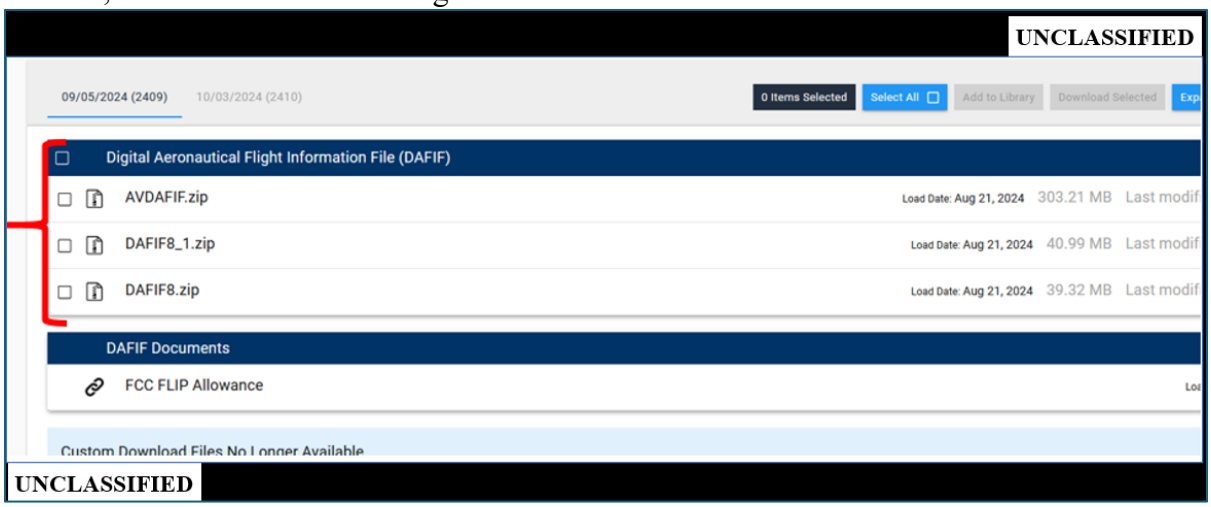
***(U) Figure 2.1.6** Critical Notices*



(U) ***Figure 2.1.6a*** *Notifications*

(U) 2.1.7 Accordions

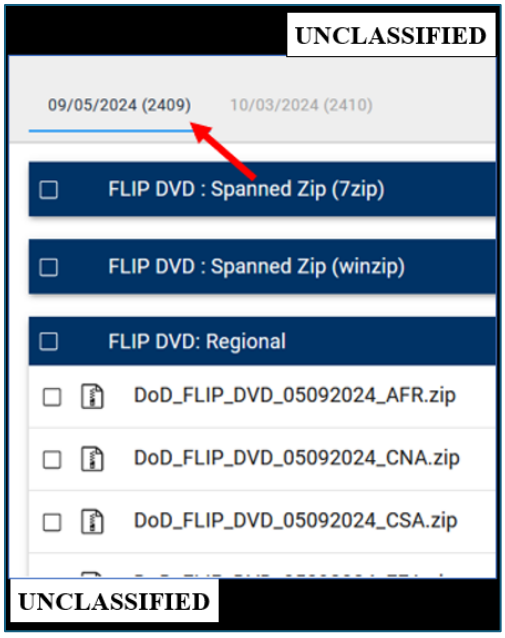
(U) The ACES documentation, product links, and data resources use an accordion format (see Figure 2.1.7). Users can toggle between expanded and collapsed states by clicking on each accordion header. Some nested accordions may require multiple expansions to access all data. Users can expand all accordions at once by clicking the *Expand All* button or collapse them using the *Collapse All* button, which is also covered in the context menu section of this guide. Each accordion resource may include properties such as a checkbox for download availability, an icon for content type (e.g., zip, pdf), a title (filename or link title), file size for downloadable resources, and an effective date range if relevant.



(U) ***Figure 2.1.7*** *Accordions*

(U) 2.1.8 Toggle Cycles

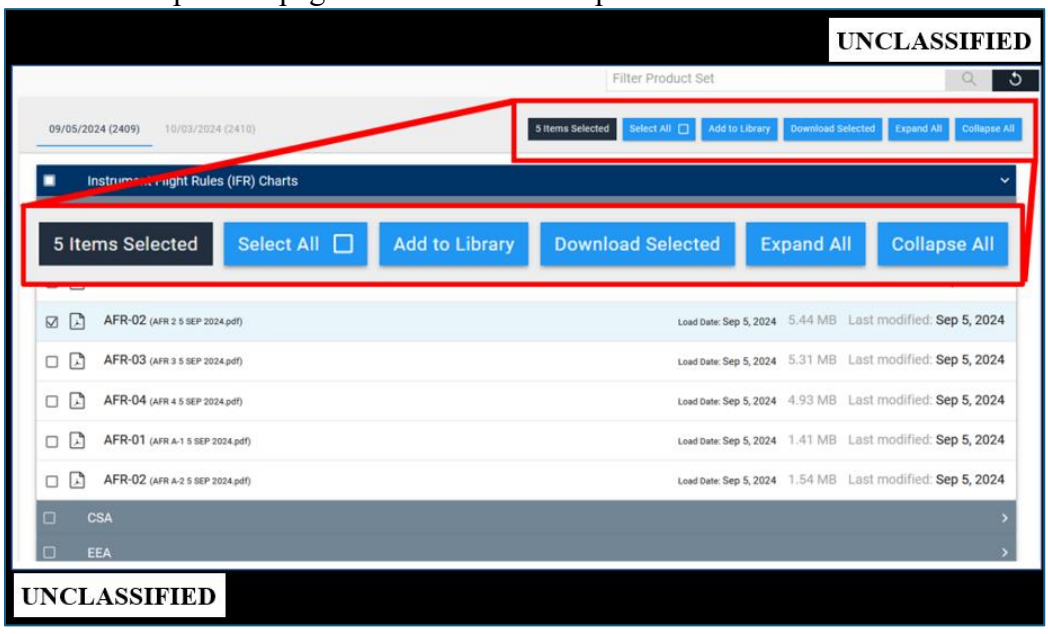
(U) In instances where the data aligns with an AIRAC cycle, the information will be displayed above the accordions (Figure 2.1.8). Users may access the files for the subsequent cycle by selecting its designated name, which is contingent upon its data releasability to the community.



***(U) Figure 2.1.8** Toggle Cycles*

(U) 2.1.9 Context Menu

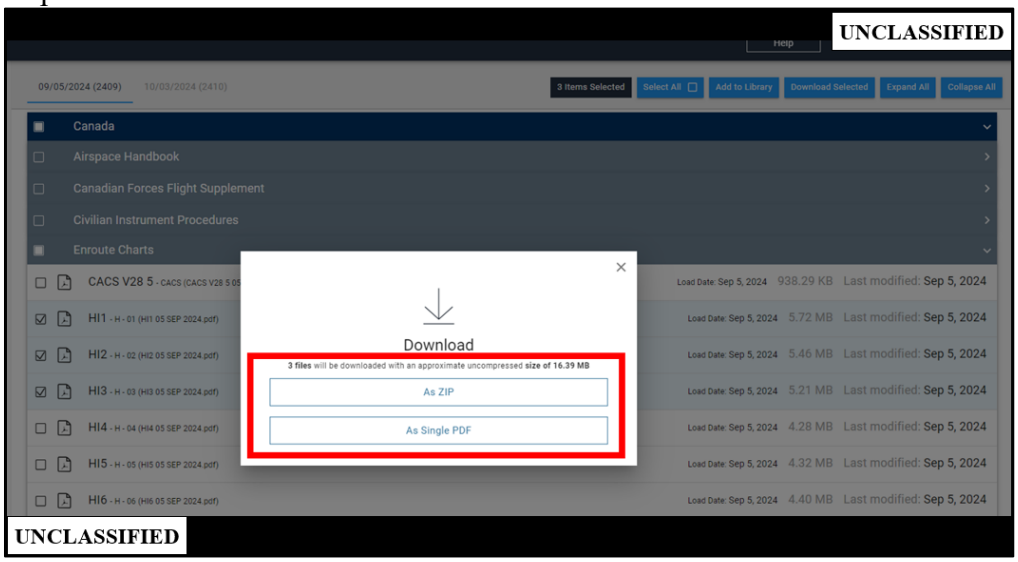
(U) The context menu (Figure 2.1.9) is accessible on all pages featuring selectable resources for download or library addition. This menu includes several functions, *Select/Deselect All*, enables users to select all compatible files or clear the current selection; *Add to Library*, allows users to incorporate currently selected resources into the active library; *Download Selected*, initiates the download dialog for the selected resources; *Expand All*, expands all accordions on the page; and *Collapse All*. minimizes all accordions. The context menu will remain fixed at the top of the page while users scroll up and down.



***(U) Figure 2.1.9** Context Menu*

(U) 2.1.10 Downloading Archives

(U) Users can download files as a merged PDF or a zipped archive. After selecting one or more files for retrieval, the, *Download Selected*, button in the context menu activates. Clicking this button opens a modal window (Figure 2.1.10). Depending on the selected resources, the modal will offer to download content *As Zip* (zip file) or *As Single PDF*, which merges multiple PDF files into one combined PDF. Once a download method is chosen, the system processes the request and provides a download link.



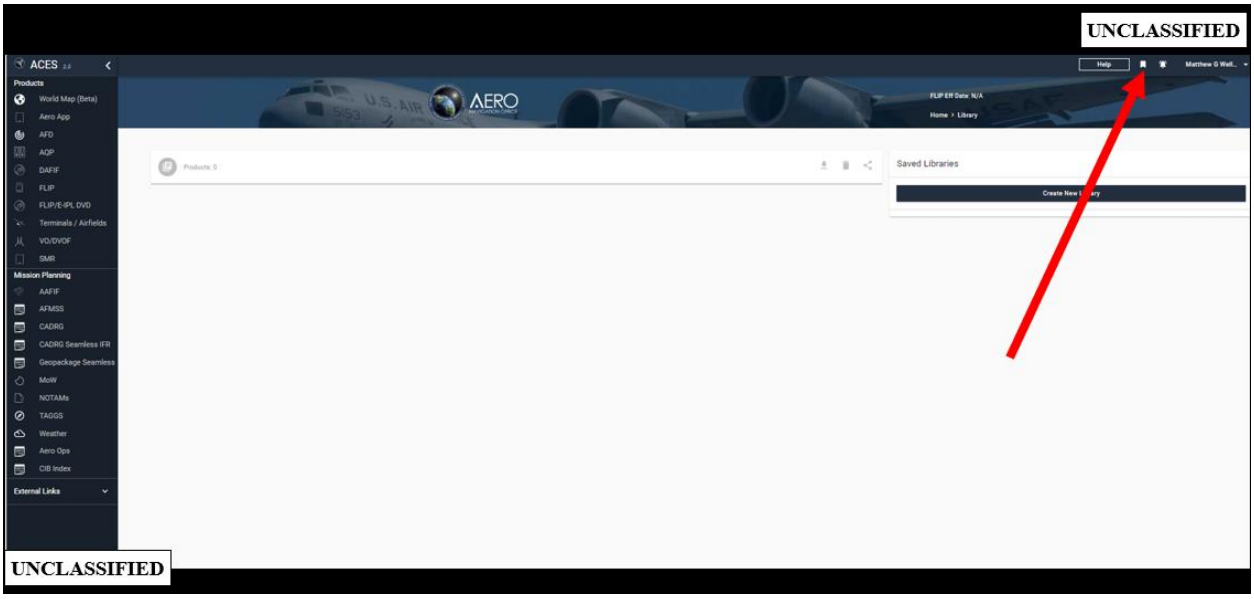
*(U) **Figure 2.1.10** Downloading Archives*

(U) 2.2 Creating and Managing Libraries

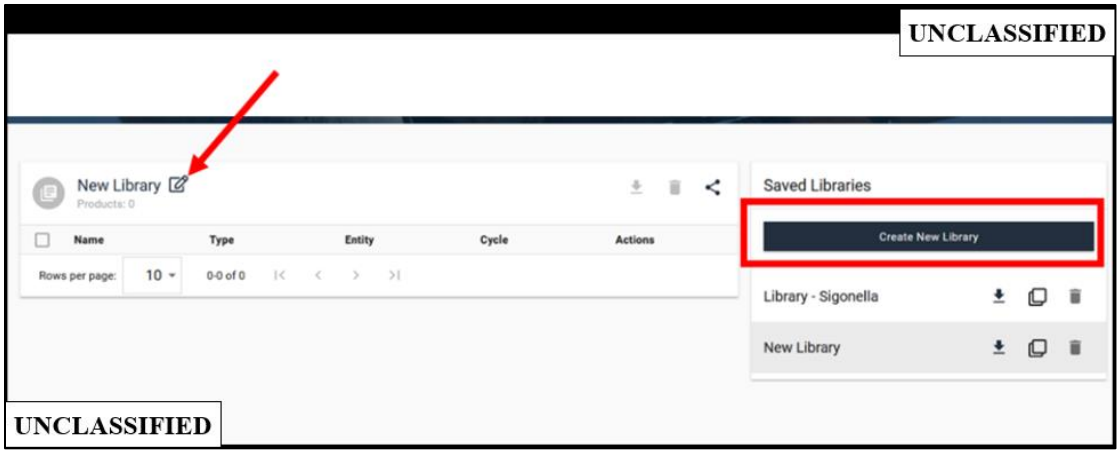
(U) The Library is a new ACES 2.0 feature. It provides a way of collecting aero resources data from multiple modules in a central location to create custom downloads which can be retained for later use. For example, files from FLIP, DAFIF, and AQP can be added to a library to create a customized download zip archive. A user may also create multiple libraries for different mission sets to aid in future resource retrieval.

(U) 2.2.1 Creating a Library

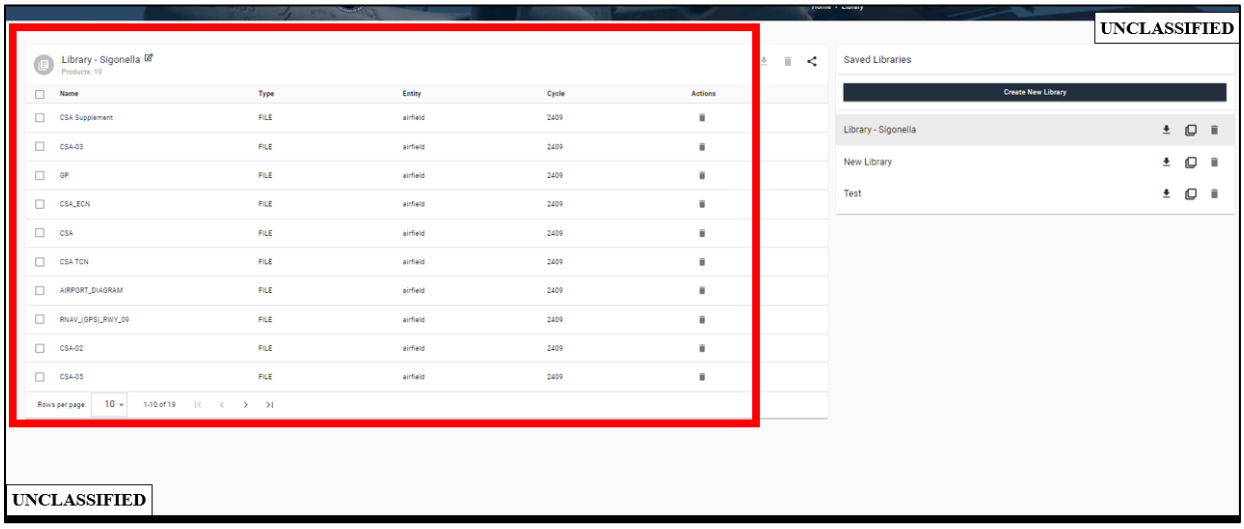
(U) Users can create multiple libraries in their collection, but only one can be active at any given time. To create a new library, click the Library icon (Figure 2.2.1) and select the, *Create New Library*, button (Figure 2.2.1a), where you will have the option to name the library using the red arrow depicted in Figure 2.2.1a. After you activate your library, you can begin adding files. To activate a library, go to the Library page by clicking the Library icon and select your desired library from the, *Saved Libraries*, panel; the active library will always display on the left side of the library screen (observed in Figure 2.2.1b).



(U) Figure 2.2.1 *Library Icon*



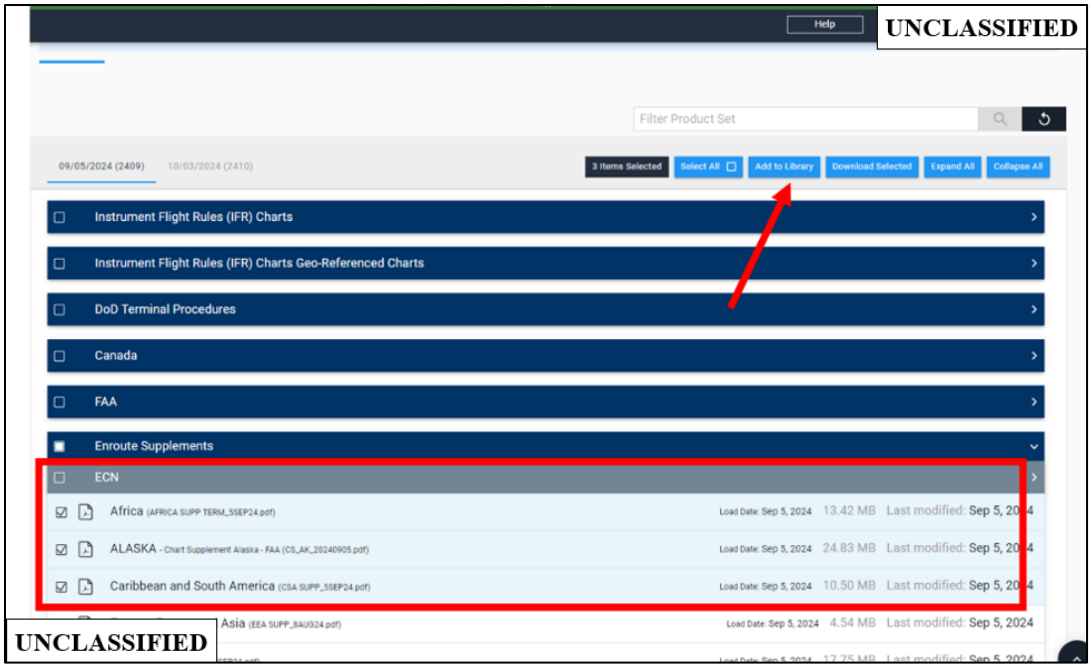
(U) Figure 2.2.1a *Creating a New Library*



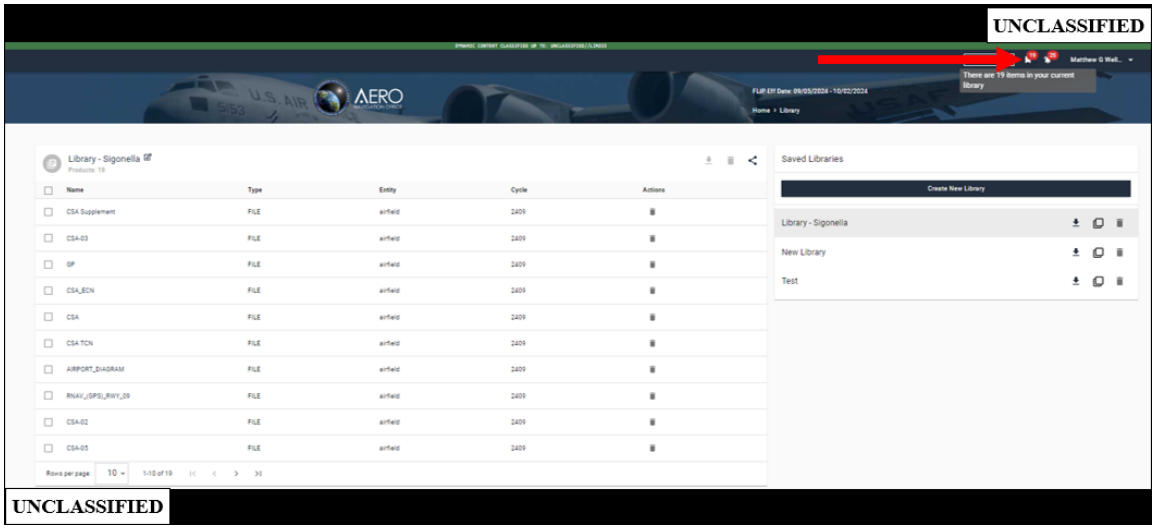
(U) Figure 2.2.1b *Active Library*

(U) 2.2.2 Adding products to a Library

(U) Users may enhance their active library by incorporating multiple data sets or files. Upon selecting menu items through the accordion and context menu, users are presented with the option to click, *Add to Library* (Figure 2.2.2). The library icon, located in the upper right corner of the interface, will automatically update to reflect the total number of items currently available in the active library (Figure 2.2.2a). By clicking on the Library icon, users can access the Library page for data retrieval.



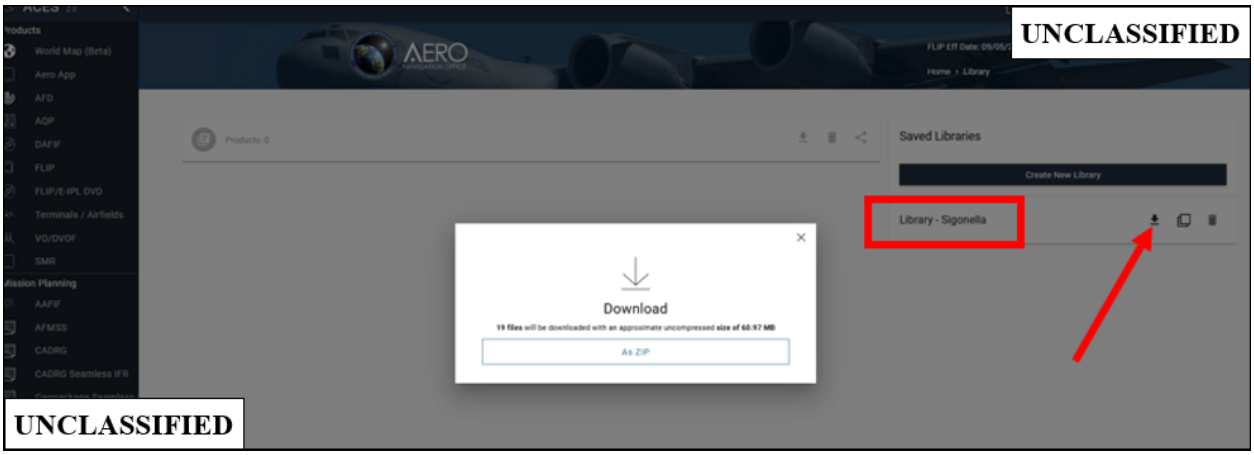
(U) ***Figure 2.2.2*** *Adding products to a Library*



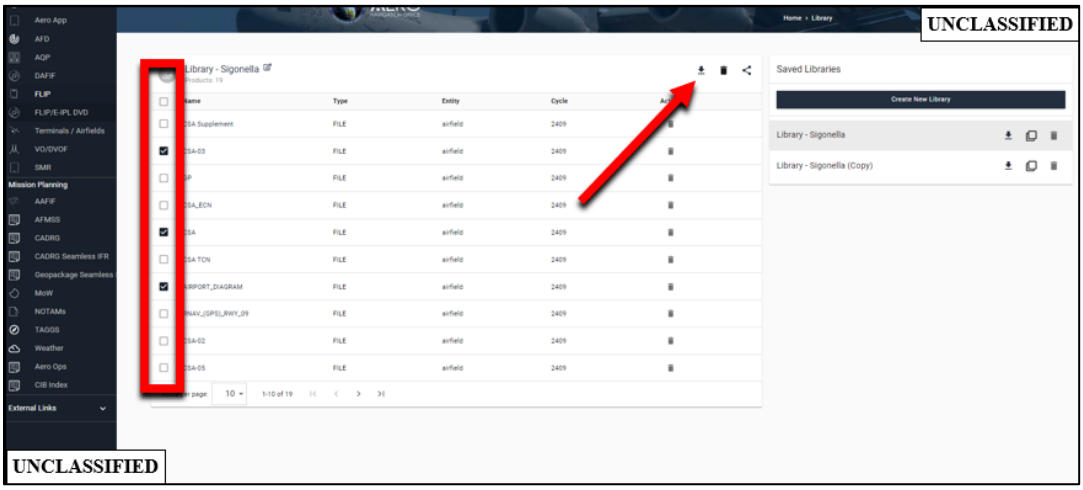
(U) ***Figure 2.2.2a*** *Total items in active library*

(U) 2.2.3 Downloading a Library

(U) To initiate the download of all products stored in a single library collection, access the Library page by selecting the library icon (Figure 2.2.1) and subsequently click the download icon associated with the target library (refer to Figure 2.2.3). This action will prompt the download dialog window. Aside from a bulk library collection download, users may also compile a download package by selecting individual files from a collection and then clicking the download icon located to the right of the title in the active Library panel (see Figure 2.2.3a). To view or download a single product, simply click its title in the active library panel.



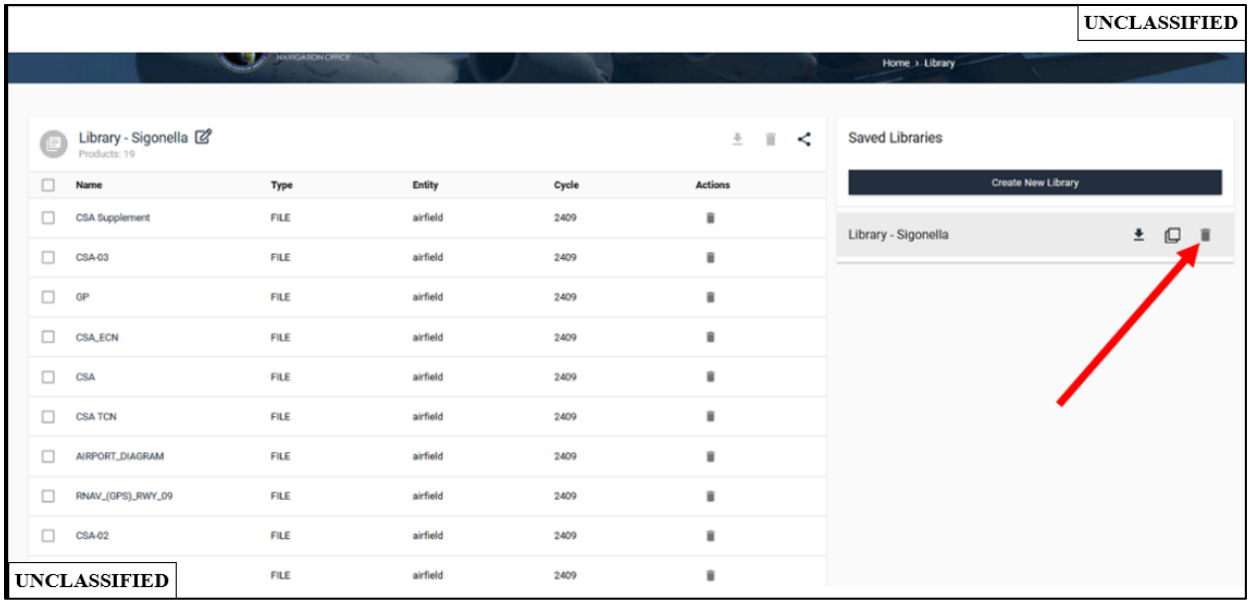
(U) ***Figure 2.2.3*** *Downloading a Library*



(U) ***Figure 2.2.3a*** *Downloading select Library files as a zip archive*

(U) 2.2.4 Deleting a Library

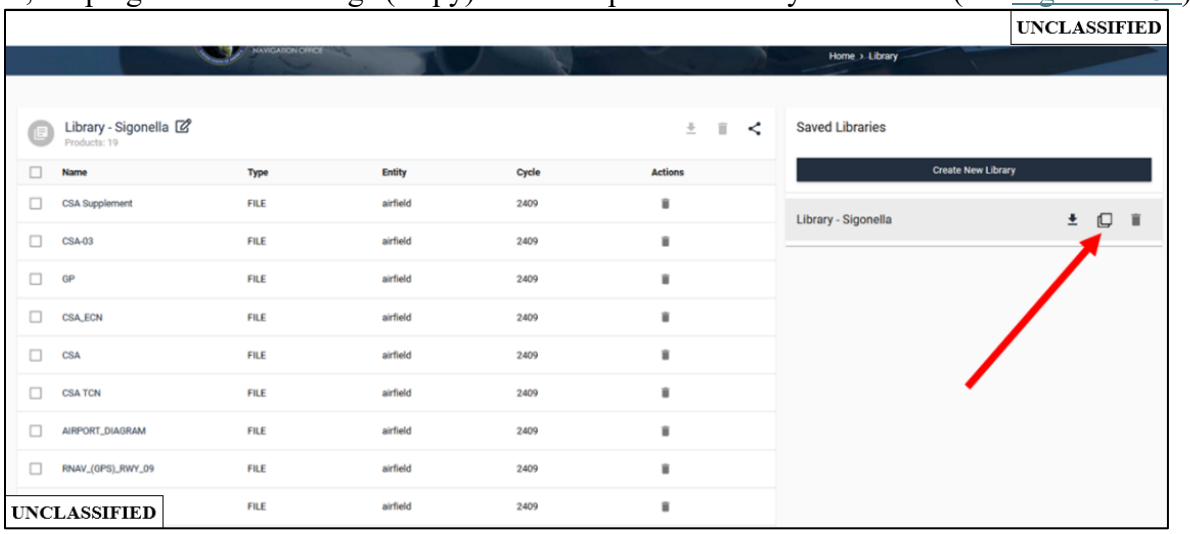
(U) From the library page, users can delete library collections. From the *Saved Libraries* panel, identify the library you wish to delete and click the delete icon (trash can) adjacent to the library's name, as illustrated in Figure 2.2.4. Additionally, users may remove individual products from a library collection by clicking the trash can icon to the right of a file name.



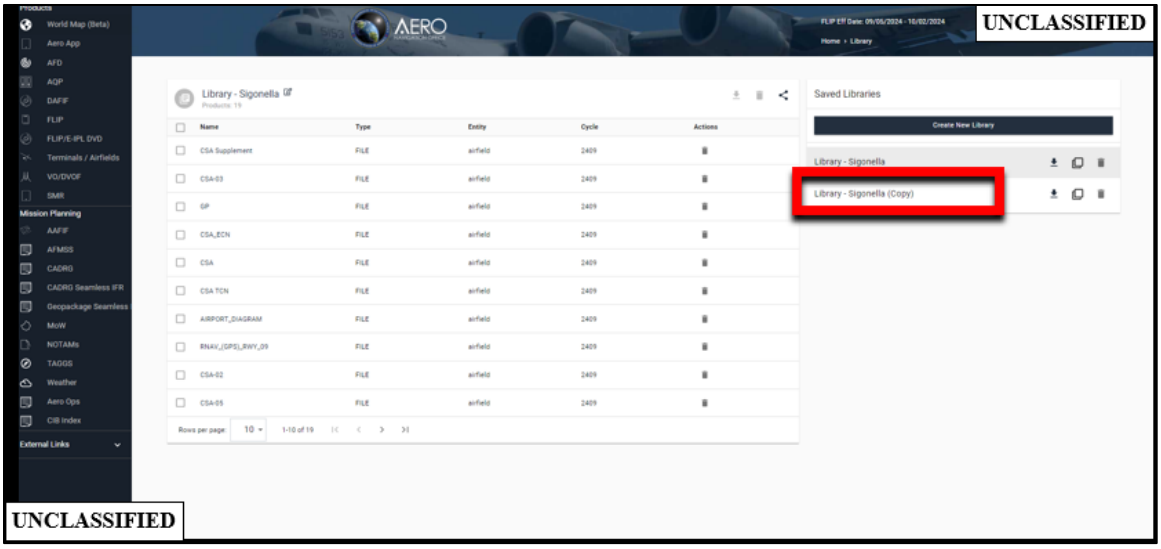
(U) ***Figure 2.2.4*** *Deleting a Library*

(U) 2.2.5 Copying a Library

(U) From the library page, users can copy an existing library collection with the same contained files. Users should identify the desired collection for copy and click the square copy icon (see red arrow in Figure 2.2.5). The system will duplicate the selected library and its internal files , keeping the while adding "(Copy)" to the duplicated library's filename (see Figure 2.2.5a).



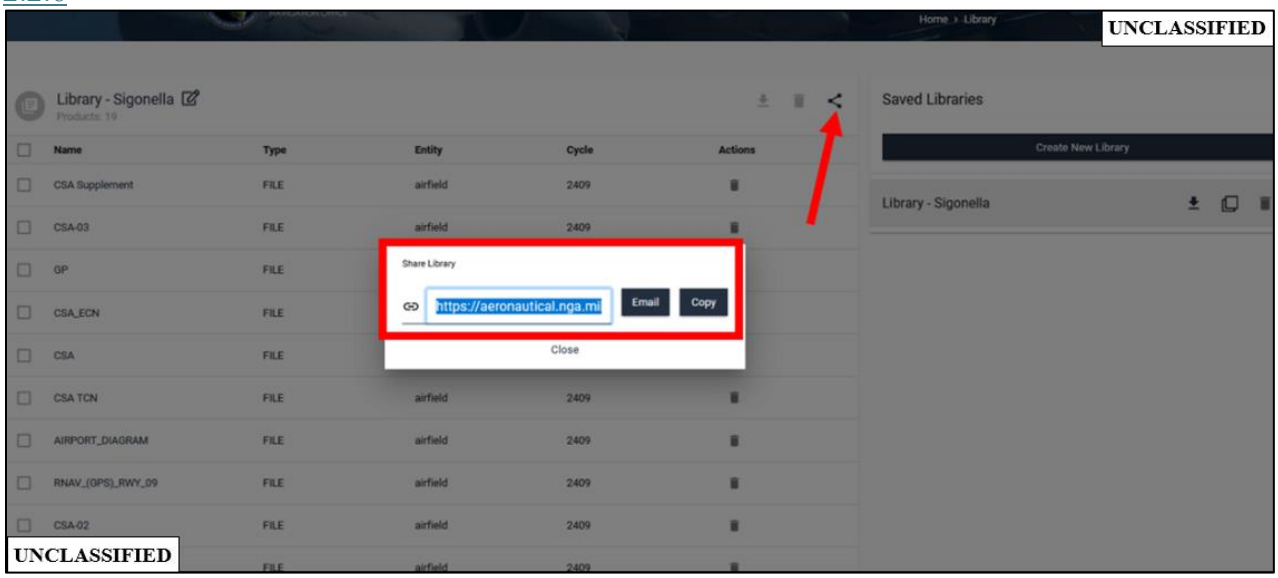
(U) ***Figure 2.2.5*** *Copying a Library*



(U) ***Figure 2.2.5a*** *Duplicated Library Example*

(U) 2.2.6 Sharing a Library

(U) From the library page, users may share libraries and the containerized files to other individuals. Users should activate the desired library for sharing and click the share icon as depicted by the red arrow in Figure 2.2.6. A pop-up window will then display options to either copy the library link or to open an email draft pre-populated with the library link (see Figure 2.2.6



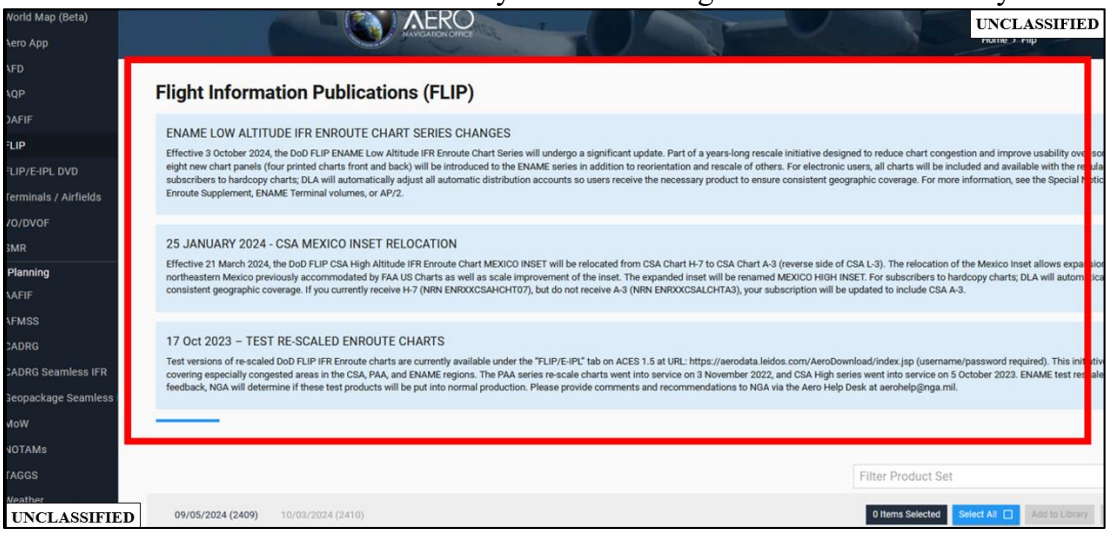
(U) ***Figure 2.2.6*** *Sharing a Library*

(U) Chapter 3: Products, Mission Planning, and External Links

(U) This section provides a functionality overview of products mission planning, and external links.

(U) 3.1 Module Notices

(U) Modules may display notifications pertaining to that module at the top of the module page (example shown in Figure 3.1). Such notices serve to inform stakeholders about new product and service releases, significant updates, and impending decommissioning of scheduled products. Additionally, these communications may be used to facilitate solicitation of user feedback in order to enhance service delivery and ensure alignment with community needs.

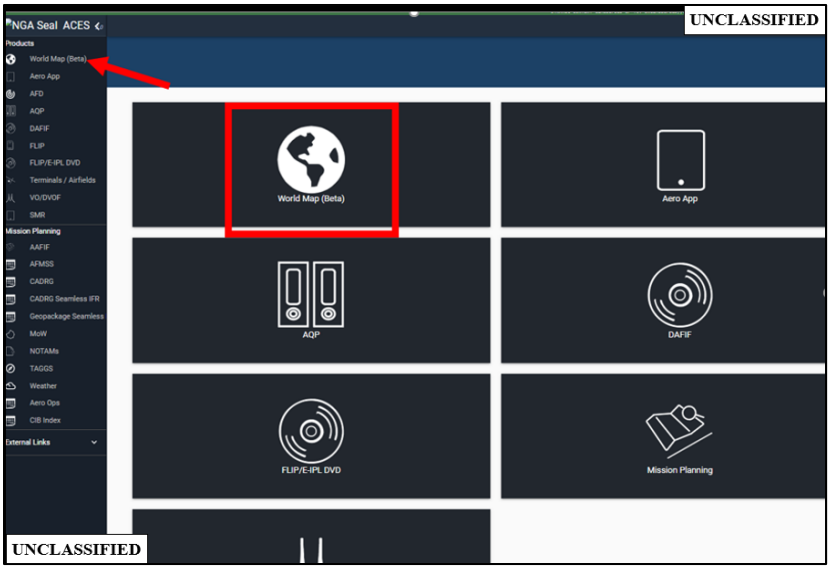


*(U) **Figure 3.1** Module Notices*

(U) 3.2 Products

(U) 3.2.1 World Map

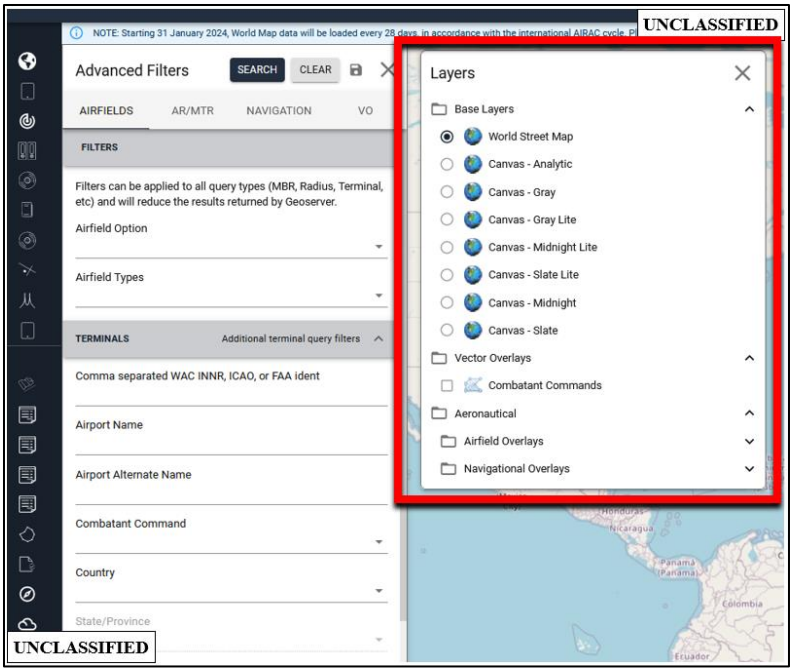
(U) The World Map is a new beta module accessible within ACES (Figure 3.2.1). The tool (Figure 3.2.1a) serves as a moving mapping interface designed to provide users with a streamlined spatial research interface capable of displaying ACES aeronautical data. World Map data is loaded every 28 years in accordance with the AIRAC cycle. The website is accessible both through the ACES module on the homage page, and also by opening https://aeronautical.nga.mil/worldmap.



***(U) Figure 3.2.1** World Map Module*

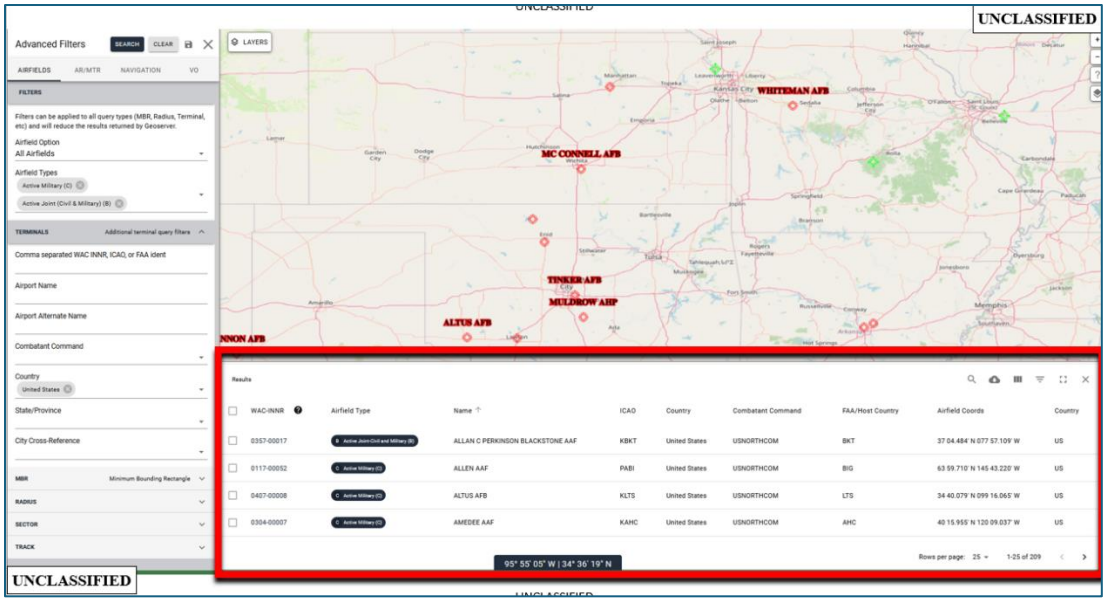
***(U) Figure 3.2.1a** World Map interface*

(U) Base Map Layers - The World Map website offers a variety of base map layers, including but not limited to *World Street Map*, *Canvas Gray*, *Canvas Midnight*, and *Canvas Slate*; see Figure 3.2.1b for full list. These layers can be opened through the Base Map Layers menu interface in the upper left corner, just to the right of the Advanced Filters navigation bar (depicted in Figure 3.2.1a).



***(U) Figure 3.2.1b** World Map Base Map Layers*

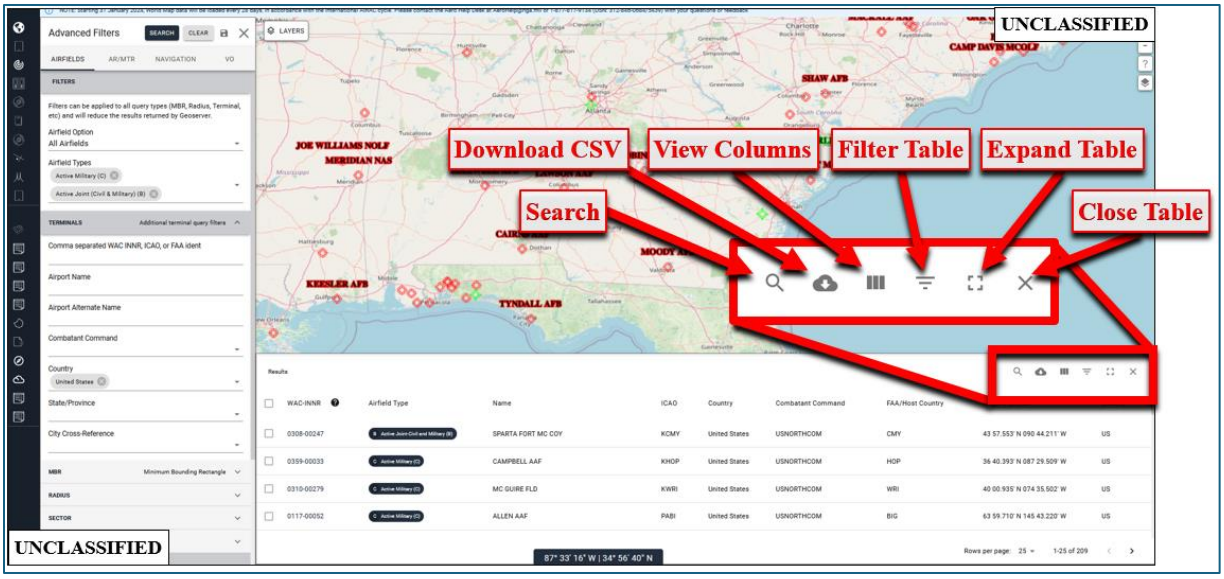
(U) Search Results Bar - found at the bottom of the interface (Figure 3.2.1c) serves as a table output for any specified data query type (Airfields, AR/MTR, Navigation, etc). Users have the option to download a range of files from these boxes using applicable buttons, such as shapefiles and KML's. The availability of data downloads depends on the outputted data type within the table and what has been selected. Users can select or deselect files using the checkboxes on the far left of the table. For Airfield displayed results, users have the additional option to select an airfield's WAC-INNR within the table. Doing so redirects the users to the ACES *Terminals/Airfield* module, allowing users to utilize the context and accordion menu to retrieve AFD shapefiles, enroute charts, procedures, supplements, and other aeronautical data specific to that airfield.



***(U) Figure 3.2.1c** Search Results Bar*

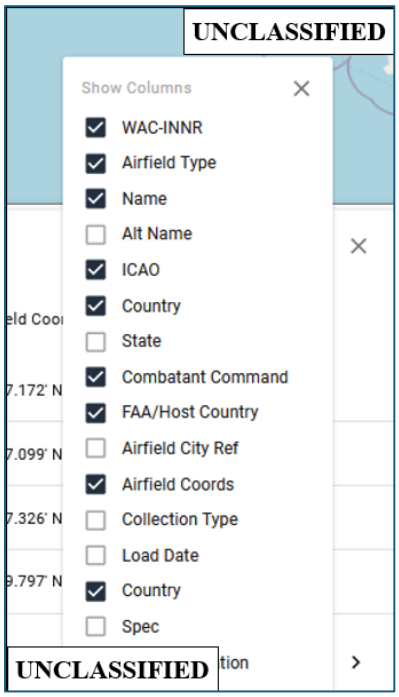
(U) Search Results Bar Table Buttons – users are presented a range of buttons within the search results bar table. These include:

- *Search* icon (magnifying glass) – allows users to query for data contained within the existing table results
- *Download CSV* icon – allows users to download the table as a CSV file
- *View Columns* icon (Figure 3.2.1e) – allows users to add additional fields to the table, or remove existing fields, thereby creating a more tailored table to user mission needs
- *Filter Table* icon (Figure 3.2.1f) - provides additional ways to filter down table results (Figure 3.2.1f), such as filtering by Airfield Name, WAC-INNR, runway length and width, etc.
- *Expand Table* icon – makes the table full screen
- *Close Table* icon – closes/removes the table view

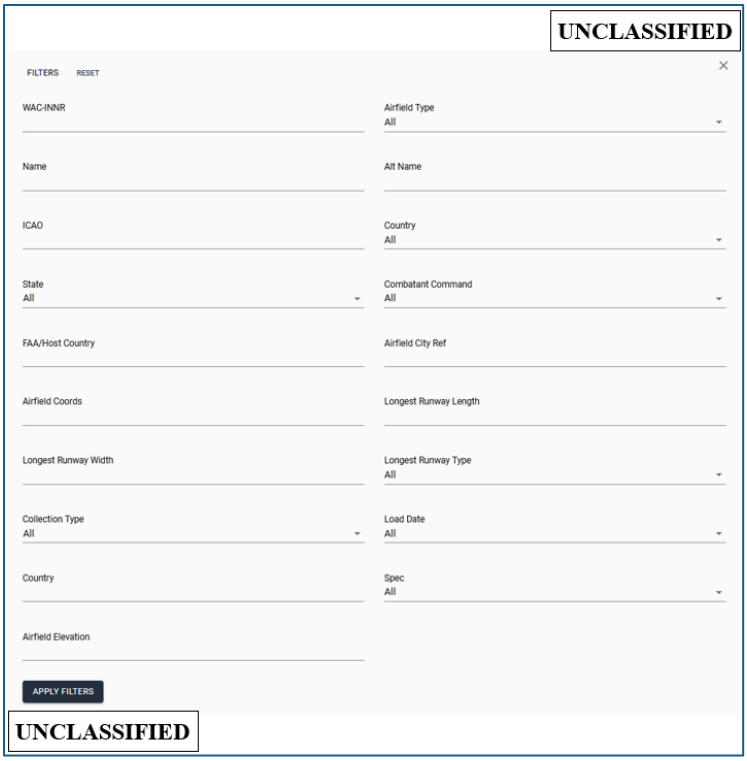


***(U) Figure 3.2.1d** Search Results Bar Table Buttons*

(U) Users also have the option to click the *View Columns* button (Figure 3.2.1d) to add additional table fields, such as alternate airfield names or collection date (see Figure 3.2.1e).

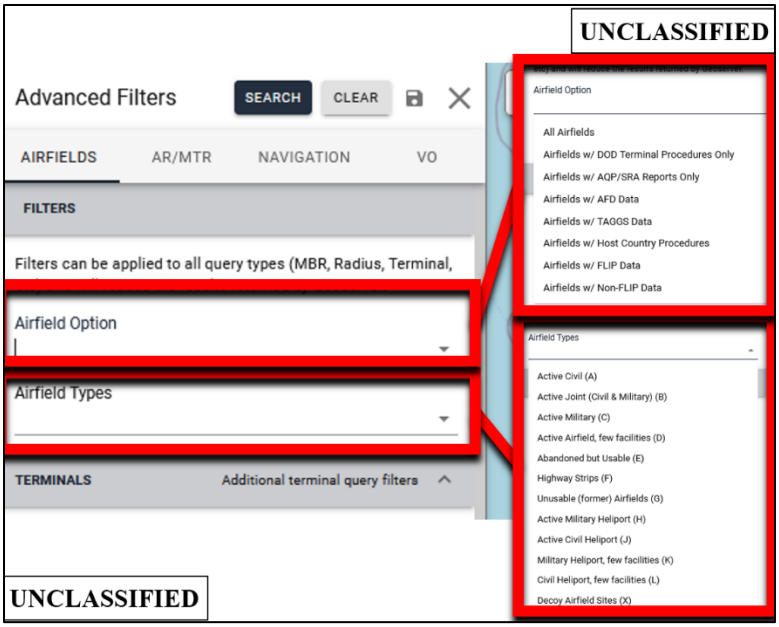


***(U) Figure 3.2.1e** View Columns Button Options*



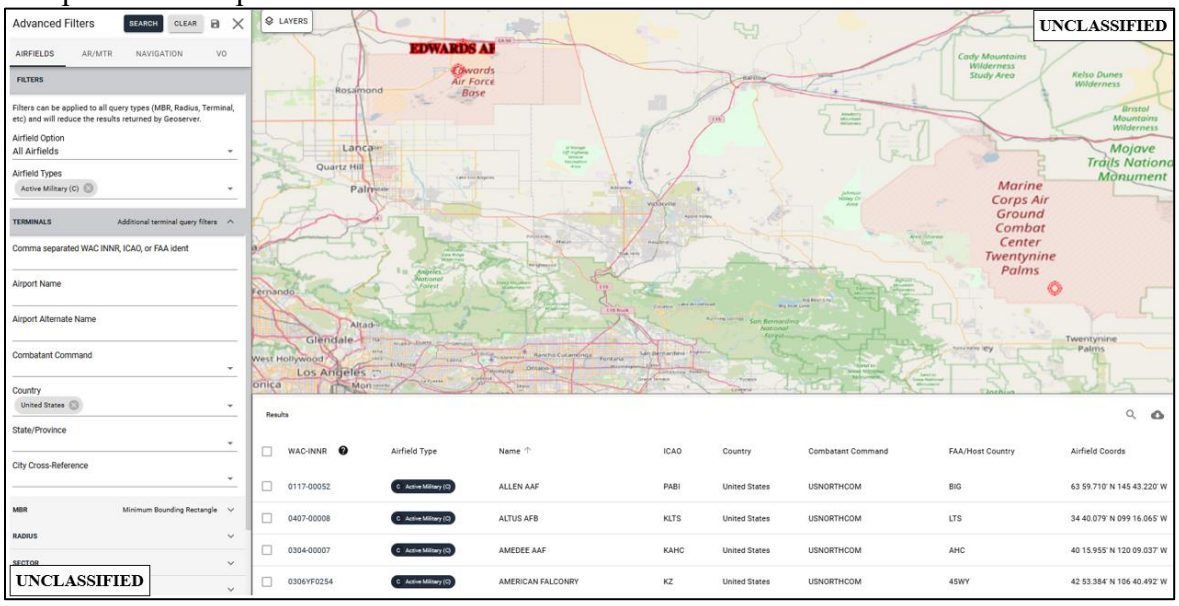
***(U) Figure 3.2.1f** Filter Table menu within Search Results Bar*

(U) Advanced Filters / Airfield - Filters (Figure 3.2.1g**) –** All searches for any airfield in the World Map module must provide inputs to this field in order to generate an airfield output. Users have the ability to refine/filter airfield queried results by utilizing various Airfield Options and Airfield Types. The available selections include but are not limited to *All Airfields*, *Airfields with AFD data*, *Airfields with TAGGS data*, *Active Military Airfields*, *Active Civil Airfields* (see Figure 3.2.1g for the full list of options). Users can also select multiple items from the drop-down list to customize their mission needs.



(U) Figure 3.2.1g *Advanced Filters / Airfield - filters*

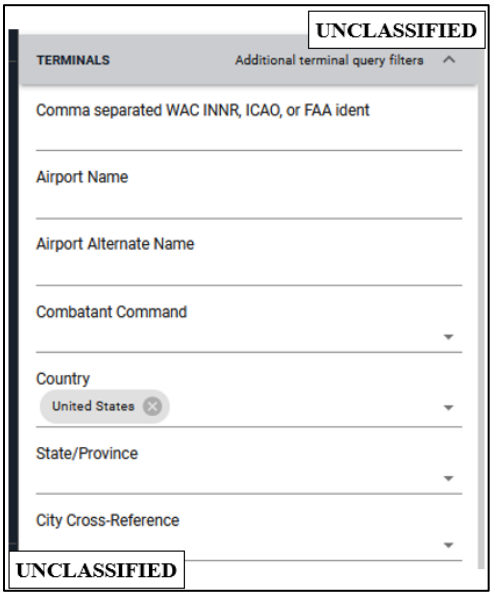
(U) Figure 3.2.1h provides an example of a query output of a search for *All Airfields & Active Military Airfields* using the Advanced Filters / Airfield search menu. The results are displayed both spatially and in the search results bar. Users should note the search bar table at the bottom is not driven or actively filtered by the mapping interface view. However, the map does show all table results that fall within the visible portion of map.



(U) Figure 3.2.1h *Airfield query results depicted on the map*

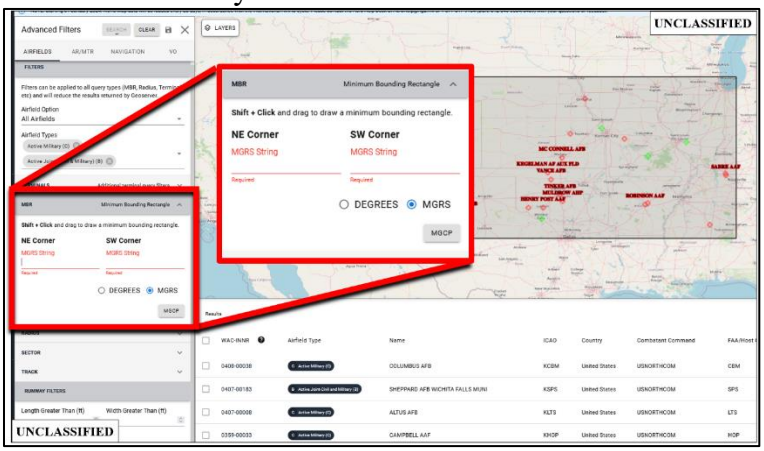
(U) Advanced Filters / Airfield - Terminals – users can also search for individual or a range of specific airfields using WAC INNR, ICAO, or FAA identifier (Figure 3.2.1i). When searching for multiple airfields, users are required to separate their inputs by comma. Users can

also search for terminals by airport name, airport alternate names, Combatant Command (i.e. USNORTHCOM, USSOUTHCOM, USEUCOM, etc), as well as Country, State/Province, or City Cross Reference.



***(U) Figure 3.2.1i** Advanced Filters / Airfield – Terminal's filter*

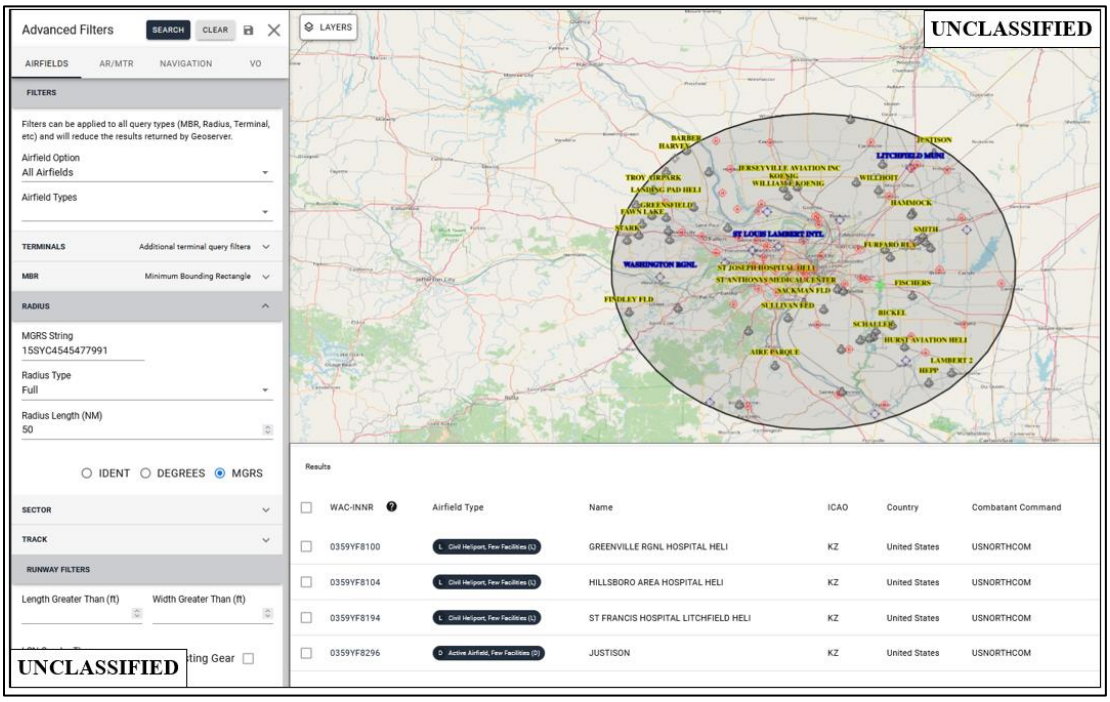
(U) Advanced Filters / Airfield - MBR – users can also spatially filter by a Minimum Bounding Rectangle (MBR) (Figure 3.2.1j), either by inputting geographic degrees or MGRS corner coordinates (Northeast and Southwest) into the MBR filter field, or by pressing *Shift* on their keyboard, then left clicking and dragging a box over the map, and then hitting search on the Advanced Filters panel. This allows you to locate and filter airfields inside the MBR.



***(U) Figure 3.2.1j** MBR Query results*

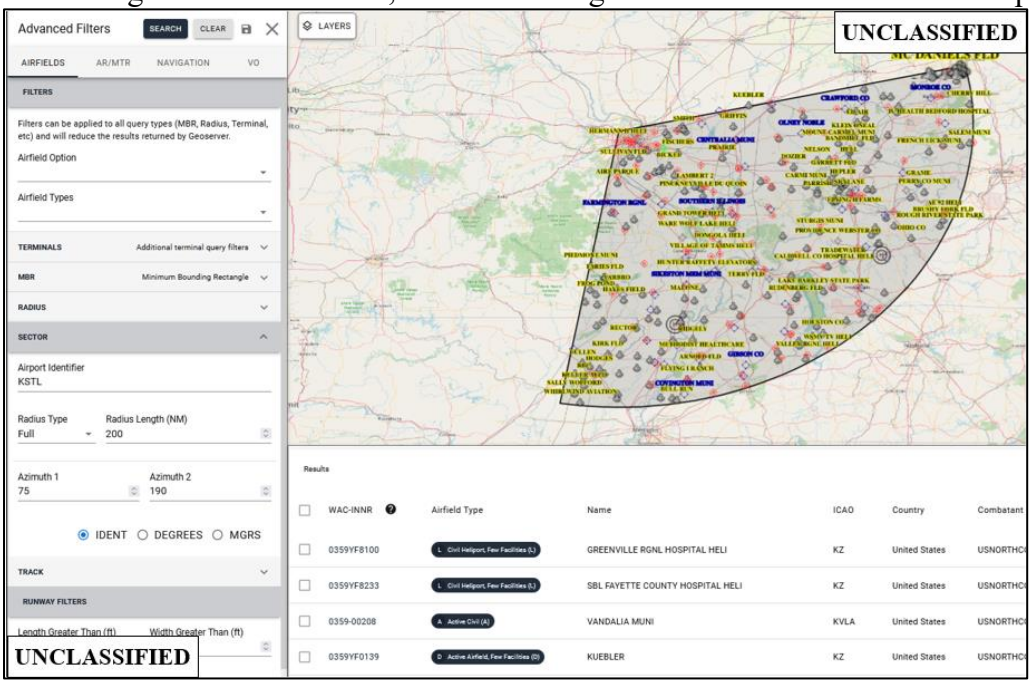
(U) Advanced Filters / Airfield - Radius – users can also spatially filter airfields by radius (Figure 3.2.1k), by inputting either geographic degrees, MGRS, or airport identifier, and then selecting the radius type (full or ring), and then inputting the selected radius distance in nautical miles, and then hitting search on the Advanced Filters panel. A ring style radius allows

users to select an inner and outer ring, and only display airfields in between those range values, whereas the full style shows all airfields within the radius.



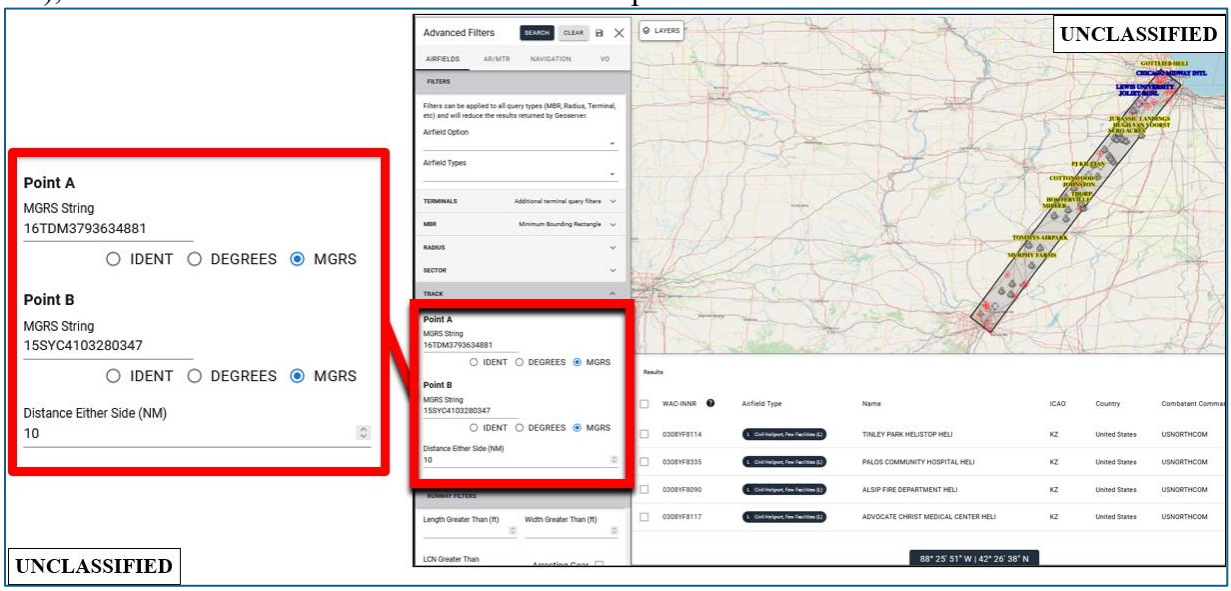
***(U) Figure 3.2.1k** Advanced Filters / Airfield - Radius (Full style) results*

(U) Advanced Filters / Airfield - Sector – users can spatially filter airfields by sector (Figure 3.2.1l), by inputting either airport identifier, geographic degrees, or MGRS, and then inputting two sector azimuth's as measured from the inputted point, and then inputting the selected radius length in nautical miles, and then hitting search on the Advanced Filters panel.



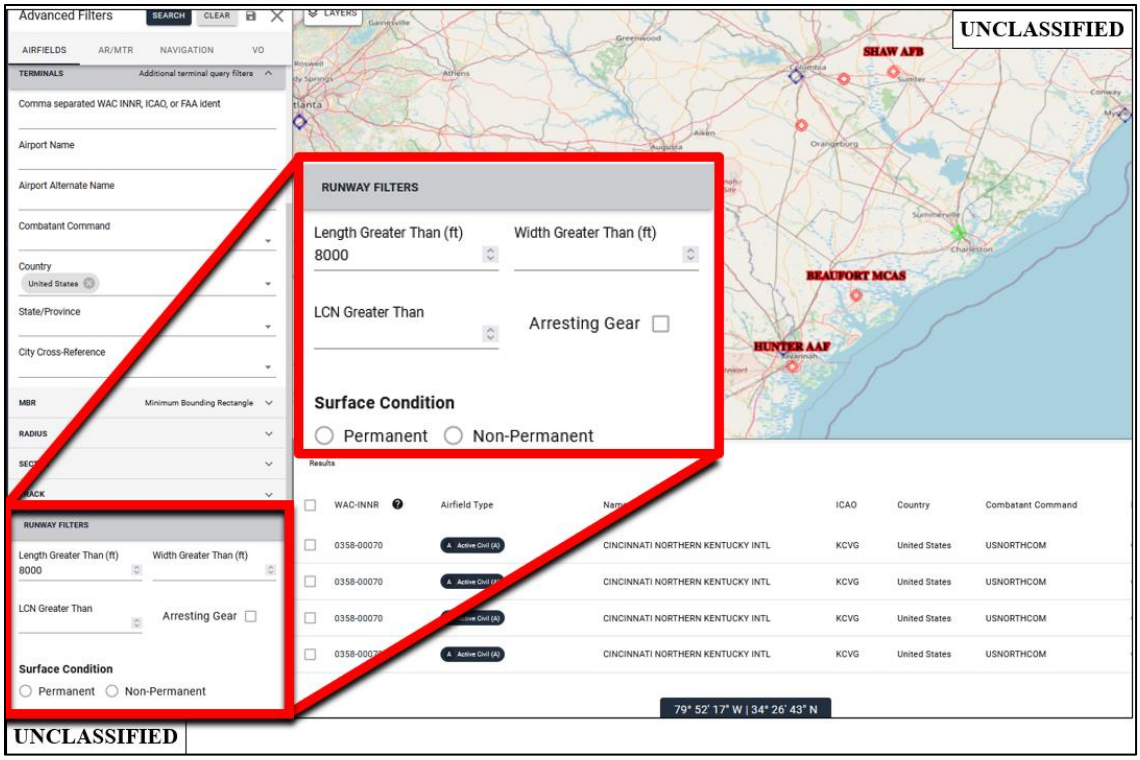
(U) ***Figure 3.2.1l*** *Advanced Filters / Airfield - Sector results*

(U) Advanced Filters / Airfield - Track – Users can spatially filter airfields by track (Figure 3.2.1m). To do this, input in the *Point A* field either the airport identifier, degrees, or MGRS for a track starting location, and one of those same selections in *Point B* for the endpoint of the track. From there, input the selected track width in nautical miles (distance from either side), and then hit search on the Advanced Filters panel.



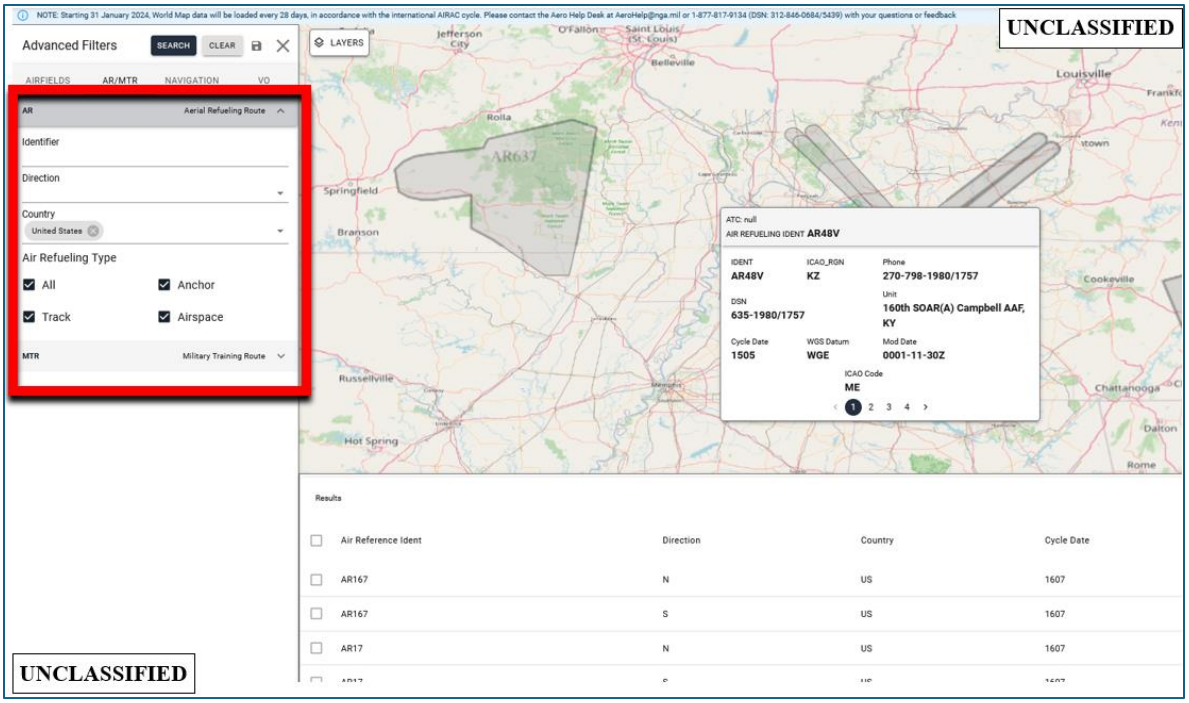
(U) ***Figure 3.2.1m*** *Advanced Filters / Airfield - Track results*

(U) Advanced Filters / Airfield – Runway Filters – Users can also filter airfield search results by runway length (feet), width (feet), and LCN (Figure 3.2.1n). The menu also provides a checkbox to filter airfields possessing Arresting Gear. Users can also utilize this filter to limit queried results to airfields capable of or greater than a specific LCN value. The surface condition (permanent and non-permanent) can also be selected as an output result. The example below shows only airfields greater than 8,000 ft length over a region encompassing Belgium.



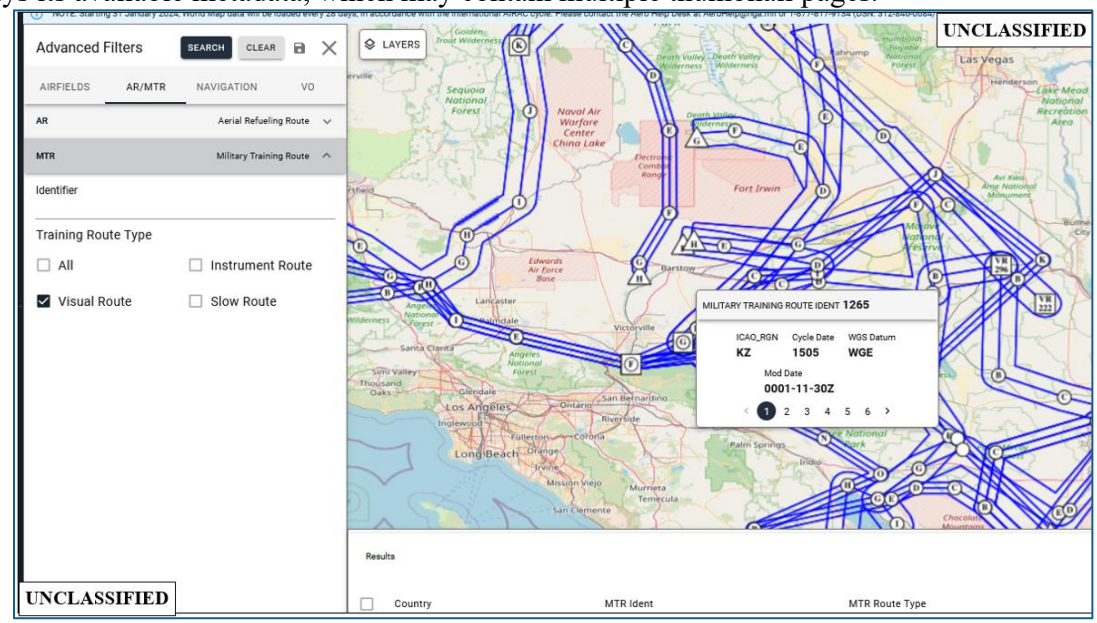
(U) Figure 3.2.1n *Advanced Filters / Airfield – Runway Filters*

(U) Advanced Filters / AR/MTR – AR – users can visually display and filter Air Refueling (AR) routes (Figure 3.2.1.o) by inputting either the AR identifier, cardinal direction (North, South, East, West, NW, SW, etc), Country, and Air Refueling Type (All, Anchor, Track, or Airspace). Clicking on an AR graphic displays its available metadata, which may contain multiple thumbnail pages with data like unit, POC contact information, cycle date, etc.



***(U) Figure 3.2.1o** Advanced Filters / AR/MTR – AR*

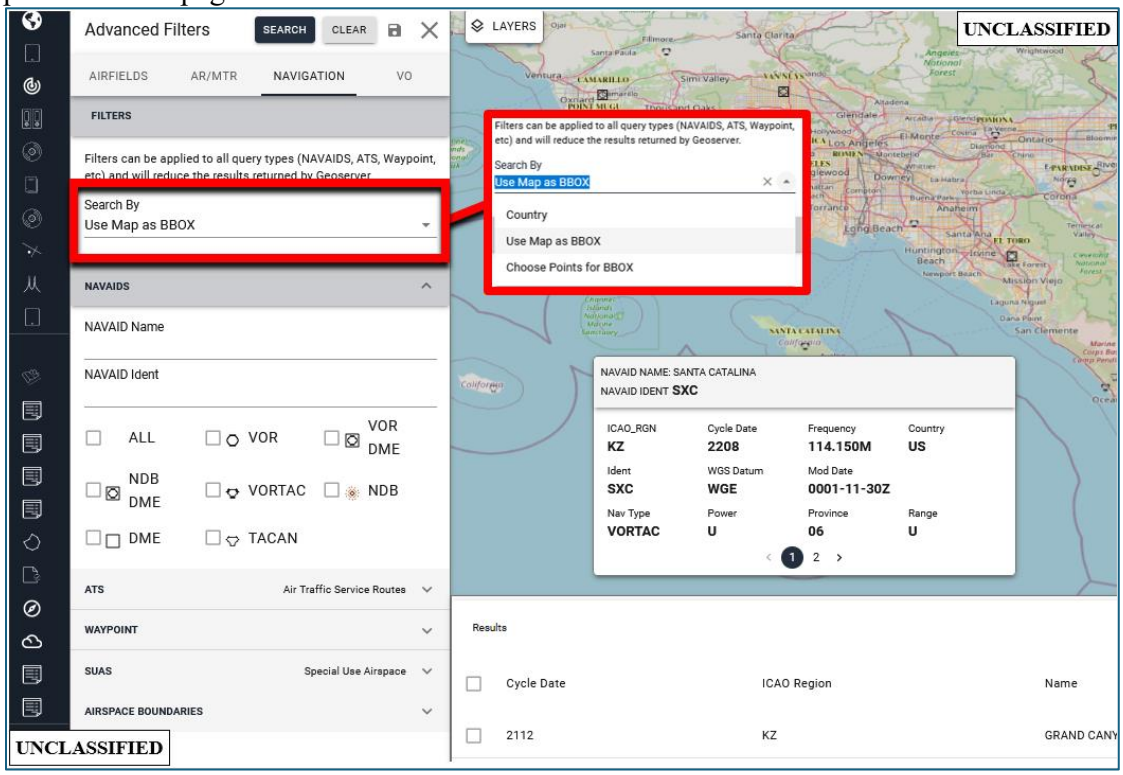
(U) Advanced Filters / AR/MTR – MTR – users can visually display and filter Military Training Routes (Figure 3.2.1.p) by inputting either the MTR identifier, and selecting the appropriate Training Route Type (All, Instrument Route, Visual Route, Slow Route). Clicking on an MTR displays its available metadata, which may contain multiple thumbnail pages.



***(U) Figure 3.2.1p** Advanced Filters / AR/MTR – MTR*

(U) Advanced Filters / Navigation – Filters – All searches for any NAVAIDS must first include this field as an input. Users can visually display and filter NAVAIDS (Figure 3.2.1q) by

querying them by country, by the user's current map display selected as a bounding box (BBOX), or by enabling the user to establish a bounding box by holding *Shift* on the keyboard and then left clicking the mouse to drag a BBOX. Users can then hit search on the Advanced Filters menu to visually display NAVAIDS. Clicking on a NAVAID icon displays its metadata, which may contain multiple thumbnail pages.

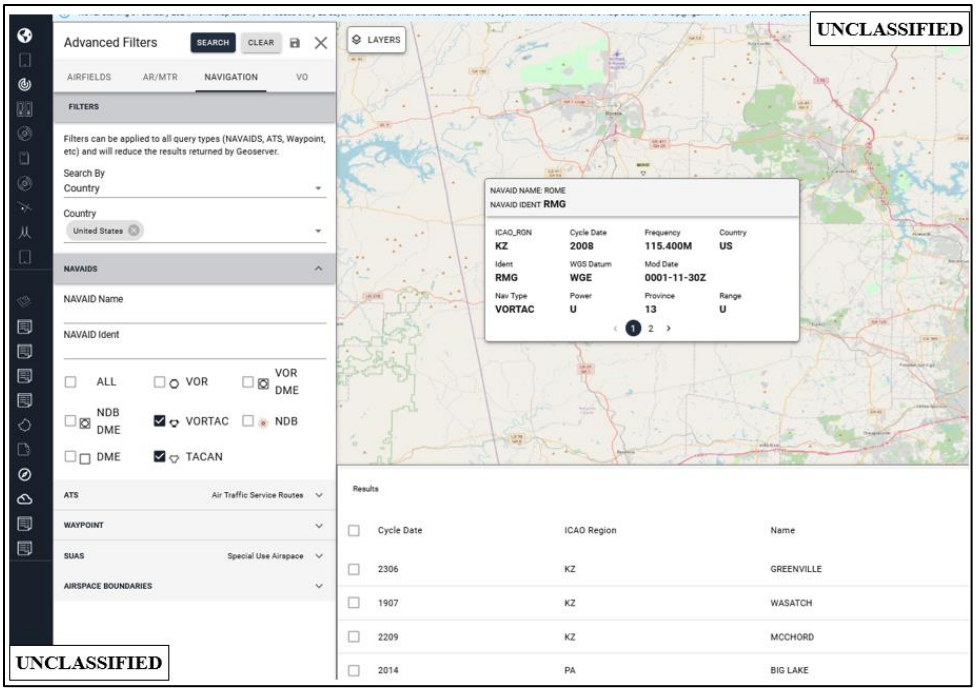


***(U) Figure 3.2.1q** Advanced Filters / Navigation – Filters*

(U) Advanced Filters / Navigation – NAVAIDS – users can filter NAVAIDS initiated in the previous step by NAVAIDS Name, NAVAID identification, or selecting one or multiple items from the following NAVAID categories below:

- All
- VHF Omnidirectional Range (VOR)
- VHF Omnidirectional Range/Distance Measuring Equipment (VOR DME)
- Non-Directional Radio Beacon Distance Measuring Equipment (NDB DME)
- Very High Frequency Omnidirectional Radio Range Tactical Air Navigation Aid (VORTAC)
- Non-Directional Radio Homing Beacon (NDB)
- Distance Measuring Equipment (DME)
- UHF Tactical Air Navigation Aid (TACAN)

(U) Clicking on a NAVAID icon displays its metadata, which may contain multiple thumbnail pages. Figure 3.2.1r shows an example of VORTAC and TACAN NAVAIDS.

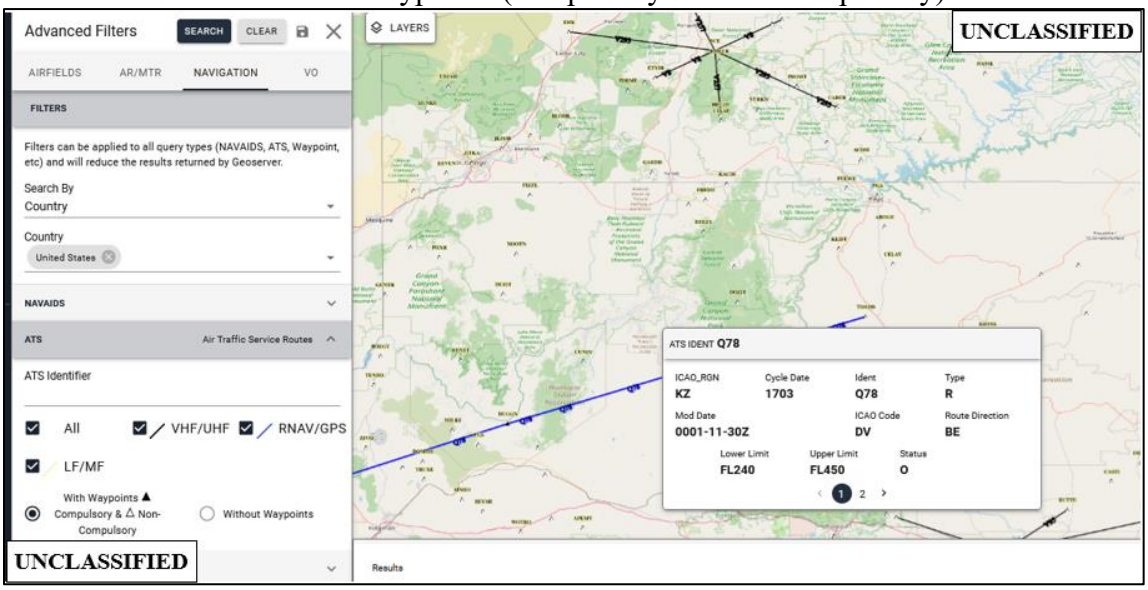


***(U) Figure 3.2.1r** Advanced Filters / Navigation – NAVAIDS*

(U) Advanced Filters / Navigation – ATS – users can filter NAVAIDS by Air Traffic Services (ATS) routes (Figure 3.2.1s). The menu allows users to display one or all the following routes:

- Very High Frequency / Ultra High Frequency (VHF/UHF)
- Area Navigation / Global Positioning System (RNAV/GPS)
- Low Frequency / Medium Frequency (LF/MF)

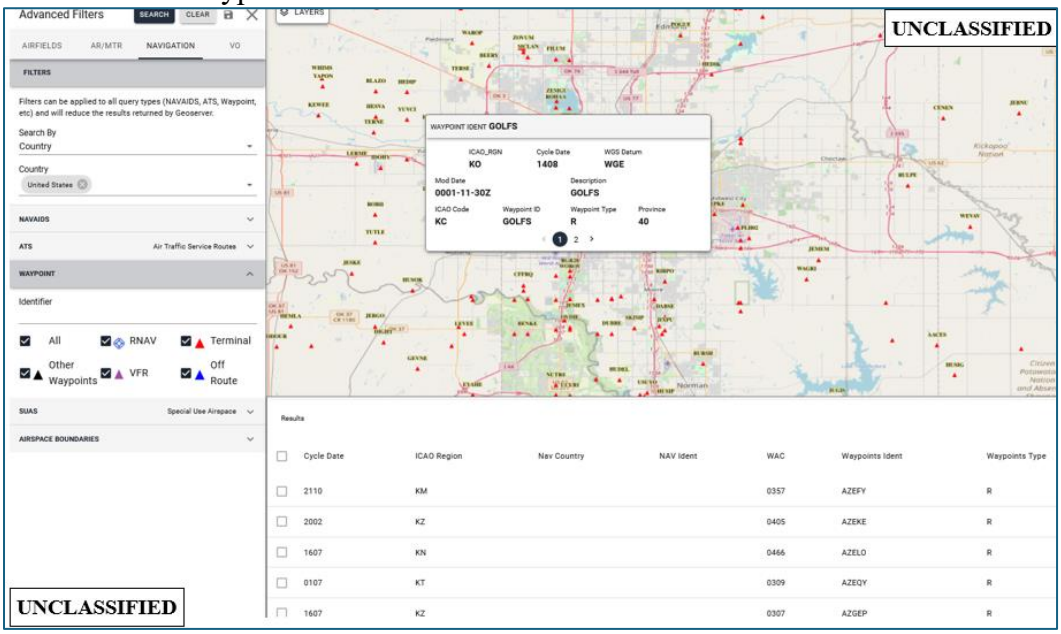
(U) Clicking on a ATS icon displays its metadata, which may contain multiple thumbnail pages. Users can also filter with waypoints (compulsory and non-compulsory) or without.



***(U) Figure 3.2.1s** Advanced Filters / Navigation – Filters*

(U) Advanced Filters / Navigation – Waypoint – this menu allows users to filter NAVAIDS by the following categories, or waypoint identifier. Clicking on a NAVAID icon (Figure 3.2.1t) displays its metadata, which may contain multiple thumbnail pages:

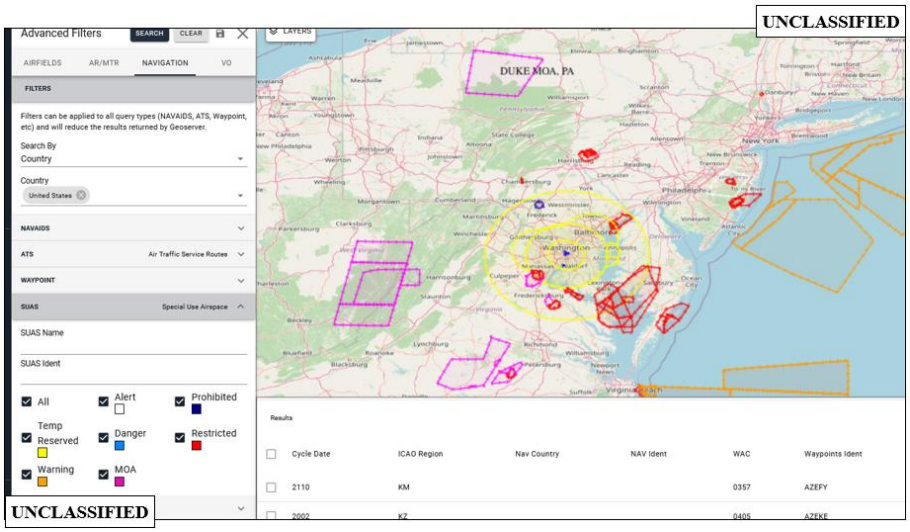
- Area Navigation (RNAV)
- Terminal, Visual Flight Rules (VFR)
- Off Route
- Other Waypoints



***(U) Figure 3.2.1t** Advanced Filters / Navigation – Waypoint*

(U) Advanced Filters / Navigation – SUAS – users can display and filter Special Use Airspace restrictions (Figure 3.2.1u) by selecting one or multiple items from the following categories within the SUAS field:

- Alert
- Prohibited
- Temp Reserved
- Danger
- Restricted
- Warning
- Military Operations Areas (MOA)

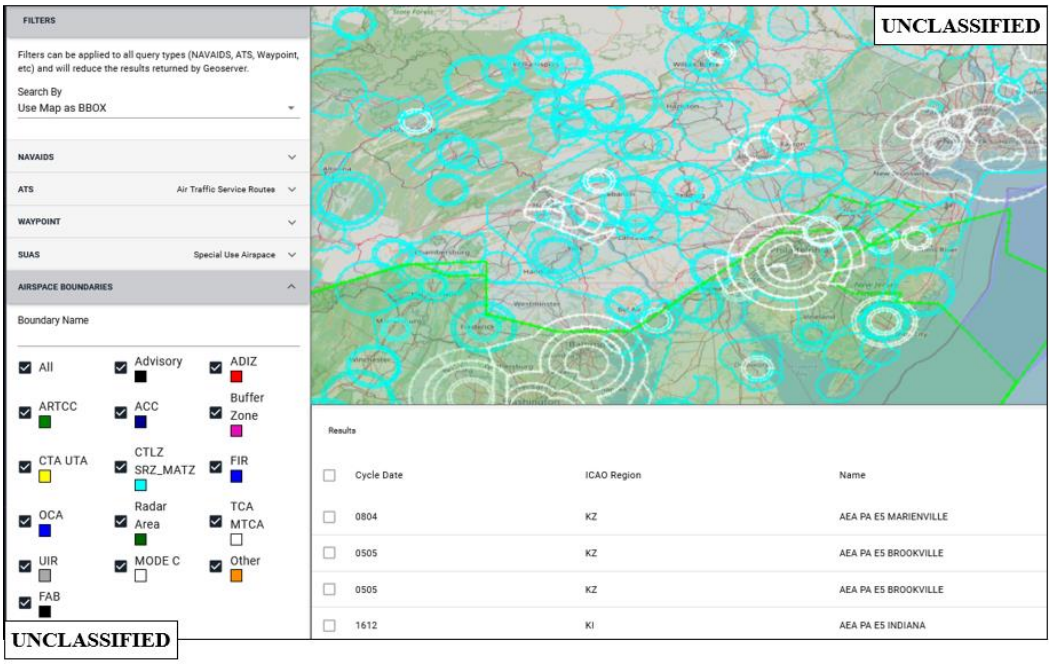


***(U) Figure 3.2.1u** Advanced Filters / Navigation – SUAS*

(U) Advanced Filters / Navigation – Airspace Boundaries – users can filter airspace boundaries (Figure 3.2.1v) by selecting one or multiple items from the following categories within the Airspace Boundaries field:

- Advisory
- Air Defense Identification Zone (ADIZ)
- Air Route Traffic Control Center (ARTCC)
- Area Control Center (ACC)
- Buffer Zone
- Control Area Upper Control Area (CTA UTA)
- Control Zone, Special Rules Zone, Military Aerodrome Traffic Zone (CTLZ SRZ MATZ)
- Flight Information Region (FIR)
- Oceanic Control Area (OCA)
- Radar Area, Terminal Control Area Minimum Terrain Clearance Altitude (TCA MTCA)
- Upper Flight Information Region (UIR)
- MODE C
- Functional Airspace Blocks (FAB)
- Other

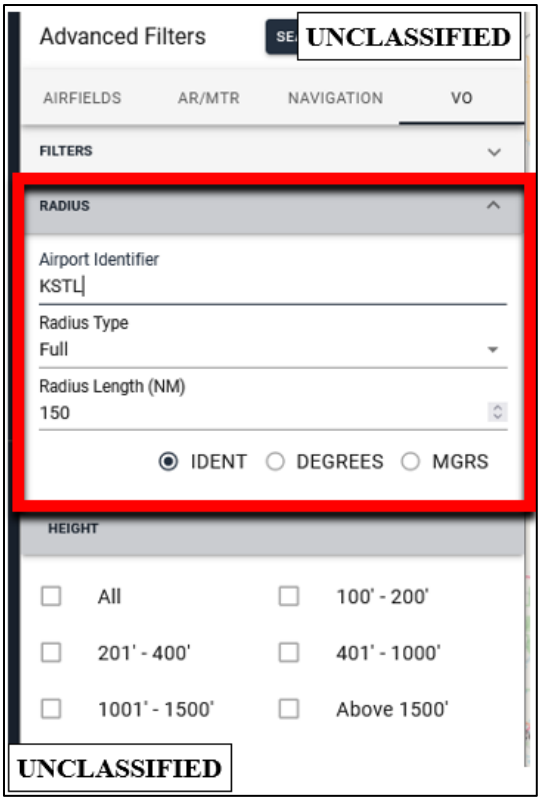
(U) Clicking on a airspace boundary graphic provides a pop-up window with additional metadata information.



***(U) Figure 3.2.1v** Advanced Filters / Navigation – Airspace Boundaries*

(U) Advanced Filters / Vertical Obstruction (VO) – Filters – this area of the filers menu allows users to query for and filter VO's by country or VO identifier.

(U) Advanced Filters / VO – Radius – this menu (Figure 3.2.1w) allows users to filter VO's by the following point location types: Airport Identifier, Geographic Degrees, or MGRS coordinate. Users can also select either a full or ring style radius. A ring style radius allows users to select an inner and outer ring, and only display VO's in between those range values, whereas the full style shows all VO's within the radius. Users must also input radius unit values in nautical miles.

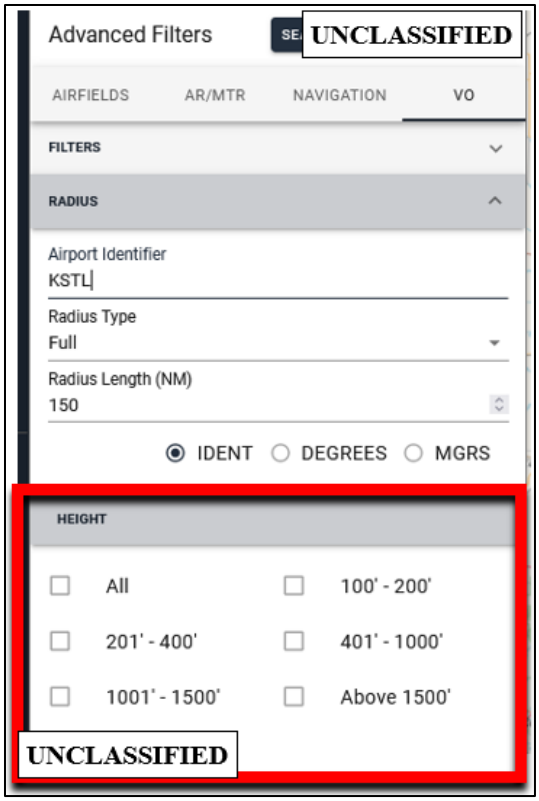


(U) Figure 3.2.1w *Advanced Filters / VO – Full Radius*

(U) Advanced Filters / VO – Height - Users can also filter by VO height. VO height filters include the following:

- 100-200 feet
- 201-400 feet
- 401-1000 feet
- 1001-1500 feet
- Above 1500 feet
- All Vertical Obstructions (VO)

(U) Clicking on a VO will display its metadata information, including height Above Ground Level (AGL).

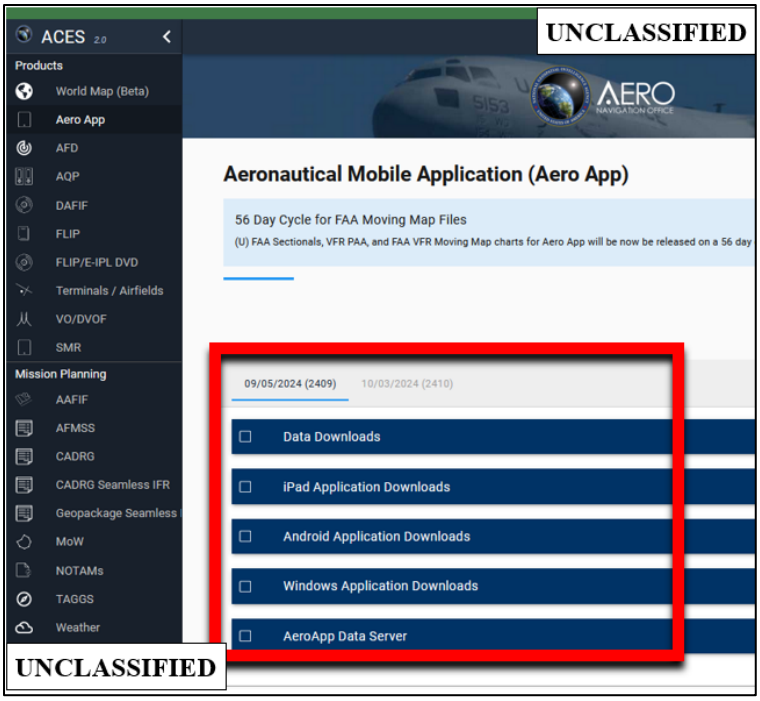


***(U) Figure 3.2.1x** Advanced Filters / VO – Height*

(U) 3.2.2 Aero App

(U) NGA's Aero App is a free advanced Electronic Flight Bag (EFB) designed for DoD and FAA flight crews. It provides crucial aeronautical information such as DAFIF, D-FLIP products, and georeferenced charts essential for mission execution. Users can access real-time traffic and weather updates, including NOTAMs, METARs, and TAFs. The app incorporates innovative features like an integrated E6B flight computer, fuel monitoring tools, and customizable user maps to streamline flight planning. Pilots can efficiently manage their courses with Military Training Routes (MTRs), air refueling Routes, and the ability to overlay hazards and obstructions on a moving map. With secure authentication and cross-platform access, the Aero App supports seamless collaboration and mission readiness across the DoD/FAA aeronautical community.

(U) The ACES portal module offers downloadable operating system formats for the Aero App (Figure 3.2.2), including iPad, Android, and Windows. The files are downloadable as a zip file. Users can also easily access quick start guides tailored to each OS. Additionally, spatial mapping data and Aero App Data Server content are available for download. To retrieve files, users should utilize steps previously outlined in the accordion and context menu sections of this guide.



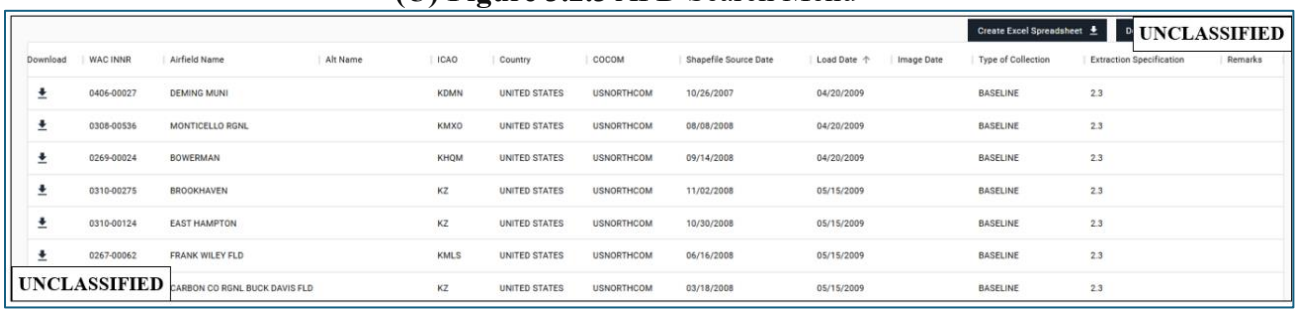
***(U) Figure 3.2.2** Aero App*

(U) 3.2.3 Airfield Foundation Data (AFD)

(U) The AFD module offers a search interface for retrieving pertinent AFD documents and files utilizing various filtering options. Available filters include comma-separated identifiers such as WAC-INNRs, ICAOs, or FAAs, in addition to a country dropdown and a COCOM dropdown menu.

(U) For enhanced customization of displayed results, users may employ the Baseline, LAG, or TERPS checkboxes to incorporate related subfolders into the results when applicable (see bottom right corner of Figure 3.2.3). Within the queried results, users can create an excel spreadsheet or download AFD products using the menu download buttons. The *Reset* icon button will remove all selected filters. Figure 3.2.3a displays the output of a search query.

(U) Figure 3.2.3 AFD Search Menu



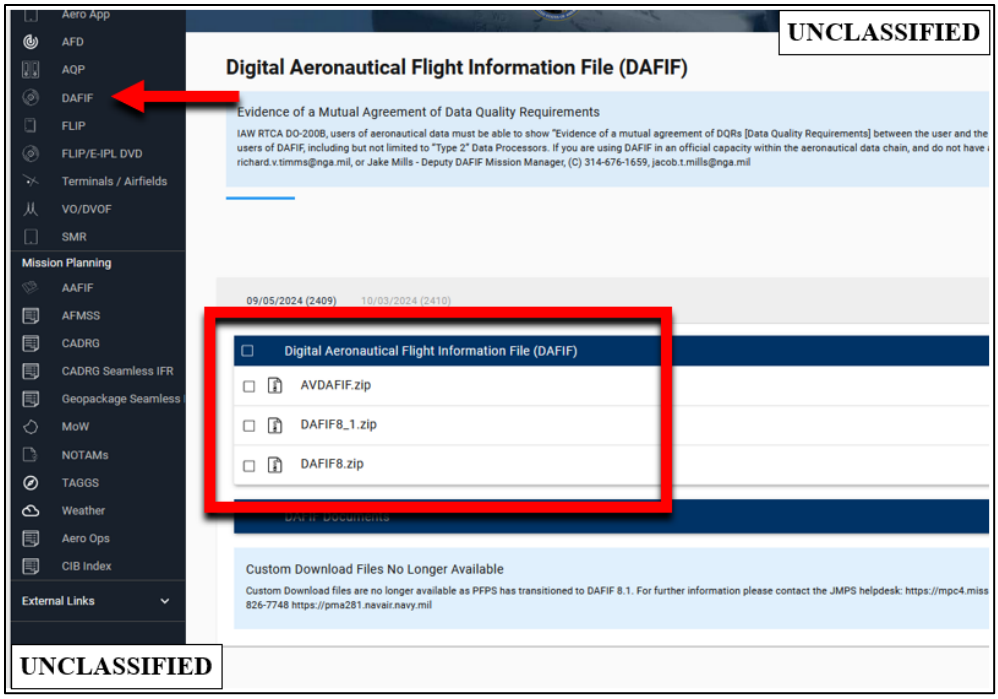
***(U) Figure 3.2.3a** AFD Search Results*

(U) 3.2.4 Airfield Qualification Program

(U) The Airfield Qualification Program module hosts specialized PDF's designed for select airfields, providing charts, textual data, and/or images to support FAA/DoD Special Pilots-in-Command (SPIC). This program serves as a situational awareness tool for identified AQP airfields, ensuring that pilots in training, have access to necessary safety information for qualification purposes.

(U) 3.2.5 DAFIF

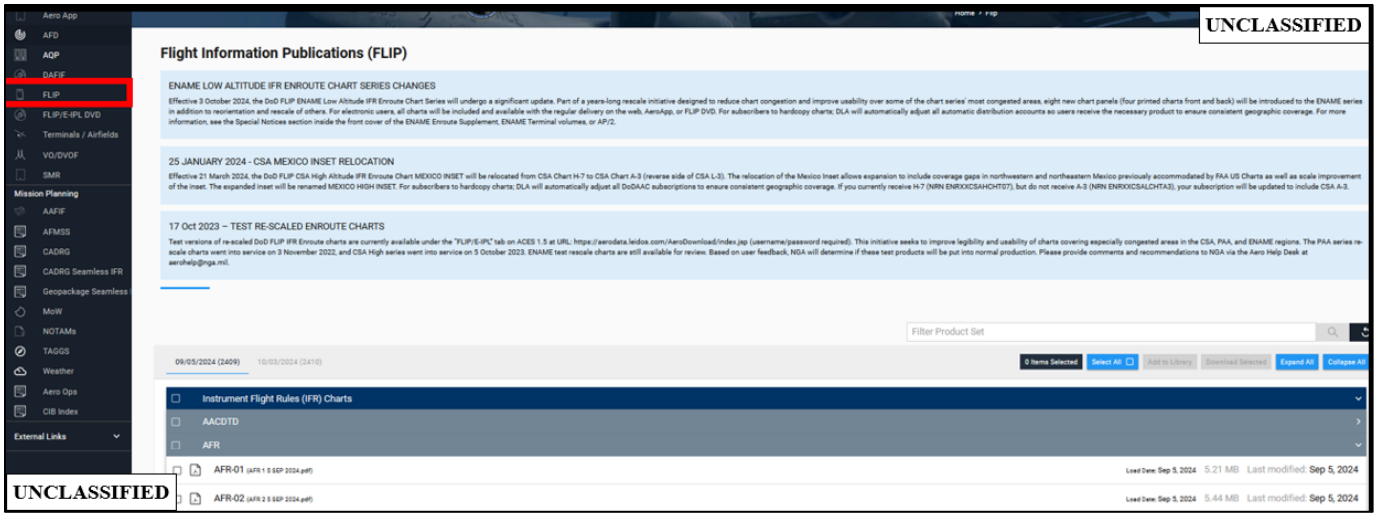
(U) The Digital Aeronautical Flight Information File (DAFIF) is a product that delivers up-to-date aeronautical data, including details on airports, navigation aids, and enroute data necessary for navigation in the Flight Management System, and is essential for global flight operations. DAFIF is designed for ingest into flight managing systems like the Joint Mission Planning System (JMPS) or the Portable Flight Planning System (PFPS). To retrieve files, users should utilize steps previously outlined in the accordion and context menu sections of this guide.



***(U) Figure 3.2.5** DAFIF*

(U) 3.2.6 FLIP

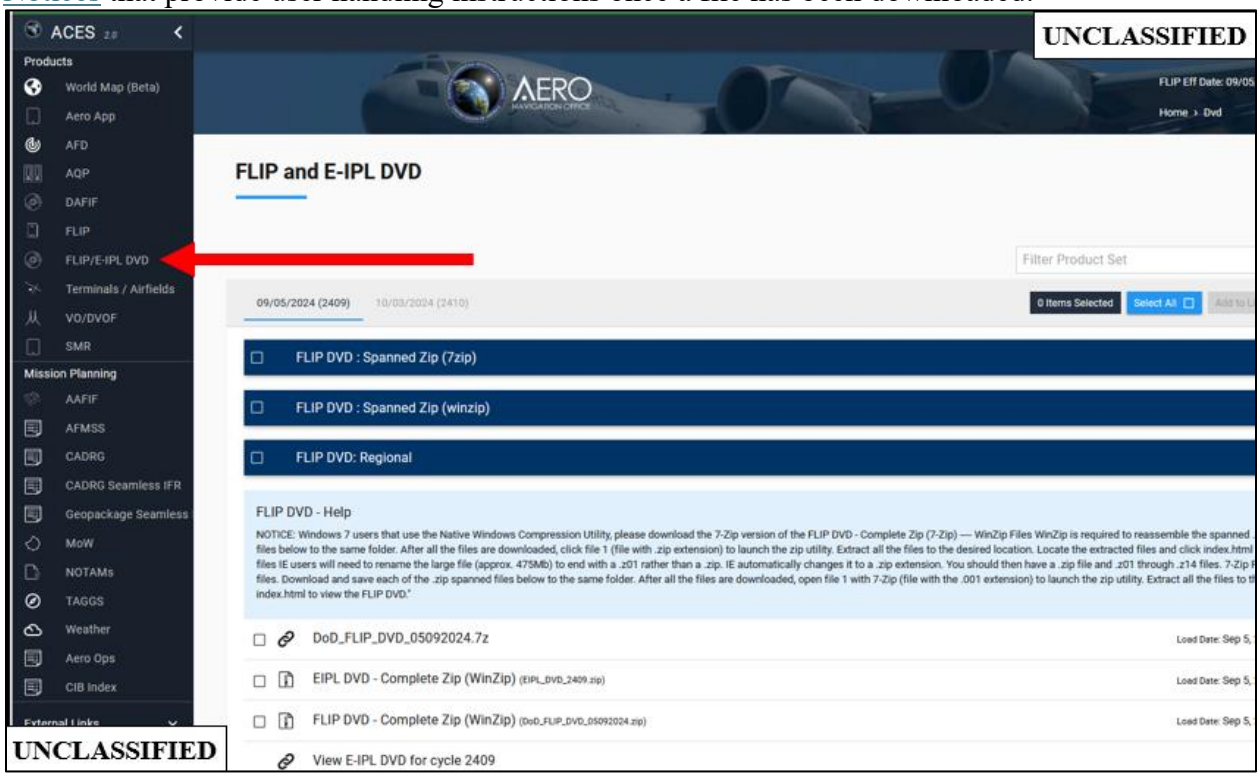
(U) This module (Figure 3.2.6) contains NGA hosted Flight Information Publications, which includes Instrument Flight Rules (IFR) Charts, IFR Charts Geo-Referenced Charts, DoD Terminal Procedures, Canada specific products, FAA, Enroute Supplements, and Planning Documents. Like much of the data on ACES, FLIP publications are cyclic by nature and users should take notice of the listed date periods above the accordion, which is also covered in section 2.1.8, Toggle Cycles. To retrieve files, users should utilize steps previously outlined in the accordion and context menu sections of this guide.



***(U) Figure 3.2.6** FLIP*

(U) 3.2.7 FLIP/E-IPL DVD

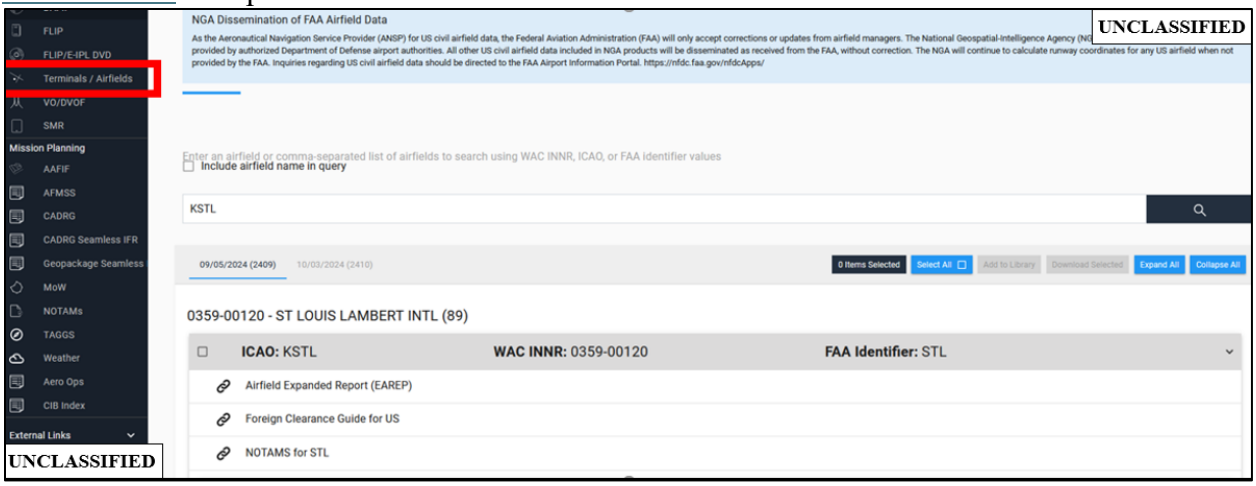
(U) The Flight Information Publications (FLIP) DVD contains a collection of aeronautical charts and data. They are available in downloadable formats of 7zip and WinZip, and organized in regional or spanned configurations. Information can also be viewed online within the View…DVD…" links. To retrieve files, users should utilize steps previously outlined in the accordion and context menu sections of this guide. The FLIP/E-IPL DVD contains Notices that provide user handling instructions once a file has been downloaded.



***(U) Figure 3.2.7** FLIP/E-IPL DVD*

(U) 3.2.8 Terminals/Airfields

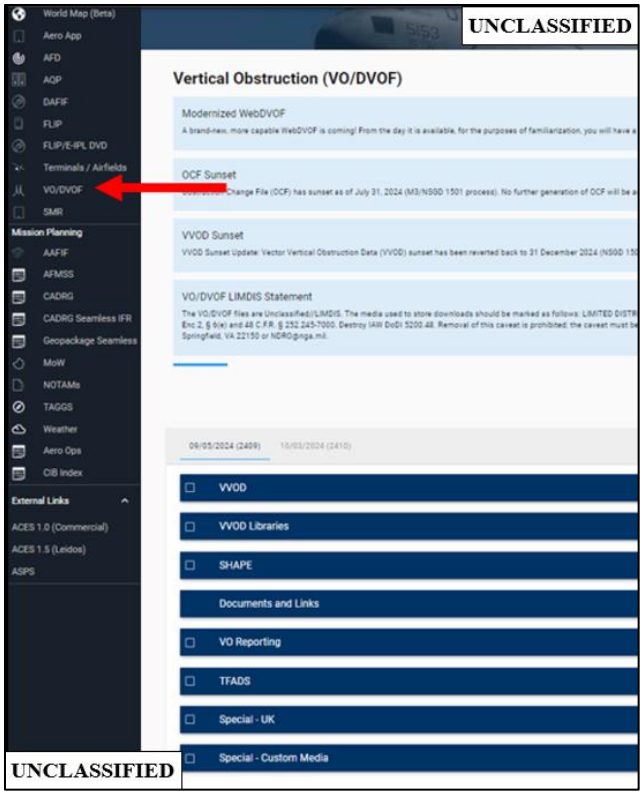
(U) The Terminals/Airfields module (Figure 3.2.8) enables users to retrieve terminal and foundation data corresponding to a specified airfield. Available data types vary by terminal but may include clearance guides, NOTAMs, AFD, enroute charts, procedure documents, planning docs, and supplements. Users can retrieve products for one or more airports by entering WAC-INNR, ICAO, or FAA identifier values. Users can perform multi-value searches by performing airfield queries and separating them with commas, such as "KSTL, TJIG." The system displays the first inputted airfield at the top of the outputted results. Additionally, users can switch between cyclical data sets by selecting the desired cycle names and can use the accordion and context menu to expand and download available datasets.



(U) Figure 3.2.8 *Terminals/Airfields*

(U) 3.2.9 VO/DVOF

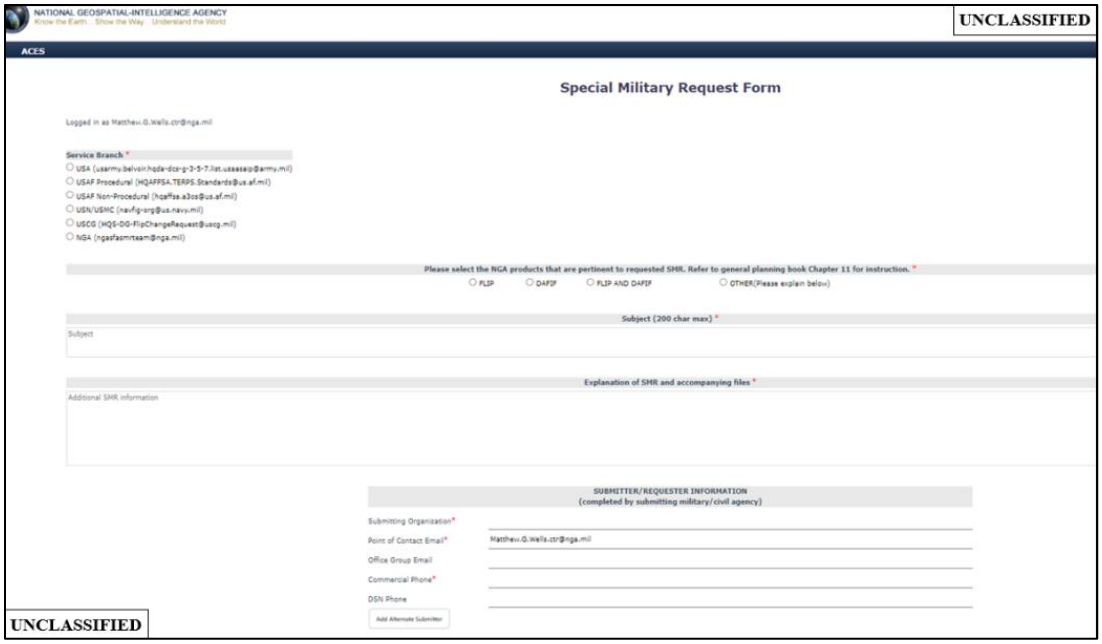
(U) The VO/DVOF (Vertical Obstruction) module (Figure 3.2.9) displays predefined TFADS-O, VVOD, OCF datasets, showcasing the relevant VO products available for the selected cycle. Users can browse and download available products which contain VVOD, VVOD Libraries, SHAPE, Documents and Links, VO reporting, TFADS, Special-UK, and Special – Custom Media by collapsing and expanding the accordion. More information on VO data can be obtained by visiting the WebDVOF website - https://webdvof.apps.kubic.nga.mil.



***(U) Figure 3.2.9** VO/DVOF*

(U) 3.2.10 SMR

(U) Opening the Special Military Request Form (SMR) module, reroutes users to NGA's SMR Form (Figure 3.2.10). This page is a menu intended for US military service components to request the inclusion of data or formats that do not conform to the current NGA/DoD specifications. Regular airfield updates should use the Flight Information List (FIL) process. For further information, users can reference the FLIP General Planning Book, Chapter 11. The latest General Planning (GP) Book is accessible through the ACES FLIP module, under the *Planning Documents* accordion.



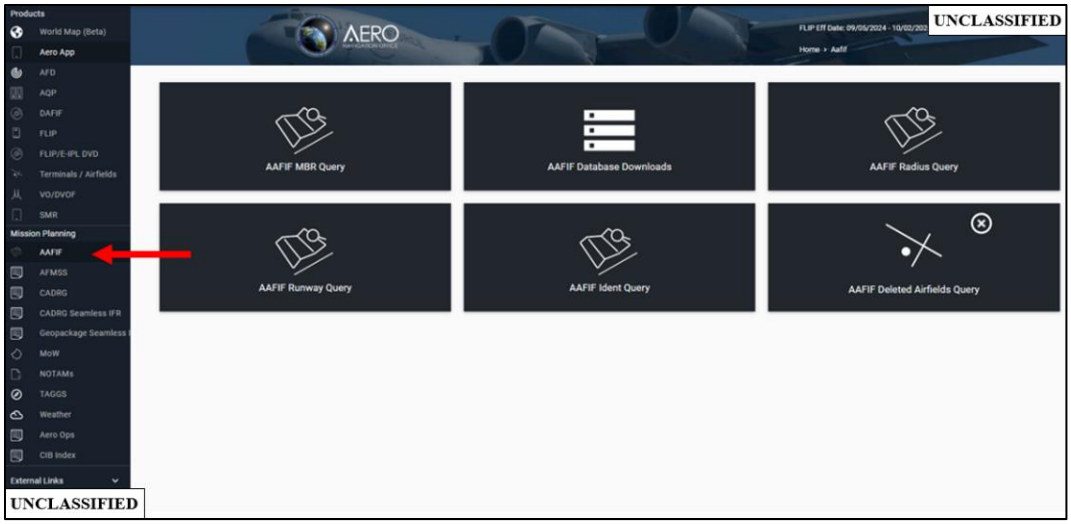
(U) Figure 3.2.10 *Special Military Request Form*

(U) 3.3 Mission Planning

(U) The Mission Planning section of ACES comprises several smaller modules that display a grid of tools and links, which are intended to support aeronautical mission planning. Some of these modules open external applications or websites. Each module features an icon on the left side of its tile. You can find a detailed outline and description of the mission planning modules below.

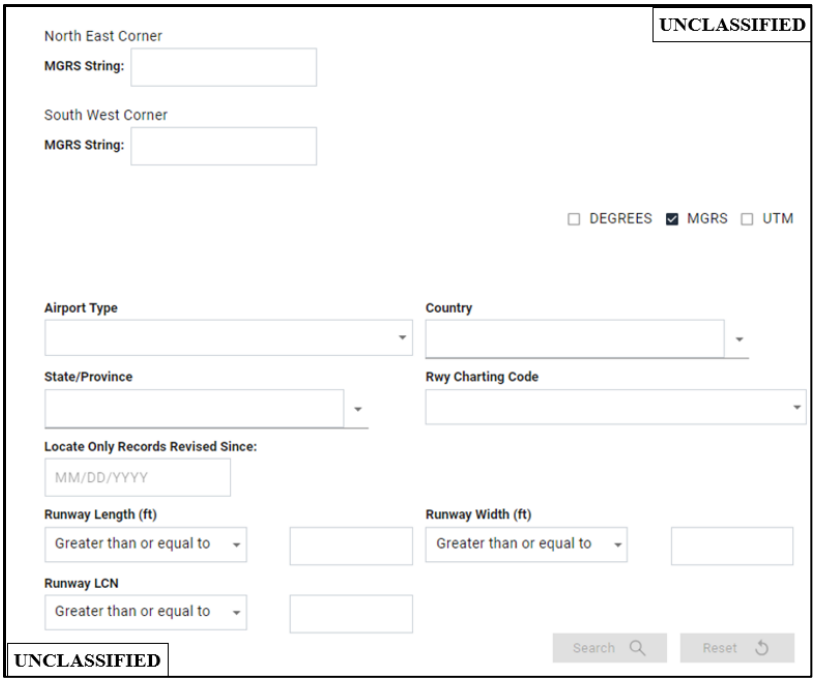
(U) 3.3.1 AAFIF

(U) The Automated Air Facilities Intelligence File (AAFIF) module (Figure 3.3.1) serves as a textual database that provides aviators with the physical characteristics of airfields, enabling users to access information regarding various airfield attributes. Key details such as runway and taxiway descriptions, hardstand dimensions, hangar specifications, and fuel availability are contained in datasets. ACES users can retrieve AAFIF through six query options on the AAFIF Module page.



***(U) Figure 3.3.1** AAFIF module*

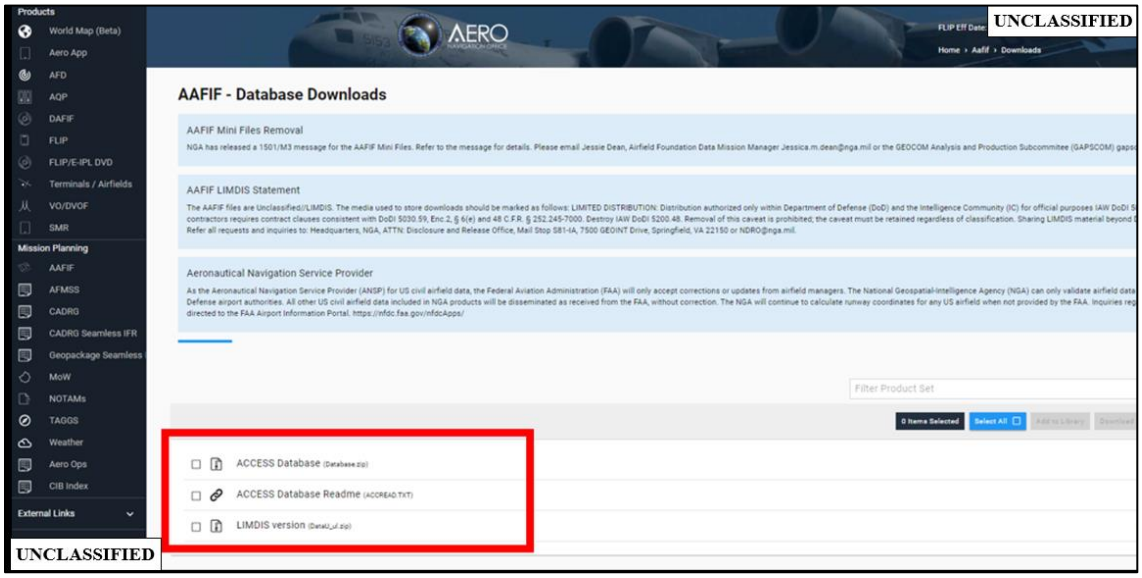
- AAFIF MBR Query - users can query airfields using a Minimum Bounding Rectangle (MBR) (Figure 3.3.1a). Users will input northeast corner and southwest coordinates in either geographic degrees, MGRS, or UTM format, and then hit search. Users can also filter search queries by airport type, country, state, or runway length/width, and LCN.



***(U) Figure 3.3.1a** AAFIF MBR Query*

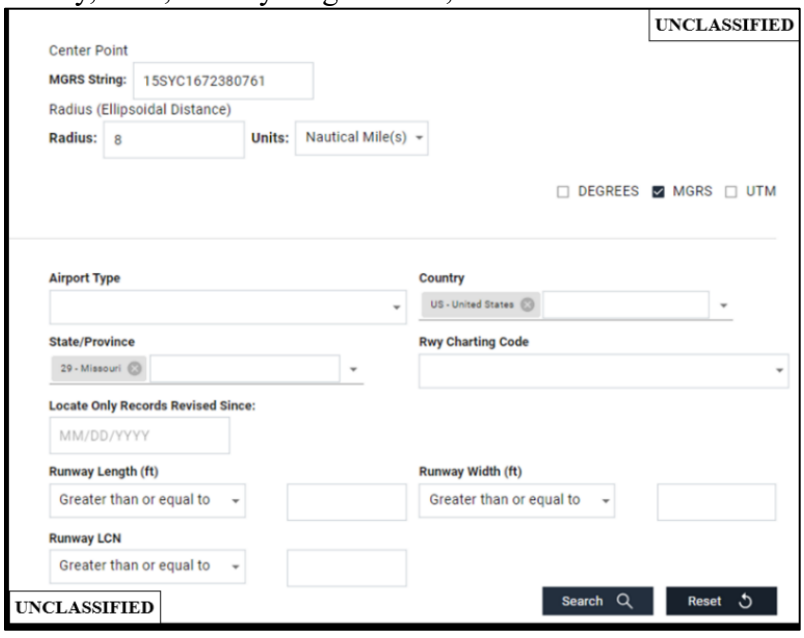
- AAFIF Database Downloads - This webpage (Figure 3.3.1b) offers users an MS Access database for download which contains dozens of individual tables including the most popular AAFIF tables, such as: *agear*, *apron*, *airport*, *arpt_coord*, *country_code*, *fuel_stor*, *fuel_stor_gen*, *hangar*, *lubricant*, *rwy*, *rwy_end*, and *twy*.

The database is exportable as a zip archive (Figure 3.3.1b) and can be extracted into its native MS Access database format.



***(U) Figure 3.3.1b** AAFIF – Database Downloads*

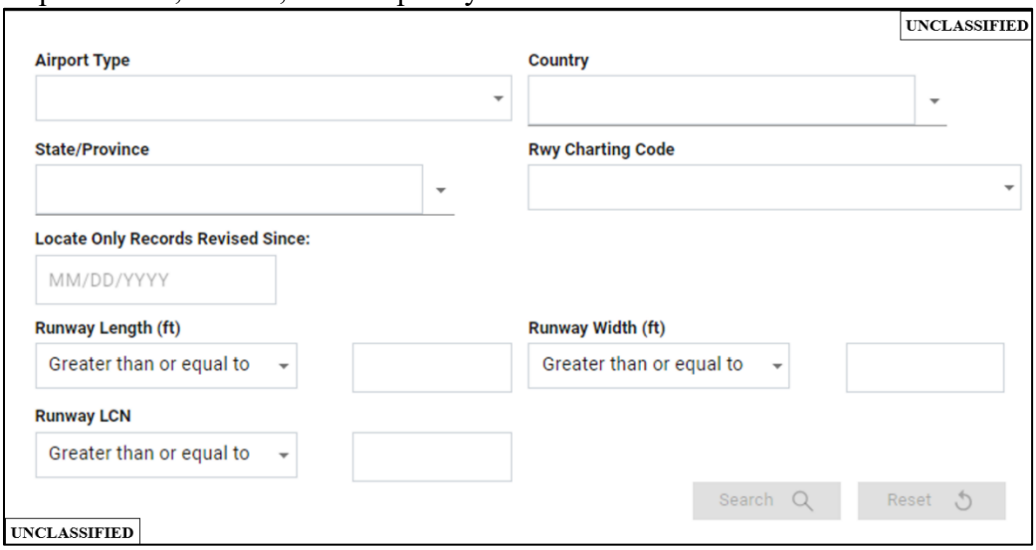
- AAFIF Radius Query – Users can query a spatial location by specifying a radius distance value measured in kilometers or nautical miles (Figure 3.3.1c), like the MBR Query. To conduct a search, users input their coordinates in degrees, MGRS, or UTM format, then click *Search*. Additionally, users can filter their search results by airport type, country, state, runway length/width, and LCN.



***(U) Figure 3.3.1c** Query by Radius*

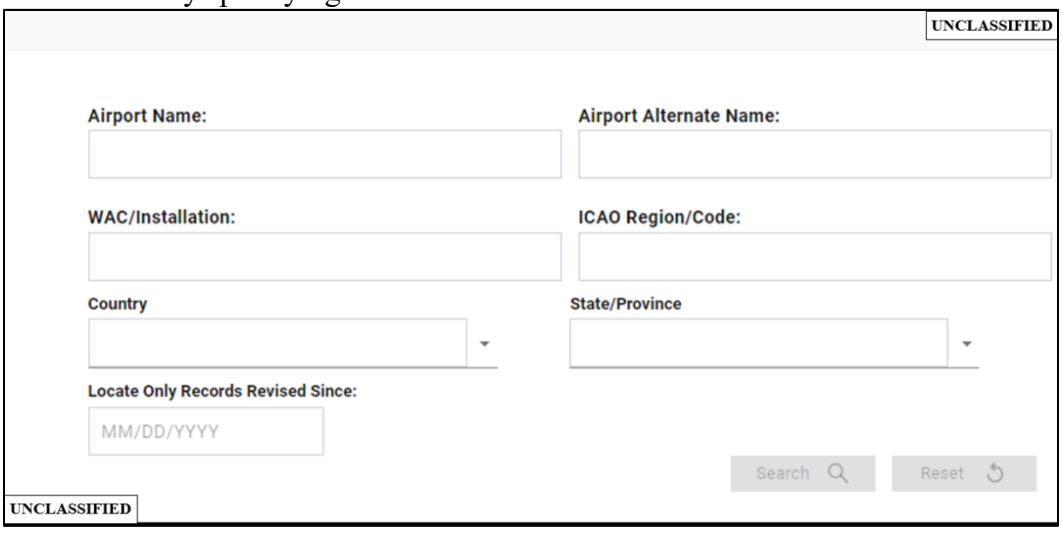
- AAFIF Runway Query – this query provides users with the ability to conduct detailed searches based on various criteria. Users can easily filter runway data by airport type, including categories like *active civil*, *active joint*, *active military*, *abandoned but*

usable, *active civil heliport*, and *military heliport*, among others (Figure 3.3.1d). Furthermore, the query enables searches by geographic parameters such as inputted country and state or province. Additionally, users can specify runway characteristics, including length, width, and Load Classification Number (LCN). The system also allows for queries based on runway charting codes, which include the categories of permanent, neutral, and temporary.



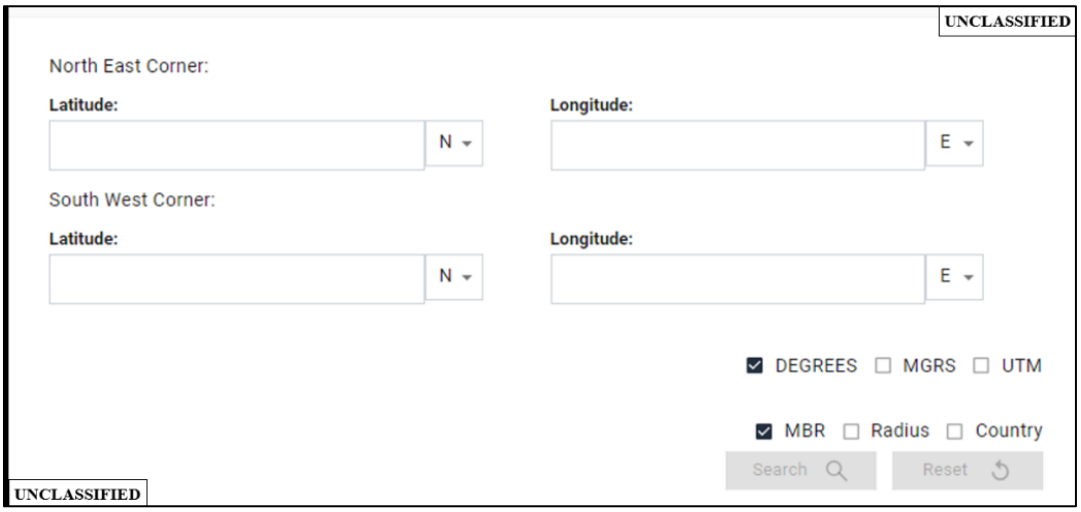
***(U) Figure 3.3.1d** Query by Radius*

- AAFIF Indent Query - This search query enables users to locate airports through various parameters such as full or partial names, alternate names, WAC/Installation numbers, ICAO region codes, and geographical identifiers such as country and state/province (Figure 3.3.1e). Furthermore, users have the option to refine their searches by specifying a date last revised.



***(U) Figure 3.3.1e** Indent Query*

- AAFIF Deleted Airfields Query – Users can query for inactive or deleted airfields (Figure 3.3.1f) by utilizing the previously described search functionalities of MBR and Radius searches. Additionally, users have the option to filter their searches by country, allowing for a more targeted approach when locating deleted or inactive airfields.

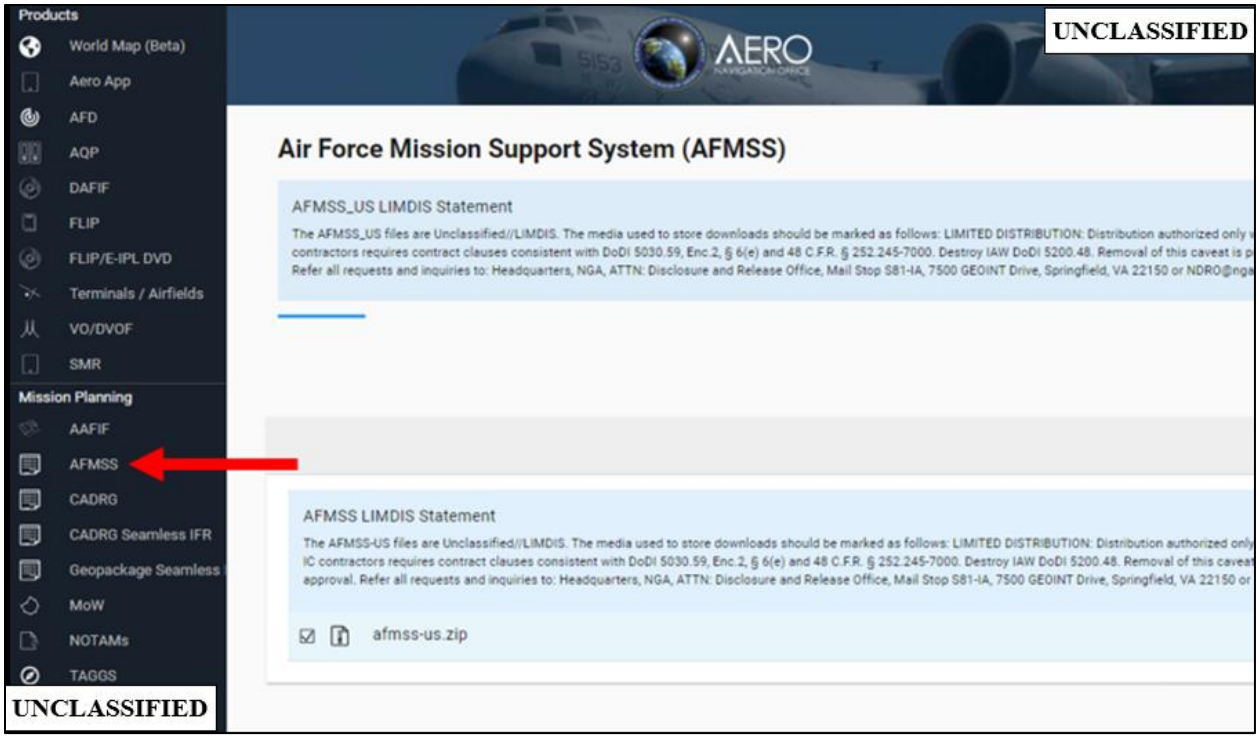


***(U) Figure 3.3.1f** Deleted Airfields Query*

(U) 3.3.2 AFMSS

(U) The Air Force Mission Support System (AFMSS) facilitates mission planning for USAF aircraft and precision-guided munitions. This system integrates specific hardware and software tailored for diverse mission planning environments. ACES offers a downloadable file that acts as a structured data container for vital mission planning information, classified at Unclassified//LIMDIS. Users can download the AFMSS data file as a zipped archive (refer to Figure 3.3.2) which can subsequently be unzipped and imported into AFMSS for further use.

Product Disclaimer: NGA does not own or maintain AFMSS

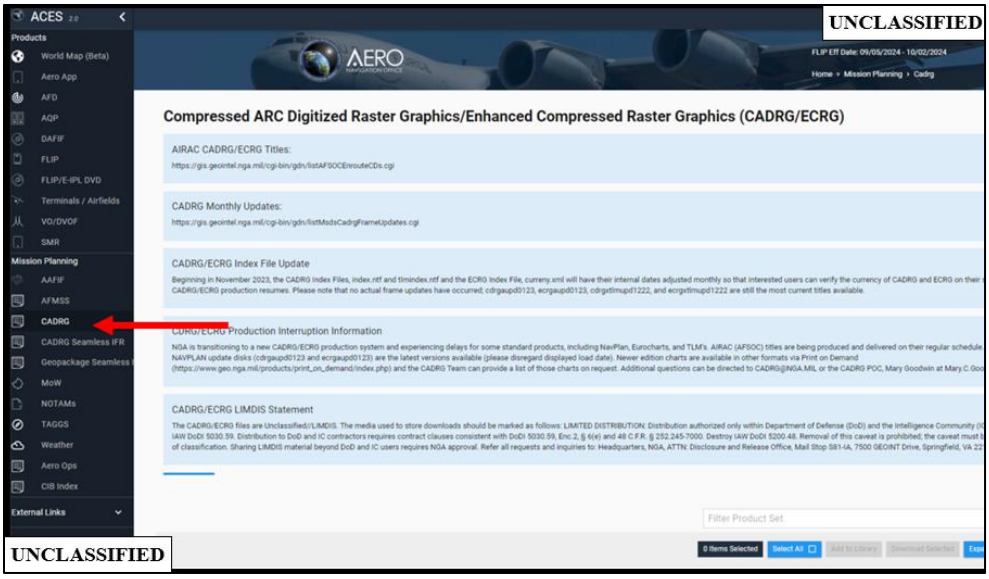


***(U) Figure** 3.3.2 AFMSS*

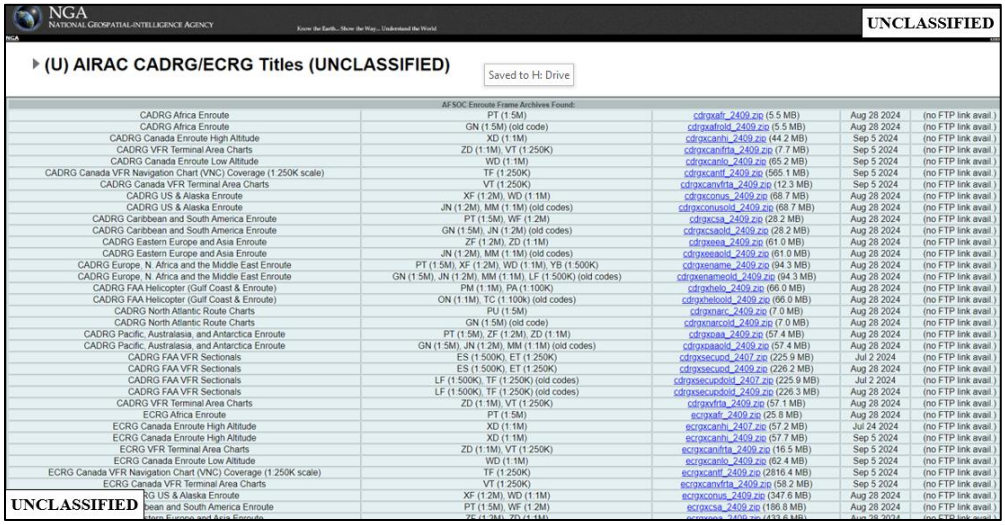
(U) 3.3.3 CADRG

(U) This section provides essential NGA links and production updates related to the latest AIRAC CADRG/ECRG mapping data (refer to Figure 3.3.3). Users can navigate through the provided weblinks to access the most recent zipped raster files which are suitable for use in a variety of GIS and flight planning applications like PFPS (Portable Flight Planning System). The files are systematically organized by type and region for streamlined access (see Figure 3.3.3a).

Product Disclaimer: NGA's Aeronautical Office does not produce or maintain CADRG. Questions pertaining to CADRG should be addressed to CADRG@nga.mil.



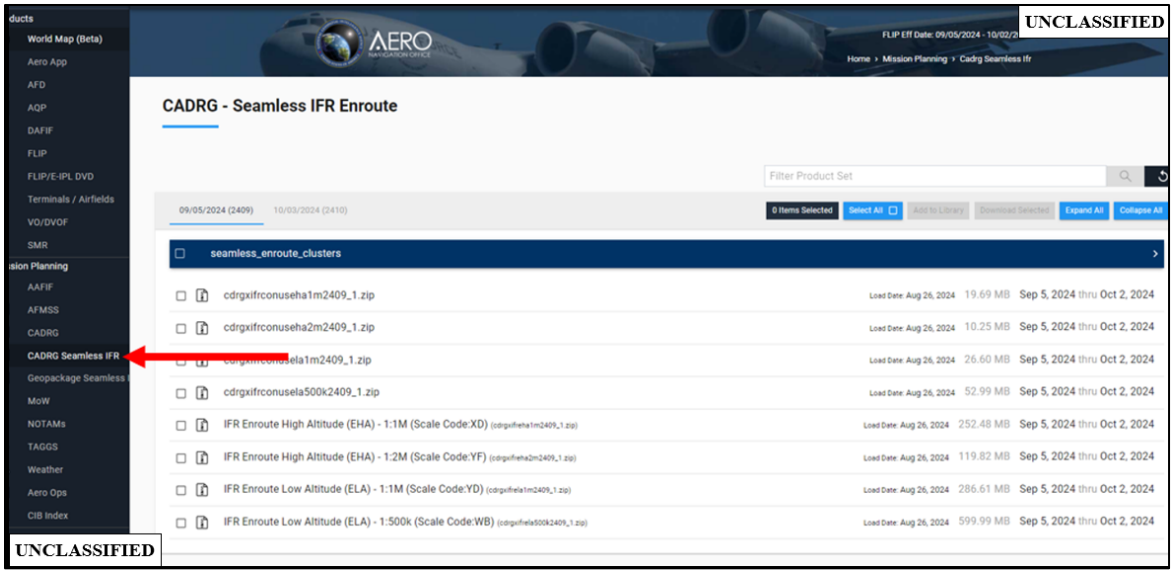
***(U) Figure 3.3.3** CADRG module*



***(U) Figure 3.3.3a** Abbreviated roster of AIRAC CADRG/ECRG Titles*

(U) 3.3.4 CADRG Seamless IFR

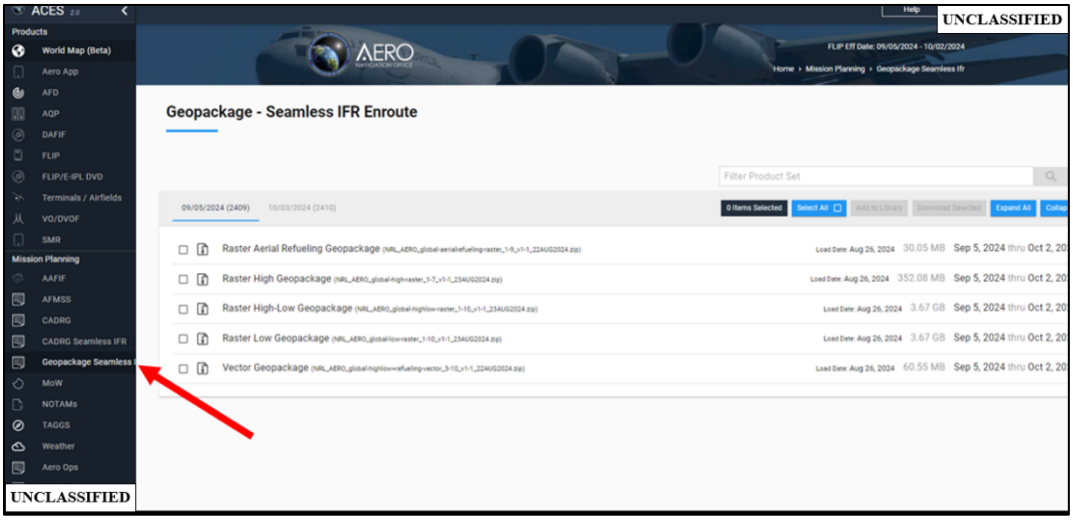
(U) This module (Figure 3.3.4) contains seamless, cyclically produced, CADRG IFR enroute charts for use in select flight planning aeronautical programs like. Files can be downloaded as zip files using the accordion and context menu, which can then be extracted into their native file format. Available download options include enroute high and low altitude charts at the 1:500,000, 1:1,000,000, and 1:2,000,000 scale.



(U) ***Figure 3.3.4*** *CADRG Seamless IFR*

(U) 3.3.5 Geopackage Seamless IFR

(U) The Geopackage seamless IFR mission planning module offers IFR enroute charts in geopackage file format that can be loaded into a range of GIS or flight planning software platforms. Users can download the cyclically produced files (Figure 3.3.5) as zipped archives, extract them in their native geopackage file format, and then load them as layers into an appropriate software platform. Available geopackage options include raster aerial refueling, raster high, raster high-low, raster low, and vector. To retrieve files, users should utilize steps previously outlined in the accordion and context menu sections of this guide.

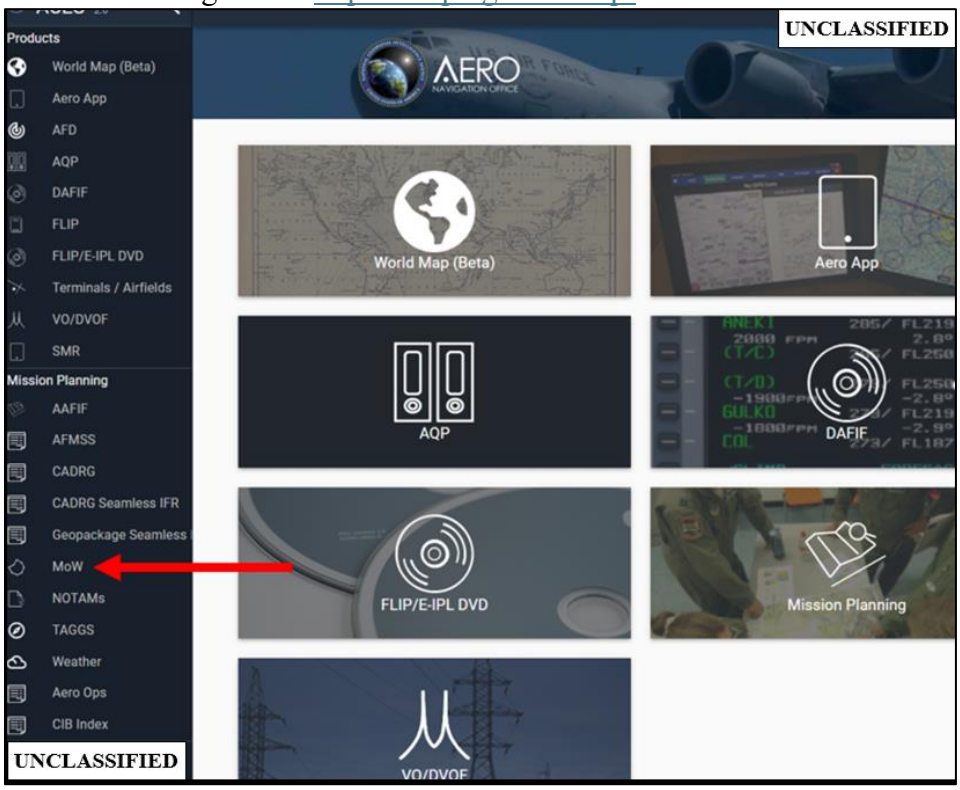


(U) ***Figure 3.3.5*** *Geopackage Seamless IFR*

(U) 3.3.6 MoW

(U) Click the Map of the World (MoW) link (Figure 3.3.6) to access NGA's Unclassified version of MoW. The MoW portal is an online geospatial environment that offers shared and

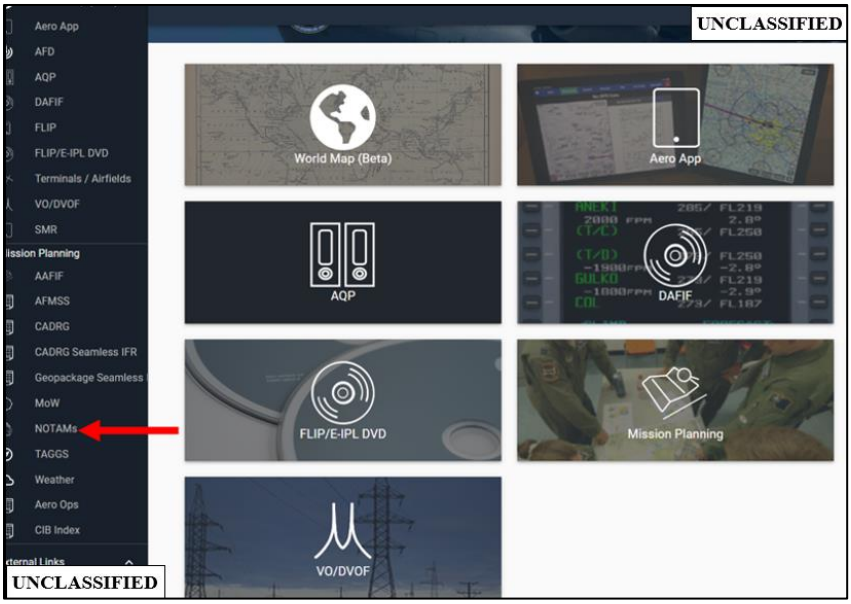
trusted geospatial content, services, and applications for NGA customers and partners to fulfill mission needs. This site is valuable for viewing a wide range of NGA hosted base maps and overlays. MoW is also accessible by opening https://map.nga.mil/. The website contains its own user guide accessible through here: https://map.nga.mil/help/.



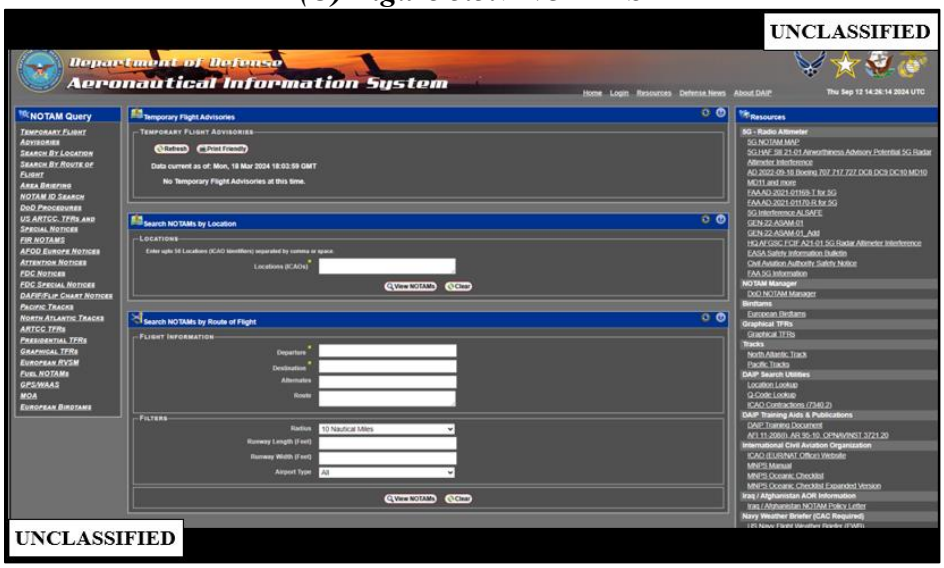
***(U) Figure 3.3.6** Map of the World Link*

(U) 3.3.7 NOTAMS

(U) Clicking the Notice to Air Missions (NOTAMS) link (Figure 3.37) redirects users to the DoD Aeronautical Information Portal (DAIP). DAIP (Figure 3.3.7a) is operated by the U.S. Department of Defense and provides twenty-four/seven access to critical NOTAMs information for aircrews. DAIP's robust platform offers real-time retrieval of domestic, international, and military NOTAMs along with graphical displays of airfield NOTAMs and temporary flight restrictions, enhancing situational awareness for aviators. Users can request NOTAMs in both raw text and report text formats, ensuring they receive the data needed in a user-friendly manner while maintaining redundancy and accessibility through an alternative FAA-maintained server. DAIP is directly accessible through https://www.daip.jcs.mil/.



***(U) Figure 3.3.7** NOTAMS*



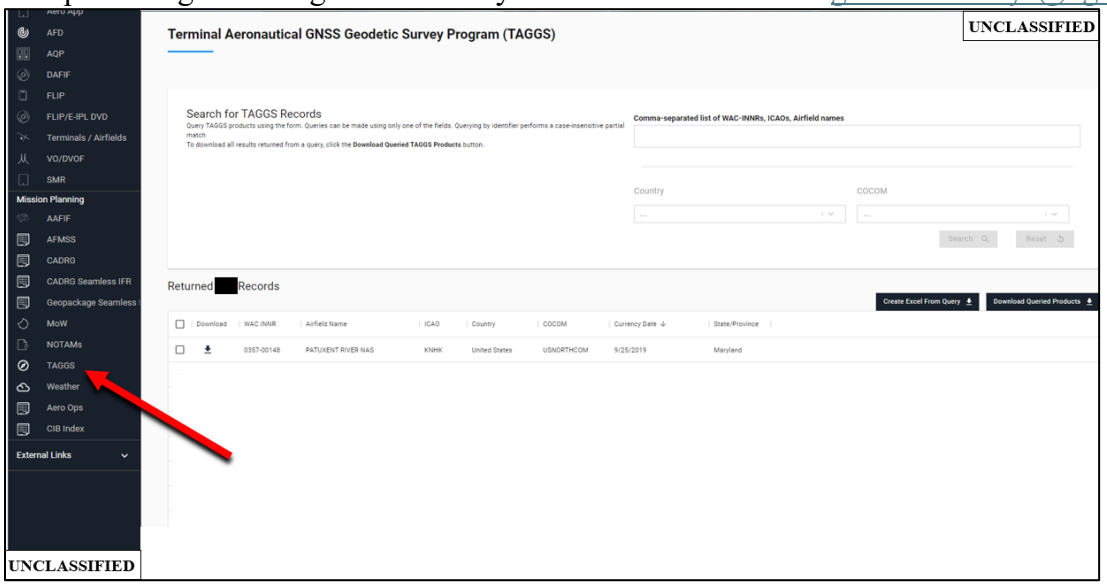
***(U) Figure 3.3.7a** DAIP portal*

(U) 3.3.8 TAGGS

(U) This interface provides access to NGA's Terminal Aeronautical GNSS Geodetic Survey Program products (TAGGS). NGA geodetic surveyors perform on-site TAGGS surveys to deliver precise measurements for the exact positions of select features on the Earth's surface using the WGS-84 reference system. These surveys specifically encompass aviation features such as runway ends and navigation aids. The ACES TAGGS module (Figure 3.3.8) allows users to find NGA's TAGGS products using various search fields, such as a list of comma-separated identifiers (WAC-INNRs, ICAOs, or Airfield Names) and a country or COCOM dropdown. Adjust the search criteria with the search fields, then click the magnifying search glass icon to deliver results. Click the Reset icon to clear displayed results. Users can also download the table search results as an Excel spreadsheet. Users can also download individual or multiple TAGGS

products using the *Download Queried Products* button (right side of Figure 3.3.8), or by clicking the download arrow icon to the left of the table's WAC INNR field.

Product Disclaimer: NGA's Aeronautical Office does not produce or maintain TAGGS. Questions pertaining to NGA geodetic surveys should be addressed to geodeticsurveys@nga.mil.



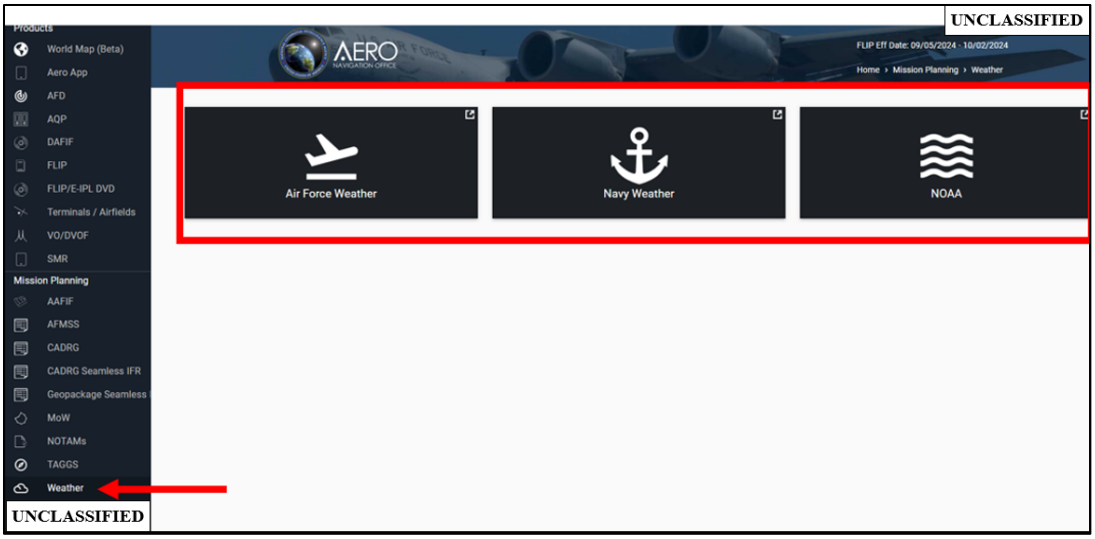
***(U) Figure 3.3.8** TAGGS*

(U) 3.3.9 Weather

(U) The following links (observed in Figure 3.3.9) provide access to various service-hosted weather portals. The first link directs you to the 557th Air Force Weather Squadron, where you can find meteorological data & forecasts tailored to USAF operations. Another link takes you to the Naval Aviation Weather service, offering forecasts tailored to maritime service operations. Additionally, there is a link to the National Oceanic and Atmospheric Administration (NOAA) site, which provides comprehensive weather information and resources.

The websites are also directly accessible through:

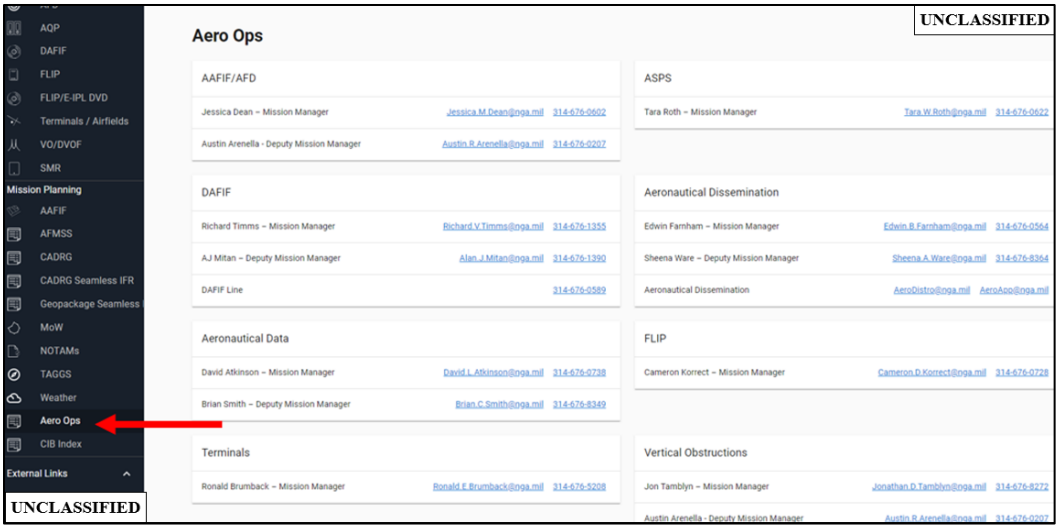
- USAF Weather: https://weather.af.mil/
- US Navy Weather: https://www.metoc.navy.mil/
- NOAA Weather: https://www.noaa.gov/weather



***(U) Figure 3.3.9** Weather*

(U) 3.3.10 Aero Ops

(U) The Aero Ops section of the ACES portal presents NGA point of contact information for specific Aero products and services (Figure 3.3.10), such as terminals, vertical obstructions, FLIP publications, etc.

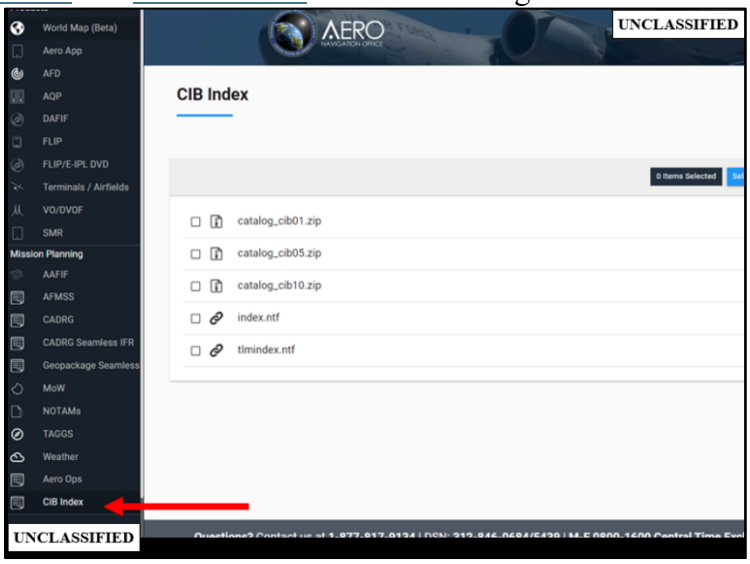


***(U) Figure 3.3.10** Aero Ops*

(U) 3.3.11 CIB Index

(U) This section of the ACES portal (Figure 3.3.11) contains Controlled Image Base (CIB) index files. These downloadable files are not orthorectified images. Rather, they are essential indexing files for ingestion into various GIS and moving map applications. They facilitate the cataloging and organization of associated CIB raster map files, thereby enhancing the efficiency of accessing, retrieving, and rendering geospatial data for quick display and analysis over a specific area. CIB is produced and available as CIB01 (1-meter resolution), CIB05 (5-meter resolution), and CIB10 (10-meter resolution). The CIB Index provides index

files applicable to these resolutions. To download these files, users should utilize steps previously outlined in the accordion and context menu sections of this guide.



(U) Figure 3.3.11 *CIB Index*

(U) 3.4 External Links

(U) 3.4.2 ACES 1.5 (Leidos)

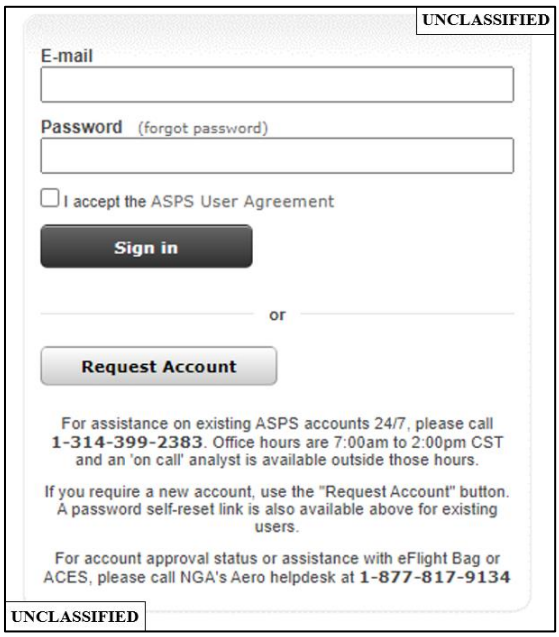
(U) ACES 1.5 requires an account established with the Aeronautical Source Packaging Service (ASPS). This version (Figure 3.4.2) enables the dissemination of Aero Products and data to DoD and mission partners within the WWW domain.

(U) Figure 3.4.2 *ACES 1.5 (Leidos) Interface*

(U) 3.4.3 ASPS

(U) The Aeronautical Source Packaging Service (ASPS) serves as a repository for aeronautical information documents published by a nation's Aeronautical Information Service

(AIS), enabling NGA users to access critical aeronautical data via an internet-enabled computer with a username/password account. The platform features a Source Directory and Advanced Search functions that facilitate efficient exploration and retrieval of aeronautical data. Users without an account can request access using the *Request Account* button. The site is also accessible by opening https://asps.leidos.com/.



(U) Figure 3.4.3 *ASPS 1.5 Login*

(U) Appendix A: Glossary of terms, abbreviations, and acronyms

(U) This table is UNCLASSIFIED

AAFIF	Automated Air Facilities Intelligence File: textual data or data tables with evaluated information and aircraft movement surfaces (runways, taxiways, aprons, etc.) facilities, support equipment, services, operations, NAVAIDS, communications, transportation, and other airport information.
AAS	Aeronautical Application Suite: a repository of aeronautical data pertinent to Department of Defense/National Geospatial-Intelligence Agency aeronautical products.
ACES	Aeronautical Content Exploitation System: an NGA hosted, graphics-based web application designed to provide DoD customers with immediate access to a wide variety of NGA aeronautical and topographic products and reports, and links to international flight publications and procedures.
AIP	Aeronautical Information Publication – a source document issued by the host country that outlines major airfields, aeronautical route structure, and regulations necessary for safe international flight within its airspace. AIP's are typically organized (through ICAO standards) into three parts: General (GEN), En Route (ENR), and Aerodromes (AD). The AIP is regularly updated through the AIRAC cycle to ensure that aviators have access to the latest information for operational safety.
AIRAC	Aeronautical Information Regulation and Control: a standardized system that establishes a 28-day publication cycle for aeronautical information, ensuring all stakeholders—including pilots, air traffic controllers, and flight management systems—are working from the same information base. Under this system, changes to aeronautical data must be disseminated at least 42 days in advance, with an objective for recipients to receive updates 28 days before the effective date. This coordinated schedule enhances efficiency and safety in aviation operations worldwide.
AIS	Aeronautical Information Service - a vital aeronautical service typically managed by the national aviation authority of each country, such as the United States FAA or European Union Aviation Safety Agency for EU member states. These organizations ensure the timely provision and management of aeronautical information necessary for the safety, regularity, and efficiency of international air navigation.
AFD	Airfield Foundation Data: an NGA collection of data, features, and shapefiles of an airfield infrastructure and the surrounding area; AFD data supports FLIP, DAFIF, AAFIF, and DVOF.
AFMSS	Air Force Mission Support System (AFMSS): a USAF suite that provides a family of systems which automate mission planning

	materials, preparation, and post-mission debriefing capabilities for numerous aircraft.
AGL / HGL	Above Ground Level / Height Above Ground Level: refers to the vertical distance measured from the highest point of a structure or terrain feature to the ground level directly beneath it.
AQP	Airfield Qualification Program: hosts specialized PDF's designed for select airfields, providing charts, textual data, and/or images to support FAA/DoD Special Pilots-in-Command (SPIC). This program serves as a situational awareness tool for identified AQP airfields, ensuring that pilots in training, have access to necessary safety information for qualification purposes.
AR	Air Refueling: the in-flight transfer of fuel from a tanker aircraft, such as a KC-135, to a receiver aircraft in support of strategic, operational, and tactical objectives. AR expands options available to commanders by increasing the range, payload, persistence, and flexibility of joint and coalition receiver aircraft.
Arresting Gear	Equipment used to rapidly decelerate aircraft during landings, ensuring safety in emergency situations such as brake failures or steering issues. On land-based airfields, the system typically employs steel wire ropes or barrier nets that engage an aircraft's tailhook or wings, effectively transferring kinetic energy to bring the aircraft to a controlled stop.
ARTCC	Air Route Traffic Control Centers: a facility that provides air traffic control services to aircraft operating on instrument flight rules (IFR) flight plans within controlled airspace, primarily during the en route phase of flight, while also offering advisory services to visual flight rules (VFR) aircraft when possible.
ASPS	Aeronautical Source Packaging Service: a digital library of native and translated non-imagery sourced aeronautical content; serves as a distribution mechanism for unpublished graphics and commercial aero products to ACES and the Aero mobile app.
BBOX	Bounding Box: defines a rectangular area on a mapping interface by specifying the geographical coordinates of its southwest and northeast corners.
CAC	Common Access Card: a smart card that provides military personnel, government employees, and eligible contractors with secure, centralized access to systems and facilities while serving multiple functions, including identification, authentication, and access control.
CADRG/ECRG	Compressed ARC Digitized Raster Graphics/Enhanced Compressed Raster Graphics: CADRG presents high-resolution graphical (mapping) representations of aerial imagery for various weapons, theater battle management, mission planning, and digital moving map systems. ECRG is the improvement to CADRG, offering better image quality and compression algorithms, enhancing the clarity and detail of raster-based maps. Together, these formats facilitate rapid dissemination and analysis of geospatial data, supporting critical decision-making in various operational settings.

CIB	Controlled Image Base - a high-accuracy database of orthorectified and radiometrically balanced imagery. CIB is an essential product utilized by mission planners, FEMA, and in cockpit displays, aiding in feature extraction and imagery registration.
City Cross Reference	A city cross-reference is a tool that identifies and connects city names to their respective airport codes or identifiers in aviation. This system enhances flight planning, ticket booking, and customer service by providing a clear link between multiple airports and their cities.
COCOM/CCMD	Combatant Command: a unified military command within the U.S. Department of Defense that encompasses units from multiple service branches, tasked with executing broad and continuous military missions either geographically or functionally. Each command is led by a four-star general or admiral, who possesses operational command authority, and operates under the guidance of the Unified Command Plan, which outlines their specific responsibilities and areas of operation. Command examples include but are not limited to: US CENTCOM, US EUCOM, US SOUTHCOM, US CYBERCOM, US SPACECOM, and US TRANSCOM.
DAFIF	Digital Aeronautical Flight Information File: a global subset of the AAS database that provides essential navigation data, including airports with hard surface runways, navigation aids, and airspace information, and is tailored for ingestion into Flight Management and Mission Planning Systems.
DLA	Defense Logistics Agency: a US federal agency that provides vital logistics support to military operations, ensuring that service members receive necessary supplies and materials efficiently.
DoD	Department of Defense: coordinates and oversees the United States military forces to ensure national security while protecting U.S. interests globally.
EFB	Electronic Flight Bag: a digital tool utilized by flight crews to streamline flight management tasks, reducing reliance on paper-based materials by housing essential references such as navigational charts and flight operation manuals. EFB enhance safety and efficiency in aviation by facilitating automated calculations for takeoffs, landings, flight management, etc.
E-IPL	Electronic – Instrument Procedure Library: NGA-produced Terminal Charts of foreign procedures not included in FLIP, designed for paperless reproduction in the DoD FLIP "Volpe" Format. These charts, available through the DoD Aeronautical Mobile Application, ACES, and ASPS, are standard presentations of international terminal procedures, with their operational use governed by individual service policy. E-IPL is generated from source nation data and contains procedures not found in the DoD FLIP.
FAA	Federal Aviation Administration: a government agency responsible for regulating civil aviation and ensuring aviation safety in the United States. Its mission is to promote the safety and efficiency of the nation's

	aerospace system while fostering innovation and supporting the growth of the aviation industry.
FEMA	Federal Emergency Management Agency: coordinates the United States federal government's response to natural and man-made disasters. Its mission is to help people before, during, and after disasters by aiding and promoting resilience in communities across the nation.
FIL	Flight Information List: a document which serves as the official conduit for the Office of Primary Responsibility (OPR) within the military services to communicate additions, deletions, and modifications pertaining to aeronautical data under their jurisdiction.
FLIP	Flight Information Publications (FLIP): A suite of aeronautical charts and booklets published on a 28-day cycle (or, in some cases 56- or 112-day cycles) by the Aeronautical Navigation Office and used by DoD pilots and other authorized users to plan and fly worldwide.
FOUO	For Official Use Only: a designation used within the U.S. government to indicate a specific category of unclassified information that, while not classified, is still sensitive and should be protected from public disclosure.
GEOINT	Geospatial Intelligence: intelligence derived from the collection, analysis, and dissemination of geospatial information. This information can include imagery, mapping data, and geospatial data that can be used for various applications, including national security, disaster response, and resource management.
GNSS	Global Navigation Satellite System: a satellite-based technology providing global geolocation and time information. It includes systems like GPS (developed by the U.S.), GLONASS (Russia), BeiDou (China), and Galileo (EU). GNSS serves various users, from military and aviation to everyday individuals, delivering accurate positioning, navigation, and timing services.
GPS	Global Positioning System: a navigation technology operated by the US government that determines precise location coordinates using satellite signals.
ICAO	International Civil Aviation Organization: a specialized agency of the United Nations whose primary purpose is to promote the safe, secure, and orderly development of international civil aviation worldwide . ICAO works by setting global standards and regulations necessary for aviation safety, efficiency, security, environmental protection, and economic development.
IFR	Instrument Flight Rules: govern the procedures for flying an aircraft solely by reference to instruments in the cockpit, allowing pilots to operate in low visibility conditions and navigate using air traffic control instructions.
ISO	International Organization for Standardization: an independent, non-governmental international organization that develops and publishes international standards across various technical and non-technical fields.

	It comprises representatives from national standards organizations of member countries and operates over 800 technical committees for standards development.
JWICS	Joint Worldwide Intelligence Communications System: a secure telecommunications network used by the U.S. Department of Defense and other authorized government entities for the exchange of classified intelligence and information.
LCN	Load Classification Number: A quantitative metric representing the estimated surface weight-bearing capacity of a structural element or pavement system, such as a runway. The LCN can be determined through various methodologies, including analytical calculations, empirical testing, and computational modeling, to assess the capability of a surface to support applied loads without risking structural integrity or performance degradation.
LIMDIS	Limited Distribution: in the context of U.S. classification systems, categorizes specific information and documents that are restricted to a "limited" audience to safeguard from public disclosure.
MBR	Minimum Bounding Rectangle: describes the smallest rectangle that fully encompasses a given aerial shape or set of points within a two-dimensional space. Aviation professionals utilize the MBR for flight planning, collision avoidance, search operations, and data analysis, enhancing navigation and airspace management efficiency.
METAR	METeorological Aerodrome Report: an internationally standardized format used for reporting observational weather data, primarily aimed at aircraft pilots and meteorologists for weather forecasting. Comprised of critical information such as temperature, wind direction and speed, visibility, cloud cover, and barometric pressure, METAR reports are generated regularly from airports and observation stations, with special reports issued as needed to reflect significant changes in weather conditions.
MoW	Map of the World: an online, NGA hosted, geospatial environment tool that provides shared and trusted geospatial content services and applications for use by NGA customers and partners.
MTR	Military Training Routes: designated pathways established for military aircraft conducting low-altitude, high-speed training maneuvers, and are developed in collaboration between the FAA and the DOD. These routes are categorized as IFR (Instrument Flight Rules) or VFR (Visual Flight Rules), and are charted with specific identification codes to ensure safety and coordination with civilian air traffic.
NAVAIDS	Navigation Aids: essential devices or systems that assist pilots and mariners in safely determining their positions and navigating their routes. In aviation, these navigation aids encompass a variety of tools, including VORs (VHF Omnidirectional Range), which emit signals to help aircraft find their bearings, NDBs (Non-Directional Beacons), which provide radio signals for location referencing, and GPS (Global

	Positioning System), a satellite-based system that gives precise location information.
NGA	National Geospatial-Intelligence Agency: a U.S. government agency under the Department of Defense (DoD) that provides geospatial intelligence (GEOINT) to support national security, military operations, and humanitarian efforts.
NOAA	National Oceanic and Atmospheric Administration: a scientific agency within the U.S. Department of Commerce dedicated to understanding and predicting changes in the Earth's environment. NOAA's mission is to provide timely and reliable information about the atmosphere, oceans, and coastal resources to promote environmental stewardship and safeguard lives and property.
NOTAM	Notice to Air Missions (formerly Notice to Airmen): an advisory issued by aviation authorities to highlight conditions or changes that may affect the safety of flights. This can include information about navigational aids, runway status, airspace restrictions, or any temporary hazards
OCF	Obstruction Change File: a subset of DVOF used in mission planning that contains vertical obstructions that have changed.
PAA	Pacific, Australasia and Antarctica: a specific FLIP subregion defined for the purposes of air navigation and air traffic management. This region encompasses the vast Pacific Ocean, including Australasia (Australia, New Zealand, and surrounding island groups), and extends to the southernmost parts of the world, including Antarctica.
PFPS	Portable Flight Planning Software: a suite that enables pilots to create, update, and manage flight plans efficiently using mobile devices. This software integrates real-time weather data and airspace information to enhance situational awareness during flight preparation and execution.
PKI	Public Key Infrastructure: a vital framework that enables secure communication and transactions across various domains, including government and military operations. The U.S. government, particularly the Department of Defense, leverages PKI to establish trust, verify identities, protect data, ensure compliance with regulations, facilitate interoperability, manage access, support cybersecurity initiatives, validate digital signatures, and invest in robust implementation and management of PKI systems.
SFA	Source Foundation Aeronautical Office: NGA's aeronautical sector responsible for acquiring, preparing, and distributing aeronautical products for the US government and partner organizations in support of national strategy and DoD needs.
SIPRNET	Secret Internet Protocol Router Network (SIPRNet) : a secure system of interconnected computer networks utilized by the U.S. Department of Defense and the U.S. Department of State for the transmission of classified information.
SMR	Special Military Request Form: a formal request from the military to add data or information to DAFIF and/or FLIP products that does not normally meet the publication criteria for these products.

SUAS	Special Use Airspace: refers to designated airspace where specific activities are confined or where limitations are imposed on aircraft operations to ensure safety and security. Pilots must be aware of these airspace restrictions as they are visually indicated on aeronautical charts, ensuring proper navigation and adherence to regulations.
TAF	Terminal Aerodrome Forecast: a specific weather forecast format that provides information for airport operations, particularly in aviation contexts. Issued at least four times daily, TAFs report weather conditions expected within a 5-mile radius of an airport and cover periods typically ranging from 24 to 30 hours. These forecasts are generated by human meteorologists, consider local geographic factors, and utilize a standardized coding system similar to that used in METAR reports.
TAGGS	Terminal Aeronautical GNSS Geodetic Survey Program: a program established by Secretary of Defense directives that provides a precise World Geodetic System 84 (WGS 84) database of accurately surveyed coordinates for aerodromes, including runways, navigation aids, vertical obstructions, and ground control points.
TFADS-O	The Table Formatted Aeronautical Data Set – Obstacles: an improved NGA hosted aeronautical vertical obstructions (VO) dataset intended to replace the current vector vertical obstruction database.
TFR	Temporary Flight Advisories: brief, time-sensitive notifications issued by aviation authorities, such as the Federal Aviation Administration (FAA) in the United States, to inform pilots about specific operational hazards in a particular airspace. These advisories encompass a range of conditions, including military exercises, special events, weather phenomena, and unmanned aircraft operations, and are disseminated through channels like NOTAMs to ensure pilots maintain situational awareness for safe and efficient flight operations.
VFR	Visual Flight Rules: a set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going.
VO/DVOF	Vertical Obstruction / Digital Vertical Obstruction File: a digital resource repository used in aviation systems, providing data on the location, height, and type of vertical obstructions in an airspace. Examples include towers, power lines, smokestacks, etc. This information helps pilots and air traffic controllers identify potential hazards, facilitating safe route planning and compliance with obstacle clearance regulations. TFADS-O is anticipated to replace DVOF.
WAC	World Aeronautical Chart: a type of aeronautical map designed for visual navigation by pilots, providing essential information on airspace, terrain, navigational aids, and geographic features. Produced at a 1:1,000,000 scale, WACs cover extensive areas and are suited for en-route navigation and flight planning. While similar to sectional charts and utilizing the same symbols, WACs offer less detail due to their broader scale, making them less suitable for slower, local flights under visual flight rules. Discontinued by the FAA in 2015, WACs include

	topographic information, airports, and radio navigational aids, making them valuable for strategic flight planning.
WAC-INNR	WAC Installation Number Reason: a DoD published unique identification number based on the WAC and assigned to specific installations or updates of World Aeronautical Charts. This number aids in cataloging and tracking chart editions and revisions.

(U) Appendix B: High-level product descriptions

Product Name	Product Description	Additional Details
Aero Application (Aero App)	App developed to display multiple aero products as an Electronic Flight Bag. Available for iOS, Android and Windows operating systems.	Delivery system that hosts Aero data and products on an Electronic Flight Bag (EFB)/Electronic Knee Board (EKB). Aero App is an alternate dissemination platform replacing legacy paper Aero data/products. Aero Data Server, AWS, Digital Devices provide users the capability to operate in austere environments without Wi-Fi.
Automated Air Facilities Intelligence File (AAFIF)	Textual/Tabular dataset about all known airfields (49,000).	Updated weekly on web. Automatically updated when an AFD Baseline is completed. Classification availability dependent on the network accessed
Digital Aeronautical Flight Information File (DAFIF®) 8.0	Dataset containing all information required for mission planning, enroute and terminal navigation. Includes airfields, terminal procedures, navaids, refueling tracks, airspace/boundaries and waypoints.	DAFIF® 8.0 will sunset (cease production) on 31 Dec 2024. DAFIF® 8.1 is the current DAFIF® product.
Digital Aeronautical Flight Information File (DAFIF®) 8.1	Dataset containing all information required for mission planning, enroute and terminal navigation. Includes airfields, terminal procedures, navaids, refueling tracks, airspace/boundaries and waypoints.	DAFIF® 8.1 is certified for navigation in CNS/ATM airspace, under the authority of an LOA granted by the FAA dated 12 Aug 2024.
Digital Aeronautical Flight Information File (DAFIF®) 9.0	Dataset containing all information required for mission planning, enroute and terminal navigation. Includes airfields, terminal procedures, navaids, refueling tracks, airspace/boundaries and waypoints.	This product is still under development. Test data began distribution in 2023. DAFIF® 9.0 will be based on the ARINC 424-23 XML specification.

Digital Vertical Obstruction File (DVOF)	The user facing VO database for storing, retrieving, and managing data concerning known vertical obstructions worldwide, i.e. all manmade features, known to NGA, projecting above the earth's surface that pose a hazard to navigation.	DVOF itself is not downloadable. It is a "snapshot" of the VO database. All user-facing VO formats are derived from DVOF, such as TFADS-O, KML, KMZ, Shapefile, and other additional formats. WebDVOF is the recommended download site for DVOF data.
Table Formatted Aeronautical Data Set - Obstructions (TFADs-O)	VO data format capable of containing global obstructions.	The TFADS-O format can contain the entirety of VO data and is the most universal and easily converted format. TFADS-O can also be converted to GIS standard formats such as shape files.
Vector Vertical Obstruction Database (VVOD)	VO data format capable of containing global obstructions.	VVOD is a vector-based digital product that portrays vertical obstruction data. VVOD will sunset 12/31/2024. Its replacement is TFADS-O.
Electronic-Instrument Procedures Library (E-IPL)	Contains Non-DoD FLIP host nation/foreign terminal procedures translated into a Volpe format graphic.	Available via NGA Custom Media upon request.
Airfield Foundation Data (AFD) - Baseline	Vector data depicting airfields; includes runways, taxiways, surfaces, navaids, perimeter information.	The AFD - Baseline product is a zip file bundled with Shapefiles (vector data), layerfiles (style data), and a .KMZ file to view data in GoogleEarth. This is also a functional requirement for DAFIF airfields.
Airfield Foundation Data (AFD) - Layered Airfield Graphics (LAG)	AFD Vector data overlaid on imagery. Vector layers can be individually controlled.	The AFD - LAG product is an ad hoc product. It is a GeoPDF that allows for enhanced mission planning and situation awareness. The vector data overlaid on the imagery comes from the AFD - Baseline product.
Airfield Qualification Program (AQP)	FAA and DOD situational awareness product for identified AQP airfields.	FAA and DOD situational awareness product for identified AQP airfields.
Area Arrival Charts Depicting Terrain Data (AACDTD)	Part of the FLIP requirement; includes 3 charts for Alaska; terrain data layers are a key aspect	1501 sunset scheduled for January 2025

Flight Information Publications (FLIP) - DVD	FLIP DVD includes DoD FLIP, FAA and Canadian FLIP products.	
FLIP - Enroute Supplements	Regional FLIP products that provide additional information on airfields, navaids, and communication centers as an extension to respective Enroute Charts.	US IFR Supplement; foreign Enroute Supplements (AFR, CSA, EEA, ENAME, PAA), Flight Information Handbook (FIH)
FLIP - High and Low IFR Enroute and Area Charts, worldwide	Small-Scale charts that depict the enroute structure to aid in planning and navigating instrument flights in the enroute phase of flight.	
FLIP - Planning Documents (GP, AP)	FLIP products that provide general and theater-specific planning and reference information.	General Planning (GP); Area Planning (AP); AP/1B (MTR) charts
FLIP - Seamless IFR Enroute Chart	CADRG/ECRG formatted enroute charts for use in moving maps or in other tools that use CADRG format	Available in Beta version - 1:500K, 1:1M, 1:2M; loaded to ACES. Only US Army has an official requirement submitted via the FG NOX.
Worldwide Terminal Instrument Procedures	DoD and FAA terminal instrument procedures presented in Volpe format CONUS and OCONUS.	DOD and FAA FLIP terminal procedures plus Electronic-Instrument Procedure Library (E-IPL).
Canadian Products	Canadian FLIP, including planning documents, enroute charts and supplements, and instrument procedures. Available in hard copy from Defense Logistics Agency (DLA) and electronically on the DoD FLIP DVD, NGA's aeronautical web sites, and the DoD Aeronautical Mobile Application.	Not created/maintained by NGA.
FAA Chart Supplements	FAA product that provides additional information on airfields	Not created/maintained by NGA.
FAA Terminal Procedures	FAA produced terminal procedures available via Hardcopy, FLIP DVD, ACES 2.0 and ACES 1.5.	Not created/maintained by NGA.
FAA US High and Low Enroute Charts	FAA small-scale charts depicting the CONUS enroute structure to aid in planning and navigation	Not created/maintained by NGA.

	instrument flights in the enroute phase of flight.	
FAA Visual Flight Rules (VFR) (Low Altitude Charts)	FAA small-scale charts for visual navigation.	Not created/maintained by NGA.