Module 3: Data Acquisition via the Automatic Identification System Analysis Package (AISAP)

http://ais-portal.usace.army.mil/

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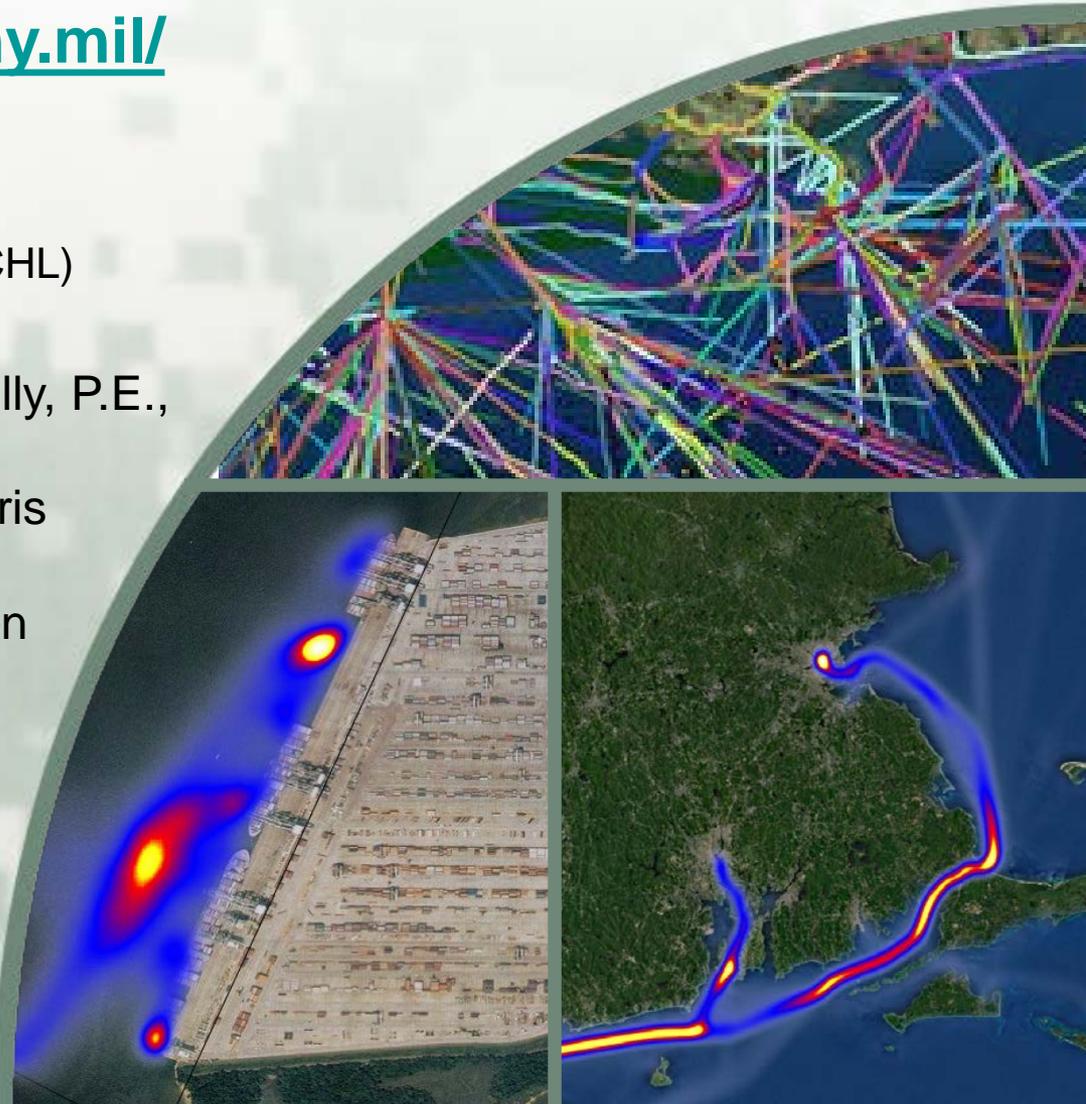
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Patricia DiJoseph, PhD, Brandan Scully, P.E., Brian Tetreault (ERDC-CHL)
Rich Akers, Irven Ingram, Rachel Norris (SAM-OPJ)
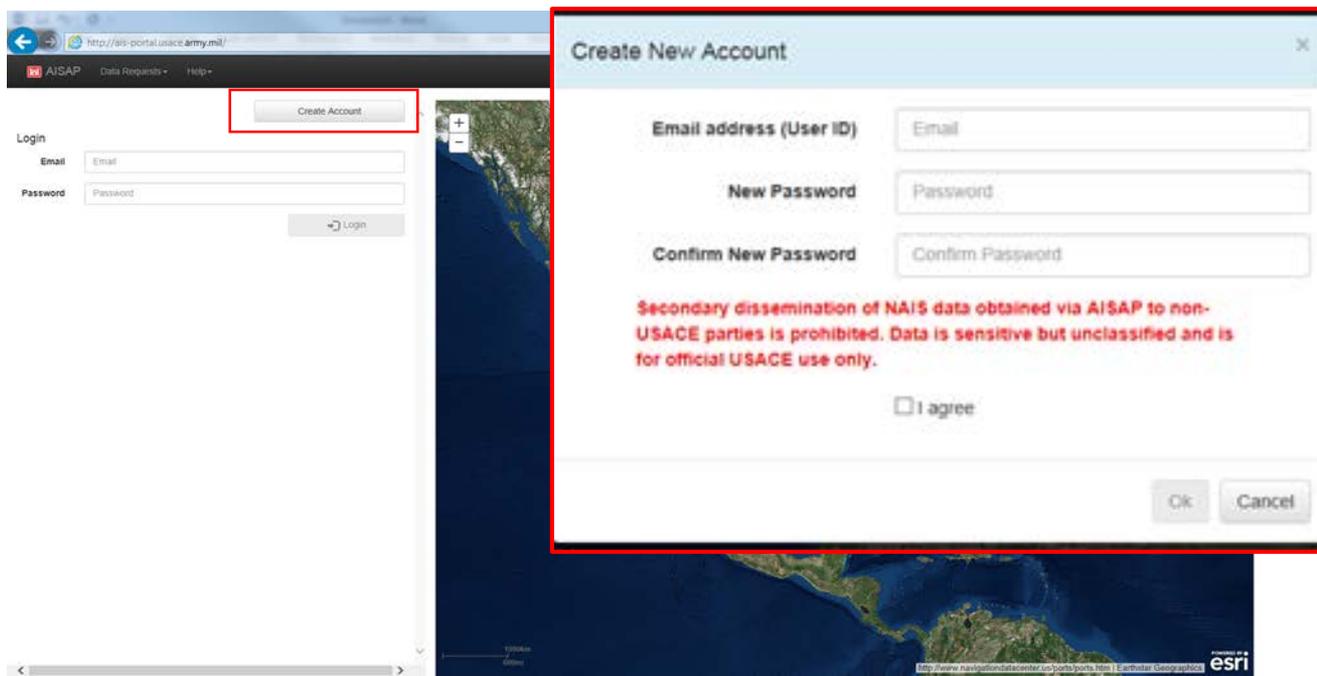Susan Herrle, Steven Antrim, Shannon Langford (ARA, Inc.)

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ERDC
Engineer Research and Development Center

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NAVSYS
Navigation Systems Research Program

First Login

- AISAP is accessed at https://ais-portal.usace.army.mil/

- Must access via an ACE-IT computer.

- If this is your first time using AISAP, you will need to create an account.
    - Click on Create Account. A Create New Account pop up box will appear.
    - Enter your email address and create a password.
    - Agree to the following "Secondary dissemination of NAIS data obtained via ASIAP to non-USACE parties is prohibited. Data is sensitive but unclassified and is for official UACE use only" and then check I agree.
    - Click okay to create your account.

AISAP Interface

Browser address bar: http://ais-portal.usace.army.mil/

Menu bar: AISAP | Data Requests ▼ | Help ▼ | user.name ▼ | Base Map ▼ | Map Tools ▼

Data Requests menu:
- Find Requests
- Query Tool
- NAIS Web Services
- Request Status Lookup

Help menu:
- Documentation
- Contact

user.name menu:
- Logout
- Change Password

Base Map menu:
- streets
- satellite
- hybrid
- topo
- gray
- oceans
- national-geographic
- osm

Map Tools menu:
- Measure
- Heap Map Control
- USACE Layers
- Toggle Width of Map

Data Query Tool

- The Data Query Tools enables the user to request a subset of the USCG database.

- The request is automatically, electronically sent to the USCG database.

- There are two methods for users to define which vessels' data they want from the USCG database:
  - One, the user specifies the vessel(s).
  - Two, the user does not specify vessels but instead defines the following criteria vessels must have met in order to be included: location they must have traveled in or through during a specified time period, at a specified speed range.

- Once the vessels are specified, the user then defines the time period from which to pull the records, and the maximum number of records per vessel to return.

Email Address

- Email address sets the following:
  - Where automated emails are sent to notify the user that their query was received, and then that their query completed.
  - Which queries are viewable and searchable by email address.
  - Query status editing privileges.

- AISAP auto populates the field with the username email.
  - Users can manually change the email address.

Query Tool

After completing the form, click 'Submit Request' to send your request to the Corps for processing. An email will be sent to the provided email address when the request is finished.

Email	
Start Time	
End Time	

Which Vessels?   ☑ All MMSIs   ☐ Selected MMSIs

Time Period Parameter

- The user defines the earliest and latest AIS records to include, based off of the records' timestamps.

- Format: YYYY-MM-DD HH:MM:SS (can be populated via drop down calendar or manually).

- Time period is entered in Universal Standard Time (UTC), AIS data is in UTC.

Manual entry

Drop down calendar

Using the Drop Down Calendar

- Advance by one level (e.g., go from viewing a single month to all months) by clicking on the calendar header
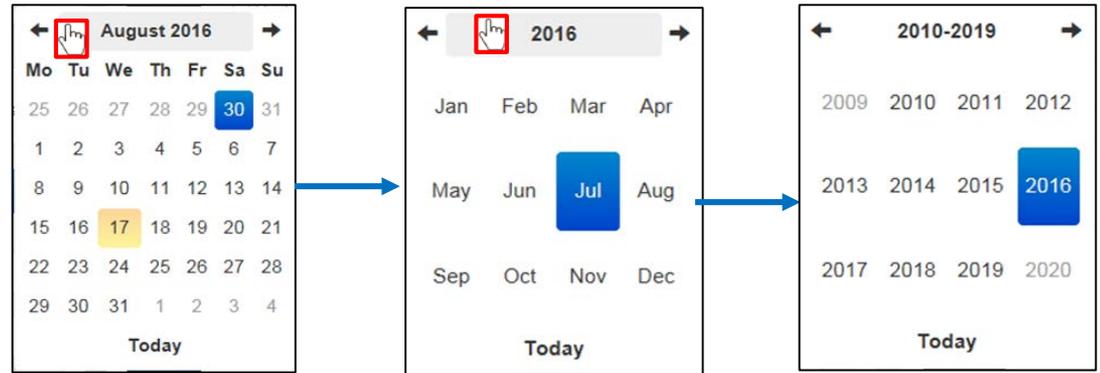
- Drill down by one layer (e.g., go from viewing all hours within a day to all minutes within a particular hour) by clicking on the desired value from the current options (e.g., click on the date to view the hours for that day)
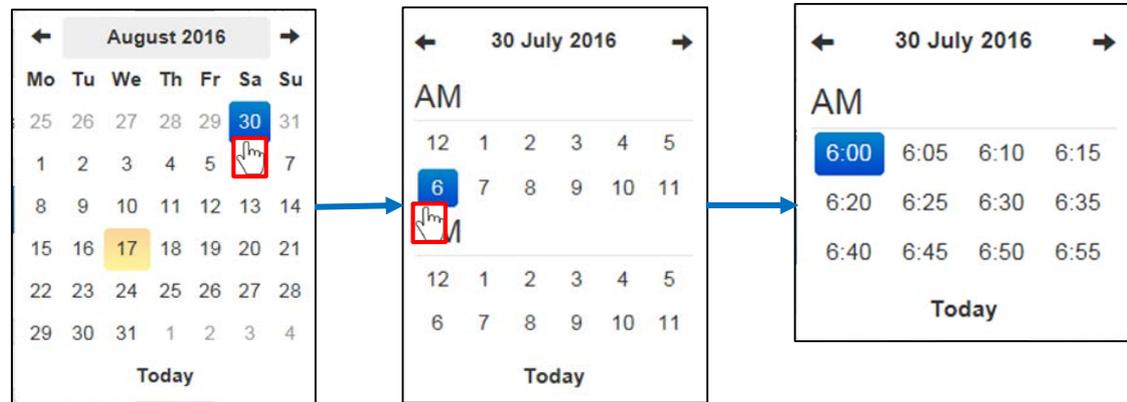

- Advance or go back by one time period (e.g., from the current month to the next or previous month) by clicking on the arrows at the top of the calendar
- Manually enter seconds values
- Manually enter a time that does not fall on a five minute mark (e.g, 6:07 instead of 6:05 or 6:10)

Which Vessels Parameter – Selected MMSIs

To return data on user specified vessels check Selected MMSIs"

- If vessel MMSI numbers are known:
  - Enter MMSIs into field.
    - Separate more than one MMSI by spaces, commas, periods, colons, tabs, or returns.

Query Tool

After completing the form, click 'Submit Request' to send your request to the Corps for processing. An email will be sent to the provided email address when the request is finished.

Email	patricia.k.dijoseph@usace.army.mil
Start Time	
End Time	

Which Vessels? ☐ All MMSIs   ☑ Selected MMSIs

🔍 MMSI List

- If vessel MMSI are not known:
  - Click on search button.
  - Enter known information about vessel into either name, call sign, or IMO Number field.
    - Note user can enter partial information to find any vessel meeting that criteria.
  - Click Find Vessel(s) button.
  - Select vessel(s) by clicking on green button.
  - Click OK button once complete.

Vessel Search

Name	mary
Call Sign	
IMO Number	

Find Vessel(s)

	367082520	MARY VIRGINIA	275877	WDC8155
	367086560	MARY DIANE MCCALL	0	WDC8407
	367092190	MARY L	0	WDC8727
	367122270	MARY G	0	WDD2978
	367126790	QUEEN MARY	0	WTD8392
	367136880	MARY HOPE II	0	WDD3837
	367151850	MARY ETHEL	0	WYZ3386
	367170470	MISS MARY	0	WDD6260

OK

Which Vessels Parameter-All MMSIs

To return data on any vessel that meets user specified criteria, check "All MMSIs".

- A vessel location box will pop up. See next slide for details.

Vessels' Location Parameters

- Used when selecting "All MMSIs".

- The user defines a geofence to identify vessels that traveled in or through a specific area.

- The geofence must be a rectangle.

- The geofence can be set in two ways:
  - Enter the coordinates of the geofence in decimal degrees : upper left latitude, upper left longitude, lower right latitude, and lower right longitude.
  - Draw the geofence:
    - Change the map view (e.g., zoom in, zoom out, change the base map, and/or add layers) so that the location you want the geofence is visible.
    - Click on Draw Box.
    - Place the mouse pointer on the map where you want to start the geofence.
    - Click and then drag to set the outline of the geofence.
      - Release the mouse to set the geofence.
      - The coordinate fields will auto populate.
      - To redraw the geofence, click on Draw Box and repeat the steps.
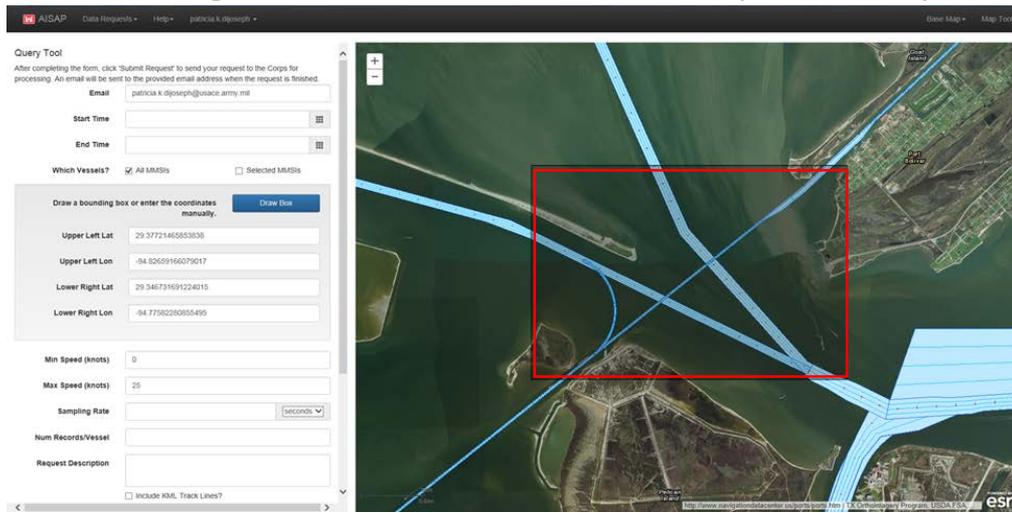
Min and Max Speed Parameters

- Used when selecting "All MMSIs".

- Used to exclude vessels that never traveled between a minimum and maximum speed

- The speed for at least one position report associated with the vessel must be both **greater than** the minimum speed, and **less than** the maximum speed, for it to be included in the subset

- If a vessel has at least one position record that meets the speed parameters but has one or more records that do not, all the records will be returned for that vessel

- Speed units are in knots

Query Tool

After completing the form, click 'Submit Request' to send your request to the Corps for processing. An email will be sent to the provided email address when the request is finished.

Email	
Start Time	
End Time	

Which Vessels?   ☑ All MMSIs   ☐ Selected MMSIs

Draw a bounding box or enter the coordinates manually.   **Draw Box**

Upper Left Lat	
Upper Left Lon	
Lower Right Lat	
Lower Right Lon	

| Min Speed (knots) | 0 | × |
| Max Speed (knots) | 25 | |

Speed Parameters Example

1. If the sample vessel positon reports for a single vessel below meet the user defined time period and location criteria, will that vessel be included in a subset with a Min Speed defined as 0 knots and a Max Speed defined as 5 knots?

2. What if the Min Speed is defined as 6 knots and the Max Speed is defined as 10 knots?

Record	TX_DTTM	LAT	LON	SPEED
1	7/30/2016 14:43	32.7883	-79.9103	0
2	7/30/2016 14:49	32.7882	-79.9125	2
3	7/30/2016 14:51	32.7878	-79.9141	2
4	7/30/2016 14:47	32.7878	-79.9105	6

Number of Records / Sampling Rate Parameter

- Used when selecting "All MMSIs" and "Selected MMSIs".

- The sampling rate and number of records parameters allows the user to request a down sampling of the records that meet the user defined request parameters for a vessel.
  - This decreases the amount of data returned and thus improves the speed efficiency of the query process and any later data analysis processes

- The USCG database returns the records such that they reflect an even sampling rate or an even amount of time between position reports.

- The user only needs to fill in the number of records field or the sampling rate field.

Number of Records / Sampling Rate Parameter Continued

- The number of records is the maximum number of AIS position records to return for any single vessel.

- The sampling rate is the desired time difference between two consecutive records. It equals the time period divided by the maximum number of records.

- The sampling rate unit of time can be defined by the user (e.g., seconds, minutes, hours, days) by clicking on the drop down menu.

- AISAP automatically populates the sampling rate field, if the user enters the number of records, and vice versa.

- The maximum number of records per vessel per request allowed in ASIAP is 15,000. If your number of records is greater than this, the field will be highlighted in red. You will need to either decrease the time period or decrease the number of records/ increase the sampling rate.

Sampling Rate	5	minutes ⌄
Num Records/Vessel	576	

Example input to request vessel position reports at a five minute interval, such as at 12:00, 12:05, 12:10, etc., over a 2 day (48 hour) period

Request Description

- Required field; Submit Request button will not activate without it.

- Provide a description of the request, such as location, time period, sampling rate, and purpose of request.

- Text entered in field is viewable to all users once the request is submitted.

Examples:

Include KML Track Lines

- Select to include vessels' KML track lines in the request output

- Used to view a vessels' time stamped position reports on a map

- Enables animation of the vessel position over time in Google Earth

Submit Request

- After defining all required parameters, click on Submit Request.

- An email will be sent to the provided email address from donotreply@usace.army.mil confirming that the request has been received.

Request Status Lookup

- Accessed under the Data Request drop down menu.

- Will open up in a new window.

- Provides the progress status of the requests.

- Leave email field blank to see all users' requests or enter a user's email to see their specific requests. Then click on "Check Request Status".

- Request ID will match that contained in the submission confirmation email.

- Percent Complete field shows progress of request.
  - Size of request and number of requests currently running affect query time.

- Request's data is available in AISAP when AISAP Ready field is "true".

Request Status Lookup Continued

- If your request is failing or not progressing, try stopping that request and submit a new request with adjusted parameters or contact us.
    - If the request is too small, such as if there were no vessels that met the parameters, the request will fail.
    - If the request is too large, such as for a long time period and a high sampling rate, the request will progress slowly or even fail.
- You can Pause your request (request email must match your user email).
- You can Resume a request from where it was paused.
- You can Stop your request (request email must match your user email) from completing. Once you hit stop, you cannot resume it.
- You can Restart a request from the beginning.

Request Status Lookup

Email: kenneth.n.mitchell@usace.army.mil   [Check Request Status]

Request ID	Email Address	Request Date	Status	Is Finished	Percent Complete	AISAP Ready	Description	Restart	Resume	Pause	Stop	Delete
54432	kenneth.n.mitchell@usace.army.mil	2016-08-24T14:23:37.168778	Completed	true	100	true	All US-flagged tankers; FEB-APR 2016; 1-hr data; KML	↻	►	▮	▮	✕
54429	kenneth.n.mitchell@usace.army.mil	2016-08-24T12:46:55.374807	Completed	true	100	true	Production test query; Columbia River above Portland; 1-7 JUL 2016; 1-hr data	↻	►	▮	▮	✕

Download Returned Data

- Located at the bottom of the Query Tool page, accessed under the Data Request drop down menu.

- This step is NOT required to visualize and/or analyze the data in AISAP.

- You can use it if you want to see what a completed requests' finished data looks like or to conduct analysis outside of AISAP.

- It is used to download the KML track lines, if they were requested.

- Voyage.csv provides the static vessel information. Note it is manually entered by the vessel owner/operator and can be incorrect.

- Report.csv provides the time stamped position reports along with course over ground, rate of turn, speed over ground, and heading. Information is electronically collected onboard the vessel.

Request Number
Voyage.csv
Report.csv
VesselTrackLines.zip
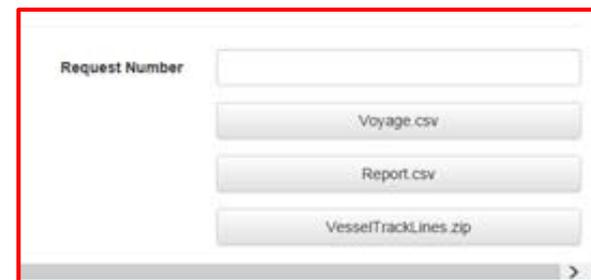
Voyage CSV file example

MMSI	IMO_NUMBER	CALL_SIGN	NAME	SHIP_AND_CARGO_TYPE	DIM_BOW	DIM_STERN	DIM_PORT	DIM_STARBOARD	NAV_SENSOR	ETA	DRAUGHT
3675	35527	WDF9237	BI	Vessel - Towing	7	20	8	2			1.2
3669	0	WDB7102	M	Vessel - Towing	10	35	9	4			2.9
3669	0	WDB7117	GI	Not Available (default)	0	0	0	0			2.6
3669	0	WDB8732	W	Vessel - Towing (length of tow > 200m or breadth > 25m)	7	39	7	6			3.1
3669	0	WDB8727	CI	Vessel - Towing	7	47	7	8			3.2
3669	89000	WCK9504	A/	Tug	5	16	4	5			2.6

Report CSV file example

MSG_TYPE	MMSI	NAME	RECEIVER	TX_DTTM	LAT	LON	COURSE_OVER_GROUND	NAV_STATUS	POS_ACCURACY	RATE_OF_TURN	SPEED_OVER_GROUND	HEADING
0	366963		.ARK	10/19/2014 7:20	37.138938	-88.731647	283	Not defined (default) or A	FALSE	0	6	289
0	366963		.ARK	10/19/2014 7:25	37.142037	-88.743433	295	Not defined (default) or A	FALSE	0	6	311
0	366963		.ARK	10/19/2014 7:30	37.146557	-88.750568	318	Not defined (default) or A	FALSE	0	5	325
0	366963		.ARK	10/19/2014 7:35	37.152737	-88.757573	314	Not defined (default) or A	FALSE	0	5	313

Find Requests

- Accessed under the Data Request drop down menu.
- Before submitting a request, you can check to see if the data you want is already available via a previously submitted and completed request.
- Previous requests can be searched by any of the following criteria: geographic location, request ID, time period, submitter email, description, maximum number of records.
- Values for multiple fields can be entered.
- The email and description fields can accept partial values.
- Draw a geographic location (polygon) as follows:
  - Click on the Draw Area button,
  - Click on the map to add each vertex of the polygon,
  - Double click to close the area and finish.

Find Requests Continued

- Click Retrieve Data to display a list of requests that meet the criteria entered and to display the request on the map with gray boxes.
    - Darker boxes indicate more than one request for that location.
    - Clicking on each box shows a description for that request.
    - Click on the arrow at the top of each box to show the descriptions for the other requests for the location, if applicable.
    - Click on the magnify glass next to a request in the list to zoom to that request on the map.

NAIS Web Services

Access via AISAP, under the Data Requests drop down menu

NAIS Web Services

Data format types; the blue button indicates a type is available for the service

Parameters

MMSI	
Name	
Call Sign	
IMO Number	
Start Time	
End Time	
Upper Left Lat	0
Upper Left Lon	0
Lower Right Lat	0
Lower Right Lon	0
Min Speed (knots)	0
Max Speed (knots)	1
Num Records	1

Services

Service	Default	XML	JSON	KML	KML Track	KML Position
Vessel Track Line	Default					
Vessel Identity		XML	JSON			
Vessel Position		XML	JSON	KML		
Vessel Position Aggr. List		XML	JSON		KML Track	KML Position
Vessel Position List		XML	JSON		KML Track	KML Position
Vessel Position in Area		XML	JSON	KML		
Vessel Transit		XML	JSON			
Voyage History		XML				

Output from Webservice

NAIS Web Services User Interface

Hover over a services button to see which parameter fields are required; hover over a parameters button to see which services intake that field.

NAIS Service	User Defined Parameters					NAIS Service Description
	MMSI	Time Pd.	Location	Speed	# of Rcds	
Vessel Position	x					Returns the current location (lat/lon) of the requested vessel, and provides basic vessel information, including call sign, name, speed, course, the date this position was recorded, and the source type of the data.
Vessel Identity	x	x				Returns basic information about the vessel or vessels in the query. Note that this supports wild card searches, and can return multiple results for a given query. The results include the MMSI, IMO number, call sign, name, and date ranges the requested vessel data was valid. This is useful for tracking when things like call sign or vessel name change.
Voyage History	x					Returns a list of all voyage records on file for the requested MMSI, as filed with the coast guard. Each voyage record contains the following information: MMSI, IMO number, call sign, name, ETA, destination, start time, end time, and

NAIS Service	User Defined Parameters					NAIS Service Description
	MMSI	Time Pd.	Location	Speed	# of Rcds	
Vessel Track Line	x	x			x	Returns the vessel's track line over the requested date range, at the requested sample rate.
Vessel Position in Area			x			Used to scan a requested rectangular geofence, and returns all vessels currently inside that box. This method shows real time data. Returns several fields about each vessel's identity, position, and course.
Vessel Transit		x	x	x		Returns a list of vessels that were in a requested geofence, over a requested data range. This method also allows the user to filter out vessels based on speed. This method returns several fields about each vessel's identity, position, and course.

NAIS Service	User Defined Parameters					NAIS Service Description
	MMSI	Time Pd.	Location	Speed	# of Rcds	
Vessel Position Aggr. List	x	x			x	Returns the low-resolution (5-minute max resolution) vessel position data over the selected date range. Each data point is represented by MMSI, speed, heading, lat, lon, course over ground, rate of turn, navigation status, and receiver information.
Vessel Position List	x	x			x	Returns the high-resolution vessel position data (no min or max resolution) of the requested vessel over the selected date range. Each data point is represented by MMSI, speed, heading, lat, lon, course over ground, rate of turn, navigation status, and receiver information.

Some Querying Tips

- Check for pre-existing queries that already have the data you want.

- If no data is returned for your query or your query is not progressing, try submitting a new request with adjusted parameters.

- Data availability requires that vessels were broadcasting AIS and the AIS receivers were functional.

- Use the NAIS web services to quickly check for data availability if no data is being returned.

- The number of queries running and the size of the queries affects their time to complete.

- If comparing AIS data to other data sources, make sure it's all converted into the same time standard.