

User Guide:

AIS TrackBuilder Tool v1.0 (for ArcGIS Pro)

The AIS TrackBuilder Tool is designed to take AIS point data from an Esri FileGeodatabase and convert it to a polyline track line feature class. This tool has been designed as an ArcGIS Python Toolbox tool that is utilized within ArcGIS Pro (version 2.1.x or later). The user specifies the input AIS point feature class and the output track line feature class name and location, and selects options on how the track lines are segmented. The tool is designed to work with AIS point data created with the CSV to filegeodatabase Tool, but is flexible and can work with any point dataset format as long as it includes a ID field to distinguish unique track lines and a datetime field.

This document outlines:

- System/Software requirements
- How to access the tool within ArcGIS Pro
- Usage instructions

Software Requirements

ArcGIS Pro	Version 2.1.x or later <ul style="list-style-type: none">• Designed in version 2.1.3
------------	--

How to access the tool within ArcGIS Pro

No special installation is required to use this Python Toolbox. The toolbox files should be extracted with the AIS_Uilities_2018_Pro ZIP file, and the toolbox can be accessed directly from the ArcGIS Pro Catalog.

1. Browse the directory containing the Python Toolbox files.
2. The **AIS_Uilities_2018_Pro** Python Toolbox should appear with this location:

 AIS_Uilities_2018_Pro.pyt	GP	7/3/2018 4:07 PM
---	----	------------------

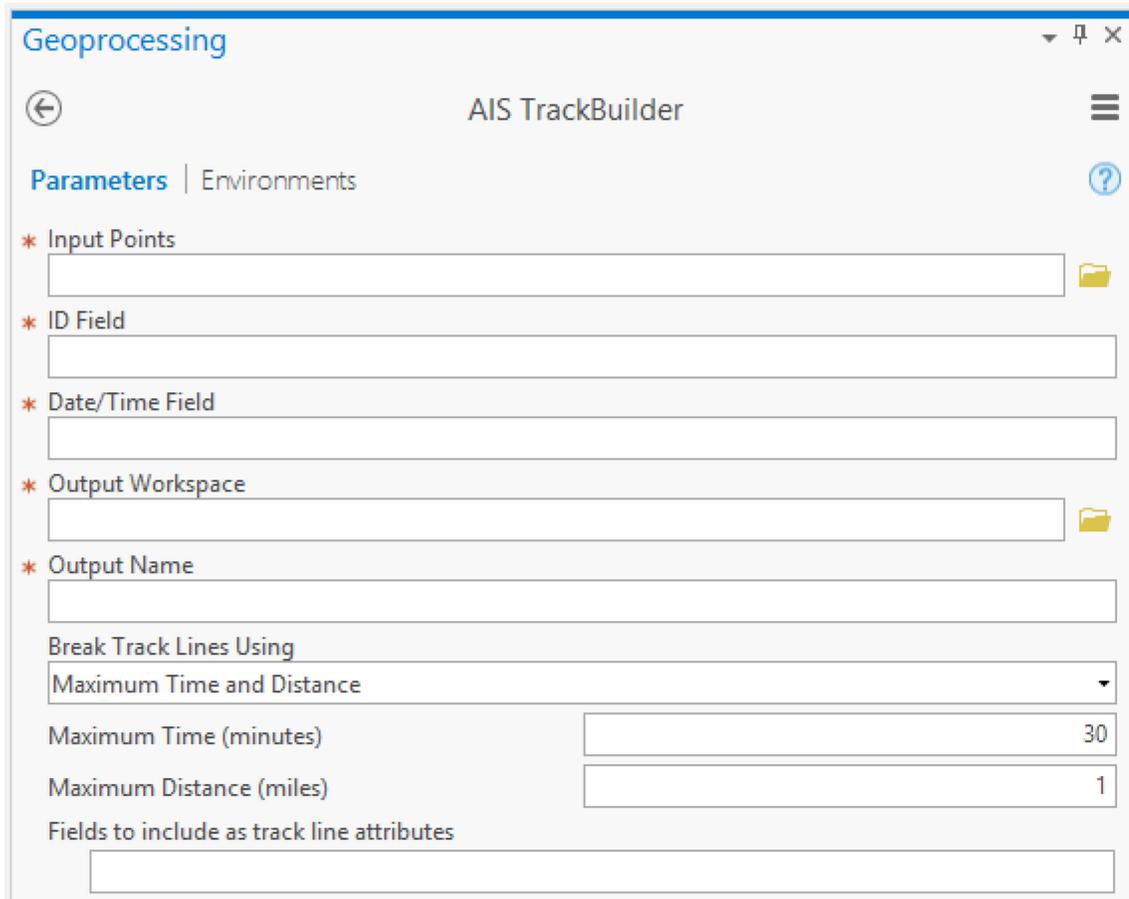
3. Double click the toolbox to access the **AIS TrackBuilder** tool:

Name	Type
 AIS CSV to File Geodatabase	script
 AIS TrackBuilder	script

4. Double click on tool to load the dialog and run the tool.

Usage instructions

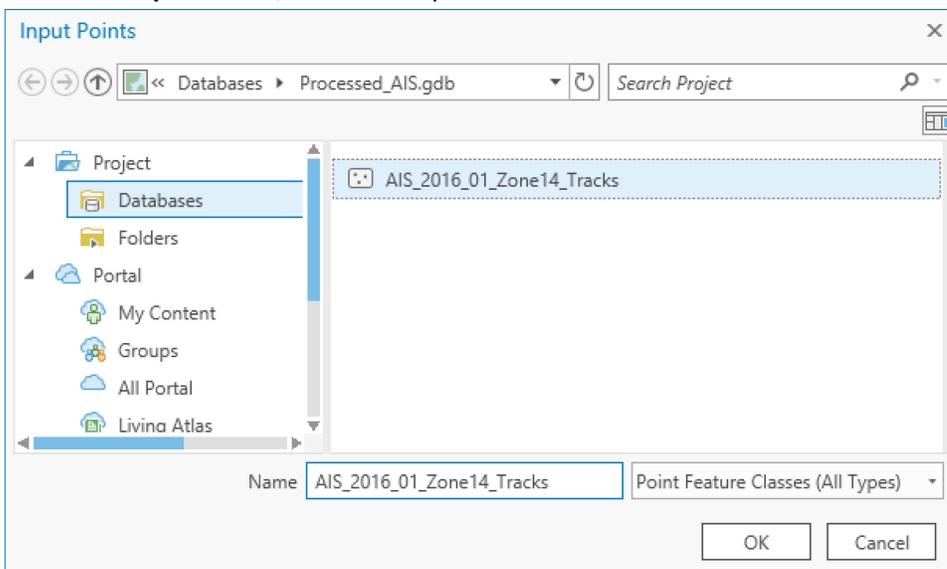
1. Open the **AIS TrackBuilder** tool ArcGIS Pro



The screenshot shows the Geoprocessing window for the AIS TrackBuilder tool. The interface includes a back arrow, a search icon, and a help icon. The tool name "AIS TrackBuilder" is displayed at the top. Below the tool name, there are two tabs: "Parameters" (selected) and "Environments". The Parameters section contains several input fields and options:

- Input Points:** An empty text box with a folder icon to its right.
- ID Field:** An empty text box.
- Date/Time Field:** An empty text box.
- Output Workspace:** An empty text box with a folder icon to its right.
- Output Name:** An empty text box.
- Break Track Lines Using:** A dropdown menu currently set to "Maximum Time and Distance".
- Maximum Time (minutes):** A text box containing the value "30".
- Maximum Distance (miles):** A text box containing the value "1".
- Fields to include as track line attributes:** An empty text box.

2. To set the **Input Points**, browse the point feature class to be used to build the track lines.



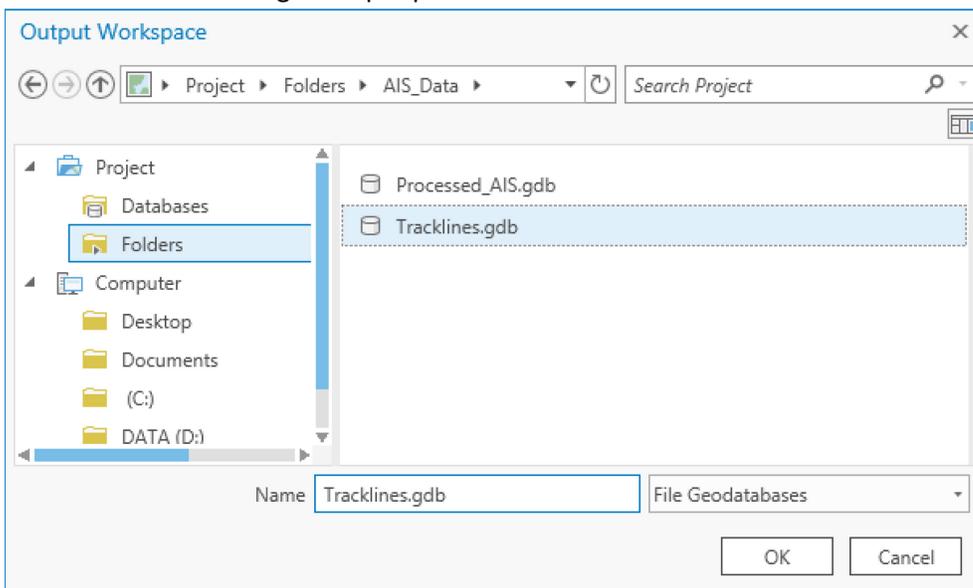
The screenshot shows the "Input Points" dialog box. The dialog has a title bar with a close button. Below the title bar, there are navigation arrows, a breadcrumb path "Databases > Processed_AIS.gdb", a search box with the text "Search Project", and a refresh icon. The main area of the dialog is a tree view showing the project structure. The "Databases" folder is expanded, and the "AIS_2016_01_Zone14_Tracks" feature class is selected and highlighted. Below the tree view, there is a "Name" field containing "AIS_2016_01_Zone14_Tracks" and a dropdown menu set to "Point Feature Classes (All Types)". At the bottom of the dialog, there are "OK" and "Cancel" buttons.

3. After selecting the input points, some default parameters will be automatically selected if the input points are in the standard data format.

4. Select the name of the numeric **ID Field** to use to differentiate points belonging to different vessels. The default is the MMSI field.



5. Select the name of the **Date/Time Field** that stores the timestamp of each AIS data point. The default is the BaseDateTime field.
6. Browse to the existing, or create a new, FileGeodatabase where the new track line feature class will be created and click Add. For best results, the output geodatabase should be different than the database containing the input point features.



7. Enter the desired name of the output track line feature class.



8. Select the desired method to use to break the track lines: Maximum Time and Distance or Time Interval. Based on this selection, the following input parameters will be available:

- a. **Maximum Time and Distance** will split lines where the distance or time between two sequential points exceeds one of the thresholds provided.
 - i. Enter the maximum time to allow between points in minutes, the default is 30 minutes
 - ii. Enter the maximum distance between points in (statute) miles, the default is 1 mile

Break Track Lines Using	
Maximum Time and Distance	
Maximum Time (minutes)	30
Maximum Distance (miles)	1

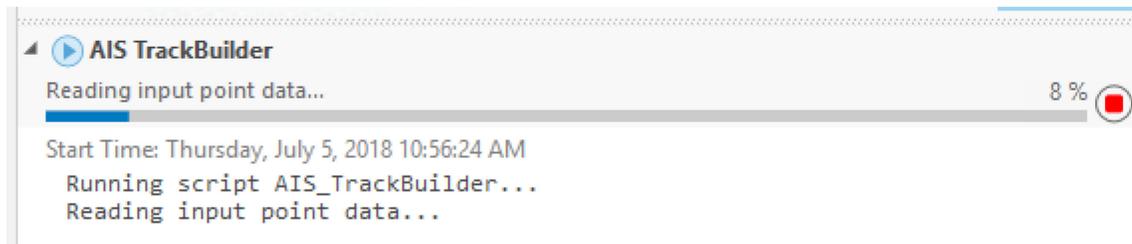
- b. **Time Interval**, all vessel points within the specified interval are connected regardless of distance or time between points.
 - i. Enter the time interval in hours, the default is 24 hours

Break Track Lines Using	
Time Interval	
Time Interval (hours)	24

- 9. Select any attribute fields to be transferred to the generated track lines. The attribute(s) from the first point on each trackline will be applied to the track line feature. The field name and type will match the input point data.
 - a. **Recommendation:** do not to include the following standard fields: MMSI, BaseDateTime, SOG, COG, Heading.
 - b. The field used for the ID Field and the Date/Time Field input parameters will already be included in the output track lines. Other attributes that vary from point to point should not be applied to the track lines.

Fields to include as track line attributes	
VesselName	
IMO	
CallSign	
VesselType	

- 10. Click the **Run** button to start running the TrackBuilder tool.
- 11. The following dialog will show the progress of the TrackBuilder.



12. When the tool has completed, it will display the number of unique IDs (MMSI), and the number of track lines created, and the resulting track line feature class will exist in the specified output FileGeodatabase

```
▲ ✓ AIS TrackBuilder
  Completed successfully

Start Time: Thursday, July 5, 2018 10:56:24 AM
Running script AIS_TrackBuilder...
Reading input point data...
Read 2,648,675 points
Building output track line feature class...
Generating track lines...
Unique MMSI's= 702
Track lines created = 4,199
Completed script AIS TrackBuilder...
Succeeded at Thursday, July 5, 2018 11:02:02 AM (Elapsed Time: 5 minutes 38 seconds)
```