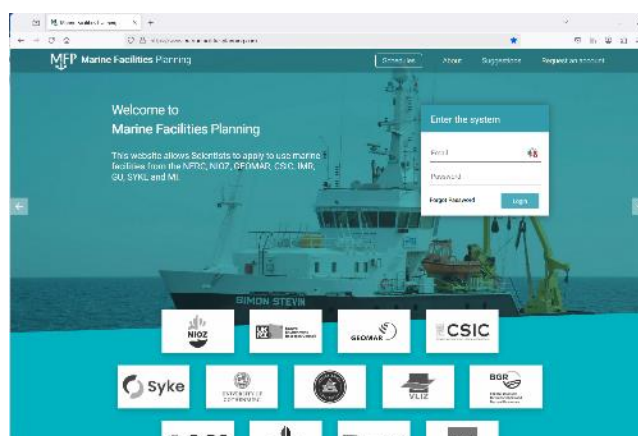


Import a cruise plan created with Marine Facilities Planning into Perplex7



<https://www.marinefacilitiesplanning.com/>

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Introduction

Perplex7 is a software that can be used to plan and efficiently carry out expeditions with research vessels. The software was developed at the Alfred Wegener Institute and used during countless voyages of the RV Polarstern.

PERPLEX allows scientists and expedition leaders as well as logisticians and nautical personnel to optimize routes and compare them with water depths, sovereignty zones and other important boundary conditions, e.g. sea ice concentration. In addition, individual equipment deployments can be planned and the requirements of passengers can be taken into account and balanced.

The planning, including all relevant information, is not only carried out before the expedition, but must also be updated regularly during the expedition, taking into account, for example, the actual speed of the ship or the duration of equipment deployments. The scientific chief scientist can easily use Perplex to create relatively precise work plans for the next few days. The remaining ship time is also continuously recalculated in order to meet the scheduled end of the voyage at the specified port

of entry. The software is based on a graphical user interface that displays all the required information such as the station list and map side by side.

The instructions explain how an expedition planned with *Marine Facilities Planning* (MFP) can be imported into Perplex7 so that the chief scientist can use the software at sea.

Requirements

- The stand-alone version of Perplex7 (Perplex7.exe) must be installed. Alternatively, the source code of the software (Perplex7.mlapp) can also be executed in the Matlab Command Window, e.g. if Perplex7 is to be used on a MAC.
- Check the "Ports.txt" file in the "Dataset" directory and add the port of departure and destination if necessary.
- Check the file "Default_InstrTable.csv" in the "Perplex7" directory and add devices if necessary. Alternatively, you can also edit the table with the device details in Perplex7, see Instrument tab, and also overwrite existing device names. Note that when creating a new cruise, the changes made are only retained if they were made directly in "Default_InstrTable.csv".
- The csv-file exported from MFP, e.g. "CoordinatesExport-20250227T1121.csv" is needed.

```
WPT No., LAT, , , LON, , ,  
1, 54, 27.19, N, 007, 45.28, E  
2, 54, 33.97, N, 008, 07.52, E  
3, 54, 45.77, N, 008, 12.64, E  
4, 54, 50.66, N, 007, 21.69, E  
5, 55, 20.89, N, 007, 36.78, E
```

A description of the software can be found in "Perplex7-Manua.pdf".

Convert MFP-Export

In Perplex7 there is a menu to import a text file with a list of waypoints; see Perplex7-Manua.pdf page 12-13. To be able to import the export of waypoint coordinates from MFP, the format must be converted, so that the above csv file becomes this text file:

```
54.453200 7.754700  
54.566200 8.125300  
54.762800 8.210700  
54.844300 7.361500  
55.348200 7.613000
```

The format was converted using a simple Matlab program *MFP_CoordinatesExportCSV.m*, which can be found in <https://github.com/rohardt/Perplex7> and Mathworks File Exchange:

https://de.mathworks.com/matlabcentral/fileexchange/132872-perplex7?s_tid=ta_fx_results

To execute *MFP_CoordinatesExportCSV.m* users can access "Matlab online" via their browser, they do not need a Matlab license!

Matlab online and Convert MFP-Export

Open and execute "Matlab online" in your browser.

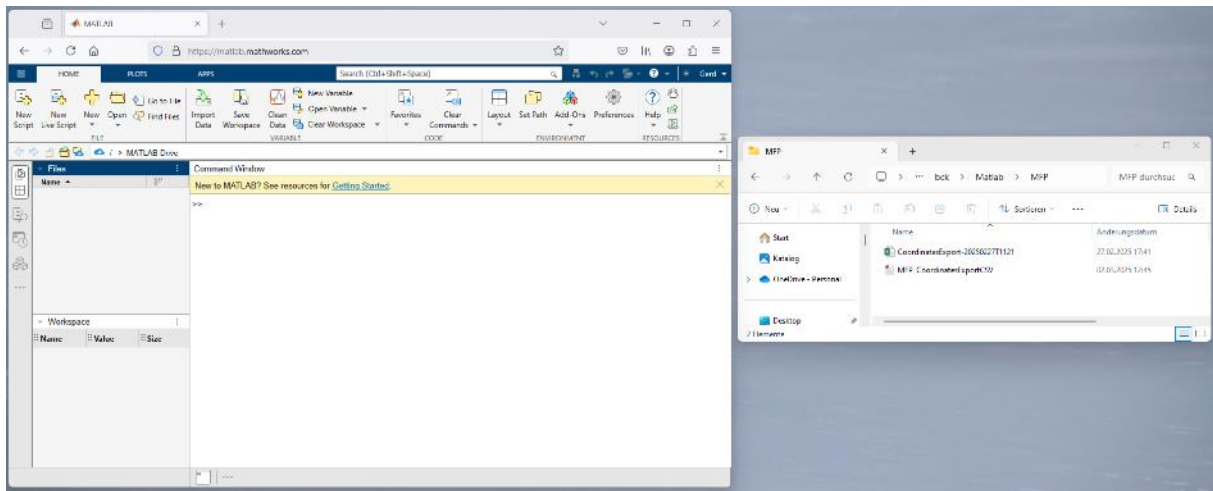


Fig. 1: On the right is your local folder, e.g. “MFP”. Click and select *CoordinatesExport-20250227T1121.csv* first and hold down the LMB (left mouse button). Then drag it into the Matlab window in “Files”.

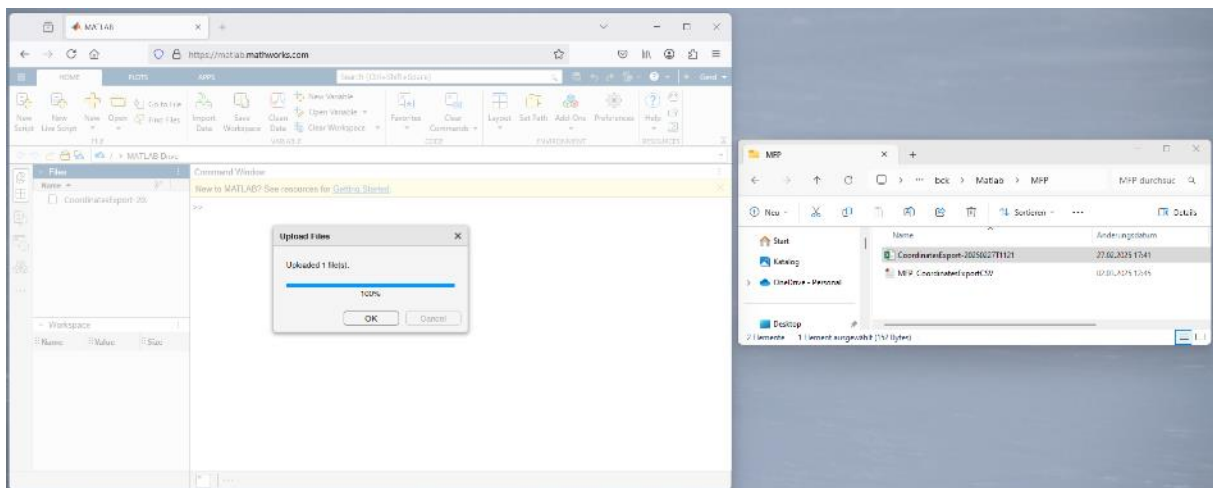


Fig. 2: Press [ok].

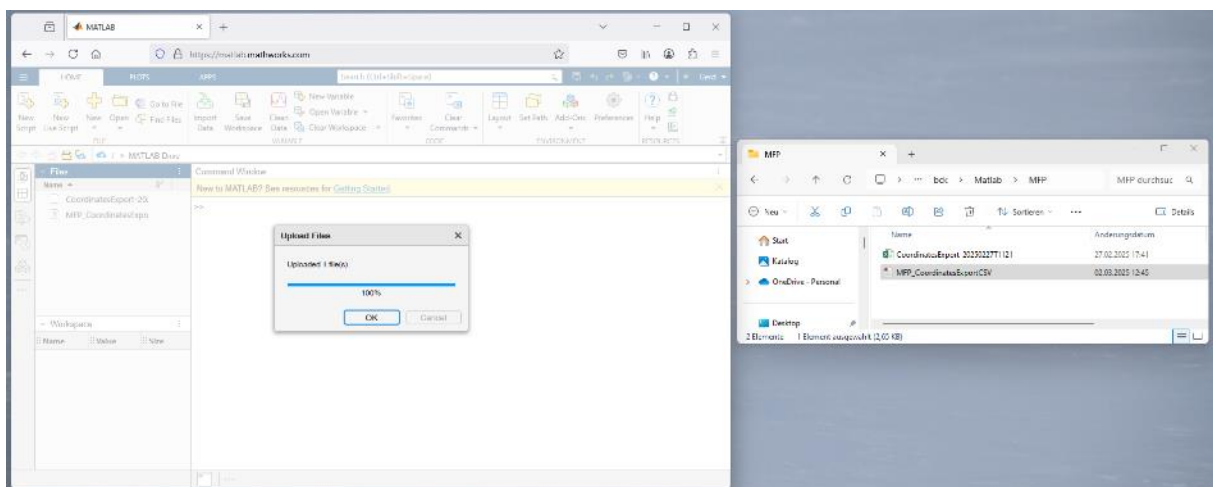


Fig. 3: Next click and select *MFP_CoordinatesExportCSV.m* (the Matlab script) and hold down the LMB. Then drag it into the Matlab window in “Files” too and press [ok].

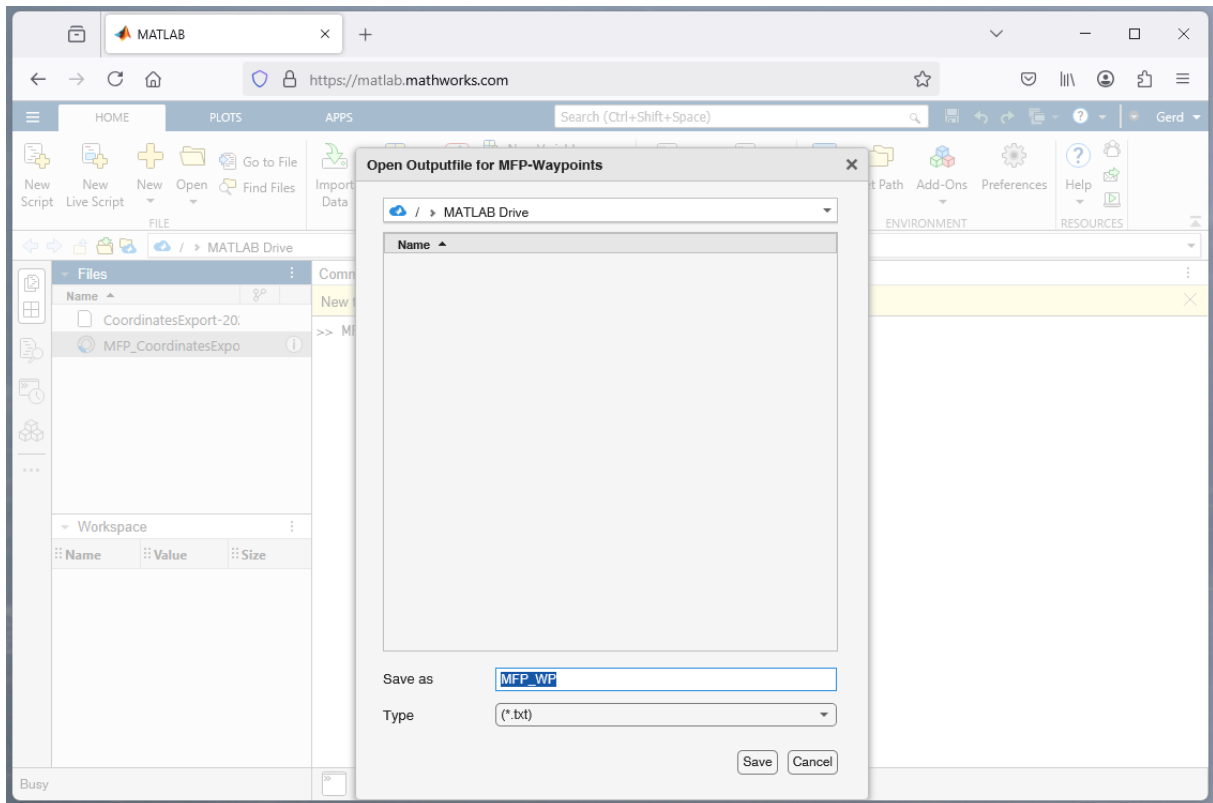


Fig. 4: Execute the script *MFP_CoordinatesExportCSV.m* (click on RMB and select “Run”). Then enter the name of the output file (without .txt) and press [save].

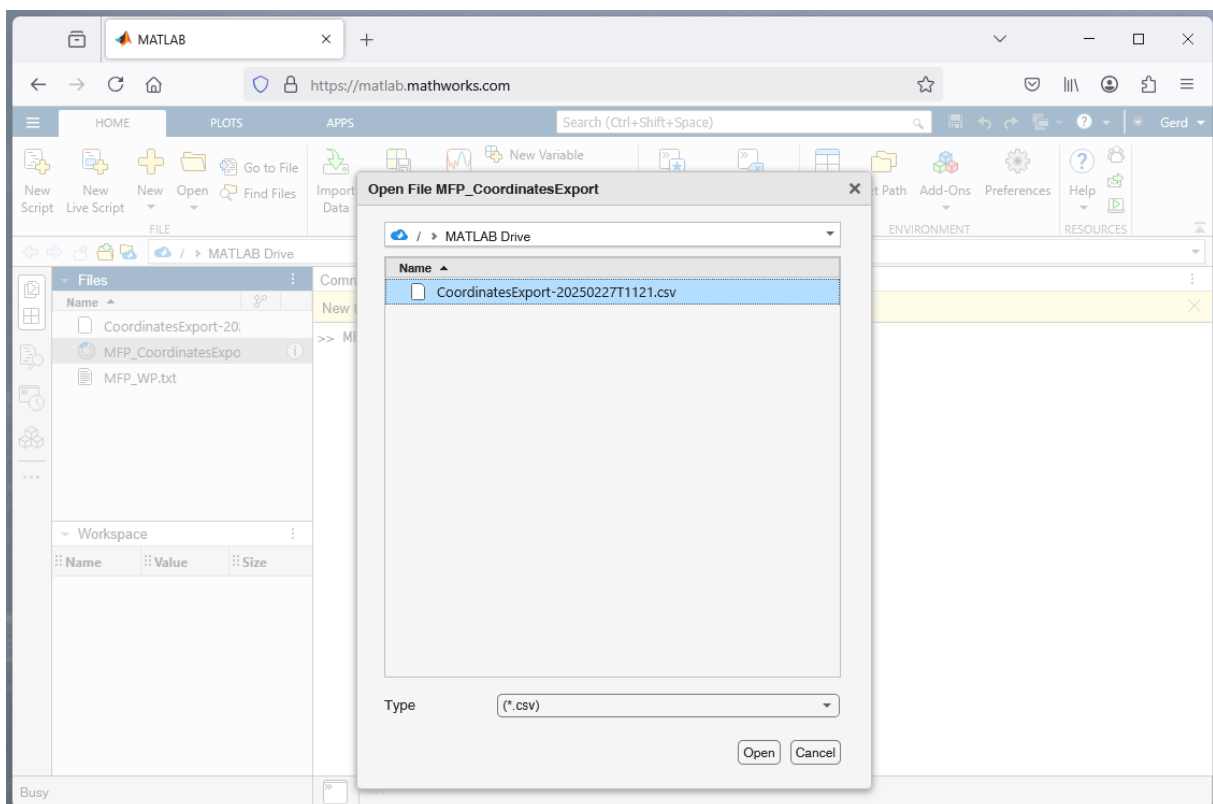


Fig. 5: All csv files are now displayed here. Select the required file and press [open].

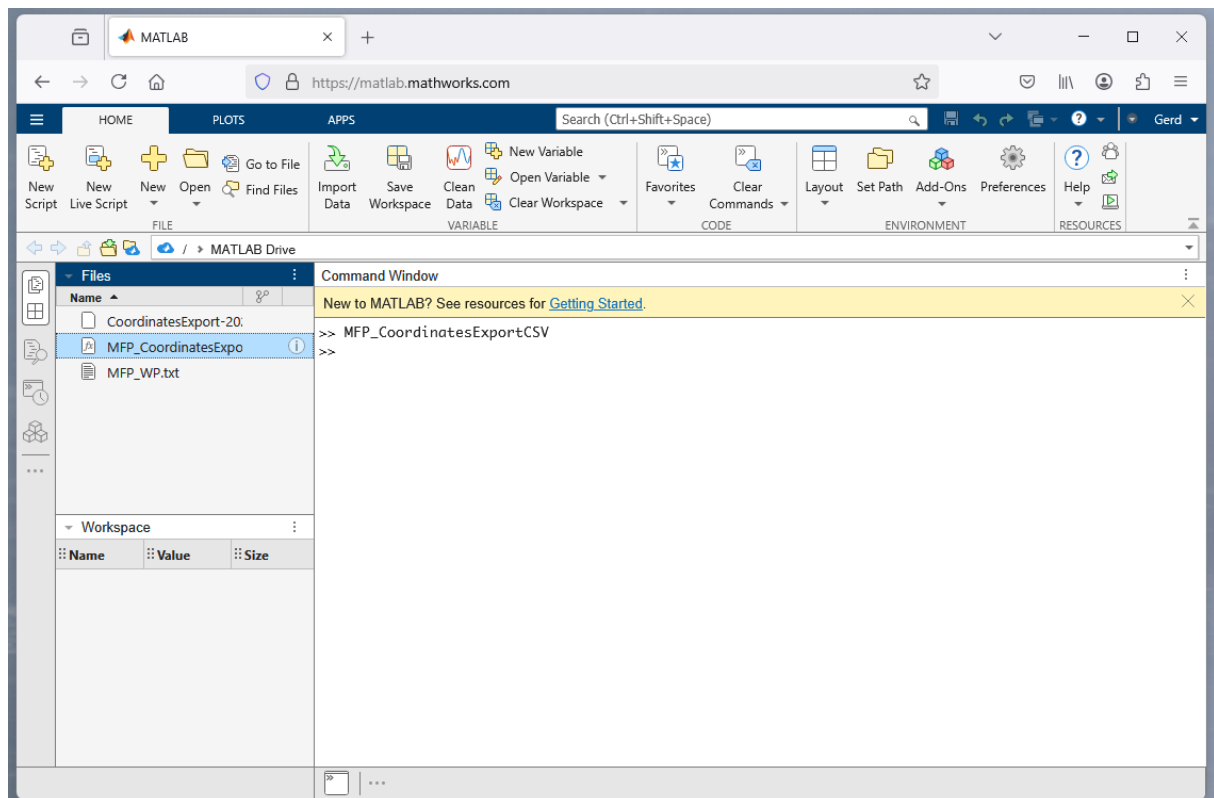


Fig. 6: MFP_WP.txt is the file with the latitude and longitude of the waypoints in the format that can be imported into Perplex7. Mark MFP_WP.txt with the RMB and select “download”. This file can now be copied from the local “download” folder to the folder C:\Perplex7\application\Import.

Import MFP-Waypoints into Perplex7

The following shows how the waypoints from MFP are now imported into Perplex7 and completed with device inserts.

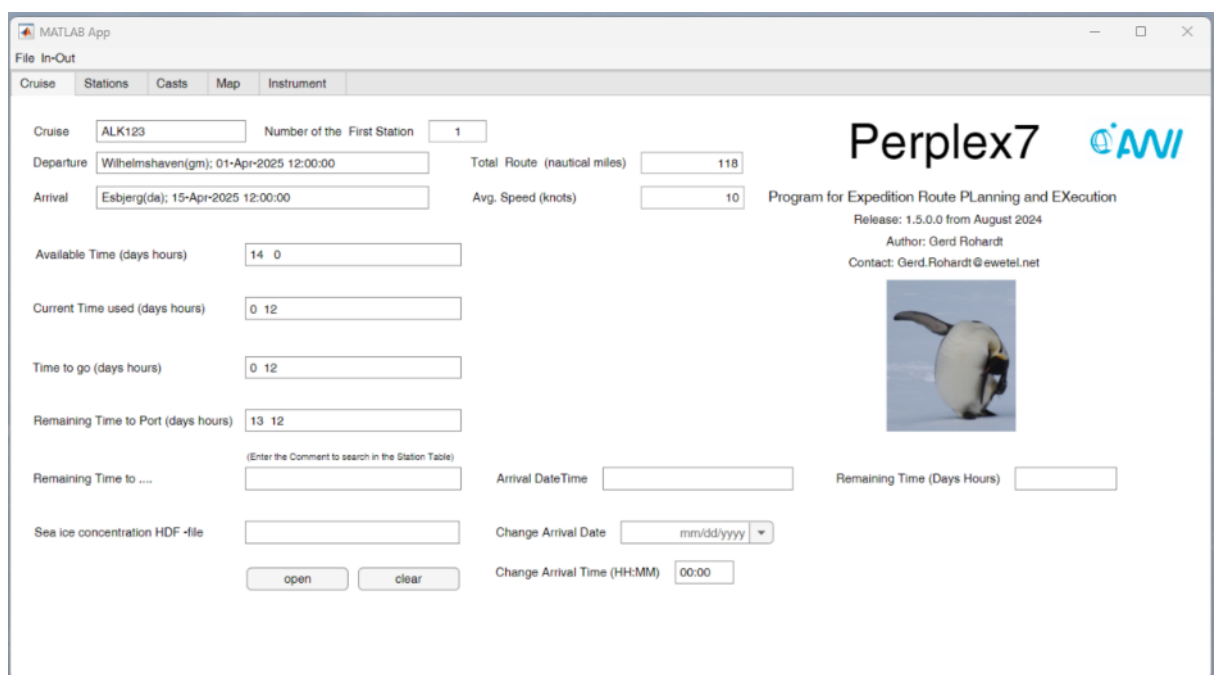


Fig. 7: Here is the cruise ALK123 is just used as an example. Start with menu [File – New]. At the beginning, the Station Tab contains two waypoints (port of departure and arrival) only.

MATLAB App

File In-Out

Cruise	Stations	Casts	Map	Instrument										
Nr	Type	Proc	Active	Stat...	DateTime	Latitude	Longitude	Depth	Speed	Way to go	Delay	No. Casts	Duration	Comment
1	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	01-Apr-2025 12:00:00	53.5167	8.1500	-1	10	57.9300	0	NaN	0	Wilhelmshaven(gm)
2	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	01-Apr-2025 17:47:34	54.4532	7.7547	23	10	14.5900	0	NaN	NaN	
3	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	01-Apr-2025 19:15:07	54.5662	8.1253	12	10	12.1700	0	NaN	NaN	
4	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	01-Apr-2025 20:28:08	54.7628	8.2107	11	10	29.7900	0	NaN	NaN	
5	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	01-Apr-2025 23:26:52	54.8443	7.3615	23	10	31.4600	0	NaN	NaN	
6	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	02-Apr-2025 02:35:38	55.3482	7.6130	22	10	29.4000	0	NaN	NaN	
7	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	02-Apr-2025 05:32:02	55.4667	8.4500	-7	10	0	0	NaN	NaN	Esbjerg(da)

Change List

☒ delete Start Row Clear

☐ insert End Row ☒

☐ C-paste Insert after Row Execute

☐ X-paste

☐ order

Change Speed

Ship Speed [knots] Change

Use Start Row and End Row (see left panel) to change Speed in Station Table.

Clone Cast Setup from ...

Clone Nr from Station Tab

from Nr to Nr

Convert DM to Degrees

+/-DD MM.mm -00 00.00

DD.dd 0.0000

☒

Fig. 8: Import with menu [In-Out – Import from txt-file]. Nr 2 – 6 are the waypoints from file “MFP_WP.txt”.



Fig. 9: The map limits in the Map Tab were changed manually.

The MATLAB App window displays the 'Casts' tab. The table lists various instruments and their configurations. The first four rows are highlighted, indicating they are active.

Active	Instrument	Description	User	Fixed	Handling	Down	Trawling	Up
1	CTD	CTD	Sandra	0	10	0.5000	0	0.5000
1	GRAB	Grab	Max	0	5	0.5000	0	0.5000
1	PLA	Plankton Net	Otto	15	0	0	0	0
1	SD	Secchi Disk	Ute	10	0	0	0	0
0	ADCP	Acoustic Doppler Current Profiler	nn	0	0	0	0	0
0	AEROS	Aerosol Sampler	nn	0	0	0	0	0
0	AIRGN	Airgun - Seismic Source	nn	0	0	0	0	0
0	AIRS	Air sampler	nn	0	0	0	0	0
0	ALTI	Altimeter	nn	0	0	0	0	0
0	ATURBP	Air Turbulence Profiler	nn	0	0	0	0	0
0	AUV	Autonomous underwater vehicle	nn	0	0	0	0	0
0	BC	Box Corer	nn	0	0	0	0	0
0	BN	Bottom Net	nn	0	0	0	0	0
0	BOAT	Boat	nn	0	0	0	0	0
0	BOO	Boomer - Seismic Source	nn	0	0	0	0	0
0	BS	Benthos Sampler	nn	0	0	0	0	0
0	BT	Bathymograph	nn	0	0	0	0	0
0	BUOY	Buoy	nn	0	0	0	0	0
0	CALIB	Calibration	nn	0	0	0	0	0
0	CCN	Cloud Condensation Nuclei	nn	0	0	0	0	0
0	CHAM	Benthic chamber	nn	0	0	0	0	0
0	CM	Current Meter	nn	0	0	0	0	0
0	CO2S	CO2 Sensor	nn	0	0	0	0	0

Units:
Fixed : hours
Handling: minutes
Down : m/s
Trawling : minutes
Up : m/s

Buttons: Sort, Update

Fig. 10: As an example CTD, GRAB, PLA and SD were activated and the settings were made to calculate how long it takes to use a specific device. Pressing [Sort] moves all active devices on top of the table in alphabetical order. All active devices were displayed in the Cast Tab too.

The MATLAB App window displays the 'Casts' tab. The table lists various instruments and their configurations. The first four rows are highlighted, indicating they are active.

Type	Proc	Active	Cast...	Instrument	DateTime	Duration	Delay	Depth	Comment
ST	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	SD	01-Apr-2025 17:47:34		10.0000	0	23 Ute
ST	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2	PLA	02-Apr-2025 03:47:34		15.0000	0	10 Otto
ST	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	CTD	02-Apr-2025 18:47:34		0.1922	0	23 Sandra
ST	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4	GRAB	02-Apr-2025 18:59:06		0.1089	0	23 Max

Station Number:

Position:

Water Depth(m):

Way to go (nm):

Duration (HH:MM):

Set End of Cast

Set Date:

Set Time (H M):

Change Casts

☐ Direct Update DateTime

Instrument

CTD

GRAB

PLA

SD

Fig. 11: In the Cast Tab we select and inserted the devices. The order can be changed at any time; select Instrument and press [shift up] or [shift down]. For the PLA we also limited the profile depth to 10 m too.

MATLAB App

File In-Out

Cruise	Stations	Casts	Map	Instrument										
Nr	Type	Proc	Active	Stat...	DateTime	Latitude	Longitude	Depth	Speed	Way to go	Delay	No. Casts	Duration	Comment
1	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	01-Apr-2025 12:00:00	53.5167	8.1500	-1	10	57.9300	0	NaN	0	Wilhelmshaven(gm)
2	ST	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	01-Apr-2025 17:47:34	54.4532	7.7547	23	10	14.5900	0	4	25.3011	
3	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	02-Apr-2025 20:33:11	54.5662	8.1253	12	10	12.1700	0	NaN	NaN	
4	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	02-Apr-2025 21:46:12	54.7628	8.2107	11	10	29.7900	0	NaN	NaN	
5	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	03-Apr-2025 00:44:56	54.8443	7.3615	23	10	31.4600	0	NaN	NaN	
6	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	03-Apr-2025 03:53:42	55.3482	7.6130	22	10	29.4000	0	NaN	NaN	
7	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	03-Apr-2025 06:50:06	55.4667	8.4500	-7	10	0	0	NaN	NaN	Esbjerg(da)

Change List

☒ delete Start Row

☐ insert End Row

☐ C-paste Insert after Row

☐ X-paste

☐ order

Change Speed

Ship Speed [knots]

Use Start Row and End Row (see left panel) to change Speed in Station Table.

Clone Cast Setup from ...

Clone Nr from Station Tab

from Nr to Nr

Convert DM to Degrees

+/-DD MM.mm

DD.dd

Fig. 12: Nr 2. is the first station; see Cast Tab in Fig. 11. In the panel “Clone Cast Setup from...” we used the station setup from Nr 2 for Nr. 3 to 6; see Fig. 13.

MATLAB App

File In-Out

Cruise	Stations	Casts	Map	Instrument										
Nr	Type	Proc	Active	Stat...	DateTime	Latitude	Longitude	Depth	Speed	Way to go	Delay	No. Casts	Duration	Comment
1	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	01-Apr-2025 12:00:00	53.5167	8.1500	-1	10	57.9300	0	NaN	0	Wilhelmshaven(gm)
2	ST	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	01-Apr-2025 17:47:34	54.4532	7.7547	23	10	14.5900	0	4	25.3011	
3	ST	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2	02-Apr-2025 20:33:11	54.5662	8.1253	12	10	12.1700	0	4	25.2767	
4	ST	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	03-Apr-2025 23:02:48	54.7628	8.2107	11	10	29.7900	0	4	25.2744	
5	ST	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4	05-Apr-2025 03:18:00	54.8443	7.3615	23	10	31.4600	0	4	25.3011	
6	ST	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5	06-Apr-2025 07:44:50	55.3482	7.6130	22	10	29.4000	0	4	25.2989	
7	WP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NaN	07-Apr-2025 11:59:10	55.4667	8.4500	-7	10	0	0	NaN	NaN	Esbjerg(da)

Change List

☒ delete Start Row

☐ insert End Row

☐ C-paste Insert after Row

☐ X-paste

☐ order

Change Speed

Ship Speed [knots]

Use Start Row and End Row (see left panel) to change Speed in Station Table.

Clone Cast Setup from ...

Clone Nr from Station Tab

from Nr to Nr

Convert DM to Degrees

+/-DD MM.mm

DD.dd

Fig. 13: With “clone”, it is very easy to enter the devices at the stations. If, for example, no GRAB is used at a particular station, this device can be deleted there afterward.

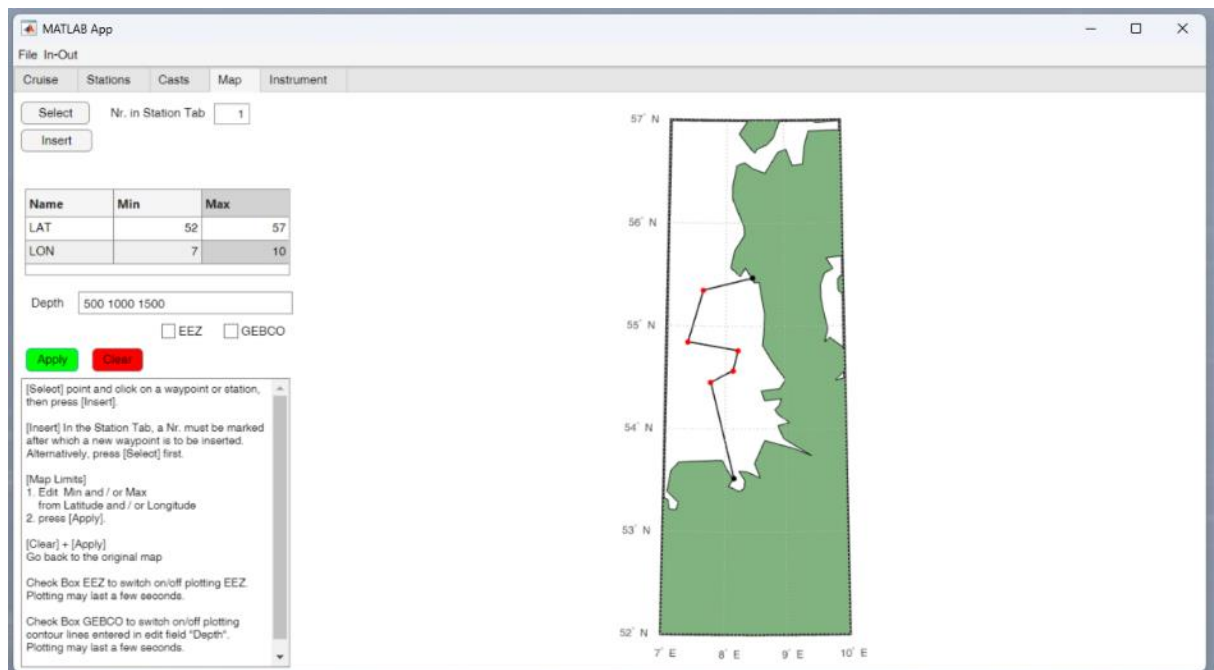


Fig. 14: In the Map Tab, stations are displayed in red.

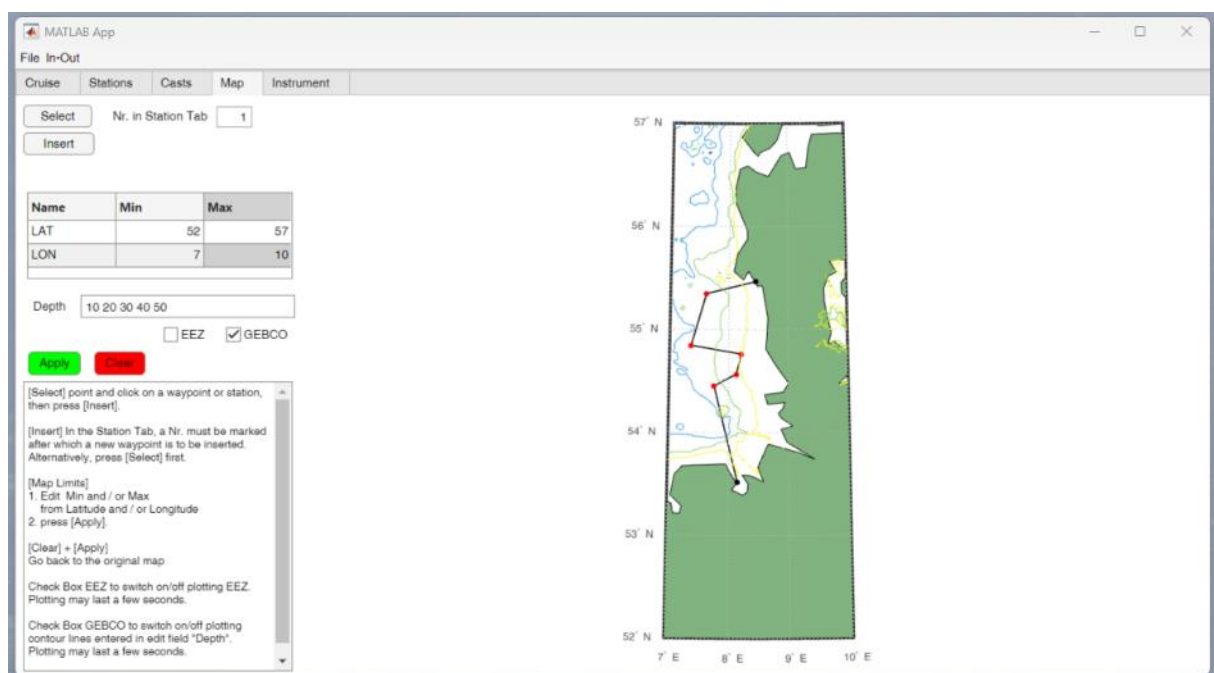


Fig. 15: Map Tab with depth contours.

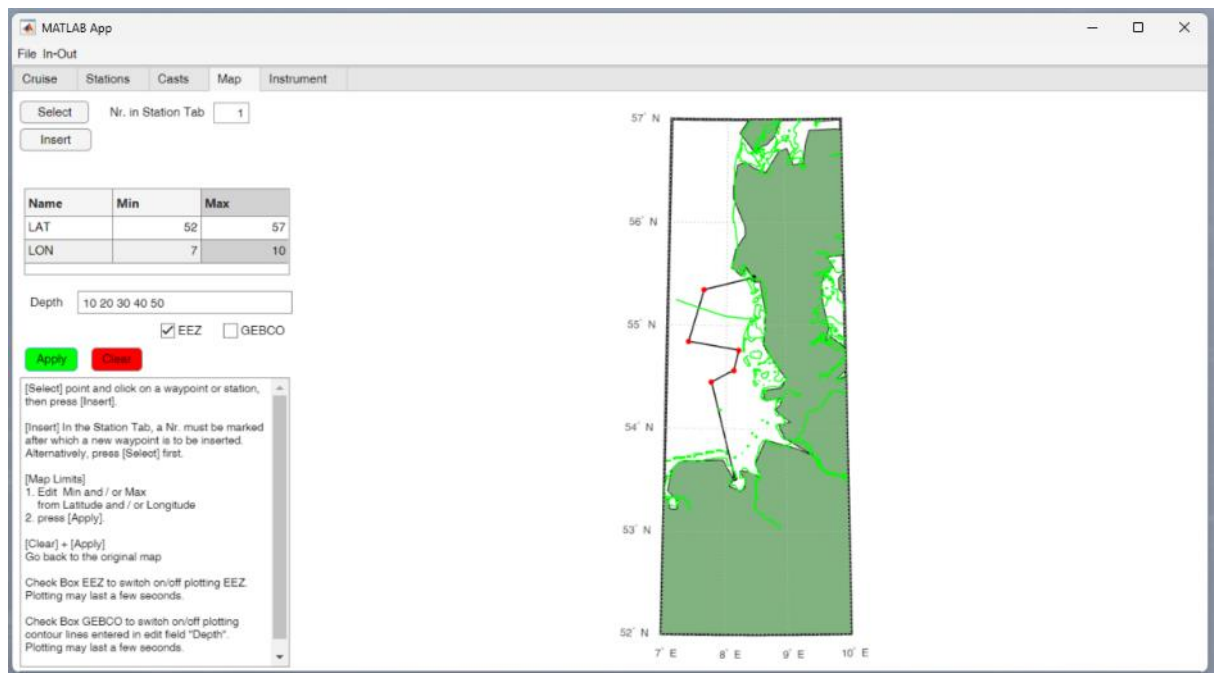


Fig. 16: Map Tab with EEZ .

Links

- Source Code:

<https://github.com/rohardt/Perplex7>

<https://de.mathworks.com/matlabcentral/fileexchange/>

Search for:

“Perplex7” and/or “waypointsalongtransect”

- Stand-alone / compiled version:

<https://github.com/rohardt/Perplex7-Exe>

Manual are the PDF-Files in the given links!