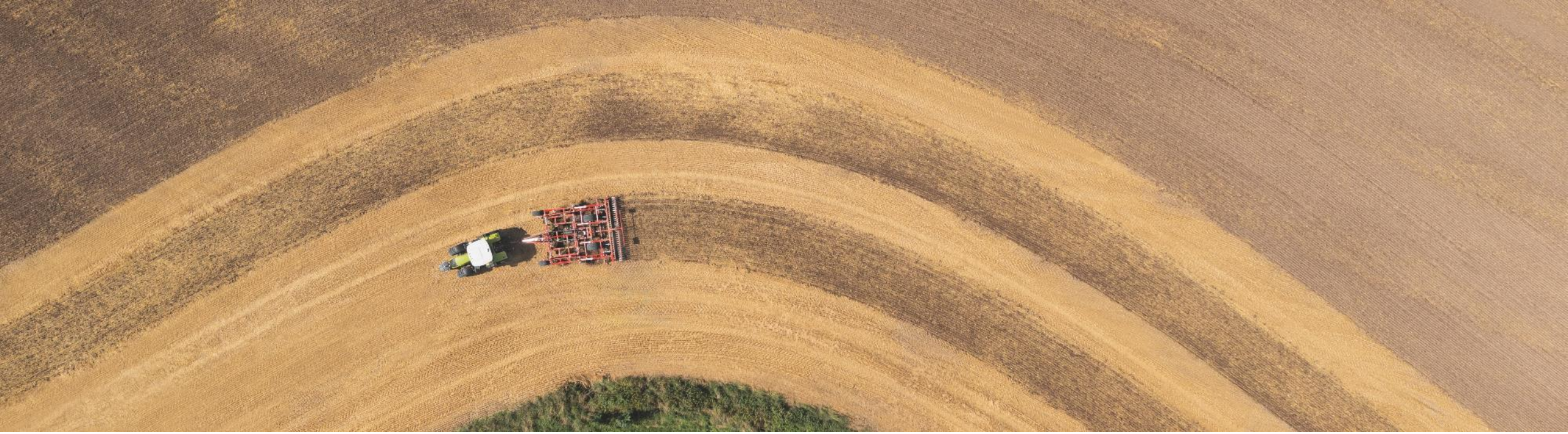


Digital & precision farming solution

System operation CEMIS 1200

Content

User Interface

Map View Layout

Map View Layout:

Map Layout provides individual configurations of relevant information and quick access capabilities to most important functions in context of automatic steering

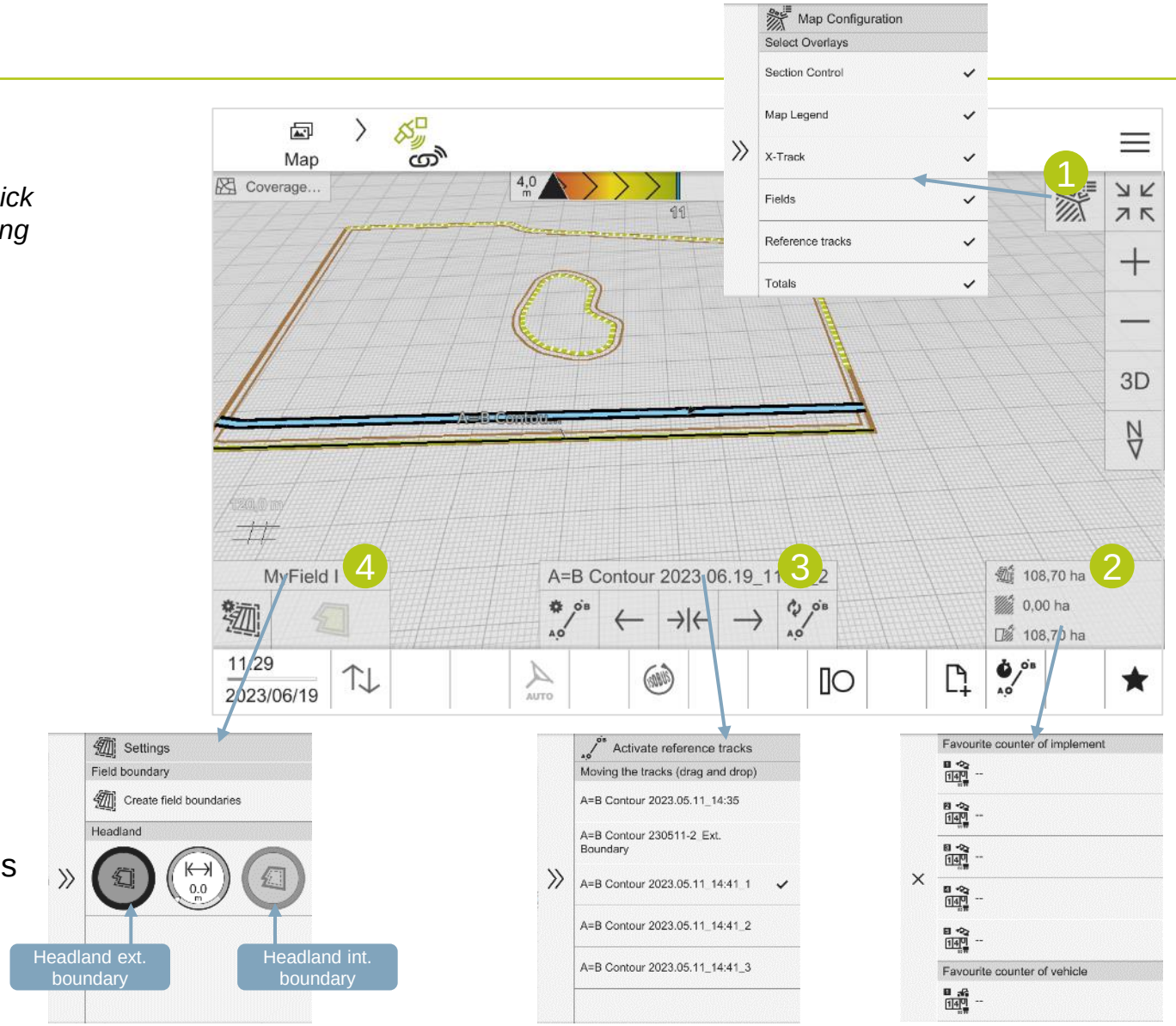
- Provides quick access via map overlays

1. Map Layout Configuration:
   → Individual configuration of displayed map overlays

2. Favorite Total Overlay:
   → Individual configuration and display of up to 3 totals

3. Reference Line Overlay:
   → Provide most relevant functions for automatic steering
   → Driving mode selection, Snap / Nudge, Ref.line Toggling
   → Display Name of active Ref.line
   → Quick Access to Ref.line list via “Ref.line Name” button

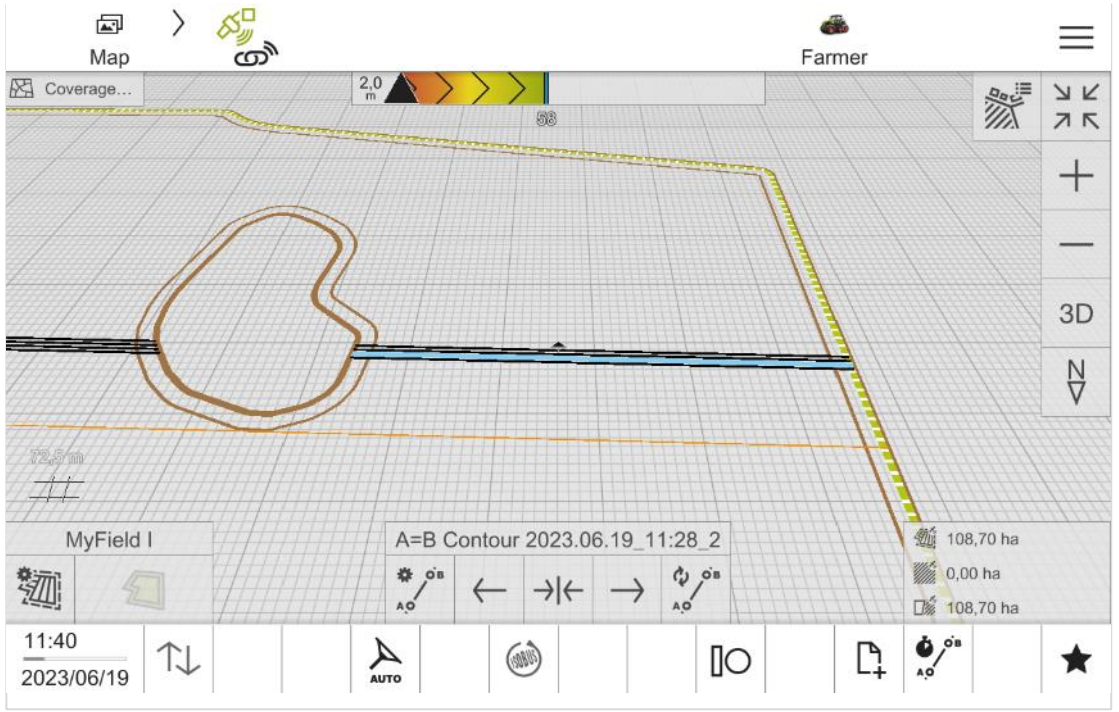
4. Field Overlay
   → Provide most relevant functions for Fields
   → Quick Access to Boundary recording, Headland line settings
   → Toggle Working strategies
   → Display Name of active Field
   → Quick Access to Field list via “Field Name” button



Map View – Field Grid

Map View Improvement – Field Grid:

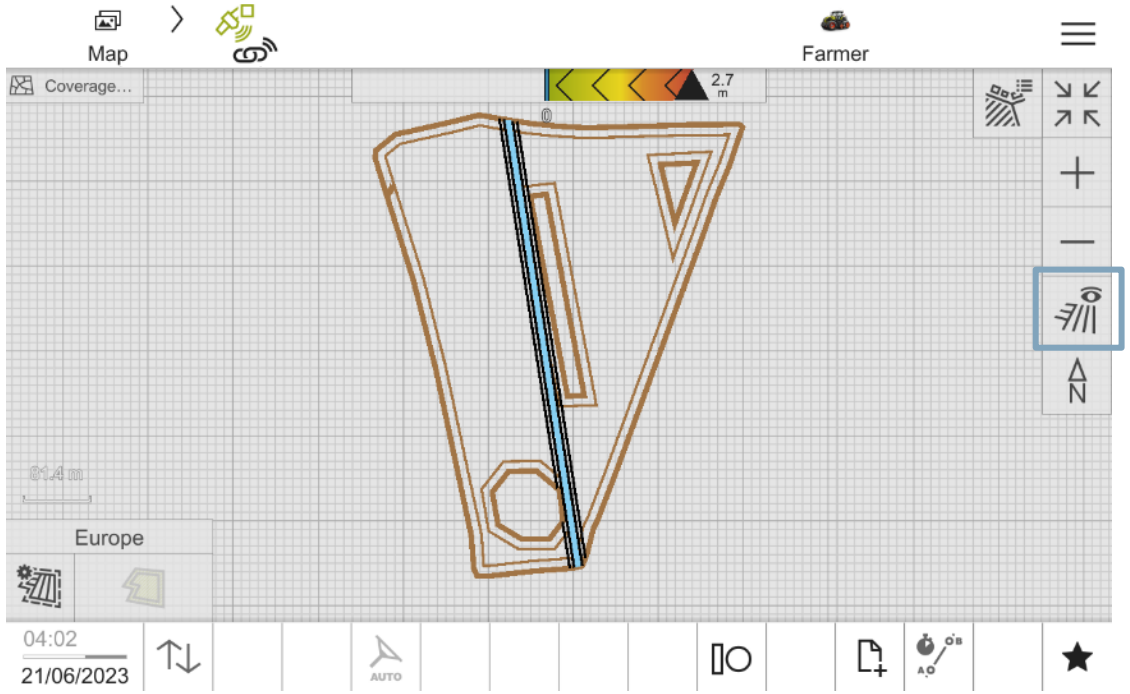
- Display waylines only within field boundaries
- Waylines are cut off at field boundaries (interior and exterior)
- Wayline clipping at field boundaries can be configured by the user (ON / OFF)
  → enabled by default



Map View – FIELD VIEW

Map View Improvements – FIELD VIEW:

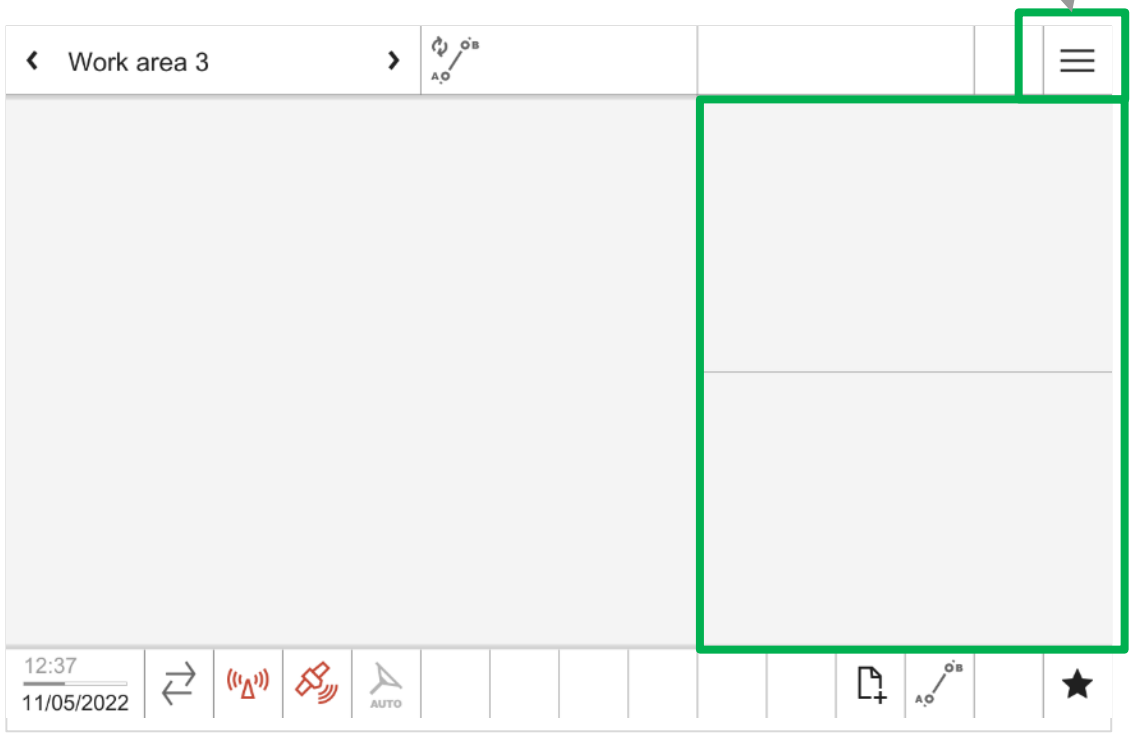
- Added a dedicated View which focuses the zoom level to the selected field boundary
  → display the complete field in the Map
- FIELD VIEW accessible via Toggle Button in the Map view commands layer (2D → 3D → FIELD VIEW)
- FIELD VIEW displayed in North orientation only
- **Note**: an active field boundary is required to use the FIELD VIEW



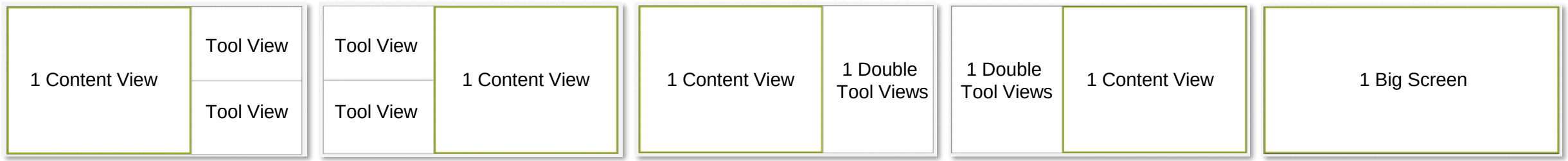
User Interface - Configuration

New UI Layout:
The permanent menu bar on right side disappears. This will gain more space for bigger tool views → 2 bigger tool view instead of 3 small ones.

- Screen configuration via Layout Manager
- Open menues on demand
- 2 bigger tool views
  → better usage / visibility
- Swap tool view areas (left / right)
- Big screen option (e.g. Map View)



Possible Screen Configurations:



Terminal: Switch Off Display

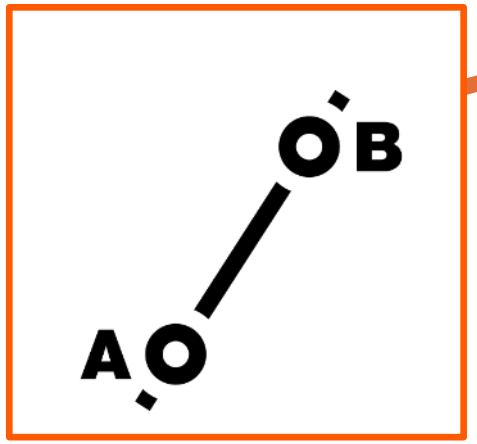
Switch Off Display:

- Switch off the terminal via softkey in the CEMIS menu
- Avoid disturbance caused by the terminal when e.g. in road transportation
- Switch ON again via touch gesture on the screen

Steering

Driving strategies – Quick A-B mode

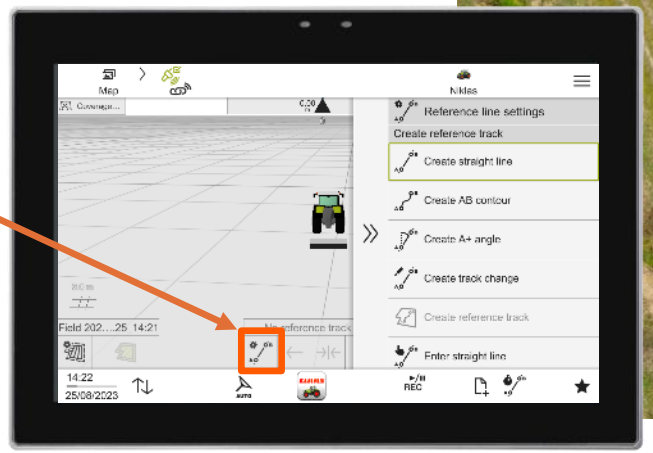
- Quick and easy access to the A-B mode via the quick access menu
- Field work can be started immediately
- A-B track created automatically
- Set Point A by pressing the touch key
- Point B is set automatically at a distance of 50 m



Driving strategies – straight A-B mode

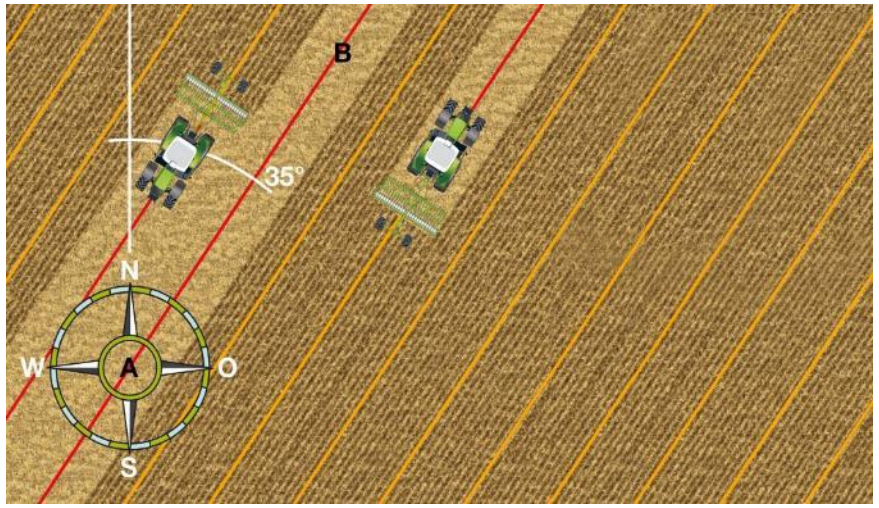
- This mode offers a very high level of accuracy (depending on the correction signal)
- The most frequently used type of track guiding, e.g. for creating blocks
- Tight turns can be avoided by working every other track
- The track is defined by setting a Point A and B. All other tracks are created at an equal distance (matching the pre-set working width)
- This makes it possible to work with several machines with the same working width on one field

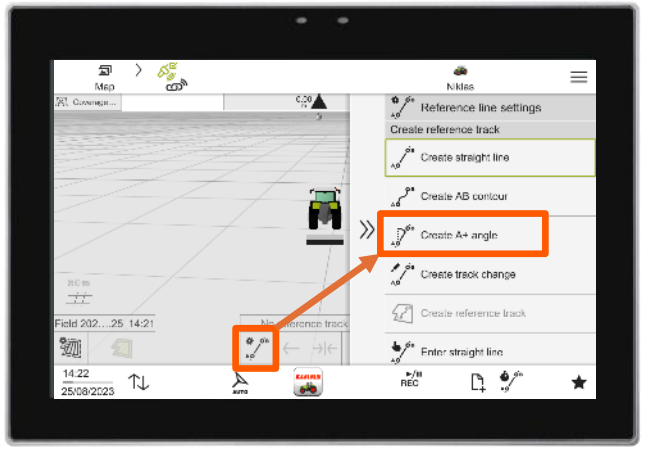
Reference line menu



Driving strategies – A+ angle mode

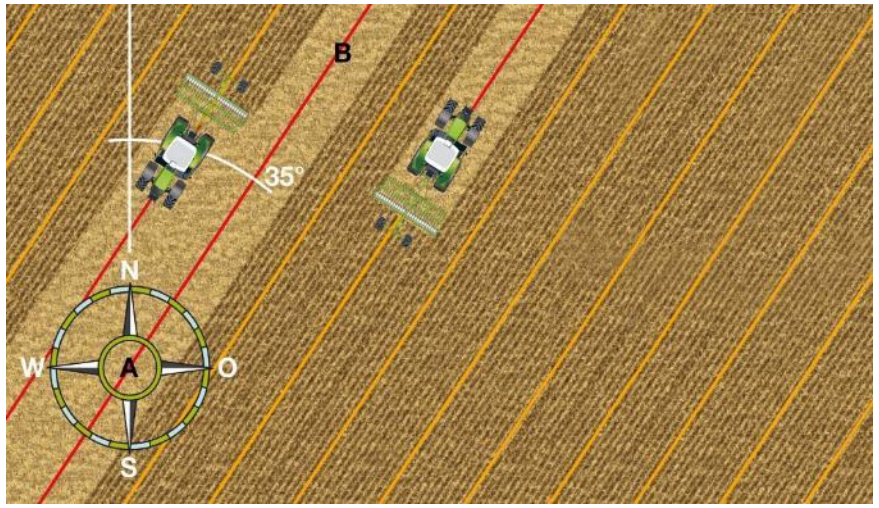
- Additional function for making wheeled machine fleets such as several combine-harvesters and transport vehicles travel on exactly the same track
- This is ideal for working diagonally to the "normal track", e.g. first stubble breaking or when exchanging reference lines between two combines in the same field

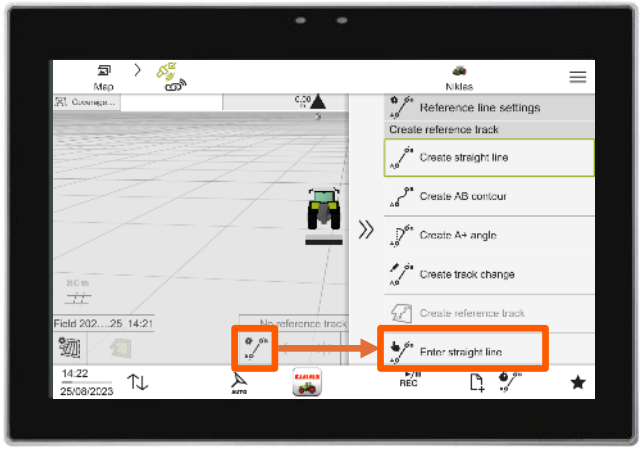




Driving strategies – A-B line based on geo-coordinates

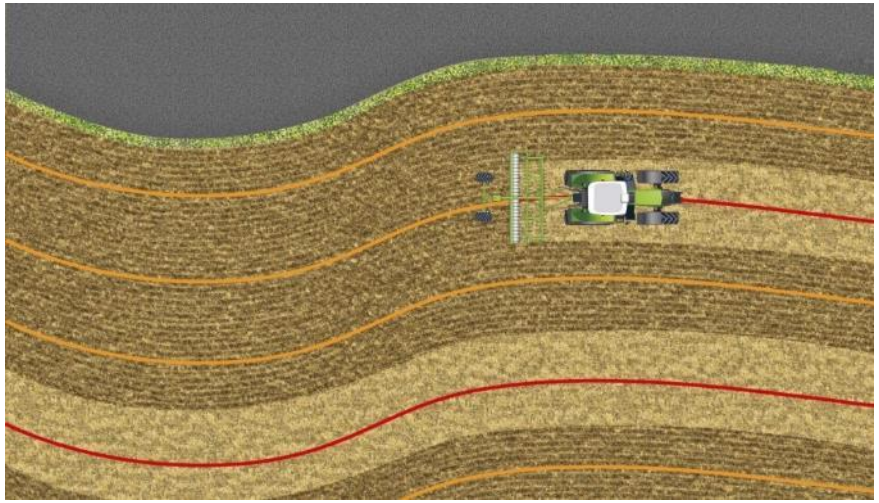
- Additional function for creating reference tracks by exact geo coordinates that mark the A and B points
- Allows the exact planning and exchange of desired reference lines, for example to match the direction of a powerline crossing the field.

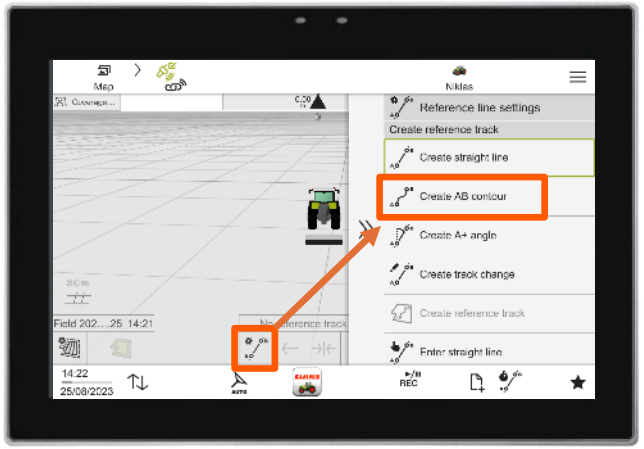


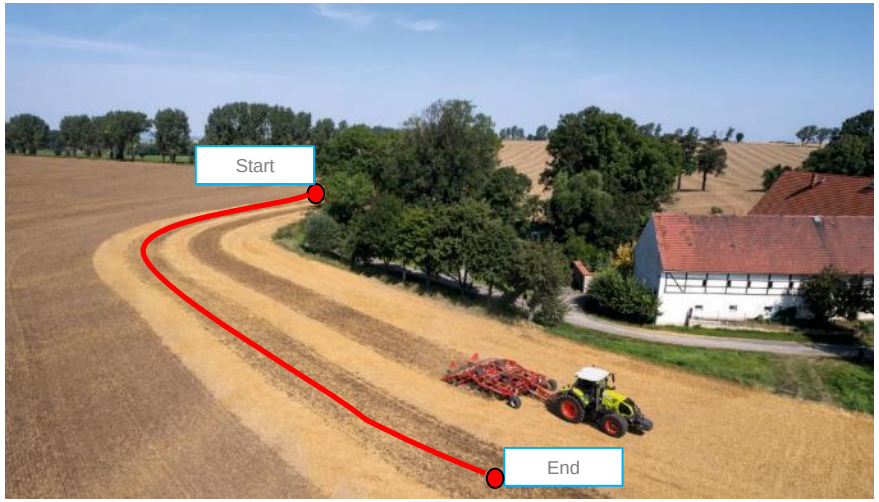


Driving strategies – A-B contour mode

- Working on curved field contours
- Tight turns can be avoided by working every other track
- The track is defined by starting and stopping the recording. All other tracks are created at an equal distance (matching the pre-set working width)
- A-B countour lines can be adapted to extend the starting or end points as well as to create detours around obstacles in the field (e.g. power poles or trees)







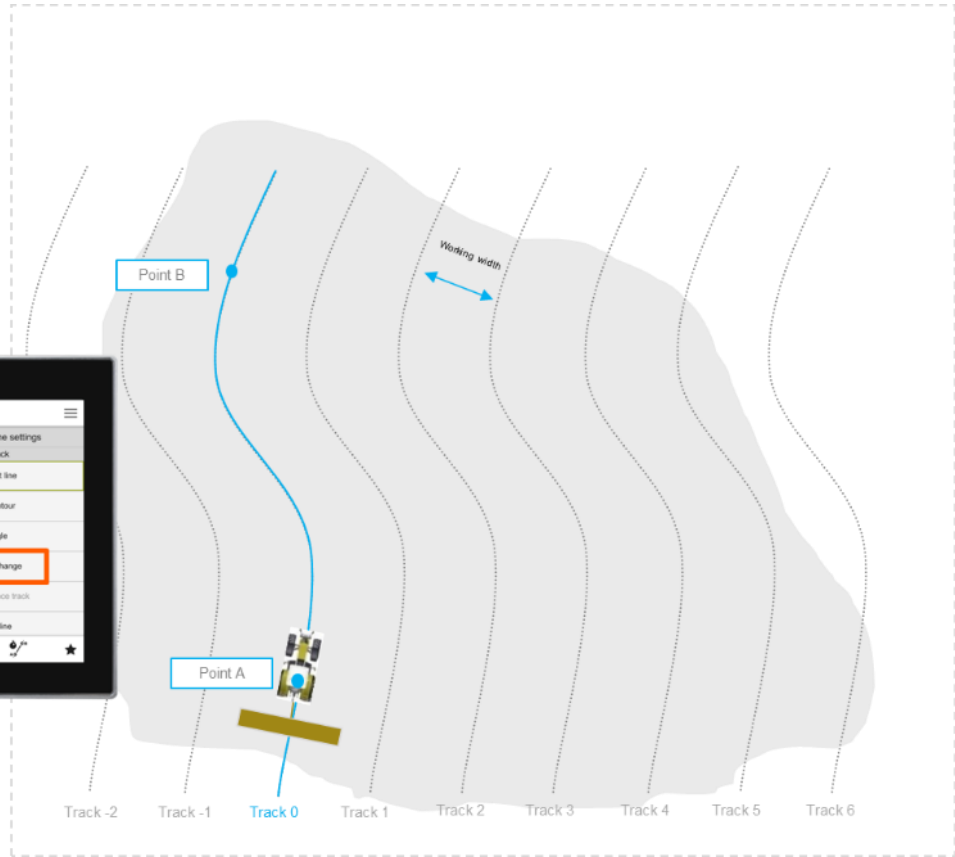
Driving strategies – Adaptive A-B contour

Adaptive A=B Contour:

User gets the possibility to make a detour on an existing AB contour and merge the detour into an existing AB contour.

Several options available for usage of adaptive AB contour

- Start detour on current track and merge into same track



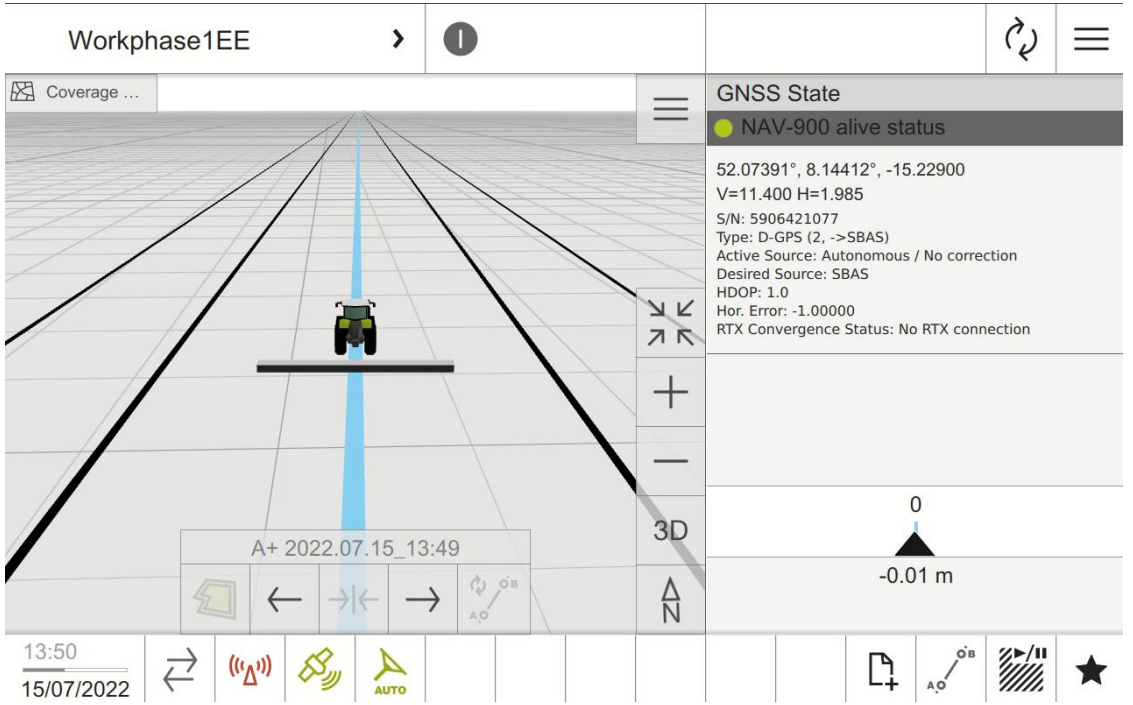
Driving strategies – Adaptive A-B contour

Adaptive A=B Contour:

User gets the possibility to make a detour on an existing AB contour and merge the detour into an existing AB contour.

Several options available for usage of adaptive AB contour

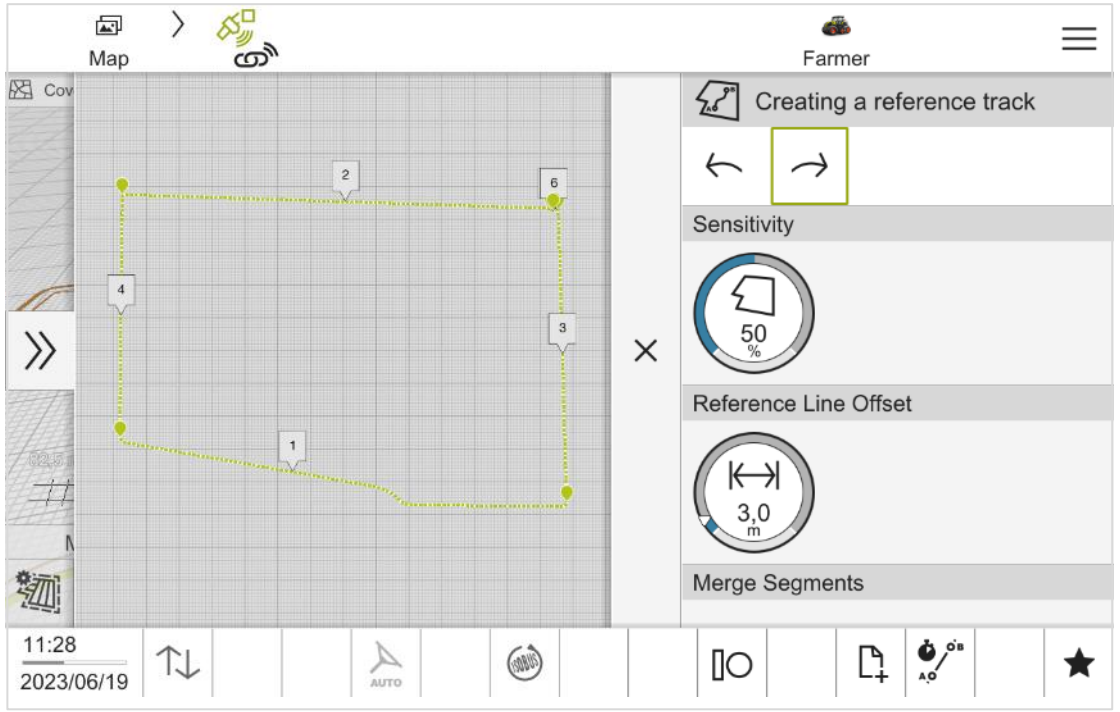
- Start detour on current track and merge into same track
- Start detour on current reference line, start detour, change reference line and merge into another reference line (**see video**)
- Start detour on current track and create a new End point of the contour
- Create a new start point for the contour and merge into the current track

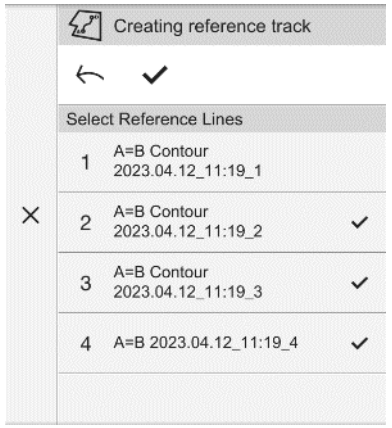


Steering: Auto Reference Line

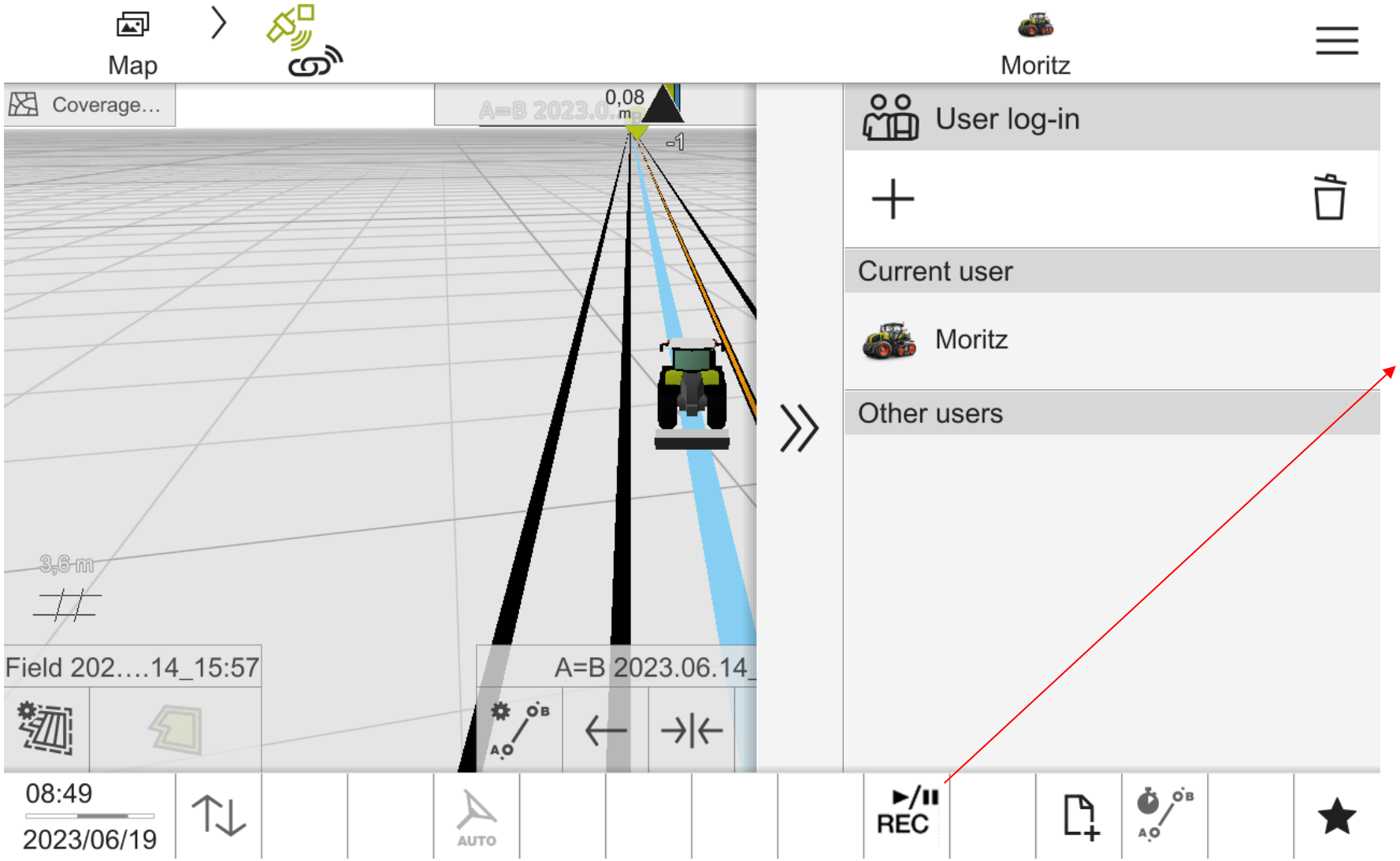
Auto Reference Line:

- Automatic creation of a set of reference lines from an existing field boundary
- Influence number of potential ref.lines segments via sensitivity settings
- Ref.line segments visualization via fly-out tab
- User selection of relevant ref.line segments
- Selected ref.line segments are automatically activated for ref.line toggling
- Ability of **merging adjacent ref.line segments into one segment**
- Created Reference Lines are shifted automatically (inside field) → default: half of working width
- Ability to create automatic, **encircling reference lines** from a field boundary





Record Icon



No recording in progress

Active recording in progress

recording paused

New line recording during active steering

- During active automatic steering, it is currently not possible to record a new reference line in parallel (exemption: adaptive AB contour)
- This functionality could be useful to e.g. create a new AB straight while driving along the field boundary with active steering on an AB contour

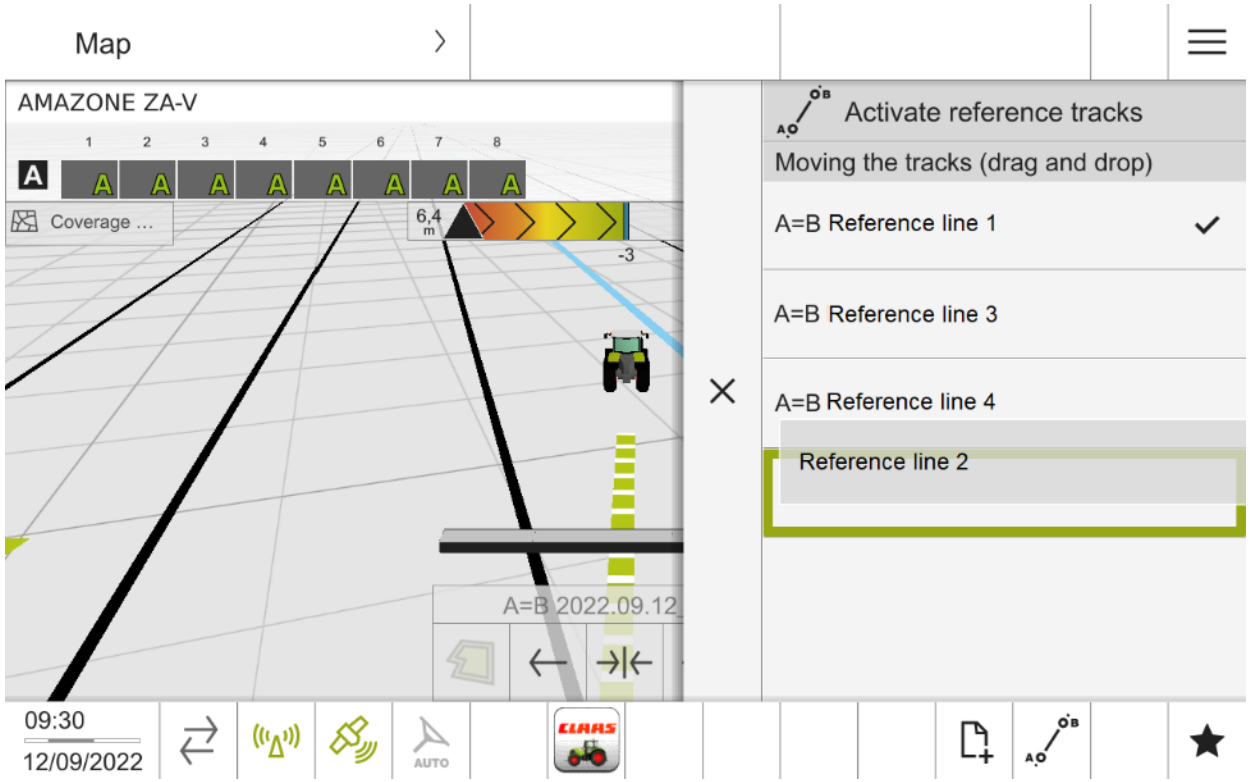
➔ no need to drive a path manually for the AB straight recording

Steering: Ref line toggling

Optimize Multi Reference line Toggling:

The user is able to change the order of reference lines for reference line toggling.

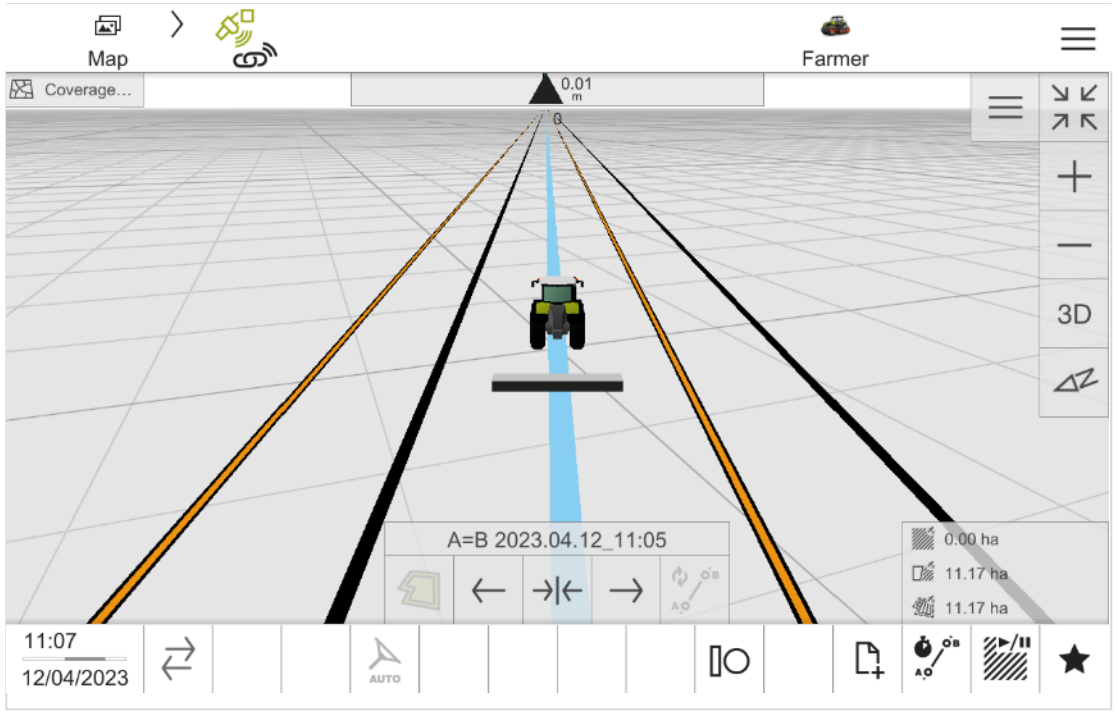
- The user can adapt the order of the reference lines to his needs
- Sorting the reference lines can be done via drag&drop

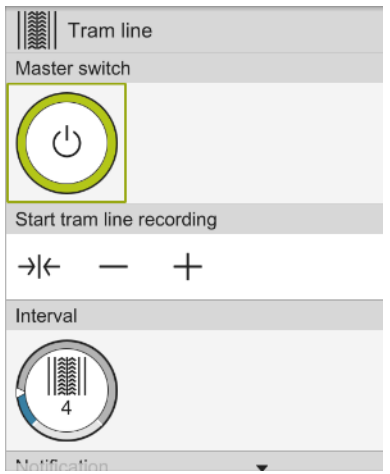


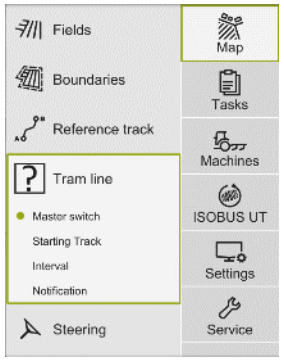
Steering: Tramline Management

Tramline Management:

- Ability to highlight/display the tramlines in a field on map view of CEMIS 1200
  - Enable / Disable tramline feature via Master switch
  - Define start point for the tramline tracks (e.g. track 0)
  - Set tramline track interval (e.g. every 4 tracks)
  - User-defined notifications when entering or leaving a tramline (message type: Visual, Audio)



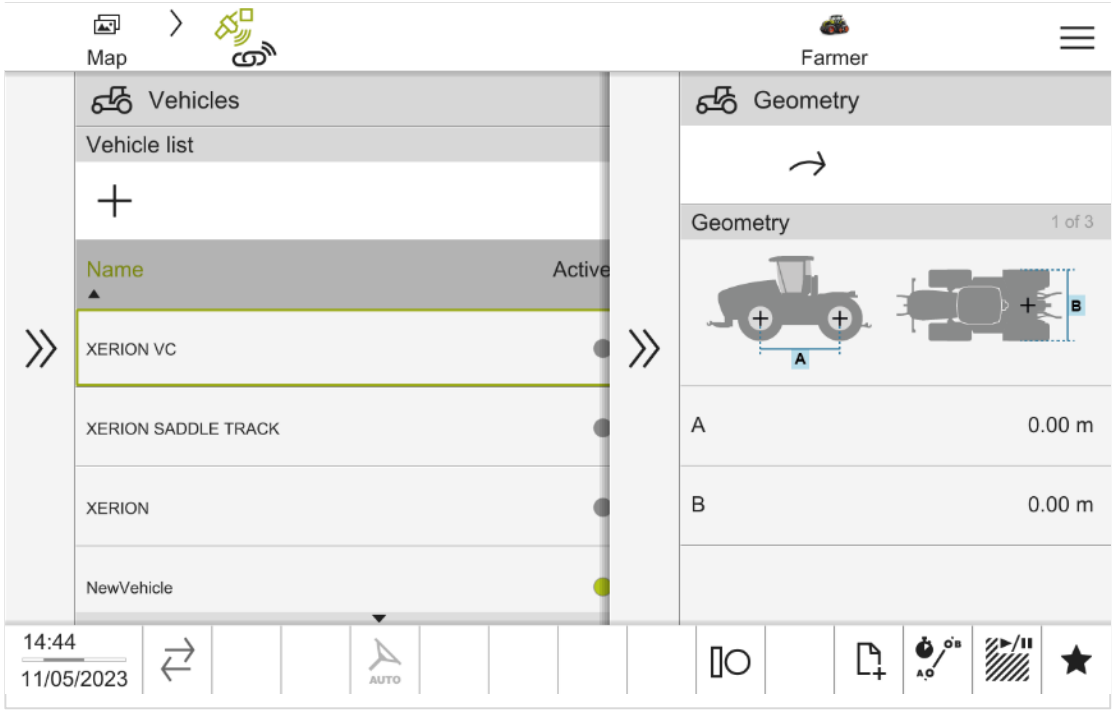


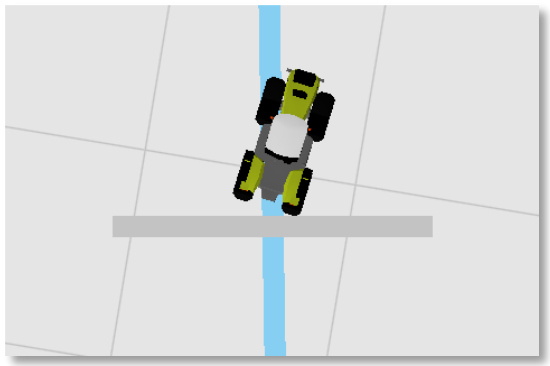


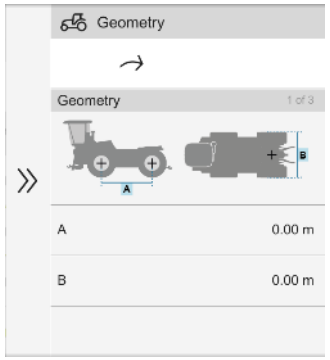
Steering: XERION – Support Crab Steer Mode

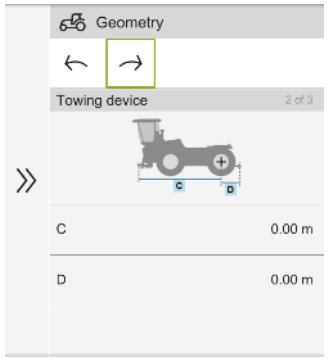
XERION – Support Crab Steer Mode:

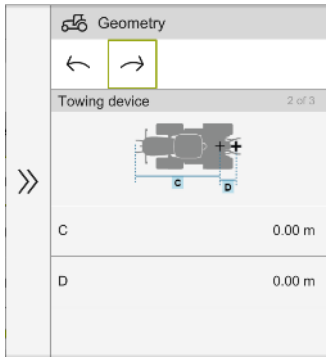
- Support of Crab Steer Mode for automatic steering
- Support of XERION variants: Standard, Trac VC, Saddle Trac
- Support of goose neck for Trac VC
- Extension of XERION specific settings (e.g. geometry settings, silhouettes, Parameters, roll calibration, etc.)
- XERION TRAC VC silhouettes reflect cabin position
- Display of crab steering angle in Map View







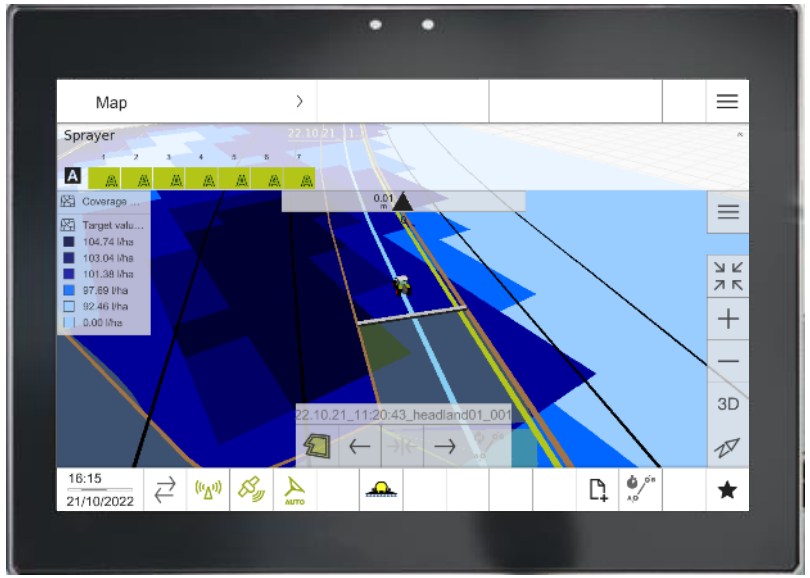




ISOBUS

ISOBUS

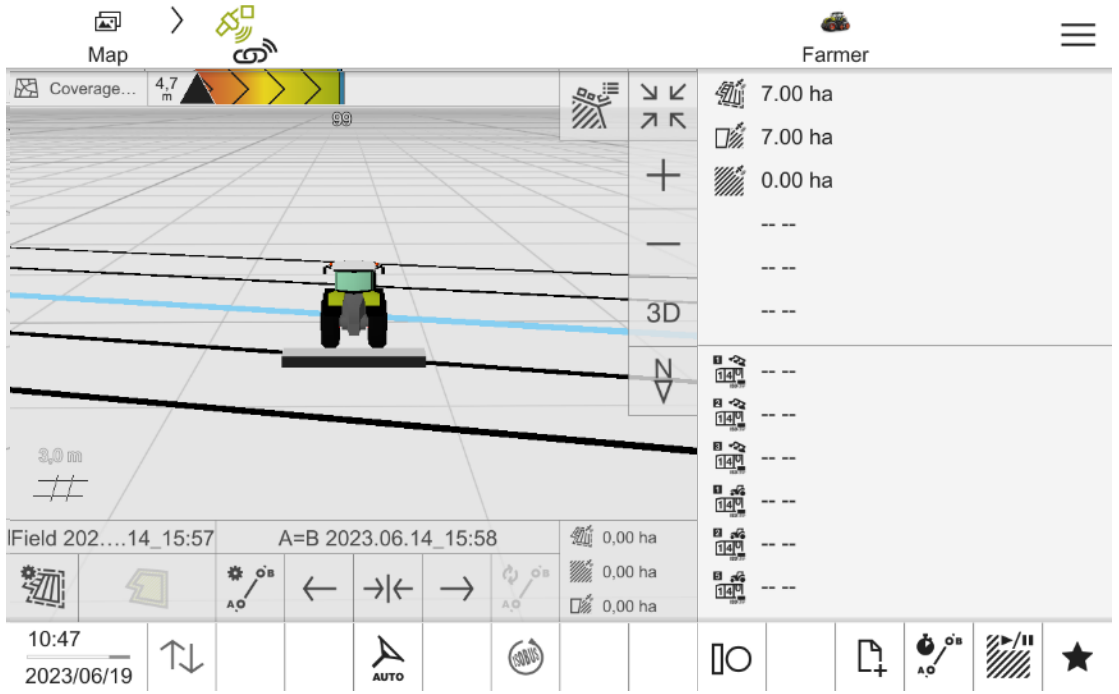
- A terminal for all ISOBUS applications
- Quick, simple upgrade via license management in a matter of minutes
- Control of implements and field work can be tailored to every need
- The CEMIS 1200 terminal supports the following functions as standard:
  - ISO UT
  - ISO AUX-N
  - TC BAS
  - GPS Task Management
  - GPS Application (VRA)
  - GPS Section Control (TC-SC)

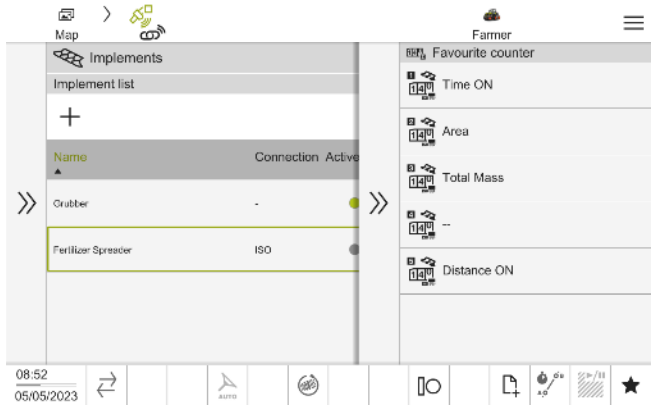


ISO TC: Favorite Totals (Status Tool View)

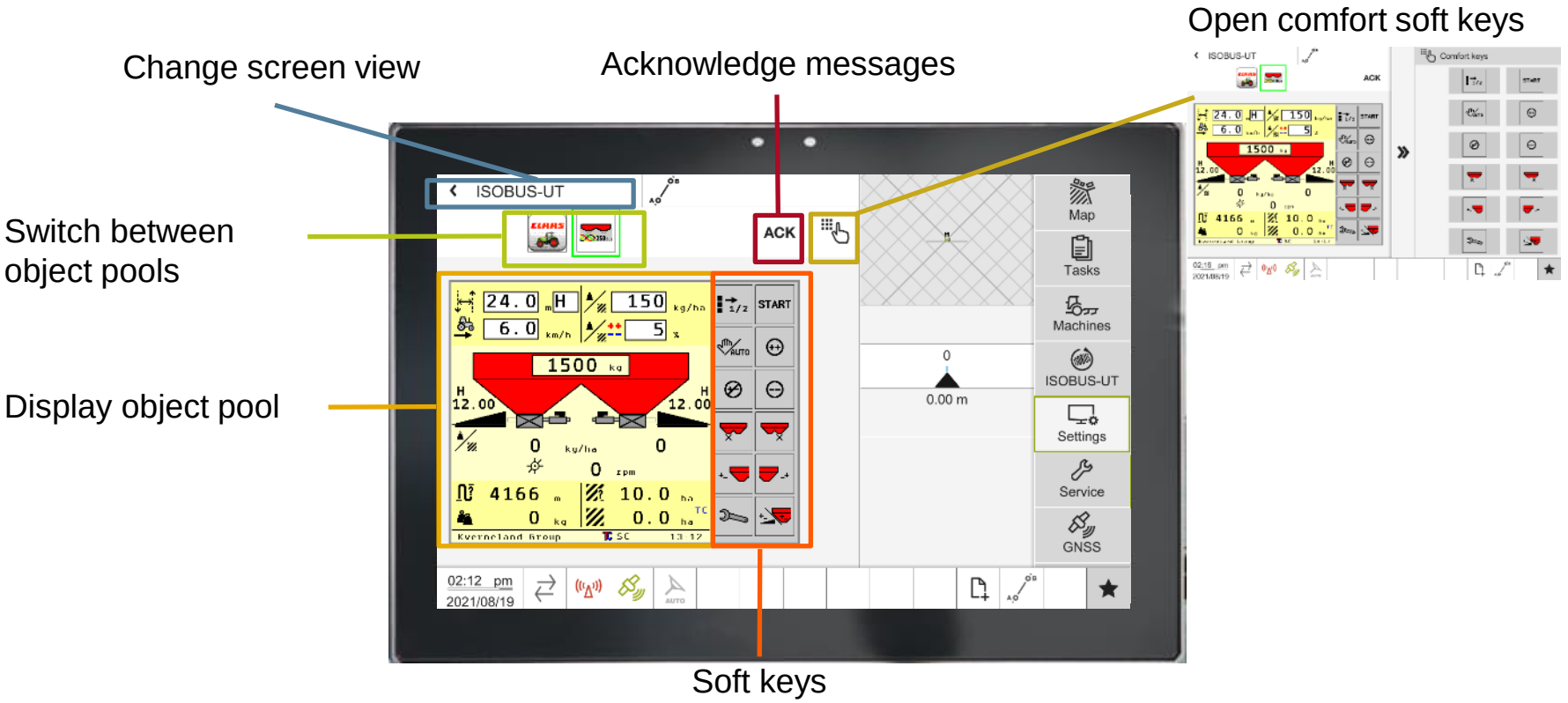
Favorite Totals (Status Tool View):

- User can pick favorite ISOBUS totals that shall be displayed in the “Status information toolviews”
  → no need for entering specific menus
  - For implements: selection from available implement totals
  - For vehicle: favorite totals defined per vehicle type by CLAAS
- Pre-selection via vehicle / implement menu
- Favorite totals are displayed as “icon” – “value” – “unit”
- Continuous update of favorite totals (if tool view is visible)





ISOBUS


Change screen view
Acknowledge messages
Open comfort soft keys
Switch between object pools
Display object pool
Soft keys
ISOBUS-UT
ACK
Map
Tasks
Machines
ISOBUS-UT
Settings
Service
GNSS
START
24.0
6.0
150
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4166
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2021/08/19

ISOBUS F-key asignment

- Control of ISOBUS functions using function keys on the CMOTION or an external joystick
- Very easy and comfortable implement control without having to change the hand position
- Technically, a distinction is made between AUX Old and AUX New
- The two AUX-O and AUX-N standards have evolved as a result of the growing scope of functions and safety features of ISOBUS implements
- The AUX-N standard can support more functions than the AUX-O standard
- Since AUX-O and AUX-N are not compatible, the connected units and the Universal Terminal must all support the same AUX standard

ISOBUS F-key assignment

1 Select F-key

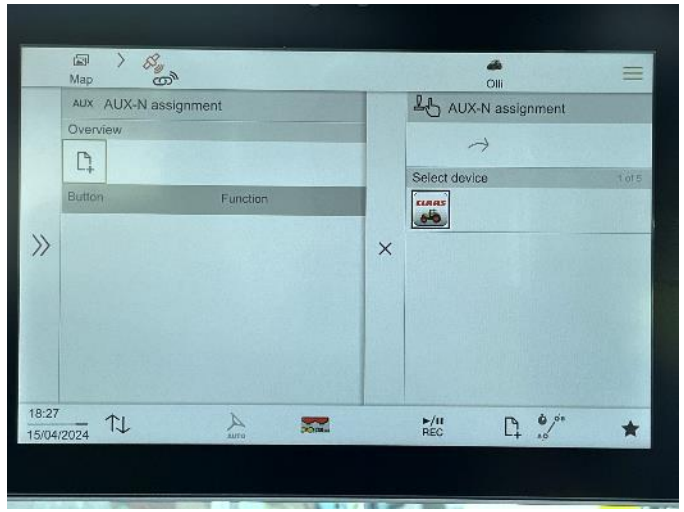
2 Select ISOBUS assignment

CEBIS

CEMIS

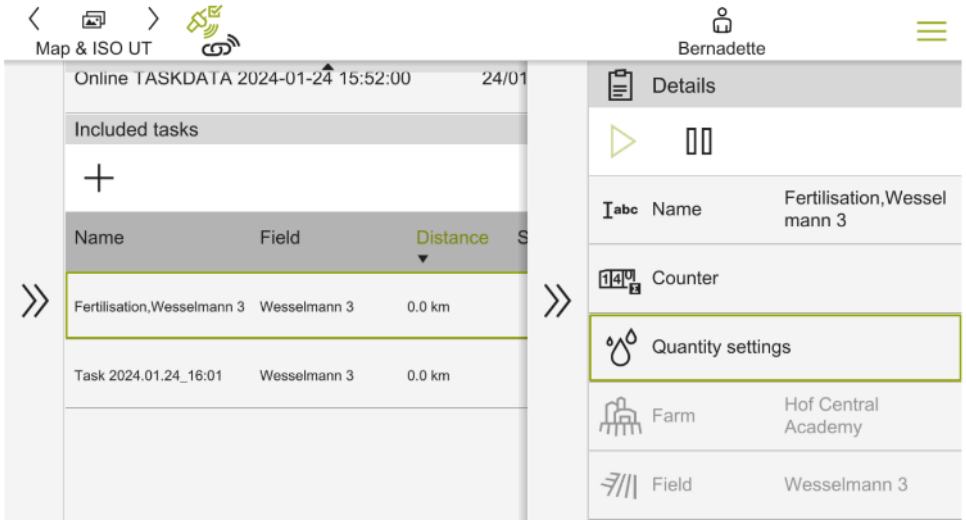
3 Access F-key wizard

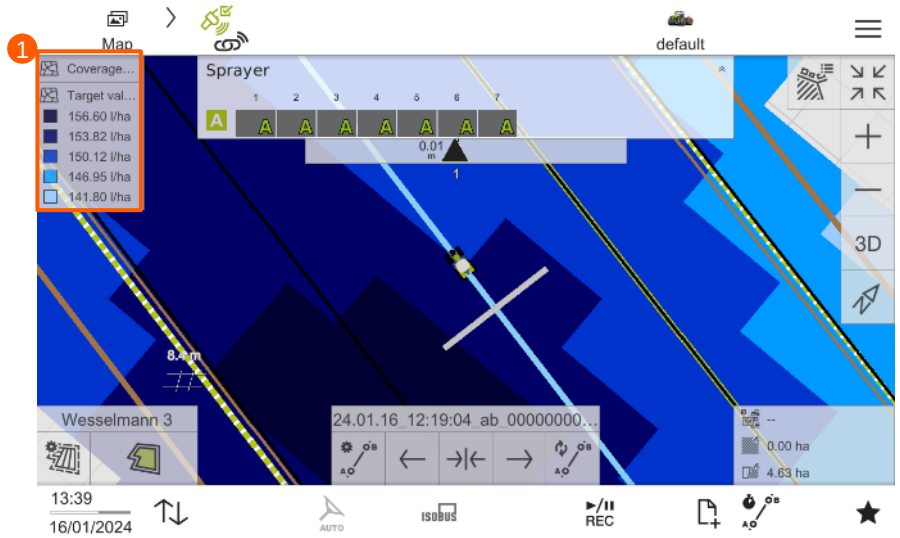
4 Assign function to F-key



Variable rate application

- In addition to GPS Task Management, VRA offers the option of planning tasks related to a specific location
- Site-specific field management, e.g. during fertilizer application, spraying or sowing
- Import of an application map via ISO XML task
- Target values from the ISO XML task (1)
- Application map is automatically displayed on the map screen as soon as the specific task is started

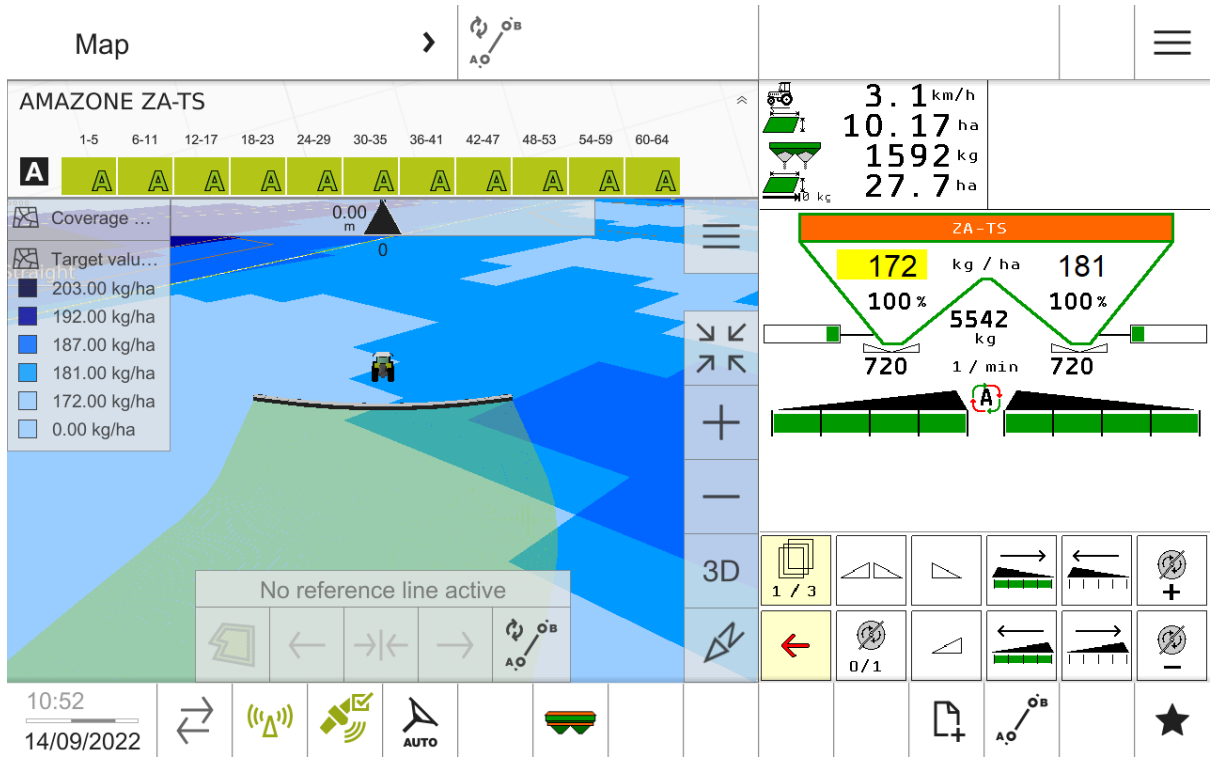




Variable rate application on spreader

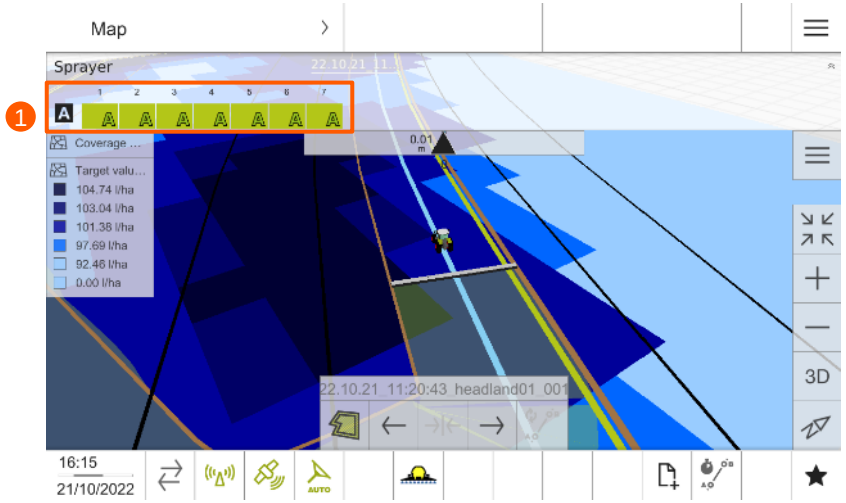
Support different rates for left and right spreader disc:

- Many implements, especially spreaders, do support different rates for each spreader disc (left and right)
- With that, the implement can react even more accurate to the application map when using VRA
- When using VRA on CEMIS 1200, it is possible to send different rates to the implement if the left side of the boom is located on a different zone on the map than the right side of the boom



Section Control

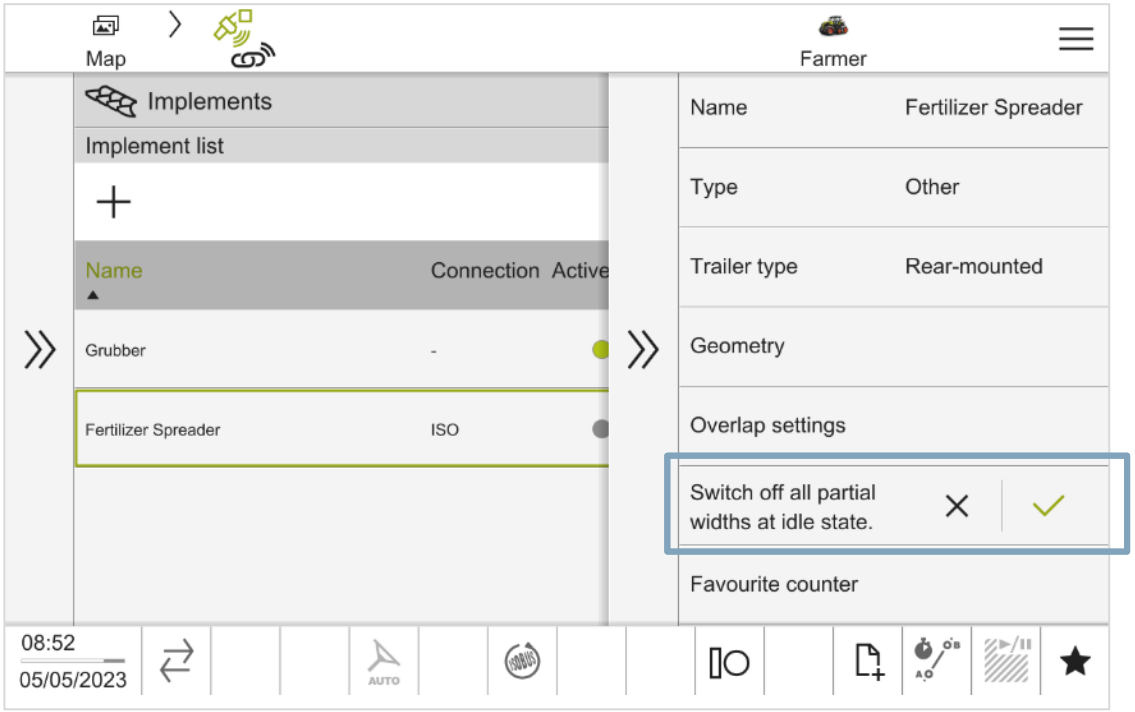
- Automatic activation of sections, e.g. of crop sprayers, fertilizer spreaders or precision seed drills
- Can be customized to suit different implements
- Supports 1 boom and up to 80 sections
- Switch sections on / off automatically (1)
- Easy preparation of TC-SC during implement setup



ISO SC: Section Control behavior at standstill

Section Control behavior at standstill:

- Selection how SECTION CONTROL behaves during stillstand
  - OFF: Terminal switches sections OFF (default)
    → Supports use cases e.g. spraying, fertilizing, seeding, etc.
  - ON: Terminal keeps last section state
    → Supports use cases e.g. for swathers, where sections = ON means that the rakes keep running even in stillstand
- Adjustable per implement
- Only for implements with Section Control

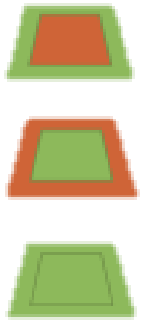


ISO SC: Section Control

Working strategies:

Ability to choose between different working strategies for Section Control: Headland only, Mainland only and full field. Pre-requisite: Creation of Headland lines possible.

- Headland only (implement applies only on the headland)
- Mainland only (implement applies only on the mainland)
- Whole field (implement applies within the whole field boundary)



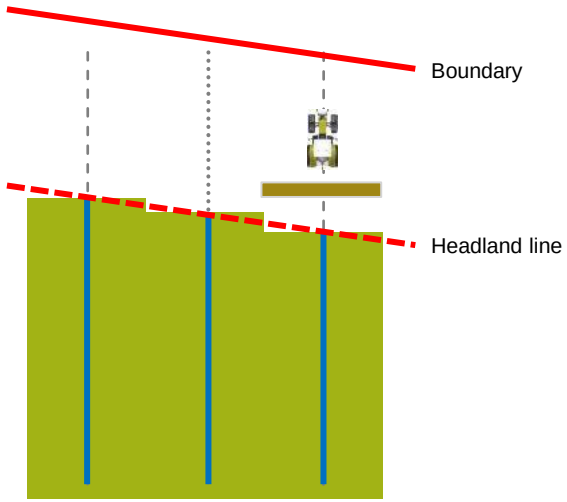
headland only

mainland only

whole field

SC switching at headland lines:

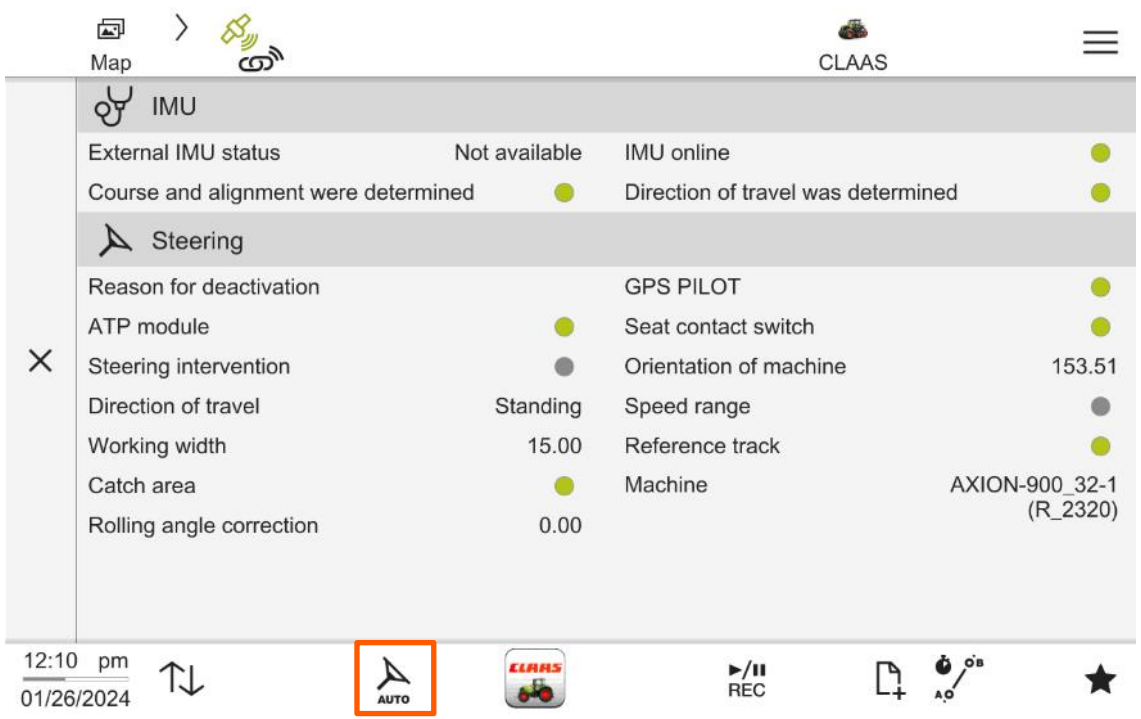
Ability to use headland line as trigger for Section control (in combination with working strategies)



Diagnostic

Diagnostic

Terminal GNSS and correction signal status diagnosis

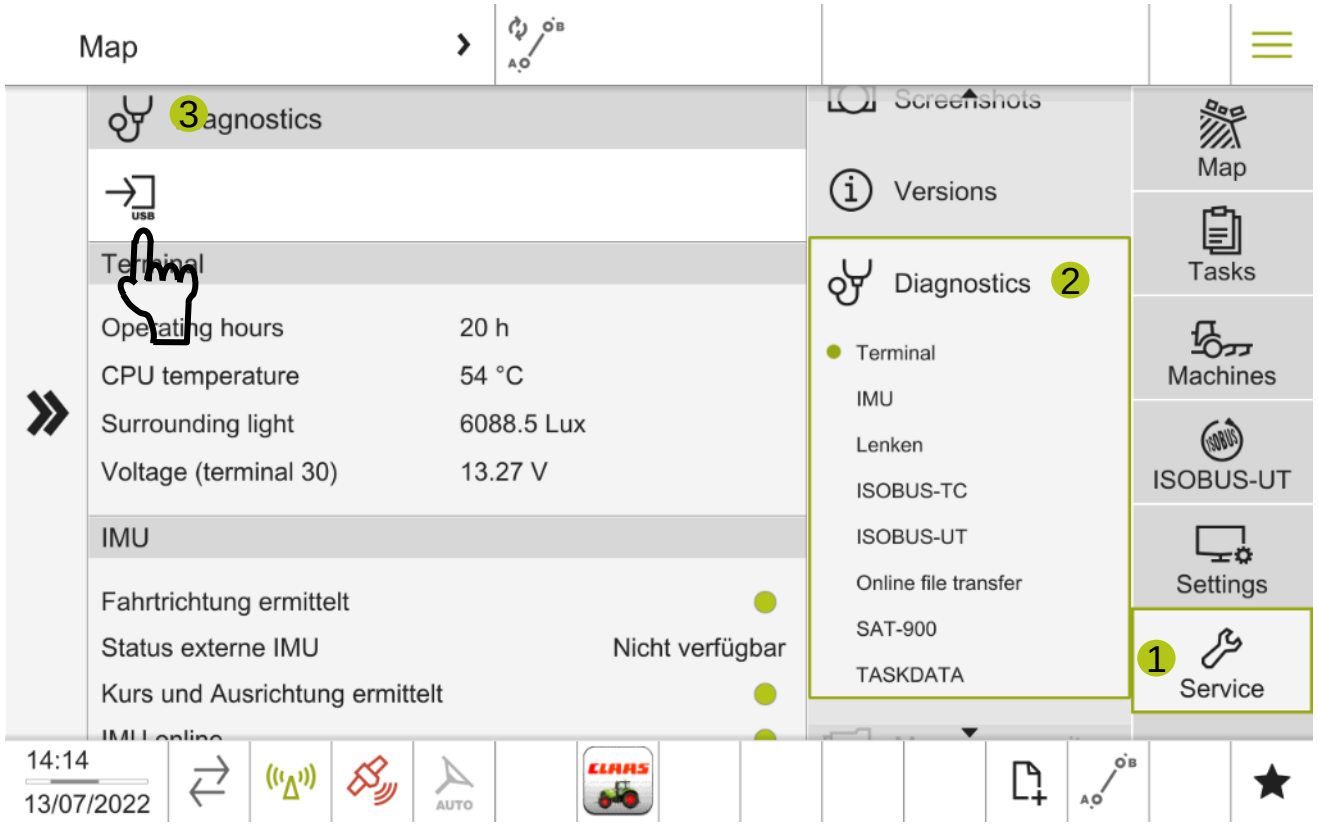


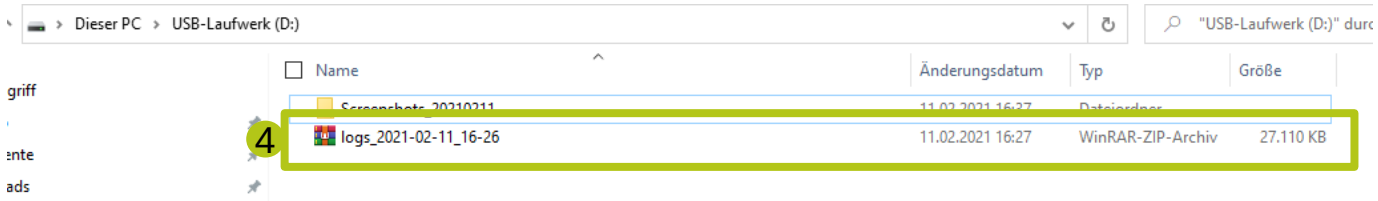
Diagnostic

Terminal export log file

Put the empty USB stick in the terminal -> Open Service menu (1) -> Call up diagnostic (2) -> Press the top left of the USB (3) -> Export starts

The export may take some minutes. After export has finished, a message will appear that the USB stick can now be removed. Forward the .ZIP file (4) to Service.



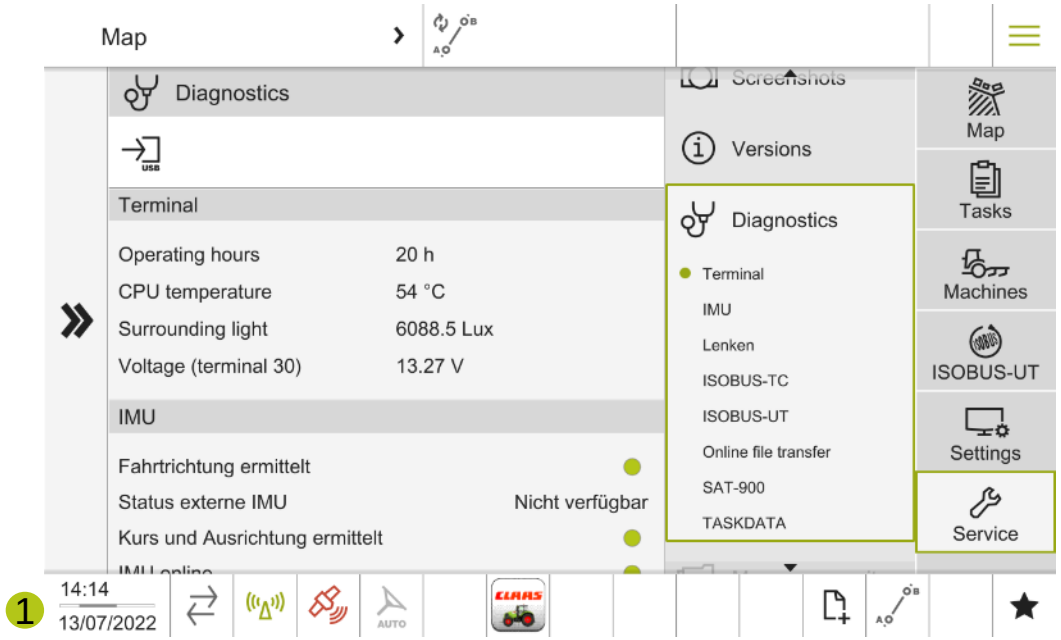


Diagnostic

What to do in case of failure?

To report issues of the GPS Pilot CEMIS 1200, the following points are important:

- Documentation of the issue via video, picture, screen shot, or own notes
- Note down time and date of the issue
  - (1) Time and date can also be documented via the screenshot function
- Export the terminal logs
  - The terminal logs include most relevant data for trouble shooting in R&D
- For steering performance issues, check steering performance checklist
- Send the ticket, including documentation and data to your CLAAS Service.



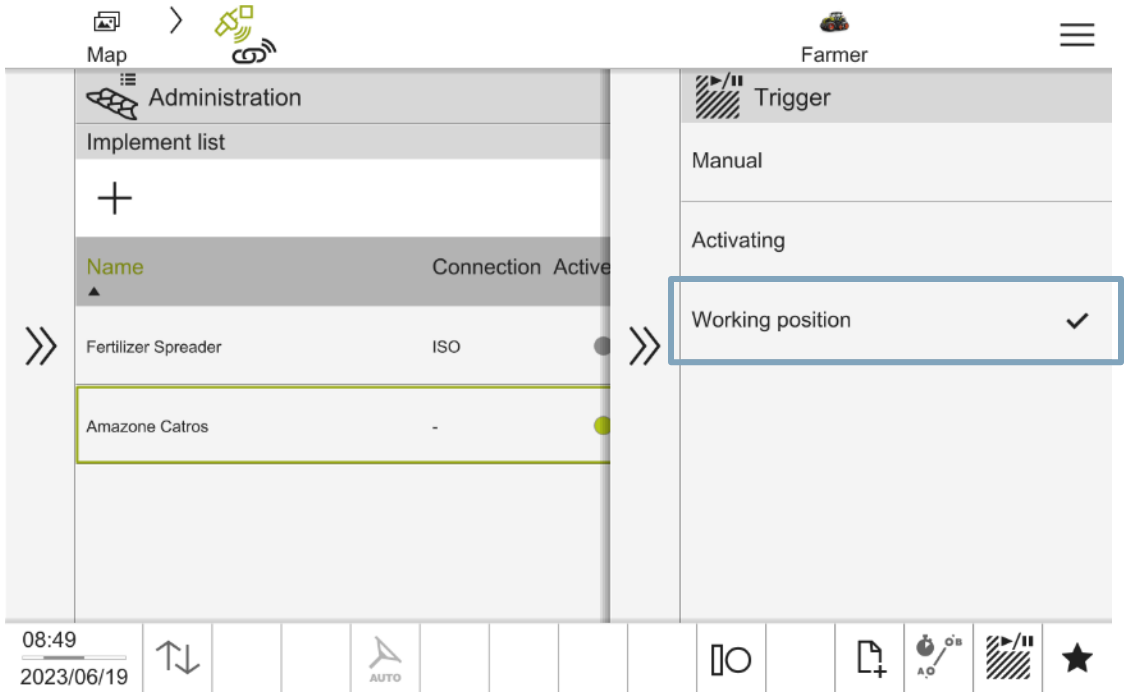
Data Management

ISO TC: Trigger for Coverage

External Trigger for Coverage recording:

Ability to link coverage recording to working position from vehicle (configuration via CEBIS)

- Set up machine working position as trigger source
  → via implement profile in CEMIS
- Start a Task inside CEBIS in order the trigger
- Feature relies on machine working position that is selected in CEBIS, e.g.:
  - spool valves
  - PTO
  - 3-point hitch
  - etc.

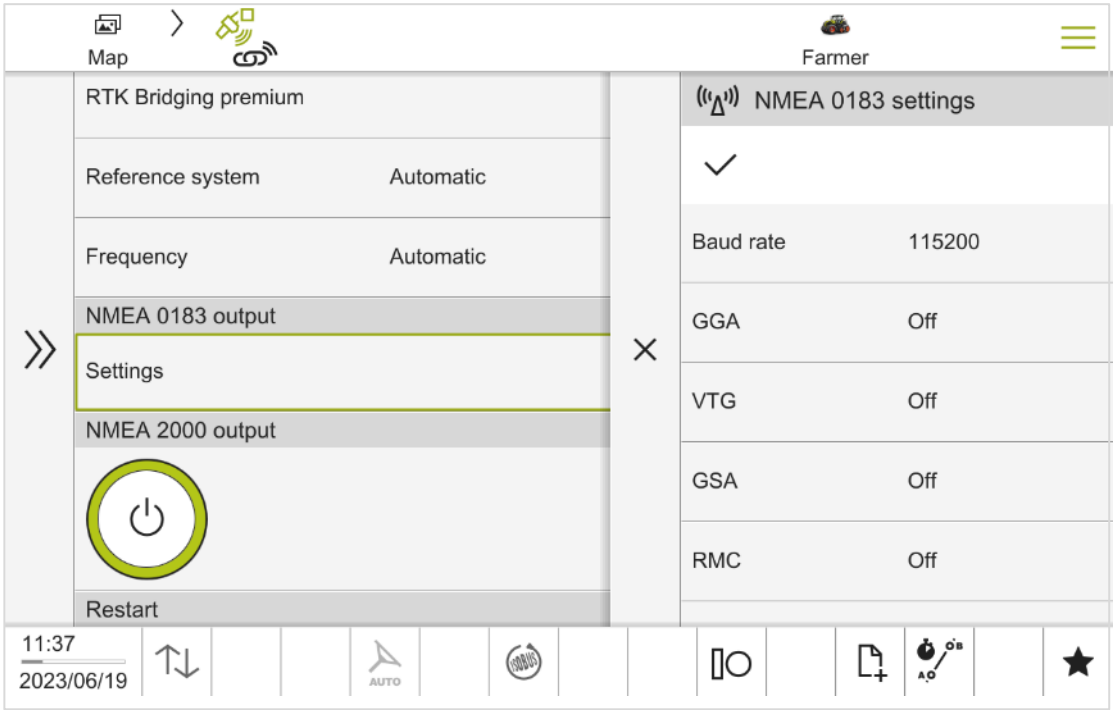


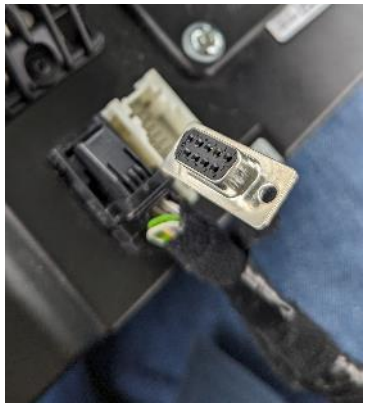
Terminal: NMEA out

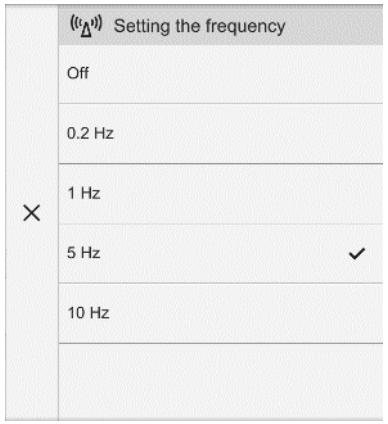
NMEA 0183 message output via RS232:

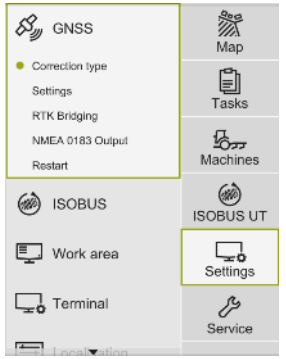
The CEMIS 1200 is able to provide GNSS data to 3rd party job computer for GNSS based applications based on NMEA 0183 data (e.g. for Section Control on proprietary terminal)

- Enable output of serial NMEA 0183 string via RS232 interface
  → via GNSS settings menu
- Enable / Disable NMEA messages (e.g. GGA, VTG, etc.)
- Select output rate of NMEA messages







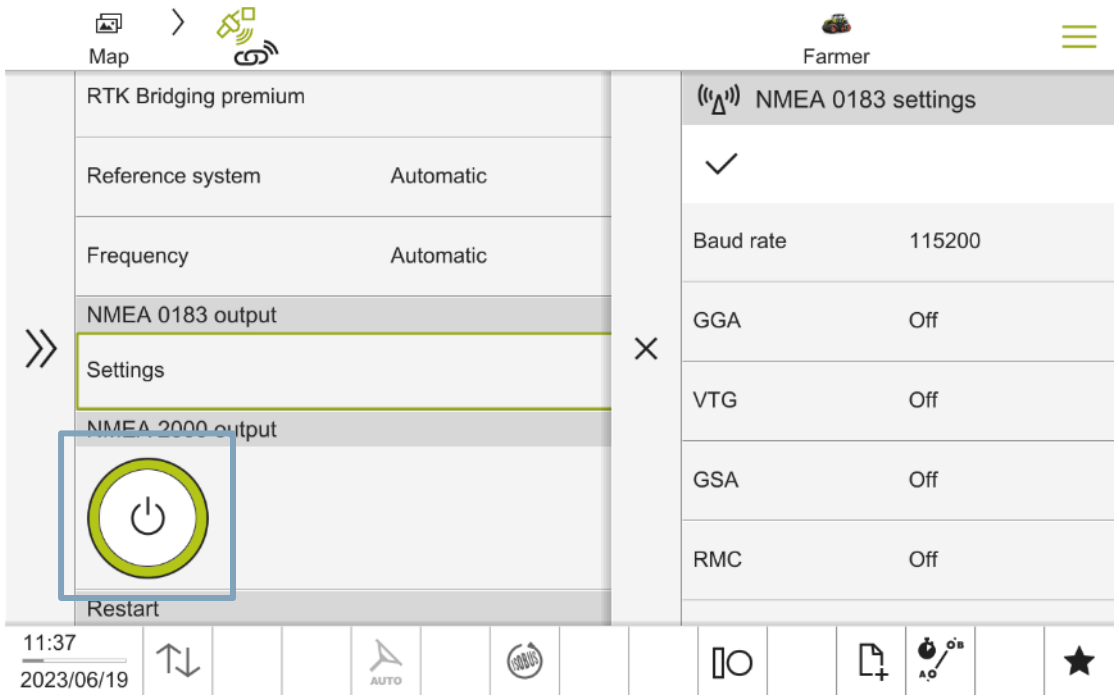


Terminal: NMEA 2000 output

NMEA 2000 message output via ISOBUS:

The CEMIS 1200 is able to provide GNSS data via the ISOBUS for GNSS based applications based on NMEA 2000 data (e.g. for Section Control on proprietary terminal)

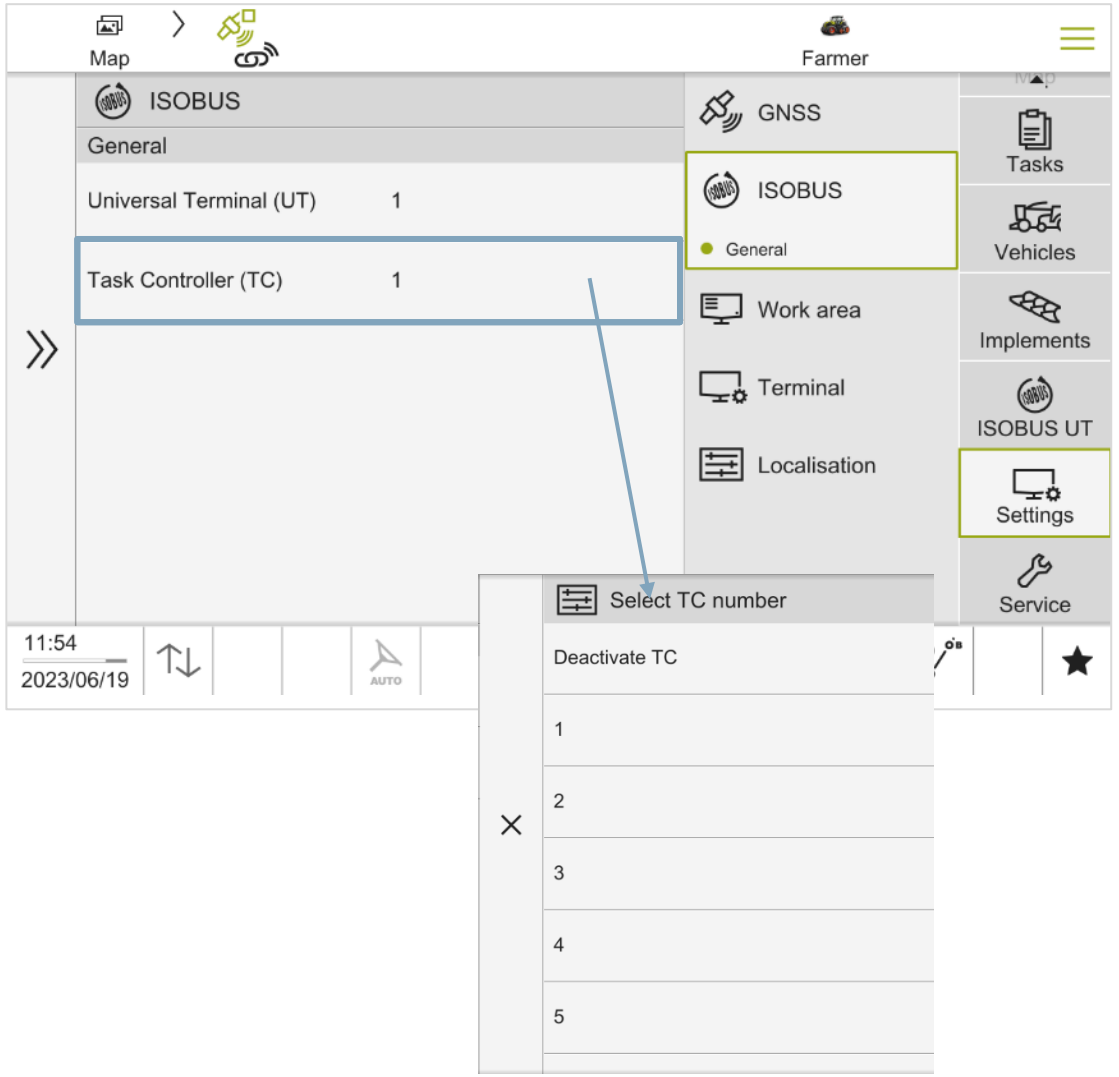
- Enable / Disable output of NMEA 2000 string via ISOBUS
  → via GNSS settings menu
- The following messages are supported
  - PGN 129025 – Position Rapid Update
    → *provides Latitude & Longitude*
  - PGN 129026 – COG & SOG, Rapid Update
    → *provides Course Over Ground (COG) and Speed over Ground (SOG)*
  - PGN 129027 – Position Delta, High Precision Rapid Update
    → *provides very fast update rates of position data*
  - PGN 129029 – GNSS Position Data
    → *provides a comprehensive set of GNSS parameters*



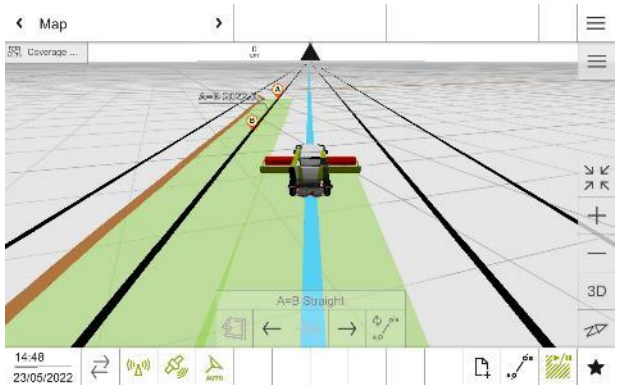
ISO TC: Function Instance and Main Switch for Task Controller

Function Instance and Main Switch for Task Controller:

- Function instance for CEMIS Task Controller can be adapted
- Task Controller can be set to state “OFF”
- Steering system can be used even when Task Controller is set “OFF”
  - Avoiding unnecessary data on the bus
- Allows the user to use a 3rd party ISOBUS terminal to operate his ISOBUS implements while using the CEMIS 1200 for automatic steering
- Machine profile must be created manually



Refline Sharing Coordinate input

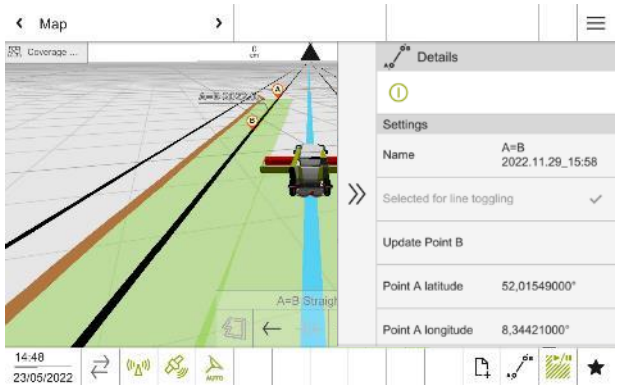


1.

Create AB line at CEMIS1200 on 1st combine

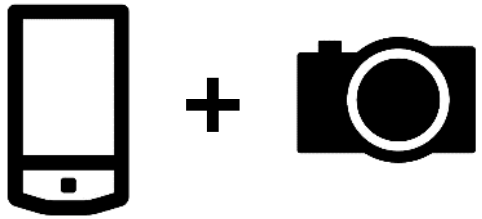
2.

Open AB line detail menu to display coordinates of A and B point



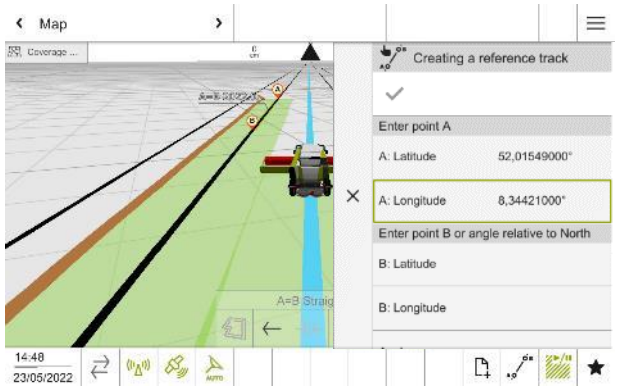
3.

Take a photo with your smartphone of the displayed coordinates and send it to the driver of the 2nd combine



4.

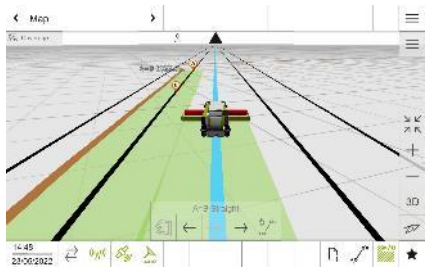
Create a new AB line on 2nd combine via coordinate input

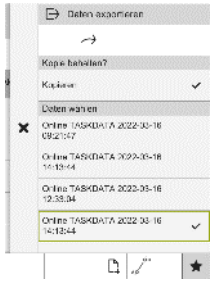


Refline Sharing via TELEMATCIS Up-/Downloadcenter

1. Step

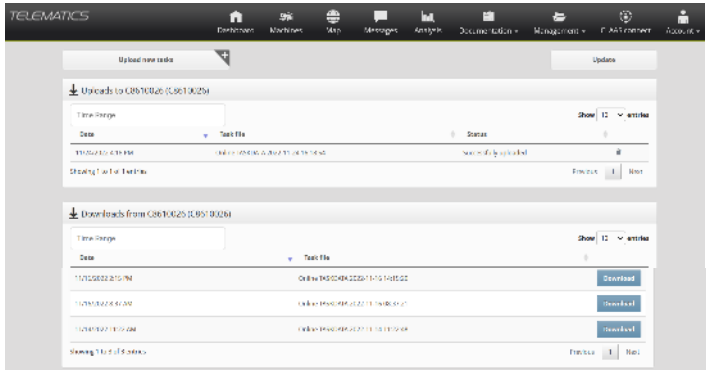
Creation of refline at CEMIS 1200 directly on the field at one combine – send a task (with the refline) via Online File Transfer to the backend

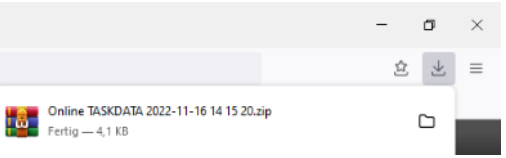




2. Step

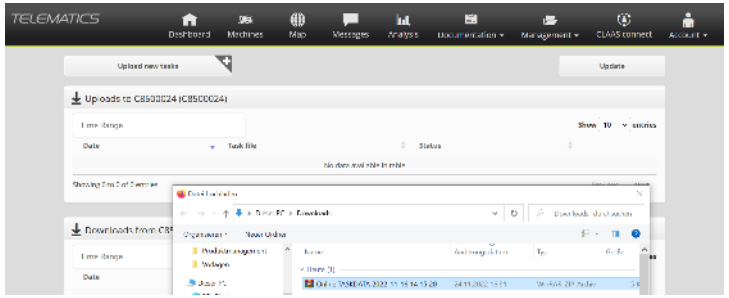
Task received in the TELEMATCIS Up/Downloadcenter – download of the task necessary and storage at PC

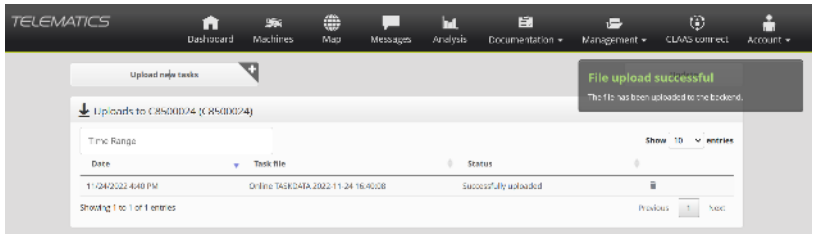




3. Step

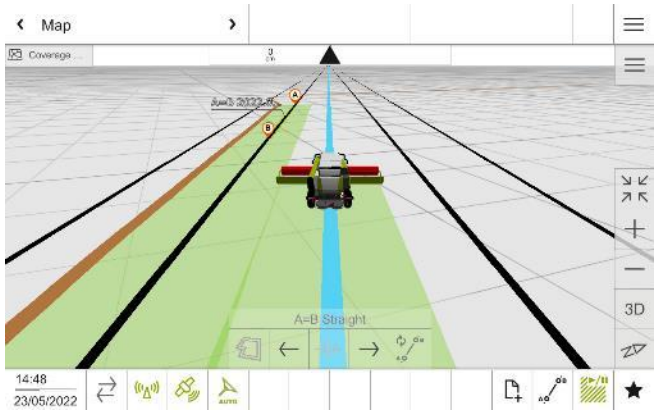
Upload of the stored task (zipped) in the Up / Downloadcenter and send to other combine(s) – refline is shared





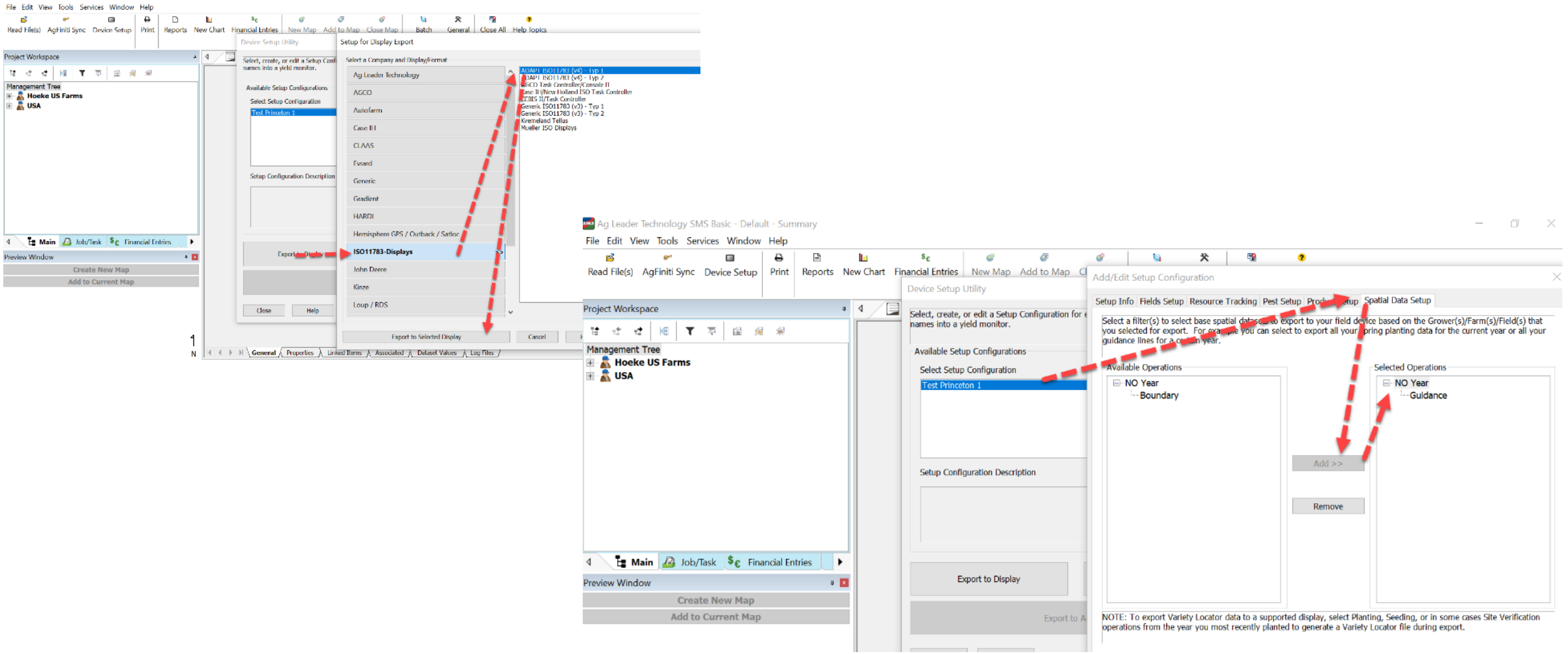
4. Step

Open the received task at CEMIS 1200 on the combine(s) – Selection of needed refline – all combines have the same refline

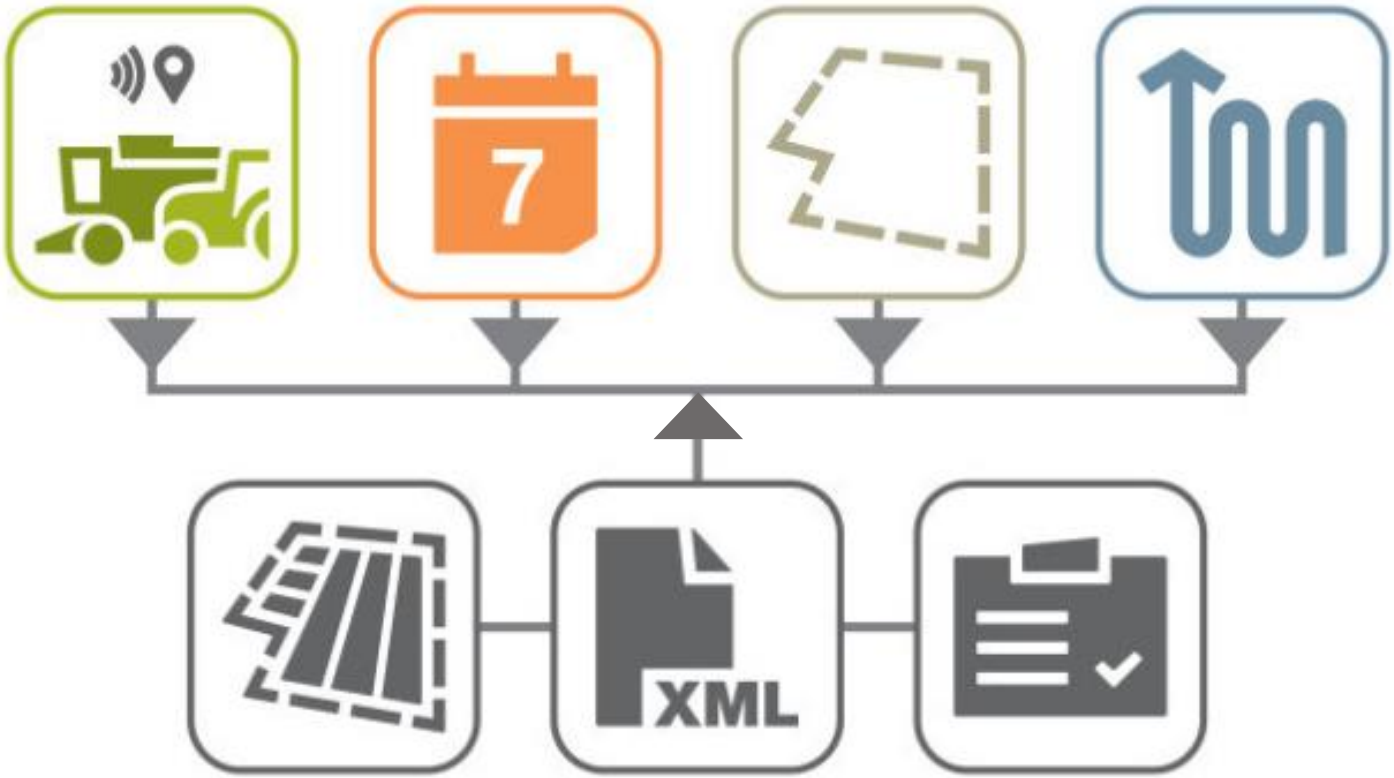


GPS PILOT CEMIS 1200

Data from AgLeader to CEMIS 1200



07 Task management



Task management

Principles

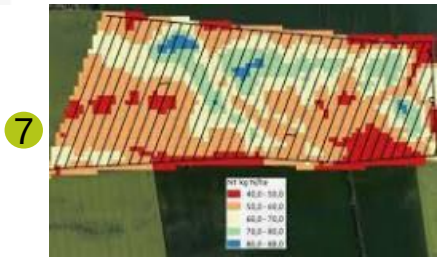
The CEMIS Task management is based on the ISOxml standard. A **task** consists of several individual pieces of data – what is known as **master data**.

Master data can be:

- Operation (farm) (1)
- Field (boundary lines, driving tracks, markings) (2)
- Work step (3)
- Driver/employee (4)

Additional master data:

- Product (e.g. fertilisers, seed, spraying agents) (5)
- Product volume (6)
- Product volume card (7)



Master Data Handling on Terminal

Master Data Handling on Terminal:

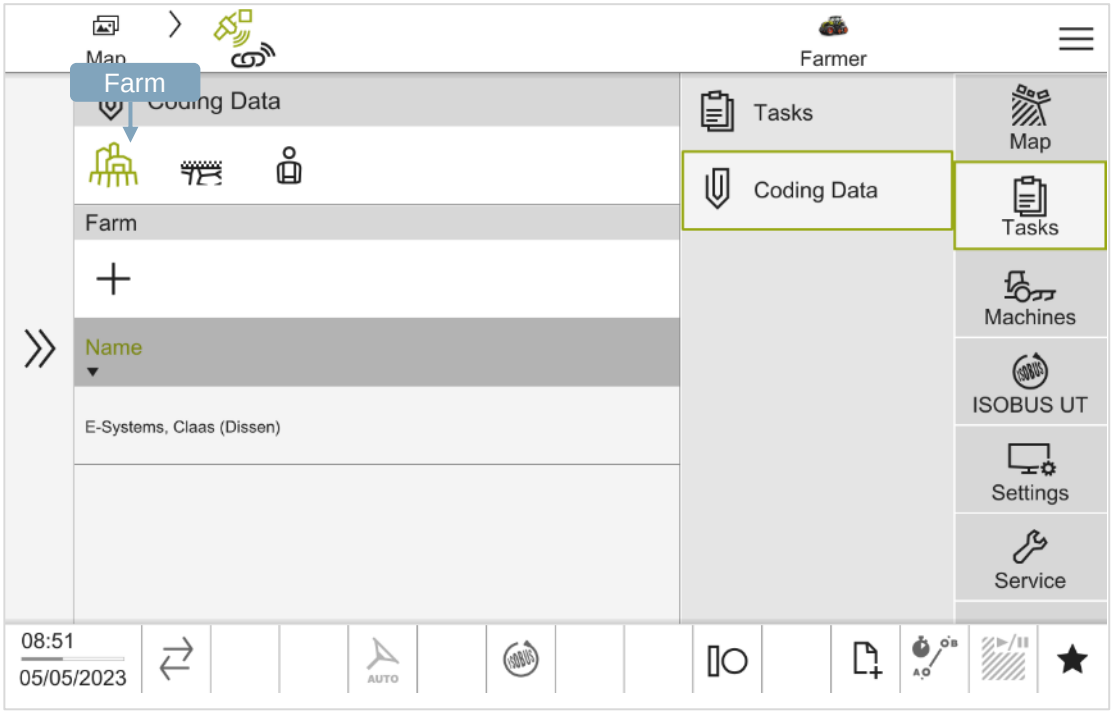
Ability to create new master data directly on the terminal w/o using FMIS in between

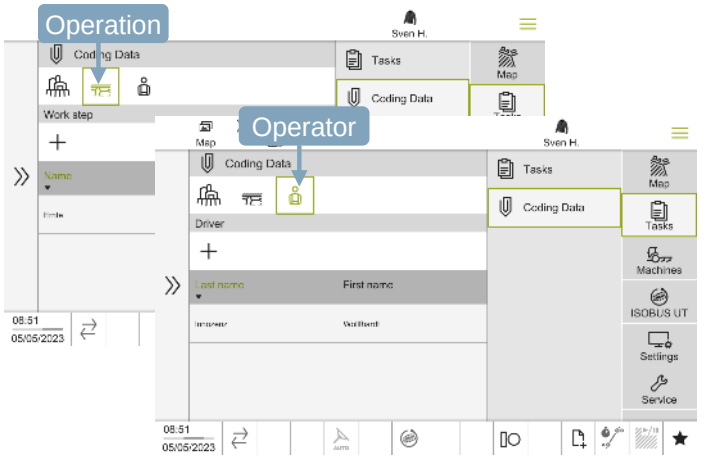
Master Data handling

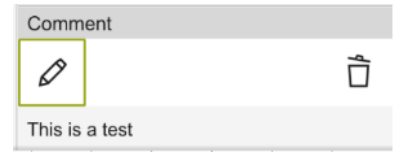
- Create new farm, new operation, new operator on the terminal
- Edit existing master data directly on the terminal
- Display master data on the terminal
- Created Master Data can be selected as reference in a task

Task Comments

- Comments from FMIS are displayed in the Task
- Create individual comment to a task
- Edit or delete task comments
- Task comment is documented in TASKDATA



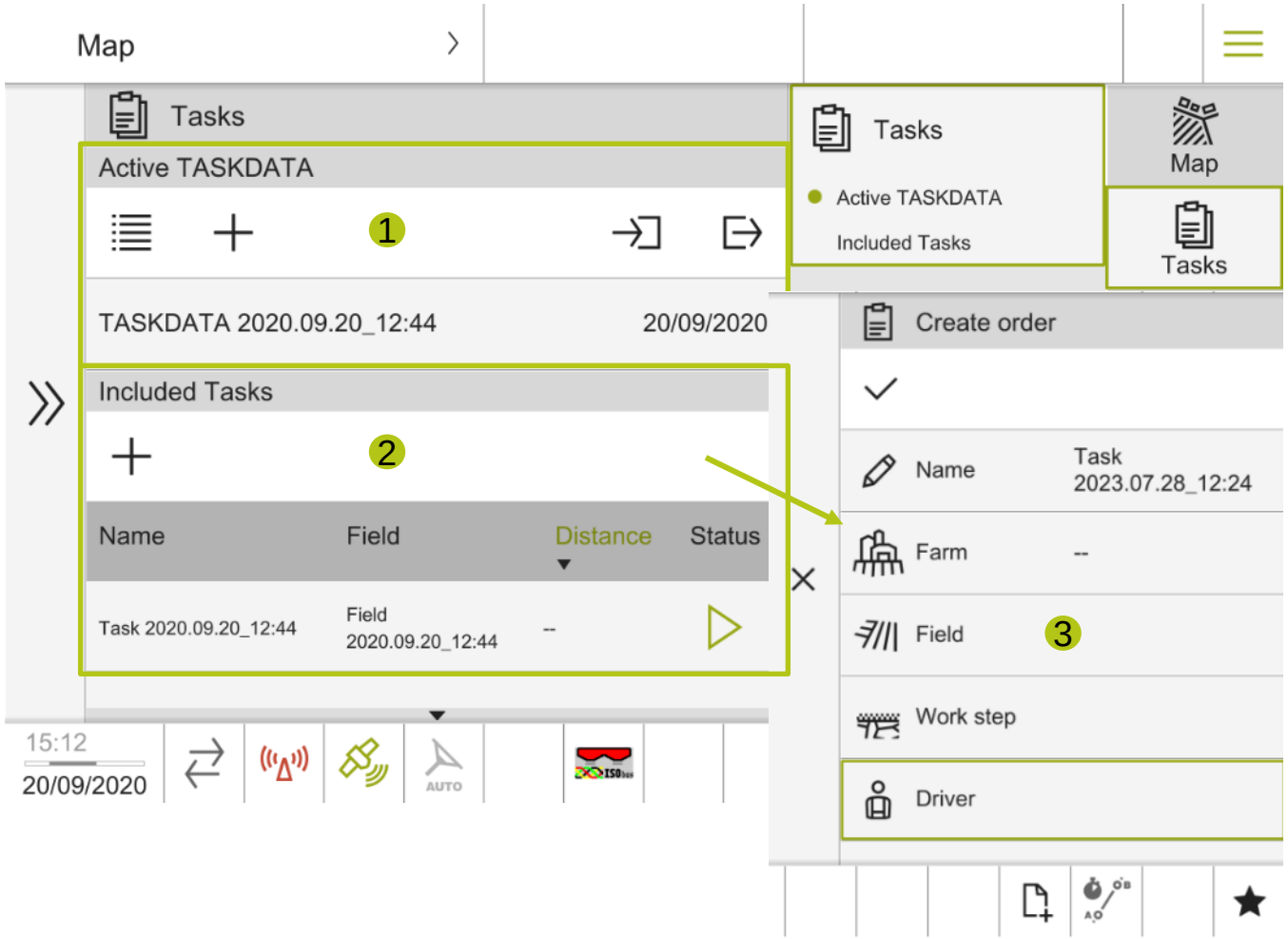




Task management

Task management principles

- (1) Active TASKDATA
  - The CEMIS terminal can save more then one taskdata, but only one can be active
  - This taskdata includes all the master data, like described on the page before
  - The complete taskdata can be imported and exported
  - It is also possible to add a new taskdata in the CEMIS
- (2) Included Tasks
  - Within on taskdata we can have several single tasks which are using the overall masterdata
  - (3) It is possible to add, **but not to delete**, different masterdata within the taskdata

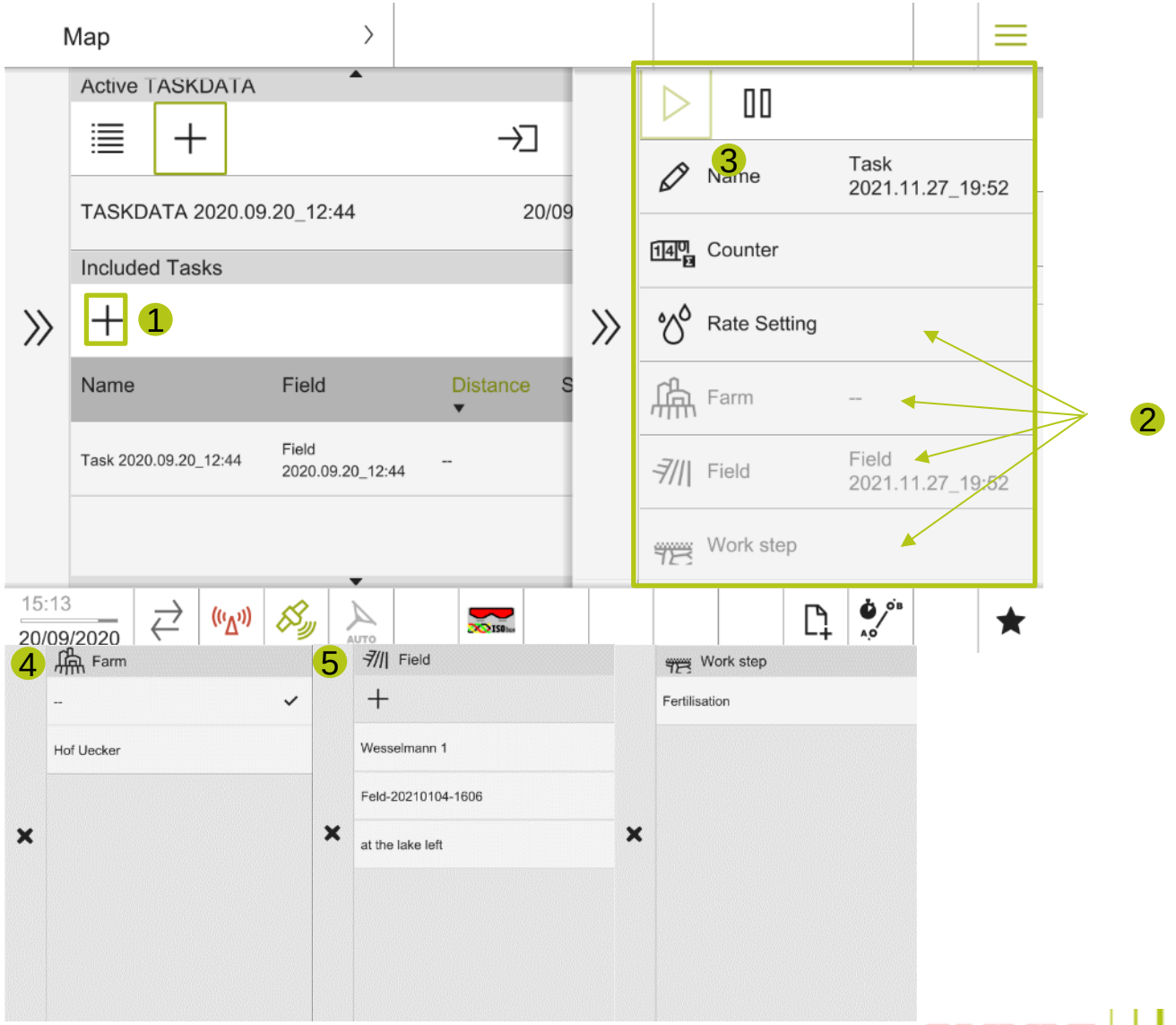


Note: Some master data, such as farm, work step, driver, can´t be added to the task, as they must be added by the farm management software. This will be changed in the upcoming software versions.

Task management

Task management principles

- (1) Create a new task in the task menu with the +
- (2) The task can be created on the basis of masterdata (Rate Setting, farm, field, work step and operator)
- (4), (5) If a farm has been selected, only the fields assigned to the farm are displayed under Field
- (3) Start Task



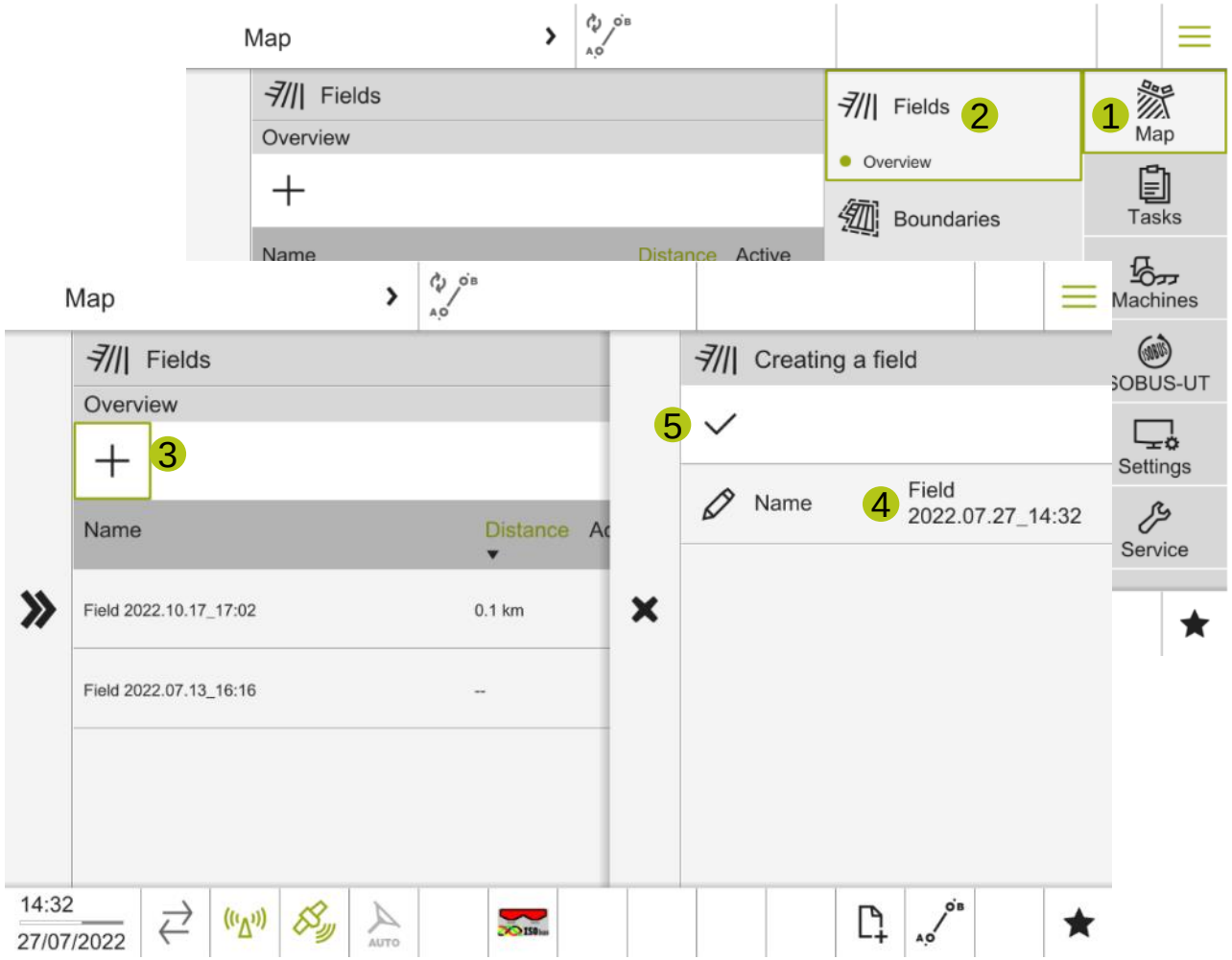
Task management

Creating a field

Within the CEMIS it is possible to add fields to the masterdata. The "Map" menu (1) contains the "Fields" menu (2)

- (3) A new field can be created by pressing the plus symbol
- (4) The field is created with the time stamp as its name, the name can be changed
- (5) Press Confirm to save the field

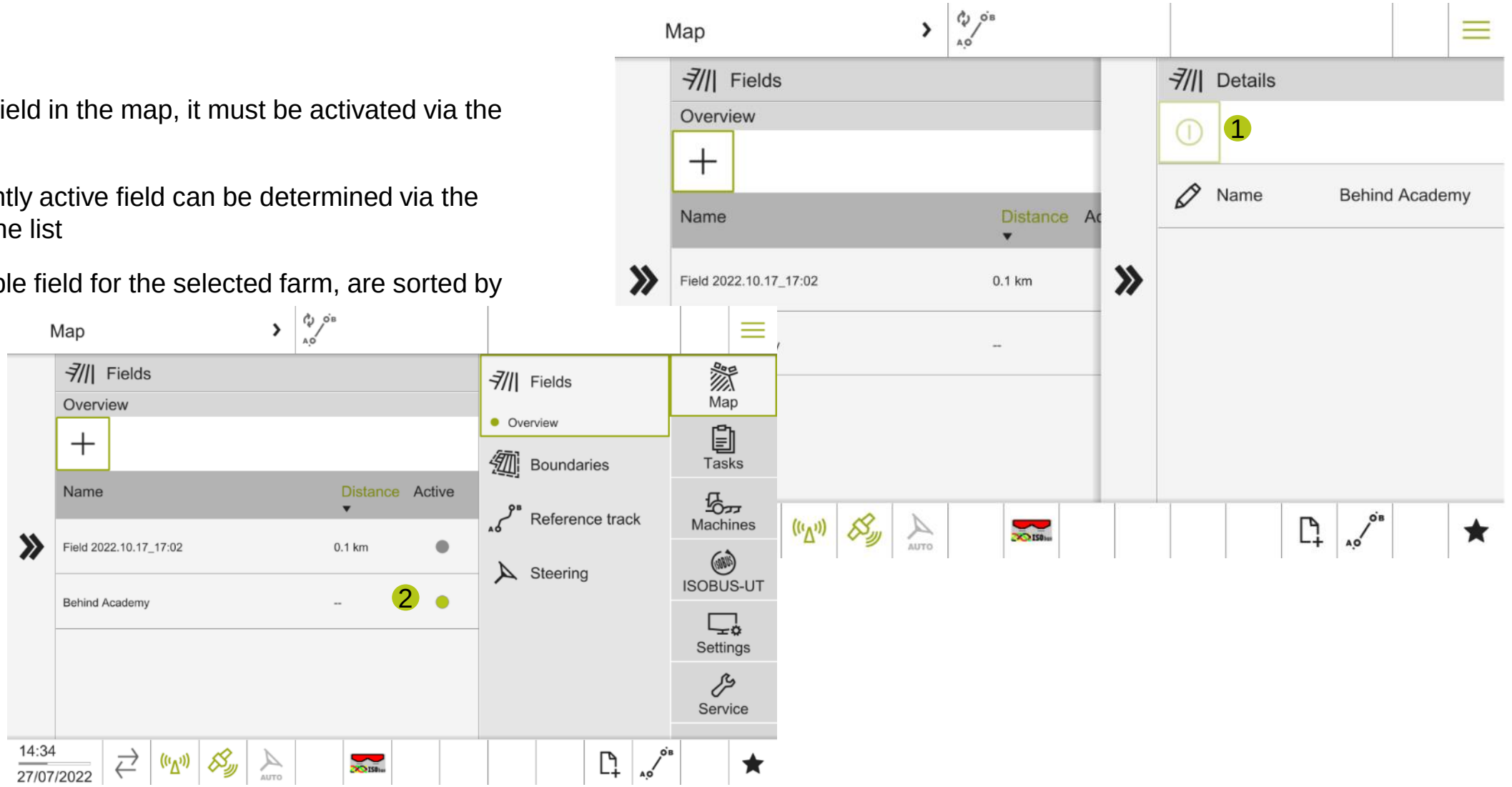
Note: The field will be saved under the current farm, if chosen in the task.



Task management

Creating a field

- (1) To load a field in the map, it must be activated via the button
- (2) The currently active field can be determined via the green dot in the list
- (3) the available field for the selected farm, are sorted by distance



Task data structure

TASKDATA

- Task 1
    - Farm
        - Field 1
            - Reference line 1
            - Reference line 2
        - Field 2
- Task 2
    - Field 3

TASKDATA

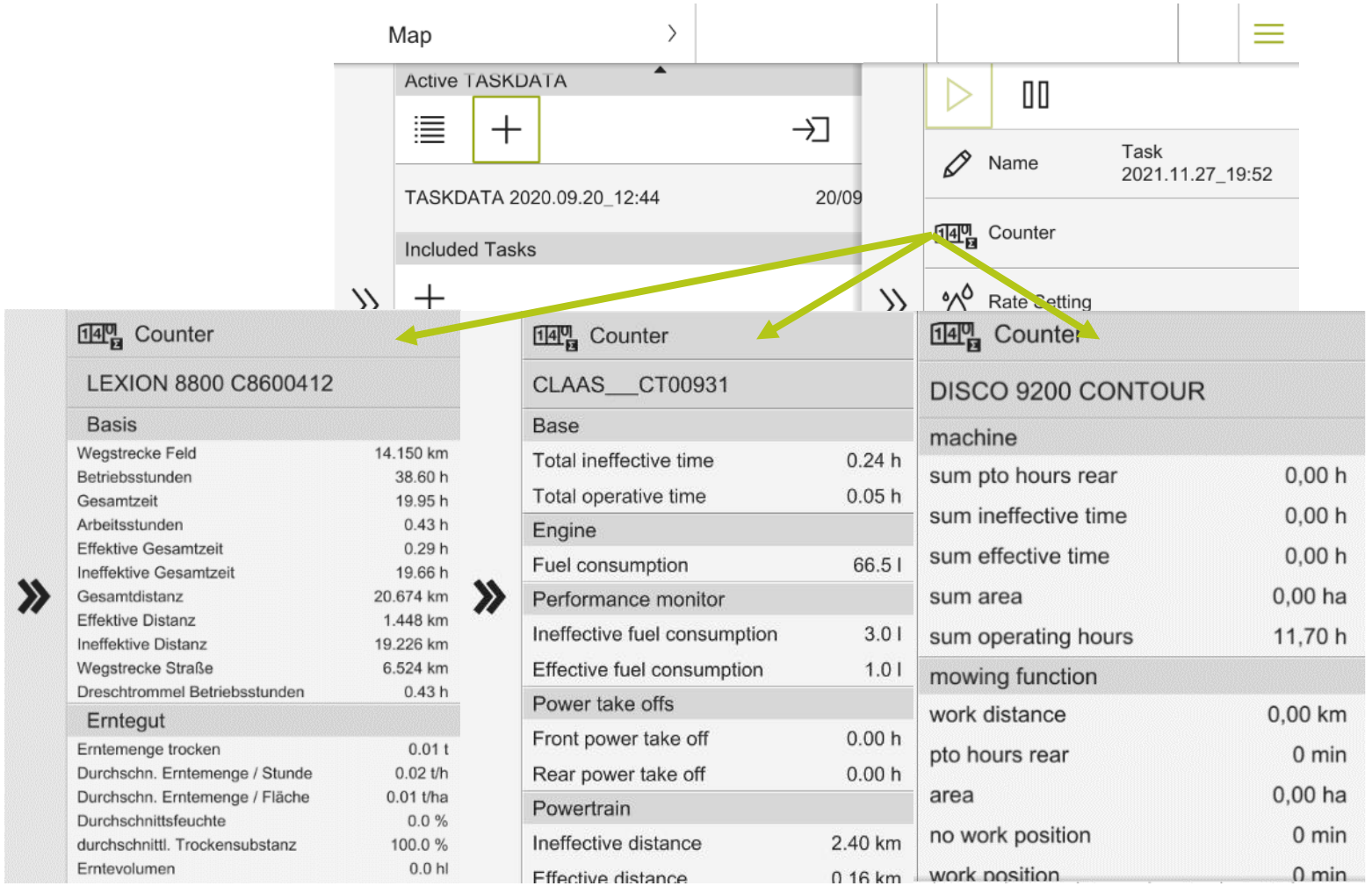
- Task 3

Task management

Counters

For documentation purposes, the available counters are stored within the task.

- The counters are running from the start to the stop of the task
- The counters can be displayed in the task details.
- Which counters are available is depending on the connected vehicle and implement. Only implement with a Task Controller Basic unlock are able to deliver counters

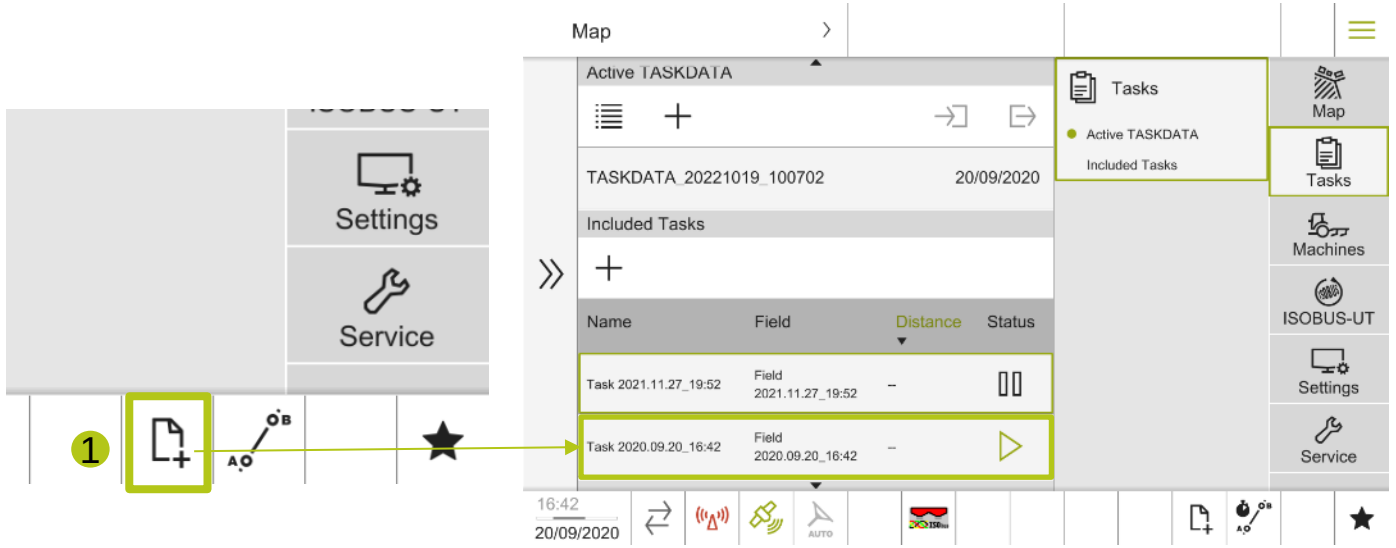


Task management

Quick Task

In case the documentation of masterdata and tasks is not needed, users can also create tasks without using master data.

- (1) by pressing the quick task button, a new task and a new field, both named with time and date stamp, are created and active. The system is directly ready to go.



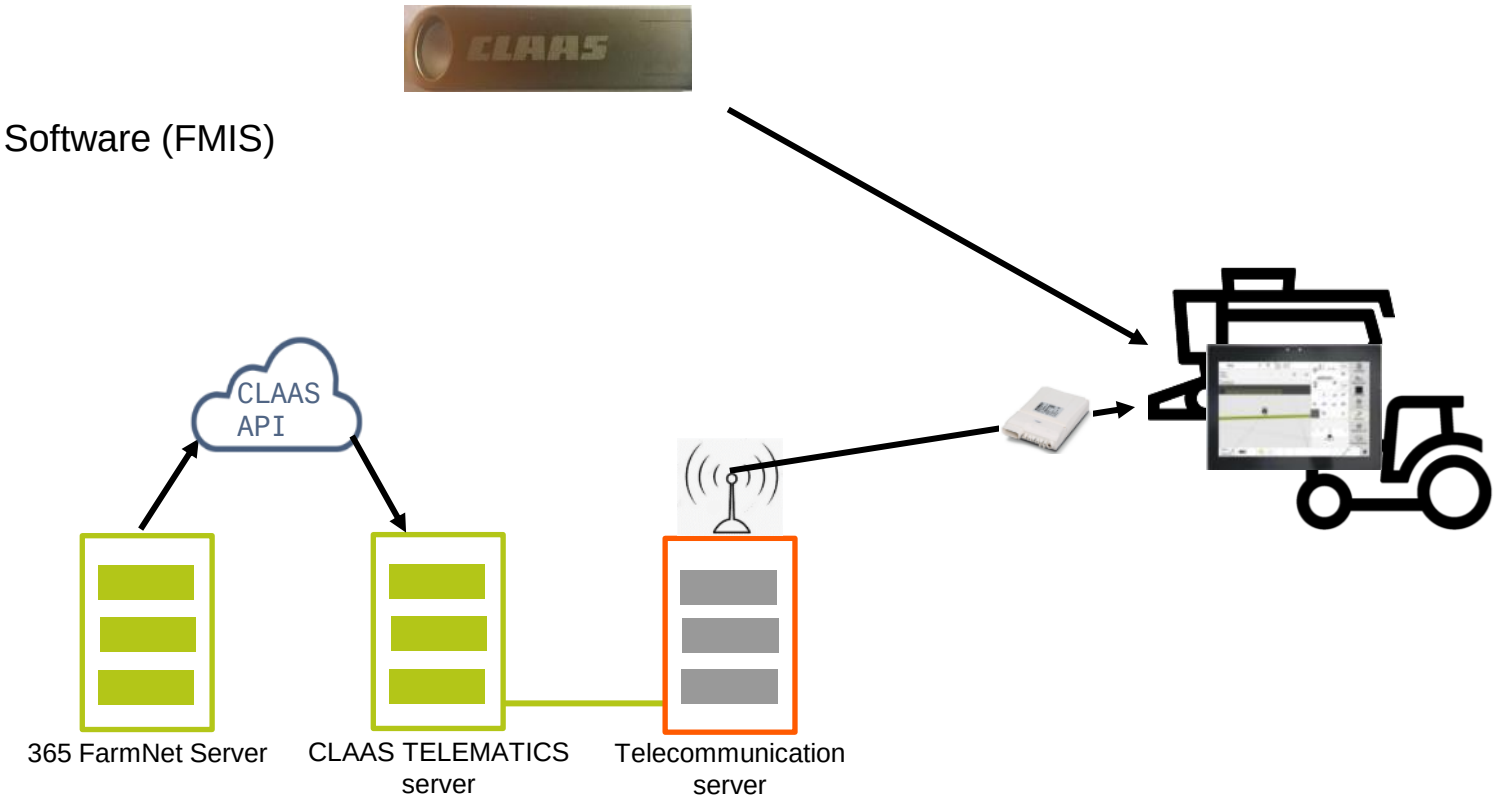
Note: After the task creation, the master date of the task can not be modified afterwards.

Task management

TASKDATA transfer

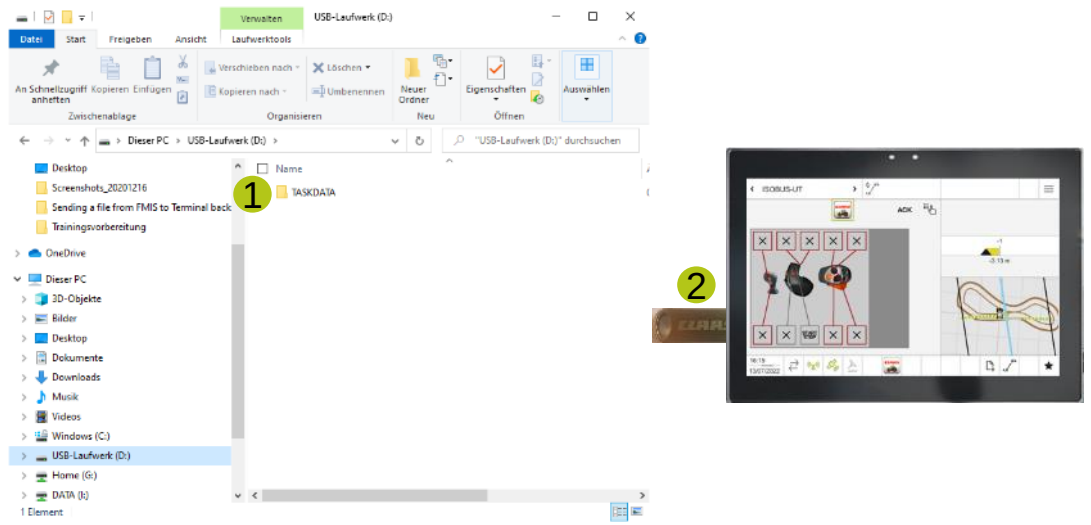
The taskdata transfer is done according the ISOxml standard

- taskdata can be transferred between:
  - Machine and Farm Management Information Software (FMIS)
- For the taskdata transfer, two options are possible
  - Option 1. via USB stick
  - Option 2. via Online File Transfer (OFT)



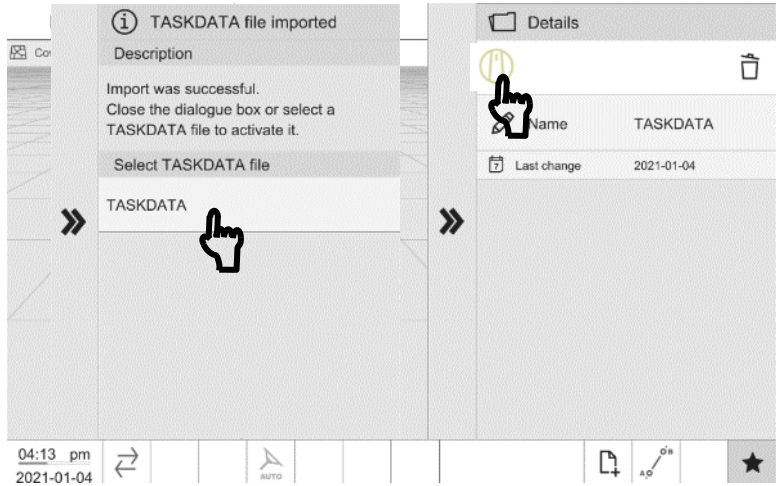
Task management

TASKDATA transfer – USB import



For **option 1:**

- (1) Copy pre planned task from the FMIS onto a USB stick in a TASKDATA folder
- (2) Insert the USB stick into the terminal
- After the USB stick has been detected, start import
- The task can be started directly

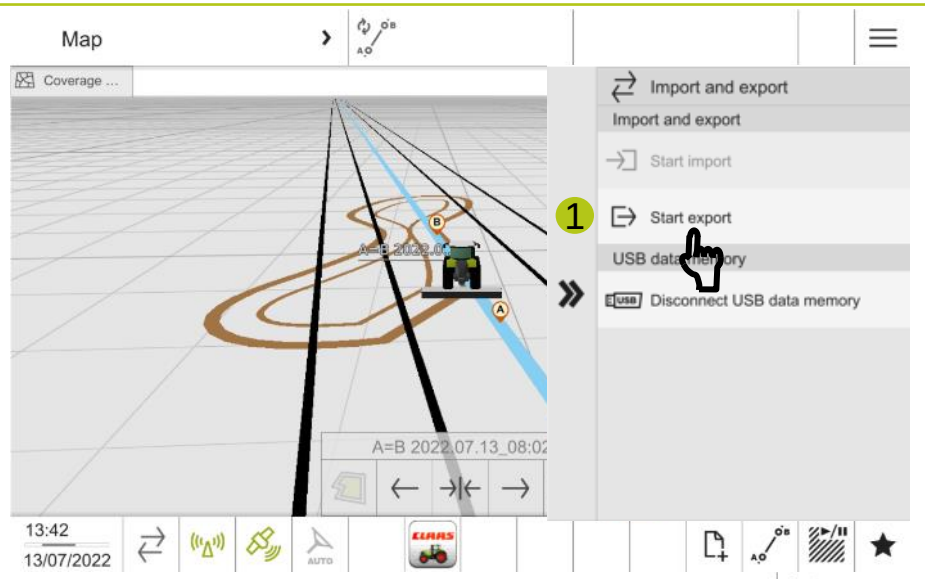


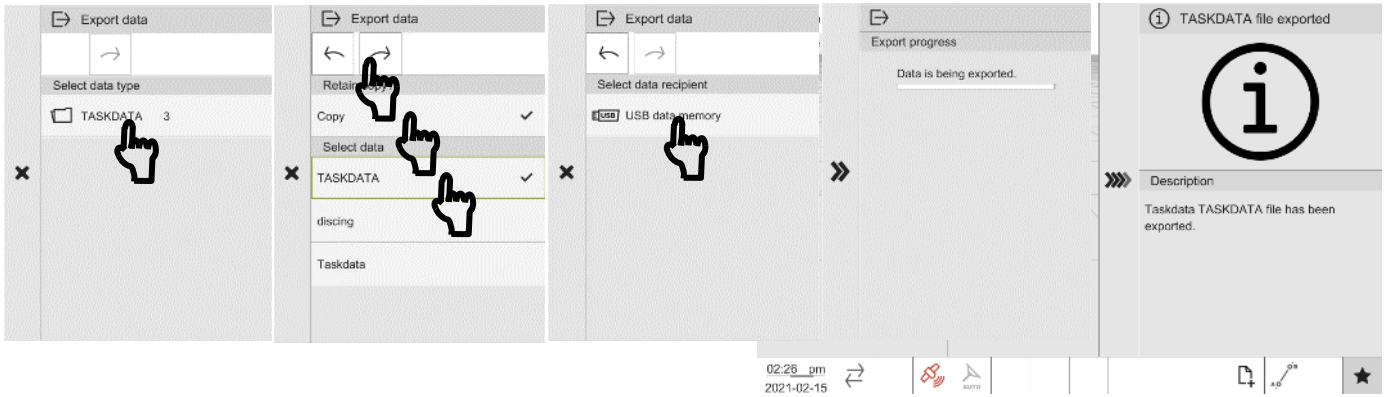
Task management

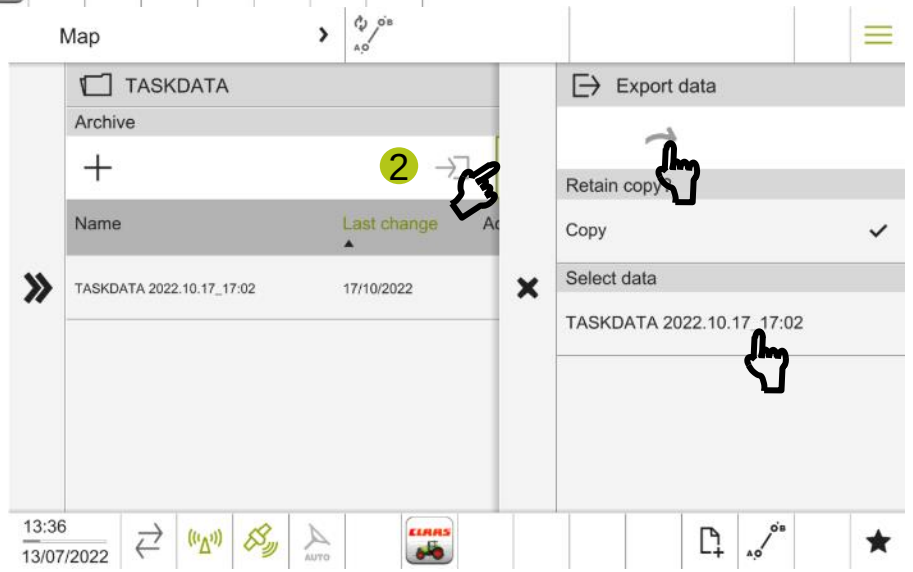
TASKDATA transfer – USB export

For **option 1:**

- Insert the USB stick into the terminal -> Start the import/export dialogue (1) or go to the Task menu -> Open tasks (2) and start the export
- Select the task file
- Select the storage medium (USB stick)
- Export the task file





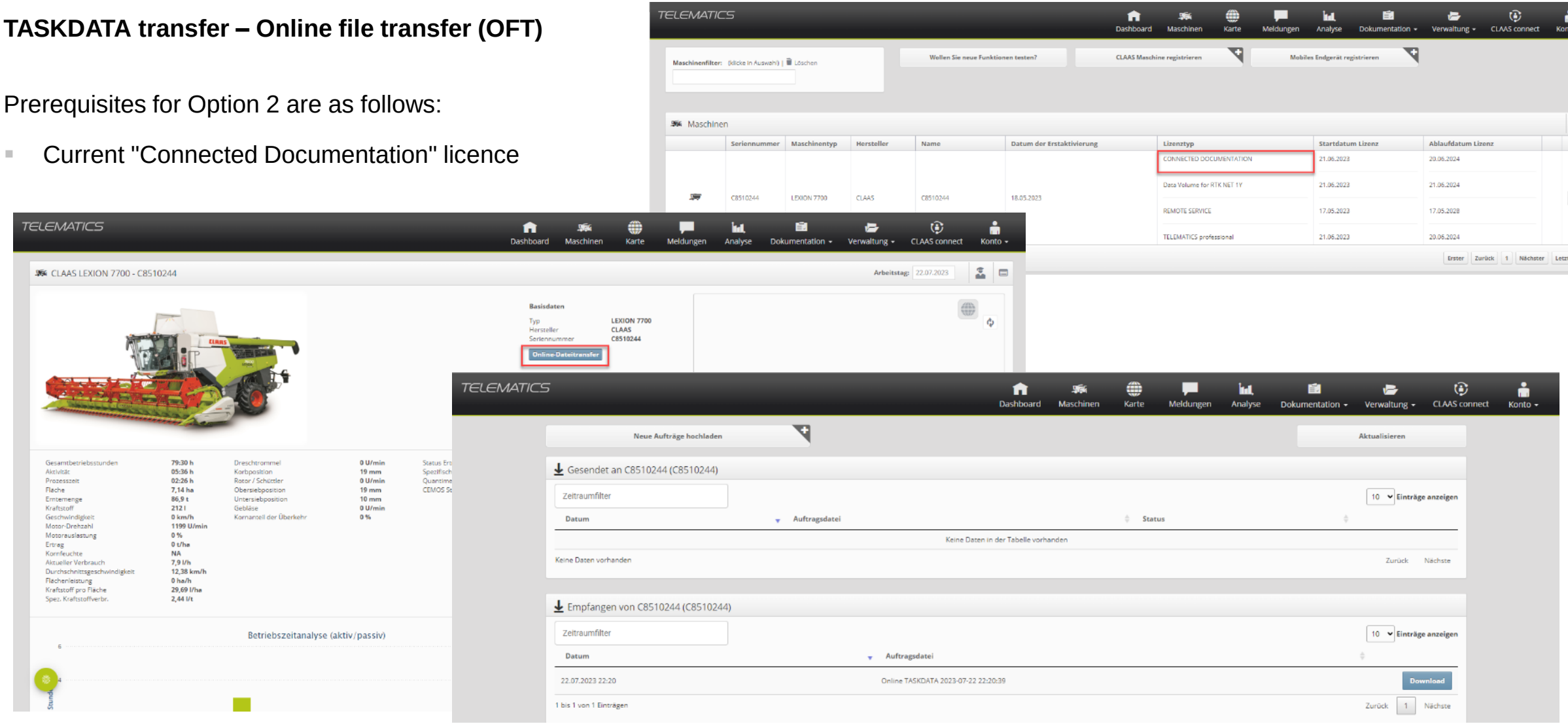


Task management

TASKDATA transfer – Online file transfer (OFT)

Prerequisites for Option 2 are as follows:

- Current "Connected Documentation" licence

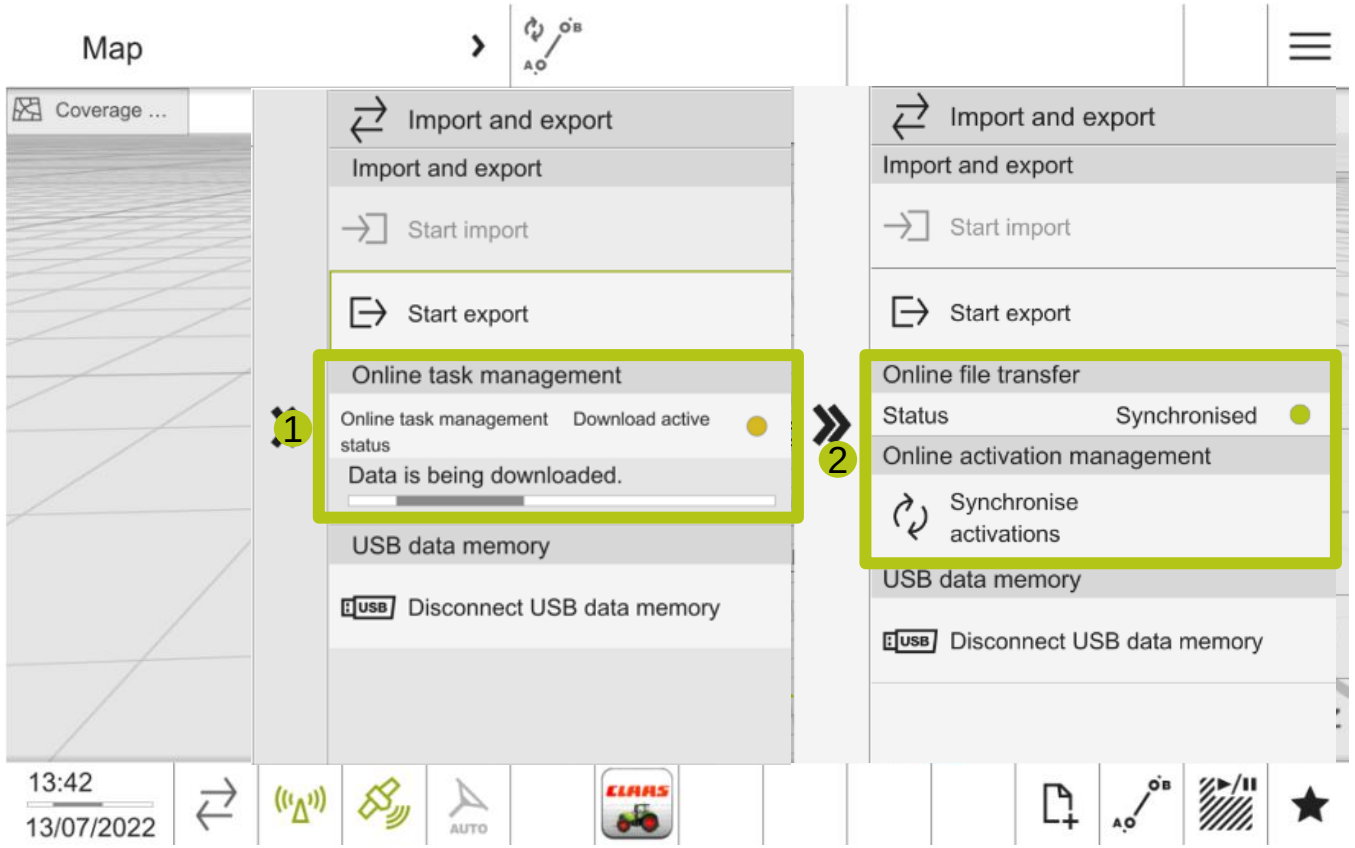


Task management

TASKDATA transfer – Online file transfer (OFT) import

Should a task be available on the server and should the UCM have established an Internet connection, the task is loaded onto the terminal (1). No interaction by the operator is required.

Online Task Management Status (2) indicates whether a task is currently being loaded ● or all tasks are synchronised with the server ●.



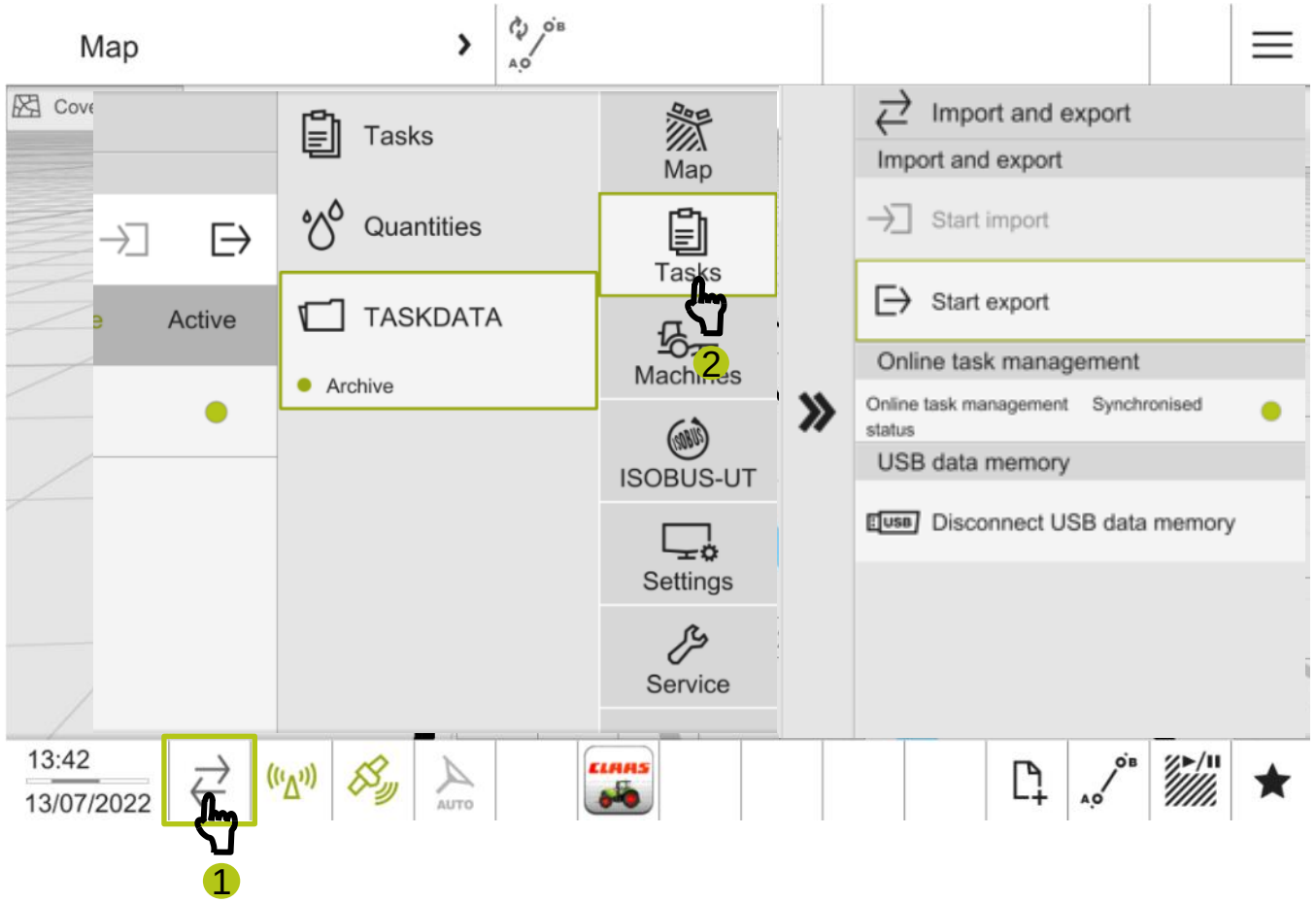
Note: The transfer process can take between 30 seconds and 15 minutes, depending on the Internet connection and file size.

Task management

TASKDATA transfer – Online file transfer (OFT) export

Open the Import/Export area via the quick access button (1) or in the task menu (2).

Start of task export (3).



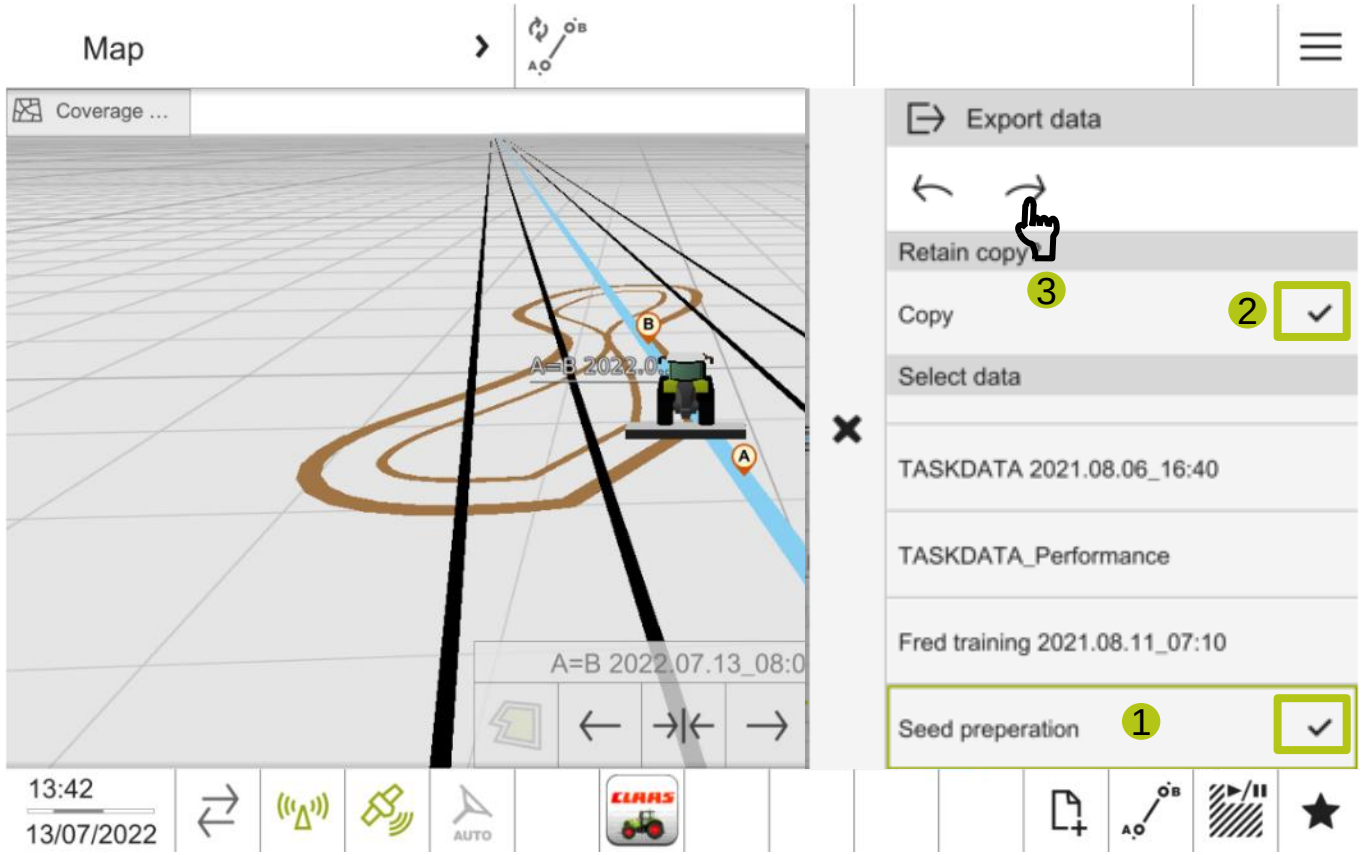
Task management

TASKDATA transfer – Online file transfer (OFT) export

Select a task to be exported (1)

Selecting the copy function (2) makes a copy of the task which is stored on the terminal.

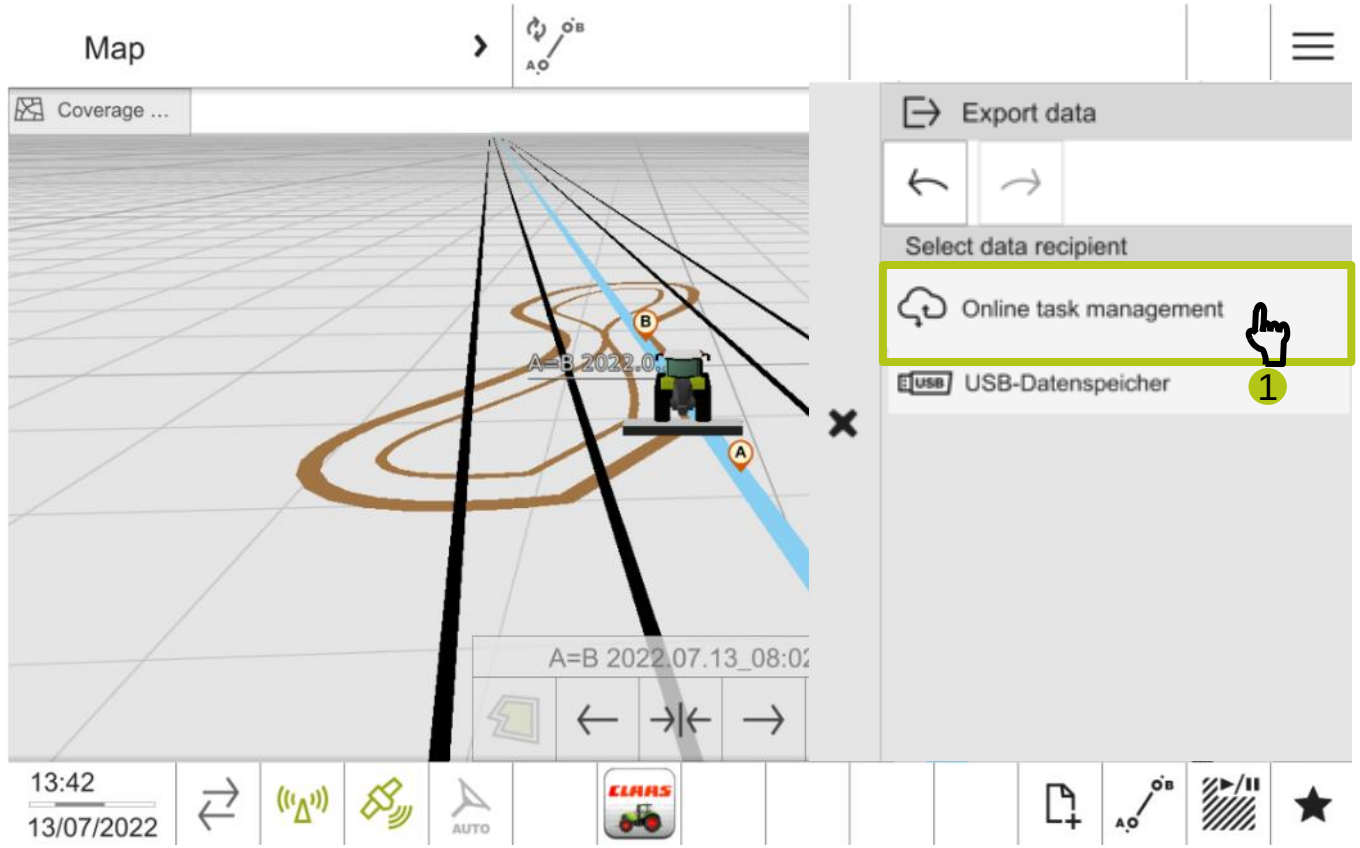
Once the task has been selected, tap "Next" (3) in the export dialogue.



Task management

TASKDATA transfer – Online file transfer (OFT) export

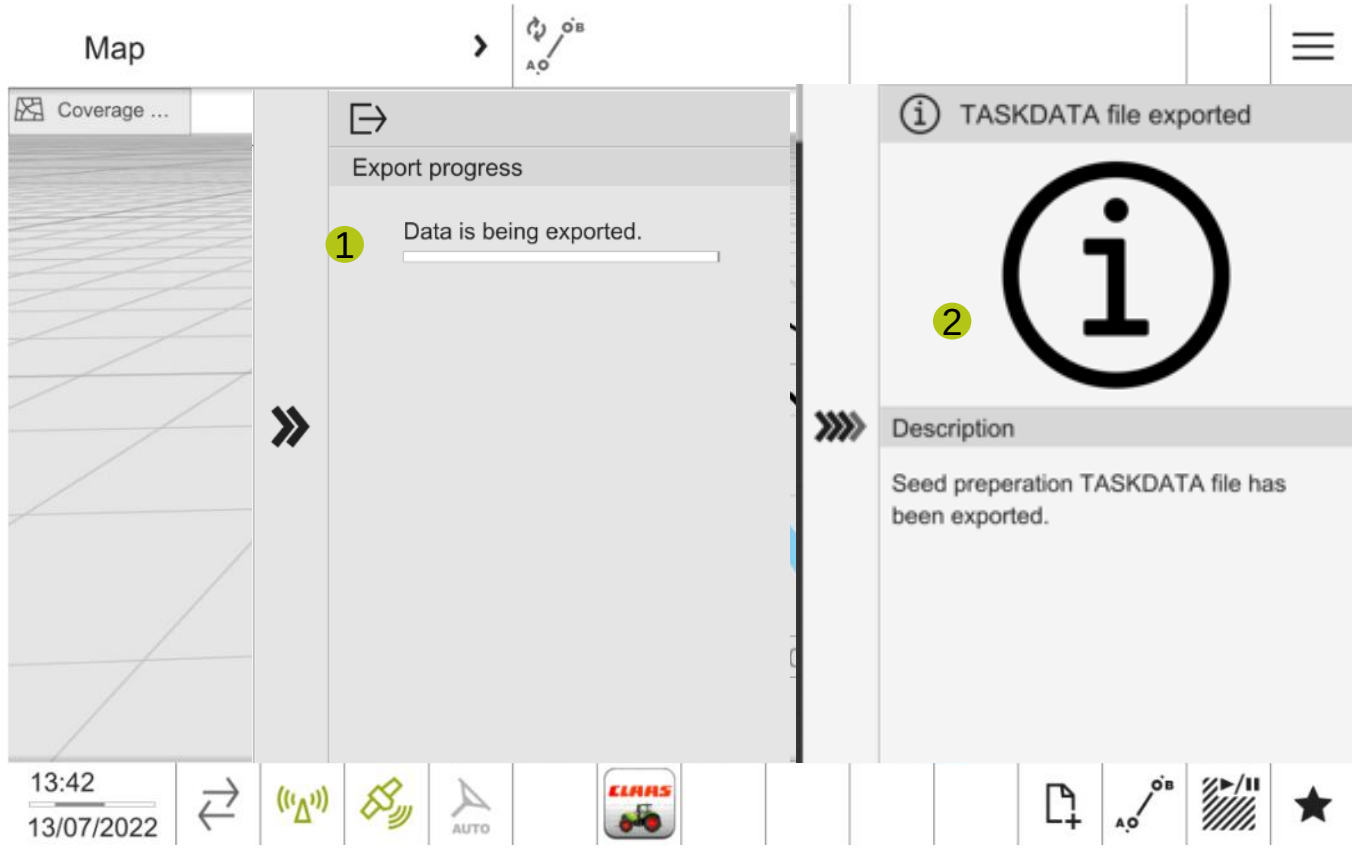
Once the data receiver (1) has been selected, the export process is started.



Task management

TASKDATA transfer – Online file transfer (OFT) export

When the task has been transferred to the OTM server (1), a notification is provided in the terminal (2).



Congratulations!

You are ready for operation