

DESCRIPTION

Display and operator communication system

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The invention relates to a display and control concept, in the form of a modular unit, in particular for combat vehicles, which may in general also be armored.

10 Combat vehicles are in general steered by means of direct or else indirect driver view from the vehicle. An armored vehicle such as this is disclosed in DE 196 42 386 C1. The requirements for the displays and controls for the driver are also continuously becoming
15 more stringent for combat vehicles, under the influence of modern technologies. The space available in the driver area is, however, more than the space required for this purpose. For example, among other factors, there is a requirement for integration of a control and
20 navigation system in order in this way to be able to additionally provide the driver with navigation data. Integration of a plurality of display and control units for different new subsystems is, however, placing demands on the available stowage space adjacent to the
25 driver's station and is furthermore preventing compliance with the general ergonomic requirements, such as driver leg freedom, protection requirements, etc.

30 As described in DE 92 15 019 U1, control and display units or consoles are known from the civil vehicle field, which contain a control computer with a processor and main memory as well as sensors for obtaining information from the environment. The control
35 console in DE 92 15 019 U1 has two screens with associated keypads. A map can be displayed on one screen, while a selectable display can be produced on

the other, of various sensor information items from the surrounding area.

The invention is in this case based on the object of
5 improving the displays and controls for a driver, in particular of an armored combat vehicle.

The object is achieved by the features of patent claim
1. Advantageous embodiments are contained in the
10 dependent claims.

The invention is based on the idea of combining a plurality of display and control devices which are required for the additional subsystems such that the
15 display and control devices are fused with one another and carry out a plurality of tasks, thus avoiding the need for more space. For example, no additional monitor is used to display the navigation data. In fact, this data can be displayed on a central monitor, which is
20 preferably a component of the driver control box. In addition, there is no monitor for the rearward and battlefield camera or cameras, since these camera images can likewise be displayed on the central monitor, for example by means of a picture-in-picture
25 function. By way of example, pictograms can be displayed on the monitor as a substitute for the script field indicator for the chassis. A plurality of functional monitoring processes for specific systems can likewise be displayed on the same monitor. Keys and
30 control elements to control the displays etc. are, of course, provided on the control box.

In a development of the invention, a larger central monitor than the monitor which was previously included
35 separately at the driver's station is preferably installed in the driver control box. Furthermore, the control box has had digital interfaces added to it, for example in order to transmit chassis data or else

navigation data to a control system. Chassis warning
information, ACT information (functional monitoring,
functional testing, fault localization), camera images
and navigation data can be displayed on the monitor,
5 depending on the operating mode.

In a development of the invention, for example, the
engine speed and/or vehicle speed, gear selected, etc.
can be displayed on a preferably round LC display on/in
10 the central steering yoke, independently of the
monitor. This then replaces the conventional mechanical
steering yoke. Particularly for purposes relating to
ergonomic driver station design, it is also possible to
integrate other displays in the steering yoke.

15 One major advantage of this modular concept is the
integration of a standard concept in different vehicle
types. In addition to improvement to the concept, this
also results in the field of view being optimized for
20 all the displays of chassis data, ITS data for the
pioneer-specific and recovery-specific facilities,
camera images (driving in reverse, tool change, digger
operation) and, if desired, navigation data displays.
Particularly when used on other control systems,
25 chassis data can now be transmitted with
nation-specific systems.

A standard control and display system is provided for
the driver irrespective of what type of vehicle he is
30 driving, offering integration of all functions and
displays. The capability for better ergonomic design of
the driver's station is assisted by reducing the number
of assemblies in the area of the driver's station. A
larger monitor image allows the information to be
35 displayed more clearly, and the field of view on the
monitor and LC display is improved. The operational
capability of the concept is improved by the
integration of additional electrical and digital

interfaces for transmission of chassis and navigation data to different control systems.

The concept can be widened and narrowed. The navigation data display can be suppressed while, in contrast, the chassis data displays can be given priority, or vice versa. However, it is also possible to additionally display further information that is particularly relevant for the driver. The navigation data can be displayed by means of a compass rose displayed on the monitor, and a vehicle orientation display can be provided. Alternatives are the direction of the compass and display of the distance to a waypoint.

As already mentioned, the data on the LC display can alternatively or additionally be displayed on the monitor or on a script field display which can be positioned separately. The use of segments to display speed is known from civilian vehicle technology where the color characteristics of the individual segments are used to provide information about the vehicle speed. In the present case, by way of example, a speed of 5 km/h is defined per segment. The brightness of this display can be dimmed and, as is likewise known from the civilian vehicle field, can be controlled inter alia on the basis of the ambient brightness.

The invention will be explained in more detail using one exemplary embodiment and with reference to the drawing, in which:

Figure 1 shows a display and control system and a round LC combined display for the driver's station,

Figure 2 shows display options on the display and control system monitor,

- Figure 3 shows one possible display of navigation data on the monitor,
- Figure 4 shows the round LC combined display integrated in the steering yoke, and
- Figure 5 shows a script field display as an alternative to the LC combined display.
- 10 Figure 1 shows the newly designed concept of a common display and control system 100 with the major assemblies comprising the navigation unit 1 (if desired) to which a GPS 2 can be added, chassis electrical system 3, preferably a control box 4 with at least one monitor 4.1, and a computer 5. This is preferably a component of a control system within the vehicle itself, so that existing units in the vehicle can also be used. These assemblies are connected to the control box 4 via electrical lines 6. A CAN bus or the like, in particular, is provided for communication between the computer 5 and the control box 3.

In one special embodiment, the aim is to include an LC display 7 in the steering yoke 8. Vehicle-specific data such as the vehicle speed 10, engine speed 11, dipped light, left indicator light 12, etc. (Figure 4) can be displayed on this LC display 7. In this case, the display 7 preferably communicates via the control box 4, in order to obtain the appropriate information.

30 Figures 2 and 3 show possible displays of function and information data for a driver, who is not illustrated in any more detail, on the monitor 4.1. While Figure 2 characterizes the functional monitoring display, navigation data is also output in the display in Figure 3. The various displays can be selected etc. with the aid of the key and control elements 13 on the control box 4.

Figure 5 shows a script field display 20, which can also be integrated in the control box 4 or steering yoke 8. In this case, the speed is displayed by means of segments 21. In this case, by way of example, the last two segments 21.3 have a red background, the four segments 21.2 before them a yellow one, and the nine segments 21.1 a green one. Furthermore, the known warning and display fields 22 can be included. In this case as well, electrical power is supplied via the vehicle's own power supply system. The appropriate data is also provided via the BUS 6 in this case.

PATENT CLAIMS

1. Display and control system (100) for a combat vehicle which

- is of modular and standard design for different vehicle types, having
- at least one control box (4) for a driver, and having a monitor (4.1) integrated therein, for displaying a plurality of different function and information data items, and
- having key and/or control elements (13) for switching and connection of the desired display on the monitor (4.1),
- having additionally integrated electrical and digital interfaces for transmission of
 - o chassis *and/or* navigation data
 - o chassis warning information,
 - o ACT information, function monitoring, function testing, fault localization,
 - o ACT data relating to the pioneer-specific and recovery-specific devices
 - o camera images
- wherein these data items, information items and images can be displayed on the monitor (4.1) depending on the operating mode.

2. Display and control system according to Claim 1, characterized in that, when used on different reference systems, chassis data can be transmitted to nation-specific systems.

3. Display and control system according to Claim 1, characterized in that the camera images can likewise be displayed on the monitor (4.1) by means of a picture-in-picture function.

4. Display and control system according to Claims 1, characterized in that an LCD display (7) is included in a steering handle (8), on which vehicle-specific data such as the vehicle speed (10), engine rotation speed (11), dipped headlights, left indicator light (12) etc. can be displayed, wherein the display (7) communicates with the control box (4).

5. Display and control system according to Claim 4, characterized in that an alpha numeric display (20) can also be integrated on the control box (4) or steering handle (8).

6. Display and control system according to Claim 5, characterized in that the speed can be displayed by means of segments (21).

7. Display and control system according to Claims 1, characterized in that warning and display areas (22) can be included.

8. Display and control system according to Claims 1, characterized in that the navigation data can be visualized by means of a compass rose which is displayed on the monitor (4.1), and by means of a display of the vehicle alignment.

9. Display and control system according to Claim 8, characterized in that alternatives for visualization of the navigation data are the direction of the compass and the display of the range to the waypoint.