Title: SYSTEM FOR TRAFFIC SAFETY AND REGULATION CONTROLLED BY VIRTUAL KEYBOARD

Abstract: A system for traffic safety and regulation controlled by virtual keyboard comprises safety-control device (1), compulsory control device (2), transmitter (3) and virtual keyboard (4). It compares the received information with the data contained in the memorized program of the system functioning and operating under specific conditions (endangered safety). Its priorities are: - active monitoring and correction of vehicles speed, according to the speed limit allowed for a particular road section, - prevent actions of destructive persons against the vehicle systems, - enable the functioning of vehicle systems under specific conditions only by means of compulsory control devices (2). The system simultaneously informs, by means of the system activation indicator N, the person controlling the vehicle on all the available data of the system and all the operations undertaken within the solution according to the invention. After the exceed of the speed limit is determined, the system controls the operation assembly D with the aim to correct the speed of the vehicle, using to that effect all the technical possibilities of the vehicle itself. In the case of endangered safety conditions, it blocks the systems for manual control by means of the unit for monitoring the control system E, prevents opening of the control cabin doors, and switches to compulsory control system (2). Compulsory control device (2) functions under specific control conditions. Transmitter (3) emits standardized signal of speed limitation according to the given and/or programmed operation mode. Casing U contains all the elements of the virtual keyboard (4). It can be mounted on some other system components, making therewith a homogenous unity.
SYSTEM FOR TRAFFIC SAFETY AND REGULATION
CONTROLLED BY VIRTUAL KEYBOARD

DESCRIPTION OF THE INVENTION

1. TECHNICAL FIELD

This invention relates to systems and devices:

a) for the active regulation of the speed of vehicles (cars, buses, trucks, motorcycles, ships, planes and other vehicles) in the areas where the speed is limited,

b) intended for the safety of crews and passengers (in air-crafts and other public conveyance), including a keyboard which doesn’t require a physical contact to be used.

2. TECHNICAL PROBLEM

The development of vehicles, the increase of their cruising speed, a heavy traffic and ever changing traffic conditions continually require an active regulation of speed of vehicles and changing speed limits, to prevent disregard of speed limits that could cause human and material damage, in particular in heavy traffic locations, which, owing to the environmental conditions or traffic participants strongly affect the traffic safety. In addition, due to a growing number of persons terrorizing and putting to risk other peoples’ property and life, there is a continuous need for improved safety of crews and passengers, with the aim of protecting people and their property, in particular in the air traffic, which owing to a high risk needs a special attention.

The system and devices according to the invention are controlled by keyboards, functioning by means of mechanical contacts, generated manually, but they may have a functional error due to a possible loose contact and may therewith prevent a good functioning of the system. The existing keyboards require a physical contact with a user, putting the operator to risk owing to possible contact voltage. The contact keyboards, owing to their functioning requirements, prevent multiple layered control (mounting of several layers of spatially shifted control functions on the same ground-plan surface). Long-term use of contact keyboards may cause irritation of fingertips, preventing the operator to continue with his work.
3. STATE OF THE ART

Known solutions are used to solve this problem, such as:

1. Mounting of limitation signs, which do not affect observance of the speed limit directly, but give orders to the driver.
2. Mounting of the speed bumpers, which cause unpleasant and unnatural driving conditions in the case of unadjusted speed during the crossing thereof. Some drivers disregard the effect of speed bumpers, and do not slow down, which results in uncontrolled movements of vehicles and may cause casualties and material damage.
3. Exceeding speed limit detecting systems and subsequent sanctions for traffic violations, intended to improve the behavior of traffic participants, do not affect certain traffic participants, due to their irresponsibility. This leaves the problem of speeding unsolved.
4. Synchronization of traffic lights to prevent traffic participants from disregarding speed limits, whereby the problem of limiting speed between two traffic lights, which are sufficiently far from each other to allow uncontrolled acceleration of vehicles, remains unsolved.
5. Weapon search of passengers.
6. Restricted access of passengers to the crew controlling the vehicle.
7. Warning codes in the case of imminent danger.

4. DISCLOSURE OF THE INVENTION

The first aim of the invention is to correct, from outside, the speed of vehicles in the speed limit zone, regardless of the will of person controlling the vehicle.

The second aim of the invention is to adjust the speed of the vehicle to the optimum traffic conditions in a particular section, to increase traffic safety and to avoid human or material damage.

The third aim is to enable changing of speed limit according to certain, or all the parameters such as: the time of the day, environmental conditions (temperature, humidity, kind of precipitation), kind of vehicle (special vehicles, passenger cars, freight vehicles, …).

The fourth aim is to prevent aggressive and destructive behavior of passengers against safety of the vehicle crew.

The fifth aim is to decrease to the maximum the possibility of human and material loss.
The sixth aim is to avoid a physical contact with a keyboard and operation by means of mechanical contacts.

The seventh aim is to avoid operation by means of unreliable keyboard contacts.
The eighth aim is to allow multiple control functions on the same surface.

The system according to the invention includes:

a) safety-control device (1),
b) compulsory-control device (2),
c) transmitter (3),
d) virtual keyboard (4),
e) mechanical parts.

Safety-control device (1), the parts of which do not have to form a unity, is designed to be incorporated in a vehicle, and consists of:

- computer monitoring and control unit A,
- memory-program unit B,
- transceiver of wave signals C,
- operation assembly D,
- unit for the monitoring of a control system E,
- unit for blocking control cabin door F,
- auto-pilot monitoring and control unit G,
- unit for coded control of auto-pilot H,
- speedometer L,
- system activation indicator N,
- indicator of control cabin air separation I.

**Computer monitoring and control unit A** has a task of processing data obtained through a transceiver of wave signals C from a transmitter (3) and speedometer L, controlling all the segments of the system, and control functioning according to the given or a chosen program and functioning in correlation with a device for compulsory control (2) in the case of emergency. For its proper functioning it uses the necessary electronic assemblies and elements.

**Memory-program unit B** determines the operating mode.
Transceivers of wave signals C receive and/or transmit standardized signal of other elements of the system.

Operation assembly D has the task of converting a signal for the correction of the speed (standardized according to the desired limit) received from the computer monitoring and control unit A to electric and/or electric and mechanic and/or electric and magnetic operation which will directly carry out the correction of the speed of the vehicle in the way to correct the function of a drive unit, and/or acting though a back-up braking system, if this technological requirement is already met and/or acting upon the main braking system of the vehicle. The main aim is automatic correction of the speed of the vehicle, according to the given limit and without possibility that the correction of the speed of the vehicle be under control of the person driving the vehicle.

Unit for the monitoring of a control system E blocks the control of the vehicle.

Auto-pilot monitoring and control unit G directly affects the functioning of an automatic pilot system.

Unit for coded control of auto-pilot H, controls the functioning of an automatic pilot.

Speedometer L may be the already existing element of the vehicle.

System activation indicator N gives information to the person driving the vehicle by giving a sound or visual (on the screen) signal on the activation of the system for the active control of the speed for this section of the road and/or activation of the system in the vehicle with the presentation of the current speed limit and/or presentation of the level of the system activation in the vehicle - the manner in which the system corrects the speed of the vehicle and/or the action by unauthorized person and/or the activation of the auto-pilot system and/or the functioning of the system by means of a compulsory control device (2) (all with the aim to deter the person driving the vehicle from possible acts which may be dangerous in the case of not having information concerning the activation of the system and controlling the vehicle without active control of the speed and/or functioning of the compulsory control device).

Indicator of the control cabin air separation I, gives the signal on the status of the cabin door (open/closed) to the computer monitoring and control unit A, functioning in the manner to register the change of the pressure in the cabin (the air pressure in the cabin may differ from the pressure in other parts of the vehicle, and the opening of the door changes the pressure and activates the regulation mechanism).
Compulsory control device (2), designed to be incorporated in the accompanying vehicle, consists of:

- computing-converter unit J, and
- transceiver of wave signals C,

To control the vehicle where the system doesn’t allow its normal control, due to an unauthorized activity against the vehicle.

Transmitter (3) may perform several functions in the sense of speed limit, e.g. programmed functioning, remote reception of commands to change the functioning – changing of the speed limits and enabling to display them on the speed limit traffic signs, consisting of:

- power-converter assembly M,
- memory-program unit B,
- transceiver of wave signals C,
- battery O,
- photo cell P.

Power-converter assembly M, converts the respective voltage to the one used by the transmitter (3).

Transceiver of wave signals C, emits wave signals of particular range, and receives wave signals as ordering the change of system functioning. It requires a permanent electric energy supply for its proper functioning. In variant II (Fig.2), instead of energy-converting assembly M, it uses a battery O for the purpose of accumulating energy for its proper functioning during the lack of energy supply from the photo-cell during bad weather conditions.

Photo-cell P is an occasional electric energy supplier, used according to the weather conditions.

Virtual keyboard (4) consists of:

- transmitter of optical wave R,
- receiver of optical wave S,
- electronic assembly T, and
- casing U.

The interruption of the optical wave between the transmitter and the receiver results in the functional change required for keyboard functioning, where the functioning may be
conditioned by simultaneous interruption of more than one optical beam, and the optical network system may be made in more than one level of the same ground-plan surface (layered in the "Z axis"). The optical system itself may be made in the way that each optical beam have its characteristic feature (wavelength, frequency, and the like), to avoid possible error due to closing of the optical stream by means of elements not belonging to the same pair of transmitters and receivers, whereby the interruption of the optical beam is made by fingers and/or by other means, and the point is that there is no need to touch physically the keyboard, since the function of "writing" takes place in free space, where it is necessary only to interrupt one or several optical beams, thus giving the command by means of a keyboard, which has a (non-)standard arrangement of letters and/or characters, and at which is necessary to mark quadrants (optical beams crossing points) the interruption of which results in actuating function [interrupted/non-interrupted] for keyboard operation.

**Transmitter of optical wave R** emits optical wave.  
**Receiver of optical wave S** registers the occurrence/interruption of light wave.  
**Electronic assembly T** converts the obtained signals or the group of signals into the execution signal required for the functioning of the system that includes a keyboard.  
All the mentioned elements are incorporated in the casing U.

**Casing U**, to satisfy its functionality, doesn't have to close the whole keyboard ground-plan surface, so it may form a frame for it. This allows for the keyboard to be put directly on the display of the system controlled by the keyboard, and/or in the area which is already filled with some other devices and/or commands such as a monitor or the like that may serve in the system containing a keyboard also for background marking of special coordinates on which a keyboard performs a particular function.  
The other variant of the keyboard may have an exchangeable support for that purpose, and the third variant may have marks above the receiver and transmitter, and the fourth may be some combination of the mentioned three variants.

**Mechanical elements** include e.g. casings, carriers and antennas.

5. SHORT DESCRIPTION OF THE DRAWINGS

Figure 1 shows a block scheme of the system and device according to the invention.
Figure 2 shows a variant of the transmitter (3)
Figure 3 shows a keyboard without mechanical contacts (4).

1 safety-control device
2 compulsory control device
3 transmitter
4 virtual keyboard
5 device for automatic operation of the vehicle drive unit

6 auxiliary braking system of the vehicle
7 main braking system of the vehicle

A computer monitoring and control unit
B memory-program unit
C transceiver of wave signals

D operation assembly
E unit for monitoring the control system
F unit for blocking the control cabin door
G auto-pilot monitoring and control unit
H unit for auto-pilot coded control

I control cabin air separation indicator
J computing-converter unit
K converting-emitting assembly
L speedometer
M power-converter assembly

N system activation indicator
O battery
P photo cell
R transmitter of optical beam
S receiver of optical beam

T electronic assembly
U casing
6. DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

System for traffic safety and regulation controlled by virtual keyboard, as represented by a block scheme on Fig. 1, includes:

- safety-control device (1),
- compulsory control device (2),
- transmitter (3),
- virtual keyboard (4).

Safety-control device (1) including as a constituent or independent part:

Computer monitoring and control unit A, responsible for processing the data obtained from all the assembly units, including the control thereof and control as programmed by the memory-program unit B, in the case of emergency, and the system for preventing regular control system functioning by means of auto-pilot monitoring and control unit G, and without functioning of the compulsory control device (2). It receives standardized signal through transceiver of wave signals C and indication of the vehicle speed from speedometer L, and after processing received data it defines the operational mode to correct the vehicle speed. It sends a standardized command signal to operation assembly D, and it transmits the received data to the system activation indicator N, as to inform the person driving the vehicle that the active speed control system is activated. Computer monitoring and control unit A, in the transmitter (3) gives a signal for the activation of the system according to the invention, according to the programmed capabilities of the transmitter or according to the remotely received signals to change the system operation, whereby the command for a higher degree of speed limitation has priority (lower permitted speed).

Transceiver of wave signals C, forming part of the safety-control device (1) receives a standardized signal for speed limitation from the transmitter (3), and functions as a non-physical connection with the compulsory control device (2), functioning only under the condition that the compulsory control device is at least 20 meters and at maximum 2.000 meters far from it, whereby the both mentioned values may differ ± 50%. Speedometer L continually measures the speed and transmits the resulting data to computer monitoring and control unit A. Operation assembly D converts the standardized signal-command, according to the operation level to electric and/or electro-mechanic and/or electro-magnetic activity (depending on the technical possibilities of the vehicle) with the aim to correct the vehicle speed, and directly act upon the vehicle systems used for braking (braking by means of
changing the operation of a drive unit, braking by means of the auxiliary braking system, 
braking by means of the main braking system). Memory-program unit B defines the 
operation mode including possibility of operation programmed according to various 
parameters (speed, height, direction and the like). Unit for monitoring the control system E 
having function of blocking the same on the command received from computer monitoring 
and control unit A. Unit for blocking the control cabin door F serves as physical protection 
from destructive activity of any third person. Control cabin air separation indicator I 
performs the function of checking the unit for blocking the control cabin door, and 
additionally it may be in connection with a device for changing pressure in the control cabin. 
A code for the activation of the auto-pilot during the normal operation should be supplied to 
the unit for auto-pilot coded control H, and the auto-pilot is deactivated by the same code 
(or by any other, according to the programmed function). Auto-pilot monitoring and control 
unit G automatically actuates auto-pilot on the command of computer monitoring and control 
unit A, as programmed in the case of emergency (in the case the control cabin door opens, 
false procedure for activating/deactivating of the auto-pilot) and without possibility that the 
regular control system be actuated again, without operation of the device for compulsory 
control (upgrading the control signal in the compulsory control regime, because during that 
time the control is not regular, but the upgraded signal from the compulsory control device is 
used, the compulsory control device being mounted to the auxiliary vehicle through which the 
moving of the vehicle is additionally monitored. 
System activation indicator N indicates (audibly and/or visually on the screen) the activation 
of the system for the active control of the speed on a particular section of the road, and/or the 
speed limit for that section of the road, and/or the activation of the system in the vehicle itself, 
and/or the operation of the system to correct the vehicle speed (the way in which the system 
corrects the vehicle speed, in compliance with the installed possibilities of the vehicle), 
receiving information from computing control assembly, and the power supply unit, which 
has to be independent, uninterrupted, and safe, regardless of other conditions. 
Compulsory control device (2) (intended for the auxiliary vehicle) within which or 
separately, there are: transceiver of wave signals C, to receive and send standardized signal 
of activity of computer control and monitoring unit, which, in emergency can act only through 
a device for compulsory control, installed in the auxiliary vehicle, and is functional only 
under condition that the safety assembly (arrangement) is away from it 20 meters at least, and
2.000 at maximum, whereby both mentioned values can differ by ± 50%, computing-
converter unit J, serving to upgrade the signal before it is sent back to the sender, i.e. to the
computer control and monitoring unit, according to the programmed manner of operation.

**Transmitter (3)** consisting of:
- Power-converter assembly M,
- Memory-program unit B,
- Converting-emitting assembly K.

**Power-converter assembly M** has a task of continually supplying the device with electric
power for the purpose of smooth operation using public electric power supply or any other.

**Memory-program unit B** determines the operation mode with the possibility of its change
depending on the time (time of the day), zone (the length of the section of the road the system
is to be applied to), limitation level (depending on the speed to be limited), kind of the vehicle
(different speed limits for different vehicles), weather conditions (depending on precipitations
and other conditions), using outdoor sensor, and with the possibility of remote control.

**Converting-emitting assembly K** having a function of emitting standardized signal of speed
limit according to the operation mode determined by the memory-program unit, the form of
which can be adjusted to particular technical requirements.

The elements of the **transmitter (3)**, as the second variant, according to Fig. 2 are:
- memory-program unit B,
- converting-emitting assembly K,
- battery O,
- photo cell P.

**Memory-program unit B** unites the operation of the transmitter, in the sense of programmed
giving of the previously determined speed limit signal which may be activated in particular
time intervals and previously determined duration of emitting interruption, designed for
emitting assembly.

**Converting-emitting assembly K** transforms a signal, received from memory-program unit,
into a wave signal, which is by means of antenna emitted to the environment with a radius of
propagation of 0.5 – 5 m, with possible departure of ± 50%.

**Battery O** accumulates energy obtained from a photo-cell making it simultaneously available
to memory-program unit and converting-emitting assembly.
Photo-cell P continually produces electric power required for transmitter operation and sends it to the battery.

Virtual keyboard (4) (as on Fig.3) consists of:
- transmitter of optical beam R,
- receiver of optical beam S,
- electronic assembly T,
- casing U.

Transmitter of optical beam R emits optical beam, while the kind of the wave can be specific for a particular pair of elements (transmitter/receiver) to avoid possible error, in the case that the optical stream is closed through elements not belonging to the same pair.

Receiver of optical beam S receives optical beam, the status of which (uninterrupted/interrupted) provides function used for the operation of a keyboard system without mechanic contacts. The status of a working pair may be used in combination with other pair or pairs.

Electronic assembly T converts the received signal relating to the change of the status of optical beam into standardized signal of particular command, sent by this assembly to the system the virtual keyboard belongs to, and which is controlled by the virtual keyboard i.e. the keyboard serves as command device for the functioning and uniting the system.

The casing U incorporates all the elements according to the invention. It may, but doesn’t have to have its ground-plan surface closed. Thus, the system according to the invention may be used also on the surface filled with devices and/or components of the same or any other system. The additional possibility is to incorporate the functional elements of the system according to the invention (transmitter/receiver) in more than one level of the same surface (in the Z axis). Therewith the possibility is obtained of multiple use of the same surface, including the increased number of functions on the same surface. Furthermore, the casing may be adjusted in the way to be built in some other element of the system (monitor or the like), thus integrating two different functional units in one, saving the room, and facilitating the work in the cases where those units are used as mobile and/or portable elements of the system.
7. THE MANNER OF APPLICATION OF THE INVENTION

The disclosed invention provides: a practical and effective protection of crews and passengers of vehicles against destructive behavior of third persons, the lowering of the risk in the case of emergency, safety at work of crews and passengers of vehicles, active control of the speed of vehicles, including possibility of sub-control of the speed where traffic conditions require two or several speed limits with a very limited zone of system operation, permanent useful system and devices, easy to construct given the current state of the art, including a complete control of the speed limit of vehicles. The system shall define standards to be used for signals of a particular significance, and standards for changing signals of compulsory control system, it has to standardize wave forms of signals to be used for interconnection of devices of the system, with the aim to globalize the application of the system. Furthermore, it is necessary to manufacture the devices of the system, implementing the existing technological achievements, and to put the transmitter to the place where the speed control of the vehicle is intended to be carried out (with the possibility to incorporate the second variant of the transmitter in the traffic lane itself), then a safety-control device built in the vehicle and to connect it with the systems for the correction of the speed of the vehicle itself, with the auto-pilot system. A device for compulsory control has to be built in the vehicle that follows the referenced vehicle, without full control in the cases of unexpected activities by third persons, in the manner that prevents avoiding the activation of this invention by the person driving the vehicle, provided that the safety-control device be incorporated in the vehicle in the process of vehicle production and/or that the safety-control device be incorporated in the vehicle in specialized services.

The success of this system requires that law regulates the application of this system to the vehicles intended to be encompassed by the system. Furthermore, it is necessary to build elements of the keyboard and assemble them according to the described manner of operation, provided that the construction, including the number of functions, the number of levels of operating elements and models, complies with the requirements of the system implementing the invention. As the electronic elements the existing elements available on the market may be used, or they could be designed specially for the specific functions. The invention itself has to be carried out in compliance with the existing standards, to avoid the need for additional elements harmonizing output functions.
CLAIMS

1. System for traffic safety and regulation controlled by a virtual keyboard, characterized by the fact that it consists of:
   - safety-control device (1) consisting of a transceiver of wave signals C, computer monitoring and control unit A, speedometer L, operation assembly D, system activation indicator N, unit for monitoring the control system E, unit for auto-pilot coded control H, unit for blocking the control of cabin door F, control cabin air separation indicator I, and auto-pilot monitoring and control unit G,
   - compulsory control device (2) consisting of transceiver of wave signals C and computing converter unit J,
   - transmitter (3) consisting of power-converter assembly M, and memory program unit B, and converting-emitting assembly K,
   - virtual keyboard (4) consisting of transmitter of optical beam R, receiver of optical beam S, electronic assembly T and casing U.

2. System according to claim 1, characterized by the fact that the transmitter (3) allows memorizing of all the standardized wave formed signals, as well the emitting of the mentioned signals.

3. System according to claim 1, characterized by the fact that the safety control device (1) allows reception of all the standardized wave formed signals, transmission of the received signals to computer monitoring and control unit A, comparison of the received signals with the data on the speed of the vehicle received from the speedometer L, and generation of the corresponding signals on the basis of which the operation assembly D will correct the speed of the vehicle, without giving possibility to the person driving the vehicle to act upon the process of correction of the vehicle speed.

4. System according to claims 1-3, characterized by the fact that the operation assembly D acts upon braking, electrically, electrically and mechanically or electrically and magnetically:
   - by changing the operation mode of the drive unit,
   - by activating the auxiliary braking system,
   - by activating the main braking system.
5. System according to claims 1, 3 and 4, characterized by the fact that the braking system remains active until the speed of the vehicle is harmonized with the prescribed speed limit.

6. System according to claims 1 and 2, characterized by the fact that the constituent part of the transmitter (3) is memory program unit B that regulates the operation of the transmitter depending on the time (of the day), zone of the application (the length of the traffic road to which the speed limitation will be applied), kind of the vehicle and weather conditions (in particular visibility on the section on which the speed is limited).

7. System according to claim 6, characterized by the fact that memory-program unit B, for operation depending on weather conditions, uses outdoor sensor which forms part of the transmitter (3) providing information on the visibility on the section of the road on which the speed is being limited by means of the disclosed system.

8. System according to claims 1 – 7, characterized by the fact that computer monitoring and control unit A, after establishing the exceed of the speed limit, and the percentage thereof, defines the activity aiming at slowing down the vehicle, in the way that it uses the standardized signal intended for operation assembly D, for the correction of the speed of the vehicle.

9. System according to claims 1 and 3, characterized by the fact that the computer monitoring and control unit A is mechanically and/or electronically protected from deliberate neutralization of the system activation in the vehicle.

10. System according to claim 1, characterized by the fact that the system activation indicator gives audible or visual signal of the system activation.

11. System according to claims 1 and 10, characterized by the fact that the system activation indicator remains active during the whole time of the system use.

12. System according to claims 1 – 9, characterized by the fact that the computer monitoring and control unit A transmits the received information on the activation of the system for active limitation of the speed of vehicles on the road section under control, and information on measures taken for the correction of the speed of vehicles and safety measures, to the system activation indicator as long as it has such information.
13. System according to claims 1, 8, 9 and 12, characterized by the fact that the computer monitoring and control unit A actively corrects the speed even during the intervals between two signals (the signal continually repeating in particular time intervals), while the transceiver of the wave signal doesn’t receive the signal during that time.

14. System according to claims 1, 8, 9, 12 and 13, characterized by the fact that computer monitoring and control unit A, in the case of receiving two different limitation signals, gives priority to the limitation signal of higher level (of lower permitted speed).

15. System according to claim 1, characterized by the fact that transmitter (3) of converting-emitting assembly K emits a signal ranging 0,5 – 5 meters, with departure of ± 50%.

16. System according to the invention, characterized by the fact that transmitter (3) dimensions allow its incorporation in the traffic road without changing the conditions thereon.

17. System according to claim 16, characterized by the fact that computer monitoring and control unit A determines whether the vehicle is to be controlled manually or by means of an auto-pilot.

18. System according to claims 16 and 17, characterized by the fact that a safety control device (1), in special conditions, allows only programmed control of the vehicle.

19. System according to claims 16 – 18, characterized by the fact that the safety control device (1) makes impossible the control of the vehicle to unauthorized person after coded use of auto-pilot.

20. System according to claims 16 – 19, characterized by the fact that the safety control device (1) functions in correlation with other devices of the system.

21. System according to claims 16 – 20, characterized by the fact that the safety control device (1) has a reliable, continuous and independent power supply.

22. System according to claims 1, 8, 9, 12 and 14, characterized by the fact that the computer monitoring and control unit A unites functions of all the units of the system and controls them.

30
23. System according to claims 1 and 22, characterized by the fact that computer monitoring and control unit A, while compulsory controlling the system, have connection with other compatible unit for the purpose of the system functionality.

24. System according to claims 1, 22 and 23, characterized by the fact that computer monitoring and control unit A, after switching to operation under special conditions, doesn’t allow switching back to normal function before the vehicle stops.

25. System according to claim 1, characterized by the fact that, in disarranged operating conditions of the safety-control device (I), a unit for monitoring the control system E blocks the control system, according to the signal of the computer monitoring and control unit A.

26. System according to claims 1 and 25, characterized by the fact that the unit for monitoring the control system under compulsory control conditions is programmed to act upon the control system executing the command received from the computer monitoring and control unit A.

27. System according to claims 1 and 22 – 24, characterized by the fact that the memory-program unit B, in correlation with the computer monitoring and control unit A determines the mode of the programmed functioning of the system to the auto-pilot, by means of the auto-pilot monitoring and control unit.

28. System according to claims 1, 22 – 24 and 27, characterized by the fact that memory-program unit B, against command by the computer monitoring and control unit A, reads the programmed operation in the case of compulsory control.

29. System according to claim 1, characterized by the fact that the unit for blocking the control cabin door E, prevents the opening of the control cabin doors, during the manual regulation of the control system, and deblocks it only during the operation of the auto-pilot.

30. System according to claims 1 and 29, characterized by the fact that the control cabin air separation indicator I, in the case that the control cabin is open during the manual control of the vehicle, gives an alarm signal to the computer monitoring and control unit A, which automatically blocks the manual control of the vehicle and activates the auto-pilot.
31. System according to claim 1, characterized by the fact that the auto-pilot monitoring and control unit G, automatically activates the pilot in the case of disturbance of the normal functioning of the safety-control device (1), and all that in correlation with the computer monitoring and control unit A.

32. System according to claims 1 and 31, characterized by the fact that the auto-pilot monitoring and control unit G, after activation of the compulsory functioning of the safety assembly, prevents manual or normal control of the vehicle by the auto-pilot.

33. System according to claim 1, characterized by the fact, that the transceiver of wave signals C is connected with the device for compulsory control (2), only during the activation of the compulsory control device.

34. System according to claims 1 and 33, characterized by the fact, that the transceiver of wave signals C, serves as a bridge for upgrading of signals before their use in the compulsory control system.

35. System according to claim 1, characterized by the fact, that unit for auto-pilot coded control H uses changeable or any other coding system, whereby the same code is used both for blocking and unblocking of the auto-pilot.

36. System according to claim 1, characterized by the fact, that the compulsory control device (2) functions only provided that it is at least 20 m and at maximum 2,000 m, ±50% far from the safety assembly.

37. System according to claims 1 and 34, characterized by the fact that the transceiver of wave signals C serves as a bridge between the safety assembly and the compulsory control device.

38. System according to claim 1, characterized by the fact that the computing-converter unit J, of the compulsory control device functions under the programmed mode, in the sense of upgrading the signal used for the compulsory control.

39. System according to claim 1, characterized by the fact that the transmitter of the optical wave R emits optical beam towards the receiver functioning as its pair.

40. System according to claims 1 and 39, characterized by the fact that the transmitter of the optical beam R emits optical beam through the whole duration of the system activity.
41. System according to claims 1 and 39, characterized by the fact that each transmitter of
the optical beam can emit optical wave of different characteristics.

42. System according to claim 1, characterized by the fact that the receiver of the optical
beam S serves as the provider of the optical beam status.

43. System according to claims 1 and 41, characterized by the fact that the receiver of the
optical beam S reacts only to the optical beam of its pair transmitter.

44. System according to claims 1 – 42, characterized by the fact that the operation elements
(receiver/transmitter of optical beam) from the plain view may be positioned at the same
point, but shifted in space.

45. System according to claims 1 – 43, characterized by the fact that a particular function
may be carried out with one or several pairs of operation elements.

46. System according to claim 1, characterized by the fact that the electronic assembly T
converts the received signal of the optical wave status to a standardized signal of a
particular functional operation.

47. System according to claims 1 and 45, characterized by the fact that the electronic
assembly T may treat several status signals as one standardized output signal.

48. System according to claim 1, characterized by the fact that the casing U may form part of
any other operational element of the same system, containing also a virtual keyboard (4).

49. System according to claims 1 and 47, characterized by the fact that the casing U allows
the incorporation of the receiver and transmitter of the optical beam in more than one
surface level along the Z axis of the same plane surface.

50. System according to claims 1, 10 and 11, characterized by the fact that the surface of the
casing U doesn’t have to be completely closed at its whole plane surface.

51. System according to claims 47 – 49, characterized by the fact that the marking of the
output functions may be background and/or according to the operational pair
(receiver/transmitter of the optical wave).
Fig. 2

Fig. 3

light beams net  
net of quadrants (imaginary key)
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

<table>
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According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
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<td>Y US 6 016 458 A (ROBINSON ALAN DAVID ET AL) 18 January 2000 (2000-01-18)</td>
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|        |                                                                                |                      |
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* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

**T** later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

**X** document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

**Y** document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

**Z** document member of the same patent family

**Date of the actual completion of the international search**

27 June 2002

**Date of mailing of the international search report**

05/07/2002

**Name and mailing address of the ISA**

European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2243, Tx. 31 655 sipo nl, Fax: (+31-70) 340-3016

**Authorized officer**

HeB, D

Form PCT/ISA/02/10 (second sheet) (July 1992)
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INTERNATIONAL SEARCH REPORT

Box I  Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [ ] Claims Nos.:
   because they relate to subject matter not required to be searched by this Authority, namely:

2. [X] Claims Nos.: 1,34,37,38,44,45,50,51
   because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
   see FURTHER INFORMATION sheet PCT/ISA/210

3. [ ] Claims Nos.:
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II  Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

[ ] The additional search fees were accompanied by the applicant’s protest.

[ ] No protest accompanied the payment of additional search fees.
Continuation of Box I.2

Claims Nos.: 1,34,37,38,44,45,50,51

The description, claims and drawings of the present international application fail to comply with the requirements of Articles 5 and 6 PCT to such an extent that, according to Article 17(2)(a)(ii) PCT, a meaningful search could not be carried out on all of the claims 1 to 51 as originally filed.

This is due to the fact that the alleged invention as claimed in independent claim 1 is considered to relate to three entirely different aspects, viz.

1. the compulsory control of the vehicle (in particular, the speed thereof) by means of receiving (radio) wave signals by the vehicle;
2. improvement of (air) traffic safety by monitoring and blocking some control cabin (cockpit?) door and activation of an auto-pilot; and
3. the control of the system by some so-called 'virtual keyboard' consisting of optical beam transmitters and receivers, as illustrated in Fig.3.

It appears that option 1. is primarily directed to road vehicle traffic whereas option 2. clearly aims at air traffic. With respect to option 3., it is absolutely obscure not only from all claims, but also from the entire description and drawings as on file, where the feature of the 'virtual keyboard' is located, and for what purpose it is actually used. Thus, these three aspects can be regarded to be solutions to completely different objects which are not linked by some technical effects or functional interrelation.

Further, an additional lack of clarity of claim 1 results from the fact that claim 1 merely enumerates the individual components of the different system devices, but fails to mention their respective functions, their interconnections with other devices and the resulting functional interrelation thereof. For instance, claim 1 is silent with respect to the control of the vehicle (speed) in case the speed measured by the speedometer is found to exceed a speed limit received from a (roadside) transmitter. In addition, claim 1 also lacks any indication where the individual constituent elements of the claimed system are located, e.g. whether they are arranged in the vehicle or along the road etc.

Therefore, since in particular claim 1 as originally filed is found to lack clarity, and since the description and drawings of the present application are considered not to disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art, the present international application is considered not to meet the requirements of Articles 5 and 6 PCT to such an extent, that, pursuant to Article 17(2)(a)(ii) PCT, a full meaningful search was considered not to be possible.

Further, the following dependent claims were deemed to be so unclear and thus not to meet the requirements of Article 6 PCT that a meaningful
search was also impossible.

Claims 34, 37, 38: The technical meaning of a 'bridge' between the stated devices is obscure. Further, it cannot be understood what is meant by the expression "upgrading of/the signal(s)", as used in claims 34 and 38.

Claim 44: As a matter of fact, it is impossible that several operation elements are "positioned at the same point, but shifted in space", as set out in this claim. Since it goes without saying that different entities are either arranged at the same or at different locations, the subject-matter of claim 44 is contradictory in itself.

Claim 45: Since any kind of operation element is regarded to be suitable for carrying out "a particular function", as stated in this claim, the failure to mention any particular function in claim 45 leads to the fact that the subject-matter of this claim is essentially undefined.

Claim 50: The formulation with respect to the casing surface which is stated "not to have to be completely closed at its whole plane surface" is not suitable for defining any subject-matter for which protection is sought. Rather than stating any conditions which do not have to be met, it should have been tried instead to define the technical features of the system in terms of constructional details which characterize particularly the casing surface.

Claim 51: Since the formulation relating to the "marking of the output functions", mainly due to the lack of any reference thereof, is incomprehensible, the subject-matter of claim 51 is not understood.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.
<table>
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