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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

10/24/01

**INVENTOR(S)**

Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Mouhamad Ahmad	Naboulsi	West Bloomfield, Michigan US

☐ Additional inventors are being named on the _____ separately numbered sheets attached hereto
TITLE OF THE INVENTION (280 characters max)**SYSTEM FOR CONTROLLING TELEMATICS IN VEHICLES**Jc564 U.S. PTO
60/336293

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ENCLOSED APPLICATION PARTS (check all that apply)

Specification Number of Pages

79



CD(s), Number



Drawing(s) Number of Sheets



Other (specify)



Application Data Sheet. See 37 CFR 1.76

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)

Applicant claims small entity status. See 37 CFR 1.27.



A check or money order is enclosed to cover the filing fees



The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number

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Payment by credit card. Form PTO-2038 is attached.

FILING FEE
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\$80.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.



No.



Yes, the name of the U.S. Government agency and the Government contract number are: _____

Respectfully submitted,

Date

10/24/01

SIGNATURE

REGISTRATION NO.

18,277

TYPED or PRINTED NAME

Allen M. Krass

(if appropriate)

Docket Number:

NMA-10018/03

TELEPHONE

248-647-6000

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C.

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FORD EX. 1033, p. 1

**SYSTEM FOR CONTROLLING TELEMATICS IN VEHICLES TO
REDUCE DRIVER OVERLOAD AND DISTRACTION**

As used in the following description, telematics refers to the integration
5 of information, communication, computing and entertainment technologies into
vehicles. Broadly, these technologies can be divided into external technologies
which involve transmissions to and from the vehicle, such as cell phones,
radio, navigation systems, and concierge systems (On Star) and the like and
systems which operate within the vehicle such as vehicle based games and the
10 like.

The present invention broadly controls the driver's level of access to
each telematics activity based on safety parameters and feedback from the
driving environment. Essentially, the system of the present invention employs
a gateway having an operating system controlling access between the driver
15 and various telematics systems. The operating system also senses a variety of
vehicle and driver conditions including such factors as vehicle speed, steering
angle and the like; driver physiological feedback including steering wheel
sensors; and information relating to the driver habits to add, remove, prioritize,
enable or block communication between the driver and various telematics
20 activities. The operating system can be programmed to determine the degree of
access of the driver and communication to the driver based on the sensed
conditions. For example, if the vehicle is moving at freeway speeds and all
physical primary safety conditions are met, a driver may be allowed to receive
or make a phone call over the cell phone but will not be able to add new
25 numbers to the phone memory or add a new number to the contact manager.

When the vehicle is moving at excessive speeds or during extreme steering maneuvers, the operating system will prevent all outgoing calls by the operator and store incoming calls for later provision to the operator. When the vehicle is standing still for more than a measured amount of time (i.e. five seconds),
5 the system will enable all telematic functions.

The system automatically identifies and docks, cell phones, PDAs and the like which the driver brings into the vehicle, preferably using short range telecommunication systems such as Blue Tooth or the like.

10 The preferred embodiment of the system employs a safety switch employing two switches, one for each hand, at the ten-ten position of the steering wheel or equivalent positions on alternative steering devices such as a control stick. The control switches must both be depressed to enable full operation of the system, although limited telematics capability may be provided when only one switch is depressed, depending on the programming of the
15 operating system.

Detailed operation of various embodiments of the system are described in the attached specifications.

Claims

- 1 1. A system for controlling the communication between a vehicle
- 2 driver and telematics systems such as cell phones, pagers, PDAs and the like
- 3 comprising:
- 4 means for sensing a variety of operating parameters relating to the
- 5 vehicle such as speed, steering angle, driver physiology and the like, and
- 6 providing a level of access between the driver and the various telematics
- 7 systems as a function of the sensed vehicle and driver conditions.

Safe Telematics Controls

**The achievement of a Safe
Simple
Accessible
Universal
Available
Portable
Cost Effective**

Driver Telematics Controls

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Safe Telematics Controls

The topics and comments covered here do not cover any specific Brand of service/technology or features and are not meant to evaluate the specifics of service or to claim knowledge of benefit or disadvantage of any known Brand of service existing or to be launched.

Background

What is Telematics?

Telematics is a recently coined term. It refers to the addition of Information, Computing, Communications and Entertainment Technologies into the car driving experience.

Why is it needed?

- a:** Tremendous amount of man/woman hours are spent behind the wheels. Maximizing use of our time when commuting to work, or while driving on a long business trip will positively impact our productivity. Depending on what we do with this extra productivity, we will impact our quality of life.
- b:** Because it is there. This makes it disadvantageous to those who are not using it. Just like being on the Internet.

How to achieve Telematics?

We have used Telematics since early 90's by integrating various off the shelf products into a single process (Not product).
Cell Phone, Pager, GPS Navigation, Notebook, Palm Pilot, and Internet connection

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Background

Who is in the Market

Automotive Companies
Major Tier one automotive suppliers
Big name Electronics Giants
After Market entrepreneurs

What is on the Market

GPS Navigation systems of various sophistication/complexity
(Built in or After Market)
Cell Phones and accessories with various configurations
(Built in or After Market)
PDA's, Notebook PC's and accessories for mobility
(Built in or After Market)
Wireless Always On Internet access
(Built in or After Market)
Concierge service where a live operator will assist driver at the touch of a button.

What is Missing?

Good question, actually, an Excellent question.

What Is Missing?

This presentation, is using the Radio as a Case Study/Benchmark and to show the lack of, Significant, Universally applicable, Cost effective progress on resolving **safe controls of peripherals in our vehicles in general.**

What Is Missing?

Radios and their entertainment successors have long been a source of distraction to drivers. I remember seeing a Michigan State Police TV Ad, back in the 70's, describing how a man wanted to change a tune and ended up changing the life of a family by killing their young daughter. The story in the ad, as tragic as it is, **did not stop drivers from continuing to take their hands off the wheels and eyes off the road to change the radio to their favorite station. Why? Because they were not offered any alternatives. Yet, they were offered the enticement.**

And Now with the advent of Telematics, the radio is one of many culprits in this situation. CD's, Tape decks, Cellular phones, Pagers, PDA's, AutoNavigation, Internet and e-mail access, etc. All all stand alone equipments with a mind of their own.

This issue is being pushed up to national debate level. It is a cause to be solved, with grass root proponents and virtually no opponents.

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What Is Missing?

What is missing is NOT an abundance of creative and innovative technologies!

What is missing Lack of a universal system approach that integrates Telematics technologies

- With the car
- With the driver
- With the driving experience

What is missing is a Safe Telematics Controls, STC

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What Is Being Done?

Achievements:

Speech Recognition:

The most significant achievement is the advent of speech recognition. We experimented with this technology in the 80's and discounted it's importance and effectiveness quickly. The technical challenges where not the main discouragement, and they have since been turned to miniscule or near none existing problem. Cost remains a significant factor.

Concierge Service:

Usually found in Luxury cars, Concierge services are now beginning to move down stream. This service relieves the driver from having to look at a screen to discern position and opens the possibility to many new services that can potentially be added.

More Fancy interfaces:

An array of layered menus on graphical touch screen or push buttons interface that is as distracting if not more distracting and involved then simple levers and buttons in the current systems.

Why they're not helping?

Speech Recognition:

1: Safety

- Backseat drivers issuing commands advertently or inadvertently
- Audio from other internal sources, e.g, radio etc.

2: Simplicity The Problem with speech recognition is the same problem that faced DOS and helped push GUI like Mac and Windows into success. This means:

- Drivers have to remember a lot of commands to achieve simple tasks.
- Drivers have to be mindful of Syntax

3: Accessibility

- Drivers have to be able to speak, (No illness/disability)

4: Availability

- Open Windows/ wind noise/ Audio from other internal sources.

5: Universality/Portability

- Investment in equipments and systems that are affixed to a vehicle and can not be used elsewhere.
- Driver's Accent (Can be a problem depending on system sophistication)
- vehicle has to speak the language of the Driver, which requires several development, maintenance and upgrade tracks.

6: Cost

- The technology has limited applications. Unlike Cellular phone technology, barring a breakthrough in applications, reliable and effective speech recognition is not sufficiently popular to bring down cost.
- vehicle has to speak the language of the Driver, which means more development, maintenance and upgrade cost

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Why they're not helping?

Concierge Service:

1: Safety

- Other Communication and Information devices are still stand alone and can still cause distraction to Drivers
- Some features like air bag deployment monitoring and vehicle tracking in event of theft or carjacking are a **plus**

2: Privacy

- Serious issues.

3: Simplicity:

- No issues. A **plus**

4: Accessibility:

- Driver has to be able to speak, (No illness/disability)

5: Availability

- Service coverage

6: Universality:

- Investment in equipments and services that are affixed to vehicle and can not be used elsewhere.
- Other Communication and Information devices are still stand alone **and a potential for distraction and unsafe usage.**
- Advisors have to speak the Driver language, which means more specialized staffing

Why they're not helping?

Concierge Service (Continued)

7: Cost

- Monthly fees associated with the service
- Advisors have to speak the Driver language, which means more staffing cost
- Other monthly fees still have to be paid for own portable cellular and ISP providers

More Fancy interfaces:

An array of layered menus on graphical touch screen or push buttons interface that is as distracting if not more distracting and involved. This item speaks for it selves.

(On some newer luxury vehicles, visible controls are counted in the hundreds.)

Why they're not helping?

Summary:

What we see is:

- An abundance of creative and innovative technologies.**
- Lack of a universal system approach that integrates technologies with the car, the driver, and the driving experience.**
- The car becomes a hauler of gadgets and people.**

Applications, and Why

- 1: Passenger cars: Daily use is increasing rapidly
- 2: Rental vehicles: Will add benefit to a traveler
- 3: Hazardous material trucks: Helping a driver on staying focus on a primary target
- 4: Airplane, so use of these equipment, or other equipment that will effect the safety of the vessel and passenger, or to comply with the laws and regulations of a local aviation body as the plane travels across Various air space, e.g. Political, restricted etc.

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What we need to control

The Telematics equipment that are prevalent today are the following:

Cell Phones, (Including text messaging)
In Car Navigation Aid, (Full map or just Arrows)
Pagers, (Including Text Messaging)
PDA, (Including Wireless e-mail and Internet access, getting reminders of,
Calling up or setting appointments or agenda)
Notebook, (Including Wireless e-mail and Internet access, getting reminders of, Calling up or setting appointments or agenda)
In Vehicle access to the Internet, e.g. Shopping, Reservations etc
In Vehicle access to Personal or Business LAN, WAN
In Vehicle access to e-mail
Information e.g. about nearest facility, Hospital, Gas Station etc.
Audio and video equipment, e.g. Radio, Music CD, DVD, Books on tapes etc.

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What we need to control

Current Telematics components and shortcomings

I- Touch Screens (Auto Navigations)

- 1: Off to the side
- 2: Lower then Eye Level
- 3: May or may not require a vehicle to be parked to change settings
- 4: More distracting and involved to operate than a radio
- 5: Do not support look ahead, hands at 10:10
- 6: No relationship or restriction on vehicle and driver/driving condition

II- Knobs and buttons Input (Auto Navigations)

- 1: Off to the side
- 2: Lower then Eye Level
- 3: May or may not require a vehicle to be parked to change settings
- 4: More distracting to operate than a radio
- 5: Do not support look ahead, hands at 10:10
- 6: No relationship or restriction on vehicle and driver/driving condition

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What we need to control

Current Telematics components and shortcomings

III- Cell Phones

- 1: Hand Held
- 2: Head set
- 3: Some are voice activated
- 4: Docking base/Hand free
- 5: Still require hands off steering wheel, Possibly eyes off road
- 6: No relationship or restriction on vehicle and driver/driving condition
- 7: Distracting to receive/initiate calls
- 8: Do not support look ahead, hands at 10:10

IV- PDAs

- 1: Hand Held
- 2: More distracting to operate then a radio
- 3: Usually stowed away, or on person
- 4: No relationship or restriction on vehicle and driver/driving condition
- 5: Do not support look ahead, hands at 10:10
- 6: No relationship or restriction on vehicle and driver/driving condition

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What we need to control

Current Telematics components and shortcomings

V- Pagers

- 1: Hand Held
- 2: More distracting to operate than a radio
- 3: Usually stowed away, or on person
- 4: No relationship or restriction on vehicle and driver/driving condition
- 5: Do not support look ahead, hands at 10:10
- 6: No relationship or restriction on vehicle and driver/driving condition

VI- Notebooks PC

- 1: Off to the side
- 2: Lower than Eye Level
- 3: Docking base/On passenger seat
- 4: More distracting to operate than a radio
- 5: Do not support look ahead, hands at 10:10
- 6: No relationship or restriction on vehicle and driver/driving condition

What we need to control

Current Telematics components and shortcomings

VII- Concierge systems

- 1: Off to the side
- 2: partially support look ahead, hands at 10:10. (Require at least one hand off steering wheel, eyes off road)
- 3: Functionalities and services are voice activated, (Accessibility concern)
- 4: No relationship or restriction on vehicle and driver/driving condition

STC

What is STC?

STC stands for **Safe Telematics Control**. This safety will be achieved by avoiding all the short coming of the previously noted systems and solutions.

Our experimentation, research and experience indicates the following as essential components of an STC.

1: Safety Categories

Clearly separating what's:

Important for safe driving	Class A
Important to drivers	Class B
"Nice to Have" to drivers	Class C

2: Assuring driver intent

3: Simplicity

4: Accessibility

5: Availability

6: Privacy

7: Universality

8: Portability

9: Cost

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STC: Safety Categories

Important for safe driving Class A

Clear view of the road. (Looking Ahead, Head up, Eyes up)

Correct driver Positioning to respond to emergency maneuvers. (Hands @ 10:10)

Simplicity of Controls

Accessibility of controls

Availability of controls

No untimely distraction (No conflict between driving safely and using Telematics)

No overwhelming distractions (No conflict between driving safely and using Telematics, No Multiple Telematics requests)

No overloaded activity (No conflict between driving safely and using Telematics , No Multiple Telematics request

Good driving conditions/habits

Good, (Stable), driver state of mind/physiology

Access to emergency services and information

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STC: Safety Categories

Important to drivers Class B

Finishing the trip safely, efficiently.

Traffic and Weather

Access to

- Emergency services
- Emergency contacts
- Emergency information
- Directions
- Note taking/reminders

News and entertainment, (In this order)

Override of controls for emergency purposes

Cost is manageable and not prohibitive

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STC: Safety Categories

Drivers "Nice to Have"

Class C

Contact with the Out Of Cabin World:

Phone: Incoming / Outgoing
Voice mail retrieval
Paging
e-mail
Text Messaging

Entertainment and News, (In this order)

Good use of the time spent in vehicle

Cost is manageable and not prohibitive

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STC: Assuring driver intent

- No accidental input likely
- No secondary unintended peripheral input likely
- Input switches are tested for integrity at start up and are not triggered by chance touching.
- Disabled switches will fail to safe state, not allowing circumventing of system priority

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STC: Simplicity

- No multiple commands required
- Automatic Intuitive arrangement of Priority functions,
e.g. Cruise Controls over Changing a music CD
Phone over Radio Volume
- Automatic Intuitive arrangement of mostly used functions
for easy and quick access
- Controls are simple (Yes/No), (Up /Down), etc.

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STC: Accessibility

- Can be used if a driver can drive
- Normal vision
- Ability to hear sounds. Discernable Audio is a Plus
- Does not require more than driver limbs
- Can take to account some physical disability. (Loss of a hand etc.)

STC: Availability

- Self contained and does not depend on real time connection
- Can be updated with new information in several ways
 - 1- Wireless internet
 - 2- Wireless LAN / WAN
 - 3- Physical Synchronization with PDA or other storage media

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STC: Privacy

- Easy to control access to information stored or generated by system without the need for a second party
- No real time data is accessible to any second party without high level of sophisticated technology

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STC: Universality

- Not dependent on regional or linguistics specialty
- Not dependent on brand or model or specific service
- Interchangeable modules or components, e.g. new cell phone

STC: Portability

- Modules as in Cell phones, Pagers, etc are portable and usable outside the vehicle
- Modules as in Cell phones, Pagers, etc are portable and usable in all models and makes of vehicles irrespective of Brands

STC: Cost

- Cost will be kept low by:
 - Using off the shelf modules
 - Maximizing returns on investments by permitting multiple usage
 - permitting individual modules upgrade or replacement

STC

HOW?

- 1: Placing Hands on the steering wheels and @ 10:10 is mandatory to initiate or respond to a Telematics activity.
- 2: Allowing any off the shelf device existing, or to be developed to Dock with the system **physically or wirelessly**.
- 3: The systems is monitored by a Modular, Dynamic, State Machine logic, that adds, remove, prioritize, enable or block equipments and services by:
 - a: **STC safety categories and operation parameters**
 - b: **Frequency of use (as per each driver habit / pattern)**
 - c: **Real time Driving conditions**
 - e: **Driver physiology feed back**
- 4: This state machine is a stand alone device, or an embedded software in any of the existing CPU's of the vehicle.

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Terms

Telematics:	Integration of Information, communication, computing and entertainment technologies into the car.
STC:	ACT Coined term - Safe Telematics Controls.
PDA:	Personal Data Assistant, e.g. Palm, Pocket PC etc.
Auto navigation:	Digital computerized technology that assist drivers in locating their position or getting direction while driving.
Safety Categories:	ACT developed concept - Concept to categorize safe driving parameters while using Telematics
Driver intent:	ACT developed term - Extremely low chance of accidental activation
Simplicity:	ACT developed concept - No complexity, No information, controls or distraction overload from vehicle and Telematics
Accessibility:	ACT developed concept - Controls need to be accessible by the absolute majority of drivers that are legally able to operate a vehicle.
Availability:	ACT developed concept - Availability of STC independent of other systems and outside of vehicle condition
Privacy:	ACT developed concept - No other party then driver is involved or has access to STC or STC data
Universality:	ACT developed concept - Brand independence on vehicle and peripheral sides
Portability:	ACT developed concept - Portability of peripherals that comprise an STC to be used elsewhere
Cost:	ACT developed concept - Cost as a financial factor as well as a safety factor.

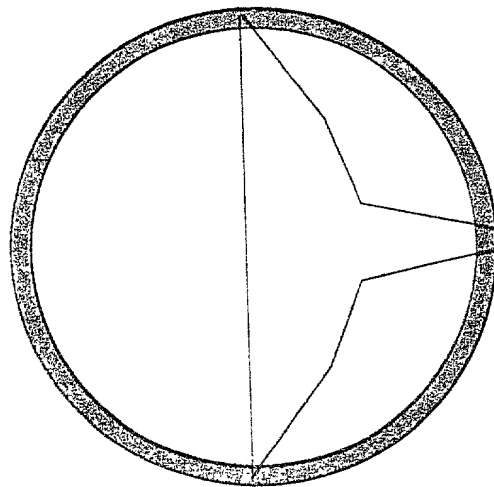
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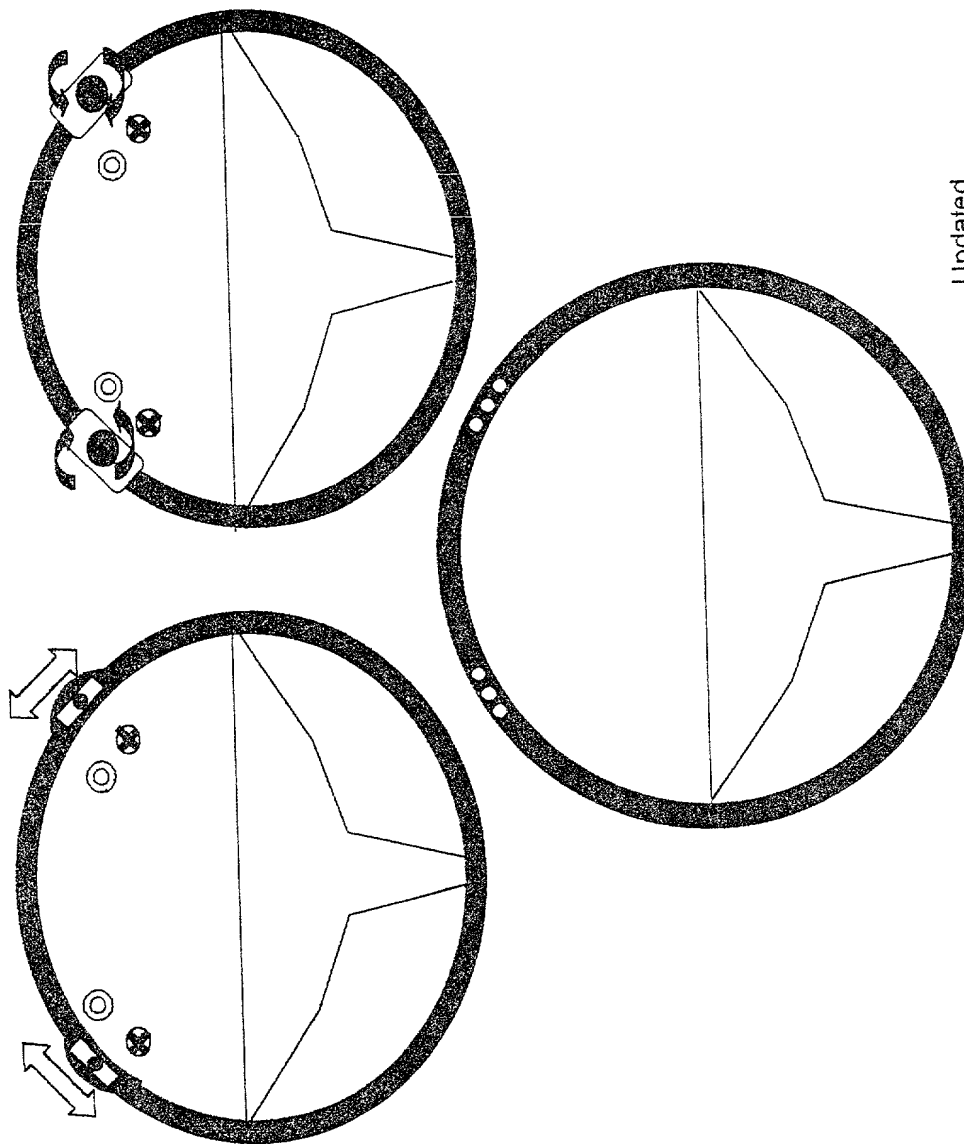
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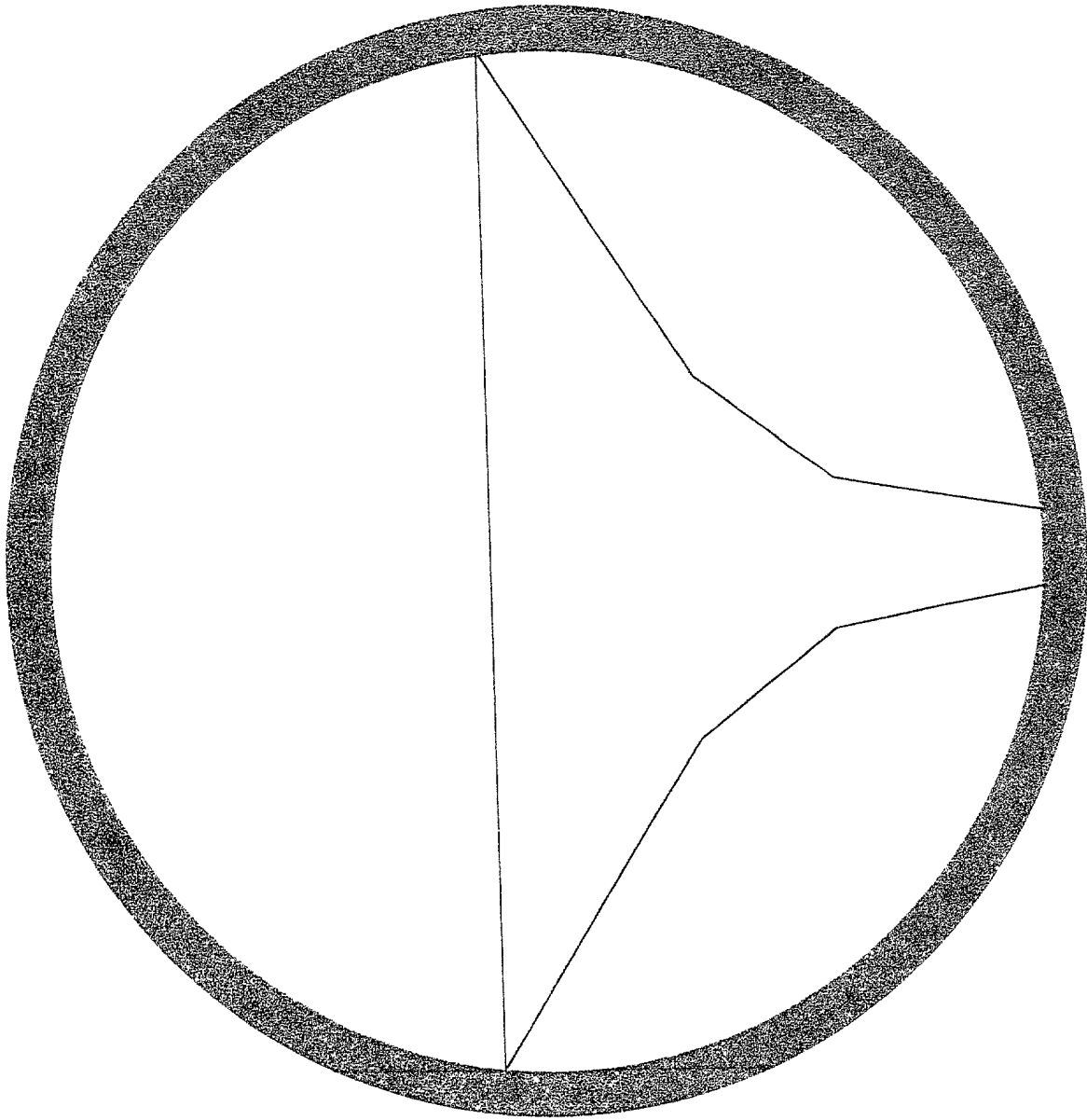
Hands @ 10:10

Current Steering wheels



Several Proposed Steering wheels





Mechanical or Resistive buttons, Type 1



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These Buttons will sit:

On the surface of the steering wheel rim /flush

Facing the driver

@ 10:10

The red buttons:

- are push In/Out momentary buttons
- touch sensitive to measure changes in driver physiology.
- Signals are timed to assure no system override
- used to engage system

The white buttons:

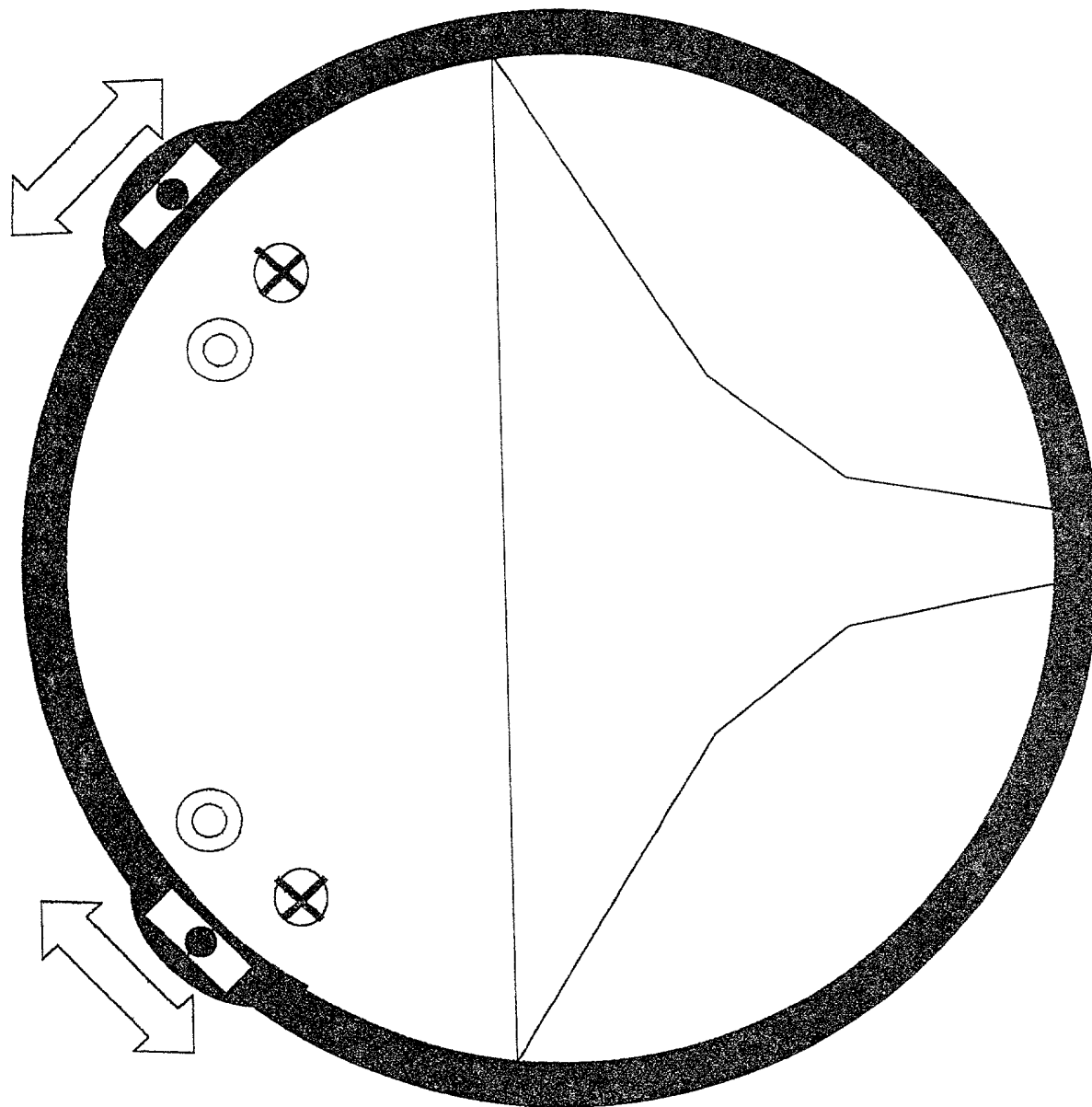
- are slide Up/Down momentary buttons
- They are used to activate and toggle options

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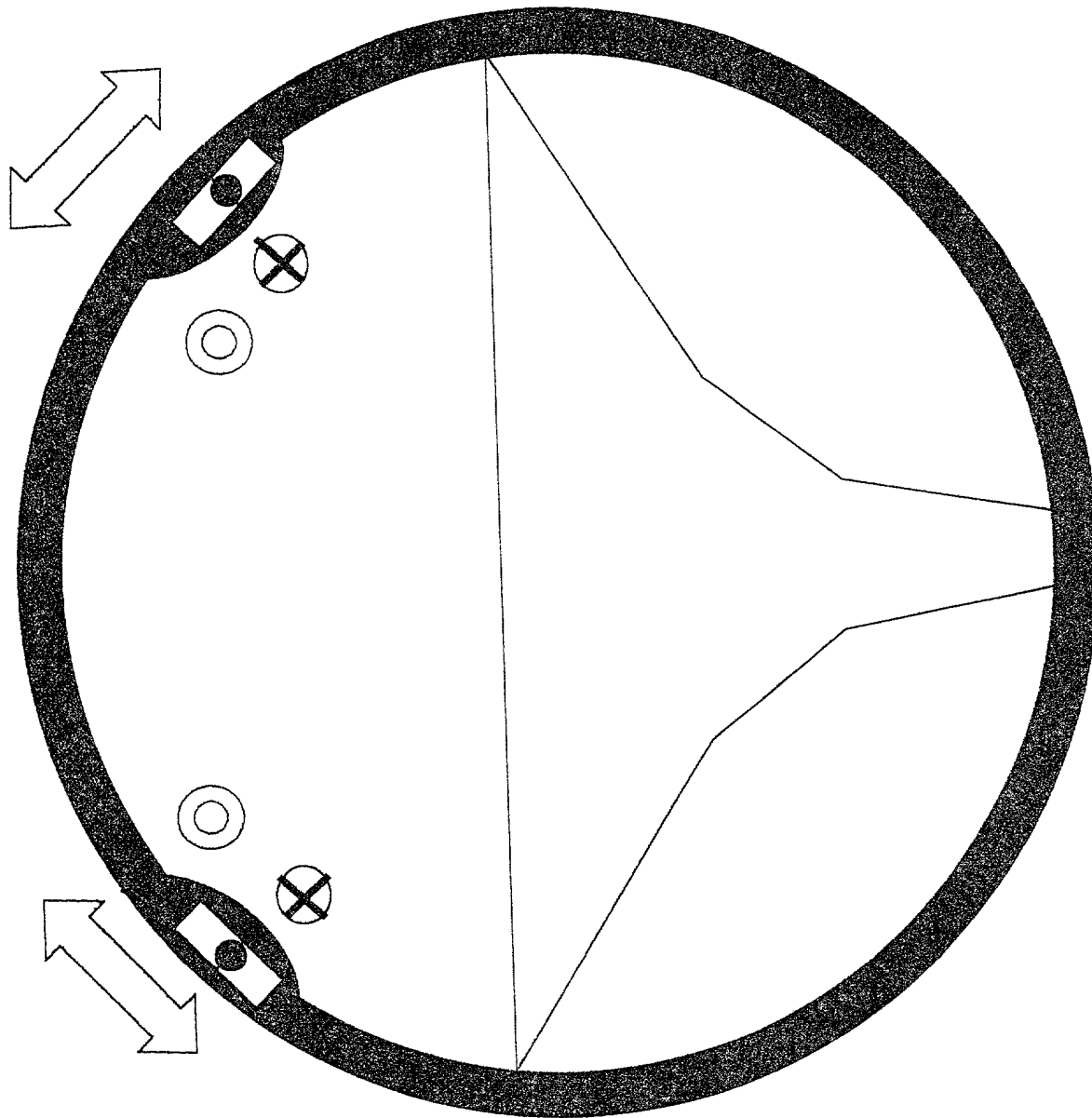
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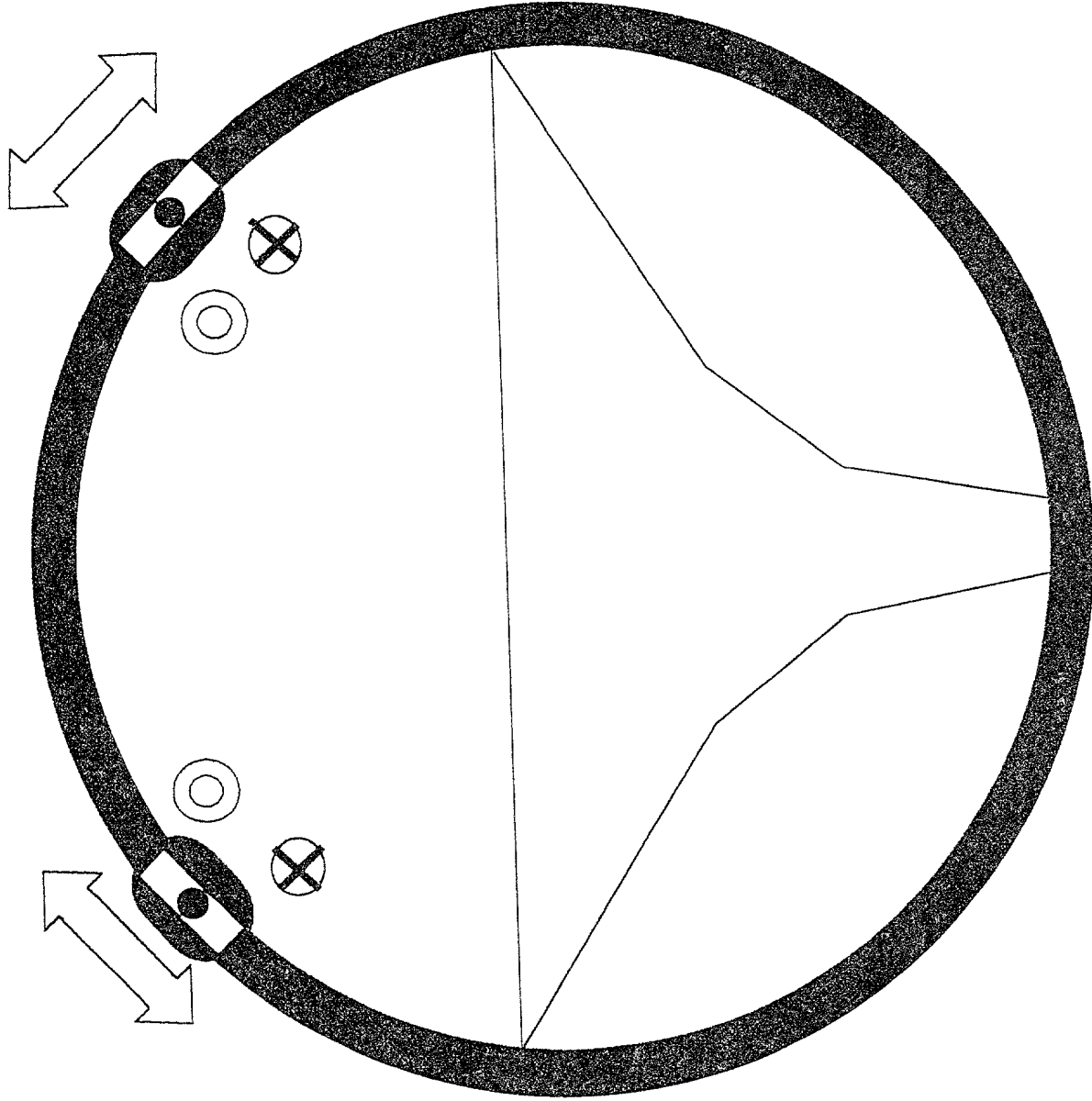
Mechanical or Resistive buttons, Type 1



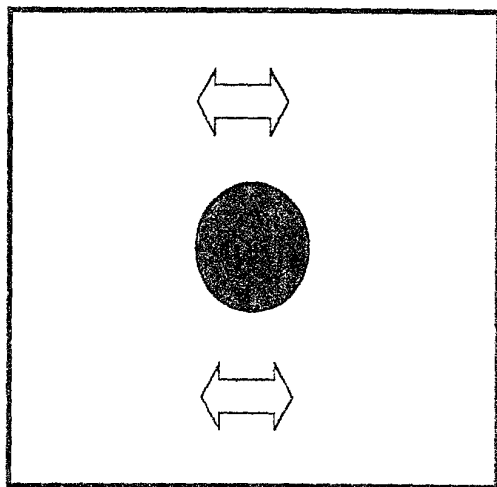
Applied Computer Technologies, Inc. **Mechanical or Resistive buttons, Type 1**



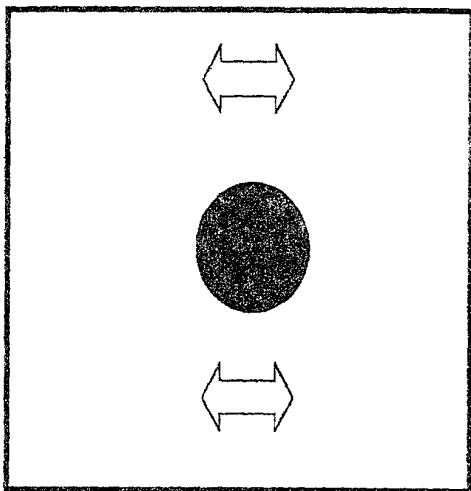
Applied Computer, Inc. FORD EX 1033 **Mechanical or Resistive buttons, Type 1**



Mechanical or Resistive buttons, Type 2. Page 1/2



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These Buttons will wrap around the steering wheel rim:

On the surface or flush with the cross section of the steering wheel rim

Facing the driver

@ 10:10

The red buttons:

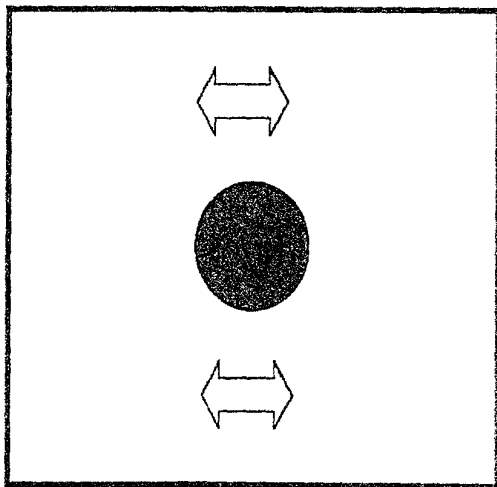
- are push In/Out momentary buttons
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- used to engage system

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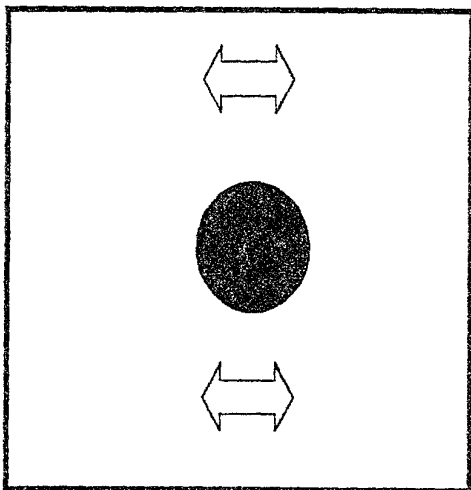
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Mechanical or Resistive buttons, Type 2. Page 2/2



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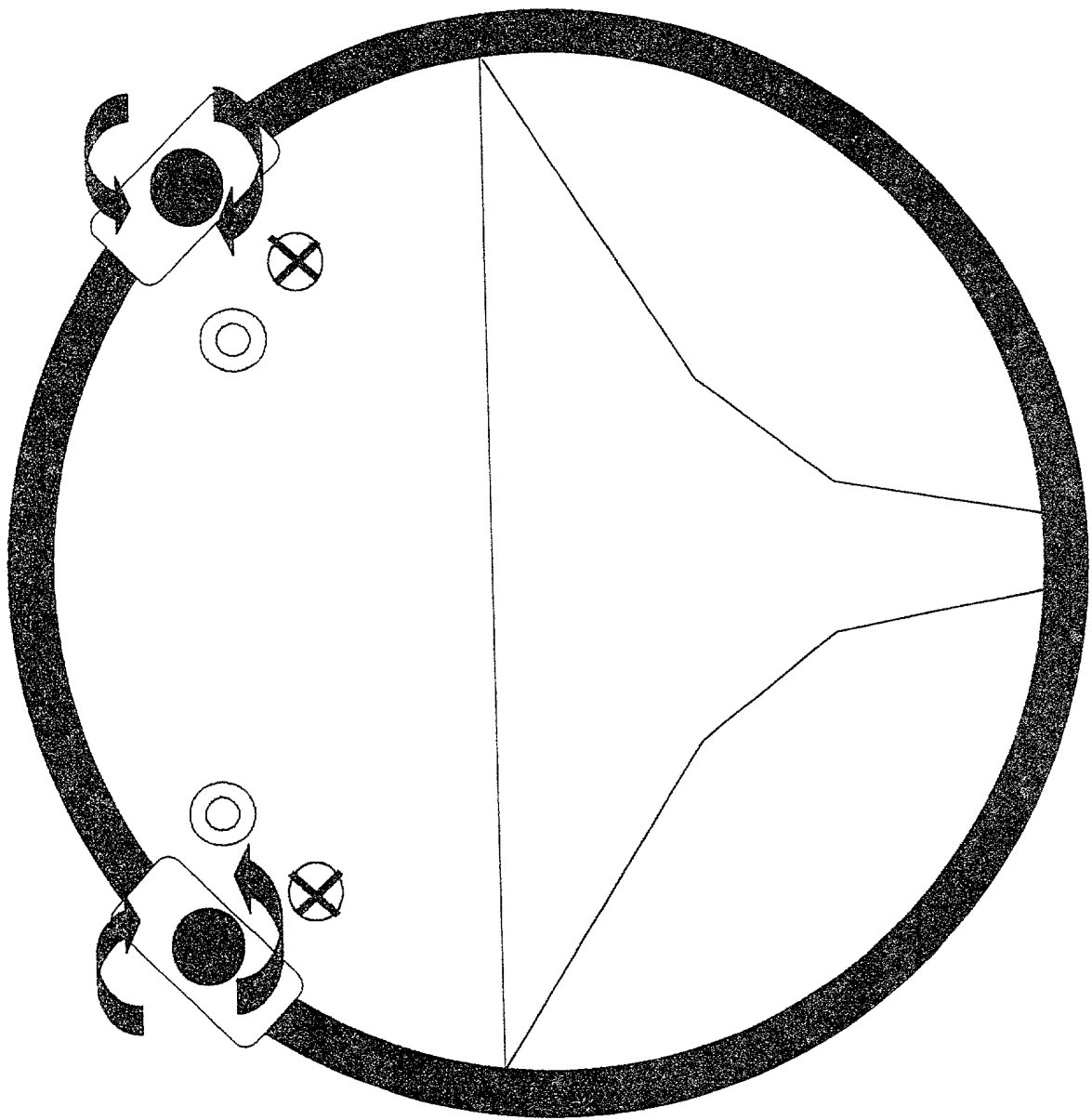


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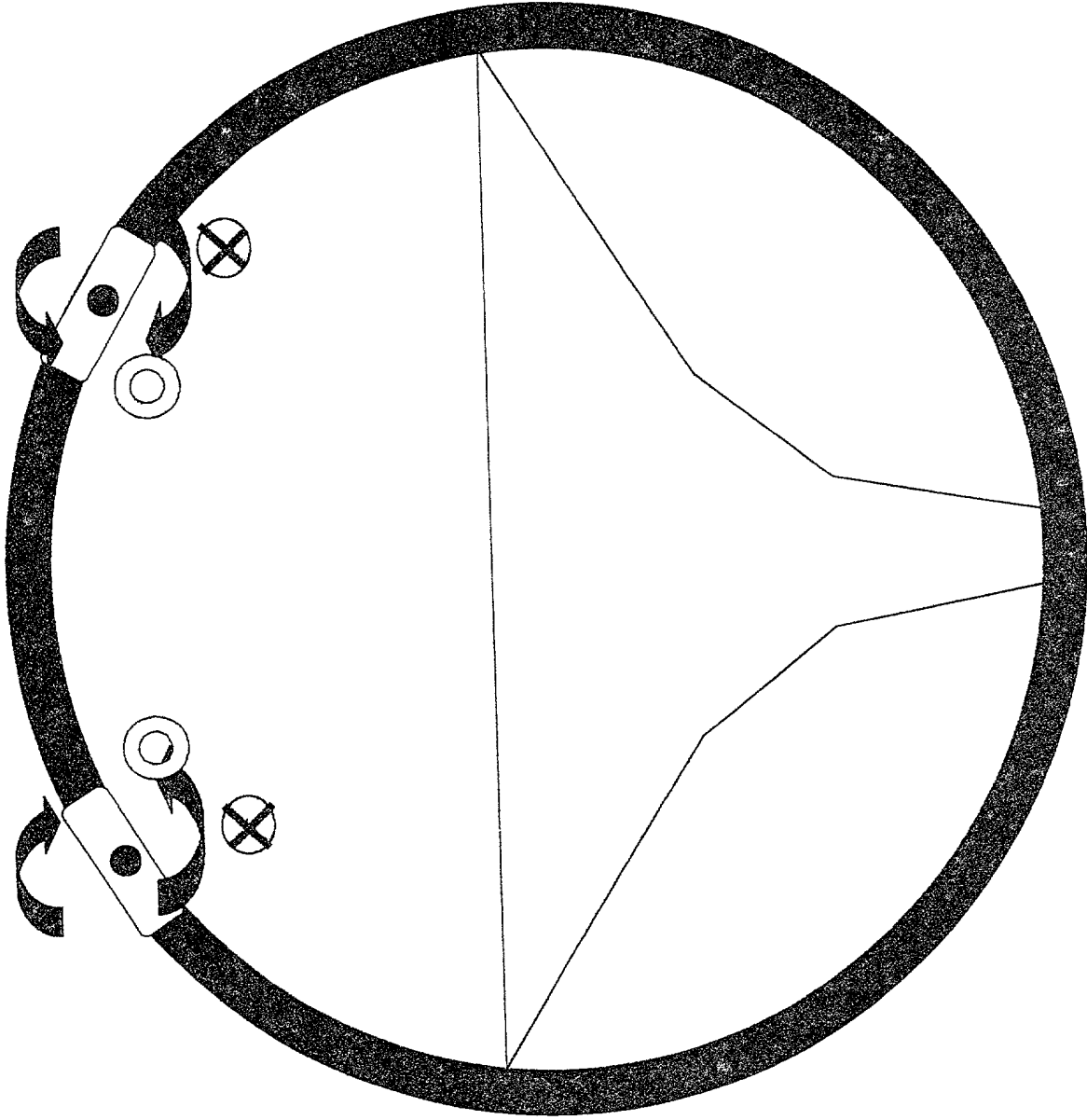
The white buttons are:

- Twist up/down about the steering rim, momentary buttons
- They are used to activate and toggle options

Applied Computer Technologies, Inc. FORD EX. 1033
Mechanical or Resistive buttons, Type 2

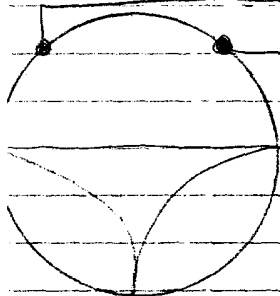


Applikomp, Applied Computer Technologies, Inc. **DATA BASE** **Mechanical or Resistive buttons, Type 2**



2)

SOUND *
VOICE
HAND



STE
PS

Telenet
Devices
Docked
or
Interface
(Built in)
or
External

CONTROL
of vehicle
equipment

- Veh. Info
- Steer angle
- Veh speed
- Weather cond
- Veh load
- Veh weight
- ABS Info
- Traction Control
- Electronic Stabil
Program
- Weather cond
- other feedback
that affect
stability / handling
driving intensity
- GPS Data

* 09/23/01

- * Heart beat Rate
changes up / down
- * Driver voice (stress)
- * Pressure on buttons
change in rate

09/28/01

Gyro scope
G force sensor

10/04/01

- heater settings
- Automatic inf control
setting
- activation signal
- activation rate (not
clear)

SCANNED # 20

Background

As advances in communication enter the automobile, in addition to the existing control requirements of radios, CDs, HVAC and other equipment, it is becoming increasingly difficult for drivers to handle all the requirements as well as the unexpected interruption of a cell call or a PDA alarm or a pager, etc.

STC stands for Safe Telematic Control. This product will be used to prioritize and insure safe control of a vehicle telematic/information and other accessories while keeping the driver's hands at 10/10 as all safety recommendations require.

Assuming the standard version is installed, it will require that a driver has two hands. This example will demonstrate the function based on such assumption.

(1) A driver enters a vehicle, (2) identify him/herself to vehicle, (3) dock all electronic communication equipment to STC wirelessly or physically, e.g. pager, cell phone, PDA, etc., (4) driver will initiate his/her trip. Please see scenarios sample.

Scenario One (Driver Initiate):

Driver wants to make a call or review pagers or read e-mail or connect to Internet. (1) The driver will activate safety switch and then, after system acknowledges safety switch activation by providing the driver with a beep or a voice feedback, the driver with his/her hand on the actuated safety switch will toggle through options with the toggle switch until he gets to a selection that's needed, then using the toggle switch will confirm selection and proceed with desired action. This could be multiple layers of options. These options can be provided on a HUD or via voice. Even if devices can be activated by voice control, they still need to have safety switch depressed to ensure driver intention and not an erroneous sound from radio, passenger or a malfunction of devices. During this time the driver's hands must remain at 10/10. The driver must maintain the steering wheel within a specific angle. This angle is calculated based on the following inputs: (1) weather condition, (2) speed of vehicle, (3) proximity of vehicle to others (front/back), feedback from ABS, ESP, traction control, etc. This angle (for example) is about 30 degrees either side of zero if speed is 40 mph, but it is less when speed is higher and more when speed is lower. The driver will also be allowed to temporarily take his hands off the 10/10 position to, let's say, make a sharp turn. But will have to put them back at 10/10 within a certain amount of time to continue the previously started activity. This amount of time is again dependent on speed, weather, vehicle proximity to others and feedback from ABS, ESP and traction control.

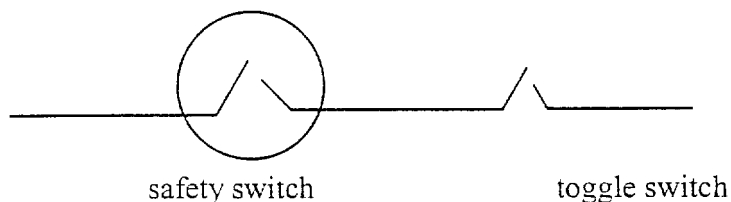
Scenario two (incoming):

Incoming information will be customized by driver to select what he/she wants to receive and in what priority. Once an incoming is detected by the system, the system will go through a checklist to verify feedback from steering about position and about speed and ABS and ESP and traction control and weather condition. When all conditions are met, the system will announce the incoming to the driver who will have to press the safety control switch and hold up. While

using the toggle switch to accept the incoming, the remainder of the controls will be as per outgoing, including hands at 10/10 and hands off for a certain amount of time but temporarily.

To prevent override to the safety control switch, the validation signal for engaging both parts of the safety switch is timed and monitored to assure that it is not constantly pressed. Detecting an ALWAYS ON signal will prevent any new telematic or control activity from being initiated. Similarly, having an activity initiated and received by the driver while another activity is already in progress will be regulated and prioritized by customization and by chronological checklist of safety priorities, e.g. speed, angle of steering, weather, etc.

The safety switch is necessary to allow the toggle switch or switches or controls to activate. They're logically in series, but not necessarily so in the real physical world.



Page of graph will show logic of operation of the system.

The system will communicate with the vehicle via the vehicle bus, or via direct tap to various CPUs or sensors in the vehicle.

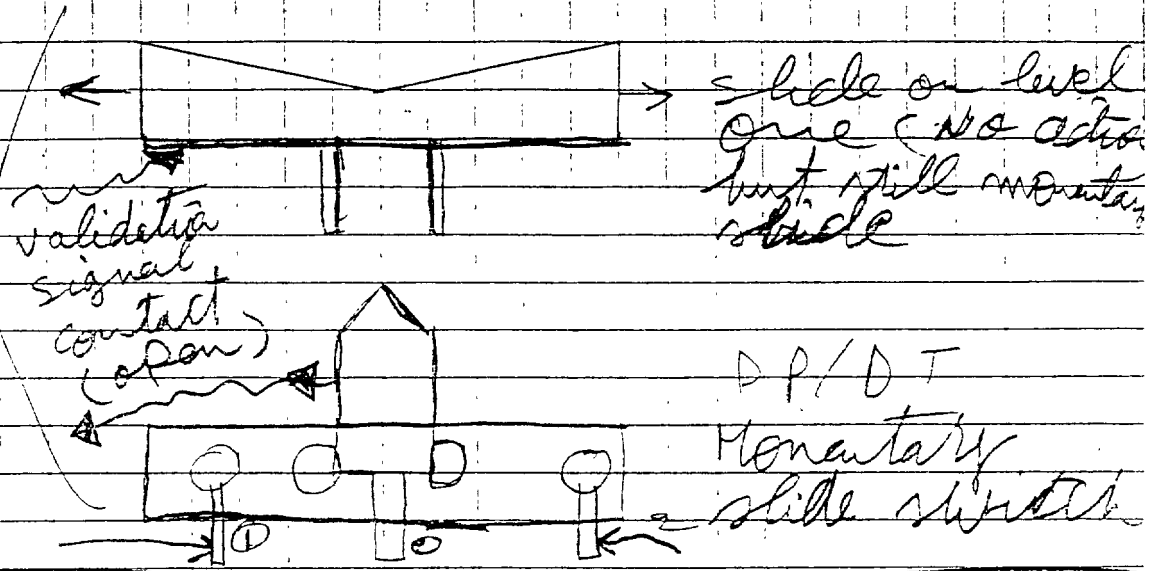
GPS information about required direction of the vehicle will be fed back to the STC and compared to actual vehicle direction. If vehicle is not in required heading, the STC will suppress any telematic or vehicle action from incoming or outgoing. Emergency signals and distress signals are exempted from any STC controls. This will be necessary in case the vehicle is skidding sideward while steering and speed is still within spec, because the car is being driven recklessly.

If a telematic activity was intercepted during a nonfavorable condition, the CPU will inform the driver as soon as conditions are within spec.

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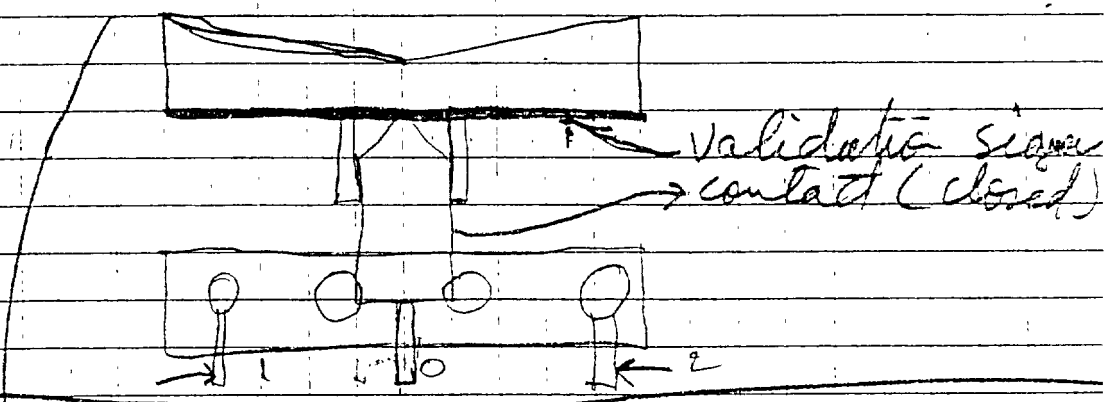
①

No T
ACTIVATED
VOT
engaged

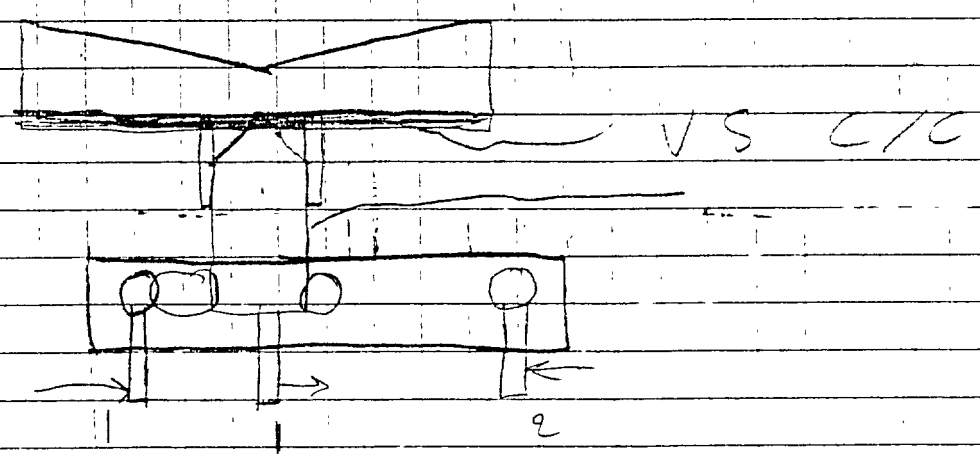


engaged

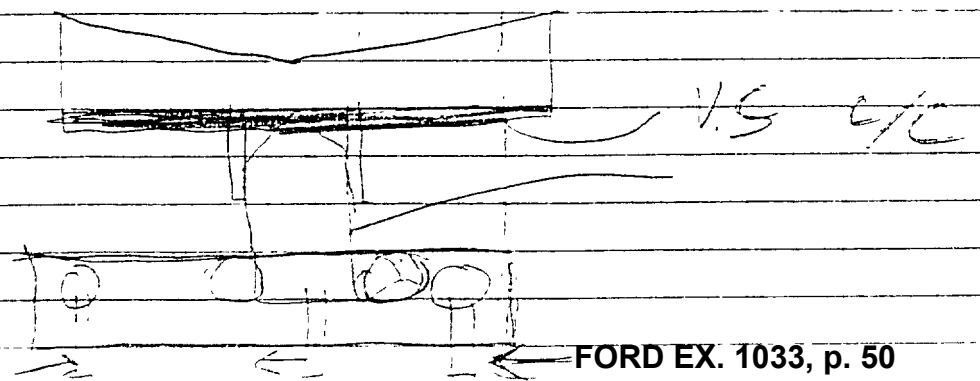
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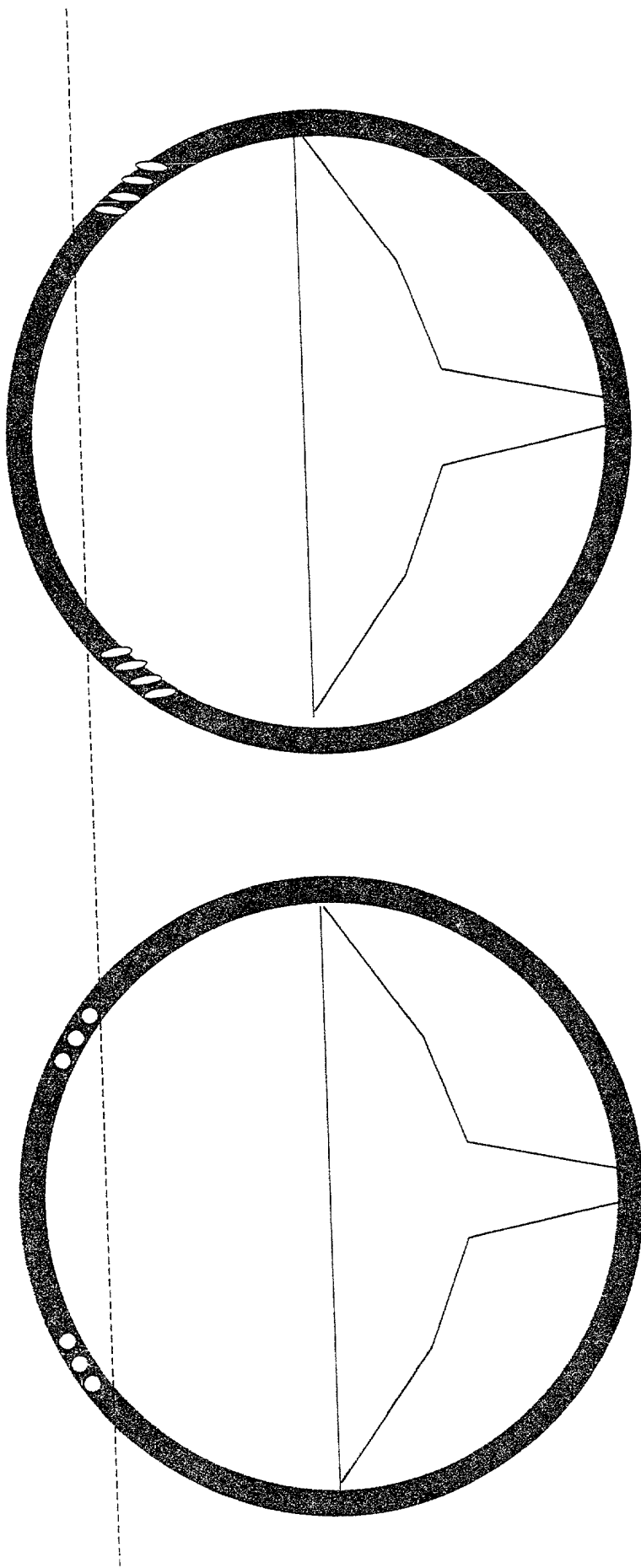
activated ①



activated ②



Touch sensitive buttons configurations



**Rear/ facing away from Driver side
of Steering wheels**

**Front/ Driver facing side
of Steering wheels**

Updated
Presentation: 10/04/01
Graphics: 09/27/01

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Original Idea, Prepared and
designed by M. A. Naboulsi

Safe Telematics Controls

The achievement of a Safe

Simple

Accessible

Universal

Available

Portable

Cost Effective

Driver Telematics Controls

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designed by M. A. Naboulsi

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Updated

Presentation:

10/15/01

Graphics:

10/04/01

Safe Telematics Controls

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Beginning of design

HOW?

- 1: Placing Hands on the steering wheels and @ 10:10 is mandatory to initiate or respond to a Telematics activity.
- 2: Allowing any off the shelf device existing, or to be developed to Dock with the system **physically or wirelessly**.
- 3: The systems is monitored by a Modular, Dynamic, State Machine logic, that adds, remove, prioritize, enable or block equipments and services by:
 - a: **STC safety categories and operation parameters**
 - b: **Frequency of use (as per each driver habit / pattern)**
 - c: **Real time Driving conditions**
 - e: **Driver physiology feed back**
- 4: This state machine is a stand alone device, or an embedded software in any of the existing CPU's of the vehicle.

Beginning of design:

HOW? 1: Switches or similar interface

Placing Hands on the steering wheels and @ 10:10 is mandatory to initiate or respond to a Telematics activity.

This is achieved by placing switche(s) or sensor(s) (SorS), at 10:10, (in case the steering mechanism is a steering wheel rim), or at the recommended position in case the steering technology has evolved or branched off from using current format.

The SorS will serve to assure driver intent. This will make it necessary to create SorS that are not activated by accidental touching or pressing, and by creating a redundancy and dependency in the configuration of such SorS that an accidental activation of one SorS during a normal operation of a steering mechanism, as in activating steering wheel rim mounted SorS while turning the wheel.

The SorS are tested for integrity at start up. Such test will be automatic and redundant to assure integrity and are not triggered by chance touching.

The SorS will be designed to fail to a safe state, meaning (not allowing circumventing of system priorities and rules)

Ideal SorS would be multi contact mechanical. Other type of SorS is possible as long as circuitry that fails to safe is designed to mimic and assure the intent of examples in diagram 1 and 2.

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Updated

Presentation: 10/15/01

Graphics: 10/04/01

Beginning of design:

HOW? 1: Switches or similar interface

Placing Hands on the steering wheels and @ 10:10 is mandatory to initiate or respond to a Telematics activity.

If a vehicle is equipped with Voice Control, then a minimum of one safety SorS must be implemented to assure driver's intent. *But a second switch is still necessary to assure that the driver is not using his Free Hands to conduct other activities, thus adding to the distraction of operating and using a Telematics.*

LEFT BLANK

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Updated

Presentation:

10/15/01

Graphics:

10/04/01

Beginning of design:

HOW? 1: Switches or similar interface

Placing Hands on the steering wheels and @ 10:10 is mandatory to initiate or respond to a Telematics activity.

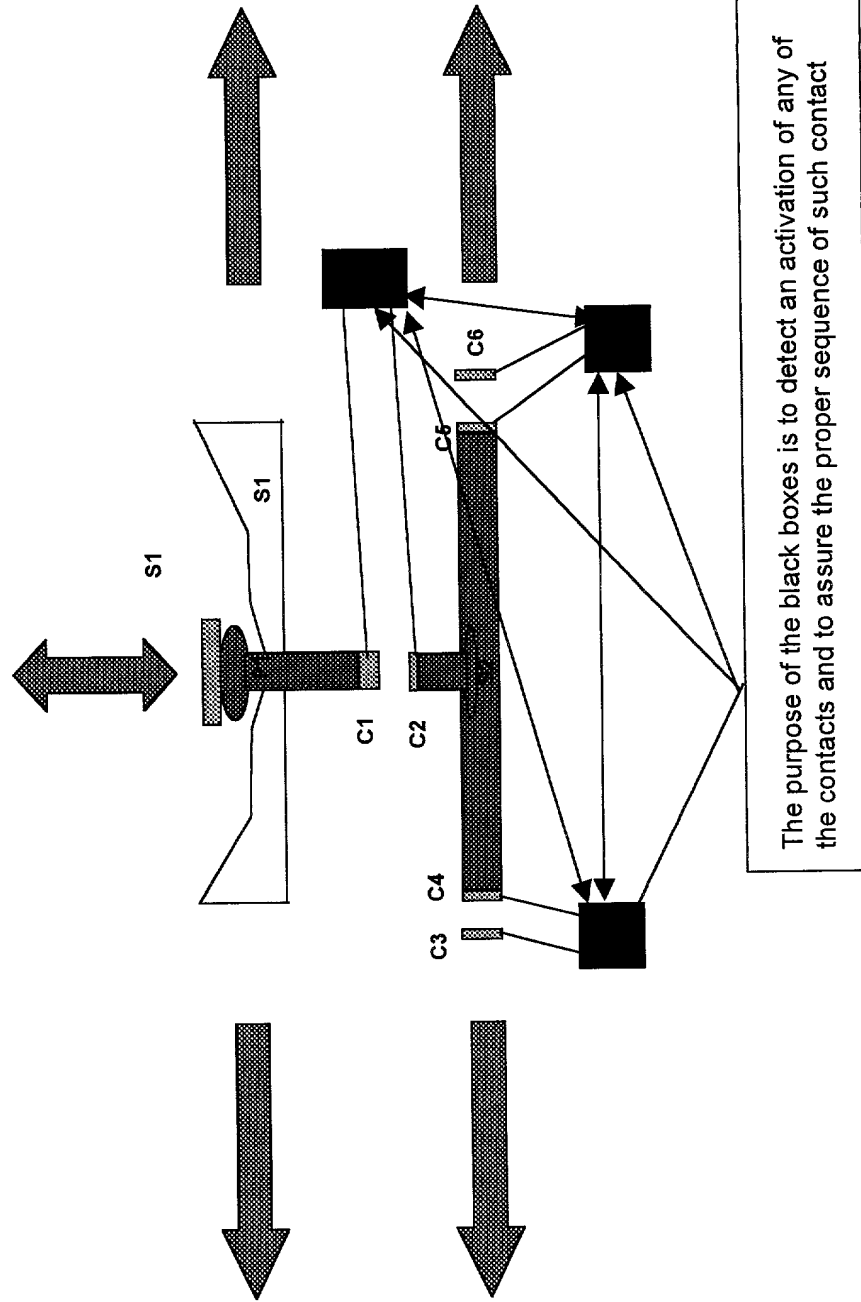


Figure 1a

The purpose of the black boxes is to detect an activation of any of the contacts and to assure the proper sequence of such contact

Beginning of design:

HOW? 1: Switches or similar interface

Placing Hands on the steering wheels and @ 10:10 is mandatory to initiate or respond to a Telematics activity.

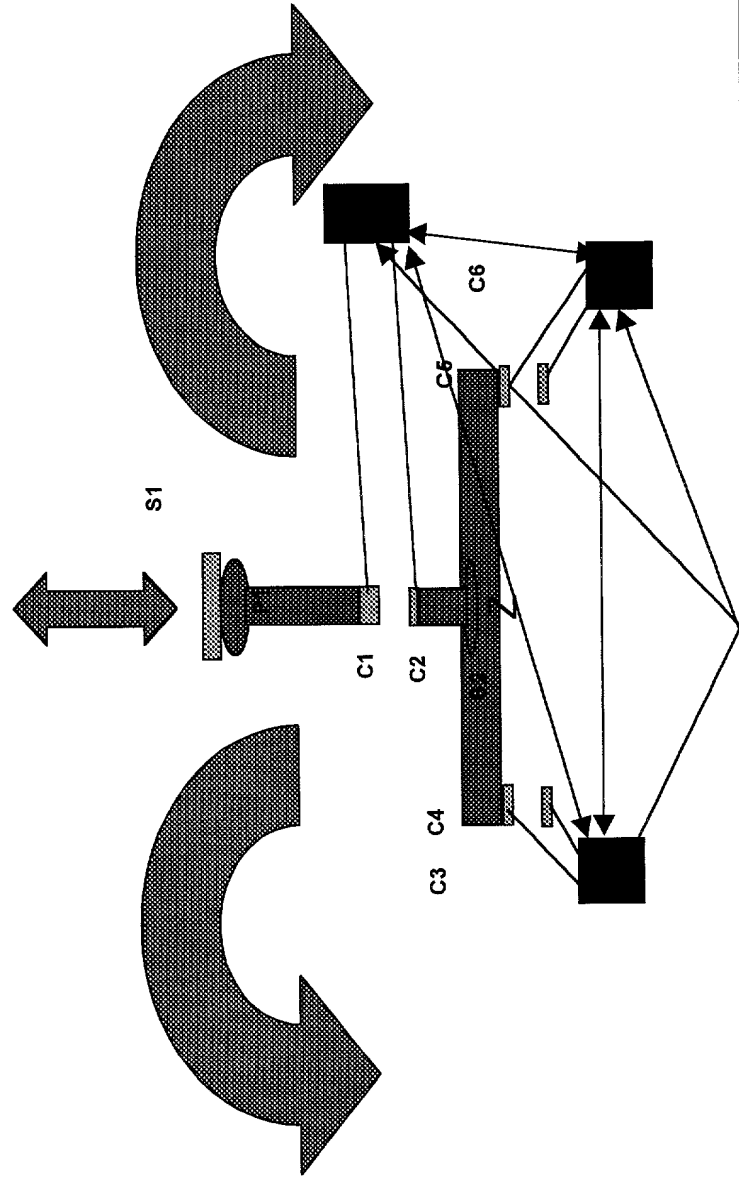


Figure 1b

The purpose of the black boxes is to detect an activation of any of the contacts and to assure the proper sequence of such contact

Beginning of design:

HOW? 1: Switches or similar interface

Placing Hands on the steering wheels and @ 10:10 is mandatory to initiate or respond to a Telematics activity .

Referring to Figure 1a, the P1 portion of the SorS is allowed to moved vertically and to make contacts via C1 to C2.

P1 is then coupled to S2. Upon moving S1 horizontally, P1 couple to S2 will be moved horizontally as well and causes C4 to make contacts with C3 or C5 to make contact with C6.

The black boxes contain detection circuits or mechanism that will verify contact and sequence and transmit signals to other portion of the system.

There will be a need for redundancy of such SorS, to assure that both hands are on the steering mechanism.

One SorS will act as an initiator, lSorS, of the process while the other will act as a selector, SSorS. Unless the the lSorS is activated properly, activating SSorS will not result in any action, even if SSorS is activated properly.

S1 is used for temperature and Heart rate reading. We now have an interface that assures driver intent.

Beginning of design:

HOW? 1: Switches or similar interface

Placing Hands on the steering wheels and @ 10:10 is mandatory to initiate or respond to a Telematics activity.

Referring to Figure 1b, the P1 portion of the SorS is allowed to moved vertically and to make contacts via C1 to C2.

P1 is then coupled to S2. Upon moving P1 horizontally, P1 couple to S2 will be maintained and causes S2 to swivel about point Z . C4 will make contacts with C3 or C5 will make contact with C6.

The black boxes contain detection circuits or mechanism that will verify contact and sequence and transmit signals to other portion of the system.

There will be a need for redundancy of such SorS, to assure that both hands are on the steering mechanism.

One SorS will act as an initiator, lSorS, of the process while the other will act as a selector, SSorS. Unless the the lSorS is activated properly, activating SSorS will not result in any action, even if SSorS is activated properly.

S1 is used for temperature and Heart rate reading. We now have an interface that assures driver intent.

Updated
Presentation: 10/15/01
Graphics: 10/04/01

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Beginning of design:

HOW? 1: Switches or similar interface

Placing Hands on the steering wheels and @ 10:10 is mandatory to initiate or respond to a Telematics activity.

When using resistive, optical or touch sensitive switches, the following will be detected:

- 1: Sequence of events for set values
- 2: Timing of each event

Also, a Fail to Safe circuit must be incorporated to assure that electronic component failures do not cause an override the system intent.

In all, there are three signals emanating from an SorS. This number can be greater if redundancy is used to assure system integrity.

These signals are P,U,D

depending on the mechanical or logical configuration of a switch, e.g. fig 1a, a switch can work with only three signals. Figure 1b however shows a switch that can have up to 5 contacts combinations generated out of only 3 contacts switch. Two of those states are deemed to be a non-STC states and should be circumvented with monitoring circuitry or with filtering and mask in a CPU logic.

Beginning of design:

HOW? 1: Switches or similar interface

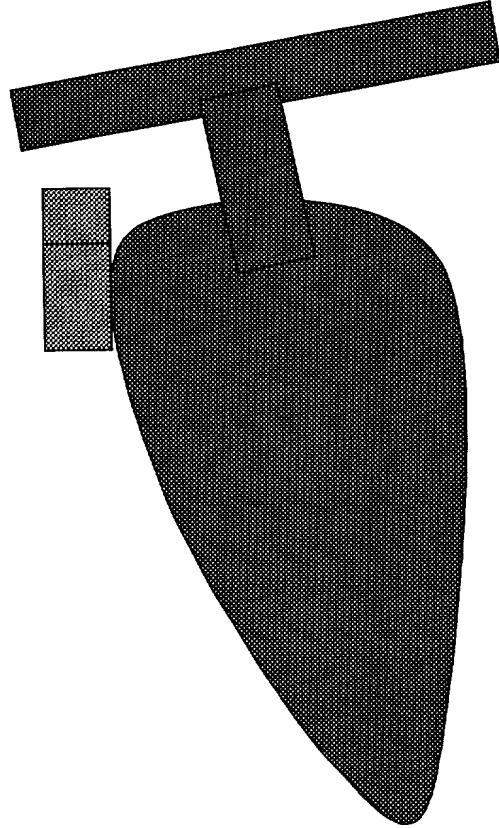


Fig 3a: Side
view

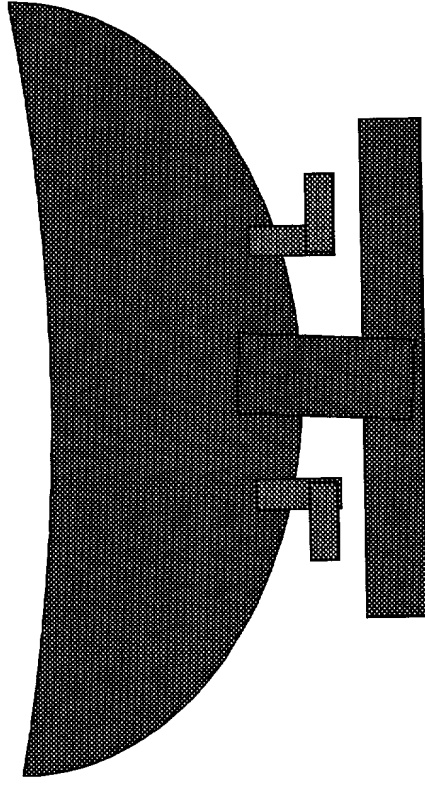


Fig 3b: Top
View

The SorS can also be mounted on levers as in the turn signal levers and extended out from the top of the IP to be within easy reach of the driver when hands are @10/10. The disadvantage here is that the hands are not firmly gripping the steering wheel, and maneuvering the steering wheel will cause a loss of activation instantaneously.

Beginning of design: HOW? 2: Feed back

The systems will give the driver a feed back via Audio, sounds and visual displays on a HUD graphic screen

1. *The driver will select preferred method of feed back*
2. *The screen will be a graphic based display and will be a HUD*
3. *The Voice feed back will be in the language of the driver*
4. *The sounds will be non threatening or alarming sounds*
5. *The display, if not using a HUD, will be graphical and will be displayed and LIT in a position that a driver primary vision will still be focused on the road and not off the Road.*
6. *The Lighting of any type of display will automatically adjust to the glare or darkness being experienced by the driver*
7. *The sound or audio feed back will interrupt any other audio in progress, unless safety related-it will then proceed following the other audio, and will adjust the volume to overcome any existing noises in the environment of the driver, e.g. open window, loud passenger, etc...*

Beginning of design: HOW? 3: Operating System

The systems is monitored by a Modular, Dynamic, State Machine logic, that adds, remove, prioritize, enable or block equipments and services

The Operating system will control the level of access to each Telematics activity based on Safety parameters and feed back from the driving environment.

This environment will be assessed based on safety but will be variable as well, e.g. If the car is moving at freeway speed, and all Physical

primary safety conditions are met,

1. A driver will be able to access a phone call In or Out,
2. But the driver will not be able to add a new number to the phone memory
3. the driver will not be able add a new number to the Contact manager,
4. A driver will be able to dial a number from the Contact manager
5. A driver will be able to record a voice memo to do so later or use a phone voice activated feature to dial a number

6. ***The operating system will allow the use of the SorS to control non Telematics functions as well by interfacing directly or via Bus with other vehicle functions. The same safety rules will still apply.***

Beginning of design: HOW? 3: Operating System

The systems is monitored by a Modular, Dynamic, State Machine logic, that adds, remove, prioritize, enable or block equipments and services

The Operating system will control the level of access to each Telematics activity based on Safety parameters and feed back from the driving environment.

This environment will be assessed based on safety but will be variable as well, e.g. If the car is moving at freeway speed, and all **Physical**

primary safety conditions are met,

1. If a Driver attempted to access a system during a regulated or controlled situation, the system will deny access to such activity
2. The system will also inform the driver of the reason, e.g. High speed, excessive maneuvering criteria is surpassed, etc.. This will allow the driver to reach a decision on priority of the Telematics activity or the driving situation and condition
3. The system may allow a driver to over ride controls, e.g, A detective driving a private vehicle may decide to pursue a criminal and needs full access to the cell phone for back up irrespective of the driving condition or environment.
4. The Operating system will always **time monitor** SorS to assure that they were not circumvented by mechanically or electronically holding them down

Beginning of design:

HOW? 4: Driver ID and transportability of profile

The systems is monitored by a Modular, Dynamic, State Machine logic, that adds, remove, prioritize, enable or block equipments and services

The Operating system will control the level of access to each Telematics activity based on Safety parameters and feed back from the driving environment.

This environment will be assessed based on safety but will be variable as well, e.g. If the car is moving at freeway speed, and all Physical primary safety conditions are met,

1. *Operating system will maintain a profile about each driver of a vehicle. These profiles are transportable via synchronization of devices or via ftp, so a driver can drive another vehicle, e.g. a rented vehicle, and without having to go through another set up operation. Also the system will not have to go through the learning mode of each driver preferences.*
2. *The Operating system will maintain each profile secured via password. The password will consist of a combination of strokes and pushes of one or both of the SoRS.*

Design

Input Signals

There will be three types of input signals

1. From Vehicle
2. From Telematics devices
3. From Driver

Output Signals

1. To Vehicle (When Controlling Non Telematics devices:
e.g. HVAC, Radio, Cruise, Seats Heater, etc...
2. To Telematics devices: e.g. Signals based on input from
driver, Signals based on input from vehicles
3. To feed back: e.g. Signals to sounds, lights, HUD or
other informational display

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Design: Input Signals-From Vehicle

From Bus Production Version		Discrete I/O Proof of Concept/Aftermarket	
	Signal	Type	How
Steering Angle	Steering Angle	Analog A/D	Via proximity sensor to be added to the steering wheel and column
Vehicle speed	Vehicle speed, From GPS	Communication	Via Software
Vehicle Load	Vehicle Load, From estimated weight # of passenger	Keyed in	Via PC, with an option to review and keep as is
Weather Condition	Weather Condition, From Internet	Keyed in	Via PC, with an option to review and keep as is
Vehicle Weight (Preprogrammed by Model)	Vehicle Weight,	Keyed in	Via PC, Once
Brake activation	Brake	Analog A/D	Via brake pedal switch
ABS activation signal	From ABS	Analog A/D	By tapping into the ABS light or signal
Traction Control signal	From Traction Control light,	Analog A/D	Same as above
ESP Program signal	From ESP Control light,	Analog A/D	Same as above
G Force	G Force meter	Analog A/D	From a G Force Module
HVAC Setting	HVAC Setting	Analog A/D	From a proximity switch
Wiper setting	Wiper setting	Analog A/D	Tapping into the Wiper motor fuse (Current On or Off)
Lighting condition Night/Day	Lighting condition Night/Day	Analog A/D	Tapping into a light cell, light switch, Time from PC clock. PC clock should also be updated from GPS position to adjust for time zones
Fog Lamp activated (Front / Rear)	Fog Lamp activated (Front / Rear)	Analog A/D	Tapping into Light fuse (Current On or Off)
Proximity alarm	Proximity Alarm	Analog A/D	Depend on sensor used
GPS Directional Information	N/A	Communication	This one will be handled via I/O and software API

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Updated

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Graphics: 10/04/01

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Design: Input Signals- Telematics devices

From Bus Production Version	Discrete I/O Proof of Concept/Aftermarket		
	Signal	Type	How
Incoming Cell Call	Incoming Cell Call	Analog A/D	By tapping into the docking station pins
Incoming Page	Incoming Page	Analog A/D	By tapping into the docking station pins
Incoming e-mail	Incoming e-mail	PC Program	This one will be handled via I/O and software API
Routing notices and Alarms from planners etc.	Routing notices and Alarms from planners etc.	PC Program	This one will be handled via I/O and software API

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Design: Input Signals- From Driver

From Bus Production Version	Discrete I/O Proof of Concept/Aftermarket		
	Signal	Type	How
SorS Input commands	SorS Input commands	Digital	P: Present U: OK (Thumb Up) D: Next / Cancel /No (Thumb Down) See truth table. This one will be handled via I/O and software
SorS Input Sensory	SorS Input Sensory	Analog	Heart Rate and Temperature and changes in rate From the surface of the SorS. Used to discern stress. This one will be handled via I/O and software
SorS Input Sensory	SorS Input Sensory	Analog	Pressure on SorS From the surface of the SorS. Used to discern stress. This one will be handled via I/O and software
Voice Sensory	Voice Sensory	Analog	From the Microphone. Used to discern stress. This one will be handled via I/O and software

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Design: Output Signals- To Vehicle

From Bus Production Version	Discrete I/O Proof of Concept/Aftermarket		
	Signal	Type	How
SorS output commands	SorS Input commands	Digital	P: Present U: OK (Thumb Up) D: Next / Cancel /No (Thumb Down) (When Controlling Non Telematics devices: e.g. HVAC, Radio, Cruise, Seats Heater, etc...) - This one will be handled via I/O and software
SorS output commands	SorS Input commands	Digital	- To Telematics devices: e.g., Call a number from phone, Call a number from Contact book, Call the number that paged me, Record a message, E-mail a voice message, Give me another route, include where I am as a stop and reroute, repeat last instruction, find nearest hospital/gas station etc.... This one will be handled via I/O and software
STC Gateway command	STC Gateway command	Digital	- Logically determined operation for feed back to driver or to other systems interfaced with the STC e.g. Adjusting display intensity, reversing or changing display colors to match ambient lighting conditions, adjusting volume to overcome existing environmental noises, silencing a Radio or similar Audio to allow for cellular communication or an alarm to be issued or voiced, etc.... This one will be handled via I/O and software

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Design: Sors Signals- To Gateway

Fig 2a:

Truth table for STC ISorS as depicted in Fig1a

I S o r S P	I S o r S U	I S o r S D	P: Present (Thumb Up)	U: OK	D: Next / Cancel /No (Thumb Down)
0	0	0	0	0	0
0	0	1	0	0	0
0	1	0	0	0	0
0	1	1	0	0	0
1	0	0	1	0	0
1	0	1	1	0	1
1	1	0	1	1	0
1	1	1	0	0	0

Truth table for STC SSorS as depicted in Fig1a

S S o r S P	S S o r S U	S S o r S D	P: Present (Thumb Up)	U: OK	D: Next / Cancel /No (Thumb Down)
0	0	0	0	0	0
0	0	1	0	0	0
0	1	0	0	0	0
0	1	1	0	0	0
1	0	0	1	0	0
1	0	1	1	0	1
1	1	0	1	1	0
1	1	1	0	0	0

1. The output from ISorS will be three signals indicating 1 Up, Down and On. Each of these signals need to be passed on to the Gateway for analysis and decision on what to do with any one of the SSorS three possible signals.
2. The P signal must precede any other signal in each switch for the switch input to be accepted. (Sequential Logic Operation)
3. The SSorS switch signal acceptance will always depend on the ISorS switch meeting the required criteria before the SSorS or within a small fraction of a time of SSorS activation

The P signal must precede any other signal in each switch for the switch input to be accepted. (Sequential Logic Operation)

The SSorS switch signal acceptance will always depend on the ISorS switch meeting the required criteria before the SSorS or within a small fraction of a time of SSorS activation

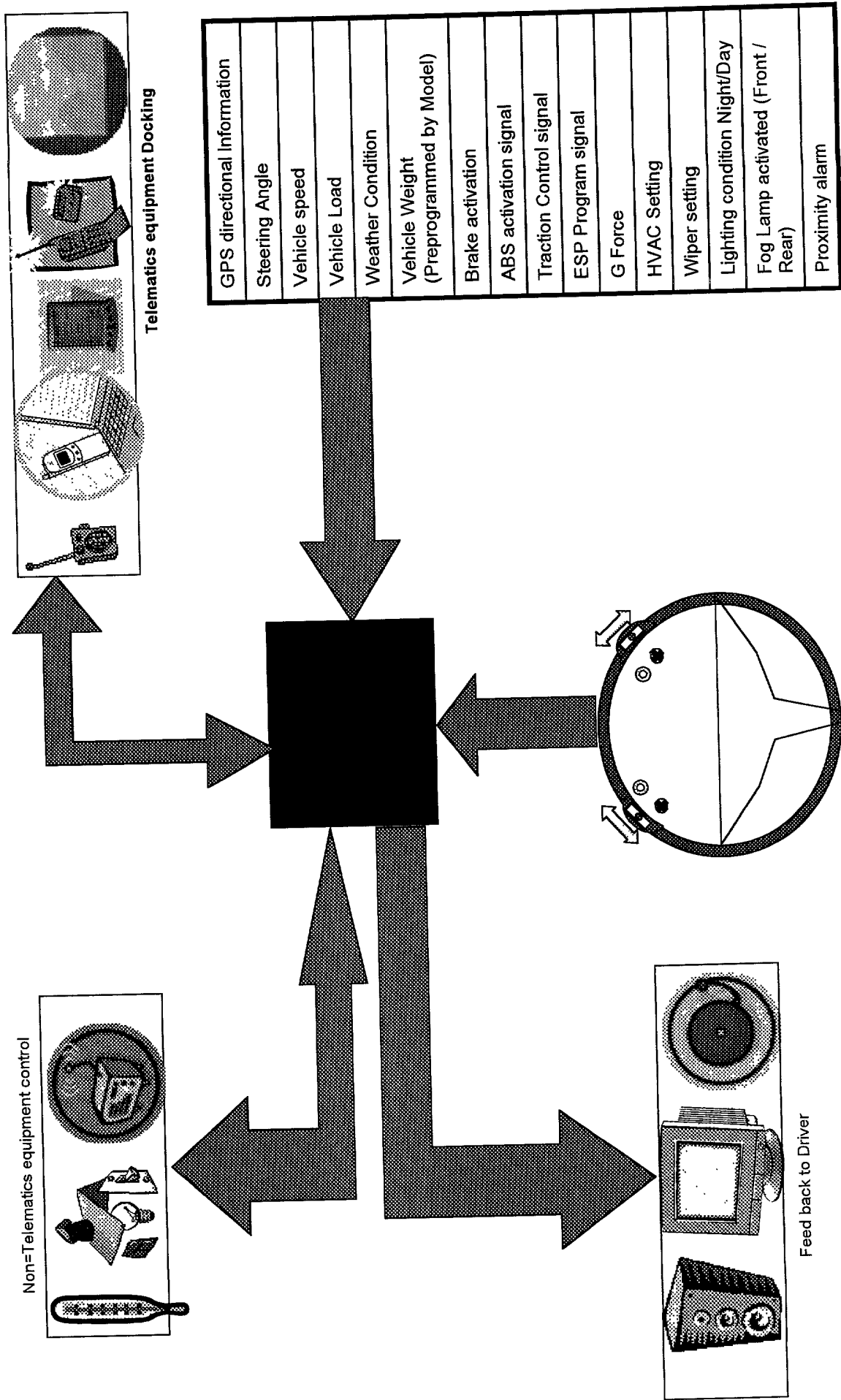
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Updated
Presentation:
Graphics:

10/15/01
10/04/01

Design: Block Diagram-STC (Aftermarket)



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Terms

Telematics: Integration of Information, communication, computing and entertainment technologies into the car.

STC: ACT Coined term - Safe Telematics Controls.

PDA: Personal Digital Assistant, e.g. Palm, Pocket PC etc.

Auto navigation: Digital computerized technology that assist drivers in locating their position or getting direction while driving.

Safety Categories:

ACT developed concept - Concept to categorize safe driving parameters while using Telematics

Driver intent: ACT developed term - Extremely low chance of accidental activation

Simplicity: ACT developed concept - No complexity, No information, controls or distraction overload from vehicle and Telematics

Accessibility: ACT developed concept - Controls need to be accessible by the absolute majority of drivers that are legally able to operate a vehicle.

Availability: ACT developed concept - Availability of STC independent of other systems and outside of vehicle condition

Privacy: ACT developed concept - No other party then driver is involved or has access to STC or STC data

Universality: ACT developed concept - Brand independence on vehicle and peripheral sides

Portability: ACT developed concept – Portability of peripherals that comprise an STC to be used elsewhere

Cost: ACT developed concept - Cost as a financial factor as well as a safety factor.

Updated
Presentation: 10/15/01
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Original Idea, Prepared and designed by M. A. Naboulsi

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Terms

SorS :
ISorS:
SSorS:

ACT coined term – Switch or Sensor.
Initiator SorS.
Selector SorS.

Safe Telematics Controls

The achievement of a Safe

Simple

Accessible

Universal

Available

Portable

Cost Effective

Driver Telematics Controls

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Safe Telematics Controls

The topics and comments covered here do not cover any specific Brand of service/technology or features and are not meant to evaluate the specifics of service or to claim knowledge of benefit or disadvantage of any known Brand of service existing or to be launched.

Applications, and Why

- 1: Passenger cars: Daily use is increasing rapidly
- 2: Rental vehicles: Will add benefit to a traveler
- 3: Hazardous material trucks: Helping a driver on staying focus on a primary target
- 4: Airplane, so use of these equipment, or other equipment that will effect the safety of the vessel and passenger, or to comply with the laws and regulations of a local aviation body as the plane travels across Various air space, e.g. Political, restricted etc.
- 5: Motorcycles

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Telematics:

Integration of Information, communication, computing and entertainment technologies into the car.

STC:

ACT Coined term - Safe Telematics Controls.

PDA:

Personal Digital Assistant, e.g. Palm, Pocket PC etc.

Auto navigation:

Digital computerized technology that assist drivers in locating their position or getting direction while driving.

Safety Categories:

ACT developed concept - Concept to categorize safe driving parameters while using Telematics

Driver intent:

ACT developed term - Extremely low chance of accidental activation

Simplicity:

ACT developed concept - No complexity, No information, controls or distraction overload from vehicle and Telematics

Accessibility:

ACT developed concept - Controls need to be accessible by the absolute majority of drivers that are legally able to operate a vehicle.

Availability:

ACT developed concept - Availability of STC independent of other systems and outside of vehicle condition

Privacy:

ACT developed concept - No other party then driver is involved or has access to STC or STC data

Universality:

ACT developed concept - Brand independence on vehicle and peripheral sides

Portability:

ACT developed concept – Portability of peripherals that comprise an STC to be used elsewhere

Cost:

ACT developed concept - Cost as a financial factor as well as a safety factor.

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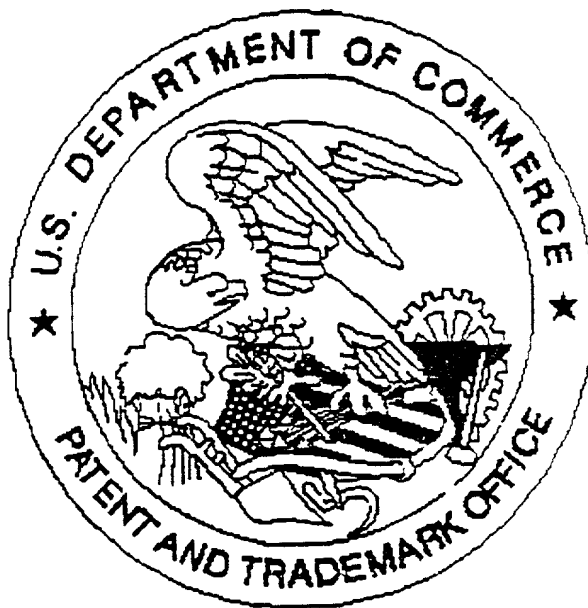
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