of communications in a hybrid system consisting of two field data buses connected by a radio link, bus and radio communications having very different constraints.

**[0019]** Another goal of the invention is to allow the personnel of the remote control station to have access to the devices, controls, sensors and commands of a weapons system such as a turret exactly as if the personnel were inside the turret. However, as soon as the turret no longer needs to be controlled and operated remotely, the additional transceiver client has to be able to be disconnected from the interface and the turret can return to the initial state thereof for being operated by onboard personnel (typically, commander and gunner).

## Summary

**[0020]** A first aspect of the present disclosure relates to a system for securing two-way communications using a radio frequency wireless network, between N weapons systems apt to be remotely operated, with N≥1, and a control station, comprising:

- a remote-control station for accommodating at least one operator, with a first field data bus to which a first controller is connected with at least a first transceiver system as a client;
- N conventional weapons systems each with a second field data bus, and at least one client,

  said system comprising an additional client with a second transceiver system, apt to be connected to each of the N weapons systems, permanently or removably, for operation in remote operation mode; the first controller with the first transceiver thereof being then apt to receive data from and/or send commands to the client via the radio network and the additional client with the second transceiver being apt to send data from and/or receive commands intended for the client via the radio network

  The first transceiver and the second transceiver being implemented in software programs, defining an operation in software radio or SDR and are configured for exchanging messages so as to provide the requested

quality of service and in particular a predetermined latency time; characterized in that said system is configured for entering degraded SDR mode if the predetermined latency time is exceeded and allow both field data buses and the respective clients thereof to be operated smoothly despite radio link interference in the following manner :

- a transmitter which sends a message to a receiver receives a first acknowledgment from the receiver, which allows the message sent to the transmitter to be erased;
- if the first acknowledgment is not received, the message is returned a certain number of times within a time limit set by the predetermined latency time;
- after said time limit, the sender enters degraded mode and/or continues to try to pass the message and/or sends a second acknowledgment to the working bus of which same is a client so that the other clients of the working bus can operate without disruption and in a transparent manner;

**[0021]** According to preferred examples, the system for securing two-way communications further comprises at least one of the following features or an appropriate combination of a plurality thereof:

- The N weapons systems are armored vehicle turrets and the clients are sensors or actuators;
- The additional client is a second controller or computer equipped with the second transceiver system for removably connecting to at least one of the N weapons systems in a conventional configuration;
- The first field bus, respectively the second field bus, is an industrial field bus such as CAN, MilCAN or Ethernet;
- field buses can be replaced by communication systems operating according to other architectures, such as e.g. a star [network] architecture;
- the accessibility for the operator to the respective devices, controllers, sensors and actuator commands of the weapons system is transparent

and identical to a conventional configuration where the weapons system is manned;

- the system is configured for accepting commands sent with very low latency;
- the system is apt to manage multiple communications with weapons systems;
- the system comprises means for searching for unmanned frequencies so as to avoid jamming and enemy radio links.

**[0022]** A second aspect of the present disclosure relates to the use of a weapons system such as an armored vehicle turret, successively according to one of the following two modes and vice versa:

- an unmanned remote operation mode using the security system for two-way radio communications between the control station and the remotely operated weapon system, as described hereinabove;
- an ordinary or conventional mode of operation, in manned form, where the second controller or computer equipped with a second transceiver system has been disconnected from the weapon system.

## Brief description of figures

**[0023]** Figure 1 shows schematically, a system for secure wireless communications between a control station and one or a plurality of remote-operated turrets according to the present invention.

**[0024]** Figure 2 represents schematically, the separation of the channels dedicated to the video stream and to the transit of commands, respectively, and of the data in the system according to the invention.

**[0025]** Figure 3 shows schematically, the means of control of communications using a working bus and a radio transmission, according to the invention.