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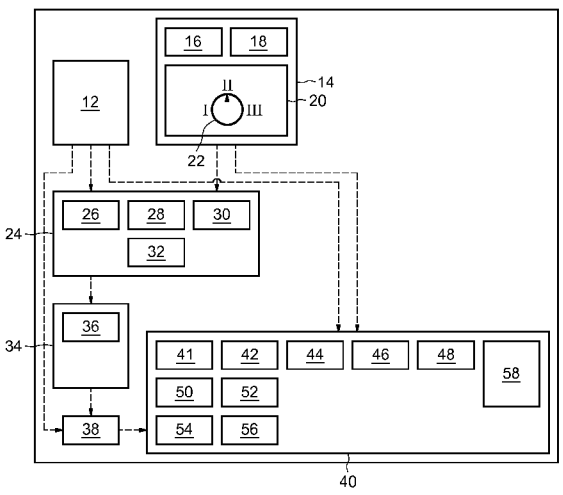
FIG.2



(57) Abstract: This alerting system (10) for a light aircraft includes a reception unit (12) for receiving a piece of information to be released, a release unit (40) able to generate an alert for addressing a piece of information received by the reception unit (12) to a user. It further includes a determination unit (24) able to determine at least one index chosen among a criticality index ($i_{criticality}$) of a piece of information received by the reception unit (12) and a non-response index ($i_{non\_response}$) of a piece of information received by the reception unit (12), the release unit (40) taking into account the index ($i_{criticality}$, $i_{non\_response}$) determined by the determination unit (24) while it generates an alert.

WO 2020/211919 A1

Alerting system for a light aircraft

This invention relates to an alerting system for a light aircraft and a method of alerting a light aircraft's pilot, co-pilot or crew member.

For instance, alerting systems for aircraft include ground proximity warning system also known by the corresponding acronym "GPWS". A GPWS is a system detecting an immediate danger of flying into the ground and addressing a sound alarm to the pilot in such case. Most commercial airplanes include a GPWS.

Although such an alerting system has significantly improved safety in commercial airplanes, few light aircraft are equipped with a GPWS. Hence, the development of alerting systems such as the GPWS did not allow improving the light aircraft's safety as well as in commercial aircraft.

Even if the aircraft is equipped with an alerting system such as a GPWS, the pilot may experience an inattentional deafness phenomenon. In such case, the pilot's concentration is such that he does not perceive the alert provided by the alerting system. As well, a relatively old pilot may have, for instance, a low hearing sensitivity preventing him to perceive a sounding alert issued by the alerting system. In both cases, the alert is not perceived by the pilot which may result in a critical hazardous situation.

This drawback is particularly strong in light aircraft. Sensory abilities of light aircraft's pilots are less supervised than those of commercial aircraft's pilots. Besides, light aircraft's pilots often fly alone. These reasons increase the risk of being overwhelmed, leading to misperception of an alert and therefore renders the existing alerting systems not adapted to light aircraft.

It is thus an object of the invention to provide an alerting system adapted to a light aircraft.

More particularly, the invention aims at improving perception of an alert by a light aircraft's pilot, co-pilot or crew member.

According to a first aspect of the invention, it is proposed an alerting system for a light aircraft including a reception unit for receiving a piece of information to be released, a release unit able to generate an alert for addressing a piece of information received by the reception unit to a user.

According to one of its general features, this alerting system further includes a determination unit able to determine at least one index chosen among a criticality index of a piece of information received by the reception unit and a non-response index of a piece of information received by the reception unit, the release unit taking into account the index determined by the determination unit while it generates an alert.

The determination unit allows the release unit to modify a release mode of the alert in case of a particularly critical piece of information and/or an alert not taken into account by a user. Hence, one limits the probability of a crucial alert being not perceived by the user.

In the present application, the word “user” refers to an occupant of the aircraft equipped with the alerting system. The user is for instance the aircraft 2’s pilot or the aircraft 2’co-pilot.

Preferably, the determination unit is further able to determine an environment-related index.

The environment-related index allows taking into account an environment’s influence on the perception of the alerts by the user. The probability of an alert being not perceived is thus further decreased.

One may also foresee a calculating unit able to calculate a salience level as a function of the index determined by the determination unit, the release unit being so configured to adjust a salience of an alert generated as a function of a salience level calculated by the calculating unit.

Salience adjustment allows organising the different alert release modes in order to modify the release mode in response to a change of an index determined by the determination unit.

Preferably, the calculating unit includes a map issuing values of a salience level as a function of said at least one index determined by the determination unit.

One may also foresee a prioritizing unit able to sort several pieces of information to be released taking into account a salience level of each piece of information.

Such a prioritizing unit attracts the user's attention on a piece of information having priority.

Several variants may be considered for sorting the pieces of information.

According to a first variant, the prioritizing unit is so configured to decrease the salience level of a piece of information if the piece of information has a salience level which is lower than a salience level of another piece of information.

According to a second variant, the prioritizing unit is so configured to zero out the salience level of a piece of information if the piece of information has a salience level which is lower than a salience level of another piece of information.

In another embodiment, the release unit is so configured to generate a multisensorial alert if a salience level of a piece of information is higher than a threshold.

Preferably, the multisensorial alert involves at least three senses.

Such a multisensorial alert is particularly efficient for overcoming an inattentional deafness and/or bad sensory capabilities while ensuring that the alerting system does not become too complex. The alerting system is thus rendered particularly adapted to a light aircraft.

One may also foresee a customization unit able to issue a user-related index, the release unit being so configured to take into account

a user-related index issued by the customization unit while it generates an alert.

The customization unit improves even more the perception by addressing to the user only alerts chosen for being easily perceived by him.

Preferably, the release unit is so configured to use a name of the user when it generates an alert.

In this way, the risk of a not perceived alert is further limited by calling out the user in outstanding situations. The name of the user may be chosen among its family name, its surname and a nickname.

In a preferred embodiment, the customization unit includes an entry module, the release unit being so configured to use a family name and/or a surname and/or a nickname inputted in the entry module.

In another embodiment, the customization unit includes a modelling module able to determine a user profile of a user of the system, the customization unit being so configured to take into account a user profile determined by the modelling module when it issues a user-related index.

Such a modelling module allows choosing alerts which may be easily perceived by the user.

Several variants may be imagined for determining the user profile.

According to a first, simple and not intrusive variant, the modelling module includes a selection module able to display a plurality of user profiles, the modelling module being so configured to receive a user profile selected by a user of the system.

According to a second variant, the modelling module includes a display screen, the modelling module being so configured to display questions on the display screen, the modelling module being so configured to determine a user profile as a function of answers given by a user of the system in response to the questions displayed on the display screen.

Such a variant allows modelling a particularly accurate user profile.

Preferably, the modelling module includes an adjustment module able to adjust a user profile taking into account actions performed by a user of the system, the adjustment module preferably taking into account actions performed during a simulation and/or actions performed in real environment.

In particular, the adjustment module learns from pilot's behaviour to update the user profile. Hence, the user profile may be rendered more accurate automatically, without requiring a direct action from the user.

According to another aspect of the invention, it is proposed a method of alerting a light aircraft's pilot including receiving a piece of information to be released, determining at least one index chosen among a criticality index of the piece of information received and a non-response index of the piece of information received, generating an alert for addressing the piece of information received to the light aircraft's pilot, wherein the index determined is taken into account while generating the alert.

Other advantages and features of the invention will emerge upon examining the detailed description of embodiments, which are in no way limiting, and the appended drawings wherein:

- figure 1 is a top-down schematic view of a light aircraft including an alerting system according to a first embodiment of the invention,
- figure 2 is a flowchart of the alerting system of figure 1,
- figure 3 is a flowchart of an alerting system according to a second embodiment of the invention,
- figure 4 is a flowchart of an alerting system according to a third embodiment of the invention, and
- figure 5 is a flowchart of an alerting system according to a fifth embodiment of the invention.

As illustrated in figure 1, a light aircraft 2, in particular a light airplane, includes a cockpit 4 and an aircraft computer 6. In the schematic view of figure 1, a pilot 8 is installed in the cockpit 4.

The aircraft computer 6 is equipped with appropriate means to detect an outstanding situation, in particular a hazardous situation. For instance, the aircraft computer 6 may detect stalling of the aircraft 2, outing the flight envelope of the aircraft 2, a risk of forgetting to extend the landing gear of the aircraft 2, a risk of forgetting to extend flaps of the aircraft 2.

Alternatively, the outstanding situation may be detected by an external device, such as a flight data recorder. This may particularly be the case in a light aircraft not equipped with an aircraft computer.

The aircraft 2 further includes an alerting system 10. In the depicted embodiment, the pilot 8 is the system 10's user. However, one may without departing from the scope of the invention consider an alerting system whose user is a co-pilot or any other crew member of the aircraft 2. The alerting system 10 is intended to alert the pilot 8 of an outstanding situation encountered by the aircraft 2. The alerting system 10 will now be described referring to the flowchart of figure 2.

The alerting system 10 includes a reception unit 12. The reception unit 12 is in data connection with the aircraft computer 6. More particularly, the reception unit 12 is so configured to receive a relevant piece of information issued by the aircraft computer 6. Such a relevant piece of information may include an information that the aircraft 2 encounters an outstanding situation or a hazardous situation detected by the aircraft computer 6.

The alerting system 10 includes a customization unit 14. The customization unit 14 includes an entry module 16. The entry module 16 may be part of the aircraft computer 6. By means of the entry module 6, the pilot 8 may enter its family name, its surname and its or one of its nickname(s). The customization unit 14 also includes a selection module 18. By means of the selection module 18, the pilot 8 may select a name among the family name, the surname and the nickname entered in the entry module 16.

The customization unit 14 further includes a modelling module 20. The modelling module 20 includes a selection module 22. In the depicted embodiment, the selection module 22 is a selector switch. The selection module 22 allows the pilot 8 to choose between a plurality of user profiles. In the depicted embodiment, the selection module 22 displays:

- a hearing sensitive profile intended to be selected by a user having a relatively good hearing ability or preferring audio alerts,
- a visual sensitive profile intended to be selected by a user having a relatively good viewing ability or preferring visual alerts, and
- a haptic and proprioception sensitive profile intended to be selected by a user with a high cutaneous sensitivity and a high sensitivity of the nervous system to information of posture and movements given by muscles and joints, or preferring haptic alerts.

The alerting system 10 includes a determination unit 24. The determination unit 24 is in data connection with the reception unit 12 and the customization unit 14.

The determination unit 24 includes a user module 26. The user module 26 is reset at the end of each flight. Nevertheless, one does not depart from the scope of the invention by foreseeing a different evolution, for instance by foreseeing that the user module 26 is reset only in case of a pilot change in the aircraft 2. From the data issued by the customization unit 14, the user module 26 infers:

- a user-related index $i_{user\_hearing}$ concerning hearing sensitivity of the pilot 8,
- a user-related index i_{user_visual} concerning visual sensitivity of the pilot 8, and
- a user-related index i_{user_haptic} concerning haptic and proprioception sensitivity of the pilot 8.

In embodiment of figure 1, the indexes $i_{user\_hearing}$, i_{user_visual} and i_{user_haptic} are determined as a function of the user profile selected by the pilot 8 by means of the selection module 22. For instance, if the

pilot 8 has selected a hearing sensitive profile, the indexes i_{user_visual} and i_{user_haptic} are 1 whereas the index $i_{user\_hearing}$ takes the value 2.

The determination unit 24 includes an environment module 28. The environment module 28 evolves continuously. In the depicted embodiment, it is regularly reset, for instance every 15 minutes. The environment module 28 is in data connection with the aircraft computer 6. More particularly, the environment module 28 is able to collect data representative of a sound level inside the cockpit 4 and data representative of ambient light and glare on an instrument panel of the cockpit 4. From this data, the environment module 28 issues:

- an environment-related index $i_{env\_hearing}$ related to hearing sensitivity, and
- an environment-related index i_{env_visual} related to visual sensitivity.

Namely, in case of a high sound level but good visibility conditions inside the cockpit 4, the index $i_{env\_hearing}$ will be lower than the index i_{env_visual}. On the contrary, in case of a high glare but low noise inside the cockpit 4, the index i_{env_visual} will be lower than the index $i_{env\_hearing}$.

The determination unit 24 includes a criticality module 30. The criticality module 30 is in data connection with the reception unit 12 and issues a criticality index $i_{criticality}$ for each piece of information received by the reception unit 12. The more important is the criticality of the piece of information, the higher is the index $i_{criticality}$. For instance, the index $i_{criticality}$ associated to a low fuel alert will be less important than the index $i_{criticality}$ of a stalling alert and much less important than a stalling alert at low altitude.

The determination unit 24 includes a non-response module 32. The non-response module 32 is in data connection with the reception unit 12. The non-response module 32 is so configured to associate a non-response index $i_{non\_response}$ to the pieces of information received by the reception unit 12. For a part of the pieces of information received by the reception unit 12, being namely the pieces of information that do not require an immediate response from the pilot 8, the index

$i_{non\_response}$ takes the minimal value. For any other piece of information, the non-response module 32 detects if the piece of information has been taken into consideration by the pilot 8 after a predetermined duration. In the depicted embodiment, the non-response module 32 implements several checks, namely four checks after four different durations from the beginning of the alert. The four different durations are namely 3 seconds, 8 seconds, 10 seconds and 12 seconds. For instances, these durations may be modified taking into account the criticality and non-response indices.

Therefore, for each piece of information collected from the reception unit 12, the determination unit 24 issues an index vector i:

$$i = \begin{pmatrix} i_{\text{user\_hearing}} \\ i_{\text{user\_visual}} \\ i_{\text{user\_haptic}} \\ i_{\text{env\_hearing}} \\ i_{\text{env\_visual}} \\ i_{\text{criticality}} \\ i_{\text{non\_response}} \end{pmatrix}$$

The alerting system 10 includes a calculation unit 34. The calculation unit 34 is in data connection the determination unit 24. The calculation unit 34 is intended to issue a salience level S_L as a function of the vector i. Namely, the salience level S_L is a vector consisting of a visual salience level S_L_{visual}, a sound salience level $S\_L_{hearing}$ and a haptic and proprioceptive salience level S_L_{haptic}. The calculation unit 34 includes a map 36 containing values of a salience level S_L as a function of the vector i:

$$S\_L = (S\_L_{hearing} \quad S\_L_{visual} \quad S\_L_{haptic})^T = f(i)$$

The alerting system 10 includes a prioritizing unit 38 in data connection with the calculation unit 34. The prioritizing unit 38 is intended to select a piece of information collected from the reception unit 12 and to increase its salience level in comparison with the salience level of the other pieces of information. To do so, the prioritizing unit 38 determines, for each piece of information collected from the reception unit 12, the module of the salience level of the piece of information:

$$\|S\_L\| = \sqrt{S\_L_{hearing}^2 + S\_L_{visual}^2 + S\_L_{haptic}^2}$$

Then, the prioritizing unit 38 selects the piece of information having the highest module. Then, the prioritizing unit 38 maintains unchanged the salience level of the selected piece of information and decreases the salience level of the other pieces of information. In other words, for two pieces of information info_1 and info_2 having respective salience levels S_L_1 and S_L_2, if the salience level S_L_1 is higher than the salience level S_L_2, the piece of information info_1 will be selected. Thus, the salience level S_L_1 will be maintained unchanged whereas the salience level S_L_2 will be decreased. In the depicted embodiment, the prioritizing unit 38 divides by two the salience level of the pieces of information that have not been selected.

The alerting system 10 includes a release unit 40. The release unit 40 is in data connection with the reception unit 12, the customization unit 14 and the prioritizing unit 38. Namely, the release unit 40 receives pieces of information to release from the reception unit 12. For each piece of information collected from the reception unit 12, the release unit 14 receives a salience level S_L issued by the prioritizing unit 38. If the alerting system is not provided with a prioritizing unit, the release unit 40 receives the salience level S_L directly from the calculation unit 34. Besides, the release unit 40 receives a name vector from the customization unit 14:

$$name = \begin{pmatrix} \text{family\_name} \\ \text{surname} \\ \text{nickname} \\ \text{name\_choice} \end{pmatrix}$$

In the depicted embodiment, the release unit 40 includes a green light emitting diode (LED) 41, an orange light emitting diode (LED) 42, a visual indicator 44, a flash indicator 46, a liquid crystal display (LCD) screen 48, a sound source 50, a telecommunication module 52, a vibration motor 54 and a heating resistor 56. The light emitting diodes 41 and 42 can emit constant light or blinking light. The flash indicator 46 may emit flashing light at different frequencies being namely 5 Hz and 10 Hz. The liquid crystal display screen 48 may display a written message, icons or colours. Without departing

from the scope of the invention, one may modify the number and colours of LEDs and use them either for continuous lighting or for blinking or flashing. Without departing from the scope of the invention, one may replace the liquid crystal display screen 48 with a head up display (HUD), a head mounted display (HMD), any other kind of screen or any other suitable display means. The sound source 50 may emit short beeps having different frequencies, being namely 1 Hz, 5 Hz, two seconds long beeps, complex sound alarms being for instance a tune or a frequency modulated beep, or a voice message. In particular, the voice message may include the user's name entered in the entry module 16 and selected in the selection module 18. The telecommunication module 52 may implement a data connection between the sound source 50 and a distant control centre (not depicted) in such a way that an operator of the distant control centre may give oral instructions to the pilot 8 via the sound source 50. The vibration motor 54 may generate vibrations having different frequencies, being namely 3 Hz or 5 Hz. The vibration motor 54 and the heating resistor 56 may be located in a cloth or a part in contact with the pilot skin, being for instance the pilot 8's jacket, the pilot 8's wristwatch, the pilot 8's headphones or the yoke of the aircraft 2.

The release unit 40 includes an alert management system 58. The alert management system 58 is able to control the elements 41 to 56 in order to generate an alert for each piece of information collected from the reception unit 12 taking into account the associated salience level. The alert management system 58 is also configured to receive the name vector issued by the customization unit 14. The alert management system 58 collects the name entered and selected by the pilot 8 and sets the sound source 50 in such a way that a sound corresponding to the name of the pilot 8 is issued by the sound source 50 at the beginning of each voice message. As well, the alert management system 58 sets the liquid crystal display screen 48 in such a way that the pilot 8's name is written thereon before each written message.

The release unit 40 is in data communication with the aircraft computer 6. This data communication allows transferring the content of the alert which may be for instance a message text to be displayed on the screen 8, a voice message to be issued by the source 50, etc.

A method of alerting the pilot 8 by means of the alerting system 10 will now be described. More particularly, the method will be described with reference to two pilots A and B. The pilot A has selected the hearing sensitive profile whereas the pilot B has selected the visual sensitive profile. A stalling condition of the aircraft 2 has been detected by the aircraft computer 6 at the time t_0. In a first example, the pilot A experiences stalling at medium altitude, being namely 1500 feet. In a second example, the pilot B experiences stalling at the same medium altitude as in the first example. In a third example, the pilot A experiences stalling at low altitude, being namely 300 feet. The environment conditions are the same for each example. Each pilot is in a plane equipped with a stall alarm but does not react to the alerts. Thus, the stall does not cease and the stall alarm continues.

The actions performed by the release module 40 following the stalling of the aircraft are indicated in the below table.

Time	**Pilot A – Situation 1**	**Pilot B – Situation 1**	**Pilot A – Situation 2**
t_0	Message on screen 48	Fixed light by LED 42	Message on screen 48 Vibration (3 Hz) by vibration motor 54 Voice message by source 50
t_0 +3 sec	Message on screen 48 Long beep (2 sec) by source 50	Fixed light by LED 42 Flash (5 Hz) by indicator 46	Voice message by source 50 Flash (5Hz) by indicator 46 Vibration (3 Hz) by vibration motor 54
t_0 +8 sec	Message on screen 48 Short beeps (1Hz) by source 50	Fixed light by LED 42 Flash (5Hz) by indicator 46 Voice message by source 50	Voice message by source 50 Flash (5Hz) by indicator 46 Vibration (3 Hz) by vibration motor 54
t_0 +10 sec	Message on screen 48 Vibration (3Hz) by vibration motor 54 Short beeps (5 Hz) by source 50	Vibration (3 Hz) by vibration motor 54 Flash (10Hz) by indicator 46 Continuous beep by source 50	Voice message by source 50 Flash (5Hz) by indicator 46 Vibration (3 Hz) by vibration motor 54
t_0 +12 sec	Voice message by source 50 Flash (5Hz) by indicator 46 Vibration (3 Hz) by vibration	Vibration (3 Hz) by vibration motor 54 Flash (10Hz) by indicator 46	Voice message by source 50 Flash (5Hz) by indicator 46 Vibration (3 Hz) by vibration

	motor 54	Short beeps (1Hz) with modulated frequency by source 50	motor 54

As may be inferred from the table, the alerts released by the release unit 40 are much more salient in situation 2 than in situation 1. Indeed, stalling is more critical at low altitude than at medium altitude. Therefore, the index $i_{criticality}$ associated to the stalling information in situation 2 is much bigger than the index $i_{criticality}$ associated to the stalling information in situation 1.

Besides, the pilot A is provided with many sound alerts whereas the pilot B is provided with many visual alerts. This is a consequence of a different sensitivity of the pilots A and B which is determined by the customization unit 14.

A stalling alert requires a response of the pilot. Therefore, the salience level increases gradually as the four checks implemented by the non-response module 32 reveal that the pilot has not responded to the alert.

If the salience level's module becomes higher than a threshold, the load management system 58 pilots a multisensorial alert. In the depicted embodiment, the multisensorial alert involves three senses by combining, namely, a haptic alert, a visual alert and a sound alert. In the depicted embodiment, the multisensorial alert is implemented after 10 seconds without response in situation 1 and immediately in situation 2.

Figure 3 illustrates an alerting system 60 according to a second embodiment of the invention. The same elements have the same references.

The alerting system 60 differs from the alerting system 10 in that the prioritizing unit 38 is replaced with a prioritizing unit 62. As well as the prioritizing unit 38, the prioritizing unit 62 selects the piece of information having the highest salience level. Then, the prioritizing unit 62 is so configured to zero out or annul the salience level of the pieces of information which are not selected.

In other words, considering the precited example, the piece of information info_2 has a salience level S_L_2 lower than the salience

level S_L_1 of the piece of information info_1. As a consequence, the prioritizing unit 62 sets the value S_L_2 to zero whereas it maintains the value S_L_1 unchanged.

One may also foresee a further embodiment wherein the alerting system includes both prioritizing units 38 and 62. In such an embodiment, for instance, the prioritizing unit 62 may be used if and only if two alerts are in conflict with each other. For instance, if a first piece of information is to be addressed by an alert being a blinking light on a LED and a second piece of information is to be addressed by an alert being a continuous light on the same LED, those alerts are in conflict with each other and the prioritizing unit 62 is operated instead of the prioritizing unit 38.

Figure 4 illustrates an alerting system 64 according to a third embodiment of the invention. The same elements have the same references.

The alerting system 64 differs from the alerting system 10 in that the selection module 22 is replaced with a display screen 66. The modelling module 20 is so configured to display a plurality of questions on the display screen 66. Namely, the modelling module 20 displays a question asking an age, a gender, a visual disability and a hearing disability. The modelling means 20 is so configured to collect the responses provided by the pilot 8 to the questions and to choose a user profile taking into account the responses collected. For instance, if the pilot 8 is seventy years old and has a high hearing disability, the modelling means 20 chooses a visual or haptic user profile.

Although, in the third embodiment, the display screen 66 replaces the selection module 22, one may without departing from the scope of the invention imagine an embodiment combining the display screen and the selection module. For instance, in such an embodiment, provisional user-related indexes may be inferred from the selection implemented by the pilot 8 by means of the selection module. Then, definitive user-related indexes may be obtained by adjusting the provisional user-related indexes on the basis of the responses provided by the pilot 8 to questions displayed on the display screen.

Figure 5 illustrates an alerting device 68 according to a fourth embodiment of the invention. The same elements have the same references.

The alerting system 68 differs from the alerting system 64 in that it further includes an adjustment module 70. The adjustment module 70 is so configured to analyse the pilot 8's responses to alerts provided by the release units 40. Namely, if the pilot 8 almost never reacts after a sound alert, the adjustment module 70 decreases the index $i_{user\_hearing}$.

The alerting system 68 and the adjustment module 70 may be operated during a flight simulation. Adjusting the pilot-related indexes during a simulation is particularly advantageous because it allows having in alerting system which is directly accurately adapted to the pilot 8 without requiring flying with an inefficient alerting system.

As well, the adjustment module 70 may be operated in real flight conditions. In the depicted embodiment, adjustment in real flight conditions is combined with adjustment during a flight simulation, which improves even more the accuracy of the pilot-related indexes. Nevertheless, the adjustment in real flight conditions may replace the adjustment during a flight simulation. In such case, the alerting system is more quickly and easily available to the pilot 8.

CLAIMS

1. Alerting system (10, 60, 64, 68) for a light aircraft (2) including a reception unit (12) for receiving a piece of information to be released, a release unit (40) able to generate an alert for addressing a piece of information received by the reception unit (12) to a user (8), characterized in that it further includes a determination unit (24) able to determine at least one index chosen among a criticality index ($i_{criticality}$) of a piece of information received by the reception unit (12) and a non-response index ($i_{non\_response}$) of a piece of information received by the reception unit (12), the release unit (40) taking into account the index ($i_{criticality}$, $i_{non\_response}$) determined by the determination unit (24) while it generates an alert.

2. System (10, 60, 64, 68) according to claim 1, wherein the determination unit (24) is further able to determine an environment-related index ($i_{env\_hearing}$, i_{env_visual}).

3. System (10, 60, 64, 68) according to claim 1 or 2, including a calculating unit (34) able to calculate a salience level (S_L) as a function of the index ($i_{criticality}$, $i_{non\_response}$) determined by the determination unit (24), the release unit (40) being so configured to adjust a salience of an alert generated as a function of a salience level (S_L) calculated by the calculating unit (34), the calculating unit (34) preferably including a map (36) issuing values of a salience level (S_L) as a function of said at least one index ($i_{criticality}$, $i_{non\_response}$) determined by the determination unit (24).

4. System (10, 60, 64, 68) according to any of claims 1 to 3, further including a prioritizing unit (38) able to sort several pieces of information (info_1, info_2) to be released taking into account a salience level (S_L_1, S_L_2) of each piece of information (info_1, info_2).

5. System (10, 64, 68) according to claim 4, wherein the prioritizing unit (38) is so configured to decrease the salience level (S_L_2) of a piece of information (info_2) if the piece of information

(info_2) has a salience level (S_L_2) which is lower than a salience level (S_L_1) of another piece of information (info_1).

6. System (60) according to claim 4, wherein the prioritizing unit (38) is so configured to zero out the salience level (S_L_2) of a piece of information (info_2) if the piece of information (info_2) has a salience level (S_L_2) which is lower than a salience level (S_L_1) of another piece of information (info_1).

7. System (10, 60, 64, 68) according to any of claims 1 to 6, wherein the release unit (40) is so configured to generate a multisensorial alert if a salience level (S_L) of a piece of information is higher than a threshold.

8. System (10, 60, 64, 68) according to any of claims 1 to 7, further including a customization unit (14) able to issue a user-related index ($i_{user\_hearing}$, i_{user_visual}, i_{user_haptic}), the release unit (40) being so configured to take into account a user-related index ($i_{user\_hearing}$, i_{user_visual}, i_{user_haptic}) issued by the customization unit (14) while it generates an alert.

9. System (10, 60, 64, 68) according to claim 8, wherein the release unit (40) is so configured to use a family name and/or a surname and/or a nickname of a user (8) when it generates an alert.

10. System (10, 60, 64, 68) according to claim 9, wherein the customization unit (14) includes an entry module (16), the release unit (40) being so configured to use a family name and/or a surname and/or a nickname inputted in the entry module (16).

11. System (10, 60, 64, 68) according to any of claims 8 to 10, wherein the customization unit (16) includes a modelling module (20) able to determine a user profile of a user (8) of the system (10, 60, 64, 68), the customization unit (16) being so configured to take into account a user profile determined by the modelling module (20) when it issues a user-related index ($i_{user\_hearing}$, i_{user_visual}, i_{user_haptic}).

12. System (10, 60) according to claim 11, wherein the modelling module (20) includes a selection module (22) able to display a plurality of user profiles, the modelling module (20) being so

configured to receive a user profile selected by a user (8) of the system (10, 60).

13. System (64, 68) according to claim 11 or 12, wherein the modelling module (20) includes a display screen (66), the modelling module (20) being so configured to display questions on the display screen (66), the modelling module (20) being so configured to determine a user profile as a function of answers given by a user (8) of the system (64, 68) in response to the questions displayed on the display screen (66).

14. System (68) according to any of claims 11 to 13, wherein the modelling module (20) includes an adjustment module (70) able to adjust a user profile taking into account actions performed by a user (8) of the system (68), the adjustment module (70) preferably taking into account actions performed during a simulation and/or actions performed in real environment.

15. Method of alerting a light aircraft's pilot (8) including receiving a piece of information to be released, determining at least one index chosen among a criticality index ($i_{criticality}$) of the piece of information received and a non-response index ($i_{non\_response}$) of the piece of information received, generating an alert for addressing the piece of information received to the light aircraft's pilot (8), wherein the index ($i_{criticality}$, $i_{non\_response}$) determined is taken into account while generating the alert.

FIG.1

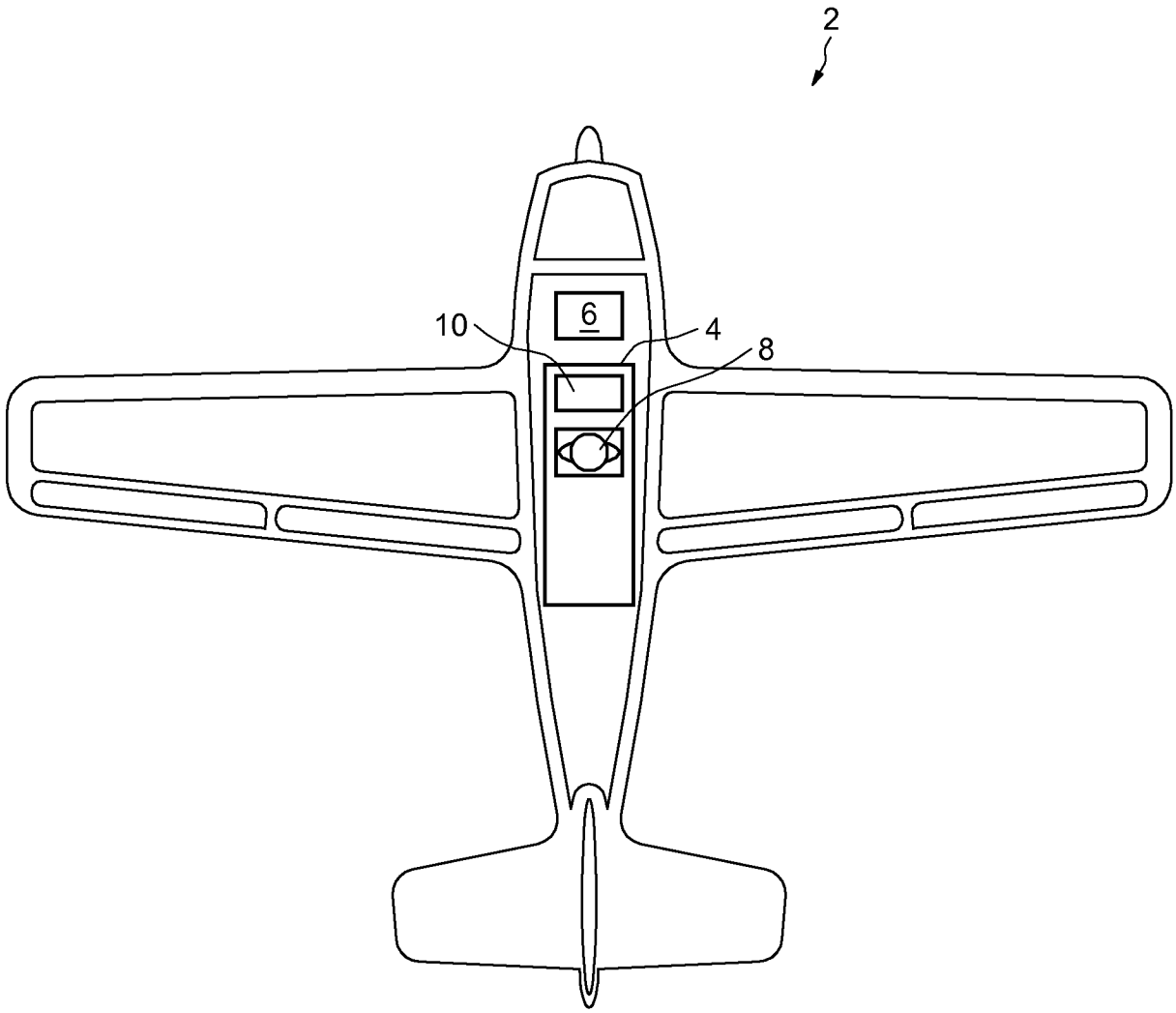


FIG.2

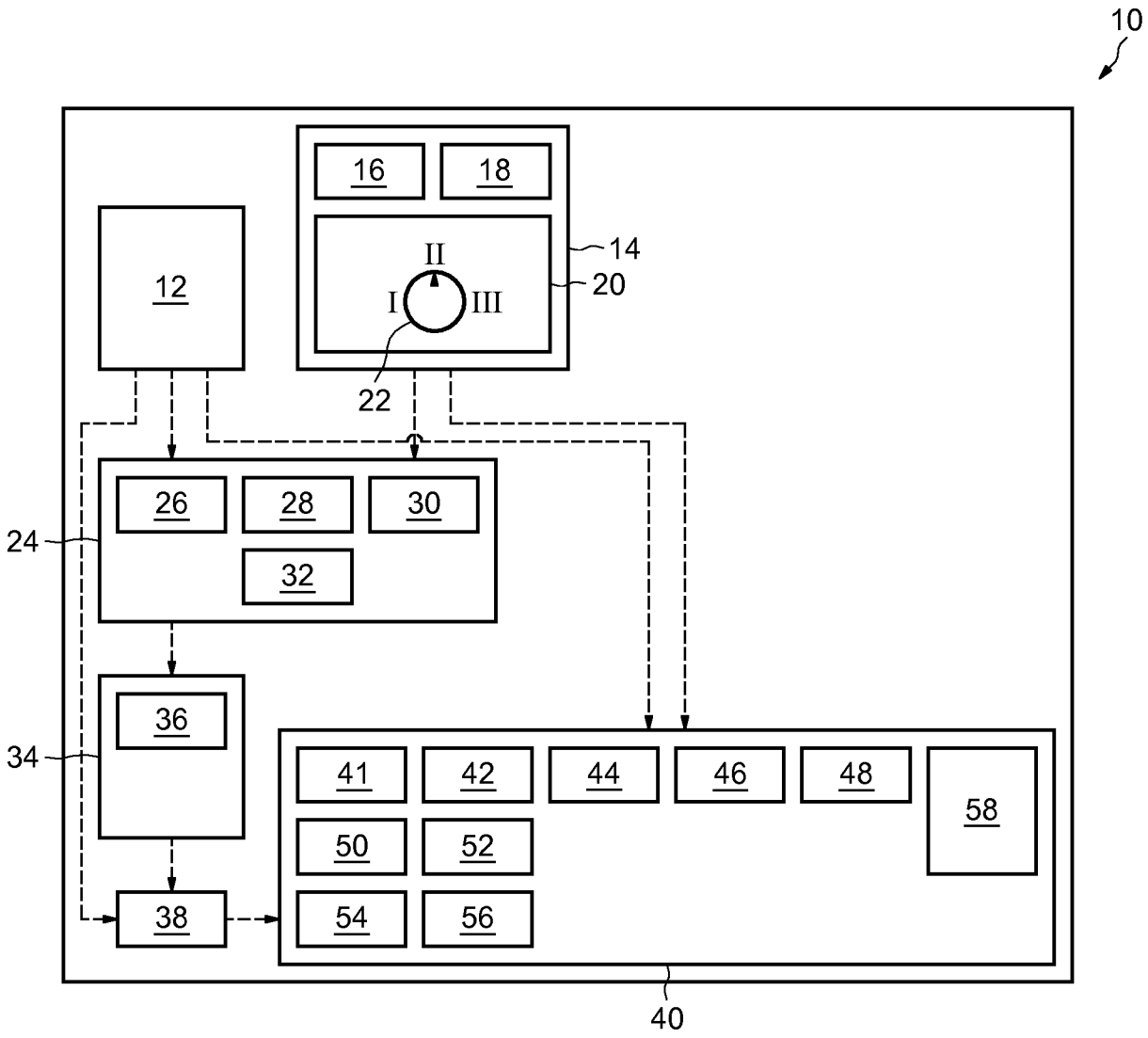

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FIG.3

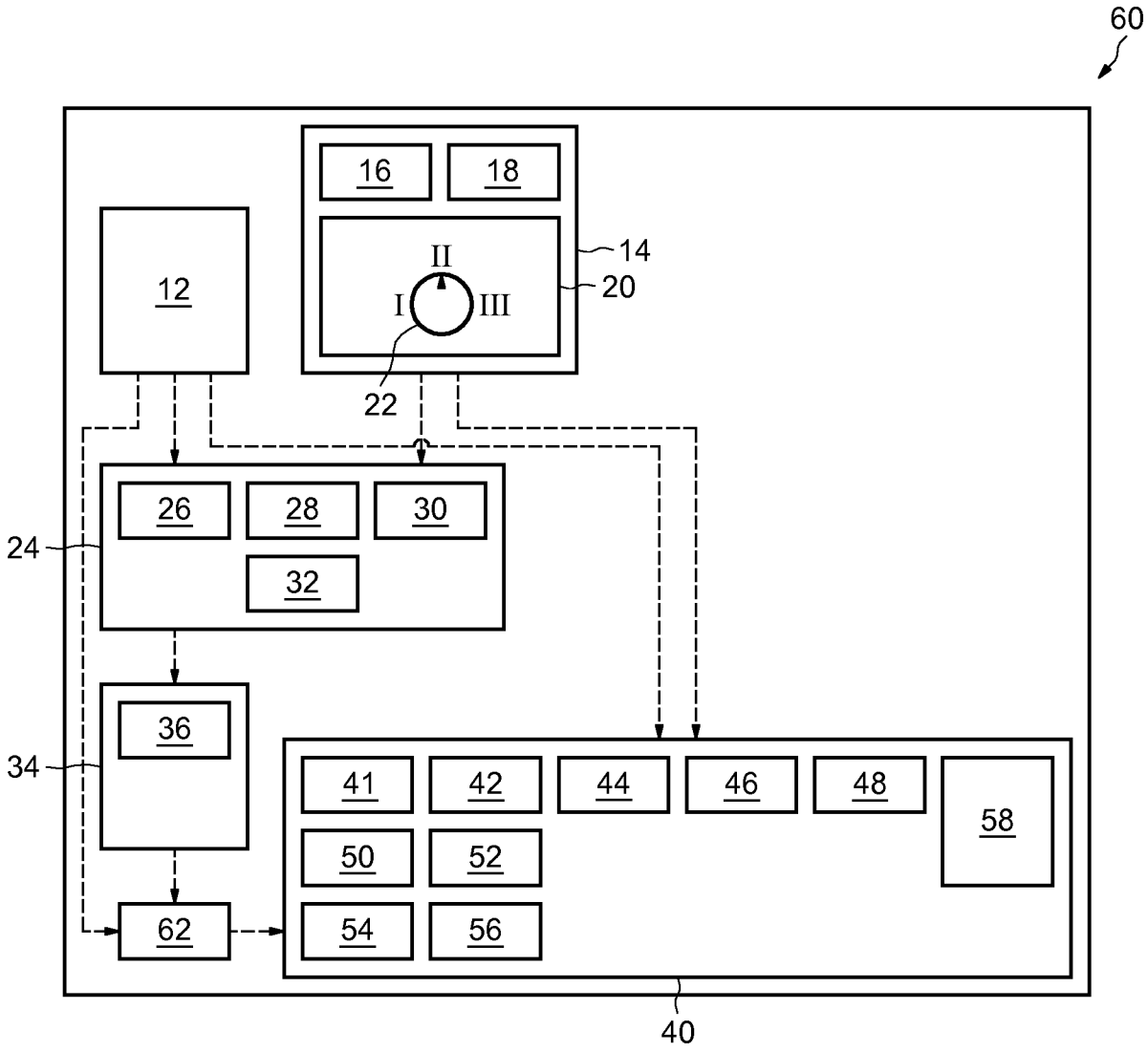
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FIG.4

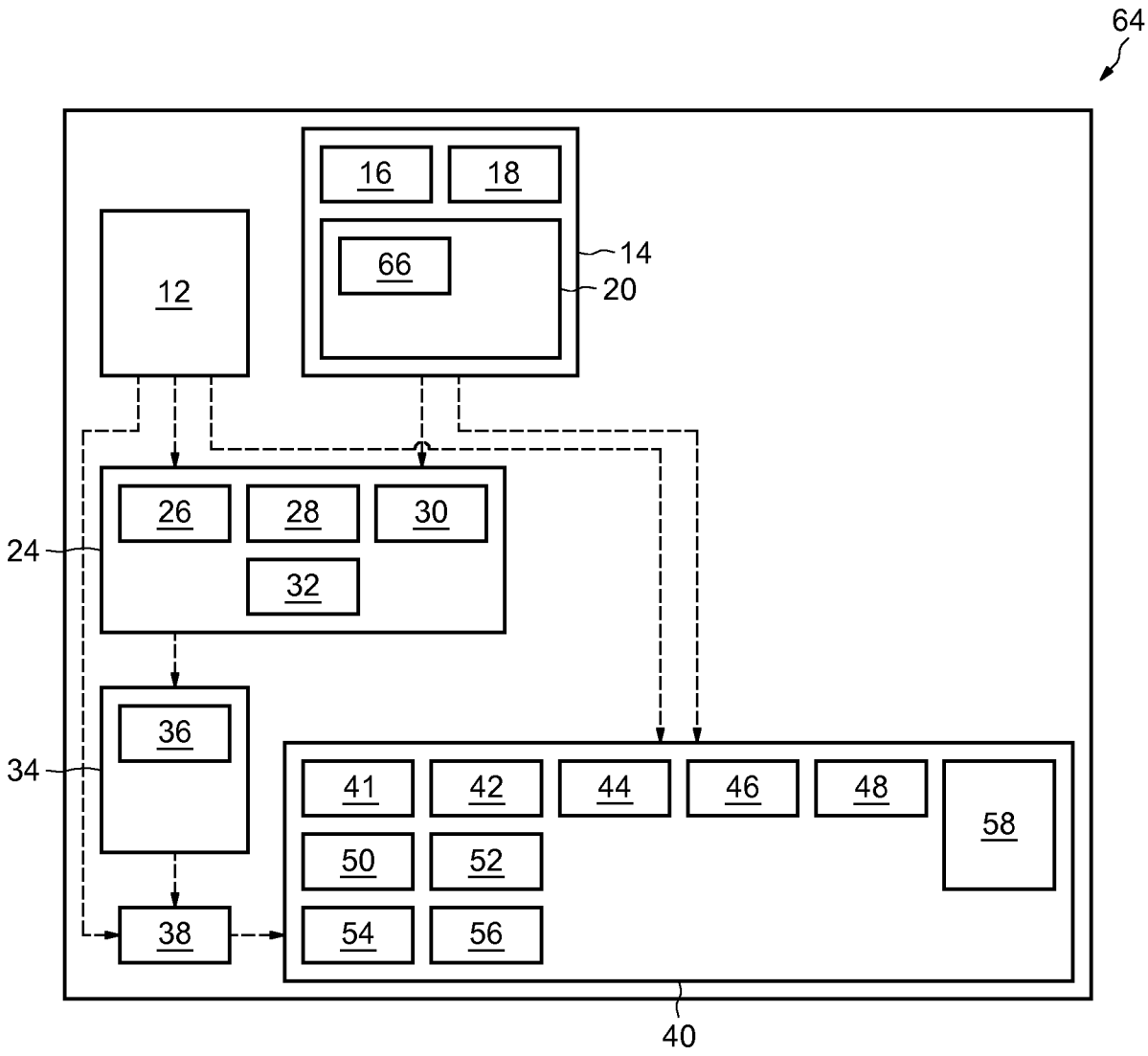
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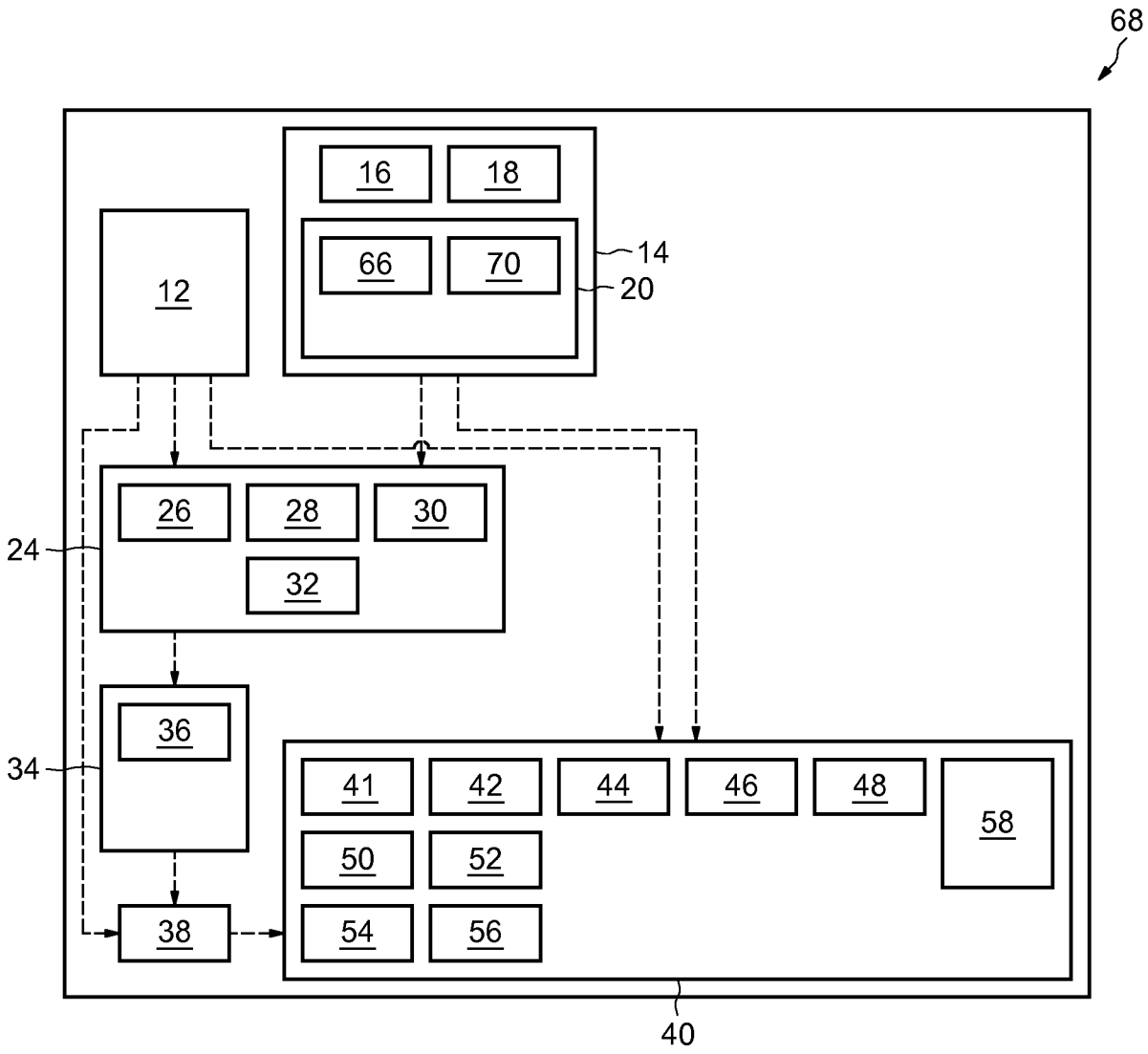
FIG.5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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/059656

A. CLASSIFICATION OF SUBJECT MATTER
INV. B64D43/02 B64D45/00 G07C5/00 G08G5/00
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B64D G07C G08G

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 043 757 A (PATRICK NICHOLAS J M [US]) 28 March 2000 (2000-03-28) column 3, line 26 - column 5, line 9; figures 1-6	1-8,15
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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 December 2019	18/12/2019

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Lambert, Brice

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/059656

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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