

A MOBILIZED DIAGNOSTIC SYSTEM

Technical Field

The present disclosure relates to a mobilized diagnostic system for providing timely diagnosis thus treatment to patients suffering from acute cerebrovascular diseases (CVD) or stroke. In more specific, the disclosed system features a mobile computerized tomography (CT) scanner having improved safety against leakage of the electromagnetic irradiation used in the CT scanning and better brain imaging quality.

Background

Cerebrovascular accident (CVA) or Stroke has become worldwide issues in connection to diets and ever-increasing aging population in the society. Without timely treatment, stroke can lead to serious morbidity and mortality to the patients. Stroke generally requires long period of time for recovery hence rendering most of them bed-ridden and lack of productivity during the recovery period. To counter or reduce severity of the negative impact caused by stroke, it is important to provide prompt treatment to these patients to prevent further deterioration. Still, the origin of the injuries has to be identified before any treatments can be administrated. However, the golden hour of 4.5 hours to treat acute stroke are mostly squandered on making the way to reach the patients and transferring to the closest hospital, if available, before a doctor can actually diagnose and treat. In view of that, there is a need of a mobilized diagnostic and treatment system equipped with the necessary medical devices including CT machine and communication module that the mobilized system can travel to a site, where acute stroke patients located, for providing immediate diagnosis and consultation for a treatment plan by a remotely stationed neurologist through the communication module.

Japanese patent application no. 3027769 attempts to develop a CT examination vehicle having a CT scanner mounted in a central portion in the longitudinal direction of the vehicle. The vehicle carries an entrance at the rear wall for a subject on a stretcher or a wheelchair to be admitted and access the CT scanner. The vehicle disclosed in this Japanese patent application requires all medical staffs of the vehicle to stay out of the vehicle throughout a scanning process of the CT scanner to avoid exposure to the radioactive irradiation. Further, Chinese patent publication No. 111544025A discloses another mobilized CT scanning vehicle incorporated

with a damping mechanism to prevent accidental movement of the CT scanner caused by condition of the road that the vehicle travels through. Mobile diagnostic system described in Chinese patent publication no. 102988142 also feature a similar damping mechanism to protect functionality of the CT scanner regardless of the road condition.

5 Summary

The present disclosure aims to provide a mobilized diagnostic and treatment system for providing a timely diagnosis then supportive treatment or even treatment to a patient with CVA or Acute Stroke. Particularly, the disclosed system is incorporated with a CT scanning assembly, which can be used to derive a diagnosis or preliminary diagnosis from a patient of CVA or
10 brain injuries.

Another object of the present disclosure is to provide a mobilized diagnostic system with a communication module enabling instant communication of at least a paramedic or an emergency medical technician (EMT) operating the disclosed system with a remotely located medical officer to derive a diagnosis or preliminary diagnosis and subsequently being able to
15 administrate a treatment or supportive treatment to acute stroke patients. Several proven specific managements including intravenous thrombolysis medication, blood pressure reduction, and intravenous fluid replacement if indicated shall prevent deterioration or aggravation of the patient's health condition before receiving the appropriate medical care from the doctor stationed at the hospital.

20 More object of the present disclosure is to cater a mobilized diagnostic system capable of offering CT scanning services to patients of all ages and sizes by adjusting the relative position of various components of an assembly of CT scanner installed. More specifically, the disclosed system can adjust a position of a body part of a subject or patient to be examined by the assembly of CT scanner regardless of the age and size of the subject within a limited space
25 of a transportation unit or a caravan attached to a transportation unit.

At least one of the preceding objects is met, in whole or in part, by the present disclosure, in which one of the embodiments of the present disclosure is a mobile diagnostic system or mobilized diagnostic system comprising a land transportation unit having a driving cabin; a caravan defining a longitudinal chamber being connected to and transportable by the

transportation unit; an assembly of computerized tomography (CT) scanner resided within the chamber, the assembly comprising a base movably placed on a floor of the chamber through a first locking mechanism, a gantry defining a central bore being vertically erected on top of the base for receiving a body part of a subject thereto, and a horizontally extending couch on which the subject rested on being detachably fastened on the floor through a second locking mechanism succeeding to the gantry; a control module resided within the driving cabin communicatively connecting to the assembly for controlling operation of the assembly; and a primary power source for providing energy to a movement of the transportation unit and an operation of the assembly of CT scanner.

10 Preferably, the first locking mechanism realizes movement of the gantry towards or away from the couch along a horizontal axis and the second locking mechanism prohibits movement of the fastened couch on the floor. Also, the couch is configurable to adjust a distance of the subject in relation to the floor along a vertical axis.

15 In some embodiments, the chamber is concealed from driving cabin by a front wall of the caravan that a front door is fabricated on the front wall for accessing the chamber from the driving cabin.

For more embodiments, the chamber is accessible from an external environment through a rear door fabricated on a rear wall of the caravan.

20 In more embodiments, the caravan has an internal surface covered with an aluminium composite-based coating and an external surface covered with a lead-based coating.

For more embodiments, the aluminium composite-based coating has a thickness of 3-5 mm, and the lead-based coating has a thickness of 0.5-2 mm.

To prevent leakage of the radiation used in the CT scanner, the caravan is substantially wrapped in stainless steel in addition to the coating for some embodiments.

25 In more embodiments, the system may further comprise a secondary power source for providing energy for an operation of the assembly of CT scanning upon failing of the primary power source in providing the energy to the assembly of the CT scan. Preferably, in some

embodiments, the secondary power source is a rechargeable battery which is recharged by the primary power source when the secondary power source is idle.

To effectuate instant communication with the medical officer, the disclosed system further comprising a communication module enabling wireless communication of an operator
5 of on site with an external party.

Also, in other embodiments, the couch comprises an upholstered bed, a frame extending downward from an underneath surface of the bed, and at least a pair of wheels provided to the frame enabling sliding movement of the couch on a relatively flattened surface.

10 For elevating the couch along the vertical axis, the frame facilitates engagement of the couch to the second locking mechanism and movement of the couch along the vertical axis.

In more embodiments, the disclosed system further comprises one or more continuous tracks assembled at a bottom of the base to enable forward or backward movement of the gantry in relation to the couch.

15 In several embodiments, the first locking mechanism comprises a pair of floor brackets each being spaced to mount on the floor in parallel defining a passageway therebetween for placement and movement of the base in relation to the couch and a longitudinally running trough being defined within each floor bracket, a pair of base brackets each being spaced apart to affix onto the base such that each base bracket comprises a downwardly extending hand
20 insertable into the corresponding trough of the floor bracket permitting sliding movement of the base and the gantry thereby in relation to the couch, an actuator activatable for effectuating a forward movement of the gantry towards the couch or a backward movement of the gantry away from the couch, an electromagnetic component capable of generating a magnetic field upon receiving an electric current, and a locking element residing within the trough engaged to
25 the hand of the base bracket in a default locking mode prohibiting sliding of the base bracket via the trough and the locking element being switchable to an unlocking mode to disengage from the hand of the base upon generation of the magnetic field by the electromagnetic component and activation of the actuator.

Also, in more embodiments, the second locking mechanism comprises an elongate
30 stage raised from the floor expanding along the length and a midpoint of the chamber with a

pair of side edges each defining a groove for forming a sliding rail therein, a rack extendable from the frame to be slidably engaged to the sliding rails upon pushing the couch towards the gantry such that the couch is free of sideways movement, an arrangement on the frame for adjustment of a position of the bed along a vertical axis in relation to a level of the floor, and a gripper extending upward from the stage to releasably anchor onto the frame to secure the position of the couch on the floor.

Preferably, in several embodiments, the disclosed mobilized diagnostic system further comprises N number of weight sensors installed and spaced apart on the floor corresponding to the relative orientation of the wheels of the couch at a horizontal plane that the weight sensors are configured to measure a weight of the subject upon aligning the wheels with the sensors. More preferably, N equals to the number of wheels of the couch. Still, in some embodiments, the weight sensor measuring the weight of the subject is free from being interfered by an engagement of the rack and the sliding rails.

15 **Brief Description of Drawings**

Fig. 1 is a side view of one embodiment of the disclosed mobilized diagnostic system (a) with and (b) without the sidewall;

Fig. 2 is a bottom view of the embodiments shown in Fig. 1;

Fig. 3 is a rear view of the embodiments shown in Fig. 1;

20 Fig. 4 illustrates (a) part of the first locking mechanism without fastening to the CT scanner and (b) with the CT scanner mounted to it;

Fig. 5 illustrates (a) the second locking mechanism without latching on the couch and (b) with the couch fastened to it;

Fig. 6 illustrates part of the first locking mechanism in more details;

25 Fig. 7 shows one embodiment of the chamber defined by the caravan with the inset revealing the relative arrangement of various coatings and wrappings on the wall of the caravan;

Fig. 8 illustrate an arrangement of the couch in relation to the second locking mechanism of several embodiments of the disclosed system; and

Fig. 9 is a picture showing an engagement of the rack of the frame with the sliding trails of the stage.

5 Detailed Description

Hereinafter, the disclosure shall be described according to the preferred embodiments and by referring to the accompanying description and drawings. However, it is to be understood that referring the description to the preferred embodiments of the disclosure and to the drawings is merely to facilitate discussion of the various disclosed embodiments and it is envisioned that those skilled in the art may devise various modifications without departing from the scope of the appended claim.

Referring to Fig. 1 to Fig. 7, various embodiments of a mobilized diagnostic system (100) with respect to the present disclosure is described. Essentially, the mobilized diagnostic system (100) comprises a land transportation unit (110) having a driving cabin (111); a caravan (120) defining a longitudinal chamber (121) being connected to and transportable by the transportation unit (110); an assembly of computerized tomography (CT) scanner (130) resided within the chamber (121), the assembly (130) comprising a base (131) mounted on a floor (122) of the chamber (121) through a first locking mechanism (140), a gantry (132) defining a central bore (133) being vertically erected on top of the base (131), and a horizontally extending couch (170) detachably fastened on the floor (122) through a second locking mechanism (150) succeeding to the gantry (132); a control module (160) resided within the driving cabin (111) or the chamber (121) communicatively connecting to the assembly (130) for controlling operation of the assembly (130); and a primary power source for providing energy to a movement of the transportation unit (110) and an operation of the assembly of CT scanner (130). Preferably, the first locking mechanism (140) realizes movement of the gantry (132) towards or away from the couch (170) along a horizontal axis and the second locking mechanism (150) prohibits movement of the fastened couch (170) on the floor (122). The couch (170) is configurable to adjust a distance of the subject in relation to the floor (122) along a vertical axis. The gantry (132)

essentially houses one or more X-ray sources capable of radiating x-ray towards a body part to be examined and a plurality of x-ray detectors for capturing the x-ray signal passing through the body part. A slip ring (not shown) is coupled to the gantry (132) for transmitting the electricity and electrical signal across the moving interface of the gantry while a body part of a subject or patient rests inside the bore (133) of the gantry.

As illustrated in the figures given, the land transportation unit (110) can be a modification of campervan, camper lorry, camper bus, etc with a caravan (120) or caravan-like construct projecting out from the rear of the driving cabin (111) for accommodating the assembly of CT scanner (130). In some embodiments, a modified truck, lorry, or the like preferably having a caravan (120) or a planar platform extending from the rear for receiving the caravan (120) loaded thereupon. The land transportation unit (110) employed in the present disclosure shall possess sufficient power to pull the caravan (120), the assembly of CT scanner (130), the system (100) operator and/or paramedics, and other equipment being necessary for administering emergency medical support to the patients. Specifically, the primary power source of the disclosed system (100) is preferably an internal combustion engine resided in the land transportation unit (110) that the internal combustion engine run on petrol or diesel to provide the needed power for the operation of the disclosed system (100). For further embodiments, the disclosed system (100) may include a secondary power source (191) for providing energy for an operation of the assembly of CT scanner upon failing of the primary power source in providing the energy to the assembly of the CT scanner. There are possible scenarios where the fuel in the engine may be running low and transportation unit (110) is travelling around an area that acquiring a fuel in time can be difficult. The presence of the secondary battery ensures the operation of the assembly of CT scanner (130) remains intact despite the primary power source runs into trouble including low fuel reservation. Preferably, the secondary power source (191) is a rechargeable battery module which is recharged by the primary power source when the secondary power source (191) is idle. More specifically, the rechargeable battery employed as the secondary power source (191) is a lithium-ion battery coupled to a circuit being configured to drain power from the primary power source for

recharging when the secondary power source (191) is not in use. Once the secondary power source (191) is switched on by the paramedic or the operator, the assembly of CT scanner (130) shall by default utilize the power of the secondary power source (191) instead of the primary power source according to some of the preferred embodiments. Also, there are embodiments of the disclosed system (100) that a rechargeable battery is used as the primary powers source. Still, there are embodiments that the operation of the assembly of CT scanner (130) runs solely on the power supplied from the secondary power source (191), which instead can be recharged from the primary power source or an external power grid.

Form Fig. 1 and Fig. 2, one can see that the disclosed system (100) is generally separated into two different compartments. The cabin (111) of the transportation unit (110) is positioned at the front while the chamber (121) keeping the assembly of the CT scanner (130) is located at the rear portion of the disclosed system (100). The front of the cabin (111) carries a windshield of the transportation unit (110) with the internal combustion engine (not shown) located under the hood of the cabin (111). A wheel steering (114) and a driver seat (115) are positioned behind the windshield for a driver to maneuver the transportation unit (110). Furthermore, the secondary power source (191) or rechargeable battery module is installed within the cabin (111) preferably abutting on one of the sidewalls for obtain better stability against the vibration as a result of the transportation unit (110) movement. Further, the cabin (111) and/or the chamber (121) is where a workstation (116) located. At the workstation (116), a control module (160) preferably in the form of a computing device such as laptop, desktop, tablet, etc. is made available for the paramedics or operators to manage the operation of the assembly of CT scanner (130) from thereto. Preferably, the disclosed system (100) may further comprise a communication module at the workstation (116) enabling wireless communication of an operator on site with an external party. The external party can be one or more medical officers, doctors, specialists in the medical field with the desired qualifications and/or experience to advise the paramedics on providing supportive treatment to the patients remotely. The wireless communication module may adopt any know cellular technologies known in the art to effectuate the wireless communication. For example, the cellular technologies applicable in the

present disclosure for the wireless communication module can be, but not limited to, Global System (100) for Mobile Communications (GSM), General Packet Radio Service (GPRS), Code-Division Multiple Access (CDMA) One, CDMA2000, Enhanced Data Rates for GSM Evolution (EDGE), 3G, 4G, or 5G network. More preferably, the wireless communication
5 module features both audio and video communications for multiple parties enabling better communication among different parties involved in a real-time or almost real-time manner. The cabin (111) may be occupied with some storages cabinets housing various medical equipment needed for providing supportive treatment to the patient.

According to several embodiments of the disclosed system (100), the cabin (111) of the
10 transportation unit (110) is accessible from several door fabricated on the body of the transportation unit (110). For instance, there are two opposites cabin doors (119) installed around the driver seat (115), one for the driver to get into the driver seat (115) while another one for the paramedics to enter into the cabin (111). It is noteworthy that the chamber (121) is concealed from driving cabin (111) by a front wall (118) of the caravan (120) that a front door is fabricated
15 on the front wall (118) for accessing the chamber (121) from the driving cabin (111). The front wall (118) compartmentalizes the cabin (111) and the chamber (121) into two separate sections. In few embodiments, the front door may request verification about identity of the personnel using the front door such that only those authorized can access the chamber (121) and vice versa. It is important to note that the caravan (120) and the transportation unit (110) can be constructed
20 in a single body, in which the cabin (111) and chamber (121) are separated by the front wall (118), for a number of embodiments of the disclosed system (100).

In addition to the front door, there are a side door (128) and/or a rear door (129) rendering the chamber (121) accessible by the patients and/or the paramedics. More specifically, the side door (128) is located at least at one lateral side of the caravan (120). Preferably, the side door
25 (128) is only accessible by the operator or technician for servicing the assembly of CT scanner (130). As to the rear door (129), it is dedicated for the paramedics to admit the patient into the chamber (121) such that the patient can be derive a preliminary diagnosis using the assembly of CT scanner (130). Particularly, the admission of the patient from an environment external to

the chamber (121) can be performed through a rear door (129) fabricated on a rear wall (127) of the caravan (120). To facilitate transfer of the patient from a floor level lower than the chamber (121), the caravan (120) comprises an extendable rear ramp (192) attached right below the rear door (129). The rear ramp (192) can be switched between an extended position and a retracted position. When the rear ramp (192) is not in use, it is kept under the bottom of the caravan (120) as the retracted position. Upon activation, the rear ramp (192) extends out from the bottom of the caravan (120) with the outwards end tilted towards the lower floor level creating a slanting ramp for the paramedic to push the patient on a wheeled-stretcher or the couch (170) ascending into the chamber (121). A control console of the rear ramp (192) may be placed within the chamber (121) around the rear door (129). The paramedic or operator can move the rear ramp (192) between the retracted position and the extended position through the control console. Also, in alternative embodiments, the rear ramp (192) may be flipped towards the rear wall (127) rather than keeping under the bottom of the caravan (120) in the retracted position. The rear ramp (192) flips away from the rear wall (127) to create the ascending ramp to adopt the extended position in these embodiments.

Pursuant to more embodiments, the walls (including sidewalls, front wall and rear wall) are preferably constructed from at least three different layers. Particularly, the caravan (120) can be fabricated from fiberglass or aluminium thus giving rise to a base layer (181) of the wall of the caravan (120). Additionally, the inner surface of the base layer (181) facing the chamber (121) is covered with an aluminium composite-based coating composing an inner (182) or internal layer of the wall. On the other hand, an external surface of the base layer (181) facing towards the external environment is covered with a lead-based coating establishing an external or exterior layer (183) thereto. Combination of the base layer (181), the inner layer (182) and the exterior layer (183) shall grant the caravan (120) the capacity to filter out harmful radiation discharged during operation of the assembly of CT scanner (130). To filter the electromagnetic irradiation completely or almost completely, the aluminium composite-based coating preferably has a thickness of 3-5mm while the lead-based coating has a thickness of 0.5-2mm. The thickness ratio of the exterior layer (183): base layer (181): inner layer (182) is 0.5:2:1. In

more preferred embodiments, the caravan (120) is substantially wrapped in stainless steel to render the caravan (120) better resistance against corrosion caused by most of environmental agents. The stainless-steel layer (184) shall be in a thickness of 0.5 to 2mm wrapping the exterior layer (183), the base layer (181) and the inner layer (182) underneath and form the exterior of the caravan (120). The arrangement of the stainless-steel wrapping, the exterior layer (183), the base layer (181) and the inner layer (182) for the wall of the caravan (120) associated to several embodiments can be seen in the inset of Fig. 7.

In a number of embodiments, the disclosed system (100) may further comprise a waste management module (not shown) with a receiving inlet resided within the chamber (121) and a discharge outlet fabricated on the exterior of the caravan (120). The receiving inlet and the discharge outlet (177) may be connected through a chute for moving the waste from the interior of the caravan (120) to the exterior. Both the receiving inlet and discharge outlet may be concealed with a lid, which can be swung open for disposal or collection of waste.

An alloy or metal plate (199) can be mounted underneath of the floor, as revealed in Fig. 2, to support and/or reinforce securement of the assembly of the CT scanner (130) including parts of the first locking mechanism (140). Similarly, reinforced support (198) can be found at the bottom of the caravan (120) to create better securement of the second locking mechanism (150).

With reference to the Fig. 5a and 5b, perspective views of parts of the first locking mechanism (140) without and with mounting of the base (131) and gantry (132) are respectively illustrated. Particularly, the first locking mechanism (140) comprises, a pair of floor brackets (141) each being spaced to mount on the floor (122) in parallel defining a passageway therebetween for placement and movement of the base (131) in relation to the couch (170) and a longitudinally running trough (143) being defined within each floor bracket (141), a pair of base brackets (142) each being spaced apart to affix onto the base (131) such that each base bracket (142) comprises a downwardly extending hand insertable into the corresponding trough (143) of the floor bracket (141) permitting sliding movement of the base (131) and the gantry

(132) thereby in relation to the couch (170), an actuator activatable for effectuating a forward movement of the gantry (132) towards the couch (170) or a backward movement of the gantry (132) away from the couch (170), an electromagnetic component (144) capable of generating a magnetic field upon receiving an electric current, and a locking element (not shown) residing
5 within the trough (143) engaged to the hand of the base bracket (142) in a default locking mode prohibiting sliding of the base bracket (142) via the trough (143) and the locking element being switchable to an unlocking mode to disengage from the hand of the base upon generation of the magnetic field by the electromagnetic component (144) and activation of the actuator. Furthermore, in some embodiments as shown in Fig. 6, a plurality of rollers (145) arranged in
10 series and rotatable around the vertical axis are mounted on the sidewall (146) of the floor bracket (141) adjacent to the base (131) to assist forward and backward movement of the base (131) against the sidewalls (146) of floor brackets (141) under reduced friction. The rollers (145) rotate in association to the forward or backward movement of the base (131) thus lowering the friction created on the base (131) and the floor brackets (141). Moreover, in some embodiments,
15 the disclosed system (100) further comprises one or more continuous tracks or wheels assembled at a bottom of the base (131) to enable forward or backward movement of the gantry (132) in relation to the couch (170) with reduced friction on the floor (122). In those embodiments incorporated with the continuous track, activation of the actuator preferably leads to activation of the continuous track as well and vice versa. To control the movement of the gantry (131) and
20 the attached base (132), the floor brackets (141) may respectively have a stopper (148) to halt the moving gantry beyond a travel limit within the sliding rail.

For some embodiments, the couch (170) used in the assembly of CT scanner (130) is preferably a wheeled emergency stretcher or the like being fashioned to detachably fasten onto the second locking mechanism (150). The couch (170) may comprise an upholstered bed (171),
25 a frame (172) extending downward from an underneath surface of the bed (171), and at least a pair of wheels (173) provided to the frame (172) enabling sliding movement of the couch (170) on a relatively flattened surface. In more embodiments, the frame (172) facilitates engagement of the couch (170) to the second locking mechanism (150) and movement of the couch (170) along

the vertical axis by the second locking mechanism (150). The frame (172) in these embodiments, as illustrated in Fig. 8, can be a scissor frame or a frame of scissor arm having at least a pair of X-shaped constructs (174) each comprises a pair of upper arms and a pair of lower arms. The pair of X-shaped constructs (174) are connected to each other at the pivotal point (175) through a shaft that movement of the upper arms and lower arms of one construct (174) results in mirrored movements of the opposite X-shaped construct (174) to effectuate upward and downward movements of the couch (170). For instance, the couch (170) ascends to a position further away from the floor level by moving the tips of the upper arms or the lower arms of the X-shaped construct (174) towards each other, while moving the tips of the upper arms or the lower arms of the X-shaped construct (174) apart shall bring the couch (170) closer to the level of the floor (122). A latch and a plurality of apertures fabricated on the frame (172) can be used as a fastening means to secure the position of the bed (171) of the couch (170) after adjustment of the vertical height of the bed (171) in relation to the floor level in some embodiments of the disclosed system (100). In short, the disclosed system may comprise an auxiliary locking device to secure position or height of the bed (171) in relation to the floor level in some embodiments.

With reference to Fig. 8 and Fig. 9, the second locking mechanism (150) may comprise an elongate stage (151) raised from the floor (122) expanding along the length and a midpoint of the chamber (121) with a pair of side edges (153) each defining a groove for forming a sliding rail (179) therein, a rack (176) extendable from the frame (172) to be slidably engaged to the sliding rails (179) upon pushing the couch (170) towards the gantry (132) such that the couch (170) is free of sideways movement, an arrangement on the frame (172) for adjustment of a position of the bed (171) along a vertical axis in relation to a level of the floor (122), a fastening means (196) to secure the position of the bed (171), and a gripper (154) extending upward from the stage (151) to releasably anchor onto the frame (172) to secure the position of the couch (170) on the floor (122). More specifically, the stage (151) is fabricated from metal, alloy, reinforced plastic or any combination thereof capable of catering good mechanical property against abrasion and collision caused by the couch (170) or frame (172) accidentally knocking onto stage (151) when the couch (170) is pushed towards the gantry (132). The stage (151) is narrower

in width compared to the distance setting the at least a pair of wheels (173) apart that the wheels (173) glide on the floor (122) along the side of the stage (151) for pushing the subject towards the gantry (132) with the rack (176) engaged to the stage (151). As shown in Fig. 9, the rack (176) is a substantially n-shaped construct having a curved rim (177) terminated into a pair of free
5 ends (178). The pair of free ends (178) of the n-shaped construct is preferably hinged to the frame (172) allowing the rack (176) to be pivotally retreated into or extended away from the frame (172). The rack (176) may be incorporated with a roller at each of the corners of the curved rim (177) that each roller is configured to couple with a sliding rail (179) for securing position of the couch (170) as mentioned above.

10 According to a number of embodiments, the disclosed system (100) further comprises N number of weight sensors (193) installed and spaced apart on the floor (122) corresponding to the relative orientation of the wheels (173) of the couch (170) at a horizontal plane that the weight sensors (193) are configured to measure a weight of the subject upon aligning the wheels (173) with the sensors (193). Preferably, N equals to the number of wheels (173) of the couch
15 (170). By aligning the wheels (173) of couch (170) with the weight sensors (193) laid on the floor (122), the operator can activate the weight sensor (193) using the control module (160) housed in the driving cabin (111). The weight sensors (193) can work with the second locking mechanism (150) to secure the alignment with the couch (170) in some embodiments of the disclosed system (100). More preferably, the weight sensor (193) measuring the weight of the
20 subject is free from being interfered by an engagement of the rack (176) and the sliding rails (179) especially when the second locking mechanism (150) is employed to secure the alignment with the weight sensor. The weight measured can be useful for deciding the amount of contrast material to be used on the subject for enhancing the images captured.

It is to be understood that the present disclosure may be embodied in other specific
25 forms and is not limited to the sole embodiment described above. However, any modification and equivalents of the disclosed concepts such as those which readily occur to one skilled in the art are intended to be included within the scope of the claims which are appended thereto.

Claims

1. A mobilized diagnostic system comprising
 - a land transportation unit having a driving cabin;
 - a caravan defining a longitudinal chamber being connected to and transportable by
 - 5 the transportation unit;
 - an assembly of computerized tomography (CT) scanner resided within the chamber,
 - the assembly comprising a base movably placed on a floor of the chamber through a first
 - locking mechanism, a gantry defining a central bore being vertically erected on top of the
 - base for receiving a body part of a subject thereto, and a horizontally extending couch on
 - 10 which the subject rested on being detachably fastened on the floor through a second
 - locking mechanism succeeding to the gantry;
 - a control module resided within the driving cabin or the chamber communicatively
 - connecting to the assembly for controlling operation of the assembly; and
 - a primary power source for providing energy to a movement of the transportation
 - 15 unit and an operation of the assembly of CT scanner,
 - wherein the first locking mechanism realizes movement of the gantry towards or
 - away from the couch along a horizontal axis and the second locking mechanism prohibits
 - movement of the couch fastened on the floor,
 - wherein the couch is configurable to adjust a distance of the subject in relation to the
 - 20 floor along a vertical axis.
2. The system of claim 1, wherein the chamber is concealed from driving cabin by a front
- wall of the caravan that a front door is fabricated on the front wall for accessing the
- chamber from the driving cabin.
3. The system of claim 1, wherein the chamber is accessible from an external environment
- 25 through a rear door fabricated on a rear wall of the caravan.
4. The system of claim 1, wherein the caravan has an internal surface covered with an
- aluminium composite-based coating and an external surface covered with a lead-based
- coating.
5. The system of claim 4, wherein the aluminium composite-based coating has a thickness
- 30 of 3.0-5.0 mm and the lead-based coating has a thickness of 0.5-2.0 mm.

6. The system of claim 4, wherein the caravan is substantially wrapped in stainless steel.
7. The system of claim 1 further comprising a secondary power source for providing energy for an operation of the assembly of CT scanning upon failing of the primary power source in providing the energy to the assembly of the CT scan.
- 5 8. The system of claim 7, wherein the secondary power source is a rechargeable battery which is recharged by the primary power source when the secondary power source is idle.
9. The system of claim 1 further comprising a communication module enabling wireless communication of an operator of on site with an external party.
- 10 10. The system of claim 1, wherein the couch comprises an upholstered bed, a frame extending downward from an underneath surface of the bed, and at least a pair of wheels provided to the frame enabling sliding movement of the couch on a relatively flatted surface.
11. The system of claim 1 further comprising one or more continuous tracks assembled at a bottom of the base to enable forward or backward movement of the gantry in relation to the couch.
- 15 12. The system of claim 1, wherein the first locking mechanism comprises a pair of floor brackets each being spaced to mount on the floor in parallel defining a passageway therebetween for placement and movement of the base in relation to the couch and a longitudinally running trough being defined within each floor bracket, a pair of base brackets each being spaced apart to affix onto the base such that each base bracket comprises a downwardly extending hand insertable into the corresponding trough of the floor bracket permitting sliding movement of the base and the gantry thereby in relation to the couch, an actuator activatable for effectuating a forward movement of the gantry towards the couch or a backward movement of the gantry away from the couch, an electromagnetic component capable of generating a magnetic field upon receiving an electric current, and a locking element residing within the trough engaged to the hand of the base bracket in a default locking mode prohibiting sliding of the base bracket via the trough and the locking element being switchable to an unlocking mode to disengage from the hand of the base upon generation of the magnetic field by the electromagnetic component and activation of the actuator.
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13. The system of claim 10, wherein the second locking mechanism comprises an elongate stage raised from the floor expanding along the length and a midpoint of the chamber with a pair of side edges each defining a groove for forming a sliding rail therein, a rack extendable from the frame to be slidably engaged to the sliding rails upon pushing the couch towards the gantry such that the couch is free of sideways movement, an arrangement on the frame for adjustment of a position of the bed along a vertical axis in relation to a level of the floor, and a gripper extending upward from the stage to releasably anchor onto the frame to secure the position of the couch on the floor.
14. The system of claim 13 further comprising N number of weight sensors installed and spaced apart on the floor corresponding to the relative orientation of the wheels of the couch at a horizontal plane that the weight sensors are configured to measure a weight of the subject upon aligning the wheels with the sensors, wherein N equals to the number of wheels of the couch.
15. The system of claim 14, wherein the weight sensor measuring the weight of the subject is free from being interfered by an engagement of the rack and the sliding rails.