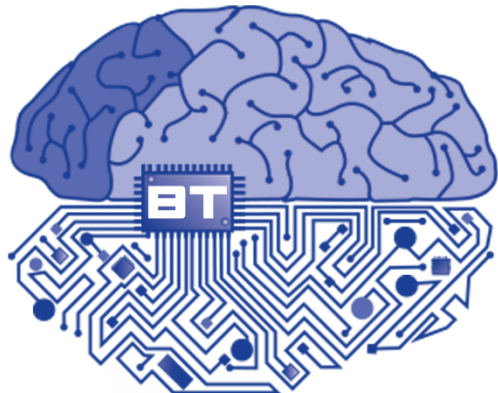




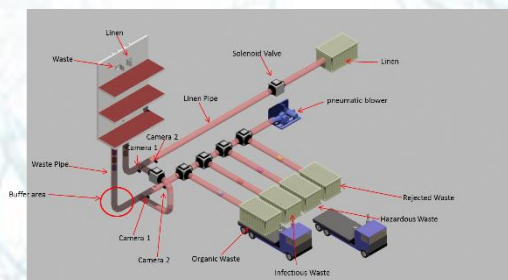
BRAIN TOOLS

When Brain Really Drives

WasteHike-M®

Medical Waste and Linen Transfer System

Living a Safe Future... Living the Dream...



System Catalogue

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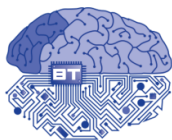
Email: bt.italy@braintoolseng.com

Administrative Office:

Via Budino 16/A,

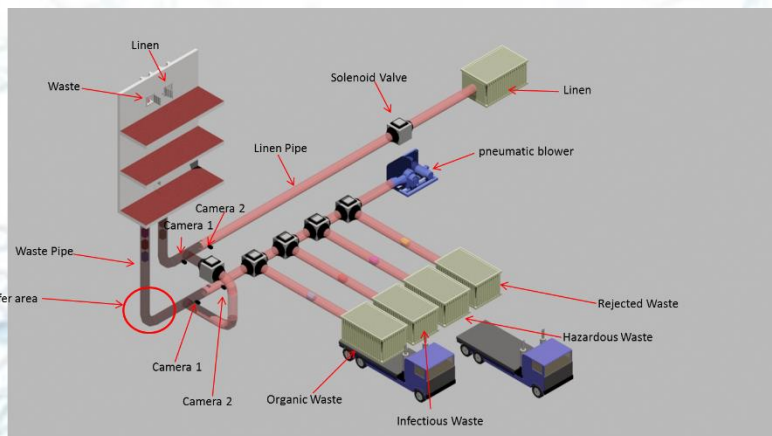
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WasteHike-M

Safe Transfer



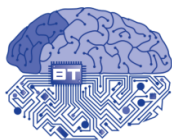
Summary

1. **Concept**
2. **System components**
3. **Algorithm**
4. **Mechanical System Features**
5. **Control System**
6. **RFID Tracking System (option)**
7. **Trucks GPS tracking System**
8. **Quality**

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Concept:

Innovative fully centralized automated vacuum waste and linen collection system base on “smart-management”.

We provide a **fully engineered and customized solution** that matches the customer needs keeping into consideration the main important features.

BTI uses a **real time feedback signals** to segregate between the different categories of waste as well as the linen and **assures no mixture** for waste to linen and visa versa if needed.

It **does not depend on time control** which an open loop system and not closed. The system when its configured as color segregation uses two cameras to **identify and validate the type of waste** and doesn't depend on time. Nevertheless, the time is used for error detection.

Moreover, the system can be reconfigured using **RFID/GPS** system which can be used to track waste, linen, containers, trucks and even personnel.

In fact in Brain Tools Italy we start from where others finish and completed the portrait for the whole transfer which we call (HCMTR) **Hospital Container Waste Treatment Route**.



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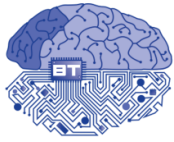
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System components:

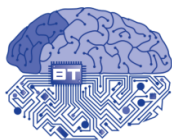


1. Collection Point 1 – Drop In Doors
2. Pneumatic Transport System:
Compressed air system and stainless steel piping network
3. Collection Point 2 – Differentiation
4. Security:
 - 1) RGB sensors (cameras)
 - 2) Fire Sprinkler System
 - 3) Disinfecting Device
5. Supervisory Control and Data Acquisition System
6. RFID (option)
7. GPS Trucks Tracking System
8. Bags

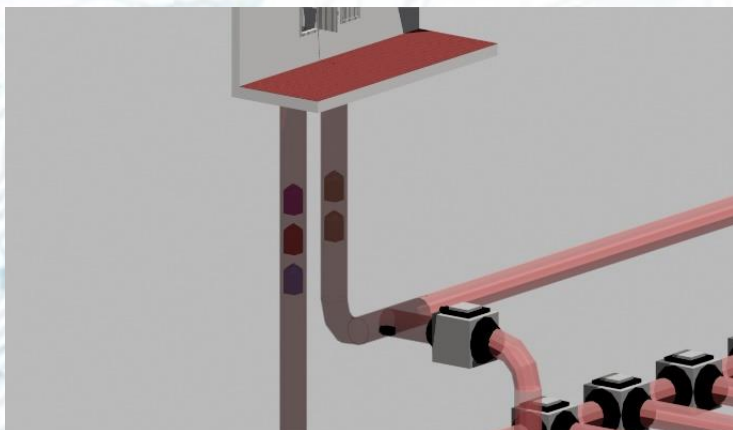
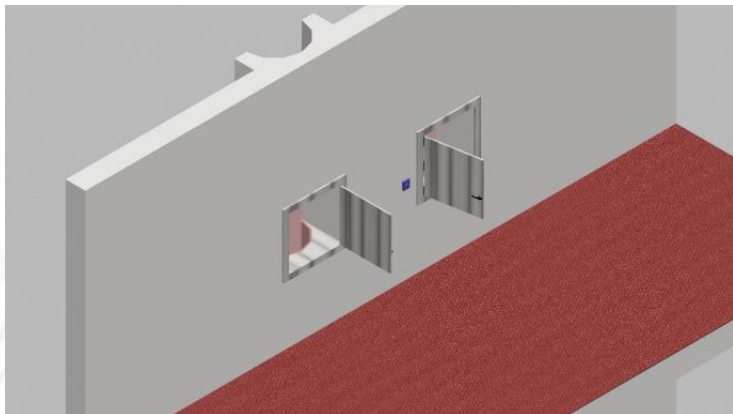
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Algorithm:



Collection

Collection point 1 – **Drop In** – 2 pcs: one is dedicated for waste and the other is dedicated for Linen.

The operation is straight forward, the operator should **press a button**, wait till the **gate opens**, once the gate is opened he drops the bag and he will close the door.

The bags will **fall by gravity** to a buffer that will give a signal to **all collection points at which the drop in doors can't be opened until an empty signal will arrive**.

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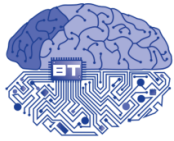
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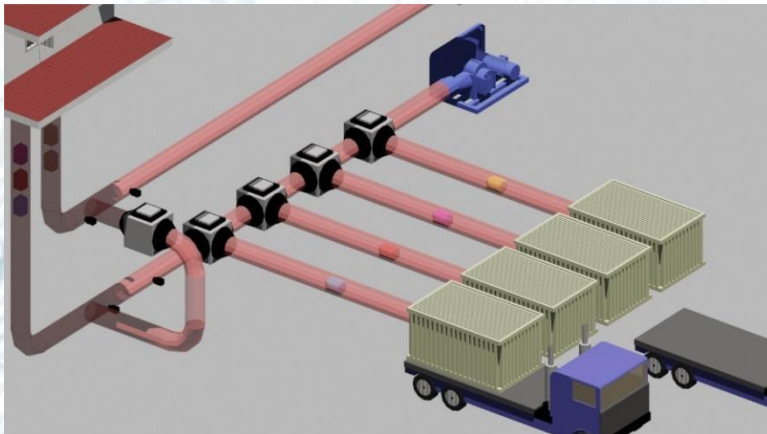
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Algorithm:



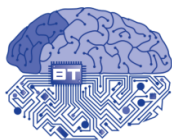
Traffic Management

Every floor has a **queue** and a **priority** predetermined by the system supervisor.

Once **full signal** is sent to insure no drop in door will be opened the same signal will open the valve under the buffer and will **activate the pneumatic transport system** which transports all bags to the **Collection Point 2** where it will be compacted into **sealed containers**.

Once the container is **full** then a **message** should be sent by the system supervisor that the **container** is ready to **be moved out of the hospital**. Meanwhile the **drop in points** will be **reactivated** for the cycle to be repeated.

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Algorithm:



Separation Control

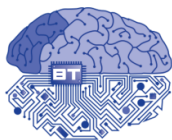
There are **two parallel** routes in the system, one route for Linen and the other route is for color coded waste, every bag of waste has a special color (Red Green and Blue) depending on the type of waste.

It has to be well understood that waste should be placed in its **dedicated gate** and so for the linen.

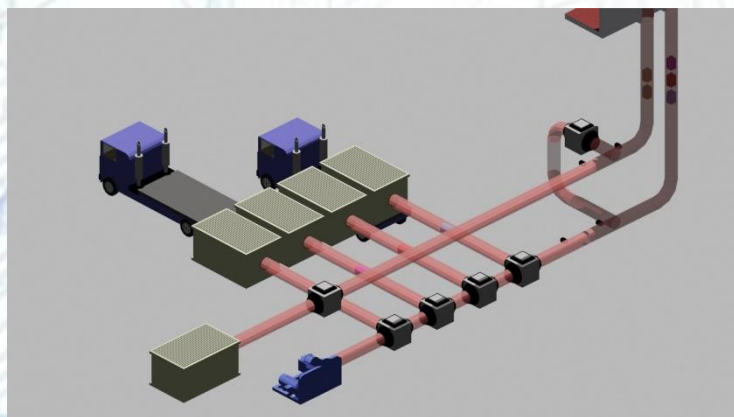
In case Linen was placed in waste gate it will be detected later on before it reaches to the container and an action has to be taken.

On the other hand, when a waste is dropped in the Linen gate, **WasteHike-M** will consider this a **fatal error**, it will **register** the time and date of error and the operator name who is responsible on the shift as well as an acoustic and visual alarm will be produced.

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Algorithm:



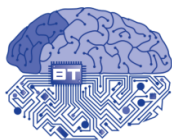
Identification – Validation – Differentiation

The waste transport system starts to move the bags, at high speed. At the final stage of the trip there will be two **RGB sensors** (cameras) well separated. The first sensor will identify the color, sending the signal to the other camera which should be ready to send the bag to the proper container. Once the second camera validates the color it opens immediately the gate of the proper container.

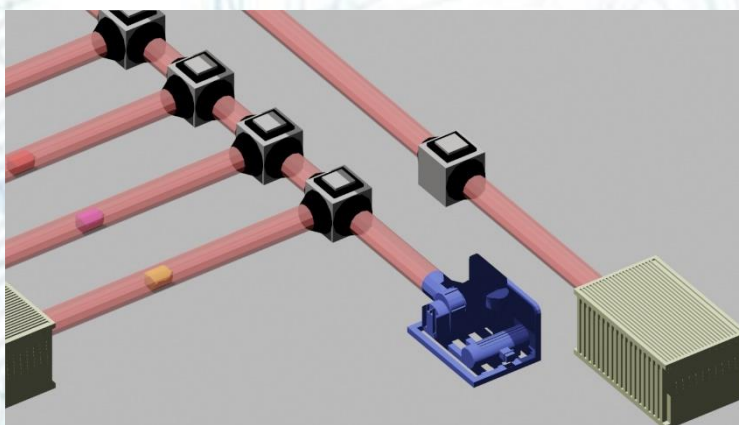
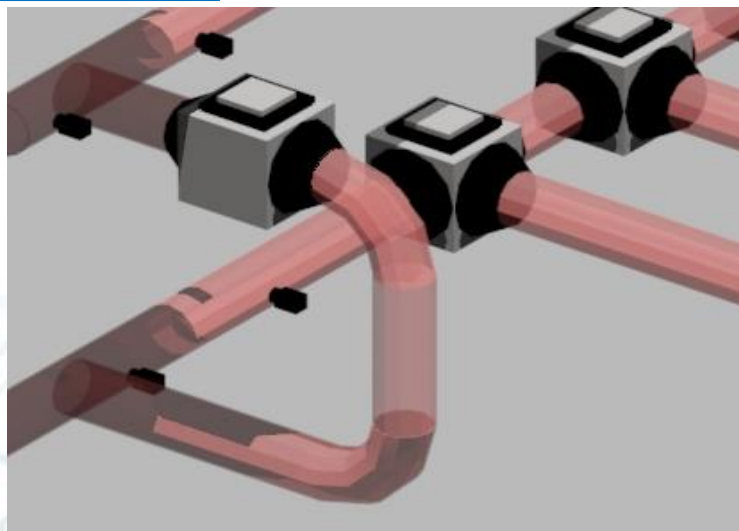
In other words if the color is green then green container will open, if Red then Red container will open if Blue then Blue will open.

In case the waste is undefined it will be moved to the container pre-set by the supervisor.

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Algorithm:



Separation Control

The linen tracking system is a bit simpler as it should not give any color, once a color is detected the system should immediately hold, transfer the alien bag to the waste route as it will be dangerous to mix the waste with laundry indeed.

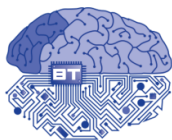
A feature that exists only on **WasteHike-M**: once it's in waste route it will be tracked by the color tracking system.

For sure the connection between the two routes is pressure gradient system which prohibits the air to move but only in one way linen to trash and not vice versa.

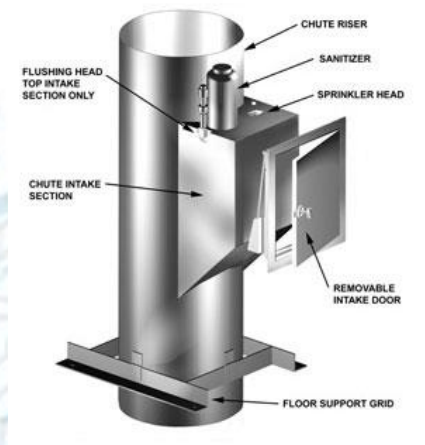
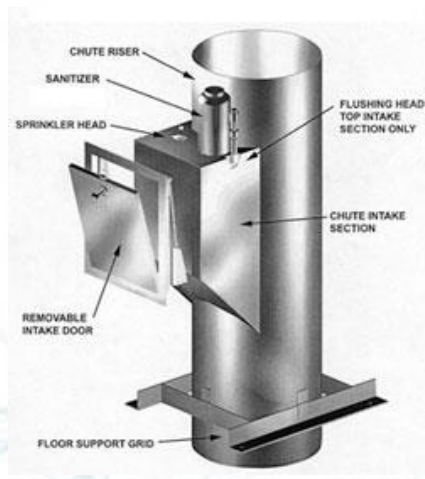
Once Linen passed validation the gate towards the laundry room will be opened and drop off linen bags.

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Algorithm:



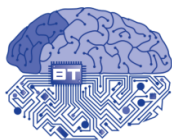
Security

Linen and Waste chute **disinfecting and sanitizing device** are provided upon customer request. A flushing head is provided for disinfecting and sanitizing. Disinfectant sanitizer/access door unit can be added to the flush head at the top floor to periodically clean the chute with the proper solution.

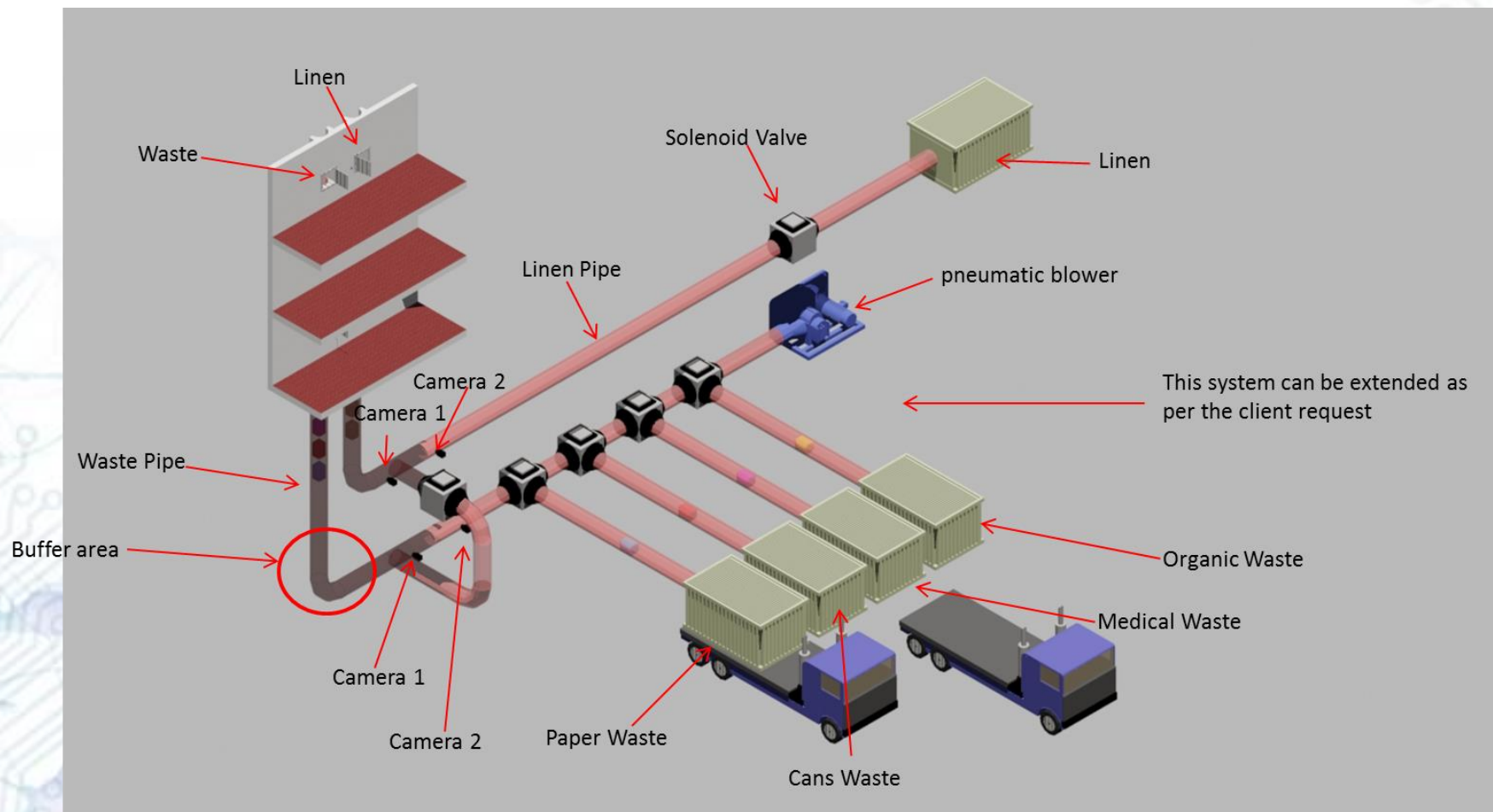
All Flushing units require high side-hinged stainless steel access door bearing can be provided by BT Italy if required by contractor. Complete with a fitting for connection by plumber.

Beside the disinfection the chutes are provided with **Fire Sprinkler System** with flushing spray head, a 165 degree automatic brass sprinkler above the top intake door. Complete with a fitting for connection by fire protection or plumber. Sprinklers will be located at the top floor and on every other floor depending on local fire codes.

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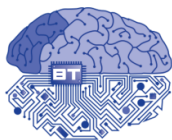
Mechanical System Features:



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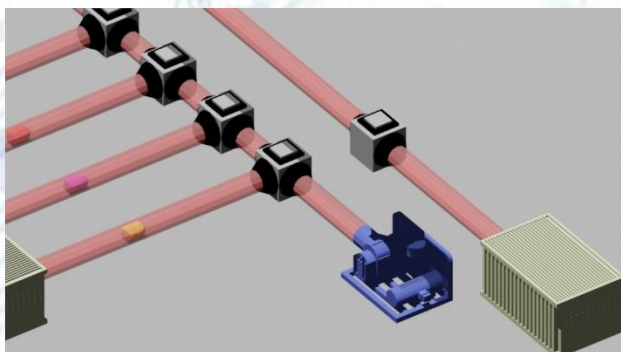


Mechanical System Features:



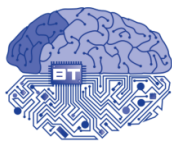
Stainless Steel 304 and Mild Steel pipe piping system for Linen and Waste respectively with standard diameter ranging from 200 mm to 500 mm depending on the requirement of the contractor.

Compressed air system consisting Exhausters with non-return valve, Diverter & Sectioning Valves, Airflow control equipment, Dust filter and silencer and Deodorization equipment.



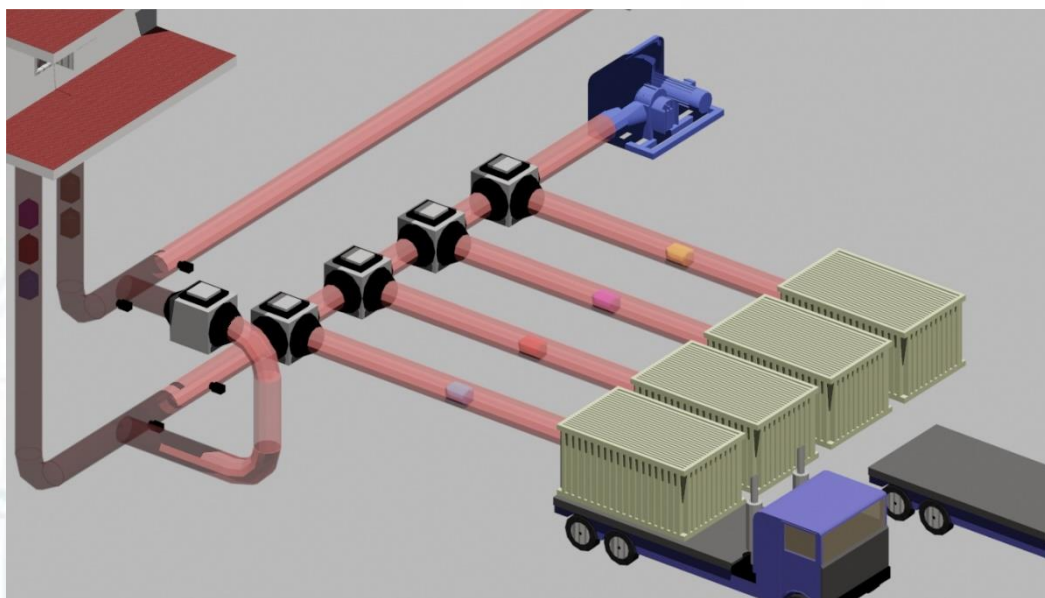
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Mechanical System Features:

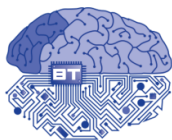
The container conveyer system includes overhead crane system



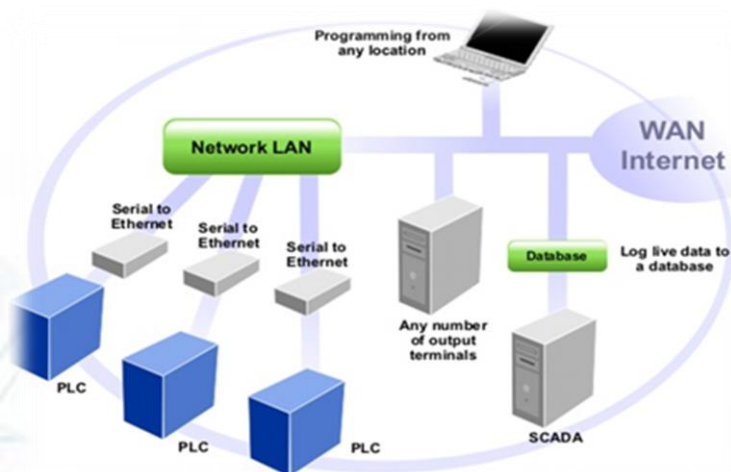
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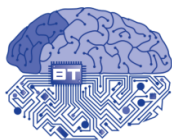
Control System: **Supervisory Control and Data Acquisition System**



- ✓ **PLC** based control system.
- ✓ Every Drop In is supplied with push buttons for closing and opening the gates based on **intelligent queuing system**.
- ✓ **Wireless** and **Ethernet** based system.
- ✓ **Stations Based Supervisory** on customer requirements.
- ✓ Multi-Authorization system based on **B-Level security** levels.
- ✓ **PC based master control system** that can be accessed via web and smartphones **Android** or **IOS** based.
- ✓ **Remote Maintenance System** with wireless IP camera system.
- ✓ **Touch Screen** Based management system.
- ✓ **UPS** system for system protection.
- ✓ **Color Segregation** of waste bags (RFID based segregation can be provided upon request as will be discussed in the options).
- ✓ **Free Software updates** up to 5 years from system installation.

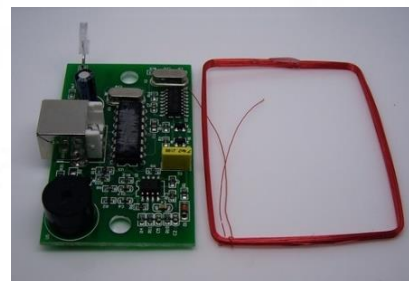
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RFID Tracking System (option):

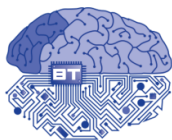
Complete Optional SCADA System based on RFID Technology



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RFID Tracking System (option):

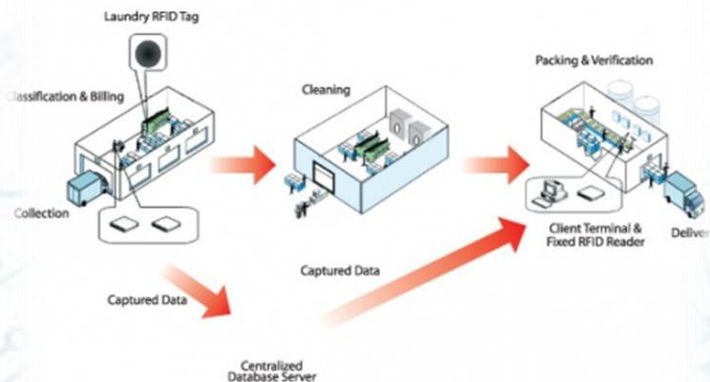
Laundry Management System

The linen bags is provided with bags supplied internally with RFID labels where these bags can be tracked from the moment they are dropped in the chute to the moment they are disposed in the laundry/linen store.

The frequency at which tags are chosen is to **comply with hospital requirement.**

The system consists of active readers for tags detections. This system enables 100% assurance that laundry bags can be disposed in the correct Linen Line.

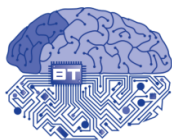
Brain Tools Easy Track system will make it easy safe and reliable.



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RFID Tracking System (option):

RFID Waste Management System

Each type of waste is assigned to a specified frequency and RFID based waste bags are provided by BT Italy to get rid of color segregation and replace it with **real time waste bags management system**.

There are several advantages some of which are **safety, statistical analysis of volume** of each waste result in hospital per predetermined time frames and **possibility to access the system remotely**.

There are several active readers located in the system which will guarantee that each type of waste is going to the correct container. Hand held readers can be provided for QA department.

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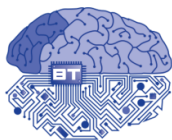
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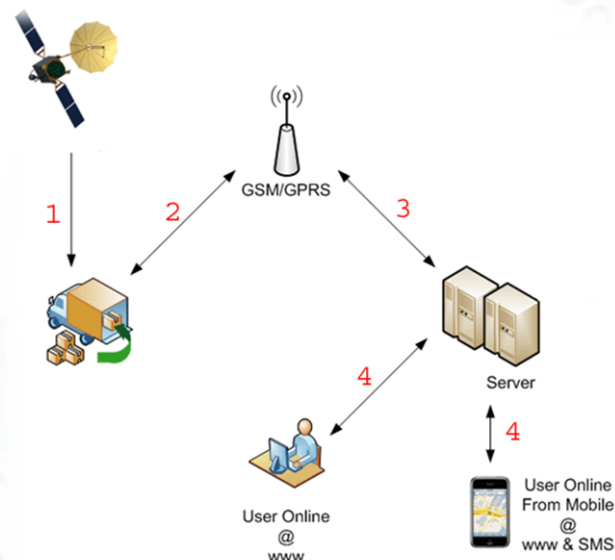
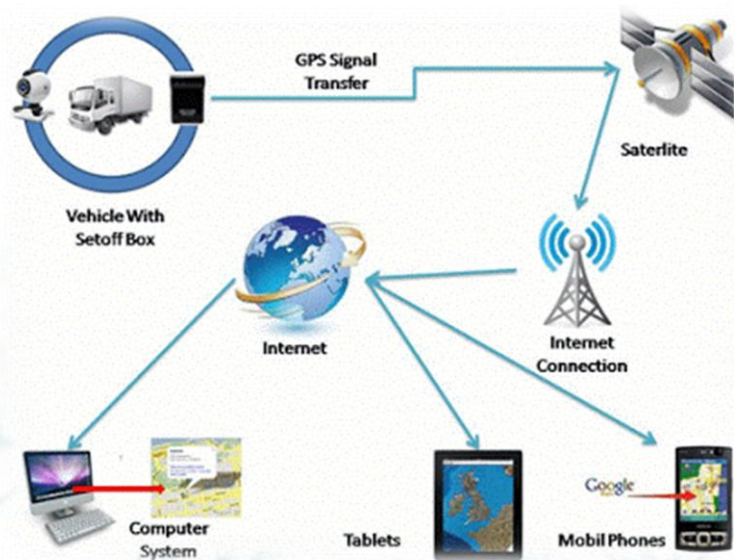
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GPS Trucks Tracking System:

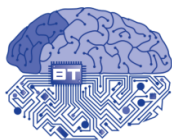


Brain Tools completes the puzzle of waste by providing a GPS system to be integrated within the trucks transporting the hazardous waste to the final destination which could be a central medical waste treatment system.

The truck can be tracked via WEB and GPS whether through a simple smartphone or a tablet or a pc and laptops. The system completes the puzzle to finally transporting the waste to the safe target to get rid of it.

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Quality:

The entire execution of the process, from the design to commissioning and training, according to the latest quality requirements.

Risk analysis, software validation (electronic board), electrical security, emergency management, quality and security of the system are performed upon commissioning in order to achieve CE conformity to ensure that every step of the design and implementation meet the top level of the functional quality and security of the system.

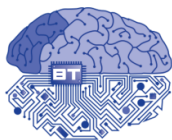


Applied Quality Standards:

- **Directive 2006/42/EC** –
Machinery
- **Directive 2004/108/EC** –
**Electromagnetic
compatibility (EMC)**
- **Directive 2006/95/EC** –
**Low Voltage Directive
(LVD) (where applicable)**

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