TITLE: Expanding Floor/ Accordion drone docking station

CROSS-REFERENCE TO RELATED APPLICATIONS:

[0001] This application claims the benefit of United States Provisional Patent Application with Serial Number 63012662 filed April 20, 2020, by Daniel S. O'Toole. The application was entitled a "Special Expanding Floor/ Accordion drone docking station called a DRONEDEK."

FIELD OF INVENTION:

[0002] This invention relates to a Special Expanding Floor/ Accordion drone docking station called a DRONEDEK. The invention relates to drones and delivery of parcels or goods. The present application relates to a delivery location for receiving a package from a vehicle – drone or unmanned aerial vehicle (UAV), robotic carriers, or automated unmanned vehicle systems (AUVS). The present disclosure relates to unmanned and drone aircraft, more specifically to landing and docking systems for unmanned aircraft to deliver o receive goods. The embodiments of the disclosure relate to the field of aircrafts and unmanned vehicular delivery, in particular to a device for receiving and sending an article. A device for a drone docking station for deposit of items delivered by drone, robot or AUVS. Items may include but not be limited to food items, groceries, and parcels. A secure porch, roof, window or otherwise building mounted box may be secured through to an existing edifice or may be configured to mount to an existing mailbox post and/or take the place of the mailbox. The

invention relates to drones and delivery of parcels or goods.

BACKGROUND-FIELD OF INVENTION and PRIOR ART:

[0005] As far as known, there are no Special Expanding Floor/ Accordion drone docking station called a DRONEDEK or the like. It is believed that this product is unique in its design and technologies. This background as to drone deliveries and the current industry and market should be useful. Unmanned aerial vehicles (UAVs) comprise a variety of vehicles, from conventional fixed wing airplanes, to helicopters, to ornithopters (i.e., machines that fly like birds), and are used in a variety of roles. They can be remotely piloted by a pilot on the ground or can be autonomous or semi-autonomous vehicles that fly missions using preprogrammed coordinates, GPS navigation, etc. UAVs can include remote control helicopters and airplanes for the hobbyist, for example. UAVs may be equipped with cameras to provide imagery during flight, which may be used for navigational or other purposes, e.g., identify a house address, etc. UAVs can also be equipped with sensors to provide local weather and atmospheric conditions, radiation levels, and other conditions. UAVs may also include cargo bays, hooks, or other means for carrying payloads. Newer generation UAVs may also provide significant payload capabilities. As a result, UAVs can also be used for delivering packages, groceries, mail, and other items. The use of UAVs for deliveries can reduce costs and increase speed and accuracy. The range provided by current UAV technology,

however, makes deliveries over a wide area--e.g., throughout a city, or even a portion of a city—difficult.

[0006] Parcel transportation between an origin and a destination is traditionally a labor-intensive process. For short distance, "local" deliveries, an item (e.g., parcel) may be transported by a delivery person between the origin and the destination. For example, the delivery person may drive a vehicle to transport the item between the origin and the destination and may ensure that the item is properly picked up and/or delivered according to delivery instructions. For longer-distance deliveries, transportation of an item may involve several delivery personnel, who may individually perform one or more steps for picking up an item, sorting the item one or more times, transporting the item from a final sort of location to a final delivery destination, and/or delivering the item from the delivery vehicle to the destination address (e.g., serviceable point). Because of the labor-intensive nature of this process, various attempts have been made to assist carrier personnel by reducing the physical demands required in the transportation and delivery process; however, prior attempts have faced substantial difficulties in ensuring that various aspects of the transportation and delivery process are properly performed. For example, attempts have been made to utilize unmanned vehicles, such as Unmanned Aerial Vehicles (UAVs) to transport items from a final sort of location to an intended delivery destination. However, such concepts are generally limited by the effective range of the UAVs, as well as the number of available UAVs that may be utilized to deliver items to locations a substantial distance away from the final sort of location. Accordingly, a need exists for additional systems and methods to assist carrier

personnel and thereby reduce the physical demands of the transportation and delivery process.

[0007] Typically ordered items are packed in shipping packages (e.g., corrugated boxes) and shipped to the user's residence or place of business. Physical delivery of items to user specified locations has improved dramatically over the years, with some retailers offering next day delivery of ordered items. The final or last mile delivery of physical items to a user specified location is traditionally accomplished using a human controlled truck, bicycle, cart, etc. For example, a user may order an item for delivery to their home. The item may be picked from a ground-based material handling facility, packed, and shipped to the user for final delivery by a shipping carrier. The shipping carrier will load the item onto a truck that is driven by a human to the final delivery location and the human driver, or another human companion with the driver, will retrieve the item from the truck and complete the delivery to the destination. For example, the human may hand the item to a recipient, place the item on the user's porch, store the item in a post office box, etc. In these new times where the world is changing before ones very eyes, technology must keep up with consumer habits. Efficiency, cost savings, technology, convenience, ease, safety, and more combine to dictate where the US and world market economy is going.

[0008] One emerging sector of the economy is last mile logistics. Within this segment of the shipping economy is a rapidly developing facet known as drone delivery. Shifting metrics in the world’s ecosystem dictate now, more than ever, the need for autonomous delivery. Enter DRONEDEK. DRONEDEK currently holds two US Utility Patents, and it continues to

constantly build on its offerings. Every day in the US 1.7 million packages is stolen. The loss created is in the billions. DRONEDEK solves this problem through encrypted, authenticated delivery. Every day in the US, thousands of packages are mis-shipped. DRONEDEK solves this problem through encrypted, authenticated delivery. In this new world, social distancing will be the "new normal". DRONEDEK allows shippers, deliverers, and recipients to practice social distancing all while increasing the user experience.

[0009] Millennials are a growing force in the US and world economy, and they have their own way of doing things. More and more people are working from home, venturing out less and expecting "the away from home" experience at home. Enter DRONEDEK. DRONEDEK brings so many features and benefits to the user experience all while delivering more. In addition to the demands mentioned above, the consumer wants their purchases now. DRONEDEK is a vital component in the emerging drone delivery economy. Delivering items quicker and cheaper by way of drone, autonomous driverless vehicle or robot only solves part of the problem. If those items are not delivered to a safe, smart, secure receptacle, everything gained in the process is lost at the front door. Parcel delivery is the fastest growing segment in delivery commerce. DRONEDEK will accelerate the timing for it to happen. Additionally, DRONEDEK will open other facets of delivery through autonomous vehicles. Food, beverage, and pharmaceutical delivery will all benefit through the DRONEDEK platform.

[0010] The market includes all residential and commercial street addresses in the USA. Each day 100M items are purchased on the internet of which 91% of the e-commerce deliveries are less than 5lbs which matches the typical drone weigh capacity

and fits within DRONEDEK's cargo bay that measures 24 by 24 inches in diameter. The market for secured drone receptacle will grow exponentially as demonstrated by retail statistics showing the accelerating trend of online commerce and coupled with the even faster growth of unsecured conventional delivery theft or porch piracy. The USPS reported that 1.7M USPS packages are being stolen each day, enhancing DRONDEK's market relevance and demand for its smart secured drone delivery solution. Shippers today incur an estimated $2 per delivery costs while drone delivery is estimated to generate $1 cost saving per delivery for the logistics industry. As a result, DRONEDEK's business model and smart mailbox delivers a disruptive savings to the logistics industry of $1 Billion every 11 days.

PROBLEM SOLVED

[0011] The improvement and problem solved as a device for an expanded drone docking stations are several: the Special Expanding Floor/ Accordion drone docking station called a DRONEDEK provides expanded volume for several packages and deliveries to the on docking station; it administers Ultraviolet or ozone disinfecting/ detoxing to remove infectious disease, viruses and bacteria; it provides inter-communication to other drones, UAVs, AUVS, and robots delivering in the area; it serves as a weather monitoring station, traffic, human and pet movement with facial recognition cameras, as well as able to tag and track for authorities; it interchanges information with providers and collects information for Big Data Collection and Networking for marketing information and data; at the location of the DRONEDEK docking station it provides flood lights, two way speakers, alarms, and flashing and colored lighting for

security and communications; it accommodates a ground vault for meeting homeowner association rules and restrictions; it monitors weight and size of package and can tattoo brand packages for returns; it has an assist mechanism for robot/AUVS (automated unmanned vehicle systems) assist to unload of parcels to DRONEDEK; and it has an assist for and it can provide a charging station or battery exchange to the drones and UAVs.

PRIOR ART

[0012] A novelty search revealed no other prior art that conflicts with this Special Expanding Floor/ Accordion drone docking station called a DRONEDEK. The prior art found included:

A. US Patent 9211025 called a Postal cube and issued in 2015 to Walid and Elhawashy describes a device configured to securely and automatically receive parcel is described.

B. US Patent 9244147 called an Automated package delivery to a delivery receptacle issued to Soundararajan et al. and assigned to Google Wings which was issued in 2016.

C. US Patent 984034 called a Drone docking station and delivery system and issued in 2017 to Dan O'Toole (Licensed to DRONEDEK Corporation teaches a drone docking station for deposit of items delivered by drone.

D. US Patent 9387928 called a Multi-use UAV docking station systems and methods issued in 2016 to Gentry, et al and assigned to Amazon Tech portrays a systems and methods for providing a series of multiuse UAV docking stations are disclosed.

E. US Patent 9527605 called a Multi-use, unmanned aerial vehicle docking station issued in 2016 to Gentry, et al and assigned to Amazon Tech

F. US Patent 9536216 named and called a Delivery of packages by unmanned aerial vehicles was issued in 2017 to Lisso and assigned to Amazon Tech.

G. US Patent 10124912 called a Landing Pad for Unmanned Aerial Vehicle Delivery that was issued in 2018 with a disputed prior submission and to Walsh et al. and assigned to Valqari.

H. US Patent 9650136 is named an Unmanned aerial vehicle payload delivery and was issued in 2017 to Haskin et al and assigned to Amazon Tech.

I. US Patent 10163177 is entitled a System and method for controlling drone delivery or pick up during a delivery or pick-up phase of drone Operation was issued in 2018 to Ferris & McGee.

J. US Patent 9928749 named a Methods for delivering a parcel to a restricted access area was issued in 2018 to Gil et al. and assigned to UPS.

K. US Patent 10457421 called a Drone docking station and delivery system was issued in 2019 to Dan O'Toole and licensed to DRONEDEK Corporation.

[0013] Continuing with prior art:

L. US Patent 10210475 named a Systems, Devices, and/or Methods for Managing Drone Deliveries was issued in 2019 to Pargoe and assigned to Airbox.

M. A US Patent 10373507 describes and names a Multi-functional motorized box and landing pad for automatic drone package delivery which issued in 2019 for Marcell et al. as assigned to Quantum Systems.

N. US Patent 10287034 is a Drone aircraft landing and docking systems issued in 2019 to Mozer and assigned to American Robotics, Inc.

O. US Patent 10112712 is entitled a Multi-use UAV Docking Station Systems and Methods that was issued in 2018 to Gentry et al and assigned to Amazon Tech.

P. US Patent 10147067 issued as a Drone Operated Delivery Receptacle in 2018 to James Pleis teaches a drone operated delivery receptacle for receiving packages.

Q. US Patent 10592843 is named an Unmanned aerial delivery to secure location and was issued in 2020 to Natarajan et al. and assigned to Walmart Apollo.

R. US Patent 9928749 is named a Methods for delivering a parcel to a restricted access area.

S. US Patent 9969495 is called an Unmanned aerial vehicle pickup and delivery systems and was issued to Gil in 2018 and assigned to UPS.

T. US Patent 10874240 is named a Landing pad receptacle for package delivery and receipt which was issued to in 2020 to Lewis et al. and assigned to Walmart Apollo.

U. Korean patent KR10196425 issued in South Korea is named a Drone delivery mailbox that issued in 2019to Noh Hyeong in Canada.

V. Canadian Patent CA2898304C issued in 2020 and assigned to Quantum and called the invention consists of an actuated box and navigation aid for automatic delivery by unmanned vehicles (UAV) or drones.

[0014] As can be observed, none of the prior art has anticipated or caused one skilled in the art of drone docking

stations to see this invention by Daniel S. O'Toole as obvious to a person skilled in the ordinary art of a docking station or delivery receptacle for drones or unmanned aerial vehicles (UAV), robotic carriers, or automated unmanned vehicle systems (AUVS). It provides a superior system for handling packages and delivering them to residential and commercial location in an effective, efficient, and safe manner.

SUMMARY OF THE INVENTION

[0015] This invention is a Special Expanding Floor/ Accordion drone docking station called a DRONEDEK. The preferred embodiment of Special Expanding Floor/ Accordion drone docking station called a DRONDEK is: A drone dock and delivery box for accepting drone deliveries comprising: (a) a means and structure for expanding the receiving section for containing multiple parcels with a raiseable floor; (b) means of locating the drone dock such that the drone may accurately approach and dock with the drone dock; (c) a means of engaging the drone dock such that a stable connection or attachment can be made; (d) a means of transferring the contents of the drone to the interior of the drone dock; (e) a means of preserving such as temperature control and a means for securely storing the delivered goods once in the drone dock; (f) a mean of disengaging (release) from the drone dock; (g) a means of communication between the drone and the drone dock, either directly or through a remote server; (h) a set of functional components incorporated within the box to allow for preservation and security of the stored goods, and to prevent damage during the transfer and or subsequent storage (soft); (i) a means of securing the box to a structure at a

residential or commercial address; (j) a set of optional features comprising a charging station and exchange mechanism; a collector to identify explosive material, anthrax and the like; an ultraviolet scan system to eradicate disease, virus and harmful materials; an ozone applicator to eradicate disease, virus and harmful materials; (k) a set of identification feature such as a barcode reader, a weight and dimension sensor, and a tattoo printer for return parcels; (l) a set of features on the drone dock for weather monitoring, tag and track vehicles and packages, etc., and a camera with facial recognition software to track humans and pets; and (m) a set of local features such as two-way speakers, LED light that are colored and can strobe flash, and a flood light.

OBJECTS AND ADVANTAGES

[0016] There are several objects and advantages of the Special Expanding Floor/ Accordion drone docking station called a DRONEDEK. There are currently no known drone docking stations or receivers for drone or unmanned aerial vehicle (UAV), robotic carriers, or automated unmanned vehicle systems (AUVS) that are effective at providing the objects of this invention. The various advantages and benefits are:

Item	Advantages
1	Has a secure opening and closing door feature that allows the drone to communicate with the station and open and close its cargo doors to receive and ship its contents - means for locking and a keypad for onsite access to the DRONEDEK;
2	Provides expanded volume for several packages and deliveries to the on-docking station that is a

	secure receptacle designed to hold parcels that are received or that are waiting to be shipped accompanied with a barcode reader, a return tattoo printer for package return and ability to place gate code for manual intervention and delivery;
3	Administers Ultraviolet or ozone disinfecting/ detoxing to remove infectious disease, viruses, and bacteria;
4	Provides explosive materials and anthrax, etc. detection;
5	Provides inter-communication to other drones, UAVs, AUVS, and robots delivering in the area;
6	Serves as a weather monitoring station, traffic, human and pet movement with facial recognition cameras, as well as able to tag and track for authorities;
7	Interchanges information with providers and collects information for Big Data Collection and Networking for marketing information and data;
8	At the location of the DRONEDEK docking station it provides flood lights, two-way speakers, dog whistle, alarms, and flashing and colored lighting for security and communications;
9	Accommodates a ground vault for meeting homeowner association rules and restrictions;
10	Monitors weight and size of package and can tattoo brand packages for returns;
11	Can provide a charging station or battery exchange to the drones and UAVs;
12	Has an assist mechanism for robot/AUVS (automated

	unmanned vehicle systems) assist to unload of parcels to DRONEDEK;
13	Has remote access and connectivity with a contents-sensing switch that via its phone application;
14	Has a means of preserving and temperature control for the goods and deliveries of parcels;
15	Has a camera system internal/external to compartment of drone dock with technology and recognition precision to interconnect to applications for facial recognition of humans and pets and paint/tag and track monitoring communications;
16	Is powered by a solar panel and/or 110-volt electrical power supply, allowing for operation of its high-level features and a solar panel as a power source;
17	Protects packages from rain, wind, sleet, hail and snow, and harsh temperatures and a heated cargo door option allows for access during the iciest of weather; and
18	Allows through a GPS beacon for the shipping drone to home in on the DRONEDEK's precise location.

[0017] Finally, other advantages and additional features of the present Special Expanding Floor/ Accordion drone docking station called a DRONEDEK device will be more apparent from the accompanying drawings and from the full description of the device. For one skilled in the art of drone docking stations and delivery receptacles, it is readily understood that the features shown in the examples with this product are readily adapted to other types of drone docking stations and systems

and devices interfacing with drone or unmanned aerial vehicle (UAV), robotic carriers, or automated unmanned vehicle systems (AUVS).

DESCRIPTION OF THE DRAWINGS - FIGURES

[0018] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate an embodiment of the Special Expanding Floor/ Accordion drone docking station called a DRONEDEK for various applications device that is preferred. The drawings together with the summary description given above and a detailed description given below explain the principles of the DRONEDEK device. It is understood, however, that the Special Expanding Floor/ Accordion drone docking station called a DRONEDEK is not limited to only the precise arrangements and instrumentalities shown.

[0019] **FIGS. 1 A** through **1 D** are sketches of the general drone docking station/ DRONEDEK for deposit of items delivered by drone hereinafter referred to as expanded floor/ and receiving section drone dock or docking station.

[0020] **FIG. 2** shows the communication and delivery system from the order of the product/ parcel to the delivery to the docking station/ DRONEDEK with the expanding section.

[0021] **FIGS. 3 A** through **3 C** are sketches of a docking station/ DRONEDEK with the expanding section with the components and features shown from generally a side or end view.

[0022] **FIGS. 4 A** through **4 D FIGS.** are more sketches of a docking station/ DRONEDEK with the expanding section with the components and features shown from several views.

[0023] **FIG. 5** is a group of sketches and prototype of a docking station/ DRONEDEK with the expanding section.

[0024] **FIG. 6 A** through **6 H** are sketches of a general embodiment indicating some of the features of the DRONEDEK.

[0025] **FIG. 7 A** through **7 E** are sketches of an inground vault system for homeowner associations and an assist mechanism for unloading robot/AUVS (automated unmanned vehicle systems).

[0026] **FIG. 8 A** through **8 H** are sketches of the operation of delivery by a drone at the residential or commercial receiving location and the expanding DRONEDEK.

[0027] **FIG. 9 A** through **9 F** are sketches of prior art in drone delivery systems to date.

DESCRIPTION OF THE DRAWINGS – REFERENCE NUMERALS

[0028] The following list refers to the drawings:

Table B: Reference numbers.

No.	Description
30	drone docking system/ DRONEDEK **30** for deposit of items delivered by drone **50**
31	drone docking station/ DRONEDEK **31** for deposit of items delivered by drone hereinafter referred to as expanded floor/ and receiving section drone dock, docking station, the box, or drone box, or docking box) for deposit of items delivered by drone.
31P	prototype **31P** of DRONEDEK with extending floor
31DS	design sketches **31DS** of DRONEDEK with extending floor

32	drone docking station structure **32** with expanding section/ accordion with a raiseable floor **32F**
32A	side and side surface **32A** of structure **32**
32B	end and end surface **32B** of structure **32**
32C	bottom and bottom surface **32C** of structure **32**
32D	control console **32D**
32E	clearance **32E** for slidable door **34**
32F	raiseable floor **32F** of enclosed structure **32**
32FM	motor **32FM** to lower floor **32F**
32DD	means **32DD** to drive floor **32F** chain, cable, belt, or the like
32P	pulley/ sprocket **32P** for means **32DD**
32DM	means **32DM** to support drive floor **32F** at the end where drive means **32DD** – enclosed channel, angle with castors or the like
32EM	means **32EM** to support drive floor **32F** at opposite end of drive – enclosed channel, angle with castors or the like
33	drone structure/ container opening **33**
34	closeable and openable, movable/ motorized sliding doors **34** on the dock structure **32** with a means for heating
34A	door motor **34A**
36	a means **36** to prevent damage and deterioration like a foam or soft padding, a curved side, a sealed door, a temperature-controlled interior, and a heated sliding door.
38	top surface **38** of docking structure **32** surrounding the perimeter of the opening **34** with a means for heating
39A	mounting pad/ foundation plate **39A** for structure **32**

40	parcels **40** such as food items, groceries, tools, electronics, documents, and the like
50	drone **50**
50A	drone **50A** with parcel
50B	drone **50B** empty/without parcel
51	drone pads **51**
61	camera system **61** internal/external to compartment of drone **50** having technology and recognition precision to interconnect to various applications for facial recognition of humans and pets
62	optional receiving dimples **62** for the drone pads **51**
63	a means of transferring **63** the contents/parcel **40** of the drone **50** to the interior of the box through the opening **34** and a mean of disengaging from the parcel **40** such as controllable arms **64**; releasable/locking ball and socket with the package **65**; magnetic or electronic holding structure **66**
64	controllable catch arms **64** or the like
65	releasable/locking ball and socket with the package **65** or the like
66	control system **66** for the motors **34A**, **32FM**, and interface to keyboard **116**
67	power source **67**
68	solar panel **68** as a power source
69	one or more lighting mechanisms **69** inside the container **32**
70	a means of preserving and securely storing **70** the delivered goods once in the box – i.e., a totally secure solution for home or office drone deliveries of parcels **40**

71	means for locking **71,** a keypad **71A** for onsite access to the DRONEDEK**,** facial recognition or fingerprint
71A	a keypad **71A** for onsite access to the DRONEDEK
72	temperature control **72** hot/ cold system
73	barcode reader **73** – infrared or other
73A	barcode reader waves and signals **73A**
73B	barcode reader label **73B** on package **40**
74	wind block **74**
76	charging station **76**
77	heated top **77**
78	a motion flood light **78** that has focus technology to flood an area or create spotlight floods at specific line of sight areas in the yard near the DRONEDEK **31**
79	mail slot **79** for regular land mail
80	collector panel **80** for detection of explosives or anthrax or other perceived threats
81	battery exchange mechanism **81** for interchangeability of drone batteries with the DRONEDEK
82	extendable/ retractable means for exchanging **82** batteries such as an extendable arm and securing latch to remove the drone battery **83,** move it to the exchange mechanism **81** and move charged battery **84** back to drone **50** and re-engage the drone power connection
83	drone battery **83**
84	charged battery **84**
85	discharged battery **85**
90	parcel order mechanism **90** – personal communication devices **106** connected to the network **103**
91	providing system **91** or goods source – order, supplier, and distribution company – “good stuff company”.

92	external lighting **92** that can be LED type systems to strobe, flash colors, communicate to authorities, distress, etc.
93	weight and dimension sensors **93**
94	two-way speakers and loud audio alarm system **94** to communicate to persons at the DRONEDEK **31** or to provide loud alarms, shrill sirens etc.
100	location and tracking means **100** of all nearby drones and communication with docking station **31**
102	a means of locating **102** the docking station **31** such that drone can approach and dock with it. GPS system or the like, etc.
103	cloud/network **103**
104	satellites **104**
105	signal and cell towers **105**
106	personal communication devices **106** – such as smart phones, tablets, laptops, personal computers, and the like
107	specific GPS address **107** for the docking station **31**
108	local signal/ or mechanical means **108** – to facilitate final location and transfer such as Cold beam technology, Laser beam, Radar, Lidar, Quick Response (QR) code tags, Radio frequency RFID) remote identification tracking and sensing for drone authentication and landing for navigating the drone **50** to its exact location on the docking station **31**
109	encrypted signal **109** from the docking station **31**
110	a means for encrypted communication **110** between the drone and the drone dock, either directly or through a remote server (Wi-Fi, Bluetooth, hot spot, satellite

	etc. and others)
111	smart phone application or the like to communicate status of the docking event with the user of the personal communication devices **106**
112	flight **112** from goods source **91** to docking station **31**
113	flight **113** from docking station **31** back to good source or another user destination
114	alternative flight **114** from original docking station to secondary docking station to "pick-up" parcel
115	Return tattoo printer **115** branding of package for return and ability to place gate code **115A** to a codex or manual intervention and delivery
116	console control keyboard **116**
117	encrypted anti-theft chips **117** mounted to the frame
120	micro weather station **120** mechanisms, sensors, etc.
122	paint and track **122** monitoring communications and follow with GPS once painted
125	ultraviolet detox/ disinfect **125**
130	ozone detox/ disinfect **130**
150	vault **150** for underground homeowner association installation
151	structural members **151** for raising platform **155**
152	rolling sealed top doors **152**
155	movable platform **155**
156	open area **156** of vault **150**
157	means to raise and lower **157** such as chain, cable, rope, belt, and pulleys/sprockets/ sheaves connected to motor **158**

158	means **158** to convert electricity to rotational movement such as electric motor or equal
159	power source **159**
160	powered hot/cold plate temperature assist **160**
170	a set of powered rollers **170** for assist platform **172**
172	assist platform **172**
175	extending support arms **175**
177	extension cylinder **177** for robot/AUVSI assist unit **180**
178	receptacles **178** for 110 V source, for cellphone charging, and for Tesla, electric scooter, and the like charging
179	power source **179** for powered rollers and for Tesla, and scooter charging **178** and the like
180	robot/AUVS (automated unmanned vehicle systems) assist unit **180** to assist unload of parcels **40** to DRONEDEK **31**
400	prior Art **400** US Patent 9,840,340 to O'Toole in 2017
401	prior Art **401** US Patent 10.457.421 to O'Toole in 2019
402	prior Art **402** US Patent 10.093.454 to Kalyan in 2018
403	prior Art **403** US Patent 9,387,928 to Gentry et al in 2016
404	prior Art **404** US Patent 10,124,912 to Walsh in 2018
405	prior Art **405** US Patent 9,928,749 to Gil et al in 2018

DETAILED DESCRIPTION OF PERFERRED EMBODIMENT

[0029] The present development is a Special Expanding Floor/ Accordion drone docking station called a DRONEDEK. This invention relates to a Special Expanding Floor/ Accordion drone docking station called a DRONEDEK. The invention relates

to drones and delivery of parcels or goods.
The present application relates to a delivery location for receiving a package from a vehicle – drone or unmanned aerial vehicle (UAV), robotic carriers, or automated unmanned vehicle systems (AUVS). The present disclosure relates to unmanned and drone aircraft, more specifically to landing and docking systems for unmanned aircraft to deliver o receive goods. The embodiments of the disclosure relate to the field of aircrafts and unmanned vehicular delivery, in particular to a device for receiving and sending an article. A device for a drone docking station for deposit of items delivered by drone, robot or AUVS. Items may include but not be limited to food items, groceries, and parcels. A secure porch, roof, window or otherwise building mounted box may be secured through to an existing edifice or may be configured to mount to an existing mailbox post and/or take the place of the mailbox. The invention relates to drones and delivery of parcels or goods.

[0030] The advantages for the Special Expanding Floor/ Accordion drone docking station called a DRONEDEK device **30** are listed above in the introduction. Succinctly the benefits are that the device:

1. Has a secure opening and closing door feature that allows the drone to communicate with the station and open and close its cargo doors to receive and ship its contents - means for locking and a keypad for onsite access to the DRONEDEK;
2. Provides expanded volume for several packages and deliveries to the on-docking station that is a secure receptacle designed to hold parcels that are received or that are waiting to be shipped accompanied with a

barcode reader, a return tattoo printer for package return and ability to place gate code for manual intervention and delivery;

3. Administers Ultraviolet or ozone disinfecting/ detoxing to remove infectious disease, viruses and bacteria;
4. Provides explosive materials and anthrax, etc. detection;
5. Provides inter-communication to other drones, UAVs, AUVS, and robots delivering in the area;
6. Serves as a weather monitoring station, traffic, human and pet movement with facial recognition cameras, as well as able to tag and track for authorities;
7. Interchanges information with providers and collects information for Big Data Collection and Networking for marketing information and data;
8. At the location of the DRONEDEK docking station it provides flood lights, two-way speakers, alarms, and flashing and colored lighting for security and communications;
9. Accommodates a ground vault for meeting homeowner association rules and restrictions;
10. Monitors weight and size of package and can tattoo brand packages for returns;
11. Can provide a charging station or battery exchange to the drones and UAVs;
12. Has an assist mechanism for robot/AUVS (automated unmanned vehicle systems) assist to unload of parcels to DRONEDEK;
13. Has remote access and connectivity with a contents-sensing switch that via its phone application;

14. Has a means of preserving and temperature control for the goods and deliveries of parcels;
15. Has a camera system internal/external to compartment of drone dock with technology and recognition precision to interconnect to applications for facial recognition of humans and pets and paint/tag and track monitoring communications;
16. Is powered by a solar panel and/or 110-volt electrical power supply, allowing for operation of its high-level features and a solar panel as a power source;
17. Protects packages from rain, wind, sleet, hail and snow, and harsh temperatures and a heated cargo door option allows for access during the iciest of weather; and
18. Allows through a GPS beacon for the shipping drone to home in on the DRONEDEK's precise location.

[0031] The preferred embodiment of Special Expanding Floor/ Accordion drone docking station **31** called a DRONDEK is: A drone dock and delivery box **31** for accepting drone deliveries comprising: (a) a means and structure **32** for expanding the receiving section for containing multiple parcels with a raiseable floor **32F**; (b) means of locating **100, 102** the drone dock such that the drone may accurately approach and dock with the drone dock; (c) a means of engaging **51,62** the drone dock **31** such that a stable connection or attachment can be made; (d) a means **63, 64, 65** of transferring the contents **40** of the drone to the interior **33** of the drone dock **31**; (e) a means of preserving **70, 72** such as temperature control and a means for securely storing the delivered goods once in the drone dock;

(f) a mean of disengaging **51,62** (release) from the drone dock **31**; (g) a means of encrypted communication **108, 110** between the drone **50** and the drone dock **31**, either directly or through a remote server (Wi-Fi, Bluetooth, hot spot, satellite etc. and others); (h) a set **71, 71A** of functional components incorporated within the box to allow for preservation and security of the stored goods, and to prevent damage during the transfer and or subsequent storage (soft); (i) a means of securing **39A** the box to a structure at a residential or commercial address **107**; (j) a set of optional features comprising a charging station **76** and exchange mechanism **81**; a collector **80** to identify explosive material, anthrax and the like; an ultraviolet scan **125** system to eradicate disease, virus and harmful materials; an ozone applicator **130** to eradicate disease, virus and harmful materials; (k) a set of identification feature such as a barcode reader **73**, a weight and dimension sensor **93**, and a tattoo printer **115** for return parcels; (l) a set of features on the drone dock for weather monitoring **120**, tag and track **122** vehicles and packages, etc. and follow with GPS once painted, and a camera **61** with facial recognition software to track humans and pets; and (m) a set of local features such as two-way speakers and loud audio alarms **94**, LED light **92** that are colored and can strobe flash, and a flood light **78**.

[0032] There is shown in **FIGS. 1-9** a complete description and operative embodiment of the Special Expanding Floor/ Accordion drone docking station called a DRONEDEK device. In the drawings and illustrations, one notes well that the **FIGS. 1-9** demonstrate the general configuration and use of this product. The various example uses are in the operation and use section, below.

[0033] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate an embodiment of the Special Expanding Floor/ Accordion drone docking station called a DRONEDEK device **30** that is preferred. The drawings together with the summary description given above and a detailed description given below explain the principles of the DRONEDEK device **30.** It is understood, however, that the Special Expanding Floor/ Accordion drone docking station called a DRONEDEK device **30** is not limited to only the precise arrangements and instrumentalities shown. Other examples of drone docking stations and package receptacles for drone or unmanned aerial vehicle (UAV), robotic carriers, or automated unmanned vehicle systems (AUVS) to be within the scope and spirit shown here.

[0034] **FIGS. 1 A** through **1 D** are sketches of the general drone docking station/ DRONEDEK **31** for deposit of items **40** delivered by drone **50** hereinafter referred to as expanded floor/ and receiving section drone dock **31** or docking station. Viewed in these sketches are: a drone docking system/ DRONEDEK **30** for deposit of items delivered by drone **50**; a drone docking station/ DRONEDEK **31** for deposit of items delivered by drone hereinafter referred to as expanded floor/ and receiving section drone dock, docking station, the box, or drone box or docking box) for deposit of items delivered by drone; a prototype **31P** of DRONEDEK with extending floor; a design sketch **31DS** of DRONEDEK with extending floor; and a vault **150** for underground homeowner association installation.

[0035] **FIG. 2** shows the communication and delivery system from the order of the product/ parcel to the delivery to the docking station/ DRONEDEK with the expanding section. In this view is: a drone docking system/ DRONEDEK **30** for deposit of

items delivered by drone **50**; a drone docking station/ DRONEDEK **31** for deposit of items delivered by drone hereinafter referred to as expanded floor/ and receiving section drone dock, docking station, the box, or drone box or docking box) for deposit of items delivered by drone; a parcels **40** such as food items, groceries, tools, electronics, documents, and the like; a drone **50**; a drone **50A** with parcel; a drone **50B** empty/without parcel; a parcel order mechanism **90** – personal communication devices **106** connected to the network **103**; a providing system **91** or goods source – order, supplier, and distribution company – "good stuff company"; a location and tracking means **100** of all nearby drones and communication with docking station **31**, **131**; a means of locating **102** the docking station **31** such that drone can approach and dock with it. GPS system or the like, etc.; a cloud/network **103**; a group of satellites **104**; a signal and cell towers **105**; a personal communication devices **106** – such as smart phones, tablets, laptops, personal computers, and the like; a specific GPS address **107** for the docking station **31**; local signal/ or mechanical means **108** – to facilitate final location and transfer such as Cold beam technology, Laser beam Radar, Lidar, Quick Response (QR) code tags, Radio frequency RFID) remote identification tracking and sensing for drone authentication and landing for navigating the drone **50** to its exact location on the docking station **31**; an encrypted signal **109** from the docking station **31**; a means for encrypted communication **110** between the drone and the drone dock, either directly or through a remote server (Wi-Fi, Bluetooth, hot spot, satellite etc. and others); a smart phone application **111** or the like to communicate status of the docking event with the user of the personal communication devices **106**; a

flight **112** from goods source **91** to docking station **31**; a flight **113** from docking station **31** back to good source or other user destination; an alternative flight **114** from original docking station to secondary docking station to "pick-up" parcel; and a paint/tag and track **122** monitoring communications and follow with GPS once painted. In the overall control system with the Dronedek receptacles **30, 31,** air traffic control data for drone "FAA" - DRONEDEK to utilize drone tracking capabilities and feature. The drone tracking and monitoring features to provide mapping of drone location in and around the geographical area of each DRONDEDEK. Like flight-ware the drone-ware feature to provide visibility of drones operating in the market including aerial mapping. air traffic control whereby DRONEDEK can schedule incoming and outgoing shipments and can be prioritized by user; marketplace conduit; big data metrics harvesting.

[0036] **FIGS. 3 A** through **3 C** are sketches of a docking station/ DRONEDEK **31, 30** with the expanding section **32** with the components and features shown from generally a side or end view. These drawings portray: a drone docking station/ DRONEDEK **31** for deposit of items delivered by drone hereinafter referred to as expanded floor/ and receiving section drone dock, docking station, the box, or drone box or docking box) for deposit of items delivered by drone; drone docking station structure **32** with expanding section/ accordion with a raiseable floor **32F**; a side and side surface **32A** of structure **32**; an end and end surface **32B** of structure **32**; a bottom and bottom surface **32C** of structure **32**; a control console **32D**; a clearance **32E** for slidable door **34**; a raiseable floor **32F** of enclosed structure **32**; a motor **32FM** to lower floor **32F**; a means **32DD** to drive floor **32F** chain, cable, belt,

or the like; a pulley/ sprocket **32P** for means **32DD**; a means **32DM** to support drive floor **32F** at the end where drive means **32DD** – enclosed channel, angle with castors or the like; a means **32EM** to support drive floor **32F** at opposite end of drive – enclosed channel, angle with castors or the like; a drone structure/ container opening **33**; a closeable and openable, movable/ motorized sliding door **34** with a means for heating on the dock structure **32**; a door motor **34A**; a means **36** to prevent damage and deterioration like a foam or soft padding, a curved side, a sealed door, a temperature controlled interior, and a heated sliding door; a top surface **38** of docking structure **32** surrounding the perimeter of the opening **34**, the surface **38** with a means for heating; a mounting pad/ foundation plate **39A** for structure **32**; a parcel **40** such as food items, groceries, tools, electronics, documents, and the like; a drone **50**; a drone **50A** with parcel; a camera system **61** internal/ external to compartment of drone **50** having technology and recognition precision to interconnect to applications for facial recognition of humans and pets; an optional receiving dimples **62** for the drone pads **51**; a control system **66** for the motors **34A**, **32FM**, **132FM**, **232FM**, **332FM**, and interface to keyboard **116**; an encrypted anti-theft chips **117** mounted to the frame; a power source **67**; a solar panel **68** as a power source; a means of preserving and securely storing **70** the delivered goods once in the box – i.e. a totally secure solution for home or office drone deliveries of parcels **40**; a temperature control **72** hot/ cold system; a barcode reader **73** – infrared or other; a temperature control **72** hot/ cold system; a barcode reader **73** – infrared or other; two-way speakers and loud audio alarm system **94** to communicate to persons at the DRONEDEK **31**, **131** or to provide loud alarms, shrill sirens

etc.; a console control keyboard **116**, receptacles **178** for 110 V source, for cellphone charging, and for Tesla, electric scooter, and the like charging; and power source **179** for powered rollers and for Tesla, and scooter charging **178** and the like.

[0037] **FIGS. 4 A** through **4 D FIGS.** are more sketches of a docking station/ DRONEDEK **31** with the expanding section **32** with the components and features shown from several views. Demonstrated in these views are: a drone docking station/ DRONEDEK **31** for deposit of items delivered by drone hereinafter referred to as expanded floor/ and receiving section drone dock, docking station, the box, or drone box or docking box) for deposit of items delivered by drone; drone docking station structure **32** with expanding section/ accordion with a raiseable floor **32F**; a side and side surface **32A** of structure **32**; an end and end surface **32B** of structure **32**; a bottom and bottom surface **32C** of structure **32**; a control console **32D**; a clearance **32E** for slidable door **34** with a means for heating; a raiseable floor **32F** of enclosed structure **32**; a motor **32FM** to lower floor **32F**; a means **32DD** to drive floor **32F** chain, cable, belt, or the like; a pulley/ sprocket **32P** for means **32DD**; a means **32DM** to support drive floor **32F** at the end where drive means **32DD** – enclosed channel, angle with castors or the like; a means **32EM** to support drive floor **32F** at opposite end of drive – enclosed channel, angle with castors or the like; a drone structure/ container opening **33**; a closeable and openable, movable/ motorized sliding door **34** on the dock structure **32**; a door motor **34A**; a means **36** to prevent damage and deterioration like a foam or soft padding, a curved side, a sealed door, a temperature controlled interior, and a

heated sliding door; a top surface **38** of docking structure **32** surrounding the perimeter of the opening **34** with a means for heating; a mounting pad/ foundation plate **39A** for structure **32**; a parcel **40** such as food items, groceries, tools, electronics, documents, and the like; a drone **50**; a drone **50A** with parcel; a camera system **61** internal/ external to compartment of drone **50** having technology and recognition precision to interconnect to applications for facial recognition of humans and pets; an optional receiving dimples **62** for the drone pads **51**; a control system **66** for the motors **34A**, **32FM**, **132FM**, **232FM**, **332FM**, and interface to keyboard **116**; a power source **67**; a solar panel **68** as a power source; a means of preserving and securely storing **70** the delivered goods once in the box – i.e. a totally secure solution for home or office drone deliveries of parcels **40**; a temperature control **72** hot/ cold system; a barcode reader **73** – infrared or other; a temperature control **72** hot/ cold system; a barcode reader **73** – infrared or other; two-way speakers and loud audio alarm system **94** to communicate to persons at the DRONEDEK **31**, **131** or to provide loud alarms, shrill sirens etc.; a return tattoo printer **115** branding of package for return and ability to place gate code **115A** to a codex or manual intervention and delivery; a console control keyboard **116**; an encrypted anti-theft chips **117** mounted to the frame; receptacles **178** for 110 V source, for cellphone charging, and for Tesla, electric scooter, and the like charging; and a power source **179** for powered rollers and for Tesla, and scooter charging **178** and the like.

[0038] **FIG. 5** is a group of sketches **31DS** and prototype **31P** of a docking station/ DRONEDEK **31** with the expanding section **32.** Shown here are a prototype **31P** of DRONEDEK with extending

floor and a design sketch **31DS** of DRONEDEK with extending floor. These speak for themselves based on the other drawings herein.

[0039] **FIG. 6 A** through **6 H** are sketches of a general embodiment of the expanding DRONEDEK **31** indicating some of the features of the DRONEDEK. Portrayed here are the following: a drone docking station/ DRONEDEK **31** for deposit of items delivered by drone hereinafter referred to as expanded floor/ and receiving section drone dock, docking station, the box, or drone box or docking box) for deposit of items delivered by drone; a drone docking station structure **32** with expanding section/ accordion with a raiseable floor **32F**; a drone structure/ container opening **33**; a closeable and openable, movable/ motorized sliding doors **34** on the dock structure **32**; a door motor **34A**; a means **36** to prevent damage and deterioration like a foam or soft padding, a curved side, a sealed door, a temperature controlled interior, and a heated sliding door; a top surface **38** of docking structure **32** surrounding the perimeter of the opening **34**; a parcel **40** such as food items, groceries, tools, electronics, documents, and the like; a drone **50**; a camera system **61** internal/external to compartment of drone **50** having technology and recognition precision to interconnect to applications for facial recognition of humans and pets; an optional receiving dimples **62** for the drone pads **51**; a releasable/locking ball and socket **65** with the package **40** or the like; one or more lighting mechanisms **69** inside the container **32**; a means of preserving and securely storing **70** the delivered goods once in the box – i.e. a totally secure solution for home or office drone deliveries of parcels **40**;

a temperature control **72** hot/ cold system; a barcode reader **73** – infrared or other; a barcode reader waves and signals **73A**; a barcode reader label **73B** on package **40**; a wind block **74**; a charging station **76**; a heated top **77**; a motion flood light **78** that has focus technology to flood an area or create spotlight floods at specific line of sight areas in the yard near the DRONEDEK **31, 131**; a mail slot **79** for regular land mail; a collector panel **80** for detection of explosives or anthrax or other perceived threats; a battery exchange mechanism **81** for interchangeability of drone batteries with the DRONEDEK; an extendable/ retractable means for exchanging **82** batteries such as an extendable arm and securing latch to remove the drone battery **83,** move it to the exchange mechanism **81** and move charged battery **84** back to drone **50** and re-engage the drone power connection; a drone battery **83**; a charged battery **84**; a discharged battery **85**; a weight and dimension sensors **93**; a two-way speakers and loud audio alarm system **94** to communicate to persons at the DRONEDEK **31, 131** or to provide loud alarms, shrill sirens etc.; a location and tracking means **100** of all nearby drones and communication with docking station **31, 131**; a specific GPS address **107** for the docking station **31**; a return tattoo printer **115** branding of package for return and ability to place gate code **115A** to a codex or manual intervention and delivery; micro weather station **120** mechanisms, sensors, etc.; a paint/tag and track **122** monitoring communications and follow with GPS once painted; an ultraviolet detox/ disinfect **125**; and an ozone detox/ disinfect **130** using O3 as a disinfectant/detox material.

[0040] A further description of several of these features is appropriate. On the **external cameras** **61** they have a facial recognition system is a technology capable

of identifying or verifying a person from a digital image or a video frame from a video source. There are multiple methods in which facial recognition systems work, but in general, they work by comparing selected facial features from given image with faces within a database. It is also described as a Biometric Artificial Intelligence based application that can uniquely identify a person by analyzing patterns based on the person's facial textures and shape. While initially a form of computer application, it has seen wider uses in recent times on mobile platforms and in other forms of technology, such as robotics. It is typically used as access control in security systems and can be compared to other biometrics such as fingerprint or eye iris recognition systems. Although the accuracy of facial recognition system as a biometric technology is lower than iris recognition and fingerprint recognition, it is widely adopted due to its contactless and non-invasive process. Recently, it has also become popular as a commercial identification and marketing tool. Other applications include advanced human-computer interaction, video surveillance, automatic indexing of images, and video database, among others.

[0041] As to a **barcode reader 73, a** barcode reader (or barcode scanner) is an optical scanner that can read printed barcodes, decode the data contained in the barcode and send the data to a computer. Like a flatbed scanner, it consists of a light source, a lens and a light sensor translating for optical impulses into electrical signals. Additionally, nearly all barcode readers contain *decoder* circuitry that can analyze the barcode's image data provided by the sensor and sending the barcode's content to the scanner's output port. Barcode readers can be

differentiated by technologies as follows: Pen-type reader consist of a light source and photodiode that are placed next to each other in the tip of a pen. To read a barcode, the person holding the pen must move the tip of it across the bars at a relatively uniform speed. The photodiode measures the intensity of the light reflected from the light source as the tip crosses each bar and space in the printed code. The photodiode generates a waveform that is used to measure the widths of the bars and spaces in the barcode. Dark bars in the barcode absorb light and white spaces reflect light so that the voltage waveform generated by the photodiode is a representation of the bar and space pattern in the barcode. This waveform is decoded by the scanner in a manner like the way Morse code dots and dashes are decoded. The Laser scanners work the same way as pen-type readers except that they use a laser beam as the light source and typically employ either a reciprocating mirror or a rotating prism to scan the laser beam back and forth across the barcode. As with the pen-type reader, a photodiode is used to measure the intensity of the light reflected from the barcode. In both pen readers and laser scanners, the light emitted by the reader is rapidly varied in brightness with a data pattern and the photodiode receive circuitry is designed to detect only signals with the same modulated pattern. CCD readers use an array of hundreds of tiny light sensors lined up in a row in the head of the reader. Each sensor measures the intensity of the light immediately in front of it. Each individual light sensor in the CCD reader is extremely small and because there are hundreds of sensors lined up in a row, a voltage pattern identical to the pattern in a barcode is generated in the reader by sequentially measuring the voltages across each

sensor in the row. The important difference between a CCD reader and a pen or laser scanner is that the CCD reader is measuring emitted ambient light from the barcode whereas pen or laser scanners are measuring reflected light of a specific frequency originating from the scanner itself. LED scanners can also be made using CMOS sensors, and are replacing earlier Laser-based readers.

[0042] For a **collector panel 80:** An explosives trace-detection portal machine, also known as a trace portal machine and commonly known as a puffer machine, is a security device that seeks to detect explosives and illegal drugs at airports and other sensitive facilities as a part of airport security screening. The machines are intended as a secondary screening device, used as a complement to, rather than a substitute for, traditional X-ray machines. The term "trace-detection" refers to the machine's ability to detect extremely small "traces" of these compounds. The exact sensitivities of these machines are not available information, but a mass spectrometer detects compounds on a molecular level and would only be limited by the efficiency of the collection from the air puffed to obtain a sample for analysis. Some companies use ion mobility spectrometry (IMS) technology and can detect explosives such as RDX, PETN, TNT, and Nitroglycerin. It can also detect controlled substances such as marijuana, cocaine, heroin, PCP, methamphetamine, and MDMA. One system developed is physically similar but internally different. It uses mass spectrometry (MS) technology, which can detect 16 explosive compounds with 10-100x more sensitivity than IMS, resolve multiple compounds at the same time, and perform shoe bomb detection without removing shoes. This collection technology is also

significantly different and offers a narcotics screening portal as a separate product. The machine operates by releasing multiple puffs of air at a passenger who is standing upright within the machine. This will flush out any particles on the person inside the machine then analyze and identify them in seconds. It is capable of screening up to 180 passengers an hour. This sample is then analyzed using IMS or MS technology to search for specific explosive or narcotic compounds. If a substance of concern is detected, the security personnel are notified by a visible and/or audible alarm. The machine can also be used for other bio-hazardous materials associated but not limited to bio- and germ-warfare chemicals and biological hazards.

[0043] For a **micro weather station 120** mechanisms, sensors, etc. consider this background: Used is a novel and practical micro weather station, which can sense temperature, relative humidity, pressure, and anemometer, and is portable in small size and possesses high precisions. The micro weather station comprises multi-sensor chip, anemometer, measurement system, display system and power management system. Based on MEMS technology, multi-sensor chip integrated temperature, relative humidity and pressure is developed and manufactured. A drag force wind sensor using the torque of cantilever to measure the velocity of wind is developed. The wind direction can be measured by perpendicularly encapsulating the two-wind sensor. Compared with those processes used in other types of micro weather station, the processes used is very simple and compatible. All the results exhibit outstanding performances of the micro weather station. Micro-electromechanical systems (MEMS) are a process technology used to create tiny integrated devices or systems that combine mechanical and electrical

components. They are fabricated using integrated circuit (IC) batch processing techniques and can range in size from a few micrometers to millimeters. Weather monitoring is of great importance in many domains such as: agriculture, military, entertainment etc. There are several solutions for monitoring the weather. The classical solution consists in static weather stations. Another solution is based on wireless sensor networks (WSNs). The third solution uses low dimensions weather stations. This paper presents a weather station made of temperature, humidity, pressure, and luminosity sensors embedded in a microcontroller-based board. The station is controlled through the SMS service of mobile phones. Weather sensors from micro systems companies are redefining what an all-in-one weather sensor should be. Everything needed for weather sensing is built into one unit. That includes 27 environmental parameters, a processor, communications unit, and solar power system. Small and lightweight, these portable weather sensors take on jobs previously reserved for larger, more complex systems. Within 60 seconds of turning them on, they are ready to transmit local conditions using a cellular or Iridium satellite link. With these advantages in size, weight and ruggedness, weather sensors are opening new markets and locations for autonomous meteorological sensors. Typical desires for a weather stations include (for example and not as a limitation): Cloud-based data logging, solar power, and processor; Two-way Cellular or Iridium satellite connection; Integrated panoramic imaging; Expansion port; Rugged and portable; Easy installation; and Autonomous operations. The Weather Data Collected is typically: Temperature; Barometric pressure; Humidity; Wind speed; Wind direction; Compass reading; Angular tilt; Visibility; Dust accumulation;

Lightning distance; Visual imagery; Precipitation amount; Present weather; and GPS location.

[0044] A **Paint/tag and track** **122** monitoring communications considers this: Drones **50** and these docking stations **31** can tag and track quarry using nanoparticle sprays. The US Air Force is funding work to let drones to tag suspects or cars with a spray that gives them a distinct spectral signature, making them easy to track. On a dusty road in northern Pakistan, a nondescript vehicle rounds a corner. Fifty meters overhead, a tiny drone buzzes unseen, spraying a fine mist across the vehicle's roof as it passes below. The vehicle is now tagged and can be tracked from many kilometers away by an infrared scanner on a larger drone. This scenario may soon be played out now that the US Air Force has contracted to develop a drone-based tagging system. Tagging materials – taggants – are made that can be used to discreetly label vehicles carrying smuggled goods, or people who are involved in civil disobedience or attempting to cross international borders illegally. Interest in tagging technology has been driven in part by growing pressure on the White House over civilian deaths in US drone attacks. Tagging by drones would allow people to be tracked for subsequent arrest. Some taggants are based on quantum dots – semiconductor nanocrystals less than 50 atoms across. Because of quantum effects, they absorb and emit light at specific wavelengths. The company has demonstrated a taggant powder that, when illuminated with an invisible ultraviolet laser, can be detected by infrared cameras 2 kilometers away. The powder is delivered as an aerosol that clings to metal, glass and cloth, and batches can be engineered to have distinct spectral signatures. The nanocrystals would be sprayed by a hand-launched drone with a

wingspan of less than 1.5 meters, it is quiet and has a range of several kilometers. A larger Predator drone could then illuminate the target with an ultraviolet laser and track its progress. “Nanocrystals can be sprayed by a hand-launched drone and illuminated with a laser”. But spraying the taggant accurately can be tricky. They experimented with small drones that delivered a simulated taggant made from colored sugar beads used in cake decoration. They wanted to coat a road with the stuff so that it would stick to the wheels of any vehicle that drove through. But the wind blew the beads around as soon as they were sprayed. So, the team developed software to model the effects of wind so they could allow for it when spraying When they fed in estimates of wind speed and direction based on readings from the drone’s sensors, the drone could hit a target from an altitude of 45 meters. A more advanced system would allow accurate tagging from greater distances, which would be more effective as small drones can be inaudible when flying further than 60 meters away. The US Department of Homeland Security has expressed interest in giving non-lethal offensive capabilities to drones used by its Customs and Border Protection service. Any such move is bound to be contentious, and tagging might prove more acceptable to US public opinion. Drones could also use smart tagging during riots so that the people involved can be identified and later arrested. Many ways to make one’s mark- TAGGING technology has moved on since the days of using water cannon with indelible dye to mark rioters. One company produces a range of products containing unique synthetic DNA sequences. These include automatic sprays for marking intruders, a personal defense spray and a device like a paintball pistol that can tag an

individual from 30 meters away. Once painted they can follow the items with GPS.

[0045] For **Ultraviolet detox/ disinfect 125** systems: Ultraviolet germicidal irradiation (UVGI) is a disinfection method that uses short wavelength ultraviolet (ultraviolet C or UVC), light to kill or inactivate microorganisms by destroying nucleic acids and disrupting their DNA, leaving them unable to perform vital cellular functions. UVGI is used in a variety of applications, such as food, air, and water purification. UVC light is weak at the Earth's surface as the ozone layer of the atmosphere blocks it. UVGI devices can produce strong enough UVC light in circulating air or water systems to make them inhospitable environments to microorganisms such as bacteria, viruses, molds, and other pathogens. UVGI can be coupled with a filtration system to sanitize air and water. The application of UVGI to disinfection has been an accepted practice since the mid-20th century. It has been used primarily in medical sanitation and sterile work facilities. Increasingly, it has been employed to sterilize drinking and wastewater, as the holding facilities are enclosed and can be circulated to ensure a higher exposure to the UV. In recent years UVGI has found renewed application in air purifiers. UV light is electromagnetic radiation with wavelengths shorter than visible light but longer than X-rays. UV is categorized into several wavelength ranges, with short-wavelength UV (UVC) considered "germicidal UV". Wavelengths between about 200 nm and 300 nm are strongly absorbed by nucleic acids. The absorbed energy can result in defects including pyrimidine dimers. These dimers can prevent replication or can prevent the expression of necessary

proteins, resulting in the death or inactivation of the organism.

- Mercury-based lamps operating at low vapor pressure emit UV light at the 253.7 nm line.
- Ultraviolet light-emitting diodes (UVC LED) lamps emit UV light at selectable wavelengths between 255 and 280 nm.
- Pulsed-xenon lamps emit UV light across the entire UV spectrum with a peak emission near 230 nm.

Microorganisms have less protection against UV and cannot survive prolonged exposure to it. A UVGI system is designed to expose environments such as water tanks, sealed rooms and forced air systems to germicidal UV. Exposure comes from germicidal lamps that emit germicidal UV at the correct wavelength, thus irradiating the environment. The forced flow of air or water through this environment ensures exposure. The degree of inactivation by ultraviolet radiation is directly related to the UV dose applied to the water. The dosage, a product of UV light intensity and exposure time, is usually measured in microjoules per square centimeter, or equivalently as microwatt seconds per square centimeter (was/cm^2). Dosages for a 90% kill of most bacteria and viruses range from 2,000 to 8,000 was/cm^2. Larger parasites such as cryptosporidium require a lower dose for inactivation. As a result, the U.S. Environmental Protection Agency has accepted UV disinfection as a method for drinking water plants to obtain cryptosporidium, giardia, or virus inactivation credits. For example, for a 90% reduction of cryptosporidium, a minimum dose of 2,500 $\mu W \cdot s/cm^2$ is required based on the U.S. EPA UV Guidance Manual published in 2006. The effectiveness of germicidal UV depends on the length of time a microorganism is

exposed to UV, the intensity and wavelength of the UV radiation, the presence of particles that can protect the microorganisms from UV, and a microorganism's ability to withstand UV during its exposure. In many systems, redundancy in exposing microorganisms to UV is achieved by circulating the air or water repeatedly. This ensures multiple passes so that the UV is effective against the highest number of microorganisms and will irradiate resistant microorganisms more than once to break them down. "Sterilization" is often misquoted as being achievable. While it is theoretically possible in a controlled environment, it is very difficult to prove, and the term "disinfection" is generally used by companies offering this service as to avoid legal reprimand. Specialist companies will often advertise a certain log reduction, e.g., 6-log reduction or 99.9999% effective, instead of sterilization. This takes into consideration a phenomenon known as light and dark repair (photoreactivation and base excision repair, respectively), in which a cell can repair DNA that has been damaged by UV light. The effectiveness of this form of disinfection depends online-of-sight exposure of the microorganisms to the UV light. Environments where design creates obstacles that block the UV light are not as effective. In such an environment, the effectiveness is then reliant on the placement of the UVGI system so that line of sight is optimum for disinfection. Dust and films coating the bulb lower UV output. Therefore, bulbs require periodic cleaning and replacement to ensure effectiveness. The lifetime of germicidal UV bulbs varies depending on design. Also, the material that the bulb is made of can absorb some of the germicidal rays.

[0046] For Ozone detox/ disinfect unit **130** utilizing O3 to disinfect: Microorganisms cause issues in various places, in a clinical setting bacterium can cause dangerous outbreaks. Ozone can be used as a chemical disinfectant to kill bacteria and viruses with low ozone concentrations. The contact time is altered depending on the desired deactivation grade. For many applications, a bacteria reduction of 99.99 % which corresponds to a 4-log reduction is enough, for a higher deactivation grade the solution is easily adapted to provide higher concentrations and exposure time, in adapted solutions even bacteria spores can be treated. The figure above applies for treatment in rooms and ventilation ducts, that have been used with ozone to limit the spread of airborne microorganisms in food industries and food storage. Non-touch technologies include the usage of UV-lamps and chemicals dispersed as an aerosol or gas which deactivates microorganisms. Compared to other treatment methods for air disinfection, ozone can efficiently disinfect large air volumes, neutralizing micro-organisms, including viruses. This makes it ideal for use in medical applications, for example in hospitals or doctors waiting rooms. An important factor that enables savings is the time the cleaning agent can actively deactivate bacteria. Ozone concentration is adapted to the desired log reduction after finished treatment ozone either decompose into oxygen naturally over several hours or the decomposition is accelerated significantly using ozone destructors.

[0047] **FIG. 7 A** through **7 E** are sketches of an inground vault system **150** for homeowner associations and an assist mechanism **180** for unloading robot/AUVS (automated unmanned vehicle systems). Demonstrated by these drawings are a drone docking station/ DRONEDEK **31** for deposit of items delivered by

drone hereinafter referred to as expanded floor/ and receiving section drone dock, docking station, the box, or drone box, or docking box) for deposit of items delivered by drone; a control system **66** for the motors **34A**, **32FM**, **132FM**, **232FM**, **332FM**, and interface to keyboard **116**; a vault **150** for underground homeowner association installation; a structural member **151** for raising platform **155**; a rolling sealed top doors **152**; a movable platform **155**; an open area **156** of vault **150**; a means to raise and lower **157** such as chain, cable, rope, belt, and pulleys/sprockets/ sheaves connected to motor **158**; a means **158** to convert electricity to rotational movement such as electric motor or equal; a power source **159**; a set of powered rollers **170** for assist platform **172**; an assist platform **172**; an extending support arms **175**; an extension cylinder **177** for robot/AUVSI assist unit **180**; a receptacles **178** for 110 V source, for cellphone charging, and for Tesla, electric scooter, and the like charging; a power source **179** for powered rollers and for Tesla, and scooter charging **178** and the like; a robot/AUVS (automated unmanned vehicle systems) assist unit **180** to assist unload of parcels **40** to DRONEDEK **31, 131**; and a motor and hydraulic unit **332FM** to robot/AUVSI assist unit **180.**

[0048] **FIG. 8 A** through **8 H** are sketches of the operation of delivery by a drone **50** at the residential or commercial receiving location **107** and the expanding DRONEDEK **31.** This section is described below in the Operations Section.

[0049] **FIG. 9 A** through **9 F** are sketches of prior art in drone delivery systems to date. Here former patents and applications for various docking station and systems are shown. These include: a prior art **400** US Patent 9,840,340 to O'Toole in 2017 named Drone docking station and delivery

system; a prior art **401** US Patent 10,457,421 to O'Toole in 2019 named a Drone docking station and delivery system; a prior art **402** US Patent 10,093,454 to Kalyan in 2018 entitled a Unmanned aerial vehicle payload receiving apparatus; a prior art **403** US Patent 9,387,928 to Gentry et al in 2016 called a Multi-use UAV docking station systems and methods; a prior art **404** US Patent 10,124,912 to Walsh in 2018 called a Landing pad for unmanned aerial vehicle delivery; and a prior art **405** US Patent 9,928,749 to Gil et al in 2018 entitled Methods for delivering a parcel to a restricted access area. As can be seen, the Special Expanding Floor/ Accordion drone docking station **31** called a DRONEDEK device is a unique combination and use as described herein.

[0050] The objects include, but are not limited to: Objects: 1. To provide for communication between the drone dock and a drone, 2. To provide security, and preservation of the delivered goods before during and after delivery, and 3. To provide expansion of the secure retention area for accepting several deliveries.

[0051] Features include:

Security	Has a secure opening and closing door feature that allows the drone to communicate with the station and open and close its cargo doors to receive and ship its contents - means for locking **71** and a keypad **71A** for onsite access to the DRONEDEK.
Expanding receiver	Provides expanded volume for several packages and deliveries to the on-docking station.
Protection from explosions,	collector panel **80** for detection of explosives or anthrax or other perceived threats.

disease, etc.	
Weather data station	micro weather station **120** mechanisms, sensors, etc.
Intercommunications with drones and UAV	location and tracking means **108, 100, 110** of all nearby drones and communication with docking station **31.** Able to have encrypted communication and tracking of driverless vehicles, robots, vendors that interact with drones. DRONEDEK to utilize non station drone delivery features including vehicle and commercial carriers and mobile DRONEDEK applications; provides the ability to track and interface with aerial, driverless cars or robots (i.e., full UAV, drone and robotic interface)
Data retrieval	Interchanges information with providers and collects information for Big Data Collection and Networking for marketing information and data.
Disease and virus removal	ozone detox/ disinfect **130** and ultraviolet detox/ disinfect **125.**
Tracking assist	camera system **61** internal/external to compartment of drone **50** having technology and recognition precision to interconnect to applications for facial recognition of humans and pets and paint/tag and track **122** monitoring communications and follow with GPS once painted.
Underground vault	vault **150** for underground homeowner association installation.
Assist to unload	robot/AUVS (automated unmanned vehicle systems) assist unit **180** to assist unload of parcels **40** to

	DRONEDEK **31.**
Preservation	a means of preserving and securely storing **70** the delivered goods once in the box – i.e., a totally secure solution for home or office drone deliveries of parcels **40** and a temperature control **72** hot/ cold system.
Local Security Features	At the location of the DRONEDEK docking station **31** it provides flood lights, two-way speakers, dog whistle, loud audio alarms **94**, and flashing and colored LED lighting **92** for security and communications and alerting emergency vehicles and first responders.
Weatherproof	Protects packages from rain, wind, sleet, hail and snow, and harsh temperatures. A heated cargo door option allows for access during the iciest of weather.
GPS Location Enabled	Allows through a GPS beacon for the shipping drone to home in on the DRONEDEK's precise location.
Charging Station	Features a built-in charging station that can re-energize the drone, effectively doubling drone delivery range- charging station **76** and battery exchange mechanism **81** for interchangeability of drone batteries with the DRONEDEK.
Solar Powered	Is powered by a solar panel and/or 110-volt electrical power supply, allowing for operation of its high-level features - solar panel **68** as a power source.
Drop Off and Pick Up	Is a secure receptacle designed to hold parcels that are received or that are waiting to be shipped – a weight and dimension sensors **93**, a barcode reader **73** – infrared or other, and a return tattoo printer **115**

	branding of package for return and ability to place gate code **115A** to a codex or manual intervention and delivery, can mark a gate code **115A** onto the carton **40** for manual delivery.
Flexible installation	Has a secure mounting **39A** infrastructure for iron-clad installation to a structure or concrete flat surface.
Connectivity	Allows the user to easily stay connected to his/her package. DRONEDEK features a contents-sensing switch that via its app, can communicate successful receipt and shipping of parcels to shipper, recipient, and/or shipping company. A user can even see the package via DRONEDEK's built-in camera **61**.
Remote Access	Features a secure mobile application allowing for remote camera access and the ability to lock and unlock ones DRONEDEK via one's phone or tablet. The owner of the box may retrieve the contents easily through a simple code entered, key or cell phone application **111**.

The Big Data Collection anticipates using blockchain technology. A simple explanation of this is that a block in a blockchain is a collection of data. The data is added to the block in blockchain, by connecting it with other blocks in chronological others creating a chain of blocks linked together. The first block in the Blockchain is called Genesis Block. A blockchain is a decentralized, distributed and public digital ledger that is used to record transactions across many computers so that any involved record cannot be altered retroactively, without the alteration of all subsequent blocks. A blockchain has been described as a value-

exchange protocol. See: https://coingeek.com/ibm-patent-takes-on-package-drone-theft-with-blockcha . With the paint/tag and track **122,** camera system **61,** collector panel **80,** GPS location **107,** and data track **108** features and resultant data, by providing the data from the Dronedek receptacles and connecting the receptacles data reservoir to various emergency systems and application, the proper authorities can be alerted and assisted to report emergency events and can help direct/guide authorities to building locations or even locations of vehicles and persons.

[0052] The details mentioned here are exemplary and not limiting. Other specific components and manners specific to describing a Special Expanding Floor/ Accordion drone docking station called a DRONEDEK device **31,30** may be added as a person having ordinary skill in the field of the art of drone docking station and package receptacles for drone or unmanned aerial vehicle (UAV), robotic carriers, or automated unmanned vehicle systems (AUVS) devices and their uses well appreciates.

OPERATION OF THE PREFERRED EMBODIMENT

[0053] The Special Expanding Floor/ Accordion drone docking station called a DRONEDEK **31,30** has been described in the above embodiment. The manner of how the device operates is described below. One notes well that the description above and the operation described here must be taken together to fully illustrate the concept of the Special Expanding Floor/ Accordion drone docking station called a DRONEDEK **31,30.** The preferred embodiment of Special Expanding Floor/ Accordion drone docking station **31** called a DRONDEK is: A drone dock and

delivery box **31** for accepting drone deliveries comprising: (a) a means and structure **32** for expanding the receiving section for containing multiple parcels with a raiseable floor **32F**; (b) means of locating **100, 102** the drone dock such that the drone may accurately approach and dock with the drone dock; (c) a means of engaging **51,62** the drone dock **31** such that a stable connection or attachment can be made; (d) a means **63, 64, 65** of transferring the contents **40** of the drone to the interior **33** of the drone dock **31**; (e) a means of preserving **70, 72** such as temperature control and a means for securely storing the delivered goods once in the drone dock; (f) a mean of disengaging **51,62** (release) from the drone dock **31**; (g) a means of encrypted communication **108, 110** between the drone **50** and the drone dock **31**, either directly or through a remote server (Wi-Fi, Bluetooth, hot spot, satellite etc. and others); (h) a set **71, 71A** of functional components incorporated within the box to allow for preservation and security of the stored goods, and to prevent damage during the transfer and or subsequent storage (soft); (i) a means of securing **39A** the box to a structure at a residential or commercial address **107**; (j) a set of optional features comprising a charging station **76** and exchange mechanism **81**; a collector **80** to identify explosive material, anthrax and the like; an ultraviolet scan **125** system to eradicate disease, virus and harmful materials; an ozone applicator **130** to eradicate disease, virus and harmful materials; (k) a set of identification feature such as a barcode reader **73**, a weight and dimension sensor **93**, and a tattoo printer **115** for return parcels; (l) a set of features on the drone dock for weather monitoring **120**, tag and track **122** vehicles and packages, etc. and follow with GPS once painted, and a camera **61** with facial

recognition software to track humans and pets; and (m) a set of local features such as two-way speakers and loud audio **94,** LED light **92** that are colored and can strobe flash, and a flood light **78.**

[0054] Special Expanding Floor/ Accordion drone docking station called a DRONEDEK **31,30** operates as follows: A secure encrypted code **110** that drone **50** accesses to direct the dock to open its top **34** to allow for safe delivery into the box **31** may be employed. In lieu of code drone may trigger opening of drone dock by simply accessing its landing base. Final communication between the drone and the drone dock **31** may be through electronic or magnetic connection that is made upon the drone landing and connecting with the box. The communication may be directly between the docking or delivery box and the drone itself upon docking in order to facilitate the transmission of a code in a lock box. In alternative embodiments a remote server may be employed whereby the drone communicates its location and docking details to the remote server, upon which the remote server pings or otherwise delivers and signal directly to the box or an associated IP address triggering it to unlock and open. The box may also communicate via RFID in order to identity itself to the drone (or vice versa) and communicate a bar code or I.D. sequence required for docking and unlocking. In similar fashion a Bluetooth signal may be employed to communicate a code to the drone once the drone is in range of the box and its blue tooth signal. In certain embodiments the box will deliver GPS guidance to the drone for proper docking and delivery into box. Upon successful deposit in the dock, the top will close securely assuring that entry into the dock by vandals, thieves or animals is prohibited. Retrigger to close may be

accomplished in similar fashion to the signal to open either by direct communication between the drawing and the box or through a remote server. The box may also be designed to automatically close and lock once the drone un-docks from the box. And the communication may also be turn over a wireless network such as Wi-Fi, Bluetooth, satellite etc. and others that would be recognized by those skilled in the art. The communication may be directly between the docking or delivery box and the drone itself upon docking to facilitate the transmission of a code in a lock box. In alternative embodiments a remote server may be employed whereby the drone communicates its location and docking details to the remote server, upon which the remote server pings or otherwise delivers and signal directly to the box or an associated IP address triggering it to unlock and open. The box may also communicate via RFID to identity itself to the drone (or vice versa) and communicate a bar code **73** or I.D. sequence required for docking and unlocking. In similar fashion a Bluetooth signal may be employed to communicate a code to the drone once the drone is in range of the box and its blue tooth signal. In certain embodiments the box will deliver GPS guidance to the drone for proper docking and delivery into box. Upon successful deposit in the dock, the top will close securely assuring that entry into the dock by vandals, thieves or animals is prohibited. Retrigger to close may be accomplished in similar fashion to the signal to open either by direct communication between the drawing and the box or through a remote server. The box may also be designed to automatically close and lock once the drone un-docks from the box.

[0055] The box design may allow a drop of the item **40** into its cavity **33** and onto a floor **32F** or pad **36** once the lid **34.** The item **40** will drop in and the lid **34** will return to their home position and not allow for access to the inserted item except by the intended recipient. The Drone Dock **31, 30** will then report to its owner and the shipper and the shipping company that the item is securely in the dock and come and retrieve it. The drone dock **31** may also report charging status as well as takeoff status to shipper.

[0056] **FIG. 8 A** through **8 H** are sketches of the operation of delivery by a drone **50** at the residential or commercial receiving location **107** and the expanding DRONEDEK **31.** Shown here are: a drone docking station/ DRONEDEK **31** for deposit of items delivered by drone hereinafter referred to as expanded floor/ and receiving section drone dock, docking station, the box, or drone box or docking box) for deposit of items delivered by drone; a design sketch **31DS** of DRONEDEK with extending floor; a drone structure/ container opening **33**; a closeable and openable, movable/ motorized sliding doors **34** on the dock structure **32**; a foam or soft padding **36**; a parcel **40** such as food items, groceries, tools, electronics, documents, and the like; a drone **50**; a camera system **61** internal/external to compartment of drone **50** having technology and recognition precision to interconnect to applications for facial recognition of humans and pets; an optional receiving dimples **62** for the drone pads **51**; a solar panel **68** as a power source; a barcode reader **73** – infrared or other; a barcode reader waves and signals **73A**; a barcode reader label **73B** on package **40**; a wind block **74**; an external lighting **92** that can be LED type systems to strobe, flash colors, communicate to authorities, distress, etc.; a personal communication devices

106 – such as smart phones, tablets, laptops, personal computers, and the like; a specific GPS address **107** for the docking station **31;** local signal/ or mechanical means **108** – to facilitate final location and transfer such as Cold beam technology, Laser beam, Radar, Lidar, Quick Response (QR) code tags, Radio frequency RFID) remote identification tracking and sensing for drone authentication and landing for navigating the drone **50** to its exact location on the docking station **31;** and a smart phone application **111** or the like to communicate status of the docking event with the user of the personal communication devices **106.** Shipping and receiving by the drones are Coordinated with the FAA, sender and receiver of the goods 91 when a package is sent or received. Any conflicts send an indicator/warning signal to the smart phone (**Fig. 8 H**) as well as when items are being received and shipped. If a problem occurs for receiving such as an oversize package or full receptacle **30,31,** a message is sent and the package is sent to a pre-arranged overflow zone. Every Dronedek receptacle **30,31** has what is called the drone zone which is an overflow area for items that are too large or non-functioning DroneDek or that a receptacle is full and there is an electronic surveillance at the zone which monitors packages dropped in those areas. The client is notified that the package is there and if somebody breaks that field and takes that item there is a photo/ video and electronic visual documentation of that person. At the zone, an audible alarm "warning one that he/she is too close to the package, please step back or the alarm will sound" is present like the Viper alarm system RTM for vehicles.

[0057] With this description it is to be understood that the Special Expanding Floor/ Accordion drone docking station

called a DRONEDEK **31, 30** is not to be limited to only the disclosed embodiment of product. The features of the Special Expanding Floor/ Accordion drone docking station called a DRONEDEK **31, 30** are intended to cover various modifications and equivalent arrangements included within the spirit and scope of the description.

[0058] While certain novel features of this invention have been shown and described and are pointed out in the annexed claims, it is not intended to be limited to the details above, since it will be understood that various omissions, modifications, substitutions and changes in the forms and details of the device illustrated and, in its operation, can be made by those skilled in the art without departing in any way from the spirit of the present invention. Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention.

[0059] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which these inventions belong. Although any methods and materials similar or equivalent to those described herein can also be used in the practice or testing of the present inventions, the preferred methods and materials are now described above in the foregoing paragraphs.

[0060] Other embodiments of the invention are possible. Although the description above contains much specificity,

these should not be construed as limiting the scope of the invention, but as merely providing illustrations of some of the presently preferred embodiments of this invention. It is also contemplated that various combinations or sub-combinations of the specific features and aspects of the embodiments may be made and still fall within the scope of the inventions. Various features and aspects of the disclosed embodiments can be combined with or substituted for one another to form varying modes of the disclosed inventions. Thus, it is intended that the scope of at least some of the present inventions herein disclosed should not be limited by the particularly disclosed embodiments described above.

[0061] The terms recited in the claims should be given their ordinary and customary meaning as determined by reference to relevant entries (e.g., definition of "plane" as a carpenter's tool would not be relevant to the use of the term "plane" when used to refer to an airplane, etc.) in dictionaries (e.g., widely used general reference dictionaries and/or relevant technical dictionaries), commonly understood meanings by those in the art, etc., with the understanding that the broadest meaning imparted by any one or combination of these sources should be given to the claim terms (e.g., two or more relevant dictionary entries should be combined to provide the broadest meaning of the combination of entries, etc.) subject only to the following exceptions: (a) if a term is used herein in a manner more expansive than its ordinary and customary meaning, the term should be given its ordinary and customary meaning plus the additional expansive meaning, or (b) if a term has been explicitly defined to have a different meaning by reciting the term followed by the phrase "as used herein shall mean" or similar language (e.g., "herein

this term means," "as defined herein," "for the purposes of this disclosure [the term] shall mean," etc.). References to specific examples, use of "i.e.," use of the word "invention," etc., are not meant to invoke exception (b) or otherwise restrict the scope of the recited claim terms. Other than situations where exception (b) applies, nothing contained herein should be considered a disclaimer or disavowal of claim scope. Accordingly, the subject matter recited in the claims is not coextensive with and should not be interpreted to be coextensive with any embodiment, feature, or combination of features shown herein. This is true even if only a single embodiment of the feature or combination of features is illustrated and described herein. Thus, the appended claims should be read to be given their broadest interpretation in view of the prior art and the ordinary meaning of the claim terms.

[0062] Unless otherwise indicated, all numbers or expressions, such as those expressing dimensions, physical characteristics, etc. used in the specification (other than the claims) are understood as modified in all instances by the term "approximately." At the very least, and not as an attempt to limit the application of the doctrine of equivalents to the claims, each numerical parameter recited in the specification or claims which is modified by the term "approximately" should at least be construed considering the number of recited significant digits and by applying ordinary rounding techniques.

[0063] The present invention contemplates modifications as would occur to those skilled in the art. While the disclosure has been illustrated and described in detail in the figures and the foregoing description, the same is to

be considered as illustrative and not restrictive in character, it being understood that only selected embodiments have been shown and described and that all changes, modifications, and equivalents that come within the spirit of the disclosures described heretofore and or/defined by the following claims are desired to be protected.

CLAIMS –

What is claimed is:

1. An inground vault for underground homeowner association installation of a drone dock with a station and a delivery box for accepting goods/parcels as deliveries by a drone to a person requesting the goods/parcels with a multiple set of hot and cold sections comprising:

(a) a structure for providing each hot and cold section with an interior wherein each of the hot or cold section can move/roll to a side of the delivery box and enable the drone dock to separate each goods/parcel of a group of multiple goods/parcels with a raiseable floor and to maintain and preserve each of the goods/parcels at a predetermined temperature, and the structure having a motorized sliding door;

(b) a means for locating the drone dock with GPS and then for permitting the drone to accurately approach and to dock with the station;

(c) a means of engaging the drone dock such that a stable connection/attachment can be made;

(d) a means of transferring each of the goods/parcels from the drone to the interior of the structure of the drone dock;

(e) a means of preserving the predetermined temperature with a powered hot/cold plate and temperature assist and control unit;

(f) a means for securely storing the goods/parcels once transferred to the interior of the structure of the drone dock;

(g) a means of disengaging/releasing the drone from the drone dock;

(h) a means of encrypted communication between the drone and the drone dock which has a specific GPS address and communication to the person requesting the delivery of the goods/parcels;

(i) a functional component incorporated within the delivery box to prevent damage and deterioration during the transfer and subsequent storage;

(j) a transport unit to carry and transport the drone dock; and

(k) a set of identification features; wherein the goods/parcel that is delivered to the person requesting the goods/parcels can be tracked and delivered and a set of demographics regarding the tracking and delivery can provide data for a marketing study.

2. The inground vault of claim 1, wherein the means for securely storing the goods/parcels once transferred to the interior of the structure of the

drone dock is selected from the group consisting of a keypad for onsite access to the drone dock, a facial recognition camera, and a fingerprint activated release system.

3. The inground vault of claim 1, wherein the means for locating the drone dock with GPS and then for permitting the drone to accurately approach and to dock with the station is selected from a group consisting of cold beam technology, laser beam, radar, lidar, Quick Response (QR) code tags, and radio frequency identification (RFID).

4. The inground vault of claim 1, wherein the means of encrypted communication between the drone and the drone dock is selected from the group consisting of Wi-Fi, Bluetooth, hot spot, and satellite systems and wherein the drone dock has encrypted communication and tracking of a driverless vehicles, a robots, and vendors that interact with the drone dock and wherein the drone dock can track and interface with an aerial drone, a commercial carrier, a driverless car (UAV) and a robot.

5. The inground vault of claim 1, wherein the functional component to prevent damage and deterioration during the transfer and subsequent storage is selected from the group consisting of a soft receiving pad, a curved side, a sealed door, a temperature-controlled interior, and a heated sliding door.

6. The inground vault of claim 1, wherein the set of identification feature is a barcode reader.

7. The inground vault of claim 1, wherein the set of identification feature is a weight and dimension sensor.

8. The inground vault of claim 1, wherein the set of identification feature is a tattoo printer for reverse logistics and for return of parcels.

9. The inground vault of claim 1, further comprising:

a movable platform for mounting the drone dock and delivery box thereon;

a structural member for raising the platform;

a means to raise and lower the platform;

a means to convert electricity to rotational movement connected to the means to raise and lower the platform;

wherein the platform is adapted to be lowered or raised to lower and raise the drone dock and delivery box into and from the inground vault.