

1) Family number: 63050197 (US2017372137A)

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Title: SYSTEMS, DEVICES, AND METHODS FOR ROBOTIC REMOTE SENSING FOR PRECISION AGRICULTURE

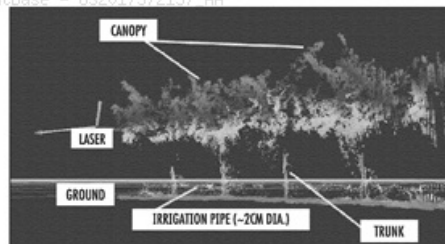
Abstract: Source: US2017372137A [EN] The present subject matter relates to systems, devices, and methods for data-driven precision agriculture through close-range remote sensing with a versatile imaging system. This imaging system can be deployed onboard low-flying unmanned aerial vehicles (UAVs) and/or carried by human scouts. Additionally, the present technology stack can include methods for extracting actionable intelligence from the rich datasets acquired by the imaging system, as well as visualization techniques for efficient analysis of the derived data products. In this way, the present systems and methods can help specialty crop growers reduce costs, save resources, and optimize crop yield.

Classifications:

International (IPC 8-9): G06K9/00 G06T17/05 H04N13/02 H04N5/33 H04N7/18 (Advanced/Invention)

CPC: H04N13/0282 H04N13/025 G06T17/05 H04N5/332 H04N7/185 G06K9/00657 Y02A40/12

PatBase - US2017372137 A1



Family:

Publication number	Publication date	Application number	Application date
US2017372137 AA	20171228	US20160545266	20160127
WO16123201 A1	20160804	WO2016US15093	20160127

Priority:

US20150108509P 20150127 US20160545266 20160127 WO2016US15093 20160127

Probable Assignee: UNIV PENNSYLVANIA

Assignee(s): (std): UNIV PENNSYLVANIA

Assignee(s): TRUSTEES OF UNIV OF PENNSYLVANIA

Inventor(s): (std): CROSS GARETH BENOIT ; DAS JNANESHWAR ; KUMAR R VIJAY ; MAKINENI ANURAG ; MULGAONKAR YASH SHAILESH ; QU CHAO

Agent(s): HUNT GREGORY A

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

2) Family number: 56648247 (DE202014002338U1)

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Title: WEITGEHEND AUTONOM FLIEGENDE UAV-HUBSCHRAUBER-DROHNE ZUR AUSBRINGUNG VON PFLANZENSCHUTZMITTELN IN DER LANDWIRTSCHAFT, FORSTWIRTSCHAFT UND IM WEINANBAU (BIS ZU EINEM MAX. ABFLUGGEWICHT VON 150KG) LARGELY INDEPENDENT FLYING UAV DRONE HELICOPTER FOR DEPLOYMENT OF PESTICIDES IN AGRICULTURE, FORESTRY AND VINEYARDS (UP TO A MAX. DEPARTURE OF WEIGHT 150KG) (Machine translation)

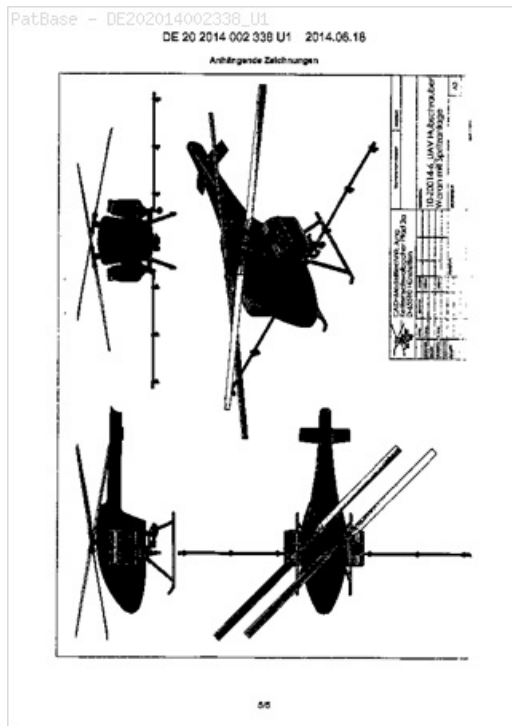
Abstract: Source: DE202014002338U1 [DE] Weitgehend autonom fliegende UAV-Hubschrauber-Drohne (UAV = unmanned aerial vehicle – unbemanntes Luftfahrzeug) zur Ausbringung von Pflanzenschutzmitteln in der Landwirtschaft, Forstwirtschaft und im Weinanbau (bis zu einem max. Abfluggewicht von 150 kg). dadurch gekennzeichnet, dass die UAV-Hubschrauber-Drohne weitgehend autonom fliegen kann. Die zu fliegenden Flugbahnen werden dabei vorab definiert. Dabei lassen sich die Fluggeschwindigkeit, Flugrichtung und der Höhenabstand zu der zu behandelnden Agrarfläche möglichst exakt festlegen. Ein am Boden stehender Sicherheitspilot kann dabei jederzeit in die Steuerung der Hubschrauber-Drohne eingreifen.

Machine translation: Largely autonomous flying UAV helicopter drone (UAV = Unmanned aerial vehicle - Unmanned Aerial Vehicle) for the application of pesticides in agriculture, forestry and wine (up to a maximum weight of 150 kg.). characterized in that the UAV helicopter drone is largely autonomous flying. The flying trajectories to be defined in advance here. Here, the flight speed, flight direction and the distance to the height to be treated Agrarfläche can be defined as precisely as possible. A standing on the ground safety pilot can intervene at any time in the control of helicopter drone.

Classifications:

International (IPC 8-9): B64D1/16 G05D1/10 (Advanced/Invention)

CPC: G05D1/102 B64C2201/024 B64C2201/12 B64D1/18 A01B79/005 Y02A40/294



Family:

Publication number	Publication date	Application number	Application date
DE202014002338 U1	20140618	DE201420002338U	20140315

Priority:

DE201420002338U 20140315

Probable Assignee:

JUNG VOLKER

Assignee(s): (std):

JUNG VOLKER

Assignee(s):

JUNG

3) Family number: 58623272 (CN303119102S)

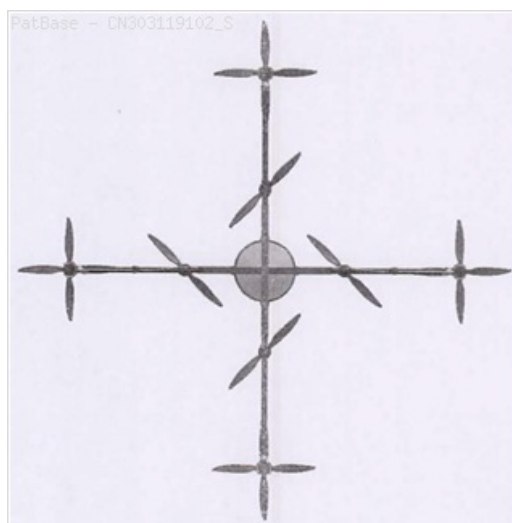
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Title: Agricultural crop protection UAV (Machine translation)

Abstract: Source: CN303119102S **Machine translation:** This design is a product name of agricultural crop protection UAV; mainly used for agriculture, forestry, plant protection; design point is that the overall shape of the product, especially the parts (flying platform) using the outer-rotor, the inside of the single rotor, foldable, on parts (flying platforms) may be integrally separated from the lower part; three-dimensional figure published in the specified map.

Classifications:

Locarno class: 12/07



Family:

Publication number	Publication date	Application number	Application date
CN303119102 S	20150304	CN201430298596F	20140815

Priority:

CN201430298596F 20140815

Probable Assignee:

ZHUHAI YUREN AEROCRAFT CO LTD

Assignee(s): (std):

ZHUHAI YUREN AEROCRAFT CO LTD

Title: UAV-BASED SENSING FOR WORKSITE OPERATIONS

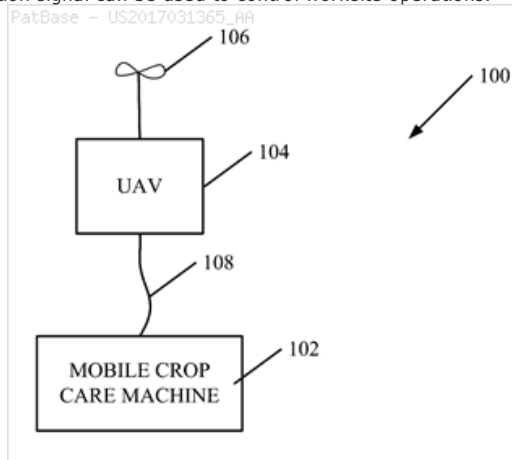
Abstract: Source: US2017031365A [EN] A sensor senses an attribute of a worksite at a location that is geographically spaced from a corresponding mobile machine. An operation is performed at the location, based upon the sensed attribute. An action signal is generated based on the effect data. An unmanned aerial vehicle communicates effect data, indicative of an effect of the operation at the location, to the mobile machine. The action signal can be used to control worksite operations.

Classifications:

International (IPC 8-9): A01B69/00 A01B79/00 A01C21/00 B64C27/20 B64C27/22 B64C39/02 G01S19/42 G05D1/00 G05D1/02 G05D1/10 G06Q50/02 (Advanced/Invention)

CPC: G05D1/0219 B64C39/024 G05D1/0246 G05D2201/0201 G05D2201/0202 B64C2201/123 A01B79/005 G05D1/0094

US: 701/50



Family:

Publication number	Publication date	Application number	Application date
BR102016015380 A2	20170131	BR20161015380	20160630
DE102016212623 A1	20170202	DE201610212623	20160712
US2017031365 AA	20170202	US20150813573	20150730
US2017315555 AA	20171102	US20170650115	20170714
US9740208 BB	20170822	US20150813573	20150730

Priority:

US20150813573 20150730 US20170650115 20170714

Probable Assignee: DEERE AND CO

Assignee(s): (std): DEERE AND CO

Assignee(s): DEER AND CO

Inventor(s): (std): ANDERSON NOEL W ; BRADLEY J HITCHLER ; HITCHLER BRADLEY J ; HITCHLER BRADLEY ; NOEL W ANDERSON ; RAMANATHAN SUGUMARAN ; SUGUMARAN RAMANATHAN

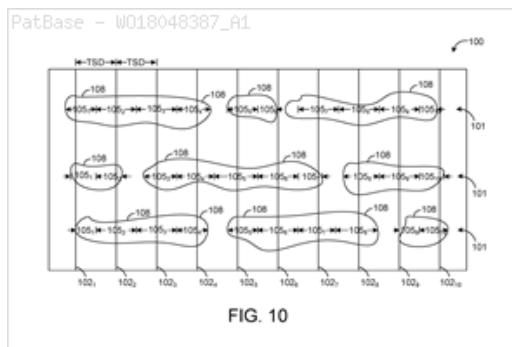
Agent(s): KELLY HOLT AND CHRISTENSON PLLC; JOSEPH R

Title: SYSTEMS AND METHODS FOR MAPPING EMERGED PLANTS

Abstract: A system uses an optical sensor and an image processing apparatus to map emerged plants in a field. The optical sensor collects at least one image of a field of emerged plants. The image processing apparatus analyzes the image to detect areas of vegetation and creates a vegetation map indicative of the detected areas. The image processing element then analyzes the vegetation map to identify emerged plants within the image and creates at least map indicating locations of the emerged plants in the field. Such map may be used to make efficient crop management decisions based on the actual layout of emerged plants in the field.

Classifications:

International (IPC 8-9): A01B49/06 (Advanced/Invention)



Family:

Publication number	Publication date	Application number	Application date
WO18048387 A1	20180315	WO2016US50472	20160907

Priority:

WO2016US50472 20160907

Probable Assignee: PREC HAWK USA INC

Assignee(s): (std): PREC HAWK USA INC

Assignee(s): PRECISION HAWK USA INC

Inventor(s): (std): BAYNES JEREMY ; HAUN THOMAS ; PUNJANI ALI ; LOBATON EDGAR ; LOHMAN PAT ; MEAD MATT ; SAN SOUCI JASON ; SLATER ANDREW

Agent(s): HOLLAND JON E ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

6) Family number: 66086464 (WO17099568A1) © PatBase

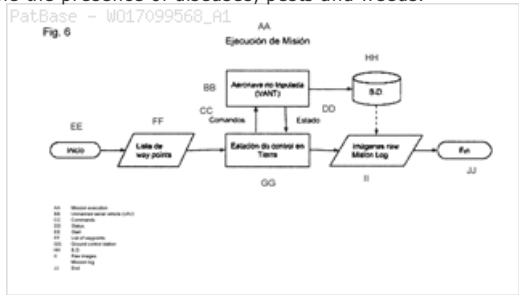
Title: METHOD FOR PLANNING OVERFLIGHT OF IRREGULAR POLYGONS USING TWO OR MORE UNMANNED AERIAL VEHICLES FOR PRECISION AGRICULTURE USING MULTISPECTRAL AND HYPERSPECTRAL AERIAL IMAGE ANALYSIS

Abstract: The invention relates to a method by means of which it is possible to use a plurality of unmanned aerial vehicles that are radio controlled by means of a computer, to generate a multispectral photographic map of a crop field in order to generate information that helps to improve crop yield and to determine the presence of diseases, pests and weeds.

Classifications:

International (IPC 8-9): A01B79/00 G03B37/00 (Advanced/Invention)

CPC: A01B79/00 G03B37/00 Y02A40/12



Family:

Publication number	Publication date	Application number	Application date
WO17099568 A1	20170615	WO2015MX00165	20151211

Priority:

WO2015MX00165 20151211

Probable Assignee: PACHECO SANCHEZ JOSE ANTONIO

Assignee(s): (std): PACHECO SANCHEZ JOSE ANTONIO

Inventor(s): (std): PACHECO SANCHEZ JOSE ANTONIO

Agent(s): VAZQUEZ PALMA OMAR

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

7) Family number: 57492637 (US2014303814A) © PatBase

Title: AERIAL FARM ROBOT SYSTEM FOR CROP DUSTING, PLANTING, FERTILIZING AND OTHER FIELD JOBS

Abstract: Source: US2014303814A [EN] Modern farming is currently being done by powerful ground equipment or aircraft that weigh several tons and treat uniformly tens of hectares per hour. Automated farming can use small, agile, lightweight, energy-efficient automated robotic equipment that flies to do the same job, even able to farm on a plant-by-plant basis, allowing for new ways of farming. Automated farming uses unmanned aerial vehicles (UAVs) that are equipped with detachable implements and reservoirs and that we call "aerial farm robots." Automated farming uses high-precision GPS and other precision positioning and vision technology to autonomously and precisely perform crop dusting, planting, fertilizing and other field related farming or husbandry tasks. The subsystems for the control, refill, recharge and communication subsystems of the aerial farm robots are part of the overall automated farming system, and can autonomously handle most of the husbandry tasks on a farm.

Classifications:

International (IPC 8-9): A01B79/00 A01B79/02 A01C21/00

A01C7/00 A01C7/04 A01M9/00 B64B1/40 B64C39/02 B64D1/16

B64D1/18 G05D1/00 G05D1/10 G08G5/00

G08G5/04 (Advanced/Invention)

CPC: G08G5/0043 B64B1/40 G08G5/04 B64B2201/00 B64C2201/022

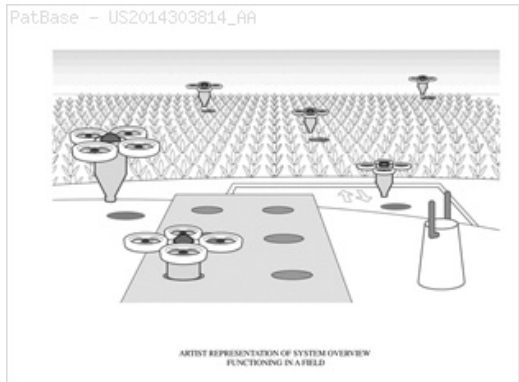
B64C2201/042 B64C2201/101 B64C2201/108 B64C2201/126

B64C2201/146 B64C2201/141 A01B79/005 A01C21/00 B64C39/024

B64D1/16 B64C2201/027 B64C2201/12 B64C2201/145 B64D1/00

A01B79/02 Y10S901/01 A01C7/04 G05D1/104

US: 1/1 701/3 901/1



Family:

Publication number	Publication date	Application number	Application date
EP2978665 A1	20160203	EP20140776144	20140320
EP2978665 A4	20170426	EP20140776144	20140320
US2014303814 AA	20141009	US20140220990	20140320

US2016307448 AA	20161020	US20160193033	20160625
US9382003 BB	20160705	US20140220990	20140320
US9852644 BB	20171226	US20160193033	20160625
WO14160589 A1	20141002	WO2014US31359	20140320

Priority:

US20130804685P 20130324 US20140220990 20140320 WO2014US31359 20140320
US20160193033 20160625

Probable Assignee: BEE ROBOTICS CORP

Assignee(s): (std): BEE ROBOTICS CORP

Inventor(s): (std): BUREMA HARM ; FILIN ANATOLY ; SALNIKOV VLADIMIR

Agent(s): WITTMANN GUENTHER; PATENT STRATEGIES; EDWARD; DURNEY EDWARD

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

8) Family number: 60399891 (WO15139091A1)

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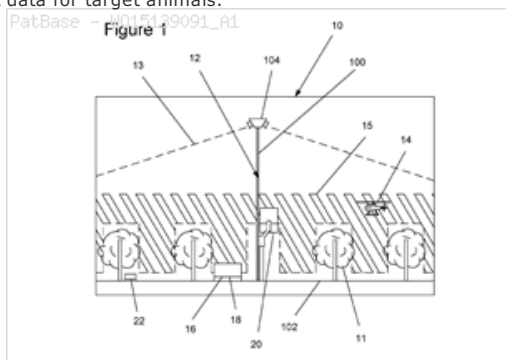
Title: SYSTEM FOR DETECTING TARGET ANIMALS IN A PROTECTED AREA

Abstract: A system for detecting target animals in a protected area, said system for performing the steps of converting visual light into a sequence of digital images; identifying objects in the sequence of digital images; for each one of objects, generating object data representing at least one of position; velocity; and size; and detecting target animals by comparing object data generated for each one of said objects with known object data for target animals.

Classifications:

International (IPC 8-9): G01S7/41 G06K9/36 (Advanced/Invention)

CPC: A01M29/06 A01M29/16 A01M31/002 G05D1/101 G06K9/0063



Family:

Publication number	Publication date	Application number	Application date
WO15139091 A1	20150924	WO2015AU50119	20150319

Priority:

AU20140900962 20140319

Probable Assignee: REACTIVE ELECTRONICS

Assignee(s): (std): REACTIVE ELECTRONICS

Inventor(s): (std): MCNAB CAMERON

Agent(s): DAVIES COLLISON CAVE

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

9) Family number: 61740984 (US2016050840A)

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Title: METHODS FOR AGRONOMIC AND AGRICULTURAL MONITORING USING UNMANNED AERIAL SYSTEMS

Abstract: Source: US2016050840A [EN] A method for agronomic and agricultural monitoring includes designating an area for imaging, determining a flight path above the designated area, operating an unmanned aerial vehicle (UAV) along the flight path, acquiring images of the area using a camera system attached to the UAV, and processing the acquired images.

Classifications:

International (IPC 8-9): A01B76/00 A01B79/00 B64C39/02

G01C11/02 G01C11/04 G05D1/00 G05D1/02 G06K9/00 G06K9/46

G06K9/62 G06Q10/00 G06Q50/02 G06T11/60 G06T13/80 G06T5/00

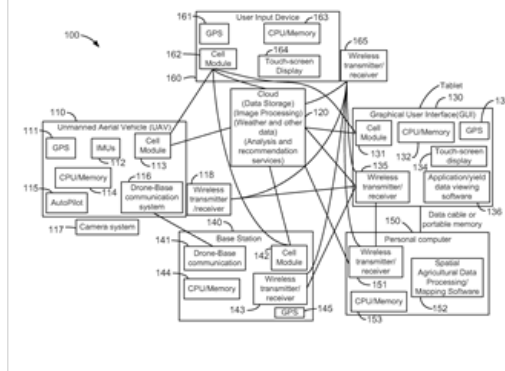
G06T7/00 G06T7/40 G6Q10/00 H04N5/232

H04N7/18 (Advanced/Invention)

CPC: G06T11/60 B64C2201/123 G06T5/006 A01B79/005

G05D1/0094 G06K9/00657

US: 701/3

**Family:**

Publication number	Publication date	Application number	Application date
AR101607 AA	20161228	AR2015P102694	20150821
AU2015305406 AA	20160225	AU20150305406	20150820
CA2957081 AA	20170202	CA20152957081	20150820
CL2017000426 A1	20180302	CL20170000426	20170222
CN107148633 A	20170908	CN201580044988	20150820
CO20170002677 A2	20170609	CO20170002677	20170322
EP3183697 A1	20170628	EP20150834359	20150820
IN201717008175 A	20170714	IN201717008175	20170308
US2016050840 AA	20160225	US20150831165	20150820
US9922405 BB	20180320	US20150831165	20150820
WO16029054 A1	20160225	WO2015US46165	20150820

Priority:

US20140040859P 20140822 US20140046438P 20140905 US20150831165 20150820
 WO2015US46165 20150820

Probable Assignee: CLIMATE CORP**Assignee(s):** (std): CLIMATE CORP**Assignee(s):** KOCH JUSTIN L ; PLATTNER TROY L ; SAUDER DOUG ; BAURER PHIL**Inventor(s):** (std): BAURER PHIL ; DOUG SAUDER ; JUSTIN L KOCH ; KOCH JUSTIN L ; PHIL BAURER ; PLATTNER TROY L ; SAUDER DOUG ; TROY L PLATTNER**Agent(s):** PIZZEYS PATENT AND TRADE MARK ATTORNEYS PTY LTD; RIDOUT AND MAYBEE LLP; ESTUDIO CLARKE MODET AND CO CHILE LIMITADA; CAROLINA MERCEDES DAZA MONTALVO; BOTTI MARIO; HICKMAN PALERMO BECKER BINGHAM LLP; MALGORZATA A; KULCZYCKA MALGORZATA A ET AL**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW**10) Family number: 60401984 (US2017112118A)**

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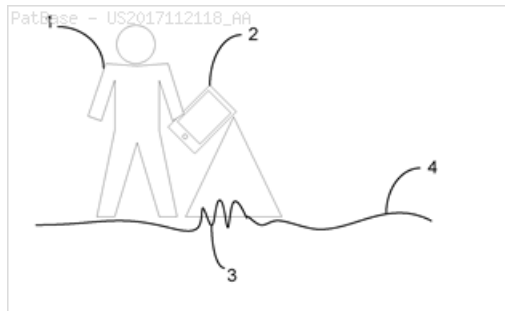
Title: A CALIBRATION DEVICE, A SPRAYING SYSTEM AND A METHOD OF CALIBRATION

Abstract: Source: US2017112118A [EN] A calibration device that utilises sensor data from an optical sensor to develop one or more calibration parameters for controlling operation of a sprayer utilising itself optical sensors and transmitting the calibration parameters to said sprayer. A method of calibrating a sprayer utilising the calibration information is also disclosed. A method of pasture or crop management for a region of interest in which a composite representation of cumulative substance applications is used to developing a representation in which sub regions of the region of interest having prescribed characteristics are visually differentiated from other regions. The spatial distribution of calibration values may also be recorded and used to analyse substance application against calibration values to develop a report of apparently anomalous calibration values.

Classifications:

International (IPC 8-9): A01C23/00 A01C23/02 A01G1/00 A01M7/00 B05B12/12 G01N21/84 G06Q50/02 (Advanced/Invention)

CPC: A01C23/007 A01C23/023 A01M7/0089 B05B12/122 A01G1/001 A01G22/00

US: 239/73**Family:**

Publication number	Publication date	Application number	Application date
AU2015232048 AA	20150924	AU20150232048	20150310
CA2942783 AA	20160914	CA20152942783	20150310
US2017112118 AA	20170427	US20150127145	20150310
WO15142190 A2	20150924	WO2015NZ50024	20150310
WO15142190 A3	20160331	WO2015NZ50024	20150310

Priority:

NZ20140622729 20140320 WO2015NZ50024 20150310

Probable Assignee: MACKENZIE RESEARCH GROUP LTD

Assignee(s): (std): MACKENZIE RES GROUP LTD

Assignee(s): MACKENZIE RESEARCH GROUP LTD ; MACKENZIE CRAIGE HECTOR

Inventor(s): (std): MACKENZIE CRAIGE HECTOR

Agent(s): ELLIS TERRY; HILL AND SCHUMACHER; ELLIS TERRY ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR
CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID
IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN
MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG
SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW