

August 1, 2019

Docket Management Facility
US Department of Transportation
1200 New Jersey Avenue SE
West Building, Ground Floor
Room W12-140
Washington, DC 20590

Subject: UPS Flight Forward Inc. Petition for Exemption from Specific Regulations pursuant to 49 USC 44807 and 14 CFR 11.61, *et seq.* 14 CFR Parts 91 and 135

UPS Flight Forward Inc. (UPS FF) respectfully submits this Petition for Exemption (Petition) from the specific regulations in 14 CFR parts 91 and 135 identified in this document, pursuant to 14 CFR part 11. UPS FF is seeking these exemptions in support of its application for an Air Carrier Operating Certificate under part 135. Additionally, this Petition specifically seeks exemption under the authority of 49 USC 44807 from both the statutory requirement for an aircraft in air commerce, and the regulatory requirement of 14 CFR 135.25 for an aircraft conducting operations under part 135.

For your convenience, this Petition is organized as follows:

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I. BACKGROUND

UPS FF is a newly incorporated subsidiary of United Parcel Service, Inc. (UPS) that is committed to using technology to transform business. This begins with our participation in the Unmanned Aircraft Systems Integration Pilot Program (IPP). Specifically, UPS FF has partnered with the North Carolina DOT (NCDOT), WakeMed hospital in Raleigh, NC, and Matternet, the manufacturer of the M2 small unmanned aircraft system (sUAS). This partnership provides an innovative application of sUAS in the development of commercial package delivery. Particularly, the partnership under the NC IPP is focused on the transport of blood and medical samples for testing from outlying facilities to the lab within the WakeMed hospital network. sUAS package delivery replaces the inefficient and time consuming ground courier services used currently with a much more efficient and timely unmanned aircraft service. This provides test results and diagnosis to doctors more rapidly, leading to more timely treatment, which in turn, improves the patient's health and overall experience.

However, long before the inception of UPS FF, parent company UPS, a global leader in logistics, displayed a deep rooted tradition in both innovation and public service. UPS is continually looking for ways to leverage technology in the development of better methods to support its customers and the public at large. From the founding of UPS in 1907 as a messenger service company, through our growth into common carriage and the air express market, and more recently the rapidly growing e-commerce world, UPS has continued to evolve and innovate.

During that evolution and over 30 years ago, UPS gained approval for an Air Carrier Operating Certificate (AOC) to fly under part 121 of the Federal Aviation Regulations. UPS Airlines, one of the world's largest and safest airlines, currently operates a fleet of more than 250 aircraft in support of worldwide operations to over 220 countries and territories. UPS Airlines, with the support of its parent company, has been a successful, responsible, safe, and innovative leader in the commercial aviation community and the National Airspace System (NAS) for a very long time.

Designed from a wealth of UPS aviation experience, a history of technological innovation, logistics and transportation expertise, and a focus on safety and customer service, UPS FF is the next logical evolution for UPS. UPS FF is able to leverage decades of aviation experience in a new and innovative arena with a goal to safely integrate unmanned aircraft (UA) into the NAS.

UPS, UPS Airlines, and UPS FF all understand and recognize the importance of maintaining a safe airspace system for all aircraft and operators - manned and unmanned, passenger and cargo. UPS FF also recognizes the need to provide opportunities for a structured approach to safely solve the many technical challenges associated with exploring the commercial viability of an enhanced unmanned aircraft system (UAS) in the NAS. UPS FF submits that this can be done through testing and validation of operational concepts that demonstrate safety and reliability, and aid in the development of regulatory boundaries. Working with the involved government agencies to solve the regulatory and policy challenges is also a very necessary objective that UPS FF will proudly participate in. This is another reason why UPS FF's partnership in the NC IPP is the right fit at the right time.

It is appropriate that North Carolina, the state that was "First in Flight", should also be at the center of the quest into the next evolution of aeronautics: expanding and implementing UAS in the NAS. Aviation, like UPS, has evolved immensely over the past century, reacting to and creating new technology. One element that has remained constant, however, is the US Government's promotion of advances in transportation and communication technology to facilitate economic growth. This position, relative to aviation, dates back to the support for the Air Mail service in 1918, when UPS was barely 10 years old. The NC IPP is just the next evolution in that support of innovation for aviation. UPS FF is honored to be a participant in the NC IPP and recognizes the importance of our role in this process. It is from this foundation that UPS FF offers the following information for consideration.

II. CONCEPT OF OPERATIONS (CONOPS)

UPS FF is a participant in the NC IPP and has partnered with the NCDOT, WakeMed hospital in Raleigh, NC, and Matternet. Matternet is both the manufacturer and the operator of the M2 sUAS at WakeMed hospital under part 107, until such time as UPS FF receives its AOC under part 135 and assumes operational control.

The WakeMed hospital operation involves the transport of blood and medical samples for testing from outlying facilities to the lab within the WakeMed hospital network. WakeMed's hospital system consists of satellite facilities in various locations around the Raleigh, NC area with a main campus complex that houses a state of the art laboratory facility. WakeMed hospital has traditionally used ground courier services to transport these samples on a scheduled basis from the satellite facility to the main campus lab for testing. Hospital networks, like WakeMed, frequently consolidate expensive lab equipment and personnel into centralized locations which then serve the surrounding areas. However, utilizing a ground courier service that travels on an infrequent schedule (called "batch processing") causes the lab to be overrun with samples when the ground courier arrives, and then lacking samples to test prior to the arrival of the next ground courier delivery. This batch processing is inefficient and delays patient's diagnosis and treatment.

Using a sUA to transport samples across these distances is a much more efficient and timely process, eliminating the batch processing and providing a steady flow of samples to test. The outcome is the facilitation of test results and diagnosis to doctors more rapidly, leading to more timely treatment, and in turn, improved patient health and overall experience.

Under the NC IPP, Matternet is operating the M2 sUAS under part 107 and applicable waivers. UPS FF is applying for an AOC under part 135 and will assume responsibility for this operation, and expand its scope through appropriate regulatory approvals and waivers. Flights are currently operated five (5) days per week, conditions permitting, carrying blood and medical samples to prove the validity of this operation. Data is being collected from the operation and analyzed to: provide feedback through the NC IPP and the FAA; track the durability and reliability of the sUAS; and identify and aid in the development of operating standards.

UPS FF's CONOPS do not involve deliveries to ad hoc locations, nor do they involve deliveries to the general public. Routes are pre-planned and approved by the FAA following safety analysis and risk assessment. UPS FF's processes and controls are consistent with accepted Safety Management System (SMS) principles. Although not required under part 135, UPS FF has assigned a Director of UAS Safety (DOS) to manage safety processes and procedures to ensure the highest degree of safety for the new sUAS operation. The Route Approval Process is a mandatory UPS FF General Operating Manual (GOM) requirement and is used to support application to the FAA for new route approvals authorized by Operations Specification issuance.

This safety analysis and risk assessment determines the suitability of the route and identifies route characteristics that provide for safe flight profile creation. The assessment's purpose is to identify hazards, such as obstacles and obstacle heights from official government sources; design routing that minimizes flight over roads and dense populations/gatherings; and to identify any other hazards that may present a risk to the operation or to the general public.

Once a route is assessed, designed, and approved, that route is loaded into the Matternet Flight Control System and geo-fencing is used to ensure the sUA operates in the assessed airspace volume.

Additionally, UPS FF incorporates trained and qualified Visual Observers (VO) as crewmembers, when the route requires. The VOs are in constant communication with the Remote Pilot in Command (RPIC) and are responsible for notifying the RPIC if safety of flight may be compromised due to ground or flight hazards (e.g., other aircraft or air medical helicopters, mobile cranes, weather phenomenon, etc.).

A unique aspect of the hospital environment is the proximity to Helicopter Emergency Medical Services (HEMS) during active sUAS operations. The RPIC coordinates with WakeMed's HEMS dispatchers to ensure there are no ongoing operations before each sUAS flight. This mitigation has been working successfully in hospital settings since March 2019 (the beginning of the part 107 operation in NC), and through over 1,000 successful flight segments without incident in NC and over 4,000 successful flight segments worldwide for the Matternet M2 sUAS.

III. MATTERNET M2 – sUAS

The Matternet M2 sUAS is a commercial delivery quad-copter designed to operate on beyond visual line of sight (BVLOS) routes in automated flight. The sUA is powered by Lithium-ion batteries and carries a payload box to transport goods.

The M2 is approximately 50 x 50 x 10 inches in size, with a maximum gross takeoff weight of 29.1 pounds. The maximum payload capacity is 4.4 pounds.



The M2 is typically flown from a ground control station (GCS) which utilizes a commercial-off-the-shelf device hosting a proprietary and secure aircraft control application. Communications with the sUA are accomplished via cellular signals. The M2 may also be controlled manually via a hand-held transmitter.

The M2 auto flight system is responsible for flight control and navigation and includes a global positioning system (GPS) and compass module. Significant setup/tuning is accomplished on each sUA, which is manually flown by Matternet Safety Pilots to ensure nominal flight behavior, and

then put through a series of qualification tests utilizing the GCS to ensure expected performance over the course of at least seven (7) hours of nominal flight. This safety and reliability testing is accomplished on every M2 before it is placed into service.

In auto mode, the sUA flies an approved, predetermined route that is uploaded to the sUA. Additional inputs are available to the RPIC to: stop the flight along its route (“hover”); return it to its departure point; direct it to an immediate controlled landing at a safe alternate location; or direct it to a controlled descent by activating the parachute recovery system in emergency situations. The RPIC also has the ability to view the live telemetry data from the sUA, including position, attitude, and battery status.

Matternet’s UAS is engineered with security in mind. All communications to and from the sUA are secured with industry best practices, including Transport Layer Security (TLS). The M2 platform’s primary command and control (C2) link is a proprietary digital signal. Should a degradation or loss of the C2 link occur, the sUA is capable of proceeding to its intended destination as planned and landing safely.

In addition to the geo-fence safeguards, the M2 sUA has a Flight Termination System (FTS). The FTS provides an additional safety layer when certain operational parameters are exceeded by deploying a parachute to reduce the kinetic energy transfer of the sUA. Separate power and electronics controls are included that allow the FTS to remove power from the motors and sound an audible alert on the sUA when the parachute deploys to serve as an awareness and safety mitigation to any possible people in the vicinity. The M2 parachute system has been evaluated by an independent third party, and is in compliance with the testing standards of deployable parachutes in American Society for Testing and Materials (ASTM) F3322-18 parachute recovery systems (PRC).

There is a dedicated battery for the FTS which ensures that the parachute ejection and flight telemetry can continue in case of primary power failure.

IV. SPECIFIC REGULATIONS UNDER PETITION FOR EXEMPTION

Due to the number of regulations for which exemptions are being sought, UPS FF has formatted this portion of the document in numerical order, and identified by subpart, beginning with 14 CFR part 91. For each regulation, UPS FF has identified the specific extent of the relief it is seeking and the reason it is required. This information contains or references provisions, conditions, limitations, or procedures contained in UPS FF’s manuals and processes, as applicable. These mitigations were derived through a robust SMS process and are intended to ensure there is no adverse effect on safety, or to provide an equivalent or greater level of safety as the rule provides as published.

14 CFR 91

Subpart A – GENERAL

91.7 - Civil Aircraft Airworthiness.

- 91.7(a) *No person may operate a civil aircraft unless it is in an airworthy condition.*
- 91.7(b) *The pilot in command of a civil aircraft is responsible for determining whether that aircraft is in condition for safe flight. The pilot in command shall discontinue the flight when unairworthy mechanical, electrical, or structural conditions occur.*

Pursuant to 14 CFR 3.5(a), an aircraft is airworthy when it “conforms to its type design and is in a condition for safe operation.” UPS FF requests relief from 91.7 specifically related to the airworthiness requirement as it relates to an FAA type certification. UPS FF will operate the Matternet M2 sUAS. Matternet is actively pursuing an airworthiness type certificate for the M2 sUAS in accordance with established guidelines. The required Unmanned Aircraft Flight Manual (UFM) and Unmanned Aircraft Maintenance Manual (UMM) that support the type certification process and the request for relief are proprietary and confidential manuals and are submitted under separate cover.

UPS FF has developed a Continuous Airworthiness Maintenance Program (CAMP) in accordance with 135.411(a)(2). The ten (10) elements of an effective CAMP are described in detail in the UPS FF General Maintenance Manual (GMM) submitted under separate cover. Coordinated practices between the flight operations and maintenance departments are designed to ensure the continued airworthiness of each aircraft and in particular that the airworthiness of the aircraft is verified prior to each flight.

Relief is required to serve functionally as a substitute for an airworthiness determination until such time that the M2 type certification is completed and a certificate of airworthiness is issued. The policies and procedures identified in the UPS FF manuals submission ensure that the aircraft is safe for flight at all times, and the proposed procedures provide an equivalent or greater level of safety as that provided by Section 91.7 as published.

91.9(b) – Civil Aircraft Flight Manual, Marking, and Placard Requirements.

- 91.9(b) *No person may operate a U.S.-registered civil aircraft –*
- (1) *For which an Airplane or Rotorcraft Flight Manual is required by 21.5 of this chapter unless there is available in the aircraft a current, approved Airplane or Rotorcraft Flight Manual or the manual provided for in 121.141(b); and*

- (2) *For which an Airplane or Rotorcraft Flight Manual is not required by 21.5 of this chapter, unless there is available in the aircraft a current approved Airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof.*

UPS FF requests relief from 91.9(b) specifying the requirement to carry appropriate manuals on each aircraft. The FAA Office of the Chief Counsel previously provided an interpretation regarding the impracticality of carrying certain documents on a sUA with no pilot onboard. The interpretation dated August 8, 2014 from Mark W. Bury, Assistant Chief Counsel For International Law, Legislation and Regulations, AGC-200, titled, "*Interpretation regarding whether certain required documents may be kept at an unmanned aircraft's control station,*" specifically stated, "the intent of these regulations is met if the pilot of the unmanned aircraft has access to these documents at the control station from which he or she is operating the aircraft."

The FAA has also stated in Exemption 18163 that relief to 91.9(b) is not necessary, but granted an exemption to the regulation nonetheless.

The UPS FF GOM establishes detailed policies, procedures, and instructions regarding the equipment and information that must be available to the RPIC when operating the sUAS, including required documentation. Company manuals, the UFM, and all required documents are available to the RPIC at the GCS from which the RPIC is controlling the flight. This provides access of required documents to the RPIC in the conduct of their duties and for presentation to an FAA inspector, upon request. Therefore, the mitigation proposed by UPS FF provides an equivalent or greater level of safety as that provided by Section 91.9(b) as published.

Subpart B – FLIGHT RULES

91.119(b) and (c) - Minimum Safe Altitudes: General

- 91.119 *Except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes:*
- (b) *Over congested areas. Over any congested area of a city, town, or settlement, or over any open air assembly of persons, an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.*
- (c) *Over other than congested areas. An altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.*

UPS FF requests relief from 91.119(b) and (c) to conform to current requirements for sUA to typically operate at or below 400 feet AGL. In accordance with the UPS FF GOM Route Approval Process, a safety analysis and risk assessment are conducted for each intended route of flight from takeoff to touchdown. This safety assessment determines the suitability of the route and identifies route characteristics that provide for safe flight profile creation. The assessment's purpose is to identify hazards, such as obstacles and obstacle heights from official government sources, design routing that minimizes flight over roads and dense populations/gatherings, and to identify any other hazards that may present a risk to the operation or to the general public. The Route Approval Process is a mandatory UPS FF GOM requirement and is used to support application to the FAA for new route approvals authorized by Operations Specification issuance. Once an acceptable route is assessed, designed, and approved, that route is loaded into the Matternet Flight Control System and geo-fencing is used to ensure the sUA operates in the assessed airspace volume.

Current UPS FF routes are flown at a minimum altitude of 300 feet AGL and a maximum altitude of 400 feet AGL in Class G airspace, with takeoff and landing phases flown in vertical profiles to ensure obstacle clearance. The profile minimum altitude ensures full deployment of the emergency parachute if activation of the Matternet M2 sUA FTS is required. The maximum altitude on the proposed routes provides separation from manned aircraft normally operating at or above 500 feet AGL (1,000 feet AGL over congested areas).

Additionally, UPS FF incorporates trained and qualified VOs as crewmembers when required. The VOs are in constant communication with the RPIC and are responsible for notifying the RPIC if safety of flight may be compromised due to ground or flight hazards (e.g., other aircraft or air medical helicopters, mobile cranes, weather phenomenon, etc.).

UPS FF route approval requirements provide a consistent degree of control over sUA routes and do not involve deliveries to ad hoc locations, nor do they involve deliveries to the general public. UPS FF's processes and controls are consistent with accepted SMS principles that provide an equivalent or higher level of safety with the requirements of 14 CFR 119(b) and (c) as published.

91.121(a)(1) - Altimeter Settings.

91.121(a) Each person operating an aircraft shall maintain the cruising altitude or flight level of that aircraft, as the case may be, by reference to an altimeter that is set, when operating -

(1) Below 18,000 feet MSL, to-

(i) The current reported altimeter setting of a station along the route and within 100 nautical miles of the aircraft;

- (ii) *If there is no station within the area prescribed in paragraph (a)(1)(i) of this section, the current reported altimeter setting of an appropriate available station; or*
- (iii) *In the case of an aircraft not equipped with a radio, the elevation of the departure airport or an appropriate altimeter setting available before departure.*

UPS FF seeks relief from 91.121(a)(1) which requires maintaining a cruising altitude by reference to an altimeter that is set to a local altimeter setting. All UPS FF sUAS flight segments will be operated below 400 feet AGL. The Matternet M2 sUA does not have a traditional, adjustable onboard barometric altimeter, but utilizes a combination of systems to fly the required altitude and to provide altitude information to the GCS. Altimetry augmenting instrumentation and software includes GPS sensors and a barometric pressure altimeter. Altitude is displayed on the GCS and viewable by the RPIC. The altitude input derived from the barometric pressure altimeter changes relative to the reading received at takeoff. To ensure system safety, this value is reset to zero before each takeoff and confirmed during preflight. Effectively, this system provides a higher or equivalent level of safety with rotorcraft/helicopter operations that rely on radio altitude reporting for maintaining height above terrain when operating at/below 1,000 feet AGL. During the preflight process, the RPIC confirms the airworthiness of the aircraft which includes ensuring all components of the altimetry system are operational for safety of flight. Therefore, the proposed procedure provides an equivalent or greater level of safety as that provided by Section 91.121(a)(1) as published.

91.151(b) - Fuel Requirements for Flight in VFR Conditions.

- 91.151(a) *No person may begin a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed –*
 - (1) *During the day, to fly after that for at least 30 minutes; or*
 - (2) *At night, to fly after that for at least 45 minutes.*
- 91.151(b) *No person may begin a flight in a rotorcraft under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed, to fly after that for at least 20 minutes.*

UPS FF requests relief from 91.151(b) to the prescriptive requirements noted for time-based reserves due to the design characteristics of battery powered sUAS. The regulatory required reserves exceed the capability of the sUAS, are unduly restrictive given the flight profile and use case presented, and are not necessary to preserve the safety of the operation.

As part of the UPS FF GOM Route Approval Process a minimum battery charge is prescribed for each route. UPS FF routes are individually approved by the FAA which involves a thorough safety analysis and risk assessment of all planning factors and safety hazards on the route including battery charge requirements. UPS FF sUA preflight checklists have a specified minimum battery requirement which has been set for the applicable approved route to be flown with sufficient reserves to allow for a safe landing. During preflight, the RPIC ensures, based on current weather and flight conditions, that sufficient battery charge is available for safe conduct of the operation. Additionally, the RPIC has the ability to monitor battery charge in flight and can manually command the sUA to return or land should the battery discharge at an unexpectedly high rate or if there is any doubt that flight may be continued safely to the planned destination. The RPIC and/or VO will use route information and visual confirmation of suitable intermediate landing points to ensure minimal hazard to persons or property should an unscheduled landing become necessary. In addition, the independently powered FTS minimizes the risk of damage or injury to persons or property on the ground in the event of primary power loss. Therefore, the proposed procedures provide an equivalent or greater level of safety as that provided by Section 91.151(b) as published.

Subpart C – EQUIPMENT, INSTRUMENT, AND CERTIFICATE REQUIREMENTS

91.203(a)(1) – Civil Aircraft; Certifications Required.

91.203(a) Except as provided in 91.715, no person may operate a civil aircraft unless it has within it the following:

- (1) An appropriate and current airworthiness certificate. Each U.S. airworthiness certificate used to comply with this subparagraph (except a special flight permit, a copy of the applicable operations specifications issued under 21.197(c) of this chapter, appropriate sections of the air carrier manual required by parts 121 and 135 of this chapter containing that portion of the operations specifications issued under 21.197(c), or an authorization under 91.611) must have on it the registration number assigned to the aircraft under part 47 of this chapter. However, the airworthiness certificate need not have on it an assigned special identification number before 10 days after that number is first affixed to the aircraft. A revised airworthiness certificate having on it an assigned special identification number, that has been affixed to an aircraft, may only*

be obtained upon application to the responsible Flight Standards office.

UPS FF requests relief from 91.203(a)(1) specifying the requirement to carry an airworthiness certificate on each aircraft. The FAA Office of the Chief Counsel previously provided an interpretation regarding the impracticality of carrying certain documents on a sUA with no pilot onboard. The interpretation dated August 8, 2014 from Mark W. Bury, Assistant Chief Counsel For International Law, Legislation and Regulations, AGC-200, titled, *"Interpretation regarding whether certain required documents may be kept at an unmanned aircraft's control station,"* specifically stated, "the intent of these regulations is met if the pilot of the unmanned aircraft has access to these documents at the control station from which he or she is operating the aircraft."

The FAA has stated in exemption 18163 that relief to 91.203 is not necessary, but granted an exemption to the regulation nonetheless.

The UPS FF GOM establishes detailed policies, procedures, and instructions regarding the equipment and information that must be available to the RPIC when operating the sUAS, including required documentation. Company manuals, the UFM, and all required documents are available to the RPIC at the GCS from which the RPIC is controlling the flight. This provides access of required documents to the RPIC in the conduct of their duties and for presentation to an FAA inspector, upon request. Therefore, the proposed procedures provide an equivalent or greater level of safety as that provided by Section 91.203(a)(1) as published.

14 CFR 135

Subpart A – GENERAL

135.21(f) – Manual Requirements.

135.21(f) Except as provided in paragraph (h) of this section, each certificate holder must carry appropriate parts of the manual on each aircraft when away from the principal operations base. The appropriate parts must be available for use by ground or flight personnel.

UPS FF requests relief from 135.21(f) specifying the requirement to carry appropriate parts of the manual on each aircraft. The FAA Office of the Chief Counsel previously provided an interpretation regarding the impracticality of carrying certain documents on a sUA with no pilot onboard. The interpretation dated August 8, 2014 from Mark W. Bury, Assistant Chief Counsel For International Law, Legislation and Regulations, AGC-200, titled, *Interpretation regarding whether certain required documents may be kept at an unmanned aircraft's control station,* specifically stated, "the intent of these regulations is met if the pilot of the unmanned aircraft

has access to these documents at the control station from which he or she is operating the aircraft.”

While the cited interpretation was specific to parts 91.9(b), and 91.203(a), the FAA has been consistent in the application of this logic in addressing similar requests for exemption. FAA Exemption 18163 stated that relief is not necessary as long as documents are available to the relevant personnel.

The UPS FF GOM establishes detailed policies, procedures, and instructions regarding the equipment and information that must be available to the RPIC when operating the sUAS, including required documentation. Company manuals, the UFM, and all required documents are available to the RPIC at the GCS from which the RPIC is controlling the flight. This provides access of required documents to the RPIC in the conduct of their duties and for presentation to an FAA inspector, upon request. Therefore, the proposed procedures provide an equivalent or greater level of safety as that provided by Section 135.21(f) as published.

135.25(a)(1) and (2) – Aircraft Requirements.

135.25(a) Except as provided in paragraph (d) of this section, no certificate holder may operate an aircraft under this part unless that aircraft-

- (1) Is registered as a civil aircraft of the United States and carries an appropriate and current airworthiness certificate issued under this chapter; and*
- (2) Is in an airworthy condition and meets the applicable airworthiness requirements of this chapter, including those relating to identification and equipment.*

UPS FF will operate the Matternet M2 sUAS. Until such time as the type certificate has been issued for this sUA, UPS FF will require relief under the provisions of 49 USC 44807 from the requirement for the aircraft to have a current airworthiness certificate as required under 135.25(a)(1) and 135.25(a)(2).

The required UFM and UMM that support the type certification process and our request for relief are proprietary and confidential manuals and are submitted under separate cover.

Matternet’s successful advancement through the type certification process, including the required Matternet M2 UFM and UMM, provide the baseline for the current operation and maintenance of the sUAS. UPS FF has developed a CAMP in accordance with 135.411(a)(2) described in detail in the accompanying GMM. Coordinated practices between UPS FF’s flight operations and maintenance departments are designed to ensure the continued airworthiness of each aircraft and in particular that the airworthiness of the aircraft is verified prior to each flight.

The conditions and limitations of a grant of exemption will be included in the documents and information required to be available at the RPIC's GCS from which the RPIC is controlling the flight. The GCS is also subject to airworthiness requirements and UPS FF has carefully considered the reality of having to incorporate operating system updates/revisions that may be necessitated to address factors such as cybersecurity threats or to ensure normal operation of the device in the wireless infrastructure. If commercial-off-the-shelf software is updated after relief is granted under the authority of 49 USC 44807 but prior to issuance of a type certificate for the M2, UPS FF will follow the procedures described in the UPS FF GOM and GMM, governing commercial-off-the-shelf software updates, and approved by the FAA.

Until such time as the type certificate is issued for the Matternet M2 sUAS, compliance with UPS FF procedures and the conditions and limitations of a granted exemption will provide an equivalent level of safety and assurance as to the airworthiness of the aircraft. UPS FF will require relief under the provisions of 49 USC 44807 from the requirement for the aircraft to have a current airworthiness certificate as stated in 135.25(a) pending type certification of the Matternet M2 sUAS. Therefore, the proposed procedures provide an equivalent or greater level of safety as that provided by Section 135.25(a) as published.

Subpart B – FLIGHT OPERATIONS

135.63(c) and (d) – Recordkeeping Requirements.

135.63(c) For multiengine aircraft, each certificate holder is responsible for the preparation and accuracy of a load manifest in duplicate containing information concerning the loading of the aircraft. The manifest must be prepared before each takeoff and must include:

- (1) The number of passengers;*
- (2) The total weight of the loaded aircraft;*
- (3) The maximum allowable takeoff weight for that flight;*
- (4) The center of gravity limits;*
- (5) The center of gravity of the loaded aircraft, except that the actual center of gravity need not be computed if the aircraft is loaded according to a loading schedule or other approved method that ensures that the center of gravity of the loaded aircraft is within approved limits. In those cases, an entry shall be made on the manifest indicating that the center of gravity is within limits according to a loading schedule or other approved method;*
- (6) The registration number of the aircraft or flight number;*
- (7) The origin and destination; and*

(8) *Identification of crew members and their crew position assignments.*

135.63(d) *The pilot in command of an aircraft for which a load manifest must be prepared shall carry a copy of the completed load manifest in the aircraft to its destination. The certificate holder shall keep copies of completed load manifests for at least 30 days at its principal operations base, or at another location used by it and approved by the Administrator.*

UPS FF requests relief from the requirement of 135.63(c) to prepare a load manifest and 135.63(d) that requires a copy of the completed load manifest to be carried in the aircraft. The Matternet M2 UFM establishes a maximum payload based on performance requirements. Matternet flight testing has verified the maximum payload weight stipulated in the M2 sUAS UFM and that the sUA does not have critical center of gravity (CG) loading characteristics. The UFM also verifies that the maximum takeoff weight of the sUA will not be exceeded provided the maximum payload weight limits are observed. Compliance with the UFM listed maximum payload weight thus ensures that the sUA will remain within CG limits and will not exceed the maximum allowable takeoff weight.

UPS FF trained personnel accept each payload, perform an inspection, weigh the payload, and record the payload actual weight before loading the payload box on the sUA. Procedures for the retention of flight records are contained in the UPS FF GOM and ensure retention for a minimum of thirty (30) calendar days. Training curricula regarding aircraft loading and training record retention policies are contained in the UPS FF Flight Training Manual (FTM). This provides the information critical for FAA oversight with respect to compliance with aircraft loading and weight and balance.

UPS FF requests relief from 135.63(d) specifying the requirement to carry the completed load manifest on the aircraft. The FAA Office of the Chief Counsel previously provided an interpretation regarding the impracticality of carrying certain documents on a sUA with no pilot onboard. The interpretation dated August 8, 2014 from Mark W. Bury, Assistant Chief Counsel For International Law, Legislation and Regulations, AGC-200, titled, *Interpretation regarding whether certain required documents may be kept at an unmanned aircraft's control station*, specifically stated, "the intent of these regulations is met if the pilot of the unmanned aircraft has access to these documents at the control station from which he or she is operating the aircraft."

UPS FF procedures ensure the capture and retention of all applicable information that would normally be included on a load manifest. The electronic information is retrievable and more accessible than traditional paper-based manifests. UPS FF can demonstrate an equivalent level of compliance with 135.63(d). Therefore, the proposed procedures provide an equivalent or greater level of safety as that provided by Section 135.63(c) and (d) as published.

135.65(a) and (d) - Reporting Mechanical Irregularities.

- 135.65(a) Each certificate holder shall provide an aircraft maintenance log to be carried on board each aircraft for recording or deferring mechanical irregularities and their correction.*
- 135.65(d) Each certificate holder shall establish a procedure for keeping copies of the aircraft maintenance log required by this section in the aircraft for access by appropriate personnel and shall include that procedure in the manual required by 135.21.*

UPS FF requests relief from the 135.65(a) requirement to carry the maintenance log on board each aircraft and from the 135.65(d) requirement to keep copies of the aircraft maintenance log in the aircraft.

UPS FF has deployed a Flight and Maintenance Management System (FMMS) which provides real-time access to the airworthiness status of the aircraft, including the disposition of any discrepancies that were discovered on previous flight(s). The FMMS and the procedures for completing maintenance records is described in detail in the UPS FF GMM and provides RPICs and UAS Technicians (FAA Certificated Repairman) immediate access to all information that is typically available via a traditional paper-based maintenance logbook.

Access to the FMMS and the maintenance documentation relevant to this request is accomplished via a desktop application and/or a mobile enterprise application available to the RPIC at the GCS from which the RPIC is controlling the flight. UAS Technicians likewise have access to the FMMS via a desktop application or mobile device on which the enterprise application is installed.

As discussed previously for 91.9(b) and 91.203(a)(1), the FAA has determined relief is not necessary as long as documents are available to the relevant personnel. UPS FF procedures for creating and accessing the aircraft maintenance information ensures an equivalent level of safety as that provided by Section 135.65(a) and (d) as published.

Subpart C – AIRCRAFT AND EQUIPMENT

135.143(c) – General Requirements.

- 135.143(c) ATC transponder equipment installed within the time periods indicated below must meet the performance and environmental requirements of the following TSO's:*
- (1) Through January 1, 1992: (i) Any class of TSO-C74b or any class of TSO-C74c as appropriate, provided that the equipment was manufactured before January 1, 1990; or*

The intent of 91.215 to afford ATC facilities with jurisdiction over the affected airspace deviation authority should apply equally to part 135 operations, particularly those operations conducted in the low altitude structure where UPS FF aircraft will operate. Therefore, the proposed procedures provide an equivalent or greater level of safety as that provided by Section 135.143(c) as published.

135.149(a) – Equipment requirements: General.

135.149 No person may operate an aircraft unless it is equipped with –

(a) A sensitive altimeter that is adjustable for barometric pressure;

UPS FF seeks relief from 135.149(a) which requires aircraft to be equipped with an adjustable barometric altimeter. All UPS FF sUAS flight segments will be operated below 400 feet AGL. The Matternet M2 sUA does not have a traditional, adjustable onboard barometric altimeter but utilizes a combination of systems to fly the required altitude and to provide altitude information to the GCS. Altimetry augmenting instrumentation and software includes GPS sensors and a barometric pressure altimeter. Altitude is displayed on the GCS and viewable by the RPIC. The altitude input derived from the barometric pressure altimeter changes relative to the reading received at takeoff. To ensure system safety, this value is reset to zero before each takeoff and confirmed during preflight. Effectively, this system provides a higher or equivalent level of safety with rotorcraft/helicopter operations that rely on radio altitude reporting for maintaining height above terrain when operating at/below 1,000 feet AGL. During the preflight process, the RPIC confirms the airworthiness of the sUAS which includes ensuring all components of the altimetry system are operational for safety of flight. Therefore, the proposed procedures provide an equivalent or greater level of safety as that provided by Section 135.149(a) as published.

135.161(a) - Communication and Navigation Equipment for Aircraft Operations under VFR over Routes Navigated by Pilotage.

135.161(a) No person may operate an aircraft under VFR over routes that can be navigated by pilotage unless the aircraft is equipped with the two-way radio communication equipment necessary under normal operating conditions to fulfill the following:

(1) Communicate with at least one appropriate station from any point on the route, except in remote locations and areas of mountainous terrain where geographical constraints make such communication impossible.

- (2) *Communicate with appropriate air traffic control facilities from any point within Class B, Class C, or Class D airspace, or within a Class E surface area designated for an airport in which flights are intended; and*
- (3) *Receive meteorological information from any point en route, except in remote locations and areas of mountainous terrain where geographical constraints make such communication impossible.*

UPS FF seeks relief from 135.161(a) which requires aircraft to be equipped with a two-way radio. Due to size and weight constraints, VHF radio installation is not practical on the Matternet M2 sUA. UPS FF GOM procedures require the RPIC to maintain constant contact with other required crewmembers (i.e., VO) via telephone and to access FAA approved weather sources for current weather at their GCS. Any required local ATC coordination is identified during the required UPS FF GOM Route Approval Process and may be conducted prior to flight by telephone.

UPS FF flights are conducted at or below 400 feet AGL and do not currently operate within Class B, C, or D airspace. In accordance with UPS FF procedures, telephone voice contact may be established with any required entities (e.g., helipad operators) as identified in the safety analysis and risk assessment process for hazard mitigation. The Route Approval Process is a mandatory UPS FF GOM requirement and is used to support application to the FAA for new route approvals authorized by Operations Specification issuance. This process ensures that UPS FF is required to revisit any ATC communication, coordination, and airspace requirements each time a new route is planned, and the FAA equally has the opportunity to evaluate the request and make an approval determination. This safety assessment and the controls that ensure that UPS FF sUA operate on the approved route and altitudes, provides an equivalent level of safety.

In addition, each required crewmember has immediate access to FAA approved meteorological information at all times prior to and while the aircraft is in flight. This access to real-time, approved meteorological and aeronautical information sources provides a greater level of safety as that provided by Section 135.161(a) as published.

Subpart D – VFR/IFR OPERATING LIMITATIONS AND WEATHER REQUIREMENTS

135.203(a), (a)(1) and (b) – VFR: Minimum Altitudes.

- 135.203 *Except when necessary for takeoff and landing, no person may operate under VFR -*
 - (a) *An airplane -*
 - (1) *During the day, below 500 feet above the surface or less than 500 feet horizontally from any obstacle; or*

(2) *At night, at an altitude less than 1,000 feet above the highest obstacle within a horizontal distance of 5 miles from the course intended to be flown or, in designated mountainous terrain, less than 2,000 feet above the highest obstacle within a horizontal distance of 5 miles from the course intended to be flown; or*

(b) *A helicopter over a congested area at an altitude less than 300 feet above the surface.*

Unlike 91.119, 135.203 does not address all “aircraft” but rather “airplane” in 135.203(a) and “helicopter” in 135.203(b). Both an airplane and a helicopter are subsets of aircraft. *See e.g. ICAO Annex I, Annex 6; 14 CFR 1.1.* An airplane is defined as “an engine-driven fixed-wing aircraft heavier than air, that is supported in flight by the dynamic reaction of the air against its wings.” 14 CFR 1.1. A helicopter is defined as “a rotorcraft that, for its horizontal motion, depends principally on its engine-driven rotors.” *Id.*

Similarly, a sUA is an aircraft, but whether it should be treated in the first instance as a helicopter or airplane for purposes of these regulations should depend on whether the sUA derives its lift from motor driven rotors or dynamic reaction of the air against its wings. *See 14 CFR 1.1.* As a result, because the sUA in question is a true rotorcraft, it should be considered a helicopter rather than an airplane, and only relief from 135.203(b) is required. However, to the extent this position is not agreed with, UPS FF also requests relief from 135.203(a) and (a)(1).

UPS FF requests relief from 135.203(a), (a)(1), and (b) to conform to current requirements for sUA to typically operate at or below 400 feet AGL. In accordance with the UPS FF GOM Route Approval Process, a safety analysis and risk assessment are conducted for each intended route of flight from takeoff to touchdown. This safety assessment determines the suitability of the route and identifies route characteristics that provide for safe flight profile creation. The assessment’s purpose is to identify hazards, such as obstacles and obstacle heights from official government sources, design routing that minimizes flight over roads and dense populations/gatherings, and to identify any other hazards that may present a risk to the operation or to the general public. The Route Approval Process is a mandatory UPS FF GOM requirement and is used to support application to the FAA for new route approvals authorized by Operations Specification issuance. Once an acceptable route is assessed, designed, and approved, that route is loaded into the Matternet Flight Control System and geo-fencing is used to ensure the sUA operates in the assessed airspace volume.

Current UPS FF routes are flown at a minimum altitude of 300 feet AGL and a maximum altitude of 400 feet AGL in Class G airspace, with takeoff and landing phases flown in vertical profiles to ensure obstacle clearance. The profile minimum altitude ensures full deployment of the emergency parachute if activation of the Matternet M2 sUA Flight Termination System is

required. The maximum altitude on the proposed routes provides separation from manned aircraft normally operating at or above 500 feet AGL (1,000 feet AGL over congested areas).

Additionally, UPS FF incorporates trained and qualified VOs as crewmembers when required. The VOs are in constant communication with the RPIC and are responsible for notifying the RPIC if safety of flight may be compromised due to ground or flight hazards (e.g., other aircraft or air medical helicopters, mobile cranes, weather phenomenon, etc.).

UPS FF route approval requirements provide a consistent degree of control over aircraft routes and do not involve deliveries to ad hoc locations, nor do they involve deliveries to the general public. UPS FF's processes and controls are consistent with accepted SMS principles that provide an equivalent or greater level of safety as that provided by Section 135.203(a), (a)(1) and (b) as published.

135.209 - VFR: Fuel Supply.

135.209(b) No person may begin a flight operation in a helicopter under VFR unless, considering wind and forecast weather conditions, it has enough fuel to fly to the first point of intended landing and, assuming normal cruising fuel consumption, to fly after that for at least 20 minutes.

UPS FF requests relief from 135.209(b) to the prescriptive requirements noted for time-based reserves due to the design characteristics of battery powered aircraft. The regulatory required reserves exceed the capability of the sUA and are therefore disproportionate for the use case.

As part of the UPS FF GOM Route Approval Process a minimum battery charge is prescribed for each route. UPS FF routes are individually approved by the FAA which involves a thorough safety analysis and risk assessment of all planning factors and safety hazards on the route including battery charge requirements. UPS FF sUA preflight checklists have a specified minimum battery requirement which has been set for the applicable approved route to be flown with sufficient reserves to allow for a safe landing. During the preflight check, the RPIC ensures, based on current weather and flight conditions, that sufficient battery charge is available for safe conduct of the operation. Additionally, the RPIC has the ability to monitor battery charge in flight and can manually command the sUA to return or land should the battery discharge at an unexpectedly high rate or if there is any doubt that flight may be continued safely to destination. The RPIC and/or VO will use route information and visual confirmation of suitable intermediate landing points to ensure minimal hazard to persons or property should an unscheduled landing become necessary. In addition, the independently powered backup FTS minimizes the risk of damage or injury to persons or property on the ground in the event of primary power loss. Therefore, the propose procedures provide an equivalent or greater level of safety as that provided by Section 135.209(b) as published.

Subpart E - FLIGHT CREWMEMBER REQUIREMENTS

135.243(b)(1) and (2) - Pilot in Command Qualifications.

135.243(b) Except as provided in paragraph (a) of this section, no certificate holder may use a person, nor may any person serve, as pilot in command of an aircraft under VFR unless that person –

- (1) Holds at least a commercial pilot certificate with appropriate category and class ratings and, if required, an appropriate type rating for that aircraft; and*
- (2) Has had at least 500 hours time as a pilot, including at least 100 hours of cross-country flight time, at least 25 hours of which were at night.*

UPS FF requests relief for 135.243(b)(1) requiring a pilot in command to hold an appropriate category and class rating and 135.243(b)(2) requiring a pilot in command to have 500 hours of pilot time, 100 hours of cross-country, and 25 at night. This request is based on the current lack of sufficient definition for the category, class, and type of these unique aircraft and the level of qualifications, training, and operational experience that is required of UPS FF RPICs.

The UPS FF GOM requires all UPS FF RPICs hold a minimum of a commercial pilot certificate, a part 107 remote pilot certificate with a sUAS rating, and a minimum of a second-class medical certificate. UPS FF places a focus on UAS flight experience coupled with preexisting aviation knowledge and a comprehensive training program developed, implemented, and maintained by UPS FF and approved by the FAA. In addition, the base requirement of a commercial certificate ensures a minimum level of aeronautical knowledge and experience. The training program outlined in the FTM which includes supervised operational experience (OE) flying, produces an equivalent or higher level of safety than that of a manned, single pilot, single-engine operation that complies with the hour requirements of 135.243(b)(2).

Additionally, the nature of a battery powered sUAS is that they fly relatively short distances and duration compared to manned flights and the UPS FF operation is currently day VFR only. Therefore, UPS FF requests relief from the minimum cross country and night hour requirements specified in 135.243(b)(2) as they are not applicable to current operations. Therefore, the proposed procedures provide an equivalent or greater level of safety as that provided by Section 135.243(b)(1) and (2) as published.

V. SUPPORTING DOCUMENTS

UPS FF has developed a set of required manuals in its pursuit of a part 135 AOC. Additionally, the sUAS manufacturer, Matternet, has developed a set of required manuals and checklists required for exemption under 49 USC 44807, while seeking to obtain a type certification. These documents are confidential and proprietary, therefore we are submitting them under separate cover and request they be used to adjudicate the exemption:

- UPS FF General Operations Manual (GOM)
- UPS FF General Maintenance Manual (GMM)
- UPS FF Flight Training Manual (FTM)
- UPS FF Operation and Administration Manual (OAM)
- UPS FF Dangerous Goods Procedures Manual (DGPM)
- Matternet M2 Unmanned Aircraft Flight Manual (UFM)
- Matternet M2 Unmanned Aircraft Maintenance Manual (UMM)

VI. GRANTING THE EXEMPTION IS IN THE PUBLIC INTEREST

The United States Congress has set the integration of unmanned aircraft systems as a national priority. As the FAA noted in its grant of exemption 18163, the FAA Reauthorization Act of 2018 (Public Law 115-254) requires the FAA to “update existing regulations to authorize the carriage of property by operators of small unmanned aircraft systems for compensation or hire within the United States.”

UPS FF is a participant in the NC IPP. UPS FF has partnered with the NCDOT, WakeMed hospital in Raleigh, NC, and Matternet to transport blood and medical samples among locations in the WakeMed hospital network. A grant of this Petition will allow UPS FF to continue its work and expand its ability to offer this potentially life-saving service to this hospital network and its patients in NC and elsewhere in the U.S.

The service UPS FF will be able to offer under the grant of this Petition will facilitate rapid processing of test results, decreasing the time needed to diagnose a patient and ensure that the patient can receive needed treatment. This provides a benefit to individual patients and the hospital (which can work more efficiently), and the community that the hospital serves. Thus, there is a public benefit at the local level, with improved public health and safety, and at the national level, by furthering the Congressional goal of full integration of UAS into the NAS.

UPS FF also believes that the services that will be provided pursuant to this Petition will enhance safety and protect the environment. Currently, the blood and medical samples are transported between locations using a gas-powered motor vehicle and a driver. The sUA to be operated under this exemption is electric with zero (0) emissions. As a result, the use of an electric sUA to deliver blood and medical samples, instead of a motor vehicle, will reduce emissions and pollution for each community that UPS FF operates. In addition, UPS FF believes that by following the

protocols and procedures in the attached documentation, delivery of the blood and medical samples by sUA will be safer to the public than providing the same service with a motor vehicle, while providing cleaner air.

UPS FF is also able to serve the public interest by leveraging UPS's and its affiliated companies' strong depth of experience in operating, maintaining, and managing its world class part 121 airline and bringing that knowledge base to UAS operations. All personnel of UPS FF are former members of UPS Airlines, bringing extensive commercial aviation experience to the UAS industry. UPS Airlines and UPS FF both understand the needs of the NAS. As a result, UPS FF has a unique perspective on the challenges that must be overcome to safely and successfully introduce unmanned aircraft into the NAS, while at the same time, promoting innovation and economic development, and adding benefits to public health and safety. UPS FF has a vested interest in the safe operations of UAS in the NAS. UPS FF will introduce UAS into the same airspace occupied by aircraft operated by its sister company, UPS Airlines. UPS FF and UPS Airlines are well positioned to assist the FAA in promulgating rules and regulations for the integration of UAS into the NAS.

The NC IPP was implemented with multiple goals in mind, among them to: (i) accelerate safe drone integration; (ii) help the U.S. Department of Transportation (USDOT) and FAA promulgate new rules; (iii) identify ways to balance local and national interests related to drone integration; (iv) improve communications with local, state, and tribal jurisdictions; and (v) address security and privacy risks, all associated with the operation of unmanned aircraft. UPS FF, as an active partner and proud member of the NC IPP, is committed to furthering these stated goals to serve the public interest.

The information and data the USDOT and FAA will collect from a UPS FF's operations, as described in this document and from its future expansion, will be a valuable contribution toward achieving the USDOT's and the FAA's stated goals respective to UAS operations in the U.S. It is in the public interest for the UPS FF Petition to be granted.

VII. IMPLEMENTATION STRATEGY

When UPS FF receives the adjudication of this Petition, the Director of UAS Operations, Chief UAS Pilot, Director of UAS Maintenance, and Director of UAS Safety will implement its provisions, conditions, and limitations in the following manner:

- Make all required changes and/or additions to policies, processes, procedures, and limitations;
- Revise the affected manuals accordingly and submit to the appropriate FAA oversight office for review, approval or acceptance, as defined;
- Make all UPS FF responsible parties aware of the provisions, conditions, and limitations of the Petition to ensure operations are compliant with such requirements; and
- Follow established oversight processes to validate continued compliance.

VIII. SUMMARY FOR FEDERAL REGISTER

Pursuant to 14 CFR 11.61 *et seq.* 49 USC 44807, UPS FF is submitting this Petition from the specific regulations in 14 CFR Parts 91 and 135 identified below. UPS FF is a partner in the NC IPP and is seeking these exemptions in support of its application for an AOC under part 135.

14 CFR Part 91

91.7

91.9(b)

91.119(b)

91.119(c)

91.121(a)(1)

91.151(b)

91.203(a)(1)

14 CFR Part 135

135.21(f)

135.25(a)(1)

135.25(a)(2)

135.63(c)

135.63(d)

135.65(a)

135.65(d)

135.143(c)

135.149(a)

135.161(a)

135.203(a)

135.203(b)

135.209(b)

135.243(b)(1)

135.243(b)(2)

IX. CONCLUSION

In consideration of the foregoing, UPS FF respectfully requests a favorable adjudication of this Petition.

Questions regarding this Petition may be directed to Myron Scott Wright, President UPS FF by email at myronwright@ups.com, by phone at (502) 558-3342, or by letter at the address listed below.

Sincerely,



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