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## RESEARCH SERVICES AGREEMENT

**THIS RESEARCH SERVICES AGREEMENT** (hereinafter "Agreement"), is made by and between DeKalb County, Georgia, a political subdivision of the State of Georgia (operator of DeKalb Peachtree Airport or PDK Airport) ("SPONSOR"), and Emory University a non-profit corporation organized under the laws of the State of Georgia ("Emory")."

WHEREAS, SPONSOR desires to engage Emory, based upon particular requirements and qualifications, to provide certain services pertaining to A Proposal to Perform an Air and Noise Study at PDK Airport ("Project", which is further described in Exhibit B attached hereto); and

WHEREAS, Emory desires to perform such Project.

NOW, THEREFORE, in consideration of the foregoing and the mutual covenants herein contained the Parties agree as follows:

### 1.0 DEFINITIONS

1.1 "Agreement" means this Agreement, including any Exhibits or documents attached thereto, and incorporated herein by reference.

1.2 "Emory Intellectual Property" shall mean that Intellectual Property conceived or made by one or more employees of Emory, including the Principal Investigator, during the term of this Agreement and directly resulting from work performed pursuant to the Project.

1.3 "Intellectual Property" shall mean and include, but not limited to, inventions, developments, patent rights, patent applications, techniques, methods, processes, apparatus, innovations, discoveries, conceptions, designs, products, trade secrets, improvements thereto, modifications thereof, whether patentable or not patentable, and Software.

1.4 "Parties" shall mean SPONSOR and Emory collectively. "Party" shall mean SPONSOR or Emory.

1.5 "Principal Investigator" shall mean Emory personnel serving as Emory's Authorized Representative regarding Project related matters and who coordinates the performance of the Project with SPONSOR's Authorized Representative identified in Exhibit A.

1.6 "Project Data/Material " means all data and information generated by the Principal Investigator in connection with the Project or in any way arising out of the conduct of the Project by Emory and any employees of Emory working under the Principal Investigator's supervision in performing the Project, during the term of this Agreement. Project Data/Material shall not include Confidential Information of SPONSOR.

## **2.0 EXHIBITS**

2.1 The exhibits ("Exhibits") referenced and attached hereto are incorporated and part of this Agreement. If any conflict exists between the provisions of this Agreement and the Exhibits, the provisions of this Agreement shall govern.

Exhibit A: Authorized Representatives  
Exhibit B: Description of the Project  
Exhibit C: Payment Schedule

## **3.0 TERM**

3.1 The services to be performed pursuant to this Agreement shall begin on March 1, 2012 and end on August 31, 2013 unless terminated sooner pursuant to Section 12.0 of this Agreement. This Agreement may be renewed or extended per mutual agreement of the Parties.

## **4.0 PERFORMANCE OF THE PROJECT**

4.1 During the Term of this Agreement Emory agrees:

4.1.1 To perform the Project in a timely and professional manner in accordance with the terms and conditions of this Agreement, applicable University policies and

guidelines, U.S. laws, rules and regulations, and general academic standards of good practice in research.

4.1.2 To ensure that the Project is performed under the direct management and supervision of P. Barry Ryan, ("Principal Investigator").

4.1.3 To provide SPONSOR with reports related to the progress of the Project being performed hereunder at SPONSOR's reasonable request or as required in Exhibit B of this Agreement.

4.1.4 To promptly advise SPONSOR in writing of the occurrence of any event that may delay or affect the Project performance under this Agreement.

## **5.0 FUNDING**

5.1 SPONSOR shall pay Emory the total sum of four-hundred-seventy-seven thousand, two hundred and forty-four dollars (\$477,244 USD) for the performance of the Project in accordance with the Payment Schedule, attached and referenced hereto as Exhibit C and incorporated herein.

5.2 All payments pursuant to this Agreement shall reference the Principal Investigator's name and Emory's reference number 17743. Checks shall be made payable to **Emory University** (Tax ID: 58-0566256) and mailed to the following address:

Emory University  
P.O. Box 935084  
Atlanta, GA 31193-5084

## **6.0 OWNERSHIP OF PROJECT DATA AND INTELLECTUAL PROPERTY**

6.1 Ownership of Project Data. Subject to the obligations of confidentiality and the conditions on publication contained in this Agreement, all Project Data shall be owned by SPONSOR. Emory shall be entitled to use the Project Data for internal academic research, teaching and educational purposes, and shall have the right to publish the results of the Project subject to the conditions of Section 8.0 below.

## 6.2 Ownership of Intellectual Property.

6.2.1 Inventorship shall be determined according to United States patent law.

6.2.2 Emory shall not acquire any right, title or interest in any SPONSOR Intellectual Property as a result of the performance of the Project, except that it may use SPONSOR Intellectual Property solely for the performance of the Project in accordance with this Agreement.

6.2.3 All Intellectual Property rights (including patents, trademarks, service marks, copyrights and applications for all of the foregoing) which were owned by or licensed to Emory (collectively, "Emory Intellectual Property") prior to the Effective Date (whether or not used by Emory to make and/or develop any Project Intellectual Property, Project Data or results hereunder) shall remain the property of Emory or Emory's licensor. SPONSOR shall not acquire any right, title or interest in any Emory Intellectual Property as a result of Emory's performance of the Project under this Agreement.

## 7.0 GRANT OF RIGHTS

7.1 SPONSOR hereby grants a non-exclusive, non-transferable right and license to Emory to use SPONSOR Intellectual Property and Confidential Information disclosed by SPONSOR to Emory throughout the term of this Agreement for the sole purpose of and to the extent necessary for properly carrying out the Project.

7.2 Subject to SPONSOR's compliance with all the terms of this Agreement and subject to any pre-existing rights of any third parties, including the United States government, Emory hereby grants SPONSOR a fully paid-up option to negotiate an exclusive, worldwide license for the development, manufacture, sale and use of any invention encompassed within Emory Intellectual Property on terms to be later mutually agreed. The term of SPONSOR's option with regard to any Emory Intellectual Property shall commence upon the Agreement's Effective Date and terminate six (6) months after each such disclosure to SPONSOR. SPONSOR may exercise its option to negotiate a license by informing Emory in writing during the term of the option. If SPONSOR and Emory cannot reach agreement on the terms of the license within six (6) months after the date SPONSOR exercised its option in writing or if SPONSOR chooses to not exercise its option during the term of the option, Emory shall be free to license its interest in such Emory Intellectual Property to other third parties.

## **8.0 PUBLICATION**

8.1 With the exception of SPONSOR's confidential and proprietary information, Emory/Principal Investigator shall be free to publish in professional and academic journals, and present results related to the performance of this Agreement at symposia, conferences and professional meetings. At least thirty (30) days prior to publication or before the submission of such proposed publication, Emory and/or the Principal Investigator shall provide to SPONSOR, for review and comment, a copy of proposed publications, including manuscripts and abstracts. During the 30-day review/comment period, SPONSOR shall have the right to object to and delay such proposed publication if SPONSOR believes that the proposed publication contains confidential or proprietary Information that should be removed prior to publication. If SPONSOR makes an objection during such 30-day period, SPONSOR and Emory/Principal Investigator shall meet, before such presentation or before submitting any proposed publication to a third party, for the purpose of making good faith efforts to discuss and resolve all issues raised by SPONSOR's objection.

## **9.0 COMPLIANCE AND REPRESENTATIONS**

9.1 Emory and SPONSOR each represent to the best of its knowledge that it is fully authorized to make the Agreement set forth herein, and that it is not precluded from by any other agreement now in effect.

9.2 Emory/Principal Investigator represent to the best of its knowledge that the Principal Investigator's relevant qualifications, including dates, location, and experience are correctly listed and described in his/her most recent curriculum vitae (CV).

9.3 SPONSOR and Emory represent that the Project will be conducted in compliance with applicable U.S. laws, rules and regulations.

## **10.0 INDEPENDENT CONTRACTOR**

10.1 Emory shall perform the Project as an independent contractor and nothing contained in this Agreement shall be construed to create or imply a joint venture, partnership, principal-agent or employment relationship between the Parties or between SPONSOR and any Emory employees assigned to perform work on the Project. Neither Party shall take any action or permit any action to be taken on its



behalf which purports to be done in the name of or on behalf of the other Party and shall not have power or authority to bind the other Party or to assume or create any obligation or responsibility express or implied on the other Party's behalf or in its name, nor shall either Party represent to any one that it has such power or authority.

## **11.0 INDEMNITIES; EXCLUSION OF WARRANTIES, LIMITATION OF LIABILITY, INSURANCE**

11.1 Indemnification by Emory. Emory agrees to defend, indemnify and hold harmless SPONSOR, its agents, employees, officers, Affiliates and assigns ("SPONSOR Indemnitees") from and against any and all third-party Claims arising out of or relating to (i) the negligence or willful misconduct of any Emory Indemnitees in their performance of the Project under this Agreement, or (ii) any failure by an Emory Indemnitee to comply with any applicable U.S. governmental law, rule or regulation; provided, however, that Emory's obligations shall not extend to a SPONSOR Indemnitee for that portion of any Claim attributable to (i) the performance of the Study by SPONSOR or (ii) SPONSOR's use of the Project results, data and/or material or any Intellectual Property to which rights, title and interest are assigned or granted to SPONSOR hereunder, or (iii) any failure by SPONSOR to comply with any applicable U.S. law, rule or regulation, or (iv) any negligent act or willful misconduct on the part of any SPONSOR Indemnitee.

11.2 EXCEPT AS EXPRESSLY PROVIDED HEREIN, NEITHER PARTY MAKES ANY WARRANTIES, EXPRESS OR IMPLIED, AS TO ANY MATTER WHATSOEVER, INCLUDING, WITHOUT LIMITATION, WITH RESPECT TO THE PROJECT, THE PROJECT DATA AND/OR MATERIAL OR ANY INTELLECTUAL PROPERTY, WHETHER TANGIBLE, CONCEIVED, DISCOVERED, OR DEVELOPED UNDER THIS AGREEMENT; OR THE MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE OF THE PROJECT, THE PROJECT DATA. OR MATERIAL OR ANY INTELLECTUAL PROPERTY. IN NO EVENT SHALL EITHER PARTY BE LIABLE FOR ANY LOSS OF PROFITS, BUSINESS INTERRUPTION OR ANY OTHER INDIRECT, CONSEQUENTIAL, INCIDENTAL, SPECIAL, PUNITIVE OR EXEMPLARY DAMAGES OF ANY KIND SUFFERED BY THE OTHER PARTY, ITS AFFILIATES, ANY LICENSEE, OR ANY THIRD PARTY RESULTING FROM THE OTHER PARTY'S USE OF THE PROJECT DATA OR ANY INTELLECTUAL PROPERTY.

## 12.0 TERMINATION

12.1 Either Party may terminate this Agreement without cause by giving the non-terminating Party advance written notice of not less than thirty (30) days prior to the date of proposed termination. In the event of a termination without cause, payment by Sponsor to Emory shall be limited to the services performed by Emory pursuant to this Agreement, as of the last day services were performed prior to the date of the proposed termination.

12.2 In the event of a material default on the part of either Party, the non-defaulting Party may give thirty (30) days' written notice to the defaulting Party, during which time the defaulting Party shall cure the default within ten (10) calendar days. If the defaulting Party fails to cure the default within the ten (10) day period, the non-defaulting Party may give written notification that this Agreement is immediately terminated. The decision to terminate shall not be construed as an election of remedies or a waiver of any remedies, and the non-defaulting Party shall be entitled to remedies available at law and in equity.

12.3 In the event that Principal Investigator becomes unavailable and/or unable to complete the Project pursuant to the terms of this Agreement and a mutually acceptable replacement is not named within thirty (30) days or within a time mutually agreed by the Parties, either Party may terminate this Agreement upon ten (10) days written notice to the other Party.

## 13.0 MISCELLANEOUS

13.1 NOTICES - All notices and consents required to be given or made by the Parties shall be in writing and shall be deemed given when received by Sponsor or Emory, as confirmed by facsimile, return, overnight mail or courier receipt.

**To SPONSOR:**

Mike Van Wie, A.A.E.  
Airport Director  
DeKalb Peachtree Airport  
2000 Airport Road, Suite 212  
Atlanta, GA 30341  
770-936-5440

**To Emory:**

Attn: Director  
Office of Sponsored Programs  
Emory University  
1599 Clifton Rd NE, 4<sup>th</sup> Floor  
Mailstop: 1599-001-1BA  
Atlanta, GA 30322

13.2 PUBLICITY - Neither Party shall employ or use the seal, name, trademark, trade name or logo of the other Party or the other Party's Affiliates or employees in any promotional materials or advertising without the prior express written permission of the other Party nor shall either Party originate any publicity, news release, or other public announcement relating to this Agreement or to performance hereunder or the existence of this Agreement; except as required by law, without the prior express written permission of the other Party.

13.3 ENTIRE AGREEMENT - This Agreement, including the Exhibits attached hereto, constitutes the entire agreement between the Parties with respect to the subject matter hereof and supersedes all prior communication, agreements or understandings, written or oral, between the Parties with respect thereto.

13.4 AMENDMENT - This Agreement may only be amended or modified by a writing duly executed by both parties which expressly references and amends this Agreement.

13.5 WAIVER - No waiver of any of the provisions of this Agreement shall constitute a waiver of any other provision (whether or not similar), nor shall such waiver constitute a continuing waiver unless otherwise expressly provided in writing.

13.6 SURVIVAL - Notwithstanding the expiration or termination of this Agreement, it is acknowledged and agreed that those rights and obligations set forth in Sections 8.1, 9.3, 11.1, 11.2, 11.3, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8, and 13.9. and by their nature are intended to survive the expiration or termination of this Agreement, shall survive,

13.7 GOVERNING LAW - The interpretation and performance of this Agreement, and obligations arising hereunder shall be governed by the laws of the State of Georgia, without regard to conflicts of law principles.

13.8 DISPUTE RESOLUTION - Emory and SPONSOR shall initially attempt in good faith to resolve any significant controversy, claim, or dispute arising out of or relating to this Agreement or significant breach thereof (hereinafter referred to as a "Dispute") through at least one face-to-face negotiation between senior executives of the rank of at least Vice President, or in the case of Emory and/or SPONSOR, an officer of Emory and/or SPONSOR of equivalent rank and with power to bind each of Emory and/or SPONSOR, at the place of business of the Party of whom the



meeting is first requested.

13.9 ASSIGNMENT - This Agreement is personal to the Parties and shall not be assignable by either Party without the prior written consent of the other Party. Notwithstanding the foregoing, SPONSOR may assign its rights and obligations under this Agreement without Emory's consent: (i) to an Affiliate; or (ii) incident to the transfer of all or substantially all of its business.

13.10 FORCE MAJEURE - Any delays in, or failure of performance of any Party to this Agreement, shall not constitute a default hereunder, or give rise to any claim for damages, if and to the extent caused by occurrences beyond the control of the Party affected, including, but not limited to, acts of God, strikes or other concerted acts of workmen, civil disturbances, fires, floods, explosions, riots, war, terrorism, rebellion, sabotage, acts of governmental authority or failure of governmental authority to issue licenses or approvals which may be required.

[SIGNATURES APPEAR ON FOLLOWING PAGES]

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their respective authorized representative, in three counterparts, each to be considered an original.

**EMORY UNIVERSITY**

By: [Signature]  
Signature (SEAL)

Janette Hannam Hayes  
Name (Typed or Printed)  
Associate Director  
Office of Sponsored Programs

Title

58-0566256  
Federal Tax I.D. Number

1/24/12  
Date Signed by Sponsor

**ATTEST:**

[Signature] (Seal)  
Shannon Walker  
Name (Typed or Printed)

SB. Assoc. Sponsored Research Analyst  
Title

**DEKALB COUNTY, GEORGIA**

[Signature] by Dir. (Seal)  
W. BURRELL ELLIS, JR.  
Chief Executive Officer  
DeKalb County, Georgia

**ATTEST:**

[Signature]  
BARBARA H. SANDERS, CCC  
Clerk of the Chief Executive Officer  
and Board of Commissioners of  
DeKalb County, Georgia

DeKalb County  
Contract No. 12-96395

Signed, sealed and delivered as to County in the presence of:

Connie M. Newsome



Notary Public  
My Commission Expires: 4-24-14

**READ AND ACKNOWLEDGED  
PRINCIPAL INVESTIGATOR:**

By: [Signature]  
Printed Name: T. Barry Ryao  
Title: Professor

Date: 23 Jan 2012

Signed, sealed and delivered as to County in the presence of:

[Signature] (Seal)

Notary Public  
My Commission Expires:

April 8, 2014



**APPROVED AS TO SUBSTANCE:**

[Signature]  
Airport Director  
DeKalb Peachtree Airport

**APPROVED AS TO FORM:**

[Signature]  
Sr. ~~Dist~~ County Attorney Signature

Jermaine A. Walker  
Sr. ~~Asst~~ County Attorney Name (Typed or Printed)

**EXHIBIT A**

**AUTHORIZED REPRESENTATIVES**

Designated SPONSOR Authorized Representative:	Designated Emory Authorized Representative:
Name:	Name: Janette Hannam Hayes
Location:	Location: Office of Sponsored Programs 1599 Clifton Road, 4th Floor Atlanta, GA 30322
Telephone:	Telephone: (404) 727-2503

## **Exhibit B**

### **Description of Project**

#### **A Proposal to Perform an Air and Noise Study at PDK Airport**

**P. Barry Ryan  
Emory University  
November 2011**

##### ***Introduction***

DeKalb Peachtree Airport (PDK) located in DeKalb County is the second busiest airport in Georgia with between 150,000 and 200,000 airport operations per year (PDK Airport 2011). PDK is currently home to approximately 600 aircraft including approximately 50 corporate jets. The principal runway is just over 6000 feet in length, running nearly due N/S, and currently offers regular takeoff and landing for individual aircraft up to 75,000 lbs, with heavier aircraft allowed with special permission. While there is a dispute as to the legal propriety of aircraft larger than 66,000 lbs using PDK, all agree that the current practice at PDK is to permit all aircraft up to 75,000 lbs. to use the facility without having to obtain permission to do so.

DeKalb County and the organization Open DeKalb, Inc. (Open DeKalb) have agreed on the need to study the impact of these aircraft fuel emissions and aircraft noise events with specific goals outlined in the memo attached as Appendix I. These goals may be summarized by stating that both groups are fundamentally interested in the potential health impacts on the surrounding community and, potentially, strategies that could be brought to bear that might reduce these impacts.

This document is a proposed plan for work to assess the air pollution and noise impacts (collectively, the "Impacts") of PDK on the community. The proposal is designed to address all of the Goals set forth in Appendix I, and to evaluate seasonal and annual patterns in the Impacts.

##### ***Proposed Work***

###### **Overview**

The proposed work will afford an assessment of air contaminant and noise exposure experienced by the community around the PDK. There are three main Phases proposed. Phase I will develop a series of modeling exercises that will afford



assessment of current and expected air contaminants generated by aircraft operations and projected impact of these contaminants on the local community. In addition, using data provided by a combination of PDK's noise monitoring system and a data analysis program developed by Open DeKalb, a modeling program will be set up to begin to assess the impact of noise associated with aircraft operations on the community. Regarding air contaminants, the work proposed by Emory focuses on air contaminant data collection in developing time increments over which air pollution data will receive closer scrutiny in Phase II. Regarding noise, the proposed work will gather information on noise impacts from specific aircraft and establish relationships between size of aircraft and noise impacts. Phase II focuses on data collection and analysis of the impact of these exposures, both air contaminants and noise, on the surrounding community. Phase III is the data analytic component of the investigation. Phase III focuses on data analysis and report generation. This Phase will commence as soon as significant data are generated to afford analysis and will continue through the end of the project.

#### Phase I- Air Modeling

A considerable amount of useful air-related data already exists to assist in understanding the impact of the PDK on the surrounding community. Historical meteorological data are available from this site stretching back for several decades. Such data include temperature, air pressure, wind speed and wind direction, as well as other meteorological parameters, and can be used to model air pollutant impacts on the community. Modeling of air contaminant levels by this method affords better selection of monitoring sites for Phase II.

#### *Specific Modeling Activities Proposed- Air*

Meteorological data taken at the PDK can be used in conjunction with regulatory models put forward by the United States Environmental Protection Agency, e.g., AERMOD (USEPA 2009), to estimate the impact of various sources of environmental contaminants in a local community. We propose a series of analyses that will invoke the last ten years of data and compute month-by-month averages of hypothetical air contaminant constituents to assess the impact of the airport on the surrounding community. This will take into account also the geographic presence of several major highways, namely I-85, I-285, Buford Highway, and Chamblee Tucker Road.

#### Phase I- Noise Modeling

In addition, using data provided by PDK's noise monitoring system, a data analysis and modeling program will be set up to begin to assess the impact of noise associated with aircraft operations on the community. During Phase I, we will assess the MSAccess system

previously developed by Open DeKalb and others, and implement modifications designed to both improve the data analysis system and prepare for noise monitoring in Phase II.

The modeling of Phase I will aid us in developing appropriate placement strategies for Phase II Air Sample Data Acquisition. Seasonal and month-to-month differences are noted for both meteorological conditions and for PDK operations. Combining these two will lead to a more efficient sampling strategy. Further, the Noise Modeling work will aid us in the development of placement strategies for the portable noise monitor (See below.)

#### Phase II- Data Acquisition and Analysis

The Data Acquisition and Analysis Phase of this study will take up the bulk of the time and expense of the investigation. Field sampling for air pollutants requires equipment purchases, maintenance, and laboratory/computer data reduction. Since there is a noise monitoring network in place and a portable monitor available, we will use the four existing noise monitors and the one mobile noise monitor to collect noise data that we will then correlate with actual aircraft. That correlation will enable us to deduce whether aircraft over a given weight are noisier or quieter than smaller aircraft at specific points of their operations. Air contaminant data acquisition will, itself, consist of two modes- active, real-time, contaminant concentration data acquisition; and passive, integrated, contaminant concentration data acquisition. These two data collection modes offer complementary information. Active samplers offer time-resolved analysis of various components of air contamination with time resolutions typically on the order of minutes or less. However, the equipment is expensive, generally requires external electrical power and a secure location, and can be "finicky" in the field and thus requires a good deal of technical support. Note that we will also make use of FAA radar stream data on aircraft entering PDK airspace that will afford analysis of contaminant and noise impact by aircraft type. These data will be used in conjunction with fixed-site and mobile noise monitors placed at multiple locations in the community. Passive sampling of air offers an inexpensive sampling platform that is robust and does not require electrical power, but has time resolution measured in days to weeks. While passive sampling of air does not have the time resolution required to attribute a particular airport operation with a specific observation of pollutant levels, it does offer the ability to develop a detailed mapping of contaminant levels throughout the community and a better understanding of long-term impacts of airport operations and surrounding highways on the community as a whole and individual locations where possible.

### *Active Sampling for Air Contaminants*

We propose to draw upon work done by Levy's group at Harvard (Dodson et al. 2009) in which they made use of detailed time-resolved particulate matter data and land-use regression to account for the airport impact separate from the impact of highways. Such detailed statistical analysis requires large amounts of real-time data coupled with a detailed assessment of airport operations and, where available, understanding of the vehicular traffic flow patterns for major arterial roads in the area. Fortunately, such information is available to us in this study and we will follow their lead.

In order to collect sufficient information to assess the air impact, we propose using five Active/High Intensity sites- sites that will use active monitors to produce real-time data (See Figure 1.) Two of these sites will be located relatively close to the airport runways, perhaps no more than 100 meters from either end of the 2R-20L runway. Using results from the meteorological modeling data, we will select two additional monitoring sites that represent upwind and downwind directions from the airport at a distance of approximately 1-2 kilometers from the center of the airport. In addition, we will select two additional sites in the community for active monitoring. Finally, we will select a site removed from direct influence of the airport to represent the urban background. The current expected location for this site is approximately 5 kilometers almost due south of PDK. Thus a total of seven sites will be monitored actively.

Our focus for active sampling will be on fine particulate matter as this contaminant offers the best solution for invoking tracers of both aircraft exhaust and automotive exhaust. We propose collection of air and noise data on a continuous basis year round. This will afford collection of a substantial database to be used in statistical modeling and analysis.

We will include sampling for metal concentration using a pump and filter apparatus at each of the active sites. Particulate matter would be collected on Teflon® filters for 24hr on a six-day rotating schedule, resulting in 60 samples at each of the seven active site locations for a total of 420 samples. These samples would be extracted with nitric acid and analyzed by inductively-coupled plasma/mass spectrometry for a series of metals including lead, arsenic, cadmium, and chromium, but also as many as six other metals selected for expected sources and health outcomes. Table 1 lists the sampling methods for air contaminants.

<b>Table 1. Proposed Active Sampling Methods.</b>
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Seven Setups- Four Airport Related, Two Community-Based, plus Background Sites

Monitoring of Black Carbon by Aethalometer  
Monitoring of Ultrafine Particles by Condensation Particle Counter  
Monitoring of Airborne Metals by Pump and Filter sampling apparatus.

*Passive Sampling for Air Contaminants*

Passive sampling for air contaminants is relatively inexpensive and allows for sampling within the community itself. There is no need for electrical power with this type of sampling. Sampling can be done in essentially any location for which access can be granted on a regular basis. In previous work, we have sampled in public locations and at private residences with approximately 90% data recovery (Ryan and Ayres 2006; MASSPORT 2010). Unfortunately, methods do not exist that allow passive sampling equivalent to the active sampling network proposed. Therefore, we propose to look at one contaminant, nitrogen dioxide (NO<sub>2</sub>) that is often used as a tracer of combustion sources, and a volatile organic compound (VOC) sampler, that is a tracer for automotive exhaust and other organic species. Monitors will be placed at each of the active monitoring sites plus an additional 12 sampling locations within the community. We will solicit volunteers from among community residences and seek advice from community residents on locations for sampling in public locations. We will include continuous one-week sampling each week for a total of 52 one-week averaged samples. Table 2 summarizes the passive sampling program.

**Table 2. Proposed Passive (Community-Based) Sampling Methods.**

Nineteen Setups- Seven at Active Site Locations and 12 Additional Sites within the Community.

Monitoring of Nitrogen Dioxide by Palmes Passive Sampler

Monitoring of Volatile Organic Compounds (BTEX) by 3M OVM 3500 Passive Sampler

*Noise Monitoring*

The principal reason to monitor noise events in order to gain an understanding of the relative noise impacts of smaller and larger

aircraft. Three categories of aircraft are set forth in the Goals, namely, (a) those with certified maximum takeoff weights of 66,000 pounds or less, (b) those with certified maximum takeoff weights in excess of 66,000 pounds but less than 75,000 pounds, and (c) those with certified maximum takeoff weights of 75,000 pounds or more. Noise is monitored on a regular basis at four sites in the region surrounding PDK Airport. These data are acquired and stored for later analysis by PDK personnel. PDK will make available a portable noise monitor that has been used in the past for specific studies. We propose to place this monitor at each of our passive air monitoring sites on a rotating basis. Our sampling schedule will have this monitor at each community location for a two-week period in the first half of the study and a two-week period in the second half of the study. Data will be collected in a manner similar to that of the four "normal" sites with data downloading, storage, and preliminary data reduction done in an analogous fashion. The exact placements will be determined using quadrangle maps and local topography and will coincide with air sample collection sites. The study will be conducted over a one-year period. We will analyze these data and, using FAA radar stream/transponder data, identify aircraft associated with various noise levels. The Airport Noise and Operations Monitoring System at PDK (the "ANOMS") automatically correlates the FAA radar stream data (with its embedded identifying N numbers for each aircraft, where available) enabling us to tie noise events (and air samples) to specific aircraft, and thus to place them in a weight category for analytical purposes. When there is no N number in the radar stream data, the aircraft is flying under visual flight rules (VFR) or is a military aircraft. Such aircraft, expected to be about 40% of the fleet using PDK, into the will be categorized as "<60,000 lbs" as bigger planes fly under instrument flight rules (IFR), not VFR. To tie N numbers to specific aircraft using PDK, we will update the MSAccess database originally created by Open DeKalb to enable us to correlate noise events and active air samples with specific aircraft operations.

Phase II- Data Acquisition and Analysis consists of four sub-phases. Phase IIa involves Equipment Acquisition and Testing. We have examples of the various active sampling apparatus in our laboratory; however we will need to acquire new equipment to place in the locations outlined. These instruments must be calibrated and cross-validated after acquisition to ensure that the results are comparable. In addition, during this time period, we will familiarize ourselves with the working procedures for the portable noise monitor and evaluate its efficacy in this investigation. This activity will begin on 1 December 2011 and be completed by 15 January 2012.



For noise analysis, Phase IIa will include meeting with relevant Open DeKalb and PDK personnel to understand and to update the MSAccess database originally created by Open DeKalb, that will correlate the FAA radar stream data of N numbers with noise events registered on one of the five noise monitoring stations during the study.

Phase IIb- Preliminary Data Collection will begin after initial calibration and testing of instrumentation is complete. Instruments will be placed in the field and monitoring protocols developed during Phase IIa will be implemented and evaluated. Finalized field protocols will be developed based on these test results. Simultaneously, we will begin passive sampling and evaluate existing protocols for applicability in this community setting. Finally, we will place the portable noise monitor at the background site to assess ease of data collection, download speeds, and other components of operation. Activities under Phase IIb will begin on 15 January 2012 and be completed by 28 February 2012. During Phase II, we will attempt to correlate all noise events collected during the year-long Phase II with aircraft type as classified by three categories of aircraft set forth in the Goals and described above. However, we do note that it is likely that some events will not be classifiable in this fashion due to, for example, lack of transponder information, failure to identify aircraft in some other way, or noise events not correlated with aircraft at all.

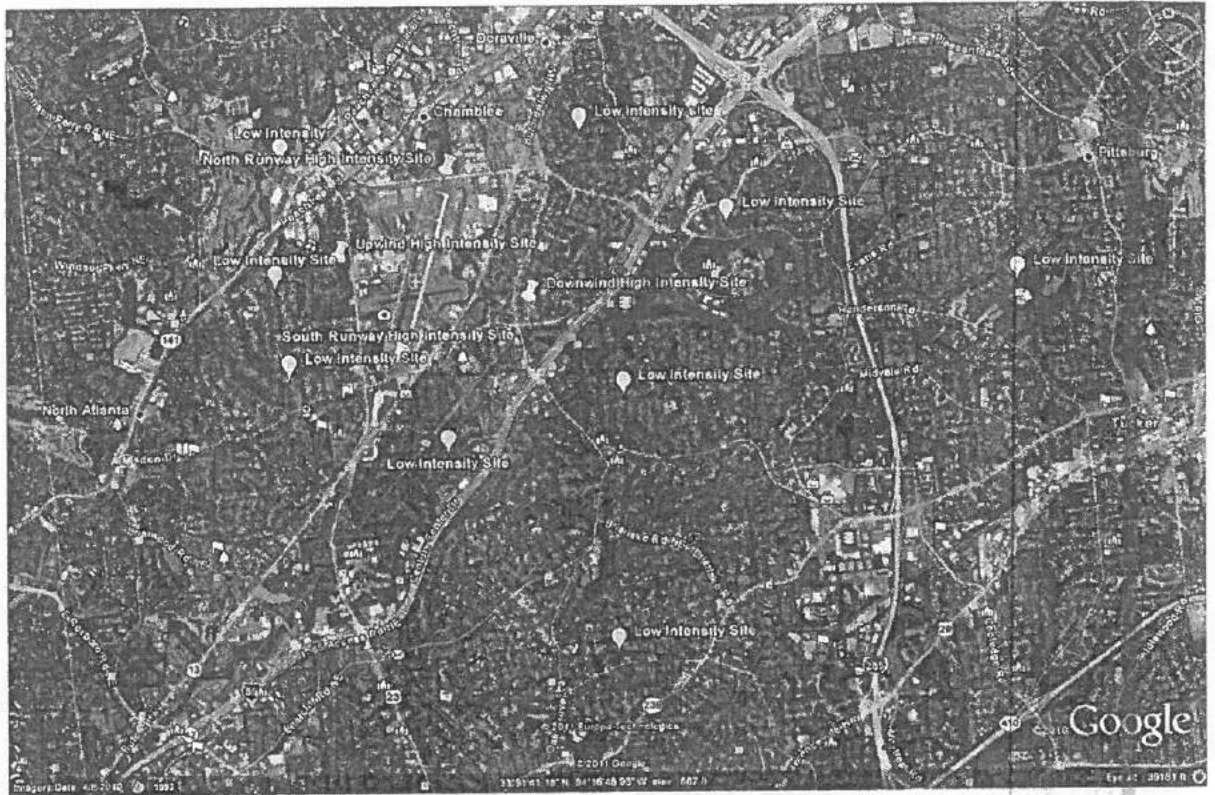
Phase IIc- Noise and Air Contaminant Data Collection is the full data collection effort associated with this study. Data will be collected for a one-year period commencing on 1 March 2012 and continuing through 28 February 2013.

Phase IId- Laboratory and Data Analysis will be ongoing throughout the project and will commence with analysis of field testing samples as early as 1 January 2012 and will continue through completion of all laboratory and data analysis no later than 30 April 2013. This analysis includes both active and passive air contaminant sampling, and noise data analysis.

#### Phase III- Data Analysis and Reporting

Report generation will began almost simultaneously with the commencement of the study itself. Model runs on both noise data and air contaminant data will be tabulated and summarized in early reports. This will be followed in early winter 2012 by a report on Phase IIa- Equipment Acquisition and Testing. This will be followed by a late-winter 2012 report on Phase IIb- Preliminary Data Collection.

Summary reports of results from Phase IIc- Noise and Air Contaminant Data Collection will be produced quarterly and will be available four weeks after the end of the quarter. Reports will be in the form of both tabular and graphical summaries with text description.



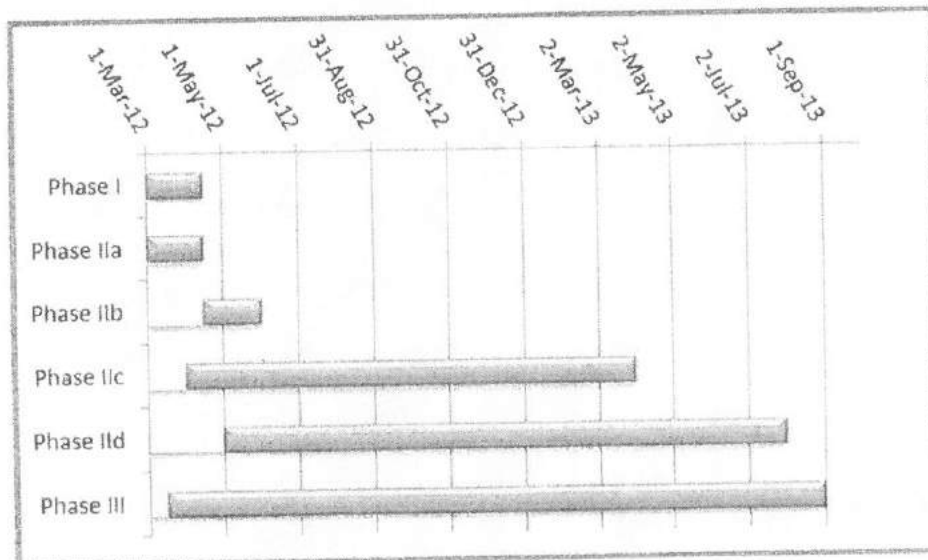
**Figure 1. Rough Monitoring Plan for PDK Airport Study.** Active/High Intensity air contaminant sites are indicated by yellow "push pin" icons on this Google® Earth image. Passive/Low Intensity sites are indicated by blue "balloon" icons. Two other Active/High Intensity sites will be placed in the community based on modeling input and input from the community itself. A seventh Active/High Intensity site would be located approximately 5 kilometers nearly due south of the airport to serve as a Background site not influenced by the PDK. Four noise monitors are currently at fixed sites surrounding the airport. A fifth portable noise monitor will rotate through the community passive monitoring sites through the study. Major roads and highways are indicated. NB: This arrangement is illustrative and not final. Final monitoring locations will be developed using noise/air modeling results and with input from both open DeKalb and PDK personnel.

Detailed reporting will await completion of the one year data collection effort. At this point, sufficient data will be collected to address the questions raised in the overall goals indicated in the original Goals statement (Appendix I). Further, analyses along the lines of the Dodson work (Dodson et al. 2009) would be completed at this time.

Two other reports will also be filed. First among these will be a report summarizing similar data collected at other airports including, but not limited to, T.F. Green Airport in Rhode Island (Dodson et al. 2009), LAX in Los Angeles (LAX 2008), Teterboro (NJ) Airport (ENVIRON 2008), and other airports for which air contaminant studies have been under taken. Further, we will explore these reports, and investigate others to determine whether noise studies similar to ours have been done. If so, we will report on those as well. We will begin development of this report as soon as the study commences and expect completion to occur in the early winter of 2011. A follow-on to this report will be a direct comparison of results of the proposed investigation with these studies taking into account the relative size of the airports, type of air traffic, and proximity to the surrounding community.

***Proposed timeline for the study***

The chart below indicates the approximate timeline for the investigations assuming a start date of March 1, 2012 and a proposed end date of August 31, 2013. Phases are discussed in text.



## **Budget Justification**

In this budget justification, we assume a start date for the project of March 1, 2012 and it continues for a total of 18 months through August 31, 2013. This includes three months for modeling, equipment purchase, protocol development, and shake-out, followed by 12 months of monitoring. The remaining three months is for completion of data analysis, report generation, and presentation to the DeKalb County Board of Commissioners.

### **Personnel**

**Ryan-** Dr. Ryan will act as Principal Investigator on this project. He will be responsible for all activities and results from the study. He will oversee all field and laboratory work including modeling of the impact of air contaminants on the surrounding community and the impact of noise, and to compare the relative impact of these based on aircraft size.. He will directly oversee the Field/Laboratory Technician and the Graduate Research Assistants. He will dedicate 25% of his time solely to this project.

**Sarnat-** Dr. Sarnat will serve in an advisory role on this project. He will supply guidance on the collection of field data using the particulate air-sampling apparatus discussed below. He will supply direction for the Field and Laboratory Technician on matters associated with particulate matter field data collection and guidance on laboratory analytical techniques for these pollutants. He will dedicate 10% of his full-time effort to this investigation.

**Greenwald-** Dr. Greenwald will serve in an advisory role on this project. He will supply guidance on the collection of field data using the particulate air-sampling apparatus discussed below. His principal focus for this study will be on methods and apparatus of field instrumentation, including development of sampler shelters and assurance of quality data collection. He will dedicate 10% of his full-time effort to this investigation.

**Field and Laboratory Technician TBN-** The Field and Laboratory technician will have responsibilities for sampler preparation, field deployment and pick-up, and laboratory analysis of samples. The individual is expected to have significant field data collection experience as well as laboratory experience. This person should have a BS/BA in a scientific discipline. An MPH is preferred. Expected salary is \$40,000/year. This individual will be fully dedicated (100%) to this project for 16 months commencing March 1, 2012 and continuing through June 30, 2013.

**Graduate Research Assistants TBN-** Graduate Research Assistants will be drawn from the pool of MPH candidates at Rollins School of Public Health. They will supply labor for routine laboratory

analysis, routine sample preparation, and routine data entry. We propose use of such individuals at 15 hours per week at a pay rate of \$12 per hour. We will seek out a graduate student with MSAccess experience to work with Open DeKalb, Inc., and PDK personnel to evaluate and update the existing MSAccess noise database.

***Equipment (Not Subject to indirect costs)***

Sampling equipment will be purchased for this study. Each site will require two instruments: an Aethalometer, which measures fine particulate (black carbon) typically associated with diesel and/or kerosene combustion; and, a CPS multi-channel ultrafine particle counter, used to differentiate particles of various sizes. Thus for each site we have:

Aethalometer	\$6,000	
CPS	\$10,000	
Total for each site:		\$16,000

We are proposing monitoring actively at two airport-related sites (each end of the principal runway), four community-based sites, and a background site, for a total of seven sites. In addition, we propose purchasing one additional monitoring set to act as a backup in case of instrument failure.

<u>Total Equipment</u>	8 setups @ \$16,000/setup	\$128,000
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***Supplies (Subject to indirect Costs)***

**Active Sampling**

In addition to the equipment described above, we will be sampling actively for particulate matter that will be extracted and analyzed for metal content. Each sampler requires a pump, sampling head, and filter material for collection. We will sample seven sites as discussed above and need one back-up apparatus, which will also be used for quality control determinations.

For each site:

1 pump	@\$1,000 each	\$1000
1 sampling head	@ \$500 each	\$500
30 filters	@\$7/each	\$210
<u>Total for each Site</u>		\$1710

<u>Eight Sites Total</u>		\$13,680
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**Passive Sampling**

Community-based sampling is an important component of this investigation. We will use passive sampling for nitrogen dioxide and volatile organic compounds (VOCs) as indicators of airport and non-airport related contamination in the community. We will monitor at each of the active sites to draw a relationship between measured contaminant concentrations by active samplers with that measured by passive samplers. Further, we will select 12 additional sites around the community for monitoring, resulting in a total of 19 sites.



For each site:

Apparatus:

Nitrogen dioxide: \$25 per site-week

VOCs: \$25 per site-week

52 monitoring weeks

Multiplier to include quality assurance samples- 1.2

$\$50/\text{site-week} \times 52 \text{ weeks} \times 1.2 = \$3,120/\text{site}$

<u>19 Sites Total</u>	\$59,280
Laboratory Supplies	
Reagents, gases, standards, glassware and other materials for analysis	\$15,000
Instrument Time	\$15,000
<b>Other Direct Charges</b>	
Local Travel	
2 per week x 52 weeks x 25 miles/trip x \$0.50/mile	\$1,300
Software for Air Modeling	\$2,000

#### **Indirect Charges**

DeKalb Peachtree Airport and DeKalb County limit the billable indirect charges to *no more than 10%* of the appropriate direct charges.

#### **References Cited**

Airport PDK (2011). "DeKalb Peachtree Airport, Atlanta Georgia- Our History." Retrieved 20 May 2011 from <http://web.co.dekalb.ga.us/pdkairport/history.asp>.

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Ryan PB and Ayres MM (2006) A Longitudinal Study of Nitrogen Dioxide Concentrations around a Major Metropolitan Airport: 1987 – 2005. Joint Annual Meeting of the International Society of Exposure Analysis and International Society for Environmental Epidemiology. Paris, France.

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## Appendix I

### Goals of Air and Noise Study at PDK Airport Prepared by Open DeKalb, Inc. and Mike Van Wie, PDK Airport Director

April 22, 2011

The goal of the study is to collect hard data on the impact of PDK aircraft operations on air quality and noise over the geographic area reasonably impacted by the Airport. The study must to the greatest extent possible:

1. Analyze the air and noise pollution impacts of three categories of aircraft, (a) those with certified maximum takeoff weights of 66,000 pounds or less, (b) those with certified maximum takeoff weights in excess of 66,000 pounds but less than 75,000 pounds, and (c) those with certified maximum takeoff weights of 75,000 pounds or more;
2. not include air and noise pollution impacts from major vehicular highways near the Airport;
3. not include air and noise pollution impacts from air traffic in and out of Hartsfield-Jackson Airport;
4. provide analysis of PDK's relative impact on air quality in the area, so that PDK emissions can be understood as one contributor to the area's air and noise pollution, rather than with static figures for PDK's emissions without any qualifying context for the figures; and
5. provide comparative analysis of similar airport's(s') emissions.

The intent is to provide the DeKalb County Board of Commissioners, DeKalb CEO's Office and the Airport Staff, and the public with the ability to make informed decisions about Airport operations. As the County moves toward a Master Plan for the airport, policymakers, those who execute policy and those persons regularly impacted by the Airport either due to the location of their homes, offices or other regular physical contact with the Airport's operations, must be able to weigh costs and benefits of Airport operations intelligently.

## Appendix II- Draft Work Authorization Form for DeKalb County

### WORK AUTHORIZATION FORM DEKALB COUNTY, GEORGIA

Work Authorization for Professional Architect/Engineering Services  
At DeKalb Peachtree Airport in DeKalb County, Georgia

\_\_\_\_\_  
(Project Identification No.)  
authorization No.)

(Work  
authorization No.)

#### Description of Assignment

Emory University's Department of Environmental Health will develop and implement an air pollution and noise pollution monitoring program designed to evaluate the air and noise impacts of DeKalb Peachtree Airport aircraft operations. The air monitoring program will consist of multiple-site, continuous air pollutant monitoring for particulate matter, and discrete monitoring for metal concentrations in air contaminants using active samplers at each of approximately seven sites. The air monitoring sites will include airport-based sites, sites in the community, and a background site. Additional community-based air monitoring will be carried out using passive, integrating samplers designed to evaluate longer-term exposures at each of approximately 12 additional sites in the community surrounding the airport. The noise monitoring program will use data collected from the Airport's Noise and Operations Monitoring System (NOMS) and correlate noise events at the stationary and mobile noise monitoring sites with radar stream data to enable a comparison of the relative impacts of three size categories of aircraft. A portable noise monitor will be rotated among the community-based sites, with each site being monitored for approximately two weeks during the first half of the study and two weeks in the second half. Both active and passive sampling will operate continuously for a period of one year (52 weeks) commencing on March 1 2012, or three months after Notice-to-Proceed. An interim report will be delivered approximately one month after the Equipment Evaluation Phase, 1 December 2011-29 February 2012 or three months after Notice-to-Proceed, followed by quarterly summary reports on monitoring. After the end of the continuous monitoring period, 28 February 2013, or 15 months after the Notice-to-Proceed, preparation of a final report summarizing all results will begin. The format of this report and delivery schedule will be provided to DeKalb Peachtree staff, with a final delivery date of three months after the conclusion of monitoring, 31 May 2013 or 18 months after the Notice-to-Proceed.

1) Compensation: \$476,258

2) Schedule:

Work will begin on 1 December 2011, or immediately upon Notice-to-Proceed and will continue until 31 May 2013 or for a period of 18 months after Notice-to-Proceed

**Exhibit C  
Payment Schedule**

**SUMMARY**

**A Proposal to Perform an Air and Noise Study at PDK Airpo  
March 1, 2012 - August 31, 2013**

	<b>YEAR ONE</b>	<b>YEAR TWO</b>
<b>PERSONNEL</b>	145,903.00	65,332.00
<b>CONSULTANTS</b>	0.00	0.00
<b>EQUIPMENT</b>	128,000.00	0.00
<b>SUPPLIES</b>	102,960.00	0.00
<b>TRAVEL</b>	1,300.00	0.00
<b>OTHER EXPENSE</b>	2,000.00	0.00
<b>SUBTOTAL DIRECT COSTS</b>	380,163.00	65,332.00
<b>SUBCONTRACTS</b>	0.00	0.00
<b>TOTAL DIRECT COST</b>	<b>380,163.00</b>	<b>65,332.00</b>
<b>INDIRECT COST</b>	25,216.00	6,533.00
<b>TOTAL PROJECT COST</b>	<b>405,379.00</b>	<b>71,865.00</b>