

Federation of Earth Science Information Partners Partnership Application

Please complete all sections to the fullest extent possible and forward completed application to: Carol Meyer, carol.meyer@earthsciencefoundation.org. If you have any questions, please contact her at 877.870.3747.

I. CONTACT INFORMATION

A. Primary Contact/Principal Investigator

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B. Designated Assembly Representative (could be same as above)

Name: John N. McHenry, Chief Scientist
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C. Other Contacts

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II. ABOUT YOUR ORGANIZATION

A. ORGANIZATION/DIVISION/PROJECT NAME: *Baron Advanced Meteorological Systems*:
“**Assimilating AURA-derived Trace Gas Retrievals and MODIS AOD into an Operational Multi-pollutant Ensemble Air Quality Forecast Decision Support System with a focus on Ozone and Haze Prediction**”
NASA ROSES A.24 Awardee

B. OVERVIEW OF YOUR PRIMARY ACTIVITIES (250 words or less)

In this project, an outstanding team of scientists and engineers led by PI John McHenry—who has pioneered operational-commercial air quality forecasting in the US (McHenry et al., 2004; McHenry and Dabberdt, 2005)—will infuse NASA Earth-Sun System research results from the AURA and MODIS platforms into an extant air quality forecast decision-support system (AQF-DSS). The AQF-DSS runs operationally at Baron Advanced Meteorological Systems (BAMS) high-performance computing facility, co-located with the National Climatic Data Center (NCDC) in Asheville, NC. The core modeling system includes MM5 (with WRF coming online), SMOKE, CMAQ, and MAQSIP-RT.

By utilizing newly available AURA-OMI NO₂ measurements and *significantly improved* MODIS aerosol optical depth (AOD) measurements, the team will enable the DSS to provide improved real-time forecast guidance and policy planning to state/local agencies, a regional planning organization (RPO), federal agencies, and commercial television weathercasters nationally. The state/local agencies include those in New England, the mid-Atlantic, the Midwest, the Southeast, and the Southern Plains. This project will also promote expansion of products and services to new clients, and it addresses the Air Quality national priority application within the ROSES-A.24 solicitation.

References:

- McHenry, J.N., W.F. Ryan, N.L. Seaman, C.J. Coats, J. Pudykeiwicz, S. Arunachalam, and J. Vukovich, 2004: A real-time Eulerian photochemical model forecast system: Overview and initial ozone forecast perform. in the NE U.S. Corridor. *Bull. Am. Met. Soc.* **85**(4), 525-548.
- McHenry, J. N. and W.F. Dabbert, 2005: Air quality and meteorological monitoring strategies to advance air quality modeling and its application to operational air quality forecasting. **Final Report**. National Exposure Research Lab, Office of Research and Development, US Environmental Protection Agency, RTP, NC 27711., 80pp.

C. Please list and briefly describe the primary product(s) or service(s) that your organization provides (will provide) to the community.

- We will provide research grade operational forecast model datasets for evaluation and analysis.
- We will provide commercial products and services directly to our clients through ESIP websites where feasible.
- We will provide operational forecast products for field programs.
- We would like to become more involved in GEOSS/EOS by providing operational model datasets for research, archiving, and dissemination where practical.
- We would like to become more involved in GEOSS/EOS activities in general.

D. Please give a main website address for the proposed Partnership:

<http://www.baronams.com/projects/nasa/esip> [does not yet exist]

Web Address: *and/or*

<http://datafed.net/> (and potentially others)

III. HOW YOUR ORGANIZATION WILL BENEFIT FROM/CONTRIBUTE TO THE EARTH SCIENCE INFORMATION PARTNERS (ESIP) FEDERATION

- A. Describe current or anticipated users of your products and services and how you think the Federation can help you better serve this population. (200 words or less)

As discussed above, we currently have more than 15 states and agencies that subscribe to our operational air quality forecast system products and services. By participating in ESIP, we will be able to expand the suite of products and tools offered, in order to improve our clients' ability to forecast and warn the public about potentially deleterious events, as well as track the real-time evolution of air quality at higher resolution and with better fidelity. It will provide the opportunity to enhance partnerships and develop additional and novel earth science products with a focus on air quality.

- B. Describe any Earth science technologies that you have developed and are willing to bring to the Federation's efforts to provide best-practices. (200 words or less)

The primary focus of our organization is operational forecasting. We pioneered operational air quality forecasting using advanced atmospheric chemistry models coupled to advanced emission and mesoscale meteorological models. We are involved, as well, with the WRF and WRF-Chem communities and the development of those systems. We have focused considerable effort on understanding the performance of our forecast systems versus available surface measurements, and in comparison to other forecast models and ensembles. In addition, we regularly work with NOAA and other organizations to supply forecast data to field programs.

- C. Describe how your proposed membership would contribute to the efforts and the mission of one or more standing committees, working groups and/or clusters. See Page 3 for descriptions of the different activities of the various standing committees, working groups, and clusters. (200 words or less)

Our membership would clearly contribute to the efforts of several standing committees. As a commercial organization, we have a vested interest in providing value-added high-quality earth-science based products and services. This project is an ideal application of such a vision. Thus, our contribution to the Commercial Development Standing Committee would be key in our view. Further, because we rely on high-performance computing and information technology, we could make important contributions to the Information Technology and Interoperability Standing Committee. Finally, because the usability and advancements in products and services result from both advancements in core science as well as its evolving/novel dissemination to end users, we are clearly interested in the Products and Services Standing Committee. Because our focus is air quality and primarily operational air quality forecasting, the AQ Cluster would clearly apply. However, we also have interest in and the need for GIS in our systems, and so that Cluster is also important to our mission. Thus, we believe that we could make substantial contributions to several Standing Committees and Clusters.

- D. Describe your own use of Earth science information and data and how you would see this use enhanced by your partnership in the Federation. (200 words or less)

Our operational forecast systems use a variety of earth science information at present, mostly meteorological in nature. We also use emissions inventories and some real-time fire-emissions datasets; and in this project we will begin using NASA satellite information operationally. We use GIS data as needed, including soils, land-cover, and terrain datasets. In some of our related modeling systems, we use hydrological and hydrometeorological data, including surface range gauges, snow-depth measurements, stream-gauge measurements, etc. We believe that the partnership will allow us to expand our access to new/improved datasets that will create additional commercial and research-to-operations opportunities.

IV. YOUR CHOICE OF MEMBERSHIP TYPE. PLEASE PICK ONE.

ESIP-I (primarily a data archive center)



ESIP-II (primarily a research center)



ESIP-III (primarily applications and education)



ESIP-IV (primarily a sponsoring member)



V. Any other comments about your proposed membership and its relation to the Federation that you wish to provide.

I think we fit in more than one box above. Our commercial products and services clearly has an applications orientation; however, we also conduct first-principles forecast-system research and participate in field programs. Perhaps the evaluating committee might suggest where we best fit based on our application.

Thank you for your application for partnership in the ESIP Federation.

List of Federation Committees and Clusters

Administrative Committees

Executive Committee: Comprised of all standing and administrative committee chairs, ESIP Type Representatives, the President and Vice President of the Federation. Oversight body for most day-to-day activities of the Federation, acts on behalf of the Assembly between meetings.

Constitution and Bylaws: Provides counsel on matters related to the constitution and bylaws and other related issues (e.g. amendments to government documents)

Finance and Appropriations: Oversees financial resources of the Federation, including the annual budgeting process.

Partnership: Reviews and processes all applications for membership before making applications available for review by members of the Federation. Deals with other membership-related issues.

Standing Committees:

Commercial Development: Promotes a forum wherein commercial development of Earth science information can be fostered.

Community Engagement: Provides a forum for the Federation to promote partner products and to engage new users for data products and services.

Education: Provides a forum to make accessible to educators and learners at all levels in both formal and informal educational contexts the Earth science data, information, tools, and curricula available within the ESIP Federation.

Information Technology and Interoperability: Provides a forum for discussing information technology and interoperability issues of the Earth science community and serves as a central point for activities in this realm.

Products and Services: Provides a forum for defining best practices and defining requirements for earth science products and services. Currently is involved in developing an inventory of partner products and services.

Clusters (presently active, April 2005):

GIS

Intelligent Systems

Air Quality