

Project Title: CrowdMag

Program Office Sponsoring or Conducting this CSC Project: NESDIS/National Centers for Environmental Information (NCEI)

Authority for this CSC Project: CCSA and CGSA (33 U.S.C. §§ 883a et seq.)

Purpose of this CSC Project: This project will be used to: 1) build, grow, and foster a worldwide community of citizen scientists and enthusiasts collecting magnetic field data and sharing it to further our understanding of Earth's magnetic field and 2) develop magnetic models and maps using the data shared by CrowdMag users in combination with data collected by ships, aircrafts, and satellites to fill in the gaps of professional mapping of Earth's magnetic field.

Type(s) of Information Collected and From Whom It Is Collected: This project will collect the following information: magnetic field data from the phone's magnetic sensor, time of measurement, location of measurement, location accuracy, and the model of your phone (so that we know which type of sensor was used to collect the magnetic field data). It will collect this information automatically from those who voluntarily install the CrowdMag app on their cell phones and activate the app.

Use of the Information: The NCEI magnetic field research team will use these data to assess the utility of incorporating crowdsourced magnetic field data to help improve NOAA's models used in navigation and geolocation applications. Using CrowdMag data, our team will periodically produce scientific products such as maps, graphs, and/or mathematical models. In order to further geomagnetic field research, these products may be presented at meetings, be included in publications, or be made available to the public via the Internet.

Method(s) of Information Collection: Electronically from cell phones

Affected Public: Individuals

Estimated Average Annual Number of Participants: 15,600

Estimated Average Annual Number of Responses per Participant: 4.21

Estimated Average Minutes per Response: 0.8

Estimated Average Annual Burden Hours: 877

Estimated Total Annual Cost to Participants in this CSC Project: \$0

Estimated Average Annual Costs to the Federal Government: \$25,000

Estimated Average Annual Number of Federal Government Employees (FTEs): 0.15

Recruitment and Retention Methods for Voluntary Participants (SSA item 1): CrowdMag does not actively recruit volunteers. Users download the app in response to web-search or a visit to the CrowdMag website.

Gifts or Payments (SSA Item 9): We do not plan to provide a gift or payment to the voluntary participants.

Annual and Multi-Year Schedules (SSA Item 16): The data collection part of CrowdMag project is “always on”, meaning that we do not control the data collection schedules of individual users. The data are sent automatically to the NCEI servers where they are processed and ingested to a database every hour using an automated process. The data are periodically used by the NCEI scientists to develop models and maps. There are no set schedules for this process, although we present the results to the scientific community 2-3 times per year.

Display OMB Control No. and Expiration Date (SSA Item 17): CrowdMag does not display an OMB Control No. and expiration date. If necessary, the next upgrade to the CrowdMag app could add that information.

Statistical Methods: This CSC project will not employ statistical methods.

1. Who will be surveyed and why is it appropriate to survey that group?

The CrowdMag app is open to all. As such, we do not determine who can participate in the project.

2. How was the survey developed including consultation with interested parties, pretesting, and responses to suggestions for improvement?

The set of parameters collected by the CrowdMag app was determined based on the end use of the data – to develop maps and models. We have not changed those parameters since the release of the app.

3. How will the survey be conducted, how will the population be sampled if not all the population will be surveyed, what is the expected response rate, and what actions does NOAA plan to take to improve the response rate?

The CrowdMag users are concentrated in the cities, thereby creating an imbalance of data coverage over rural areas and over oceans. We are currently beta testing a “flight-mode” version of the CrowdMag that aims to let users contribute while flying in commercial airlines. We hope that the lack of coverage over rural and oceanic regions will be mitigated to some extent.

4. How will NOAA analyze the results of the survey and generalize the results to the entire population?

The data collected by the CrowdMag project is a sparse sampling of the Earth’s magnetic field. In order to develop global magnetic field models, we fit smooth “Spherical-Harmonic-Functions” to the observed data.

5. What is the contact information for individuals consulted on the statistical aspects of the design, and for the agency unit, contractor(s), grantee(s), or other person(s) who will

actually collect and/or analyze the information for the agency? The contact information should include name, title, affiliation, email address, and telephone number.

Dr(s). Manoj Nair, Rick Saltus, CIRES, University of Colorado at Boulder.

Approval for Pretesting: This CSC project will not require additional pretesting with more than nine members of the public.

Supplemental Documents: There are two supplemental documents for this CSC project. One is the tutorial for the CrowdMag cell phone app, including screenshots. The other includes additional screenshots from and information about the app.

CERTIFICATION: I certify the following are true.

1. The collection is voluntary.
2. The collection is low-burden for respondents and low-cost for the Federal Government.
3. The collection is non-controversial and does not raise issues of concern to other federal agencies.
4. The collection will not include highly influential scientific information, which is information NOAA or OMB determines: (i) could have a potential impact of more than \$500 million in any year, or (ii) is novel, controversial, or precedent setting or has significant interagency interest.
5. The collection complies with 5 CFR 1320.9 and the related provisions of 5 CFR 1320.8(b)(3).
6. The collection will provide qualitative and quantitative data that help inform scientific research and monitoring, validate models or tools, support STEM learning, and enhance the quantity and quality of data collected to support NOAA's mission.

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