

Review of ICARTT file format implementation and operational suitability

NASA's Earth Science Data Systems Standards Process Group (SPG) is considering the International Consortium for Atmospheric Research on Transport and Transformation (ICARTT) file format for adoption as a community standard. The ICARTT file format was developed to fulfill the data management needs for the ICARTT campaign in 2004. This file format is text-based and composed of a header section (metadata) with critical data description information (e.g., data source, uncertainties, contact information, and brief overview of measurement technique), and a data section. Although it was primarily designed for airborne data, the ICARTT format proved to be practical for other mobile and ground-based studies and various data types. The ICARTT file format has since been widely accepted in the airborne field study community and used in recent major airborne studies sponsored by NASA, NSF, NOAA and international partners.

You are invited to review this Requests For Comment (RFC) in the context of your **implementation experience** with this data format specification and its **suitability for operational use**. You only need to answer questions applicable to you. Please send your completed review to:

spg-rfc-019@lists.nasa.gov.

Implementation Experience questions:

1. (*Your background*) Describe in a sentence or two your overall implementation experience related to the proposed specification. (*e.g., specification implementer, tools developer, data provider, scientific analyst, science user, etc.*) Have you directly implemented the ICARTT format specification? Did you use a pre-existing software package, and if so, what did you use?

I have provided model results in the ICARTT format to the NASA archives. I wrote my own IDL programs to create the ICARTT files.

2. (*Completeness*) Does the specification provide all the detail you need to implement it in software? (*e.g., to read or write a data file; to implement the specification, a profile or extension; or develop a tool such as a format translator*) If not, describe what is missing in the specification.

I feel the specification ought to have an explicit item for the units of each variable. Frequently the convention is to include them after a comma after the variable name, but that is not required. No one should be allowed to archive data without saying what units they are in!

3. (*Accuracy*) Do any parts of the specification contain inaccuracies, or internal inconsistencies? If so, please provide details.
4. (*Clarity*) Is any part of the specification ambiguous, or poorly explained? If so,

please provide details.

5. (*Usefulness*) How well does this specification meet your information sharing needs? (e.g., *does it work well with the data types and data manipulations in your application? Does it properly represent your datasets? What are the pros and cons of this data format?*)

This format seems satisfactory for the airborne data, and model results interpolated to the aircraft flight tracks, which is what I provide.

There are many archaic features, though, of this format, that were implemented in the original Ames formats to reduce file size. I would remove the volume number, number of volumes, and the scale factors. It also seems the multi-dimensional (auxiliary variables) formats could be written as 1001 formats. For example, lidar data of O3 at multiple altitudes at each time could have separate variables for the ozone at each altitude (or distance from the plane): o3_100m, o3_200m, etc.

6. (*Implementation*) What implementation challenges does the proposed standard present? Please provide details, if any.

Operational Suitability questions:

7. Do you currently use or plan to use the ICARTT format in a production setting? Do you plan to distribute data in this format to science collaborators and other researchers?

No; Only as required by the NASA archive.

8. Why do you choose to use the ICARTT format over other data formats for your applications?
9. Does the ICARTT file format meet your requirements for storing and accessing data?

It is fine for aircraft and ground-based data. I do not use it for the 3D satellite and model results I primarily deal with.

10. Have you or your users encountered any difficulty when using some of the data in the ICARTT format? If you have, please provide a brief description of your experience.
11. What operational challenges or limitations does ICARTT present? Please provide details.
12. What benefits does the ICARTT file format present? Are there any drawbacks to using this file format? (e.g., *Does it offer the flexibility you want to package the data types in your applications? Does it facilitate interdisciplinary studies?*)
13. How much data do/will you provide or archive in the ICARTT format? (*Number*

of distinct data sets, total data volume, number of files.)

I have provided model result files for the NASA INTEX-B and ARCTAS campaigns.

14. How many users do you have or expect to have for data in the ICARTT format, and what is your expected user community?
15. (*User comments*) Any additional comments, observations or criticisms of the ICARTT format and the RFC can be provided here.