

**Minutes from CGNS Steering Committee Meeting  
Submitted by Bob Bush (UTRC)**

**Meeting held on January 10, 2000**

**Reno, NV**

1. The meeting was called to order at 6:30 by Bob Bush. There were 21 people in attendance, representing 16 organizations. The list of attendees is included as an attachment.
2. The minutes of the December telecon were approved.
3. Final copies of the Steering Committee Charter were distributed. The charter is also available on the CGNS web site.
4. Discussion of proposed changes to the Steering Committee.
  - Bob Bush introduced Steve Legensky of Intelligent Light, and reviewed the request to add Intelligent Light to the Steering Committee. Steve Legensky reviewed what Intelligent Light brings to the Committee. This includes a commitment to implement CGNS in their product, bring a significant customer base and therefore provide user feedback. Intelligent Light also offered to bring technology elements based on previous contracted work which may significantly speed CGNS data access, and committed a one person level of effort in support of the CGNS standard, upgrades and utilities.
  - Diane Poirier introduced Nouredine Hakimi and Marc Tombroff of NUMECA and reviewed their request that NUMECA becomes a member of the CGNS Steering Committee. The NUMECA representatives relayed their experiences implementing CGNS into their production capability and their extensive European contact, customer base and international collaborations.
  - The committee agreed to add Intelligent Light and NUMECA to the Steering Committee by unanimous consent.
  - With these additions the Steering Committee is composed of 14 organizations (up to 15 are allowed by the Charter).
  - There was some discussion of who the appropriate Air Force representative should be. It used to be Steve Scherr of AFRL in Dayton, but he has a new position and may no longer be the appropriate point of contact. It was noted that there is other potential AF organizations that might be more active in the Committee. No actions were taken at this time.
5. Theresa Babrauckas displayed several versions of the 'swan' logo for comment and discussion. After some discussion, she agreed to go back to refine and select a small number of candidates for further review. Ed Hall also indicated a willingness to look at meshing and solving 'on' the logo to obtain color contours as a potential logo.
6. Bob Bush reviewed the material to be proposed at the AIAA CFD Committee on Standards the following evening. The Committee had a final agreement that we would propose becoming a sub-committee of that AIAA committee, establishing an affiliation between the CGNS Steering Committee and the AIAA. The proposal materials are included as attachments. (Bob Bush

made the presentation the following evening. After a question and answer period, and some discussion, the AIAA CFD Committee on Standards approved the proposal. Thus, the CGNS Steering Committee is now formally affiliated with the AIAA CFD Committee on Standards as the CGNS Sub-Committee.)

7. Diane Poirier reviewed the current status of the CGNS software and proposed extensions. There was some discussion about the Chemistry proposal, and the potential need for a more complete definition, and/or a phased implementation of capabilities. Theresa Babrauckas indicated that we should contact the NCC group on their experiences and requirements for chemistry data for aerodynamic modeling, and agreed to make contact with them to get their input. It was also recommended that we look at the CHEMKIN database as it is widely used to define chemistry properties, and the chemistry support in KIVA. Mori Mani agreed to review the CGNS extension proposal and make specific recommendations.
8. Diane Poirier reviewed the CGNS evaluation report from Aerospatiale. Their conclusion is that CGNS could replace their current file format (DAMAS) once the I/O performance is improved.
9. There was a brief discussion of the current status of the ISO standard process as it relates to CGNS.
10. There was a brief discussion on potential future funding sources to support the CGNS standard. A draft Funding Requirements document is attached for comment.
11. The meeting was adjourned at 8:15.
12. Action Items
  - Bob Bush – Propose AIAA affiliation - completed
  - Mori Mani – Revisions to Chemistry extension proposal
  - Theresa Babrauckas – Logo revision
  - Theresa Babrauckas – Contact NCC for chemistry extension suggestions
  - All – Contact Cosner with ISO member country reference contacts.
  - Poirier, Bush – Discuss potential NIST proposal
  - Bob Bush – Arrange Feb/Mar telecon
  - Diane Poirier - Start working on performance improvements
  - Steve Legensky: Identify specific work elements Intelligent Light is interested in contributing to CGNS.
  - Diane Poirier – Implement in the API the extensions proposed for:
    - Rigid Grid Motion
    - Arbitrary Grid Motion
    - Iterative and Time-Dependant Data

Attachments:

- Attendees
- AIAA Affiliation Position Paper
- Funding Requirements document

List of Attendees  
CGNS Steering Committee Meeting  
Reno, NV, January 10, 2000

Member Name	Member Email	Affiliation
Alonso	Juan J. <a href="mailto:jjalonso@stanford.edu">jjalonso@stanford.edu</a>	Stanford University
Babrauckas	Theresa <a href="mailto:theresa@lerc.nasa.gov">theresa@lerc.nasa.gov</a>	NASA Glenn Research Center
Bush	Bob <a href="mailto:bushrh@utrc.utc.com">bushrh@utrc.utc.com</a>	UTRC
Chawner	John <a href="mailto:jrc@pointwise.com">jrc@pointwise.com</a>	Pointwise, Inc. (president)
Davis	Roger <a href="mailto:davisrl@utrc.utc.com">davisrl@utrc.utc.com</a>	UTRC, Stanford
Edwards	David <a href="mailto:dee@ilight.com">dee@ilight.com</a>	Intelligent Light
Hakimi	Nouredine <a href="mailto:noure@numeca.be">noure@numeca.be</a>	NUMECA Head of CFD Group
Hall	Edward <a href="mailto:Edward.J.Hall@allison.com">Edward.J.Hall@allison.com</a>	Rolls-Royce-Allison
Hill	Chris	Fluent
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Kenwright	David <a href="mailto:davidk@nas.nasa.gov">davidk@nas.nasa.gov</a>	NASA Ames
Legensky	Steve <a href="mailto:sml@ilight.com">sml@ilight.com</a>	Intelligent Light
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Ochs	Scott <a href="mailto:ssochs@adapco.com">ssochs@adapco.com</a>	ADAPCO
Poirier	Diane <a href="mailto:diane@flash.icemcfd.com">diane@flash.icemcfd.com</a>	ICEM CFD Engineering
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Reuther	James <a href="mailto:jreuther@mail.arc.nasa.gov">jreuther@mail.arc.nasa.gov</a>	NASA Ames
Thornton	Anthony L. <a href="mailto:anthony.thornton@lmco.com">anthony.thornton@lmco.com</a>	Lockeed Martin Skunk Works
Tombroff	Marc <a href="mailto:marc@numeca.be">marc@numeca.be</a>	NUMECA General Manager

CGNS Steering Committee  
Position Paper  
AIAA Committee on Standards

The CGNS Steering Committee has been established to help ensure the continuation of the CFD General Notation System (CGNS). In order to perform this mission most effectively, the Steering Committee would like to affiliate with an established organization that can support the mission of the Committee, and help ensure the establishment and continuation of the Standard.

The CGNS Steering Committee has become aware of the AIAA CFD Committee on Standards, and would like to explore the possibility of becoming a sub-committee of that organization. This affiliation will advance the AIAA mission and the CFD CoS mission to promote the acceptance of standards in a core area of interest to AIAA.

This document summarizes the expectations and anticipated working relationship that the CGNS Steering Committee would like to see materialize.

The AIAA Committee on Standards would create a new sub-committee, called the CGNS sub-committee, which would be the continuation of the existing CGNS Steering Committee.

The CGNS sub-committee would operate autonomously, and would not increase the workload on existing sub-committees.

A member of the CGNS sub-committee (usually the CGNS Steering Committee Chairperson) would represent the sub-committee at AIAA Committee on Standards meetings.

This affiliation does not preclude the CGNS Steering Committee from collaborating with other professional organizations that might also support the continuation of the CGNS Data Standard.

Access to AIAA communications media, technical conferences, committees, etc. will accelerate the process of gaining acceptance for CGNS and ensuring that CGNS meets the needs of the entire aerospace CFD community.

The AIAA would support the CGNS sub-committee by providing a legal entity through which contracts could be negotiated, and funding accumulated and distributed in support of the Standard. (The sub-committee is responsible for raising any funds that are to be disbursed by them.)

The CGNS sub-committee would abide by the CGNS Steering Committee Charter (until such time as the CoS adopts their own by-laws).

CGNS Steering Committee  
Funding Requirements

The CGNS Steering Committee has been established to help ensure the continuation of the CFD General Notation System (CGNS). In order to perform this mission, resources will be required to maintain and further develop the software and documentation, to help propagate the standard, and to ensure a sufficient support to new adepts of CGNS. This document outlines the effort the Steering Committee feels is required to maintain a viable data standard for CFD.

**Proposed Tasks**

The effort has been broken down into the ten categories summarized in the following table. An estimate in man-year of the level of effort required in each given year is also shown. A brief description of the specific tasks envisioned in each category is also provided.

<b>Tasks</b>	<b>Year 2000</b>	<b>Year 2001</b>	<b>Year 2002</b>
Extensions	0.5	0.3	0.1
Validation and Performance Reports	0.2	0.1	0.1
Documentation	0.3	0.3	0.3
Training	0.1	0.2	0.1
Web Maintenance	0.1	0.2	0.2
User Support	0.2	0.2	0.1
Utility Development	0.2	0.3	0.5
Platform/OS Upgrade Maintenance	0.2	0.2	0.1
Outreach	0.1	0.1	0.1
Administration	0.1	0.1	0.1
<b>Total</b>	<b>2.0</b>	<b>2.0</b>	<b>1.7</b>

Table 1. Estimated effort in man-year required for each task

Description of the specific tasks

**1. Extensions –**

The more CGNS is being adopted, the more the users request extensions to the standard to support data types not yet part of the SIDS. The CGNS Steering Committee recognizes that it is not possible to satisfy every individual requirement. However, some requests are general enough to benefit the whole CFD community.

The role of the CGNS Committee would then be to determine which extensions are general enough to be added to the CGNS standard. It would supervise the elaboration of proposals by voluntary sub-committees and post these proposals on the CGNS web site for all users to comment on them. Once approved by the CGNS Steering Committee, these proposals would be implemented in the documentation and software (API).

## **2. Validation and Performance Reports –**

### 2.1 Validation

As the CGNS API extends, and if more and more programmers add their contributions to it, the risk to introduce bugs increases. In addition, the more the user base grows, the more costly problems in the software will be. It is therefore important to establish a test metric that will grow with the API. This test metric should allow testing every function of the API and every node in the CGNS ADF tree. It should also allow testing both the C and FORTRAN interfaces on all supported platforms.

### 2.2 Verification

Users are questioning the performance of CGNS, and what they can expect in comparison to their existing I/O systems. Preliminary performance tests have shown that it takes more CPU time to create a new CGNS file, or to read an existing one, then to write or read a typical sequential file. However, once the database is created, interrogating a CGNS file shows much better performance. This is due to the fact that CGNS not only writes long list of data, but also creates an organized database.

The penalty involved with the initial creation of the hierarchical database worries several users. In order to provide potential users with the confidence required to rely on the new standard, a thoroughly performance study on the CGNS I/O should be conducted. Parameters such as operating system, number of blocks and nodes in the mesh, unstructured or structured data, quantity of auxiliary information, etc, should be included in this performance study. The performance of the CGNS I/O in CPU time, wall clock time and memory, should be compared with other I/O systems (FORTRAN read/write, C fread/fwrite, Plot3D, etc... ).

## **3. Documentation –**

The CGNS Data Standard (SIDS), and associated software (ADF and API), currently have a substantial body of documentation. This documentation will need to be enhanced, maintained and augmented, as extensions are approved and implemented. The existing documentation, although necessary and useful, is enough to scare away the most devoted CGNS fan... Since one of the main goals of the CGNS Steering committee is to propagate the standard by acquiring more and more users, it is necessary to provide for simpler and more comprehensive documentation, in the form of a User's Guide and Training Manual.

## **4. Training –**

It is envisioned that as CGNS is accepted and adopted by various software organizations, that training will be required to facilitate new users. This effort will develop training materials, and provide training for new users. The aim is to reduce the barriers to full implementation, and to gain wide acceptance of the standard.

## **5. Web Maintenance –**

The CGNS web site was originally established as a mean to distribute the CGNS software and documentation. It has grown to be a key element in the propagation of the CGNS standard. In addition to its primary function of distribution, the CGNS web site also allows to recruit new users. It informs users of any pertinent CGNS news and receives user questions and requests. It is also used to post new proposals for extensions to the standard, and any other relevant documentation

such as conference papers, presentation viewgraphs, etc. Finally it provides for a “meeting place” for all CGNS users. It can be foreseen that eventually a CGNS News Group could be added to the web site to facilitate exchange between users.

#### **6. User Support –**

As the user base grows, the number of questions and requests send to the CGNS-Support Team increases accordingly. Timely response to users requests is mandatory in order to maintain users interest. So in the coming years, users support should be a priority.

When the user base is large enough, we foresee that a News Group may be sufficient, as users could answer each other questions.

#### **7. Utility Development –**

Utilities differ from extensions for they do not change the Standard Interface Data Structures (SIDS). They are instead tools facilitating the use of CGNS. For examples, it would be useful to have a utility to compare two CGNS files, or to view the file content graphically. Several proposals for utility development have been submitted to the CGNS Steering Committee. The Steering Committee supports the idea of creating some utilities that would benefit all users.

#### **8. Platform/OS Upgrade, Maintenance & Validation –**

The CGNS API and ADF Core are distributed on most platforms/operating systems commonly used by the CFD community. Currently, these are SGI/IRIX, SUN/Solaris, HP/UX, IBM/AIX, DEC-Alpha/OSF, CRAY/Unicos and WindowsNT. Although not distributed on the CGNS web site, users have also compiled and ran CGNS successfully on Linux. It is important to continue porting CGNS to a wide range of platforms, and keep updating the compiled libraries as the different operating systems are upgraded. This automatically involves testing the API on all new or upgraded operating system.

#### **9. Outreach –**

In the early years of CGNS, the outreach effort is crucial in order to inform the CFD community of the existence of CGNS, and convince key organizations to adopt the CGNS standard, and maybe even contribute to its development.

#### **10. Administration –**

Most administrative efforts are done on a voluntary basis. However some extraordinary administrative costs may arise. For example, the cost related to the user meeting at the Reno conference, or the cost of teleconferences between Steering Committee members. The Steering Committee should be able to cover for such special administrative costs.

### Funding Sources

Much of the work, to date and anticipated, will be performed as in-kind contributions from CGNS Steering Committee Members and CGNS users at large.

Additional resources will be sought to reimburse the software Focal Point for work performed to maintain the software.

Interested parties may seek resources to fund significant extensions to the standard or software utilities.

Funding/contributions will be sought from industry and government agencies interested in extending and maintaining the CGNS Standard. Support may be provided:

- a) to the CGNS Steering Committee who will contract with interested parties and,
- b) directly to parties interested in working on the CGNS Standard. (It is anticipated that these activities will be coordinated with the Steering Committee.)