



by John Steinbrenner / Pointwise

on behalf of

CGNS Steering Committee

What is CGNS?

- CFD General Notation System
- A standard for recording & recovering CFD data.
 - Facilitates data exchange between sites, software, and computers
 - Stabilizes archiving of data
- Free, open source: www.CGNS.org



CGNS History

- 1994: Boeing & NASA identify file transfer as the main impediment to CFD technology transfer.
- 1995-98: CGNS developed under NASA contract NAS1-20267 (AST Program)
- 1998: 1st Release
- 1999: CGNS Steering Committee formed (subcommittee of AIAA Comm. on Standards)
- Specific Goal: CGNS output from pre-processors



CGNS Technology

- Intellectual content
 - SIDS (Standard Interface Data Structures)
 - Rules for organizing CFD data
 - File mapping
- Implementation
 - Mid-Level Library
 - API that understands SIDS and file mapping
 - cg_*
 - ADF (Advanced Data Format)
 - Portable binary I/O
 - Tree data structure
 - adf_*



CGNS Philosophy

- Target 3D, multi-zone, Navier-Stokes solutions (and subsets thereof)
- Assume CFD data consists of small number of large arrays
- Employ a topology based, hierarchical, tree-like structure



SIDS Content

- Grid coordinates, elements, & flow solution
 - Structured or Unstructured
- Multi-zone connectivity
- Boundary conditions
- Governing flow equations
- Time dependency
- Miscellaneous (reference states, convergence history, etc.)
- Extensions for new technologies and capabilities
 - Input from CGNS community at large
 - Documented in SIDS
 - Implemented in API



CGNS Standardization

- AIAA Recommended Practice R-101-2002
 - Review/voting complete 01 June
- Implementations
 - Various commercial software vendors, end user organizations, etc.
- ISO STEP Standardization



ISO STEP

- STEP – STandard for the Exchange of Product model data – ISO 10303
- Goal - CGNS to be ISO standard for Fluid Dynamics data
- AP237 – Fluid Dynamics
- Strategy
 - AP for CFD data
 - Based on existing CGNS
 - Extend to other fluids data
 - Wind tunnel, flight test, hydrodynamics



ISO STEP Requirements

- Strong link to product data management
 - Record of all data sources, persistent links
- Re-Use existing data structures to full extent
 - AP203 – geometry
 - AP209 – finite element analysis
 - AP232 – technical data exchange
- ASCII only
 - Need binary



CGNS- ISO Timeline

- 3 page-by-page reviews at ISO SC4 meetings within last 12 months
- June 2002 – release mods to Committee Draft Ballot
- Fall 2002 – workshop for interested parties in Fort Worth, TX (Lockheed host)
- Nov 2002 – ISO SC4 meeting in Seoul
 - Hope to release AP237 to committee draft ballot (aggressive)



ISO STEP Approval Process

- Requires number of favorable votes at each “gate”
- More votes required with each successive “gate”
- Approximately 17 P-member countries – one vote per country
- CGNS users currently exist in each P-member country
- Final ballot in 2004-2005



Use It!

- Add CGNS to your applications
 - Download docs, source, binaries from CGNS.org
- Get involved at CGNS.org
 - Participate in telecons
 - Subscribe to CGNSTalk
 - Promote CGNS
 - Propose & work on extensions

