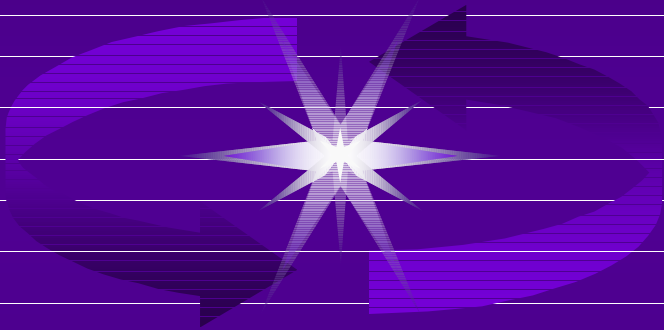


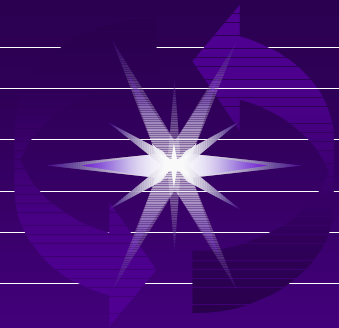
*Prepared for the:  
SIGAda Conference, 14 November 2000*



# *Ada Standardization: Status and Issues*

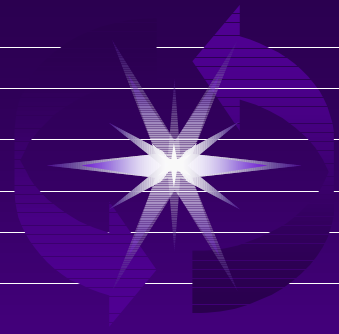
James W. Moore  
The MITRE Corporation

The views and opinions  
expressed in this presentation  
are those of the author and do  
not represent MITRE or the  
Department of Defense.



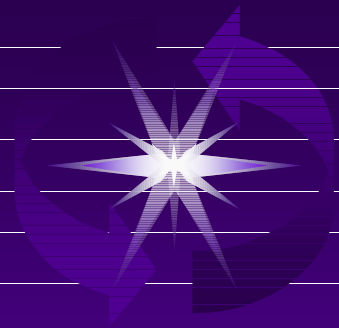
# *Scope of Presentation*

- ◆ Standardization
  - ◆ Who makes standards?
  - ◆ How are they made?
- ◆ Ada Standards
  - ◆ Status
  - ◆ Plans

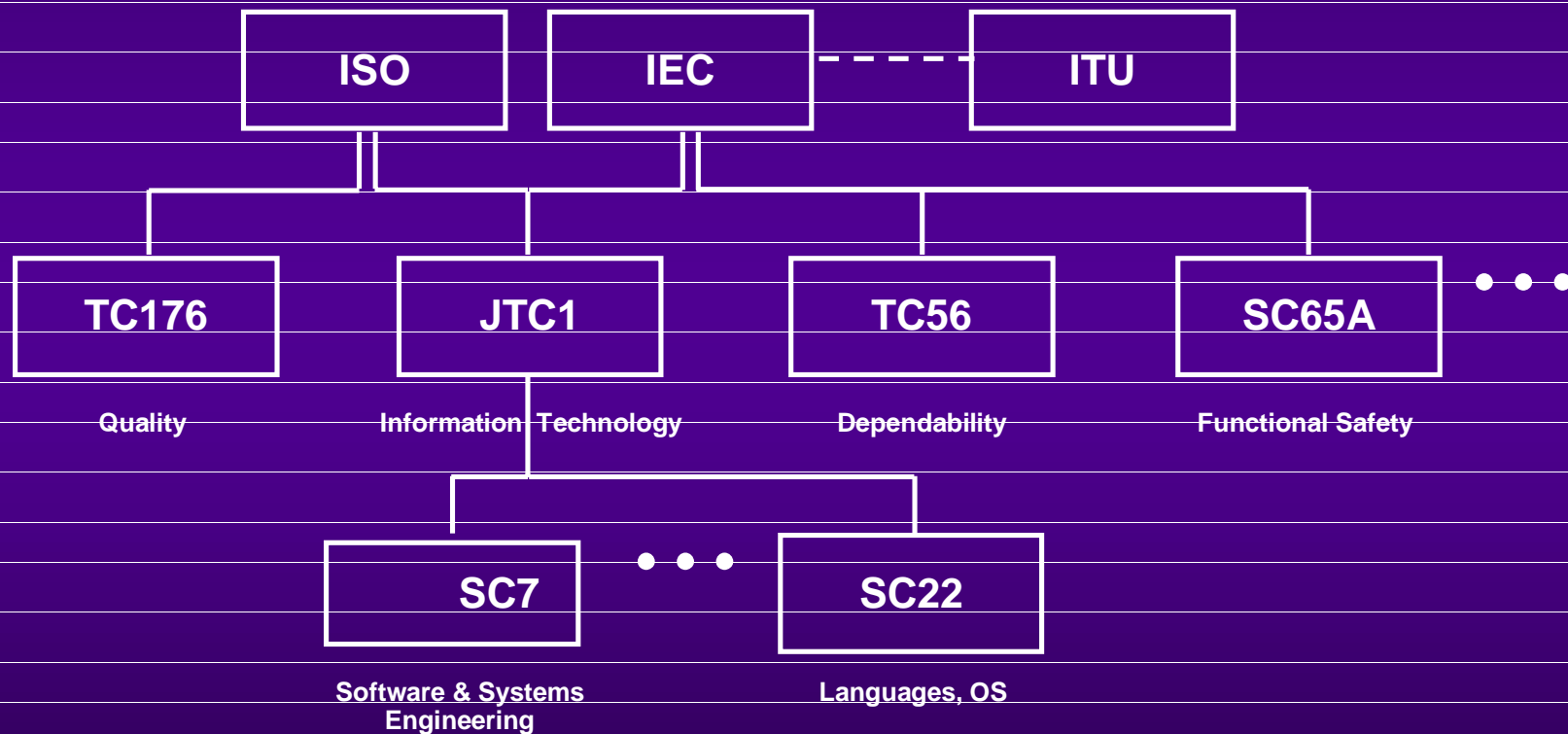


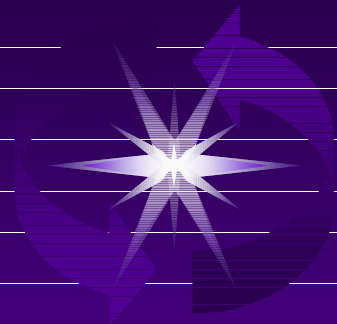
## *Who Makes Standards?*

- ◆ *De jure* standards are formal standards made by organizations authorized, in some way, to make them. Examples include ISO and IEEE standards.
- ◆ *De facto* standards (more properly called specifications) are those recognized by the marketplace as important. Examples include OMG CORBA, Windows API.

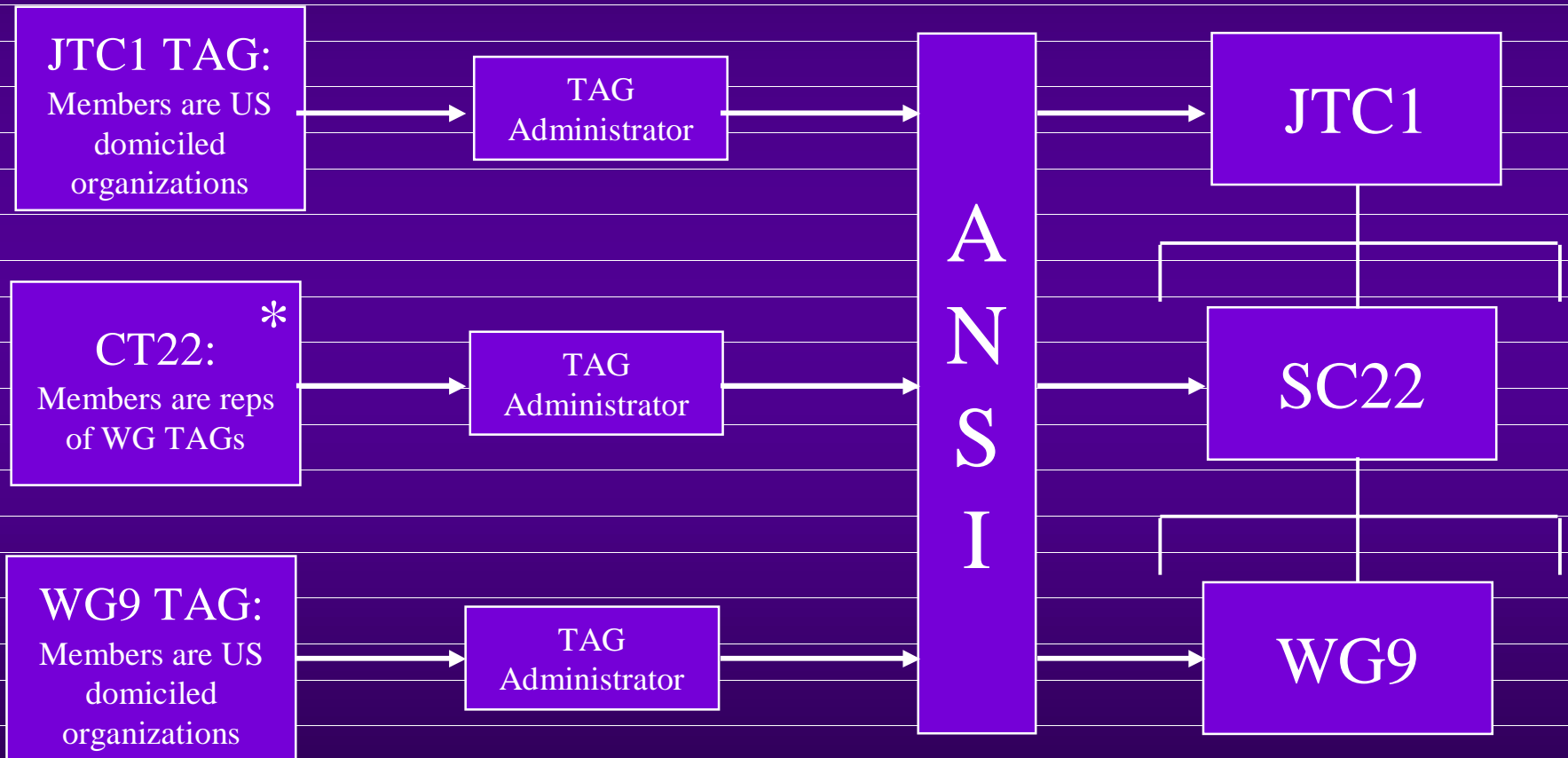


# *Developers of International Standards*

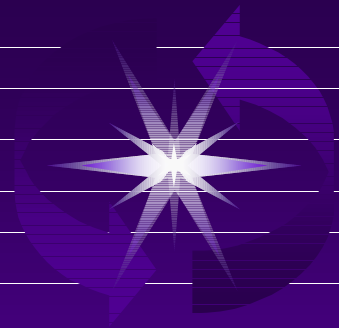




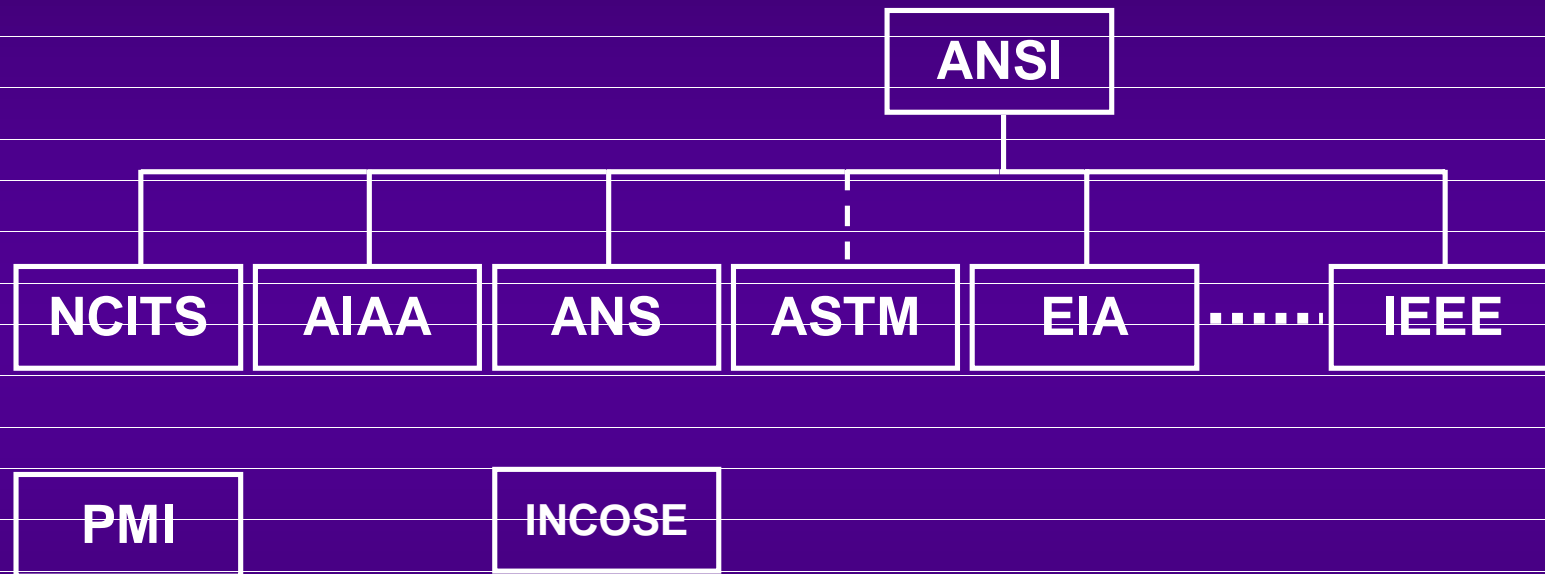
# How the US is Represented in JTC1, SC22 and WG9



\* Caution: This is a *unique* arrangement.

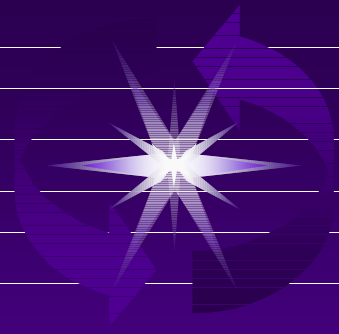


# *Developers of US Standards*



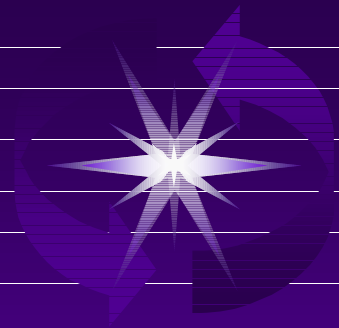
**About 550 organizations in the U. S. make standards.**

**About half of them are accredited by ANSI, allowing them to participate in international standardization activity.**



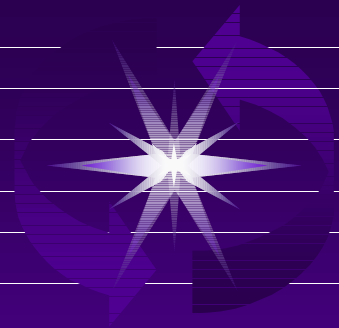
# *Three Ways to Make a US Standard*

- ◆ *Accredited Standards Organization: An organization that does many things including making standards, e.g. IEEE.*
- ◆ *Accredited Standards Committee: An organization created purely for the purpose of making standards, e.g. X3.*
- ◆ *The Canvass method*



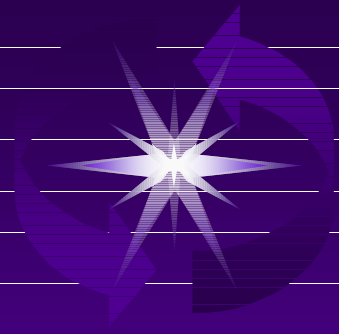
## *What Sort of Standard is Ada?*

- ◆ Ada is an international standard, approved by JTC1:
  - ◆ Originally in 1987
  - ◆ Revision in 1995
- ◆ Ada is an ANSI standard, developed via the Canvass method
  - ◆ Originally in 1983
  - ◆ Revision in 1995



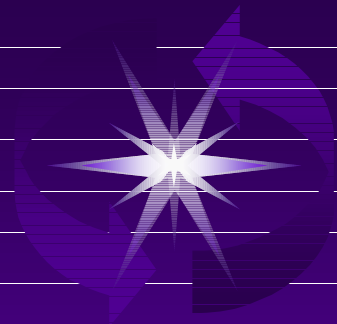
# *International Standards*

- ◆ The International Organization for Standardization (*ISO is not an acronym*) teamed with International Electrotechnical Commission (IEC) in 1986 to set up a Joint Committee (JTC1) with the scope of Information Technology



## *JTC1: Membership*

- ◆ “National Bodies”: Each country is represented by their statutory national standards organization. (Exception: The US is represented by ANSI.)
- ◆ *P-Members* (Participating Members) each have one vote.
- ◆ *O-Members* (Observing Members) are provided with all information.



# *JTC1: Structure*

Technical Direction	Subcommittees
Cultural and Linguistic Adaptability and User Interfaces	SC22/WG20 - Internationalization SC35 - User Interfaces SC02 - Coded Character Sets
Data Capture and Identification Systems	SC31 - Automatic Identification and Data Capture Techniques SC17 - Cards and Personal Identification
Data Management Services	SC32 - Data Management and Interchange
Document Description Languages	SC34 - Document Description and Processing Languages
Information Interchange Media	SC11 - Flexible Magnetic Media for Digital Data Interchange SC23 - Optical Disk Cartridges for Information Interchange
Multimedia and Representation	SC29 - Coding of Audio, Picture, and Multimedia and Hypermedia Information SC24 - Computer Graphics and Image Processing
Networking and Interconnects	SC25 - Interconnection of Information Technology Equipment SC06 - Telecommunications and Information Exchange between Systems
Office Equipment	SC28 - Office Equipment
Programming Languages and System Interfaces	SC22 - Programming Languages, their Environments and Systems Software Interfaces
Security	SC27 - IT Security Techniques
Software Engineering	SC07 - Software Engineering
TBD	SC36 - Learning Technology

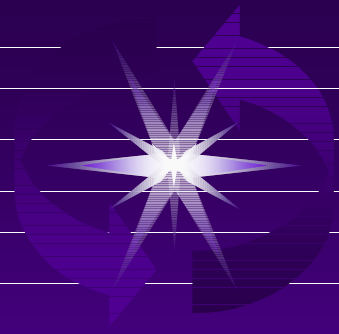


# *SC22: Programming Languages, Environments, System SW Interfaces*

## ◆ Programming Languages

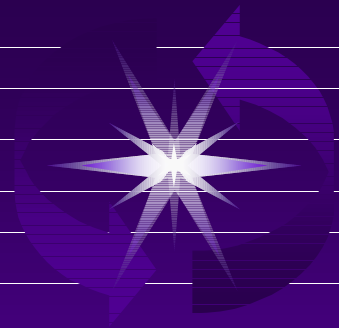
- ◆ WG3, APL
- ◆ WG4, COBOL
- ◆ WG5, Fortran
- ◆ WG9, Ada
- ◆ WG13, Modula-2
- ◆ WG14, C
- ◆ WG16, ISLisp
- ◆ WG17, Prolog
- ◆ WG21, C++

- ◆ Environments
- ◆ System Software Interfaces
  - ◆ WG15, POSIX
- ◆ Other
  - ◆ WG11, Binding Techniques
  - ◆ WG19, Formal Specification Languages
  - ◆ WG20, Internationalization
- ◆ Lingering responsibility for Pascal, Algol, PL/I, Basic, FIMS, PCTE, CHILL, MUMPS, Extended BNF, Forth



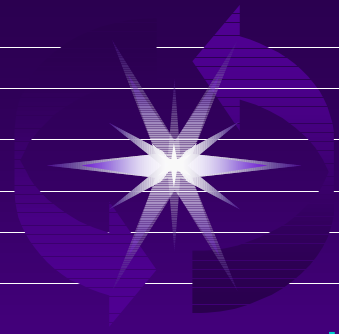
# *WG9: Ada Programming Language*

- ◆ Active Member Bodies: Canada, Germany, Japan, Switzerland, UK, USA
- ◆ Rapporteur Groups
  - ◆ Ada: Language maintenance
  - ◆ Annex H: High integrity systems
  - ◆ ASIS: Library interfaces

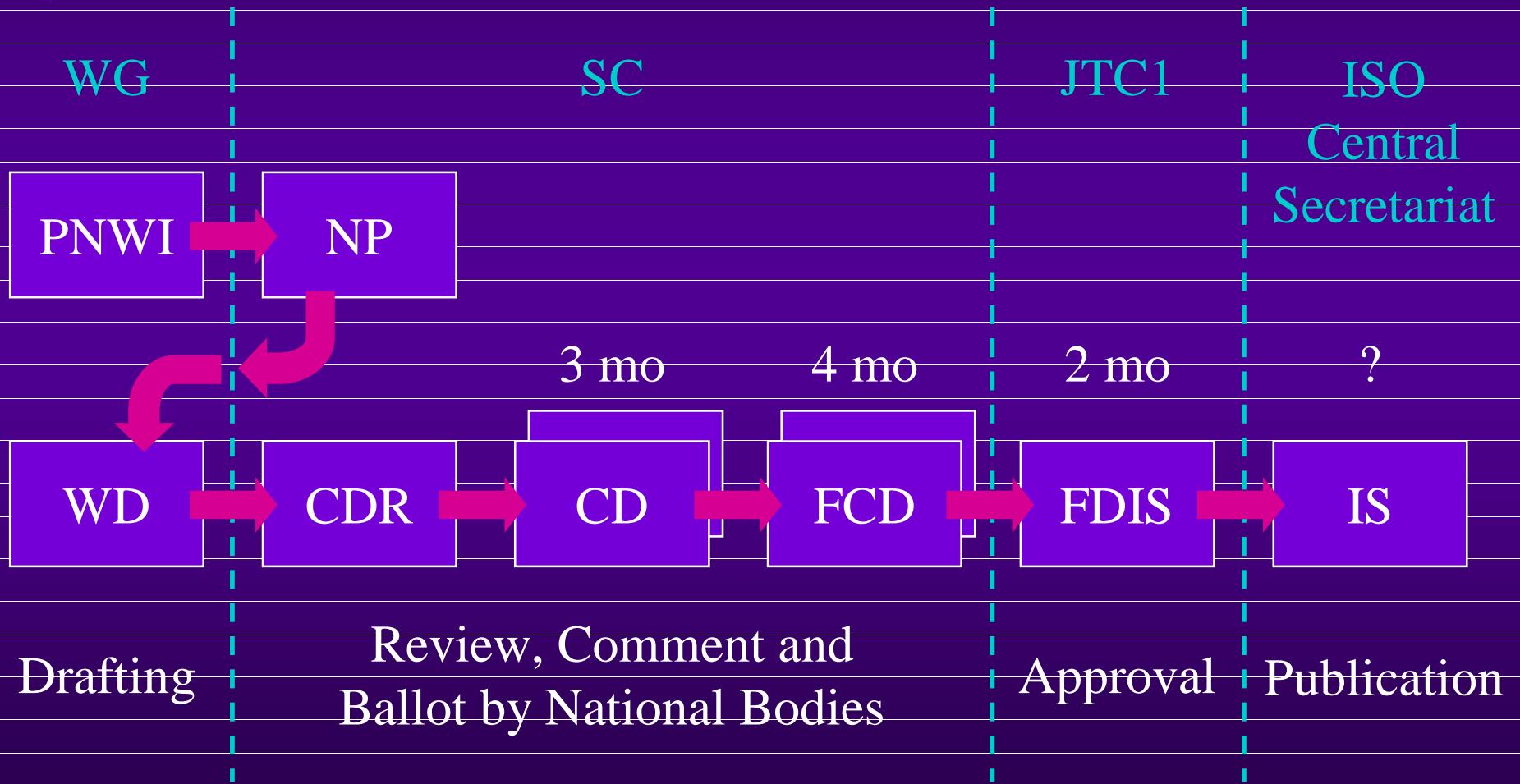


# *International Standards and Technical Reports*

- ◆ *International Standard* (sometimes called IS): A normative document
- ◆ *Technical Report* (often called TR): Any document that is *not* normative:
  - ◆ Type 1: A document that failed to achieve consensus
  - ◆ Type 2: A document on which work continues
  - ◆ Type 3: Material not suitable for standardization, e.g. a reference model



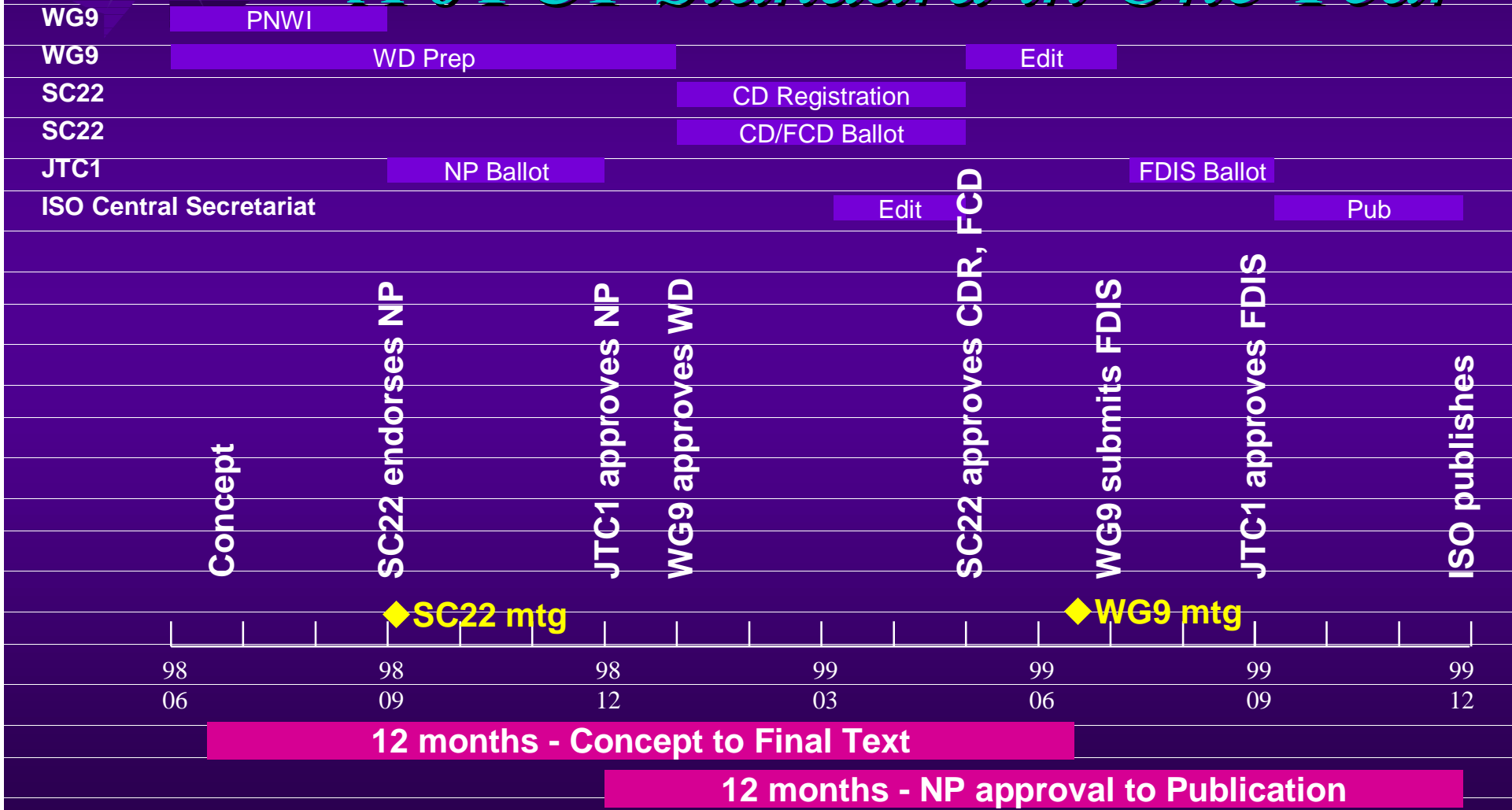
# How are International Standards Made?

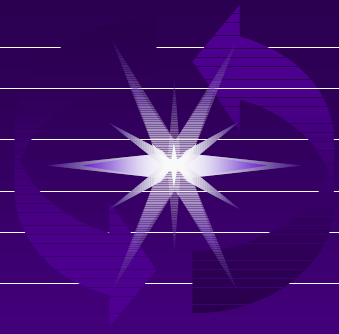




# ISO/IEC 18009:

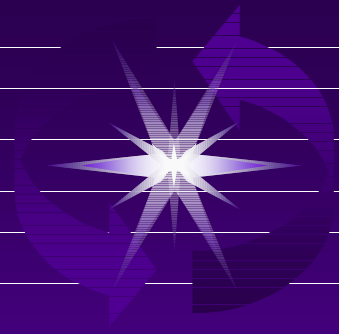
## A JTC1 Standard in One Year





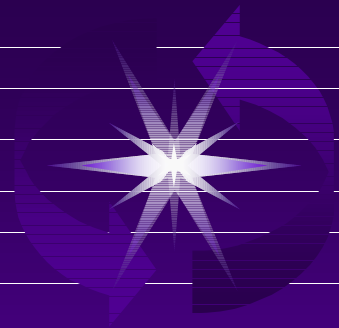
# *Language Standards*

- ◆ ISO/IEC 8652:1995, IT--Programming Languages--Ada  
*The Ada Language Reference Manual*
- ◆ Technical Corrigendum to ISO/IEC 8652  
*Formal disposition of many of the “Ada Issues”*
- ◆ ISO/IEC 18009:1999, Conformity Assessment of an Ada Language Processor  
*The replacement for “compiler validation”.*



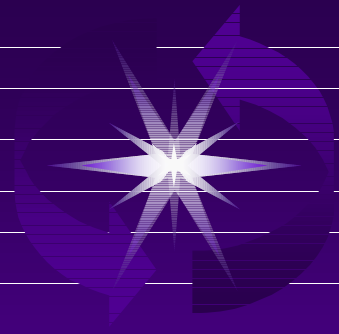
## *Plans for Language*

- ◆ Technical Corrigendum 1 will be approved this year by SC22.
- ◆ Another CORR is planned circa 2003.
- ◆ Language revision will be considered circa 2005.



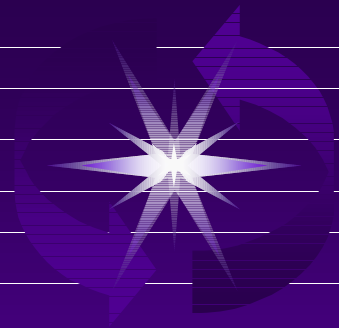
# *Numerics Standards*

- ◆ ISO/13813:1998, IT--Programming Languages--Generic Packages of Real and Complex Type Declarations and Basic Operations for Ada (including Vector and Matrix Types)
- ◆ ISO/13814:1998, IT--Programming Languages--Generic Package of Complex Elementary Functions for Ada



# *Integrity Standards*

- ◆ ISO/IEC TR 15942:2000, Guidance for the Use of Ada in High Integrity Systems
- ◆ Refers to 15 standards from other areas of ISO, IEC, JTC1 and other bodies, including:
  - ◆ IEC 880, Software for computers in the safety systems of nuclear power stations
  - ◆ IEC 61508, Functional safety: Safety-related systems
  - ◆ ISO/IEC 15026, System and software integrity levels
  - ◆ ISO/IEC 15408, Evaluation criteria for information technology security



# *ASIS Standards*

- ◆ ISO/IEC TR 15291:1999, IT--Programming Languages--Ada Semantic Interface Specification (ASIS)