7. Concepts and Models of the Visualization Process

- 7.1 Process models
- 7.2 Reference model
- 7.3 Enabling technologies
7.1 Process Models (a)

- **AVS pipeline**
  - pump data through pipeline into rendered picture
- **Visualization idioms**
  - flexibility in viewing data with various representation techniques
- **Interactive pipeline models**: more complex process models
7.1 Process Models (b)

- Haber and McNabb (Visualization Idioms)
- Visualization process is series of transformations to convert raw simulated data into a displayable image:

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Simulation Data  ——> Data Enrichment/Enhancement  ——> Derived Data  ——> Visualization Mapping  ——> Abstract Visualization Object (AVO)  ——> Rendering  ——> Displayable Image

Flexibility in designing various visual presentations for same data
AVO: "imaginary" object described by visual attributes, e.g. geometry, time, color, transparency, luminosity, reflectance, surface texture.
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Visualization idiom: “a specific sequence of data enrichment and enhancement transformations, visualization mappings and rendering transformations that produce an abstract display of a scientific data set”. [HAB90]
7.2 Reference Model

- Compare various approaches of process models

[ROB94]
7.3 Enabling technologies

- Software and Hardware
  - e.g. batch vs. interactive, distributed environments, oo paradigms
- User Interface
  - e.g. data flow diagramming, truly interactive systems
- Mapping strategies
  - e.g. through intelligent agents, knowledge bases