SEG Advanced Modeling (SEAM) Project

http://research.seg.org/SEAM/

- **The panel:**
  - Bee Bednar, Biondo Biondi, Joakim Blanch, Jacques Leveille, Joe Stefani, Bill Underwood (SEG).

- **The "Gang of five"**
  - Bill Abriel (Chevron), Bee Bednar (SEAM), Biondo Biondi (Stanford Univ.), Arthur Cheng (SEGRC), Stew Levin (Halliburton)

- **The milestones**
  - General meeting at CSM (July 05), two meetings of Geological Model Design Working Group and two meetings of Numerical Modelling Working Group
  - Twelve companies have agreed to be named at this workshop as "interested in the project" and "prospective sponsors" of the SEAM consortium
    - Amerada Hess, BHP, CGG, Chevron, ConocoPhillips, ExxonMobil, Geotrace, Halliburton, PGS, Total, Veritas, WesternGeco.

http://research.seg.org/SEAM/

Agenda

- **Purpose - Biondo Biondi**

- **Model Design (Salt) - Jacques Leveille**

- **Model Design (Stratigraphy) - Joe Stefani**

- **Numerical Modeling - Joachim Blanch**

- **Business Model - Bee Bednar**

- **Discussion**

http://research.seg.org/SEAM/

SEAM Goals

- **Design and generate synthetic 3-D seismic data that represent seismic challenges to the consortium members and the exploration seismology community.**

http://research.seg.org/SEAM/

SEAM Goals

- Design and generate synthetic 3-D seismic data that represent seismic challenges to the consortium members and the exploration seismology community.

- Provide data sets to the exploration seismology community for research, benchmark, and education.

http://research.seg.org/SEAM/

SEAM Goals

- Design and generate synthetic 3-D seismic data that represent seismic challenges to the consortium members and the exploration seismology community.

- Provide data sets to the exploration seismology community for research, benchmark, and education.

- Share the high cost of model design and numerical computation.

http://research.seg.org/SEAM/

SEAM Goals

- Design and generate synthetic 3-D seismic data that represent seismic challenges to the consortium members and the exploration seismology community.

- Provide data sets to the exploration seismology community for research, benchmark, and education.

- Share the high cost of model design and numerical computation.

- Provide a forum to discuss geophysical problems of interest to the consortium members.
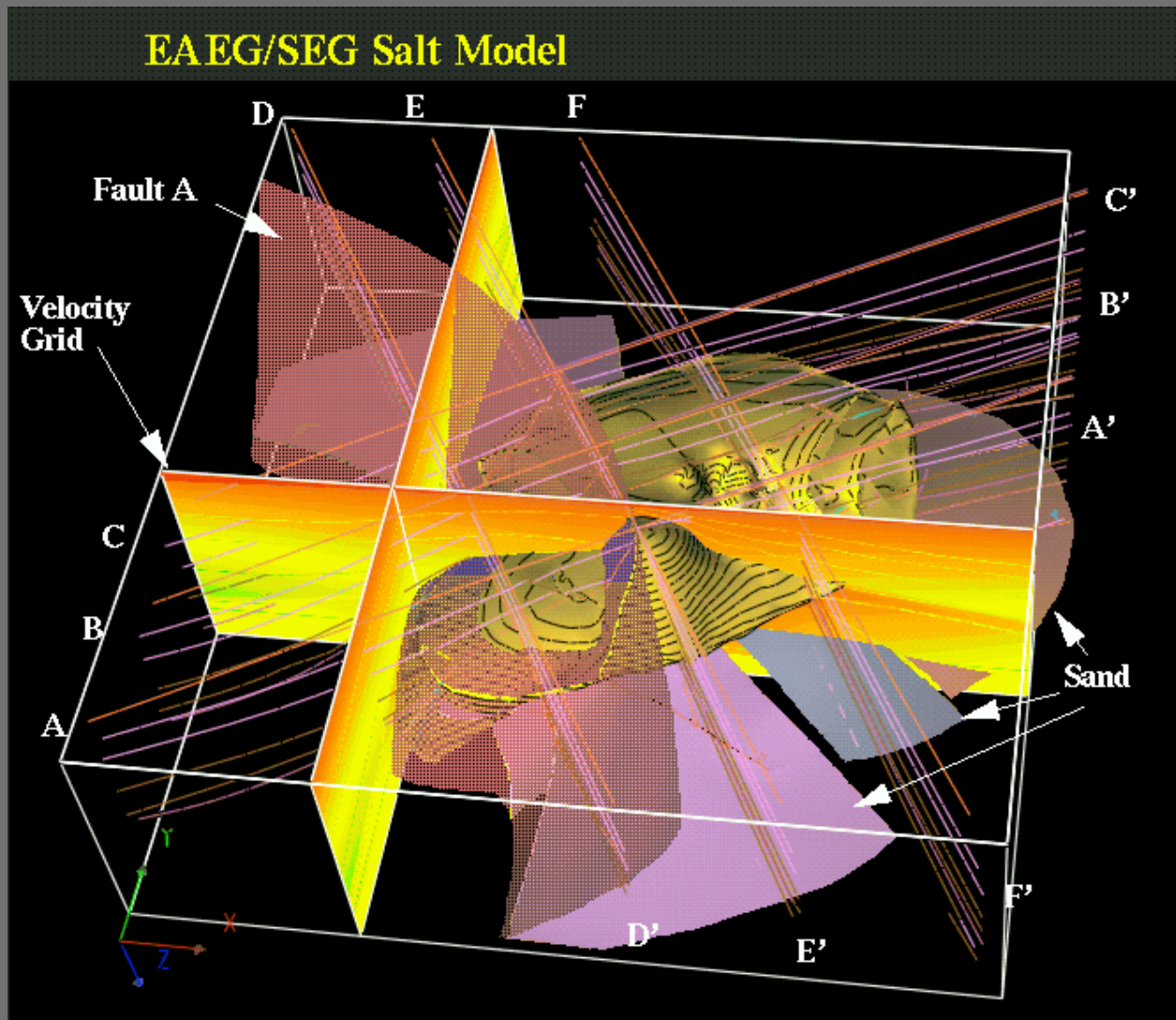
http://research.seg.org/SEAM/

SEAM Goals

- Design and generate synthetic 3-D seismic data that represent seismic challenges to the consortium members and the exploration seismology community.

- Provide data sets to the exploration seismology community for research, benchmark, and education.

- Share the high cost of model design and numerical computation.

- Provide a forum to discuss geophysical problems of interest to the consortium members.

- Exercise the art of geological modeling and seismic modeling.

http://research.seg.org/SEAM/

SEG/EAGE Salt Data

EAEG/SEG Salt Model

Fault A

Velocity Grid

D   E   F

C'
B'
A'

Sand

C

B

A

D'   E'   F'

+ Example of successful collaborative modeling project

+ Data used in hundreds of SEG abstracts and tens of Leading Edge and Geophysics papers

+ Data used extensively for algorithm benchmarking

− Acoustic

− No stratigraphy
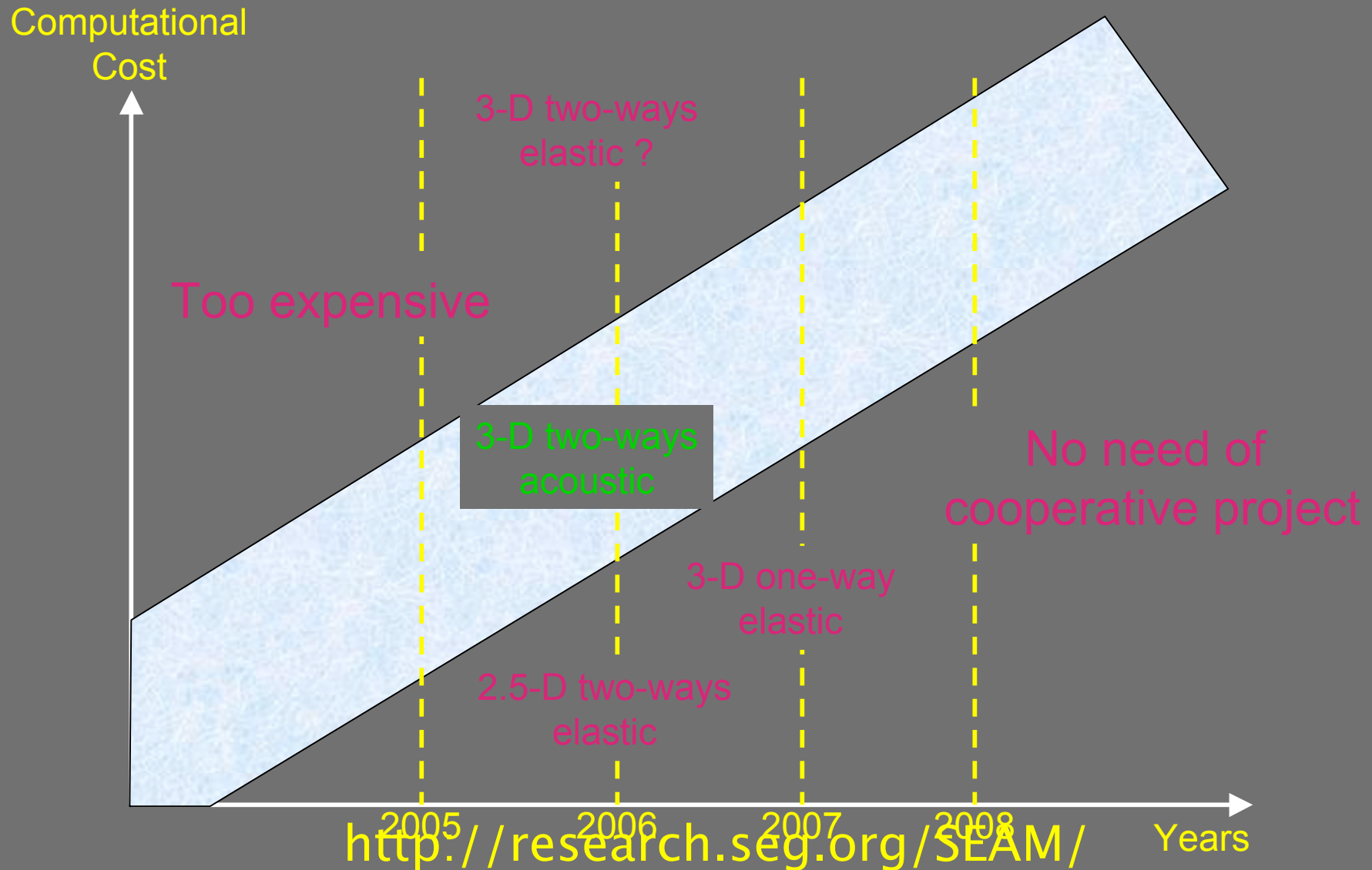
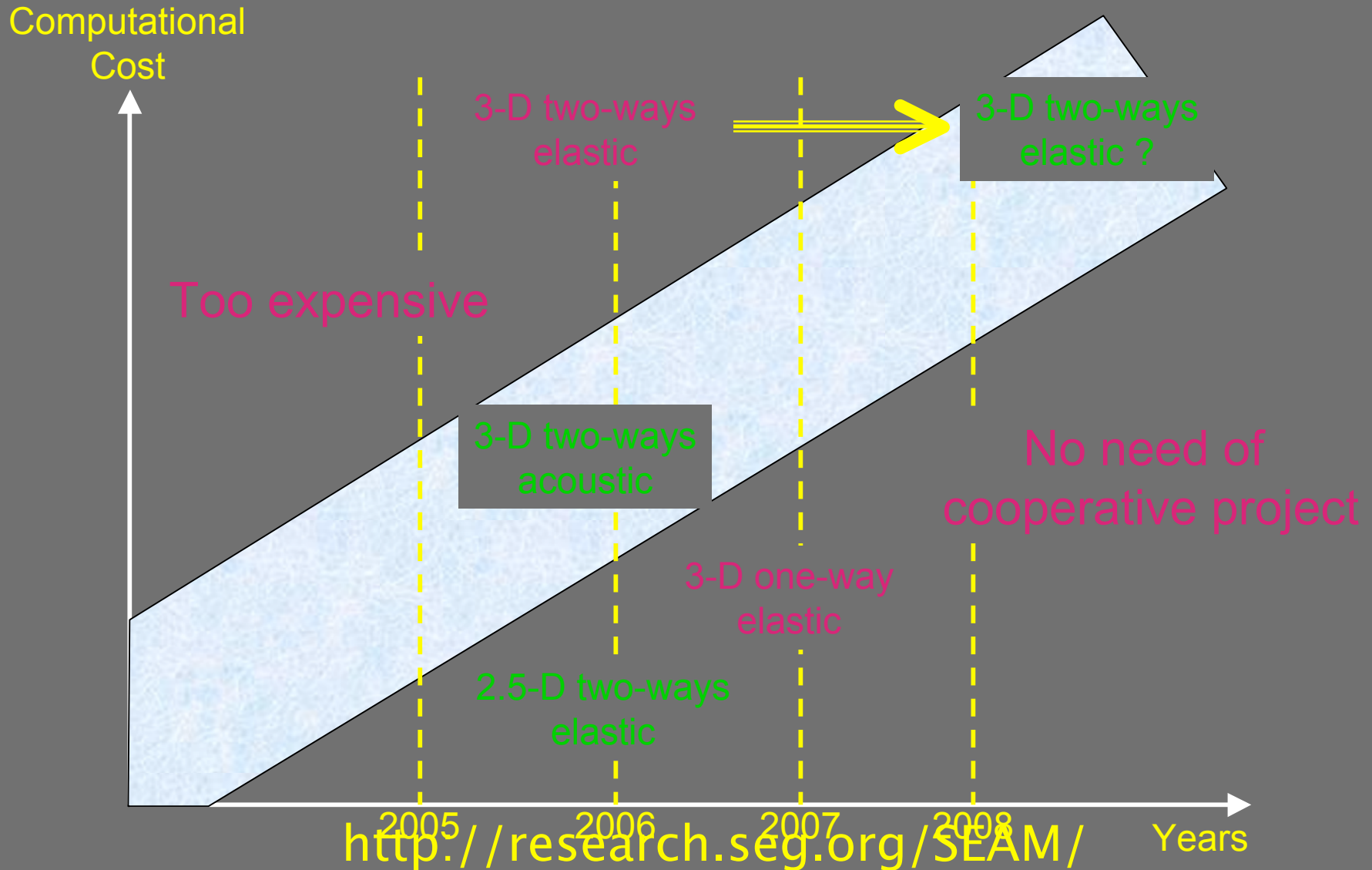− Simple structure

− Small scale

− Numerical dispersion

http://research.seg.org/SEAM/

SEAM Project
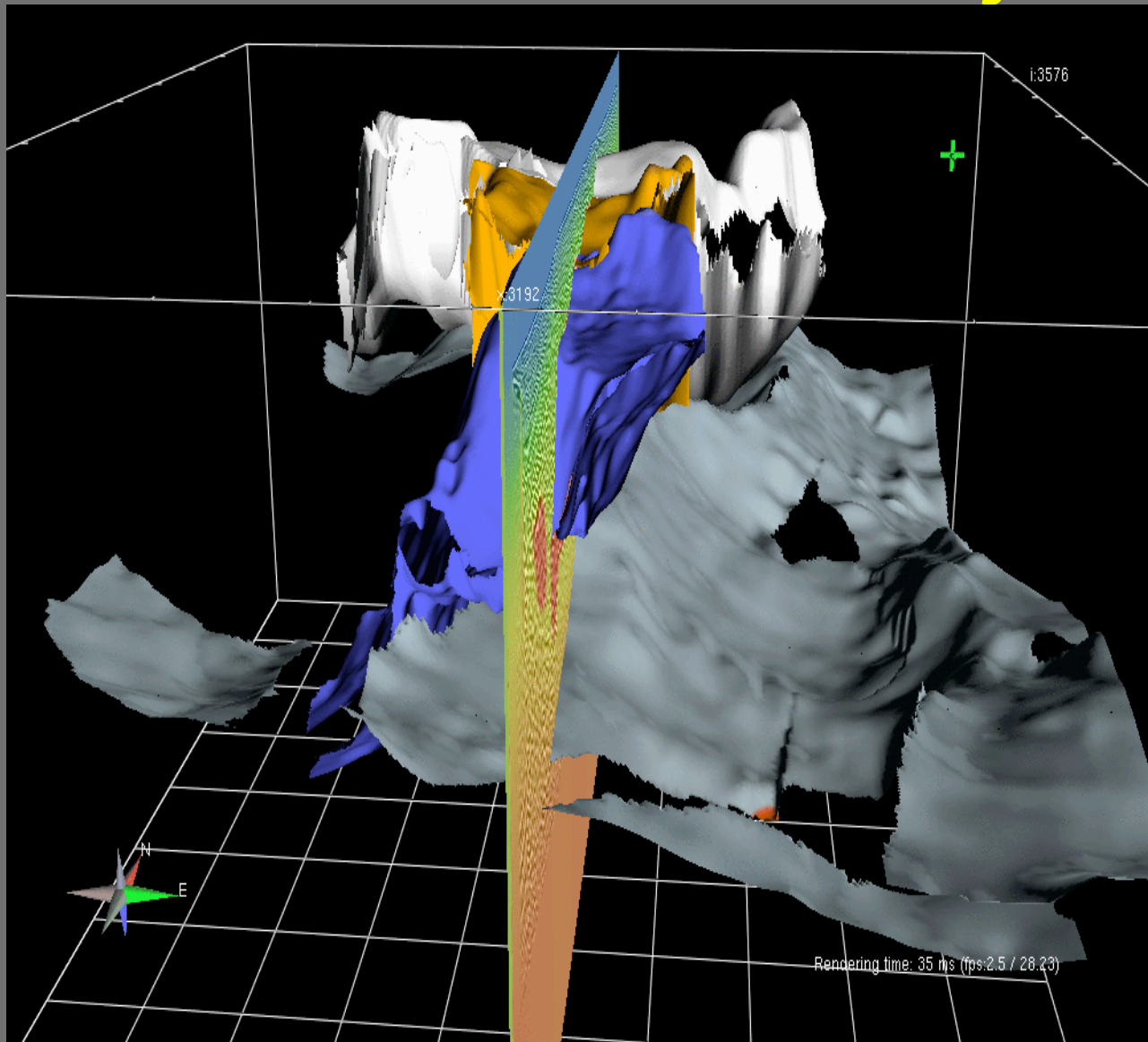
- **+** Elastic model (V_p, V_s, ρ)
- **+** Realistic and multiple salt bodies
- **+** Realistic stratigraphy
- **+** Minimal numerical dispersion
- **+** Large scale
  15 Km Depth
  40X40 Km Horizontal
- **+** Large shot aperture
  30X30 Km
- **+** High frequency
  30-40 Hz
- **+** Enable acquisition design research.
- **−** First data set acoustic

http://research.seg.org/SEAM/

Rationale for cooperative project

Computational Cost

3-D two-ways elastic ?

Too expensive

3-D two-ways acoustic

No need of cooperative project

3-D one-way elastic

2.5-D two-ways elastic

2005   2006   2007   2008

http://research.seg.org/SEAM/

Years

Rationale for cooperative project

http://research.seg.org/SEAM/

Agenda

- **Purpose - Biondo Biondi**

- **Model Design (Salt) - Jacques Leveille**

- **Model Design (Stratigraphy) - Joe Stefani**

- **Numerical Modeling - Joachim Blanch**

- **Business Model - Bee Bednar**

- **Discussion**

http://research.seg.org/SEAM/