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**BOOTSTRAP SEMINAR  
Nov 30 - Dec 2, 1992**

**Foil Set B:**

**PARADIGMS —**

**STRETCHING OUR PERCEPTIONS OF CHANGE**

Douglas C. Engelbart, Bootstrap Institute

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**BASIC BOOTSTRAP CONCEPTS**

- Objective:** Pursue high-performance org
- Hypothesis #1:** Whole-system Augmentation
- Hypothesis #2:** ABC's of Org Improvement
- Hypothesis #3:** Bootstrap Strategy
- Hypothesis #4:** Collab. Knowledge Work (CODIAK)
- Hypothesis #5:** Open Hyperdoc System (OHS)
- Hypothesis #6:** Joining forces in a C Community

(assumes major paradigm shifts throughout)

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B2

**PARADIGMS**

Envision sweeping change resulting from increasing complexity and urgency, and the many barriers to progress.

Envision "high-performance" organizations that maneuver through complexity and urgency with remarkable speed, agility, precision, and vision.

- **Paradigms as Barriers to Change**
- The Bootstrap Paradigm(s)
- Prevailing Paradigms Affect Strategy
- Shifting and Stretching our Paradigms
- Conclusion

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DEFINITIONS

**Paradigm:** a pattern, example, or model

**Welt-an-schau-ung:** ("world view") a comprehensive philosophy or conception of the universe and of human life.

**Frame-work:** 1. a structure serving to hold the parts of something together or to support something constructed or stretched over or around it (the ~ of a house). 2. the basic structure, arrangement, or system. 3. same as "frame of reference".

**Frame of Reference:** the set of ideas, facts, or circumstances within which something exists.

B4

PARADIGMS: EXAMPLES FROM HISTORY

Restrictive paradigms are easy to spot retroactively:

- Christopher Columbus on the "edge of the earth"
- Quoted reactions to innovation
- Doug's personal accounts

What are we doing *today* to amuse future historians?

B5

PARADIGMS & LANGUAGE

- Language reflects world view

Example: Eskimos have 24 words for "snow"

- Language shapes world view

Example: Words and concepts that can't be readily translated because there's no word for it



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**B9**

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Since that time, the term "paradigm" has emerged to convey much the same meaning as the term "framework" used by Kennedy and Putt (1956) and Engelbart (1962, Bib-2, Bib-3). (You will find that we are using the terms "framework" and "paradigm" interchangeably.)

**B10**

**PAPER BY KENNEDY & PUTT SPURRED THE 1960 "AUGMENTATION FRAMEWORK" SEARCH**

They brought out the importance of a conceptual framework to the process of research.

They pointed out that new, multi-disciplinary research generally finds no appropriate framework to fit within; that a framework of sorts would grow eventually, but that an explicit framework-search phase preceding the research is much to be preferred.



*Kennedy, J. L. and Putt, G. H., "Administration of Research in a Research Corporation," RAND Corporation Report P-847, April 20, 1956.*

The rapidly increasing "complexity and urgency" will require correspondingly more rapid shifts in the paradigms within which we can effectively perceive and resolve our problems.

This is the challenge to humankind that triggered all of this Augmentation and Bootstrap pursuit.

**B11**

**BOOTSTRAP'S BASIC PREMISE**

"While population and gross product increase at a significant rate,

The **complexity** of man's problems grows still faster, and

The **urgency** with which solutions must be found becomes steadily greater ...

The **product** of **complexity** times **urgency** has surpassed man's ability to deal with it."

*Paraphrased from '62 Augmentation Framework Paper*



### Paradigms

The "quantitative scale" of these critical factors, when increased past a certain point, produce significant, qualitative systemic changes within our organizations and their environments.

Some domains of science and engineering long ago learned this about "dimensional scaling" within functional systems.

The qualitative changes are often a surprise to those who live with these systems every day.

It is thus predictable that surprising, large-impact changes will occur in our every-day environments.

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#### QUESTION OF SCALE AND PERVASIVENESS

What do different people believe will be the scale and pervasiveness of societal change stemming from computer-communications technology? I.e., changes in the way:

- we live and work?
- our organizations are structured?
- our marketplaces are structured?
- our business transactions are negotiated and implemented?
- our legislative processes are carried out?
- our judicial systems work?
- our educational systems work?

**B16**

#### LARGE-SCALE TRANSFORMATIONS WILL BE COSTLY IN:

- Dollars
- Human energy
- Stress
- Distraction from direct business functions
- Backing out from a wrong turn

*Expect decades of investment in change*

**B17**

#### DESPERATELY NEED A GENERAL STRATEGY FOR SURVIVAL AND SUCCESS: *Faster & Smarter*

**Faster:** Increased Responsiveness

- Quick to identify the need for change
- Quick to integrate new knowledge
- Quick to make informed decisions
- Quick to respond to new market opportunities --
- Faster design, creation, delivery of quality products
- Quick to capitalize on new technologies & techniques
- Able to change course mid-stream



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**B21**

**ASSUMING HUGE CHANGES IN NEXT-CENTURY ORGANIZATIONS – HOW DO WE PURSUE THEM?**

It is hard enough to cope with today -- with this quarter.

We've never before had to cope with change rates like this.

No models to guide us.

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**B22**

**CRITICAL CHOICE:  
WHICH EVOLUTIONARY PATH?**

- Bewildering variety of paths will be perceived
- Expect extended period of rapid and complex change
- Organizations with better paths will emerge with improved capabilities
- Organizations with poorer paths will fall behind or die
- How will you and your competitors fare?

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**CRITICAL NECESSITY:  
AN APPROPRIATE FRAMEWORK**

- Not generally understood as an issue when opening new pursuits
- Inappropriate framework may lead to wasteful mistrials and widely ignored possibilities
- E.g., why wasn't computer-supported collaboration perceived as an important pursuit much sooner?
- Conceptual and strategic framework: Inherited from local culture OR consciously cultivated?

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**HOW WILL YOUR ORGANIZATION DEVELOP ITS FRAMEWORK?**

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**HOW WILL YOUR INDUSTRY DEVELOP ITS FRAMEWORK?**

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**BOOTSTRAP FRAMEWORK DEVELOPMENT  
PRODUCED A STRATEGY**

I have a strategy ... years of development and refinement resulted in detailed draft of a "handbook" with all the necessary ingredients for bootstrapping organizations into the 21st century.

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**CHALLENGE**

☞ Take this strategy, or one like it\*, back to your organization and get going on it right away.

... but where would you take it? Who's responsible for it? Is your org positioned or even oriented for rapid, dramatic transformation?

The greatest limiting factor will be paradigms!

Your strategy needs to take this into account.

\*If you have a better one, I'd really like to know so I can make mine better!

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**BOOTSTRAP'S FRAMEWORK DEVELOPMENT  
PRODUCED A NUMBER OF PARADIGM SHIFTS**

Stretching our perceptions of:

- Rate, scale and pervasiveness of change;
- Scale and nature of potential improvement in organizational capabilities -- significant concepts introduced that are difficult to discuss in today's vocabulary and paradigms. E.g.:
- Potential candidates for organizational change toward capability improvement;
- Strategic options for investing in improvement.

*A critical issue -- if working effectively within tomorrow's organizations will involve a radical paradigm shift -- consider the special problem of trying to plan, design and implement tomorrow's Augmentation System from within today's paradigm.*

*See also note at C31.*

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BOOTSTRAP PARADIGM BARRIERS

The Bootstrap Strategy is loaded with new paradigms!

- it is only recently that people are resonating
• not readily traslatable into today's paradigms
• broader in scope than most paradigms
• require paradigm shifts in several cross-disciplinary areas
• had to invent terms for discussing key concepts
• don't be surprised if you don't "get it" all on the first pass
• don't be surprised if you can't explain it easily to a colleague
• hope you'll agree Bootstrapping is important pursuit

Notes

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CONCLUSION

- We need higher-performance organizations asap
• Prevailing paradigms will not lead to serious pursuit soon enough
• We need a comprehensive strategy asap for bootstrapping organizations into the 21st century!