**F**

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

### Foil Set F:

## HYPERDOCUMENT SYSTEM —

## A TOOL SYSTEM FOR CODIAK SUPPORT

**Douglas C. Engelbart,  Bootstrap Institute**

*See Bib-26 and Bib-28 in Section S and U for a more complete treatment of the "OHS proposal."*

*The answer to basic CODIAK interoperability is a future "Open Hyperdocument System."*

**F1**

### 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)

**Notes**

**F2**

### BRIEF NOTE ABOUT  NLS/AUGMENT

Launched the R&D in early 60's for research prototype oNLine System (NLS) to support CODIAK work (then called Intellectual Work, later Knowledge Work).

Later bought by Tymshare, then McDonnell Douglas, where it got heavy use in pilot trials in aerospace and government, and renamed AUGMENT -- but no significant enhancement since early 80's.

The following requirements are based on extensive experience with these pilots.

AUGMENT badly needs replacing -- until then it is still useful for demonstrating the integrated features.

**Notes**

**Notes**_____

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**Notes**_____

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**F3**

### *Hypothesis #5:* Open Hyperdoc System (OHS)

An underlying open hyperdocument-system infrastructure is needed to support interoperable, high-performance CODIAK work.

- **Requirements for a Hyperdocument System**
  - **General Provisions**
  - **Recorded Dialog**
  - **Intelligence Collection**
  - **Electronic Handbook**
- **Toward *Open* Hyperdocument Systems**
- **Issues for the Info-Sys Marketplace**

**F4**

### A HYPERDOCUMENT SYSTEM FOR CODIAK SUPPORT

First beachhead for *online* CODIAK support:

Providing flexible linkages to any object within and across multi-media files.

**F5**

### *STAGE 1:* SUPPORTING THE CODIAK PROCESS FOR A MUTUAL KNOWLEDGE DOMAIN

*Shared knowledge-work environment*

Shared Files    Index

**F6**

### PARADIGM SHIFT

*The full power of the computer will not be realized until we break away from the old paper-based paradigm!*

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**F7**

### * NEW PARADIGM *
### FROM AUTOMATION TO AUGMENTATION

Consider an alternative to just making nicer printouts --

composing, studying, modifying and communicating *online*.

A different paradigm from automated paper generation.

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**F8**

### PARADIGM SHIFT

If you're just visiting Paris, you can get by with grunts and gestures, but if you *live* there you'll want the power of a fluent *language*.

What about providing an extensible command language as an extension of menus and function keys!

*Providing for open-ended vocabulary growth -- in classes of objects (nouns) and executable functions (verbs) -- has been important to us from the beginning. See the "CLI" and Grammer elements in the architecture depicted in Foils G19 and G20; also the descriptions in Bib-20, Section O.*

**F9**

**ONLINE TOOL SYSTEM**

Display ← View Generator ← File Position

Others' Screens

P / M

**Open-ended Vocabulary**

Computer Storage

Shared-File Collaboration

DCE-AER
24Mar92

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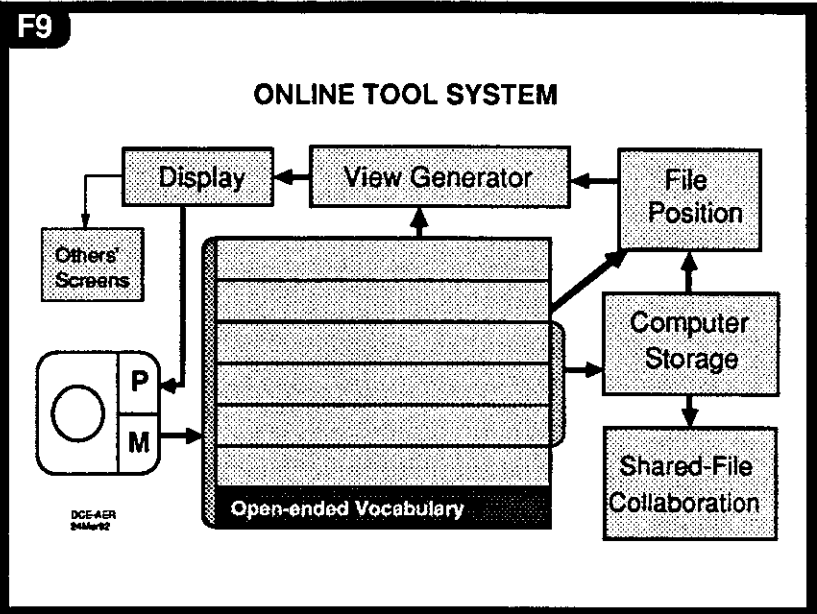
**Notes**_____

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**F10**

☀ **PARADIGM SHIFT** ☀

Consider that future high-performance organizations *might* be populated with highly proficient knowledge workers!

What about providing optional high-performance controls for operating the high-performance hyperdoc-sys "vehicle"!

ELX                                             © Bootstrap Institute

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*All of the foregoing flexiblity, designed for use over the full spectrum of knowledge-work activity, deserves a fast and flexible means of control.*

**F11**

**ONLINE TOOL SYSTEM**

Display ← View Generator ← File Position

Others' Screens

P / M

**Option: High-Performance Control**

**Open-ended Vocabulary**

Computer Storage

Shared-File Collaboration

DCE-ADC
21Mar92
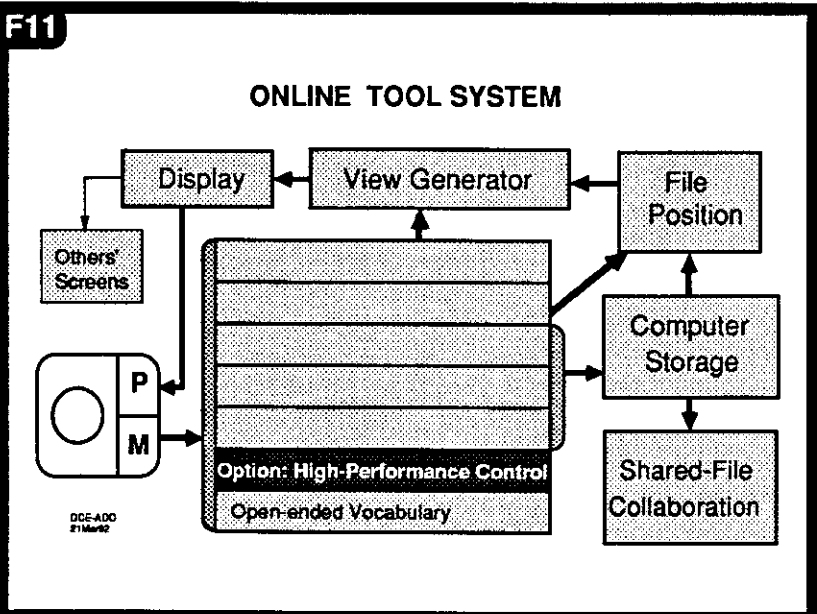
**F12**

## PUBLIC STATEMENT, 1963:
## ABOUT FUTURE AUGMENTATION SYSTEMS

Skilled tool users will be able to gain real benefit from shorter and shorter response times . . .

with diminishing returns not likely to set in before 1/4 second.

*We pursued maximal improvement in capability -- and assumed that significant Human System changes were fair game.*

*The system architecture was later developed with explicit provisions for "Grades of User Proficiency."*

*(See Bib-8).*

**F13**

## FAST CONCURRENT CONTROL

**One-handed Chord Keyset:**

Code for **a** →

**b**

**c**

**d**
**e**
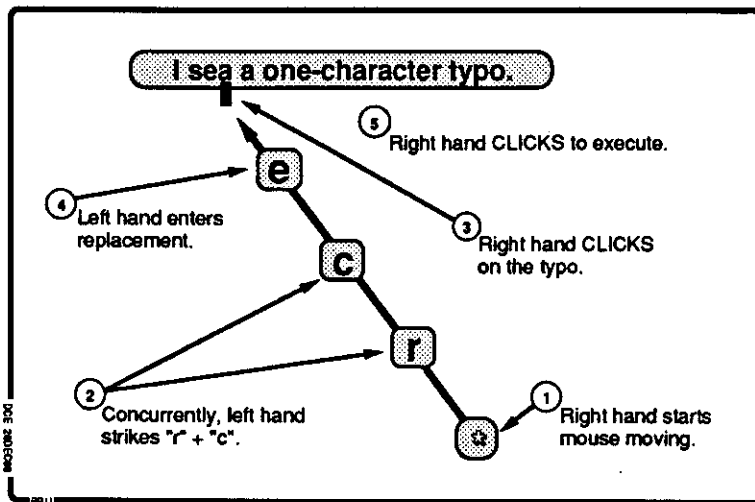**f**
**g**
**h**

**x**
**y**
**z**
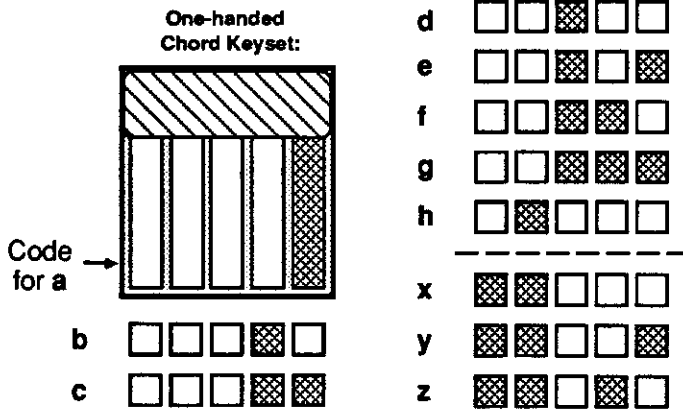
DCE-ADW
21Mar92

*The chord keyset was provided as an option which amply repaid the learning time with unparalleled speed and flexibility of system operation.*

**F14**

## COMMAND SYNTAX: REPLACE CHARACTER

I sea a one-character typo.

⑤ Right hand CLICKS to execute.

**e**

④ Left hand enters replacement.

**c**

③ Right hand CLICKS on the typo.

**r**

② Concurrently, left hand strikes "r" + "c".

① Right hand starts mouse moving.

*In the average time required to move the mouse to a target object, or to a menu item, a reasonably skillful keyset user can simultaneously enter five to seven characters.*

*Pre-designation of command function, in parallel with mouse-movement to the target, is thus much more efficient than is the sequential process of selecting the target object and then designating the function.*

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*This introduced a fundamental paradigm shift.*

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**F15**

**ONE'S CONSCIOUS KNOWLEDGE, REPRESENTED BY A COMPLEX STRUCTURE OF CONCEPTS**

Percept. | Motor

Mental

We have concepts for things & for relationships between concepts, etc.

Raw look, as if we could see the way we actually hold conceptual knowledge.

DCE-ADF
24Mar92

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**F16**

**KEY INVENTION: USING EXPLICIT SYMBOL STRUCTURES TO REPRESENT OUR CONCEPTS**

Percept. | Motor

Mental

We could hardly think or communicate otherwise.

Some of the linkage is unconscious and automatic.

But formal concepts and relational linkages are fundamentally important to our language.

DCE-ADG
24MAR92

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**F17**

**NEW: MAKING AN EXTERNAL MAP OF THE HUMAN'S INTERNAL CONCEPT STRUCTURE**

- Computer-aided writing

- Explicit file structure that models thought and knowledge structure

- Computer-aided structuring

**Opportunity: Break from linear paper; Use a truer external representation.**

DCE-IN1DEC92

**F18**

## THE TOOL SYSTEM



DCE-ADN
21 Mar 92

*Emergence of "Outline Processing."*

**F19**

## ONLINE TOOL SYSTEM



DCE-ADX
21 Mar 92

*Emergence of integrated, multi-media, electronic documents.*

**F20**

INTERNAL STRUCTURE

## COMPOSITE AND STRUCTURED



*Emergence of explicit conceptual objects within the computer file -- enrichens the users' conceptual model and command language.*

*A very valuable "new paradigm" feature that hasn't been generally appreciated (yet).*

**Notes**_____

**Notes**_____

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**F21**

### 💡 PARADIGM SHIFT 💡

*New:* **Using names and addresses for things and places in the structure**

*Opportunity:* let it be part of your mental map; yields more computer help.

*New:* **Harnessing names and addresses for distant jumping or manipulating**

*Opportunity:* use human ability to know names and structural locations.

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**F22**

**ONLINE TOOL SYSTEM**



Display ← View Generator ← File Position

Others' Screens

P / M

In-File Addressing & Links
Integrated Multi-media
Manipulate Content & Structure
Option: High-Performance Control
Open-ended Vocabulary

Computer Storage

Shared-File Collaboration

DCE-AEA
24Mar92

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**F23**

**A GREAT DEAL OF VALUE CAN BE DERIVED FROM HAVING IN-FILE ADDRESSES! E.g.:**



Directory: JSMITH

File: --

File: S-DOC

File: --

**File Address:**
'JSmith, S-Doc,'

**Passage Address (e.g.):**
'JSmith, S-Doc, components '

**Figure Address (e.g.):**
'JSmith, S-Doc, figure-1 '

Assume a character-string syntax for specifying a path to any given object within the file -- could be a name, or number-address, relative address, etc.

DCE-AEA
24Mar92

**F24**

### UNAMBIGUOUS TEXTUAL ADDRESSES ENABLE USE OF IN-FILE CITATION "LINKS"

Directory: WJONES

Directory: JSMITH

"see below (figure-1)"

File: AR8

File: S-DOC

File: ---

"(JSmith,S-Doc, components)"

"(S-Doc, figure-1)"

DCE-AEE
24-Mar-92

**Notes**

**F25**

### STAGE 2: SUPPORTING THE CODIAK PROCESS FOR A MUTUAL KNOWLEDGE DOMAIN

Shared knowledge-work environment

Shared Files    Index

**Notes**

**F26**

### ONLINE TOOL SYSTEM

Display ← View Generator ← File Position

Others' Screens

Remote Jumps & Manipulation.

In-File Addressing & Links

Integrated Multi-media

Manipulate Content & Structure

Option: High-Performance Control

Open-ended Vocabulary

P

M

Computer Storage

Shared-File Collaboration

DCE-AEC
24-Mar-92

*One-hop "jumping" to explicit locations within any document is a very valuable capability provided by flexible naming and addressing conventions. And these same conventions also provide ready handles for users to specify any other operation upon the "remote" objects.*

*Important realization emerged here - - our minds not only do very fast one-hop jumps to a "distant conceptual object," but they also offer us a quick means of "zooming" to details or overviews.*

**F27**

## WE CAN "THINK" ONLY A SMALL PART AT A TIME — AS WITH A "CONSCIOUS WINDOW"

| Percept. | Motor |
|----------|-------|

**Mental**

DCE-AEF
27 DEC

Our windows travel over this large, complex net by quick, easy "jumps".

And we transform from depth and complexity of concept structure into manageable "views".

*This led to another very valuable different-paradigm feature in NLS.*

*"View-control options" are so valuable that it can only be a matter of time before the principles and practices are integrated into general use.*

**F28**

### NEW: USING COMPUTER AID TO CREATE THE BEST "VIEW" FOR THE IMMEDIATE NEED

- Option to ignore line and page breaks that don't carry meaning.

- Option to show addresses, labels, referencing, attributes, . .

- Option to filter by level or content.

**Opportunity: abandon paper-dictated geometry; view content & structure.**

DCE 27 DEC

AEG

## Notes

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**F29**

### ONLINE TOOL SYSTEM

**Print**

**Display**

**View Generator**

File Position

Others' Screens

**View, Filter, Windows**

Remote Jumps & Manipulation

In-File Addressing & Links

Integrated Multi-media

Manipulate Content & Structure

Option: High-Performance Control

Open-ended Vocabulary

P

M

Computer Storage

Shared-File Collaboration

DCE-AEH
24 Mar 92

**F30**

### VIEWS

<ref. -- OAD,2250,7:cmsy>                    next view ➝ :ebt>

**7 CONTROLLING THE VIEWS**

**7a** A user of a book, or of most on-line text systems, is constrained to viewing the text as though he had a window through which he sees a fixed, formatted document. But as described below, our worker can view a section of text in many ways, depending upon his need of the moment.

_**VIEW**_: All levels; Numbers On; All line per statement; Blank lines.

The remaining foils show a variety of views which a user could evoke when studying (and in case of Foils F37 and F38, modifying) the structural content of an AUGMENT document – in this case, Bib-20, Section R, page 9.

**F31**

### VIEWS

<:ebt>                                        next view ➝ <:zg>

**7 CONTROLLING THE VIEWS**

**7a** A user of a book, or of most on-line text

**7b** MULTIPLE WINDOWS

**7c** WINDOW VIEWS

**7d** USER-SPECIFIED SEQUENCE

_**VIEW**_: 2 levels; Numbers On; 1 line per statement; Blank lines.

You are invited to study Bib-22 in Section Q, for details of viewing (and addressing, and jumping, etc.).

**F32**

### VIEWS

<:zg>                                        next view  <:l>

7 CONTROLLING THE VIEWS
  7a A user of a book, or of most on-line text
  7b MULTIPLE WINDOWS
  7c WINDOW VIEWS
  7d USER-SPECIFIED SEQUENCE

_**VIEW**_: 2 levels; Numbers On; 1 line per statement; No blank lines; Branch only.

## Notes

*The remaining foils show a variety of "views" which a user could evoke when studying (and in case of Foils F37 and F38, modifying) the structural content of an AUGMENT document – in this case, Bib-22, Section Q, page 9.*

**Notes**

**Notes**

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**F33**

**VIEWS**

<:l>                                        next view→ <:c>

7  CONTROLLING THE VIEWS
  7a  A user of a book, or of most on-line text
  7b  MULTIPLE WINDOWS
  7c  WINDOW VIEWS
  7d  USER-SPECIFIED SEQUENCE
8  TRAVELING THROUGH THE WORKING
  8a  An important provision in AUGMENT
  8b  Traveling from one view point to another
9  MODIFYING THE DOCUMENT
  9a  Given the array of capabilities described

*VIEW*: *2 levels; Numbers On; 1 line per statement; No blank lines; All Plex.*

---

**F34**

**VIEWS**

<:c>                                        next view→ <:n>

7  CONTROLLING THE VIEWS
  7a  A user of a book, or of most on-line text
  7b  MULTIPLE WINDOWS
    7b1  For whatever total screen area is
    7b2  (Note: Cross-file editing can be
    7b3  User-adjustable parameters are
  7c  WINDOW VIEWS
    7c1  STRUCTURE CUTOFF. Show only
    7c2  LEVEL CLIPPING. For the
    7c3  STATEMENT TRUNCATION. For

*VIEW*: *All levels; Numbers On; 1 line per statement; No blank lines.*

---

**F35**

**VIEWS**

<:n>                                   Jump  with view→ <:ebmg>

CONTROLLING THE VIEWS
  A user of a book, or of most on-line text
  MULTIPLE WINDOWS
    For whatever total screen area is
    (Note: Cross-file editing can be done at
    User-adjustable parameters are used to
  WINDOW VIEWS a
    STRUCTURE CUTOFF. Show only the
    LEVEL CLIPPING. For the designated
    STATEMENT TRUNCATION. For those

*VIEW*: *All levels; Numbers off; 1 line per statement; No blank lines.*

**F36**

## VIEWS

<:ebmg>

**7c WINDOW VIEWS**
7c1 STRUCTURE CUTOFF. Show only the
7c2 LEVEL CLIPPING. For the designated
7c3 STATEMENT TRUNCATION. For those
7c4 INTER-STATEMENT SEPARATION.
7c5 (Note: The foregoing view controls are
7c6 STATEMENT NUMBERS AND NAMES.
7c7 FROZEN STATEMENTS. A worker may
7c8 USER-SPECIFIED CONTENT FILTERS.

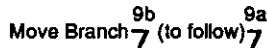*VIEW: 3 levels; Numbers on; 1 line per statement;*
*No blank lines; Branch only.*

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**F37**

## VIEWS

Move Branch ⌐ 9b    (to follow) ⌐ 9a

**9 MODIFYING THE DOCUMENT**
9a Given the array of capabilities described
9b Concurrent use of mouse and keyset also
   9b1 Keyset hand strikes "m" and "b" (for
   9b2 The mouse hand depresses the
9c A few extra verbs are useful for structure
9d A major source of structure-modification
9e (Note: I just had myself timed for this
9f In our view, interactive computer support

**Handles structural branch of any size.**
*(Can type Stmt Nums or click anywhere on stmt.)*

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**F38**

## VIEWS

**9 MODIFYING THE DOCUMENT**
9a Given the array of capabilities described
9b Concurrent use of mouse and keyset also
   9b1 Keyset hand strikes "m" and "b" (for
   9b2 The mouse hand depresses the
9c A few extra verbs are useful for structure
9d A major source of structure-modification
9e (Note: I just had myself timed for this
9f In our view, interactive computer support

**After the move:** *Branch 9b used to be 9d (and 9c*
*was 9b; 9d was 9c).*

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*Shared-screen conferencing with multiple parties, and control-exchange capability -- operative since 1972 -- always assumed to be a future certainty as a general utility feature.*

**F39**

### ONLINE TOOL SYSTEM

Display → View Generator ← File Position

Others' Screens

View, Filter, Windows
Remote Jumps & Manipulation
In-File Addressing & Links
Integrated Multi-media
Manipulate Content & Structure
Option: High-Performance Control
Open-ended Vocabulary

P / M

Computer Storage

Shared-File Collaboration

**F40**

### A SHARED SCREEN FEATURE HAS MANY USES

**Function**

- Jointly reviewing and/or editing a document
- Guided tours of the knowledge domain
- Online coaching
- Meeting support
- More ...

**Examples**

"Let's finalize the wording for that section so we can go ahead and sign."

"Can you show me those figures?"

"Can you show me how you compiled that code?"

Preparation, formulating/displaying (dynamic) agenda and group notes, presenting/retrieving docs, full remote participation...

**F41**

### "Z" SHARING SCREEN WITH "X" AND "Y"

X — Files
Shared knowledge-work environment
Shared Files — Index
Z — Files
Y — Files

**F42**

☀ * PARADIGM SHIFT * ☀

Recipients of emailed hyperdocuments
should to be able to click on the links to
follow the cited references!

**F43**

*STAGE 3:* SUPPORTING THE CODIAK PROCESS
FOR A MUTUAL KNOWLEDGE DOMAIN



Shared knowledge-work environment

"Throw-Away" E-Mail

Shared Files

Index
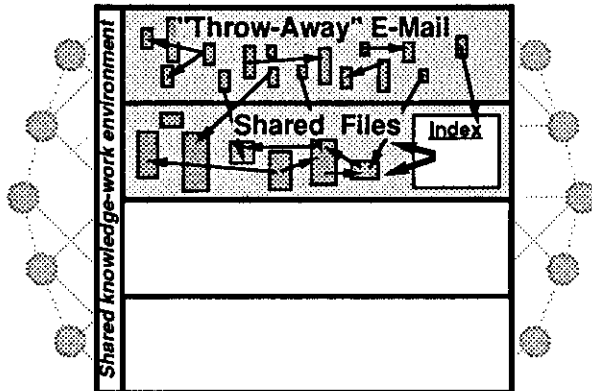
**F44**

☀ * PARADIGM SHIFT * ☀

Email has opened whole new horizons for organizations,
but also opened the "floodgates" for information
overload. Too much, too hard to manage, and the
important knowledge that might have enduring value is
buried or lost.

Try providing an integrated library-like system. Just
prepare a submittal form for the message or document,
and an automated "clerk" assigns a catalog number,
stores the item, notifies recipients with a link for easy
retrieval, notifies of supercessions, catalogs it for future
searching, manages document collections, ...

*Integrated mail system in use since 1970. The unique NLS/AUGMENT Journal System became operative that same year -- a special form of "hyperdocument publishing" of uniquely high value in a CODIAK process.*

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**F45**



**STAGE 4: SUPPORTING THE CODIAK PROCESS FOR A MUTUAL KNOWLEDGE DOMAIN**

**F46**



**A JOURNAL SYSTEM PROVIDES RECORDED DIALOG "HYPERTEXT PUBLISHING"**

Document D ready to submit

Submittal form S prepared using special email form

Chooses from a wide selection of field types for cataloging the new entry. Besides To, Cc, & Bc (to receive citation notification), has fields for Keywords, Supersedes <xxx>, Access-restriction options, etc.

Journal Catalog

Permanent Journal Repository

Citation Notification mailed to distribution

Permanent ID number assigned

**F47**



**DIALOG RECORDED WITHIN A JOURNAL SYSTEM**

#2250

#2339

#2314

**F48**

## A JOURNAL SUPPORTS RECORDED DIALOG

| Function | Examples |
|---|---|
| • Formalized email | Memos, trip reports |
| • Online conferencing | "Anyone have suggestions for X?" |
| • Document exchange | "Here's the latest draft for review -- note major changes to <sect-f> |
| • Document review | "Inconsistencies in <2a> and <5d>..." |
| • Doc management | Storing intermediate states of proj docs |
| • Doc accountability | Versions tracked, signatures verifiable |
| • Intelligence collection | "Here's the latest on Y -- note esp. <4b>" |
| • More ... | |

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**F49**

### STAGE 5: SUPPORTING THE CODIAK PROCESS FOR A MUTUAL KNOWLEDGE DOMAIN



*Shared knowledge-work environment*
- "Throw-Away" E-Mail
- Shared Files — Catalog, Journal, Ex Docs
- Journal (Library)
- External Docs (Offline)
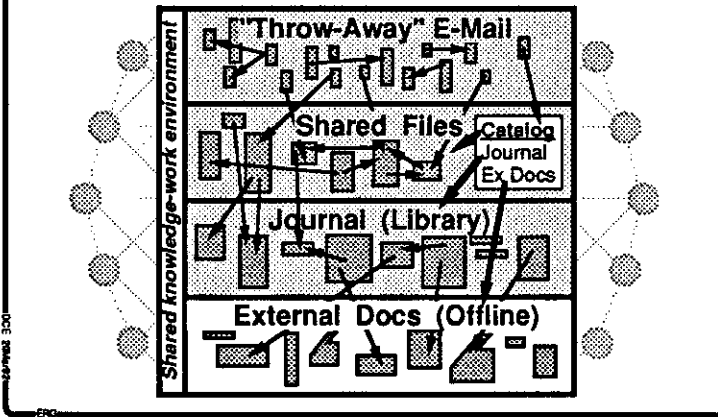
*Our XDOC System flourished until about 1973 -- dying then from lack of appreciation within our sponsor community.*

*XDOC entries were indexed in the same catalog system that supports the Journal.*

*Likely evolve toward a general, unified records management system -- managing both online and external records in an integrated manner.*

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**F50**

### CONTROLLING EXTERNAL DOCUMENTS IS AN IMPORTANT COLLABORATIVE FUNCTION

- Books, clippings, articles, etc.

- Catalogued and indexed via same tools as for "internal," on-line documents.

- Important purpose is to support citation links to external material.

- Another purpose is the common one of facilitating retrieval and access.

*An integrated external-document (XDOC) system was planned from the beginning to be a part of what we now call the CODIAK capability.*

*It remains a basic element in expected future Hyperdocument Systems.*

*Basic functional element in an effective CODIAK capability.*

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**F51**

### A COMMUNITY INTELLIGENCE SYSTEM CAN BE DISTRIBUTED AND CO-OPERATIVE

- Significant capability would be provided by Dialog Support and External Document Control.

- Bibliography, annotations, critiques and discussions thereof entered freely by Community participants.

- Trained support staff can add important elements of service.

**F52**

### A COMMUNITY'S INTELLIGENCE COLLECTION (CIC) WILL INVOLVE ALL RECORD TYPES



**F53**

### SPECIAL SUPPORT NEEDED TO MANAGE A DYNAMIC, EVOLVING, COMMUNITY "HANDBOOK"

- From Dialog and Intelligence records.

- Dynamically maintained, to reflect current understanding, commitments, standards, etc., as relevant to Community purpose and interests.

- Concurrent, on-line & publication; CBI.

- Active target for ongoing dialog.

**F54**

### THE HANDBOOK: A COMMUNITY'S INTEGRATED EVOLVING KNOWLEDGE BASE



*Shared Knowledge-work environment*

CIC

"Throw-Away" E-Mail

Shared Files

Catalog
Journal
Ex Docs

Journal (Library)

Handbook

External Docs (Offline)

*Notes* _____

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**F55**

### STRUCTURED HYPERTEXT: PROVIDING NEW STUDY POWER OVER ESTABLISHED BODY OF KNOWLEDGE;



Control

USER PERSON
(E.g. running
Hypercard)

CALL IT A "HANDBOOK"

Other-generated
knowledge

DCE-CCC4.1
16JUN80

*Notes* _____

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**F56**

### STRUCTURED HYPERTEXT: VERY USEFUL TO SERVE A COMMUNITY WITH A COMMON REFERENCE BASE.



Control

USER PERSON
(Using group-
access system)

USER PERSON
(Using group-
access system)

Many

USER PERSON
(Using group-
access system)

CALL IT A "HANDBOOK"

Other-generated
knowledge

The next step: provide
for the community to
generate, collaboratively,
its own "Handbook" (or
knowledge product).

DCE-CCC4.2
16JUN80

*Notes* _____

*Bringing out the "system" aspect -- to support wide-area, generic CODIAK processes.*

## Notes

## Notes

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**F57**

### SHOULD SUPPORT NOT ONLY REFERENCE ACCESS, BUT ALSO *DYNAMIC EVOLUTION* OF THE HANDBOOK

COMMUNITY (Mission- or discipline-oriented)

FILES | MAIL | JOURNAL | XDOC

Notes, Ideas, Comments, Arguments, Possibilities, Needs, Correspondence, External Documents, ...

Indices, structures, reports, intelligence analyses.

Integrated, structured, indexed, HANDBOOK.

Dialog about the current Handbook -- where it is going, what it should become, what is missing, needs fixing. (May include introduction of new item of "external intelligence" thought to be of relevance.)

Results of "digestion" work, on external intelligence content -- online information as well as hard-copy "external documentation" (XDOC).

Continuing cycle of study, new-item contribution, analysis, and updating earlier drafts -- a very basic process. Call it THE HANDBOOK CYCLE.

"Handbook" = current draft of evolving document being developed by the community.

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**F58** HANDBOOK EXAMPLE: AN ANNOTATED HYPERINDEX TO DYNAMIC PROJECT REFERENCE BASE

LOCATOR

AUGMENT — CCC — NASP — TAC

INTRODUCTION — ROSTER — PROJECT — INTERNET

DOCUMENTATION — DIALOG — BACKGROUND

WBS — TASK — PLANS — SCHEDULES

DCE 24Mar92

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**F59**

### INFORMATION STRUCTURE FOR NASP

Projects are managed by a WBS (Work Breakdown Structure), which identifies projects, specific tasks, and components or tasks performed by the various companies. The information in a WBS readily fits in a structured document.

NASP PROG

NASP MATERIALS CONTRACT 0001

OVERVIEW AND GOALS — TITANIUM ALUMINIDES 1000 — TITANIUM ALUM METAL MATRIX — REFRACTORY COMPOSITES — HIGH CONDUCTIVITY COMPOSITES

PREPARE MASTER PLAN — IDENTIFY MATERIAL REQM'TS — IDENTIFY & DEVELOP PROCESSES 1300 — CHARACTERIZE MATERIAL — FABRICATE STRUCTURAL PANELS — SCALE UP PANELS — COMPONENT TEXT

NAAO TASK 1310 — MDC TASK 1320 — GD TASK 1330 — ROCKETDYNE TASK 1340 — PRATT & WHITNEY TASK 1350

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**F60**

## SUPPORTING THE *CODIAK* PROCESS

- <u>Recorded dialog</u>, highly collaborative, within an open hyperdocument system -- integrated with E-mail, shared files, and permanent, cataloged "library" system -- as well as with CIC and Handbook.

- <u>Community Intelligence Collection</u> (CIC) -- in highly useable, hyperdocument form -- integrated with recorded dialog and Handbook.

- <u>Community Handbook</u> -- a dynamically evolving, hyperdocument, "collaborative-knowledge product" -- integrated with recorded dialog and CIC.

**Notes**

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**F61**

### *Hypothesis #5:* Open Hyperdoc System (OHS)

An underlying open hyperdocument-system infrastructure is needed to support interoperable, high-performance CODIAK work.

- **Requirements for a Hyperdocument System**
  - **General Provisions**
  - **Recorded Dialog**
  - **Intelligence Collection**
  - **Electronic Handbook**
- **Toward *Open* Hyperdocument Systems**
- **Issues for the Info-Sys Marketplace**

**Notes**

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**F62**

## TOWARD AN *OPEN* HYPERDOC SYSTEM FOR WIDE-AREA CODIAK SUPPORT

Moving toward providing integrated, interoperable, *seamless* hyperdocument systems to support the CODIAK process within and across organizations.

*(Note: Assumes full provision for restricting access as desired).*

**Notes**

## Notes

**F63**

The need for CODIAK interoperability
will extend the scope of standards.

## Notes

*(Same as E7)* ➡

**F64**

### BASIC KNOWLEDGE PROCESS RESULTS IN A DYNAMICALLY EVOLVING KNOWLEDGE BASE



**External Environment**

Interacting    Scanning

Ingesting

| Dialog Records | Intelligence Collection | Knowledge Product |

- Analyzing
- Digesting
- Integrating
- Collaborating
- Developing
- Applying
- Re-using

## Notes

**F65**

### OHS: TO SERVE "ALL DOCUMENT NEEDS" WITHIN VERY LARGE PROJECTS

Large, small: formal, legal documents or informal working notes.

"OHS E-mail" to convey a general-purpose "hyperdocument" of any size.

Requirements, specifications, design details, status reports, work breakdown structures, change orders.

References, instructions, policy, glossary, RFP, bids, work orders, "even" source code.

**F66**

## ESSENTIAL ELEMENTS OF AN OHS

- Mixed-object documents
- Explicitly structured documents
- View control of objects' form, sequence and content
- The basic "hyperdocument"
- Hyperdocument "back-link" capability
- Hyperdocument "library system"
- Hyperdocument mail
- Personal signature encryption

- Shared-window teleconferencing
- Inter-linkage between hyper-documents and other data systems
- Link addresses that are readable and interpretable by humans
- Every object addressable
- Hard-copy print options to show addresses of objects and address specification of links
- External-document control
- Access control
- More

*See <Bib-26@11> in Section S.*

**F67**

### INTEROPERABLE KNOWLEDGE DOMAINS SHARE AND EXCHANGE DOCUMENTS



*Shows the generic sharing requirement for an interoperable hyperdocument <u>system</u>.*

**F68**

### KNOWLEDGE-DOMAIN INTEROPERABILITY GREATLY ENHANCED BY HYPERTEXT LINKAGE CAPABILITY



**Notes**_____

**Notes** _____

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**F69**

### AN OHS WOULD INTEGRATE AND SUPPORT MANY IMPROVEMENT PROGRAMS

Given an open hyperdocument system, how much specialiazed software would be needed for such as groupware, concurrent engineering, CALS (online document delivery), enterprise integration, organizational learning, etc.?

How much could be saved?

**Notes** _____

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**F70**

### *Hypothesis #5:* Open Hyperdoc System (OHS)

An underlying open hyperdocument-system infrastructure is needed to support interoperable, high-performance CODIAK work.

- **Requirements for a Hyperdocument System**
  - **General Provisions**
  - **Recorded Dialog**
  - **Intelligence Collection**
  - **Electronic Handbook**
- **Toward *Open* Hyperdocument System_s_**
- **Issues for the Info-Sys Marketplace**

**Notes** _____

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**F71**

### OHS: SOME OF ITS EMERGENT REQUIREMENTS WARRANT MULTI-PARTY CONSIDERATION

"Multi-Party" -- major vendors and user organizations from the large-project industries will be affected.

"Requirements" such as:

An "authored" document, including its "authored" links, must be isolatable, signable, mailable, archiveable, ...And each organization in the OHS "web" must be able to hold its own collection of private and public hyperdocuments.

**F72**

### OHS: OPEN HYPERDOCUMENT SYSTEM; CHALLENGE FOR BOTH VENDOR AND USER ORGS

"Open" for guaranteed use across the spectrum of major computer & workstation platforms.

Suitable to support all document needs within very large projects -- across multiple organizations.

A working prototype exists: obsolete platform; but useable for important pilot applications.

An aerospace company assessing OHS implementation & utilization. Seeking interest among system vendors and large user orgs.

*Notes*

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**F73**

### IN THE GROUPWARE MARKET, THE USER-ORG COMMUNITY MUST BECOME MORE PRO-ACTIVE

Suppose, for instance, that larger user orgs became leaders in exploratory development of human-system improvements to harness downstream technologies.

And suppose that they also found practical ways to accellerate cooperative road-mapping of their common future info-sys functional and architectural requirements -- toward serving their critical and expensive org-evolution programs.

An OHS how many years sooner this way? Consider the value gained from each earlier-year's "no-island," open use of radical, online, OHS interop possibilities.

*Notes*

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**F74**

### THE NEW AUGMENTED-ORG PARADIGM POSES SERIOUS NEW MARKETPLACE CHALLENGES

If, with experience from evolutionary development, significant changes emerge in org processes to harness radical new collaborative technology, then:

How will the vendors get that experience in order to shape their groupware architectures?

How will non-exploring user organizations get that experience in order to know how to shop among the different vendor's offerings?

And what would a large user organization face five years after choosing a weaker basic architecture?

*Notes*