

Declassified and Approved For Release 2012/12/14 : CIA-RDP95-00972R000100020001-8

13 June 1983

Subject File: R&D
Planning
#3

OFFICE OF RESEARCH AND DEVELOPMENT
FY84 PROGRAM
IN SUPPORT OF
OFFICE OF DATA PROCESSING

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NEW STARTS IN FY84

*USER INTERFACES

COMPUTER-AIDED LANGUAGE TRAINING
KNOWLEDGE-BASED SYSTEMS

PROJECTS COMPLETING IN FY84

SYSTEM DESIGN EVALUATION METHODOLOGIES
BENCHMARKING LARGE-SCALE MODELS

CONTINUING PROJECTS

PROJECTS

COMPUTER SECURITY:

RECON GUARD
AUDIT TRAIL

SYSTEMS RESEARCH:

DATA COMMUNICATIONS
ADVANCED TEXT RETRIEVAL

APPLICATIONS:

STATISTICAL CONTENT OF TEXT
LARGE-SCALE MODELING SYSTEM

FY84 PRODUCTS

TEST AND VERIFICATION
STATISTICAL TECHNIQUES

TECHNOLOGY FORECAST
PROTOTYPE TESTBED

EFFICIENT TECHNIQUES (N-GRAM?)
CONCEPTUAL DESIGN

CONTINUING PROJECTS OF POSSIBLE INTEREST

ARTIFICIAL INTELLIGENCE:

AI SYMPOSIUM
GEOGRAPHIC INFORMATION SYSTEM
GOLDEN TIGER (WITH DDI)

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USER INTERFACES

OBJECTIVE: TO ENABLE USERS (INCLUDING PROGRAMMERS) TO GET WHAT THEY WANT FROM COMPUTERS WITH LESS SPECIAL-PURPOSE PROGRAMMING.

APPROACH: SELECT PROMISING TECHNIQUES FROM RECENT DEVELOPMENTS IN USER INTERFACE TECHNOLOGY (E.G., GRAPHICAL INTERFACES, ADVANCED SOFTWARE DEVELOPMENT ENVIRONMENTS, INTELLIGENT AGENTS, AUTOMATIC AND SEMI-AUTOMATIC PROGRAMMING) AND EVALUATE THEM IN THE AGENCY ENVIRONMENT

STATUS: NEW START IN FY84

FUNDS: FY-84
\$250K

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LANGUAGE TRAINING

OBJECTIVE: IMPROVE COMMUNITY'S ABILITY TO TRAIN PERSONNEL IN FOREIGN LANGUAGES

APPROACH: APPLY COMPUTER-BASED TECHNOLOGIES TO LANGUAGE TRAINING TO REDUCE STUDENT'S DEPENDENCE ON TRAINING BY AN INSTRUCTOR

STATUS: FY84: NEW START (DCI PRODUCTION ENHANCEMENT)
ASSESS AREAS OF CRITICAL LANGUAGE TRAINING NEEDS AND CAPABILITIES OF TECHNOLOGY; BEGIN DEFINITION DEVELOPMENT OF PROTOTYPE TRAINING SYSTEMS

FUNDS: FY-84
\$295K

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KNOWLEDGE BASED SYSTEMS METHODOLOGY

OBJECTIVE: TO DEVELOP CAPABILITY TO CAPTURE SENSITIVE AGENCY EXPERTISE IN KNOWLEDGE BASES FOR A WIDE VARIETY OF SUBJECT AREAS WITH MINIMAL INVOLVEMENT OF NON-AGENCY "KNOWLEDGE ENGINEERS.

APPROACH: DEVELOP A PROTOTYPE (BASED ON EXISTING KNOWLEDGE-ENGINEERING TOOLS SUCH AS AGE, EMYCIN, KAS, OPS, ROSIE ETC.) TO AID IN THE ELICITING OF BASIC FACTS, CONSTRUCTS, AND RELATIONSHIPS WITHIN AN AREA OF EXPERTISE FOR REPRESENTATION IN A KNOWLEDGE BASE; EVALUATE ITS USE BY AGENCY PERSONNEL. (THIS IS A HIGH RISK PROJECT)

STATUS: NEW START IN FY84

FUNDS: FY84
268K

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PROJECTS COMPLETING IN FY84

SYSTEM DESIGN EVALUATION METHODOLOGIES

BENCHMARKING LARGE-SCALE MODELS

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SYSTEM DESIGN EVALUATION METHODOLOGIES

- DEVELOP A GENERAL-PURPOSE QUEUING SYSTEM EVALUATION FACILITY FOR SYSTEM DESIGN AND HARDWARE CONFIGURATION ALTERNATIVES

FY81: - DESIGNED SYSTEM AND BUILT EARLY PROTOTYPE

FY82: - EVALUATED PROTOTYPE FOR PREDICTING VM PERFORMANCE

FY83: - TRANSFER SYSTEM TO RUN ON VM

- DESIGN USER-FRIENDLY INTERFACES AND DOCUMENTATION

- FY83 CONTRACT IN NEGOTIATION

● FUNDS:	<u>FY-81</u>	<u>FY-82</u>	<u>FY-83</u>
	\$42K	\$55K	\$100K (ORD)
			24.7K (ODP)

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BENCHMARKING LARGE-SCALE MODELS

EVALUATE THE COMPUTATIONAL EFFICIENCY OF CRAY (PARALLEL) COMPUTERS AGAINST IBM (SERIAL) COMPUTERS ON A SET OF LARGE-SCALE MODELS

FY-83 PROGRESS:

- COMPLETE TESTING AND EVALUATION OF THE FOLLOWING TYPES OF ALGORITHMS AND APPLICATIONS:
 - OPTIMAL CONTROL - ECONOMETRIC MODEL
 - SIMULATION - PETROLEUM RESERVOIR ANALYSIS
 - NETWORKS - TRANSPORTATION/DISTRIBUTION
 - LINEAR PROGRAMMING - REFINERY ANALYSIS
 - SIMULATION - HYDROLOGICAL ANALYSIS
- COMPLETE A REPORT FOR DISTRIBUTION TO EACH DDI OFFICE AND ODP ANALYZING THE COMPUTATIONAL STATISTICS AND CONVERSION PROBLEMS

FY-84 PLAN:

- NO FURTHER RESEARCH IS PLANNED

FUNDS:

<u>FY-83</u>	<u>FY-84</u>
20K	0

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CONTINUING PROJECTS

COMPUTER SECURITY:

RECON GUARD
AUDIT TRAIL

SYSTEMS RESEARCH:

DATA COMMUNICATIONS
ADVANCED TEXT RETRIEVAL

APPLICATIONS:

STATISTICAL CONTENT OF TEXT
LARGE-SCALE MODELING SYSTEM

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RECON GUARD

- OBJECTIVE: ● DEVELOP A SYSTEM FOR PROTECTING INFORMATION IN A MULTILEVEL SYSTEM FROM BEING RELEASED TO UNAUTHORIZED USERS.
- APPROACH: ● EMPLOYMENT OF A NEW, VERIFIABLE HARDWARE ARCHITECTURE DESIGN TECHNIQUE TO DEVELOP A GUARD EXTENSION ON WHICH TO IMPLEMENT AN AUTHENTICATED RECORD RELEASE STRATEGY. (A CHECKSUM IS ATTACHED TO EACH RECORD, AND CHECKED BY THE GUARD SYSTEM PRIOR TO RELEASE OF THE RECORD).
- STATUS: FY83/84 - DEMONSTRATE AND EVALUATE THE SECURITY FEATURES PROVIDED BY THE GUARD SYSTEM DESIGN CONCEPT, THROUGH EXPERIMENTATION WITH A PROTOTYPE GUARD SYSTEM CONNECTED TO THE RECON DATA BASE.
- FUNDS: FY-83 FY-84
 \$200K \$300K

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AUTOMATED AUDIT TRAIL

OBJECTIVE: ● IMPROVE THE SECURITY OFFICERS' CAPABILITY TO MONITOR COMPUTER SYSTEMS TO DETECT IMPROPER USE

APPROACH: ● THE CONTRACTOR WILL EVALUATE VARIOUS STATISTICAL TECHNIQUES FOR AUTOMATICALLY DETECTING ABNORMAL SYSTEM USAGE. IF THIS SHOWS PROMISE, THE APPROACH WILL BE BROADENED AND A PROTOTYPE SYSTEM WILL BE BUILT TO HELP ISSG TO ASSESS THE FEASIBILITY OF THE METHOD.

STATUS: ● FY83: RFP FOR STATISTICAL TECHNIQUES ISSUED -- TWO RESPONSES IN EVALUATION (15 JUL 83 START ANTICIPATED)
● FY84: PROTOTYPE AND ADDITIONAL DEVELOPMENT (IF WARRANTED)

<u>FUNDS:</u>	<u>FY-83</u>	<u>FY-84</u>
	\$240K	\$200K

DATA COMMUNICATIONS NETWORK
(TECHNOLOGY FORECAST)

- OBJECTIVE: ● DETERMINATION OF THE SECURITY, ARCHITECTURAL, AND USAGE IMPACT ON AGENCY INFORMATION SYSTEMS/NETWORKS IF CURRENT COMMERCIAL AND ACADEMIC R&D EFFORTS IN COMMUNICATION AND DEVICE TECHNOLOGY REACH EXPECTATION.
- APPROACH: ● EXAMINATION OF CURRENT DATA COMMUNICATION TECHNOLOGY AND PROJECTION OF FUTURE RESEARCH DIRECTION AND POSSIBLE RESULTS TO DETERMINE THE TECHNOLOGICAL IMPACT AND FUTURE AGENCY EFFORTS IN THIS AREA.
- STATUS: - SOW WRITTEN
- PROGRAM BEING DISCUSSED WITH POSSIBLE CUSTOMERS: ODP, COMMO, OS/ISSG
- FUNDS: FY-83 FY84
 \$150K \$150K

ADVANCED TEXT RETRIEVAL

OBJECTIVE: ● TO PROVIDE A GENERAL SYSTEM ARCHITECTURE FOR TEXT RETRIEVAL WHICH CAN BE IMPLEMENTED IN A VARIETY OF USER ENVIRONMENTS.

APPROACH: ● DEVELOP A GENERAL-PURPOSE TEXT RETRIEVAL SYSTEM

- QUERY LANGUAGE, SOFTWARE, HARDWARE
- INDEX & SCAN ALGORITHMS
- PERFORMANCE MEASUREMENT
- MODULAR DESIGN
- PORTABLE IMPLEMENTATION
- TESTBED ENVIRONMENT

● PROJECT STEERING GROUP OF POTENTIAL CUSTOMERS

- FBIS
- NPIC
- ODP
- ORD
- OSO
- SAFE
- CPAS

STATUS: ● PHASE I: JUN 82 - JUL 83

- SURVEYED AGENCY REQUIREMENTS AND COMMERCIAL SYSTEMS
- CONDUCTED SIMULATIONS OF ALTERNATIVES

● PHASE II: AUG 83 - DEC 83

- DESIGN SYSTEM
- BUILD LISP PROTOTYPE

● PHASE III: JAN 84 - SEP 84

- IMPLEMENT C PROTOTYPE
- EXPERIMENT WITH VARIOUS ALGORITHMS & INTERFACES

<u>FUNDS:</u>	<u>FY-82</u>	<u>FY-83</u>	<u>FY-84</u>
	\$147K	\$200K	\$200K

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STATISTICAL CONTENT ANALYSIS OF TEXT
(SCAT)

OBJECTIVE: DEVELOP APPLICATION-INDEPENDENT TECHNIQUES TO CHARACTERIZE THE CONTENTS OF TEXT DATABASES

APPROACH: INVESTIGATE USE OF STATISTICAL TECHNIQUES TO CHARACTERIZE DATABASE CONTENTS

STATUS: FY81/82 - DEVELOPED STATISTICAL CONTENT ANALYSIS ALGORITHMS TO CLUSTER RELATED DOCUMENTS BASED ON CO-OCCURRENCE OF TERMS.

FY83/84 - INVESTIGATE POTENTIALLY MORE EFFICIENT TECHNIQUES

FY84/85 - APPLY STATISTICAL CONTENT ANALYSIS TECHNIQUES TO FOREIGN LANGUAGE TEXT

FUNDS: FY83 FY84
 100 100

LARGE-SCALE MODELING SYSTEM
(PROJECT LSMS)

DEVELOP A HIGH-LEVEL MODELING SYSTEM FOR THE GENERATION, MANAGEMENT, AND SOLUTION OF
LARGE-SCALE MODELS AND FOR FACILITATING THE USE OF MODELS

FY-83 PROGRESS: RFP RELEASED; RESPONSES ARE DUE 5 JULY 1983

- DEVELOP LSMS CONCEPTUAL DESIGN
- DEVELOP EXAMPLES OF EXTERNAL INTERFACES
- PREPARE ESTIMATES OF THE COST AND SCHEDULE
- DEFINE COMPUTER RESOURCE REQUIREMENTS

FY-84 PLAN:

- BASED UPON THE CONCEPTUAL DESIGN DEVELOPED ABOVE AND THE RELATED DOCUMENTS, IT IS ANTICIPATED THAT SOME PHASES OF THE LSMS WILL BE INITIATED IN FY-84.

FUNDS:

<u>FY-83</u>	<u>FY-84</u>
197K	400K

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CONTINUING PROJECTS OF POSSIBLE INTEREST

ARTIFICIAL INTELLIGENCE:

AI SYMPOSIUM

GEOGRAPHIC INFORMATION SYSTEM

GOLDEN TIGER (WITH DDI)

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AI SYMPOSIUM

OBJECTIVE: ● TO EXPOSE INTELLIGENCE PERSONNEL TO THE TECHNOLOGY OF ARTIFICIAL INTELLIGENCE

- CAPABILITIES
- PROJECTS
- HARDWARE
- LIMITATIONS
- CONTRACTORS
- SOFTWARE

APPROACH: ● HOST A 2-DAY SYMPOSIUM

- AGENCY ANALYST/MANAGER FOCUS
- BRIEFINGS, DEMONSTRATIONS, VIDEO TAPES

STATUS: ● FIRST SYMPOSIUM HELD 30 NOV - 1 DEC 1982 (JOINT OSWR SPONSORSHIP)

- SELECTED TOPICS (EXPERT SYSTEMS, INTELLIGENT DATA BASES, NATURAL LANGUAGE)
- HIGHLY FAVORABLE RESPONSE (300 ATTENDEES)

● SECOND SYMPOSIUM BEING PLANNED FOR FALL 83 (JOINT AISG SPONSORSHIP)

- EXPANDED TOPIC SET (IMAGERY, SIGNALS, VOICE)
- OPEN ATTENDANCE TO INTELLIGENCE COMMUNITY

FUNDS: FY-82 FY-83
 \$17K \$ 30K (DCI)

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GEOGRAPHIC INFORMATION SYSTEM

OBJECTIVE: ● TO IMPROVE ANALYST AND CARTOGRAPHER PRODUCTIVITY IN THE USE OF DIGITAL MAPS

APPROACH: ● DEVELOP A KNOWLEDGE-BASED SYSTEM TO HANDLE GEOGRAPHIC CONCEPTS AND SPATIAL RELATIONSHIPS

● KBGIS WILL INTERFACE WITH EXISTING AGENCY GEOGRAPHIC SYSTEMS AND DATA BASES (TACK, WDBII) MAINTAINED BY ODP AND CPAS

STATUS: ● COMPETITIVE RFP (EST. JUL 83 START)

● PHASE I: JUL 83 - FEB 84

- ANALYZE REQUIREMENTS
- SURVEY STATE OF THE ART
- DEVELOP CONCEPTUAL DESIGN
- BUILD LISP PROTOTYPE

● PHASE II: MAR 84 - FEB 85

- DEVELOP DETAILED DESIGN
- IMPLEMENT INITIAL CAPABILITY

<u>FUNDS:</u>	<u>FY-83</u>	<u>FY-84</u>
	\$200K	\$300K

GOLDEN TIGER

OBJECTIVE: ● TO EVALUATE NEW METHODS OF MAN/MACHINE INTERACTION AND ARTIFICIAL INTELLIGENCE TECHNOLOGY

APPROACH: ● DEVELOP APPLICATIONS ON XEROX 1100 (DOLPHIN)
- SAFE-LIKE SCENARIO (MAIL, MAPS, SYSTEM ACCESS, TOOLBOX)
- AI TOOLS (DADM, DISCIPLE, HYDRO, IPL, ROSIE, ...)

STATUS: ● PHASE I: JUN 82 - FEB 83
- INSTALLED 1100 + 300 MB DISK IN DDI/ASG SPACE
- DEVELOPED PROTOTYPE WINDOWS/SCENARIOS FOR DI ANALYSTS

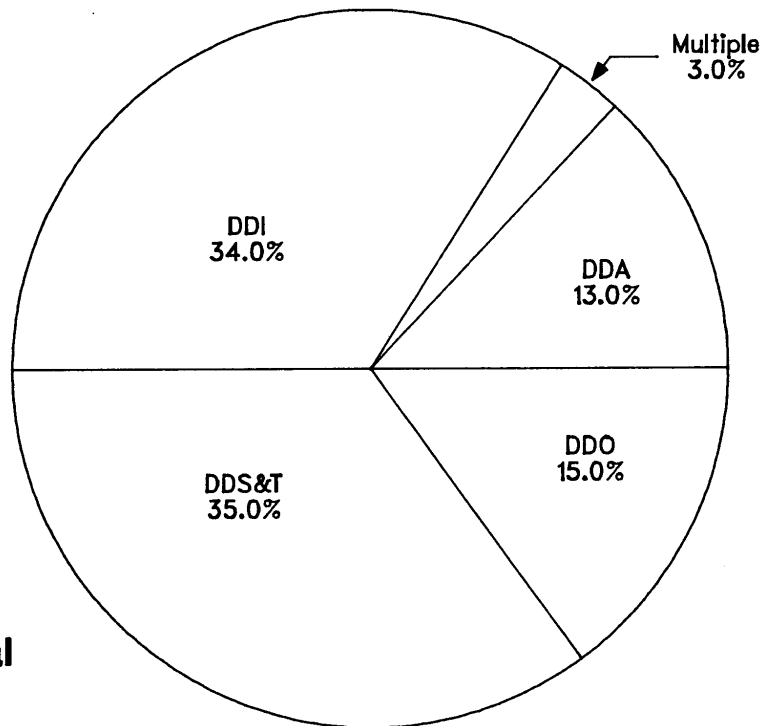
● PHASE II: MAR 83 - SEP 83
- ADD PRINTER, COLOR TERMINAL, DISK, MEMORY
- DEVELOP ODP INTERFACE (VM, SAFE, ETC.)
- DEVELOP ADDITIONAL SCENARIOS
- DEMONSTRATIONS & FEEDBACK

● PHASE III: OCT 83 - JUL 84
- ACQUIRE 1132 PROCESSOR (DORADO)
- INSTALL MULTIPLE COPIES OF GOLDEN TIGER
- EXPERIMENT WITH UTILITY TO ANALYSTS

<u>FUNDS:</u>	<u>FY-82</u>	<u>FY-83</u>	<u>FY-84</u>
(DDI)	\$203K	\$312K	(UNKNOWN)

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FY84 R&D Program Funding by Directorate



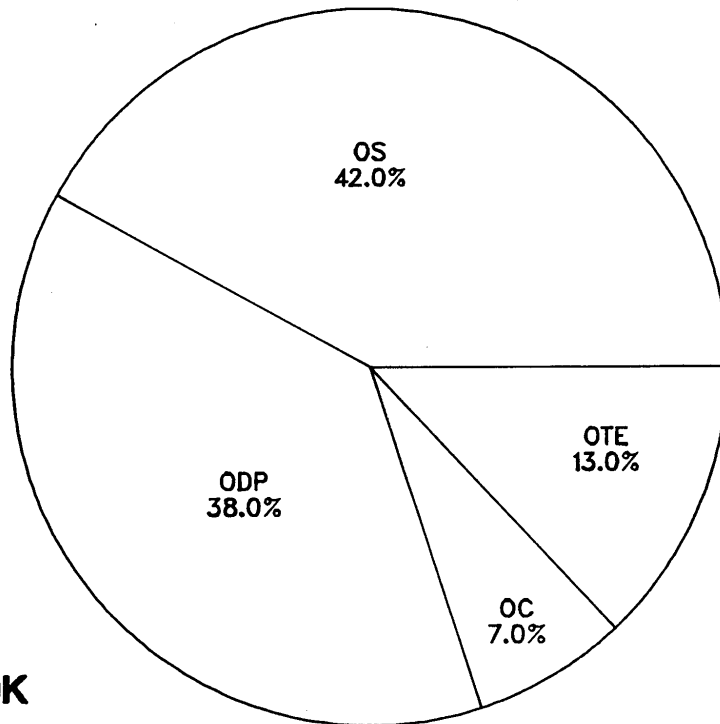
**ORD FY 84 Total
\$16,468K**

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FY84 R&D Program DDA Funding by Office



DDA Total \$2220K

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