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Dr. Kenneth R. Boff

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Socio-Technical Sciences
8260 Barton Farms Blvd
Sarasota, FL 34240
United States

8. PERFORMING ORGANIZATION REPORT NUMBER

N/A

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14. ABSTRACT

The goal of this three phase / three year effort was to characterize the state of the foundational science of “reliance” and “influence” by drawing on foreign expertise and research findings to broaden the research base in support of US national security and defense.

The specific objective of the effort were

1. To understand and leverage state of the art research and data on the dynamics and effects of “Reliance”, “Trust” and “Influence” and on culture, society and military effectiveness
2. To facilitate the generation of scientifically viable ideas and proposals for supported research on this phenomenon.
3. To foster development of a sustainable international Trust & Influence Research Community of Practice
4. To assist in development and rationalization of an International Research investment strategy.

Phase one (6 months) was focused on building an international expert network. To accomplish this involved identifying key thought leaders and institutions driving this research outside of the US. An initial search resulted in a sizable sample (~100) globally distributed researchers from across the behavioral, social, political, anthropological and computer sciences. Further search using online tools including *Google Scholar* and *Web of Science* provided CVs, citations, publications and data useful to culling this sample to a smaller set. These individuals were, in turn, engaged online to assess their level of interest in collaborating with or conducting sponsored research for the AFOSR.

Those willing to interact were further interrogated about their current work, future directions and interest in engaging in answering fundamental research questions of specific interest to AFOSR. After consultation with AFOSR, a smaller even smaller subset of these investigators were invited to submit brief whitepapers that elaborated specific research questions of potential mutual interest. Papers were received from the individuals shown in Table 1 and were evaluated for quality and their option value to the USAF and DoD. Those ideas and concepts deemed of high value led to requests for proposal with the expectation that proposals received would be submitted into the AFOSR competitive granting process.
In November 2014, Site visits were made to prospective and some existing grantees in Singapore, Malaysia and Japan.

Phase 2 of this effort was to commence on Nov 28, but was not contracted due to an administrative determination to terminate this effort. As a result, no further progress was made by Socio-Technical Sciences and all correspondence with prospective grantee as actions in progress were conveyed to the appropriate PMs at AOARD.

15. SUBJECT TERMS

Influence, Trust, socio-cultural prediction

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FINAL REPORT

FA2386-14-1-4083

Social Cultural Dynamics of Trust, Influence and Persuasion

Kenneth R Boff, PhD
Principal Scientist, Socio-Technical System Sciences
8260 Barton Farms Blvd
Sarasota FL, 34240

Social Cultural Dynamics of Trust, Influence and Persuasion

INTRODUCTION:
The goal of this three phase / three year effort was to characterize the state of the foundational science of "reliance" and "influence" by drawing on foreign expertise and research findings to broaden the research base in support of US national security and defense.

OBJECTIVES and APPROACH:
The specific objective of the effort were

1. To understand and leverage state of the art research and data on the dynamics and effects of "Reliance", "Trust" and "Influence" and on culture, society and military effectiveness
2. To facilitate the generation of scientifically viable ideas and proposals for supported research on this phenomenon.
3. To foster development of a sustainable international Trust & Influence Research Community of Practice
4. To assist in development and rationalization of an International Research investment strategy.

Phase one (6 months) was focused on building an international expert network. To accomplish this involved identifying key thought leaders and institutions driving this research outside of the US. An initial search resulted in a sizable sample (~100) globally distributed researchers from across the behavioral, social, political, anthropological and computer sciences. Further search using online tools including *Google Scholar* and *Web of Science* provided CVs, citations, publications and data useful to culling this sample to a smaller set. These individuals were, in turn, engaged online to assess their level of interest in collaborating with or conducting sponsored research for the AFOSR.

Those willing to interact were further interrogated about their current work, future directions and interest in engaging in answering fundamental research questions of specific interest to AFOSR. After consultation with AFOSR, a smaller even smaller subset of these investigators were invited to submit brief whitepapers that elaborated specific research questions of potential mutual interest. Papers were received from the individuals shown in Table 1 and were evaluated for quality and their option value to the USAF and DoD. Those ideas and concepts deemed of high value led to requests for proposal with the expectation that proposals received would be submitted into the AFOSR competitive granting process.

In November 2014, Site visits were made to prospective and some existing grantees in Singapore, Malaysia and Japan. The itinerary is shown as Appendix 1.

Phase 2 of this effort was to commence on Nov 28, but was not contracted due to an administrative determination to terminate this effort. As a result, no further progress was made by Socio-Technical Sciences and all correspondence with prospective grantee as actions in progress were conveyed to the appropriate PMs at AOARD.

* HU = Human Use

TABLE 1: Trust & Influence Proposals

Title	PIs	Abstract	HU*	Cost/Time
Modeling of harnessing of trust and influence in a cyberspace (MOHATIC)	Shu□Heng Chen (Dept of Economics, Nat Chengchi U Taiwan), Akira Namatame, (Dept of CS National Defense Academy, Japan), Cheong Siew Ann (Dept of Physics, NTU, Singapore)	*Investigates the factors that affect the availability and robustness of trust as a governance mechanism in a cyberspace.* Phase 1Builds and validates a prototype agent-based model using field and internet data. Phase 2 scale up to include influence and cultural embeddedness & use as a basis for studying the governance of trust & influence in cyberspace. Phase 3: Validate using surveys, questionnaires and human studies.	Phase 3	$280K (50K, 120K 110K) over 2 years
Dissemination of opinions and ideas via complex contagion on social networks	Yoshihisa Kashima, Alex Stivala, Garry Robins (Dept of Psych, U of Melbourne) & Michael Kirley (Dept of Computer Science, U of Melbourne).	Aims to develop methods for studying three inter-related questions. First, what is the structure of "cultural space", the set of ideas, opinions, and attitudes held by individuals? Second, how do culture, ideas, and opinions spread through society, considered as people and their social relations, and how do different "cultural spaces" affect the processes of such diffusion? Third, related to the second question, we can ask "how (targeting which individuals) do we best spread innovations or compelling ideas through a social network?"	Prob no	2 year effort. 1 year sought july 2015- $69,450 AU = $61K US.
Patterns of Dehumanization and Humanization and the Development of Trust: Divisions Within and Between the Muslim World.	Noraini Noor (Dept of Pysch, International Islamic U, Kuala Lumpur, MY), and Daniel Christie (Prof Emeritus, Dept of Psych, Ohio State U),	Addresses development of trust in muslim and mixed muslim-christian societies (i.e. Pakistan, Malaysia, UK, US and the Philippines). Will be examining at 1. How is the "Other" dehumanized or humanized in public discourse? 2. Are there qualitative and quantitative differences in the dehumanizing and humanizing statements in the different regions and over time? 3. How can social conditions of trust and cooperation be fostered and established, based on the humanizing statements?	NO Secondary/ anonymous data only	$62K/ 1year

Multilevel Comparisons on the Antecedents of Trust Among Team Members and Work Outcomes	Mei-Hua Lin and Michelle Lee, Sunway University, ML	This research explores the concept of mistrust in relation to trust and whether the role of mistrust is similar to that of trust in affecting work outcomes. Second, although trust & trustworthiness have been found to affect work outcomes, the mechanisms of these relationships remain unclear. Here, we include team communication and organizational commitment as mediators of these relationships. Third, this research explores the antecedents of trust focusing on two levels of analysis: the team environment and individual differences. Lastly, previous research has found trust and trustworthiness to be different between in-groups and out-groups. This research examines whether the proposed conceptual model will be diff for those of in-group vs those of out-group. Hence, the overall goal is to provide a comprehensive view on the factors (team and individual level) influencing trust and trustworthiness and the mechanisms in which the trust process affects work outcomes.	YES	Year 1: $37K Year 2: $36K
Science and society: Interactions between trust and ideology affect our orientation to science and the future	*Iain Walker and Fabio Boschetti CSIRO, Australia* *Iain.A.Walker@csiro.au*	We suggest: i) the functioning of a civil society depends not just on the level of interpersonal trust, but on how trust is distributed among human and non□ human entities like institutions, norms and incentives; and ii) trust is inevitably interlinked to our attitudes towards the future. We propose developing and testing an analysis of how trust in institutions such as science, government, and the free market, interact to shape our orientation to the future and our acceptance or rejection of various science□based interventions. Our initial request seeks support for two early phases in our research program: a) further developing a detailed theoretical framework; b) running scoping studies involving 1 or 2 initial surveys and 1 or 2 focus groups	Focus groups. Needs to be assessed as to whether falls under IRB	*Year 1= $67,233 AU = $58.3K US* This is a leadin to a 3 year program that will involve surveys and WSs that has not been cost estimated.

The Trust Machine	University of New South Wales at the Australian Defence Force Academy, Canberra, AU) and Eleni Petraki (Faculty of Arts and Design, University of Canberra, AU	The focus of this effort is to build a synthetic environment (test bed) and trust game to conduct a series of studies that explore the boundary constraints of trust. Abbass is a computer scientist with noted expertise in adversarial red teaming using agent-based models and in modeling and evolving human behavior and emotions.		*3 year effort $847,325 AU ($746,381US)* *Y1: $313,550AU* *Y2: $263,688AU* *Y3: $270,087AU*

Appendix 1 Nov Asian Trip Itinerary

ASIAN TRIP
(Rev 3.0 Nov 2 2014)

Mon Nov 10: **SINGAPORE: National University of Singapore (NUS)**
1300 Ashley Fulmer Department of Psychology RM: AS4-02-27
afulmer@nus.edu.sg TEL: (65) 6516 7765
1500 School of Sociology: Trevor Penney (penney@nus.edu.sg) &
Ya Hui Michelle See (psysyhm@nus.edu.sg) 10 Kent Ridge
Crescent Rm AS4#02-08 across from general office

Tue Nov 11: **Singapore: Nanyang Institute of Technology (NTU):**
1000 Soon Ang, Dir, Center for Innovation Research in Cultural
Intelligence & Leadership, Nanyang Business School. 50 Nanyang Ave,
Blk S3, Level One, Section C, Room 93. Tel: (65) 6790-5993 (Lace)
ASANG@ntu.edu.sg

1300 Rohan Gunaratna Dir, The International Centre for Political Violence and Terrorism Research (ICPVTR) at the S. Rajaratnam School of International Studies (RSIS)
isrkgunaratna@ntu.edu.sg Irene Tan (secretary) +65 6316 8925
or Mr. Vikram at +65 6316 8928 (Receiving Officer)

1600? Meeting + Dinner Location TBD

Mark Woodward (Arizona State U), MARK.WOODWARD@asu.edu
Hani Mohamed, CEO, Alertist miss.hani.mohamed@gmail.com

Wed Nov 12 **SINGAPORE**

0830-1030 @Hilton meet with **Hussein Abbass**
10:45 @Hilton David Chan davidchan@smu.edu.sg
Lee Kuan Yew Fellow, School of Business, Singapore Management University, (+65)6790 4717
1515 DEP SIN TR2458 ARR KUL 1615 tigerair
1630 Light Rail to **HILTON KL**

Thu Nov 13 **KL**

10-1300 **Halimahtun Khalid**, Dami Sciences LTD,
Suite C-10-4, Wisma Goshen, Plaza Pantai,
No 5., Jalan 4/83A, Off Jalan Pantai Baru,
59200 Kuala Lumpur
mahtunkhalid@gmail.com1

1400 SUNWAY U. **Mei-Hua Lin & Michelle Lee** Dept of Psych, mhlin@sunway.edu.my

Fri Nov 14 **KL**

0830-1000 @Hilton **Prof Noraini Noor** reninoor@yahoo.com
1030-1200 **Norhayati Zakaria & Shafiz Yusof**
College of Law, Government, and International Studies Universiti Utara Malaysia Sintok, 06010 Kedah Malaysia
1030-1130 Transport to, Kuala, Lumpur
1430-1630 **MIMOS** (National R&D centre in Info and Comm Technologies (ICT)
David Wortley, davidwortley@hotmail.com
Institute for Gamification and Enabling Technologies
Mobile: +60 11 2318 0284 (Malaysia) Universiti Putra Malaysia in Selangor
Possibly Rahinah Ibrahim and Normahdiah Sheik Said
TBD **DEP** for KUL (~45 min)

1900 **DEP for Sing** TR2465 DEP KUL ARR SIN@2010
Overnight @ Crown Plaza Chengi

Sat Nov 15 **DEP @0610 UA 9674 (ANA 802) ARR Tokyo NRT 1400**
Bus to ANA- Taxi to Hardy Barracks Confirmation #34858

Sun Nov 16 **FREE**

Mon Nov 17 **Tokyo**
0800-0900 AOARD. Visits to
0900-1100 @AOARD Ryozo Yoshino, yoshino@ism.ac.jp
1100-1230 Leave for NDA
1230-1330 Lunch with Akiro Namatame
1330- @ NDFA with Prof Namatame nama@nda.ac.jp

Tues Nov 18 **Tokyo**
O800-0900 @AOARD
0910-0930 Leave for Chiyoda Campus, Hitotsubashi U (20 min Taxi)
0930-1130 Toshio Yamaguishi, yamagishitoshio@gmail.com
1300 @AOARD

Wed Nov 19 DEP **Tokyo**

APPENDIX 2

CURRICULUM VITAE

KENNETH R BOFF

CURRICULUM VITAE

Kenneth Richard Boff

8260 Barton Farms Blvd - Sarasota FL 34240
941-706-2455
krboff@gmail.com

POSITIONS:

- Principal Scientist, Socio-Technical Sciences 2009-
- Principal Scientist, Tennenbaum Institute, Georgia Institute of Technology 2007-2012
- Senior Technical Advisor, Asian Office of Aerospace Research and Development, Tokyo, Japan 2007-2010
- Independent Consultant 2007-
- Chief Scientist, Human Effectiveness Directorate, Air Force Research Laboratory. Wright-Patterson Air Force Base, OH 1997-2007
- Director, Fitts Human Engineering Division, USAF Armstrong Lab Wright-Patterson Air Force Base, OH 1991-1997
- Director of Design Technology, Aerospace Medical Research Laboratory 1988-1991
- Engineering Research Psychologist, Aerospace Medical Research Laboratory. Wright-Patterson Air Force Base, OH 1980-1988
- Research psychologist. AF Human Resources Laboratory Wright-Patterson Air Force Base, OH 1977-1980

EDUCATION:

Ph.D.	Experimental Psychology, Columbia University	1978
M.Phil.	Experimental Psychology, Columbia University	1975
M.A.	Experimental Psychology, Hunter College (CUNY)	1972
B.A.	General Psychology, Hunter College (CUNY)	1969

PROFESSIONAL ACTIVITIES AND MEMBERSHIPS:

- Technical Advisory Board Member: Army Research Laboratory 2013 -
- Chair, National Academy of Sciences, Soldier Systems Panel 2013 -
- Advisory Board: Southeast Asian Network of Ergonomic Societies Conference. Lankawi, Malaysia. 2012 -
- Panel Member: National Academy of Sciences, Soldier Systems Pane2011-
- Technical Auditor, R&D portfolio of the Center for Behavioral Sciences, Liberty Mutual Insurance Co, Hopkinton, Ma 2010
- Panel Member: FAA Research Engineering Development Advisory Committee to assess cultural impacts of NextGen: The redesign and development of the Next Generation National Aerospace Management System 2010-2011
- Human Computer Interaction and Visualization Advisory Board, University of Kaiserslautern, GE (Annual meeting) 2007-2011
- Technical Reviewer, AFOSR MURI on Socio-Cultural Modeling 2008-2010

- Chair, International Workshop on The Etiology and Impact of Digital Natives on Societies, Culture and Commerce, Korean Advanced Institute for Science & Technology (KAIST). Taejon, SK. 2009
- Chair, International Work Shop on Culture: Affect, Behavior and Cognition. Langkawi, Malaysia 2008
- Chair, FAA Human Factors R&D Advisory Committee 2007-2009
- Steering Committee: International Federation of Automatic Control (IFAC) Seoul, South Korea 2006-2007
- Steering Committee: HCI International 2007, July, Beijing, PRC 2006-2007
- Steering Committee: Int'l Conference on Human-Computer Interaction in Aeronautics (HCI-Aero 2006), Sept 2006, Seattle WA 2005-2006
- Associate Editor, Information-Knowledge-Systems Management Journal 2004-
- Editorial Board, Handbook of Human Factors, Wiley & Sons 2003-2005
- Steering Committee: HCI International 2005, July, Las Vegas NE 2004-2005
- Steering Committee; Intl Conference on Work with Computing Systems, Sarawak, Malaysia 2003-2004
- Steering Committee; International Symposium of Aviation Psychology, Dayton, OH 2002-2003
- Steering Committee: HCI International 2003, June, Crete, GR 2002-2003
- Co-Chair: RTO Symposium on the Role of Humans in Automated Systems. Oct 2002; Warsaw, Poland. 2002
- Member, NATO Technical Group on Battle Space Visualization: Paris, Amsterdam 2000-2002
- Organizing Committee, Int'l Conference on Human-Computer Interaction in Aeronautics (HCI-Aero 2000); Toulouse, FR 1999-2000
- Chair, RTO Symposium on Usability of Information in Battle Management Operations. April, Oslo, Norway 2000
- Organizing Committee, IEEE Computer Society Symposium on Human Interaction With Complex Systems '00, Champaign-Urbana IL 1998-1999
- Steering Committee, 8th Computer Generated Forces Conf. Orlando Fl 1998-1999
- Director, Putting Technology To Work Workshop; Sinclair College 1998
- Organizing Committee, IEEE Computer Society Symposium on Human Interaction With Complex Systems '98, Dayton OH 1997-1998
- Steering Committee, HCI International '00 1998-
- US National Coordinator and HF Chair, NATO Research & Technology Organization (RTO), Human Factors and Medicine Panel 1997-2003
- US National Coordinator, NATO AGARD Aerospace Medicine Panel 1997
- Steering Committee, HCI –Aero 98; Montreal CA 1997-1998
- Steering Committee, IEEE Info Visualization 98 1997-1998
- Steering Committee, HCI International '99 1997-1999
- Steering Committee, 2nd Conference on IE Applications and Practices 1997
- Technical Advisor, IEEE Science, Engineering & Technology Congressional Visits Day (16-17 Apr 97) 1997
- Advisory Committee, ASEAN Ergonomics 97, Kuala Lumpur, Malaysia 1996-1997

- Steering Committee, IEEE Visualization 97. Phoenix AZ 1996-1997
- USAF Principal Member, Human-Centered Systems Committee, National Science and Technology Council (NSTC) 1996-
- Steering Committee for Establishment of Ohio Regional Center for Information Technology 1996
- Session Chair, Ergonomics Society Annual Conference on *Cognitive Quality in Advanced Crew Systems Concepts (United Kingdom)* 1996
- Editorial Board of *Handbook of Applied and Engineering Psychology* 1996
- Organizing Committee, IEEE Computer Society Symposium on Human Interaction With Complex Systems, Dayton OH 1996
- Chair, Organizing Committee NATO AGARD Symposium on Crew Collaboration, Oslo, Norway, 1996-1998
- Chair, Membership Committee; Human Factors & Ergonomics Society 1995-1997
- Program Board: IEEE Int'l Conference on Human-Computer Interaction (August 1997) 1995-1997
- Editorial board: *International Journal of Cognitive Ergonomics* 1995-2003
- External Reviewer: Wright-State University Regional Strategic Plan 1995
- HSI Chair, DOD Infrastructure Review 1994
- Editorial board: *Handbook of Human Factors* (Wiley & Sons) 1994-1996
- Chair, DOD Human Systems Interface Panel 1994-1998
- Chair, Joint Directors of Labs Human Systems Interface Panel 1992-1994
- Chair, NATO AGARD Working Group 20 on 3-D Surface Anthropometry, 1992-1995
- Technical Coordination Program Action Group 13: Human Systems Integration (TTCP-UAG-13) 1992-1993
- Consultant, National Academy of Sciences/National Research Council: Panel on Human Error 1992
- Chair, Human Factors Committee, NATO AGARD, Aerospace Medical Panel 1991-1997
- Member, Scientific Task Planning Group for development of the Aviation Human Factors National Plan - Federal Aviation Administration 1990
- Steering Committee: International Conference on Human Factors in Design for Manufacturability and Process Planning. Honolulu, Hawaii 1990
- Member, NATO Defense Research Group, Panel 8 RSG on Human Error 1990
- Chair, Steering Committee for Crew Systems Ergononics Information Analysis Center 1990-2003
- Peer Reviewer, member, IEEE Systems, Man, and Cybernetics Society 1987-1997
- Member, National Research Council/National Academy of Sciences: Sponsor Committee on Human Factors 1987-2004
- Member, Office of the Under Secretary of Defense/Defense Logistics Agency: Executive Policy Board for Information Analysis Centers 1987-1991
- Member, Panel on Human Factors Specialist Utilization and Education National Research Council/National Academy of Sciences 1987-1990
- Member, Visual Simulation Committee of the Tri-Service Simulation Technology Advisory Group 1987-1989
- Review Board: USAF Air Safety Mishap Panel 1987-1989

- Chairman: Tri-Service Human Factors Technology Advisory Group (TAG):
  - Human Engineering Guidelines Committee 1987-1989
  - Design Support Systems Committee 1986-1988
- Project Officer: Air Standardization Coordinating Committee Working Party 61 - Proj 113, Aeromedical Aspects of Vision &Visual Enhancement 1983-1985
- Reviewer, Applied Vision Association (UK) 1980-1986
- Peer Reviewer Human Factors & Ergonomics Society 1977-2007
- Consulting and critical program review for NASA, FAA, Army Research Institute, Army MANPRINT Office, and AF Aeronautical Systems Center 1977-1991

AWARDS AND HONORS:

- Presidential Rank Award (Nominated by the Secretary of the AF) 2007
- IEEE Senior Member 2004
- Edenfield Executive in Residence; Georgia Institute of Technology 2002-2004
- NATO Scientific Achievement Award 2003
- NATO RTO/HFM Panel Excellence Award 2002
- Fellow, International Ergonomics Association (IEA) 2000
- Fellow, Human Factors & Ergonomics Society 1997
- Department of Defense, Certificate of Merit, Joint Logistics Commanders 1996
- Department of Defense, Technology Transfer Award 1993
- Directors Award, Armstrong Laboratory 1991
- US Patent: Rapid Communication Display Technology, (#4,845,645) 1989
- Scientific and Engineering Technical Achievement Award, Air Force Systems Command 1989
- Best Paper Award - Human Factors Society 1988
- Meritorious Award for Program Management 1985
- Rank Prize award, Cambridge University, UK 1984
- Columbia University Graduate Fellowship 1972-1976

CITATIONS:

- Who's Who in the USA
- Who's Who in America
- Who's Who in the World
- Who's Who in Science & Engineering
- Who's Who in Frontier Science and Technology
- Who’s Who of Emerging Leaders in America
- Who's Who in the Midwest
- Who’s Who in Society
- Dictionary of International Biography
- International Who's Who of Contemporary Achievement
- Personalities of America

SPECIALIZED TRAINING:

- Managing the Process Enterprise, Hammer & Co, Cambridge, MA 2004
- Vanguard Information Technology & Innovation Workshops 2000-2004
- Management of Technology & Innovation, CalTech, Pasadena CA 2002
- Understanding the S&T Enterprise, Brookings Institute, Wash DC 1999
- Marketing Management, WPAFB 1999
- Competitive Technological Intelligence, Georgia Institute of Technology 1998
- Seven Habits of Highly Effective People, Steven Covey 1998
- First Things First, Steven Covey 1997
- 101 Practices of World Class R&D Management, WPAFB 1995
- USAF Acquisition Professional Development Program, Level III 1994
- Public Policy Challenges Facing DOD, Brookings Institute, Wash DC 1994
- Leadership: Creating Opportunity with a Changing Workforce**,** WPAFB 1994
- Liberation Management, Tom Peters 1993
- Systems Engineering, AFIT, WPAFB, OH 1992
- Acquisition Management, AFIT, WPAFB, OH 1992
- Human Resource Management Today, American Management Association 1992
- Issues in Science & Technology for Science Executives, Brookings Inst 1990
- Total Quality Management, Deming 1989
- Advanced Human Factors Engineering, University of Michigan 1977

SIGNIFICANT ACCOMPLISHMENTS:

R&D Leadership & Management:

- Senior Mentor and advisor: AFRL International Program encompassing technical agreements with 39 countries 2006-2007
- HE Chief Scientist responsible for quality and value performance of ~$200M/yr R&D portfolio. 1997-2007
- Established AFRL thrust on Revolutionary Human Optimization to capitalize on advances in psycho-pharmacology, robotics and augmented cognition 2005-2007
- Conceived and established the Defense Cognitive Systems Engineering Center under the Dayton-based Wright Brother's Institute. 2001-2007
- Chief of the USAF Armstrong Laboratory Human Engineering Division responsible for breakthrough advances in helmet mounted systems, night-vision systems and advanced crew station concepts. 1991-1997
- Established US/UK MOU on Helmet Systems Technology (VISTA Warrior, Nunn Amendment Program) 1996-2001
- Project Manager: US-Sweden MOU on Air Crew Protection and Performance 1995-2007
- Established: US-French MOU for Super Cockpit Technologies (Nunn) 1993-1997
- Establishing and chaired tri-services/DARPA planning group for Human Systems Interface Technologies. Successfully fielded Master Plan for the $200M FY95 Program for OSD and Congress. 1994-1995
- Lead the formation of the joint service Reliance Human Systems Interface Technology Panel (HSI) and served as first Chairman 1992-1997
- Assembled and managed multi-agency consortia (including Army, Navy, 1980-1991

Air Force, NASA, FAA, and NATO AGARD) resulting in principal funding and support of four major research and analytic study projects.

- Conceived, proposed and founded the Crew System Ergonomics Info 2006 Analysis Center (CSERIAC)at Wright-Patterson AFB.An internationally recognized, information and technology clearing house for DoD. 1987-

PATENTS AND PUBLICATIONS:

PATENT: Rapid Communication Display Technology, (1989) US Patent #4,845,645

Boff, K.R. (2015). A perspective on the changing nature of R&D investment and collaboration in the Asian-Pacific. *Information, Knowledge, Systems Management*. Expected Spring 2015

Rouse, W.B., & Boff, K.R. and Sanderson, P (2012). Complex socio-technical systems - Understanding and influencing the causality of change. IOS Press: Amsterdam

Rouse, W.B., & Boff, K.R. (2011). Cost-benefit analysis of human systems investments. In G. Salvendy, (Ed.), *Handbook of Human Factors and Ergonomics. (Fourth Edition)* New York, NY: John Wiley & Sons, Inc.

Boff, K.R. (2006). Revolutions and shifting paradigms in human factors and ergonomics. *Applied Ergonomics*. 37, 391-399.

Rouse, W.B., & Boff, K.R. (2006). Value-Centered R&D. In Rouse W.B. (Ed). Enterprise transformation: Understanding and enabling fundamental change. Wiley, New York.

Rouse, W.B., & Boff, K.R. (2006). Cost-benefit analysis of human systems investments. In G. Salvendy, (Ed.), *Handbook of Human Factors and Ergonomics. (Third edition)* New York, NY: John Wiley & Sons, Inc.

Rouse, W.B., & Boff, K.R. (Eds) (2005). *Organizational simulation. From modeling and simulation to games and entertainment* Wiley, New York.

Rouse, W.B., & Boff, K.R. (2004). Value-centered R&D organizations. Ten principals for characterizing, assessing, and managing value. *IEEE Systems Engineering*. 7(2), 167-184.

Rouse, W.B., & Boff, K.R. (2003). Value Streams in Science and technology: A case study of value creation. Information and intelligent tutoring systems – knowledge- Systems Management. *IEEE Systems Engineering*. 6(2), 76-91.

Rouse, W.B., & Boff, K.R. (2003). Cost/Benefit analysis for human systems integration - Assessing and trading off economic and non-economic impacts of HIS. (Booher, H.R. (ED). *Handbook of Human Systems Integration*. John Wiley & Sons. New York: NY.

Rouse, W.B., & Boff, K.R. (2001).Impacts of next-generation concepts of military operations on human effectiveness. Information – knowledge- Systems management. 2(2001). 1-11.

Rouse, W.B., & Boff, K.R. (2001). Strategies for value: Quality, productivity and innovation In R&D/technology organizations. Systems Engineering, 4(2). 87-106.

Rouse, W.B., & Boff, K.R. (2000). Cost/benefit challenges: How to make the case for

Rouse, W.B., & Boff, K.R. (1999). Making the case for investments in human effectiveness. Information - Knowledge - Management. 1(3). 225-247.

Rouse, W.R. and Boff, K.R. (1998). R&D/Technology management: A framework for putting technology to work. *IEEE Transactions on Systems, Man, and Cybernetics, Part C: Applications and Reviews.* 28 (4), 501-515.

Rouse, W.R. and Boff, K.R. (1998). Knowledge Maps for knowledge mining: Application to R&D/Technology management. *IEEE Transactions on Systems, Man, and Cybernetics, Part C: Applications and Reviews*. 28 (3). 309-317.

Rouse, W.R. and Boff, K.R. (1998), Human Factors of Design. *Ergonomics in Design, The Magazine of Human Factors Applications*. 6 (1), 11-17.

Rouse, W.R., Boff, K.R., and Sutley Thomas, B.G. (1997). Assessing cost/Benefits of research and development investments. *IEEE Transactions on Systems, Man, and Cybernetics, Part A: Systems and Humans.* 27 (4), 389-401.

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Calhoun, G.L., Arbak, C., and Boff, K.R. (1984). Eye controlled switching for crew station design. *Proceedings of the 28th Annual Meetings of the Human Factors Society,* 1, 258-262.

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Boff, K.R. and Martin, E. (1980). Aircrew information requirements in simulator display design: The integrated cueing requirements study. *Proceedings of the 2nd Inter--Service/Industry Training Equipment Conference*. Washington, DC: National Security Industrial Association. 355-362.

Boff, K.R. (1979). Part-task trainer for the F-106A MA-1 radar-infrared fire control system: field evaluation of acceptance and utilization. Air Force Human Resources Laboratory Technical Memo.

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Boff, K.R., and Matin, L. (1977). Velocity independence of vernier offset produced by rotary target motion. *Supplement to Investigative Ophthalmology & Visual Science*. Vol 22 (4).

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CHAIRED WORKSHOPS AND PROFESSIONAL SHORT COURSES

- Chair and prime organizer of the Workshop on Interdisciplinary Workshop on Influence and Persuasion in the Formation and Sustainment of Social-Fringe Groups. Kuching, Malaysia. Feb 2012.
- Chair and prime organizer of the Workshop on "Understanding and influencing the causality of change in complex socio-technical systems. Queensland, Australia. Feb 2011.
- Senior Mentor: Interdisciplinary workshop on society, culture and language, University of Plymouth, UK. Nov 2010.
- Senior Mentor: Workshop on methodological and theoretical issues in the study of values in Islamic countries. Cairo, Egypt. Jun 2010.
- Chair & Principal Organizer, The Etiology and Impact of Digital Natives on Societies, Cultures and Commerce. Korean Advanced Institute of Science and Technology (KAIST), Taejeon, SK. November 2009
- Chair & Principal Organizer, Culture: Affect, Behavior and Cognition. A Multi-disciplinary WS. Lankawi, Malaysia, December 2008
- Director, WS on Organizational Simulation, Clearwater, FL, December 2003
- Director, Strategies for Value WS. Atlanta GA, June 2001
- Director, Getting to Value: Enhancing Quality, Productivity and Innovation; Dayton OH, Nov 2000
- Director, Planning for Innovation WS; Stone Mountain, GA, Feb 2000
- Director, Putting Technology To Work Workshop; Sinclair College, Dayton OH, October, 1998
- Chair: *3-D Surface Anthropometry Working Group*. NATO AGARD, April 1993-1995
  Wright-Patterson AFB OH, April 1995
  Universite Rene Descartes a Paris, Paris, France, October 1994
  National Research Council, Ottawa, Canada, April 1994
  Escola Do Servico De Saude Militar, Lisbon, Portugal, October 1993
  DKFZ, Heidelberg, Germany, April 1993
- Director: Short Course - *Human Factors: Case Studies & Applications in Engineering Design* Crew System Ergonomics Information Analysis Center (CSERIAC). Dayton, OH; June 1990.
- Director: Short Course - Engineering for Man-Machine Systems: Human Performance for System Designers. The University of Dayton. Dayton, OH, June 1988.
- Director: Short Course - *Human Engineering Design Considerations for Aircrew Station Modification*; NATO AGARD, June 1988.
  Escola Do Servico De Saude Militar, Lisbon, Portugal.
  War Museum. Athens, Greece.

Delft University of Technology. Delft, Netherlands.

- Co-Director: *The Psychology of System Design Workshop*, Lake Lanier, GA, March 1986.
- Director: *Human Perception and Performance* Workshop for System Designers. The University of Dayton, Dayton, OH; June 1986.
- Director: *Automated Information Management Technology Workshop*. Dayton, OH; April 1984.
- Director*: Integrated Perceptual Information for Designers Workshop*. Air Force Institute of Technology, Wright-Patterson AFB, OH; March 1981.

KEYNOTES, INVITED COLLOQUIA AND SPECIAL PRESENTATIONS:

Invited Colloquium: Implementing Human Factors in Complex Adaptive Systems. University of Linkoping, Linkoping SW. April 2009

Invited Presentation: Challenges Implementing "Effective" HCIV Solutions in Complex Systems. Fraunhofer Institute, Kaiserslautern GE. March 2009

Invited Keynote Address: Complex Systems Perspective on the Revolution in Human Performance Optimization. Complex 2007, Gold Coast AU

Invited Keynote: Revolutions in human system integration: Exploring the impacts of rapidly shifting paradigms. HCI-Aero 2006. Seattle WA. Sept 2006

Invited Keynote: Revolutions and shifting paradigms in human factors and ergonomics. 50th Anniversary Meeting of International Ergonomics Association. Maastricht, NE. July 2006

Invited Presentation: Swedish Defense Research Agency (FOI). Linkoping, Sweden. June 2006

Invited Keynote: From HSI to CSI: Homunculus redux? International Conference on Augmented Cognition, Las Vegas, NE. July 2005

Invited Speaker: MANPRINT: Transforming for the soldier workshop. Arlington, VA. 2004

Invited Colloquium: Mind over matter: Cognitive science, modeling and engineering in the Air Force. Georgia Institute of technology. Atlanta GA. October 2002

Invited Keynote: Human factors R&D: A strategy for the new millennium. ASEAN Ergonomics '2000. Singapore, November 2000.

Invited Capstone Speaker. How abstract is too abstract? How real is too complex? *CODATA Euro-American Workshop, "Visualization of Information and Data, Where are We and Where Do We Go From Here?*," Paris, FR. June 1997

Invited Speaker, EuroVis Symposium. University of Kaiserslautern, GE, June 1997

Invited Plenary Address. Human technology integration: A framework for the future. *AGARD 2020 Spring Symposium*, Paris, FR. April 1997.

Invited Presentation: (with W.R. Rouse) *"Support to cost-effectiveness assessment in systems acquisition,"* Joint US/UK workshop on Human Factors. San Diego CA, February 1997

Invited Presentation: *"Making the Case for Human Factors"*. National Academy of Sciences Workshop. Wash DC, December 1996.

Invited Keynote Address: Making visualization work: how abstract is too abstract - how real is too complex? *IEEE Symposium on Information Visualization*. San Francisco CA, October 1996.

Invited Keynote Address: Complex system interfaces: some chokepoints on the road from theory to applications. *IEEE Computer Society Symposium on Human Interaction with Complex Systems*. Dayton OH, August 1996

Invited Keynote Address: Human Engineering: Advanced Human System Interface Technologies, *Fifth International Conference on Human-Machine Interaction and Artificial Intelligence in Aerospace*, Toulouse, France. September 1995

Invited Keynote Address: Human Engineering In the US Air Force: *Conference on Human Factors in Aviation*, Linkoping Technical University, Linkoping, Sweden. May 1995

Invited Presentation: Human factors in the US Air Force. National Academy of Sciences, Human Factors Committee. Wash DC, April, 1995.

Invited Keynote address: Ergonomics & Military Performance. Presented at the *35th NATO DRG Seminar on Improving Military Performance Through Ergonomics*, Mannheim, GE, September 1994.

Colloquium: *Human Factors in the Wild: A Profile of the Fitts Human Engineering Division.* Wright State University, Departments of Human Factors and Computer Sciences, Dayton, OH, April, 1994.

Colloquium: *Usefulness and Usability of Human Factors Data*: University of Toronto, Canada, December 1993

Invited Address: Ergonomics in Motor Vehicle Manufacturing, Issues and Opportunities. *Motor Vehicle Manufacturer's Association Symposium*, Livonia, MI, June, 1992.

Colloquium: *Human Factors in System Design*. The HUSAT Research Centre,

Leicestershire, UK, November, 1989.

Invited Address: *Integration of Human Factors Research with Systems Development.*
1. DCIEM. Toronto, Canada. February, 1989.
2. Canadian National Research Council. Ottawa, Canada, February 1989.

Invited Address: *Crew System Ergonomics Information Analysis*. National Research Council. Washington, DC, March, 1989.

Invited Address: Human Factors in Design. *The Fourth Mid-Central Ergonomics/Human Factors Conference*, University of Illinois, Champaign-Urbana, IL, July, 1987.

Colloquium: *Human Factors: From Research to Applications*. CERMA. Paris, France, September 1987.

Colloquium: *Engineering of Ergonomics Knowledge.* RAF Institute of Aviation Medicine. Farnborough, UK, September 1987.

Colloquium: *Aiding the Design of Complex Human System Interfaces*. The Human Sciences and Advanced Technology Research Center (HUSAT). Loughborough, England, December 1987.

Colloquium: *Usability of Human Performance Data for System Design*. MRC Applied Psychology Unit, Cambridge, England, December 1987.

Colloquium: *Integrating Perceptual Information into Interface Design*. XEROX EUROPARC. Cambridge, England, December 1987.

Colloquia: *Human Performance in System Interface Design:* Japan, April 1985.
University of Tokyo, Komaba, Tokyo
University of Kyoto, Kyoto
University of Osaka, Toyonaka, Osaka
Aichi Institute of Technology, Toyota
Hosei University, College of Engineering, Tokyo
Hitachi Ltd., Kokubunji, Tokyo
Japanese Auto Research Institute, Tsukuba

Computer-Aided Systems Human Engineering: A Hypermedia Design Tool. *35th Annual Human Factors Society Meeting*, San Francisco, CA, September, 1991.

Understanding the Usefulness and Usability of Technical Information. *NATO/AGARD Technical Information Panel.* Brussels, Belgium, November, 1989.

Matching Crew System Specifications to Human Performance Capabilities, *NATO AGARD*. Stuttgart, Germany, September 1987.

Factoring Ergonomics Data into System Design. *Symposium of Air Standardization Coordinating Committee, WP 10,* RAF North Luffenham, Stamford, Leicestershire, UK, September 1986.

Information Transfer From Research to Applications: The Roles of Archival Publications. *IEEE International Conference on Systems, Man, and Cybernetics*. Atlanta, GA, October 1986.

Invited Address: Human Performance Considerations in the Display of Information in Depth. *Rank PrizeConference: Biological and Engineering Aspects of Visual Hyperacuity, Depth Perception and 3-D Displays*. Trinity College, Cambridge, England, January 1984.

A Philosophy for Integrated Perceptual Information for Designers. *Annual Meetings of the American Psychological Association*., Anaheim, CA, September 1983.

Advanced Display Concepts and Integrated Perceptual Information for Designers. *NASA Human Role in Space Workshop*. Leesburg, VA, August 1982.

Advanced Applications for 3-D Perception. *First Annual Adelphi University Applied Experimental Psychology Conference*, New York, NY, October 1982.

Colloquium: *Use of Perceptual Data in Display Design*. Graduate Psychology/Human Factors Program, Wright State University, Dayton, OH, May 1981.

The Use of Perceptual Data in Training Device Design. *Annual Meeting of the American Psychological Association*. Montreal, Canada, September 1980.

Invited lectures: *Pilot Cues and Psychological Aspects of Flight Simulation,* AIAA/University of Dayton, Dayton, OH, March/October 1980.

Colloquium: *Visual Perception and Dynamic Computer Generated Images.* Electrical Engineering and Psychology Departments, University of Rhode Island, April 1980.

Invited Lecture: *Visual Perception and Flight Simulation, Graduate Psychology/Human Factors Program,* Wright State University, Dayton, OH, May 1980.

Integrated Perceptual Information for Designers, *Bi-Annual Human Factors Technology Advisory Group,* New Orleans, LA, October 1980.

Integrated Cueing Requirements Study. *2nd Interservice/Industry Training Equipment Conference*, Salt Lake City, UT, 1980.

Vernier Offset Resulting from Induced Visual Latency. *Association for Research in Vision*

and Ophthalmology, Sarasota, FL, May 1979.

Integrated Cueing Requirements for Flight Simulation. *Annual Meeting of the American Psychological Association*, New York, NY, September 1979.

Integrated Cueing Requirements for Flight Simulation, *NATO/AGARD Working Group 10*, Orlando, FL, November 1979.

Orientation Dependence of Vernier Distortion and Vernier Acuity. *Association for Research in Vision and Ophthalmology*, Sarasota, FL, May 1978.

Orientation Selectivity for Processing of Vernier Offsets. *Annual Meeting of the Eastern Psychological Association*, Washington, D.C., 1978.

Velocity Independence of Vernier Offset Produced by Rotary Target Motion. *Association for Research in Vision and Ophthalmology*, Sarasota, FL, May, 1977.

An Illusion of Vernier Offset with Rotating Targets. *Annual Meeting of the Eastern Psychological Association*, New York, NY, September, 1974.