Priority Action Report

Speaker Recognition

Digital Multimedia SAC

Dr. Hirotaka Nakasone, Chair

Dr. Joe Campbell, Presenter

22 Feb 2016

Subcommittee Leadership

Position	Name	Organization	Term	Email
Chair	Hirotaka Nakasone	FBI	2	hirotaka.nakasone@ic.fbi.gov
Vice Chair	James L. Wayman	San Jose State University	3	JLWayman@aol.com
Executive Secretary	Peter Higgins	Higgins Associates, Int'l	4	peter@higgins-biometrics.com

Subcommittee Members

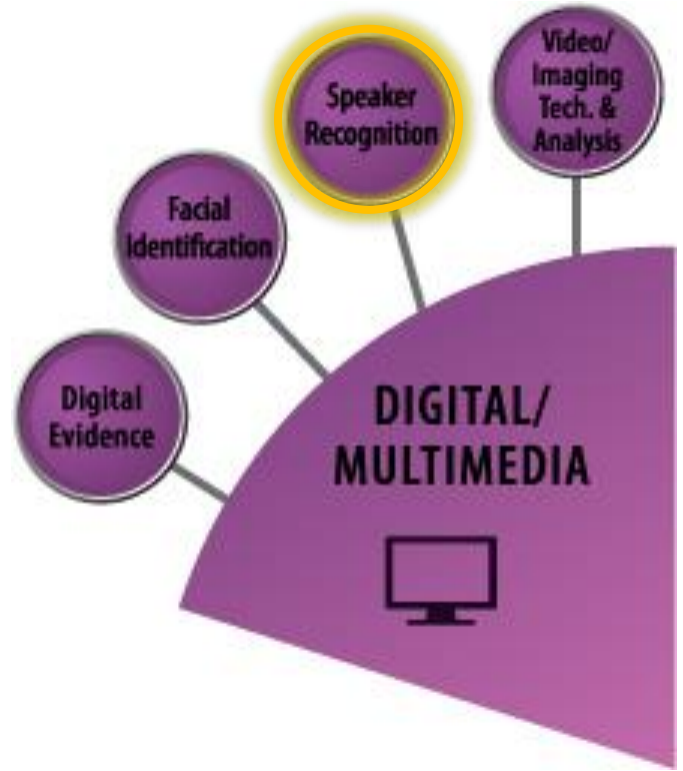| #	Name	Organization	Term
1	Aaron Lawson	SRI	2
2	Alvin Martin	NIST	2
3	Chris Cieri	Linguistic Data Consortium, U Penn	4
4	David Farris	U.S. Govt	2
5	David Marks	Sandia National Laboratories	3
6	Dorothy Glancy	Santa Clara University School of Law	4
7	Douglas Reynolds	MIT Lincoln Laboratory	2
8	Hirotaka Nakasone	FBI	2
9	Jack Godfrey	JHU	2
10	Jim Wayman	San Jose State University	3
11	Joe Campbell (DMSAC)	MIT Lincoln Laboratory	2
12	John Hansen	University of Texas at Dallas	3
13	Ken Marr	FBI	3
14	Kevin Farrell	Nuance Communications	3
15	Mitchell McLaren	SRI	4
16	Oscar Morales	U.S. Govt	3
17	Pedro A. Torres-Carrasquillo	MIT Lincoln Laboratory	4
18	Peter Higgins	HAI	4
19	Raymond Slyh	Air Force Research Laboratory	4
20	Reva Schwartz (DMSAC)	NIST	2
21	Stephen Gibbs	U.S. Govt	2
22	Walter Andrews	BBN/Raytheon	3

Subcommittee International Partners

- **Currently, our international guests are invited from organizations in a variety of countries including Canada, Germany, The Netherlands, South Africa, and the United Kingdom**

Subcommittee Affiliates

- **Interested and qualified individuals may apply to the OSAC for full membership or to become affiliates in the designated subcommittee**
- **Currently, 20 appointed and 20 affiliate members from the U.S. Government, U.S. National Labs, academia, industry, and international partner organizations**

Discipline Description

"**Speaker recognition is the process of comparing human speech samples to determine if they were produced by the same speaker.**"

(Adopted at the OSAC Kick-Off Meeting, Norman, OK., 1/20-22, 2015.)

Subcommittee Purpose and Objectives

Purpose: To support and promote the scientific foundations and practice of speaker recognition, voice data collection, measurement, transmission, and retrieval, through the development and dissemination of consensus-based standards, guidelines, best practices, and recommendations for forensic and investigatory applications

Objectives: Speaker Recognition Subcommittee shall engage in:
- Identifying the *scope, theories, and practice areas* of the disciplines of voice biometrics, speaker identification, voice data collection, measurement, transmission, and retrieval
- Recommending *best practices* for data collection, quality assessment, compression, decompression, transmission protocols, reports, and terminology
- Proposing standard procedures for data interpretation and wording of *conclusions* presented in court
- Suggesting *education,* training, and continuing education requirements for practitioners
- Promulgating and disseminating *research and development priorities* to the community
- Collecting and distributing discipline-specific information on *scientific foundations*
- Seeking *international recognition* and harmonization of appropriate work products

Nine Priority Topic Areas

Priority Topic #	Topic Area
1	Speech collection guidelines for speaker reco applications
2	Recommendations for prioritized research areas
3	Data and evaluation surveys
4	Guidelines for data preparation
5	Guidelines for the use of ANSI/NIST-ITL Type 11 Voice Records
6	Forensic speaker recognition process map
7	Contribution to "Reference Manual on Scientific Evidence"
8	Annotated list of important speaker recognition cases
9	Vocabulary terms for speaker recognition

Topic 1: Speech Collection Guidelines for SR Applications

- **Priority: High**

- **Guidelines for the collection of speech data in a variety of Use Cases including**
  - **Use Case #1: Interrogation in a Criminal Justice Facility**
  - **Use Case #2: Interrogation in the Field**
  - **Use Case #3: Recording from a Body Camera**

Task Group: RDT&E
Task Group Co-Chairs:
Dr. Pedro Torres-Carrasquillo, ptorres@ll.mit.edu
Mr. Stephen Gibbs, segibbs.work@gmail.com

Topic 1: Speech Collection Guidelines for SR Applications

Committee Action Plan

Priority (high/med/low/)	Planned Actions	Approx. Deadline	Assignee
High	"Audio Collection at a Temporary Location" draft document ready for Subcommittee approval at July OSAC meeting Expected to be ready for initial vote at one of the Virtual Meetings first part of 2016	July 31, 2016	RDT&E Task Group Co-Chairs: Dr. Pedro Torres-Carrasquillo Mr. Stephen Gibbs

Topic 2: Recommendations for Prioritized Research Areas

- **Priority: High**
- **Identify general research gaps**
  - **Focus on a set of four scenarios of interest**
- **Identify application-centric research gaps**
- **Document for approval on July 2016 meeting**

Task Group: RDT&E
Task Group Co-Chairs:
Dr. Pedro Torres-Carrasquillo, ptorres@ll.mit.edu
Mr. Stephen Gibbs, segibbs.work@gmail.com

Topic 2: Recommendations for Prioritized Research Areas

Committee Action Plan

Priority (high/med/low/)	Planned Actions	Approx. Deadline	Assignee
High	1st Draft	09/30/2015	RDT&E Task Group Co-Chairs: Dr. Pedro Torres-Carrasquillo Mr. Stephen Gibbs
High	2nd draft	12/31/2015	RDT&E Task Group Co-Chairs: Dr. Pedro Torres-Carrasquillo Mr. Stephen Gibbs
High	Final draft for SR Subcommittee approval	July 27-29, 2016 At Phoenix meeting	RDT&E Task Group Co-Chairs: Dr. Pedro Torres-Carrasquillo Mr. Stephen Gibbs

Topic 3: Data and Evaluation Surveys

- **Priority: High**

- **Three data surveys**
  - o **Catalog available corpora and addressed mismatch conditions**
  - o **Evaluate feasibility of found data such as prison calls and 911 samples**
  - o **Needs for unavailable data based on prioritized research needs**

- **Timeline to be developed prior to the first virtual meeting, approx mid March 2016**

Task Group: RDT&E
Task Group Co-Chairs:
Dr. Pedro Torres-Carrasquillo, ptorres@ll.mit.edu
Mr. Stephen Gibbs, segibbs.work@gmail.com

Topic 4: Guidelines for Data Preparation

- **Priority: High**

- **Create Guidelines for Data Preparation to support best practices for automatic speaker recognition (ASR)**
  - **Focus on computer-centric ASR with a human in the loop**

- **Develop a Forensic SR Process Map (Topic #6)**
  - **Inform the Guidelines for Data Preparation**
  - **Inform best practices for ASR in general**

Task Group: Best Practice
Task Group Co-Chairs:
Dr. Joseph Campbell, jpc@ll.mit.edu
Mr. Kenneth Marr, Kenneth.Marr@ic.fbi.gov

Topic 4: Guidelines for Data Preparation

Committee Action Plan

Priority (high/med/low/)	Planned Actions	Approx. Deadline	Assignee
High	Complete Data Preparation Draft #6 adjudicated draft	1/27/2016	Task Group Co-Chairs Dr. Joseph Campbell Mr. Kenneth Marr
High	Complete Data Preparation Draft #7 adjudicated draft	4/1/2016	Task Group Co-Chairs Dr. Joseph Campbell Mr. Kenneth Marr
High	Complete Data Preparation Draft #8 adjudicated draft	7/29/2016	Task Group Co-Chairs Dr. Joseph Campbell Mr. Kenneth Marr
High	Complete Data Preparation Draft #9 adjudicated draft	12/31/2016	Task Group Co-Chairs Dr. Joseph Campbell Mr. Kenneth Marr

Topic 5: Guidelines for the Use of ANSI/NIST-ITL Type 11 Voice Records

- **Priority: High**

- **Guidelines and recommendations needed for Type 11 Voice Records implementation to enable standardization of voice data transactions by using the "ANSI/NIST-ITL 1-2011 Update: 2013"**

Task Group: Best Practice
Task Group Co-Chairs:
Dr. Joseph Campbell, jpc@ll.mit.edu
Mr. Kenneth Marr, Kenneth.Marr@ic.fbi.gov

Topic 5: Guidelines for the Use of ANSI/NIST-ITL Type 11 Voice Records

Speaker Recognition

Committee Action Plan

Priority (high/med/low/)	Planned Actions	Approx. Deadline	Assignee
High	A designated team within Best Practice Task Group will work with the Department of Defense, Defense Forensic and Biometric Agency and the FBI Criminal Justice Information Services Division	1st draft due 6/1/2015,	Peter Higgins
High	2nd draft	due 9/30/2015	Peter Higgins
High	Final draft (1st voting by SR Subcommittee in progress)	due 2/1/2016	Peter Higgins

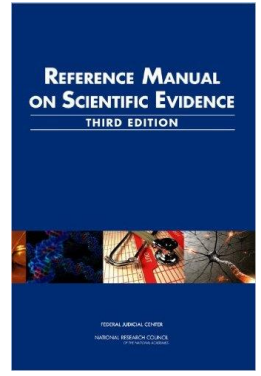# Topic 6: Forensic Speaker Recognition Process Map

- **Priority: High!**

- **Develop a forensic SR process map to structure activities**
  - **Collect process maps from available sources, including Europe**
  - **Consult related process maps from fingerprinting, DNA, etc.**
  - **Hold facilitated meeting to review process maps and draft ours**
  - **Use this to structure our future BP activities, e.g., Topic #4**
  - **Build road map (including a task list)**
  - **Create a Best Practices process map**
  - **Timeline will be determined at the first virtual meeting in mid March 2016**

Task Group: Best Practice
Task Group Co-Chairs:
Dr. Joseph Campbell, jpc@ll.mit.edu
Mr. Kenneth Marr, Kenneth.Marr@ic.fbi.gov

Topic 7: Contribution to the Reference Manual on Scientific Evidence

- **Priority: Medium**
- **Dated and little information on speaker recognition in the "Reference Manual on Scientific Evidence, 3e," NAS, NAP, 2011**
- **Draft a report that recommends the Manual be updated to include the speaker recognition discipline**
- **Work with OSAC's Legal Resource Committee**

REFERENCE MANUAL ON SCIENTIFIC EVIDENCE
THIRD EDITION

FEDERAL JUDICIAL CENTER
NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

Task Group: Legal Aspect of Speaker Recognition (LASR)
Task Group Chair: Prof. Dorothy Glancy, dglancy@scu.edu

Topic 7: Contribution to the Reference Manual on Scientific Evidence

Speaker Recognition

Committee Action Plan

Priority (high/med/low/)	Planned Actions	Approx. Deadline	Assignee
Medium	Recruit legal talent into the LASR Task Group to draft and review the product. It will take about 2 years to produce a final draft.	2/1/2017	Dorothy Glancy

Topic 8: Annotated List of Important Speaker Recognition Cases

- **Priority: High**

- **Provide a sense of trends regarding how the law is treating the discipline**

- **Analysis of "Shepardized" cases explaining to non-technical audiences the importance of the cases, including lawyers, judges and the speaker recognition community**

- **On-going effort in identification of relevant legal precedent, description of case background, and shepardization.**

Task Group: Legal Aspect of Speaker Recognition (LASR)
Task Group Chair: Prof. Dorothy Glancy, dglancy@scu.edu

Topic 8: Annotated List of Important Speaker Recognition Cases

Committee Action Plan

Priority (high/med/low/)	Planned Actions	Approx. Deadline	Assignee
High	Task Group LASR will update the annotated list every 6 months.	Every 6 months	Task Group Chair: Dorothy Glancy

Topic 9: Vocabulary Terms for Speaker Recognition

- **Priority: High**

- **Ad hoc committee focus on the Guidelines for Vocabulary Terms for Speaker Recognition**

- **Initial document contains a total of 208 terms, along with definitions, reference sources, and page/citations**

Task Group: Ad hoc committee
Ad-Hoc committee Lead: Prof. John Hansen
As-Hoc committee members: Dr. James Wayman,
Ms. Reva Schwartz, and Dr. Geoffrey Morrison
Contact information: john.hansen@utdallas.edu

Topic 9: Vocabulary Terms for Speaker Recognition

Committee Action Plan

Priority (high/med/low/)	Planned Actions	Approx. Deadline	Assignee
High	Complete the proof by the Ad-Hoc committee	4/15/2016	John Hansen
High	Distribute the draft to Speaker Subcommittee for comments	4/20/2016	
High	Complete adjudicate comments from Speaker Subcommittee	5/18/2016	
High	Submit the final product to DMSAC	6/15/2016	

Summary

Priority Topic #	Topic Area
1	Speech collection guidelines for speaker reco applications
2	Recommendations for prioritized research areas
3	Data and evaluation surveys
4	Guidelines for data preparation
5	*Guidelines for the use of ANSI/NIST-ITL Type 11 Voice Records*
6	Forensic speaker recognition process map
7	Contribution to "Reference Manual on Scientific Evidence"
8	Annotated list of important speaker recognition cases
9	*Vocabulary terms for speaker recognition*

Great progress on all topics, including nearing completion on 5 & 9!

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OSAC Speaker Recognition
AAFS, Las Vegas, 22 Feb 2016