

DEFENSE INNOVATION BOARD

Open Meeting Minutes

March 05, 2020

2:00PM to 4:00PM

Capital Factory, 701 Brazos St, Austin, TX 78701

The Defense Innovation Board (DIB) is a federal advisory committee within the Department of Defense (DoD) operating pursuant to the Federal Advisory Committee Act of 1972, the Government in Sunshine Act of 1976, and other appropriate federal regulations. The DIB meets quarterly and held its fourteenth public session on March 05, 2020 from 2:00PM to 4:00PM in the auditorium of the Capital Factory, Austin, TX.

DIB Members (voting) (12)

Eric Schmidt
Kurt Delbene
Michael Mcquade
Richard Murray
Mark Sirangelo
Missy Cummings (dial-in)
Danny Hillis (dial-in)
Eric Lander (dial-in)
Marne Levine (dial-in)
Jen Pahlka (dial-in)
Daniela Rus (dial-in)
Neil deGrasse Tyson (dial-in)

DIB Staff Support (non-voting) (8)

Mr. Joshua Marcuse, Executive Director
Ms. Collen Laughlin, Designated Federal Officer
Ms. Schuyler Moore
Ms. Erin Bugg
Maj. Travis Sheets
Ms. Chantae O'Connor
Ms. Cortney Weinbaum

Public Commenters (15)

Igor Alvarado
Lacey Schley
William Theuer
Oliver Parsons
Bernice Glenn
Cierra Keyes
Scott Hayford
Matthew Reyburn
Jerry Castanos
Adam Freeland
Richard Buchter
Brian Cook
Bob Galway
Carlos Sanmiguel

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PUBLIC MEETING OVERVIEW

1. Review **DIB’s current projects**
2. Receive updates from **Science & Technology (S&T) Subcommittee**
 - a. **DIB recommendations: Joint Pathology Center (JPC) Repository Enhancement**
 - b. **Independent DIB assessment: Software Development and Software Acquisition Training and Management Program (NDAA §862)**
3. Receive updates from **Workforce, Behavior, & Culture (WBC) Subcommittee**
 - a. **DIB recommendations: Appointing a DoD Chief Digital Engineering & Recruiting Management Officer (NDAA §230)**
4. Receive a DoD **“Implementation Update”** on past DIB recommendations
5. Hear **comments from the public**, as customary

PUBLIC MEETING SESSION

(please see attached transcript for detailed comments)

1400-1425 Opening Remarks

- Administration & Compliance – Designated Federal Officer, Collen Laughlin
 - The DFO (Collen Laughlin) opened the proceedings with welcome remarks and thanks to the host organization, and a reminder about FACA and the Sunshine Act.
- Introduction & Welcome to Austin – Executive Deputy to Commanding General Army Futures Command, Sue Goodyear
 - The Executive Director (Joshua Marcuse) introduced the board members and provided an overview of the agenda.
- Opening Remarks – Board Chair
 - The Chair (Dr. Eric Schmidt) started the meeting with brief remarks, including an overview of the DIB’s recommendation and introduction of subcommittee updates.

Science and Technology (S&T) Subcommittee Update

1425-1450 Joint Pathology Center

- Dr. Michael McQuade provided an S&T update.
 - Dr. McQuade, S&T Co-Chair, reiterated S&T’s mission and emphasized two current projects: Joint Pathology Center (JPC) and Software Acquisition & Practices (SWAP). He also previewed upcoming projects: Innovative Acquisition Design & Manufacturing Approach, AI Test and Evaluation Validation and Verification, and a space related project.
 - Dr. McQuade provided highlights of JPC findings and proposed recommendations and led Board members to deliberate the issue.
 - Once deliberations were exhausted, the Chair moved to vote on JPC recommendation.

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- The JPC recommendation passed with all in favor.

1450-1515 Software Acquisition & Practices (SWAP)

- Led by Dr. Richard Murray
- Our second recommendation was tasked to the DIB by Congress through the 2020 National Defense Authorization Act (NDAA).
 - Specifically, in Section 862, Congress asked for the DIB to create an independent assessment of the Department's progress implementing software development, software management, and software training programs - very directly related to the DIB SWAP report.
 - Specifically, in Section 862, Congress asked for the DIB to create an independent assessment of the Department's progress implementing software development, software management, and software training programs - very directly related to our SWAP report.
 - Deliberation between members ensued.
- Once deliberations were exhausted, the Chair moved to vote on SWAP recommendation.
- The SWAP Section 862 recommendation passed with all in favor.

1516-1520 Upcoming S&T Project Overview

- Dr. Michael McQuade provided an S&T update of upcoming projects.
 - Dr. McQuade, S&T Co-Chair, reiterated S&T's mission as he previewed upcoming projects: Innovative Acquisition Design & Manufacturing Approach, AI Test and Evaluation Validation and Verification, and a space related project.

Workforce, Behavior, and Culture (WBC) Subcommittee Update

1521-1535 Appointing a DoD Chief Digital Engineering & Recruiting Management Officer (NDAA §230)

- Kurt Delbene kicked off the WBC portion and provided an update on the WBC subcommittee along with WBC Co-Chair Jen Pahlka.
 - Mr. Delbene discussed the §230 provision in the FY20 NDAA and expressed encouragement on the focus on digital talent. This aligns with many of our previous recommendations, including our Workforce Now recommendation which we passed at our October public meeting.
- After presenting key points of this recommendation, other board members deliberated.
- Once deliberations were exhausted, the Chair moved to vote on NDAA §230 recommendation.
- The Appointing a DoD Chief Digital Engineering & Recruiting Management Officer (NDAA §230) recommendation passed with all in favor.

1536-1545 Update: Department Implementation of Recommendations

- Colleen Laughlin led an update and briefed the members on the status of implementation of past DIB recommendations

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1546-1555 Public Comments (2 Minutes Per Presenter)

- Colleen Laughlin prompted the public comment period. Ms. Laughlin noted presenters have up to two minutes, and Board members are not permitted to respond to questions or comments. Ms. Laughlin was the moderator. Board members listened.
- Josh Marcuse announced the end of the public comment period, gave a quick recap of the meeting, provided brief direction for audience, invited the public to attend the winter meeting, and turned to the Chair for final comments.

Colleen Laughlin - Moderated Public Comments (2 minutes per presenter)

PUBLIC COMMENTS

Last Name:	First Name:	Comment:
Alvarado	Igor	Need for an increased effort on supporting dual use/purpose innovative technologies that can serve the different missions of DoD while also having an impact in industry and society as a whole. For example, leveraging 5G and mmWave technologies combined with cloud/edge computing, AI and sensing can have direct impact in our economy, sustainability, (cyber) security and quality of life.
Schley	Lacey	The sustainment community faces unique challenges which new acquisition programs don't necessarily encounter. This also tends to be the largest cost segment of a program's life cycle, so Agile/DevSecOps could provide significant cost savings if applied to sustainment. With the DIB's research into Agile/DevSecOps in terms of application and management, what findings or recommendations do you have for the sustainment community?
Theuer	William	Discuss emergent policy Challenges resulting from OSINT
Parsons	Oliver	Does the DoD have plans to integrate gaming and esports to increase the lethality of the warfighter?
Glenn	Bernice	Vendor vetting and trusted supply chains are critical to the US DOD yet the procurement process, prototype acquisition, and academic outreach processes supporting the warfighter are porous. What requirements will be put in place with accelerators, contract managers, and academic partners to ensure vetting is taking place at all? And when will DSS engage to support industry and contracting managers in this process since they have vetting as their mandate and budget?
Keyes	Cierra	Victim (<i>This is the name of the organization the individual is with</i>) information about upcoming meeting.
Hayford	Scott	What is the DIB recommending to improve awareness of efforts across USG and especially across Defense and IC? FACT one

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		example over \$100M spent on "language translation" solutions... Leadership knows there is a problem, but nothing accomplished yet the technology exists.
Reyburn	Matthew	With the advent of programmable living matter/engineered living matter, is there any work on creating a singular DoD policy around the development/acquisition of these materials? Has there been more work done on the biodefense vulnerabilities framework? - https://www.nap.edu/catalog/24832/a-proposed-framework-for-identifying-potential-biodefense-vulnerabilities-posed-by-synthetic-biology
Castanos	Jerry	Innovation is needed in logistics and maintenance fields.
Freeland	Adam Freeland	What is the standard A.I. must achieve in order for judicial findings that A.I. can comment on a field of art as would a person having ordinary skill in the art.
Buchter	Richard	How do we define Disruptive?
Cook	Brian	Does the DIB attempt to synchronize the efforts of AFC, AFWERX, DUiX, SOFWERX and others?
Galway	Bob	(Comment from Facebook) What is the board's distinction between innovation and relevant innovation? How do the departments inspire the importance of adding relevance to their innovations?
Galway	Bob	Would like to see the board address the need for organizational technical knowledge transfer within DoD. Specifically, the need for capturing, curating and transferring organizational domain specific wisdom, lessons learned, and skill sets. I see the need for this transfer as the base for organizationally relevant innovation and one of the foundational steps in developing the next generation of technical innovators and leaders. How can we do this better? Structure? Creating opportunities? We need some methods for making the long-term value of these efforts and the stewardship of the various technical areas competitive with the short-term wins needed to obtain resources and funding in the eyes of senior leadership. Cheers for the realization of the needs for the existence of a DIB!
Carlos A.	Sanmiguel	At Xofia Inc, we are working on a turbulence profiling model for real-time laser beam propagation measurements and forecasting.

1555-1556 Closing Remarks

- o Led by Eric Schmidt, Colleen Laughlin adjourned.
- o Dr. Schmidt made closing comments and Ms. Laughlin concluded the meeting.

END OF PUBLIC SESSION

ADJOURNMENT

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Colleen Laughlin, the DFO, adjourned the DIB's March 05, 2020 public meeting session at 1600.

I hereby certify, to the best of my knowledge, the foregoing minutes are accurate and complete.

A handwritten signature in black ink, appearing to be 'Eric Schmidt', written in a cursive style.

Eric Schmidt, Ph.D.
Chairman, Defense Innovation Board

Attachment (1) – Meeting Attendees

Attachment (2) - Transcript Public Meeting Dated October 31, 2019

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ATTACHMENT (1)

MEETING ATTENDEES: 252 Total

118 in-person RSVPs, with 134 more tuning in via livestream

Last Name	First Name
Schley	Lacey
Kage	Katherine
Vail	Joelle
Alvarado	Igor
Alvarado	Igor
Wiegand	Natalie
Gillan	Chris
White	Randall
Alvarado	Igor
Hartman	Lillian
Walker	Patrice
Kopser	Joseph
Cherukuri	Paul
Laughlin (Boehnke)	Julie
Sohl	David
Sanchez	Chris
Zakariaie	David
Kukurba	Kimberly
Erian	Sophia
Grelle	Joshua
Fancher	Pack
LeBlanc	Andrea
Westervelt	Rick
Rodgers	Launtz
Walker	Zach
Sankovich	Christopher
Lilley	Ryan

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Corbin	Starr
Moniz	Jose-Maria
Royo	Joseph
Magtalas	Kevin
Futch	Steven
Stevens	Kyle
Brian	Skinner
Smith	Steven
Huckle	Erik
Hannah	Keith
Rhodes	John
Stanley	JD
Fetter	Jordyn
Wright	Robert
Daugherty	Gordon
Ryan	Jack
Jones	Cullen
Garlington	Mike
Durham	Benjamin
Polvado	Lamarque
Schermerhorn	Jordan
Sauceda	Chris
Pena	Roland
Norwood	Paul
Brinson	Justin
rexilius	jason
Moncur	Joel
Banach	Alex
BHATTACHARJEE	BARNIL
Field	Macon
Kage	Katherine
Isaac	Jonah
Brauer	Scott

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Mullen	Brendan
Kneeland	David
Lerma	Bronson
Banach	Alex
Banach	Alex
Boston	Gerald
Drew	Scheifele
Furin	Timothy
Barendrecht	Andrew
Carper	Greer
Nguyen	Victoria
Dedeker	Derek
Ryan	David
Rodriguez	Richard
Boston	Gerald
Murray	Shawn
Wright	Michael
Sauceda	Chris
Rudolph	Dean
Reitmeier	Jessica
Athey	Alex
Carlson	Craig
Bauld	Sean
Cook	Brian
Johnson	Pat
George	Devin
Hatcher	Ryan
Singleton	Sean
Cucolo	Tony
Lowder	Bruce
Smith	Trevor
Boone	Adam
Gwinn	Mary

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Hatcher	Nicholas
Scheberle	Drew
Bales	Travis
Garlington	Michael
Baumhart	Patricia
Rentas	Francisco
Zizza	Mike
Zizza	Mike
Mondragon	Verenice
Brewer	James
Capaldini	Nick
Scheifele	Drew
O'Connor	Chantae
Layo	Kristen
Smith	Trevor
Brewer	James
Perry	Frank
Corbin	Andrew
Isaac	Jonah
Gupta	Ritwik
Berry	Ryan
Ward	Daniel
Perry	Frank
Banach	Alex
Mia	Marshall
Northshield	Susan
Levy	Zachary
Goertner	Frank
Macdonald	Ali
Woloveck	Patrick
Theuer	William
Taylor	Justin
Korman	Hayley

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Rudolph	Michael
Blair	Dianna
Parsons	Oliver
Olson	Niels
RENTAS	FRANCISCO
Trimble	Kathy
Shattuck	Jordan
Glenn	Bernice
Lambert	Brett
Keyes	Cierra
Gehlhaus Carew	Diana
Doe	William
Ernst	Alan
Bloemhard	Heather
Alexe	Gabriela
Myers	Susan
Cross	John
dieuliis	diane
Boehnlein	Cynthia
Abbott	Mark
Kroman	Beth
Creely	Thomas
Cooke	Tim
Shields	Trisha
Bolling	Alexander
Levanto	Holly
Pasho	Brad
Cosner	Michelle
Gadwale	Genevieve
Pena	Vanessa
Garrison	Kevin
SIMMONS	KASHIA
Dunson	Marlies

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Chiasson	Cassidy
Hayford	Scott
Yu	Jeffrey
Boyd	Bret
Carter	Kevin
jones	quinton
Logsdon	Robert
Goobic	Adam
Reyburn	Matthew
Liaw	David
Rydberg	Katelyn
Hollidy	Maynard
Dodd	Matthew
Burke	Joel
Bang	Young
Rothenberg	Josh
Baumhart	Patricia
Greene	Andrew
Dutterer	Clark
Green	michael
Fetter	Kyle
Gali	Shalini
Viscardy	Virginie
Hannah	Hunt
Watkins	Will
Garrett	Will
Silverman	Josh
Viscardy	Virginie
Naroski Merker	Melissa
Castanos	Jerry
Tobin	Katherine
Harris	Melissa
Tarasek	Gerald

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Brissette	Mark
Luthy, PhD, MBA	Connie L
Timmons	Danielle
Freeland	Adam Freeland
Villano	Peter
Jacox	Madison
Murray	Melaina
Bookard	Joe
Braun	Rachel
Willox	David
Farmer	Tim
Pope	Lexa
Lazar	Liviu
Dimonte	Sarah
Wehr	Juliet
Pakanen	Aulikki
Edwards	Marcus
Buchter	Richard
Stark	Michael
Spence	Sean
Young	Jeff
Caron	Christopher
Harper	Aphaia
Hetzel	Jennifer
Cassidy	Chiasson
Rudolph	Michael
Chwastek	Matthew
Glenn	Bernice
Hill	Peter
Hannah	Hunt
Malik	Farhan
Willox	David
Cheatwood	Jon

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Armijo	Jeff
Quarles	Gregory
Whitaker	Christopher
LOWE	DONALD
Hardy	Devon
Blount	Bobby
Butler	Brett
Skinner	Dan
Galway	Bob
Ertmer	Michael
Braun	Rachel
Lowe	Donald
Carlos A.	Sanmiguel
Stanley	JD
Theuer	William
Doe	William
Freeman	Eric
Thane	John
Baren	Drew
Carper	Greer
Jasmine	Berry
Moniz	Jose-Maria
Hannah	Hunt
Dimock	Alan
Cummins	Elaine
Berry	Ryan
Berry	Ryan

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ATTACHMENT (2)
Transcript Public Meeting Dated March 05, 2020

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4 **DEFENSE INNOVATION BOARD QUARTERLY MEETING**

5

6 **CAPITAL FACTORY**

7 **AUSTIN, TEXAS**

8

9 **March 5, 2020**

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1 P R O C E E D I N G S

2 DR. ERIC SCHMIDT: We work style operation
3 with all sorts of really interesting technology groups
4 here in this building.

5 So as a bit of background, we collectively
6 are a -- a subset of the Defense Innovation Board
7 members, and we work for free as special government
8 employees for the DoD to try to help -- help drive
9 innovation, drive change, so forth and so on.

10 The way our structure works is we have --
11 as part of being a FACA committee we have public
12 meetings. This is a public meeting, which we are very
13 happy to do, and it's literally an official meeting of
14 our group to talk about things so you can watch the
15 way we make our recommendations and help us shape what
16 we want to do.

17 The -- you know, Austin has a fantastic
18 innovation community, this is not a new fact for you
19 all, and, you know, I want to make sure I thank the
20 hosts at the Capital Factory for this obviously.

21 You know who I am.

22 Kurt -- where is Kurt -- Kurt is nowadays
23 the Executive Vice President of Corporate Strategy,
24 and has run many of the products -- products and
25 services that you use from Microsoft.

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1 Michael McQuade was a big-time aerospace
2 Executive and is now President for Research at

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3 Carnegie Mellon University.
4 Richard Murray is a Professor at Caltech,
5 Control & Dynamical Systems & Bioengineering.
6 And Mark Sirangelo is now an Entrepreneur
7 in Residence at the University of Colorado, and was
8 head of Space Systems at Sierra Ne -- Nevada
9 Corporation. So he's the person who understands space
10 and space activities best among our group.
11 On our line we have a number of other
12 people. We have Eric Lander, who's the President of
13 The Broad Institute, and one of the foremost
14 biologists in the -- in the country.
15 Jen Pahl -- Pahlka, who is the Founder and
16 Executive Director of Code for America, and the former
17 Deputy CTO of the U.S. Government.
18 Dr. Daniela Rus, who is the Director of
19 Computer Science and AI, and Professor of -- and a
20 Professor at MIT, and a foremost AI expert.
21 Neil deGrasse Tyson I think is well known
22 to this audience, an Astrophysicist at the American
23 Museum of Natural History in -- in New York City, and
24 an Astrophysicist by training as well.
25 Missy Cummings is the Director of Humans &
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1 Autonomy Lab, and a Professor of Engineering at Duke
2 Universities, and was also a fighter pilot in the Navy
3 before she turned to university work.
4 Marne Levine is the VP of Global
5 Partnerships & Business Development at Facebook, and a
6 former Chief Operating Officer of Instagram.
7 And Danny Hillis, who's a Computer Theorist
8 and co-founder of Applied Inventions, and inventor of
9 many of the things that we use today.
10 So -- so the way we -- the way this meeting
11 works is we're gonna have a set of sub-committee
12 discussions, we're gon -- we want to talk about two
13 recommendations, a report on something called "Biology
14 and Data Digitization," with something called the

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15 "Joint Pathology Center," something that we have been
16 working on for a long time; and, then, the Congress
17 has mandated an assessment of software of the Talent
18 Programs and a response to Congressional tasking
19 through the NDAA.

20 When we started our job -- objective was to
21 have no reports at all because we figured nobody would
22 read them, and the government has recently been
23 mandating that we actually produce reports so that
24 they can read them, which I guess is a good sign. So
25 we're gonna go through -- we're gonna go through those

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1 with you.

2 We're going to talk about workforce
3 behaviors and culture, and this an area that's been a
4 high priority for us for a while, and we are going to
5 discuss a recommendation of the appointment of a new
6 Digital Engineering Recruitment & Management Officer
7 as -- which is, again, part of the NDAA.

8 And if you are not familiar with NDAA --
9 most of you are -- it's the legislation that's passed
10 every year that authorizes the Defense Department and
11 the defense activities of the nation, and we are
12 subject to that law obviously.

13 We'll give a report on how we're doing
14 implementing some of the DIB, and, then, we're going
15 to go to public comment.

16 Colleen.

17 MS. COLLEEN LAUGHLIN: That sounds great.

18 Thank you, Eric.

19 I think first we'll start off, we have a
20 representative from Army -- Army Futures Command here
21 who's just gonna give some brief remarks.

22 MS. SUE GOODYEAR: Good afternoon,
23 everybody.

24 Whoa. Tall person. I'm good. I could
25 stand on my toes.

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1 Good afternoon, everybody. I'm Sue
2 Goodyear, I'm General Murray's Executive Deputy, and,
3 so, on behalf of General Murray, on behalf of Army
4 Futures Command, and on behalf of the City of Austin
5 we want to welcome you. This is an -- a really good
6 innovation ecosystem here, that's one of the reasons
7 why Army Futures Command is here, and I think this
8 audience, and everyone online, and everybody out
9 there, would like to welcome you and want to look
10 forward to take advantage of what you're gonna talk
11 about, and, then, take advantage of the public forum.
12 So on behalf of General Murray I would like
13 to welcome you all here, and thank you.

14 MS. COLLEEN LAUGHLIN: Great. I'm gonna do
15 some FACA throat-clearing language up-front, and,
16 then, we'll get on with the -- with the show here.
17 So welcome to everyone here in Austin, the
18 Capital Factory for hosting us.
19 My name is Colleen Laughlin, and I am the
20 Executive Director and designated federal official for
21 the Defense Innovation Board.

22 If you have not done so already, please go
23 ahead and silence your electronic devices.
24 Today's meeting is being recorded and live
25 streamed to allow members of the public to attend

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1 today's meeting virtually.

2 I want to do a quick shoutout to the
3 Defense Media Activity for providing your expert
4 services and support today, so thank you.

5 And welcome to all of our in-person and
6 virtual attendees.

7 The Board will now convene its public
8 session. As we begin this meeting allow me to share a
9 few procedural remarks.

10 As Eric noted, the Board is a
11 discretionary, independent advisory board operated
12 under the Federal Advisory Committee Act and the

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13 Government in Sunshine Act. Today's meeting was
14 announced in the Federal Register Notice posted on
15 February 17th, 2020.

16 The public was invited to submit written
17 comments for the Board members to consider. Fourteen
18 comments were received in advance of today's meeting,
19 and will be posted online with the minutes of this
20 meeting.

21 There have been no significant changes to
22 the meeting's agenda as posted in the Federal Register
23 of Notice.

24 Depending on time constraints there may be
25 an opportunity for members of the public attending

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1 here today to provide verbal comments to the Board at
2 the end of the meeting.

3 Just a quick reminder, when you do your
4 public comments the Board is not able to respond, but
5 we will -- we, of course, welcome and would love to
6 hear all your remarks.

7 All of our papers for today's meeting can
8 be found on the DIB's website, which is
9 innovation.defense.gov, we encourage you to follow
10 along. You can follow us on our Twitter handle at
11 [innovationboard](https://twitter.com/innovationboard) as another way to follow the
12 conversation.

13 And with that we will go ahead and kick off
14 the meeting.

15 DR. ERIC SCHMIDT: Thank you. Do you want
16 me to say a few things about where -- where I think we
17 are?

18 MS. COLLEEN LAUGHLIN: Yes, I think that
19 would be wonderful.

20 DR. ERIC SCHMIDT: We've had a series of
21 meetings with Secretary Esper, who is a very
22 impressive public servant, and he continues to
23 emphasize AI, talent management, and in reducing the
24 foreign influence on the U.S. tech sector as themes

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25 that we should be focused on.

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1 We work very closely with Secretary

2 Griffin, and he's focused us on biotechnology,

3 commercial space, and trying to strengthen our ties to

4 the national security innovation base.

5 Secretary Lord is very, very focused with

6 us on the software study and the SWAP study, this is a

7 good forum to talk about that, and she's pushing for

8 variable re -- reforms on acquisition. She's also

9 doing a very interesting initiative around trusted

10 capital to try to sort of streamline the relationship

11 between the DoD and start-ups that are -- start-ups

12 and -- and more mature companies that are building

13 technologies that meet DoD needs.

14 We are very, very proud to be a small

15 component of the Joint AI Center that's run through

16 the OSD CIO, and we're beyond excited that the DoD

17 announced the AI Ethical Principles, which we heavily

18 participated in a week ago. If you haven't seen them

19 please read them, I think they're going to be a --

20 my -- my opinion -- you guys can say whatever you

21 want -- I think they're going to be the index all the

22 other countries are now gonna judge. I think we

23 really, as a nation, made a -- made a strong

24 proponent.

25 So, in any case, General Janet Shanahan

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1 will be here next week as part of the conference.

2 So there's other things going on. The FY21

3 budget increases federal research by six percent,

4 including increases specifically for AI.

5 We have -- I'm the Chairman of something

6 called the "National Security Commission on AI," we

7 released an interim report in November, these -- these

8 folks worked very closely with me to help make that a

9 success. I won't summarize it, but you can read it,

10 it's been very well received on a bipartisan basis.

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11 We -- we're going to hear some
12 recommendations from some new topics that you'll hear
13 that were initially introduced in Georgetown at our
14 last meeting, and I guess I'd say to my colleagues
15 thank you guys for coming, it's just fantastic to be
16 here.

17 So, Colleen, how do you want to do this,
18 you want to . . .

19 MS. COLLEEN LAUGHLIN: So I think right now
20 we'll jump into the S&T update --

21 DR. ERIC SCHMIDT: Okay.

22 MS. COLLEEN LAUGHLIN: -- with -- starting
23 off with Dr. McQuade there.

24 DR. MICHAEL McQUADE: Okay. Thank you.

25 And thanks, again, everybody for being here.

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1 One of our committees in the Defense

2 Innovation Board is the S&T sub-committee, my
3 colleague, Richard Murray, and I co-chair that, and
4 we're actually gonna split the duties here for two
5 subjects. I am going to lead a discussion with the
6 Board on some recommendations we're making on a Joint
7 Pathology Center repository, enhancements to the
8 digitization of that, and, then, Richard's gonna talk
9 about the DIB's assessment on the progress that the
10 Department is making relative to software development,
11 and software acquisition, testing, and management
12 plans. So both of those on the agenda for today.

13 So let me jump in on the Pathology Center,
14 and before I do that I want to recognize two people in
15 the audience. It's always good to have the people who
16 have the task of implementing whatever it is that you
17 recommend.

18 So Colonel Joel Moncur is here with us, who
19 is the Director of the Joint Pathology Center, and Dr.
20 Frank Rentas, who is the Director of R -- R&D for the
21 JPC. The gentlemen are both right here -- you can
22 wave your hands -- thank you very much.

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23 On the phone is Eric Lander, and I am
24 counting on Eric jumping in at any moment when I
25 either -- either misspeak or don't speak enough. So,

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1 Eric, thanks in advance for that.

2 So our first recommendation today --

3 DR. ERIC LANDER: Glad to be here.

4 DR. MICHAEL McQUADE: -- thank you -- is a
5 project that has significant impact for the global
6 community as well as for the Department of Defense,
7 it's focused on a very large volume of medical data
8 that we have in a way to better understand and treat
9 infectious diseases, cancers, and other places where
10 large-scale data analysis can provide value to the
11 public health community.

12 I guess I don't want to be the first

13 person, but I'll simply say the word "Coronavirus"

14 and, then, move on, so . . .

15 So next slide, please.

16 So we jump into specific recommendations.

17 There's some things that's important to keep in
18 context. So when we say "medical data" what are we
19 talking about at JPC? We're talking about biopsies,
20 so tissue samples taken from patients with certain
21 types of cancer or disease. Those samples have to
22 be, want to be pre -- collected and associated, paired
23 with medical records of the patients who gave those
24 tissue samples for the medical data to be useful.

25 Large volumes of data from discreet disease

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1 and cancers are sought, but rarely available, and I'll
2 show you some numbers in a moment about the amazing
3 value of this repository.

4 There are lots of barriers to accumulating
5 and accessing a meaningful amount of data. Generally
6 there are few centralized resources of this kind of
7 data, and major organizations typically dispose of the
8 samples of these kind of data after a time that's

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9 either required by volume limitations, by legal or
10 statutory limitations, et cetera.

11 If we have access to that data the medical
12 community's better able to identify and understand
13 current and future disease, it enables the global
14 community to better respond to future global health
15 crises, and it promotes a better sense of health and
16 well-being both in the DoD and in the general
17 population.

18 So we see this as an amazingly valuable
19 resource, and, then, coupled with artificial
20 intelligence, machine learning, things that the DIB
21 has talked about for a very long time only serves to
22 amplify the value of that repository.

23 So there are specific benefits for DoD, not
24 just for the global health community. Number one,
25 improving the Service members' health and readiness;

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1 providing a resource to establish and deepen
2 partnerships with the private sector, the academic
3 sector, or, quite honestly, with peer adversaries;
4 provide the massive data sets that allow us to explore
5 how AI and ML can really provide value in health care,
6 it's a subject that is obviously catalytic for all of
7 us; and ultimately lowering the cost of health care
8 for the DoD, which is billions of dollars in the
9 budget.

10 Next slide.

11 So -- so there's the challenge how do we
12 improve health care, and the main topic for the
13 discussion then is the -- the repository at the DoD's
14 Joint Pathology Center.

15 JPC is organized as part of the Defense
16 Health Agency, it's overseen by the Office of the
17 Undersecretary for Personnel & Readiness, and it holds
18 the largest repository of disease and cancer-related
19 data in the world.

20 So just to give you scale, there are 55

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21 million plus glass pathology slides, there are 31
22 million paraffin-embedded tissue blocks, there are
23 over 500,000 wet tissue samples, data that stretches
24 back over a hundred years. So if you think about the
25 value of the data that we ingest into data analytic

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1 studies and into machine learning studies this is an
2 amazing resource that's available to us. It also, as
3 I said, holds tremendous value for the Department's
4 digital modernization.

5 So just the pure action of how do we deal
6 with data sets this large, how do we extract value
7 from our algorithmic capabilities, but, of course,
8 it's not hard -- I'm sorry, it's not easy. Sorry, it
9 is hard. It's not hard, it's not hard at all. Glass
10 slides, paraffin blocks, 55 million, they're hard to
11 share, they're hard to analyze, and, most importantly
12 of all, they are degrading over time.

13 So for this reason we are recommending a
14 set of recommendations for the JPC to rapidly scan the
15 full repository into digital fashion, and we have a
16 series of recommendations on how we proceed to do
17 that.

18 I'm gonna pause and just give Eric a chance
19 to jump in.

20 Eric, you want to provide any more
21 background here?

22 DR. ERIC LANDER: Well, I -- I'll just have
23 a moment or two here. I had the -- the pleasure and
24 the honor to tour the facility the -- the JPC
25 maintains and it is a marvel. It is a vast warehouse

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1 with just stacks, and stacks, and stacks of -- of
2 shelves with both slides and pathology blocks that
3 can -- can be cut. I had a chance to look at how this
4 operation is organized, and I -- it is just a national
5 treasure.

6 Who thought to save all of this for more

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7 than a century should -- should get a really big
8 medal, because it's not something you could ever
9 create today, it required a lot of forethought --
10 foresight to -- to do that.
11 Michael has already described many of the
12 reasons why this is important, and I just want to add
13 one more. This Defense Innovation Board has talked
14 about the importance of ML and -- and -- and AI as a
15 strategic capability for the DoD. Many of the
16 problems to which that's gonna be applied are highly
17 classified problems with highly classified data.
18 I'm excited about the opportunity that
19 there are a set of data which, while they involve
20 patient confidentiality, properly done can be a magnet
21 for the DoD to work together with the -- the tech
22 companies, the start-up companies, the academic
23 sector, because I think it's a great way to improve
24 your game to have the best data set in town -- best
25 data set in the country that will truly be a magnet

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1 for development of new approaches in -- in machine
2 learning.

3 So both for all of the -- the health
4 reasons, and cost reasons, and it's an amazing asset,
5 and its -- and its advance in ML, I also think it'll
6 build a special kind of relationship and position with
7 the DoD in a -- in a very constructive way relative to
8 this whole ML community, and that's a value, too.

9 So carry on.

10 But anybody who gets a chance to take a
11 tour of it you'll see it -- why I was so impressed.
12 DR. ERIC SCHMIDT: Can I try to understand?
13 This is -- is -- who is opposed to this brilliant
14 idea, Michael and Eric? I mean, like, this benefits
15 humanity, it benefits the military, what -- what are
16 the issues?

17 DR. MICHAEL McQUADE: The -- the issues
18 relate to do we have the technology, do we have the

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19 capability to do this at scale and at volume. There's
20 a minor issue of money, but it's a minor issue,
21 so . . .

22 So I would just say -- Eric Lander made
23 this comment before, but I'll get to repeat it --
24 think about this repository and think about Indiana
25 Jones, so that's the mental picture you should have of

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1 this vast warehouse full of samples, so . . .

2 So the first three recommendations related
3 to the pilots. I keep referencing back to the
4 standard way the Defense Innoboard(sic) -- Innovation
5 Board operates, get out there, try something, and
6 improve it as you go.

7 So our first recommendation is to execute a
8 pilot on the slide-scanning itself. So the Secretary
9 of Defense should direct the launching of a pilot to
10 scan an initial batch of slides within 12 months, and
11 the goal here is to establish the tools, the methods,
12 the processes, the analyses to determine how to scale
13 up beyond the first set of slides.

14 So the goal here that we have laid out in
15 our recommendation is to scan something between a
16 million and 2 million slides, to do that over the
17 first 12 months, to estimate -- at an estimated cost
18 of something in the 10 to \$15 million range, and at
19 the end of 12 months be in a position to double the
20 volume in a second 12-month period at -- at reduced
21 cost, with an upgraded set of tools and capabilities.

22 So that's recommendation number one.

23 DR. MARK SIRANGELO: Michael, I -- Michael,
24 I think it's also that we're gonna do a -- a sampling
25 from the different periods and a sampling of the

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1 different types so that this batch is gonna
2 represent -- does it make sense -- how far back does
3 it make sense to go, and what's the quality of the
4 slides in those early periods as well.

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5 DR. MICHAEL McQUADE: Right. Thank you.
6 And -- and -- and, again, the whole idea here is you
7 do a pilot to find out what it is that is gonna
8 deliver maximum value and can allow you to set the
9 parameters for the ongoing work.

10 DR. ERIC SCHMIDT: Usually in these data
11 extraction strategies the more recent data is much
12 more useful than the hundred-years-old data, do you
13 have any reason to believe that that's not true?

14 DR. MICHAEL McQUADE: Eric?

15 DR. ERIC LANDER: Well, the one reason why
16 the old data is useful is there are conditions and
17 diseases we don't have today, so as -- as a general
18 rule what -- what Eric Schmidt said is exactly right,
19 but, you know, there's the 1918 flu, there's many
20 things, so I think there will be a set of medical
21 problems that can only be addressed through this
22 archive, and it's -- it's worth exploring what issues
23 we'll encounter there.

24 DR. MICHAEL McQUADE: The other thing I
25 would say -- and go back to Mark's comment -- is -- is
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1 part of this first pilot needs to be determined which
2 slides are both valuable and deteriorating most
3 rapidly, but may allow you to prioritize how you'd
4 move forward.

5 DR. MARK SIRANGELO: Yeah. And I would
6 also add that there are some diseases that make a
7 comeback very late after they've -- were thought to
8 have gone away, we're seeing some of that these days,
9 so having some of that older data, even if it's not
10 perfect, it might help us if we combat certain areas
11 like the plague and other things which have reappeared
12 in the world.

13 DR. MICHAEL McQUADE: So we have two --
14 two, then, ancillary recommendations to go along with
15 this, also to be accomplished during this first
16 12-month pilot.

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17 One is to launch a -- a parallel effort to
18 build on and improve the linkage of slides to medical
19 records. There's a -- quite a wide array of the
20 quality of the medical records as Eric mentioned, the
21 newer ones better than the older ones, how you access
22 the connection between slides and medical records,
23 that all needs to be piloted over the first 12 months
24 to connect the samples specifically to the records,
25 and specifically to things like additional medical

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1 visits, et cetera, the additional information that can
2 go along with the slides. So that's the second
3 recommendation.

4 And the third is to initiate a pilot to
5 allow some enhancements -- molecular annotations to
6 the slides -- to the physical slides and tissue blocks
7 to see if there is even more value that can be
8 obtained from the slides -- so these are things like
9 immunohistochemistry and in situ hybridization of the
10 slides -- ahead of the scanning process.

11 And, so, given that I just said those words

12 Eric can explain what they mean.

13 DR. ERIC LANDER: Sure. So -- so the idea
14 is when you make a slide you just stained it with some
15 kind of a dye and you see a picture, but underlying
16 that picture is biological material, like 20,000
17 different proteins distributed into different cells,
18 and -- and 20,000 different R&A's -- type -- types of
19 R&A's that are distributed, and it's possible now to
20 reveal those by different kinds of hybridization
21 methods, and even a few years ago you would do one at
22 a time, but now there are ways to do a hundred at a
23 time, and for -- for reading out gene expression even
24 thousands at a time, and we're beginning to see
25 machine learning make it possible to take a subset of

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1 images that have been enriched and annotated in this
2 way and build tools that'll let you carry that over to

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3 many, many more slides.

4 So I think this recommendation, while it's

5 modest in scale, is to make sure that the JPC is

6 connected to the cutting edge of this work because I

7 think it will add great value.

8 So that -- that's what's going on, is,

9 you -- you know, the picture has lots more -- the

10 slide has lots more information than we've been able

11 to see until the last couple of years.

12 DR. MARK SIRANGELO: And -- and, Eric --

13 this is Mark -- isn't this also the opportunity to

14 help inform the collection of new data, new slides by

15 trying to determine how best to do that --

16 DR. ERIC LANDER: Oh, absolutely.

17 DR. MARK SIRANGELO: -- from this -- from

18 this process of doing the sampling?

19 DR. ERIC LANDER: Yes, because, of course,

20 the military is continuing to collect slides and

21 swabs, and I think engaging in a project like this

22 will very much inform indeed the whole scanning

23 process, but also the molecular annotation process I

24 think will inform how this gets done in the years

25 ahead.

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1 DR. MARK SIRANGELO: Right. So slight

2 modifications --

3 MR. DANNY HILLS: This is Danny --

4 DR. MARK SIRANGELO: -- might produce much

5 better data as we go forward.

6 DR. ERIC SCHMIDT: Danny, go ahead.

7 DR. DANNY HILLIS: Yeah, I just wanted to

8 add one thing to what Eric said, which is this is a

9 pilot -- I think this should be regarded as a pilot in

10 two different senses. It's both a pilot for doing the

11 entire re -- repository, but also this pattern of the

12 DoD having had the foresight to collect sample sets

13 and associated records has actually been repeated in

14 other places within the DoD, so there are other

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15 repositories, too.

16 And, so, if -- if -- if we can successfully
17 have all -- show the advantages of the results of this
18 pilot there's other places within DoD that these same
19 kinds of things that -- could be applied to other
20 kinds of samples that -- to other kinds of data sets.

21 DR. MICHAEL McQUADE: Thank you. Thanks,
22 Danny.

23 So those are the three pilots -- or three
24 elements of the first year's pilot, and, then, the
25 second set of recommendations relate to what happens

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1 next. So -- so we are clearly recommending that this
2 entire repository be scanned. Presumably after the
3 first -- after the first set of pilots we will have
4 determined whether there is the value that we think is
5 there, et cetera, but, then, what are the additional
6 recommendations.

7 One is that you have to work a process
8 improvement plan to be able to -- to digitize the
9 entire repository at the most cost-effective scale, so
10 that means probably something -- maybe the target is
11 below \$2 a slide, maybe it's a whole lot smaller than
12 that to be able to get to the scope that we're talking
13 about here. It's to fully develop the clear medical
14 records linkage strategy and the data strategy that
15 goes along with it. So we are talking about exabytes
16 of data, and you can't do this for the full repository
17 without understanding where, when, how, and what
18 you're gonna do with the data.

19 So improving the slide scanning by
20 targeting specific components, by understanding if
21 there are new scanning techno -- technologies that are
22 coming along, and maybe even reimagining the whole
23 process that is in the pilot program to something that
24 develops over time.

25 We need a clear data strategy, as I

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1 mentioned before, to make it easy and productive to
2 do -- to use the data and to make it accessible for
3 not only AI and ML, but other forms of a dat -- data
4 analysis, and we are suggesting that the JPC needs to
5 work directly with the Defense Digital Service on
6 that, we need to worry about de-i -- de-identifying
7 patient data while still maintaining medical records
8 linkages.

9 We need to continue to look at this issue
10 we've just been talking about, about enhancing the
11 tissue slides and the tissue blocks, and there's an
12 issue here that -- that a -- a Holy Grail, amongst a
13 whole bunch of other ones, is that what we learn in
14 the pilot from this additional molecular annotation
15 becomes a training mechanism so that we -- it --
16 for -- for the machine learning system so that we
17 don't have to do that on all the subsequent slides, so
18 to be determined whether that can work or not, so --
19 so that's the next recommendation. Sorry.

20 The fifth recommendation then relates to
21 developing a partnership plan. So we're gonna have
22 all this data, how do we make maximum use of it,
23 either partners who assist in the process, so that's
24 robotic experts, experts in pathology, experts in
25 annotation, data storage, et cetera, so that needs to

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1 be completed soon, that needs to be completed within
2 the first thir -- 90 days after launching the process.

3 We need to build a -- partnerships across
4 the research environment, the commercial environment,
5 a -- across government sectors, to Danny's point,
6 understanding how what we learn here may be more
7 relevant for other repositories in the government.

8 The JPC should reach out to organizations
9 like Memorial Sloan Kettering Cancer Center who has
10 experience in conducting similar exercises on other
11 samples, they have a repository which is roughly half
12 this size and they're scanning at roughly a million

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13 slides per year, so there's some learning that can
14 happen there.

15 And we need to seek information and
16 background from people who have been involved in very
17 large digitization efforts in the past, so things like
18 the Human Genome Project and other forms of
19 data-collection efforts that have been underway for
20 large-scale data, and, then, the ultimate goal is to
21 make a fully digitized, accessible repository
22 available within the next 5 to 10 years after
23 completion of the pilot project.

24 All physical glass slides and tissue sample
25 blocks should then be in digital format, they should

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1 be associated with secure personal health information,
2 and exist in a data link that is owned by the DoD, is
3 protected as this kind of data should be protected,
4 but is available to people who can do -- who can do
5 the analysis and derive both DoD and community value.

6 So the scale, as we said before at the very
7 beginning, is 55 million slides, and time is going by,
8 time is going by as these slides deteriorate, and time
9 is going by as we are not accessing the value from
10 this repository.

11 So those are the six recommendations, I'm
12 gonna turn the floor back over to Eric for additional
13 comments, and, then, I'll turn it over to the group
14 for more discussion.

15 So, Eric.

16 DR. ERIC LANDER: No, no, you -- you did a
17 great job on that, and, so, I think I have nothing
18 more to add to that. Thank you.

19 DR. ERIC SCHMIDT: All right.

20 DR. MARK SIRANGELO: I -- I think it would
21 be useful to talk about how this relates to the VA and
22 the VA Administration. Eric, do you have any comment
23 to that?

24 DR. ERIC LANDER: Sorry, I can't hear the

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25 question.

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1 DR. MARK SIRANGELO: How does this project
2 in its -- if it goes to its ultimate conclusion and is
3 adopted fully how does it relate to the work being
4 done at the VA? The Veterans Administration.

5 DR. ERIC LANDER: Well, I think the
6 methodologies here are -- are very general. I think
7 the specific repository will have a lot of very
8 specific problems it's gonna have to solve for its
9 amazing resource, so I want to separate out the value
10 of the -- of the DoD and VA being involved in this
11 kinda research and this kind of medical improvement,
12 which I think will be general across all health care
13 for veterans, and for active duty, and other
14 Defense -- Defense Department personnel; and, then, I
15 think this resource, quite honestly, is gonna need a
16 lot of detailed focus to make sure that these fragile
17 things are dealt with. So I'll put them in those two
18 buckets.

19 DR. KURT DELBENE: You know, I -- I have a
20 couple of questions -- or more comments than
21 questions.

22 First, I mean, we're in this hub of
23 innovation, I think we should really stress the
24 opportunity for the commercial sector to play a role
25 here. I know we talked about it for the sake of

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1 consultation, I think the paper does a great job --
2 and, actually, I support the -- the recommendations
3 wholeheartedly -- it does a great job of talking about
4 some of the pilots that are being done in -- Sloan
5 Kettering you mentioned, I think we can even think
6 about whether there's a way to outsource, under the
7 right guidance, a ton of it.

8 The other thing is there was a -- I think
9 the discussion around having all the data open, again,
10 getting to the innovation community the ability to --

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11 as long as you protect the privacy, the ability to
12 make this a data resource that others can do research
13 on, can build AI models on, I think that requires us
14 to -- to think very deeply about how much of this is
15 open to the -- to the public for innovation.

16 DR. ERIC SCHMIDT: So I'm concerned that
17 when we get into this we'll decide that we're not
18 gonna do all 55 million slides, we're gonna do a
19 subset, for all sorts of -- costs and the usual
20 problems as you have described, it's really hard.
21 Can you imagine in the first phase the
22 highest value targets and pick those as a priority?
23 You mentioned the 1918 flu as an example, in the notes
24 there are other examples of strange diseases that I
25 have never heard of. Can we get a team to say, This

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1 is the most fruitful area to start, or is that part of
2 the plan already?

3 DR. MICHAEL McQUADE: I think that's part
4 of the plan -- I will have Eric comment in just a
5 moment -- but that's clearly part of the plan, is the
6 definition of the pilot -- the definition -- not just
7 the pilot, but what comes after the pilot has to
8 include what's the prioritization of how you would go
9 after them.

10 So, Eric, I -- I know you spent time
11 thinking about this from a prioritization point of
12 view, I know there is one issue, which is sort of
13 which ones might be most valuable and most in danger
14 of sort of falling apart, but there's other
15 disease-related or clinical-related reasons.

16 So, Eric, any other comments?

17 DR. ERIC LANDER: There are -- there are
18 definitely reasons why you would prioritize, but let
19 me also speak to the -- the value of taking a chunk of
20 this and trying to work through.

21 The slides reside in sets of boxes, and
22 much like if you were trying to scan a library at a

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23 university one could make the case that perhaps
24 prioritizing which books to scan if it takes a lot of
25 work to find each of those things and cherry-pick it

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1 might not actually be the best solution if you can
2 drive down the cost.

3 So I think there are two things to go in
4 parallels. One, prioritize by medical importance and
5 representation, and the other is when I walked around
6 the facility I didn't see anything that, you know,
7 there was a law of physics said couldn't be made
8 pretty cheap.

9 So I think one of our recommendations here
10 is to ask could this be done, you know, well under
11 sub-dollar costs, in which case maybe the -- scanning
12 the whole thing works.

13 So I'm -- I -- I want to see both tracts go
14 forward.

15 DR. MARK SIRANGELO: The amount of time,
16 and energy, and cost it would take to try to put some
17 qualitative methods on this entire 55 million would
18 probably be better used just scanning the entire set
19 and --

20 DR. ERIC SCHMIDT: Uh-huh.

21 DR. MICHAEL McQUADE: Yeah. Understood.

22 DR. ERIC SCHMIDT: Okay.

23 DR. MICHAEL McQUADE: Other comments?

24 DR. ERIC LANDER: Yeah, I -- I think that
25 horse might win.

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1 DR. MICHAEL McQUADE: Anybody else on the
2 phone with comments?

3 DR. DANIELA RUS: So this is Daniela, I
4 would like to make just a few comments about how the
5 latest advancements in dealing with data at scale, and
6 considering data governments and data-sharing
7 strategies can contribute and help this project along.
8 So first we have significant advancements

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9 in database systems that is coupled -- that are
10 coupled with quality awareness, and this is leading to
11 new models for systems that can help govern data at
12 scale and enable engagements with policymakers about
13 what are the most effective, most appropriate
14 approaches.

15 Second, we have new advances on
16 privacy-preserving, trustworthy machine learning that
17 can potentially meet global legal requirements, and
18 that can provide explanation and biased assessment
19 in how they're -- they're trained, and this can be
20 utilized to -- to great benefit for this project.

21 And, thirdly, I think it's important to
22 consider they pass law across different systems
23 because data portability has clear benefits, but also
24 significant impact on privacy.

25 DR. KURT DELBENE: I think the other

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1 thing related to that last question, I think there's a
2 lot of archi -- data architecture and software
3 architecture issues here. The whole notion of the
4 amount of data that exists in these 80 million-plus
5 slides means you're not actually gonna be able to do a
6 lot of transfer of the data from one place to the
7 other, so you got to think about what your platform
8 look like so that you can bring compute to the actual
9 data -- data wake as opposed to -- privacy reasons,
10 too, you're not gonna want to download a bunch of this
11 data.

12 DR. MICHAEL McQUADE: Yeah, I -- I agree,
13 and I would have to say given all the work we've done
14 on AI and machine learning this -- this, to me --
15 if -- if I can step aside from the clinical value --
16 just the sheer value of the Department of Defense
17 having this data source and being able to learn what
18 it means to deal with data skill --

19 DR. KURT DELBENE: Yeah.

20 DR. MICHAEL McQUADE: -- of this scale

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21 is -- that in and of itself is extremely valuable.

22 DR. ERIC SCHMIDT: Well, and -- well,

23 there's a -- there's a -- we -- we've previously had

24 the -- made the point that DoD generates an enormous

25 amount of data that it never actually uses, right.

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1 DR. MICHAEL McQUADE: Yeah.

2 DR. ERIC SCHMIDT: I mean, like, there's an

3 enormous amount of data in every operation that they

4 do and this is just one example.

5 DR. MICHAEL McQUADE: Yeah. So let's use

6 one.

7 DR. MARK SIRANGELO: Yeah, and -- but it --

8 it sounds like a lot of data -- and, Eric, you know

9 this better than anyone -- 55 million images on the

10 scale of what is created every day in terms of images

11 is not as significant as it sounds.

12 DR. ERIC SCHMIDT: Yeah, but for the DoD it

13 is.

14 DR. MARK SIRANGELO: Yeah.

15 DR. MICHAEL McQUADE: Yeah.

16 DR. ERIC SCHMIDT: Okay.

17 MS. COLLEEN LAUGHLIN: Well, Mr. Chair, if

18 you're ready --

19 DR. ERIC SCHMIDT: Yeah. Yeah.

20 MS. COLLEEN LAUGHLIN: -- why don't we go

21 ahead and do a vote?

22 DR. ERIC SCHMIDT: Yes. Okay. So --

23 MS. COLLEEN LAUGHLIN: Great. And I think

24 what I'll do is I'll go through the dial-in's first --

25 DR. ERIC SCHMIDT: Okay, you go ahead.

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1 MS. COLLEEN LAUGHLIN: -- and, then, let

2 you guys raise hand --

3 DR. ERIC SCHMIDT: Okay.

4 MS. COLLEEN LAUGHLIN: -- so . . .

5 Missy?

6 DR. MISSY CUMMINGS: Yes, I'm here.

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7 MS. COLLEEN LAUGHLIN: Great. Are -- do
8 you concur with the recommendations?
9 DR. MISSY CUMMINGS: I concur.
10 MS. COLLEEN LAUGHLIN: Great.
11 Danny?
12 MR. DANNY HILLIS: I concur.
13 MS. COLLEEN LAUGHLIN: Dr. Lander?
14 DR. ERIC LANDER: As a matter of fact I
15 concur, too.
16 MS. COLLEEN LAUGHLIN: Great.
17 DR. ERIC SCHMIDT: Yeah, you better.
18 MS. COLLEEN LAUGHLIN: Marne?
19 MS. MARNE LEVINE: I concur.
20 MS. COLLEEN LAUGHLIN: Great.
21 Jen?
22 MS. JEN PAHLKA: Strongly concur.
23 MS. COLLEEN LAUGHLIN: Okay.
24 Daniela?
25 DR. DANIELA RUS: I concur.
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1 MS. COLLEEN LAUGHLIN: Fantastic.
2 And do we have Neil on the line also?
3 DR. NEIL deGRASSE TYSON: Yes, I am. Can
4 you hear me?
5 MS. COLLEEN LAUGHLIN: Yes, we can.
6 DR. NEIL deGRASSE TYSON: Yes, I -- I
7 double concur. Does that count as two votes?
8 MS. COLLEEN LAUGHLIN: I can't do that for
9 you, Neil. Excellent.
10 DR. NEIL deGRASSE TYSON: Okay.
11 MS. COLLEEN LAUGHLIN: And, then, a show of
12 hands here on the stage.
13 (All Board members raised their hands.)
14 MS. COLLEEN LAUGHLIN: Great. So we'll go
15 ahead and approve that recommendation.
16 DR. ERIC SCHMIDT: So it -- it appears to
17 be a universal --
18 DR. ERIC LANDER: Before -- before we move

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19 on can I just express my enormous admiration to the
20 JPC staff? Since I got to tour on behalf of the -- of
21 the DIB, and, then, host a meeting the -- with the JPC
22 and -- and others, I just think they're doing an
23 amazing job, and in all of these recommendations are
24 saying they should be doing more, this is very

25 supportive and none of this would be possible without

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1 the -- the -- all of what they are doing already, so

2 thank you.

3 DR. MICHAEL McQUADE: Thanks.

4 And I'll just close this by also

5 recognizing Schuyler Moore, who's part of the Defense
6 Innovation Board staff who was the lead on the
7 activity. So thank you, Schuyler.

8 DR. ERIC SCHMIDT: Thank you. Very well

9 done.

10 Shall we move to -- so, Richard, you -- you

11 want to talk about software again?

12 DR. RICHARD MURRAY: Yeah. Indeed. So --

13 thank you, Eric.

14 So the second recommendation that we have
15 coming out of the S&P sub-committee is a little bit
16 different than -- than the -- than the first.

17 As Eric mentioned, the NDAA that comes out
18 each year authorizing our activities, and this year's
19 NDAA, the 2020 NDAA, has in it Section 862 in which
20 Congress asked the Defense Innovation Board to create
21 an independent assessment of the Department's progress
22 on implementing software development, software
23 management, and software training programs, and this
24 is directly related to the SWAP report that Michael
25 and I co-chaired, along with Jen, and Milo, and

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1 Gilman, and Trey, and it came out last year.

2 And, so, just the way that's being done is

3 that in Section 862 Congress has asked the Department
4 of Defense, the Secretary, to report back an initial

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5 report on what's being done to implement various
6 activities in terms of software development, software
7 management, and software training programs, an initial
8 report around now and, then, a final report a year
9 after the NDAA was passed in 2020 -- or the '20 NDAA
10 was passed.

11 And, so, as part of that initial report and
12 final report the Defense Innovation Board has been
13 asked to give an independent assessment of the
14 Department's activities, and, so, that will be
15 included in those reports.

16 So as -- as it happens the Department is
17 going to request an extension of the initial report
18 and ask for a little bit more time, and, so, that
19 probably won't come out for a couple of months, but
20 because of the Federal Advisory's Committee Act we
21 have to publicly deliberate on our comments that will
22 go into that future report now, because this is when
23 our public meeting is.

24 And, so, to do that we have collected some
25 data from the people who are working on that initial
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1 report in terms of their initial thoughts on where
2 that was going, in addition to some of the materials
3 around that that they're basing their kind of
4 implementation activities on.

5 And, so, this is something where we're
6 seeing the beginnings of the activity that we will
7 report in another few months on what the actual
8 implementation is, but we're deliberating now on kind
9 of our sense of -- of all of that, and an assessment,
10 and, then, we'll have -- we have a short report that
11 we'll need to approve in order for that to go in.

12 So overall our assessment of the initial
13 activities is positive, the directions are right, it's
14 just starting, and, so, I think people are pointed in
15 the right direction.

16 As -- as is often I get -- think the case

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17 with the Defense Innovation Board, we'd love to see
18 things move more quickly toward actual implementation,
19 and, so, we, you know, almost uniformly give the
20 advice of, Let's get going on this, and in particular
21 to do something that is very consistent with the SWAP
22 report, which is to start small and iterate quickly,
23 and, then, identify those ways to expand that, and
24 scale it, and optimize it, and, so, that's also the
25 case here.

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1 We also think that there are opportunities
2 in the context of these initial activities that we've
3 seen started -- and I'm being vague about it because
4 they're not publicly available so I can't say what
5 they are, but we've assessed them -- but there are
6 some opportunities in there for the Department to
7 partner with Congress towards seeking legislative
8 support for some of the things that they would like to
9 do, in particular in the areas around software
10 expertise within major development and acquisition
11 programs, and DAPs(phon), as well as major information
12 systems.

13 So that's sort of where we're at, the
14 directions are good. We believe that the Department
15 should look toward implementing things as quickly as
16 it can, start small, iterate quickly, we hope to see
17 that when the actual initial report comes out, and
18 that's what we will be looking for when the final
19 report comes out about those implementation activities
20 in terms of really providing the types of training,
21 and career paths, and other things that are required
22 and that are part of our SWAP report.

23 So with that I will stop and take any
24 questions/comments from the Board regarding things.
25 And, Michael, you've been involved with

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1 this as well, you may want to throw in your own two
2 cents.

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3 DR. MICHAEL McQUADE: Just two very quick
4 comments and maybe a question that, Richard, you can
5 sort of opine back on.

6 So I -- I would just reiterate what Richard
7 said, we've -- we've seen very good support in the
8 Department for going after the recommendations, and --
9 and simply repeat that in all cases the mantra is move
10 quickly, do something, if it doesn't work, fix it,
11 move -- move again and move quickly. So general
12 reinforcing comment.

13 Richard, I guess the one question is do you
14 want to make any comments on sort of where -- where we
15 see the issue around sort of tools and -- tools and
16 capabilities? I mean, this has been an ongoing
17 refrain that we've heard for a long time, so . . .

18 DR. RICHARD MURRAY: Yeah, I -- I mean, I
19 think generally looking at how to increase the ability
20 of DoD through both the services and -- and --
21 military as well as the civilian workforce, as well as
22 contractors, to just have more capability and software
23 available to the Department of Defense, both within
24 actual doing of software, implementing software,
25 getting it out in the field, doing things quickly, but

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1 also within acquisition programs, right, the
2 acquisition side of that, and understanding, right,
3 how does modern software work, and figuring out how to
4 get modern software through that contracting process
5 in a way that makes sense.

6 And, you know, again, going back to our
7 SWAP report, Software's Never Done -- that was the
8 title of the report -- and, so, you can't sort of
9 think about software as something where you somehow
10 acqui -- you write a bunch of recommendations, you
11 know, you spend a bunch of time, you know, sort of
12 putting out a competition and deciding, and, then, you
13 acquire that software, and, then, you sustain it,
14 that's just not the way it works, right, you know, we

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15 all know this from -- you know, just from our daily
16 lives, right. You buy a piece of software and it's
17 constantly getting updated, and it needs to be
18 constantly updated, software's never done, it's an
19 ongoing process.

20 Getting people within the Department of
21 Defense who understand that, getting the capabilities
22 within the Department of Defense so that we can see
23 that type of operation going on, that when a bug or a
24 flaw comes up -- a security flaw in particular -- that
25 it's not, Oh, well, we need another release of the

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1 software, let's start writing what the requirements
2 are and 10 years from now we'll have that release that
3 protects us against that, that's way too late, right,
4 how do we say, This is an ongoing capability, this is
5 something that needs to be solved soon, how do we get
6 something out on Friday, right, because it needs to go
7 out that quickly, and, again, that requires a
8 different way of thinking about software. We need
9 that capability and expertise within the Department in
10 a variety of ways.

11 So I think, again, on the workforce side --
12 and -- and we had sort of four lines of effort, and
13 the third line of effort was really increasing the
14 capabilities within Department of Defense on the
15 people side, because, you know, software is by people
16 and for people, right, and so, you know, we -- we just
17 really need to recognize it.

18 DR. MARK SIRANGELO: To -- to pick up on
19 that, Richard, it's -- it's not just the number of
20 people attached to this, but I think certainly I would
21 recommend that we strongly emphasize that those people
22 need to be given a plan to make sure that they stay,
23 that there -- that there is a qualitative path for
24 them to move forward because they're gonna amass a --
25 a large amount of information even though they're

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1 going to be a relatively small group in the beginning,
2 and we don't want any -- as much as possible to -- we
3 don't want any significant turnover of that team
4 because it could set this project back a lot.
5 So I -- I would just recommend that we
6 strongly emphasize that as we're doing all this work
7 for the software side we make sure that we are pathing
8 and -- and making sure that the pa -- and the support
9 for the people are there to -- that we -- that those
10 people will stay for the -- for the length -- or the
11 duration of the project, and, then, have an ability to
12 train new people that come in after.

13 DR. RICHARD MURRAY: Yeah, absolutely.
14 And, again, I would say providing people with the
15 right environment so that they can do their job
16 effectively and -- and, then, having them say, Boy,
17 this is the best place I could imagine being for
18 having the type of impact that I can have as a
19 software developer I think is something that -- that
20 we absolutely have to do, and I would say we want sort
21 of both, right, that is that we want people who stay
22 in those positions rather than hopping out and going
23 into --

24 DR. MARK SIRANGELO: Yeah, it's essentially
25 making it a career track --

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1 DR. RICHARD MURRAY: Making it a career
2 track.

3 DR. MARK SIRANGELO: -- and -- and making
4 them understand it's rare to be able to be in the DoD
5 where you can do a job that affects the entire DoD
6 that -- like this could.

7 DR. RICHARD MURRAY: Right. And at the
8 same time allowing people who are in the private
9 sector to come in and spend some time in DoD and help
10 and contribute and, then, go back, and they'll still
11 be part of that DoD family, right, but now back in
12 their commercial companies and other things, and, so,

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13 how do we do both, how do we allow people to have a
14 career path, but also allow people to kinda hop
15 back -- hop in and out a little bit within the context
16 of the Department of Defense in a effective way.

17 DR. MARK SIRANGELO: Very good. Thank you.

18 DR. ERIC SCHMIDT: So -- so -- so we've had
19 enormously strong support from Secretary Lord as I
20 said earlier, and the Chief Information Officer and
21 his teams, so -- so that's in pretty good shape.

22 There were a set of changes in procurement
23 that were in flight, the most important one was
24 addressing this question of color of money. Are you
25 reasonably confident that those changes will go

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1 through?

2 DR. RICHARD MURRAY: I -- am I re -- I
3 don't know that I'm reasonably confident that anything
4 concrete will go through, but I am -- I am very
5 confident that that is something that Sec -- Secretary
6 Lord has put very high up on her list of priorities in
7 terms of really thinking, you know, how do we change
8 that acquisition process and have a single color of
9 money. It's a hard lift, right, to get all of the
10 pieces to sort of do that, and, so, I --

11 DR. ERIC SCHMIDT: You know, this is the
12 bureaucracy fighting back against sort of
13 leadership --

14 DR. RICHARD MURRAY: Absolutely.

15 DR. ERIC SCHMIDT: -- so we want the
16 leadership to win --

17 DR. RICHARD MURRAY: Absolutely.

18 DR. ERIC SCHMIDT: -- not bureaucracy.

19 DR. RICHARD MURRAY: Absolutely. And --
20 and we are strong advocates of that.

21 Again, why is that important, because when
22 you split things into multiple pots, right, you have
23 the -- it's just not the way software works, right,
24 and to sort of say, Oh, no, no, no, we can't add,

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25 that's a new feature, right, we have to go out and

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1 write the requirements for that new feature and rebid,

2 that's just not -- sorry, that is not software,

3 right.

4 And, so, again that single color of money

5 that says, Software's never done, we need to say,

6 We're gonna spend, you know, \$50 million a year, a

7 hundred million dollars on this capability that is

8 software-enabled forever, right, and we want

9 improvements all the time, right, we want to be

10 rolling out improvements every month, every quarter,

11 every year, whatever it is depending on the size of

12 that.

13 So I think getting there is absolutely the

14 right way to go, I have confidence that the leadership

15 within the DoD understands that and would like to move

16 that forward, but -- and, you know, there are lots of

17 pieces that need to agree, and I think that that

18 conversation's happening.

19 DR. ERIC SCHMIDT: Are there other --

20 are --

21 DR. KURT DELBENE: Yeah, I'll --

22 DR. ERIC SCHMIDT: Go ahead.

23 DR. KURT DELBENE: I want to pick up on a

24 theme of -- you know, one of the things we've had a

25 bunch of discussion about is you've got the DoD, which

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1 is not a very software-centric organization today, one

2 of the experiences we had when we kind of recovered

3 healthcare.gov -- and you had kind of touched on it

4 with the notion of rotation -- I think the thing we

5 need to target as -- as a first thing is to get the

6 right kernel of software of development in all the

7 right places, because one of the things we noticed is

8 if you can get trusted advisors that do the design

9 correctly, that know when -- you know, if a lot of

10 it's outsourced can know what's good and bad you can

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11 actually -- it's not as daunting as you think. You
12 can get up to this level of software capability in the
13 organization internally, and, then, you can build from
14 there, and your outcomes can become better just from
15 the beginning.

16 DR. ERIC SCHMIDT: What kind of kernel were
17 you referring to?

18 DR. KURT DELBENE: Not that kind of
19 colonel.

20 DR. RICHARD MURRAY: Both perhaps.

21 DR. KURT DELBENE: Both -- both kinds. A
22 good colonel would be good, too.

23 DR. ERIC SCHMIDT: Can we get some comments
24 from folks on the phone?

25 (No response.)

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1 DR. RICHARD MURRAY: Or not.

2 All right. Well, maybe -- maybe I'll just
3 pull it back and say, so we have prepared a
4 page-and-a-half -- which is, again, on our website,
5 and -- and you can read that -- that we are asking for
6 the Board approval to put into the initial response
7 that goes back.

8 I -- I'll also say we are looking for ways
9 to also comment on the -- the final version that comes
10 out, you know, when it comes out, and to augment what
11 we've already done, but we're asking for official
12 approval for now --

13 DR. ERIC SCHMIDT: Yeah.

14 DR. RICHARD MURRAY: -- on this particular
15 page-and-a-half assessment.

16 DR. ERIC SCHMIDT: So is -- is there
17 agreement we should -- so, Colleen, you want to just
18 go ahead?

19 MS. COLLEEN LAUGHLIN: Well, go ahead and
20 do the vote? Yeah.

21 DR. ERIC SCHMIDT: Okay.

22 MS. COLLEEN LAUGHLIN: So I'll do the

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23 dial-in's first, and, then, on -- on stage.

24 So Missy?

25 DR. MISSY CUMMINGS: Yes. Are you

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1 looking . . .

2 MS. COLLEEN LAUGHLIN: Yes.

3 DR. RICHARD MURRAY: Just need approve or

4 not.

5 MS. COLLEEN LAUGHLIN: Do you -- yes, do

6 you concur?

7 DR. MISSY CUMMINGS: Do I have any

8 comments, is that what you're asking?

9 MS. COLLEEN LAUGHLIN: No, no, we're doing

10 the vote right now. Do you concur?

11 DR. MISSY CUMMINGS: Just the vote, okay.

12 Yes. No, I concur.

13 MS. COLLEEN LAUGHLIN: Okay.

14 Danny?

15 (No response.)

16 DR. ERIC SCHMIDT: Are you there, Danny?

17 MR. DANNY HILLIS: Yes, I concur. Sorry.

18 MS. COLLEEN LAUGHLIN: Great. Thanks.

19 MR. DANNY HILLIS: On mute.

20 MS. COLLEEN LAUGHLIN: Dr. Lander?

21 DR. ERIC LANDER: Concur.

22 MS. COLLEEN LAUGHLIN: Marne?

23 MS. MARNE LEVINE: Concur.

24 MS. COLLEEN LAUGHLIN: Great.

25 Jen?

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1 MS. JEN PAHLKA: Absolutely concur.

2 MS. COLLEEN LAUGHLIN: Great.

3 Daniela?

4 DR. DANIELA RUS: I concur.

5 MS. COLLEEN LAUGHLIN: Thank you.

6 And, then, Neil?

7 DR. NEIL deGRASSE TYSON: I concur.

8 MS. COLLEEN LAUGHLIN: Great.

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9 And, then, those on stage by a show of
10 hands.

11 (All Board members raised their hands.)

12 MS. COLLEEN LAUGHLIN: Okay.

13 DR. MICHAEL McQUADE: Neil, you only
14 concurred once.

15 DR. ERIC SCHMIDT: So that ap -- appears
16 that we have approved that number 2 unanimously.
17 Now, Kurt -- so -- so we've been interested
18 in this workforce and behavior stuff for a long time,
19 and now there's a team that you're part of that's
20 really pushing hard on that, so take us through what
21 you want to get done.

22 DR. KURT DELBENE: Okay.

23 DR. ERIC SCHMIDT: Give us an update.

24 DR. KURT DELBENE: So the -- thanks a lot
25 for the intro there.

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1 We obviously have talked a lot about
2 workforce issues as part of the transformation of the
3 DoD, both in the software study, there was also a
4 Workforce Now set of recommendations that we looked at
5 in the October meeting and approved at that meeting,
6 but there's another piece that comes from the NDAA
7 again, the Defense Authorization Act, this section is
8 230, and 230 directs the DoD to promote, maintain
9 digital expertise and software development as a core
10 competency in the -- both the civilian and military
11 workforce.

12 And the first thing I'd say is that we
13 completely support this notion overall, it's
14 consistent with what the Workforce Now recommendations
15 were that were in October.

16 It -- there's an interesting provision in
17 it that we wanted to talk about, and it's a provision,
18 it's an optional provision that the Secretary can
19 appoint a civilian official to a new position, the new
20 position is called the "Chief Digital Engineering

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21 Recruitment & Management Officer," -a bit of a
22 mouthful of a -- of a position, but it's a really cool
23 idea. The DIB supports the notion of the Secretary
24 appointing this position.

25 And the idea is, you know, if -- and

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1 I'll -- I'll introduce it and we'll get a sense of --

2 of what that person might do.

3 But if you think about the workforce

4 personnel divisions it's very disparate across the

5 organizations, it is kind of mired in the past in some

6 cases.

7 We actually had a briefing from the Army's

8 Future Command Today, and -- or -- or the Chief Human

9 Capital Officer, her name is Katie Kelly, and she

10 talked about the different parts of the organization

11 having very different po -- policies in terms of how

12 they recruit people, it's very complex, it's not

13 coordinated across all those divisions, and, so, at

14 the same time digital talent is hugely important, we

15 just talked about it here, the importance of having

16 great software expertise, and, so, we think that

17 actually appointing this position could be

18 game-changing. It's an opportunity that we actually

19 think that they should take advantage of.

20 We actually like a better name, the

21 "Digital People Officer," it's less of a mouthful, so

22 I think that's a good thing.

23 And we think -- actually, in addition to

24 kinda setting on a better course we think it has an

25 opportunity to kinda bridge the gap of how do you get

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1 started again, how do you get people starting to bring

2 the right talent into the organization. So we think

3 they should really go at this boldly and -- and put

4 this position into place.

5 There's a few things we -- we actually did

6 a job description -- and you can see that in the

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7 report -- but there's a few things we think you could
8 do.

9 One, they could actually just get started
10 and start figuring out how do we effectively recruit
11 people and what are the right techniques for doing
12 that and actually just start recruiting people --
13 core -- you know, core software people -- digital
14 people, we think it's the most effective way overall
15 to do that.

16 We also think a piece of this is gonna be
17 about best practices and how do you kinda bring
18 together a community of the HR officials kind of all
19 over the organization and, you know, develop what's
20 the best approach to do this overall. So we think
21 that's a -- a good opportunity as well.

22 And, then, the other thing is when you look
23 across the organization and figure out how is it
24 working today, how do you pull it together into a
25 structure that makes sense for the future. So, as I

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1 said, we pulled together a job description.

2 We also thought the thing -- a bit about
3 where we should put this, and we think putting it in
4 the DDS makes the sense that -- makes the most
5 sense. That's the Defense Digital Service. That
6 actually got created as an offshoot of when we had the
7 issues with healthcare.gov, how do you create an
8 organization that's gonna kick start great software
9 development in the different organizations, one got
10 created for the Department of Defense. And, so, we
11 think that that already is started by creating
12 infrastructure by which, you know, you can bootstrap,
13 they'll have all the offices there together, they know
14 how to work with the DoD overall. So we think it's
15 probably the best way to get kick started really
16 quickly.

17 The other thing I think is important to
18 re -- to recognize is that it should use what's going

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19 on in the private sector as an example for what we can
20 do in the DoD as well. Every corporation is going
21 through transformation to being a digital
22 organization, and, so, we've already learned a bunch
23 about what this means, what it means in terms of
24 having the right people to do the job.

25 And, so, one of the organizations that I

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1 lead in Microsoft is called "Core Services Engineering
2 & Operations," and we've actually transformed
3 Microsoft from thinking about our internal systems as
4 things that you run to actually thinking with -- as
5 things you build using great software development
6 techniques.

7 It means you have to change who you have in
8 the organization, what the career ladders look like,
9 and we can actually -- we wrote it up in the paper,
10 but we'd be happy to talk to the DoD about what that
11 means.

12 We also cited a couple other places, like
13 Novartis and PwC, who have done a similar
14 transformation. So lots of examples in industry that
15 we can leverage there as well.

16 So overall I'd kinda -- we all kinda -- as
17 part of the workforce we strongly recommend that they
18 adopt this.

19 And I wanted to toss it over to Jen. Jen,
20 do you have some comments as well?

21 MS. JEN PAHLKA: I do. Thanks for that
22 setup, Kurt, this is a really important part of the
23 meeting today, and -- and an important part of the
24 work that we're -- we're trying to do here.

25 I guess I'll start just by commending

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1 Congress for the great idea of this position, and also
2 echoing Kurt's comment that the -- the Digital People
3 Officer is -- is a little bit of a catchier title and
4 would probably serve the position well in its

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5 simplicity, so recommending that the Department adopt
6 that name rather than the longer one. I think -- I
7 think the rest of the Board's with me on that.
8 I also just wanted to recognize and, you
9 know, assuring that all -- all of you on the -- on the
10 DIB understand this, all of us -- of us here, that
11 while this is something that is coming from Congress
12 you simply can't -- you can't simply command the
13 system to rapidly fill this digital talent gap, it is
14 obviously more complicated than that.
15 The work that we did in Workforce Now,
16 that -- that Kurt referenced, revealed that however
17 well intended the Department might be on these issues
18 of -- of filling this gap there are really a lot of
19 regulations and policies that are deeply complex,
20 deeply interconnected, and you get kinda mired down
21 and it -- it's very easy for the work that we
22 recommend to get, you know, limited to making change
23 on the margins.
24 You know, this limited incremental change,
25 as we're all, I think, in agreement here, isn't enough
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1 right now at this particular moment in time and the
2 issues that face our national defense, it's not fast
3 enough and it's not bold enough, and, so, what we're
4 recommending here I think sort of takes it up a notch.
5 I think Kurt recommend -- referenced the
6 cyber workforce example -- at least it's in the
7 report -- that one was driven in large part by federal
8 requirements to stand up the cyber workforce, which
9 had been slower than we had hoped to come, and as with
10 anything in the federal government we really
11 appreciate that -- where this individual sits, this --
12 hopefully the Digital People Officer can really make
13 or break their success how -- how close they are to --
14 to just the -- just the power.
15 So we're obviously really looking out for
16 where this position will end up being, and, as Kurt

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17 said, we think the -- the -- the Digital -- I'm
18 sorry -- the Defense Digital Service is the right
19 place to put it.

20 I guess I would also just echo Kurt's
21 comments on the important role of hiring processes,
22 and what we're rem -- recommending here. This DPO
23 would be sort of a repository of knowledge and best
24 practices of hiring around the Department, at least
25 hiring for these digital positions, and there has been

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1 a lot of study and introspection, and, of course,
2 we're -- we're looking at what the private sector has
3 done.

4 I'll also add that I think that's happening
5 in lots of places around the public sector. You know,
6 you might note that Google, for instance, has started
7 including peers in their hiring processes, it's not
8 solely managers making hiring decisions. You know,
9 why did they do something like that? Because they
10 measured it and saw that that got better results.

11 You have other practices coming from the
12 public sector. Many people have looked at how places
13 like Sensony(phon) has started blind hiring auditions
14 as part of their hiring practice, and, again, it's
15 because the data shows you get a better workforce
16 because of that.

17 So we really want to emphasize how much the
18 Department should be looking at practices from the
19 outside, not just technology considerations, and what
20 we haven't mentioned yet is just the speed of hiring.

21 We are absolutely an incredibly competitive
22 environment here and speed will matter.

23 In fact, Colleen was kind enough to forward
24 a comment from the Army Chiefs of Staff, General
25 Muchando(phon) -- I think this was just yesterday --

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1 in an event he was quoted as saying, We are in a war
2 for talent. That's true, and we should act that way,

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3 and we should be a -- as aggressive as that language
4 suggests -- suggests we should be.

5 So just excited to see this brought
6 forward, I really believe this is a critical and
7 game-changing opportunity for the Department. We can
8 rapidly scale re -- recruitment, development, and
9 retention of digital talent with this particular
10 proposal.

11 So thanks for -- for setting it up, and

12 I'll turn it back over to you, Kurt.

13 DR. KURT DELBENE: Great. Thanks, Jen.

14 So I'm -- I'm gonna toss it over to
15 questions. So there were a few we might want to think
16 about. One thing is the section talks about Digital
17 Engineering, do we want to define what that means more
18 specifically, that's a question we should probably
19 resolve at some point.

20 There's the whole notion that -- that was
21 talked about is cyber talent acquisition verse -- or
22 development versus digital engineering, how do those
23 relate to each other.

24 There's digital transformation overall, how
25 do we think about building the workforce versus the

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1 digital transformation effort underway overall.

2 The -- also we had some discussion earlier,
3 and was mentioned here, around housing it in the DDS.

4 There's -- the provisions talk about this is a
5 formative stage of -- I think it's, like, up to two
6 years, but we can have a discussion around is that --
7 is that, like, the right place to put it, would --
8 what's -- what's the value there, would we see a
9 transitioning over a period of time, and any other
10 thoughts people have about additional things we might
11 put in the capabilities, but let me -- let me toss it
12 open for discussion.

13 DR. MICHAEL McQUADE: Maybe -- maybe I'll

14 just make two -- two comments, and just in reverse

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15 order.

16 So -- so I very much like this position,
17 and -- and I think it's -- it's good to see impetus
18 from Congress to make this happen. I -- I think the
19 attachment to DDS makes a lot of sense -- and don't
20 take my comment as negative in any way, 'cause I think
21 there's a lot of good reason for that, it's -- I maybe
22 just feel -- go one step further that at some point
23 having even more maximum visibility into the
24 Secretary's office -- you know, that can be while the
25 person is in DDS or not -- but given that -- that this

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1 is conceived as a -- sort of a short term, you know, a
2 year or two before it transitions into something more,
3 and given everything the Defense Innovation Board has
4 been saying for a long time, this is -- there is no
5 more important role that -- that has to get done.

6 So I would just -- we should think a little
7 about, you know, how do we make sure that -- that this
8 is maximally visible across the organization.

9 MR. KURT DELBENE: I think it's a good
10 point.

11 I think the other thing to think about in
12 exactly the same regard is there are lots of personnel
13 divisions already in the DoD that have that function,
14 and I think part of this formative period also has to
15 be how does it relate to all those different
16 organizations and what does that transformation look
17 like as well.

18 DR. MICHAEL McQUADE: Right. With --
19 without getting buried in those organizations, right?

20 DR. KURT DELBENE: Yeah. Precisely.

21 DR. MICHAEL McQUADE: And the only other
22 comment I would make and just follow on to what you
23 said before, I think -- I think we can't look at this
24 as just how do we hire the right people, because, as
25 we have all said all along, hiring the right people

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1 without having the right tools, without having the
2 right environment, so if you're going to make a major
3 step move in the digital personnel -- you have digital
4 engineering personnel, whatever we want to call
5 them -- you have to have an environment where people
6 can actually do the work, and, so, that means this is
7 highly coupled to the systems, and the tools, and the
8 capabilities that people have, and we need to be sure
9 that the DPO has as much play in that part of the
10 conversation as anything else.

11 DR. KURT DELBENE: Yeah, totally agree.

12 DR. MARK SIRANGELO: The other thing, Kurt,
13 is that I understand that there may be some similar
14 efforts on -- being undertaken in other agencies --
15 other U.S. government agencies and departments, once
16 this is established we should encourage that outreach
17 to -- to see what type of connection because there
18 is -- there is a world beyond the DoD that -- that we
19 should also be understanding and connecting into if we
20 could.

21 DR. KURT DELBENE: Yeah, it's -- and -- and
22 other issues in some of the departments in the DoD
23 around -- we had the discussion earlier today around
24 how do you, you know, hire for particular positions,
25 what authorities do you have that you might be able to

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1 scale.

2 DR. MARK SIRANGELO: Yeah, to some extent
3 this -- this job is gonna have similar impact in
4 other ag -- in other agency's as well, it's gonna look
5 like in -- look like the same kind of thing, maybe not
6 to the extent that it is in the DoD in terms of size,
7 but it's gonna have similar impact, and some may be
8 further ahead, so we might want to see what mistakes
9 might have been made in organizing --

10 DR. KURT DELBENE: Yeah.

11 DR. MARK SIRANGELO: -- that might be
12 avoided and get -- get this going quicker.

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13 DR. ERIC SCHMIDT: So it seems to me
14 that -- that -- first, I support this proposal and
15 your analysis of it, it seems to me that we are still
16 whittling around the edges of the bureaucracy, right.
17 So we have the SWAP study, which we are
18 busy getting implementing, we have this proposal,
19 we're trying to get more software talent into the --
20 into the DoD in one form or another through various
21 mechanisms, I don't think it's going to happen fast
22 enough by -- at the end of the day people will say,
23 This was a good try, but it wasn't aggressive enough,
24 and I have been trying to think about what is the most
25 aggressive thing that could realistically be done, and

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1 I'll give you a crazy idea -- which is not under the
2 current discussion, but maybe we should discuss at
3 some future point -- which is we have roughly five
4 Service Academies, create a sixth one and call it a
5 "Cyber Academy."

6 When we visited the Air Force Academy, the
7 way it worked is you were appointed, you get to go
8 there for the first two years, and, then, if you
9 didn't want your commission you could go somewhere
10 else, but if you chose to finish your degree at the
11 Air Force Academy you were then signed up for four
12 years and the usual rules, and, all of a sudden, you'd
13 have a guaranteed pipeline of people who were
14 officers, right -- officer-level people who would be
15 flowing through the intelligence community, the CIA,
16 you -- you know, all the various hiring groups that
17 need these kinds of talents.

18 And if you don't like that idea -- 'cause
19 we don't want more than -- we've only had five and we
20 don't want to add a sixth for the last hundred
21 years -- you could create a vir -- a virtual
22 equivalent of that as a sourcing mechanism.
23 But I -- I just don't think that we're
24 going to get enough software people without having

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25 them have some more traditional pipeline.

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1 So, for example, the military does, in

2 fact, produce excellent software engineers, but it

3 gets confused and it then assigns them to guard duty,

4 right? So -- right? I -- everyone's a software

5 engineer, you've done your guard duty, too? I'm sure

6 the software -- you wrote software while you were in

7 doing guard duty.

8 But -- but there -- there's some sort of

9 confusion around what digital means, and, so, if we

10 could give these digital people some kind of status,

11 right, that had meaning in -- inside the empire, and

12 also conferred a commitment from them to the DoD, so,

13 in other words, they can't just quit, right? So we --

14 you got your education, your -- you -- you have to

15 work here, you have to work hard, and, then, after

16 three or four years you can go off.

17 DR. KURT DELBENE: I think it's an

18 interesting idea. I think it's some of the stuff that

19 this Digital People Officer could kinda think through

20 what -- what might be a good idea.

21 I do have reason to hope. I mean, there

22 are things like the JAIC being stood up that are

23 really super focused on -- on software expertise, I

24 think the DDS is another place.

25 I think we're also seeing particular

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1 projects within the DoD that are very

2 software-intense, but --

3 DR. ERIC SCHMIDT: Just to be obnoxious.

4 So the problem with this is we're talking about

5 hundreds of incredibly talented people in a 3

6 million-person organization, right. I'm just looking

7 for a scale strategy, right? I'm -- I'm looking for

8 some way to have this be the -- not the exceptional

9 conversation, but the normal conversation, Oh, yeah,

10 they're always here, yeah, yeah, we have to deal with

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11 them, they're always there, they're around, there's
12 lots of them, they have incredible value.

13 MR. KURT DELBENE: I think we should take
14 it away and think it through.

15 DR. ERIC SCHMIDT: Okay, so think of ways
16 in which you could scale literally the number of such
17 people --

18 DR. KURT DELBENE: Yeah.

19 DR. ERIC SCHMIDT: -- through traditional
20 mechanisms, hiring processes, promotion processes --

21 DR. KURT DELBENE: Yeah.

22 DR. ERIC SCHMIDT: -- changes in wor -- in
23 the various strange rules the government has.

24 DR. KURT DELBENE: The other thing I think
25 is this whole notion of -- I mean, Mic -- and

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1 Microsoft, after healthcare -- I came back from
2 healthcare.gov we started a civic leave policy and
3 that basically said, You can leave Microsoft for a
4 period of time and, then, you can come back, and
5 having more and more of that being something that can
6 be done in the agencies I think helps as well, 'cause
7 there are a lot of people want to help the country.

8 DR. MARK SIRANGELO: And -- and, Eric, I
9 really like your idea. I think the -- one of the big
10 concerns here is continuity, and this type of program,
11 this type of idea -- whether or not it's a formal
12 academy or virtually -- can -- provides that
13 continuity, but even more so the ty -- the type of
14 person we want here is we want an intellectual refresh
15 with -- with the age group that comes in, because
16 it -- there is a difference here. Maybe there isn't a
17 difference in some of the other disciplines that the
18 Academies do, but in this area it does matter, you
19 want to stay as current and you want to bring along as
20 many people on a -- in a continuous form as you can,
21 because that's what this is going to need.

22 DR. KURT DELBENE: I -- I know it's hard

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23 online. Jen, did you have any comments you want to
24 add as -- as an author of this paper? Anything to
25 add?

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1 DR. JEN PAHLKA: I just -- I -- I think

2 that Eric is exactly right, that the scale isn't quite

3 ambitious enough for the needs of the Department.

4 I'll -- I'll also just sort of maybe

5 reframe a little something that Mike -- I think it was

6 Michael said as we started the discussion here, which

7 is that it's not just about the recruitment, right.

8 To get hundreds of thousands of great digital people

9 into the Department we're also gonna have to have them

10 land into positions where they can do the job they

11 know they came here to do.

12 And the -- you know, every time we talked

13 about every single one of these recommendations or

14 proposals, when we get together we talk about the need

15 for greater speed and greater scale, and I think that

16 it's really about those things coming together, to

17 have people coming in at a time -- if they're coming

18 in -- in larger numbers when the procurement rules are

19 changing, the tools are changing, the ability for them

20 to succeed when they come in is also changing is -- is

21 so important to getting them to be effective to stick,

22 and, then, to go out and to say to other people in

23 their field, The Department of Defense is the big --

24 biggest place where you can have enormous impact and

25 change the world.

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1 So I -- I completely concur, and I want to

2 sort of tie these threads together so that they all

3 add up to greater than the sum of their part.

4 DR. ERIC SCHMIDT: Great.

5 Anybody else online?

6 (No response.)

7 MS. COLLEEN LAUGHLIN: Great.

8 Mr. Chair, I'll go ahead and start the

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9 votes.

10 DR. ERIC SCHMIDT: Yes, let's start.

11 MS. COLLEEN LAUGHLIN: Great.

12 Missy, do you concur?

13 DR. MISSY CUMMINGS: I concur.

14 MS. COLLEEN LAUGHLIN: Thank you.

15 Marne?

16 MS. MARNE LEVINE: I concur.

17 MS. COLLEEN LAUGHLIN: Thank you.

18 Jen?

19 MS. JEN PAHLKA: I concur.

20 MS. COLLEEN LAUGHLIN: Thank you.

21 And, then, Neil?

22 DR. NEIL deGRASSE TYSON: I concur.

23 MS. COLLEEN LAUGHLIN: Excellent. Thank

24 you.

25 DR. ERIC SCHMIDT: Okay.

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1 MS. COLLEEN LAUGHLIN: I think --

2 DR. MICHAEL McQUADE: You got it.

3 MS. COLLEEN LAUGHLIN: Yes.

4 DR. MICHAEL McQUADE: Okay.

5 MS. COLLEEN LAUGHLIN: Yep. Fantastic.

6 Okay.

7 DR. MARK SIRANGELO: Us (indicating)?

8 MS. COLLEEN LAUGHLIN: Oh, and, then, Board

9 members by show of hands here.

10 (All Board members raised their hands.)

11 MS. COLLEEN LAUGHLIN: Great. Thank you.

12 Fantastic.

13 And, then, with that, Dr. Schmidt, I'm

14 gonna go ahead and move --

15 DR. ERIC SCHMIDT: Yeah, I think it's --

16 it's your turn.

17 MS. COLLEEN LAUGHLIN: It -- it absolutely

18 is. Thank you.

19 So I am gonna go ahead and give an update

20 to the Board on progress implementing some of your

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21 recommendations within DoD.

22 So the -- just to give everyone a little

23 background on this, because they are a Federal

24 Advisory Committee providing advice to senior leaders

25 they actually have no authority to implement, and, so,

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1 the information is provided here to inform them of

2 actions undertaken by the Department relevant to their

3 recommendations, and updates on recommendations are

4 included in all of our meetings. So we will move

5 through these.

6 So recommendation number 5 you've had,

7 Catalyzing Innovation in Artificial Intelligence and

8 Machine Learning. As you discussed at the top of the

9 meeting, Dr. Schmidt, the Secretary of Defense

10 approved a set of AI Ethical Principles based on the

11 DIB's AI Ethics Principles that will guide the

12 Department's adoption of AI. They aim to shape global

13 norms on the development and deployment of military

14 AI, and the CIO, through the JAIC, will lead

15 implementation of these Principles to ensure that DoD

16 AI capabilities are both effective and responsible.

17 If we could do the next slide.

18 Recommendation number 10, Making Computing

19 and Bandwidth Abundant. In November 2019 the Air

20 Force announced their intention to invest \$9 billion

21 in digital and cloud architecture dependent on funding

22 in FY21, this will be part of an effort to create a

23 digital Air Force. The investment is part of a new

24 digital strategy for the Air Force that aims to field

25 a 21st Century IT infrastructure, use data for AI to

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1 help airmen make better decisions faster, and reform

2 business practices to improve effectiveness and

3 efficiency.

4 Recommendation number 12, Forge New

5 Approaches to Data Collection, Sharing, and Analysis.

6 The Army has taken steps to increase the amount of

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7 data it collects, and to make better use of that data
8 both at home and in the field. For example, the
9 Army's AI Task Force has pushed to process larger
10 amounts of existing data namely in the areas of talent
11 management and predictive maintenance.

12 The Army also plans to outfit a large
13 number of infantry soldiers with Integrated Visual
14 Augmentation System goggles, this will allow soldiers
15 in the field to act as sensors building a database of
16 what sensor-readable events happen on the battlefield.

17 Recommendations on Refactoring the
18 Acquisition Code for Competitive Advantage via the
19 DIB's Software Acquisition and Practices Study.
20 General Hyten, Vice Chairman of the Joint Chiefs of
21 Staff, has stated that one of his top priorities will
22 be to re-inject speed into DoD's requirements and
23 acquisition process, especially when it comes to
24 software. His desire to have acquisition specialists
25 write software acquisition requirements at a speed to

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1 match evolving cyber threats falls in line with the
2 recommendations in the DIB's SWAP study.

3 The next one.

4 Implementing a Zero Trust Architecture

5 Across DoD. DoD established a Zero Trust Action group
6 comprised of representatives from the services --
7 DISA, NSA, USCYBERCOM, DoD CIO, and others -- to share
8 best practices across ongoing Zero Trust Architecture
9 efforts in the Department. The group is also meeting
10 with the commercial sector to better understand
11 commercial best practices.

12 Recommendations on 5G. Last fall DoD named
13 four military bases that would host 5G testing, Naval
14 Base San Diego in California, Joint Base Lewis-McChord
15 in Washington, Hill Air Force Base in Utah, and the
16 Marine Corps Logistics Base in Albany, Georgia.

17 DoD is also involved in ongoing discussions
18 with NTIA and Congress to share hundreds of megahertz

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19 of spectrum, it has subsequently taken steps to work
20 with industry in that regard.

21 And, then, last as we're going forward in
22 our implementation updates we would like to welcome
23 the public and those in the Department of Defense to
24 tell us your innovation stories.

25 If we can go to the next slide, and we'll

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1 post this online for you, but we'd like you to send us
2 your stories, and, then, going forward we will use
3 those to present at our upcoming public meetings.

4 And with that that completes our
5 implementation update, so I will now move into public
6 comments.

7 For those who are interested we have two
8 microphones set up here, if you have -- I think you
9 filled out public comment cards when you came in, if
10 you could hand those off to some of our staff here I
11 think they'll -- they'll raise their hand and sort of
12 pre-position themselves, but we welcome folks to come
13 up and go ahead and make any public comments or
14 remarks you would like for the Board's awareness.

15 Don't be shy.

16 MR. RUBE AGUPTA: Hi. My name is Rube
17 Agupta, I'm at Cornell University. So I really,
18 really appreciate the fact that we're creating a -- a
19 position to do digital recruitment. I want to
20 emphasize that we really need to focus on retainment.
21 I've worked a long time with the DoD now,
22 for two-and-a-half years, which is not as long as you
23 guys, but been around, and I'd like to just kind of
24 share a case study.

25 One of my interns last summer -- USAFA

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1 grad, Master's at CMU, amazing, amazing practitioner
2 of cyber security and machine learning, worked with
3 us, won some awards, great guy -- went off to cyber
4 school at Biloxi for six months, had a ehh time, and

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5 now he's promoted First Lieutenant and is currently
6 sta -- stationed at his first position as an officer,
7 and his techno talents are not being used at all. He
8 is just a manager of enlisted men and women, he is
9 kinda -- he's gonna be sitting there, he's gonna be
10 trying to figure out what to do with his life, and
11 he's gonna go through this -- he's going to go through
12 all these different steps to list -- till, yeah, he
13 can leave the military and, then, go to industry and
14 do stuff with his talents. I would really emphasize
15 that we need to focus on retainment. So that's the --
16 the officer side.

17 Amongst the GS side we have a lot of
18 amazing people that I work with, and one of the issues
19 is that they come to the government because they
20 really want to make a difference, they face issues
21 against bureaucracy, against a lot of -- just a lot of
22 mismanagement, and, then, just frankly they're not
23 paid well enough as guys compared to industry, so once
24 they get the experience they leave.

25 So we do have a war for talent, it's not,

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1 like, necessarily against foreign adversaries, it's
2 against our own industry base. So how do we kind of
3 balance that out, how do we not only encourage
4 industry to work with the government, but how do we
5 keep our talented people within the DoD, DOE,
6 wherever.

7 So that's all I got.

8 MS. COLLEEN LAUGHLIN: Great. Thank you.

9 DR. ERIC SCHMIDT: Thank you very much.

10 Work on it.

11 MS. COLLEEN LAUGHLIN: Do we have anyone
12 else?

13 COMMANDER DAVID SOLE(phon): Okay. Good
14 afternoon, I'm Commander David Sole, I work down the
15 road at the -- with the Defense Health Agency as well.

16 My disclaimer is, of course, I don't represent my

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17 Department or the Navy when I speak, so -- but I would
18 like to highlight just the opportunity that the Board
19 has in front of them to encourage recruitment and
20 retention through just your presence.

21 Up until today I wasn't aware of the scope
22 of this Board and what kind of problems you're
23 solving, so when I hear you speak you're speaking to
24 the problems that I -- I -- I get angry with during my
25 job, and, so, to hear you saying, Hey, here's a

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1 possible solution is very inspiring.

2 Not to mention that you're all leaders in
3 your field and people know who you are, they -- they
4 look up to you, so just knowing you're involved and
5 you want them to go do that work is a recruitment
6 tool.

7 So increasing your exposure in the -- in
8 the community and -- and to the active duty community
9 as well really helps with keeping us re -- inspired
10 and motivated, so thank you.

11 DR. ERIC SCHMIDT: Okay. Thank you very
12 much.

13 More comments or questions?

14 Yes, sir.

15 MR. RICHARD RODRIGUEZ: Yes. My name's
16 Richard Rodriguez, I am the Director of Partnership
17 Development at the National Security Collaboration
18 Center, TTSA. I'm not sure if you've heard about this
19 center, where we're collaborating with many
20 researchers, and recently UTSA in the fall did a
21 cluster hire of artificial intelligence, and, so we
22 have faculty research looking for research projects
23 and maybe aide in -- in a timely result of the
24 scanning, maybe there might be some opportunity there,
25 but I would certainly like to speak to any one of you

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1 after this about that.

2 DR. ERIC SCHMIDT: Okay. Thank you.

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3 MS. COLLEEN LAUGHLIN: Okay, last call.

4 DR. ERIC SCHMIDT: Anybody online?

5 (No response.)

6 (A discussion among Board members.)

7 MS. COLLEEN LAUGHLIN: Great.

8 Okay, with that we'll close the public

9 comment period.

10 Dr. Schmidt, Board members, I think this is

11 a really exciting meeting with a lot of actionable

12 items that we presented here today that we will -- we

13 will take back and, hopefully, the Department hears us

14 and helps move some of this forward, and I'll sort of

15 turn it over to you.

16 DR. ERIC SCHMIDT: Thank you.

17 There's a set of things that I'm really

18 proud of. First, I'm obviously -- at least speaking

19 for myself, I've had the best time working with my

20 colleagues on the phone and here working on these

21 problems. We have a sense of purpose, we have a sense

22 that it matters, and we have an audience that's

23 listening to us, it's now up to us whether we can

24 actually get these things to happen or not, that's the

25 char -- charge.

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1 And I'm particularly -- as I mentioned in

2 my opening statement I'm particularly proud of the

3 ethics work which we approved, I think, last cycle,

4 and the staff working with the OSD, and so forth, in a

5 very expeditious way got it supported, and, in fact,

6 issued by the Defense Department, which sets -- it's

7 just sort of a historical point, it sets something

8 about morality and ethics in AI that is something I

9 want to be associated with, and I know the rest of us

10 do, 'cause we -- we all discussed it at great length,

11 it's a good example of this process working.

12 Now, for me this meeting is a bittersweet

13 meeting because we are in the process of losing our

14 historic First Founder/Executive Director, who's been

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15 replaced by an even better version -- but we will
16 avoid that for a moment --

17 DR. RICHARD MURRAY: That you recruited.

18 DR. ERIC SCHMIDT: -- that Josh
19 recruited -- but Josh Marcuse.

20 When -- when I started I was introduced to
21 him and they said, Oh, he'll be good, and I said,
22 Well, okay, whatever, how good can he be, and the
23 answer is -- the answer is he was perfect for the job.
24 His background is in Workforce Development, in fact,
25 and, so, he had an unusual approach to trying to get

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1 people, and his sta -- his talent turned out to be
2 building political support within the bureaucracy. So
3 I can rail against the bureaucracy while he can go
4 build political support inside of it, which means --
5 as Josh will tell you -- an enumerable number of
6 meetings because the DoD is a -- very, very big.
7 In addition, he used the same techniques
8 that he developed over many years to work with
9 Congress.

10 So one of the reasons why our trajectory
11 over the last five years has been so effective is
12 because Josh personally knew not only how to recruit
13 the team that has now brought what you saw today and
14 what we did before, but also understood the politics
15 of this, and in an organization when you're trying to
16 change the politics you have to have some
17 inter-supporters, you have to have a strategy of
18 internal change, right, he developed that.

19 And, so, if you go back to, for example,
20 the JAIC, right, when that was created, that didn't
21 just happen because a general who happens to be
22 incredibly talented decided, it's because there was a
23 great deal of preparatory work.

24 So what I have learned about the DoD is
25 that the work -- the DoD works through

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1 consensus-building among the staffs, and there is no
2 better person I've worked with than Josh Marcuse.
3 Thank you, Josh, for your five years of
4 service.

5 (Applause.)

6 DR. ERIC SCHMIDT: And since this is the
7 public comment period, 'cause even the people on
8 the -- and since this is the public comment period
9 you're not allowed to respond to my praise, just take
10 it as -- as -- as a genuine gift from us.

11 Colleen.

12 MS. COLLEEN LAUGHLIN: Excellent.

13 And, so, I think with that this meeting is
14 adjourned.

15 I think we have some event over here for
16 folks after, but thank you very much Board members,
17 thank you audience members for participating, and
18 those who were able to watch us on live stream.

19 (The videotaped proceedings were
20 concluded.)

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1 C E R T I F I C A T E

2 STATE OF COLORADO)

) ss.

3 COUNTY OF PUEBLO)

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5

6 I, Priscilla Naff Medina, a Professional
7 Court Reporter and Notary Public within and for the
8 State of Colorado, do hereby certify that said audio
9 recording was reduced to typewritten form under my
10 supervision;

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